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RENESAS

Renesas Microcomputer
General Catalog

MPU&MCU

Renesas Electronics
www.renesas.com



Renesas Electronics focuses not only on provision of sophisticated products and solutions but also on creation of a prosperous future for the entire planet with them.
By making full use of our global network, we understand the markets in various regions and countries and develop products that meet the needs of the people in those areas, enabling us to contribute greatly to social development on a global scale.
We are also committed to providing environmentally friendly products and solutions, such as through development of an environment for electric vehicles and smart grids, for all aspects of daily life.
"Global & Green" is our business slogan.

We focus not only on evolving products and solutions but also on creating a more prosperous future for our planet.

RENESAS

Global & Green

Developing businesses that meet the needs of each region/country, we contribute comprehensively to the development of society and a better life.

- Providing solutions that help reduce environmental impact
- Actively developing and providing smaller low-power microcontrollers
- Providing solutions that help improve the energy efficiency of whole devices

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Renesas microcontrollers play an active role in various areas of our lives

Efficient microcontrollers that provide safety and amenities for our lives and next-generation, environmentally friendly microcontrollers with low power consumption
Under the slogan of "Global & Green," Renesas Electronics offers a wide selection of high-performance, low-power microcontrollers to meet diverse customer needs.
We are also committed to providing "Eco-Friendly Microcontrollers," which evolve with changes in people's lives and changes in the global environment.
Renesas Electronics will continue expanding the areas in which our microcontrollers play an active role.

RENESAS SuperH
RENESAS M16C Platform
RENESAS V850
RENESAS H8SX
RENESAS M32R
RENESAS H8S
RENESAS RX
RENESAS H8
RENESAS RL78
RENESAS 740
RENESAS R8C
RENESAS 720
RENESAS 78K

Automotive field

Tire pressure monitors
Air bags
Dashboard control
Body control
Car audio
Car navigation
Engine control

Healthcare equipment and mobile devices

Electronic thermometers
Blood pressure monitor
Electronic pedometers
Scales & Body Composition Analyzer
Mobile phones
Bluetooth networks

Industrial machines and building management

Fire and smoke detector
Electronic Ballast, Neon Lighting
Gas meters and power meters
Access control
Air conditioning systems
Security systems
Industrial inverters

Renesas Electronics MCU Core Lineup

Home Appliances

Battery chargers
LED lightings
Refrigerators
IH Cooking Heater
Microwave ovens
Washing machines
Air conditioners

Personal computers and peripherals

Disk drive units
Laptop computers
Liquid crystal displays
Printers
Projectors
Multifunction printers
HAN

Digital AV

Remote controllers
Digital audio players
Digital cameras
CEC (HDMI interfaces)
Digital video cameras
BD and DVD recorders
Flat-panel televisions

*The categories of our products are so wide ranging that this catalog cannot list all of them. Please see our website for further information. http://www.renesas.com

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Global & Green

Renesas Development Environment for MPUs & MCUs

Extensive support services

Comprehensive support services
providing backup for your system development work

- Speedy technical support by e-mail
- The latest versions and extensive FAQs are available for download at our website.
- E-learning for advanced research, evaluation and application services

Renesas development environment website
http://www.renesas.com/tools



Renesas integrated development environment

Powerful support for speedy system development



CubeSuite+



High-performance Embedded Workshop

Renesas starter kits

Low-cost evaluation development toolkits

User-friendly platforms for Renesas MCU evaluation



Powerful support for all aspects of embedded system development

Integrated development environment, CASE

Generating compact, high-performance code

Coding tools

Development environment products from our alliance partners comprising more than 700 partner vendors worldwide

High-speed and compact embedded OS solutions

Operating systems

Backup for developers of market-leading products

Middleware/drivers

Support for system prototyping and reduced development time

Platforms

Support for a wide range of flash MCUs

Programmers

Emulator systems for a variety of applications

Emulators

Renesas development environment products for extracting maximum performance from Renesas MCUs

RENESAS
Renesas MPUs & MCUs

GAIO
GNU (Red Hat, etc.)
GHS
IAR
TASKING

ACCESS Linux Platform™
axLinux
CMX-RTX
CMX-Tiny+
EB tresos
embOS
eT-Kernel
Kinu
µC/OS-II
µ-velOSity
MontaVista® Linux®
NORTi
Nucleus PLUS
Nucleus µiPLUS
OS-9
osCAN/TimingAnalyzer
OSE Epsilon
PrKERNELv4
ProOSEK®
QNX Momentics
QNX Neutrino®
RTA-OSEK
ThreadX
velOSity
XTAL
zxLinux

Hawk
INCA
INTECRIO
LABCAR
MATLAB/Simulink
MC-Checker
METeor
Metrix
No-Hooks
PDB
PGRelief
Prism
Rational
RTA-TRACE
SCADE Suite
TargetLink
VECU-G
VISION
visualSTATE
VMPF-G
WATCHPOINT
winAMS
ZIPC

ASCET
CANape
CANLab
CANoe
CasePlayer2
CoMET
eBinder
EDGE
EmPresent

- Software packages
- C/C++ compiler packages
- MISRA C rule checker
- Peripheral Driver Generator
- Applilet
- Sample Application Program Generator & Organizer

- µITRON specification OS

Integrated development environment
- CubeSuite+
- High-performance Embedded Workshop

- **Video and imaging** (digital terrestrial broadcasting, MPEG-4, H.264, DivX, VC-1, JPEG, graphics, image recognition, super resolution, etc.)
- **Audio** (MP3, AAC, WMA, SBC, Dolby Digital, etc.)
- **Digital rights management**
- **File systems**
- **Networking support** (TCP/IP, FTP protocol stack, etc.)
- **Security** (MISTY, AES, RSA, etc.)
- **Other applications** (middleware packages and drivers)

AXE-TCP
CANbedded
CMX-MicroNet
CMX-TCP/IP
Embedded DynaFont
IrFront®
JBlend™
JBlend[nano]
MascotCapsule®
MatrixEngine
MAUI
Mobiclip™
MoPiD™
MultiKey
NetFront®
Nucleus
Shikigami
SoftStax
XiBase9

- E100
- E200F
- PC7501
- E6000H
- E6000
- Compact emulators
- IECUBE
- IECUBE2

- E10A-USB
- E30A
- E8a
- MINICUBE
- MINICUBE2
- E1
- E20
- SDI emulators

Flash memory programmer
- PG-FP5

Flash programming software
- Renesas Flash Programmer
- Flash Development Toolkit
- QB-Programmer

Emulators with programming functions
- MINICUBE2
- E1
- E8a
- E20

Starter kits
- Renesas Starter Kit

Reference platforms
- T-Engine/µT-Engine

Evaluation boards
- CPU boards

A7
advicePLUS
advicePOCKET
advicePRO
EJ-Debug
EJSCATT
ETK / XETK
Green Hills Probe
iSystem
Mr.ICE2

NEXTiCE
PALMiCE3
ROMiCEmini
RTE-2000H-TP
RTE-V850x-IE
S3062PT-CPE-2
S30830T-CPE
S810-RTDM32R
Segger J-Link
SuperTrace Probe
TRACE32-ICD PowerTools
UniSTAC II

AF9101
AF9103
AF9709C
AF9710
AF9723B
ALL-100AX
AT3-300A
AT3-310
C*arNETIMPRESS
CANfbl
Cyclone
Dual
EFP-RC
EFP-S2/S2V
EJSCATT

FLASH-100
FLASH-100AM
FlashPAKII
FlashRunner
FLX500
G-NETIMPRESS
HL-770
M1895
M1940
MegaNETIMPRESS
Octal
Optima
PLUS48
ProLINE-RoadRunner
PS288FC

PS300
PS588
Quad
S550-MFW1U
S550-SFWv3
S810-CFW1
SmartPRO 5000U
SmartPRO x5
SmartPRO x8
Stick GANG Writer
StickWriter
TEH2010
TEH2120
WizPro200Nx
Y3000-16
Y3000-4
Y3000-8

78K0S/KA1P CX
Advme7004
Advme7006
CANstress
CT-207
CT-780
CT-781
CT-7821

DEVKIT
EVA BOD
GT200/GT201
MB-78KA-SET
MB-H8A
MB-R8C29
MB-R8CS
MT-N100

S810-CLG/Tiny
S810-CLG2
S810-CLG3
TK-850/JG3L
TK-78K0R/KG3

Renesas full-spec emulators



E200F E100 IECUBE IECUBE2

Affordably priced Renesas emulators



E10A-USB E1 E20 E8a MINICUBE MINICUBE2

Flash memory programmer



PG-FP5

Renesas T-Engine series



SuperH T-Engine board

SH7722 T-Engine Appliance board

* To know more about our partners' products, please visit **http://www.renesas.com/partners**

Application Matrix

■ SuperH™ Family

Family	Series	Group	AV/Home Use				Computer Related				Automotive							Mobile	Network	Industry/Security	Motor	Note
			Audio	Video	Household Appliances	Amusement	Computers	Storage Systems	Imaging	Display	Powertrain	Chassis	Safety	Body	Dashboard	Car Information System	Car Audio					
Super H™	SH7780	SH7786*	○	○	○	●										●			○			Car navigation equipment
		SH7785	○	○	○	●										●			○	○		Car navigation equipment
		SH7780	○	○	○	○										●			●	○		Car navigation equipment
		SH7764	○	○	○	○										●			●			Ethernet Controllers (Digital AV Equipment), Car navigation equipment
		SH7763	○	○	○	○													●	●		Ethernet Controllers (Digital AV Equipment/Printers/Security Cameras)
		SH7734**	○	●	●	○										●	○	○	●	●	○	Digital AV equipment, Network equipment, Security Cameras, Handheld Terminals
		SH7731	○	○	○	○																
		SH7730	○	○	○	○																
		SH7724	○	○	●	○																
		SH7723	○	○	●	○																
		SH7722	○	○	○	○																
	SH7750	SH7760	○	○	○											●				○		Telematics/Handheld Terminals
		SH7751R	○	○	○	●										●			●	○		Gateways/Routers/Pachinko Machines, Car navigation equipment
		SH7750S	○	○	○	○													○	○		Image Processing/Pachinko Machines
		SH7750R	○	○	○	●										●			●	○		Image Processing/Pachinko Machines, Car navigation equipment
	SH7700	SH7729R	○	○	○	○													●	○		Communications Equipment/Printers/Multifunction Peripherals/Fax
		SH7727	○	○	○	○													○	●		Communications Equipment/Telephones/Printers
		SH7721	○	○	○	○													○	●		Mobile Phones/IP Phones/Printers
		SH7720	○	○	○	○												○	○	●		Mobile Phones/IP Phones/Printers
		SH7709S	○	○	○	○													●	○		Printers/Multifunction Peripherals/Fax/Electronic Musical Instruments
		SH7706	○	○	○	○													●	○		Printers/DVD Recorders/Barcode Readers
		SH7705	○	○	○	○												●	●	○		Mobile Phones/Video Printers/Digital Still Cameras/Digital Video Cameras
	SH7450	SH7456**											●									
		SH7455**											●									
		SH7451											●									
		SH7450											●									
	SH7280	SH7286	○	○	○	○			○										○	●	●	Digital AV equipment, network household electrical appliances, and machine tool
		SH7285	○	○	○	○			○										○	●	●	Digital AV equipment, network household electrical appliances, and machine tool
	SH7250	SH7256R**									●											
		SH7254R*									●											
		SH7253*									●											
	SH7243	SH7243	○	○	○	○													○	●	●	Digital AV equipment, network household electrical appliances, and machine tool
	SH7260	SH7269**	○	○	○	○									●		●	●	●	○		Graphics dashboard, Digital audio equipment, Car audio
		SH7268**	○	○	○	○									●		●	●	●	○		Graphics dashboard, Digital audio equipment, Car audio
		SH7267	○	○	○	○									●		●	●	●	○	●	Graphics dashboard, Digital audio equipment, Car audio
		SH7266	○	○	○	○									●		●	●	●	○	●	Graphics dashboard, Digital audio equipment, Car audio
		SH7265	○	○	○	○											●	●	●	○		Digital audio equipment, Car audio
		SH7264	○	○	○	○											●	●	●	○		Digital audio equipment, Car audio
		SH7263	○	○	○	○									●		●	●	●	○	●	Graphics dashboard, Digital audio equipment, Car audio
		SH7262	○	○	○	○									●		●	●	●	○	●	Graphics dashboard, Digital audio equipment, Car audio
		SH7261	●														●				●	Digital audio equipment, Car audio
	SH7239	SH7239**			○	○													●	●	●	General inverter, AC servo, Factory Automation equipment, Power conditioner, Measurement equipment
		SH7237**			○	○													●	●	●	General inverter, AC servo, Factory Automation equipment, Power conditioner, Measurement equipment
	SH7231	SH7231**		●	●	●			○	○								●	○	●	○	Office Automation equipment, Battery drive tools, Handheld Terminals, Measurement equipment, Amusement
	SH7216	SH7216			○	○													●	●	●	Industry
	SH7210	SH7211	○	○	○	○			○										○	●	●	Video printer, bar code reader, and Security camera
	SH7200	SH7206	○	○	○	○															●	Bar code reader, video printer, and fax
		SH7205	○	○	○	○												●	●	○		
		SH7203	○	○	○	○												●	●	○		
		SH7201	●	○	●															○	●	Digital audio equipment
	SH7147	SH7147	○	○	●	○					●	●								●	●	
	SH7146	SH7149			●	○														●	●	
		SH7146			●	○														●	●	
	SH7144	SH7145	○	○	○	○			○	○									○	●	●	
		SH7144	○	○	○	○			○	○									○	●	●	
	SH7137	SH7137	○	○	○	○			○	○									○	●	●	
		SH7136	○	○	○	○			○	○									○	●	●	
		SH7132	○	○	○	○			○	○									○	●	●	
		SH7131	○	○	○	○			○	○									○	●	●	
	SH7125	SH7125	○	○	●	○													○	●	●	Air-conditioner, refrigerator, and vacuum cleaner
		SH7124	○	○	●	○													○	●	●	Air-conditioner, refrigerator, and vacuum cleaner
	SH7080	SH7086	○	○	○	○			○	○									○	●	●	Digital AV equipment, network household electrical appliances, and copying machine
		SH7085	○	○	○	○			○	○									○	●	●	Digital AV equipment, network household electrical appliances, and copying machine
		SH7084	○	○	○	○			○	○									○	●	●	Digital AV equipment, network household electrical appliances, and copying machine
		SH7083	○	○	○	○			○	○									○	●	●	Digital AV equipment, network household electrical appliances, and copying machine
	SH7060	SH7065		○					○	○									○	●	●	Digital AV equipment, network household electrical appliances, and copying machine
	SH7050	SH7059	○	○	○	○			○	○	●								○	○		
		SH7058S	○	○	○	○			○	○	●								○	○		
		SH7055	○	○	○	○			○	○	●								○	○		
	SH7047	SH7109			●																●	
		SH7107			●																●	
		SH7105			●																●	
		SH7049	○	○	○	○						●								●	●	
		SH7047	○	○	●	○						●								●	●	
	SH7046	SH7148	○	○	●	○														●	●	
		SH7108			●																●	
		SH7106			●																●	
		SH7104			●																●	
		SH7101	○	○	●	○														●	●	
		SH7048	○	○	●	○														●	●	
		SH7046	○	○	●	○														●	●	
	SH7040	SH7045	○	○	○				○	○									○	●	●	
		SH7044	○	○	○				○	○									○	●	●	

● : It is best suited. ○ : It is suited.

★ : New product ★★ : Under development

Family	Series	Group	AV/Home Use				Computer Related				Automotive							Mobile	Network	Industry/Security	Motor	Note
			Audio	Video	Household Appliances	Amusement	Computers	Storage Systems	Imaging	Display	Powertrain	Chassis	Safety	Body	Dashboard	Car Information System	Car Audio					
Super H™	SH7040	SH7043	○	○	○				○	○									○	●	●	
		SH7042	○	○	○				○	○									○	●	●	
		SH7041	○	○	○				○	○									○	●	●	
		SH7040	○	○	○				○	○									○	●	●	
	SH7030	SH7034B	○	○	○	○													○	●	●	
		SH7034	○	○	○	○													○	●	●	
		SH7032	○	○	○														○	●	●	
	SH7020	SH7021	○	○	○	○													○	●	●	
		SH7020	○	○	○	○													○	●	●	
	SH7010	SH7017	○	○															○	●		
		SH7016	○	○	○	○													○	●		
		SH7014	○	○	○	○													○	●		
		SH7011	○	○	○	○			○										○	●		
	SH-Ether	SH7710	○	○	○	○													●	○		Ethernet Controllers (Digital AV Equipment/Printers/Security Cameras)
		SH7670	●	○	○														●	●		Ethernet controller (printers, audio, and FA equipment)
		SH7652	●	○	●														●			Ethernet controller (digital TV, audio, and printers)
		SH7619	●	●	●	○													●	○		Ethernet Controllers (Digital AV Equipment/Printers/Security Cameras)
		SH7618	●	●	●	○													●	○		Ethernet Controllers (Digital AV Equipment/Printers/Security Cameras)
		SH7616	○	○	○	○													●	○		Ethernet Controllers (Digital AV Equipment/Printers/Security Cameras)
		SH7615	○	○	○	○													●	○		Ethernet Controllers (Digital AV Equipment/Printers/Security Cameras)
V850	V850E2/MN4	V850E2/MN4**	○	○	●	○													●	●	●	Servo control, Inverter, Robot, NC machine tools, Printers, Housing Equipment
	V850E2/ME3	V850E2/ME3	○	●	●	●													●	●	●	Servo control, NC machine tools, Ink jet printers, Facsimiles, PPCs, DVD player
	V850E/Mx	V850E/MA3	●	●	●	○													●	●	●	Ink jet printers, Facsimiles, PPCs, DVD player, Inverter, Survo, NC machine tools
		V850E/ME2	○	●	●	●													●	●	●	Servo control, NC machine tools, Pachinko display control, Ink jet printers, Facsimiles, PPCs, DVD player
	V850E/Sx3-H	V850E/SK3-H														●	●					Car navigation equipment
		V850E/SJ3-H														●	●					Car navigation equipment
	V850E/Ix4-H	V850E/IH4-H			○																●	For inverter control
		V850E/IG4-H			○																●	For inverter control
	V850E/Ix4	V850E/IH4			○																●	For inverter control
		V850E/IG4			○																●	For inverter control
	V850E/Ix3	V850E/IG3			○																●	For inverter control
		V850E/IF3			○																●	For inverter control
	V850E/IAx	V850E/IA4			○																●	For inverter control
		V850E/IA3			○																●	For inverter control
		V850E/IA2			○																●	For inverter control
		V850E/IA1			○																●	For inverter control
	V850E/Dx3	V850E/DL3													●							
		V850E/DJ3													●							
		V850E/DG3													●							
	V850ES/Sx3	V850ES/SJ3														●	●					
		V850ES/SG3														●	●					
	V850ES/Sx2-H	V850ES/SJ2-H														●	●					
		V850ES/SG2-H														●	●					
	V850ES/SG1	V850ES/SG1														●	●					
	V850ES/Jx3-U	V850ES/JH3-U	●	●	●	●	●													○	○	For USB applications, Home audio system, Printers, Scanner
		V850ES/JG3-U	●	●	●	●	●													○	○	For USB applications, Home audio system, Printers, Scanner
	V850ES/Jx3-L	V850ES/JG3-L	●	●	●	○												●		○		For applications of low-power such as battery drive system
		V850ES/JG3-L (Built-in USB controller)	●	●	●	○	●											●		○		USB applications, Health equipment
		V850ES/JF3-L	●	●	●	○												●		○		For applications of low-power such as battery drive system, Health equipment, Camera lens, Power meter, Portable terminals
		V850ES/JE3-L	●	●	●	○												●		○		For applications of low-power such as battery drive system, Health equipment, Camera lens, Power meter, Portable terminals
		V850ES/JC3-L	●	●	●	○												●		○		For applications of low-power such as battery drive system, Health equipment, Camera lens, Power meter, Portable terminals
	V850ES/Jx3-H	V850ES/JH3-H	●	●	●	●	●													○	○	For USB applications, Home audio system, Printers, Scanner
		V850ES/JG3-H	●	●	●	●	●													○	○	For USB applications, Home audio system, Printers, Scanner
		V850ES/JE3-H**	●	●	●	●	●											○		○	○	For USB applications
		V850ES/JC3-H**	●	●	●	●	●											○		○		For USB applications
	V850ES/Jx3-E	V850ES/JJ3-E	○	○	○	○	○												●	●	○	Ethernet
		V850ES/JH3-E	○	○	○	○	○												●	●	○	Ethernet
		V850ES/JG3-E	○	○	○	○	○												●	●	○	Ethernet
		V850ES/JF3-E**	○	○	○	○	○												●	●	○	Ethernet
		V850ES/JE3-E**	○	○	○	○	○												●	●		Ethernet
	V850ES/Jx3	V850ES/JJ3	●	●	●	○														○		For high speed control applications at 3V power supply
		V850ES/JG3	●	●	●	○														○		For high speed control applications at 3V power supply
	V850ES/Ix2	V850ES/IE2			○																●	For inverter control
	V850ES/IK1	V850ES/IK1			○																●	For inverter control

● : It is best suited. ○ : It is suited.

★ : New product ★★ : Under development

Application Matrix

■ V850 MCUs ■ M32R Family ■ RX Family
■ RL78 Family ■ R8C Family

Family	Series	Group	AV/Home Use				Computer Related				Automotive							Mobile	Network	Industry/Security	Motor	Note
			Audio	Video	Household Appliances	Amusement	Computers	Storage Systems	Imaging	Display	Powertrain	Chassis	Safety	Body	Dashboard	Car Information System	Car Audio					
V850	V850ES/Hx3	V850ES/HJ3			○															●	○	5V operation, for applications of analog input
		V850ES/HG3			○															●	○	5V operation, for applications of analog input
		V850ES/HF3			○															●	○	5V operation, for applications of analog input
		V850ES/HE3			○															●	○	5V operation, for applications of analog input
	V850ES/Fx3-L	V850ES/FG3-L										○	○	●		○	○			○		
		V850ES/FF3-L										○	○	●		○	○			○		
		V850ES/FE3-L										○	○	●		○	○			○		
	V850ES/Fx3	V850ES/FK3										○	○	●		○	○			○		
		V850ES/FJ3										○	○	●		○	○			○		
		V850ES/FG3										○	○	●		○	○			○		
		V850ES/FF3										○	○	●		○	○			○		
		V850ES/FE3												●		○	○			○		
M32R	M32R/ECU	32196											●							○	●	Active safety
		32195											●							○	●	Active safety
		32192											●							○	●	Active safety
		32186									○		●							○	●	Active safety
		32185									○		●							○	●	Active safety
		32176									○		●							○		Active safety
RX	RX600	RX63N**				○													●	●		
		RX631**				○													●	●		
		RX630**																		●		
		RX62T			●															●	●	
		RX62N*								●									●	●	○	Building automation, POS
		RX621*								●									●	●	○	Building automation, POS
		RX610							○										○	●	●	OA, PPC, Printers, POS
	RX200	RX210**			●													●		○	●	Digital still camera, MFP, Meter
RL78	RL78/G1x	RL78/G13**	●	●	●	●	○	○	○	○								○	○	○	○	
		RL78/G12**	●	●	●	●	○	○	○	○								○	○	○	○	
R8C	R8C/Mx	R8C/M13B*	○	○	●	●	○		○									●	○	●	○	Electric toothbrushes, shavers
		R8C/M12A	○	○	●	●	○		○									●	○	●	○	Electric toothbrushes, shavers
		R8C/M11A	○	○	●	●	○		○									●	○	●	○	Electric toothbrushes, shavers
	R8C/Lx	R8C/LA8A	○		●	●													○	●	○	Meter/Health equipment/General LCD displays
		R8C/LA6A	○		●	●													○	●	○	Meter/Health equipment/General LCD displays
		R8C/LA5A*	○		●	●													○	●	○	Meter/Health equipment/General LCD displays
		R8C/LA3A*	○		●	●													○	●	○	Meter/Health equipment/General LCD displays
		R8C/L3AM*	○		●	●													○	●	○	Meter/Health equipment/General LCD displays
		R8C/L3AC	○		●	●													○	●	○	Meter/Health equipment/General LCD displays
		R8C/L38M*	○		●	●													○	●	○	Meter/Health equipment/General LCD displays
		R8C/L38C	○		●	●													○	●	○	Meter/Health equipment/General LCD displays
		R8C/L36M*	○		●	●													○	●	○	Meter/Health equipment/General LCD displays
		R8C/L36C	○		●	●													○	●	○	Meter/Health equipment/General LCD displays
		R8C/L35M*	○		●	●													○	●	○	Meter/Health equipment/General LCD displays
		R8C/L35C	○		●	●													○	●	○	Meter/Health equipment/General LCD displays
	R8C/5x	R8C/56H**									○	○		●			○		○	○	●	Automotive
		R8C/56G**									○	○		●			○		○	○	●	Automotive
		R8C/56F**									○	○		●			○		○	●	●	Automotive
		R8C/56E**									○	○		●			○		○	●	●	Automotive
		R8C/54H**									○	○		●			○		○	○	●	Automotive
		R8C/54G**									○	○		●			○		○	○	●	Automotive
		R8C/54F**									○	○		●			○		○	●	●	Automotive
		R8C/54E**									○	○		●			○		○	●	●	Automotive
	R8C/3x	R8C/3NT**	○	○	○	○	○		○									●	○			Touch key
		R8C/3MU**	○	○	●	●	○		○									●	○		○	
		R8C/3MQ**	○	○	●	●	○		○									●	○		○	
		R8C/3MK	○	○	●	●	○		○									●	○		○	
		R8C/3JT	○	○	●	●	○		○									●	○		○	Touch key
		R8C/3JC	○	○	●	●	○		○									●	○		○	
		R8C/3GD*	○	○	●	●	○		○									●	○		○	Photocopiers/Page Printers
		R8C/3GC	○	○	●	●	○		○									●	○		○	Photocopiers/Page Printers
		R8C/38Z									○	○		●			○		○		●	
		R8C/38Y									○	○		●			○		○		●	
		R8C/38X									○	○		●			○		●		●	
		R8C/38W									○	○		●			○		●		●	
		R8C/38M									○	○		●			○		○		●	
		R8C/38H									○	○		●			○		○		●	
		R8C/38G									○	○		●			○		○		●	
		R8C/38F									○	○		●			○		●		●	
		R8C/38E									○	○		●			○		●		●	
		R8C/38C*	○	○	●	●	○		○									●	○	●	●	Photocopiers/Page Printers
		R8C/36Z									○	○		●			○		○		●	
		R8C/36Y									○	○		●			○		○		●	
		R8C/36X									○	○		●			○		●		●	
		R8C/36W									○	○		●			○		●		●	
		R8C/36H									○	○		●			○		○		●	
		R8C/36M									○	○		●			○		○		●	
		R8C/36G									○	○		●			○		○		●	
		R8C/36F									○	○		●			○		●		●	
		R8C/36E									○	○		●			○		●		●	
		R8C/36C*	○	○	●	●	○		○									●	○	●	●	Photocopiers/Page Printers

● : It is best suited. ○ : It is suited.

★ : New product ★★ : Under development

Family	Series	Group	AV/Home Use				Computer Related				Automotive							Mobile	Network	Industry/Security	Motor	Note
			Audio	Video	Household Appliances	Amusement	Computers	Storage Systems	Imaging	Display	Powertrain	Chassis	Safety	Body	Dashboard	Car Information System	Car Audio					
R8C	R8C/3x	R8C/35M*	○	○	●	●	○		○									●	○		○	Photocopiers/Page Printers
		R8C/35D	○	○	●	●	○		○									●	○		○	Photocopiers/Page Printers
		R8C/35C	○	○	●	●	○		○									●	○		●	Photocopiers/Page Printers
		R8C/34Z									○	○		●			○		○		●	
		R8C/34Y									○	○		●			○		○		●	
		R8C/34X									○	○		●			○		●		●	
		R8C/34W									○	○		●			○		●		●	
		R8C/34U*	○	○	●	●	○		○		○	○		●			○	●	○	●	●	Photocopiers/Page Printers
		R8C/34R**									○	○		●			○		○	●	●	Automotive
		R8C/34P**									○	○		●			○		○	●	●	Automotive
		R8C/34M*	○	○	●	●	○		○		○	○		●			○	●	○	●	●	Photocopiers/Page Printers
		R8C/34K*	○	○	●	●	○		○		○	○		●			○	●	○	●	●	Photocopiers/Page Printers
		R8C/34H									○	○		●			○		○		●	
		R8C/34G									○	○		●			○		○		●	
		R8C/34F									○	○		●			○		●		●	
		R8C/34E									○	○		●			○		●		●	
		R8C/34C	○	○	●	●	○		○									●	○	●	●	Photocopiers/Page Printers
		R8C/33T	○	○	●	●	○		○									●	○	●	○	Touch key
		R8C/33M*	○	○	●	●	○		○									●	○	●	○	
		R8C/33H**									○	○		●			○		○	●	●	Automotive
		R8C/33G**									○	○		●			○		○	●	●	Automotive
		R8C/33D	○	○	●	●	○		○									●	○		○	Photocopiers/Page Printers
		R8C/33C	○	○	●	●	○		○									●	○	●	○	Photocopiers/Page Printers
		R8C/32M*	○	○	●	●	○		○									●	○		○	Photocopiers/Page Printers
		R8C/32H**									○	○		●			○		○	●	●	Automotive
		R8C/32G**									○	○		●			○		○	●	●	Automotive
		R8C/32D	○	○	●	●	○		○									●	○		○	Photocopiers/Page Printers
		R8C/32C	○	○	●	●	○		○									●	○	●	○	Photocopiers/Page Printers
	R8C/2x	R8C/2L	○	○	●	●	○		○									●	○	●	●	Photocopiers/Page Printers
		R8C/2K	○	○	●	●	○		○									●	○	●	●	Photocopiers/Page Printers
		R8C/2J	○	○	●	●	○		○									●	○	●	○	Photocopiers/Page Printers
		R8C/2H	○	○	●	●	○		○									●	○	●	○	Photocopiers/Page Printers
		R8C/2G	○	○	●	●	○		○									●	○	●	○	Photocopiers/Page Printers
		R8C/2F	○	○	●	●	○		○									●	○	●	○	Photocopiers/Page Printers
		R8C/2E	○	○	●	●	○		○									●	○	●	○	Photocopiers/Page Printers
		R8C/2D	○	○	●	●	○		○									●	○	●	●	Photocopiers/Page Printers
		R8C/2C	○	○	●	●	○		○									●	○	●	●	Photocopiers/Page Printers
		R8C/2B	○	○	●	●	○		○									●	○	●	●	Photocopiers/Page Printers
		R8C/2A	○	○	●	●	○		○									●	○	●	●	Photocopiers/Page Printers
		R8C/29	○	○	●	●	○		○		○	○		●			○	●	○	●	○	Photocopiers/Page Printers
		R8C/28	○	○	●	●	○		○		○	○		●			○	●	○	●	○	Photocopiers/Page Printers
		R8C/27	○	○	●	●	○		○		○	○		●			○	●	○	●	○	Photocopiers/Page Printers
		R8C/26	○	○	●	●	○		○		○	○		●			○	●	○	●	○	Photocopiers/Page Printers
		R8C/25	○	○	●	●	○		○									●	○	●	●	Photocopiers/Page Printers
		R8C/24	○	○	●	●	○		○									●	○	●	●	Photocopiers/Page Printers
		R8C/23									○	○		●			○		●	●	●	
		R8C/22									○	○		●			○		●	●	●	
		R8C/21									○	○		●			○		○	●	●	
		R8C/20									○	○		●			○		○	●	●	
	R8C/1x	R8C/1B	○	○	●	●	○		○									○	○	●	○	Photocopiers/Page Printers
		R8C/1A	○	○	●	●	○		○									○	○	●	○	Photocopiers/Page Printers
		R8C/19	○	○	●	●	○		○									○	○	●	○	Photocopiers/Page Printers
		R8C/18	○	○	●	●	○		○									○	○	●	○	Photocopiers/Page Printers
78K0R	78K0R/Lx3	78K0R/LH3	○		●	●													○	●		Meter/Health equipment/General LCD displays
		78K0R/LG3	○		●	●													○	●		Meter/Health equipment/General LCD displays
		78K0R/LF3	○		●	●													○	●		Meter/Health equipment/General LCD displays
	78K0R/Kx3-L	78K0R/KG3-L	●	●	●	○	○	○	○	○										○		Digital camera, Digital video camera, Fire alarm, Gas ring, Hot water suppliers, Shower restrooms
		78K0R/KF3-L	●	●	●	○	○	○	○	○										○		Digital camera, Digital video camera, Fire alarm, Gas ring, Hot water suppliers, Shower restrooms
		78K0R/KE3-L	●	●	●	○	○	○	○	○										○		Digital camera, Digital video camera, Fire alarm
		78K0R/KE3-L (Built-in USB controller)	●	●	●	○	●		○									○				Applications for USB, Health equipment
		78K0R/KD3-L	●	●	●	○	○	○	○	○										○		Digital camera, Digital video camera, Fire alarm
		78K0R/KC3-L	●	●	●	○	○	○	○	○										○		Digital camera, Digital video camera, Fire alarm
	78K0R/Kx3-L	78K0R/KC3-L (Built-in USB controller)	●	●	●	○	●		○									○				Applications for USB, Health equipment
	78K0R/Kx3-C	78K0R/KG3-C	●	●	●	●	●			○												Digital AV equipment with HDMI-CEC function
		78K0R/KF3-C	●	●	●	●	●			○												Digital AV equipment with HDMI-CEC function
	78K0R/Kx3-A	78K0R/KE3-A	●	●	●	○	○	○	○	○										○		Health equipment, Measurement equipment, Digital camera
	78K0R/Kx3	78K0R/KJ3	●	●	●	○	○	○	○	○						○	○			○		Digital camera, Digital video camera, Laser printers
		78K0R/KH3	●	●	●	○	○	○	○	○						○	○			○		Digital camera, Digital video camera, Laser printers
		78K0R/KG3	●	●	●	○	○	○	○	○						○	○			○		Digital camera, Digital video camera, Laser printers
		78K0R/KF3	●	●	●	○	○	○	○	○						○	○			○		Digital camera, Digital video camera, Laser printers
		78K0R/KE3	●	●	●	○	○	○	○	○						○	○			○		Digital camera, Digital video camera, Laser printers
	78K0R/Ix3	78K0R/IE3			○																●	For inverter control
		78K0R/ID3			○																●	For inverter control
		78K0R/IC3			○																●	For inverter control
		78K0R/IB3			○																●	For inverter control
	78K0R/Hx3	78K0R/HG3	●	●	●	○	○	○	○	○									○	●		
		78K0R/HF3	●	●	●	○	○	○	○	○									○	●		
		78K0R/HE3	●	●	●	○	○	○	○	○									○	●		
		78K0R/HC3	●	●	●	○	○	○	○	○									○	●		
	78K0R/Fx3	78K0R/FG3									●			●		○	○					
		78K0R/FF3									●			●		○	○					

● : It is best suited. ○ : It is suited.

★ : New product ★★ : Under development

Application Matrix

■ 78K0R MCUs ■ 78K0 MCUs
■ 78K0S MCUs

Family	Series	Group	AV/Home Use				Computer Related				Automotive							Mobile	Network	Industry/Security	Motor	Note
			Audio	Video	Household Appliances	Amusement	Computers	Storage Systems	Imaging	Display	Powertrain	Chassis	Safety	Body	Dashboard	Car Information System	Car Audio					
78K0R	78K0R/Fx3	78K0R/FE3									●			●		○	○					
		78K0R/FC3									●			●		○	○					
		78K0R/FB3									●			●		○	○					
	78K0R	μPD78F8058**	○	○	○	○	○												●			
		μPD78F8043																		●		Industrial sensor, Industrial actuator
78K0	78K0/Lx3-M	78K0/LG3-M**																		●		Power meter(single-phase 2-wires/3-wires)
		78K0/LE3-M**																		●		Power meter(single-phase 2-wires/3-wires)
	78K0/Lx3	78K0/LF3	○		●	●													○	●		Meter/Health equipment/General LCD displays
		78K0/LE3	○		●	●													○	●		Meter/Health equipment/General LCD displays
		78K0/LD3	○		●	●													○	●		Meter/Health equipment/General LCD displays
		78K0/LC3	○		●	●													○	●		Meter/Health equipment/General LCD displays
	78K0/Kx2-L	78K0/KY2-L	○	○	●	○	○	○	○	○										○		
		78K0/KC2-L	○	○	●	○	○	○	○	○										○		
		78K0/KB2-L	○	○	●	○	○	○	○	○										○		
		78K0/KA2-L	○	○	●	○	○	○	○	○										○		
	78K0/Kx2-C	78K0/KE2-C	●	●	●	●	●			○												Digital AV equipment with HDMI-CEC function
		78K0/KC2-C	●	●	●	●	●			○												Digital AV equipment with HDMI-CEC function
	78K0/Kx2-A	78K0/KC2-A	●	●	●	●	○	○	○	○										●		
		78K0/KB2-A	●	●	●	●	○	○	○	○										●		
	78K0/Kx2	78K0/KF2	○	○	●	○	○	○	○	○						○	○			○		
		78K0/KE2	○	○	●	○	○	○	○	○						○	○			○		
		78K0/KD2	○	○	●	○	○	○	○	○						○	○			○		
		78K0/KC2	○	○	●	○	○	○	○	○						○	○			○		
		78K0/KB2	○	○	●	○	○	○	○	○						○	○			○		
	78K0/Ix2	78K0/IY2			●															○		Control for LED, Fluorescent Lamp, Back light and Power supply
		78K0/IB2			●															○		Control for LED, Fluorescent Lamp, Back light and Power supply
		78K0/IA2			●															○		Control for LED, Fluorescent Lamp, Back light and Power supply
	78K0/Fx2-L	78K0/FY2-L												●		○	○					
		78K0/FB2-L												●		○	○					
		78K0/FA2-L												●		○	○					
	78K0/Fx2	78K0/FF2												●		○	○					
		78K0/FE2												●		○	○					
		78K0/FC2												●		○	○					
	78K0/Dx2	78K0/DF2 (Built-in CAN)													●							
		78K0/DF2 (No built-in CAN)													●							
		78K0/DE2													●							
	78K0	μPD78F8025			●															○		Control for LED, Back light (built-in LED driver)
		μPD78098x			○																●	For inverter control
		μPD78086x	○	○															○	○	○	
		μPD78F073x	●	●	●	○	●		○									○				USB memory, USB security, other devise with USB function
		μPD78F071x			●																●	For inverter control
		μPD78035x	●		●																	
		μPD78034x	●		●																	
		μPD78033x			●																	Telephones, Cameras
		μPD78032x			●																	Telephones, Cameras
		μPD78031x			●																	Telephones, Cameras
		μPD78030x	●															●		●		Mobile phones, Power meter, Radio, CD player
		μPD78007x	●	●	○																	
		μPD78006x	●	●	●																	Audio system control for CD text, TV
		μPD78005x	●	●	●													●		○		
		μPD78003xAS	●	●	●															○		
		μPD78003xA	●	●	●															○		
		μPD78002xAS	●	●	●															○		
		μPD78002xA	●	●	●															○		
		μPD179F12x	●	●	●																	Preset remote control transmitter
		μPD179F11x	●	●	●																	Preset remote control transmitter
78K0S	78K0S/Kx1+	78K0S/KY1+	○	○	●	●	○	○	○	○						○	○		○	○	○	
		78K0S/KU1+	○	○	●	●	○	○	○	○						○	○		○	○	○	
		78K0S/KB1+	○	○	●	●	○	○	○	○						○	○		○	○	○	
		78K0S/KA1+	○	○	●	●	○	○	○	○						○	○		○	○	○	
	78K0S	μPD78988x			○															●		Utility meter, Health equipment
		μPD78983x			●	●																Balance leader, Mini game
		μPD78948x	●		●																	CD radio-casette tape recorder, Portable audio, Camera, Health equipment (household healthcare equipment such as Thermometer, Blood pressure and so on)
		μPD78947x	●		●																	
		μPD78946x			●																	Remote controller, Health equipment
		μPD78945x			●																	Health equipment, Fan heater
		μPD78944x			●																	Health equipment, Fan heater
		μPD78943x			●																	Compact camera
		μPD78942x			●																	Compact camera
		μPD78941xA			●																	Compact camera, APS, Steam rice cooker
		μPD78940xA			●																	Compact camera, APS, Steam rice cooker
		μPD78932x			●																	Remote controller, Health equipment
		μPD78931x	●		○																	Portable audio, Remote controller
		μPD78930x	●		○																	Portable audio, Remote controller
		μPD78917x	○	○	●																○	Fan heater, Motor control for white goods
		μPD78916x			●																○	Fan heater, Motor control for white goods
		μPD78F913xA	○	○	●																	
		μPD78911xA	○	○	●																	
		μPD78910xA	○	○	●																	
		μPD78908x			●	●																Preset remote controller, Small household appliances, Game machines
		μPD78907x			●														○			
		μPD78906x			●																	Battery-driven small sets
		μPD78905x			●																	Battery-driven small sets

● : It is best suited. ○ : It is suited.

★ : New product ★★ : Under development

Family	Series	Group	AV/Home Use				Computer Related				Automotive											Note
			Audio	Video	Household Appliances	Amusement	Computers	Storage Systems	Imaging	Display	Powertrain	Chassis	Safety	Body	Dashboard	Car Information System	Car Audio	Mobile	Network	Industry/Security	Motor	
78K0S	78K0S	μPD78904x			●							●			●							Wireless phones, Power windows
		μPD78902x			●							●			●							Wireless phones, Power windows
M16C	R32C/100	R32C/161										○	○	●				○	●	●	●	
		R32C/160										○	○	●				○	●	●	●	
		R32C/157										○	○	●				○	●	●	●	
		R32C/156										○	○	●				○	●	●	●	
		R32C/153										○	○	●				○	●	●	●	
		R32C/152										○	○	●				○	●	●	●	
		R32C/151										○	○	●				○	●	●	●	
		R32C/145										○	○	●				○	●	●	●	
		R32C/121										○	○	●				○	●	●	●	Passive safety
		R32C/120										○	○	●				○	●	●	●	
		R32C/118A	●	○	○	○	○	○	○	○								○	●	●	●	With an FPU, a maximum of 1 MB of flash memory, and 96 KB of RAM, CAN
		R32C/118	●	○	○	○	○	○	○	○								○	●	●	●	With an FPU, a maximum of 1 MB of flash memory, and 63 KB of RAM, CAN
		R32C/117A	●	○	○	○	○	○	○	○								○	●	●	●	With an FPU, a maximum of 1 MB of flash memory, and 96 KB of RAM, CAN
		R32C/117	●	○	○	○	○	○	○	○								○	●	●	●	With an FPU, a maximum of 1 MB of flash memory, and 63 KB of RAM, CAN
		R32C/116A	●	○	○	○	○	○	○	○								○	●	●	●	With an FPU, a maximum of 1 MB of flash memory, and 96 KB of RAM
		R32C/116	●	○	○	○	○	○	○	○								○	●	●	●	With an FPU, a maximum of 1 MB of flash memory, and 63KB of RAM
		R32C/111	●	○	○	○	○	○	○	○								○	●	●	●	With an FPU, a maximum of 63 KB of RAM, Small/low-pin count packages
	M32C/80	M32C/8A	●	○	○	●	○	○	○	○							○	○	○	●	●	
		M32C/8B	●	○	○	●	○	○	○	○								○	○	●	●	Built-in 32K bytes RAM
		M32C/88	●	○	●	○	○	○	○	○		○	○	●			○	○	●	●	●	
		M32C/87	●	○	●	○	○	○	○	○							●	○	●	●	●	Large-capacity Flash memory, Car audio
		M32C/85	●	○	●	○	○	○	○	○		○	○	●			●	○	●	●	●	Car audio
		M32C/84	●	○	●	○	○	○	○	○		○	○	●			●	○	●	●	●	Car audio
		M32C/83	●	○	●	○	○	○	○	○		○	○	○			○	○	●	●	●	
		M32C/80	●	○	○	●	○	○	○	○							○	○	○	●	●	
	M16C/60	M16C/6S1**			○														●	○		Equipped with a built-in Power line communications function
		M16C/6S	○		○														●	○		Equipped with a built-in Power line communications function
		M16C/6N										○	○	●			●		●	●	●	Car audio
		M16C/6C	●	○	○	○	○	○	○	○								○	○	●	●	
		M16C/6B	○		○														●	○		Smart meter, Sensor network equipment, Remote control
		M16C/65C*	●	○	○	○	○	○	○	○							●	○	○	●	●	Car audio
		M16C/65	●	○	○	○	○	○	○	○							●	○	○	●	●	Car audio
		M16C/64C*	●	○	○	○	○	○	○	○							○	○	○	●	●	
		M16C/64A	●	○	○	○	○	○	○	○							○	○	○	●	●	
		M16C/63	●	○	○	○	○	○	○	○								○	○	●	●	
		M16C/62P	●	○	○	○	○	○	○	○							●	○	○	●	●	Car audio
		M16C/62N	●	○	○	○	○	○	○	○							○	○	○	●	●	
		M16C/62M		○	○	○	○	○	○	○							○	○	○	●	●	
		M16C/62A		○	○	○	○	○	○	○							○	○	○	●	●	
	M16C/50	M16C/5M*			○						○	○	○	●			●		●	●	●	Car audio
		M16C/5LD			○						○	○	○	●			●		●	●	●	Car audio
		M16C/5L			○						○	○	○	●			●		●	●	●	Car audio
		M16C/57*									○	○		●			○		○	○	●	Automotive
		M16C/56D		○	●	○	○				○	○	○	●			●			●	●	Car audio
		M16C/56		○	●	○	○				○	○	○	●			●			●	●	Car audio
	M16C/30	M16C/30P	●	○	○	○											●	○	○	○		Car audio
	M16C/20	M16C/24	●			○	●	●	○											○		
	M16C/Tiny	M16C/29			○						○	○	○	●			●		●	●	●	Car audio
		M16C/28		○	●	○	○				○	○	○	●			●			●	●	Car audio
		M16C/26A		○	●	○	○				○	○	○	●			●			●	●	Car audio
	M16C/10	M16C/1N												●					●	●		
H8SX	H8SX/1700	H8SX/1720S*											●							●		PC peripheral devices, high-capacity flash memory, EXDMAC, and high-speed A/D converter, Passive safety
		H8SX/1720											●							●		PC peripheral devices, high-capacity flash memory, EXDMAC, and high-speed A/D converter, Passive safety
	H8SX/1600	H8SX/1668R		○		○	○	●	●	●									○	○		PC peripheral devices, high-capacity flash memory, EXDMAC
		H8SX/1668M		○		○	○	●	●	●									○	○		PC peripheral devices, high-capacity flash memory, EXDMAC
		H8SX/1665M		○		○	○	●	●	●						○			○	○		PC peripheral devices, high-capacity flash memory, EXDMAC, and high-speed A/D converter
		H8SX/1665		○		○	○	●	●	●						○			○	○		PC peripheral devices, high-capacity flash memory, EXDMAC, and high-speed A/D converter
		H8SX/1663		○		○	○	●	●							○			○	○		Computer Peripherals/Large-Capacity Flash Memory
		H8SX/1658R		○		○	○	●	●	●									○	○		PC peripheral devices, high-capacity flash memory, EXDMAC
		H8SX/1658M		○		○	○	●	●	●									○	○		PC peripheral devices, high-capacity flash memory, EXDMAC
		H8SX/1657		○		○	○	●	●										○	○		Computer Peripherals/Large-Capacity Flash Memory
		H8SX/1655M		○		○	○	●	●	●						○			○	○		PC peripheral devices, high-capacity flash memory, EXDMAC, and high-speed A/D converter
		H8SX/1655		○		○	○	●	●							○			○	○		PC peripheral devices, high-capacity flash memory, EXDMAC, and high-speed A/D converter
		H8SX/1653		○		○	○	●	●										○	○		Computer Peripherals/Large-Capacity Flash Memory
		H8SX/1651		○		○	○	●	●										○	○		Computer Peripherals/Large-Capacity Flash Memory
		H8SX/1650C		○		○	○	●	●										○	○		Computer Peripherals/Large-Capacity Flash Memory
		H8SX/1648H		○		○	○	●	●							○			○	○		PC peripheral devices, high-capacity flash memory, EXDMAC
		H8SX/1648G		○		○	○	●	●	●						○			○	○		PC peripheral devices, high-capacity flash memory, EXDMAC
		H8SX/1648L		○		○	○	●	●							○			○	○		Computer Peripherals/Large-Capacity Flash Memory
		H8SX/1648A		○		○	○	●	●										○	○		Computer Peripherals/Large-Capacity Flash Memory
		H8SX/1645L		○		○	○	●	●							○			○	○		Computer Peripherals/Large-Capacity Flash Memory, High-Speed A/D Converter
		H8SX/1645		○		○	○	●	●							○			○	○		Computer Peripherals/Large-Capacity Flash Memory, High-Speed A/D Converter
		H8SX/1638L		○		○	○	●	●							○			○	○		Computer Peripherals/Large-Capacity Flash Memory
		H8SX/1638		○		○	○	●	●										○	○		Computer Peripherals/Large-Capacity Flash Memory
		H8SX/1635L		○		○	○	●	●							○			○	○		Computer Peripherals/Large-Capacity Flash Memory, High-Speed A/D Converter
		H8SX/1635		○		○	○	●	●							○			○	○		Computer Peripherals/Large-Capacity Flash Memory, High-Speed A/D Converter
		H8SX/1622		○		○	○	●	●										○	○		Computer Peripherals/Large-Capacity Flash Memory, ⊿Σ A/D Converter
	H8SX/1500	H8SX/1580		○					○											●		
		H8SX/1544		○					○						●					●		
		H8SX/1520R											●							○		Passive safety

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★ : New product ★★ : Under development

Application Matrix

■ H8S Family

Family	Series	Group	AV/Home Use				Computer Related				Automotive								Mobile	Network	Industry/Security	Motor	Note
			Audio	Video	Household Appliances	Amusement	Computers	Storage Systems	Imaging	Display	Powertrain	Chassis	Safety	Body	Dashboard	Car Information System	Car Audio						
H8S	H8S/2600	H8S/2678R		○			○	○	●												○		Printers, PC peripheral devices, high-capacity flash memory
		H8S/2678		●			○	○	●												○		
		H8S/2668		●			○	○	○												○		
		H8S/2655							○												○		
		H8S/2649													●						●		
		H8S/2648													●						●		
		H8S/2646					○								●						●		
		H8S/2643		●		○			○											○	●		
		H8S/2639													●						●		
		H8S/2638													●						●		
		H8S/2636													●						●		
		H8S/2635													●						●		
		H8S/2633		○		○		○	●											○	●		
		H8S/2630													●						●		
		H8S/2628											●								●		Passive safety
		H8S/2615								○			●								●		Passive safety
		H8S/2612								●			●								●		Passive safety
		H8S/2609		○		○		○	○											○	●		
		H8S/2607		○		○		○	○											○	●		
		H8S/2604		○		○		○	○											○	●		
		H8S/2602		○		○		○	○											○	●		
	H8S/2500	H8S/2556	○														●				○		
		H8S/2552	○							●							●				○		
		H8S/2506	○	○	○	○	○	○	○	●							●	○	○	○	○		
	H8S/2400	H8S/2472					●		○											●			PC server, PC peripheral devices
		H8S/2463					●		○											●			PC server, PC peripheral devices
		H8S/2462					●		○											●			PC server, PC peripheral devices
		H8S/2456R		○	○	○	●		●	○									○	●	●		ePOS and card reader
		H8S/2456		○	○	○	●		●	○									○	●	●		ePOS and card reader
		H8S/2454		○	○	○	●		●	○									○	●	●		ePOS and card reader
		H8S/2427R		●		○	○		●											○	●		FPD (LCD/PDP-TV and projector) and copying machine
		H8S/2427		●		○	○		●											○	●		FPD (LCD/PDP-TV and projector) and copying machine
		H8S/2426R		●		○	○		●											○	●		FPD (LCD/PDP-TV and projector) and copying machine
		H8S/2426		●		○	○		●											○	●		FPD (LCD/PDP-TV and projector) and copying machine
		H8S/2425		●		○	○		●											○	●		FPD (LCD/PDP-TV and projector) and copying machine
		H8S/2424		●		○	○		●											○	●		FPD (LCD/PDP-TV and projector) and copying machine
	H8S/2300	H8S/2398	○	○	○			○	○												●		
		H8S/2378R	○	●	○	○	○		●											○	●		FPD (LCD/PDP-TV and projector) and copying machine
		H8S/2378	○	●	○	○	○		●											○	●		FPD (LCD/PDP-TV and projector) and copying machine
		H8S/2368	○	●	○	○	○		●											○	●		
		H8S/2357			○	○			○											○	○		
		H8S/2355							○												○		
		H8S/2350				○	○	●	○												○		
		H8S/2345				○	○	○	○											○	○		
		H8S/2339				○	○		○												○		
		H8S/2329		○	○	●	○	○	●											○	○		
		H8S/2319			○	○	○	●	○											●	○		
	H8S/2200	H8S/2282													●		○						
		H8S/2280													●		○						
		H8S/2268	○	○	○	○	○	○	○	○									○	○	●		Radio equipment and electric power meter
		H8S/2258	○														●			○	○		
		H8S/2245	○	●	●	○	○		○	○							○	○	○	●	●		
		H8S/2239	○	●	●	○	○		○	○							○	○	○	●	●		
		H8S/2238R	○	●	●	○	○		○	○							○	○	○	●	●		
		H8S/2238B	○	●	●	○	○		○	○							○	○	○	●	●		
		H8S/2237	○	○	○	○	○		○	○							○	○	○	●	●		
		H8S/2227	○	○	○	○	○		○	○							○	○	○	●	●		
		H8S/2218		○	○	○	●			○									○	●	●		ePOS and card reader
		H8S/2215		○	○	○	●			○									○	●	●		ePOS and card reader
		H8S/2214		○	○	○	○			○									○	●	●		
		H8S/2212		○	○	○	●			○									○	●	●		ePOS and card reader
	H8S/2100	H8S/2189R	○	○	○	○		○		○									○	○	○		Software IP support
		H8S/2168					●	●												●	●		
		H8S/2164					●	●												●	●		
		H8S/2153					●	●												●	●		
		H8S/2148					●			●											●		KBC (Key Board Controller)
		H8S/2144			●	●	●														●		KBC (Key Board Controller)
		H8S/2140B					●			●											●		KBC (Key Board Controller)
		H8S/2138					●														●		KBC (Key Board Controller)
		H8S/2134B			●	●	●														●		Meter
		H8S/2134			●	●	●														●		Meter
		H8S/2128S			●		●			●											●		
		H8S/2128			●		●			●											●		
		H8S/2125			●		●			●											●		
		H8S/2124			●		●			●											●		
		H8S/2117R	●				●																
		H8S/2117	●				●																
		H8S/2116	●				●																
		H8S/2114R	●				●																KBC (Key Board Controller)
		H8S/2112R	●				●																KBC (Key Board Controller)
		H8S/2112	●				●																KBC (Key Board Controller)
		H8S/2111B					●																KBC (Key Board Controller)
	H8S/Tiny	H8S/20335R**			●	○	○	○	○	○											●	●	Electrical household appliances, industrial devices, security devices

● : It is best suited. ○ : It is suited.

★ : New product ★★ : Under development

Family	Series	Group	AV/Home Use				Computer Related				Automotive							Mobile	Network	Industry/Security	Motor	Note
			Audio	Video	Household Appliances	Amusement	Computers	Storage Systems	Imaging	Display	Powertrain	Chassis	Safety	Body	Dashboard	Car Information System	Car Audio					
H8S	H8S/Tiny	H8S/20323R**			●	○	○	○	○	○										●	●	Electrical household appliances, industrial devices, security devices
		H8S/20235R**			●	○	○	○	○	○										●	●	Electrical household appliances, industrial devices, security devices
		H8S/20235			●	○	○	○	○	○										●	●	Electrical household appliances, industrial devices, security devices
		H8S/20223R**			●	○	○	○	○	○										●	●	Electrical household appliances, industrial devices, security devices
		H8S/20223			●	○	○	○	○	○										●	●	Electrical household appliances, industrial devices, security devices
		H8S/20215R**			●	○	○	○	○	○										●	●	Electrical household appliances, industrial devices, security devices
		H8S/20215			●	○	○	○	○	○										●	●	Electrical household appliances, industrial devices, security devices
		H8S/20203R**			●	○	○	○	○	○										●	●	Electrical household appliances, industrial devices, security devices
		H8S/20203			●	○	○	○	○	○										●	●	Electrical household appliances, industrial devices, security devices
		H8S/20115R**			●	○	○	○	○	○										●	●	Electrical household appliances, industrial devices, security devices
		H8S/20115			●	○	○	○	○	○										●	●	Electrical household appliances, industrial devices, security devices
		H8S/20103R**			●	○	○	○	○	○										●	●	Electrical household appliances, industrial devices, security devices
		H8S/20103			●	○	○	○	○	○										●	●	Electrical household appliances, industrial devices, security devices
	H8S Super Low Power	H8S/2264																		●		Network, power meter
H8	H8/300H Tiny	H8/3694		●	●	●								○					●	●		
		H8/36912		●	●	●												○	●	●		
		H8/36902			●	●												○	●	●		
		H8/3687		●	●	●								○					●	●	●	
		H8/3672			●	●													●	●		
		H8/36109			●															●	●	
		H8/36094				●													●	●		
		H8/36087		●	●	●													●	●	●	
		H8/36079	●	●	●	●													●	○	●	
		H8/36077	●	●	●	●													●	○	●	
		H8/36064			●	●													●	●	●	
		H8/36057			●	●								○					●	●	●	
		H8/36049			●	●													●	●	●	
		H8/36037			●	●								○					●	●	●	
		H8/36024			●	●								○					●	●		
		H8/36014	○		●	●								○					●	●		
	H8/300H Super Low Power	H8/38799		○	○	○													○	●		
		H8/38776			○															●		
		H8/38704		●																●		RF-ID and sensor
		H8/38702S		●																●		RF-ID and sensor
		H8/38602R		○	○	○													○	●		
		H8/38537		○	○	○													○	●		
		H8/38524		○	○	○													○	●		
		H8/38099		○	○	○													○	●		
		H8/38086R																		●		
		H8/38076R			○															●		
H8	H8/300L Super Low Power	H8/3847S																		●		Radio
		H8/38447			●															●		
		H8/38427			●															●		
		H8/38347			●															●		
		H8/38327			●															●		
		H8/3827S																		●		Radio
		H8/38124			●															●		Electric power meter
		H8/38104			●															●		Electric power meter
		H8/38024S		●																●		DSC
		H8/38024R			●															●		Health equipment
		H8/38004		●																●		RF-ID and sensor
		H8/38002S		●																●		RF-ID and sensor
740	38000	38D5	○		●																	
		38D2	○		●																	
		3858	○		○															○		
		3850A	○		○															○		Coping machine, page printer
		3823	●		○															○		Compact Camera
		3803L			●															○		Coping machine, page printer
		3803H			●															○		Coping machine, page printer
	740	7549			●																	
		7548	●		●																	
		7547			●																	
		7546			●																	
		7545			●																	Preset remote control
		7544			●																	
720	4500	4571	○	○	○																	Preset remote control
		455A			●																	LCD remote control
		4559			●																	LCD remote control
		4509			●																	
		4508			●																	
	720	4286	○	○	○																	Single-function remote control

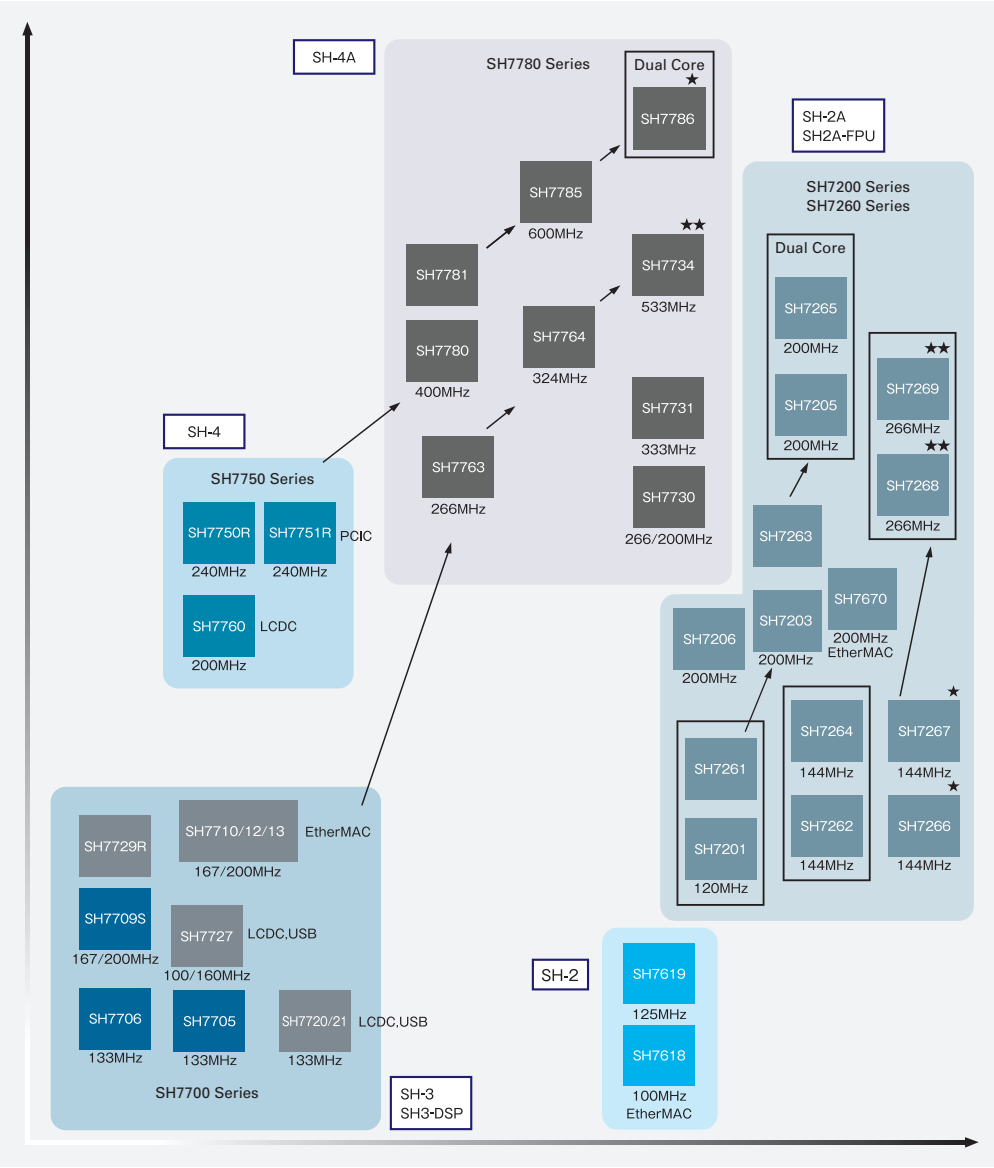
● : It is best suited. ○ : It is suited.

★ : New product ★★ : Under development

SuperH—a key device in digital household appliances and next-generation IT products

MPU (microprocessor) type SuperH products with cache memory provide superior processing power, support a wide variety of program and data types, and meet the increased performance requirements of car navigation systems, network components, digital household appliances, and more.

• SuperH (MPU Type) Roadmap



★ : New product ★★ : Under development

- An SDRAM controller is built in.
- Incorporates a cache memory, thus maintaining the performance at a range in excess of the operating frequency of the external bus.
- Models incorporating the Memory Management Unit (MMU) supports a variety of operating systems.
- Incorporates an on-chip debugging function, thus providing an emulation environment at the maximum operation frequency of the LSI.

■Application Examples

Communications equipment
Wireless LAN and car navigation equipment



OA equipment
Printer, Fax/Complex machine, and copy machine



Consumer equipment
Compact printer, Digital Audio



SH7780 Series (SH-4A)

• Incorporates the top CPU core SH-4A in the SuperH family

• Specifications (SH7780 Series)

Series		SH7780		
Group		SH7786	SH7785	SH7780
Memory	ROM (Bytes)	—		
	RAM (Bytes)	(8K + 16K) × 2	8K (high speed) + 16K (high speed) + 128K (middle speed)	16K (high speed) + 32K (middle speed)
	ROM Type*1	L		
	Cache Memory	(32K (instructions) + 32K (data)) × 2 + 256K (L2Cache)	32K (instructions), 32K (data), 4-way set-associative	
	Program Security	—		
CPU	CPU	SH-4A Core		
	Basic Instructions	103		
	Minimum Instruction Execution Time (ns)	0.94 (@533MHz)	0.85 (@600MHz)	1.25 (@400MHz)
	Dhrystone Performance	—		
	Multiplier	32 × 32 → 64		
	Multiply-Accumulate Instruction	32 × 32 + 64 → 64		
	Barrel Shifter	Yes		
	FPU	Yes		
	MMU	Yes		
DMA	DMAC (Channels)	24 (max)	12 (4 channels of them can receive an external request)	
	DTC/DMAC II	—		
External Bus Expansion	Address Space (Bytes)	Local: 448M (max) DDR3: 2G (max)	Local: 448M, DDR: 1G, PCI: 512M + memory I/O area	Local: 384M, DDR: 256M, PCI: 512M + memory I/O area
	Bus State Controller	SRAM/MPX/Burst ROM/Byte Control SRAM/PCMCIA		
	Bus Structure	Local bus/DDR3 PCI-Express	Local bus (8/16/32/64-bit*3)/DDR2 (32-bit)/ PCI (32-bit)	Local bus (8/16/32-bit), DDR (32-bit), PCI (32-bit)
	SDRAM Controller	Yes (DDR3-SDRAM)	Yes (DDR2-SDRAM)	Yes (DDR-SDRAM)
	DRAM Controller	—		
	PCI Controller	Yes (PCI-Express)	Yes	
	Endian Conversion	Yes		
	Host Interface	—		
Clock	Clock Generation Circuit	1 circuit		
	PLL	Yes		
	RTC	—		Yes
	Oscillation Stop Detection	—		
	Frequency Divider	Yes		
	Power Save	Sleep/Module standby		
Power Supply Voltage Detection	Power-On Reset/POR	—		
A/D Converter	Resolution × Channels	—		
	Sample and Hold	—		
	Multi-Channel Sample and Hold	—		
D/A Converter	Resolution × Channels	—		
Timer	8-bit	—		
	16-bit	—		4 (CMT)
	32-bit	12 (TMU)	6 (TMU)	
	Input Capture	1 (shared with TMU)		
	Output Compare	—		
	PWM Output	—		
	Event Counter	—		
	2-Phase Encoder Input	—		
	3-Phase Inverter Control	—		
Watchdog Timer		1		
Serial Interface	Clock Sync./Clock Async.	6 (max)	6 (Max.)	2 (Max.)
	Clock Sync. Only	—		
	Clock Async. Only	—		
I²C-bus		2 (max)	—	
Smart Card/SIM		—		
Synchronous Serial Communication Unit/Special Serial I/O		—		
CAN	Channels	—		
	Message Box (Numbers)	—		
FlexRay		—		
Ethernet		1 (max)	—	
USBHOST		2 (max)	—	
USBFunction		1 (max)	—	
IrDA		—		
LCD		Display unit		—
I/O Ports	Input Only (Numbers)	—		
	CMOS I/O (Numbers)	60 (max)	108 (Max.)	75 (Max.)
	High Voltage Port (Numbers)	—		
	N-Channel Open Drain Port (Numbers)	—		
	High Current Drive Port	—		
	Pull-Up Resistor	—	108 (Max.)	43 (Max.)
External Interrupts Pins		9 (NMI + 15 (15 level) or 8) (max)	9 (NMI + 15 (15 level) or 8)	
Debugging Function	Boundary Scan/JTAG	Yes		
	On-Chip Debug	Yes		
	On-Board Flash Program	—		
Other Functions	ROM Correction Function	—		
	Others	HAC, SSI, NAND flash interface, SDIF, HSPI (Some pins for each module are multiplexed)	Audio Codec interface, Serial Sound Interface, MultiMediaCard interface, NAND flash interface (Some pins for each module are multiplexed)	
Operating Frequency/Supply Voltage		533MHz/ 1.25V (internal), 3.3V (I/O etc.), 1.5V (DDR3 etc.)	600MHz/ 1.1V (internal), 3.3V (I/O), 1.8V (DDR2)	400MHz/ 1.25V (internal), 3.3V (I/O), 2.5V (DDR)
Operating Ambient Temperature (˚C)		–40 to 85 / –20 to 85	–40 to 85	–20 to 75 / –40 to 85
Package*2		BGA593	PRBG0436GA-A	BP-449
Part No.		R8A77860HBG** / R8A77860NBG*	R8A77850BANBGN / R8A77850BADBGN	R8A77800BNBG / R8A77800BDBG

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code
*3 When not using PCI/DU

★ : New product ★★ : Under development

• Specifications (SH7780 Series)

Series		SH7780					
Group		SH7730				SH7731	
Memory	ROM (Bytes)	—					
	RAM (Bytes)	16K (high speed)				148K	
	ROM Type*1	L					
	Cache Memory	32K (instructions), 32K (data), 4-way set-associative					
	Program Security	—					
CPU	CPU	SH-4A Core				SH4AL-DSP Core	
	Basic Instructions	103				170	
	Minimum Instruction Execution Time (ns)	2.5 (@200MHz)	1.88 (@266MHz)	2.5 (@200MHz)	1.88 (@266MHz)	1.5 (@333MHz)	
	Dhrystone Performance	—					
	Multiplier	32 × 32 → 64					
	Multiply-Accumulate Instruction	32 × 32 + 64 → 64					
	Barrel Shifter	Yes					
	FPU	Yes				—	
	MMU	Yes					
DMA	DMAC (Channels)	6 (2 channels of them can receive an external request)				6 (1 channel of them can receive an external request)	
	DTC/DMAC Ⅱ	—					
External Bus Expansion	Address Space (Bytes)	384M					
	Bus State Controller	SRAM/SDRAM/Burst ROM/Byte Control SRAM/PCMCIA				SRAM/Burst ROM/Byte Control SRAM/PCMCIA	
	Bus Structure	Separate bus (8/16/32-bit)				Local bus (16/32-bit) SDRAM (16/32/64-bit)	
	SDRAM Controller	Yes				Yes (SDRAM)	
	DRAM Controller	—					
	PCI Controller	—					
	Endian Conversion	Yes					
	Host Interface	—					
Clock	Clock Generation Circuit	1 circuit					
	PLL	Yes					
	RTC	Yes					
	Oscillation Stop Detection	—					
	Frequency Divider	Yes					
	Power Save	Sleep/Software standby/Module standby				Sleep/Software standby/ Module standby/U-standby	
Power Supply Voltage Detection	Power-On Reset/POR	—					
A/D Converter	Resolution x Channels	—	10-bit × 4			—	
	Sample and Hold	—	Yes			—	
	Multi-Channel Sample and Hold	—					
D/A Converter	Resolution x Channels	—	10-bit × 2			—	
Timer	8-bit	—					
	16-bit	6 (TPU)				4 (TPU)	
	32-bit	8 (TMU × 3, CMT × 5)				4 (TMU × 3, CMT × 1)	
	Input Capture	—					
	Output Compare	6 (shared with TPU)				1 (shared with TPU)	
	PWM Output	6 (shared with TPU)				1 (shared with TPU)	
	Event Counter	—					
	2-Phase Encoder Input	—					
	3-Phase Inverter Control	—					
Watchdog Timer		1					
Serial Interface	Clock Sync./Clock Async.	6				3 (SCIF × 3)	
	Clock Sync. Only	1				1 (SIO)	
	Clock Async. Only	—					
I²C-bus		2				1	
Smart Card/SIM		1 (T=0 (sub set)/T=1 (sub set))				1 (T=0 mode/T=1 mode)	
Synchronous Serial Communication Unit/Special Serial I/O		—				2 (SIOF × 2)	
CAN	Channels	—					
	Message Box (Numbers)	—					
FlexRay		—					
Ethernet		—					
USBHOST		—				1 (High-Speed)	
USBFunction		—				High-Speed	
IrDA		Yes (using serial I/F, 2ch)				Yes	
LCD		—					
I/O Ports	Input Only (Numbers)	28				23	
	CMOS I/O (Numbers)	78				100	
	High Voltage Port (Numbers)	—					
	N-Channel Open Drain Port (Numbers)	—					
	High Current Drive Port	—					
	Pull-Up Resistor	97 (I/O 79, input 18)				103 (I/O 80, input 23)	
External Interrupts Pins		21 (NMI + 20 (15 level))				9 (NMI 1 + IRQ 8)	
Debugging Function	Boundary Scan/JTAG	Yes					
	On-Chip Debug	Yes					
	On-Board Flash Program	—					
Other Functions	ROM Correction Function	—					
	Others	—				LCD controller (LCDC) Key scan interface (KEYSC) SD card host interface (SDHI)	
Operating Frequency/Supply Voltage		200MHz/ 1.2V (internal), 3.3V (I/O)	266MHz/1.2V (internal), 3.3V (I/O)	200MHz/1.2V (internal), 3.3V (I/O)	266MHz/1.2V (internal), 3.3V (I/O)	333MHz/1.3V (internal), 3.3V (I/O) 266MHz/1.2V (internal), 3.3V (I/O)	
Operating Ambient Temperature (˚C)		–20 to 75		–40 to 85			
Package*2		PLQP0208KB-A				PLBG0417KB-A	PRBG0449GA-A
Part No.		R8A77300C200FP	R8A77301C200FP	R8A77301C266FP	R8A77301D200FP	R8A77301D266FP	R8A77310C333BA	R8A77310D333BG

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Oz : OzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (SH7780 Series)

Series		SH7780																
Group		SH7734																
Memory	ROM (Bytes)	—																
	RAM (Bytes)	ILRAM 16KB, OLRAM 16KB																
	ROM Type*1	L																
	Cache Memory	32K (instructions), 32K (data), 4-way set-associative																
	Program Security	—																
CPU	CPU	SH-4A																
	Basic Instructions	103																
	Minimum Instruction Execution Time (ns)	0.94 (@533MHz)																
	Dhrystone Performance	—																
	Multiplier	32 × 32 → 64																
	Multiply-Accumulate Instruction	32 × 32 + 64 → 64																
	Barrel Shifter	Yes																
	FPU	Yes																
	MMU	—																
DMA	DMAC (Channels)	34																
	DTC/DMAC II	—																
External Bus Expansion	Address Space (Bytes)	4G																
	Bus State Controller	Yes																
	Bus Structure	Separate bus (8/16-bit), DDR (16-bit)																
	SDRAM Controller	Yes																
	DRAM Controller	—																
	PCI Controller	—																
	Endian Conversion	—																
	Host Interface	Yes																
Clock	Clock Generation Circuit	1 circuit (CPG)																
	PLL	Yes																
	RTC	Yes																
	Oscillation Stop Detection	—																
	Frequency Divider	Yes																
	Power Save	Sleep/Software standby/Deep standby/Module standby																
Power Supply Voltage Detection	Power-On Reset/POR	—																
A/D Converter	Resolution × Channels	10-bit × 8																
	Sample and Hold	Yes																
	Multi-Channel Sample and Hold	—																
D/A Converter	Resolution × Channels	—																
Timer	8-bit	—																
	16-bit	5 (MTU2)																
	32-bit	9																
	Input Capture	(shared with MTU2)																
	Output Compare	(shared with MTU2)																
	PWM Output	(shared with MTU2)																
	Event Counter	(MTU2)																
	2-Phase Encoder Input	(MTU2)																
	3-Phase Inverter Control	(MTU2)																
Watchdog Timer		1																
Serial Interface	Clock Sync./Clock Async.	6 (max)																
	Clock Sync. Only	—																
	Clock Async. Only	—																
I^2C-bus		2 (max)																
Smart Card/SIM		—																
Synchronous Serial Communication Unit/Special Serial I/O		RSPI × 1 (max), HSPI × 1 (max), QSPI × 1 (max), SSI × 4 (max)																
CAN	Channels	—				2 (max)				—				2 (max)				
	Message Box (Numbers)	—				32 × 2				—				32 × 2				
FlexRay		—																
Ethernet		GEthernet × 1 (max)																
USBHOST		2 (max) (High-Speed)																
USBFunction		1 (max) (High-Speed)																
IrDA		Yes																
LCD		Yes																
I/O Ports	Input Only (Numbers)	12 (max)																
	CMOS I/O (Numbers)	160 (max)																
	High Voltage Port (Numbers)	—																
	N-Channel Open Drain Port (Numbers)	—																
	High Current Drive Port	—																
	Pull-Up Resistor	—																
External Interrupts Pins		5 (NMI + IRQ × 4)																
Debugging Function	Boundary Scan/JTAG	Yes																
	On-Chip Debug	Yes																
	On-Board Flash Program	—																
Other Functions	ROM Correction Function	—																
	Others	Video in, Display cntl., SRC, FLCTL, MMC, VEU	Video in, Display cntl., SRC, FLCTL, MMC, VEU, 2D Graphics Accelerator	Video in, Display cntl., SRC, FLCTL, MMC, VEU, SDHI	Video in, Display cntl., SRC, FLCTL, MMC, VEU, SDHI, 2D Graphics Accelerator	Video in, Display cntl., SRC, FLCTL, MMC, VEU, RCAN	Video in, Display cntl., SRC, FLCTL, MMC, VEU, RCAN, 2D Graphics Accelerator	Video in, Display cntl., SRC, FLCTL, MMC, VEU, RCAN, SDHI	Video in, Display cntl., SRC, FLCTL, MMC, VEU, RCAN, SDHI, 2D Graphics Accelerator	Video in, Display cntl., SRC, FLCTL, MMC, VEU, STIF	Video in, Display cntl., SRC, FLCTL, MMC, VEU, STIF, 2D Graphics Accelerator	Video in, Display cntl., SRC, FLCTL, MMC, VEU, STIF, SDHI	Video in, Display cntl., SRC, FLCTL, MMC, VEU, STIF, SDHI, 2D Graphics Accelerator	Video in, Display cntl., SRC, FLCTL, MMC, VEU, STIF, RCAN	Video in, Display cntl., SRC, FLCTL, MMC, VEU, STIF, RCAN, 2D Graphics Accelerator	Video in, Display cntl., SRC, FLCTL, MMC, VEU, STIF, RCAN, SDHI	Video in, Display cntl., SRC, FLCTL, MMC, VEU, STIF, RCAN, SDHI, 2D Graphics Accelerator
Operating Frequency/Supply Voltage		533MHz/1.25V (internal), 3.0 to 3.6V (peripheral), 1.8/1.5V (DDR)																
Operating Ambient Temperature (˚C)		–40 to 85																
Package*2		BGA440																
Part No.		R8A77343DA00BG★★	R8A77343DA01BG★★	R8A77343DA02BG★★	R8A77343DA03BG★★	R8A77343DA04BG★★	R8A77343DA05BG★★	R8A77343DA06BG★★	R8A77343DA07BG★★	R8A77343DA08BG★★	R8A77343DA09BG★★	R8A77343DA0ABG★★	R8A77343DA0BBG★★	R8A77343DA0CBG★★	R8A77343DA0DBG★★	R8A77343DA0EBG★★	R8A77343DA0FBG★★	

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (SH7780 Series)

Series		SH7780																
Group		SH7734																
Memory	ROM (Bytes)	—																
	RAM (Bytes)	ILRAM 16KB, OLRAM 16KB																
	ROM Type*1	L																
	Cache Memory	32K (instructions), 32K (data), 4-way set-associative																
	Program Security	—																
CPU	CPU	SH-4A																
	Basic Instructions	103																
	Minimum Instruction Execution Time (ns)	0.94 (@533MHz)																
	Dhrystone Performance	—																
	Multiplier	32 × 32 → 64																
	Multiply-Accumulate Instruction	32 × 32 + 64 → 64																
	Barrel Shifter	Yes																
	FPU	Yes																
	MMU	—																
DMA	DMAC (Channels)	34																
	DTC/DMAC Ⅱ	—																
External Bus Expansion	Address Space (Bytes)	4G																
	Bus State Controller	Yes																
	Bus Structure	Separate bus (8/16-bit), DDR (16-bit)																
	SDRAM Controller	Yes																
	DRAM Controller	—																
	PCI Controller	—																
	Endian Conversion	—																
	Host Interface	Yes																
Clock	Clock Generation Circuit	1 circuit (CPG)																
	PLL	Yes																
	RTC	Yes																
	Oscillation Stop Detection	—																
	Frequency Divider	Yes																
	Power Save	Sleep/Software standby/Deep standby/Module standby																
Power Supply Voltage Detection	Power-On Reset/POR	—																
A/D Converter	Resolution × Channels	10-bit × 8																
	Sample and Hold	Yes																
	Multi-Channel Sample and Hold	—																
D/A Converter	Resolution × Channels	—																
Timer	8-bit	—																
	16-bit	5 (MTU2)																
	32-bit	9																
	Input Capture	(shared with MTU2)																
	Output Compare	(shared with MTU2)																
	PWM Output	(shared with MTU2)																
	Event Counter	(MTU2)																
	2-Phase Encoder Input	(MTU2)																
	3-Phase Inverter Control	(MTU2)																
Watchdog Timer		1																
Serial Interface	Clock Sync./Clock Async.	6 (max)																
	Clock Sync. Only	—																
	Clock Async. Only	—																
I^2C-bus		2 (max)																
Smart Card/SIM		—																
Synchronous Serial Communication Unit/Special Serial I/O		RSPI × 1 (max), HSPI × 1 (max), QSPI × 1 (max), SSI × 4 (max)																
CAN	Channels	—				2 (max)				—				2 (max)				
	Message Box (Numbers)	—				32 × 2				—				32 × 2				
FlexRay		—																
Ethernet		GEthernet × 1 (max)																
USBHOST		2 (max) (High-Speed)																
USBFunction		1 (max) (High-Speed)																
IrDA		Yes																
LCD		Yes																
I/O Ports	Input Only (Numbers)	12 (max)																
	CMOS I/O (Numbers)	160 (max)																
	High Voltage Port (Numbers)	—																
	N-Channel Open Drain Port (Numbers)	—																
	High Current Drive Port	—																
	Pull-Up Resistor	—																
External Interrupts Pins		5 (NMI + IRQ × 4)																
Debugging Function	Boundary Scan/JTAG	Yes																
	On-Chip Debug	Yes																
	On-Board Flash Program	—																
Other Functions	ROM Correction Function	—																
	Others	Video in, Display cntl., SRC, FLCTL, MMC, VEU	Video in, Display cntl., SRC, FLCTL, MMC, VEU, 2D Graphics Accelerator	Video in, Display cntl., SRC, FLCTL, MMC, VEU, SDHI	Video in, Display cntl., SRC, FLCTL, MMC, VEU, SDHI, 2D Graphics Accelerator	Video in, Display cntl., SRC, FLCTL, MMC, VEU, RCAN	Video in, Display cntl., SRC, FLCTL, MMC, VEU, RCAN, 2D Graphics Accelerator	Video in, Display cntl., SRC, FLCTL, MMC, VEU, RCAN, SDHI	Video in, Display cntl., SRC, FLCTL, MMC, VEU, RCAN, SDHI, 2D Graphics Accelerator	Video in, Display cntl., SRC, FLCTL, MMC, VEU, STIF	Video in, Display cntl., SRC, FLCTL, MMC, VEU, STIF, 2D Graphics Accelerator	Video in, Display cntl., SRC, FLCTL, MMC, VEU, STIF, SDHI	Video in, Display cntl., SRC, FLCTL, MMC, VEU, STIF, SDHI, 2D Graphics Accelerator	Video in, Display cntl., SRC, FLCTL, MMC, VEU, STIF, RCAN	Video in, Display cntl., SRC, FLCTL, MMC, VEU, STIF, RCAN, 2D Graphics Accelerator	Video in, Display cntl., SRC, FLCTL, MMC, VEU, STIF, RCAN, SDHI	Video in, Display cntl., SRC, FLCTL, MMC, VEU, STIF, RCAN, SDHI, 2D Graphics Accelerator
Operating Frequency/Supply Voltage		533MHz/1.25V (internal), 3.0 to 3.6V (peripheral), 1.8/1.5V (DDR)																
Operating Ambient Temperature (˚C)		–40 to 85																
Package*2		BGA440																
Part No.		R8A77343PA00BG★★	R8A77343PA01BG★★	R8A77343PA02BG★★	R8A77343PA03BG★★	R8A77343PA04BG★★	R8A77343PA05BG★★	R8A77343PA06BG★★	R8A77343PA07BG★★	R8A77343PA08BG★★	R8A77343PA09BG★★	R8A77343PA0ABG★★	R8A77343PA0BBG★★	R8A77343PA0CBG★★	R8A77343PA0DBG★★	R8A77343PA0EBG★★	R8A77343PA0FBG★★	

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (SH7780 Series)

Series		SH7780							
Group		SH7763			SH7764				
Memory	ROM (Bytes)	—							
	RAM (Bytes)	16K							
	ROM Type*1	L							
	Cache Memory	32K (instructions), 32K (data), 4-way set-associative							
	Program Security	—							
CPU	CPU	SH-4A Core							
	Basic Instructions	103							
	Minimum Instruction Execution Time (ns)	1.9 (@266MHz)			1.5 (@324MHz)				
	Dhrystone Performance	478MIPS (266MHz), 1.8GFLOPS (266MHz)			583MIPS (324MHz)				
	Multiplier	32 × 32 → 64							
	Multiply-Accumulate Instruction	32 × 32 + 64 → 64							
	Barrel Shifter	Yes							
	FPU	Yes							
	MMU	Yes							
DMA	DMAC (Channels)	6 (4 channels of them can receive an external request)			6 (2 channels of them can receive an external request)				
	DTC/DMAC Ⅱ	—							
External Bus Expansion	Address Space (Bytes)	Local: 448M, DDR: 256M, PCI: 512M + memory I/O area			256M				
	Bus State Controller	SRAM/MPX/Burst ROM/Byte Control SRAM/PCMCIA			SRAM/SDRAM				
	Bus Structure	Local bus (8/16/32-bit)/DDR (32-bit)/PCI (32-bit)/multiplex bus (32-bit)			Separate bus (8/16/32-bit) SDRAM can connect to 64-bit bus				
	SDRAM Controller	Yes (DDR-SDRAM)			Yes				
	DRAM Controller	—							
	PCI Controller	Yes			—				
	Endian Conversion	Yes							
	Host Interface	—							
Clock	Clock Generation Circuit	1 circuit							
	PLL	Yes							
	RTC	Yes			—				
	Oscillation Stop Detection	—							
	Frequency Divider	Yes							
	Power Save	Sleep/Module standby			Sleep/Refresh standby/Module standby				
Power Supply Voltage Detection	Power-On Reset/POR	—							
A/D Converter	Resolution × Channels	10-bit × 4			—				
	Sample and Hold	Yes			—				
	Multi-Channel Sample and Hold	Yes			—				
D/A Converter	Resolution × Channels	8-bit × 2			—				
Timer	8-bit	—							
	16-bit	4 (CMT)			—				
	32-bit	6 (TMU)							
	Input Capture	2 (shared with TMU)			1 (shared with TMU)				
	Output Compare	—							
	PWM Output	—							
	Event Counter	—							
	2-Phase Encoder Input	—							
	3-Phase Inverter Control	—							
Watchdog Timer		1							
Serial Interface	Clock Sync./Clock Async.	3							
	Clock Sync. Only	—							
	Clock Async. Only	—							
I²C-bus		2			1				
Smart Card/SIM		Yes			—				
Synchronous Serial Communication Unit/Special Serial I/O		3 (serial IO × 3)			6 (SSI × 6)				
CAN	Channels	—							
	Message Box (Numbers)	—							
FlexRay		—							
Ethernet		2 (Gbit)			1				
USBHOST		Yes (selectable USB Function)			1 (Host/Function selectable)				
USBFunction		Yes (selectable USB HOST)			1 (Host/Function selectable)				
IrDA		Yes			—				
LCD		Yes							
I/O Ports	Input Only (Numbers)	4 (Max.)			—				
	CMOS I/O (Numbers)	107 (Max.)			77				
	High Voltage Port (Numbers)	—							
	N-Channel Open Drain Port (Numbers)	—							
	High Current Drive Port	—							
	Pull-Up Resistor	Yes			77				
External Interrupts Pins		9 (NMI + 15 (15 level) or 8)			3				
Debugging Function	Boundary Scan/JTAG	Yes							
	On-Chip Debug	Yes							
	On-Board Flash Program	—							
Other Functions	ROM Correction Function	—							
	Others	Sec.accelerator, Audio CODEC interface, Serial Sound Interface, MultiMediaCard Interface, Stream Interface (Some pins for each module are multiplexed.)	Audio CODEC interface, Serial Sound Interface, MultiMediaCard Interface, Stream Interface (Some pins for each module are multiplexed.)	Sec.accelerator, SD Host interface, Audio CODEC interface, Serial Sound Interface, MultiMediaCard Interface, Stream Interface (Some pins for each module are multiplexed.)	—			SD host interface	
Operating Frequency/Supply Voltage		266MHz/1.25V (internal), 3.3V (I/O), 2.5V (DDR)			324MHz/1.2V (Internal)/3.3V (I/O)				
Operating Ambient Temperature (˚C)		–20 to 75			–20 to 85		–40 to 85	–20 to 85	–40 to 85
Package*2		BP-449			PRBG0404GA-A				
Part No.		R5S77630AY266BGV	R5S77631AY266BGV	R5S77632AY266BGV	R5S77640N300BG	R5S77640D300BG	R5S77640P300BG	R5S77641N300BG	R5S77641D300BG	R5S77641P300BG

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (SH7780 Series)

Series		SH7780		
Group		SH7722	SH7723	SH7724
Memory	ROM (Bytes)	—		
	RAM (Bytes)	148K	16K	
	ROM Type*1	L		
	Cache Memory	32K (instructions), 32K (data) 4-way set-associative	L1C: 32K (instructions), 32K (data) 4-way set-associative L2C: 256K (Mixed instruction and operand type)	
	Program Security	—		
CPU	CPU	SH4AL-DSP Core	SH-4A Core	
	Basic Instructions	170	103	
	Minimum Instruction Execution Time (ns)	1.5 (@333.4MHz)	1.25 (@400MHz)	1.00 (@500MHz)
	Dhrystone Performance	597MIPS (333.4MHz)	720MIPS (400MHz)	900MIPS (500MHz)
	Multiplier	32 × 32 → 64		
	Multiply-Accumulate Instruction	32 × 32 + 64 → 64		
	Barrel Shifter	Yes		
	FPU	—		
	MMU	Yes		
DMA	DMAC (Channels)	6 (1 channel of them can receive an external request)	12 (2 channels of them can receive an external request)	
	DTC/DMAC II	—		
External Bus Expansion	Address Space (Bytes)	384M		
	Bus State Controller	SRAM/Burst ROM/NOR-Flash/PCMCIA		
	Bus Structure	Local bus (16/32-bit) SDRAM (16/32/64-bit)	Local bus (16/32-bit) DDR1-SDRAM (32-bit)	
	SDRAM Controller	Yes (SDRAM)	Yes (DDR1-SDRAM)	Yes (DDR2/MobileDDR-SDRAM)
	DRAM Controller	—		
	PCI Controller	—		
	Endian Conversion	Yes		
	Host Interface	—		
Clock	Clock Generation Circuit	1 circuit		
	PLL	Yes		
	RTC	—		
	Oscillation Stop Detection	—		
	Frequency Divider	Yes		
	Power Save	Sleep/Software standby/Module standby/U-standby		Sleep/Software standby/ Module standby/R-standby/U-standby
Power Supply Voltage Detection	Power-On Reset/POR	Yes		
A/D Converter	Resolution × Channels	—	10-bit × 4	—
	Sample and Hold	—		
	Multi-Channel Sample and Hold	—		
D/A Converter	Resolution × Channels	—		
Timer	8-bit	—		
	16-bit	4 (TPU)		
	32-bit	3 (TMU), 1 (CMT)	6 (TMU), 1 (CMT)	
	Input Capture	—		
	Output Compare	1 (shared with TPU)		
	PWM Output	1 (shared with TPU)		
	Event Counter	—		
	2-Phase Encoder Input	—		
	3-Phase Inverter Control	—		
Watchdog Timer		1		
Serial Interface	Clock Sync./Clock Async.	3 (SCIF × 3)	3 (SCIF × 3), 3 (SCIFA × 3)	
	Clock Sync. Only	1 (SIO)	—	
	Clock Async. Only	—		
I²C-bus		1		
Smart Card/SIM		Yes		
Synchronous Serial Communication Unit/Special Serial I/O		2 (SIOF × 2), 2 (SIU × 2)	2 (MSIOF × 2)	
CAN	Channels	—		
	Message Box (Numbers)	—		
FlexRay		—		
Ethernet		—		1
USBHOST		—	Yes	
USBFunction		Yes		
IrDA		Yes		
LCD		Yes		
I/O Ports	Input Only (Numbers)	23	6	
	CMOS I/O (Numbers)	100	162	
	High Voltage Port (Numbers)	—		
	N-Channel Open Drain Port (Numbers)	—		
	High Current Drive Port	—		
	Pull-Up Resistor	Yes		
External Interrupts Pins		9 (NMI 1 + IRQ 8)		
Debugging Function	Boundary Scan/JTAG	Yes		
	On-Chip Debug	Yes		
	On-Board Flash Program	—		
Other Functions	ROM Correction Function	—		
	Others	Video processing unit (VPU) Video I/O (VIO) JPEG Processing Unit (JPU) Video Output Unit (VOU) TS Interface (TSIF) Key scan interface (KEYSC) 2D Graphics Accelerator (2DG) SD card host interface (SDHI) NAND Flash Memory Control (FLCTL)	Video processing unit (VPU5F) Video I/O (VIO5) Video Output Unit (VOU) TS Interface (TSIF) Key scan interface (KEYSC) 2D Graphics Accelerator (2DG) SD card host interface (SDHI) NAND Flash Memory Control (FLCTL) ATAPI interface (ATAPI)	
Operating Frequency/Supply Voltage		266MHz/1.2V (internal), 3.3V (I/O) 333MHz/1.3V (internal), 3.3V (I/O)	400MHz/1.2V (internal), 3.3V (I/O), 2.5V (DDR)	500MHz/1.2V (internal), 3.3V (I/O), 1.8V (DDR)
Operating Ambient Temperature (˚C)		–20 to 70	–40 to 85	–20 to 70 / –40 to 85 / –20 to 70
Package*2		PLBG0417KB-A	PRBG0449GA-A	PVBG0441KA-B
Part No.		R8A77220AC266BA	R8A77220AC266BG	R8A77230C400BG / R8A77230D400BG / R8A77240D500BG / R8A77240B500BB

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

SH7750 Series (SH-4)

- Realizes high-performance: operating at 240MHz
- Realizes 1.5 to 2.0 times higher-performance than previous series by doubling cache memory capacity (2-way)
- MP3 processing was enabled by using an FPU for DSP processing.
- On-chip powerful peripheral functions

• Specifications (SH7750 Series)

Series		SH7750									
Group		SH7750R						SH7750S			
Memory	ROM (Bytes)	—									
	RAM (Bytes)	—									
	ROM Type*1	L									
	Cache Memory	16K (instructions), 32K (data), 2-way set-associative						8K (instructions), 16K (data), Direct map			
	Program Security	—									
CPU	CPU	SH-4 Core									
	Basic Instructions	94									
	Minimum Instruction Execution Time (ns)	2.5 (@200MHz)	2.1 (@240MHz)	2.5 (@200MHz)	2.1 (@240MHz)	2.5 (@200MHz)	2.1 (@240MHz)	2.5 (@200MHz)	3 (@167MHz)	2.5 (@200MHz)	3.8 (@133MHz)
	Dhrystone Performance	—									
	Multiplier	32 × 32 → 64									
	Multiply-Accumulate Instruction	32 × 32 + 64 → 64									
	Barrel Shifter	Yes									
	FPU	Yes									
	MMU	Yes									
DMA	DMAC (Channels)	8 (2 channels of them can receive an external request)						4 (2 channels of them can receive an external request)			
	DTC/DMAC II	—									
External Bus Expansion	Address Space (Bytes)	448M									
	Bus State Controller	SRAM/DRAM/SDRAM/MPX/Burst ROM/Byte Control SRAM/PCMCIA									
	Bus Structure	Separate bus (8/16/32/64-bit)/multiplex bus (32/64-bit)									
	SDRAM Controller	Yes									
	DRAM Controller	Yes									
	PCI Controller	—									
	Endian Conversion	Yes									
	Host Interface	—									
Clock	Clock Generation Circuit	1 circuit									
	PLL	Yes									
	RTC	Yes									
	Oscillation Stop Detection	—									
	Frequency Divider	Yes									
	Power Save	Sleep/Standby/Module standby									
Power Supply Voltage Detection	Power-On Reset/POR	—									
A/D Converter	Resolution × Channels	—									
	Sample and Hold	—									
	Multi-Channel Sample and Hold	—									
D/A Converter	Resolution × Channels	—									
Timer	8-bit	—									
	16-bit	—									
	32-bit	5 (TMU)						3 (TMU)			
	Input Capture	1 (shared with TMU)									
	Output Compare	—									
	PWM Output	—									
	Event Counter	—									
	2-Phase Encoder Input	—									
	3-Phase Inverter Control	—									
Watchdog Timer		1									
Serial Interface	Clock Sync./Clock Async.	1									
	Clock Sync. Only	—									
	Clock Async. Only	1									
I²C-bus		—									
Smart Card/SIM		1 (T=0 (sub set))									
Synchronous Serial Communication Unit/Special Serial I/O		—									
CAN	Channels	—									
	Message Box (Numbers)	—									
FlexRay		—									
Ethernet		—									
USBHOST		—									
USBFunction		—									
IrDA		—									
LCD		—									
I/O Ports	Input Only (Numbers)	—									
	CMOS I/O (Numbers)	28 (Max.)									
	High Voltage Port (Numbers)	—									
	N-Channel Open Drain Port (Numbers)	—									
	High Current Drive Port	—									
	Pull-Up Resistor	Yes									
External Interrupts Pins		5 (NMI + 15 (15 level) or 4)									
Debugging Function	Boundary Scan/JTAG	Yes						—			
	On-Chip Debug	Yes									
	On-Board Flash Program	—									
Other Functions	ROM Correction Function	—									
	Others	(Some pins for each module are multiplexed)									
Operating Frequency/Supply Voltage		200MHz/1.5V, 3.3V (I/O)	240MHz/1.5V, 3.3V (I/O)	200MHz/1.5V, 3.3V (I/O)	240MHz/1.5V, 3.3V (I/O)	200MHz/1.5V, 3.3V (I/O)	240MHz/1.5V, 3.3V (I/O)	200MHz/1.95V, 3.3V (I/O)	167MHz/1.8V, 3.3V (I/O)	200MHz/1.95V, 3.3V (I/O)	133MHz/1.5V, 3.3V (I/O)
Operating Ambient Temperature (˚C)		-20 to 75 / -40 to 85	-20 to 75 / -40 to 85	-20 to 75 / -40 to 85	-20 to 75 / -40 to 85	-20 to 75 / -40 to 85	-20 to 75 / -40 to 85	-20 to 75 / -40 to 85	—		
Package*2		PRBG0292GA-A		PRBG0256DE-B		PRQP0208KE-B		PRBG0256DE-A	PRQP0208KE-B	PLBG0264GA-A	PRQP0208KE-B
Part No.		HD6417750RBG200	HD6417750RBG200D	HD6417750RBG240	HD6417750RBG240D	HD6417750RBP200	HD6417750RBP200D	HD6417750RBP240	HD6417750RBP240D	HD6417750RF200	HD6417750RF200D	HD6417750RF240	HD6417750RF240D	HD6417750SBP200	HD6417750SBP200W	HD6417750SF167	HD6417750SF167D	HD6417750SF167I	HD6417750SF200	HD6417750SF200W	HD6417750SV/BT133	HD6417750SV/FT133

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (SH7750 Series)

Series		SH7750															
Group		SH7751R														SH7760	
Memory	ROM (Bytes)	—															
	RAM (Bytes)	—															
	ROM Type*1	L															
	Cache Memory	16K (instructions), 32K (data), 2-way set-associative															
	Program Security	—															
CPU	CPU	SH-4 Core															
	Basic Instructions	94															
	Minimum Instruction Execution Time (ns)	2.5 (@200MHz)		2.1 (@240MHz)		2.5 (@200MHz)		2.1 (@240MHz)		2.5 (@200MHz)		2.1 (@240MHz)		2.5 (@200MHz)			
	Dhrystone Performance	—															
	Multiplier	32 × 32 → 64															
	Multiply-Accumulate Instruction	32 × 32 + 64 → 64															
	Barrel Shifter	Yes															
	FPU	Yes															
	MMU	Yes															
DMA	DMAC (Channels)	8 (2 channels of them can receive an external request) + 4 (PCI only)														8 (4 channels of them can receive an external request)	
	DTC/DMAC II	—															
External Bus Expansion	Address Space (Bytes)	448M + PCI area														448M	
	Bus State Controller	SRAM/DRAM/SDRAM/MPX/Burst ROM/Byte Control SRAM/PCMCIA														SRAM/SDRAM/MPX/Burst ROM/Byte Control SRAM/PCMCIA	
	Bus Structure	Separate bus (8/16/32-bit)/multiplex bus (32-bit)															
	SDRAM Controller	Yes															
	DRAM Controller	Yes														—	
	PCI Controller	Yes														—	
	Endian Conversion	Yes															
	Host Interface	—														Yes (Multi-function interface)	
Clock	Clock Generation Circuit	1 circuit															
	PLL	Yes															
	RTC	Yes														—	
	Oscillation Stop Detection	—															
	Frequency Divider	Yes															
	Power Save	Sleep/Standby/Module standby															
Power Supply Voltage Detection	Power-On Reset/POR	—															
A/D Converter	Resolution × Channels	—														10-bit × 4	
	Sample and Hold	—														Yes	
	Multi-Channel Sample and Hold	—														Yes	
D/A Converter	Resolution × Channels	—															
Timer	8-bit	—															
	16-bit	—														4 (CMT)	
	32-bit	5 (TMU)														3 (TMU)	
	Input Capture	1 (shared with TMU)															
	Output Compare	—														1 (shared with CMT)	
	PWM Output	—															
	Event Counter	—															
	2-Phase Encoder Input	—															
	3-Phase Inverter Control	—															
Watchdog Timer		1															
Serial Interface	Clock Sync./Clock Async.	1														3	
	Clock Sync. Only	—															
	Clock Async. Only	1														—	
I²C-bus		—														2	
Smart Card/SIM		1 (T=0 (sub set))														1 (T=0 (sub set)/T=1 (sub set))	
Synchronous Serial Communication Unit/Special Serial I/O		—															
CAN	Channels	—														2	
	Message Box (Numbers)	—														32	
FlexRay		—															
Ethernet		—															
USBHOST		—														1 (Full speed)	
USBFunction		—															
IrDA		—															
LCD		—														Yes	
I/O Ports	Input Only (Numbers)	—															
	CMOS I/O (Numbers)	39 (Max.)														69 (Max.)	
	High Voltage Port (Numbers)	—															
	N-Channel Open Drain Port (Numbers)	—															
	High Current Drive Port	—															
	Pull-Up Resistor	Yes															
External Interrupts Pins		5 (NMI + 15 (15 level) or 4)															
Debugging Function	Boundary Scan/JTAG	Yes															
	On-Chip Debug	Yes															
	On-Board Flash Program	—															
Other Functions	ROM Correction Function	—															
	Others	(Some pins for each module are multiplexed)														Audio Codec interface × 2, Serial Sound Interface × 2, MultiMediaCard interface (Some pins for each module are multiplexed)	
Operating Frequency/Supply Voltage		200MHz/1.5V, 3.3V (I/O)		240MHz/1.5V, 3.3V (I/O)		200MHz/1.5V, 3.3V (I/O)		240MHz/1.5V, 3.3V (I/O)		200MHz/1.5V, 3.3V (I/O)		240MHz/1.5V, 3.3V (I/O)		200MHz/1.5V, 3.3V (I/O)			
Operating Ambient Temperature (°C)		–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85		
Package*2		PRBG0292GA-A				PRBG0256DE-B				PRQP0256LA-B				BP-256B			
Part No.		HD6417751RBG200	HD6417751RBG200D	HD6417751RBG240	HD6417751RBG240D	HD6417751RBP200	HD6417751RBP200D	HD6417751RBP240	HD6417751RBP240D	HD6417751RF200	HD6417751RF200D	HD6417751RF240	HD6417751RF240D	HD6417760BL200A	HD6417760BL200AD		

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

SH7700 Series (SH3-DSP)

• Realizes high-performance : 260MIPS/200MHz
• It has standard peripheral functions built-in, and is applicable to various applications.

• Specifications (SH7700 Series)

Series		SH7700				
Group		SH7705	SH7720	SH7721	SH7727	
Memory	ROM (Bytes)	—				
	RAM (Bytes)	—	16K			
	ROM Type*1	L				
	Cache Memory	32K, 4-way set-associative			16K, 4-way set-associative	
	Program Security	—				
CPU	CPU	SH-3 Core	SH3-DSP Core			
	Basic Instructions	68	160			
	Minimum Instruction Execution Time (ns)	10 (@100MHz)	7.5 (@133MHz)		10 (@100MHz)	6.3 (@160MHz)
	Dhrystone Performance	—				
	Multiplier	32 × 32 → 64				
	Multiply-Accumulate Instruction	32 × 32 + 64 → 64				
	Barrel Shifter	Yes				
	FPU	—				
	MMU	Yes				
DMA	DMAC (Channels)	4 (2 channels of them can receive an external request)	6 (2 channels of them can receive an external request)		4 (2 channels of them can receive an external request)	
	DTC/DMAC II	—				
External Bus Expansion	Address Space (Bytes)	384M				
	Bus State Controller	SRAM/SDRAM/Burst ROM/Byte Control SRAM	SRAM/SDRAM/Burst ROM/Byte Control SRAM/PCMCIA		SRAM/SDRAM/Burst ROM/PCMCIA	
	Bus Structure	Separate bus (8/16/32-bit)				
	SDRAM Controller	Yes				
	DRAM Controller	—				
	PCI Controller	—				
	Endian Conversion	Yes				
	Host Interface	—				
Clock	Clock Generation Circuit	1 circuit				
	PLL	Yes				
	RTC	Yes (not separated power supply voltage)	Yes		Yes (not separated power supply voltage)	
	Oscillation Stop Detection	—				
	Frequency Divider	Yes				
	Power Save	Sleep/software standby/Module standby/hardware standby				
Power Supply Voltage Detection	Power-On Reset/POR	—				
A/D Converter	Resolution × Channels	10-bit × 4			10-bit × 6	
	Sample and Hold	Yes				
	Multi-Channel Sample and Hold	Yes				
D/A Converter	Resolution × Channels	—	8-bit × 2			
Timer	8-bit	—				
	16-bit	5 (TPU × 4, CMT)	9 (TPU × 4, CMT × 5)		1 (CMT)	
	32-bit	3 (TMU)				
	Input Capture	1 (shared with TMU)	—			
	Output Compare	1 (shared with TPU)			—	
	PWM Output	4 (shared with TPU)			—	
	Event Counter	—				
	2-Phase Encoder Input	—				
	3-Phase Inverter Control	—				
Watchdog Timer		1				
Serial Interface	Clock Sync./Clock Async.	2			1	
	Clock Sync. Only	—	2		1	
	Clock Async. Only	—			1	
I²C-bus		—	1		—	
Smart Card/SIM		—	1 (T=0 (sub set)/T=1 (sub set))		1 (T=0 (sub set))	
Synchronous Serial Communication Unit/Special Serial I/O		—				
CAN	Channels	—				
	Message Box (Numbers)	—				
FlexRay		—				
Ethernet		—				
USBHOST		—	2 (selectable USB Function)			
USBFunction		1	1 (selectable USB HOST)			
IrDA		Yes (using serial I/F (1ch))			—	
LCD		—	Yes			
I/O Ports	Input Only (Numbers)	—	7		—	
	CMOS I/O (Numbers)	105	110		104	
	High Voltage Port (Numbers)	—				
	N-Channel Open Drain Port (Numbers)	—				
	High Current Drive Port	—				
	Pull-Up Resistor	Yes	117 (I/O 110, input 7)		Yes	
External Interrupts Pins		23 (NMI + 22 (15 level))			7 (NMI + 6 (15 level))	
Debugging Function	Boundary Scan/JTAG	Yes				
	On-Chip Debug	Yes				
	On-Board Flash Program	—				
Other Functions	ROM Correction Function	—				
	Others	—	DSP function, MultiMediaCard interface, Compare match timer, SD Host interface, SSL accelerator	DSP function, MultiMediaCard interface, Compare match timer, SSL accelerator	DSP function, MultiMediaCard interface, Compare match timer, SD Host interface	DSP function
Operating Frequency/Supply Voltage		100MHz/1.5V, 3.3V	133MHz/1.5V, 3.3V		100MHz/1.8V, 3.3V	160MHz/1.9V, 3.3V
Operating Ambient Temperature (˚C)		–20 to 75				
Package*2		TTBGA208JA-A	PLQP0208KA-A	TTBGA208JA-A	PLQP0208KA-A	PLBG0256GA-A	PLBG0256KA-A	PLBG0256GA-A	PLBG0256KA-A	PLBG0256GA-A	PLBG0256KA-A	PLBG0256GA-A	PLBG0240JA-A	PRQP0240KC-B	PLBG0240JA-A	PRQP0240KC-B
Part No.		HD6417705BP100B	HD6417705F100B	HD6417705BP133B	HD6417705F133B	HD6417320BP133C	HD6417720BL133C	HD6417720BP133C	R8A77210C133BA	R8A77210C133BG	R8A77211C133BA	R8A77211C133BG	HD6417727BP100C	HD6417727F100C	HD6417727BP160C	HD6417727F160C

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (SH7700 Series)

Series		SH7700												
Group		SH7706	SH7709S				SH7729R							
Memory	ROM (Bytes)	—												
	RAM (Bytes)	—					16K							
	ROM Type*1	L												
	Cache Memory	16K, 4-way set-associative												
	Program Security	—												
CPU	CPU	SH-3 Core					SH3-DSP Core							
	Basic Instructions	68					160							
	Minimum Instruction Execution Time (ns)	7.5 (@133MHz)	10 (@100MHz)	7.5 (@133MHz)	6 (@167MHz)	5 (@200MHz)	10 (@100MHz)	7.5 (@133MHz)	6 (@167MHz)	5 (@200MHz)				
	Dhrystone Performance	—												
	Multiplier	32 × 32 → 64												
	Multiply-Accumulate Instruction	32 × 32 + 64 → 64												
	Barrel Shifter	Yes												
	FPU	—												
	MMU	Yes												
DMA	DMAC (Channels)	4 (2 channels of them can receive an external request)												
	DTC/DMAC Ⅱ	—												
External Bus Expansion	Address Space (Bytes)	384M												
	Bus State Controller	SRAM/SDRAM/Burst ROM/PCMCIA												
	Bus Structure	Separate bus (8/16/32-bit)												
	SDRAM Controller	Yes												
	DRAM Controller	—												
	PCI Controller	—												
	Endian Conversion	Yes												
	Host Interface	—												
Clock	Clock Generation Circuit	1 circuit												
	PLL	Yes												
	RTC	Yes												
	Oscillation Stop Detection	—												
	Frequency Divider	Yes												
	Power Save	Sleep/software standby/module standby/hardware standby												
Power Supply Voltage Detection	Power-On Reset/POR	—												
A/D Converter	Resolution × Channels	10-bit × 4	10-bit × 8											
	Sample and Hold	Yes												
	Multi-Channel Sample and Hold	Yes												
D/A Converter	Resolution × Channels	8-bit × 2												
Timer	8-bit	—												
	16-bit	1 (CMT)												
	32-bit	3 (TMU)												
	Input Capture	1 (shared with TMU)												
	Output Compare	—												
	PWM Output	—												
	Event Counter	—												
	2-Phase Encoder Input	—												
	3-Phase Inverter Control	—												
Watchdog Timer		1												
Serial Interface	Clock Sync./Clock Async.	1												
	Clock Sync. Only	—												
	Clock Async. Only	1	2											
I²C-bus		—												
Smart Card/SIM		1 (T=0 (sub set))												
Synchronous Serial Communication Unit/Special Serial I/O		—												
CAN	Channels	—												
	Message Box (Numbers)	—												
FlexRay		—												
Ethernet		—												
USBHOST		—												
USBFunction		—												
IrDA		—	Yes (using serial I/F (1ch))											
LCD		—												
I/O Ports	Input Only (Numbers)	—												
	CMOS I/O (Numbers)	72	96											
	High Voltage Port (Numbers)	—												
	N-Channel Open Drain Port (Numbers)	—												
	High Current Drive Port	—												
	Pull-Up Resistor	Yes												
External Interrupts Pins		7 (NMI + 6 (15 level))	23 (NMI + 22 (15 level))											
Debugging Function	Boundary Scan/JTAG	Yes												
	On-Chip Debug	Yes												
	On-Board Flash Program	—												
Other Functions	ROM Correction Function	—												
	Others	—					DSP function							
Operating Frequency/Supply Voltage		133MHz/ 1.9V, 3.3V	100MHz/ 1.7V, 3.3V	133MHz/ 1.8V, 3.3V	167MHz/ 1.9V, 3.3V	200MHz/ 2.0V, 3.3V	100MHz/ 1.7V, 3.3V	133MHz/ 1.8V, 3.3V	167MHz/ 1.9V, 3.3V	200MHz/ 2.0V, 3.3V				
Operating Ambient Temperature (˚C)		–20 to 75												
Package*2		TTBG0208JA-A	PLQP0176KD-A	PLBG0240JA-A	PLQP0208KA-A	PLBG0240JA-A	PLQP0208KA-A	PLBG0240JA-A	PLQP0208KA-A	PRQP0208KE-B	PLBG0240JA-A	PLQP0208KA-A	PLBG0240JA-A	PLQP0208KA-A
Part No.		HD6417706BP133	HD6417706F133	HD6417709SBP100B	HD6417709SF100B	HD6417709SBP133B	HD6417709SF133B	HD6417709SBP167B	HD6417709SF167B	HD6417709SHF200B	HD6417729RBP100B	HD6417729RF100B	HD6417729RBP133B	HD6417729RF133B

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

Controller type ROM-less versions : SH7200 Series

SH7200 Series (SH-2A)

- New SH-2A CPU core achieves low power consumption and high-performance
- 128KB large-capacity RAM and cache memory
- Enhanced on-chip peripheral functions

• Specifications (Controller type ROM-less versions: SH7200 Series)

Series		SH7200		
Group		SH7201		SH7206
Memory	ROM (Bytes)	—		
	RAM (Bytes)	32K		128K
	ROM Type*1	L		
	Cache Memory	16K, 4-way set-associative		
	Program Security	—		
CPU	CPU	SH-2A Core		
	Basic Instructions	112		91
	Minimum Instruction Execution Time (ns)	8.3 (@120MHz)	10 (@100MHz)	5 (@200MHz)
	Dhrystone Performance	288MIPS (120MHz)	240MIPS (100MHz)	480MIPS (200MHz)
	Multiplier	32 × 32 → 64		
	Multiply-Accumulate Instruction	32 × 32 + 64 → 64		
	Barrel Shifter	Yes		
	FPU	Yes		—
	MMU	—		
DMA	DMAC (Channels)	8 (4 channels of them can receive an external request)		
	DTC/DMAC II	—		
External Bus Expansion	Address Space (Bytes)	384M		
	Bus State Controller	SRAM/SDRAM		SRAM/Byte Control SRAM/Burst ROM/MPX-IO/ SDRAM/PCMCIA
	Bus Structure	Separate bus (8/16/32-bit)		
	SDRAM Controller	Yes		
	DRAM Controller	—		
	PCI Controller	—		
	Endian Conversion	—		
	Host Interface	—		
Clock	Clock Generation Circuit	1 circuit		
	PLL	Yes		
	RTC	Yes		—
	Oscillation Stop Detection	—		
	Frequency Divider	Yes		
	Power Save	Sleep/software standby/module standby/deep standby		Sleep/software standby/module standby
Power Supply Voltage Detection	Power-On Reset/POR	—		
A/D Converter	Resolution × Channels	10-bit × 8		
	Sample and Hold	Yes		Yes (2 circuits)
	Multi-Channel Sample and Hold	—		
D/A Converter	Resolution × Channels	8-bit × 2		
Timer	8-bit	2 (TMR)		—
	16-bit	6 (MTU2)		11 (MTU2 × 6, MTU2S × 3, CMT × 2)
	32-bit	—		
	Input Capture	19 (shared with MTU2)		30 (shared with MTU2, MTU2S)
	Output Compare	16 (shared with MTU2)		24 (shared with MTU2, MTU2S)
	PWM Output	16 (shared with MTU2)		24 (shared with MTU2, MTU2S)
	Event Counter	8 (MTU × 6, TMR × 2)		11 (MTU2 × 6, MTU2S × 3, CMT × 2)
	2-Phase Encoder Input	2 (shared with MTU2)		
	3-Phase Inverter Control	1 (shared with MTU2)		2 (shared with MTU2, MTU2S)
Watchdog Timer		1		
Serial Interface	Clock Sync./Clock Async.	8		4
	Clock Sync. Only	—		
	Clock Async. Only	—		
I²C-bus		3		1
Smart Card/SIM		—		
Synchronous Serial Communication Unit/Special Serial I/O		2 (SSI × 2)		—
CAN	Channels	2		—
	Message Box (Numbers)	16		—
FlexRay		—		
Ethernet		—		
USBHOST		—		
USBFunction		—		
IrDA		—		
LCD		—		
I/O Ports	Input Only (Numbers)	14		8
	CMOS I/O (Numbers)	104		71
	High Voltage Port (Numbers)	—		
	N-Channel Open Drain Port (Numbers)	6		2
	High Current Drive Port	—		6
	Pull-Up Resistor	—		
External Interrupts Pins		17		9
Debugging Function	Boundary Scan/JTAG	—		
	On-Chip Debug	Yes		
	On-Board Flash Program	—		
Other Functions	ROM Correction Function	—		
	Others	—		
Operating Frequency/Supply Voltage		120MHz/3.0 to 3.6V	100MHz/3.0 to 3.6V	200MHz/1.15 to 1.35V, 3.0 to 3.6V (bus)
Operating Ambient Temperature (˚C)		–20 to 70	–20 to 85	
Package*2		PLQP0176KB-A		PLQP0176KD-A
Part No.		R5S72011RB120FP	R5S72011RW100FP	R5S72060W200FPV

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (Controller type ROM-less versions: SH7200 Series)

Series		SH7200	
Group		SH7203	SH7205
Memory	ROM (Bytes)	—	
	RAM (Bytes)	80K	112K
	ROM Type*1	L	
	Cache Memory	16K	
	Program Security	—	
CPU	CPU	SH2A-FPU Core	
	Basic Instructions	112	
	Minimum Instruction Execution Time (ns)	5 (@200MHz)	
	Dhrystone Performance	480MIPS (200MHz)	
	Multiplier	32 × 32 → 64	
	Multiply-Accumulate Instruction	32 × 32 + 64 → 64	
	Barrel Shifter	Yes	
	FPU	Yes	
	MMU	—	
DMA	DMAC (Channels)	8 (4 channels of them can receive an external request)	14
	DTC/DMAC II	—	
External Bus Expansion	Address Space (Bytes)	4G	
	Bus State Controller	Yes	
	Bus Structure	—	
	SDRAM Controller	Yes	
	DRAM Controller	Yes	—
	PCI Controller	—	
	Endian Conversion	—	
	Host Interface	—	
Clock	Clock Generation Circuit	1 circuit (CPG)	
	PLL	Yes	
	RTC	Yes	
	Oscillation Stop Detection	Yes	—
	Frequency Divider	Yes	
	Power Save	Sleep/software standby/ deep standby/module standby	Dual processor/single processor/dual sleep/ software standby/deep standby/module standby
Power Supply Voltage Detection	Power-On Reset/POR	—	
A/D Converter	Resolution x Channels	10-bit × 8	
	Sample and Hold	Yes	
	Multi-Channel Sample and Hold	—	
D/A Converter	Resolution x Channels	8-bit × 2	
Timer	8-bit	—	
	16-bit	MTU × 5, CMT × 2	9 (MTU × 5, CMT × 4)
	32-bit	—	1 (MTU2)
	Input Capture	16 (shared with MTU2)	
	Output Compare	16 (shared with MTU2)	
	PWM Output	16 (shared with MTU2)	
	Event Counter	7 (shared with CMT, MTU2)	9 (shared with CMT, MTU2)
	2-Phase Encoder Input	—	2 (shared with MTU2)
	3-Phase Inverter Control	—	1 (shared with MTU2)
Watchdog Timer		1	2
Serial Interface	Clock Sync./Clock Async.	4	6
	Clock Sync. Only	—	
	Clock Async. Only	—	
I²C-bus		4	
Smart Card/SIM		—	
Synchronous Serial Communication Unit/Special Serial I/O		6 (SSU × 2, SSI × 4)	8 (SSU × 2, SSI × 6)
CAN	Channels	2	
	Message Box (Numbers)	32 × 2	
FlexRay		—	
Ethernet		—	
USBHOST		1 (High-Speed)	2 (High-Speed)
USBFunction		High-Speed	
IrDA		—	
LCD		Yes	—
I/O Ports	Input Only (Numbers)	16	11
	CMOS I/O (Numbers)	82	96
	High Voltage Port (Numbers)	—	
	N-Channel Open Drain Port (Numbers)	—	
	High Current Drive Port	—	
	Pull-Up Resistor	98 (I/O 82, input 16)	107 (I/O 96, input 11)
External Interrupts Pins		17 (NMI, IRQ × 8, PINT × 8)	
Debugging Function	Boundary Scan/JTAG	—	Yes
	On-Chip Debug	Yes	
	On-Board Flash Program	—	
Other Functions	ROM Correction Function	—	
	Others	FLCTL, LCDC supporting TFT	FLCTL, ATAPI, 2DG
Operating Frequency/Supply Voltage		200MHz/1.1 to 1.3V, 3.0 to 3.6V	
Operating Ambient Temperature (˚C)		–20 to 85	
Package*2		PRQP0240KC-A	PRBG0272GA-A
Part No.		R5S72030W200FP	R5S72050W200BG

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

Controller type ROM-less versions : SH7260, SH7606 Series

SH7260 Series (SH-2A)

- Mounted SH2A-FPU core and realizes high-performance
- Suitable for such applications as automotive-use, industrial-use, consumer-use and graphics.
- Powerful peripheral functions: Timers for MTU2, PWM, etc, interfaces of SCIF, SSI, and CAN.

SH7606 Series (SH-2)

- System controller with good cost-performance rating
- Available as slave CPU with host I/F

• Specifications (Controller type ROM-less versions: SH7260 Series)

Series		SH7260			
Group		SH7263		SH7265	
Memory	ROM (Bytes)	—			
	RAM (Bytes)	80K		112K	
	ROM Type*1	L			
	Cache Memory	16K			
	Program Security	—			
CPU	CPU	SH2A-FPU Core			
	Basic Instructions	112			
	Minimum Instruction Execution Time (ns)	5 (@200MHz)			
	Dhrystone Performance	480MIPS (200MHz)			
	Multiplier	32 × 32 → 64			
	Multiply-Accumulate Instruction	32 × 32 + 64 → 64			
	Barrel Shifter	Yes			
	FPU	Yes			
	MMU	—			
DMA	DMAC (Channels)	8 (4 channels of them can receive an external request)		14	
	DTC/DMAC II	—			
External Bus Expansion	Address Space (Bytes)	4G			
	Bus State Controller	Yes			
	Bus Structure	—			
	SDRAM Controller	Yes			
	DRAM Controller	Yes		—	
	PCI Controller	—			
	Endian Conversion	—			
	Host Interface	—			
Clock	Clock Generation Circuit	1 circuit (CPG)			
	PLL	Yes			
	RTC	Yes			
	Oscillation Stop Detection	Yes		—	
	Frequency Divider	Yes			
	Power Save	Sleep/software standby/deep standby/module standby		Dual processor/single processor/dual sleep/software standby/deep standby/module standby	
Power Supply Voltage Detection	Power-On Reset/POR	—			
A/D Converter	Resolution × Channels	10-bit × 8			
	Sample and Hold	Yes			
	Multi-Channel Sample and Hold	—			
D/A Converter	Resolution × Channels	8-bit × 2			
Timer	8-bit	—			
	16-bit	MTU × 5, CMT × 2		9 (MTU × 5, CMT × 4)	
	32-bit	—		1 (MTU2)	
	Input Capture	16 (shared with MTU2)			
	Output Compare	16 (shared with MTU2)			
	PWM Output	16 (shared with MTU2)			
	Event Counter	7 (shared with CMT, MTU2)		9 (shared with CMT, MTU2)	
	2-Phase Encoder Input	—		2 (shared with MTU2)	
	3-Phase Inverter Control	—		1 (shared with MTU2)	
Watchdog Timer		1		2	
Serial Interface	Clock Sync./Clock Async.	4		6	
	Clock Sync. Only	—			
	Clock Async. Only	—			
I^2C-bus		4			
Smart Card/SIM		—			
Synchronous Serial Communication Unit/Special Serial I/O		6 (SSU × 2, SSI × 4)		8 (SSU × 2, SSI × 6)	
CAN	Channels	2			
	Message Box (Numbers)	32 × 2			
FlexRay		—			
Ethernet		—			
USBHOST		1 (High-Speed)		2 (High-Speed)	
USBFunction		High-Speed			
IrDA		—			
LCD		—			
I/O Ports	Input Only (Numbers)	16		11	
	CMOS I/O (Numbers)	82		96	
	High Voltage Port (Numbers)	—			
	N-Channel Open Drain Port (Numbers)	—			
	High Current Drive Port	—			
	Pull-Up Resistor	98 (I/O 82, input 16)		107 (I/O 96, input 11)	
External Interrupts Pins		17 (NMI, IRQ × 8, PINT × 8)			
Debugging Function	Boundary Scan/JTAG	—		Yes	
	On-Chip Debug	Yes			
	On-Board Flash Program	—			
Other Functions	ROM Correction Function	—			
	Others	CDROM, SRC, FLCTL, LCDC supporting TFT	CDROM, SRC, FLCTL, SDHI, LCDC supporting TFT	FLCTL, ATAPI, 2DG, AAC encoder	FLCTL, ATAPI, 2DG, AAC encoder, SDHI
Operating Frequency/Supply Voltage		200MHz/1.1 to 1.3V, 3.0 to 3.6V			
Operating Ambient Temperature (°C)		–40 to 85			
Package*2		PRQP0240KC-A		PRBG0272GA-A	
Part No.		R5S72630P200FP	R5S72632P200FP	R5S72631P200FP	R5S72633P200FP
		R5S72650P200BG	R5S72652P200BG	R5S72651P200BG	R5S72653P200BG

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (Controller type ROM-less versions: SH7260 Series)

Series		SH7260																			
Group		SH7266				SH7267				SH7268				SH7269							
Memory	ROM (Bytes)	—																			
	RAM (Bytes)	1600K								2500K(SRAM) + 64K(high-speed)											
	ROM Type*1	L																			
	Cache Memory	16K								8K(instruction), 8K(data), 4-way set-associative											
	Program Security	—																			
CPU	CPU	SH2A-FPU Core																			
	Basic Instructions	112																			
	Minimum Instruction Execution Time (ns)	6.9(@144MHz)		6.94(@144MHz)		6.9(@144MHz)		6.94(@144MHz)		3.76(@266MHz)											
	Dhrystone Performance	345MIPS(144MHz)								638MIPS(266MHz)											
	Multiplier	32× 32 → 64																			
	Multiply-Accumulate Instruction	32× 32 + 64 → 64																			
	Barrel Shifter	Yes																			
	FPU	Yes																			
	MMU	—																			
DMA	DMAC (Channels)	16																			
	DTC/DMAC Ⅱ	—																			
External Bus Expansion	Address Space (Bytes)	4G																			
	Bus State Controller	Yes																			
	Bus Structure	Separate bus(8/16bit)								Separate bus (8/16/32bit)											
	SDRAM Controller	Yes																			
	DRAM Controller	—																			
	PCI Controller	—																			
	Endian Conversion	—																			
	Host Interface	—																			
Clock	Clock Generation Circuit	1 circuit (CPG)																			
	PLL	Yes																			
	RTC	Yes																			
	Oscillation Stop Detection	—																			
	Frequency Divider	Yes																			
	Power Save	Sleep/software standby/deep standby/ module standby																			
Power Supply Voltage Detection	Power-On Reset/POR	—																			
A/D Converter	Resolution × Channels	10bit × 6												10bit × 8							
	Sample and Hold	Yes																			
	Multi-Channel Sample and Hold	—																			
D/A Converter	Resolution × Channels	—																			
Timer	8-bit	—																			
	16-bit	7(MTU2 × 5, CMT × 2)																			
	32-bit	—																			
	Input Capture	16 (shared with MTU2)																			
	Output Compare	16 (shared with MTU2)																			
	PWM Output	16 (shared with MTU2)								16 (shared with MTU2), 16 (shared with PWM)											
	Event Counter	7 (shared with CMT, MTU2)																			
	2-Phase Encoder Input	2 (shared with MTU2)																			
	3-Phase Inverter Control	1 (shared with MTU2)																			
Watchdog Timer		1																			
Serial Interface	Clock Sync./Clock Async.	5				8															
	Clock Sync. Only	—																			
	Clock Async. Only	—																			
I²C-bus		3								2				4							
Smart Card/SIM		—																			
Synchronous Serial Communication Unit/Special Serial I/O		4 (RSPI × 1, SSI × 3)				6 (RSPI × 2, SSI × 4)				9 (RSPI × 2, RQSPI × 2, SSI × 4, SPDIF × 1)				12 (RSPI × 2, RQSPI × 2, SSI × 6, SPDIF × 1, SIOF × 1)							
CAN	Channels	—		2		—		2		3											
	Message Box (Numbers)	—		32× 2		—		32× 2		32× 3											
FlexRay		—																			
Ethernet		—																			
USBHOST		1(High-Speed)																			
USBFunction		High-Speed																			
IrDA		—																			
LCD		—																			
I/O Ports	Input Only (Numbers)	6												8							
	CMOS I/O (Numbers)	68				92				101				133							
	High Voltage Port (Numbers)	—																			
	N-Channel Open Drain Port (Numbers)	6								4				8							
	High Current Drive Port	—																			
	Pull-Up Resistor	80 (I/O : 68, input : 6, open drain : 6)				104 (I/O : 92, input : 6, open drain : 6)				111(I/O : 101, input : 6, open drain : 4)				149(I/O : 133, input : 8, open drain : 8)							
External Interrupts Pins		9(NMI, IRQ× 8)				17 (NMI, IRQ × 8, PINT × 8)															
Debugging Function	Boundary Scan/JTAG	Yes																			
	On-Chip Debug	Yes																			
	On-Board Flash Program	—																			
Other Functions	ROM Correction Function	—																			
	Others	Video in, Display cntl., CDROM Decoder, SRC, FLCTL								2D Graphics Accelerator, Video Decoder, Video in, Display cntl., JPEG Decoder, CDROM Decoder, SRC, FLCTL, SD, MMC											
Operating Frequency/Supply Voltage		144MHz/1.15 to 1.35V (internal), 3.0 to 3.6V (peripheral)								266MHz/1.15 to 1.35V (internal), 3.0 to 3.6V (peripheral)											
Operating Ambient Temperature (°C)		–40 to 85	–20 to 85	–40 to 85	–20 to 85	–40 to 85	–20 to 85	–40 to 85	–20 to 85	–40 to +85		–20 to +85		–40 to +85		–20 to +85		–40 to +85		–20 to +85	–40 to +85
Package*2		PLQP0144KA-A				PLQP0176KB-A				PLQP0208KB-A				PLQP0256LB-A				PRBG0272GA-A			
Part No.		R5S72660P144FP	R5S72660W144FP	R5S72661P144FP	R5S72661W144FP	R5S72670P144FP	R5S72670W144FP	R5S72671P144FP	R5S72671W144FP	R5S72680W266FP**	R5S72681P266FP**	R5S72680P266FP**	R5S72681W266FP**	R5S72691P266FP**	R5S72690P266FP**	R5S72691W266FP**	R5S72690W266FP**	R5S72691P266BG**	R5S72691W266BG**	R5S72690W266BG**	R5S72690P266BG**

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (Controller type ROM-less versions: SH7260 Series)

Series		SH7260															
Group		SH7262															
Memory	ROM (Bytes)	—															
	RAM (Bytes)	704K							1088K								
	ROM Type*1	L															
	Cache Memory	16K															
	Program Security	—															
CPU	CPU	SH2A-FPU Core															
	Basic Instructions	112															
	Minimum Instruction Execution Time (ns)	6.9 (@144MHz)		6.94 (@144MHz)					6.9 (@144MHz)		6.94 (@144MHz)						
	Dhrystone Performance	345MIPS (144MHz)															
	Multiplier	32 × 32 → 64															
	Multiply-Accumulate Instruction	32 × 32 + 64 → 64															
	Barrel Shifter	Yes															
	FPU	Yes															
	MMU	—															
DMA	DMAC (Channels)	16															
	DTC/DMAC II	—															
External Bus Expansion	Address Space (Bytes)	4G															
	Bus State Controller	Yes															
	Bus Structure	Separate bus (8/16-bit)															
	SDRAM Controller	Yes															
	DRAM Controller	—															
	PCI Controller	—															
	Endian Conversion	—															
	Host Interface	—															
Clock	Clock Generation Circuit	1 circuit (CPG)															
	PLL	Yes															
	RTC	Yes															
	Oscillation Stop Detection	—															
	Frequency Divider	Yes															
	Power Save	Sleep/software standby/deep standby/module standby															
Power Supply Voltage Detection	Power-On Reset/POR	—															
A/D Converter	Resolution × Channels	10-bit × 4															
	Sample and Hold	Yes															
	Multi-Channel Sample and Hold	—															
D/A Converter	Resolution × Channels	—															
Timer	8-bit	—															
	16-bit	7 (MTU2 × 5, CMT × 2)															
	32-bit	—															
	Input Capture	16 (shared with MTU2)															
	Output Compare	16 (shared with MTU2)															
	PWM Output	16 (shared with MTU2)															
	Event Counter	7 (shared with CMT, MTU2)															
	2-Phase Encoder Input	2 (shared with MTU2)															
	3-Phase Inverter Control	1 (shared with MTU2)															
Watchdog Timer		1															
Serial Interface	Clock Sync./Clock Async.	8															
	Clock Sync. Only	—															
	Clock Async. Only	—															
I²C-bus		3															
Smart Card/SIM		—															
Synchronous Serial Communication Unit/Special Serial I/O		6 (RSPI × 2, SSI × 4)															
CAN	Channels	—	2	—	2	—	2	—	2	—	2	—	2	—	2		
	Message Box (Numbers)	—	32 × 2	—	32 × 2	—	32 × 2	—	32 × 2	—	32 × 2	—	32 × 2	—	32 × 2		
FlexRay		—															
Ethernet		—															
USBHOST		1 (High-Speed)															
USBFunction		High-Speed															
IrDA		—															
LCD		—															
I/O Ports	Input Only (Numbers)	4															
	CMOS I/O (Numbers)	89															
	High Voltage Port (Numbers)	—															
	N-Channel Open Drain Port (Numbers)	6															
	High Current Drive Port	—															
	Pull-Up Resistor	99 (I/O 89, input 4, open drain 6)															
External Interrupts Pins		17 (NMI, IRQ × 8, PINT × 8)															
Debugging Function	Boundary Scan/JTAG	Yes															
	On-Chip Debug	Yes															
	On-Board Flash Program	—															
Other Functions	ROM Correction Function	—															
	Others	Video in, Display cntl., CDROM decoder, SRC, FLCTL															
Operating Frequency/Supply Voltage		144MHz/1.1 to 1.3V (internal), 3.0 to 3.6V (peripheral)															
Operating Ambient Temperature (˚C)		–20 to 85	–40 to 85				–20 to 85				–40 to 85				–20 to 85		
Package*2		PLQP0176KB-A															
Part No.		R5S72624W144FPU	R5S72624P144FPU	R5S72625P144FPU	R5S72626P144FPU	R5S72627P144FPU	R5S72625W144FPU	R5S72626W144FPU	R5S72627W144FPU	R5S72620W144FPU	R5S72620P144FPU	R5S72621P144FPU	R5S72622P144FPU	R5S72623P144FPU	R5S72621W144FPU	R5S72622W144FPU	R5S72623W144FPU

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (Controller type ROM-less versions: SH7260 Series)

Series		SH7260															
Group		SH7264															
Memory	ROM (Bytes)	—															
	RAM (Bytes)	704K									1088K						
	ROM Type*1	L															
	Cache Memory	16K															
	Program Security	—															
CPU	CPU	SH2A-FPU Core															
	Basic Instructions	112															
	Minimum Instruction Execution Time (ns)	6.94 (@144MHz)															
	Dhrystone Performance	345MIPS (144MHz)															
	Multiplier	32 × 32 → 64															
	Multiply-Accumulate Instruction	32 × 32 + 64 → 64															
	Barrel Shifter	Yes															
	FPU	Yes															
	MMU	—															
DMA	DMAC (Channels)	16															
	DTC/DMAC Ⅱ	—															
External Bus Expansion	Address Space (Bytes)	4G															
	Bus State Controller	Yes															
	Bus Structure	Separate bus (8/16-bit)															
	SDRAM Controller	Yes															
	DRAM Controller	—															
	PCI Controller	—															
	Endian Conversion	—															
	Host Interface	—															
Clock	Clock Generation Circuit	1 circuit (CPG)															
	PLL	Yes															
	RTC	Yes															
	Oscillation Stop Detection	—															
	Frequency Divider	Yes															
	Power Save	Sleep/software standby/deep standby/module standby															
Power Supply Voltage Detection	Power-On Reset/POR	—															
A/D Converter	Resolution × Channels	10-bit × 8															
	Sample and Hold	Yes															
	Multi-Channel Sample and Hold	—															
D/A Converter	Resolution × Channels	—															
Timer	8-bit	—															
	16-bit	7 (MTU2 × 5, CMT × 2)															
	32-bit	—															
	Input Capture	16 (shared with MTU2)															
	Output Compare	16 (shared with MTU2)															
	PWM Output	16 (shared with MTU2)															
	Event Counter	7 (shared with CMT, MTU2)															
	2-Phase Encoder Input	2 (shared with MTU2)															
	3-Phase Inverter Control	1 (shared with MTU2)															
Watchdog Timer		1															
Serial Interface	Clock Sync./Clock Async.	8															
	Clock Sync. Only	—															
	Clock Async. Only	—															
I^2C-bus		3															
Smart Card/SIM		—															
Synchronous Serial Communication Unit/Special Serial I/O		6 (RSPI × 2, SSI × 4)															
CAN	Channels	—	2	—	2	—	2	—	2	—	2	—	2	—	2	—	2
	Message Box (Numbers)	—	32 × 2	—	32 × 2	—	32 × 2	—	32 × 2	—	32 × 2	—	32 × 2	—	32 × 2	—	32 × 2
FlexRay		—															
Ethernet		—															
USBHOST		1 (High-Speed)															
USBFunction		High-Speed															
IrDA		—															
LCD		—															
I/O Ports	Input Only (Numbers)	8															
	CMOS I/O (Numbers)	115															
	High Voltage Port (Numbers)	—															
	N-Channel Open Drain Port (Numbers)	6															
	High Current Drive Port	—															
	Pull-Up Resistor	129 (input 115, input 8, open drain 6)															
External Interrupts Pins		17 (NMI, IRQ × 8, PINT × 8)															
Debugging Function	Boundary Scan/JTAG	Yes															
	On-Chip Debug	Yes															
	On-Board Flash Program	—															
Other Functions	ROM Correction Function	—															
	Others	Video in, Display cntl., CDROM decoder, SRC, FLCTL															
Operating Frequency/Supply Voltage		144MHz/1.1 to 1.3V (internal), 3.0 to 3.6V (peripheral)															
Operating Ambient Temperature (˚C)		–20 to 85				–40 to 85								–20 to 85			
Package*2		PLQP0208KB-A															
Part No.		R5S72644W144FPU	R5S72645W144FPU	R5S72646W144FPU	R5S72647W144FPU	R5S72644P144FPU	R5S72645P144FPU	R5S72646P144FPU	R5S72647P144FPU	R5S72640P144FPU	R5S72641P144FPU	R5S72642P144FPU	R5S72643P144FPU	R5S72640W144FPU	R5S72641W144FPU	R5S72642W144FPU	R5S72643W144FPU

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (Controller type ROM-less versions: SH7260 Series)

Series		SH7260					
Group		SH7261					
Memory	ROM (Bytes)	—					
	RAM (Bytes)	32K					
	ROM Type*1	L					
	Cache Memory	16K, 4-way set-associative					
	Program Security	—					
CPU	CPU	SH-2A Core					
	Basic Instructions	112					
	Minimum Instruction Execution Time (ns)	8.3 (@120MHz)			10 (@100MHz)		
	Dhrystone Performance	288MIPS (120MHz)			240MIPS (100MHz)		
	Multiplier	32 × 32 → 64					
	Multiply-Accumulate Instruction	32 × 32 + 64 → 64					
	Barrel Shifter	Yes					
	FPU	Yes					
	MMU	—					
DMA	DMAC (Channels)	8 (4 channels of them can receive an external request)					
	DTC/DMAC II	—					
External Bus Expansion	Address Space (Bytes)	384M					
	Bus State Controller	SRAM/SDRAM					
	Bus Structure	Separate bus (8/16/32-bit)					
	SDRAM Controller	Yes					
	DRAM Controller	—					
	PCI Controller	—					
	Endian Conversion	—					
	Host Interface	—					
Clock	Clock Generation Circuit	1 circuit					
	PLL	Yes					
	RTC	Yes					
	Oscillation Stop Detection	—					
	Frequency Divider	Yes					
	Power Save	Sleep/software standby/module standby/deep standby					
Power Supply Voltage Detection	Power-On Reset/POR	—					
A/D Converter	Resolution × Channels	10-bit × 8					
	Sample and Hold	Yes					
	Multi-Channel Sample and Hold	—					
D/A Converter	Resolution × Channels	8-bit × 2					
Timer	8-bit	2 (TMR)					
	16-bit	6 (MTU2)					
	32-bit	—					
	Input Capture	19 (shared with MTU2)					
	Output Compare	16 (shared with MTU2)					
	PWM Output	16 (shared with MTU2)					
	Event Counter	8 (MTU × 6, TMR × 2)					
	2-Phase Encoder Input	2 (shared with MTU2)					
	3-Phase Inverter Control	1 (shared with MTU2)					
Watchdog Timer		1					
Serial Interface	Clock Sync./Clock Async.	8					
	Clock Sync. Only	—					
	Clock Async. Only	—					
I^2C-bus		3					
Smart Card/SIM		—					
Synchronous Serial Communication Unit/Special Serial I/O		2 (SSI × 2)	3 (SSI × 2, IEBus)		2 (SSI × 2)	3 (SSI × 2, IEBus)	
CAN	Channels	2	—	2	—	2	
	Message Box (Numbers)	16	—	16	—	16	
FlexRay		—					
Ethernet		—					
USBHOST		—					
USBFunction		—					
IrDA		—					
LCD		—					
I/O Ports	Input Only (Numbers)	14					
	CMOS I/O (Numbers)	104					
	High Voltage Port (Numbers)	—					
	N-Channel Open Drain Port (Numbers)	6					
	High Current Drive Port	—					
	Pull-Up Resistor	—					
External Interrupts Pins		17					
Debugging Function	Boundary Scan/JTAG	—					
	On-Chip Debug	Yes					
	On-Board Flash Program	—					
Other Functions	ROM Correction Function	—					
	Others	—					
Operating Frequency/Supply Voltage		120MHz/3.0 to 3.6V			100MHz/3.0 to 3.6V		
Operating Ambient Temperature (˚C)		–20 to 70		–40 to 85			
Package*2		PLQP0176KB-A					
Part No.		R5S72611RB120FP	R5S72612RB120FP	R5S72613RB120FP	R5S72611RP100FP	R5S72612RP100FP	R5S72613RP100FP

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

SH-Ether Series

• Specifications (SH-Ether Series)

Series		SH-Ether		
Group		SH7615	SH7616	SH7618
Memory	ROM (Bytes)	—		
	RAM (Bytes)	8K		4K
	ROM Type*1	L		
	Cache Memory	4K		16K
	Program Security	—		
CPU	CPU	SH2-DSP Core		SH-2 Core
	Basic Instructions	65		62
	Minimum Instruction Execution Time (ns)	16 (@62.5MHz)		10 (@100MHz)
	Dhrystone Performance	81MIPS (62.5MHz)		130MIPS (100MHz)
	Multiplier	32 × 32 → 64		
	Multiply-Accumulate Instruction	32 × 32 + 64 → 64		
	Barrel Shifter	—		
	FPU	—		
	MMU	—		
DMA	DMAC (Channels)	2		—
	DTC/DMAC II	—		
External Bus Expansion	Address Space (Bytes)	160M		320M
	Bus State Controller	SRAM/SDRAM/DRAM/ROM		SRAM/SDRAM/Byte Control SRAM/PCMCIA
	Bus Structure	Separate bus (8/16/32-bit)		Separate bus (8/16-bit)
	SDRAM Controller	Yes		
	DRAM Controller	Yes		—
	PCI Controller	—		
	Endian Conversion	Yes (CS2, CS4 area only)		Yes
	Host Interface	—		Yes
Clock	Clock Generation Circuit	1 circuit		
	PLL	Yes		
	RTC	—		
	Oscillation Stop Detection	—		
	Frequency Divider	Yes		
	Power Save	Sleep/standby/module standby		Sleep/software standby/module standby
Power Supply Voltage Detection	Power-On Reset/POR	—		
A/D Converter	Resolution × Channels	—		
	Sample and Hold	—		
	Multi-Channel Sample and Hold	—		
D/A Converter	Resolution × Channels	—		
Timer	8-bit	—		
	16-bit	4 (FRT, TPU × 3)		2 (CMT)
	32-bit	—		
	Input Capture	TPU		—
	Output Compare	TPU		—
	PWM Output	TPU		—
	Event Counter	—		2 (shared with CMT)
	2-Phase Encoder Input	TPU		—
	3-Phase Inverter Control	—		
Watchdog Timer		1		
Serial Interface	Clock Sync./Clock Async.	2		3
	Clock Sync. Only	—		
	Clock Async. Only	—		
I^2C-bus		—		
Smart Card/SIM		—		
Synchronous Serial Communication Unit/Special Serial I/O		2 (serial IO × 2)		—
CAN	Channels	—		
	Message Box (Numbers)	—		
FlexRay		—		
Ethernet		1		
USBHOST		—		
USBFunction		—		
IrDA		—		
LCD		—		
I/O Ports	Input Only (Numbers)	—		
	CMOS I/O (Numbers)	29		71
	High Voltage Port (Numbers)	—		
	N-Channel Open Drain Port (Numbers)	—		
	High Current Drive Port	—		
	Pull-Up Resistor	—		
External Interrupts Pins		5 (NMI + 4 (15 level))		9 (NMI + 8)
Debugging Function	Boundary Scan/JTAG	Yes		—
	On-Chip Debug	Yes		
	On-Board Flash Program	—		
Other Functions	ROM Correction Function	—		
	Others	DSP function, E-DMAC × 2		E-DMAC × 2
Operating Frequency/Supply Voltage		62.5MHz/3.3V		100MHz/1.4 to 1.6V, 3.0 to 3.6V (bus)
Operating Ambient Temperature (°C)		–20 to 75		–40 to 85
Package*2		PLBG0240JA-A	PLQP0208KA-A	PLBG0176GA-A
Part No.		HD6417615ARBP	HD6417615ARF	HD6417616GSF	HD6417618ABG100V	HD6417618ABGN100V	HD6417618ABGW100V

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (SH-Ether Series)

Series		SH-Ether									
Group		SH7619			SH7710						
Memory	ROM (Bytes)	—									
	RAM (Bytes)	16K									
	ROM Type*1	L									
	Cache Memory	16K			32K, 4-way set-associative						
	Program Security	—									
CPU	CPU	SH-2 Core			SH3-DSP Core						
	Basic Instructions	62			160						
	Minimum Instruction Execution Time (ns)	8 (@125MHz)			5 (@200MHz)						
	Dhrystone Performance	163MIPS (125MHz)			260MIPS (200MHz)						
	Multiplier	32 × 32 → 64									
	Multiply-Accumulate Instruction	32 × 32 + 64 → 64									
	Barrel Shifter	—			Yes						
	FPU	—									
	MMU	—			Yes						
DMA	DMAC (Channels)	4 (2 channels of them can receive an external request)			6 (2 channels of them can receive an external request)						
	DTC/DMAC II	—									
External Bus Expansion	Address Space (Bytes)	320M			384M						
	Bus State Controller	SRAM/SDRAM/Byte Control SRAM/PCMCIA			SRAM/SDRAM/Burst ROM/Byte Control SRAM/PCMCIA						
	Bus Structure	Separate bus (8/16/32-bit)									
	SDRAM Controller	Yes									
	DRAM Controller	—									
	PCI Controller	—									
	Endian Conversion	Yes									
	Host Interface	Yes			—						
Clock	Clock Generation Circuit	1 circuit									
	PLL	Yes									
	RTC	—			Yes (not separated power supply voltage)						
	Oscillation Stop Detection	—									
	Frequency Divider	Yes									
	Power Save	Sleep/software standby/module standby									
Power Supply Voltage Detection	Power-On Reset/POR	—									
A/D Converter	Resolution × Channels	—									
	Sample and Hold	—									
	Multi-Channel Sample and Hold	—									
D/A Converter	Resolution × Channels	—									
Timer	8-bit	—									
	16-bit	2 (CMT)			—						
	32-bit	—			3 (TMU)						
	Input Capture	—									
	Output Compare	—									
	PWM Output	—									
	Event Counter	2 (shared with CMT)			—						
	2-Phase Encoder Input	—									
	3-Phase Inverter Control	—									
Watchdog Timer		1									
Serial Interface	Clock Sync./Clock Async.	3			2						
	Clock Sync. Only	—									
	Clock Async. Only	—									
I^2C-bus		—									
Smart Card/SIM		—									
Synchronous Serial Communication Unit/Special Serial I/O		1 (SIOF × 1)			2 (serial IO × 2)						
CAN	Channels	—									
	Message Box (Numbers)	—									
FlexRay		—									
Ethernet		1 (with PHY)			2 (with bridge)					1	
USBHOST		—									
USBFunction		—									
IrDA		—									
LCD		—									
I/O Ports	Input Only (Numbers)	—									
	CMOS I/O (Numbers)	78			24						
	High Voltage Port (Numbers)	—									
	N-Channel Open Drain Port (Numbers)	—									
	High Current Drive Port	—									
	Pull-Up Resistor	—									
External Interrupts Pins		9 (NMI + 8)			7 (NMI + 4 (15 level) or 6)						
Debugging Function	Boundary Scan/JTAG	—			Yes						
	On-Chip Debug	Yes									
	On-Board Flash Program	—									
Other Functions	ROM Correction Function	—									
	Others	E-DMAC × 2			DSP function, IP sec.accelerator, E-DMAC × 4		DSP function, E-DMAC × 4		DSP function, E-DMAC × 2		
Operating Frequency/Supply Voltage		125MHz/1.71 to 1.89V, 3.0 to 3.6V (bus)			200MHz/1.5V (core), 3.3V (I/O)						
Operating Ambient Temperature (˚C)		–20 to 70	–40 to 85	–20 to 85	–20 to 75						
Package*2		PLBG0176GA-A			PLBG0256GA-A	PRQP0256LA-B	PLBG0256GA-A	PRQP0256LA-B	PLBG0256GA-A	PRQP0256LA-B	
Part No.		R4S76191B125BGV	R4S76191D125BGV	R4S76191N125BGV	R4S76191W125BGV	HD6417710BP	HD6417710F	HD6417712BP	HD6417712F	HD6417713BP	HD6417713F

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (SH-Ether Series)

Series		SH-Ether							
Group		SH7652	SH7670						
Memory	ROM (Bytes)	—							
	RAM (Bytes)	32K							
	ROM Type*1	L							
	Cache Memory	16K							
	Program Security	—							
CPU	CPU	SH2A-FPU Core							
	Basic Instructions	112							
	Minimum Instruction Execution Time (ns)	5 (@200MHz)	7.5 (@133MHz)	5 (@200MHz)	7.5 (@133MHz)	5 (@200MHz)	7.5 (@133MHz)	5 (@200MHz)	7.5 (@133MHz)
	Dhrystone Performance	480MIPS (200MHz)	320MIPS (133MHz)	480MIPS (200MHz)	320MIPS (133MHz)	480MIPS (200MHz)	320MIPS (133MHz)	480MIPS (200MHz)	320MIPS (133MHz)
	Multiplier	32 × 32 → 64							
	Multiply-Accumulate Instruction	32 × 32 + 64 → 64							
	Barrel Shifter	Yes							
	FPU	Yes							
	MMU	—							
DMA	DMAC (Channels)	8	8 (2 channels of them can receive an external request)						
	DTC/DMAC Ⅱ	—							
External Bus Expansion	Address Space (Bytes)	320M							
	Bus State Controller	SRAM/SDRAM/Byte Control SRAM/PCMCIA							
	Bus Structure	Separate bus (8/16/32-bit)							
	SDRAM Controller	Yes							
	DRAM Controller	—							
	PCI Controller	—							
	Endian Conversion	—							
	Host Interface	Yes							
Clock	Clock Generation Circuit	1 circuit							
	PLL	Yes							
	RTC	—							
	Oscillation Stop Detection	—							
	Frequency Divider	Yes							
	Power Save	Sleep/software standby/module standby							
Power Supply Voltage Detection	Power-On Reset/POR	—							
A/D Converter	Resolution × Channels	—							
	Sample and Hold	—							
	Multi-Channel Sample and Hold	—							
D/A Converter	Resolution × Channels	—							
Timer	8-bit	—							
	16-bit	2 (CMT)							
	32-bit	—							
	Input Capture	—							
	Output Compare	—							
	PWM Output	—							
	Event Counter	2 (shared with CMT)							
	2-Phase Encoder Input	—							
	3-Phase Inverter Control	—							
Watchdog Timer		1							
Serial Interface	Clock Sync./Clock Async.	3							
	Clock Sync. Only	—							
	Clock Async. Only	—							
I^2C-bus		1							
Smart Card/SIM		—							
Synchronous Serial Communication Unit/Special Serial I/O		2 (SSI)	2 (SSI × 2)						
CAN	Channels	—							
	Message Box (Numbers)	—							
FlexRay		—							
Ethernet		1							
USBHOST		1 (switchable to USB Function)							
USBFunction		1 (switchable to USB HOST)							
IrDA		—							
LCD		—							
I/O Ports	Input Only (Numbers)	8							
	CMOS I/O (Numbers)	86							
	High Voltage Port (Numbers)	—							
	N-Channel Open Drain Port (Numbers)	—	2						
	High Current Drive Port	—							
	Pull-Up Resistor	—							
External Interrupts Pins		9 (NMI + 8)							
Debugging Function	Boundary Scan/JTAG	—	Yes						
	On-Chip Debug	Yes							
	On-Board Flash Program	—							
Other Functions	ROM Correction Function	—							
	Others	DTCP-IP, TSIF	—		SDHI		Encryption function		SDHI, Encryption function
Operating Frequency/Supply Voltage		200MHz/1.2, 3.1 to 3.5 (bus)	—						
Operating Ambient Temperature (˚C)		–20 to 70	–40 to 85	–20 to 70	–40 to 85	–20 to 70	–40 to 85	–20 to 70	–40 to 85
Package*2		PRBG0240JA-A	PRBG0256GA-A						
Part No.		R5S76520B200BG	R5S76700B200BG	R5S76700D133BG	R5S76710B200BG	R5S76710D133BG	R5S76720B200BG	R5S76720D133BG	R5S76730B200BG	R5S76730D133BG

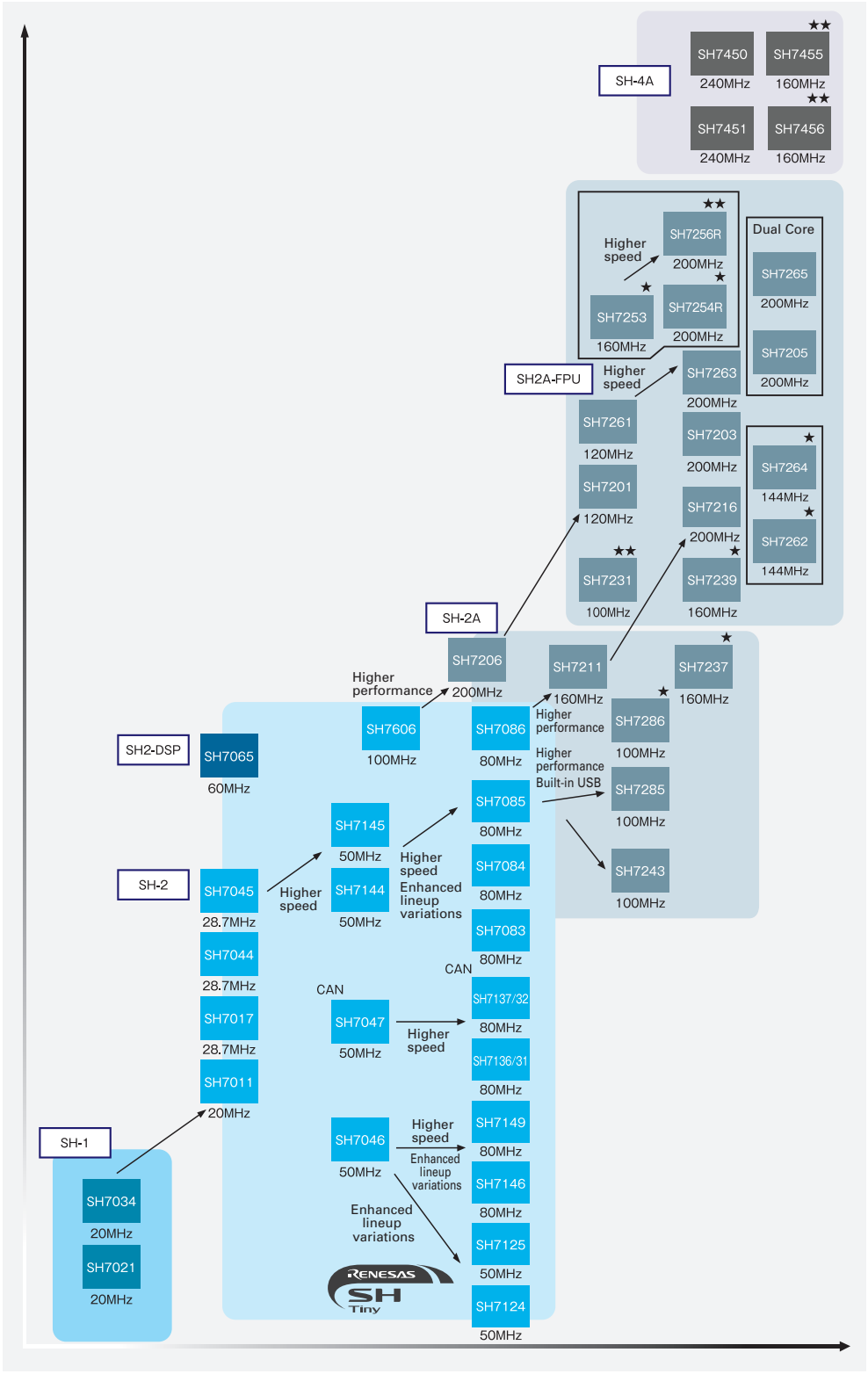
*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

The best–known 32-bit RISC embedded MCU

MCU (microcontroller) type SuperH products are the most popular 32-bit RISC embedded MCUs, combining powerful CPU cores peripheral functions such as 16-bit multi-function timers and A/D converters, and flash memory. Renesas also provide the powerful products with SH-2A core.

• SuperH (MCU Type) Roadmap



*Refer to the SH processor pages for the SH7260 Series and SH7200 Series. ★ : New product ★★ : Under development

- We continue to boost performance by extending the use of the powerful SH-2A CPU core and increasing the operating speed of MCUs with on-chip flash memory.
- Integration on a single chip of a 16-bit multifunction timer, 12-bit A/D converter, and multiple communication interfaces contributes to reduced system cost.
- Our extensive product lineup can accommodate a wide variety of applications.

■Application Examples

Automobile
Engine
Power steering



Industrial Equipment
Robot, NC, general-purpose inverter, servo, and FA control equipment



OA equipment
Printer, FAX/Complex machine



Commercial equipment
LCD projector and DVD player/recorder



Home electronics equipment
Air conditioner, refrigerator, and washing machine



SH7216 Series (SH-2A)

- 200MHz/400MIPS throughput.
- A maximum of 1 MB of high-capacity, built-in flash memory.
- Possesses a variety of peripheral functions, including USB, timer, etc.
- Increased current consumption at higher operating speeds is inhibited by measures such as a power supply stepdown circuit and a low-current-consumption design. The MCU operates on a single 3.3V power supply.

• Specifications (SH7216 Series)

Series		SH7216							
Group		SH7216							
Memory	ROM (Bytes)	512K							
	RAM (Bytes)	64K							
	ROM Type*1	F							
	Cache Memory	—							
	Program Security	Yes							
CPU	CPU	SH-2A Core				SH2A-FPU Core			
	Basic Instructions	91				112			
	Minimum Instruction Execution Time (ns)	5 (@200MHz)		10 (@100MHz)		5 (@200MHz)		10 (@100MHz)	
	Dhrystone Performance	400MIPS (Flash Memory, 200MHz)		200MIPS (Flash Memory, 100MHz)		400MIPS (Flash Memory, 200MHz)		200MIPS (Flash Memory, 100MHz)	
	Multiplier	32 × 32 → 64							
	Multiply-Accumulate Instruction	32 × 32 + 64 → 64							
	Barrel Shifter	Yes							
	FPU	—				Yes			
	MMU	—							
DMA	DMAC (Channels)	8 (4 channels of them can receive an external request)							
	DTC/DMAC II	DTC							
External Bus Expansion	Address Space (Bytes)	512M (64M × 8)							
	Bus State Controller	Direct connection to ROM/SRAM/SDRAM/MPX-I/O and the others is supported							
	Bus Structure	Separate bus (8/16/32-bit)							
	SDRAM Controller	Yes							
	DRAM Controller	—							
	PCI Controller	—							
	Endian Conversion	—							
	Host Interface	—							
Clock	Clock Generation Circuit	1 circuit							
	PLL	Yes							
	RTC	—							
	Oscillation Stop Detection	Yes							
	Frequency Divider	1/n (n = 1, 2, 4, 8)							
	Power Save	Sleep/software standby/module standby							
Power Supply Voltage Detection	Power-On Reset/POR	—							
A/D Converter	Resolution × Channels	12-bit × 8							
	Sample and Hold	Yes (2 circuits)							
	Multi-Channel Sample and Hold	Yes (3 circuits)							
D/A Converter	Resolution × Channels	—							
Timer	8-bit	—							
	16-bit	11 (MTU2 × 6, MTU2S × 3, CMT × 2)							
	32-bit	—							
	Input Capture	30 (shared with MTU2 × 19, MTU2S × 11)							
	Output Compare	24 (shared with MTU2 × 16, MTU2S × 8)							
	PWM Output	24 (shared with MTU2 × 16, MTU2S × 8)							
	Event Counter	11 (shared with MTU2, MTU2S, CMT)							
	2-Phase Encoder Input	2 (shared with MTU2)							
	3-Phase Inverter Control	2 (shared with MTU2, MTU2S)							
Watchdog Timer		1							
Serial Interface	Clock Sync./Clock Async.	5 (SCI × 4, SCIF × 1)							
	Clock Sync. Only	—							
	Clock Async. Only	—							
I²C-bus		1							
Smart Card/SIM		—							
Synchronous Serial Communication Unit/Special Serial I/O		1 (RSPI)							
CAN	Channels	1ch							
	Message Box (Numbers)	16							
FlexRay		—							
Ethernet		1ch	—	1ch	—	1ch	—	1ch	—
USBHOST		—							
USBFunction		1ch							
IrDA		—							
LCD		—							
I/O Ports	Input Only (Numbers)	10							
	CMOS I/O (Numbers)	100							
	High Voltage Port (Numbers)	—							
	N-Channel Open Drain Port (Numbers)	2 (I²C bus)							
	High Current Drive Port	124 (MTU2 × 6, MTU2S × 18)							
	Pull-Up Resistor	100							
External Interrupts Pins		9 (NMI + IRQ × 8)							
Debugging Function	Boundary Scan/JTAG	Yes							
	On-Chip Debug	Yes (User Debug Interface/Advanced users debugger)							
	On-Board Flash Program	Yes							
Other Functions	ROM Correction Function	—							
	Others	—							
Operating Frequency/Supply Voltage		200MHz/3.0 to 3.6V		100MHz/3.0 to 3.6V		200MHz/3.0 to 3.6V		100MHz/3.0 to 3.6V	
Operating Ambient Temperature (˚C)		–40 to 85							
Package*2		PLBG0176GA-A	PLQP0176LB-A	PLQP0176KB-A	PLBG0176GA-A	PLQP0176LB-A	PLQP0176KB-A	PLBG0176GA-A	PLQP0176LB-A
		PLQP0176KB-A	PLBG0176GA-A	PLQP0176LB-A	PLQP0176KB-A	PLBG0176GA-A	PLQP0176LB-A	PLQP0176KB-A	PLBG0176GA-A
		PLQP0176LB-A	PLQP0176KB-A	PLBG0176GA-A	PLQP0176LB-A	PLQP0176KB-A	PLBG0176GA-A	PLQP0176LB-A	PLQP0176KB-A
		PLBG0176GA-A	PLQP0176LB-A	PLQP0176KB-A	PLBG0176GA-A	PLQP0176LB-A	PLQP0176KB-A	PLBG0176GA-A	PLQP0176LB-A
		PLQP0176KB-A							
Part No.		R5F72145ADBG	R5F72145ADFA	R5F72145ADFP	R5F72145BDBG	R5F72145BDFA	R5F72145BDFP	R5F72145GDBG	R5F72145GDFA
		R5F72145GDFP	R5F72145HDBG	R5F72145HDFA	R5F72145HDFP	R5F72165ADBG	R5F72165ADFA	R5F72165ADFP	R5F72165BDBG
		R5F72165BDFA	R5F72165BDFP	R5F72165GDBG	R5F72165GDFA	R5F72165GDFP	R5F72165HDBG	R5F72165HDFA	R5F72165HDFP

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (SH7216 Series)

Series		SH7216																									
Group		SH7216																									
Memory	ROM (Bytes)	768K																									
	RAM (Bytes)	96K																									
	ROM Type*1	F																									
	Cache Memory	—																									
	Program Security	Yes																									
CPU	CPU	SH-2A Core												SH2A-FPU Core													
	Basic Instructions	91												112													
	Minimum Instruction Execution Time (ns)	5 (@200MHz)				10 (@100MHz)								5 (@200MHz)				10 (@100MHz)									
	Dhrystone Performance	400MIPS (Flash Memory, 200MHz)				200MIPS (Flash Memory, 100MHz)								400MIPS (Flash Memory, 200MHz)				200MIPS (Flash Memory, 100MHz)									
	Multiplier	32 × 32 → 64																									
	Multiply-Accumulate Instruction	32 × 32 + 64 → 64																									
	Barrel Shifter	Yes																									
	FPU	—												Yes													
	MMU	—																									
DMA	DMAC (Channels)	8 (4 channels of them can receive an external request)																									
	DTC/DMAC Ⅱ	DTC																									
External Bus Expansion	Address Space (Bytes)	512M (64M × 8)																									
	Bus State Controller	Direct connection to ROM/SRAM/SDRAM/MPX-I/O and the others is supported																									
	Bus Structure	Separate bus (8/16/32-bit)																									
	SDRAM Controller	Yes																									
	DRAM Controller	—																									
	PCI Controller	—																									
	Endian Conversion	—																									
	Host Interface	—																									
Clock	Clock Generation Circuit	1 circuit																									
	PLL	Yes																									
	RTC	—																									
	Oscillation Stop Detection	Yes																									
	Frequency Divider	1/n (n = 1, 2, 4, 8)																									
	Power Save	Sleep/software standby/module standby																									
Power Supply Voltage Detection	Power-On Reset/POR	—																									
A/D Converter	Resolution × Channels	12-bit × 8																									
	Sample and Hold	Yes (2 circuits)																									
	Multi-Channel Sample and Hold	Yes (3 circuits)																									
D/A Converter	Resolution × Channels	—																									
Timer	8-bit	—																									
	16-bit	11 (MTU2 × 6, MTU2S × 3, CMT × 2)																									
	32-bit	—																									
	Input Capture	30 (shared with MTU2 × 19, MTU2S × 11)																									
	Output Compare	24 (shared with MTU2 × 16, MTU2S × 8)																									
	PWM Output	24 (shared with MTU2 × 16, MTU2S × 8)																									
	Event Counter	11 (shared with MTU2, MTU2S, CMT)																									
	2-Phase Encoder Input	2 (shared with MTU2)																									
	3-Phase Inverter Control	2 (shared with MTU2, MTU2S)																									
Watchdog Timer		1																									
Serial Interface	Clock Sync./Clock Async.	5 (SCI × 4, SCIF × 1)																									
	Clock Sync. Only	—																									
	Clock Async. Only	—																									
I²C-bus		1																									
Smart Card/SIM		—																									
Synchronous Serial Communication Unit/Special Serial I/O		1 (RSPI)																									
CAN	Channels	1ch																									
	Message Box (Numbers)	16																									
FlexRay		—																									
Ethernet		1ch	—			1ch	—			1ch	—			1ch	—												
USBHOST		—																									
USBFunction		1ch																									
IrDA		—																									
LCD		—																									
I/O Ports	Input Only (Numbers)	10																									
	CMOS I/O (Numbers)	100																									
	High Voltage Port (Numbers)	—																									
	N-Channel Open Drain Port (Numbers)	2 (I²C bus)																									
	High Current Drive Port	24 (MTU2 × 6, MTU2S × 18)																									
	Pull-Up Resistor	100																									
External Interrupts Pins		9 (NMI + IRQ × 8)																									
Debugging Function	Boundary Scan/JTAG	Yes																									
	On-Chip Debug	Yes (User Debug Interface/Advanced users debugger)																									
	On-Board Flash Program	Yes																									
Other Functions	ROM Correction Function	—																									
	Others	—																									
Operating Frequency/Supply Voltage		200MHz/3.0 to 3.6V				100MHz/3.0 to 3.6V								200MHz/3.0 to 3.6V				100MHz/3.0 to 3.6V									
Operating Ambient Temperature (˚C)		–40 to 85																									
Package*2		PLBG0176GA-A	PLQP0176LB-A	PLQP0176KB-A	PLBG0176GA-A	PLQP0176LB-A	PLQP0176KB-A	PLBG0176GA-A	PLQP0176LB-A	PLQP0176KB-A	PLBG0176GA-A	PLQP0176LB-A	PLQP0176KB-A	PLBG0176GA-A	PLQP0176LB-A	PLQP0176KB-A	PLBG0176GA-A	PLQP0176LB-A	PLQP0176KB-A	PLBG0176GA-A	PLQP0176LB-A	PLQP0176KB-A	PLBG0176GA-A	PLQP0176LB-A	PLQP0176KB-A		
Part No.		R5F72146ADBG	R5F72146ADFA	R5F72146ADFP	R5F72146BDBG	R5F72146BDFA	R5F72146BDFP	R5F72146GDBG	R5F72146GDFA	R5F72146GDFP	R5F72146HDBG	R5F72146HDFA	R5F72146HDFP	R5F72166ADBG	R5F72166ADFA	R5F72166ADFP	R5F72166BDBG	R5F72166BDFA	R5F72166BDFP	R5F72166GDBG	R5F72166GDFA	R5F72166GDFP	R5F72166HDBG	R5F72166HDFA	R5F72166HDFP		

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (SH7216 Series)

Series		SH7216																									
Group		SH7216																									
Memory	ROM (Bytes)	1M																									
	RAM (Bytes)	128K																									
	ROM Type*1	F																									
	Cache Memory	—																									
	Program Security	Yes																									
CPU	CPU	SH-2A Core												SH2A-FPU Core													
	Basic Instructions	91												112													
	Minimum Instruction Execution Time (ns)	5 (@200MHz)						10 (@100MHz)						5 (@200MHz)						10 (@100MHz)							
	Dhrystone Performance	400MIPS (Flash Memory, 200MHz)						200MIPS (Flash Memory, 100MHz)						400MIPS (Flash Memory, 200MHz)						200MIPS (Flash Memory, 100MHz)							
	Multiplier	32 × 32 → 64																									
	Multiply-Accumulate Instruction	32 × 32 + 64 → 64																									
	Barrel Shifter	Yes																									
	FPU	—												Yes													
	MMU	—																									
DMA	DMAC (Channels)	8 (4 channels of them can receive an external request)																									
	DTC/DMAC II	DTC																									
External Bus Expansion	Address Space (Bytes)	512M (64M × 8)																									
	Bus State Controller	Direct connection to ROM/SRAM/SDRAM/MPX-I/O and the others is supported																									
	Bus Structure	Separate bus (8/16/32-bit)																									
	SDRAM Controller	Yes																									
	DRAM Controller	—																									
	PCI Controller	—																									
	Endian Conversion	—																									
	Host Interface	—																									
Clock	Clock Generation Circuit	1 circuit																									
	PLL	Yes																									
	RTC	—																									
	Oscillation Stop Detection	Yes																									
	Frequency Divider	1/n (n = 1, 2, 4, 8)																									
	Power Save	Sleep/software standby/module standby																									
Power Supply Voltage Detection	Power-On Reset/POR	—																									
A/D Converter	Resolution × Channels	12-bit × 8																									
	Sample and Hold	Yes (2 circuits)																									
	Multi-Channel Sample and Hold	Yes (3 circuits)																									
D/A Converter	Resolution × Channels	—																									
Timer	8-bit	—																									
	16-bit	11 (MTU2 × 6, MTU2S × 3, CMT × 2)																									
	32-bit	—																									
	Input Capture	30 (shared with MTU2 × 19, MTU2S × 11)																									
	Output Compare	24 (shared with MTU2 × 16, MTU2S × 8)																									
	PWM Output	24 (shared with MTU2 × 16, MTU2S × 8)																									
	Event Counter	11 (shared with MTU2, MTU2S, CMT)																									
	2-Phase Encoder Input	2 (shared with MTU2)																									
	3-Phase Inverter Control	2 (shared with MTU2, MTU2S)																									
Watchdog Timer		1																									
Serial Interface	Clock Sync./Clock Async.	5 (SCI × 4, SCIF × 1)																									
	Clock Sync. Only	—																									
	Clock Async. Only	—																									
I²C-bus		1																									
Smart Card/SIM		—																									
Synchronous Serial Communication Unit/Special Serial I/O		1 (RSPI)																									
CAN	Channels	1ch																									
	Message Box (Numbers)	16																									
FlexRay		—																									
Ethernet		1ch	—			1ch	—			1ch	—			1ch	—			1ch	—			1ch	—			1ch	—	
USBHOST		—																									
USBFunction		1ch																									
IrDA		—																									
LCD		—																									
I/O Ports	Input Only (Numbers)	10																									
	CMOS I/O (Numbers)	100																									
	High Voltage Port (Numbers)	—																									
	N-Channel Open Drain Port (Numbers)	2 (I²C bus)																									
	High Current Drive Port	24 (MTU2 × 6, MTU2S × 18)																									
	Pull-Up Resistor	100																									
External Interrupts Pins		9 (NMI + IRQ × 8)																									
Debugging Function	Boundary Scan/JTAG	Yes																									
	On-Chip Debug	Yes (User Debug Interface/Advanced users debugger)																									
	On-Board Flash Program	Yes																									
Other Functions	ROM Correction Function	—																									
	Others	—																									
Operating Frequency/Supply Voltage		200MHz/3.0 to 3.6V						100MHz/3.0 to 3.6V						200MHz/3.0 to 3.6V						100MHz/3.0 to 3.6V							
Operating Ambient Temperature (˚C)		–40 to 85																									
Package*2		PLBG0176GA-A	PLQP0176LB-A	PLQP0176KB-A	PLBG0176GA-A	PLQP0176LB-A	PLQP0176KB-A	PLBG0176GA-A	PLQP0176LB-A	PLQP0176KB-A	PLBG0176GA-A	PLQP0176LB-A	PLQP0176KB-A	PLBG0176GA-A	PLQP0176LB-A	PLQP0176KB-A	PLBG0176GA-A	PLQP0176LB-A	PLQP0176KB-A	PLBG0176GA-A	PLQP0176LB-A	PLQP0176KB-A	PLBG0176GA-A	PLQP0176LB-A	PLQP0176KB-A		
Part No.		R5F72147ADBG	R5F72147ADFA	R5F72147ADFP	R5F72147BDBG	R5F72147BDFA	R5F72147BDFP	R5F72147GDBG	R5F72147GDFA	R5F72147GDFP	R5F72147HDBG	R5F72147HDFA	R5F72147HDFP	R5F72167ADBG	R5F72167ADFA	R5F72167ADFP	R5F72167BDBG	R5F72167BDFA	R5F72167BDFP	R5F72167GDBG	R5F72167GDFA	R5F72167GDFP	R5F72167HDBG	R5F72167HDFA	R5F72167HDFP		

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

SH7239 Series (SH-2A)

- Realizes high-performance of 160MHz/320MIPS
- A maximum of 512 MB of high-capacity, built-in flash memory.
- Built-in functions suitable for high-precision inverter control: 12-bit A/D converter, high-functional timers
- Incorporates a variety of communication functions such as CAN, RSPI, etc.

• Specifications (SH7239 Series)

Series		SH7239							
Group		SH7237				SH7239			
Memory	ROM (Bytes)	256K		512K		256K		512K	
	RAM (Bytes)	32K		64K		32K		64K	
	ROM Type*1	F							
	Cache Memory	—							
	Program Security	Yes							
CPU	CPU	SH-2A Core				SH2A-FPU Core			
	Basic Instructions	91				112			
	Minimum Instruction Execution Time (ns)	6.25 (@160MHz)	10 (@100MHz)	6.25 (@160MHz)	10 (@100MHz)	6.25 (@160MHz)	10 (@100MHz)	6.25 (@160MHz)	10 (@100MHz)
	Dhrystone Performance	320MIPS (160MHz)	200MIPS (100MHz)	320MIPS (160MHz)	200MIPS (100MHz)	320MIPS (160MHz)	200MIPS (100MHz)	320MIPS (160MHz)	200MIPS (100MHz)
	Multiplier	32 × 32 → 64							
	Multiply-Accumulate Instruction	32 × 32 + 64 → 64							
	Barrel Shifter	Yes							
	FPU	—				Yes			
	MMU	—							
DMA	DMAC (Channels)	8 (4 channels of them can receive an external request)							
	DTC/DMAC II	DTC							
External Bus Expansion	Address Space (Bytes)	12M (2M × 6)	—	12M (2M × 6)	—	12M (2M × 6)	—	12M (2M × 6)	—
	Bus State Controller	SRAM/MPX-I/O	—	SRAM/MPX-I/O	—	SRAM/MPX-I/O	—	SRAM/MPX-I/O	—
	Bus Structure	Separate bus (8/16-bit)/ Multiplex bus (8/16-bit)	—	Separate bus (8/16-bit)/ Multiplex bus (8/16-bit)	—	Separate bus (8/16-bit)/ Multiplex bus (8/16-bit)	—	Separate bus (8/16-bit)/ Multiplex bus (8/16-bit)	—
	SDRAM Controller	—							
	DRAM Controller	—							
	PCI Controller	—							
	Endian Conversion	Yes	—	Yes	—	Yes	—	Yes	—
	Host Interface	—							
Clock	Clock Generation Circuit	1 circuit							
	PLL	Yes							
	RTC	—							
	Oscillation Stop Detection	Yes							
	Frequency Divider	1/n (n = 1, 2, 4, 8)							
	Power Save	Sleep/software standby/module standby							
Power Supply Voltage Detection	Power-On Reset/POR	—							
A/D Converter	Resolution × Channels	12-bit × 16							
	Sample and Hold	Yes (3 circuits)							
	Multi-Channel Sample and Hold	Yes (3 circuits)							
D/A Converter	Resolution × Channels	—							
Timer	8-bit	—							
	16-bit	11 (MTU2 × 6, MTU2S × 3, CMT × 2)							
	32-bit	—							
	Input Capture	30 (shared with MTU2 × 19, MTU2S × 11)							
	Output Compare	24 (shared with MTU2 × 16, MTU2S × 8)							
	PWM Output	24 (shared with MTU2 × 16, MTU2S × 8)							
	Event Counter	11 (shared with MTU2, MTU2S, CMT)				11 (shared with MTU2, MTU2S, CMT)			
	2-Phase Encoder Input	2 (shared with MTU2)							
	3-Phase Inverter Control	2 (shared with MTU2, MTU2S)							
Watchdog Timer		1							
Serial Interface	Clock Sync./Clock Async.	4 (SCI × 3, SCIF × 1)							
	Clock Sync. Only	—							
	Clock Async. Only	—							
I²C-bus		—							
Smart Card/SIM		—							
Synchronous Serial Communication Unit/Special Serial I/O		1 (RSPI)							
CAN	Channels	1ch							
	Message Box (Numbers)	16							
FlexRay		—							
Ethernet		—							
USBHOST		—							
USBFunction		—							
IrDA		—							
LCD		—							
I/O Ports	Input Only (Numbers)	16							
	CMOS I/O (Numbers)	69							
	High Voltage Port (Numbers)	—							
	N-Channel Open Drain Port (Numbers)	—							
	High Current Drive Port	12 (MTU2 × 6, MTU2S × 6)							
	Pull-Up Resistor	69							
External Interrupts Pins		8 (NMI + IRQ × 7)							
Debugging Function	Boundary Scan/JTAG	—							
	On-Chip Debug	Yes (User Debug Interface/Advanced users debugger)							
	On-Board Flash Program	Yes							
Other Functions	ROM Correction Function	—							
	Others	—							
Operating Frequency/Supply Voltage		160MHz/3.0V to 3.6V	100MHz/4.5V to 5.5V	160MHz/3.0V to 3.6V	100MHz/4.5V to 5.5V	160MHz/3.0V to 3.6V	100MHz/4.5V to 5.5V	160MHz/3.0V to 3.6V	100MHz/4.5V to 5.5V
Operating Ambient Temperature (°C)		–40 to 85							
Package*2		PLQP0120KA-A							
Part No.		R5F72374ADFP*	R5F72374BDFP*	R5F72375ADFP*	R5F72375BDFP*	R5F72394ADFP*	R5F72394BDFP*	R5F72395ADFP*	R5F72395BDFP*

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (SH7231 Series)

Series		SH7231								
Group		SH7231								
Memory	ROM (Bytes)	768K			1M					
	RAM (Bytes)	32KB + 12KB								
	ROM Type*1	F								
	Cache Memory	—								
	Program Security	Yes								
CPU	CPU	SH2A-FPU core								
	Basic Instructions	112								
	Minimum Instruction Execution Time (ns)	10(@100MHz)								
	Dhrystone Performance	200MIPS(100MHz)								
	Multiplier	32× 32 → 64								
	Multiply-Accumulate Instruction	32 × 32 + 64 → 64								
	Barrel Shifter	—								
	FPU	Yes								
	MMU	—								
DMA	DMAC (Channels)	4 (2 channels of them can receive an external request)								
	DTC/DMAC Ⅱ	DTC								
External Bus Expansion	Address Space (Bytes)	512M(64M× 8)								
	Bus State Controller	Direct connection to ROM/SRAM/SDRAM/MPX-IO and the others is supported.								
	Bus Structure	Separate bus(8/16/32bit) /multiplex bus(8/16bit)								
	SDRAM Controller	Yes								
	DRAM Controller	—								
	PCI Controller	—								
	Endian Conversion	—								
	Host Interface	—								
Clock	Clock Generation Circuit	1 circuit								
	PLL	Yes								
	RTC	—								
	Oscillation Stop Detection	Yes								
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)								
	Power Save	Sleep/software standby/module standby/deep software standby								
Power Supply Voltage Detection	Power-On Reset/POR	—								
A/D Converter	Resolution × Channels	10bit × 16								
	Sample and Hold	Yes (2 circuits)								
	Multi-Channel Sample and Hold	—								
D/A Converter	Resolution × Channels	—								
Timer	8-bit	2 (TIM32C × 2)								
	16-bit	12 (MTU2 × 6, MTU2S × 3, CMT × 2, TIM32C × 1)								
	32-bit	1 (CMT2)								
	Input Capture	32 (shared with MTU2 × 19, MTU2S × 11, CMT2 × 2)								
	Output Compare	26 (shared with MTU2 × 16, MTU2S × 8, CMT2 × 2)								
	PWM Output	24 (shared with MTU2 × 16, MTU2S × 8)								
	Event Counter	14 (shared with MTU2, MTU2S, CMT, CMT2, TIM32C)								
	2-Phase Encoder Input	4 (shared with MTU2, TIM32C)								
	3-Phase Inverter Control	2 (shared with MTU2, MTU2S)								
Watchdog Timer		1								
Serial Interface	Clock Sync./Clock Async.	8 (SCI × 4, SCIF × 4)								
	Clock Sync. Only	—								
	Clock Async. Only	—								
I²C-bus		1ch								
Smart Card/SIM		—								
Synchronous Serial Communication Unit/Special Serial I/O		1 (RSPI)								
CAN	Channels	1ch								
	Message Box (Numbers)	16								
FlexRay		—								
Ethernet		—								
USBHOST		—								
USBFunction		—								
IrDA		—								
LCD		—								
I/O Ports	Input Only (Numbers)	22								
	CMOS I/O (Numbers)	162								
	High Voltage Port (Numbers)	—								
	N-Channel Open Drain Port (Numbers)	2 (I²C bus)								
	High Current Drive Port	12(MTU2×6. MTU2S×6)								
	Pull-Up Resistor	168								
External Interrupts Pins		25(NMI + IRQ× 24)								
Debugging Function	Boundary Scan/JTAG	Yes								
	On-Chip Debug	Yes (User debug interface, advanced user debugger)								
	On-Board Flash Program	Yes								
Other Functions	ROM Correction Function	—								
	Others	KEYC			LVDS receiver I/Fx2ch, KEYC			KEYC		
Operating Frequency/Supply Voltage		100MHz/3.0 to3.6(core, I/O), 1.65 to 1.95 or 3.0 to 3.6(I/O)								
Operating Ambient Temperature (˚C)		–20 to 85		–40 to 85	–20 to 85		–40 to 85	–20 to 85		–40 to 85
Package*2		PLBG0256KA-B	PRBG0272GA-A		PLBG0256KA-B	PRBG0272GA-A		PLBG0256KA-B	PRBG0272GA-A	
Part No.		R5F72314LNBG**	R5F72314LNBA**	R5F72314LDBA**	R5F72315ANBG**	R5F72315ANBA**	R5F72315ADBA**	R5F72315LNBG**	R5F72315LNBA**	R5F72315LDBA**

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

SH7280 Series (SH-2A)

- 100MHz/200MIPS throughput.
- A maximum of 1 MB of high-capacity, built-in flash memory.
- Possesses a variety of peripheral functions, including USB, timer, etc.
- On-chip debugging function

• Specifications (SH7210, SH7280 Series)

Series		SH7210		SH7280															
Group		SH7211		SH7285			SH7286												
Memory	ROM (Bytes)	384K		512K		768K	512K			768K		1M							
	RAM (Bytes)	24K	32K	24K		32K	24K			32K									
	ROM Type*1	F																	
	Cache Memory	—																	
	Program Security	Yes																	
CPU	CPU	SH-2A Core																	
	Basic Instructions	91																	
	Minimum Instruction Execution Time (ns)	6.25 (@160MHz)		10 (@100MHz)															
	Dhrystone Performance	320MIPS (160MHz)		200MIPS (100MHz)															
	Multiplier	32 × 32 → 64																	
	Multiply-Accumulate Instruction	32 × 32 + 64 → 64																	
	Barrel Shifter	Yes																	
	FPU	—																	
	MMU	—																	
DMA	DMAC (Channels)	8 (4 channels of them can receive an external request)		8 (2 channels of them can receive an external request)			8 (4 channels of them can receive an external request)												
	DTC/DMAC II	—		DTC															
External Bus Expansion	Address Space (Bytes)	512M (64M × 8)																	
	Bus State Controller	Direct connection to ROM/SRAM/SDRAM/MPX-I/O and the others is supported																	
	Bus Structure	Separate bus (8/16-bit)/ Multiplex bus (8/16-bit)					Separate bus (8/16/32-bit)/Multiplex bus (8/16/32-bit)												
	SDRAM Controller	Yes																	
	DRAM Controller	—																	
	PCI Controller	—																	
	Endian Conversion	Yes																	
	Host Interface	—																	
Clock	Clock Generation Circuit	1 circuit																	
	PLL	Yes																	
	RTC	—																	
	Oscillation Stop Detection	—		Yes															
	Frequency Divider	1/n (n = 1, 2, 4, 8)																	
	Power Save	Sleep/software standby/module standby																	
Power Supply Voltage Detection	Power-On Reset/POR	—																	
A/D Converter	Resolution × Channels	12-bit × 8					12-bit × 12												
	Sample and Hold	Yes (1 circuit)		Yes (2 circuits)			Yes (3 circuits)												
	Multi-Channel Sample and Hold	Yes (3 units)		Yes (3 circuits)															
D/A Converter	Resolution × Channels	8-bit × 2		—			8-bit × 2												
Timer	8-bit	—																	
	16-bit	11 (MTU2 × 6, MTU2S × 3, CMT × 2)																	
	32-bit	—																	
	Input Capture	30 (shared with MTU2 × 19, MTU2S × 11)																	
	Output Compare	24 (shared with MTU2 × 16, MTU2S × 8)																	
	PWM Output	24 (shared with MTU2 × 16, MTU2S × 8)																	
	Event Counter	11 (shared with MTU2, MTU2S, CMT)																	
	2-Phase Encoder Input	2 (shared with MTU2)																	
	3-Phase Inverter Control	2 (shared with MTU2, MTU2S)																	
Watchdog Timer		1																	
Serial Interface	Clock Sync./Clock Async.	4 (SCIF)		5 (SCI × 4, SCIF × 1)															
	Clock Sync. Only	—																	
	Clock Async. Only	—																	
I²C-bus		1																	
Smart Card/SIM		—																	
Synchronous Serial Communication Unit/Special Serial I/O		—		1															
CAN	Channels	—					1ch												
	Message Box (Numbers)	—					16												
FlexRay		—																	
Ethernet		—																	
USBHOST		—																	
USBFunction		—		1ch															
IrDA		—																	
LCD		—																	
I/O Ports	Input Only (Numbers)	2		10			14												
	CMOS I/O (Numbers)	73		89			99												
	High Voltage Port (Numbers)	—																	
	N-Channel Open Drain Port (Numbers)	2 (I²C bus)																	
	High Current Drive Port	12 (MTU2 × 6, MTU2S × 6)					12 (MTU2 × 6, MTU2S × 6)												
	Pull-Up Resistor	—		89			99												
External Interrupts Pins		9 (NMI + IRQ × 8)																	
Debugging Function	Boundary Scan/JTAG	—																	
	On-Chip Debug	Yes (User Debug Interface/Advanced users debugger)																	
	On-Board Flash Program	Yes																	
Other Functions	ROM Correction Function	—																	
	Others	—																	
Operating Frequency/Supply Voltage		160MHz/1.4 to 1.6V, 3.0 to 3.6V (I/O)		100MHz/3.0 to 5.5V															
Operating Ambient Temperature (˚C)		–40 to 85		–20 to 85		–40 to 85		–20 to 85		–40 to 85		–20 to 85		–40 to 85		–20 to 85			
Package*2		PLQP0144KA-A					PLQP0176LB-A	PLQP0176KB-A	PLQP0176LB-A	PLQP0176KB-A	PLQP0176LB-A	PLQP0176KB-A	PLQP0176LB-A	PLQP0176KB-A	PLQP0176LB-A	PLQP0176KB-A	PLQP0176LB-A	PLQP0176KB-A	
Part No.		R5F72114D160FPV	R5F72115D160FPV	R5F72855D100FP	R5F72855N100FP	R5F72856N100FP	R5F72856D100FP	R5F72865D100FA	R5F72865D100FP	R5F72865N100FA	R5F72865N100FP	R5F72866D100FA	R5F72866D100FP	R5F72866N100FA	R5F72866N100FP	R5F72867D100FA	R5F72867D100FP	R5F72867N100FA	R5F72867N100FP

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

SH7243 Series (SH-2A)

- 100MHz/200MIPS throughput.
- Incorporates numerous peripheral functions such as 12-bit A/D converter
- Incorporates on-chip debugging function

• Specifications (SH7243 Series)

Series		SH7243			
Group		SH7243			
Memory	ROM (Bytes)	128K		256K	
	RAM (Bytes)	8K		12K	
	ROM Type*1	F			
	Cache Memory	—			
	Program Security	Yes			
CPU	CPU	SH-2A Core			
	Basic Instructions	91			
	Minimum Instruction Execution Time (ns)	10 (@100MHz)			
	Dhrystone Performance	200MIPS (100MHz)			
	Multiplier	32 × 32 → 64			
	Multiply-Accumulate Instruction	32 × 32 + 64 → 64			
	Barrel Shifter	Yes			
	FPU	—			
	MMU	—			
DMA	DMAC (Channels)	8 (2 channels of them can receive an external request)			
	DTC/DMA II	DTC			
External Bus Expansion	Address Space (Bytes)	512M (64M × 8)			
	Bus State Controller	Direct connection to ROM/SRAM/SDRAM/MPX-I/O and the others is supported			
	Bus Structure	Separate bus (8/16-bit)/Multiplex bus (8/16-bit)			
	SDRAM Controller	Yes			
	DRAM Controller	—			
	PCI Controller	—			
	Endian Conversion	Yes			
	Host Interface	—			
Clock	Clock Generation Circuit	1 circuit			
	PLL	Yes			
	RTC	—			
	Oscillation Stop Detection	Yes			
	Frequency Divider	1/n (n = 1, 2, 4, 8)			
	Power Save	Sleep/software standby/module standby			
Power Supply Voltage Detection	Power-On Reset/POR	—			
A/D Converter	Resolution × Channels	12-bit × 8			
	Sample and Hold	Yes (2 circuits)			
	Multi-Channel Sample and Hold	Yes (3 circuits)			
D/A Converter	Resolution × Channels	—			
Timer	8-bit	—			
	16-bit	11 (MTU2 × 6, MTU2S × 3, CMT × 2)			
	32-bit	—			
	Input Capture	30 (shared with MTU2 × 19, MTU2S × 11)			
	Output Compare	24 (shared with MTU2 × 16, MTU2S × 8)			
	PWM Output	24 (shared with MTU2 × 16, MTU2S × 8)			
	Event Counter	11 (shared with MTU2, MTU2S, CMT)			
	2-Phase Encoder Input	2 (shared with MTU2)			
	3-Phase Inverter Control	2 (shared with MTU2, MTU2S)			
Watchdog Timer		1			
Serial Interface	Clock Sync./Clock Async.	3 (SCI × 2, SCIF × 1)			
	Clock Sync. Only	—			
	Clock Async. Only	—			
I^2C-bus		—			
Smart Card/SIM		—			
Synchronous Serial Communication Unit/Special Serial I/O		—			
CAN	Channels	—			
	Message Box (Numbers)	—			
FlexRay		—			
Ethernet		—			
USBHOST		—			
USBFunction		—			
IrDA		—			
LCD		—			
I/O Ports	Input Only (Numbers)	8			
	CMOS I/O (Numbers)	63			
	High Voltage Port (Numbers)	—			
	N-Channel Open Drain Port (Numbers)	—			
	High Current Drive Port	12 (MTU2 × 6, MTU2S × 6)			
	Pull-Up Resistor	63			
External Interrupts Pins		9 (NMI + IRQ × 8)			
Debugging Function	Boundary Scan/JTAG	—			
	On-Chip Debug	Yes (User Debug Interface/Advanced users debugger)			
	On-Board Flash Program	Yes			
Other Functions	ROM Correction Function	—			
	Others	—			
Operating Frequency/Supply Voltage		100MHz/3.0 to 5.5V			
Operating Ambient Temperature (°C)		–20 to 85	–40 to 85		–20 to 85
Package*2		PLQP0100KB-A			
Part No.		R5F72433N100FP	R5F72433D100FP	R5F72434D100FP	R5F72434N100FP

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

SH7147 Series

- High-speed processing performance with a maximum operating frequency of 80 MHz
- Incorporates a CAN interface, which is highly demanded in the automotive and industrial fields
- Incorporates a powerful 16-bit timer suited for high-precision inverter control

SH7137 Series

- Processing at 80MHz/104 MIPS
- Incorporates numerous peripheral functions such as 12-bit A/D converter
- Incorporates on-chip debugging function
- Incorporates a powerful 16-bit timer suitable for high-precision inverter control.

• Specifications (SH7147, SH7137 Series)

Series		SH7147		SH7137							
Group		SH7147		SH7131		SH7132		SH7136		SH7137	
Memory	ROM (Bytes)	256K	512K	128K	256K	128K	256K				
	RAM (Bytes)	16K		8K	16K	8K	16K				
	ROM Type*1	F									
	Cache Memory	—									
	Program Security	Yes									
CPU	CPU	SH-2 Core									
	Basic Instructions	62									
	Minimum Instruction Execution Time (ns)	12.5 (@80MHz)									
	Dhrystone Performance	104MIPS (80MHz)									
	Multiplier	32 × 32 → 64									
	Multiply-Accumulate Instruction	32 × 32 + 64 → 64									
	Barrel Shifter	—									
	FPU	—									
	MMU	—									
DMA	DMAC (Channels)	—									
	DTC/DMAC II	DTC									
External Bus Expansion	Address Space (Bytes)	64M + 64M		—		2M (1M × 2)		—		2M (1M × 2)	
	Bus State Controller	Wait state (1 to 24 waits, can be extended with an external signal)		—		ROM/SRAM		—		ROM/SRAM	
	Bus Structure	Separate bus (8-bit)		—		Separate bus (8-bit)		—		Separate bus (8-bit)	
	SDRAM Controller	—									
	DRAM Controller	—									
	PCI Controller	—									
	Endian Conversion	—									
	Host Interface	—									
Clock	Clock Generation Circuit	1 circuit									
	PLL	Yes									
	RTC	—									
	Oscillation Stop Detection	Yes		—							
	Frequency Divider	1/n (n = 1, 2, 3, 4, 8)									
	Power Save	Sleep/software standby/ Deep Software Standby/ module standby/hardware standby		Sleep/module standby				Sleep/software standby/ Deep Software Standby/module standby			
Power Supply Voltage Detection	Power-On Reset/POR	—									
A/D Converter	Resolution × Channels	12-bit × 8 × 2 circuits		12-bit × 12		12-bit × 16		12-bit × 12		12-bit × 16	
	Sample and Hold	Yes		Yes (2 circuits)							
	Multi-Channel Sample and Hold	Yes (6 units)		Yes (6 circuits)							
D/A Converter	Resolution × Channels	—									
Timer	8-bit	—									
	16-bit	10 (MTU2 × 5, MTU2S × 3, CMT × 2)		11 (MTU2 × 6, MTU2S × 3, CMT × 2)							
	32-bit	—									
	Input Capture	MTU2 (12), MTU2S (9)		28 (shared with MTU2 × 19, MTU2S × 9)							
	Output Compare	MTU2 (12), MTU2S (6)		22 (shared with MTU2 × 16, MTU2S × 6)							
	PWM Output	MTU2 (12), MTU2S (6)		22 (shared with MTU2 × 16, MTU2S × 6)							
	Event Counter	MTU2S (3)		11 (shared with MTU2, MTU2S, CMT)							
	2-Phase Encoder Input	MTU2 (2)		2 (shared with MTU2)							
	3-Phase Inverter Control	MTU2, MTU2S (2)		2 (shared with MTU2, MTU2S)							
Watchdog Timer		1									
Serial Interface	Clock Sync./Clock Async.	3 (SCI)		3							
	Clock Sync. Only	—									
	Clock Async. Only	—									
I²C-bus		—		1							
Smart Card/SIM		—									
Synchronous Serial Communication Unit/Special Serial I/O		1 (SSU)		1							
CAN	Channels	1	2	1							
	Message Box (Numbers)	16	32 (16 × 2)	16							
FlexRay		—									
Ethernet		—									
USBHOST		—									
USBFunction		—									
IrDA		—									
LCD		—									
I/O Ports	Input Only (Numbers)	—		12		16		12		16	
	CMOS I/O (Numbers)	57		44		57		44		57	
	High Voltage Port (Numbers)	—									
	N-Channel Open Drain Port (Numbers)	—		2 (I²C bus)							
	High Current Drive Port	—		12 (MTU2 × 6, MTU2S × 6)							
	Pull-Up Resistor	—									
External Interrupts Pins		5		5 (NMI + IRQ × 4)							
Debugging Function	Boundary Scan/JTAG	—									
	On-Chip Debug	Yes (Advanced Users Debugger)		—				Yes (User Debug Interface)			
	On-Board Flash Program	Yes									
Other Functions	ROM Correction Function	—									
	Others	—									
Operating Frequency/Supply Voltage		80MHz/5.0V		80MHz/3.0 to 3.6V or 4.0 to 5.5V							
Operating Ambient Temperature (°C)				–40 to 85					–20 to 85	–40 to 85	–20 to 85
Package*2		PLQP0100KB-A		PLQP0080JA-A		PLQP0100KB-A		PLQP0080JA-A		PLQP0100KB-A	
Part No.		R5F71474BD80FPV	R5F71426BD80FPV	R5F71476BD80FPV	R5F71313AD80FPV	R5F71314AD80FPV	R5F71323AD80FPV	R5F71324AD80FPV	R5F71364AD80FPV	R5F71364AN80FPV	R5F71374AD80FPV	R5F71374AN80FPV

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

SH7080 Series (SH-2)

- This middle range controller utilizes the SH-2 core to enable high-speed operation at 80MHz.
- A maximum of 512 KB of high-capacity, built-in flash memory.
- Numerous variations of flash memory version, ROM-less version, mask ROM version
- Incorporates on-chip debugging function

• Specifications (SH7080 Series)

Series		SH7080															
Group		SH7083															
Memory	ROM (Bytes)	—		256K										512K			
	RAM (Bytes)	16K												32K			
	ROM Type*1	L		F				M						F			
	Cache Memory	—															
	Program Security	—		Yes				—						Yes			
CPU	CPU	SH-2 Core															
	Basic Instructions	62															
	Minimum Instruction Execution Time (ns)	12.5 (@80MHz)															
	Dhrystone Performance	104MIPS (80MHz)															
	Multiplier	32 × 32 → 64															
	Multiply-Accumulate Instruction	32 × 32 + 64 → 64															
	Barrel Shifter	—															
	FPU	—															
	MMU	—															
DMA	DMAC (Channels)	4 (externally available)															
	DTC/DMAC II	DTC															
External Bus Expansion	Address Space (Bytes)	192M (64M × 3)															
	Bus State Controller	Direct connection to ROM/SRAM/SDRAM/MPX-I/O and the others is supported															
	Bus Structure	Separate bus (8/16-bit)/Multiplex bus (8/16-bit)															
	SDRAM Controller	Yes (at 3.3V only)															
	DRAM Controller	—															
	PCI Controller	—															
	Endian Conversion	—															
	Host Interface	—															
Clock	Clock Generation Circuit	1 circuit															
	PLL	Yes															
	RTC	—															
	Oscillation Stop Detection	Yes															
	Frequency Divider	1/n (n = 1, 2, 3, 4, 8)															
	Power Save	Sleep/software standby/deep software standby/module standby															
Power Supply Voltage Detection	Power-On Reset/POR	—															
A/D Converter	Resolution × Channels	10-bit × 8 (2.0µs)															
	Sample and Hold	Yes (2 circuits)															
	Multi-Channel Sample and Hold	—															
D/A Converter	Resolution × Channels	—															
Timer	8-bit	—															
	16-bit	11 (MTU2 × 6, MTU2S × 3, CMT × 2)															
	32-bit	—															
	Input Capture	30 (shared with MTU2 × 19, MTU2S × 11)															
	Output Compare	24 (shared with MTU2 × 16, MTU2S × 8)															
	PWM Output	24 (shared with MTU2 × 16, MTU2S × 8)															
	Event Counter	11 (shared with MTU2, MTU2S, CMT)															
	2-Phase Encoder Input	2 (shared with MTU2)															
	3-Phase Inverter Control	2 (shared with MTU2, MTU2S)															
Watchdog Timer		1															
Serial Interface	Clock Sync./Clock Async.	4 (SCI × 3, SCIF × 1)															
	Clock Sync. Only	—															
	Clock Async. Only	—															
I²C-bus		—															
Smart Card/SIM		—															
Synchronous Serial Communication Unit/Special Serial I/O		1 (SSU)															
CAN	Channels	—															
	Message Box (Numbers)	—															
FlexRay		—															
Ethernet		—															
USBHOST		—															
USBFunction		—															
IrDA		—															
LCD		—															
I/O Ports	Input Only (Numbers)	8															
	CMOS I/O (Numbers)	65															
	High Voltage Port (Numbers)	—															
	N-Channel Open Drain Port (Numbers)	—															
	High Current Drive Port	12 (MTU2 × 6, MTU2S × 6)															
	Pull-Up Resistor	—															
External Interrupts Pins		9 (NMI, IRQ × 8)															
Debugging Function	Boundary Scan/JTAG	—															
	On-Chip Debug	—		Yes (User Debug Interface)				—						Yes (User Debug Interface)			
	On-Board Flash Program	—		Yes				—						Yes			
Other Functions	ROM Correction Function	—															
	Others	—															
Operating Frequency/Supply Voltage		80MHz/4.0 to 5.5V or 3.0 to 3.6V															
Operating Ambient Temperature (˚C)		–40 to 85		–20 to 85		–40 to 85		–20 to 85		–40 to 85		–20 to 85		–40 to 85		–20 to 85	
Package*2		PLBG0112GA-A	PTQP0100KA-A	PLBG0112GA-A	PTQP0100KA-A	PLBG0112GA-A	PTQP0100KA-A	PLBG0112GA-A	PTQP0100KA-A	PLBG0112GA-A	PTQP0100KA-A	PLBG0112GA-A	PTQP0100KA-A	PLBG0112GA-A	PTQP0100KA-A	PLBG0112GA-A	PTQP0100KA-A
Part No.		R5S70830AD80BGV	R5S70830AD80FTV	R5S70830AN80BGV	R5S70830AN80FTV	R5F70834AD80BGV	R5F70834AD80FTV	R5F70834AN80BGV	R5F70834AN80FTV	R5M70834ADXXXBGV	R5M70834ADXXXFTV	R5M70834ANXXXBGV	R5M70834ANXXXFTV	R5F70835AD80BGV	R5F70835AD80FTV	R5F70835AN80BGV	R5F70835AN80FTV

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (SH7080 Series)

Series		SH7080																
Group		SH7084								SH7085							SH7086	
Memory	ROM (Bytes)	—	256K			512K				—	256K				512K			
	RAM (Bytes)	16K				32K				16K					32K			
	ROM Type*1	L	F		M	F				L	F		M		F			
	Cache Memory	—																
	Program Security	—	Yes		—	Yes				—	Yes		—		Yes			
CPU	CPU	SH-2 Core																
	Basic Instructions	62																
	Minimum Instruction Execution Time (ns)	12.5 (@80MHz)																
	Dhrystone Performance	104MIPS (80MHz)																
	Multiplier	32 × 32 → 64																
	Multiply-Accumulate Instruction	32 × 32 + 64 → 64																
	Barrel Shifter	—																
	FPU	—																
	MMU	—																
DMA	DMAC (Channels)	4 (externally available)																
	DTC/DMAC Ⅱ	DTC																
External Bus Expansion	Address Space (Bytes)	512M (64M × 8)															1.5G (64M × 8, 1G × 1)	
	Bus State Controller	Direct connection to ROM/SRAM/SDRAM/MPX-I/O and the others is supported																
	Bus Structure	Separate bus (8/16-bit)/Multiplex bus (8/16-bit)								Separate bus (8/16/32-bit)/Multiplex bus (8/16/32-bit)								
	SDRAM Controller	Yes (at 3.3V only)																
	DRAM Controller	—																
	PCI Controller	—																
	Endian Conversion	—																
	Host Interface	—																
Clock	Clock Generation Circuit	1 circuit																
	PLL	Yes																
	RTC	—																
	Oscillation Stop Detection	Yes																
	Frequency Divider	1/n (n = 1, 2, 3, 4, 8)																
	Power Save	Sleep/software standby/deep software standby/module standby																
Power Supply Voltage Detection	Power-On Reset/POR	—																
A/D Converter	Resolution x Channels (min. conversion time)	10-bit × 8 (2.0µs)															10-bit × 16 (2.0µs)	
	Sample and Hold	Yes (2 circuits)															Yes (3 circuits)	
	Multi-Channel Sample and Hold	—																
D/A Converter	Resolution x Channels	—																
Timer	8-bit	—																
	16-bit	11 (MTU2 × 6, MTU2S × 3, CMT × 2)																
	32-bit	—																
	Input Capture	30 (shared with MTU2 × 19, MTU2S × 11)																
	Output Compare	24 (shared with MTU2 × 16, MTU2S × 8)																
	PWM Output	24 (shared with MTU2 × 16, MTU2S × 8)																
	Event Counter	11 (shared with MTU2, MTU2S, CMT)																
	2-Phase Encoder Input	2 (shared with MTU2)																
	3-Phase Inverter Control	2 (shared with MTU2, MTU2S)																
Watchdog Timer		1																
Serial Interface	Clock Sync./Clock Async.	4 (SCI × 3, SCIF × 1)																
	Clock Sync. Only	—																
	Clock Async. Only	—																
I²C-bus		Yes																
Smart Card/SIM		—																
Synchronous Serial Communication Unit/Special Serial I/O		1 (SSU)																
CAN	Channels	—																
	Message Box (Numbers)	—																
FlexRay		—																
Ethernet		—																
USBHOST		—																
USBFunction		—																
IrDA		—																
LCD		—																
I/O Ports	Input Only (Numbers)	8															16	
	CMOS I/O (Numbers)	76								100							118	
	High Voltage Port (Numbers)	—																
	N-Channel Open Drain Port (Numbers)	2 (I²C bus)																
	High Current Drive Port	12 (MTU2 × 6, MTU2S × 6)																
	Pull-Up Resistor	—																
External Interrupts Pins		9 (NMI, IRQ × 8)																
Debugging Function	Boundary Scan/JTAG	—																
	On-Chip Debug	—	Yes (User Debug Interface)		—	Yes (User Debug Interface)				—	Yes (User Debug Interface)		—		Yes (User Debug Interface)			
	On-Board Flash Program	—	Yes		—	Yes				—	Yes		—		Yes			
Other Functions	ROM Correction Function	—																
	Others	—																
Operating Frequency/Supply Voltage		80MHz/4.0 to 5.5V or 3.0 to 3.6V																
Operating Ambient Temperature (°C)		-20 to 85	–40 to 85		–20 to 85		–40 to 85		-20 to 85	-40 to 85	–20 to 85		–40 to 85		–20 to 85		–40 to 85	-20 to 85
Package*2		PLQP0112JA-A								PLQP0144KA-A							PLQP0176KB-A	
Part No.		R5S70840AN80FPV	R5S70840AD80FPV	R5F70844AD80FPV	R5F70844AN80FPV	R5M70844ANXXXFPV	R5M70844ADXXXFPV	R5F70845AD80FPV	R5F70845AN80FPV	R5S70850AD80FPV	R5S70850AN80FPV	R5F70854AN80FPV	R5F70854AD80FPV	R5M70854ADXXXFPV	R5M70854ANXXXFPV	R5F70855AN80FPV	R5F70855AD80FPV	R5F70865AD80FPV	R5F70865AN80FPV

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

SH7146 Series (SH-2)

- High-speed operation at 80MHz, 5V single power supply
- Numerous variations of product
- On-chip 2 motor control timers
- On-chip debugging function

• Specifications (SH7146 Series)

Series		SH7146							
Group		SH7146				SH7149			
Memory	ROM (Bytes)	256K							
	RAM (Bytes)	8K							
	ROM Type*1	F		M		F		M	
	Cache Memory	—							
	Program Security	Yes		—		Yes		—	
CPU	CPU	SH-2 Core							
	Basic Instructions	62							
	Minimum Instruction Execution Time (ns)	12.5 (@80MHz)							
	Dhrystone Performance	104MIPS (80MHz)							
	Multiplier	32 × 32 → 64							
	Multiply-Accumulate Instruction	32 × 32 + 64 → 64							
	Barrel Shifter	—							
	FPU	—							
	MMU	—							
DMA	DMAC (Channels)	—							
	DTC/DMAC II	DTC		—		DTC		—	
External Bus Expansion	Address Space (Bytes)	—				128M (64M × 2)			
	Bus State Controller	Single chip mode only				Direct connection to ROM/SRAM is supported			
	Bus Structure	—				Separate bus (8/16-bit)			
	SDRAM Controller	—							
	DRAM Controller	—							
	PCI Controller	—							
	Endian Conversion	—							
	Host Interface	—							
Clock	Clock Generation Circuit	1 circuit							
	PLL	Yes							
	RTC	—							
	Oscillation Stop Detection	Yes							
	Frequency Divider	1/n (n = 1, 2, 3, 4, 8)							
	Power Save	Sleep/software standby/module standby							
Power Supply Voltage Detection	Power-On Reset/POR	—							
A/D Converter	Resolution × Channels (min. conversion time)	10-bit × 12 (2.0µs)							
	Sample and Hold	Yes (3 circuits)							
	Multi-Channel Sample and Hold	—							
D/A Converter	Resolution × Channels	—							
Timer	8-bit	—							
	16-bit	11 (MTU2 × 6, MTU2S × 3, CMT × 2)							
	32-bit	—							
	Input Capture	30 (shared with MTU2 × 19, MTU2S × 11)							
	Output Compare	24 (shared with MTU2 × 16, MTU2S × 8)							
	PWM Output	24 (shared with MTU2 × 16, MTU2S × 8)							
	Event Counter	11 (shared with MTU2, MTU2S, CMT)							
	2-Phase Encoder Input	2 (shared with MTU2)							
	3-Phase Inverter Control	2 (shared with MTU2, MTU2S)							
Watchdog Timer		1							
Serial Interface	Clock Sync./Clock Async.	3 (SCI)							
	Clock Sync. Only	—							
	Clock Async. Only	—							
I²C-bus		—							
Smart Card/SIM		—							
Synchronous Serial Communication Unit/Special Serial I/O		—							
CAN	Channels	—							
	Message Box (Numbers)	—							
FlexRay		—							
Ethernet		—							
USBHOST		—							
USBFunction		—							
IrDA		—							
LCD		—							
I/O Ports	Input Only (Numbers)	12							
	CMOS I/O (Numbers)	45				63			
	High Voltage Port (Numbers)	—							
	N-Channel Open Drain Port (Numbers)	—							
	High Current Drive Port	12 (MTU2 × 6, MTU2S × 6)							
	Pull-Up Resistor	—							
External Interrupts Pins		5 (NMI, IRQ × 4)							
Debugging Function	Boundary Scan/JTAG	—							
	On-Chip Debug	Yes (User Debug Interface)		—		Yes (User Debug Interface)		—	
	On-Board Flash Program	Yes		—		Yes		—	
Other Functions	ROM Correction Function	—							
	Others	—							
Operating Frequency/Supply Voltage		80MHz/4.0 to 5.5V							
Operating Ambient Temperature (˚C)		–40 to 85	–20 to 85	–40 to 85	–20 to 85	–40 to 85	–20 to 85	–40 to 85	–20 to 85
Package*2		PLQP0080JA-A				PLQP0100KB-A			
Part No.		R5F71464AD80FPV	R5F71464AN80FPV	R5M71464BDXXXFPV	R5M71464BNXXXFPV	R5F71494AD80FPV	R5F71494AN80FPV	R5M71494BDXXXFPV	R5M71494BNXXXFPV

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

SH7125 Series (SH-2)

- Small, low-pin-count packages (48 or 64 pins)
- On-chip motor control timer (1ch)
- On-chip high-speed A/D converter (2.0µsec/ch)
- On-chip debugging function

• Specifications (SH7125 Series)

Series		SH7125															
Group		SH7124															
Memory	ROM (Bytes)	16K				32K				64K				128K			
	RAM (Bytes)	4K				8K											
	ROM Type*1	F															
	Cache Memory	—															
	Program Security	Yes															
CPU	CPU	SH-2 Core															
	Basic Instructions	62															
	Minimum Instruction Execution Time (ns)	20 (@50MHz)															
	Dhrystone Performance	65MIPS (50MHz)															
	Multiplier	32 × 32 → 64															
	Multiply-Accumulate Instruction	32 × 32 + 64 → 64															
	Barrel Shifter	—															
	FPU	—															
	MMU	—															
DMA	DMAC (Channels)	—															
	DTC/DMAC II	—															
External Bus Expansion	Address Space (Bytes)	—															
	Bus State Controller	Single chip mode only															
	Bus Structure	—															
	SDRAM Controller	—															
	DRAM Controller	—															
	PCI Controller	—															
	Endian Conversion	—															
	Host Interface	—															
Clock	Clock Generation Circuit	1 circuit															
	PLL	Yes															
	RTC	—															
	Oscillation Stop Detection	Yes															
	Frequency Divider	1/n (n = 2, 4, 8)															
	Power Save	Sleep/software standby/module standby															
Power Supply Voltage Detection	Power-On Reset/POR	—															
A/D Converter	Resolution x Channels (min. conversion time)	10-bit × 8 (2.0µs)															
	Sample and Hold	Yes (2 circuits)															
	Multi-Channel Sample and Hold	—															
D/A Converter	Resolution × Channels	—															
Timer	8-bit	—															
	16-bit	8 (MTU2 × 6, CMT × 2)															
	32-bit	—															
	Input Capture	15 (shared with MTU2)															
	Output Compare	12 (shared with MTU2)															
	PWM Output	12 (shared with MTU2)															
	Event Counter	8 (shared with MTU2, CMT)															
	2-Phase Encoder Input	2 (shared with MTU2)															
	3-Phase Inverter Control	1 (shared with MTU2)															
Watchdog Timer		1															
Serial Interface	Clock Sync./Clock Async.	2 (SCI)															
	Clock Sync. Only	—															
	Clock Async. Only	1 (SCI)															
I²C-bus		—															
Smart Card/SIM		—															
Synchronous Serial Communication Unit/Special Serial I/O		—															
CAN	Channels	—															
	Message Box (Numbers)	—															
FlexRay		—															
Ethernet		—															
USBHOST		—															
USBFunction		—															
IrDA		—															
LCD		—															
I/O Ports	Input Only (Numbers)	8															
	CMOS I/O (Numbers)	23															
	High Voltage Port (Numbers)	—															
	N-Channel Open Drain Port (Numbers)	—															
	High Current Drive Port	6 (MTU2)															
	Pull-Up Resistor	—															
External Interrupts Pins		4 (NMI, IRQ × 3)															
Debugging Function	Boundary Scan/JTAG	—															
	On-Chip Debug	—								Yes (User Debug Interface)							
	On-Board Flash Program	Yes															
Other Functions	ROM Correction Function	—															
	Others	—															
Operating Frequency/Supply Voltage		50MHz/4.0 to 5.5V															
Operating Ambient Temperature (˚C)		–40 to 85		–20 to 85		–40 to 85		–20 to 85		–40 to 85		–20 to 85		–40 to 85		–20 to 85	
Package*2		PLQP0048JA-A	PVQN0052LE-A	PLQP0048JA-A	PVQN0052LE-A	PLQP0048JA-A	PVQN0052LE-A	PLQP0048JA-A	PVQN0052LE-A	PLQP0048JA-A	PVQN0052LE-A	PLQP0048JA-A	PVQN0052LE-A	PLQP0048JA-A	PVQN0052LE-A	PLQP0048JA-A	PVQN0052LE-A
Part No.		R5F71240AD50FP	R5F71240AD50NP	R5F71240AN50FP	R5F71240AN50NP	R5F71241AD50FP	R5F71241AD50NP	R5F71241AN50FP	R5F71241AN50NP	R5F71242D50FP	R5F71242D50NP	R5F71242N50FP	R5F71242N50NP	R5F71243D50FP	R5F71243D50NP	R5F71243N50FP	R5F71243N50NP

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (SH7125 Series)

Series		SH7125																													
Group		SH7125																													
Memory	ROM (Bytes)	16K			32K			64K			128K																				
	RAM (Bytes)	4K			8K																										
	ROM Type*1	F																													
	Cache Memory	—																													
	Program Security	Yes																													
CPU	CPU	SH-2 Core																													
	Basic Instructions	62																													
	Minimum Instruction Execution Time (ns)	20 (@50MHz)																													
	Dhrystone Performance	65MIPS (50MHz)																													
	Multiplier	32 × 32 → 64																													
	Multiply-Accumulate Instruction	32 × 32 + 64 → 64																													
	Barrel Shifter	—																													
	FPU	—																													
	MMU	—																													
DMA	DMAC (Channels)	—																													
	DTC/DMAC II	—																													
External Bus Expansion	Address Space (Bytes)	—																													
	Bus State Controller	Single chip mode only																													
	Bus Structure	—																													
	SDRAM Controller	—																													
	DRAM Controller	—																													
	PCI Controller	—																													
	Endian Conversion	—																													
	Host Interface	—																													
Clock	Clock Generation Circuit	1 circuit																													
	PLL	Yes																													
	RTC	—																													
	Oscillation Stop Detection	Yes																													
	Frequency Divider	1/n (n = 2, 4, 8)																													
	Power Save	Sleep/software standby/module standby																													
Power Supply Voltage Detection	Power-On Reset/POR	—																													
A/D Converter	Resolution × Channels	10-bit × 8 (2.0µs)																													
	Sample and Hold	Yes (2 circuits)																													
	Multi-Channel Sample and Hold	—																													
D/A Converter	Resolution × Channels	—																													
Timer	8-bit	—																													
	16-bit	8 (MTU2 × 6, CMT × 2)																													
	32-bit	—																													
	Input Capture	19 (shared with MTU2)																													
	Output Compare	16 (shared with MTU2)																													
	PWM Output	16 (shared with MTU2)																													
	Event Counter	8 (shared with MTU2, CMT)																													
	2-Phase Encoder Input	2 (shared with MTU2)																													
	3-Phase Inverter Control	1 (shared with MTU2)																													
Watchdog Timer		1																													
Serial Interface	Clock Sync./Clock Async.	3 (SCI)																													
	Clock Sync. Only	—																													
	Clock Async. Only	—																													
I²C-bus		—																													
Smart Card/SIM		—																													
Synchronous Serial Communication Unit/Special Serial I/O		—																													
CAN	Channels	—																													
	Message Box (Numbers)	—																													
FlexRay		—																													
Ethernet		—																													
USBHOST		—																													
USBFunction		—																													
IrDA		—																													
LCD		—																													
I/O Ports	Input Only (Numbers)	8																													
	CMOS I/O (Numbers)	37																													
	High Voltage Port (Numbers)	—																													
	N-Channel Open Drain Port (Numbers)	—																													
	High Current Drive Port	6 (MTU2)																													
	Pull-Up Resistor	—																													
External Interrupts Pins		5 (NMI, IRQ × 4)																													
Debugging Function	Boundary Scan/JTAG	—																													
	On-Chip Debug	—																													
	On-Board Flash Program	Yes																													
Other Functions	ROM Correction Function	—																													
	Others	—																													
Operating Frequency/Supply Voltage		50MHz/4.0 to 5.5V																													
Operating Ambient Temperature (˚C)		–40 to 85			–20 to 85			–40 to 85			–20 to 85			–40 to 85			–20 to 85			–40 to 85			–20 to 85							
Package*2		PRQP0064GC-A	PLQP0064KB-A	PVQN0064LB-A	PRQP0064GC-A	PLQP0064KB-A	PVQN0064LB-A	PRQP0064GC-A	PLQP0064KB-A	PVQN0064LB-A	PRQP0064GC-A	PLQP0064KB-A	PVQN0064LB-A	PRQP0064GC-A	PLQP0064KB-A	PVQN0064LB-A	PRQP0064GC-A	PLQP0064KB-A	PVQN0064LB-A	PRQP0064GC-A	PLQP0064KB-A	PVQN0064LB-A	PRQP0064GC-A	PLQP0064KB-A	PVQN0064LB-A						
Part No.		R5F71250AD50FA	R5F71250AD50FP	R5F71250AD50NP	R5F71250AN50FA	R5F71250AN50FP	R5F71250AN50NP	R5F71251AD50FA	R5F71251AD50FP	R5F71251AD50NP	R5F71251AN50FA	R5F71251AN50FP	R5F71251AN50NP	R5F71252D50FA	R5F71252D50FP	R5F71252N50FA	R5F71252N50FP	R5F71252N50NP	R5F71252D50NP	R5F71253D50FA	R5F71253D50FP	R5F71253D50NP	R5F71253N50FA	R5F71253N50FP	R5F71253N50NP						

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

SH7060 Series (SH2-DSP)

- 3.3V, 78MIPS (60MHz) high-performance single-chip MCU
- Enhanced peripheral functions

SH7144 Series (SH-2)

- 3.3V single power supply on-chip flash memory
- On-chip peripheral modules such as a serial interface (4-channel) that is valuable for office equipment
- On-chip debugging function

• Specifications (SH7060, SH7144 Series)

Series		SH7060	SH7144																			
Group		SH7065	SH7144									SH7145										
Memory	ROM (Bytes)	256K	—	256K								—	256K									
	RAM (Bytes)	8K																				
	ROM Type*1	F	M	L	F	M						L	F	M								
	Cache Memory	—																				
	Program Security	—		Yes	—							Yes	—									
CPU	CPU	SH2-DSP Core	SH-2 Core																			
	Basic Instructions	182	62																			
	Minimum Instruction Execution Time (ns)	16 (@60MHz)	20 (@50MHz)																			
	Dhrystone Performance	78MIPS (60MHz)	65MIPS (50MHz)																			
	Multiplier	32 × 32 → 64																				
	Multiply-Accumulate Instruction	32 × 32 + 64 → 64																				
	Barrel Shifter	—																				
	FPU	—																				
	MMU	—																				
DMA	DMAC (Channels)	4 (2 channels of them can receive an external request)																				
	DTC/DMAC II	—	DTC																			
External Bus Expansion	Address Space (Bytes)	384M	32M (4M × 8)																			
	Bus State Controller	Yes	Direct connection to ROM/SRAM is supported																			
	Bus Structure	SRAM/DRAM/EDO DRAM	Separate bus (8/16-bit)									Separate bus (8/16/32-bit)										
	SDRAM Controller	—																				
	DRAM Controller	Yes	—																			
	PCI Controller	—																				
	Endian Conversion	Yes	—																			
	Host Interface	—																				
Clock	Clock Generation Circuit	1 circuit																				
	PLL	Yes																				
	RTC	—																				
	Oscillation Stop Detection	—	Yes																			
	Frequency Divider	Yes	1/n (n = 1, 2)																			
	Power Save	Sleep/standby/ module standby	Sleep/software standby/module standby																			
Power Supply Voltage Detection	Power-On Reset/POR	—																				
A/D Converter	Resolution × Channels	10-bit × 8																				
	Sample and Hold	Yes (2)	Yes (2 circuits)																			
	Multi-Channel Sample and Hold	—																				
D/A Converter	Resolution × Channels	8-bit × 2	—																			
Timer	8-bit	—																				
	16-bit	5 (TPU × 2, CMT × 2, MMT)	7 (MTU × 5, CMT × 2)																			
	32-bit	—																				
	Input Capture	16 (shared with TPU)	16 (shared with MTU)																			
	Output Compare	16 (shared with TPU)	16 (shared with MTU)																			
	PWM Output	16 (shared with TPU)	16 (shared with MTU)																			
	Event Counter	8 (6 (TPU) + 2 (CMT))	7 (shared with MTU, CMT)																			
	2-Phase Encoder Input	4 (shared with TPU)	2 (shared with MTU)																			
	3-Phase Inverter Control	6 (MMT)	1 (shared with MTU)																			
Watchdog Timer		1																				
Serial Interface	Clock Sync./Clock Async.	3	4 (SCI)																			
	Clock Sync. Only	—																				
	Clock Async. Only	—																				
I²C-bus		—	1									1										
Smart Card/SIM		—																				
Synchronous Serial Communication Unit/Special Serial I/O		—																				
CAN	Channels	—																				
	Message Box (Numbers)	—																				
FlexRay		—																				
Ethernet		—																				
USBHOST		—																				
USBFunction		—																				
IrDA		—																				
LCD		—																				
I/O Ports	Input Only (Numbers)	8																				
	CMOS I/O (Numbers)	110	74									98										
	High Voltage Port (Numbers)	—																				
	N-Channel Open Drain Port (Numbers)	—	2									2										
	High Current Drive Port	6 (MMT)	6 (MTU)																			
	Pull-Up Resistor	—																				
External Interrupts Pins		9	9 (NMI, IRQ × 8)																			
Debugging Function	Boundary Scan/JTAG	—																				
	On-Chip Debug	—	Yes (User Debug Interface/ Advanced user's debugger)									Yes (User Debug Interface/ Advanced user's debugger)										
	On-Board Flash Program	Yes	—	Yes																		
Other Functions	ROM Correction Function	—																				
	Others	—																				
Operating Frequency/Supply Voltage		60MHz/3.3V (some of external I/O are available at 5V)	50MHz/3.0 to 3.6V																			
Operating Ambient Temperature (°C)		–20 to 75		–40 to 85	–20 to 75	–40 to 85			–20 to 75	–40 to 85	–20 to 75		–40 to 85	–20 to 75	–40 to 85			–20 to 75	–40 to 85	–20 to 75		
Package*2		PLQP0176KC-A	PLQP0176KD-A	PRQP0112JB-A								PLQP0144KB-A										
Part No.		HD64F7065AF60V	HD6437065AXXXF	HD6417144F50V	HD6417144FW50V	HD64F7144F50V	HD64F7144FW50V	HD6437144WXXXFW	HD6437144WXXXF	HD6437144XXXFW	HD6437144XXXF	HD6417145F50V	HD6417145FW50V	HD64F7145F50V	HD64F7145FW50V	HD6437145WXXXFW	HD6437145WXXXF	HD6437145XXXFW	HD6437145XXXF			

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

SH7047 Series (SH-2)

- On-chip timer (2-channel: MTU, MMT) for motor control
- On-chip CAN interface
- 5V single power supply on-chip flash memory
- On-chip debugging function

• Specifications (SH7047 Series)

Series		SH7047										
Group		SH7047			SH7049			SH7105		SH7107		SH7109
Memory	ROM (Bytes)	256K			128K			256K		64K		128K
	RAM (Bytes)	12K			8K					4K		
	ROM Type*1	F			M							
	Cache Memory	—										
	Program Security	Yes			—							
CPU	CPU	SH-2 Core										
	Basic Instructions	62										
	Minimum Instruction Execution Time (ns)	25 (@40MHz)	20 (@50MHz)		25 (@40MHz)	20 (@50MHz)						
	Dhrystone Performance	52MIPS (40MHz)	65MIPS (50MHz)		52MIPS (40MHz)	65MIPS (50MHz)						
	Multiplier	32 × 32 → 64										
	Multiply-Accumulate Instruction	32 × 32 + 64 → 64										
	Barrel Shifter	—										
	FPU	—										
	MMU	—										
DMA	DMAC (Channels)	—										
	DTC/DMAC II	DTC								—		
External Bus Expansion	Address Space (Bytes)	256K										
	Bus State Controller	Wait state (1 to 15 wait + can be extended by an external signal)										
	Bus Structure	Separate bus (8-bit)										
	SDRAM Controller	—										
	DRAM Controller	—										
	PCI Controller	—										
	Endian Conversion	—										
	Host Interface	—										
Clock	Clock Generation Circuit	1 circuit										
	PLL	Yes										
	RTC	—										
	Oscillation Stop Detection	Yes										
	Frequency Divider	1/n (n = 1, 2)								—		
	Power Save	Sleep/software standby/hardware standby/module standby										
Power Supply Voltage Detection	Power-On Reset/POR	—										
A/D Converter	Resolution × Channels	10-bit × 8 × 2 circuits										
	Sample and Hold	Yes										
	Multi-Channel Sample and Hold	Yes (2 units)								Yes (2)		
D/A Converter	Resolution × Channels	—										
Timer	8-bit	—										
	16-bit	8 (MMT × 1, MTU × 5, CMT × 2)										
	32-bit	—										
	Input Capture	16 (shared with MTU)										
	Output Compare	16 (shared with MTU)										
	PWM Output	16 (shared with MTU)										
	Event Counter	7 (shared with MTU, CMT)										
	2-Phase Encoder Input	2 (shared with MTU)										
	3-Phase Inverter Control	2 (MTU, MMT)										
Watchdog Timer		1										
Serial Interface	Clock Sync./Clock Async.	3 (SCI)								2 (SCI)		
	Clock Sync. Only	—										
	Clock Async. Only	—										
I^2C-bus		—										
Smart Card/SIM		—										
Synchronous Serial Communication Unit/Special Serial I/O		—										
CAN	Channels	1										
	Message Box (Numbers)	32										
FlexRay		—										
Ethernet		—										
USBHOST		—										
USBFunction		—										
IrDA		—										
LCD		—										
I/O Ports	Input Only (Numbers)	16										
	CMOS I/O (Numbers)	53										
	High Voltage Port (Numbers)	—										
	N-Channel Open Drain Port (Numbers)	—										
	High Current Drive Port	12										
	Pull-Up Resistor	—										
External Interrupts Pins		5										
Debugging Function	Boundary Scan/JTAG	Yes			—							
	On-Chip Debug	Yes (H-UDI)			—							
	On-Board Flash Program	Yes			—							
Other Functions	ROM Correction Function	—										
	Others	—										
Operating Frequency/Supply Voltage		40MHz/5.0V	50MHz/5.0V	40MHz/5.0V		50MHz/5.0V	40MHz/5.0V	50MHz/5.0V				
Operating Ambient Temperature (˚C)		–40 to 85	–20 to 75	–40 to 85		–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85
Package*2		PRQP0100KB-A										
Part No.		HD64F7047FJ40V	HD64F7047F50V	HD64F7047FW40V	HD6437049XXXFJ	HD6437049XXXF	HD6437049XXXFW	HD6437105XXXF	HD6437105XXXFW	HD6437107XXXF	HD6437107XXXFW	HD6437109XXXF	HD6437109XXXFW

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

SH7046 Series (SH-2)

- On-chip timer (2-channel: MTU, MMT) for motor control
- 5V single power supply on-chip flash memory
- Compact packages (80 pins)

• Specifications (SH7046 Series)

Series		SH7046						
Group		SH7046	SH7048	SH7101	SH7104	SH7106	SH7108	SH7148
Memory	ROM (Bytes)	256K	128K	32K	256K	64K	128K	64K
	RAM (Bytes)	12K	4K	2K	4K			
	ROM Type*1	F	M					
	Cache Memory	—						
	Program Security	Yes	—					
CPU	CPU	SH-2 Core						
	Basic Instructions	62						
	Minimum Instruction Execution Time (ns)	20 (@50MHz)		25 (@40MHz)	20 (@50MHz)			
	Dhrystone Performance	65MIPS (50MHz)		52MIPS (40MHz)	65MIPS (50MHz)			
	Multiplier	32 × 32 → 64						
	Multiply-Accumulate Instruction	32 × 32 + 64 → 64						
	Barrel Shifter	—						
	FPU	—						
	MMU	—						
DMA	DMAC (Channels)	—						
	DTC/DMAC II	DTC		—				DTC
External Bus Expansion	Address Space (Bytes)	—						
	Bus State Controller	Single chip mode only						
	Bus Structure	—						
	SDRAM Controller	—						
	DRAM Controller	—						
	PCI Controller	—						
	Endian Conversion	—						
	Host Interface	—						
Clock	Clock Generation Circuit	1 circuit						
	PLL	Yes						
	RTC	—						
	Oscillation Stop Detection	Yes						
	Frequency Divider	1/n (n = 1, 2)						
	Power Save	Sleep/software standby/module standby						
Power Supply Voltage Detection	Power-On Reset/POR	—						
A/D Converter	Resolution × Channels	10-bit × 12		10-bit × 8	10-bit × 12			
	Sample and Hold	Yes (3 circuits)		Yes (2 circuits)	Yes (3 circuits)			
	Multi-Channel Sample and Hold	—						
D/A Converter	Resolution × Channels	—						
Timer	8-bit	—						
	16-bit	8 (MTU × 5, CMT × 2, MMT × 1)		7 (MTU × 5, CMT × 2)	8 (MTU × 5, CMT × 2, MMT × 1)			
	32-bit	—						
	Input Capture	16 (shared with MTU)						
	Output Compare	16 (shared with MTU)						
	PWM Output	16 (shared with MTU)						
	Event Counter	7 (shared with MTU, CMT)						
	2-Phase Encoder Input	2 (shared with MTU)						
	3-Phase Inverter Control	2 (MTU, MMT)		1 (MTU)	2 (MTU, MMT)			
Watchdog Timer		1						
Serial Interface	Clock Sync./Clock Async.	2 (SCI)						
	Clock Sync. Only	—						
	Clock Async. Only	—						
I²C-bus		—						
Smart Card/SIM		—						
Synchronous Serial Communication Unit/Special Serial I/O		—						
CAN	Channels	—						
	Message Box (Numbers)	—						
FlexRay		—						
Ethernet		—						
USBHOST		—						
USBFunction		—						
IrDA		—						
LCD		—						
I/O Ports	Input Only (Numbers)	12						
	CMOS I/O (Numbers)	42						
	High Voltage Port (Numbers)	—						
	N-Channel Open Drain Port (Numbers)	—						
	High Current Drive Port	12 (MTU × 6, MMT × 6)		6 (MTU × 6)	12 (MTU × 6, MMT × 6)			
	Pull-Up Resistor	—						
External Interrupts Pins		5 (NMI, IRQ × 4)						
Debugging Function	Boundary Scan/JTAG	—						
	On-Chip Debug	—						
	On-Board Flash Program	Yes	—					
Other Functions	ROM Correction Function	—						
	Others	—						
Operating Frequency/Supply Voltage		50MHz/4.0 to 5.5V		40MHz/4.0 to 5.5V	50MHz/4.0 to 5.5V			
Operating Ambient Temperature (°C)		–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85
Package*2		PRQP0080JD-A						
Part No.		HD64F7046F50V	HD64F7046FW50V	HD6437048XXXF	HD6437048XXXFW	HD6437101XXXF	HD6437101XXXFW	HD6437104XXXF	HD6437104XXXFW	HD6437106XXXF	HD6437106XXXFW	HD6437108XXXF	HD6437108XXXFW	HD6437148RXXXF	HD6437148RXXXFW

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

SH7040 Series (SH-2)

- High-performance single-chip MCU employing SH-2 CPU core
- Industry's first MCU to integrate 256K bytes of single power supply flash memory and cache memory
- Enhanced peripheral functions

• Specifications (SH7040 Series)

Series		SH7040																							
Group		SH7040						SH7041						SH7042											
Memory	ROM (Bytes)	—			64K			—			64K			128K											
	RAM (Bytes)	4K (2K)*																							
	ROM Type*1	L			M			L			M			O											
	Cache Memory	1K																							
	Program Security	—																							
CPU	CPU	SH-2 Core																							
	Basic Instructions	62																							
	Minimum Instruction Execution Time (ns)	60 (@16.7MHz)			35 (@28.7MHz)			60 (@16.7MHz)			35 (@28.7MHz)						63 (@16MHz)						35 (@28.7MHz)		
	Dhrystone Performance	20MIPS (16MHz)			37MIPS (28.7MHz)			20MIPS (16MHz)			37MIPS (28.7MHz)						20MIPS (16MHz)						37MIPS (28.7MHz)		
	Multiplier	32 × 32 → 64																							
	Multiply-Accumulate Instruction	32 × 32 + 64 → 64																							
	Barrel Shifter	—																							
	FPU	—																							
	MMU	—																							
DMA	DMAC (Channels)	4 (2 channels of them can receive an external request)																							
	DTC/DMAC II	DTC																							
External Bus Expansion	Address Space (Bytes)	32M																							
	Bus State Controller	Wait state (1 to 15 wait + can be extended by an external signal)																							
	Bus Structure	Separate bus (8/16-bit)						Separate bus (8/16/32-bit)						Separate bus (8/16-bit)											
	SDRAM Controller	—																							
	DRAM Controller	Yes																							
	PCI Controller	—																							
	Endian Conversion	—																							
	Host Interface	—																							
Clock	Clock Generation Circuit	1 circuit																							
	PLL	Yes																							
	RTC	—																							
	Oscillation Stop Detection	Yes																							
	Frequency Divider	—																							
	Power Save	Sleep/software standby																							
Power Supply Voltage Detection	Power-On Reset/POR	—																							
A/D Converter	Resolution × Channels	10-bit × 8																							
	Sample and Hold	Yes (2)																							
	Multi-Channel Sample and Hold	—																							
D/A Converter	Resolution × Channels	—																							
Timer	8-bit	—																							
	16-bit	7 (MTU × 5, CMT × 2)																							
	32-bit	—																							
	Input Capture	16 (shared with MTU)																							
	Output Compare	16 (shared with MTU)																							
	PWM Output	16 (shared with MTU)																							
	Event Counter	5 (shared with MTU)																							
	2-Phase Encoder Input	2 (shared with MTU)																							
	3-Phase Inverter Control	1 (shared with MTU)																							
Watchdog Timer		1																							
Serial Interface	Clock Sync./Clock Async.	2																							
	Clock Sync. Only	—																							
	Clock Async. Only	—																							
I²C-bus		—																							
Smart Card/SIM		—																							
Synchronous Serial Communication Unit/Special Serial I/O		—																							
CAN	Channels	—																							
	Message Box (Numbers)	—																							
FlexRay		—																							
Ethernet		—																							
USBHOST		—																							
USBFunction		—																							
IrDA		—																							
LCD		—																							
I/O Ports	Input Only (Numbers)	8																							
	CMOS I/O (Numbers)	74						98						74											
	High Voltage Port (Numbers)	—																							
	N-Channel Open Drain Port (Numbers)	—																							
	High Current Drive Port	6 (MTU)																							
	Pull-Up Resistor	—																							
External Interrupts Pins		9																							
Debugging Function	Boundary Scan/JTAG	—																							
	On-Chip Debug	—																							
	On-Board Flash Program	—																							
Other Functions	ROM Correction Function	—																							
	Others	—																							
Operating Frequency/Supply Voltage		16.7MHz/3.3V		28.7MHz/5.0V		28.7MHz/5.0V, 16.7MHz/3.3V		16.7MHz/3.3V		28.7MHz/5.0V		28.7MHz/5.0V, 16.7MHz/3.3V			16.7MHz/3.3V					28.7MHz/5.0V					
Operating Ambient Temperature (˚C)		-20 to 75	-40 to 85	-20 to 75	-40 to 85	-20 to 75	-40 to 85	-20 to 75	-40 to 85	-20 to 75	-40 to 85	-20 to 75	-40 to 85	-40 to 85	-20 to 75	-40 to 85	-40 to 85	-20 to 75	-40 to 85	-20 to 75	-40 to 85	-20 to 75	-40 to 85	-20 to 75	-40 to 85
Package*2		PRQP0112JA-A						PTQP0120LA-A		FP-144				PRQP0144KB-A		FP-144	PRQP0112JA-A			PTQP0120LA-A		PRQP0112JA-A		PTQP0120LA-A		PRQP0112JA-A	
Part No.		HD6417040AVF16V	HD6417040AVFI16V	HD6417040AF28V	HD6417040AFI28V	HD6437040AXXXF	HD6437040AXXXFI	HD6437040AXXXX	HD6437040AXXXXI	HD6417041AVF16V	HD6417041AVFI16V	HD6417041ACF28V	HD6417041AF28V	HD6437041AXXXF	HD6437041AXXXFI		HD6437042AXXXFI	HD6437042AXXXF	HD6437042AXXXXI	HD6437042AXXXXX	HD6477042AVF16V	HD6477042AVCFI16	HD6477042AVX16V	HD6477042AF28V	HD6477042AFI28V

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (SH7040 Series)

Series		SH7040											
Group		SH7043					SH7044				SH7045		
Memory	ROM (Bytes)	128K					256K						
	RAM (Bytes)	4K (2K)*											
	ROM Type*1	M	O				F		M		F		M
	Cache Memory	1K											
	Program Security	—					Yes		—		Yes		—
CPU	CPU	SH-2 Core											
	Basic Instructions	62											
	Minimum Instruction Execution Time (ns)	35 (@28.7MHz)			63 (@16MHz)		35 (@28.7MHz)						
	Dhrystone Performance	37MIPS (28.7MHz)			20MIPS (16MHz)		37MIPS (28.7MHz)						
	Multiplier	32 × 32 → 64											
	Multiply-Accumulate Instruction	32 × 32 + 64 → 64											
	Barrel Shifter	—											
	FPU	—											
	MMU	—											
DMA	DMAC (Channels)	4 (2 channels of them can receive an external request)											
	DTC/DMAC Ⅱ	DTC											
External Bus Expansion	Address Space (Bytes)	32M											
	Bus State Controller	Wait state (1 to 15 wait + can be extended by an external signal)											
	Bus Structure	Separate bus (8/16/32-bit)					Separate bus (8/16-bit)				Separate bus (8/16/32-bit)		
	SDRAM Controller	—											
	DRAM Controller	Yes											
	PCI Controller	—											
	Endian Conversion	—											
	Host Interface	—											
Clock	Clock Generation Circuit	1 circuit											
	PLL	Yes											
	RTC	—											
	Oscillation Stop Detection	Yes											
	Frequency Divider	—											
	Power Save	Sleep/software standby											
Power Supply Voltage Detection	Power-On Reset/POR	—											
A/D Converter	Resolution × Channels	10-bit × 8											
	Sample and Hold	Yes (2)											
	Multi-Channel Sample and Hold	—											
D/A Converter	Resolution × Channels	—											
Timer	8-bit	—											
	16-bit	7 (MTU × 5, CMT × 2)											
	32-bit	—											
	Input Capture	16 (shared with MTU)											
	Output Compare	16 (shared with MTU)											
	PWM Output	16 (shared with MTU)											
	Event Counter	5 (shared with MTU)											
	2-Phase Encoder Input	2 (shared with MTU)											
	3-Phase Inverter Control	1 (shared with MTU)											
Watchdog Timer		1											
Serial Interface	Clock Sync./Clock Async.	2											
	Clock Sync. Only	—											
	Clock Async. Only	—											
I²C-bus		—											
Smart Card/SIM		—											
Synchronous Serial Communication Unit/Special Serial I/O		—											
CAN	Channels	—											
	Message Box (Numbers)	—											
FlexRay		—											
Ethernet		—											
USBHOST		—											
USBFunction		—											
IrDA		—											
LCD		—											
I/O Ports	Input Only (Numbers)	8											
	CMOS I/O (Numbers)	98					74				98		
	High Voltage Port (Numbers)	—											
	N-Channel Open Drain Port (Numbers)	—											
	High Current Drive Port	6 (MTU)											
	Pull-Up Resistor	—											
External Interrupts Pins		9											
Debugging Function	Boundary Scan/JTAG	—											
	On-Chip Debug	—											
	On-Board Flash Program	—					Yes		—		Yes		—
Other Functions	ROM Correction Function	—					Yes		—		Yes		—
	Others	—											
Operating Frequency/Supply Voltage		28.7MHz/5.0V, 16.7MHz/3.3V		28.7MHz/5.0V		16.7MHz/3.3V	28.7MHz/5.0V						
Operating Ambient Temperature (˚C)		–40 to 85	–20 to 75	–40 to 85		–20 to 75	–40 to 85		–20 to 75		–40 to 85		–20 to 75
Package*2		FP-144	PRQP0144KB-A	FP-144			PRQP0112JA-A				PRQP0144KB-A	FP-144	PRQP0144KB-A
Part No.		HD6437043AXXXFI	HD6437043AXXXF	HD6477043AF28V	HD6477043AFI28V	HD6477043AVF16V	HD64F7044F28V	HD64F7044FI28V	HD6437044XXXFI	HD6437044XXXF	HD64F7045F28V	HD64F7045FI28V	HD6437045XXXFI	HD6437045XXXF

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

SH7010 Series (SH-2)

- High-performance single-chip MCU employing SH-2 CPU core
- Enhanced peripheral functions

• Specifications (SH7010 Series)

Series		SH7010					
Group		SH7011	SH7014		SH7016	SH7017	
Memory	ROM (Bytes)		—		64K	128K	
	RAM (Bytes)	4K	3K (1K)*			4K (2K)*	
	ROM Type*1		L		M	F	
	Cache Memory	—	1K				
	Program Security	—					
CPU	CPU	SH-2 Core					
	Basic Instructions	62					
	Minimum Instruction Execution Time (ns)	50 (@20MHz)	35 (@28.7MHz)				
	Dhrystone Performance	26MIPS (20MHz)	37MIPS (28.7MHz)				
	Multiplier	32 × 32 → 64					
	Multiply-Accumulate Instruction	32 × 32 + 64 → 64					
	Barrel Shifter	—					
	FPU	—					
	MMU	—					
DMA	DMAC (Channels)	—	2 (2 channels of them can receive an external request)				
	DTC/DMAC II	—					
External Bus Expansion	Address Space (Bytes)	16M	32M				
	Bus State Controller	Yes					
	Bus Structure	SRAM	SRAM/DRAM				
	SDRAM Controller	—					
	DRAM Controller	—	Yes				
	PCI Controller	—					
	Endian Conversion	—					
	Host Interface	—					
Clock	Clock Generation Circuit	1 circuit					
	PLL	Yes					
	RTC	—					
	Oscillation Stop Detection	—					
	Frequency Divider	Yes					
	Power Save	Sleep	Sleep/software standby				
Power Supply Voltage Detection	Power-On Reset/POR	—					
A/D Converter	Resolution × Channels	10-bit × 7	10-bit × 8 (High-speed)		10-bit × 8 (Medium-speed)		
	Sample and Hold	Yes					
	Multi-Channel Sample and Hold	Yes					
D/A Converter	Resolution × Channels	—					
Timer	8-bit	2 (TIM1, TIM2)	—				
	16-bit	5 (MTU × 3, CMT × 2)					
	32-bit	—					
	Input Capture	6 (shared with MTU)	8 (shared with MTU)				
	Output Compare	6 (shared with MTU)	8 (shared with MTU)				
	PWM Output	6 (shared with MTU)	8 (shared with MTU)				
	Event Counter	7 (3 (MTU) + 2 (TIM1, 2) + 2 (CMT))	5 (3 (MTU) + 2 (CMT))				
	2-Phase Encoder Input	—	2 (shared with MTU)				
	3-Phase Inverter Control	—					
Watchdog Timer		—	1				
Serial Interface	Clock Sync./Clock Async.	—	2				
	Clock Sync. Only	—					
	Clock Async. Only	1	—				
I²C-bus		—					
Smart Card/SIM		—					
Synchronous Serial Communication Unit/Special Serial I/O		—					
CAN	Channels	—					
	Message Box (Numbers)	—					
FlexRay		—					
Ethernet		—					
USBHOST		—					
USBFunction		—					
IrDA		—					
LCD		—					
I/O Ports	Input Only (Numbers)	—	8				
	CMOS I/O (Numbers)	11	35		74		
	High Voltage Port (Numbers)	—					
	N-Channel Open Drain Port (Numbers)	—					
	High Current Drive Port	—					
	Pull-Up Resistor	—					
External Interrupts Pins		9	7				
Debugging Function	Boundary Scan/JTAG	—					
	On-Chip Debug	—					
	On-Board Flash Program	—			Yes		
Other Functions	ROM Correction Function	—			Yes		
	Others	—					
Operating Frequency/Supply Voltage		20MHz/3.3V	28.7MHz/5.0V				
Operating Ambient Temperature (˚C)		–20 to 75					–40 to 85
Package*2		PTQP0100KA-A	PRQP0112JA-A			PRQP0112JB-A	
Part No.		HD6417011VTE20V	HD6417014F28V	HD6417014RF28V	HD6437016XXXF	HD64F7017F28V	HD64F7017FI28V

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

SH7030 Series (SH-1)

- Single-chip RISC MCUs with compact CPU core
- High performance, small size, low-power operation
- Low-cost ROM-less version available

SH7020 Series (SH-1)

- Single-chip RISC MCUs with compact CPU core
- High performance, small size, low-power operation
- Low-cost ROM-less version available

• Specifications (SH7030 Series)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Series		SH7030																			
Group		SH7032			SH7034																
Memory	ROM (Bytes)	—											64K								
	RAM (Bytes)	4K																			
	ROM Type*1	L											M				O				
	Cache Memory	—																			
	Program Security	—																			
CPU	CPU	SH-1 Core																			
	Basic Instructions	56																			
	Minimum Instruction Execution Time (ns)	50 (@20MHz)				80 (@12.5MHz)				50 (@20MHz)										80 (@12.5MHz)	
	Dhrystone Performance	26MIPS (20MHz)				16MIPS (12.5MHz)				26MIPS (20MHz)										16MIPS (12.5MHz)	

Category	Item	SH7030
CPU	Multiplier	16 × 16 → 32
	Multiply-Accumulate Instruction	16 × 16 + 42 → 42
	Barrel Shifter	—
	FPU	—
	MMU	—
DMA	DMAC (Channels)	4 (2 channels of them can receive an external request)
	DTC/DMAC II	—
External Bus Expansion	Address Space (Bytes)	44M
	Bus State Controller	Yes
	Bus Structure	SRAM/DRAM
	SDRAM Controller	—
	DRAM Controller	Yes
	PCI Controller	—
	Endian Conversion	—
	Host Interface	—
Clock	Clock Generation Circuit	1 circuit
	PLL	Yes
	RTC	—
	Oscillation Stop Detection	—
	Frequency Divider	—
	Power Save	Sleep/standby
Power Supply Voltage Detection	Power-On Reset/POR	—
A/D Converter	Resolution × Channels	10-bit × 8
	Sample and Hold	Yes
	Multi-Channel Sample and Hold	—
D/A Converter	Resolution × Channels	—
Timer	8-bit	—
	16-bit	5 (ITU)
	32-bit	—
	Input Capture	10 (shared with ITU)
	Output Compare	12 (shared with ITU)
	PWM Output	28 (12 (shared with ITU) + 16 (shared with TPU))
	Event Counter	5 (shared with ITU)
	2-Phase Encoder Input	1 (shared with ITU)
	3-Phase Inverter Control	1 (shared with ITU)
Watchdog Timer		1
Serial Interface	Clock Sync./Clock Async.	2
	Clock Sync. Only	—
	Clock Async. Only	—
I²C-bus		—
Smart Card/SIM		—
Synchronous Serial Communication Unit/Special Serial I/O		—
CAN	Channels	—
	Message Box (Numbers)	—
FlexRay		—
Ethernet		—
USBHOST		—
USBFunction		—
IrDA		—
LCD		—
I/O Ports	Input Only (Numbers)	8
	CMOS I/O (Numbers)	32
	High Voltage Port (Numbers)	—
	N-Channel Open Drain Port (Numbers)	—
	High Current Drive Port	—
	Pull-Up Resistor	—
External Interrupts Pins		9
Debugging Function	Boundary Scan/JTAG	—
	On-Chip Debug	—
	On-Board Flash Program	—
Other Functions	ROM Correction Function	—
	Others	—

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Operating Frequency/Supply Voltage	20MHz/5.0V		12.5MHz/3.3V	20MHz/5.0V	12.5MHz/3.3V				20MHz/5.0V			20MHz/5.0V, 12.5MHz/3.3V				20MHz/5.0V			12.5MHz/3.3V	
Operating Ambient Temperature (˚C)	–40 to 85	–20 to 75			–40 to 85		–20 to 75		–40 to 85		–20 to 75		–40 to 85		–20 to 75	–40 to 85	–20 to 75			–40 to 85
Package*2	PRQP0112JA-A					PTQP0120LA-A	PRQP0112JA-A	PTQP0120LA-A	PRQP0112JA-A	PTQP0120LA-A		PRQP0112JA-A		PTQP0120LA-A		PRQP0112JA-A		PTQP0120LA-A	PRQP0112JA-A	PTQP0120LA-A
Part No.	HD6417032FI20V	HD6417032F20V	HD6417032VF12V	HD6417034F20V	HD6417034VFI12	HD6417034VXI12	HD6417034VF12	HD6417034VX12	HD6417034FI20V	HD6417034XI20	HD6417034X20	HD6437034AXXXF	HD6437034AXXXFI	HD6437034AXXXXI	HD6437034AXXXX	HD6477034FI20V	HD6477034F20V	HD6477034X20V	HD6477034VF12	HD6477034VXI12

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (SH7030, SH7020 Series)

Series		SH7030								SH7020										
Group		SH7034B								SH7020						SH7021				
Memory	ROM (Bytes)	—				64K				—				16K		32K				
	RAM (Bytes)	4K								1K										
	ROM Type*1	L				M				L				M				O		
	Cache Memory	—																		
	Program Security	—																		
CPU	CPU	SH-1 Core																		
	Basic Instructions	56																		
	Minimum Instruction Execution Time (ns)	50 (@20MHz)				80 (@12.5MHz)						50 (@20MHz)								
	Dhrystone Performance	26MIPS (20MHz)				16MIPS (12.5MHz)						26MIPS (20MHz)								
	Multiplier	16 × 16 → 32																		
	Multiply-Accumulate Instruction	16 × 16 + 42 → 42																		
	Barrel Shifter	—																		
	FPU	—																		
	MMU	—																		
DMA	DMAC (Channels)	4 (2 channels of them can receive an external request)																		
	DTC/DMAC II	—																		
External Bus Expansion	Address Space (Bytes)	44M																		
	Bus State Controller	Yes																		
	Bus Structure	SRAM/DRAM																		
	SDRAM Controller	—																		
	DRAM Controller	Yes																		
	PCI Controller	—																		
	Endian Conversion	—																		
	Host Interface	—																		
Clock	Clock Generation Circuit	1 circuit																		
	PLL	Yes																		
	RTC	—																		
	Oscillation Stop Detection	—																		
	Frequency Divider	—																		
	Power Save	Sleep/standby																		
Power Supply Voltage Detection	Power-On Reset/POR	—																		
A/D Converter	Resolution × Channels	10-bit × 8								—										
	Sample and Hold	Yes								—										
	Multi-Channel Sample and Hold	—																		
D/A Converter	Resolution × Channels	—																		
Timer	8-bit	—																		
	16-bit	5 (ITU)																		
	32-bit	—																		
	Input Capture	10 (shared with ITU)		ITU		10 (shared with ITU)		ITU		10 (shared with ITU)										
	Output Compare	12 (shared with ITU)		ITU		12 (shared with ITU)		ITU		12 (shared with ITU)										
	PWM Output	28 (12 (shared with ITU) + 16 (shared with TPU))		ITU		28 (12 (shared with ITU) + 16 (shared with TPU))		ITU		28 (ITU (12) + TPU (16))										
	Event Counter	5 (shared with ITU)		ITU		5 (shared with ITU)		ITU		5 (shared with ITU)										
	2-Phase Encoder Input	1 (shared with ITU)		ITU		1 (shared with ITU)		ITU		1 (shared with ITU)										
	3-Phase Inverter Control	1 (shared with ITU)		—		1 (shared with ITU)		—		1 (shared with ITU)										
Watchdog Timer		1																		
Serial Interface	Clock Sync./Clock Async.	2																		
	Clock Sync. Only	—																		
	Clock Async. Only	—																		
I²C-bus		—																		
Smart Card/SIM		—																		
Synchronous Serial Communication Unit/Special Serial I/O		—																		
CAN	Channels	—																		
	Message Box (Numbers)	—																		
FlexRay		—																		
Ethernet		—																		
USBHOST		—																		
USBFunction		—																		
IrDA		—																		
LCD		—																		
I/O Ports	Input Only (Numbers)	8																		
	CMOS I/O (Numbers)	32																		
	High Voltage Port (Numbers)	—																		
	N-Channel Open Drain Port (Numbers)	—																		
	High Current Drive Port	—																		
	Pull-Up Resistor	—																		
External Interrupts Pins		9																		
Debugging Function	Boundary Scan/JTAG	—																		
	On-Chip Debug	—																		
	On-Board Flash Program	—																		
Other Functions	ROM Correction Function	—																		
	Others	—																		
Operating Frequency/Supply Voltage		20MHz/3.3V				12.5MHz/3.3V						20MHz/5.0V		20MHz/5.0V, 12.5MHz/3.3V				20MHz/5.0V		12.5MHz/3.3V
Operating Ambient Temperature (°C)		–20 to 75	–40 to 85		–20 to 75		–40 to 85		–20 to 75		–40 to 85		–20 to 75		–40 to 85		–20 to 75		–40 to 85	–20 to 75
Package*2		PRQP0112JA-A		PTQP0120LA-A		PRQP0112JA-A		PTQP0120LA-A		PTQP0100KA-A										
Part No.		HD6417034BVF20V	HD6417034BVFW20V	HD6417034BVXW20	HD6417034BVX20V	HD6437034BXXXF	HD6437034BXXXE	HD6437034BXXXXW	HD6437034BXXXX	HD6417020VX12V	HD6417020VX12IV	HD6417020X20IV	HD6417020X20V	HD6437020SXXXX	HD6437020SXXXXI	HD6437021SXXXXI	HD6437021SXXXX	HD6477021X20V	HD6477021X20IV	HD6477021VX12V

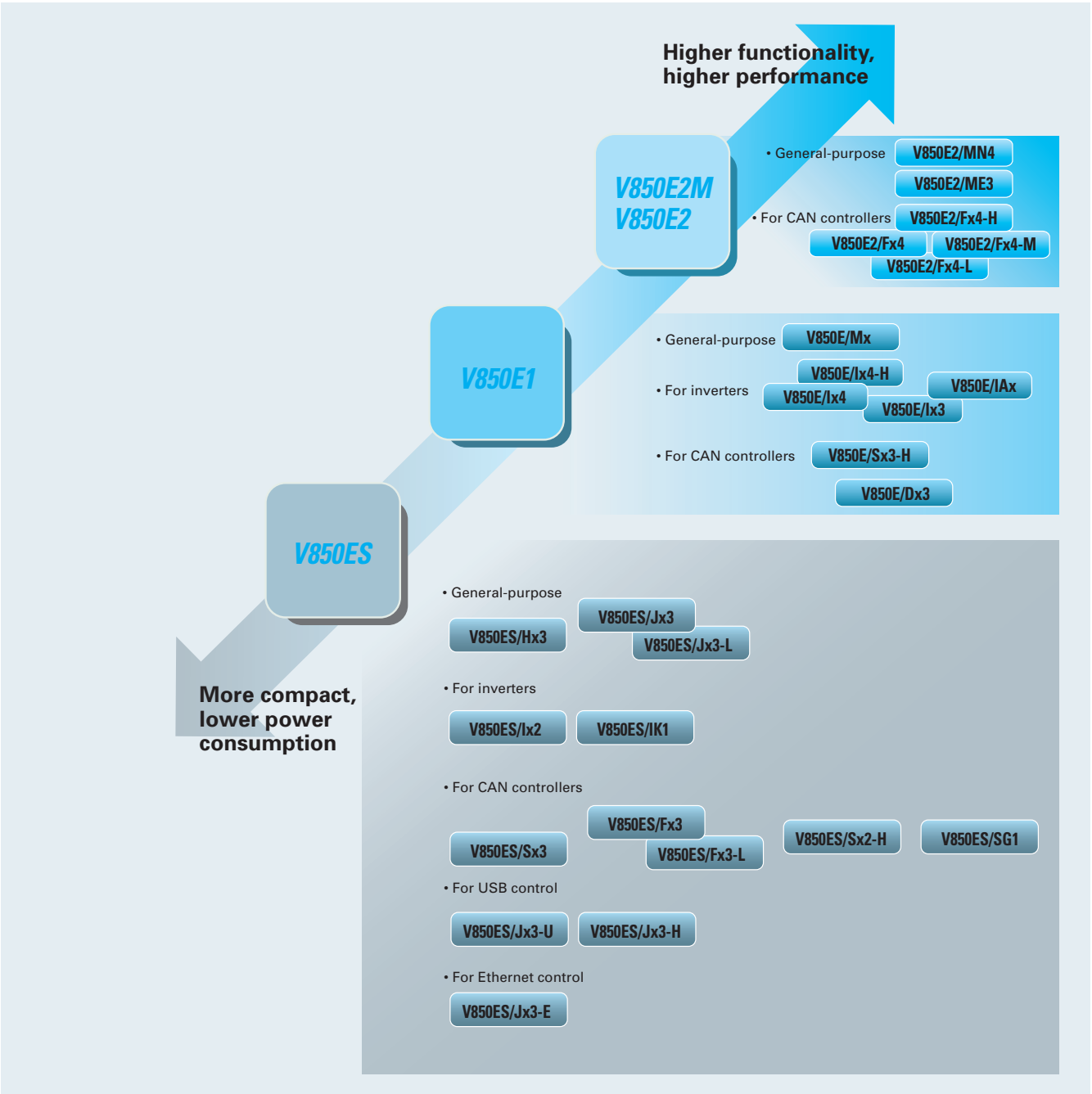
*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

V850—Our best-performing MCUs.

The V850 family of 32-bit microcontrollers began with a lineup of products featuring an original V850 core. The family has since evolved and now includes products with next-generation V850ES, V850E1, and V850E2M cores, which are ideally suited to different applications. V850ES core products are affordable and can be easily incorporated in systems that use 16-bit controllers. The V850E1 core, on the other hand, was developed to provide a high performance, and its successor, the V850E2M core, is the best choice for applications requiring top-level processing power.

• V850 MCU Roadmap

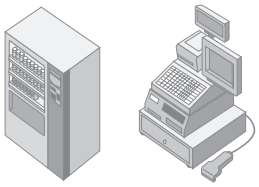


• CPU Core Overview

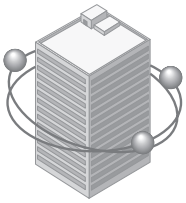
Features	CPU Core		
	V850ES	V850E1	V850E2M
Architecture	Harvard, RISC	Harvard, RISC	Harvard, RISC
Data Bus Width	32 bits	32 bits	32 bits
Address Space (Program)	16 MB	64 MB	4 GB
Address Space (Data)	16 MB	256 MB	4 GB
ALU Space	32 bits	32 bits	32 bits
Multiplication Instruction	16 × 16 → 32, 32 × 32 → 64	16 × 16 → 32, 32 × 32 → 64	16 × 16 → 32, 32 × 32 → 64 MAC instruction
Number of Instructions	80	80	98
Instruction Pipeline	5 stages	5 stages	7 stages, 2 instructions executed simultaneously
FPU	No	No	Single-precision, double-precision
Maximum Memory Size	1 MB	1 MB	32 MB
Maximum Clock Speed	48 MHz	150 MHz	200 MHz
Minimum Instruction Execution Time	21 ns	6.7 ns	5 ns
Maximum Dhrystone MIPS	98	323	512
Performance	Optimized to reduce costs	High performance	Very high performance
Lineup	General-purpose, CAN interface, motor control, network control		

• Application Examples

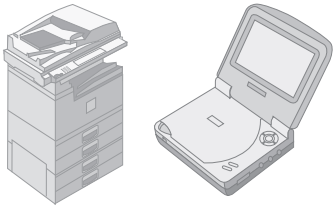
Industrial Equipment
Drink vending machines, POS terminals



FA Equipment
Building management systems



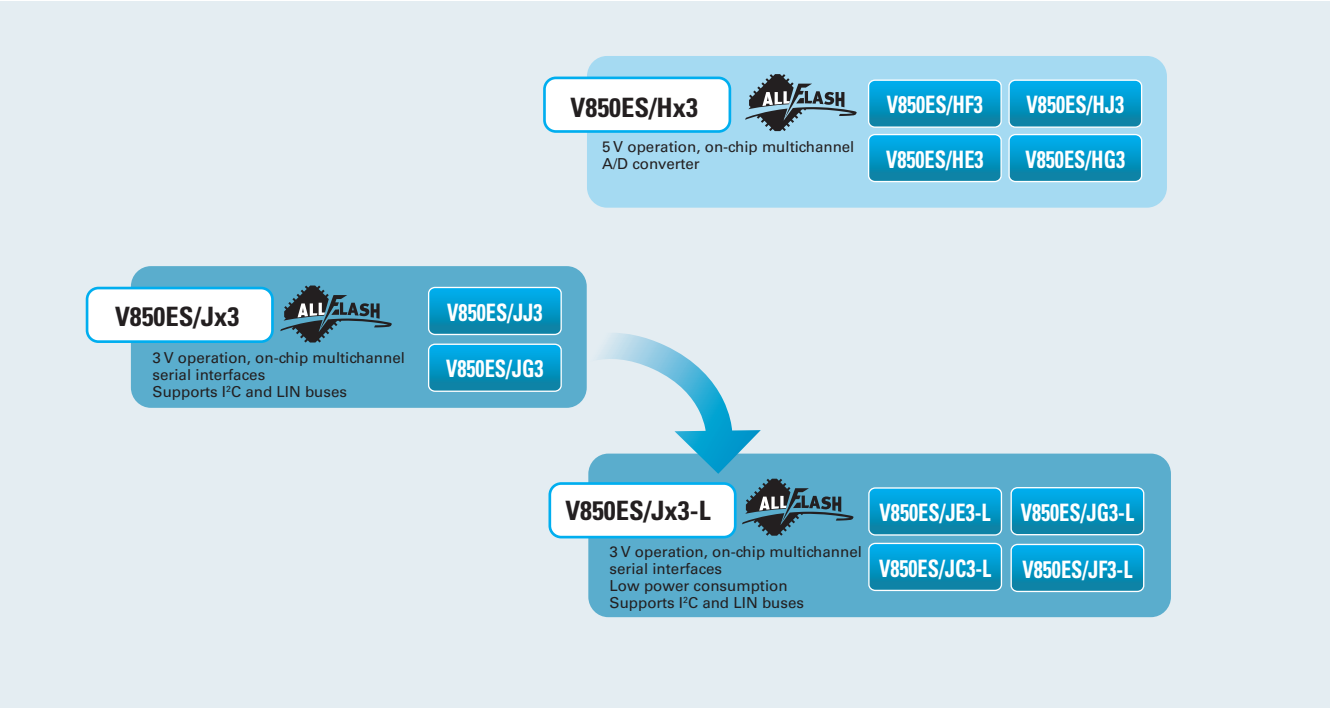
Consumer Products
Printers, DVD players



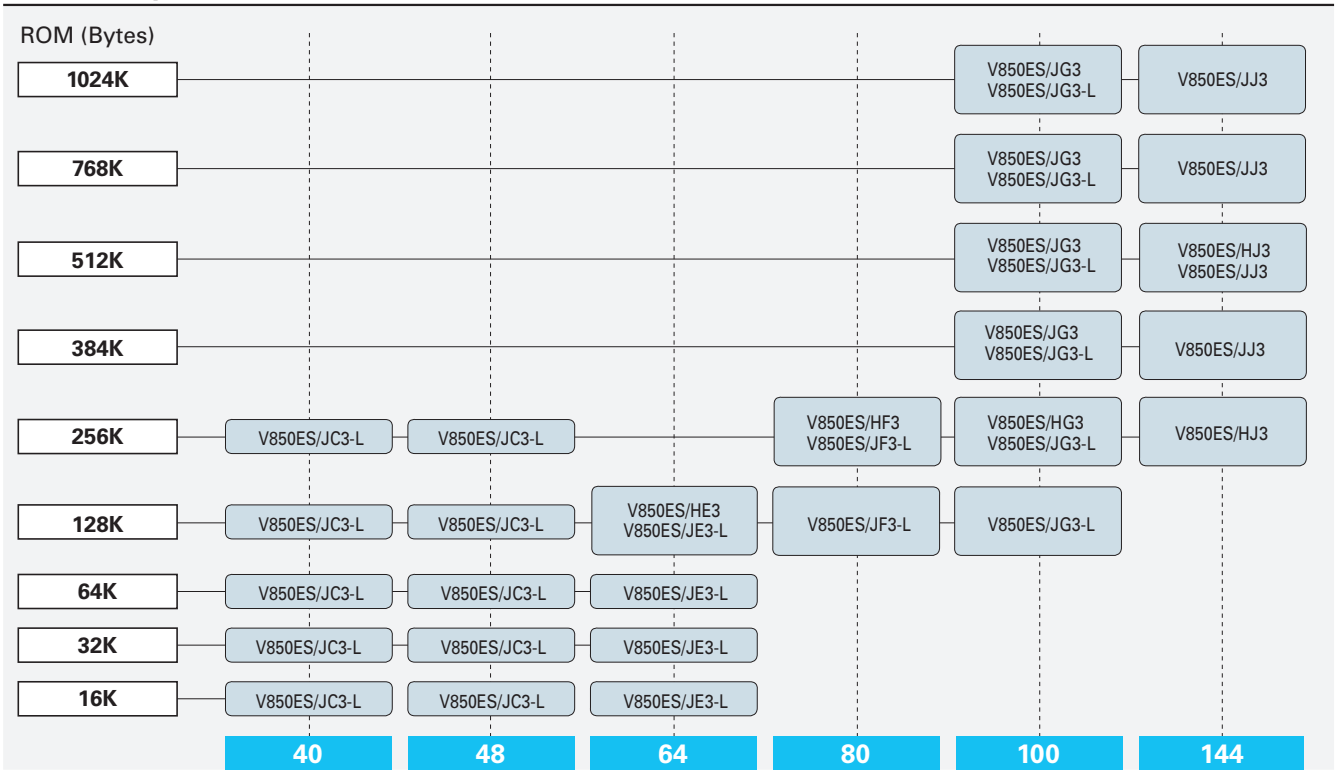
Overview of 32-bit V850ES MCUs

V850ES MCUs incorporate a compact, high-performance 32-bit RISC CPU core based on Harvard architecture. The V850ES lineup includes the V850ES/Hx3, which operates on 5 V and provides a multichannel A/D converter, the V850ES/Jx3, which operates on 3 V and delivers high-speed processing, and the V850ES/Jx3-L, which features the industry's best level power-performance ratio. And now a new product, the V850E2/MN4, has been added to the lineup. The V850E2/MN4 provides a large-capacity flash memory of up to 2 MB as well as network and USB interfaces, enabling a new level of microcontroller control and a level of dimensionality not previously available in single-chip microcontrollers.

• V850ES MCU Roadmap



• Memory Capacity (V850ES MCUs)



• Specifications (V850ES/JC3-L (40 Pins))

Group		μPD70F3797	μPD70F3798	μPD70F3799	μPD70F3800	μPD70F3838
Memory	ROM Size (Bytes)	16K	32K	64K	128K	256K
	ROM Type	Flash				
	Single-Power-Supply Flash Memory	Yes				
	RAM Size (Bytes)	8K				16K
Clock	Maximum Operating Frequency (MHz)	20				
	On-Chip Oscillator (Hz)	220k				
	Subclock (32.768kHz)	Yes				
I/O	I/O Ports	27				
Bus	External Data/Address Bus	—/—				
Timer	16-bit Timer	8				
	8-bit Timer	—				
	Other Timers	—				
	Watch Timer	—				
	Real-Time Counter	1				
	Watchdog Timer	1				
	PWM Output	16 bits × 5				
Serial Interface	UART	—				
	UART Supporting LIN-Bus	1				
	UART/CSI	—				
	UART Supporting LIN-Bus/CSI	—				
	UART/I²C	—				
	UART Supporting LIN-Bus/I²C	1				
	UART Supporting LIN-Bus/CSI/I²C	—				
	CSI	1				
	CSI/I²C	1				
	CSI with Automatic Transmission/ Reception Function	—				
	I²C	—				
	IEBus	—				
	CAN	—				
	CAN/IEBus	—				
	UART Supporting LIN-Bus/I²C/CAN	—				
OCD	On-Chip Debugger	Yes				
Peripheral Functions	LCD (Segments x Commons)	—				
	12-bit A/D Converter	—				
	10-bit A/D Converter	5				
	8-bit D/A Converter	—				
	Other Functions	LVI, CLM, DMA, CRC, key return function				
Others	Power Supply Voltage (V)	2.2 to 3.6 V (@5 MHz) 2.7 to 3.6 V (@20 MHz)				
	Package (size: (mm))	40-WQFN (6 × 6)				
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-V850MINIL (MINICUBE) QB-V850ESJX3L (IECUBE)				
Package		P40K8-50-4B4				
Part No.		μPD70F3797K8-4B4-AX**	μPD70F3798K8-4B4-AX**	μPD70F3799K8-4B4-AX**	μPD70F3800K8-4B4-AX**	μPD70F3838K8-4B4-AX**

Remark LVI: Low-voltage indicator
CLM: Clock monitor

★ : New product ★★ : Under development

• Specifications (V850ES/JC3-L (48 Pins))

Group		μPD70F3801	μPD70F3802	μPD70F3803	μPD70F3804	μPD70F3839
Memory	ROM Size (Bytes)	16K	32K	64K	128K	256K
	ROM Type	Flash				
	Single-Power-Supply Flash Memory	Yes				
	RAM Size (Bytes)	8K				16K
Clock	Maximum Operating Frequency (MHz)	20				
	On-Chip Oscillator (Hz)	220k				
	Subclock (32.768kHz)	Yes				
I/O	I/O Ports	34				
Bus	External Data/Address Bus	—/—				
Timer	16-bit Timer	8				
	8-bit Timer	—				
	Other Timers	—				
	Watch Timer	—				
	Real-Time Counter	1				
	Watchdog Timer	1				
	PWM Output	16 bits × 5				
Serial Interface	UART	—				
	UART Supporting LIN-Bus	—				
	UART/CSI	—				
	UART Supporting LIN-Bus/CSI	1				
	UART/I²C	—				
	UART Supporting LIN-Bus/I²C	2				
	UART Supporting LIN-Bus/CSI/I²C	—				
	CSI	2				
	CSI/I²C	1				
	CSI with Automatic Transmission/ Reception Function	—				
	I²C	—				
	IEBus	—				
	CAN	—				
	CAN/IEBus	—				
	UART Supporting LIN-Bus/I²C/CAN	—				
OCD	On-Chip Debugger	Yes				
Peripheral Functions	LCD (Segments × Commons)	—				
	12-bit A/D Converter	—				
	10-bit A/D Converter	6				
	8-bit D/A Converter	1				
	Other Functions	LVI, CLM, DMA, CRC, key return function				
Others	Power Supply Voltage (V)	2.2 to 3.6 V (@5 MHz) 2.7 to 3.6 V (@20 MHz)				
	Package (size: mm)	48-LQFP (7 × 7) 48-WQFN (7 × 7)				
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-V850MINIL (MINICUBE) QB-V850ESJX3L (IECUBE)				
Package		P48GA-50-GAM P48K8-50-5B4-1				
Part No.		μPD70F3801GA-GAM-AX** μPD70F3801K8-5B4-AX**	μPD70F3802GA-GAM-AX** μPD70F3802K8-5B4-AX**	μPD70F3803GA-GAM-AX** μPD70F3803K8-5B4-AX**	μPD70F3804 GA-GAM-AX** μPD70F3804K8-5B4-AX**	μPD70F3839 GA-GAM-AX** μPD70F3839K8-5B4-AX**

Remark LVI: Low-voltage indicator
CLM: Clock monitor

★ : New product ★★ : Under development

• Specifications (V850ES/JE3-L)

Group		μPD70F3805	μPD70F3806	μPD70F3807	μPD70F3808	μPD70F3840
Memory	ROM Size (Bytes)	16K	32K	64K	128K	256K
	ROM Type	Flash				
	Single-Power-Supply Flash Memory	Yes				
	RAM Size (Bytes)	8K				16K
Clock	Maximum Operating Frequency (MHz)	20				
	On-Chip Oscillator (Hz)	220k				
	Subclock (32.768kHz)	Yes				
I/O	I/O Ports	50				
Bus	External Data/Address Bus	16/22				
Timer	16-bit Timer	8				
	8-bit Timer	—				
	Other Timers	—				
	Watch Timer	—				
	Real-Time Counter	1				
	Watchdog Timer	1				
	PWM Output	16 bits × 9				
Serial Interface	UART	—				
	UART Supporting LIN-Bus	—				
	UART/CSI	—				
	UART Supporting LIN-Bus/CSI	1				
	UART/I²C	—				
	UART Supporting LIN-Bus/I²C	2				
	UART Supporting LIN-Bus/CSI/I²C	—				
	CSI	3				
	CSI/I²C	1				
	CSI with Automatic Transmission/ Reception Function	—				
	I²C	—				
	IEBus	—				
	CAN	—				
	CAN/IEBus	—				
	UART Supporting LIN-Bus/I²C/CAN	—				
OCD	On-Chip Debugger	Yes				
Peripheral Functions	LCD (Segments x Commons)	—				
	12-bit A/D Converter	—				
	10-bit A/D Converter	10				
	8-bit D/A Converter	1				
	Other Functions	LVI, CLM, DMA, CRC, key return function				
Others	Power Supply Voltage (V)	2.2 to 3.6 V (@5 MHz) 2.7 to 3.6 V (@20 MHz)				
	Package (size: mm)	64-LQFP (10 × 10) 64-FBGA (5 × 5)				
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-V850MINIL (MINICUBE) QB-V850ESJX3L (IECUBE)				
Package		P64GB-50-GAH P64F1-50-AN9				
Part No.		μPD70F3805GB-GAH-AX** μPD70F3805F1-AN9-A**	μPD70F3806GB-GAH-AX** μPD70F3806F1-AN9-A**	μPD70F3807GB-GAH-AX** μPD70F3807F1-AN9-A**	μPD70F3808GB-GAH-AX** μPD70F3808F1-AN9-A**	μPD70F3840GB-GAH-AX** μPD70F3840F1-AN9-A**

Remark LVI: Low-voltage indicator
CLM: Clock monitor

★ : New product ★★ : Under development

• Specifications (V850ES/JF3-L)

Group		μPD70F3735	μPD70F3736
Memory	ROM Size (Bytes)	128K	256K
	ROM Type	Flash	
	Single-Power-Supply Flash Memory	Yes	
	RAM Size (Bytes)	8K	16K
Clock	Maximum Operating Frequency (MHz)	20	
	On-Chip Oscillator (Hz)	220k	
	Subclock (32.768kHz)	Yes	
I/O	I/O Ports	66	
Bus	External Data/Address Bus	16/18	
Timer	16-bit Timer	6	
	8-bit Timer	—	
	Other Timers	—	
	Watch Timer	1	
	Watchdog Timer	1	
	PWM Output	16 bits × 7	
Serial Interface	UART	—	
	UART Supporting LIN-Bus	2	
	UART/CSI	—	
	UART Supporting LIN-Bus/CSI	—	
	UART/I²C	—	
	UART Supporting LIN-Bus/I²C	1	
	UART Supporting LIN-Bus/CSI/I²C	—	
	CSI	2	
	CSI/I²C	1	
	CSI with Automatic Transmission/ Reception Function	—	
	I²C	—	
	IEBus	—	
	CAN	—	
	CAN/IEBus	—	
	UART Supporting LIN-Bus/I²C/CAN	—	
OCD	On-Chip Debugger	Yes	
Peripheral Functions	LCD (Segments x Commons)	—	
	12-bit A/D Converter	—	
	10-bit A/D Converter	8	
	8-bit D/A Converter	1	
	Other Functions	LVI, CLM, DMA, CRC	
Others	Power Supply Voltage (V)	2.2 to 3.6	
	Package (size: mm)	80-LQFP (12 × 12) 80-LQFP (14 × 14)	
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-V850MINIL (MINICUBE) QB-V850ESJX3L (IECUBE)	
Package		P80GK-50-GAK P80GC-65-GAD	
Part No.		μPD70F3735GK-GAK-AX μPD70F3735GC-GAD-AX	μPD70F3736GK-GAK-AX μPD70F3736GC-GAD-AX

Remark LVI: Low-voltage indicator
CLM: Clock monitor

★ : New product ★★ : Under development

• Specifications (V850ES/JG3-L)

Group		μPD70F3737	μPD70F3738	μPD70F3792	μPD70F3793	μPD70F3841	μPD70F3842
Memory	ROM Size (Bytes)	128K	256K	384K	512K	768K	1M
	ROM Type	Flash					
	Single-Power-Supply Flash Memory	Yes					
	RAM Size (Bytes)	8K	16K	32K	40K	80K	
Clock	Maximum Operating Frequency (MHz)	20					
	On-Chip Oscillator (Hz)	220k					
	Subclock (32.768kHz)	Yes					
I/O	I/O Ports	84		83			
Bus	External Data/Address Bus	16/22					
Timer	16-bit Timer	8					
	8-bit Timer	—					
	Other Timers	—					
	Watch Timer	1					
	Real-Time Counter	—		1			
	Watchdog Timer	1					
	PWM Output	16 bits × 9					
Serial Interface	UART	—					
	UART Supporting LIN-Bus	—		4			
	UART/CSI	—					
	UART Supporting LIN-Bus/CSI	1					
	UART/I²C	—					
	UART Supporting LIN-Bus/I²C	2					
	UART Supporting LIN-Bus/CSI/I²C	—					
	CSI	3					
	CSI/I²C	1					
	CSI with Automatic Transmission/ Reception Function	—					
	I²C	—					
	IEBus	—					
	CAN	—					
	CAN/IEBus	—					
	UART Supporting LIN-Bus/I²C/CAN	—					
OCD	On-Chip Debugger	Yes					
Peripheral Functions	LCD (Segments x Commons)	—					
	12-bit A/D Converter	—					
	10-bit A/D Converter	12					
	8-bit D/A Converter	2					
	Other Functions	LVI, CLM, DMA, CRC, key return function				LVI, CLM, real time output, CRC, key return function	
Others	Power Supply Voltage (V)	2.2 to 3.6 V (@5 MHz) 2.7 to 3.6 V (@20 MHz)		2.2 to 3.6 V (@5 MHz) 2.7 to 3.6 V (@20 MHz) 2.0 to 3.6V (@2.5 MHz)			
	Package (size: mm)	100-LQFP (14 × 14) 100-LQFP (14 × 20) 121-FBGA (8 × 8)		100-LQFP (14 × 14) 121-FBGA (8 × 8)			
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-V850MINIL (MINICUBE) QB-V850ESSX2 QB-V850ESJX3L (IECUBE)					
Package		P100GC-50-UEU-1 P100GF-65-GAS P121F1-65-CAH		P100GC-50-UEU-1 P121F1-65-CAH			
Part No.		μPD70F3737GC-UEU-AX μPD70F3737GF-GAS-AX μPD70F3737F1-CAH-A	μPD70F3738GC-UEU-AX μPD70F3738GF-GAS-AX μPD70F3738F1-CAH-A	μPD70F3792GC-UEU-AX μPD70F3792F1-CAH-A	μPD70F3793GC-UEU-AX μPD70F3793F1-CAH-A	μPD70F3841GC-UEU-AX** μPD70F3841F1-CAH-A**	μPD70F3842GC-UEU-AX** μPD70F3842F1-CAH-A**

Remark LVI: Low-voltage indicator
CLM: Clock monitor

★ : New product ★★ : Under development

• Specifications (V850ES/JG3-L (with On-Chip USB Controller))

Group		μPD70F3794	μPD70F3795	μPD70F3796	μPD70F3841	μPD70F3842
Memory	ROM Size (Bytes)	256K	384K	512K	768K	1M
	ROM Type	Flash				
	Single-Power-Supply Flash Memory	Yes				
	RAM Size (Bytes)	40K			80K	
Clock	Maximum Operating Frequency (MHz)	20				
	On-Chip Oscillator (Hz)	220k				
	Subclock (32.768kHz)	Yes				
I/O	I/O Ports	80				
Bus	External Data/Address Bus	16/22				
Timer	16-bit Timer	8				
	8-bit Timer	—				
	Other Timers	—				
	Watch Timer	1				
	Real-Time Counter	1				
	Watchdog Timer	1				
	PWM Output	16 bits × 7				
Serial Interface	UART	—				
	UART Supporting LIN-Bus	4				
	UART/CSI	—				
	UART Supporting LIN-Bus/CSI	1				
	UART/I²C	—				
	UART Supporting LIN-Bus/I²C	2				
	UART Supporting LIN-Bus/CSI/I²C	—				
	CSI	3				
	CSI/I²C	1				
	CSI with Automatic Transmission/ Reception Function	—				
	I²C	—				
	IEBus	—				
	CAN	—				
	CAN/IEBus	—				
	UART Supporting LIN-Bus/I²C/CAN	—				
OCD	On-Chip Debugger	Yes				
Peripheral Functions	LCD (Segments x Commons)	—				
	12-bit A/D Converter	—				
	10-bit A/D Converter	12				
	8-bit D/A Converter	2				
	Other Functions	LVI, CLM, DMA, CRC, key return function, USB 2.0 function			LVI, CLM, Real time output, CRC, key return function, USB 2.0 function	
Others	Power Supply Voltage (V)	2.0 to 3.6 V (@2.5 MHz) 2.2 to 3.6 V (@5 MHz) 2.7 to 3.6 V (@20 MHz)				
	Package (size: mm)	100-LQFP (14 × 14) 121-FBGA (8 × 8)				
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-V850MINIL (MINICUBE) QB-V850ESJX3L (IECUBE)				
Package		P100GC-50-UEU-1 P121F1-65-CAH				
Part No.		μPD70F3794GC-UEU-AX μPD70F3794F1-CAH-A	μPD70F3795GC-UEU-AX μPD70F3795F1-CAH-A	μPD70F3796GC-UEU-AX μPD70F3796F1-CAH-A	μPD70F3843GC-UEU-AX★★ μPD70F3843F1-CAH-A★★	μPD70F3844GC-UEU-AX★★ μPD70F3844F1-CAH-A★★

Remark LVI: Low-voltage indicator
CLM: Clock monitor

★ : New product ★★ : Under development

• Specifications (V850ES/HE3, V850ES/HF3, V850ES/HG3, V850ES/HJ3)

Group		V850ES/HE3	V850ES/HF3	V850ES/HG3	V850ES/HJ3	
		μPD70F3747	μPD70F3750	μPD70F3752	μPD70F3755	μPD70F3757
Memory	ROM Size (Bytes)	128K		256K		512K
	ROM Type	Flash				
	Single-Power-Supply Flash Memory	Yes				
	RAM Size (Bytes)	8K		16K		32K
Clock	Maximum Operating Frequency (MHz)	32				
	On-Chip Oscillator (Hz)	8M, 240k				
	Subclock (32.768kHz)	Yes				
I/O	I/O Ports	51	67	84	128	
Bus	External Data/Address Bus	—/—			16/16	
Timer	16-bit Timer	7		8	9	
	8-bit Timer	—				
	Other Timers	—				
	Watch Timer	1				
	Real-Time Counter	—				
	Watchdog Timer	1				
	PWM Output	16 bits × 8 (6 phases, 16 bits × 1)		16 bits × 11 (6 phases, 16 bits × 1)	16 bits × 14 (6 phases, 16 bits × 1)	
Serial Interface	UART	—				
	UART Supporting LIN-Bus	2		3		4
	UART/CSI	—				
	UART Supporting LIN-Bus/CSI	—				2
	UART/I²C	—				
	UART Supporting LIN-Bus/I²C	—				1
	UART Supporting LIN-Bus/CSI/I²C	—				
	CSI	2			3	1
	CSI/I²C	—				
	CSI with Automatic Transmission/ Reception Function	—				
	I²C	1				—
	IEBus	—				
	CAN	—				
	CAN/IEBus	—				
	UART Supporting LIN-Bus/I²C/CAN	—				
OCD	On-Chip Debugger	Yes				
Peripheral Functions	LCD (Segments x Commons)	—				
	12-bit A/D Converter	—				
	10-bit A/D Converter	10	12	16	24	
	8-bit D/A Converter	—				
	Other Functions	POC, LVI, CLM, DMA				
Others	Power Supply Voltage (V)	3.5 to 5.5				
	Package (size: mm)	64-LQFP (10 × 10)	80-LQFP (12 × 12)	100-LQFP (14 × 14)	144-LQFP (20 × 20)	
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-V850MINIL (MINICUBE) QB-V850ESFX3 (IECUBE)				
Package		P64GB-50-GAH	P80GK-50-GAK	P100GC-50-UEU-1	P144GJ-50-GAE-1	
Part No.		μPD70F3747GB-GAH-AX	μPD70F3750GK-GAK-AX	μPD70F3752GC-UEU-AX	μPD70F3755GJ-GAE-AX	μPD70F3757GJ-GAE-AX

Remark POC: Power-on clear
LVI: Low-voltage indicator
CLM: Clock monitor

★ : New product ★★ : Under development

• Specifications (V850ES/JG3)

Group		μPD70F3739	μPD70F3740	μPD70F3741	μPD70F3742
Memory	ROM Size (Bytes)	384K	512K	768K	1M
	ROM Type	Flash			
	Single-Power-Supply Flash Memory	Yes			
	RAM Size (Bytes)	32K	40K	60K	
Clock	Maximum Operating Frequency (MHz)	32			
	On-Chip Oscillator (Hz)	220K			
	Subclock (32.768kHz)	Yes			
I/O	I/O Ports	84			
Bus	External Data/Address Bus	16/22			
Timer	16-bit Timer	8			
	8-bit Timer	—			
	Other Timers	—			
	Watch Timer	1			
	Real-Time Counter	—			
	Watchdog Timer	1			
	PWM Output	16 bits × 9			
Serial Interface	UART	—			
	UART Supporting LIN-Bus	—			
	UART/CSI	—			
	UART Supporting LIN-Bus/CSI	1			
	UART/I²C	—			
	UART Supporting LIN-Bus/I²C	2			
	UART Supporting LIN-Bus/CSI/I²C	—			
	CSI	3			
	CSI/I²C	1			
	CSI with Automatic Transmission/ Reception Function	—			
	I²C	—			
	IEBus	—			
	CAN	—			
	CAN/IEBus	—			
	UART Supporting LIN-Bus/I²C/CAN	—			
OCD	On-Chip Debugger	Yes			
Peripheral Functions	LCD (Segments × Commons)	—			
	12-bit A/D Converter	—			
	10-bit A/D Converter	12			
	8-bit D/A Converter	2			
	Other Functions	LVI, CLM, DMA, CRC			
Others	Power Supply Voltage (V)	2.85 to 3.6			
	Package (size: mm)	100-LQFP (14 × 14)			
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-V850MINIL (MINICUBE) QB-V850ESSX2 (IECUBE)			
Package		P100GC-50-UEU			
Part No.		μPD70F3739GC-UEU-AX	μPD70F3740GC-UEU-AX	μPD70F3741GC-UEU-AX	μPD70F3742GC-UEU-AX

Remark LVI: Low-voltage indicator
CLM: Clock monitor

★ : New product ★★ : Under development

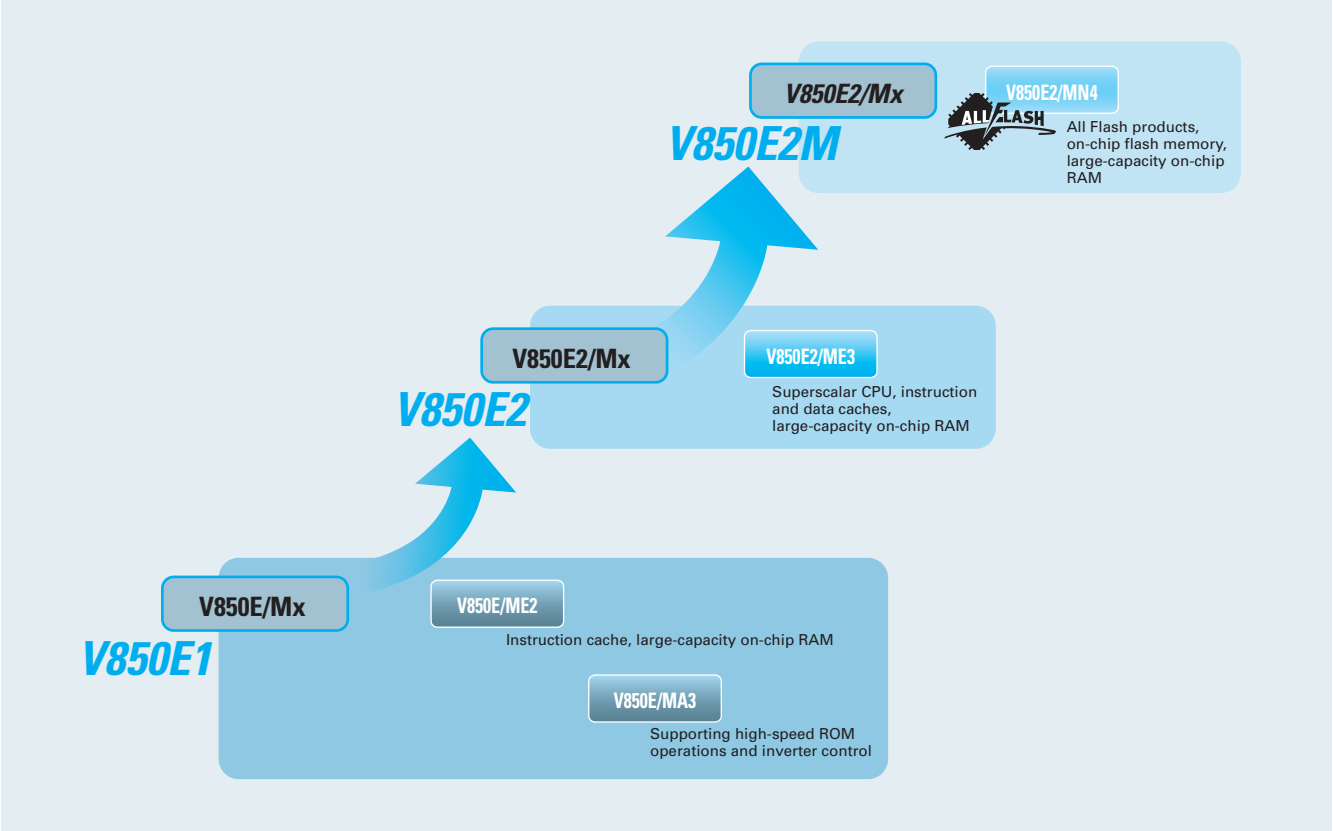
• Specifications (V850ES/JJ3)

Group		μPD70F3743	μPD70F3744	μPD70F3745	μPD70F3746
Memory	ROM Size (Bytes)	384K	512K	768K	1M
	ROM Type	Flash			
	Single-Power-Supply Flash Memory	Yes			
	RAM Size (Bytes)	32K	40K	60K	
Clock	Maximum Operating Frequency (MHz)	32			
	On-Chip Oscillator (Hz)	220k			
	Subclock (32.768kHz)	Yes			
I/O	I/O Ports	128			
Bus	External Data/Address Bus	16/24			
Timer	16-bit Timer	11			
	8-bit Timer	—			
	Other Timers	—			
	Watch Timer	1			
	Watchdog Timer	1			
	PWM Output	16 bits × 12			
Serial Interface	UART	—			
	UART Supporting LIN-Bus	1			
	UART/CSI	—			
	UART Supporting LIN-Bus/CSI	1			
	UART/I²C	—			
	UART Supporting LIN-Bus/I²C	2			
	UART Supporting LIN-Bus/CSI/I²C	—			
	CSI	4			
	CSI/I²C	1			
	CSI with Automatic Transmission/ Reception Function	—			
	I²C	—			
	IEBus	—			
	CAN	—			
	CAN/IEBus	—			
	UART Supporting LIN-Bus/I²C/CAN	—			
OCD	On-Chip Debugger	Yes			
Peripheral Functions	LCD (Segments x Commons)	—			
	12-bit A/D Converter	—			
	10-bit A/D Converter	16			
	8-bit D/A Converter	2			
	Other Functions	LVI, CLM, DMA, CRC			
Others	Power Supply Voltage (V)	2.85 to 3.6			
	Package (size: mm)	144-LQFP (20 × 20)			
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-V850MINIL (MINICUBE) QB-V850ESSX2 (IECUBE)			
Package		P144GJ-50-GAE-1			
Part No.		μPD70F3743GJ-GAE-AX	μPD70F3744GJ-GAE-AX	μPD70F3745GJ-GAE-AX	μPD70F3746GJ-GAE-AX

Remark LVI: Low-voltage indicator
CLM: Clock monitor

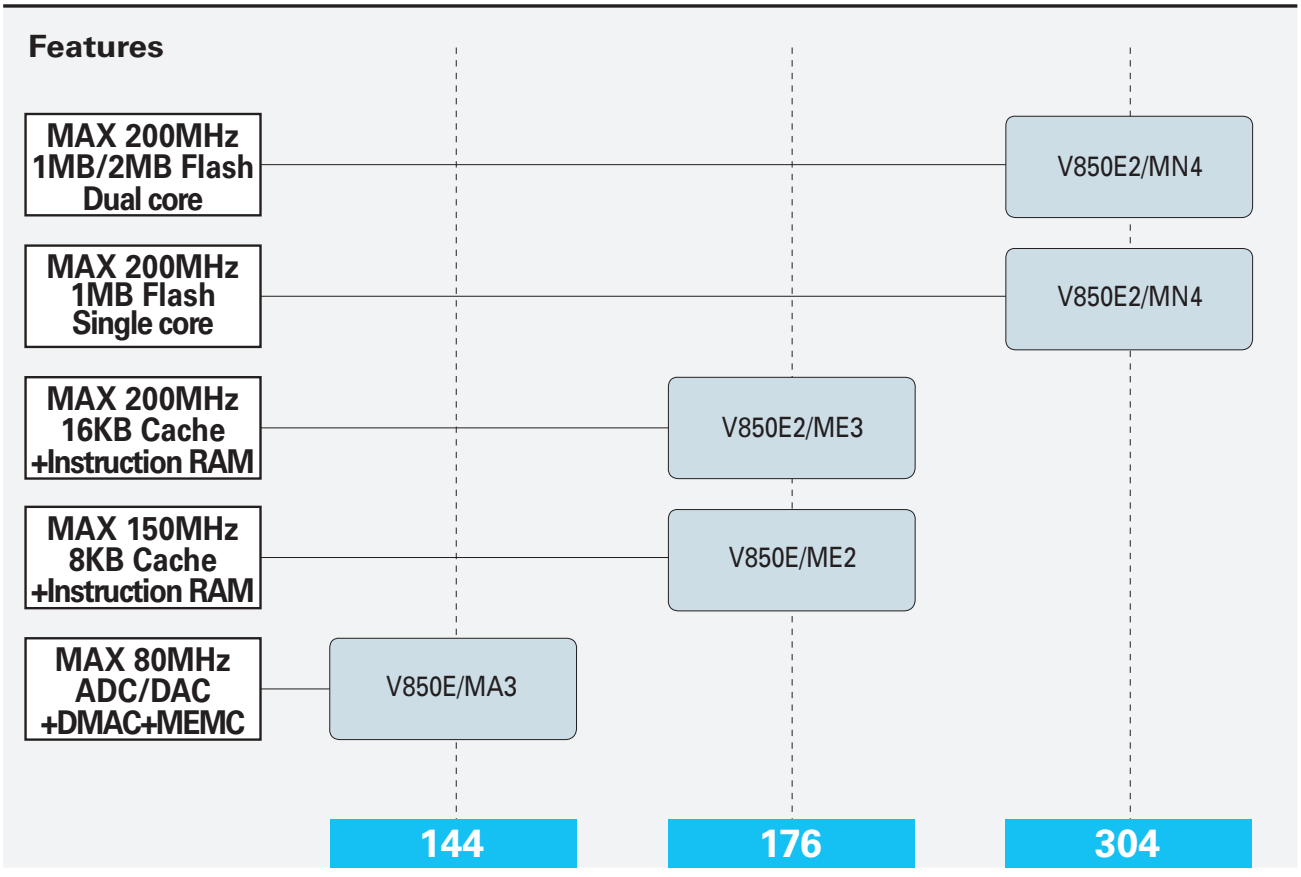
★ : New product ★★ : Under development

• V850E1, V850E2, and V850E2M MCU Roadmap



• Product Lineup (V850E1, V850E2, and V850E2M MCUs)

These 32-bit MCUs incorporate a range of controllers for communicating with external memories such as DRAM. The lineup includes products with a dual-core CPU structure enabling high-speed operation up to 200 MHz, products with and without a SDRAM controller, and products with different instruction RAM capacities, allowing you to select the MCU that best suits your required performance and program scale.



• Specifications (V850E2/ME3)

Group		μPD703500
Memory	ROM Size (Bytes)	168K
	ROM Type	RAM
	Single-Power-Supply Flash Memory	—
	RAM Size (Bytes)	32K
Clock	Maximum Operating Frequency (MHz)	200
	On-Chip Oscillator (Hz)	—
	Subclock (32.768kHz)	—
I/O	I/O Ports	78
Bus	External Data/Address Bus	32/26
Timer	16-bit Timer	12
	8-bit Timer	—
	Other Timers	—
	Watch Timer	—
	Watchdog Timer	—
	PWM Output	16 bits × 8
Serial Interface	UART	1
	UART Supporting LIN-Bus	—
	UART/CSI	1
	UART Supporting LIN-Bus/CSI	—
	UART/I²C	—
	UART Supporting LIN-Bus/I²C	—
	UART Supporting LIN-Bus/CSI/I²C	—
	CSI	1
	CSI/I²C	—
	CSI with Automatic Transmission/ Reception Function	—
	I²C	—
	IEBus	—
	CAN	—
	CAN/IEBus	—
	UART Supporting LIN-Bus/I²C/CAN	—
OCD	On-Chip Debugger	Yes
Peripheral Functions	LCD (Segments x Commons)	—
	12-bit A/D Converter	—
	10-bit A/D Converter	8
	8-bit D/A Converter	—
	Other Functions	8 KB instructions cache, 8 KB data cache, USB and DMA
Others	Power Supply Voltage (V)	1.4 to 1.65, 3.0 to 3.6
	Package (size: mm)	176-QFP (24 × 24)
	In-Circuit Emulator Emulation Board	—
Package		S176GM-50-3EU, JEU, KEU-3
Part No.		μPD703500GM-JEU-A

★ : New product ★★ : Under development

• Specifications (V850E/ME2)

Group		μPD703111B-06	μPD703111B-10	μPD703111B-13	μPD703111B-15
Memory	ROM Size (Bytes)	128K			
	ROM Type	RAM			
	Single-Power-Supply Flash Memory	—			
	RAM Size (Bytes)	16K			
Clock	Maximum Operating Frequency (MHz)	66	100	133	150
	On-Chip Oscillator (Hz)	—			
	Subclock (32.768kHz)	—			
I/O	I/O Ports	78			
Bus	External Data/Address Bus	32/26			
Timer	16-bit Timer	12			
	8-bit Timer	—			
	Other Timers	—			
	Watch Timer	—			
	Watchdog Timer	—			
	PWM Output	16 bits × 8			
Serial Interface	UART	1			
	UART Supporting LIN-Bus	—			
	UART/CSI	1			
	UART Supporting LIN-Bus/CSI	—			
	UART/I²C	—			
	UART Supporting LIN-Bus/I²C	—			
	UART Supporting LIN-Bus/CSI/I²C	—			
	CSI	1			
	CSI/I²C	—			
	CSI with Automatic Transmission/ Reception Function	—			
	I²C	—			
	IEBus	—			
	CAN	—			
	CAN/IEBus	—			
	UART Supporting LIN-Bus/I²C/CAN	—			
OCD	On-Chip Debugger	Yes			
Peripheral Functions	LCD (Segments x Commons)	—			
	12-bit A/D Converter	—			
	10-bit A/D Converter	8			
	8-bit D/A Converter	—			
	Other Functions	8 KB instructions cache, USB and DMA			
Others	Power Supply Voltage (V)	1.35 to 1.65, 3.0 to 3.6			1.4 to 1.65, 3.0 to 3.6
	Package (size: mm)	176-LQFP (24 × 24)			
	In-Circuit Emulator Emulation Board	QB-V850MINIL (MINICUBE)			
Package		S176GM-50-UEU-1			
Part No.		μPD703111BGM-06-UEU-A	μPD703111BGM-10-UEU-A	μPD703111BGM-13-UEU-A	μPD703111BGM-15-UEU-A

★ : New product ★★ : Under development

• Specifications (V850E/MA3)

Group		μPD703136BY	μPD703131BY	μPD703132BY	μPD703133BY	μPD703134BY	μPD70F3134BY
Memory	ROM Size (Bytes)	256K			512K		
	ROM Type	Mask					Flash
	Single-Power-Supply Flash Memory	—					Yes
	RAM Size (Bytes)	8K	16K	32K	16K	32K	
Clock	Maximum Operating Frequency (MHz)	80					
	On-Chip Oscillator (Hz)	—					
	Subclock (32.768kHz)	—					
I/O	I/O Ports	112					
Bus	External Data/Address Bus	16/26					
Timer	16-bit Timer	9					
	8-bit Timer	—					
	Other Timers	—					
	Watch Timer	—					
	Watchdog Timer	1					
	PWM Output	16 bits × 6, 6 phases, 16 bits × 1					
Serial Interface	UART	—					
	UART Supporting LIN-Bus	—					
	UART/CSI	3					
	UART Supporting LIN-Bus/CSI	—					
	UART/I²C	1					
	UART Supporting LIN-Bus/I²C	—					
	UART Supporting LIN-Bus/CSI/I²C	—					
	CSI	—					
	CSI/I²C	—					
	CSI with Automatic Transmission/ Reception Function	—					
	I²C	—					
	IEBus	—					
	CAN	—					
	CAN/IEBus	—					
	UART Supporting LIN-Bus/I²C/CAN	—					
OCD	On-Chip Debugger	Yes					
Peripheral Functions	LCD (Segments x Commons)	—					
	12-bit A/D Converter	—					
	10-bit A/D Converter	8					
	8-bit D/A Converter	2					
	Other Functions	DMA, ROMC					
Others	Power Supply Voltage (V)	2.3 to 2.7, 3.0 to 3.6					
	Package (size: mm)	144-LQFP (20 × 20), 161-FBGA (13 × 13)					
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-V850MINIL (MINICUBE) QB-V850EMA3 (IECUBE)					
Package		S144GJ-50-UEN P161F1-80-EN4-1					
Part No.		μPD703136BYGJ-xxx-UEN-A μPD703136BYF1-xxx-EN4-A	μPD703131BYGJ-xxx-UEN-A μPD703131BYF1-xxx-EN4-A	μPD703132BYGJ-xxx-UEN-A μPD703132BYF1-xxx-EN4-A	μPD703133BYGJ-xxx-UEN-A μPD703133BYF1-xxx-EN4-A	μPD703134BYGJ-xxx-UEN-A μPD703134BYF1-xxx-EN4-A	μPD70F3134BYGJ-UEN-A μPD70F3134BYF1-EN4-A

Remark ROMC: ROM correction

★ : New product ★★ : Under development

• Specifications (V850E2/MN4)

Group		μPD70F3510	μPD70F3512	μPD70F3514	μPD70F3515
Memory	ROM Size (Bytes)	1M			2M
	ROM Type	Flash			
	Single-Power-Supply Flash Memory	Yes			
	RAM Size (Bytes)	64K		64K × 2	
Clock	Maximum Operating Frequency (MHz)	200 MHz			
	On-Chip Oscillator (Hz)	—			
	Subclock (32.768kHz)	—			
I/O	I/O Ports	188			
Bus	External Data/Address Bus	26/26, 32/32			
Timer	16-bit Timer	16 ch × 4 units			
	8-bit Timer	—			
	Other Timers	32-bit timer: 16ch × 1; 16-bit encoder timer × 2			
	Watch Timer	1			
	Watchdog Timer	1		2	
Serial Interface	CSI/UART	4			
	CSI/UART/I²C	6	4		
	CSI/UART/I²C/CAN	—	2		
	USB 2.0 Function	1			
	USB 2.0 Host	1			
	Ethernet Controller	—	1		
OCD	On-Chip Debugger	Yes			
Peripheral Functions	LCD (Segments × Commons)	—			
	12-bit A/D Converter	—			
	10-bit A/D Converter	12			
	8-bit D/A Converter	—			
	Other Functions	DMAC, H-bus shared memory: 64KB; H-bus memory side cache: 16KB; secondary memory-dedicated DMAC; Supports inverter timer; boundary scan function			
Others	Power Supply Voltage (V)	1.1 to 1.3, 3.0 to 3.6, 3.0 to 3.6, 4.5 to 5.5 (analog system)			
	Package (size: mm)	304-FBGA (19 × 19)			
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-V850MINIL (MINICUBE)			
Package		P304F1-80-HN6			
Part No.		μPD70F3510F1-HN6-A**	μPD70F3512F1-HN6-A**	μPD70F3514F1-HN6-A**	μPD70F3515F1-HN6-A**

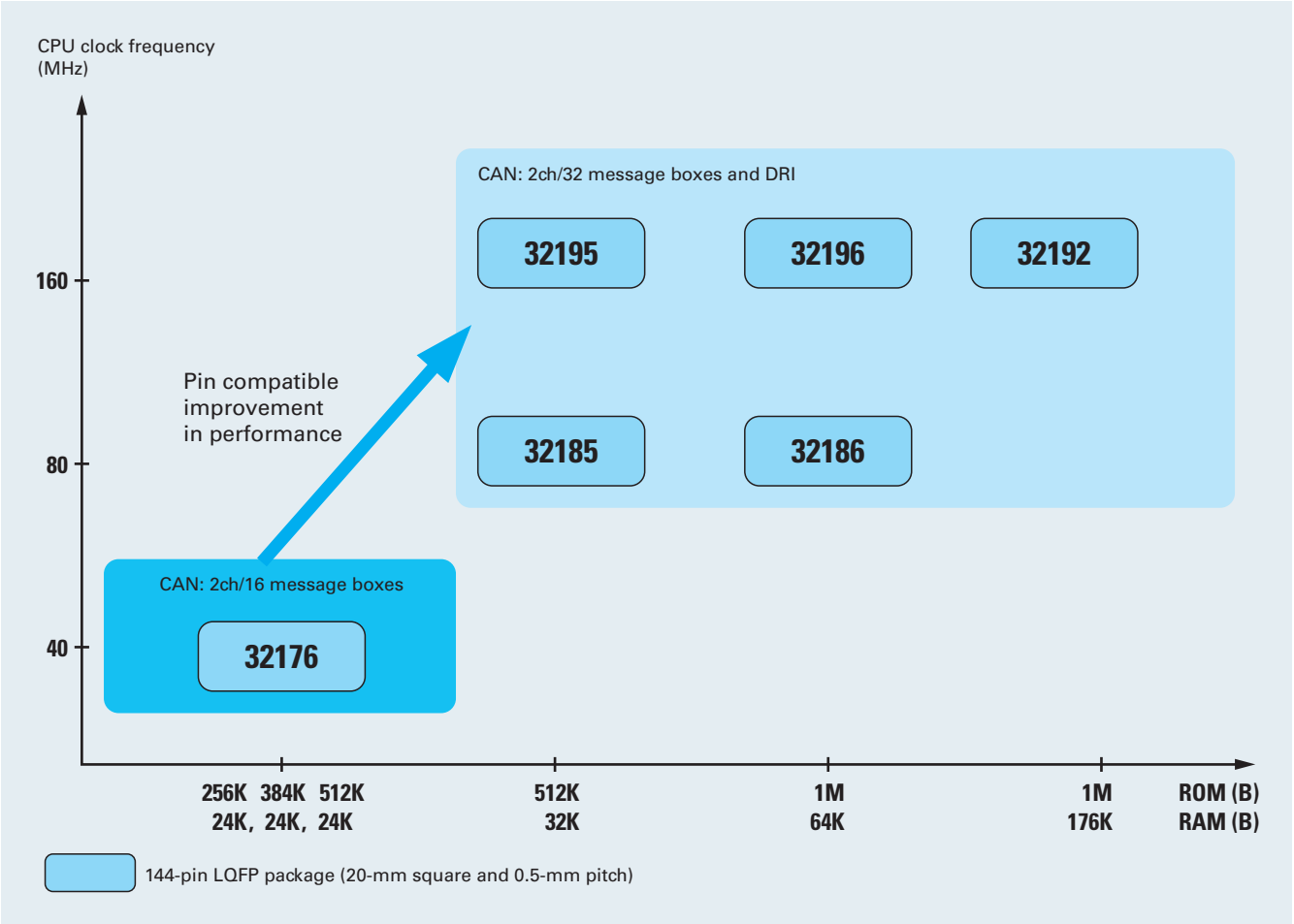
★ : New product ★★ : Under development

The M32R family of 32-bit RISC MCUs was developed specifically to enable customers to incorporate high-level functionality into systems. These MCUs have an M32R CPU core, a compact design that delivers excellent performance.
Devices in the M32R family are ideal solutions for applications such as general industrial and car-mounted systems, digital AV equipment, digital imaging equipment, and portable consumer products.

M32R Family Features

- Proprietary Renesas compact 32-bit RISC core provides excellent performance
- Most instructions are executed in a single clock cycle
- Multiple-operation instructions (load and address update, store and address update, etc.) are executed in a single clock cycle
- Both 16-bit and 32-bit instructions are used to achieve high code efficiency
- 4G bytes address area is supported
- Support for DSP function instructions (using on-chip multiply-accumulate unit) is standard

• M32R Family Roadmap



Outline of M32R/ECU Series

The M32R/ECU Series MCU is a single-chip MCUs that incorporates the M32R CPU core provided with 32-bit RISC architecture, peripheral functions, and ROM/RAM. Each model of the 32185, 32186, 32192, 32195, and 32196 Groups incorporates a fully IEEE754-compliant single-precision FPU. The M32R/ECU Series MCU incorporates large-capacity flash memory up to 1M byte, thus helping to improve productivity at product development and manufacturing stages, and ease of maintenance at the mass production stage. The M32R/ECU Series MCU also adopts a multi-function peripheral circuit and allows sequential use of each peripheral function in combination. The M32R/ECU Series MCU excels in environment resistance in a wide operating temperature range (-40°C to 125°C) and ensures low noise and low power consumption. It is ideal for applications requiring high reliability, such as power train control, industrial equipment control, and AV control.

M32R/ECU Series Features

- Large-capacity on-chip flash memory supports rapid reprogramming
- On-chip CAN controller on all series models
- Most instructions are executed in a single clock cycle (Version with fully IEEE 754-compliant FPU available)
- Wide operating temperature range (-40°C to 125°C)
- High-speed operation and low power consumption
- Operates on 3.3V single power supply; 5V interface also possible

• M32R-CPU Core Specifications

M32R CPU Core	Proprietary Renesas 32-Bit RISC Architecture	
	Logical address space	4G bytes
	Number of instructions	83 (16-bit/32-bit instructions)
	General-purpose registers	32-bit × 16
	Control registers	32-bit × 5
	DSP functions	Multiply-accumulate function: 32-bit × 16-bit multiplier + 56-bit accumulator
	Pipeline stages	5: Instruction fetch, decode, execution, memory access, write-back

32176 Group

- Provides reinforced peripheral functions, such as 24K bytes RAM, two-channel CAN, and four-channel serial I/O, all while maintaining the performance of the 32171 Group.
- Operates with a single 3.3-V or 5-V power supply.
- Supports a wide temperature range and is ideal for embedded applications that require high precision and high reliability.

• M32R-FPU Core Specifications

M32R-FPU Core	Proprietary Renesas 32-Bit RISC Architecture + IEEE 754-Compliant single-precision FPU	
	Logical address space	4G bytes
	Number of instructions	100 (basic instructions: 83 + FPU: 12, extended: 5 instructions)/6 addressing
	General-purpose registers	32-bit × 16
	Control registers	32-bit × 6 (common: 5 + FPU: 1)
	DSP functions	Multiply-accumulate function: 32-bit × 16-bit multiplier + 56-bit accumulator
	FPU functions	• Support for 5 exceptions Invalid operation, divide by zero, overflow, underflow, precision error • 4 rounding modes (nearest value, 0 direction, + infinity direction, – infinity direction) • Multiply-Accumulate (FMADD) and difference-of-products (FMSUB) instructions suitable for FFT butterfly computation
	Pipeline stages	6: Instruction fetch, decode, execute1, execute2, memory access, write-back

*Refer to "Automotive MCUs" for the M32R family.

32185 Group

- Incorporates a fully IEEE754-compliant M32R-FPU core, and realizing high-speed operation at 80MHz.
- Equipped with 512K bytes flash memory and 32K bytes large-capacity RAM.
- Incorporates a two-channel CAN expandable to 32 slots.
- Incorporates Direct RAM interface (DRI).
- Pin compatibility with the 32176 Group.
- Supporting a wide range of operating temperatures, and ideal for embedded applications requiring high precision and high reliability.

32186 Group

- Incorporates a fully IEEE754-compliant M32R-FPU core, and realizing high-speed operation at 80MHz.
- Equipped with 1M byte flash memory and 64K bytes large-capacity RAM.
- Incorporates a two-channel CAN expandable to 32 slots.
- Incorporates Direct RAM interface (DRI).
- Pin compatibility with the 32176 Group.
- Supporting a wide operating temperature range ideal for embedded applications requiring high precision and high reliability.

32192 Group

- Incorporates a fully IEEE754-compliant M32R-FPU core, and realizing high-speed operation at 160MHz.
- Equipped with 1M byte flash memory and 176K bytes large-capacity RAM.
- Incorporates a two-channel CAN expandable to 32 slots.
- Incorporates Direct RAM interface (DRI).
- Pin compatibility with the 32176 Group.
- Supporting a wide operating temperature range ideal for embedded applications requiring high precision and high reliability.

32195 Group

- Incorporates a fully IEEE754-compliant M32R-FPU core, and realizing high-speed operation at 160MHz.
- Equipped with 512K bytes flash memory and 32K bytes large-capacity RAM.
- Incorporates a two-channel CAN expandable to 32 slots.
- Incorporates Direct RAM interface (DRI).
- Pin compatibility with the 32176 Group.
- Supporting a wide operating temperature range, and ideal for embedded applications requiring high precision and high reliability.

32196 Group

- Incorporates a fully IEEE754-compliant M32R-FPU core, and realizing large-speed operation at 160MHz.
- Equipped with 1M byte flash memory and 64K bytes high-capacity RAM.
- Incorporates a two-channel CAN expandable to 32 slots.
- Incorporates Direct RAM interface (DRI).
- Pin compatibility with the 32176 Group.
- Supporting a wide operating temperature range ideal for embedded applications requiring high precision and high reliability.

*DRI: In applications that utilize image data, the direct RAM interface module allows large amounts of external data to be transferred rapidly to on-chip RAM without the need to stop the CPU.

The RX Family takes as its background the knowhow accumulated over many years and utilizes the latest technology to satisfy the current and future requirements of customers, delivering even better performance, even better code efficiency, even lower power consumption, even higher integration, and continuity with existing products.
We confidently recommend the RX Family of MCUs as the next-generation world standard at the middle range level.

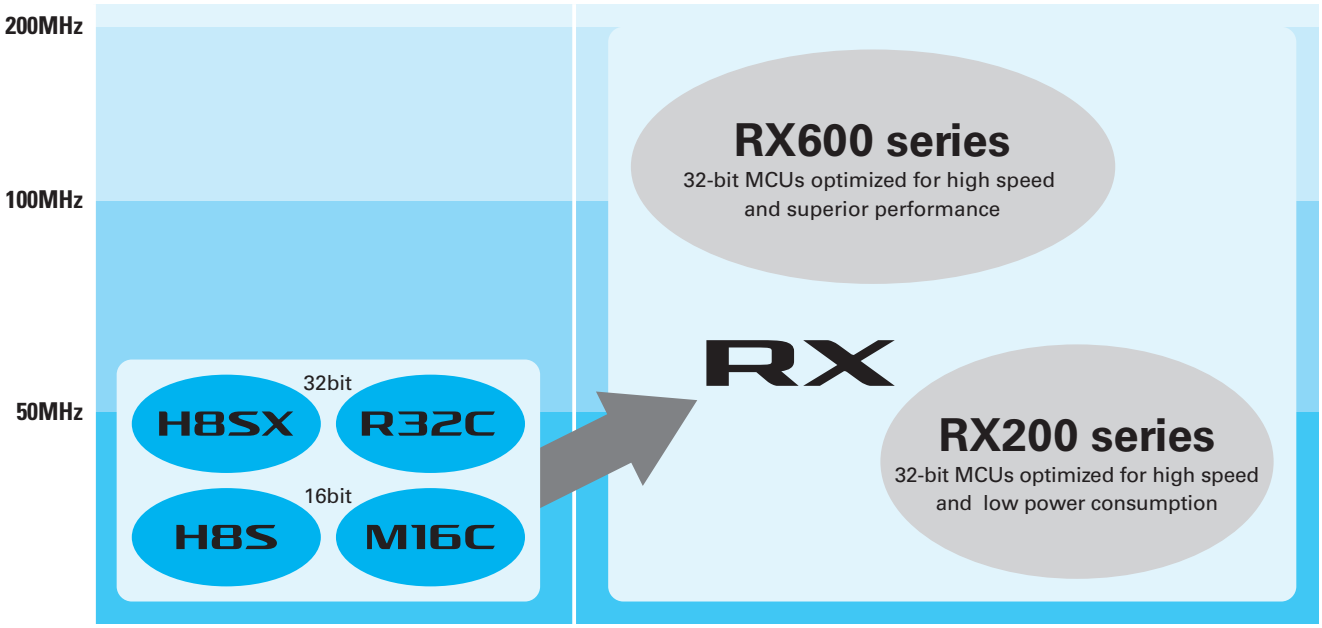
RX Family Features

The RX Family combines the strengths of CISC MCUs such as the H8S Family, H8SX Family, M16C Family, and R32C Family with the high-speed methodology developed for the SuperH Family of RISC MCUs.

- To CISC features such as instructions with variable byte length have been added RISC features such as general register machine architecture, Harvard architecture, five-stage pipeline, and Out of order completion.
- Provided with the enhanced DSP operation, barrel shifter, and built-in high-speed multiplier and divider.
- The number of registers has been optimized, with 16 selected as the number of 32-bit general registers to ensure a balance between overhead and performance.
- The basic instructions and addressing modes used most frequently have been assigned the shortest formats to reduce both the number of instructions and the code size.
- Instructions are read from a memory area comprising 100MHz of no-wait on-chip flash memory.

• RX Family Roadmap

Maximum operating frequency



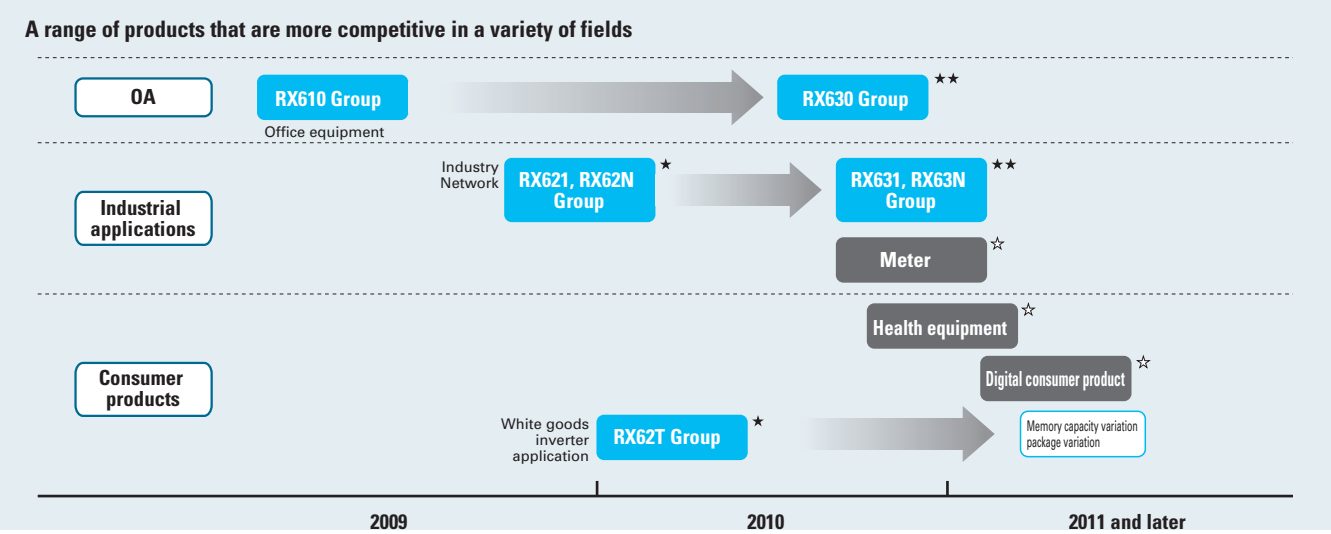
Outline of RX600 Series

The RX600 Series, designed for high speed and excellent performance, is intended for system control applications demanding high-speed processing of large-scale programs.

RX600 Series Features

- High speed CPU
  - 100MHz operation (target 200MHz)
  - No wait cycles when accessing flash memory (100MHz operation)
- High performance
  - 1.65 DMIPS/MHz
  - Single precision floating point computing unit (FPU)
  - DSP function
- Back ground operation (BGO) function
  - A dedicated circuit is provided to control data erasure and write, enabling this operation to be executed during user programming.
- Low consumption current
  - Operation: 0.5mA/MHz
- Compatibility
  - Designed with pin compatibility with existing M16C in mind
  - Support for reuse of C language source code developed for H8S, H8SX, M16C, or R32C
  - Succeed the peripheral functions from the existing products

• RX600 Series Roadmap



★ : New product ★★ : Under development ☆ : In planning stage

RX610 Group

- Application fields
  Industrial/office equipment
- RX CPU for high speed, high performance, and low power consumption
  - High speed (100MHz), high performance (1.65 DMIPS/MHz), and low power consumption (100MHz at 50mA)
  - Single precision floating point computing unit
- Enhanced functions
  - Enhanced analog functions
    (10-bit ADC [0.8µs] x 4 units, 10-bit DAC)
  - Large capacity memory that allows one cycle access (2MB flash, 128KB RAM)
  - Enhanced communication functions
    (SCI: 7ch, Fast Mode PLUS [1Mbps] compatible I²C)
  - Enhanced timer functions
    (16-bit timer 16ch [TPU: 12ch/CMT: 4ch], 8-bit timer 4ch)
- Continuity
  - Pin compatibility (power supply, mode pins, bus control signals, etc.) with M16C Family and continuation of same package options
  - Peripheral functions compatible with conventional products (SH: CMT/H8: DTC, TPU, TMR, SCI)

RX62N/RX621 Group

- Application fields
  Robot, NC, sequencer, POS peripheral equipment, printer, etc.
- RX CPU for high speed, high performance, and low power consumption
  - High speed (100MHz), high performance (1.65 DMIPS/MHz), and low power consumption (100MHz at 50mA)
  - Single precision floating point computing unit
- Enhanced functions
  - Enhanced analog functions
    (12-bit ADC x 8ch or 10-bit ADC x 8ch (4ch x 2 units), 10-bit DAC x 2ch)
  - Large capacity memory that allows one cycle access (512KB flash, 96KB RAM)
  - Enhanced communication functions
    (Ethernet controller x 1ch (note1), USB2.0 Full-speed (Host/Function, OTG) x 2ch, CAN x 1ch (option(note1)))
  - Built-in dedicated DMAC (EXDMAC x 2ch)
  - Multi-functional timers
    (16-bit timer 16ch [MTU2: 12ch/CMT: 4ch], 8-bit timer 4ch (TMR))
- Continuity
  - Pin compatibility (power supply, mode pins, bus control signals, etc.) with M16C Family and continuation of same package options
  - Peripheral functions compatible with conventional products (SH: CMT/H8: DTC, TMR, SCI)
- Abundant of package configurations
  - A wide range of package lineup such as 85-LGA(note2), 100-pin LQFP, 144-pin LQFP, 145-pin LGA, and 176-pin BGA

note1 : RX62N only
note2 : RX621 only

RX62T Group

- Application fields
  OA, consumer equipment : white goods
  Industrial equipment: general-purpose inverter, AC servo, machine tool, sequencer
- RX CPU for high speed, high performance, and low power consumption
  - High speed (100MHz), high performance (1.65 DMIPS/MHz), and low power consumption (100MHz at 50mA)
  - Single precision floating point computing unit
- Enhanced functions
  - Enhanced A/D converters
    (3 units, 20ch:12bit A/D x 4ch x 2 units, 10bit A/D × 12ch)
    (12bit A/D 1 unit x 3ch, A/D 3 units x 7ch, simultaneous sampling enable)
    (The continuous A/D conversion simplified by the double data register newly installed in 12-bitA/D module.)
  - On-chip programmable gain amplifier (12bit A/D)
    (possible to set gain independently)
  - On-chip comparator
    (window comparator function, the reference voltage selectable from the external source and the internal source , negate control of PWM)
  - Enhanced communication functions
    (CAN, LIN, RSPI, I², SCI)
  - Enhanced timer functions
    (16-bit timer x 16ch: MTU3, GPT, CMT),
    (100MHz PWM, independently control 3ch of 3-phase inverter with the complementary PWM, independently control 4ch of single phase inverter with the complementary PWM, enabling the generation of laterally asymmetric PWM triangle waveforms, independently control the right and the left dead-time of complementary PWM, Phase Start of PWM by Software)
- Continuity
  - Pin compatibility (power supply, mode pins, bus control signals, etc.) with M16C Family and continuation of same package options
  - Peripheral functions compatible with conventional products (SH: CMT, MTU3, DTC, POE3, SCI)
- 5V single power and 3.3V single power lineup
  - For the 3.3V products, analog power 5V supply setting is also available.
- Abundant of package configurations
  - A wide range of package lineup such as 64-pin, 80-pin, 100-pin, and 112-pin LQFP
  - Line-up of 0.65mm pitch, 0.5mm pitch

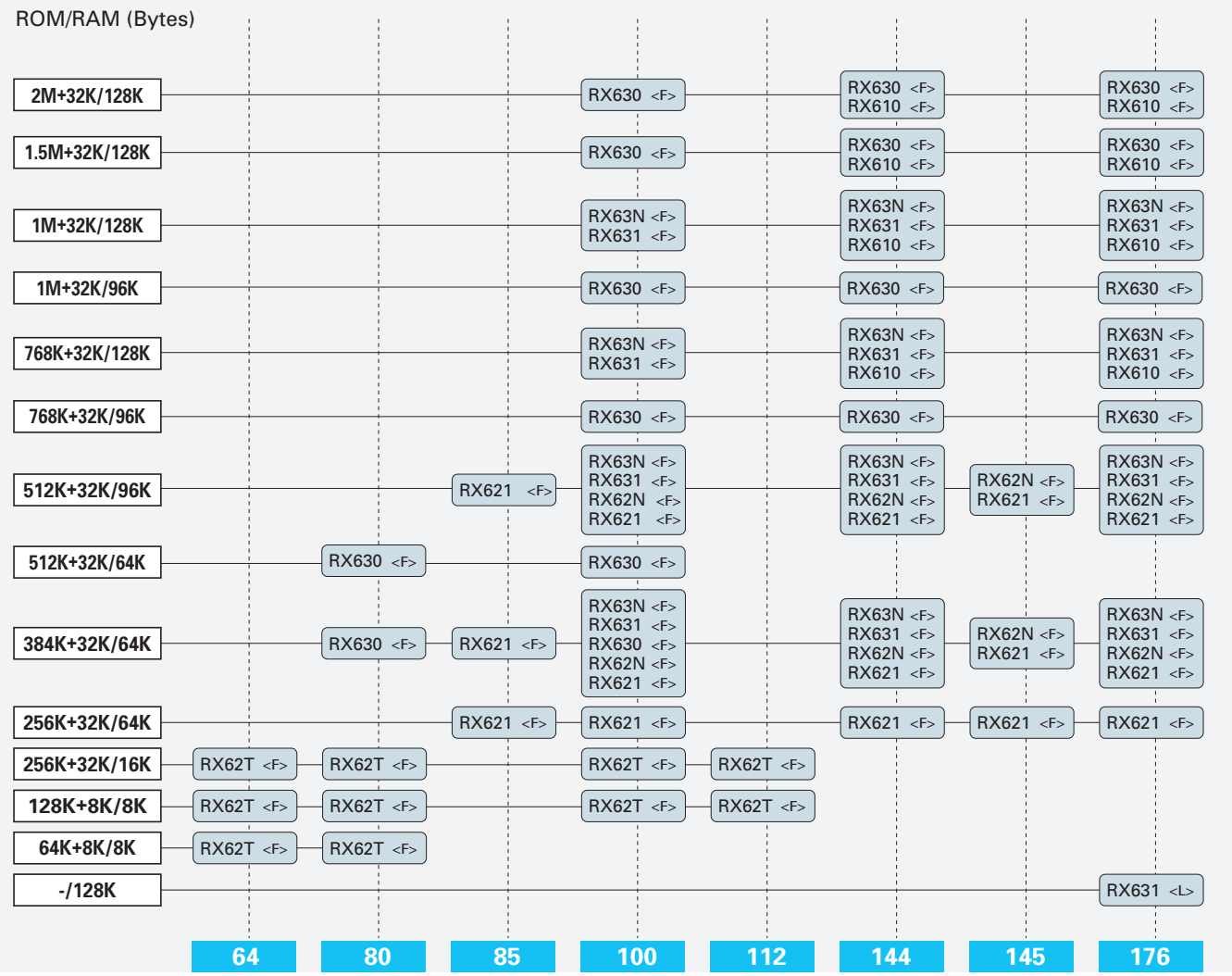
RX630 Group

- Application fields
  OA equipment, consumer equipment, general industrial equipment
- RX CPU for high speed, high performance, and low power consumption
  - High speed (100MHz), high performance (1.65 DMIPS/MHz), and low power consumption (100MHz at 50mA)
  - Single precision floating point computing unit
- Enhanced functions
  - Enhanced analog functions
    (12-bit ADC x 21ch, 10-bit ADC x 8ch, 10-bit DAC x 2ch)
  - Incorporate data flash capable of 100,000 rewrites (E2Data Flash : 32KB)
  - Enhanced communication functions
    (USB2.0 Full-speed (Function) x 1ch, CAN x 3ch (option)) (SCIc: 12ch, SCId: 1ch, RIIC: 4ch, RSPI x 3ch, IEBus: 1ch)
  - Enhanced timer functions
    (16-bit timer x 22ch (TPU: 12ch, MTU2: 6ch, CMT: 4ch), 8-bit timer: 4ch (TMR))
- Supports the IEC60730 safety standard for home appliances
  - WDT using dedicated on-chip oscillator
  - Oscillation stop monitor, frequency abnormal check function (GPT)
  - A/D self-check function
  - Port output check function
  - CRC calculator for checking communication data and memory data
- Continuity
  - Pin compatibility (power supply, mode pins, bus control signals, etc.) with M16C Family and continuation of same package options
  - Peripheral functions compatible with conventional products (SH: CMT/H8: DTC/TPU/TMR/SCI)
- Abundant of package configurations
  - A wide range of package lineup such as 80-pin, 100-pin, 144-pin, and 176-pin LQFP

RX63N/RX631 Group

- Application fields
- OA equipment, consumer equipment, general industrial equipment
- RX CPU for high speed, high performance, and low power consumption
  - High speed (100MHz), high performance (1.65 DMIPS/MHz), and low power consumption (100MHz at 50mA)
- Enhanced functions
  - Enhanced analog functions
    (12-bit ADC x 21ch, 10-bit ADC x 8ch, 10-bit DAC x 2ch)
  - Incorporate data flash capable of 100,000 rewrites (E2Data Flash : 32KB)
  - Enhanced communication functions
    (Ethernet controller x1ch, USB2.0 Full-speed (Host/Function, OTG) x 2ch , CAN x 2ch)
    (SCIc: 12ch, SCId: 1ch, RIIC: 4ch, RSPI : 3ch, IEBus: 1ch)
  - Incorporate DMAC dedicated for external bus (EXDMAC x 2ch)
  - Enhanced timer functions
    (16-bit timer x 22ch (TPU: 12ch, MTU: 6ch, CMT: 4ch), 8-bit timer: 4ch (TMR))
- Continuity
  - Pin compatibility (power supply, mode pins, bus control signals, etc.) with M16C Family and continuation of same package options
  - Peripheral functions compatible with conventional products (SH: CMT/H8: DTC/SCI)
- Abundant of package configurations
  - A wide range of package lineup such as 100-pin LQFP, 100-pin LGA, 144-pin LQFP, 145-pin LGA, 176-pin LQFP and 176-pin BGA

• Memory Capacity (ROM/RAM) (RX600 Series)



Letters in brackets < > indicate memory variations.
F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

• Specifications (RX600 Series)

Group		RX610							
Memory	ROM (Bytes)	768K + 32K		1M + 32K		1.5M + 32K		2M + 32K	
	RAM (Bytes)	128K							
	ROM Type*1	F							
	Data Flash/E2 Data Flash	32K (Data flash)							
	Program Security	Yes (ID code protection, ROM code protection)							
CPU	CPU	RX CPU Core							
	Basic Instructions	90							
	Minimum Instruction Execution Time (ns)	10 (@100MHz)							
	Dhrystone Performance	165MIPS							
	Multiplier	32 × 32 → 64							
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32 32 × 32 + 80 → 80							
	Barrel Shifter	Yes							
	FPU	Yes							
DMA	DMAC (Channels)	4							
	EXDMAC	—							
	DTC/DMAC Ⅱ	DTC							
External Bus Expansion	Address Space (Bytes)	4G							
	Bus State Controller	SRAM/ROM/Byte Control SRAM/ Burst ROM							
	Bus Structure	Separate bus, selectable data bus width (8/16-bit)							
	SDRAM Controller	—							
	Endian Conversion	Yes (data)							
Clock	Clock Generation Circuit	1 circuit (Main clock)							
	PLL	Yes							
	Subclock	—							
	RTC	—							
	On-Chip Oscillator	—							
	Oscillation Stop Detection	—							
	Frequency Divider	1/n (n = 1, 2, 4, 8)							
	Power Save	Sleep/Full module clock stop/Software standby/Deep software standby							
Power Supply Voltage Detection	Power-On Reset/POR	—							
	Low Voltage Detection/LVD	—							
A/D Converter	Resolution × Channels	10-bit × 16							
	Sample and Hold	Yes							
	Multi-Channel Sample and Hold	Yes							
D/A Converter	Resolution × Channels	10-bit × 2							
Timer	8-bit	4 (TMR)							
	16-bit	12 (TPU), 4 (CMT)							
	32-bit	—							
	Input Capture	32 (TPU)							
	Output Compare	32 (TPU), 4 (TMR)							
	PWM Output	32 (TPU)							
	Programmable Pulse Generator	32 (PPG)							
	Event Counter	20 (TMR, TPU, CMT)							
	2-Phase Encoder Input	4 (TPU)							
	3-Phase Inverter Control	—							
Watchdog Timer		1							
Serial Interface	Clock Sync./Clock Async.	7 (SCI)							
	Clock Sync. Only	—							
	Clock Async. Only	—							
I²C-bus		2							
Smart Card/SIM		7 (SCI)							
Synchronous Serial Communication Unit/Special Serial I/O		—							
CAN	Channels	—							
	Message Box (Numbers)	—							
Ethernet		—							
USB Host		—							
USB Function		—							
CRC Calculation Circuit		1 ($X^8 + X^2 + X + 1$, $X^{16} + X^{15} + X^2 + 1$, $X^{16} + X^{12} + X^5 + 1$)							
I/O Ports	Input Only (Numbers)	—							
	CMOS I/O (Numbers)	117	140	117	140	117	140	117	140
	High Voltage Port (Numbers)	—							
	N-Channel Open Drain Port (Numbers)	16							
	High Current Drive Port	—							
	Pull-Up Resistor	40							
External Interrupts Pins		17							
Debugging Function	Boundary Scan/JTAG	—/Yes	Yes/Yes	—/Yes	Yes/Yes	—/Yes	Yes/Yes	—/Yes	Yes/Yes
	On-Chip Debug	Yes							
	On-Board Flash Program	Yes							
Other Functions	Others	—							
Operating Frequency/Supply Voltage		100MHz/3.0 to 3.6V							
Operating Ambient Temperature (°C)		–40 to 85	–20 to 85	–40 to 85	–20 to 85	–40 to 85	–20 to 85	–40 to 85	–20 to 85	–40 to 85	–20 to 85	–40 to 85	–20 to 85	–40 to 85	–20 to 85	–40 to 85	–20 to 85
Package*2		PLQP0144KA-A		PLBG0176GA-A		PLQP0144KA-A		PLBG0176GA-A		PLQP0144KA-A		PLBG0176GA-A		PLQP0144KA-A		PLBG0176GA-A	
Part No.		R5F56104VDFP	R5F56104VNFP	R5F56104WDBG**	R5F56104WNBG**	R5F56106VDFP	R5F56106VNFP	R5F56106WDBG**	R5F56106WNBG**	R5F56107VDFP	R5F56107VNFP	R5F56107WDBG**	R5F56107WNBG**	R5F56108VDFP	R5F56108VNFP	R5F56108WDBG**	R5F56108WNBG**

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (RX600 Series)

Group		RX621										
Memory	ROM (Bytes)	256K + 32K				384K + 32K			512K + 32K			
	RAM (Bytes)	64K							96K			
	ROM Type*1	F										
	Data Flash/E2 Data Flash	32K (Data flash)										
	Program Security	Yes (ID code protection, ROM code protection)										
CPU	CPU	RX CPU Core										
	Basic Instructions	90										
	Minimum Instruction Execution Time (ns)	10 (@100MHz)										
	Dhrystone Performance	165MIPS										
	Multiplier	32 × 32 → 64										
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32 32 × 32 + 80 → 80										
	Barrel Shifter	Yes										
	FPU	Yes										
DMA	DMAC (Channels)	4										
	EXDMAC	2	—	2	—	2	—	2	—	2	—	2
	DTC/DMAC Ⅱ	DTC										
External Bus Expansion	Address Space (Bytes)	4G										
	Bus State Controller	SRAM/ ROM/ Burst ROM/ Byte control SRAM/ SDRAM	SRAM/ ROM/ Burst ROM/ Byte control SRAM	SRAM/ROM/ Burst ROM/Byte control SRAM/ SDRAM	SRAM/ ROM/ Burst ROM/ Byte control SRAM	SRAM/ROM/ Burst ROM/Byte control SRAM/ SDRAM	SRAM/ ROM/ Burst ROM/ Byte control SRAM	SRAM/ ROM/ Burst ROM/ Byte control SRAM/ SDRAM	SRAM/ROM/ Burst ROM/Byte control SRAM	SRAM/ROM/ Burst ROM/Byte control SRAM/ SDRAM	SRAM/ ROM/ Burst ROM/ Byte control SRAM	SRAM/ ROM/ Burst ROM/ Byte control SRAM/ SDRAM
	Bus Structure	Separate bus, selectable data bus width(8/16/32-bit)	Separate bus, selectable data bus width(8/16-bit)					Separate bus, selectable data bus width(8/16/32-bit)	Separate bus, selectable data bus width (8/16-bit)			Separate bus, selectable data bus width(8/16/32-bit)
	SDRAM Controller	Yes	—	Yes	—	Yes	—	Yes	—	Yes	—	Yes
	Endian Conversion	Yes (data)										
Clock	Clock Generation Circuit	3 circuits (Main clock, sub clock, low speed on-chip oscillator)										
	PLL	Yes										
	Subclock	Yes (32.768kHz)										
	RTC	Yes										
	On-Chip Oscillator	Yes (Low speed : 125kHz)										
	Oscillation Stop Detection	Yes										
	Frequency Divider	1/n (n = 1, 2, 4, 8)										
	Power Save	Sleep/Full module clock stop/software standby/deep software standby										
Power Supply Voltage Detection	Power-On Reset/POR	Yes										
	Low Voltage Detection/LVD	Yes (Low voltage detection)										
A/D Converter	Resolution × Channels	12-bit × 8 or 10-bit × 8										
	Sample and Hold	Yes										
	Multi-Channel Sample and Hold	Yes										
D/A Converter	Resolution × Channels	10-bit × 2	10-bit × 1	10-bit × 2	10-bit × 1	10-bit × 2	10-bit × 1	10-bit × 2	10-bit × 1	10-bit × 2	10-bit × 1	10-bit × 2
Timer	8-bit	4 (TMR)										
	16-bit	12 (MTU2), 4 (CMT)										
	32-bit	—										
	Input Capture	38 (MTU2)										
	Output Compare	4 (TMR), 32 (MTU2)										
	PWM Output	4 (TMR), 32 (MTU2)										
	Programmable Pulse Generator	32										
	Event Counter	Yes										
	2-Phase Encoder Input	Yes										
	3-Phase Inverter Control	Yes										
Watchdog Timer		2										
Serial Interface	Clock Sync./Clock Async.	6 (SCI)										
	Clock Sync. Only	2 (RSPI)										
	Clock Async. Only	—										
I²C-bus		2	1	2	1	2	1	2	1	2	1	2
Smart Card/SIM		6 (SCI)										
Synchronous Serial Communication Unit/Special Serial I/O		2 (RSPI)										
CAN	Channels	1										
	Message Box (Numbers)	32										
Ethernet		—										
USB Host		2	1					2	1			2
USB Function		2	1					2	1			2
CRC Calculation Circuit		1 ($X^8 + X^2 + X + 1$, $X^{16} + X^{15} + X^2 + 1$, $X^{16} + X^{12} + X^5 + 1$)										
I/O Ports	Input Only (Numbers)	2										
	CMOS I/O (Numbers)	126	58	103	72	103	72	126	58	103	72	126
	High Voltage Port (Numbers)	11 (input)	6 (input)	11 (input)	7 (input)	11 (input)	7 (input)	11 (input)	6 (input)	11 (input)	7 (input)	11 (input)
	N-Channel Open Drain Port (Numbers)	35	23	33	27	33	27	35	23	33	27	35
	High Current Drive Port	—										
	Pull-Up Resistor	56	28	44	40	44	40	56	28	44	40	56
External Interrupts Pins		17										
Debugging Function	Boundary Scan/JTAG	Yes/Yes			—/Yes	Yes/Yes	—/Yes	Yes/Yes			—/Yes	Yes/Yes
	On-Chip Debug	Yes										
	On-Board Flash Program	Yes										
Other Functions	Others	—										
Operating Frequency/Supply Voltage		100MHz/2.7 to 3.6V										
Operating Ambient Temperature (˚C)		–40 to 85										
Package*2		PLBG0176GA-A	PTLG0085JA-A	PTLG0145JB-A	PLQP0144KA-A	PLQP0100KB-A	PTLG0145JB-A	PLQP0144KA-A	PLQP0100KB-A	PLBG0176GA-A	PTLG0085JA-A	PTLG0145JB-A	PLQP0144KA-A	PLQP0100KB-A	PLBG0176GA-A
Part No.		R5F56216BDBG	R5F56216BDLD	R5F56216BDLE	R5F56216BDFB	R5F56216BDFP	R5F56217BDLE	R5F56217BDFB	R5F56217BDFP	R5F56217BDBG	R5F56217BDLD	R5F56218BDLD	R5F56218BDLE	R5F56218BDFB	R5F56218BDFP	R5F56218BDBG

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (RX600 Series)

Group		RX62N															
Memory	ROM (Bytes)	384K + 32K						512K + 32K									
	RAM (Bytes)	64K						96K									
	ROM Type*1	F															
	Data Flash/E2 Data Flash	32K (Data flash)															
	Program Security	Yes (ID code protection, ROM code protection)															
CPU	CPU	RX CPU Core															
	Basic Instructions	90															
	Minimum Instruction Execution Time (ns)	10 (@100MHz)															
	Dhrystone Performance	165MIPS															
	Multiplier	32 × 32 → 64															
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32 32 × 32 + 80 → 80															
	Barrel Shifter	Yes															
	FPU	Yes															
DMA	DMAC (Channels)	4															
	EXDMAC	2				—		2				—		2			
	DTC/DMAC Ⅱ	DTC															
External Bus Expansion	Address Space (Bytes)	4G															
	Bus State Controller	SRAM/ROM/Burst ROM/Byte control SRAM/SDRAM				SRAM/ROM/ Burst ROM/Byte control SRAM		SRAM/ROM/Burst ROM/Byte control SRAM/SDRAM				SRAM/ROM/ Burst ROM/Byte control SRAM		SRAM/ROM/ Burst ROM/Byte control SRAM/ SDRAM			
	Bus Structure	Separate bus, selectable data bus width (8/16-bit)						Separate bus, selectable data bus width (8/16/32-bit)		Separate bus, selectable data bus width (8/16-bit)				Separate bus, selectable data bus width (8/16/32-bit)			
	SDRAM Controller	Yes				—		Yes				—		Yes			
	Endian Conversion	Yes (data)															
Clock	Clock Generation Circuit	3 circuits (Main clock, sub clock, low speed on-chip oscillator)															
	PLL	Yes															
	Subclock	Yes (32.768kHz)															
	RTC	Yes															
	On-Chip Oscillator	Yes (Low speed : 125kHz)															
	Oscillation Stop Detection	Yes															
	Frequency Divider	1/n (n = 1, 2, 4, 8)															
	Power Save	Sleep/Full module clock stop/software standby/deep software standby															
Power Supply Voltage Detection	Power-On Reset/POR	Yes															
	Low Voltage Detection/LVD	Yes (Low voltage detection)															
A/D Converter	Resolution × Channels	12-bit × 8 or 10-bit × 8															
	Sample and Hold	Yes															
	Multi-Channel Sample and Hold	Yes															
D/A Converter	Resolution × Channels	10-bit × 2				10-bit × 1		10-bit × 2				10-bit × 1		10-bit × 2			
Timer	8-bit	4 (TMR)															
	16-bit	12 (MTU2), 4 (CMT)															
	32-bit	—															
	Input Capture	38 (MTU2)															
	Output Compare	4 (TMR), 32 (MTU2)															
	PWM Output	4 (TMR), 32 (MTU2)															
	Programmable Pulse Generator	32															
	Event Counter	Yes															
	2-Phase Encoder Input	Yes															
	3-Phase Inverter Control	Yes															
Watchdog Timer		2															
Serial Interface	Clock Sync./Clock Async.	6 (SCI)															
	Clock Sync. Only	2 (RSPI)															
	Clock Async. Only	—															
I²C-bus		2				1		2				1		2			
Smart Card/SIM		6 (SCI)															
Synchronous Serial Communication Unit/Special Serial I/O		2 (RSPI)															
CAN	Channels	1	—	1	—	1	—	1	—	1	—	1	—	1	—	1	—
	Message Box (Numbers)	32	—	32	—	32	—	32	—	32	—	32	—	32	—	32	—
Ethernet		1ch															
USB Host		1						2		1				2			
USB Function		1						2		1				2			
CRC Calculation Circuit		1 ($X^8 + X^2 + X + 1$, $X^{16} + X^{15} + X^2 + 1$, $X^{16} + X^{12} + X^5 + 1$)															
I/O Ports	Input Only (Numbers)	2															
	CMOS I/O (Numbers)	103				72		126		103				72		126	
	High Voltage Port (Numbers)	11 (input)				7 (input)		11 (input)						7 (input)		11 (input)	
	N-Channel Open Drain Port (Numbers)	33				27		35		33				27		35	
	High Current Drive Port	—															
	Pull-Up Resistor	44				40		56		44				40		56	
External Interrupts Pins		17															
Debugging Function	Boundary Scan/JTAG	Yes/Yes				—/Yes		Yes/Yes				—/Yes		Yes/Yes			
	On-Chip Debug	Yes															
	On-Board Flash Program	Yes															
Other Functions	Others	—															
Operating Frequency/Supply Voltage		100MHz/2.7 to 3.6V															
Operating Ambient Temperature (˚C)		–40 to 85															
Package*2		PTLG0145JB-A		PLQP0144KA-A		PLQP0100KB-A		PLBG0176GA-A		PTLG0145JB-A		PLQP0144KA-A		PLQP0100KB-A		PLBG0176GA-A	
Part No.		R5F562N7BDLE	R5F562N7ADLE	R5F562N7BDFB	R5F562N7ADFB	R5F562N7BDFP	R5F562N7ADFP	R5F562N7BDBG	R5F562N7ADBG	R5F562N8BDLE	R5F562N8ADLE	R5F562N8BDFB	R5F562N8ADFB	R5F562N8BDFP	R5F562N8ADFP	R5F562N8BDBG	R5F562N8ADBG

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (RX600 Series)

Group		RX62T																			
Memory	ROM (Bytes)	64K + 8K								128K + 8K											
	RAM (Bytes)	8K																			
	ROM Type*1	F																			
	Data Flash/E2 Data Flash	8K (Data flash)																			
	Program Security	Yes (ID code protection, ROM code protection)																			
CPU	CPU	RX CPU Core																			
	Basic Instructions	90																			
	Minimum Instruction Execution Time (ns)	10 (@100MHz)																			
	Dhrystone Performance	165MIPS																			
	Multiplier	32 × 32 → 64																			
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32 32 × 32 + 80 → 80																			
	Barrel Shifter	Yes																			
	FPU	Yes																			
DMA	DMAC (Channels)	—																			
	EXDMAC	—																			
	DTC/DMAC Ⅱ	DTC																			
External Bus Expansion	Address Space (Bytes)	4G																			
	Bus State Controller	—																			
	Bus Structure	—																			
	SDRAM Controller	—																			
	Endian Conversion	Yes (data)																			
Clock	Clock Generation Circuit	2 circuits (Main clock, low speed on-chip oscillator)																			
	PLL	Yes																			
	Subclock	—																			
	RTC	—																			
	On-Chip Oscillator	Yes (Low speed : 125kHz)																			
	Oscillation Stop Detection	Yes																			
	Frequency Divider	1/n (n = 1, 2, 4, 8)																			
	Power Save	Sleep/Full module clock stop/software standby/deep software standby																			
Power Supply Voltage Detection	Power-On Reset/POR	Yes																			
	Low Voltage Detection/LVD	Yes (Low voltage detection)																			
A/D Converter	Resolution × Channels	12-bit × 4 × 2 units				12-bit × 4 × 2 units and 10-bit × 4				12-bit × 4 × 2 units				12-bit × 4 × 2 units and 10-bit × 4				12-bit × 4 × 2 units and 10-bit × 12			
	Sample and Hold	Yes																			
	Multi-Channel Sample and Hold	Yes (6ch)				Yes (7ch)				Yes (6ch)				Yes (7ch)							
D/A Converter	Resolution × Channels	—																			
Timer	8-bit	—																			
	16-bit	8 (MTU3) 4 (GPT) 4 (CMT)																			
	32-bit	—																			
	Input Capture	20 (MTU3) 6 (GPT)				21 (MTU3) 6 (GPT)				20 (MTU3) 6 (GPT)				21 (MTU3) 6 (GPT)				27 (MTU3) 8 (GPT)			
	Output Compare	20 (MTU3) 6 (GPT)				21 (MTU3) 6 (GPT)				20 (MTU3) 6 (GPT)				21 (MTU3) 6 (GPT)				24 (MTU3) 8 (GPT)			
	PWM Output	14 (MTU3) 6 (GPT)				15 (MTU3) 6 (GPT)				14 (MTU3) 6 (GPT)				15 (MTU3) 6 (GPT)				16 (MTU3) 5 (POE3) 8 (GPT)			
	Programmable Pulse Generator	—																			
	Event Counter	2(MTU3)																			
	2-Phase Encoder Input	2(MTU3)																			
	3-Phase Inverter Control	1 (MTU3 or GPT)								1 (MTU3 or GPT)				1 (MTU3 orGPT)				3 (MTU3, GPT)			
Watchdog Timer		2																			
Serial Interface	Clock Sync./Clock Async.	3 (SCI)																			
	Clock Sync. Only	1 (RSPI)																			
	Clock Async. Only	—																			
I²C-bus		1																			
Smart Card/SIM		3(SCI)																			
Synchronous Serial Communication Unit/Special Serial I/O		1(RSPI)																			
CAN	Channels	1	—			1	—			1	—			1	—			1	—		
	Message Box (Numbers)	32	—			32	—			32	—			32	—			32	—		
Ethernet		—																			
USB Host		—																			
USB Function		—																			
CRC Calculation Circuit		1 ($X^8 + X^2 + X + 1$, $X^{16} + X^{15} + X^2 + 1$, $X^{16} + X^{12} + X^5 + 1$)																			
I/O Ports	Input Only (Numbers)	9				13				9				13				21			
	CMOS I/O (Numbers)	37				44				37				44				55			
	High Voltage Port (Numbers)	—																			
	N-Channel Open Drain Port (Numbers)	2																			
	High Current Drive Port	0	6	0	6					0	6	0	6					12			
	Pull-Up Resistor	—																			
External Interrupts Pins		5 (NMIx1 + INTx4)				9 (NMIx1 + INTx8)				5 (NMIx1 + INTx4)				9 (NMIx1 + INTx8)							
Debugging Function	Boundary Scan/JTAG	—/Yes																			
	On-Chip Debug	Yes																			
	On-Board Flash Program	Yes																			
Other Functions	Others	Programmable gain amplifier comparator																			
Operating Frequency/Supply Voltage		100MHz/ 4.0 to 5.5V	100MHz/2.7 to 3.6V (AVcc 3.0 to 3.6V or 4.0 to 5.5V)	100MHz/ 4.0 to 5.5V	100MHz/2.7 to 3.6V (AVcc 3.0 to 3.6V or 4.0 to 5.5V)	100MHz/ 4.0 to 5.5V	100MHz/2.7 to 3.6V (AVcc 3.0 to 3.6V or 4.0 to 5.5V)	100MHz/ 4.0 to 5.5V	100MHz/2.7 to 3.6V (AVcc 3.0 to 3.6V or 4.0 to 5.5V)	100MHz/ 4.0 to 5.5V	100MHz/2.7 to 3.6V (AVcc 3.0 to 3.6V or 4.0 to 5.5V)	100MHz/ 4.0 to 5.5V	100MHz/2.7 to 3.6V (AVcc 3.0 to 3.6V or 4.0 to 5.5V)	100MHz/ 4.0 to 5.5V	100MHz/2.7 to 3.6V (AVcc 3.0 to 3.6V or 4.0 to 5.5V)	100MHz/ 4.0 to 5.5V	100MHz/2.7 to 3.6V (AVcc 3.0 to 3.6V or 4.0 to 5.5V)	100MHz/ 4.0 to 5.5V	100MHz/2.7 to 3.6V (AVcc 3.0 to 3.6V or 4.0 to 5.5V)	100MHz/ 4.0 to 5.5V	100MHz/2.7 to 3.6V (AVcc 3.0 to 3.6V or 4.0 to 5.5V)
Operating Ambient Temperature (°C)		–40 to 85																			
Package*2		PLQP0064KB-A				PLQP0080JA-A				PLQP0064KB-A				PLQP0080JA-A				PLQP0100KB-A			
Part No.		R5F562T6ADFM	R5F562T6BDFM	R5F562T6DDFM	R5F562T6EDFM	R5F562T6ADFF	R5F562T6BDFF	R5F562T6DDFF	R5F562T6EDFF	R5F562T7ADFM	R5F562T7BDFM	R5F562T7DDFM	R5F562T7EDFM	R5F562T7ADFF	R5F562T7BDFF	R5F562T7DDFF	R5F562T7EDFF	R5F562T7ADFP	R5F562T7BDFP	R5F562T7DDFP	R5F562T7EDFP

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (RX600 Series)

Group		RX62T																			
Memory	ROM (Bytes)	128K + 8K				256K + 32K															
	RAM (Bytes)	8K				16K															
	ROM Type*1	F																			
	Data Flash/E2 Data Flash	8K (Data flash)				32K (Data flash)															
	Program Security	Yes (ID code protection, ROM code protection)																			
CPU	CPU	RX CPU Core																			
	Basic Instructions	90																			
	Minimum Instruction Execution Time (ns)	10 (@100MHz)																			
	Dhrystone Performance	165MIPS																			
	Multiplier	32 × 32 → 64																			
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32 32 × 32 + 80 → 80																			
	Barrel Shifter	Yes																			
	FPU	Yes																			
DMA	DMAC (Channels)	—																			
	EXDMAC	—																			
	DTC/DMAC Ⅱ	DTC																			
External Bus Expansion	Address Space (Bytes)	4G																			
	Bus State Controller	—																			
	Bus Structure	—																			
	SDRAM Controller	—																			
	Endian Conversion	Yes (data)																			
Clock	Clock Generation Circuit	2 circuits (Main clock, low speed on-chip oscillator)																			
	PLL	Yes																			
	Subclock	—																			
	RTC	—																			
	On-Chip Oscillator	Yes (Low speed : 125kHz)																			
	Oscillation Stop Detection	Yes																			
	Frequency Divider	1/n (n = 1, 2, 4, 8)																			
	Power Save	Sleep/Full module clock stop/software standby/deep software standby																			
Power Supply Voltage Detection	Power-On Reset/POR	Yes																			
	Low Voltage Detection/LVD	Yes (Low voltage detection)																			
A/D Converter	Resolution × Channels	12-bit × 4 × 2 units and 10-bit × 12				12-bit × 4 × 2 units				12-bit × 4 × 2 units and 10-bit × 4				12-bit × 4 × 2 units and 10-bit × 12							
	Sample and Hold	Yes																			
	Multi-Channel Sample and Hold	Yes (7ch)				Yes (6ch)				Yes (7ch)											
D/A Converter	Resolution × Channels	—																			
Timer	8-bit	—																			
	16-bit	8 (MTU3) 4 (GPT) 4 (CMT)																			
	32-bit	—																			
	Input Capture	27 (MTU3) 8 (GPT)				20 (MTU3) 6 (GPT)				21 (MTU3) 6 (GPT)				27 (MTU3) 8 (GPT)							
	Output Compare	24 (MTU3) 8 (GPT)				20 (MTU3) 6 (GPT)				21 (MTU3) 6 (GPT)				24 (MTU3) 8 (GPT)							
	PWM Output	16 (MTU3) 5 (POE3) 8 (GPT)				14 (MTU3) 6 (GPT)				15 (MTU3) 6 (GPT)				16 (MTU3) 5 (POE3) 8 (GPT)							
	Programmable Pulse Generator	—																			
	Event Counter	2 (MTU3)																			
	2-Phase Encoder Input	2 (MTU3)																			
	3-Phase Inverter Control	3 (MTU3, GPT)				1 (MTU3 or GPT)								3 (MTU3, GPT)							
Watchdog Timer		2																			
Serial Interface	Clock Sync./Clock Async.	3 (SCI)																			
	Clock Sync. Only	1 (RSPI)																			
	Clock Async. Only	—																			
I²C-bus		1																			
Smart Card/SIM		3 (SCI)																			
Synchronous Serial Communication Unit/Special Serial I/O		1 (RSPI)																			
CAN	Channels	1	—			1	—			1	—			1	—			1	—		
	Message Box (Numbers)	32	—			32	—			32	—			32	—			32	—		
Ethernet		—																			
USB Host		—																			
USB Function		—																			
CRC Calculation Circuit		1 ($X^8 + X^2 + X + 1$, $X^{16} + X^{15} + X^2 + 1$, $X^{16} + X^{12} + X^5 + 1$)																			
I/O Ports	Input Only (Numbers)	21				9				13				21							
	CMOS I/O (Numbers)	61				37				44				55				61			
	High Voltage Port (Numbers)	—																			
	N-Channel Open Drain Port (Numbers)	2																			
	High Current Drive Port	12				0	6	0		6				12							
	Pull-Up Resistor	—																			
External Interrupts Pins		9 (NMIx1 + INTx8)				5 (NMIx1 + INTx4)				9 (NMIx1 + INTx8)											
Debugging Function	Boundary Scan/JTAG	—/Yes																			
	On-Chip Debug	Yes																			
	On-Board Flash Program	Yes																			
Other Functions	Others	Programmable gain amplifier comparator																			
Operating Frequency/Supply Voltage		100MHz/ 4.0 to 5.5V	100MHz/2.7 to 3.6V (AVcc 3.0 to 3.6V or 4.0 to 5.5V)	100MHz/ 4.0 to 5.5V	100MHz/2.7 to 3.6V (AVcc 3.0 to 3.6V or 4.0 to 5.5V)	100MHz/ 4.0 to 5.5V	100MHz/2.7 to 3.6V (AVcc 3.0 to 3.6V or 4.0 to 5.5V)	100MHz/ 4.0 to 5.5V	100MHz/2.7 to 3.6V (AVcc 3.0 to 3.6V or 4.0 to 5.5V)	100MHz/ 4.0 to 5.5V	100MHz/2.7 to 3.6V (AVcc 3.0 to 3.6V or 4.0 to 5.5V)	100MHz/ 4.0 to 5.5V	100MHz/2.7 to 3.6V (AVcc 3.0 to 3.6V or 4.0 to 5.5V)	100MHz/ 4.0 to 5.5V	100MHz/2.7 to 3.6V (AVcc 3.0 to 3.6V or 4.0 to 5.5V)	100MHz/ 4.0 to 5.5V	100MHz/2.7 to 3.6V (AVcc 3.0 to 3.6V or 4.0 to 5.5V)	100MHz/ 4.0 to 5.5V	100MHz/2.7 to 3.6V (AVcc 3.0 to 3.6V or 4.0 to 5.5V)	100MHz/ 4.0 to 5.5V	100MHz/2.7 to 3.6V (AVcc 3.0 to 3.6V or 4.0 to 5.5V)
Operating Ambient Temperature (˚C)		–40 to 85																			
Package*2		PLQP0112JA-A				PLQP0064KB-A				PLQP0080JA-A				PLQP0100KB-A				PLQP0112JA-A			
Part No.		R5F562T7ADFH	R5F562T7BDFH	R5F562T7DDFH	R5F562T7EDFH	R5F562TAADFM	R5F562TABDFM	R5F562TADDFM	R5F562TAEDFM	R5F562TAADFF	R5F562TABDFF	R5F562TADDFF	R5F562TAEDFF	R5F562TAADFP	R5F562TABDFP	R5F562TADDFP	R5F562TAEDFP	R5F562TAADFH	R5F562TABDFH	R5F562TADDFH	R5F562TAEDFH

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (RX600 Series)

Group		RX630																	
Memory	ROM (Bytes)	384K + 32K				512K + 32K				768K + 32K									
	RAM (Bytes)	64K								96K									
	ROM Type*1	F																	
	Data Flash/E2 Data Flash	32K (E2 Data flash)																	
	Program Security	Yes (ID code protection, ROM code protection)																	
CPU	CPU	RX CPU Core																	
	Basic Instructions	90																	
	Minimum Instruction Execution Time (ns)	10 (@100MHz)																	
	Dhrystone Performance	165MIPS																	
	Multiplier	32 × 32 → 64																	
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32 32 × 32 + 80 → 80																	
	Barrel Shifter	Yes																	
	FPU	Yes																	
DMA	DMAC (Channels)	4																	
	EXDMAC	—																	
	DTC/DMAC Ⅱ	DTC																	
External Bus Expansion	Address Space (Bytes)	4G																	
	Bus State Controller	SRAM/ROM/ Byte control SRAM/ Page access supported		—		SRAM/ROM/ Byte control SRAM/ Page access supported		—		SRAM/ROM/Byte control SRAM/Page access supported									
	Bus Structure	Separate bus (8/16-bit), selectable multiplex bus width(8/16-bit)		—		Separate bus (8/16-bit), selectable multiplex bus width(8/16-bit)		—		Separate bus (8/16/32-bit), selectable multiplex bus width(8/16-bit)		Separate bus(8/16-bit), selectable multiplex bus width(8/16-bit)							
	SDRAM Controller	—																	
	Endian Conversion	Yes (data)																	
Clock	Clock Generation Circuit	4 circuits (Main clock, sub clock, low speed on-chip oscillator, high speed on-chip ocsillator)																	
	PLL	Yes																	
	Subclock	Yes																	
	RTC	Yes																	
	On-Chip Oscillator	Yes																	
	Oscillation Stop Detection	Yes																	
	Frequency Divider	1/n (n = 1, 2, 4)																	
	Power Save	Sleep/Full module clock stop/software standby/deep software standby																	
Power Supply Voltage Detection	Power-On Reset/POR	Yes																	
	Low Voltage Detection/LVD	Yes (Low voltage detection)																	
A/D Converter	Resolution × Channels	12-bit × 14 or 10-bit × 8		12-bit × 11 or 10-bit × 4		12-bit × 14 or 10-bit × 8		12-bit × 11 or 10-bit × 4		12-bit × 21 or 10-bit × 8						12-bit × 14 or 10-bit × 8			
	Sample and Hold	Yes																	
	Multi-Channel Sample and Hold	—																	
D/A Converter	Resolution × Channels	10-bit × 1								10-bit × 2						10-bit × 1			
Timer	8-bit	4(TMR)																	
	16-bit	6 (TPU), 6 (MTU2), 4 (CMT)								12 (TPU), 6 (MTU2), 4 (CMT)						6 (TPU), 6 (MTU2), 4 (CMT)			
	32-bit	—																	
	Input Capture	16 (TPU), 19 (MTU2)								32 (TPU), 19 (MTU2)						16 (TPU), 19 (MTU2)			
	Output Compare	16 (TPU), 16 (MTU2)								32 (TPU), 16 (MTU2)						16 (TPU), 16 (MTU2)			
	PWM Output	4 (TMR), 16 (MTU2)																	
	Programmable Pulse Generator	32 (PPG)																	
	Event Counter	20 (TPU, MTU2, TMR, CMT)								26 (TPU, MTU2, TMR, CMT)						20 (TPU, MTU2, TMR, CMT)			
	2-Phase Encoder Input	6 (TPU), 6 (MTU2)								12 (TPU), 6 (MTU2)						6 (TPU), 6 (MTU2)			
	3-Phase Inverter Control	6 (MTU2)																	
Watchdog Timer		2																	
Serial Interface	Clock Sync./Clock Async.	9 (SCI)								13 (SCI)						9 (SCI)			
	Clock Sync. Only	2 (RSPI)								3 (RSPI)						2 (RSPI)			
	Clock Async. Only	—																	
I²C-bus		2								4						2			
Smart Card/SIM		9								13						9			
Synchronous Serial Communication Unit/Special Serial I/O		2								3						2			
CAN	Channels	1	—	1	—	1	—	1	—	2	—	2	—			1	—		
	Message Box (Numbers)	32	—	32	—	32	—	32	—	32	—	32	—			32	—		
Ethernet		—																	
USB Host		—																	
USB Function		Yes																	
CRC Calculation Circuit		1 ($X^8 + X^2 + X + 1$, $X^{16} + X^{15} + X^2 + 1$, $X^{16} + X^{12} + X^5 + 1$)																	
I/O Ports	Input Only (Numbers)	2																	
	CMOS I/O (Numbers)	78		58		78		58		148		117				78			
	High Voltage Port (Numbers)	—																	
	N-Channel Open Drain Port (Numbers)	78		58		78		58		148		117				78			
	High Current Drive Port	—																	
	Pull-Up Resistor	78		58		78		58		148		117				78			
External Interrupts Pins		16																	
Debugging Function	Boundary Scan/JTAG	—																	
	On-Chip Debug	Yes																	
	On-Board Flash Program	Yes																	
Other Functions	Others	—																	
Operating Frequency/Supply Voltage		100MHz/2.7 to 3.6V																	
Operating Ambient Temperature (˚C)		–40 to 85																	
Package*2		PLQP0100KB-A		PLQP0080KB-A		PLQP0100KB-A		PLQP0080KB-A		PLQP0176KB-A		PLQP0144KA-A				PLQP0100KB-A			
Part No.		R5F56307DDFP**	R5F56307CDFP**	R5F56307DDFN**	R5F56307CDFN**	R5F56308DDFP**	R5F56308CDFP**	R5F56308DDFN**	R5F56308CDFN**	R5F5630ADDFC**	R5F5630ACDFC**	R5F5630ADDFB*	R5F5630ACDFB**			R5F5630ADDFP**	R5F5630ACDFP**		

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (RX600 Series)

Group		RX630																	
Memory	ROM (Bytes)	1M + 32K				1.5M + 32K				2M + 32K									
	RAM (Bytes)	96K				128K													
	ROM Type*1	F																	
	Data Flash/E2 Data Flash	32K (E2 Data flash)																	
	Program Security	Yes (ID code protection, ROM code protection)																	
CPU	CPU	RX CPU Core																	
	Basic Instructions	90																	
	Minimum Instruction Execution Time (ns)	10 (@100MHz)																	
	Dhrystone Performance	165MIPS																	
	Multiplier	32 × 32 → 64																	
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32 32 × 32 + 80 → 80																	
	Barrel Shifter	Yes																	
	FPU	Yes																	
DMA	DMAC (Channels)	4																	
	EXDMAC	—																	
	DTC/DMAC II	DTC																	
External Bus Expansion	Address Space (Bytes)	4G																	
	Bus State Controller	SRAM/ROM/Byte control SRAM/Page access supported																	
	Bus Structure	Separate bus (8/16/32-bit), selectable multiplex bus width (8/16-bit)		Separate bus (8/16-bit), selectable multiplex bus width (8/16-bit)		Separate bus (8/16/32-bit), selectable multiplex bus width (8/16-bit)		Separate bus (8/16-bit), selectable multiplex bus width (8/16-bit)		Separate bus (8/16/32-bit), selectable multiplex bus width (8/16-bit)		Separate bus (8/16-bit), selectable multiplex bus width (8/16-bit)							
	SDRAM Controller	—																	
	Endian Conversion	Yes (data)																	
Clock	Clock Generation Circuit	4 circuits (Main clock, sub clock, low speed on-chip oscillator, high speed on-chip ocsillator)																	
	PLL	Yes																	
	Subclock	Yes																	
	RTC	Yes																	
	On-Chip Oscillator	Yes																	
	Oscillation Stop Detection	Yes																	
	Frequency Divider	1/n (n = 1, 2, 4)																	
	Power Save	Sleep/Full module clock stop/software standby/deep software standby																	
Power Supply Voltage Detection	Power-On Reset/POR	Yes																	
	Low Voltage Detection/LVD	Yes (Low voltage detection)																	
A/D Converter	Resolution × Channels	12-bit × 21 or 10-bit × 8		12-bit × 14 or 10-bit × 8		12-bit × 21 or 10-bit × 8		12-bit × 14 or 10-bit × 8		12-bit × 21 or 10-bit × 8		12-bit × 14 or 10-bit × 8							
	Sample and Hold	Yes																	
	Multi-Channel Sample and Hold	—																	
D/A Converter	Resolution × Channels	10-bit × 2		10-bit × 1		10-bit × 2		10-bit × 1		10-bit × 2		10-bit × 1							
Timer	8-bit	4(TMR)																	
	16-bit	12 (TPU), 6 (MTU2), 4 (CMT)		6 (TPU), 6 (MTU2), 4 (CMT)		12 (TPU), 6 (MTU2), 4 (CMT)		6 (TPU), 6 (MTU2), 4 (CMT)		12 (TPU), 6 (MTU2), 4 (CMT)		6 (TPU), 6 (MTU2), 4 (CMT)							
	32-bit	—																	
	Input Capture	32 (TPU), 19 (MTU2)		16 (TPU), 19 (MTU2)		32 (TPU), 19 (MTU2)		16 (TPU), 19 (MTU2)		32 (TPU), 19 (MTU2)		16 (TPU), 19 (MTU2)							
	Output Compare	32 (TPU), 16 (MTU2)		16 (TPU), 16 (MTU2)		32 (TPU), 16 (MTU2)		16 (TPU), 16 (MTU2)		32 (TPU), 16 (MTU2)		16 (TPU), 16 (MTU2)							
	PWM Output	4 (TMR), 16 (MTU2)																	
	Programmable Pulse Generator	32 (PPG)																	
	Event Counter	26 (TPU, MTU2, TMR, CMT)		20 (TPU, MTU2, TMR, CMT)		26 (TPU, MTU2, TMR, CMT)		20 (TPU, MTU2, TMR, CMT)		26 (TPU, MTU2, TMR, CMT)		20 (TPU, MTU2, TMR, CMT)							
	2-Phase Encoder Input	12 (TPU), 6 (MTU2)		6 (TPU), 6 (MTU2)		12 (TPU), 6 (MTU2)		6 (TPU), 6 (MTU2)		12 (TPU), 6 (MTU2)		6 (TPU), 6 (MTU2)							
	3-Phase Inverter Control	6(MTU2)																	
Watchdog Timer		2																	
Serial Interface	Clock Sync./Clock Async.	13 (SCI)		9 (SCI)		13 (SCI)		9 (SCI)		13 (SCI)		9 (SCI)							
	Clock Sync. Only	3 (RSPI)		2 (RSPI)		3 (RSPI)		2 (RSPI)		3 (RSPI)		2 (RSPI)							
	Clock Async. Only	—																	
I²C-bus		4		2		4		2		4		2							
Smart Card/SIM		13		9		13		9		13		9							
Synchronous Serial Communication Unit/Special Serial I/O		3		2		3		2		3		2							
CAN	Channels	2	—	2	—	1	—	3	—	3	—	1	—	3	—	3	—	1	—
	Message Box (Numbers)	32	—	32	—	32	—	32	—	32	—	32	—	32	—	32	—	32	—
Ethernet		—																	
USB Host		—																	
USB Function		Yes																	
CRC Calculation Circuit		1 ($X^8 + X^2 + X + 1$, $X^{16} + X^{15} + X^2 + 1$, $X^{16} + X^{12} + X^5 + 1$)																	
I/O Ports	Input Only (Numbers)	2																	
	CMOS I/O (Numbers)	148		117		78		148		117		78		148		117		78	
	High Voltage Port (Numbers)	—																	
	N-Channel Open Drain Port (Numbers)	148		117		78		148		117		78		148		117		78	
	High Current Drive Port	—																	
	Pull-Up Resistor	148		117		78		148		117		78		148		117		78	
External Interrupts Pins		16																	
Debugging Function	Boundary Scan/JTAG	—																	
	On-Chip Debug	Yes																	
	On-Board Flash Program	Yes																	
Other Functions	Others	—																	
Operating Frequency/Supply Voltage		100MHz/2.7 to 3.6V																	
Operating Ambient Temperature (˚C)		–40 to 85																	
Package*2		PLQP0176KB-A		PLQP0144KA-A		PLQP0100KB-A		PLQP0176KB-A		PLQP0144KA-A		PLQP0100KB-A		PLQP0176KB-A		PLQP0144KA-A		PLQP0100KB-A	
Part No.		R5F5630BDDFC**	R5F5630BCDFC**	R5F5630BDDFB**	R5F5630BCDFB**	R5F5630BDDFP**	R5F5630BCDFP**	R5F5630DDDFC**	R5F5630DCDFC**	R5F5630DDDFB**	R5F5630DCDFB**	R5F5630DDDFP**	R5F5630DCDFP**	R5F5630EDDFC**	R5F5630ECDFC**	R5F5630EDDFB**	R5F5630ECDFB**	R5F5630EDDFP**	R5F5630ECDFP**

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (RX600 Series)

Group		RX631											
Memory	ROM (Bytes)	—	384K + 32K					512K + 32K					
	RAM (Bytes)	128K	64K					96K					
	ROM Type*1	L	F										
	Data Flash/E2 Data Flash	—	32K (E2 Data flash)										
	Program Security	Yes (ID code protection, ROM code protection)											
CPU	CPU	RX CPU core											
	Basic Instructions	90											
	Minimum Instruction Execution Time (ns)	10(@100MHz)											
	Dhrystone Performance	165MIPS											
	Multiplier	32 × 32 → 64											
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32 32 × 32 + 80 → 80											
	Barrel Shifter	Yes											
	FPU	Yes											
DMA	DMAC (Channels)	4											
	EXDMAC	2											
	DTC/DMAC Ⅱ	DTC											
External Bus Expansion	Address Space (Bytes)	4G											
	Bus State Controller	SRAM/ROM/Byte control SRAM/ Page access supported/SDRAM											
	Bus Structure	Separate bus (8/16-bit), selectable multiplex bus width (8/16-bit)	Separate bus (8/16/32-bit), selectable multiplex bus width (8/16-bit)		Separate bus (8/16-bit), selectable multiplex bus width (8/16-bit)			Separate bus (8/16/32-bit), selectable multiplex bus width (8/16-bit)		Separate bus (8/16-bit), selectable multiplex bus width (8/16-bit)			
	SDRAM Controller	Yes											
	Endian Conversion	Yes (data)											
Clock	Clock Generation Circuit	4 circuits (Main clock, sub clock, low speed on-chip oscillator, high speed on-chip ocsillator)											
	PLL	Yes											
	Subclock	Yes											
	RTC	Yes											
	On-Chip Oscillator	Yes											
	Oscillation Stop Detection	Yes											
	Frequency Divider	1/n (n = 1, 2, 4)											
	Power Save	Sleep/Full module clock stop/software standby/deep software standby											
Power Supply Voltage Detection	Power-On Reset/POR	Yes											
	Low Voltage Detection/LVD	Yes (Low voltage detection)											
A/D Converter	Resolution × Channels	12-bit × 21 or 10-bit × 8				12-bit × 14 or 10-bit × 8		12-bit × 21 or 10-bit × 8				12-bit × 14 or 10-bit × 8	
	Sample and Hold	Yes											
	Multi-Channel Sample and Hold	—											
D/A Converter	Resolution × Channels	10-bit × 2				10-bit × 1		10-bit × 2				10-bit × 1	
Timer	8-bit	4(TMR)											
	16-bit	12 (TPU), 6 (MTU2), 4 (CMT)				6 (TPU), 6 (MTU2), 4 (CMT)		12 (TPU), 6 (MTU2), 4 (CMT)				6 (TPU), 6 (MTU2), 4 (CMT)	
	32-bit	—											
	Input Capture	32 (TPU), 19 (MTU2)				16 (TPU), 19 (MTU2)		32 (TPU), 19 (MTU2)				16 (TPU), 19 (MTU2)	
	Output Compare	32 (TPU), 16 (MTU2)				16 (TPU), 16 (MTU2)		32 (TPU), 16 (MTU2)				16 (TPU), 16 (MTU2)	
	PWM Output	4(TMR), 16(MTU2)											
	Programmable Pulse Generator	32 (PPG)											
	Event Counter	26 (TPU, MTU2, TMR, CMT)				20 (TPU, MTU2, TMR, CMT)		26 (TPU, MTU2, TMR, CMT)				20 (TPU, MTU2, TMR, CMT)	
	2-Phase Encoder Input	12 (TPU), 6 (MTU2)				6 (TPU), 6 (MTU2)		12 (TPU), 6 (MTU2)				6 (TPU), 6 (MTU2)	
	3-Phase Inverter Control	6 (MTU2)											
Watchdog Timer		2											
Serial Interface	Clock Sync./Clock Async.	13 (SCI)				9 (SCI)		13 (SCI)				9 (SCI)	
	Clock Sync. Only	3 (RSPI)				2 (RSPI)		3 (RSPI)				2 (RSPI)	
	Clock Async. Only	—											
I²C-bus		4				2		4				2	
Smart Card/SIM		13				9		13				9	
Synchronous Serial Communication Unit/Special Serial I/O		3				2		3				2	
CAN	Channels	2	—	2	—	2	—	2	—	2	—	2	—
	Message Box (Numbers)	32	—	32	—	32	—	32	—	32	—	32	—
Ethernet		—											
USB Host		Yes											
USB Function		Yes											
CRC Calculation Circuit		1 ($X^8 + X^2 + X + 1$, $X^{16} + X^{15} + X^2 + 1$, $X^{16} + X^{12} + X^5 + 1$)											
I/O Ports	Input Only (Numbers)	2											
	CMOS I/O (Numbers)	133		111		78		133		111		78	
	High Voltage Port (Numbers)	—											
	N-Channel Open Drain Port (Numbers)	133		111		78		133		111		78	
	High Current Drive Port	—											
	Pull-Up Resistor	133		111		78		133		111		78	
External Interrupts Pins		16											
Debugging Function	Boundary Scan/JTAG	—											
	On-Chip Debug	Yes											
	On-Board Flash Program	Yes											
Other Functions	Others	—											
Operating Frequency/Supply Voltage		100MHz/2.7 to 3.6V											
Operating Ambient Temperature (˚C)		–40 to 85											
Package*2		PLBG0176GA-A	PLQP0176KB-A		PLQP0144KA-A		PLQP0100KB-A		PLQP0176KB-A		PLQP0144KA-A		PLQP0100KB-A	
Part No.		R5F56310DDFC**	R5F56317DDBG**	R5F56317CDBG**	R5F56317DDFB**	R5F56317CDFB**	R5F56317DDLA**	R5F56317CDLA**	R5F56318DDBG**	R5F56318CDBG**	R5F56318DDFB**	R5F56318CDFB**	R5F56318DDLA**	R5F56318CDLA**

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (RX600 Series)

Group		RX631											
Memory	ROM (Bytes)	768K + 32K						1M + 32K					
	RAM (Bytes)	128K											
	ROM Type*1	F											
	Data Flash/E2 Data Flash	32K (E2 Data flash)											
	Program Security	Yes (ID code protection, ROM code protection)											
CPU	CPU	RX CPU Core											
	Basic Instructions	90											
	Minimum Instruction Execution Time (ns)	10 (@100MHz)											
	Dhrystone Performance	165MIPS											
	Multiplier	32 × 32 → 64											
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32 32 × 32 + 80 → 80											
	Barrel Shifter	Yes											
	FPU	Yes											
DMA	DMAC (Channels)	4											
	EXDMAC	2											
	DTC/DMAC Ⅱ	DTC											
External Bus Expansion	Address Space (Bytes)	4G											
	Bus State Controller	SRAM/ROM/Byte control SRAM/Page access supported/SDRAM											
	Bus Structure	Separate bus (8/16/32-bit), selectable multiplex bus width (8/16-bit)		Separate bus (8/16-bit), selectable multiplex bus width (8/16-bit)				Separate bus (8/16/32-bit), selectable multiplex bus width (8/16-bit)		Separate bus (8/16-bit), selectable multiplex bus width (8/16-bit)			
	SDRAM Controller	Yes											
	Endian Conversion	Yes (data)											
Clock	Clock Generation Circuit	4 circuits (Main clock, sub clock, low speed on-chip oscillator, high speed on-chip ocsillator)											
	PLL	Yes											
	Subclock	Yes											
	RTC	Yes											
	On-Chip Oscillator	Yes											
	Oscillation Stop Detection	Yes											
	Frequency Divider	1/n (n = 1, 2, 4)											
	Power Save	Sleep/Full module clock stop/software standby/deep software standby											
Power Supply Voltage Detection	Power-On Reset/POR	Yes											
	Low Voltage Detection/LVD	Yes (Low voltage detection)											
A/D Converter	Resolution × Channels	12-bit × 21 or 10-bit × 8				12-bit × 14 or 10-bit × 8		12-bit × 21 or 10-bit × 8				12-bit × 14 or 10-bit × 8	
	Sample and Hold	Yes											
	Multi-Channel Sample and Hold	—											
D/A Converter	Resolution × Channels	10-bit × 2				10-bit × 1		10-bit × 2				10-bit × 1	
Timer	8-bit	4 (TMR)											
	16-bit	12 (TPU), 6 (MTU2), 4 (CMT)				6 (TPU), 6 (MTU2), 4 (CMT)		12 (TPU), 6 (MTU2), 4 (CMT)				6 (TPU), 6 (MTU2), 4 (CMT)	
	32-bit	—											
	Input Capture	32 (TPU), 19 (MTU2)				16 (TPU), 19 (MTU2)		32 (TPU), 19 (MTU2)				16 (TPU), 19 (MTU2)	
	Output Compare	32 (TPU), 16 (MTU2)				16 (TPU), 16 (MTU2)		32 (TPU), 16 (MTU2)				16 (TPU), 16 (MTU2)	
	PWM Output	4(TMR), 16(MTU2)											
	Programmable Pulse Generator	32(PPG)											
	Event Counter	26 (TPU, MTU2, TMR, CMT)				20 (TPU, MTU2, TMR, CMT)		26 (TPU, MTU2, TMR, CMT)				20 (TPU, MTU2, TMR, CMT)	
	2-Phase Encoder Input	12 (TPU), 6 (MTU2)				6 (TPU), 6 (MTU2)		12 (TPU), 6 (MTU2)				6 (TPU), 6 (MTU2)	
	3-Phase Inverter Control	6 (MTU2)											
Watchdog Timer		2											
Serial Interface	Clock Sync./Clock Async.	13 (SCI)				9 (SCI)		13 (SCI)				9 (SCI)	
	Clock Sync. Only	3 (RSPI)				2 (RSPI)		3 (RSPI)				2 (RSPI)	
	Clock Async. Only	—											
I²C-bus		4				2		4				2	
Smart Card/SIM		13				9		13				9	
Synchronous Serial Communication Unit/Special Serial I/O		3				2		3				2	
CAN	Channels	2	—	2	—	2	—	2	—	2	—	2	—
	Message Box (Numbers)	32	—	32	—	32	—	32	—	32	—	32	—
Ethernet		—											
USB Host		Yes											
USB Function		Yes											
CRC Calculation Circuit		1 ($X^8 + X^2 + X + 1$, $X^{16} + X^{15} + X^2 + 1$, $X^{16} + X^{12} + X^5 + 1$)											
I/O Ports	Input Only (Numbers)	2											
	CMOS I/O (Numbers)	133		111		78		133		111		78	
	High Voltage Port (Numbers)	—											
	N-Channel Open Drain Port (Numbers)	133		111		78		133		111		78	
	High Current Drive Port	—											
	Pull-Up Resistor	133		111		78		133		111		78	
External Interrupts Pins		16											
Debugging Function	Boundary Scan/JTAG	—											
	On-Chip Debug	Yes											
	On-Board Flash Program	Yes											
Other Functions	Others	—											
Operating Frequency/Supply Voltage		100MHz/2.7 to 3.6V											
Operating Ambient Temperature (˚C)		–40 to 85											
Package*2		PLQP0176KB-A		PLQP0144KA-A		PLQP0100KB-A		PLQP0176KB-A		PLQP0144KA-A		PLQP0100KB-A	
Part No.		R5F5631ADDBG**	R5F5631ACDBG**	R5F5631ADDFB**	R5F5631ACDFB**	R5F5631ADDLA**	R5F5631ACDLA**	R5F5631BDDBG**	R5F5631BCDBG**	R5F5631BDDFB**	R5F5631BCDFB**	R5F5631BDDLA**	R5F5631BCDLA**

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (RX600 Series)

Group		RX63N											
Memory	ROM (Bytes)	384K + 32K						512K + 32K					
	RAM (Bytes)	64K						96K					
	ROM Type*1	F											
	Data Flash/E2 Data Flash	32K (E2 Data flash)											
	Program Security	Yes (ID code protection, ROM code protection)											
CPU	CPU	RX CPU Core											
	Basic Instructions	90											
	Minimum Instruction Execution Time (ns)	10 (@100MHz)											
	Dhrystone Performance	165MIPS											
	Multiplier	32 × 32 → 64											
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32 32 × 32 + 80 → 80											
	Barrel Shifter	Yes											
	FPU	Yes											
DMA	DMAC (Channels)	4											
	EXDMAC	2											
	DTC/DMAC Ⅱ	DTC											
External Bus Expansion	Address Space (Bytes)	4G											
	Bus State Controller	SRAM/ROM/Byte control SRAM/Page access supported/SDRAM											
	Bus Structure	Separate bus (8/16/32-bit), selectable multiplex bus width (8/16-bit)		Separate bus (8/16-bit), selectable multiplex bus width (8/16-bit)				Separate bus (8/16/32-bit), selectable multiplex bus width (8/16-bit)		Separate bus (8/16-bit), selectable multiplex bus width (8/16-bit)			
	SDRAM Controller	Yes											
	Endian Conversion	Yes (data)											
Clock	Clock Generation Circuit	4 circuits (Main clock, sub clock, low speed on-chip oscillator, high speed on-chip ocsillator)											
	PLL	Yes											
	Subclock	Yes											
	RTC	Yes											
	On-Chip Oscillator	Yes											
	Oscillation Stop Detection	Yes											
	Frequency Divider	1/n (n = 1, 2, 4)											
	Power Save	Sleep/Full module clock stop/software standby/deep software standby											
Power Supply Voltage Detection	Power-On Reset/POR	Yes											
	Low Voltage Detection/LVD	Yes (Low voltage detection)											
A/D Converter	Resolution × Channels	12-bit × 21 or 10-bit × 8				12-bit × 14 or 10-bit × 8		12-bit × 21 or 10-bit × 8				12-bit × 14 or 10-bit × 8	
	Sample and Hold	Yes											
	Multi-Channel Sample and Hold	—											
D/A Converter	Resolution × Channels	10-bit × 2				10-bit × 1		10-bit × 2				10-bit × 1	
Timer	8-bit	4 (TMR)											
	16-bit	12 (TPU), 6 (MTU2), 4 (CMT)				6 (TPU), 6 (MTU2), 4 (CMT)		12 (TPU), 6 (MTU2), 4 (CMT)				6 (TPU), 6 (MTU2), 4 (CMT)	
	32-bit	—											
	Input Capture	32 (TPU), 19 (MTU2)				16 (TPU), 19 (MTU2)		32 (TPU), 19 (MTU2)				16 (TPU), 19 (MTU2)	
	Output Compare	32 (TPU), 16 (MTU2)				16 (TPU), 16 (MTU2)		32 (TPU), 16 (MTU2)				16 (TPU), 16 (MTU2)	
	PWM Output	4 (TMR), 16 (MTU2)											
	Programmable Pulse Generator	32 (PPG)											
	Event Counter	26 (TPU, MTU2, TMR, CMT)				20 (TPU, MTU2, TMR, CMT)		26 (TPU, MTU2, TMR, CMT)				20 (TPU, MTU2, TMR, CMT)	
	2-Phase Encoder Input	12 (TPU), 6 (MTU2)				6 (TPU), 6 (MTU2)		12 (TPU), 6 (MTU2)				6 (TPU), 6 (MTU2)	
	3-Phase Inverter Control	6(MTU2)											
Watchdog Timer		2											
Serial Interface	Clock Sync./Clock Async.	13 (SCI)				9 (SCI)		13 (SCI)				9 (SCI)	
	Clock Sync. Only	3 (RSPI)				2 (RSPI)		3 (RSPI)				2 (RSPI)	
	Clock Async. Only	—											
I²C-bus		4				2		4				2	
Smart Card/SIM		13				9		13				9	
Synchronous Serial Communication Unit/Special Serial I/O		3				2		3				2	
CAN	Channels	2	—	2	—	2	—	2	—	2	—	2	—
	Message Box (Numbers)	32	—	32	—	32	—	32	—	32	—	32	—
Ethernet		Yes											
USB Host		Yes											
USB Function		Yes											
CRC Calculation Circuit		1 ($X^8 + X^2 + X + 1$, $X^{16} + X^{15} + X^2 + 1$, $X^{16} + X^{12} + X^5 + 1$)											
I/O Ports	Input Only (Numbers)	2											
	CMOS I/O (Numbers)	133		111		78		133		111		78	
	High Voltage Port (Numbers)	—											
	N-Channel Open Drain Port (Numbers)	133		111		78		133		111		78	
	High Current Drive Port	—											
	Pull-Up Resistor	133		111		78		133		111		78	
External Interrupts Pins		16											
Debugging Function	Boundary Scan/JTAG	—											
	On-Chip Debug	Yes											
	On-Board Flash Program	Yes											
Other Functions	Others	—											
Operating Frequency/Supply Voltage		100MHz/2.7 to 3.6V											
Operating Ambient Temperature (˚C)		–40 to 85											
Package*2		PLQP0176KB-A		PLQP0144KA-A		PLQP0100KB-A		PLQP0176KB-A		PLQP0144KA-A		PLQP0100KB-A	
Part No.		R5F563N7DDBG**	R5F563N7CDBG**	R5F563N7DDFB**	R5F563N7CDFB**	R5F563N7DDLA**	R5F563N7CDLA**	R5F563N8DDBG**	R5F563N8CDBG**	R5F563N8DDFB**	R5F563N8CDFB**	R5F563N8DDLA**	R5F563N8CDLA**

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (RX600 Series)

Group		RX63N											
Memory	ROM (Bytes)	768K + 32K						1M + 32K					
	RAM (Bytes)	128K											
	ROM Type*1	F											
	Data Flash/E2 Data Flash	32K (E2 Data flash)											
	Program Security	Yes (ID code protection, ROM code protection)											
CPU	CPU	RX CPU Core											
	Basic Instructions	90											
	Minimum Instruction Execution Time (ns)	10 (@100MHz)											
	Dhrystone Performance	165MIPS											
	Multiplier	32 × 32 → 64											
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32 32 × 32 + 80 → 80											
	Barrel Shifter	Yes											
	FPU	Yes											
DMA	DMAC (Channels)	4											
	EXDMAC	2											
	DTC/DMAC Ⅱ	DTC											
External Bus Expansion	Address Space (Bytes)	4G											
	Bus State Controller	SRAM/ROM/Byte control SRAM/ Page access supported/SDRAM											
	Bus Structure	Separate bus (8/16/32-bit), selectable multiplex bus width (8/16-bit)		Separate bus (8/16-bit), selectable multiplex bus width (8/16-bit)				Separate bus (8/16/32-bit), selectable multiplex bus width (8/16-bit)		Separate bus (8/16-bit), selectable multiplex bus width (8/16-bit)			
	SDRAM Controller	Yes											
	Endian Conversion	Yes (data)											
Clock	Clock Generation Circuit	4 circuits (Main clock, sub clock, low speed on-chip oscillator, high speed on-chip ocsillator)											
	PLL	Yes											
	Subclock	Yes											
	RTC	Yes											
	On-Chip Oscillator	Yes											
	Oscillation Stop Detection	Yes											
	Frequency Divider	1/n (n = 1, 2, 4)											
	Power Save	Sleep/Full module clock stop/software standby/deep software standby											
Power Supply Voltage Detection	Power-On Reset/POR	Yes											
	Low Voltage Detection/LVD	Yes (Low voltage detection)											
A/D Converter	Resolution × Channels	12-bit × 21 or 10-bit × 8				12-bit × 14 or 10-bit × 8		12-bit × 21 or 10-bit × 8				12-bit × 14 or 10-bit × 8	
	Sample and Hold	Yes											
	Multi-Channel Sample and Hold	—											
D/A Converter	Resolution × Channels	10-bit × 2				10-bit × 1		10-bit × 2				10-bit × 1	
Timer	8-bit	4 (TMR)											
	16-bit	12 (TPU), 6 (MTU2), 4 (CMT)				6 (TPU), 6 (MTU2), 4 (CMT)		12 (TPU), 6 (MTU2), 4 (CMT)				6 (TPU), 6 (MTU2), 4 (CMT)	
	32-bit	—											
	Input Capture	32 (TPU), 19 (MTU2)				16 (TPU), 19 (MTU2)		32 (TPU), 19 (MTU2)				16 (TPU), 19 (MTU2)	
	Output Compare	32 (TPU), 16 (MTU2)				16 (TPU), 16 (MTU2)		32 (TPU), 16 (MTU2)				16 (TPU), 16 (MTU2)	
	PWM Output	4 (TMR), 16 (MTU2)											
	Programmable Pulse Generator	32 (PPG)											
	Event Counter	26 (TPU, MTU2, TMR, CMT)				20 (TPU, MTU2, TMR, CMT)		26 (TPU, MTU2, TMR, CMT)				20 (TPU, MTU2, TMR, CMT)	
	2-Phase Encoder Input	12 (TPU), 6 (MTU2)				6 (TPU), 6 (MTU2)		12 (TPU), 6 (MTU2)				6 (TPU), 6 (MTU2)	
	3-Phase Inverter Control	6 (MTU2)											
Watchdog Timer		2											
Serial Interface	Clock Sync./Clock Async.	13 (SCI)				9 (SCI)		13 (SCI)				9 (SCI)	
	Clock Sync. Only	3 (RSPI)				2 (RSPI)		3 (RSPI)				2 (RSPI)	
	Clock Async. Only	—											
I²C-bus		4				2		4				2	
Smart Card/SIM		13				9		13				9	
Synchronous Serial Communication Unit/Special Serial I/O		3				2		3				2	
CAN	Channels	2	—	2	—	2	—	2	—	2	—	2	—
	Message Box (Numbers)	32	—	32	—	32	—	32	—	32	—	32	—
Ethernet		Yes											
USB Host		Yes											
USB Function		Yes											
CRC Calculation Circuit		1 ($X^8 + X^2 + X + 1$, $X^{16} + X^{15} + X^2 + 1$, $X^{16} + X^{12} + X^5 + 1$)											
I/O Ports	Input Only (Numbers)	2											
	CMOS I/O (Numbers)	133		111		78		133		111		78	
	High Voltage Port (Numbers)	—											
	N-Channel Open Drain Port (Numbers)	133		111		78		133		111		78	
	High Current Drive Port	—											
	Pull-Up Resistor	133		111		78		133		111		78	
External Interrupts Pins		16											
Debugging Function	Boundary Scan/JTAG	—											
	On-Chip Debug	Yes											
	On-Board Flash Program	Yes											
Other Functions	Others	—											
Operating Frequency/Supply Voltage		100MHz/2.7 to 3.6V											
Operating Ambient Temperature (˚C)		–40 to 85											
Package*2		PLQP0176KB-A		PLQP0144KA-A		PLQP0100KB-A		PLQP0176KB-A		PLQP0144KA-A		PLQP0100KB-A	
Part No.		R5F563NADDBG**	R5F563NACDBG**	R5F563NADDFB**	R5F563NACDFB**	R5F563NADDLA**	R5F563NACDLA**	R5F563NBDDBG**	R5F563NBCDBG**	R5F563NBDDFB**	R5F563NBCDFB**	R5F563NBDDLA**	R5F563NBCDLA**

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

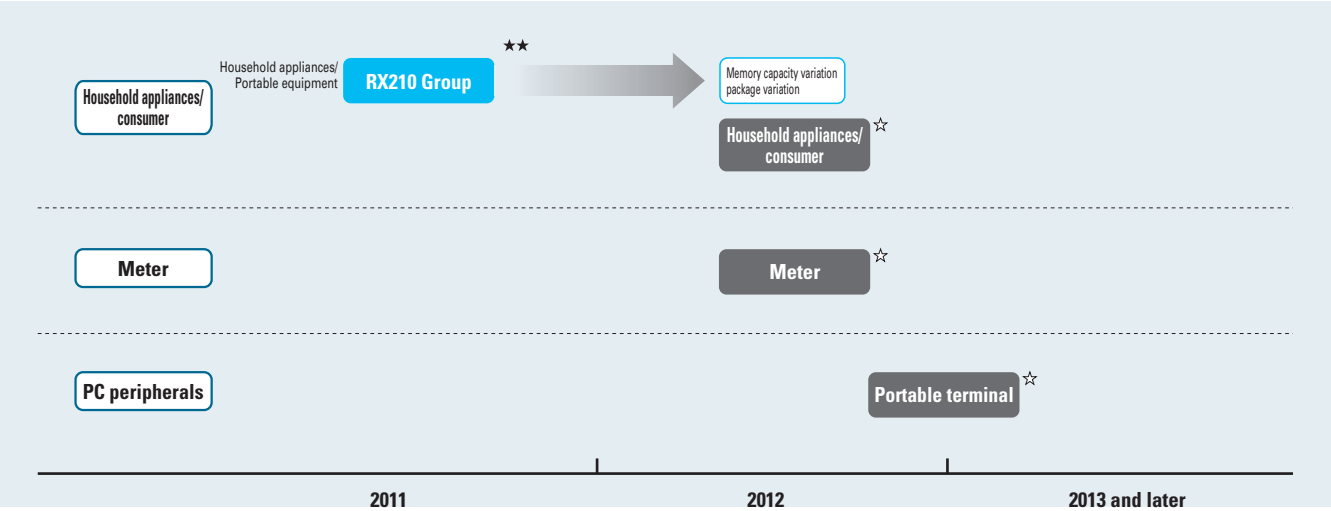
Outline of RX200 Series

The RX200 Series, designed for high speed and excellent performance same as the RX600 series, moreover realizes ultra low consumption current and ultra low power voltage operation.

RX200 Series Features

- High performance
  - 1.56 DMIPS/MHz
- Ultra low voltage operation
  - Operation : 1.62V to 1.8V/20MHz
- Ultra low consumption current
  - Normal operation : 0.2mA/MHz
- Safety
  - Built-in safety function that enable easy compliance to IEC60730
- Compatibility
  - Designed with pin compatibility with existing M16C/R32C series in mind
  - Succeed the peripheral functions from the existing products
  - Support for reuse of C language source code developed for the existing products

• RX200 Series Roadmap

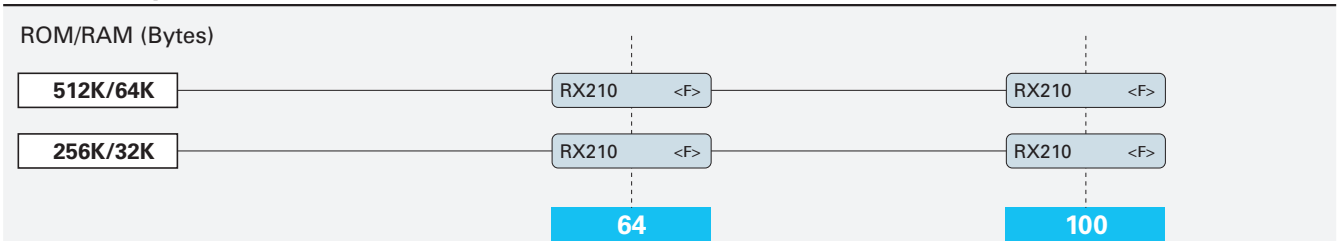


★ : New product ★★ : Under development ☆ : In planning stage

RX210 Group

- Application fields
  Smart phone, DSC, portable health equipment, household appliances, power meter, etc.
- High performance
  - 1.56 DMIPS/MHz
- Enhanced peripheral functions
  - Built-in Event Link Controller(ELC) that allows direct cooperation between the modules without CPU intervention.
  - Built-in Multi-function Pin Controller(MPC) that enables flexible selection of function for pins that have been allocated a variety of functions.
  - Built-in an ADC self-diagnostic function for preventing system malfunction and accidents
  - Built-in a CAC (Clock Frequency Accuracy Measurement Circuit) for detecting rises and drops in clock frequency and preventing system runaway
  - Built-in a DOC (Data Operation Circuit) that assists RAM failure testing
- Low power consumption current
  - Normal operation : Realizes ultra low power consumption current of 0.2mA/MHz
  - Deep software standby mode (RTC stopped): Realizes ultra low power consumption current of 0.3μA(reference value)
- Ultra low voltage operation
  - Realizes 20 MHz high speed operation at ultralow voltage of 1.62 V
- Wide Operating Voltage Range
  - Supports wide operating voltage range of 1.62 V(max. 20MHz) to 5.5 V(max. 50MHz). and Flash memory programming/erasing can be performed starting from the minimum operating voltage of 1.62 V.
- Continuity
  - Pin compatibility with M16C/R32C group
  - Peripheral functions compatible with conventional products (SH: CMT/MTU2, H8: DTC/TMR/SCI)
- Abundant of package configurations
  - A wide range of package lineup such as 64-pin LQFP, 100-pin LQFP, 100-pin TLGA

• Memory Capacity (ROM/RAM) (RX200 Series)



Letters in brackets < > indicate memory variations.
F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

• Specifications (RX200 Series)

Group		RX210				
Memory	ROM (Bytes)	256K		512K		
	RAM (Bytes)	32K		64K		
	ROM Type*1	F				
	Data Flash/E2 Data Flash	8K (Data flash)				
	Program Security	Yes (ID code protection, ROM code protection)				
CPU	CPU	RX CPU Core				
	Basic Instructions	82				
	Minimum Instruction Execution Time (ns)	20 (@50MHz)				
	Dhrystone Performance	78MIPS				
	Multiplier	32 × 32 → 64				
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32 32 × 32 + 80 → 80				
	Barrel Shifter	Yes				
	FPU	—				
DMA	DMAC (Channels)	4				
	EXDMAC	—				
	DTC/DMAC Ⅱ	DTC				
External Bus Expansion	Address Space (Bytes)	4G				
	Bus State Controller	SRAM/ROM/Burst ROM/Byte control SRAM				
	Bus Structure	Separate bus, selectable data bus width (8/16-bit)				
	SDRAM Controller	—				
	Endian Conversion	Yes (data)				
Clock	Clock Generation Circuit	5 circuits (Main clock, sub clock, high speed on-chip oscillator, low speed on-chip oscillator, low speed dedicated on-chip oscillator for IWDT				
	PLL	Yes				
	Subclock	Yes (32.768kHz)				
	RTC	Yes				
	On-Chip Oscillator	Yes (high speed: 32 to 50MHz, low speed:125kHz)				
	Oscillation Stop Detection	Yes				
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16, 32)				
	Power Save	Sleep/Full module clock stop/software standby/deep software standby				
Power Supply Voltage Detection	Power-On Reset/POR	Yes				
	Low Voltage Detection/LVD	Yes (Low voltage detection)				
A/D Converter	Resolution x Channels	12-bit × 16	12-bit × 12	12-bit × 16	12-bit × 12	12-bit × 16
	Sample and Hold	Yes				
	Multi-Channel Sample and Hold	Yes				
D/A Converter	Resolution x Channels	10-bit x 2				
Timer	8-bit	4(TMR)				
	16-bit	6(MTU2), 4(CMT)				
	32-bit	—				
	Input Capture	19(MTU2)				
	Output Compare	4(TMR), 16(MTU2)				
	PWM Output	4(TMR), 16(MTU2)				
	Programmable Pulse Generator	16				
	Event Counter	Yes				
	2-Phase Encoder Input	Yes				
	3-Phase Inverter Control	Yes				
Watchdog Timer		2				
Serial Interface	Clock Sync./Clock Async.	7 (SCI)	6 (SCI)	7 (SCI)	6 (SCI)	7 (SCI)
	Clock Sync. Only	1 (RSPI), 7 (SCI)				
	Clock Async. Only	—				
I²C-bus		1 (I²C), 7 (SCI)				
Smart Card/SIM		7 (SCI)				
Synchronous Serial Communication Unit/Special Serial I/O		1 (RSPI)				
CAN	Channels	—				
	Message Box (Numbers)	—				
Ethernet		—				
USB Host		—				
USB Function		—				
CRC Calculation Circuit		1 ($X^8 + X^2 + X + 1$, $X^{16} + X^{15} + X^2 + 1$, $X^{16} + X^{12} + X^5 + 1$)				
I/O Ports	Input Only (Numbers)	1				
	CMOS I/O (Numbers)	84	48	84	48	84
	High Voltage Port (Numbers)	—				
	N-Channel Open Drain Port (Numbers)	54	35	54	35	54
	High Current Drive Port	—				
	Pull-Up Resistor	85	48	85	48	85
External Interrupts Pins		9				
Debugging Function	Boundary Scan/JTAG	—/—				
	On-Chip Debug	Yes				
	On-Board Flash Program	Yes				
Other Functions	Others	—				
Operating Frequency/Supply Voltage		50MHz/1.62 to 5.5V				
Operating Ambient Temperature (˚C)		–40 to 85				
Package*2		PLQP0100KB-A	PLQP0064KB-A	PTLG0100JA-A	PLQP0100KB-A	PLQP0064KB-A	PTLG0100JA-A
Part No.		R5F52106ADFP**	R5F52106ADFM**	R5F52106ADLJ**	R5F52108ADFP**	R5F52108ADFM**	R5F52108ADLJ**

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

Choose the RL78 to achieve your low carbon goals.

Welcome to the RL78, a new family of low-power microcontrollers from Renesas Electronics.

We offer a complete lineup of products that provide both low power consumption and high performance to support product development in a wide variety of fields. RL:Renesas Low power. products reduce power consumption.

RL78 Family Features

- Low-power consuming, high-performance products that reduce total system power consumption
- Extensive product lineup
- Reduced system size and cost
- Comprehensive safety features
- Proven 78K and R8C technologies employed, enabling utilization of current software assets

• Roadmap

Line-up (total: 298 products)

ROM

	20-SSOP (7.62mm)	24-WQFN (4×4mm)	25-FLGA (3×3mm)	30-SSOP (7.62mm)	32-WQFN (5×5mm)	36-FPLGA (4×4mm)	40-WQFN (6×6mm)	44-LQFP (10×10mm)	48-LQFP (7×7mm)	48-WQFN (7×7mm)
512KB								□■	□■	□■
384KB								□■	□■	□■
256KB								□■	□■	□■
192KB							□■	□■	□■	□■
128KB				□■	□■	□■	□■	□■	□■	□■
96KB				□■	□■	□■	□■	□■	□■	□■
64KB	□■	□■	□■	□■	□■	□■	□■	□■	□■	□■
48KB	□■	□■	□■	□■	□■	□■	□■	□■	□■	□■
32KB	□■	□■	□■	□■	□■	□■	□■	□■	□■	□■
16KB	□■	□■	□■	□■	□■	□■	□■	□■	□■	□■
	□■	□■		□■						
12KB	□■	□■		□■						
8KB	□■	□■		□■						
4KB	□■	□■		□■						
2KB	□■									

RL78/G13 RL78/G12 Without data flash With data flash

ROM

	52-LQFP (10×10mm)	64-TQFP (7×7mm)	64-LQFP (10×10mm)	64-LQFP (12×12mm)	64-FPBGA (4×4mm)	80-LQFP (12×12mm)	80-LQFP (14×14mm)	100-LQFP (14×14mm)	100-LQFP (14×20mm)	128-LQFP (14×20mm)
512KB	□■		□■	□■		□■	□■	□■	□■	□■
384KB	□■		□■	□■		□■	□■	□■	□■	□■
256KB	□■	□■	□■	□■	□■	□■	□■	□■	□■	□■
192KB	□■	□■	□■	□■	□■	□■	□■	□■	□■	□■
128KB	□■	□■	□■	□■	□■	□■	□■	□■	□■	
96KB	□■	□■	□■	□■	□■	□■	□■	□■	□■	
64KB	□■	□■	□■	□■	□■					
48KB	□■	□■	□■	□■	□■					
32KB	□■	□■	□■	□■	□■					
16KB										
12KB										
8KB										
4KB										
2KB										

RL78/G13 Without data flash With data flash

• Applicable fields

Household appliances	Air conditioners, refrigerators, microwaves, vacuum cleaners, and rice cookers
AV devices	TVs, component stereo systems, Blu-ray recorders, and Blu-ray players
Industrial devices	Vending machines, industrial motors, and control devices
Handheld devices	PDAs and IC recorders
Health-related devices	Blood pressure meters and body fat meters
Others	Game consoles and electronic musical instruments

• Specifications (RL78/G13 (20, 24, 25-pin) (1/2))

Group		RL78/G13											
Memory	ROM size (byte)	16K	32K	48K	64K	16K	32K	48K	64K	16K	32K	48K	64K
	ROM Type	Flash											
	Single-Power-Supply Flash Memory	Yes											
	RAM size (byte)	2K	2K	3K	4K	2K	2K	3K	4K	2K	2K	3K	4K
	Data Flash (byte)	4K											
Clock	Maximum Operating Frequency (MHz)	32											
	On-Chip Oscillator (Hz)	32M, 24M, 16M, 12M, 8M, 4M, 1M, 15k											
	Subclock (32.768kHz)	—											
I/O	I/O Ports	16				20				20			
Bus	External Data/Address Bus	—/—											
Timer	16-bit Timer	8											
	Real-Time Counter	—											
	Watchdog Timer	1											
	PWM Output	PWM : 16-bit × 1, Multiplexed PWM : 16-bit × 2				PWM : 16-bit × 2, Multiplexed PWM : 16-bit × 3							
Serial Interface	CSI/UART	—											
	CSI:2ch/UART:1ch	—											
	CSI:2ch/UART:1ch/simplified I²C	2											
	CSI:2ch/UART:1ch/simplified I²C:2ch	—											
	CSI:2ch/UART supporting LIN-bus :1ch	—											
	CSI/UART supporting LIN-bus/simplified I²C	—											
	UART supporting LIN-bus	—											
	I²C	—				1							
OCD	On-Chip debugging	Yes											
Peripheral Functions	8/10-bit A/D Converter	6											
	Multiplier/Divider (bit x bit, bit ÷ bit) Multiply-accumulator (bit x bit + bit)	16 × 16 32 ÷ 32 16 × 16 + 32											
	Other Functions	POR, LVD, DMA, safety function											
OThers	Supply Voltage (V)	1.6 to 5.5											
	Package (size: mm)	20-SSOP (7.62)				24-WQFN (4 × 4)				25-FLGA (3 × 3)			
	In-Circuit Emulator Emulation Board	E1 (on-chip debugging emulator) QB-RL78G13 (IECUBE)											
Package		20-SSOP (7.62) (package code : under consideration)				24-WQFN (4 × 4) (package code : under consideration)				25-FLGA (3 × 3) (package code : under consideration)			
Part No.		R5F1006AASP**	R5F1006CASP**	R5F1006DASP**	R5F1006EASP**	R5F1007AANA**	R5F1007CANA**	R5F1007DANA**	R5F1007EANA**	R5F1008AALA**	R5F1008CALA**	R5F1008DALA**	R5F1008EALA**

Remark POR: Power-on reset
LVD: Voltage detector

★ : New product ★★ : Under development

• Specifications (RL78/G13 (20, 24, 25-pin) (2/2))

Group		RL78/G13											
Memory	ROM size (byte)	16K	32K	48K	64K	16K	32K	48K	64K	16K	32K	48K	64K
	ROM Type	Flash											
	Single-Power-Supply Flash Memory	Yes											
	RAM size (byte)	2K	2K	3K	4K	2K	2K	3K	4K	2K	2K	3K	4K
	Data Flash (byte)	—											
Clock	Maximum Operating Frequency (MHz)	32											
	On-Chip Oscillator (Hz)	32M, 24M, 16M, 12M, 8M, 4M, 1M, 15k											
	Subclock (32.768kHz)	—											
I/O	I/O Ports	16				20				20			
Bus	External Data/Address Bus	—/—											
Timer	16-bit Timer	8											
	Real-Time Counter	—											
	Watchdog Timer	1											
	PWM Output	PWM : 16-bit × 1, Multiplexed PWM : 16-bit × 2				PWM : 16-bit × 2, Multiplexed PWM : 16-bit × 3							
Serial Interface	CSI/UART	—											
	CSI:2ch/UART:1ch	—											
	CSI:2ch/UART:1ch/simplified I²C	2											
	CSI:2ch/UART:1ch/simplified I²C:2ch	—											
	CSI:2ch/UART supporting LIN-bus :1ch	—											
	CSI/UART supporting LIN-bus/simplified I²C	—											
	UART supporting LIN-bus	—											
	I²C	—				1							
OCD	On-Chip debugging	Yes											
Peripheral Functions	8/10-bit A/D Converter	6											
	Multiplier/Divider (bit x bit, bit ÷ bit) Multiply-accumulator (bit x bit + bit)	16 × 16 32 ÷ 32 16 × 16 + 32											
	Other Functions	POR, LVD, DMA, safety function											
OThers	Supply Voltage (V)	1.6 to 5.5											
	Package (size: mm)	20-SSOP (7.62)				24-WQFN (4 × 4)				25-FLGA (3 × 3)			
	In-Circuit Emulator Emulation Board	E1 (on-chip debugging emulator) QB-RL78G13 (IECUBE)											
Package		20-SSOP (7.62) (package code : under consideration)				24-WQFN (4 × 4) (package code : under consideration)				25-FLGA (3 × 3) (package code : under consideration)			
Part No.		R5F1016AASP**	R5F1016CASP**	R5F1016DASP**	R5F1016EASP**	R5F1017AANA**	R5F1017CANA**	R5F1017DANA**	R5F1017EANA**	R5F1018AALA**	R5F1018CALA**	R5F1018DALA**	R5F1018EALA**

Remark POR: Power-on reset
LVD: Voltage detector

★ : New product ★★ : Under development

• Specifications (RL78/G13 (30, 32, 36-pin) (1/2))

Group		RL78/G13																	
Memory	ROM size (byte)	16K	32K	48K	64K	96K	128K	16K	32K	48K	64K	96K	128K	16K	32K	48K	64K	96K	128K
	ROM Type	Flash																	
	Single-Power-Supply Flash Memory	Yes																	
	RAM size (byte)	2K	2K	3K	4K	8K	12K	2K	2K	3K	4K	8K	12K	2K	2K	3K	4K	8K	12K
	Data Flash (byte)	4K				8K		4K				8K		4K				8K	
Clock	Maximum Operating Frequency (MHz)	32																	
	On-Chip Oscillator (Hz)	32M, 24M, 16M, 12M, 8M, 4M, 1M, 15k																	
	Subclock (32.768kHz)	Yes																	
I/O	I/O Ports	26						28						28					
Bus	External Data/Address Bus	—/—																	
Timer	16-bit Timer	8																	
	Real-Time Counter	—																	
	Watchdog Timer	1																	
	PWM Output	PWM : 16-bit × 2, Multiplexed PWM : 16-bit × 3																	
Serial Interface	CSI/UART	—																	
	CSI:2ch/UART:1ch	—																	
	CSI:2ch/UART:1ch/simplified I²C	2																	
	CSI:2ch/UART:1ch/simplified I²C:2ch	—																	
	CSI:2ch/UART supporting LIN-bus :1ch	—																	
	CSI/UART supporting LIN-bus/simplified I²C	1																	
	UART supporting LIN-bus	—																	
	I²C	1																	
OCD	On-Chip debugging	Yes																	
Peripheral Functions	8/10-bit A/D Converter	8																	
	Multiplier/Divider (bit x bit, bit ÷ bit) Multiply-accumulator (bit x bit + bit)	16 × 16 32 ÷ 32 16 × 16 + 32																	
	Other Functions	POR, LVD, DMA, safety function																	
OThers	Supply Voltage (V)	1.6 to 5.5																	
	Package (size: mm)	30-SSOP (7.62)						32-WQFN (5 × 5)						36-FPLGA (4 × 4)					
	In-Circuit Emulator Emulation Board	E1 (on-chip debugging emulator) QB-RL78G13 (IECUBE)																	
Package		30-SSOP (7.62) (package code : under consideration)						32-WQFN (5 × 5) (package code : under consideration)						36-FPLGA (4 × 4) (package code : under consideration)					
Part No.		R5F100AAASP**	R5F100ACASP**	R5F100ADASP**	R5F100AEASP**	R5F100AFASP**	R5F100AGASP**	R5F100BAANA**	R5F100BCANA**	R5F100BDANA**	R5F100BEANA**	R5F100BFANA**	R5F100BGANA**	R5F100CAALA**	R5F100CCALA**	R5F100CDALA**	R5F100CEALA**	R5F100CFALA**	R5F100CGALA**

Remark POR: Power-on reset
LVD: Voltage detector

★ : New product ★★ : Under development

• Specifications (RL78/G13 (30, 32, 36-pin) (2/2))

Group		RL78/G13																	
Memory	ROM size (byte)	16K	32K	48K	64K	96K	128K	16K	32K	48K	64K	96K	128K	16K	32K	48K	64K	96K	128K
	ROM Type	Flash																	
	Single-Power-Supply Flash Memory	Yes																	
	RAM size (byte)	2K	2K	3K	4K	8K	12K	2K	2K	3K	4K	8K	12K	2K	2K	3K	4K	8K	12K
	Data Flash (byte)	—																	
Clock	Maximum Operating Frequency (MHz)	32																	
	On-Chip Oscillator (Hz)	32M, 24M, 16M, 12M, 8M, 4M, 1M, 15k																	
	Subclock (32.768kHz)	Yes																	
I/O	I/O Ports	26						28						28					
Bus	External Data/Address Bus	—/—																	
Timer	16-bit Timer	8																	
	Real-Time Counter	—																	
	Watchdog Timer	1																	
	PWM Output	PWM : 16-bit × 2, Multiplexed PWM : 16-bit × 3																	
Serial Interface	CSI/UART	—																	
	CSI:2ch/UART:1ch	—																	
	CSI:2ch/UART:1ch/simplified I²C	2																	
	CSI:2ch/UART:1ch/simplified I²C:2ch	—																	
	CSI:2ch/UART supporting LIN-bus :1ch	—																	
	CSI/UART supporting LIN-bus/simplified I²C	1																	
	UART supporting LIN-bus	—																	
	I²C	1																	
OCD	On-Chip debugging	Yes																	
Peripheral Functions	8/10-bit A/D Converter	8																	
	Multiplier/Divider (bit x bit, bit ÷ bit) Multiply-accumulator (bit x bit + bit)	16 × 16 32 ÷ 32 16 × 16 + 32																	
	Other Functions	POR, LVD, DMA, safety function																	
OThers	Supply Voltage (V)	1.6 to 5.5																	
	Package (size: mm)	30-SSOP (7.62)						32-WQFN (5 × 5)						36-FPLGA (4 × 4)					
	In-Circuit Emulator Emulation Board	E1 (on-chip debugging emulator) QB-RL78G13 (IECUBE)																	
Package		30-SSOP (7.62) (package code : under consideration)						32-WQFN (5 × 5) (package code : under consideration)						36-FPLGA (4 × 4) (package code : under consideration)					
Part No.		R5F101AAASP**	R5F101ACASP**	R5F101ADASP**	R5F101AEASP**	R5F101AFASP**	R5F101AGASP**	R5F101BAANA**	R5F101BCANA**	R5F101BDANA**	R5F101BEANA**	R5F101BFANA**	R5F101BGANA**	R5F101CAALA**	R5F101CCALA**	R5F101CDALA**	R5F101CEALA**	R5F101CFALA**	R5F101CGALA**

Remark POR: Power-on reset
LVD: Voltage detector

★ : New product ★★ : Under development

• Specifications (RL78/G13 (40, 44-pin) (1/2))

Group		RL78/G13																
Memory	ROM size (byte)	16K	32K	48K	64K	96K	128K	192K	16K	32K	48K	64K	96K	128K	192K	256K	384K	512K
	ROM Type	Flash																
	Single-Power-Supply Flash Memory	Yes																
	RAM size (byte)	2K	2K	3K	4K	8K	12K	16K	2K	2K	3K	4K	8K	12K	16K	20K	24K	32K
	Data Flash (byte)	4K				8K			4K				8K					
Clock	Maximum Operating Frequency (MHz)	32																
	On-Chip Oscillator (Hz)	32M, 24M, 16M, 12M, 8M, 4M, 1M, 15k																
	Subclock (32.768kHz)	Yes																
I/O	I/O Ports	36							40									
Bus	External Data/Address Bus	—/—																
Timer	16-bit Timer	8																
	Real-Time Counter	1																
	Watchdog Timer	1																
	PWM Output	PWM : 16-bit × 2, Multiplexed PWM : 16-bit × 3							PWM : 16-bit × 3, Multiplexed PWM : 16-bit × 4									
Serial Interface	CSI/UART	—																
	CSI:2ch/UART:1ch	—																
	CSI:2ch/UART:1ch/simplified I²C	1																
	CSI:2ch/UART:1ch/simplified I²C:2ch	1																
	CSI:2ch/UART supporting LIN-bus :1ch	—																
	CSI/UART supporting LIN-bus/simplified I²C	1																
	CSI:2ch/UART supporting LIN-bus :1ch	—																
	UART supporting LIN-bus	—																
	I²C	1																
OCD	On-Chip debugging	Yes																
Peripheral Functions	8/10-bit A/D Converter	9							10									
	Multiplier/Divider (bit × bit, bit ÷ bit) Multiply-accumulator (bit × bit + bit)	16 × 16 32 ÷ 32 16 × 16 + 32																
	Other Functions	POR, LVD, DMA, safety function																
OThers	Supply Voltage (V)	1.6 to 5.5																
	Package (size: mm)	40-WQFN (6 × 6)							44-LQFP (10 × 10)									
	In-Circuit Emulator Emulation Board	E1 (on-chip debugging emulator) QB-RL78G13 (IECUBE)																
Package		40-WQFN (6 × 6) (package code : under consideration)							44-LQFP (10 × 10) (package code : under consideration)									
Part No.		R5F100EAANA**	R5F100ECANA**	R5F100EDANA**	R5F100EEANA**	R5F100EFANA**	R5F100EGANA**	R5F100EHANA**	R5F100FAAFP**	R5F100FCAFP**	R5F100FDAFP**	R5F100FEAFP**	R5F100FFAFP**	R5F100FGAFP**	R5F100FHAFP**	R5F100FJAFP**	R5F100FKAFP**	R5F100FLAFP**

Remark POR: Power-on reset
LVD: Voltage detector

★ : New product ★★ : Under development

• Specifications (RL78/G13 (40, 44-pin) (2/2))

Group		RL78/G13																
Memory	ROM size (byte)	16K	32K	48K	64K	96K	128K	192K	16K	32K	48K	64K	96K	128K	192K	256K	384K	512K
	ROM Type	Flash																
	Single-Power-Supply Flash Memory	Yes																
	RAM size (byte)	2K	2K	3K	4K	8K	12K	16K	2K	2K	3K	4K	8K	12K	16K	20K	24K	32K
	Data Flash (byte)	—																
Clock	Maximum Operating Frequency (MHz)	32																
	On-Chip Oscillator (Hz)	32M, 24M, 16M, 12M, 8M, 4M, 1M, 15k																
	Subclock (32.768kHz)	Yes																
I/O	I/O Ports	36							40									
Bus	External Data/Address Bus	—/—																
Timer	16-bit Timer	8																
	Real-Time Counter	1																
	Watchdog Timer	1																
	PWM Output	PWM : 16-bit × 2, Multiplexed PWM : 16-bit × 3							PWM : 16-bit × 3, Multiplexed PWM : 16-bit × 4									
Serial Interface	CSI/UART	—																
	CSI:2ch/UART:1ch	—																
	CSI:2ch/UART:1ch/simplified I²C	1																
	CSI:2ch/UART:1ch/simplified I²C:2ch	1																
	CSI:2ch/UART supporting LIN-bus :1ch	—																
	CSI/UART supporting LIN-bus/simplified I²C	1																
	CSI:2ch/UART supporting LIN-bus :1ch	—																
	UART supporting LIN-bus	—																
	I²C	1																
OCD	On-Chip debugging	Yes																
Peripheral Functions	8/10-bit A/D Converter	9							10									
	Multiplier/Divider (bit x bit, bit ÷ bit) Multiply-accumulator (bit x bit + bit)	16 × 16 32 ÷ 32 16 × 16 + 32																
	Other Functions	POR, LVD, DMA, safety function																
OThers	Supply Voltage (V)	1.6 to 5.5																
	Package (size: mm)	40-WQFN (6 × 6)							44-LQFP (10 × 10)									
	In-Circuit Emulator Emulation Board	E1 (on-chip debugging emulator) QB-RL78G13 (IECUBE)																
Package		40-WQFN (6 × 6) (package code : under consideration)							44-LQFP (10 × 10) (package code : under consideration)									
Part No.		R5F101E AANA**	R5F101ECANA**	R5F101EDANA**	R5F101EEANA**	R5F101EFANA**	R5F101EGANA**	R5F101EHANA**	R5F101FAAFP**	R5F101FCAFP**	R5F101FDAFP**	R5F101FEAFP**	R5F101FFAFP**	R5F101FGAFP**	R5F101FHAFP**	R5F101FJAFP**	R5F101FKAFP**	R5F101FLAFP**

Remark POR: Power-on reset
LVD: Voltage detector

★ : New product ★★ : Under development

• Specifications (RL78/G13 (48, 52-pin) (1/2))

Group		RL78/G13																													
Memory	ROM size (byte)	16K	32K	48K	64K	96K	128K	192K	256K	384K	512K	16K	32K	48K	64K	96K	128K	192K	256K	384K	512K	32K	48K	64K	96K	128K	192K	256K	384K	512K	
	ROM Type	Flash																													
	Single-Power-Supply Flash Memory	Yes																													
	RAM size (byte)	2K	2K	3K	4K	8K	12K	16K	20K	24K	32K	2K	2K	3K	4K	8K	12K	16K	20K	24K	32K	2K	3K	4K	8K	12K	16K	20K	24K	32K	
	Data Flash (byte)	4K				8K						4K				8K						4K			8K						
Clock	Maximum Operating Frequency (MHz)	32																													
	On-Chip Oscillator (Hz)	32M, 24M, 16M, 12M, 8M, 4M, 1M, 15k																													
	Subclock (32.768kHz)	Yes																													
I/O	I/O Ports	44																				48									
Bus	External Data/Address Bus	—/—																													
Timer	16-bit Timer	8																													
	Real-Time Counter	1																													
	Watchdog Timer	1																													
	PWM Output	PWM : 16-bit × 3, Multiplexed PWM : 16-bit × 4																													
Serial Interface	CSI/UART	—																													
	CSI:2ch/UART:1ch	—																													
	CSI:2ch/UART:1ch/simplified I²C	1																													
	CSI:2ch/UART:1ch/simplified I²C:2ch	1																													
	CSI:2ch/UART supporting LIN-bus :1ch	—																													
	CSI/UART supporting LIN-bus/simplified I²C	—																													
	CSI:2ch/UART supporting LIN-bus :1ch	1																													
	UART supporting LIN-bus	—																													
	I²C	1																													
OCD	On-Chip debugging	Yes																													
Peripheral Functions	8/10-bit A/D Converter	10																				12									
	Multiplier/Divider (bit × bit, bit ÷ bit) Multiply-accumulator (bit × bit + bit)	16 × 16 32 ÷ 32 16 × 16 + 32																													
	Other Functions	POR, LVD, DMA, safety function																													
OThers	Supply Voltage (V)	1.6 to 5.5																													
	Package (size: mm)	48-LQFP (7 × 7)										48-WQFN (7 × 7)										52-LQFP (10 × 10)									
	In-Circuit Emulator Emulation Board	E1 (on-chip debugging emulator) QB-RL78G13 (IECUBE)																													
Package		48-LQFP (7 × 7) (package code : under consideration)										48-WQFN (7 × 7) (package code : under consideration)										52-LQFP (10 × 10) (package code : under consideration)									
Part No.		R5F100GAAFB**	R5F100GCAFB**	R5F100GDAFB**	R5F100GEAFB**	R5F100GFAFB**	R5F100GGAFB**	R5F100GHAFB**	R5F100GJAFB**	R5F100GKAFB**	R5F100GLAFB**	R5F100GAANA**	R5F100GCANA**	R5F100GDANA**	R5F100GEANA**	R5F100GFANA**	R5F100GGANA**	R5F100GHANA**	R5F100GJANA**	R5F100GKANA**	R5F100GLANA**	R5F100JCAFA**	R5F100JDAFA**	R5F100JEAFA**	R5F100JFAFA**	R5F100JGAFA**	R5F100JHAFA**	R5F100JJAFA**	R5F100JKAFA**	R5F100JLAFA**	

Remark POR: Power-on reset
LVD: Voltage detector

★ : New product ★★ : Under development

• Specifications (RL78/G13 (48, 52-pin) (2/2))

Group		RL78/G13																												
Memory	ROM size (byte)	16K	32K	48K	64K	96K	128K	192K	256K	384K	512K	16K	32K	48K	64K	96K	128K	192K	256K	384K	512K	32K	48K	64K	96K	128K	192K	256K	384K	512K
	ROM Type	Flash																												
	Single-Power-Supply Flash Memory	Yes																												
	RAM size (byte)	2K	2K	3K	4K	8K	12K	16K	20K	24K	32K	2K	2K	3K	4K	8K	12K	16K	20K	24K	32K	2K	3K	4K	8K	12K	16K	20K	24K	32K
	Data Flash (byte)	—																												
Clock	Maximum Operating Frequency (MHz)	32																												
	On-Chip Oscillator (Hz)	32M, 24M, 16M, 12M, 8M, 4M, 1M, 15k																												
	Subclock (32.768kHz)	Yes																												
I/O	I/O Ports	44																				48								
Bus	External Data/Address Bus	—/—																												
Timer	16-bit Timer	8																												
	Real-Time Counter	1																												
	Watchdog Timer	1																												
	PWM Output	PWM : 16-bit × 3, Multiplexed PWM : 16-bit × 4																												
Serial Interface	CSI/UART	—																												
	CSI:2ch/UART:1ch	—																												
	CSI:2ch/UART:1ch/simplified I²C	1																												
	CSI:2ch/UART:1ch/simplified I²C:2ch	1																												
	CSI:2ch/UART supporting LIN-bus :1ch	—																												
	CSI/UART supporting LIN-bus/simplified I²C	—																												
	CSI:2ch/UART supporting LIN-bus :1ch	1																												
	UART supporting LIN-bus	—																												
	I²C	1																												
OCD	On-Chip debugging	Yes																												
Peripheral Functions	8/10-bit A/D Converter	10																				12								
	Multiplier/Divider (bit x bit, bit + bit) Multiply-accumulator (bit x bit + bit)	16 × 16 32 ÷ 32 16 × 16 + 32																												
	Other Functions	POR, LVD, DMA, safety function																												
OThers	Supply Voltage (V)	1.6 to 5.5																												
	Package (size: mm)	48-LQFP (7 × 7)										48-WQFN (7 × 7)										52-LQFP (10 × 10)								
	In-Circuit Emulator Emulation Board	E1 (on-chip debugging emulator) QB-RL78G13 (IECUBE)																												
Package		48-LQFP (7 × 7) (package code : under consideration)										48-WQFN (7 × 7) (package code : under consideration)										52-LQFP (10 × 10) (package code : under consideration)								
Part No.		R5F101GAAFB**	R5F101GCAFB**	R5F101GDAFB**	R5F101GEAFB**	R5F101GFAFB**	R5F101GGAFB**	R5F101GHAFB**	R5F101GJAFB**	R5F101GKAFB**	R5F101GLAFB**	R5F101GAANA**	R5F101GCANA**	R5F101GDANA**	R5F101GEANA**	R5F101GFANA**	R5F101GGANA**	R5F101GHANA**	R5F101GJANA**	R5F101GKANA**	R5F101GLANA**	R5F101JCAFA**	R5F101JDAFA**	R5F101JEAFA**	R5F101JFAFA**	R5F101JGAFA**	R5F101JHAFA**	R5F101JJAFA**	R5F101J KAFA**	R5F101J LAFA**

Remark POR: Power-on reset
LVD: Voltage detector

★ : New product ★★ : Under development

• Specifications (RL78/G13 (64-pin) (1/4))

Group		RL78/G13																	
Memory	ROM size (byte)	32K	48K	64K	96K	128K	192K	256K	384K	512K	32K	48K	64K	96K	128K	192K	256K	384K	512K
	ROM Type	Flash																	
	Single-Power-Supply Flash Memory	Yes																	
	RAM size (byte)	2K	3K	4K	8K	12K	16K	20K	24K	32K	2K	3K	4K	8K	12K	16K	20K	24K	32K
	Data Flash (byte)	4K			8K						4K			8K					
Clock	Maximum Operating Frequency (MHz)	32																	
	On-Chip Oscillator (Hz)	32M, 24M, 16M, 12M, 8M, 4M, 1M, 15k																	
	Subclock (32.768kHz)	Yes																	
I/O	I/O Ports	58																	
Bus	External Data/Address Bus	—/—																	
Timer	16-bit Timer	8																	
	Real-Time Counter	1																	
	Watchdog Timer	1																	
	PWM Output	PWM : 16-bit × 4, Multiplexed PWM : 16-bit × 7																	
Serial Interface	CSI/UART	—																	
	CSI:2ch/UART:1ch	—																	
	CSI:2ch/UART:1ch/simplified I²C	—																	
	CSI:2ch/UART:1ch/simplified I²C:2ch	2																	
	CSI:2ch/UART supporting LIN-bus :1ch	—																	
	CSI/UART supporting LIN-bus/simplified I²C	—																	
	CSI:2ch/UART supporting LIN-bus :1ch	1																	
	UART supporting LIN-bus	—																	
	I²C	1																	
OCD	On-Chip debugging	Yes																	
Peripheral Functions	8/10-bit A/D Converter	12																	
	Multiplier/Divider (bit × bit, bit ÷ bit) Multiply-accumulator (bit × bit + bit)	16 × 16 32 ÷ 32 16 × 16 + 32																	
	Other Functions	POR, LVD, DMA, safety function																	
OThers	Supply Voltage (V)	1.6 to 5.5																	
	Package (size: mm)	64-LQFP (10 × 10)									64-LQFP (12 × 12)								
	In-Circuit Emulator Emulation Board	E1 (on-chip debugging emulator) QB-RL78G13 (IECUBE)																	
Package		64-LQFP (10 × 10) (package code : under consideration)									64-LQFP (12 × 12) (package code : under consideration)								
Part No.		R5F100LCAFA**	R5F100LDAFA**	R5F100LEAFA**	R5F100LFAFA**	R5F100LGAFA**	R5F100LHAFA**	R5F100LJAFA**	R5F100LKAFA**	R5F100LLAFA**	R5F100LCAFB**	R5F100LDAFB**	R5F100LEAFB**	R5F100LFAFB**	R5F100LGAFB**	R5F100LHAFB**	R5F100LJAFB**	R5F100LKAFB**	R5F100LLAFB**

Remark POR: Power-on reset
LVD: Voltage detector

★ : New product ★★ : Under development

• Specifications (RL78/G13 (64-pin) (2/4))

Group		RL78/G13																	
Memory	ROM size (byte)	32K	48K	64K	96K	128K	192K	256K	384K	512K	32K	48K	64K	96K	128K	192K	256K	384K	512K
	ROM Type	Flash																	
	Single-Power-Supply Flash Memory	Yes																	
	RAM size (byte)	2K	3K	4K	8K	12K	16K	20K	24K	32K	2K	3K	4K	8K	12K	16K	20K	24K	32K
	Data Flash (byte)	—																	
Clock	Maximum Operating Frequency (MHz)	32																	
	On-Chip Oscillator (Hz)	32M, 24M, 16M, 12M, 8M, 4M, 1M, 15k																	
	Subclock (32.768kHz)	Yes																	
I/O	I/O Ports	58																	
Bus	External Data/Address Bus	—/—																	
Timer	16-bit Timer	8																	
	Real-Time Counter	1																	
	Watchdog Timer	1																	
	PWM Output	PWM : 16-bit × 4, Multiplexed PWM : 16-bit × 7																	
Serial Interface	CSI/UART	—																	
	CSI:2ch/UART:1ch	—																	
	CSI:2ch/UART:1ch/simplified I²C	—																	
	CSI:2ch/UART:1ch/simplified I²C:2ch	2																	
	CSI:2ch/UART supporting LIN-bus :1ch	—																	
	CSI/UART supporting LIN-bus/simplified I²C	—																	
	CSI:2ch/UART supporting LIN-bus :1ch	1																	
	UART supporting LIN-bus	—																	
	I²C	1																	
OCD	On-Chip debugging	Yes																	
Peripheral Functions	8/10-bit A/D Converter	12																	
	Multiplier/Divider (bit x bit, bit ÷ bit) Multiply-accumulator (bit x bit + bit)	16 × 16 32 ÷ 32 16 × 16 + 32																	
	Other Functions	POR, LVD, DMA, safety function																	
OThers	Supply Voltage (V)	1.6 to 5.5																	
	Package (size: mm)	64-LQFP (10 × 10)									64-LQFP (12 × 12)								
	In-Circuit Emulator Emulation Board	E1 (on-chip debugging emulator) QB-RL78G13 (IECUBE)																	
Package		64-LQFP (10 × 10) (package code : under consideration)									64-LQFP (12 × 12) (package code : under consideration)								
Part No.		R5F101LCAFA**	R5F101LDAFA**	R5F101LEAFA**	R5F101LFAFA**	R5F101LGAFA**	R5F101LHAFA**	R5F101LJAFA**	R5F101LKAFA**	R5F101LLAFA**	R5F101LCAFB**	R5F101LDAFB**	R5F101LEAFB**	R5F101LFAFB**	R5F101LGAFB**	R5F101LHAFB**	R5F101LJAFB**	R5F101LKAFB**	R5F101LLAFB**

Remark POR: Power-on reset
LVD: Voltage detector

★ : New product ★★ : Under development

• Specifications (RL78/G13 (64-pin) (3/4))

Group		RL78/G13													
Memory	ROM size (byte)	32K	48K	64K	96K	128K	192K	256K	32K	48K	64K	96K	128K	192K	256K
	ROM Type	Flash													
	Single-Power-Supply Flash Memory	Yes													
	RAM size (byte)	2K	3K	4K	8K	12K	16K	20K	2K	3K	4K	8K	12K	16K	20K
	Data Flash (byte)	4K			8K				4K			8K			
Clock	Maximum Operating Frequency (MHz)	32													
	On-Chip Oscillator (Hz)	32M, 24M, 16M, 12M, 8M, 4M, 1M, 15k													
	Subclock (32.768kHz)	Yes													
I/O	I/O Ports	58													
Bus	External Data/Address Bus	—/—													
Timer	16-bit Timer	8													
	Real-Time Counter	1													
	Watchdog Timer	1													
	PWM Output	PWM : 16-bit × 4, Multiplexed PWM : 16-bit × 7													
Serial Interface	CSI/UART	—													
	CSI:2ch/UART:1ch	—													
	CSI:2ch/UART:1ch/simplified I²C	—													
	CSI:2ch/UART:1ch/simplified I²C:2ch	2													
	CSI:2ch/UART supporting LIN-bus :1ch	—													
	CSI/UART supporting LIN-bus/simplified I²C	—													
	CSI:2ch/UART supporting LIN-bus :1ch	1													
	UART supporting LIN-bus	—													
	I²C	1													
OCD	On-Chip debugging	Yes													
Peripheral Functions	8/10-bit A/D Converter	12													
	Multiplier/Divider (bit x bit, bit ÷ bit) Multiply-accumulator (bit x bit + bit)	16 × 16 32 ÷ 32 16 × 16 + 32													
	Other Functions	POR, LVD, DMA, safety function													
OThers	Supply Voltage (V)	1.6 to 5.5													
	Package (size: mm)	64-TQFP (7 × 7)							64-FPBGA (4 × 4)						
	In-Circuit Emulator Emulation Board	E1 (on-chip debugging emulator) QB-RL78G13 (IECUBE)													
Package		64-TQFP (7 × 7) (package code : under consideration)							64-FPBGA (4 × 4) (package code : under consideration)						
Part No.		R5F100LCAFC**	R5F100LDAFC**	R5F100LEAFC**	R5F100LFAFC**	R5F100LGAFC**	R5F100LHAFC**	R5F100LJAFC**	R5F100LCAFG**	R5F100LDAFG**	R5F100LEAFG**	R5F100LFAFG**	R5F100LGAFG**	R5F100LHAFG**	R5F100LJAFG**

Remark POR: Power-on reset
LVD: Voltage detector

★ : New product ★★ : Under development

• Specifications (RL78/G13 (64-pin) (4/4))

Group		RL78/G13													
Memory	ROM size (byte)	32K	48K	64K	96K	128K	192K	256K	32K	48K	64K	96K	128K	192K	256K
	ROM Type	Flash													
	Single-Power-Supply Flash Memory	Yes													
	RAM size (byte)	2K	3K	4K	8K	12K	16K	20K	2K	3K	4K	8K	12K	16K	20K
	Data Flash (byte)	—													
Clock	Maximum Operating Frequency (MHz)	32													
	On-Chip Oscillator (Hz)	32M, 24M, 16M, 12M, 8M, 4M, 1M, 15k													
	Subclock (32.768kHz)	Yes													
I/O	I/O Ports	58													
Bus	External Data/Address Bus	—/—													
Timer	16-bit Timer	8													
	Real-Time Counter	1													
	Watchdog Timer	1													
	PWM Output	PWM : 16-bit × 4, Multiplexed PWM : 16-bit × 7													
Serial Interface	CSI/UART	—													
	CSI:2ch/UART:1ch	—													
	CSI:2ch/UART:1ch/simplified I²C	—													
	CSI:2ch/UART:1ch/simplified I²C:2ch	2													
	CSI:2ch/UART supporting LIN-bus :1ch	—													
	CSI/UART supporting LIN-bus/simplified I²C	—													
	CSI:2ch/UART supporting LIN-bus :1ch	1													
	UART supporting LIN-bus	—													
	I²C	1													
OCD	On-Chip debugging	Yes													
Peripheral Functions	8/10-bit A/D Converter	12													
	Multiplier/Divider (bit x bit, bit ÷ bit) Multiply-accumulator (bit x bit + bit)	16 × 16 32 ÷ 32 16 × 16 + 32													
	Other Functions	POR, LVD, DMA, safety function													
OThers	Supply Voltage (V)	1.6 to 5.5													
	Package (size: mm)	64-TQFP (7 × 7)							64-FPBGA (4 × 4)						
	In-Circuit Emulator Emulation Board	E1 (on-chip debugging emulator) QB-RL78G13 (IECUBE)													
Package		64-TQFP (7 × 7) (package code : under consideration)							64-FPBGA (4 × 4) (package code : under consideration)						
Part No.		R5F101LCAFC**	R5F101LDAFC**	R5F101LEAFC**	R5F101LFAFC**	R5F101LGAFC**	R5F101LHAFC**	R5F101LJAFC**	R5F101LCAFG**	R5F101LDAFG**	R5F101LEAFG**	R5F101LFAFG**	R5F101LGAFG**	R5F101LHAFG**	R5F101LJAFG**

Remark POR: Power-on reset
LVD: Voltage detector

★ : New product ★★ : Under development

• Specifications (RL78/G13 (80, 100, 128-pin) (1/2))

Group		RL78/G13																											
Memory	ROM size (byte)	96K	128K	192K	256K	384K	512K	96K	128K	192K	256K	384K	512K	96K	128K	192K	256K	384K	512K	96K	128K	192K	256K	384K	512K	192K	256K	384K	512K
	ROM Type	Flash																											
	Single-Power-Supply Flash Memory	Yes																											
	RAM size (byte)	8K	12K	16K	20K	24K	32K	8K	12K	16K	20K	24K	32K	8K	12K	16K	20K	24K	32K	8K	12K	16K	20K	24K	32K	16K	20K	24K	32K
	Data Flash (byte)	8K																											
Clock	Maximum Operating Frequency (MHz)	32																											
	On-Chip Oscillator (Hz)	32M, 24M, 16M, 12M, 8M, 4M, 1M, 15k																											
	Subclock (32.768kHz)	Yes																											
I/O	I/O Ports	74												94												120			
Bus	External Data/Address Bus	—/—																											
Timer	16-bit Timer	12																								16			
	Real-Time Counter	1																											
	Watchdog Timer	1																											
	PWM Output	PWM : 16-bit × 6, Multiplexed PWM : 16-bit × 10																								PWM : 16-bit × 8, Multiplexed PWM : 16-bit × 14			
Serial Interface	CSI/UART	—																											
	CSI:2ch/UART:1ch	—																											
	CSI:2ch/UART:1ch/simplified I²C	—																											
	CSI:2ch/UART:1ch/simplified I²C:2ch	3																											
	CSI:2ch/UART supporting LIN-bus :1ch	—																											
	CSI/UART supporting LIN-bus/simplified I²C	—																											
	CSI:2ch/UART supporting LIN-bus :1ch	1																											
	UART supporting LIN-bus	—																											
	I²C	2																											
OCD	On-Chip debugging	Yes																											
Peripheral Functions	8/10-bit A/D Converter	17												20												26			
	Multiplier/Divider (bit × bit, bit ÷ bit) Multiply-accumulator (bit × bit + bit)	16 × 16 32 ÷ 32 16 × 16 + 32																											
	Other Functions	POR, LVD, DMA, safety function																											
OThers	Supply Voltage (V)	1.6 to 5.5																											
	Package (size: mm)	80-LQFP (12 × 12)						80-LQFP (14 × 14)						100-LQFP (14 × 14)						100-LQFP (14 × 20)						128-LQFP (14 × 20)			
	In-Circuit Emulator Emulation Board	E1 (on-chip debugging emulator) QB-RL78G13 (IECUBE)																											
Package		80-LQFP (12 × 12) (package code : under consideration)						80-LQFP (14 × 14) (package code : under consideration)						100-LQFP (14 × 14) (package code : under consideration)						100-LQFP (14 × 20) (package code : under consideration)						128-LQFP (14 × 20) (package code : under consideration)			
Part No.		R5F100MEAFB**	R5F100MGAFB**	R5F100MHAFB**	R5F100MJAFB**	R5F100MKAFB**	R5F100MLAFB**	R5F100MFAFA**	R5F100MGAFA**	R5F100MHAFA**	R5F100MJAFA**	R5F100MKAFA**	R5F100MLAFA**	R5F100PFAFB**	R5F100PGAFB**	R5F100PHAFB**	R5F100PJAFB**	R5F100PKAFB**	R5F100PLAFB**	R5F100PFAFA**	R5F100PGAFA**	R5F100PHAFA**	R5F100PJAFA**	R5F100PKAFA**	R5F100PLAFA**	R5F100SHAFB**	R5F100SJAFB**	R5F100SKAFB**	R5F100SLAFB**

Remark POR: Power-on reset
LVD: Voltage detector

★ : New product ★★ : Under development

• Specifications (RL78/G13 (80, 100, 128-pin) (2/2))

Group		RL78/G13																											
Memory	ROM size (byte)	96K	128K	192K	256K	384K	512K	96K	128K	192K	256K	384K	512K	96K	128K	192K	256K	384K	512K	96K	128K	192K	256K	384K	512K	192K	256K	384K	512K
	ROM Type	Flash																											
	Single-Power-Supply Flash Memory	Yes																											
	RAM size (byte)	8K	12K	16K	20K	24K	32K	8K	12K	16K	20K	24K	32K	8K	12K	16K	20K	24K	32K	8K	12K	16K	20K	24K	32K	16K	20K	24K	32K
	Data Flash (byte)	—																											
Clock	Maximum Operating Frequency (MHz)	32																											
	On-Chip Oscillator (Hz)	32M, 24M, 16M, 12M, 8M, 4M, 1M, 15k																											
	Subclock (32.768kHz)	Yes																											
I/O	I/O Ports	74												94												120			
Bus	External Data/Address Bus	—/—																											
Timer	16-bit Timer	12																								16			
	Real-Time Counter	1																											
	Watchdog Timer	1																											
	PWM Output	PWM : 16-bit × 6, Multiplexed PWM : 16-bit × 10																								PWM : 16-bit × 8, Multiplexed PWM : 16-bit × 14			
Serial Interface	CSI/UART	—																											
	CSI:2ch/UART:1ch	—																											
	CSI:2ch/UART:1ch/simplified I²C	—																											
	CSI:2ch/UART:1ch/simplified I²C:2ch	3																											
	CSI:2ch/UART supporting LIN-bus :1ch	—																											
	CSI/UART supporting LIN-bus/simplified I²C	—																											
	CSI:2ch/UART supporting LIN-bus :1ch	1																											
	UART supporting LIN-bus	—																											
	I²C	2																											
OCD	On-Chip debugging	Yes																											
Peripheral Functions	8/10-bit A/D Converter	17												20												26			
	Multiplier/Divider (bit x bit, bit ÷ bit) Multiply-accumulator (bit x bit + bit)	16 × 16 32 ÷ 32 16 × 16 + 32																											
	Other Functions	POR, LVD, DMA, safety function																											
OThers	Supply Voltage (V)	1.6 to 5.5																											
	Package (size: mm)	80-LQFP (12 × 12)						80-LQFP (14 × 14)						100-LQFP (14 × 14)						100-LQFP (14 × 20)						128-LQFP (14 × 20)			
	In-Circuit Emulator Emulation Board	E1 (on-chip debugging emulator) QB-RL78G13 (IECUBE)																											
Package		80-LQFP (12 × 12) (package code : under consideration)						80-LQFP (14 × 14) (package code : under consideration)						100-LQFP (14 × 14) (package code : under consideration)						100-LQFP (14 × 20) (package code : under consideration)						128-LQFP (14 × 20) (package code : under consideration)			
Part No.		R5F100MFAFB**	R5F100MGAFB**	R5F100MHAFB**	R5F100MJAFB**	R5F100MKAFB**	R5F100MLAFB**	R5F100MFAFA**	R5F100MGAFA**	R5F100MHAFA**	R5F100MJAFA**	R5F100MKAFA**	R5F100MLAFA**	R5F100PFAFB**	R5F100PGAFB**	R5F100PHAFB**	R5F100PJAFB**	R5F100PKAFB**	R5F100PLAFB**	R5F100PFAFA**	R5F100PGAFA**	R5F100PHAFA**	R5F100PJAFA**	R5F100PKAFA**	R5F100PLAFA**	R5F100SHAFB**	R5F100SJAFB**	R5F100SKAFB**	R5F100SLAFB**

Remark POR: Power-on reset
LVD: Voltage detector

★ : New product ★★ : Under development

• Specifications (RL78/G12 (20, 24, 30-pin))

Group		RL78/G12																									
Memory	ROM size (byte)	2K	4K	8K	12K	16K	2K	4K	8K	12K	16K	4K	8K	12K	16K	4K	8K	12K	16K	4K	8K	12K	16K	4K	8K	12K	16K
	ROM Type	Flash																									
	Single-Power-Supply Flash Memory	Yes																									
	RAM size (byte)	256	512	768	1K	1.5K	256	512	768	1K	1.5K	512	768	1K	1.5K	512	768	1K	1.5K	512	768	1K	2K	512	768	1K	2K
	Data Flash (byte)			2K					—				2K				—				2K				—		
Clock	Maximum Operating Frequency (MHz)	24																									
	On-Chip Oscillator (Hz)	24M, 16M, 12M, 8M, 4M, 1M, 15k																									
	Subclock (32.768kHz)	—																									
I/O	I/O Ports	16										22								26							
Bus	External Data/Address Bus	—/—																									
Timer	16-bit Timer	4																		8							
	Real-Time Counter	—																									
	Watchdog Timer	1																									
	PWM Output	PWM : 16-bit × 6, Multiplexed PWM : 16-bit × 3																									
Serial Interface	CSI/UART			—					1				—				1				—				1		
	CSI:2ch/UART:1ch	—																									
	CSI:2ch/UART:1ch/simplified I²C									—											2				—		
	CSI:2ch/UART:1ch/simplified I²C:2ch			1					—				1				—										
	CSI:2ch/UART supporting LIN-bus :1ch	—																									
	CSI/UART supporting LIN-bus/simplified I²C									—											1				—		
	UART supporting LIN-bus	—																									
	I²C	1																									
OCD	On-Chip debugging	Yes																									
Peripheral Functions	8/10-bit A/D Converter	11																		8							
	Multiplier/Divider (bit x bit, bit ÷ bit) Multiply-accumulator (bit x bit + bit)	16 × 16 32 ÷ 32 16 × 16 + 32																									
	Other Functions	POR, LVD, DMA, safety function					POR, LVD, safety function					POR, LVD, DMA, safety function				POR, LVD, safety function				POR, LVD, DMA, safety function				1POR, LVD, safety function			
OThers	Supply Voltage (V)	1.8 to 5.5																									
	Package (size: mm)	20-SSOP (7.62)										24-WQFN (4 × 4)								30-SSOP (7.62)							
	In-Circuit Emulator Emulation Board	E1 (on-chip debugging emulator) QB-RL78G13 (IECUBE)																									
Package		20-SSOP (7.62) (package code : under consideration)										24-WQFN (4 × 4) (package code : under consideration)								30-SSOP (7.62) (package code : under consideration)							
Part No.		R5F10266ASP**	R5F10267ASP**	R5F10268ASP**	R5F10269ASP**	R5F1026AASP**	R5F10366ASP**	R5F10367ASP**	R5F10368ASP**	R5F10369ASP**	R5F1036AASP**	R5F10277ANA**	R5F10278ANA**	R5F10279ANA**	R5F1027AANA**	R5F10377ANA**	R5F10378ANA**	R5F10379ANA**	R5F1037AANA**	R5F102A7ASP**	R5F102A8ASP**	R5F102A9ASP**	R5F102AAASP**	R5F103A7ASP**	R5F103A8ASP**	R5F103A9ASP**	R5F103AASP**

Remark POR: Power-on reset
LVD: Voltage detector

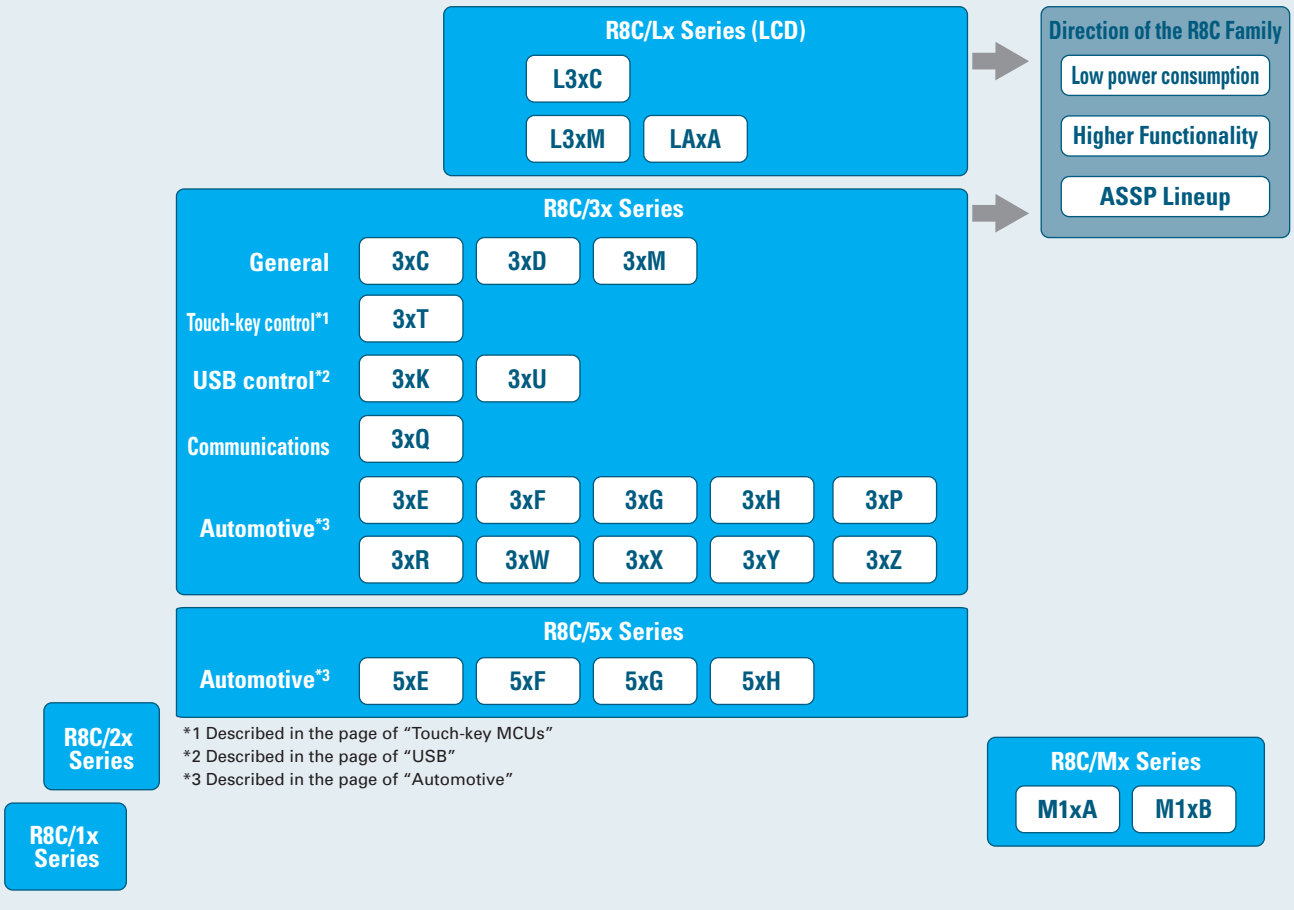
★ : New product ★★ : Under development

The R8C Family of 16-bit CISC MCUs* features high ROM efficiency, superior noise characteristics, low power consumption, and excellent processing performance in actual applications. The many on-chip peripheral functions, including a full complement of timer functions and serial communication functions, provide support for a wide variety of application fields. Products are available with features such as an on-chip oscillator that eliminates the need for an external resonator, a power-on reset circuit and low voltage detection circuit to reduce the number of external devices required, and an oscillation-stop detection function for enhanced system safety. Such features make it possible to build a safe system at reduced cost. Renesas Electronics is helping to shorten development cycles and reduce total system cost by including on-chip flash memory on all new R8C Family MCUs and providing low-cost development environments to customers. The R8C Family maintains compatibility with the M16C Family and allows sharing of the same software resources and development environments.
*** The bus width between the CPU and peripheral functions is 8 bits.**

R8C Family Applications

- Consumer: audio, home electronics and household equipment (sensors and security)
- OA/PC: office equipment
- Automotive
- Industrial/equipment
- Communications: mobile devices

• R8C Family Roadmap



The R8C core lineup contains products suitable for a wide range of fields.

Outline of R8C/Mx,3x, 2x, 1x Series

The R8C/Mx, 3x, 2x, 1x Series is a lineup of high-performance 16-bit MCUs incorporating flash memory. These MCUs make it possible to reduce a number of external parts, thus saving system costs.

R8C/Mx, 3x, 2x, 1x Series Features

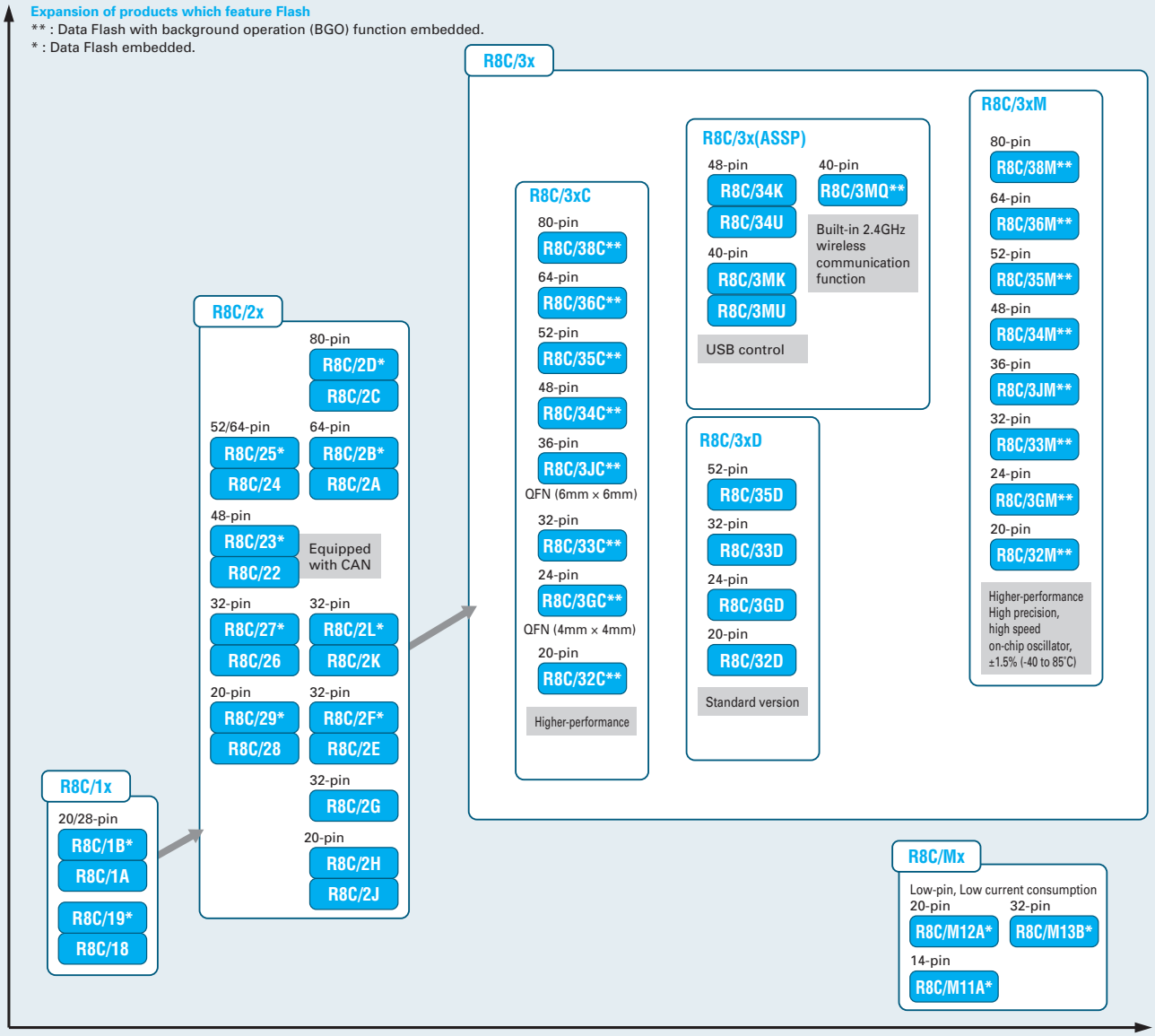
- 16-bit MCU with built-in multiplier
  Instruction compatibility with M16C/60 Series; operates at the maximum operating frequency 20MHz (excluding R8C/2G, R8C/2H and R8C/2J)
- Small package
  Small package flash MCU of 14 to 80 pins
- Incorporates high-functional peripheral circuits
  Incorporates high-functionality peripheral circuits such as on-chip oscillator, voltage detection, power-on reset, data flash, D/A converter, I²C-bus, synchronous serial communication unit, and intergrated timer
- Low-cost development environment
  Offer low-cost development environment such as on-chip debugger and Starter Kit

*The bus width is 8-bit between CPU and peripheral functions.

• CPU Overview

Performance	Machine cycles	50ns (20MHz) Except R8C/2G, R8C/2H, R8C/2J
	Address space	1M bytes
Number of Instructions	89	
Registers	Data registers : 16-bit × 4 × 2 banks Address registers : 16-bit × 2 × 2 banks Dedicated registers : 16-bit × 5	

• R8C/Mx, 3x, 2x, 1x, Series Roadmap



Standard Peripheral Functions (common functions)

- Maximum Operating Frequency: 20MHz
- Incorporate Voltage detection circuit, Power-on reset, Low-speed On-chip oscillator, High-function timers

R8C/M13B Group

- Low-voltage operation (1.8V), 32-pin package
- Incorporates high-speed On-chip oscillator and comparator.
- Incorporates data flash and supports reprogramming data flash at low-voltage (1.8V).
- Supports IrDA.
- Incorporates timer for full calendar.

R8C/M11A, M12A Group

- Low-voltage operation (1.8V), 14-pin (TSSOP,DIP), 20-pin (LSSOP, DIP) packages.
- Incorporate high-speed On-chip oscillator and comparator.
- Incorporate data flash and supports reprogramming data flash at low-voltage (1.8V).

R8C/32M, 33M, 34M, 35M Group

- Low-voltage operation (1.8V), 20-pin, 32-pin, 48-pin, 52-pin packages.
- Incorporate high-precision (±1.5%) and high-speed On-chip oscillator, D/A converter (33M, 34M, and 35M), and comparator.
- Incorporate a data transfer controller function
- Incorporate a data flash provided with a BGO function

R8C/32D, 3GD, 33D, 35D Group

- Low-voltage operation (1.8V), 20-pin, 24-pin, 32-pin, 52-pin packages.
- Incorporate high-speed On-chip oscillator and comparator

R8C/3GC, 3JC Group

- Low-voltage operation (1.8V), 24-pin (QFN), 24-pin (LSSOP), 36-pin (QFN) packages.
- Incorporate high-speed On-chip oscillator, D/A converter and comparator.
- Incorporate a data transfer controller function
- Incorporate a data flash provided with a BGO function

R8C/32C, 33C, 34C, 35C Group

- Low-voltage operation (1.8V), 20-pin, 32-pin, 48-pin, 52-pin packages.
- Incorporate high-speed On-chip oscillator, D/A converter (33C, 34C, 35C) and comparator.
- Incorporate a data transfer controller function
- Incorporate a data flash provided with a BGO function

R8C/36C, 38C Group

- Low-voltage operation (1.8V), 64-pin, 80-pin packages.
- Incorporate high-speed On-chip oscillator, D/A converter and comparator.
- Incorporate timer for two-phase encoder input
- Incorporate a data transfer controller function
- Incorporate a data flash provided with a BGO function

R8C/3MK, 3MU, 34K, 34U Group

- Incorporate USB2.0 Full-Speed (Host/Function) controller.
- Incorporate high-precision and high-speed On-chip oscillator
- Incorporate data flash
- Incorporate a data transfer controller function
- 40-pin (3MK, 3MU), 48-pin (34K, 34U) packages

* Please refer to “USB” on details in this catalog.

R8C/3MQ Group (Under Development)

- Incorporates 2.4GHz band wireless communication function
- Low voltage (1.8V) operation, 40-pin package
- Incorporates Data Transfer Controller
- Incorporates flash memory capable of programming at low-voltage (1.8V)
- Incorporates a data flash with a BGO function

R8C/2K, 2L Group

- Low-voltage operation (2.2V), 32-pin packages.
- Incorporate high-speed On-chip oscillator
- Incorporate a data flash (R8C/2L)
- Incorporate motor control function

R8C/2G, 2H, 2J Group

- Low-voltage operation (2.2V), 20-pin and 32-pin packages.
- Incorporate high-speed On-chip oscillator, and comparator (shared with Low-voltage detector)

R8C/2E, 2F Group

- 32-pin packages.
- Incorporate high-speed On-chip oscillator, D/A converter, comparator
- Incorporate a data flash (R8C/2F)

R8C/2A, 2B, 2C, 2D Group

- Low-voltage operation (2.2V), 64-pin, 80-pin packages.
- Incorporate high-speed On-chip oscillator and D/A converter
- Incorporate a data flash (R8C/2B, 2D)

R8C/26, 27, 28, 29 Group

- Low-voltage operation (2.2V), 20-pin, 32-pin packages.
- Incorporate high-speed On-chip oscillator
- Incorporate a data flash (R8C/27, 29)

* please refer to "Automotive MCUs" in this catalog.

R8C/24, 25 Group

- Low-voltage operation (2.2V), 52-pin package.
- Incorporate high-speed On-chip oscillator
- Incorporate a data flash (R8C/25)

R8C/22, 23 Group

- 48-pin packages.
- Incorporate CAN
- Incorporate high-speed On-chip oscillator
- Incorporate a data flash (R8C/23)

* Please refer to "Automotive MCUs" in this catalog.

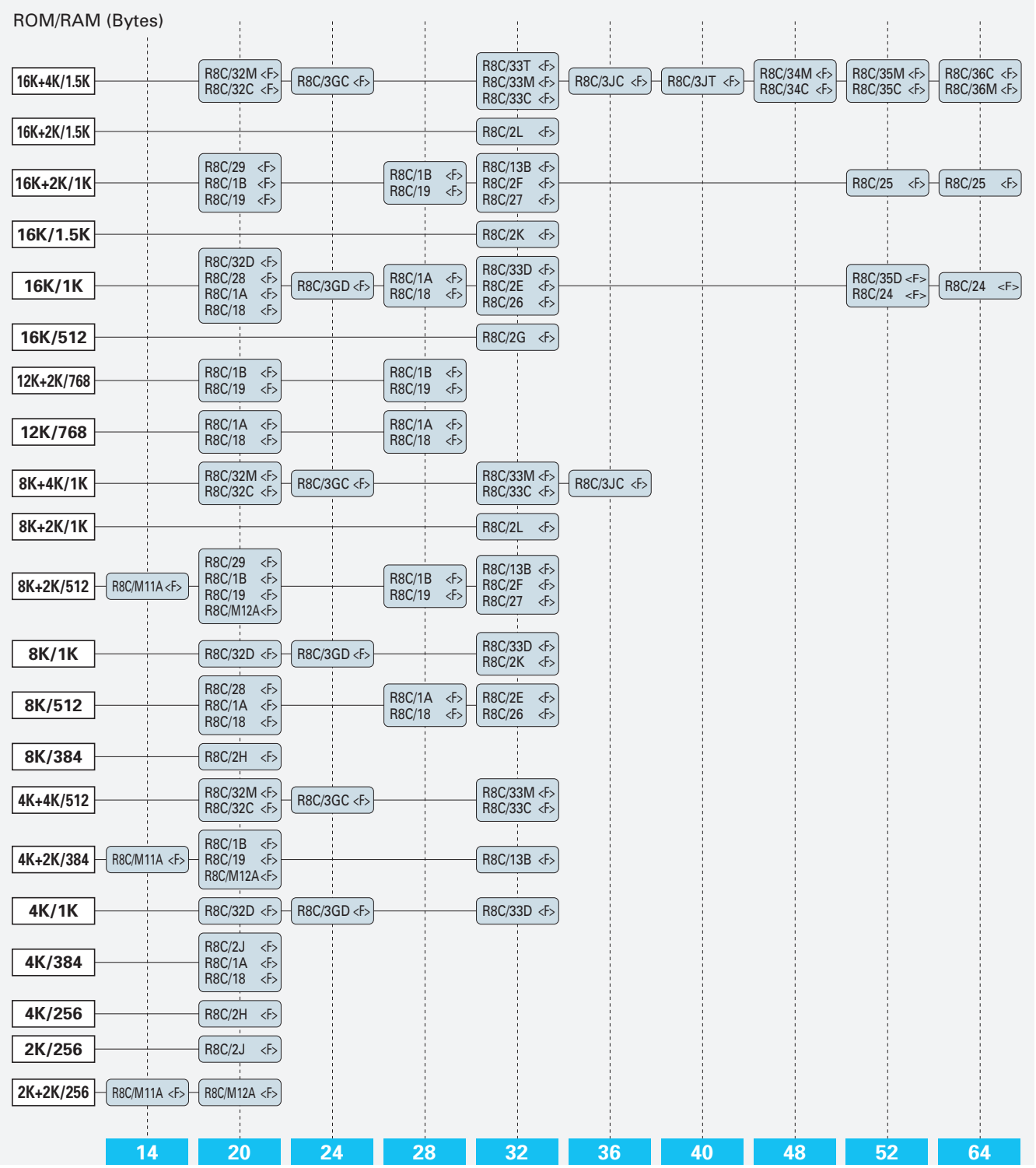
R8C/18, 19, 1A, 1B Group

- 20-pin packages.
- Incorporate high-speed On-chip oscillator, comparator (R8C/18, 19)
- Incorporate a data flash (R8C/19, 1B)

R8C/36M, 38M Group (Under Development)

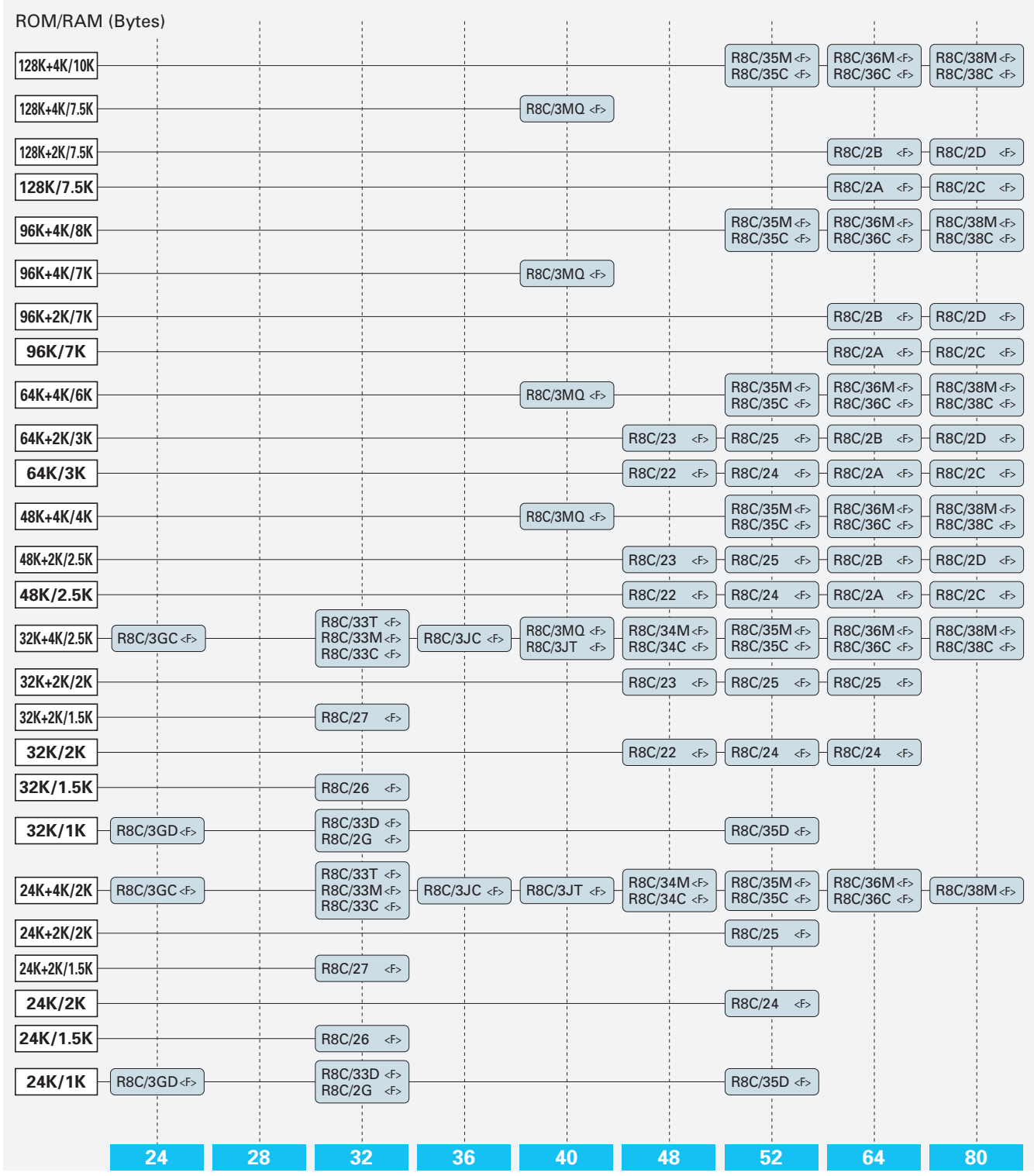
- Low voltage (1.8V) operation, 80-pin package
- Incorporate high precision (±1.5%), and high speed on-chip oscillator, D/A converter, comparator
- Incorporate timer supporting 2-phase encoder input
- Incorporate Data Transfer Controller
- Incorporate data flash with a BGO function

• Memory Capacity (ROM/RAM) (R8C/Mx, 3x, 2x, 1x Series)



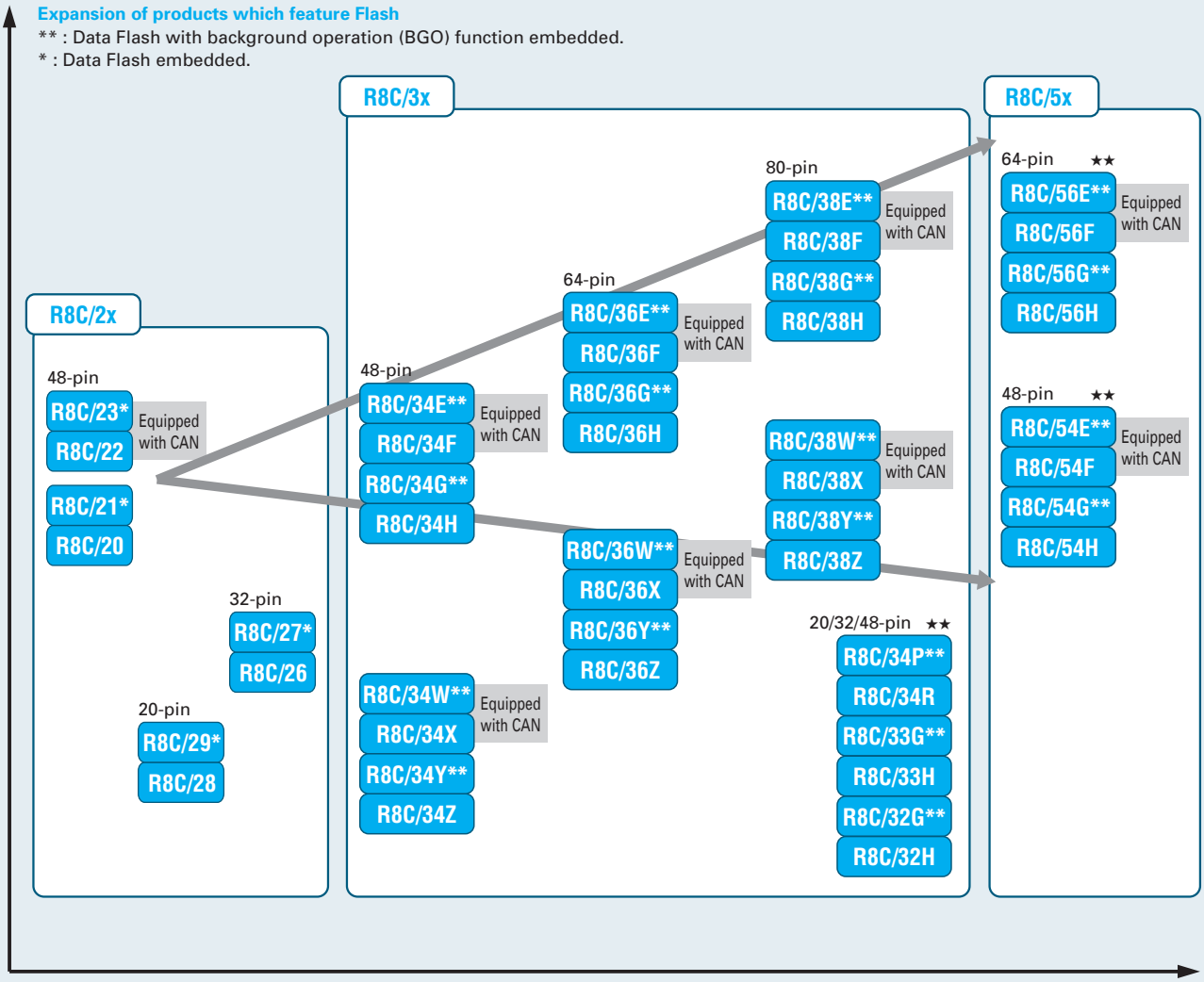
Letters in brackets < > indicate memory variations.
F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

• Memory Capacity (ROM/RAM) (R8C/Mx, 3x, 2x, 1x Series)



Letters in brackets < > indicate memory variations.
F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

• R8C/2x, R8C/3x, R8C/5x Series Roadmap for automotive installation



★★ : Under development

R8C/20, R8C/21 Group

- Maximum operating frequency of 20MHz, automotive quality, 48-pin package
- Incorporate LIN
- Incorporate a synchronous serial communications unit
- Incorporate a voltage detection circuit, power-on reset circuit, on-chip oscillator (low and high speed) and highly functional timer
- Incorporates data flash memory (R8C/21)

* Please refer to "Automotive MCUs" in this catalog.

R8C/22, R8C/23 Group

- Maximum operating frequency of 20MHz, automotive quality, 48-pin package
- Incorporate CAN and LIN
- Incorporate a synchronous serial communications unit
- Incorporate a voltage detection circuit, power-on reset circuit, on-chip oscillator (low and high speed) and highly functional timer
- Incorporates data flash memory (R8C/23)

* Please refer to "Automotive MCUs" in this catalog.

R8C/26, R8C/27 Group

- Maximum operating frequency of 20MHz, automotive quality, 32-pin package
- Incorporate LIN
- Incorporate a synchronous serial communications unit
- Incorporate a voltage detection circuit, power-on reset circuit, on-chip oscillator (low and high speed) and highly functional timer
- Incorporates data flash memory (R8C/27)

* Please refer to "Automotive MCUs" in this catalog.

R8C/28, R8C/29 Group

- Maximum operating frequency of 20MHz, automotive quality, 20-pin package
- Incorporate LIN
- Incorporate a synchronous serial communications unit
- Incorporate a voltage detection circuit, power-on reset circuit, on-chip oscillator (low and high speed) and highly functional timer
- Incorporates data flash memory (R8C/29)

* Please refer to "Automotive MCUs" in this catalog.

R8C/32G, 32H, 33G, 33H, 34P, 34R Group (Under Development)

- Maximum operating frequency of 20MHz, automotive quality, 20-pin (32G, 32H), 32-pin (33G, 33H), 48-pin (34P, 34R) package
- Incorporate a synchronous serial communications unit
- Incorporate a voltage detection circuit, power-on reset circuit, on-chip oscillator (high and low speed), comparator, D/A (33x,34x)
- Incorporates data flash memory (R8C/32G, 33G, 34P)

* Please refer to "Automotive MCUs" in this catalog.

R8C/34E, 34F, 34G, 34H Group

- Maximum operating frequency of 20MHz, automotive quality, 48-pin package
- Incorporates CAN (R8C/34E, 34F) and LIN
- Incorporates a synchronous serial communications unit
- Incorporates a voltage detection circuit, power-on reset circuit, on-chip oscillator (low and high speed) and highly functional timer
- Incorporates data flash memory with background operation function (R8C/34E, 34G)

* Please refer to "Automotive MCUs" in this catalog.

R8C/36E, 36F, 36G, 36H Group

- Maximum operating frequency of 20MHz, automotive quality, 64-pin package
- Incorporates CAN (R8C/36E, 36F) and LIN
- Incorporates a synchronous serial communications unit
- Incorporates a voltage detection circuit, power-on reset circuit, on-chip oscillator (low and high speed) and highly functional timer
- Incorporates data flash memory with background operation function (R8C/36E, 36G)

* Please refer to "Automotive MCUs" in this catalog.

R8C/38E, 38F, 38G, 38H Group

- Maximum operating frequency of 20MHz, automotive quality, 80-pin package
- Incorporates CAN (R8C/38E, 38F) and LIN
- Incorporates a synchronous serial communications unit
- Incorporates a voltage detection circuit, power-on reset circuit, on-chip oscillator (low and high speed) and highly functional timer
- Incorporates data flash memory with background operation function (R8C/38E, 38G)

* Please refer to "Automotive MCUs" in this catalog.

R8C/34W, 34X, 34Y, 34Z Group (New product)

- Maximum operating frequency of 20MHz, automotive quality, 48-pin package
- Incorporate CAN (R8C/34X, 34W) and LIN
- Incorporate a synchronous serial communications unit
- Incorporate a voltage detection circuit, power-on reset circuit, on-chip oscillator (low and high-precision and high-speed) and highly functional timer
- Incorporates data flash memory with background operation function (R8C/34W, 34Y)

* Please refer to "Automotive MCUs" in this catalog.

R8C/36W, 36X, 36Y, 36Z Group (New product)

- Maximum operating frequency of 20MHz, automotive quality, 64-p in package
- Incorporate CAN (R8C/36X, 36W) and LIN
- Incorporate a synchronous serial communications unit
- Incorporate a voltage detection circuit, power-on reset circuit, on-chip oscillator (low and high-precision and high-speed) and highly functional timer
- Incorporates data flash memory with background operation function (R8C/36W, 36Y)

* Please refer to "Automotive MCUs" in this catalog.

R8C/38W, 38X, 38Y, 38Z Group (New product)

- Maximum operating frequency of 20MHz, automotive quality, 80-pin package
- Incorporate CAN (R8C/38X, 38W) and LIN
- Incorporate a synchronous serial communications unit
- Incorporate a voltage detection circuit, power-on reset circuit, on-chip oscillator (low and high-precision and high-speed) and highly functional timer
- Incorporates data flash memory with background operation function (R8C/38W, 38Y)

* Please refer to "Automotive MCUs" in this catalog.

R8C/54E, 54F, 54G, 54H Group (Under Development)

- Maximum operating frequency:32MHz, Automotive quality, 48-pin package
- Incorporat CAN(R8C/54E, 54F) and LIN
- Incorporate synchronous serial communications unit
- Incorporate a voltage detection circuit, power-on reset circuit, on-chip oscillator (low and high-precision and high-speed) and highly functional timer
- Incorporate simplified PMC(Peripheral Mapping Controller), ELC(Event Link Controller), comparator

* Please refer to "Automotive MCUs" in this catalog.

R8C/56E, 56F, 56G, 56H Group (Under Development)

- Maximum operating frequency:32MHz, Automotive quality, 64-pin package
- Incorporat CAN(R8C/56E, 56F) and LIN
- Incorporate synchronous serial communications unit
- Incorporate a voltage detection circuit, power-on reset circuit, on-chip oscillator (low and high-precision and high-speed) and highly functional timer
- Incorporate simplified PMC(Peripheral Mapping Controller), ELC(Event Link Controller), comparator

* Please refer to "Automotive MCUs" in this catalog.

• Specifications (R8C/Mx Series)

Group		R8C/M11A			R8C/M12A			R8C/M13B		
Memory	ROM (Bytes)	2K + 2K	4K + 2K	8K + 2K	2K + 2K	4K + 2K	8K + 2K	4K + 2K	8K + 2K	16K + 2K
	RAM (Bytes)	256	384	512	256	384	512	384	512	1K
	ROM Type*1	F								
	Data Flash/E2 Data Flash	2K (Data Flash: program/erase 10k times)								
	Program Security	Yes (ID code check function)								
CPU	CPU	R8C Core								
	Basic Instructions	89								
	Minimum Instruction Execution Time (ns)	50 (@20MHz)								
	Multiplier	16 × 16 → 32								
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32								
DMA	DTC/DMAC II	—								
Clock	Clock Generation Circuit	3 circuits (Main clock, High-speed on-chip oscillator, Low-speed on-chip oscillator)						4 circuits (Main clock, Sub-clock, High-speed on-chip oscillator, Low-speed on-chip oscillator)		
	PLL	—								
	Subclock	—						Yes (32.768kHz)		
	RTC	—						Yes (Timer RE2)		
	On-Chip Oscillator	2 circuits (High speed: 20MHz, Low speed: 125kHz)								
	Oscillation Stop Detection	Yes								
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16, 32)								
	Power Save	Wait/Stop								
Power Supply Voltage Detection	Power-On Reset/POR	Yes								
	Low Voltage Detection/LVD	Yes (Voltage detection 2)								
A/D Converter	Resolution × Channels	10-bit × 5			10-bit × 6			10-bit × 8		
	Sample and Hold	Yes								
D/A Converter	Resolution × Channels	—								
Timer	8-bit	1 (Timer RB2)						3 (Timer RB2, Timer RE2, Timer RK)		
	16-bit	3 (Timer RJ2, Timer RB2, Timer RC)								
	Input Capture	4 (shared with Timer RC)								
	Output Compare	4 (shared with Timer RC)						6 (shared with Timer RC, Timer RE2, Timer RK)		
	PWM Output	4 (shared with Timer RB2, Timer RC)								
	Real-Time Port	—								
	Event Counter	1 (shared with Timer RJ2)								
	2-Phase Encoder Input	—								
	3-Phase Inverter Control	—								
Watchdog Timer		1 (with automatic start function, clock source protection function)								
Serial Interface	Clock Sync./Clock Async.	1 (UART 0)						2 (UART 0, UART 1)		
	Clock Sync. Only	—								
	Clock Async. Only	—								
I²C-bus		—						1 (shared with SSU)		
Synchronous Serial Communication Unit/Special Serial I/O		—						1 (shared with I²C)		
CAN	Channels	—								
	Message Box (Numbers)	—								
LCD		—								
I/O Ports	Input Only (Numbers)	—								
	CMOS Output Only (Numbers)	—								
	CMOS I/O (Numbers)	11			17			29		
	N-Channel Open Drain Port (Numbers)	11			17			29		
	High Current Drive Port	5			8					
	Pull-Up Resistor	10			16			28		
External Interrupts Pins		6			8					
Debugging Function	On-Chip Debug	Yes								
	On-Board Flash Program	Yes								
Other Functions	ROM Correction Function	—								
	Others	Comparator B × 1			Comparator B × 2					
Operating Frequency/Supply Voltage		20MHz/2.7 to 5.5V, 5MHz/1.8 to 5.5V								
Operating Ambient Temperature (°C)		-40 to 85	-20 to 85	-40 to 85	-20 to 85	-40 to 85	-20 to 85	-40 to 85	-20 to 85	-40 to 85	-20 to 85	-40 to 85	-20 to 85	-40 to 85	-20 to 85	-40 to 85	-20 to 85	-40 to 85	-20 to 85	-40 to 85	-20 to 85
Package*2		PTSP0014JA-B	PRDP0014AC-A	PTSP0014JA-B	PRDP0014AC-A	PTSP0014JA-B	PRDP0014AC-A	PTSP0014JA-B	PLSP0020JB-A	PRDP0020AD-A	PLSP0020JB-A	PRDP0020AD-A	PLSP0020JB-A	PRDP0020AD-A	PLSP0020JB-A	PLQP0032GB-A					
Part No.		R5F2M110ADSP	R5F2M110ANDD	R5F2M110ANSP	R5F2M111ADSP	R5F2M111ANDD	R5F2M111ANSP	R5F2M112ADSP	R5F2M112ANDD	R5F2M112ANSP	R5F2M120ADSP	R5F2M120ANDD	R5F2M120ANSP	R5F2M121ADSP	R5F2M121ANDD	R5F2M121ANSP	R5F2M122ADSP	R5F2M122ANDD	R5F2M122ANSP	R5F2M131BDFP*	R5F2M131BNFP*	R5F2M132BDFP*	R5F2M132BNFP*	R5F2M134BDFP*	R5F2M134BNFP*

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (R8C/3x Series)

Group		R8C/32M			R8C/33M					R8C/34M		
Memory	ROM (Bytes)	4K + 4K	8K + 4K	16K + 4K	4K + 4K	8K + 4K	16K + 4K	24K + 4K	32K + 4K	16K + 4K	24K + 4K	32K + 4K
	RAM (Bytes)	512	1K	1.5K	512	1K	1.5K	2K	2.5K	1.5K	2K	2.5K
	ROM Type*1	F										
	Data Flash/E2 Data Flash	4K (Data Flash: program/erase 10k times)										
	Program Security	Yes (ID code check function, ROM code protect function)										
CPU	CPU	R8C Core										
	Basic Instructions	89										
	Minimum Instruction Execution Time (ns)	50 (@20MHz)										
	Multiplier	16 × 16 → 32										
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32										
DMA	DTC/DMAC Ⅱ	DTC (Activation sources: 21)			DTC (Activation sources: 23)					DTC (Activation sources: 33)		
Clock	Clock Generation Circuit	4 circuits (Main clock, Sub-clock, High-speed on-chip oscillator, Low-speed on-chip oscillator)										
	PLL	—										
	Subclock	Yes (32.768kHz)										
	RTC	Yes (Timer RE)										
	On-Chip Oscillator	2 circuits (High speed: 40MHz, Low speed: 125kHz)										
	Oscillation Stop Detection	Yes										
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)										
	Power Save	Wait/Stop										
Power Supply Voltage Detection	Power-On Reset/POR	Yes										
	Low Voltage Detection/LVD	Yes (Voltage detection 3)										
A/D Converter	Resolution × Channels	10-bit × 4			10-bit × 12							
	Sample and Hold	Yes										
D/A Converter	Resolution × Channels	—			8-bit × 2							
Timer	8-bit	3 (Timer RA, Timer RB, Timer RE)										
	16-bit	1 (Timer RC)								3 (Timer RC, Timer RD)		
	Input Capture	4 (shared with Timer RC)								12 (shared with Timer RC, Timer RD)		
	Output Compare	5 (shared with Timer RC, Timer RE)								13 (shared with Timer RC, Timer RD, Timer RE)		
	PWM Output	4 (shared with Timer RB, Timer RC)								10 (shared with Timer RB, Timer RC, Timer RD)		
	Real-Time Port	—										
	Event Counter	1 (shared with Timer RA)										
	2-Phase Encoder Input	—										
	3-Phase Inverter Control	—								1 (shared with Timer RD)		
Watchdog Timer		1 (with automatic start function, clock source protection function, low-speed on-chip oscillator for watchdog timer)										
Serial Interface	Clock Sync./Clock Async.	2 (UART 0, UART 2)			3 (UART 0 to UART 2)							
	Clock Sync. Only	—										
	Clock Async. Only	—										
I²C-bus		1 (shared with SSU) + 1 (UART 2 (simple I²C))										
Synchronous Serial Communication Unit/Special Serial I/O		1 (shared with I²C)										
CAN	Channels	—										
	Message Box (Numbers)	—										
LCD		—										
I/O Ports	Input Only (Numbers)	1										
	CMOS Output Only (Numbers)	—										
	CMOS I/O (Numbers)	15			27					43		
	N-Channel Open Drain Port (Numbers)	—										
	High Current Drive Port	15			27					43		
	Pull-Up Resistor	15			27					43		
External Interrupts Pins		7								9		
Debugging Function	On-Chip Debug	Yes										
	On-Board Flash Program	Yes										
Other Functions	ROM Correction Function	—										
	Others	Comparator A × 2 (shared with voltage monitor 1, 2) + Comparator B × 2										
Operating Frequency/Supply Voltage		20MHz/2.7 to 5.5V, 5MHz/1.8 to 5.5V										
Operating Ambient Temperature (°C)		–40 to 85	–20 to 85	–40 to 85	–20 to 85	–40 to 85	–20 to 85	–40 to 85	–20 to 85	–40 to 85	–20 to 85	–40 to 85	–20 to 85
Package*2		PLSP0020JB-A			PLQP0032GB-A					PLQP0048KB-A		
Part No.		R5F21321MDSP*	R5F21321MNSP*	R5F21322MNSP*	R5F21322MDSP*	R5F21324MDSP*	R5F21324MNSP*	R5F21331MNFP*	R5F21331MDFP*	R5F21332MDFP*	R5F21332MNFP*	R5F21334MNFP*	R5F21334MDFP*	R5F21335MDFP*	R5F21335MNFP*	R5F21336MNFP*	R5F21336MDFP*	R5F21344MDFP*	R5F21344MNFP*	R5F21345MNFP*	R5F21345MDFP*	R5F21346MDFP*	R5F21346MNFP*

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (R8C/35M Series)

Group		R8C/35M						
Memory	ROM (Bytes)	16K + 4K	24K + 4K	32K + 4K	48K + 4K	64K + 4K	96K + 4K	128K + 4K
	RAM (Bytes)	1.5K	2K	2.5K	4K	6K	8K	10K
	ROM Type*1	F						
	Data Flash/E2 Data Flash	4K (Data Flash: program/erase 10k times)						
	Program Security	Yes (ID code check function, ROM code protect function)						
CPU	CPU	R8C core						
	Basic Instructions	89						
	Minimum Instruction Execution Time (ns)	50 (@20MHz)						
	Multiplier	16 × 16 → 32						
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32						
DMA	DTC/DMAC II	DTC (Activation sources: 33)						
Clock	Clock Generation Circuit	4 circuits (Main clock, Sub-clock, High-speed on-chip oscillator, Low-speed on-chip oscillator)						
	PLL	—						
	Subclock	Yes (32.768kHz)						
	RTC	Yes (Timer RE)						
	On-Chip Oscillator	2 circuits (High speed: 40MHz, Low speed : 125kHz)						
	Oscillation Stop Detection	Yes						
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)						
	Power Save	Wait/Stop						
Power Supply Voltage Detection	Power-On Reset/POR	Yes						
	Low Voltage Detection/LVD	Yes (voltage detection 3)						
A/D Converter	Resolution × Channels	10-bit × 12						
	Sample and Hold	Yes						
D/A Converter	Resolution × Channels	8-bit × 2						
Timer	8-bit	3 (Timer RA, Timer RB, Timer RE)						
	16-bit	3 (Timer RC, Timer RD)						
	Input Capture	12 (shared with Timer RC, Timer RD)						
	Output Compare	13 (shared with Timer RC, Timer RD, Timer RE)						
	PWM Output	10 (shared with Timer RB, Timer RC, Timer RD)						
	Real-Time Port	—						
	Event Counter	1 (shared with Timer RA)						
	2-Phase Encoder Input	—						
	3-Phase Inverter Control	1 (shared with Timer RD)						
Watchdog Timer		1 (with automatic start function, clock source protection function, low-speed on-chip oscillator for watchdog timer)						
Serial Interface	Clock Sync./Clock Async.	3 (UART0 to UART2)						
	Clock Sync. Only	—						
	Clock Async. Only	—						
I^2C-bus		1 (shared with SSU) + 1 (UART 2 (simple I^2C))						
Synchronous Serial Communication Unit/Special Serial I/O		1 (shared with I^2C)						
CAN	Channels	—						
	Message Box (Numbers)	—						
LCD		—						
I/O Ports	Input Only (Numbers)	1						
	CMOS Output Only (Numbers)	—						
	CMOS I/O (Numbers)	47						
	N-Channel Open Drain Port (Numbers)	—						
	High Current Drive Port	47						
	Pull-Up Resistor	47						
External Interrupts Pins		9						
Debugging Function	On-Chip Debug	Yes						
	On-Board Flash Program	Yes						
Other Functions	ROM Correction Function	—						
	Others	Comparator A × 2 (shared with voltage monitor 1, 2) + Comparator B × 2						
Operating Frequency/Supply Voltage		20MHz/2.7 to 5.5V, 5MHz/1.8 to 5.5V						
Operating Ambient Temperature (°C)		–40 to 85	–20 to 85	–40 to 85	–20 to 85	–40 to 85	–20 to 85	–40 to 85
		–20 to 85	–40 to 85	–20 to 85	–40 to 85	–20 to 85	–40 to 85	–20 to 85
Package*2		PLQP0052JA-A						
Part No.		R5F21354MDFP	R5F21354MNFP	R5F21355MDFP	R5F21355MNFP	R5F21356MNFP	R5F21356MDFP	R5F21357MDFP**
		R5F21357MNFP**	R5F21358MDFP**	R5F21358MNFP**	R5F2135AMDFP**	R5F2135AMNFP**	R5F2135CMDFP**	R5F2135CMNFP**

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (R8C/36M Series)

Group		R8C/36M						
Memory	ROM (Bytes)	16K + 4K	24K + 4K	32K + 4K	48K + 4K	64K + 4K	96K + 4K	128K + 4K
	RAM (Bytes)	1.5K	2K	2.5K	4K	6K	8K	10K
	ROM Type*1	F						
	Data Flash/E2 Data Flash	4K (Data Flash: program/erase 10k times)						
	Program Security	Yes (ID code check function, ROM code protect function)						
CPU	CPU	R8C core						
	Basic Instructions	89						
	Minimum Instruction Execution Time (ns)	50 (@20MHz)						
	Multiplier	16 × 16 → 32						
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32						
DMA	DTC/DMAC Ⅱ	DTC (Activation sources: 39)						
Clock	Clock Generation Circuit	4 circuits (Main clock, Sub-clock, High-speed on-chip oscillator, Low-speed on-chip oscillator)						
	PLL	—						
	Subclock	Yes (32.768kHz)						
	RTC	Yes (Timer RE)						
	On-Chip Oscillator	2 circuits(High speed: 40MHz, Low speed : 125kHz)						
	Oscillation Stop Detection	Yes						
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)						
	Power Save	Wait/Stop						
Power Supply Voltage Detection	Power-On Reset/POR	Yes						
	Low Voltage Detection/LVD	Yes (voltage detection 3)						
A/D Converter	Resolution × Channels	10-bit × 12						
	Sample and Hold	Yes						
D/A Converter	Resolution × Channels	8-bit × 2						
Timer	8-bit	3 (Timer RA, Timer RB, Timer RE)						
	16-bit	5 (Timer RC, Timer RD, Timer RF, Timer RG)						
	Input Capture	15 (shared with Timer RC, Timer RD, Timer RF, Timer RG)						
	Output Compare	16 (shared with Timer RC, Timer RD, Timer RE, Timer RF, Timer RG)						
	PWM Output	11 (shared with Timer RB, Timer RC, Timer RD, Timer RG)						
	Real-Time Port	—						
	Event Counter	1 (shared with Timer RA)						
	2-Phase Encoder Input	1 (shared with Timer RG)						
	3-Phase Inverter Control	1 (shared with Timer RD)						
Watchdog Timer		1 (with automatic start function, clock source protection function, low-speed on-chip oscillator for watchdog timer)						
Serial Interface	Clock Sync./Clock Async.	3 (UART0 to UART2)						
	Clock Sync. Only	—						
	Clock Async. Only	—						
I²C-bus		1 (shared with SSU) + 1 (UART 2 (simple I²C))						
Synchronous Serial Communication Unit/Special Serial I/O		1 (shared with I²C)						
CAN	Channels	—						
	Message Box (Numbers)	—						
LCD		—						
I/O Ports	Input Only (Numbers)	1						
	CMOS Output Only (Numbers)	—						
	CMOS I/O (Numbers)	59						
	N-Channel Open Drain Port (Numbers)	—						
	High Current Drive Port	59						
	Pull-Up Resistor	59						
External Interrupts Pins		9						
Debugging Function	On-Chip Debug	Yes						
	On-Board Flash Program	Yes						
Other Functions	ROM Correction Function	—						
	Others	Comparator A × 2 (shared with voltage monitor 1, 2) + Comparator B x 2						
Operating Frequency/Supply Voltage		20MHz/2.7 to 5.5V, 5MHz/1.8 to 5.5V						
Operating Ambient Temperature (°C)		–20 to 85	–40 to 85	–20 to 85	–40 to 85	–20 to 85	–40 to 85	–20 to 85	–40 to 85	–20 to 85	–40 to 85	–20 to 85	–40 to 85	–20 to 85	–40 to 85	–20 to 85	–40 to 85	–20 to 85	–40 to 85
Package*2		PLQP0064KB-A	PLQP0064GA-A	PLQP0064KB-A	PLQP0064GA-A	PLQP0064KB-A	PLQP0064GA-A	PLQP0064KB-A	PLQP0064GA-A	PLQP0064KB-A	PLQP0064GA-A	PLQP0064KB-A	PLQP0064GA-A	PLQP0064KB-A	PLQP0064GA-A	PLQP0064KB-A	PLQP0064GA-A	PLQP0064KB-A	PLQP0064GA-A	PLQP0064KB-A	PLQP0064GA-A	PLQP0064KB-A	PLQP0064GA-A	PLQP0064KB-A	PLQP0064GA-A	PLQP0064KB-A	PLQP0064GA-A	PLQP0064KB-A	PLQP0064GA-A
Part No.		R5F21364MNFP**	R5F21364MNFA**	R5F21364MDFP**	R5F21364MDFA**	R5F21365MNFP**	R5F21365MNFA**	R5F21365MDFP**	R5F21365MDFA**	R5F21366MNFP**	R5F21366MNFA**	R5F21366MDFP**	R5F21366MDFA**	R5F21367MNFP**	R5F21367MNFA**	R5F21367MDFP**	R5F21367MDFA**	R5F21368MNFP**	R5F21368MNFA**	R5F21368MDFP**	R5F21368MDFA**	R5F2136AMNFP**	R5F2136AMNFA**	R5F2136AMDFP**	R5F2136AMDFA**	R5F2136CMNFP**	R5F2136CMNFA**	R5F2136CMDFP**	R5F2136CMDFA**

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (R8C/38M Series)

Group		R8C/38M									
Memory	ROM (Bytes)	32K + 4K		48K + 4K		64K + 4K		96K + 4K		128K + 4K	
	RAM (Bytes)	2.5K		4K		6K		8K		10K	
	ROM Type*1	F									
	Data Flash/E2 Data Flash	4K (Data Flash: program/erase 10k times)									
	Program Security	Yes (ID code check function, ROM code protect function)									
CPU	CPU	R8C core									
	Basic Instructions	89									
	Minimum Instruction Execution Time (ns)	50 (@20MHz)									
	Multiplier	16 × 16 → 32									
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32									
DMA	DTC/DMAC II	DTC (Activation sources: 39)									
Clock	Clock Generation Circuit	4 circuits (Main clock, Sub-clock, High-speed on-chip oscillator, Low-speed on-chip oscillator)									
	PLL	—									
	Subclock	Yes (32.768kHz)									
	RTC	Yes (Timer RE)									
	On-Chip Oscillator	2 circuits(High speed: 40MHz, Low speed : 125kHz)									
	Oscillation Stop Detection	Yes									
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)									
	Power Save	Wait/Stop									
Power Supply Voltage Detection	Power-On Reset/POR	Yes									
	Low Voltage Detection/LVD	Yes (voltage detection 3)									
A/D Converter	Resolution × Channels	10-bit × 12									
	Sample and Hold	Yes									
D/A Converter	Resolution × Channels	8-bit × 2									
Timer	8-bit	3 (Timer RA, Timer RB, Timer RE)									
	16-bit	5 (Timer RC, Timer RD, Timer RF, Timer RG)									
	Input Capture	15 (shared with Timer RC, Timer RD, Timer RF, Timer RG)									
	Output Compare	16 (shared with Timer RC, Timer RD, Timer RE, Timer RF, Timer RG)									
	PWM Output	11 (shared with Timer RB, Timer RC, Timer RD, Timer RG)									
	Real-Time Port	—									
	Event Counter	1 (shared with Timer RA)									
	2-Phase Encoder Input	1 (shared with Timer RG)									
	3-Phase Inverter Control	1 (shared with Timer RD)									
Watchdog Timer		1 (with automatic start function, clock source protection function, low-speed on-chip oscillator for watchdog timer)									
Serial Interface	Clock Sync./Clock Async.	3 (UART0 to UART2)									
	Clock Sync. Only	—									
	Clock Async. Only	—									
I²C-bus		1 (shared with SSU) + 1 (UART 2 (simple I²C))									
Synchronous Serial Communication Unit/Special Serial I/O		1 (shared with I²C)									
CAN	Channels	—									
	Message Box (Numbers)	—									
LCD		—									
I/O Ports	Input Only (Numbers)	1									
	CMOS Output Only (Numbers)	—									
	CMOS I/O (Numbers)	75									
	N-Channel Open Drain Port (Numbers)	—									
	High Current Drive Port	75									
	Pull-Up Resistor	75									
External Interrupts Pins		9									
Debugging Function	On-Chip Debug	Yes									
	On-Board Flash Program	Yes									
Other Functions	ROM Correction Function	—									
	Others	Comparator A × 2 (shared with voltage monitor 1, 2) + Comparator B × 2									
Operating Frequency/Supply Voltage		20MHz/2.7 to 5.5V, 5MHz/1.8 to 5.5V									
Operating Ambient Temperature (°C)		–40 to 85	–20 to 85	–40 to 85	–20 to 85	–40 to 85	–20 to 85	–40 to 85	–20 to 85	–40 to 85	–20 to 85
Package*2		PLQP0080KB-A									
Part No.		R5F21386MDFP**	R5F21386MNFP**	R5F21387MDFP**	R5F21387MNFP**	R5F21388MDFP**	R5F21388MNFP**	R5F2138AMDFP**	R5F2138AMNFP**	R5F2138CMDFP**	R5F2138CMNFP**

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (R8C/3x Series)

Group		R8C/32C			R8C/32D		
Memory	ROM (Bytes)	4K + 4K	8K + 4K	16K + 4K	4K	8K	16K
	RAM (Bytes)	512	1K	1.5K	1K		
	ROM Type*1	F					
	Data Flash/E2 Data Flash	4K (Data Flash: program/erase 10k times)			—		
	Program Security	Yes (ID code check function, ROM code protect function)					
CPU	CPU	R8C Core					
	Basic Instructions	89					
	Minimum Instruction Execution Time (ns)	50 (@20MHz)					
	Multiplier	16 × 16 → 32					
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32					
DMA	DTC/DMAC Ⅱ	DTC (Activation sources: 21)			—		
Clock	Clock Generation Circuit	4 circuits (Main clock, Sub-clock, High-speed on-chip oscillator, Low-speed on-chip oscillator)					
	PLL	—					
	Subclock	Yes (32.768kHz)					
	RTC	Yes (Timer RE)					
	On-Chip Oscillator	2 circuits (High speed: 40MHz, Low speed: 125kHz)					
	Oscillation Stop Detection	Yes					
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)					
	Power Save	Wait/Stop					
Power Supply Voltage Detection	Power-On Reset/POR	Yes					
	Low Voltage Detection/LVD	Yes (Voltage detection 3)					
A/D Converter	Resolution × Channels	10-bit × 4					
	Multi-Channel Sample and Hold	Yes					
D/A Converter	Resolution × Channels	—					
Timer	8-bit	3 (Timer RA, Timer RB, Timer RE)					
	16-bit	1 (Timer RC)					
	Input Capture	4 (shared with Timer RC)					
	Output Compare	5 (shared with Timer RC, Timer RE)			4 (shared with Timer RC)		
	PWM Output	4 (shared with Timer RB, Timer RC)					
	Real-Time Port	—					
	Event Counter	1 (shared with Timer RA)					
	2-Phase Encoder Input	—					
	3-Phase Inverter Control	—					
Watchdog Timer		1 (with automatic start function, clock source protection function, low-speed on-chip oscillator for watchdog timer)					
Serial Interface	Clock Sync./Clock Async.	2 (UART 0, UART 2)					
	Clock Sync. Only	—					
	Clock Async. Only	—					
I²C-bus		1 (shared with SSU) + 1 (UART 2 (simple I²C))			1 (UART 2 (simple I²C))		
Synchronous Serial Communication Unit/Special Serial I/O		1 (shared with I²C)			—		
CAN	Channels	—					
	Message Box (Numbers)	—					
LCD		—					
I/O Ports	Input Only (Numbers)	1					
	CMOS Output Only (Numbers)	—					
	CMOS I/O (Numbers)	15					
	N-Channel Open Drain Port (Numbers)	—					
	High Current Drive Port	15					
	Pull-Up Resistor	15					
External Interrupts Pins		7					
Debugging Function	On-Chip Debug	Yes					
	On-Board Flash Program	Yes					
Other Functions	ROM Correction Function	—					
	Others	Comparator B × 2					
Operating Frequency/Supply Voltage		20MHz/2.7 to 5.5V, 5MHz/1.8 to 5.5V					
Operating Ambient Temperature (°C)		–20 to 85	–40 to 85	–20 to 85	–40 to 85	–20 to 85	–40 to 85	–20 to 85
Package*2		PLSP0020JB-A					
Part No.		R5F21321CNSP	R5F21321CDSP	R5F21322CDSP	R5F21322CNSP	R5F21324CNSP	R5F21324CDSP	R5F21321DDSP	R5F21321DNSP	R5F21322DNSP	R5F21322DDSP	R5F21324DDSP	R5F21324DNSP

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (R8C/3x Series)

Group		R8C/3GC													
Memory	ROM (Bytes)	4K + 4K		8K + 4K		16K + 4K		24K + 4K		32K + 4K					
	RAM (Bytes)	512		1K		1.5K		2K		2.5K					
	ROM Type*1	F													
	Data Flash/E2 Data Flash	4K (Data Flash: program/erase 10k times)													
	Program Security	Yes (ID code check function, ROM code protect function)													
CPU	CPU	R8C Core													
	Basic Instructions	89													
	Minimum Instruction Execution Time (ns)	50 (@20MHz)													
	Multiplier	16 × 16 → 32													
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32													
DMA	DTC/DMAC II	DTC (Activation sources: 23)													
Clock	Clock Generation Circuit	4 circuits (Main clock, Sub-clock, High-speed on-chip oscillator, Low-speed on-chip oscillator)													
	PLL	—													
	Subclock	Yes (32.768kHz)													
	RTC	Yes (Timer RE)													
	On-Chip Oscillator	2 circuits (High speed: 40MHz, Low speed: 125kHz)													
	Oscillation Stop Detection	Yes													
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)													
	Power Save	Wait/Stop													
Power Supply Voltage Detection	Power-On Reset/POR	Yes													
	Low Voltage Detection/LVD	Yes (Voltage detection 3)													
A/D Converter	Resolution × Channels	10-bit × 8													
	Sample and Hold	Yes													
D/A Converter	Resolution × Channels	8-bit × 2													
Timer	8-bit	3 (Timer RA, Timer RB, Timer RE)													
	16-bit	1 (Timer RC)													
	Input Capture	4 (shared with Timer RC)													
	Output Compare	4 (shared with Timer RC)													
	PWM Output	4 (shared with Timer RB, Timer RC)													
	Real-Time Port	—													
	Event Counter	1 (shared with Timer RA)													
	2-Phase Encoder Input	—													
	3-Phase Inverter Control	—													
Watchdog Timer		1 (with automatic start function, clock source protection function, low-speed on-chip oscillator for watchdog timer)													
Serial Interface	Clock Sync./Clock Async.	2 (UART 0, UART 2)													
	Clock Sync. Only	—													
	Clock Async. Only	—													
I²C-bus		1 (shared with SSU) + 1 (UART 2 (simple I²C))													
Synchronous Serial Communication Unit/Special Serial I/O		1 (shared with I²C)													
CAN	Channels	—													
	Message Box (Numbers)	—													
LCD		—													
I/O Ports	Input Only (Numbers)	1													
	CMOS Output Only (Numbers)	—													
	CMOS I/O (Numbers)	19													
	N-Channel Open Drain Port (Numbers)	—													
	High Current Drive Port	19													
	Pull-Up Resistor	19													
External Interrupts Pins		7													
Debugging Function	On-Chip Debug	Yes													
	On-Board Flash Program	Yes													
Other Functions	ROM Correction Function	—													
	Others	Comparator B × 2													
Operating Frequency/Supply Voltage		20MHz/2.7 to 5.5V, 5MHz/1.8 to 5.5V													
Operating Ambient Temperature (°C)		–20 to 85	–40 to 85		–20 to 85		–40 to 85	–20 to 85		–40 to 85	–20 to 85		–40 to 85	–20 to 85	
Package*2		PLSP0024JB-A		PWQN0024KC-A		PLSP0024JB-A		PWQN0024KC-A	PLSP0024JB-A		PWQN0024KC-A	PLSP0024JB-A		PWQN0024KC-A	
Part No.		R5F213G1CNSP	R5F213G1CDSP	R5F213G2CDSP	R5F213G2CNSP	R5F213G2CNNP	R5F213G4CDSP	R5F213G4CNSP	R5F213G4CNNP	R5F213G5CDSP	R5F213G5CNSP	R5F213G5CNNP	R5F213G6CDSP	R5F213G6CNSP	R5F213G6CNNP

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (R8C/3x Series)

Group		R8C/3GD					
Memory	ROM (Bytes)	4K	8K	16K	24K	32K	
	RAM (Bytes)	1K					
	ROM Type*1	F					
	Data Flash/E2 Data Flash	—					
	Program Security	Yes (ID code check function, ROM code protect function)					
CPU	CPU	R8C Core					
	Basic Instructions	89					
	Minimum Instruction Execution Time (ns)	50 (@20MHz)					
	Multiplier	16 × 16 → 32					
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32					
DMA	DTC/DMAC Ⅱ	—					
Clock	Clock Generation Circuit	4 circuits (Main clock, Sub-clock, High-speed on-chip oscillator, Low-speed on-chip oscillator)					
	PLL	—					
	Subclock	Yes (32.768kHz)					
	RTC	Yes (Timer RE)					
	On-Chip Oscillator	2 circuits (High speed: 40MHz, Low speed: 125kHz)					
	Oscillation Stop Detection	Yes					
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)					
	Power Save	Wait/Stop					
Power Supply Voltage Detection	Power-On Reset/POR	Yes					
	Low Voltage Detection/LVD	Yes (Voltage detection 3)					
A/D Converter	Resolution × Channels	10-bit × 8					
	Sample and Hold	Yes					
D/A Converter	Resolution × Channels	—					
Timer	8-bit	3 (Timer RA, Timer RB, Timer RE)					
	16-bit	1 (Timer RC)					
	Input Capture	4 (shared with Timer RC)					
	Output Compare	4 (shared with Timer RC)					
	PWM Output	4 (shared with Timer RB, Timer RC)					
	Real-Time Port	—					
	Event Counter	1 (shared with Timer RA)					
	2-Phase Encoder Input	—					
	3-Phase Inverter Control	—					
Watchdog Timer		1 (with automatic start function, clock source protection function, low-speed on-chip oscillator for watchdog timer)					
Serial Interface	Clock Sync./Clock Async.	2 (UART 0, UART 2)					
	Clock Sync. Only	—					
	Clock Async. Only	—					
I²C-bus		1 (UART 2 (simple I²C))					
Synchronous Serial Communication Unit/Special Serial I/O		—					
CAN	Channels	—					
	Message Box (Numbers)	—					
LCD		—					
I/O Ports	Input Only (Numbers)	1					
	CMOS Output Only (Numbers)	—					
	CMOS I/O (Numbers)	19					
	N-Channel Open Drain Port (Numbers)	—					
	High Current Drive Port	19					
	Pull-Up Resistor	19					
External Interrupts Pins		7					
Debugging Function	On-Chip Debug	Yes					
	On-Board Flash Program	Yes					
Other Functions	ROM Correction Function	—					
	Others	Comparator B × 2					
Operating Frequency/Supply Voltage		20MHz/2.7 to 5.5V, 5MHz/1.8 to 5.5V					
Operating Ambient Temperature (°C)		–20 to 85	–40 to 85	–20 to 85	–40 to 85	–20 to 85	–40 to 85
Package*2		PLSP0024JB-A					
Part No.		R5F213G1DNSP	R5F213G1DDSP	R5F213G2DDSP	R5F213G2DNSP	R5F213G4DNSP	R5F213G4DDSP	R5F213G5DDSP	R5F213G5DNSP	R5F213G6DNSP	R5F213G6DDSP

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (R8C/3x Series)

Group		R8C/33C					R8C/33D				
Memory	ROM (Bytes)	4K + 4K	8K + 4K	16K + 4K	24K + 4K	32K + 4K	4K	8K	16K	24K	32K
	RAM (Bytes)	512	1K	1.5K	2K	2.5K	1K				
	ROM Type*1	F									
	Data Flash/E2 Data Flash	4K (Data Flash: program/erase 10k times)					—				
	Program Security	Yes (ID code check function, ROM code protect function)									
CPU	CPU	R8C Core									
	Basic Instructions	89									
	Minimum Instruction Execution Time (ns)	50 (@20MHz)									
	Multiplier	16 × 16 → 32									
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32									
DMA	DTC/DMAC II	DTC (Activation sources: 23)					—				
Clock	Clock Generation Circuit	4 circuits (Main clock, Sub-clock, High-speed on-chip oscillator, Low-speed on-chip oscillator)									
	PLL	—									
	Subclock	Yes (32.768kHz)									
	RTC	Yes (Timer RE)									
	On-Chip Oscillator	2 circuits (High speed: 40MHz, Low speed: 125kHz)									
	Oscillation Stop Detection	Yes									
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)									
	Power Save	Wait/Stop									
Power Supply Voltage Detection	Power-On Reset/POR	Yes									
	Low Voltage Detection/LVD	Yes (Voltage detection 3)									
A/D Converter	Resolution × Channels	10-bit × 12									
	Sample and Hold	Yes									
D/A Converter	Resolution × Channels	8-bit × 2					—				
Timer	8-bit	3 (Timer RA, Timer RB, Timer RE)									
	16-bit	1 (Timer RC)									
	Input Capture	4 (shared with Timer RC)									
	Output Compare	5 (shared with Timer RC, Timer RE)									
	PWM Output	4 (shared with Timer RB, Timer RC)									
	Real-Time Port	—									
	Event Counter	1 (shared with Timer RA)									
	2-Phase Encoder Input	—									
	3-Phase Inverter Control	—									
Watchdog Timer		1 (with automatic start function, clock source protection function, low-speed on-chip oscillator for watchdog timer)									
Serial Interface	Clock Sync./Clock Async.	3 (UART 0 to UART 2)					2 (UART 0, UART 2)				
	Clock Sync. Only	—									
	Clock Async. Only	—									
I²C-bus		1 (shared with SSU) + 1 (UART 2 (simple I²C))					1 (UART 2 (simple I²C))				
Synchronous Serial Communication Unit/Special Serial I/O		1 (shared with I²C)					—				
CAN	Channels	—									
	Message Box (Numbers)	—									
LCD		—									
I/O Ports	Input Only (Numbers)	1									
	CMOS Output Only (Numbers)	—									
	CMOS I/O (Numbers)	27									
	N-Channel Open Drain Port (Numbers)	—									
	High Current Drive Port	27									
	Pull-Up Resistor	27									
External Interrupts Pins		7									
Debugging Function	On-Chip Debug	Yes									
	On-Board Flash Program	Yes									
Other Functions	ROM Correction Function	—									
	Others	Comparator B × 2									
Operating Frequency/Supply Voltage		20MHz/2.7 to 5.5V, 5MHz/1.8 to 5.5V									
Operating Ambient Temperature (°C)		–40 to 85	–20 to 85	–40 to 85	–20 to 85	–40 to 85	–20 to 85	–40 to 85	–20 to 85	–40 to 85	–20 to 85	–40 to 85	–20 to 85	–40 to 85	–20 to 85	–40 to 85	–20 to 85	–40 to 85	–20 to 85	–40 to 85	–20 to 85
Package*2		PLQP0032GB-A																			
Part No.		R5F21331CDFP	R5F21331CNFP	R5F21332CDFP	R5F21332CNFP	R5F21334CDFP	R5F21334CNFP	R5F21335CDFP	R5F21335CNFP	R5F21336CDFP	R5F21336CNFP	R5F21331DDFP	R5F21331DNFP	R5F21332DDFP	R5F21332DNFP	R5F21334DDFP	R5F21334DNFP	R5F21335DDFP	R5F21335DNFP	R5F21336DDFP	R5F21336DNFP

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (R8C/3x Series)

Group		R8C/3JC			
Memory	ROM (Bytes)	8K + 4K	16K + 4K	24K + 4K	32K + 4K
	RAM (Bytes)	1K	1.5K	2K	2.5K
	ROM Type*1	F			
	Data Flash/E2 Data Flash	4K (Data Flash: program/erase 10k times)			
	Program Security	Yes (ID code check function, ROM code protect function)			
CPU	CPU	R8C Core			
	Basic Instructions	89			
	Minimum Instruction Execution Time (ns)	50 (@20MHz)			
	Multiplier	16 × 16 → 32			
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32			
DMA	DTC/DMAC Ⅱ	DTC (Activation sources: 32)			
Clock	Clock Generation Circuit	4 circuits (Main clock, Sub-clock, High-speed on-chip oscillator, Low-speed on-chip oscillator)			
	PLL	—			
	Subclock	Yes (32.768kHz)			
	RTC	Yes (Timer RE)			
	On-Chip Oscillator	2 circuits (High speed: 40MHz, Low speed: 125kHz)			
	Oscillation Stop Detection	Yes			
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)			
	Power Save	Wait/Stop			
Power Supply Voltage Detection	Power-On Reset/POR	Yes			
	Low Voltage Detection/LVD	Yes (Voltage detection 3)			
A/D Converter	Resolution × Channels	10-bit × 10			
	Sample and Hold	Yes			
D/A Converter	Resolution × Channels	8-bit × 2			
Timer	8-bit	3 (Timer RA, Timer RB, Timer RE)			
	16-bit	3 (Timer RC, Timer RD)			
	Input Capture	12 (shared with Timer RC, Timer RD)			
	Output Compare	13 (shared with Timer RC, Timer RD, Timer RE)			
	PWM Output	10 (shared with Timer RB, Timer RC, Timer RD)			
	Real-Time Port	—			
	Event Counter	1 (shared with Timer RA)			
	2-Phase Encoder Input	—			
	3-Phase Inverter Control	1 (shared with Timer RD)			
Watchdog Timer		1 (with automatic start function, clock source protection function, low-speed on-chip oscillator for watchdog timer)			
Serial Interface	Clock Sync./Clock Async.	3 (UART 0 to UART 2)			
	Clock Sync. Only	—			
	Clock Async. Only	—			
I²C-bus		1 (shared with SSU) + 1 (UART 2 (simple I²C))			
Synchronous Serial Communication Unit/Special Serial I/O		1 (shared with I²C)			
CAN	Channels	—			
	Message Box (Numbers)	—			
LCD		—			
I/O Ports	Input Only (Numbers)	1			
	CMOS Output Only (Numbers)	—			
	CMOS I/O (Numbers)	31			
	N-Channel Open Drain Port (Numbers)	—			
	High Current Drive Port	31			
	Pull-Up Resistor	31			
External Interrupts Pins		8			
Debugging Function	On-Chip Debug	Yes			
	On-Board Flash Program	Yes			
Other Functions	ROM Correction Function	—			
	Others	Comparator B × 2			
Operating Frequency/Supply Voltage		20MHz/2.7 to 5.5V, 5MHz/1.8 to 5.5V			
Operating Ambient Temperature (°C)		–20 to 85			
Package*2		PWQN0036KA-B			
Part No.		R5F213J2CNNP	R5F213J4CNNP	R5F213J5CNNP	R5F213J6CNNP

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (R8C/3x Series)

Group		R8C/34C			
Memory	ROM (Bytes)	16K + 4K	24K + 4K	32K + 4K	
	RAM (Bytes)	1.5K	2K	2.5K	
	ROM Type*1	F			
	Data Flash/E2 Data Flash	4K (Data Flash: program/erase 10k times)			
	Program Security	Yes (ID code check function, ROM code protect function)			
CPU	CPU	R8C Core			
	Basic Instructions	89			
	Minimum Instruction Execution Time (ns)	50 (@20MHz)			
	Multiplier	16 × 16 → 32			
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32			
DMA	DTC/DMAC II	DTC (Activation sources: 33)			
Clock	Clock Generation Circuit	4 circuits (Main clock, Sub-clock, High-speed on-chip oscillator, Low-speed on-chip oscillator)			
	PLL	—			
	Subclock	Yes (32.768kHz)			
	RTC	Yes (Timer RE)			
	On-Chip Oscillator	2 circuits (High speed: 40MHz, Low speed: 125kHz)			
	Oscillation Stop Detection	Yes			
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)			
	Power Save	Wait/Stop			
Power Supply Voltage Detection	Power-On Reset/POR	Yes			
	Low Voltage Detection/LVD	Yes (Voltage detection 3)			
A/D Converter	Resolution × Channels	10-bit × 12			
	Multi-Channel Sample and Hold	Yes			
D/A Converter	Resolution × Channels	8-bit × 2			
Timer	8-bit	3 (Timer RA, Timer RB, Timer RE)			
	16-bit	3 (Timer RC, Timer RD)			
	Input Capture	12 (shared with Timer RC, Timer RD)			
	Output Compare	13 (shared with Timer RC, Timer RD, Timer RE)			
	PWM Output	10 (shared with Timer RB, Timer RC, Timer RD)			
	Real-Time Port	—			
	Event Counter	1 (shared with Timer RA)			
	2-Phase Encoder Input	—			
	3-Phase Inverter Control	1 (shared with Timer RD)			
Watchdog Timer		1 (with automatic start function, clock source protection function, low-speed on-chip oscillator for watchdog timer)			
Serial Interface	Clock Sync./Clock Async.	3 (UART 0 to UART 2)			
	Clock Sync. Only	—			
	Clock Async. Only	—			
I²C-bus		1 (shared with SSU) + 1 (UART 2 (simple I²C))			
Synchronous Serial Communication Unit/Special Serial I/O		1 (shared with I²C)			
CAN	Channels	—			
	Message Box (Numbers)	—			
LCD		—			
I/O Ports	Input Only (Numbers)	1			
	CMOS Output Only (Numbers)	—			
	CMOS I/O (Numbers)	43			
	N-Channel Open Drain Port (Numbers)	—			
	High Current Drive Port	43			
	Pull-Up Resistor	43			
External Interrupts Pins		9			
Debugging Function	On-Chip Debug	Yes			
	On-Board Flash Program	Yes			
Other Functions	ROM Correction Function	—			
	Others	Comparator B × 2			
Operating Frequency/Supply Voltage		20MHz/2.7 to 5.5V, 5MHz/1.8 to 5.5V			
Operating Ambient Temperature (°C)		–20 to 85	–40 to 85	–20 to 85	–40 to 85
Package*2		PLQP0048KB-A			
Part No.		R5F21344CNFP	R5F21344CDFP	R5F21345CDFP	R5F21345CNFP	R5F21346CNFP	R5F21346CDFP

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (R8C/3x Series)

Group		R8C/35C							R8C/35D		
Memory	ROM (Bytes)	16K + 4K	24K + 4K	32K + 4K	48K + 4K	64K + 4K	96K + 4K	128K + 4K	16K	24K	32K
	RAM (Bytes)	1.5K	2K	2.5K	4K	6K	8K	10K	1K		
	ROM Type*1	F									
	Data Flash/E2 Data Flash	4K (Data Flash: program/erase 10k times)							—		
	Program Security	Yes (ID code check function, ROM code protect function)									
CPU	CPU	R8C Core									
	Basic Instructions	89									
	Minimum Instruction Execution Time (ns)	50 (@20MHz)									
	Multiplier	16 × 16 → 32									
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32									
DMA	DTC/DMAC Ⅱ	DTC (Activation sources: 33)							—		
Clock	Clock Generation Circuit	4 circuits (Main clock, Sub-clock, High-speed on-chip oscillator, Low-speed on-chip oscillator)									
	PLL	—									
	Subclock	Yes (32.768kHz)									
	RTC	Yes (Timer RE)									
	On-Chip Oscillator	2 circuits (High speed: 40MHz, Low speed: 125kHz)									
	Oscillation Stop Detection	Yes									
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)									
	Power Save	Wait/Stop									
Power Supply Voltage Detection	Power-On Reset/POR	Yes									
	Low Voltage Detection/LVD	Yes (Voltage detection 3)									
A/D Converter	Resolution × Channels	10-bit × 12									
	Multi-Channel Sample and Hold	Yes									
D/A Converter	Resolution × Channels	8-bit × 2							—		
Timer	8-bit	3 (Timer RA, Timer RB, Timer RE)									
	16-bit	3 (Timer RC, Timer RD)							1 (Timer RC)		
	Input Capture	12 (shared with Timer RC, Timer RD)							4 (shared with Timer RC)		
	Output Compare	13 (shared with Timer RC, Timer RD, Timer RE)							5 (shared with Timer RC, Timer RE)		
	PWM Output	10 (shared with Timer RB, Timer RC, Timer RD)							4 (shared with Timer RB, Timer RC)		
	Real-Time Port	—									
	Event Counter	1 (shared with Timer RA)									
	2-Phase Encoder Input	—									
	3-Phase Inverter Control	1 (shared with Timer RD)							—		
Watchdog Timer		1 (with automatic start function, clock source protection function, low-speed on-chip oscillator for watchdog timer)									
Serial Interface	Clock Sync./Clock Async.	3 (UART 0 to UART 2)							2 (UART 0, UART 2)		
	Clock Sync. Only	—									
	Clock Async. Only	—									
I²C-bus		1 (shared with SSU) + 1 (UART 2 (simple I²C))							1 (UART 2 (simple I²C))		
Synchronous Serial Communication Unit/Special Serial I/O		1 (shared with I²C)							—		
CAN	Channels	—									
	Message Box (Numbers)	—									
LCD		—									
I/O Ports	Input Only (Numbers)	1									
	CMOS Output Only (Numbers)	—									
	CMOS I/O (Numbers)	47									
	N-Channel Open Drain Port (Numbers)	—									
	High Current Drive Port	47									
	Pull-Up Resistor	47									
External Interrupts Pins		9									
Debugging Function	On-Chip Debug	Yes									
	On-Board Flash Program	Yes									
Other Functions	ROM Correction Function	—									
	Others	Comparator B × 2									
Operating Frequency/Supply Voltage		20MHz/2.7 to 5.5V, 5MHz/1.8 to 5.5V									
Operating Ambient Temperature (°C)		–20 to 85	–40 to 85	–20 to 85	–40 to 85	–20 to 85	–40 to 85	–20 to 85	–40 to 85	–20 to 85	–40 to 85	–20 to 85
Package*2		PLQP0052JA-A										
Part No.		R5F21354CNFP	R5F21354CDFP	R5F21355CDFP	R5F21355CNFP	R5F21356CNFP	R5F21356CDFP	R5F21357CDFP	R5F21357CNFP	R5F21358CNFP	R5F21358CDFP	R5F2135ACDFP	R5F2135ACNFP	R5F2135CCNFP	R5F2135CCDFP	R5F21354DDFP	R5F21354DNFP	R5F21355DNFP	R5F21355DDFP	R5F21356DDFP	R5F21356DNFP

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (R8C/3x Series)

Group		R8C/36C		
Memory	ROM (Bytes)	16K + 4K	24K + 4K	32K + 4K
	RAM (Bytes)	1.5K	2K	2.5K
	ROM Type*1	F		
	Data Flash/E2 Data Flash	4K (Data Flash: program/erase 10k times)		
	Program Security	Yes (ID code check function, ROM code protect function)		
CPU	CPU	R8C core		
	Basic Instructions	89		
	Minimum Instruction Execution Time (ns)	50 (@20MHz)		
	Multiplier	16 × 16 → 32		
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32		
DMA	DTC/DMAC II	DTC (Activation sources: 39)		
Clock	Clock Generation Circuit	4 circuits (Main clock, Sub-clock, High-speed on-chip oscillator, Low-speed on-chip oscillator)		
	PLL	—		
	Subclock	Yes (32.768kHz)		
	RTC	Yes (Timer RE)		
	On-Chip Oscillator	2 circuits(High speed: 40MHz, Low speed : 125kHz)		
	Oscillation Stop Detection	Yes		
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)		
	Power Save	Wait/Stop		
Power Supply Voltage Detection	Power-On Reset/POR	Yes		
	Low Voltage Detection/LVD	Yes (voltage detection 3)		
A/D Converter	Resolution × Channels	10-bit × 12		
	Multi-Channel Sample and Hold	Yes		
D/A Converter	Resolution × Channels	8-bit × 2		
Timer	8-bit	3 (Timer RA, Timer RB, Timer RE)		
	16-bit	5 (Timer RC, Timer RD, Timer RF, Timer RG)		
	Input Capture	15 (shared with Timer RC, Timer RD, Timer RF, Timer RG)		
	Output Compare	16 (shared with Timer RC, Timer RD, Timer RE, Timer RF, Timer RG)		
	PWM Output	11 (shared with Timer RB, Timer RC, Timer RD, Timer RG)		
	Real-Time Port	—		
	Event Counter	1 (shared with Timer RA)		
	2-Phase Encoder Input	1 (shared with Timer RG)		
	3-Phase Inverter Control	1 (shared with Timer RD)		
Watchdog Timer		1 (with automatic start function, clock source protection function, low-speed on-chip oscillator for watchdog timer)		
Serial Interface	Clock Sync./Clock Async.	3 (UART0 to UART2)		
	Clock Sync. Only	—		
	Clock Async. Only	—		
I²C-bus		1 (shared with SSU) + 1 (UART 2 (simple I²C))		
Synchronous Serial Communication Unit/Special Serial I/O		1 (shared with I²C)		
CAN	Channels	—		
	Message Box (Numbers)	—		
LCD		—		
I/O Ports	Input Only (Numbers)	1		
	CMOS Output Only (Numbers)	—		
	CMOS I/O (Numbers)	59		
	N-Channel Open Drain Port (Numbers)	—		
	High Current Drive Port	59		
	Pull-Up Resistor	59		
External Interrupts Pins		9		
Debugging Function	On-Chip Debug	Yes		
	On-Board Flash Program	Yes		
Other Functions	ROM Correction Function	—		
	Others	Comparator B × 2		
Operating Frequency/Supply Voltage		20MHz/2.7 to 5.5V, 5MHz/1.8 to 5.5V		
Operating Ambient Temperature (°C)		–20 to 85	–40 to 85	–20 to 85
Package*2		PLQP0064KB-A	PLQP0064GA-A	PTQP0064LB-A
Part No.		R5F21364CNFP	R5F21364CNFA	R5F21364CNFB

Group		–40 to 85	–20 to 85	–40 to 85	–20 to 85	–40 to 85	–20 to 85	–40 to 85
Package*2		PLQP0064KB-A	PLQP0064GA-A	PTQP0064LB-A	PLQP0064KB-A	PLQP0064GA-A	PTQP0064LB-A	PLQP0064KB-A	PLQP0064GA-A	PTQP0064LB-A	PLQP0064KB-A	PLQP0064GA-A	PTQP0064LB-A	PLQP0064KB-A	PLQP0064GA-A	PTQP0064LB-A
Part No.		R5F21364CDFP	R5F21364CDFA	R5F21364CDFB	R5F21365CNFP	R5F21365CNFA	R5F21365CNFB	R5F21365CDFP	R5F21365CDFA	R5F21365CDFB	R5F21366CNFP	R5F21366CNFA	R5F21366CNFB	R5F21366CDFP	R5F21366CDFA	R5F21366CDFB

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (R8C/3x Series)

Group		R8C/36C			
Memory	ROM (Bytes)	48K + 4K	64K + 4K	96K + 4K	128K + 4K
	RAM (Bytes)	4K	6K	8K	10K
	ROM Type*1	F			
	Data Flash/E2 Data Flash	4K (Data Flash: program/erase 10k times)			
	Program Security	Yes (ID code check function, ROM code protect function)			
CPU	CPU	R8C core			
	Basic Instructions	89			
	Minimum Instruction Execution Time (ns)	50 (@20MHz)			
	Multiplier	16 × 16 → 32			
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32			
DMA	DTC/DMAC II	DTC (Activation sources: 39)			
Clock	Clock Generation Circuit	4 circuits (Main clock, Sub-clock, High-speed on-chip oscillator, Low-speed on-chip oscillator)			
	PLL	—			
	Subclock	Yes (32.768kHz)			
	RTC	Yes (Timer RE)			
	On-Chip Oscillator	2 circuits(High speed: 40MHz, Low speed : 125kHz)			
	Oscillation Stop Detection	Yes			
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)			
	Power Save	Wait/Stop			
Power Supply Voltage Detection	Power-On Reset/POR	Yes			
	Low Voltage Detection/LVD	Yes (voltage detection 3)			
A/D Converter	Resolution × Channels	10-bit × 12			
	Multi-Channel Sample and Hold	Yes			
D/A Converter	Resolution × Channels	8-bit × 2			
Timer	8-bit	3 (Timer RA, Timer RB, Timer RE)			
	16-bit	5 (Timer RC, Timer RD, Timer RF, Timer RG)			
	Input Capture	15 (shared with Timer RC, Timer RD, Timer RF, Timer RG)			
	Output Compare	16 (shared with Timer RC, Timer RD, Timer RE, Timer RF, Timer RG)			
	PWM Output	11 (shared with Timer RB, Timer RC, Timer RD, Timer RG)			
	Real-Time Port	—			
	Event Counter	1 (shared with Timer RA)			
	2-Phase Encoder Input	1 (shared with Timer RG)			
	3-Phase Inverter Control	1 (shared with Timer RD)			
Watchdog Timer		1 (with automatic start function, clock source protection function, low-speed on-chip oscillator for watchdog timer)			
Serial Interface	Clock Sync./Clock Async.	3 (UART0 to UART2)			
	Clock Sync. Only	—			
	Clock Async. Only	—			
I²C-bus		1 (shared with SSU) + 1 (UART 2 (simple I²C))			
Synchronous Serial Communication Unit/Special Serial I/O		1 (shared with I²C)			
CAN	Channels	—			
	Message Box (Numbers)	—			
LCD		—			
I/O Ports	Input Only (Numbers)	1			
	CMOS Output Only (Numbers)	—			
	CMOS I/O (Numbers)	59			
	N-Channel Open Drain Port (Numbers)	—			
	High Current Drive Port	59			
	Pull-Up Resistor	59			
External Interrupts Pins		9			
Debugging Function	On-Chip Debug	Yes			
	On-Board Flash Program	Yes			
Other Functions	ROM Correction Function	—			
	Others	Comparator B × 2			
Operating Frequency/Supply Voltage		20MHz/2.7 to 5.5V, 5MHz/1.8 to 5.5V			
Operating Ambient Temperature (°C)		–20 to 85	–40 to 85	–20 to 85	–40 to 85	–20 to 85	–40 to 85	–20 to 85	–40 to 85
Package*2		PLQP0064KB-A	PLQP0064GA-A	PTQP0064LB-A	PLQP0064KB-A	PLQP0064GA-A	PTQP0064LB-A	PLQP0064KB-A	PLQP0064GA-A	PTQP0064LB-A	PLQP0064KB-A	PLQP0064GA-A	PTQP0064LB-A	PLQP0064KB-A	PLQP0064GA-A	PTQP0064LB-A	PLQP0064KB-A	PLQP0064GA-A	PTQP0064LB-A	PLQP0064KB-A	PLQP0064GA-A	PTQP0064LB-A
Part No.		R5F21367CNFP	R5F21367CNFA	R5F21367CNFB	R5F21367CDFP	R5F21367CDFA	R5F21367CDFB	R5F21368CNFP	R5F21368CNFA	R5F21368CNFB	R5F21368CDFP	R5F21368CDFA	R5F21368CDFB	R5F2136ACNFP	R5F2136ACNFA	R5F2136ACNFB	R5F2136ACDFP	R5F2136ACDFA	R5F2136ACDFB	R5F2136CCNFP	R5F2136CCNFA	R5F2136CCNFB	R5F2136CCDFP	R5F2136CCDFA	R5F2136CCDFB

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (R8C/3x Series)

Group		R8C/38C					
Memory	ROM (Bytes)	32K + 4K	48K + 4K	64K + 4K	96K + 4K	128K + 4K	
	RAM (Bytes)	2.5K	4K	6K	8K	10K	
	ROM Type*1	F					
	Data Flash/E2 Data Flash	4K (Data Flash: program/erase 10k times)					
	Program Security	Yes (ID code check function, ROM code protect function)					
CPU	CPU	R8C Core					
	Basic Instructions	89					
	Minimum Instruction Execution Time (ns)	50 (@20MHz)					
	Multiplier	16 × 16 → 32					
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32					
DMA	DTC/DMAC II	DTC (Activation sources: 39)					
Clock	Clock Generation Circuit	4 circuits (Main clock, Sub-clock, High-speed on-chip oscillator, Low-speed on-chip oscillator)					
	PLL	—					
	Subclock	Yes (32.768kHz)					
	RTC	Yes (Timer RE)					
	On-Chip Oscillator	2 circuits (High speed: 40MHz, Low speed: 125kHz)					
	Oscillation Stop Detection	Yes					
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)					
	Power Save	Wait/Stop					
Power Supply Voltage Detection	Power-On Reset/POR	Yes					
	Low Voltage Detection/LVD	Yes (Voltage detection 3)					
A/D Converter	Resolution × Channels	10-bit × 20					
	Sample and Hold	Yes					
D/A Converter	Resolution × Channels	8-bit × 2					
Timer	8-bit	3 (Timer RA, Timer RB, Timer RE)					
	16-bit	5 (Timer RC, Timer RD, Timer RF, Timer RG)					
	Input Capture	15 (shared with Timer RC, Timer RD, Timer RF, Timer RG)					
	Output Compare	16 (shared with Timer RC, Timer RD, Timer RE, Timer RF, Timer RG)					
	PWM Output	11 (shared with Timer RB, Timer RC, Timer RD, Timer RG)					
	Real-Time Port	—					
	Event Counter	2 (shared with Timer RA, Timer RG)					
	2-Phase Encoder Input	1 (shared with Timer RG)					
	3-Phase Inverter Control	1 (shared with Timer RD)					
Watchdog Timer		1 (with automatic start function, clock source protection function, low-speed on-chip oscillator for watchdog timer)					
Serial Interface	Clock Sync./Clock Async.	3 (UART 0 to UART 2)					
	Clock Sync. Only	—					
	Clock Async. Only	—					
I²C-bus		1 (shared with SSU) + 1 (UART 2 (simple I²C))					
Synchronous Serial Communication Unit/Special Serial I/O		1 (shared with I²C)					
CAN	Channels	—					
	Message Box (Numbers)	—					
LCD		—					
I/O Ports	Input Only (Numbers)	1					
	CMOS Output Only (Numbers)	—					
	CMOS I/O (Numbers)	75					
	N-Channel Open Drain Port (Numbers)	—					
	High Current Drive Port	75					
	Pull-Up Resistor	75					
External Interrupts Pins		9					
Debugging Function	On-Chip Debug	Yes					
	On-Board Flash Program	Yes					
Other Functions	ROM Correction Function	—					
	Others	Comparator B × 2					
Operating Frequency/Supply Voltage		20MHz/2.7 to 5.5V, 5MHz/1.8 to 5.5V					
Operating Ambient Temperature (°C)		–20 to 85	–40 to 85	–20 to 85	–40 to 85	–20 to 85	–40 to 85
Package*2		PLQP0080KB-A					
Part No.		R5F21386CNFP	R5F21386CDFP	R5F21387CDFP	R5F21387CNFP	R5F21388CNFP	R5F21388CDFP	R5F2138ACDFP	R5F2138ACNFP	R5F2138CCNFP	R5F2138CCDFP

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (R8C/3x Series)

Group		R8C/3MQ				
Memory	ROM (Bytes)	32K + 4K	48K + 4K	64K + 4K	96K + 4K	128K + 4K
	RAM (Bytes)	2.5K	4K	6K	7K	7.5K
	ROM Type*1	F				
	Data Flash/E2 Data Flash	4K (Data Flash: program/erase 10k times)				
	Program Security	Yes (ID code check function, ROM code protect function)				
CPU	CPU	R8C core				
	Basic Instructions	89				
	Minimum Instruction Execution Time (ns)	62.5 (@16MHz)				
	Multiplier	16 × 16 → 32				
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32				
DMA	DTC/DMAC II	DTC (Activation sources: 17)				
Clock	Clock Generation Circuit	3 circuits (Main clock, Sub-clock, Low-speed on-chip oscillator)				
	PLL	—				
	Subclock	Yes (32.768kHz)				
	RTC	Yes (Timer RE)				
	On-Chip Oscillator	1 circuit (Low speed : 125kHz)				
	Oscillation Stop Detection	Yes				
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)				
	Power Save	Wait/Stop				
Power Supply Voltage Detection	Power-On Reset/POR	Yes				
	Low Voltage Detection/LVD	Yes (voltage detection 2)				
A/D Converter	Resolution × Channels	—				
	Sample and Hold	—				
D/A Converter	Resolution × Channels	—				
Timer	8-bit	3 (Timer RA, Timer RB, Timer RE)				
	16-bit	1 (Timer RC)				
	Input Capture	4 (shared with Timer RC)				
	Output Compare	5 (shared with Timer RC, Timer RE)				
	PWM Output	4 (shared with Timer RB, Timer RC)				
	Real-Time Port	—				
	Event Counter	1 (shared with Timer RA)				
	2-Phase Encoder Input	—				
	3-Phase Inverter Control	—				
Watchdog Timer		1 (with automatic start function, clock source protection function, low-speed on-chip oscillator for watchdog timer)				
Serial Interface	Clock Sync./Clock Async.	1 (UART0)				
	Clock Sync. Only	—				
	Clock Async. Only	—				
I^2C-bus		1 (shared with SSU)				
Synchronous Serial Communication Unit/Special Serial I/O		1 (shared with I^2C)				
CAN	Channels	—				
	Message Box (Numbers)	—				
LCD		—				
I/O Ports	Input Only (Numbers)	—				
	CMOS Output Only (Numbers)	—				
	CMOS I/O (Numbers)	18				
	N-Channel Open Drain Port (Numbers)	—				
	High Current Drive Port	18				
	Pull-Up Resistor	18				
External Interrupts Pins		11				
Debugging Function	On-Chip Debug	Yes				
	On-Board Flash Program	Yes				
Other Functions	ROM Correction Function	—				
	Others	2.4 GHz band RF transceiver circuit compliant to IEEE802.15.4 standard				
Operating Frequency/Supply Voltage		16MHz/2.7 to 3.6V, 4MHz/1.8 to 3.6V				
Operating Ambient Temperature (°C)		–20 to 85				
Package*2		PWQN0040KB-A				
Part No.		R5F213M6QNNP**	R5F213M7QNNP**	R5F213M8QNNP**	R5F213MAQNNP**	R5F213MCQNNP**

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (R8C/2x Series)

Group		R8C/2K				R8C/2L			
Memory	ROM (Bytes)	8K		16K		8K + 2K		16K + 2K	
	RAM (Bytes)	1K		1.5K		1K		1.5K	
	ROM Type*1	F							
	Data Flash/E2 Data Flash	—				2K (Data Flash: program/erase 10k times)			
	Program Security	Yes (ID code check function, ROM code protect function)							
CPU	CPU	R8C Core							
	Basic Instructions	89							
	Minimum Instruction Execution Time (ns)	50 (@20MHz)							
	Multiplier	16 × 16 → 32							
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32							
DMA	DTC/DMAC II	—							
Clock	Clock Generation Circuit	3 circuits (Main clock, High-speed on-chip oscillator, Low-speed on-chip oscillator)							
	PLL	—							
	Subclock	—							
	RTC	—							
	On-Chip Oscillator	2 circuits (High speed: 40MHz, Low speed: 125kHz)							
	Oscillation Stop Detection	Yes							
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)							
	Power Save	Wait/Stop							
Power Supply Voltage Detection	Power-On Reset/POR	Yes							
	Low Voltage Detection/LVD	Yes (Voltage detection 3)							
A/D Converter	Resolution x Channels (min. conversion time)	10-bit × 9 (3.3µs)							
	Sample and Hold	Yes							
D/A Converter	Resolution × Channels	—							
Timer	8-bit	2 (Timer RA, Timer RB)							
	16-bit	3 (Timer RC, Timer RD)							
	Input Capture	12 (shared with Timer RC, Timer RD)							
	Output Compare	12 (shared with Timer RC, Timer RD)							
	PWM Output	10 (shared with Timer RB, Timer RC, Timer RD)							
	Real-Time Port	—							
	Event Counter	1 (shared with Timer RA)							
	2-Phase Encoder Input	—							
	3-Phase Inverter Control	1 (shared with Timer RD)							
Watchdog Timer		1 (with automatic start function, clock source protection function)							
Serial Interface	Clock Sync./Clock Async.	2 (UART 0, UART 2)							
	Clock Sync. Only	—							
	Clock Async. Only	—							
I^2C-bus		—							
Synchronous Serial Communication Unit/Special Serial I/O		—							
CAN	Channels	—							
	Message Box (Numbers)	—							
LCD		—							
I/O Ports	Input Only (Numbers)	3							
	CMOS Output Only (Numbers)	—							
	CMOS I/O (Numbers)	25							
	N-Channel Open Drain Port (Numbers)	—							
	High Current Drive Port	8							
	Pull-Up Resistor	25							
External Interrupts Pins		7							
Debugging Function	On-Chip Debug	Yes							
	On-Board Flash Program	Yes							
Other Functions	ROM Correction Function	—							
	Others	—							
Operating Frequency/Supply Voltage		20MHz/3.0 to 5.5V, 10MHz/2.7 to 5.5V, 5MHz/2.2 to 5.5V							
Operating Ambient Temperature (°C)		–40 to 85	–20 to 85	–40 to 85	–20 to 85	–40 to 85	–20 to 85	–40 to 85	–20 to 85
Package*2		PLQP0032GB-A							
Part No.		R5F212K2SDFP	R5F212K2SNFP	R5F212K4SDFP	R5F212K4SNFP	R5F212L2SDFP	R5F212L2SNFP	R5F212L4SDFP	R5F212L4SNFP

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (R8C/2x Series)

Group		R8C/2G			R8C/2H		R8C/2J	
Memory	ROM (Bytes)	16K	24K	32K	4K	8K	2K	4K
	RAM (Bytes)	512	1K		256	384	256	384
	ROM Type*1	F						
	Data Flash/E2 Data Flash	—						
	Program Security	Yes (ID code check function, ROM code protect function)						
CPU	CPU	R8C Core						
	Basic Instructions	89						
	Minimum Instruction Execution Time (ns)	125 (@8MHz)						
	Multiplier	16 × 16 → 32						
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32						
DMA	DTC/DMAC Ⅱ	—						
Clock	Clock Generation Circuit	3 circuits (Sub clock, High-speed on-chip oscillator, Low-speed on-chip oscillator)					2 circuits (High-speed on-chip oscillator, Low-speed on-chip oscillator)	
	PLL	—						
	Subclock	Yes (32.768kHz)					—	
	RTC	Yes (Timer RE)					—	
	On-Chip Oscillator	2 circuits (High speed: 8MHz, Low speed: 125kHz)						
	Oscillation Stop Detection	—						
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)						
	Power Save	Wait/Stop						
Power Supply Voltage Detection	Power-On Reset/POR	Yes						
	Low Voltage Detection/LVD	Yes (Voltage detection 3)						
A/D Converter	Resolution × Channels	—						
	Multi-Channel Sample and Hold	—						
D/A Converter	Resolution × Channels	—						
Timer	8-bit	3 (Timer RA, Timer RB, Timer RE)					2 (Timer RA, Timer RB)	
	16-bit	1 (Timer RF)						
	Input Capture	1 (shared with Timer RF)						
	Output Compare	2 (shared with Timer RE, Timer RF)					1 (shared with Timer RF)	
	PWM Output	1 (shared with Timer RB)						
	Real-Time Port	—						
	Event Counter	1 (shared with Timer RA)						
	2-Phase Encoder Input	—						
	3-Phase Inverter Control	—						
Watchdog Timer		1 (with automatic start function, clock source protection function)						
Serial Interface	Clock Sync./Clock Async.	2 (UART 0, UART 2)					1 (UART 0)	
	Clock Sync. Only	—						
	Clock Async. Only	—						
I²C-bus		—						
Synchronous Serial Communication Unit/Special Serial I/O		—						
CAN	Channels	—						
	Message Box (Numbers)	—						
LCD		—						
I/O Ports	Input Only (Numbers)	—						
	CMOS Output Only (Numbers)	1					—	
	CMOS I/O (Numbers)	27			15		12	
	N-Channel Open Drain Port (Numbers)	—						
	High Current Drive Port	—						
	Pull-Up Resistor	27			15		12	
External Interrupts Pins		8			6			
Debugging Function	On-Chip Debug	Yes						
	On-Board Flash Program	Yes						
Other Functions	ROM Correction Function	—						
	Others	Comparator × 2 (shared with voltage monitor 1, 2)						
Operating Frequency/Supply Voltage		8MHz/2.7 to 5.5V, 4MHz/2.2 to 5.5V						
Operating Ambient Temperature (°C)		–20 to 85	–40 to 85	–20 to 85	–40 to 85	–20 to 85	–40 to 85	–20 to 85	–40 to 85
Package*2		PLQP0032GB-A			PLSP0020JB-A				
Part No.		R5F212G4SNFP	R5F212G4SDFP	R5F212G5SDFP	R5F212G5SNFP	R5F212G6SNFP	R5F212G6SDFP	R5F212H1SDSP	R5F212H1SNSP	R5F212H2SNSP	R5F212H2SDSP	R5F212J0SDSP	R5F212J0SNSP	R5F212J1SNSP	R5F212J1SDSP

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (R8C/2x Series)

Group		R8C/2E				R8C/2F			
Memory	ROM (Bytes)	8K		16K		8K + 2K		16K + 2K	
	RAM (Bytes)	512		1K		512		1K	
	ROM Type*1	F							
	Data Flash/E2 Data Flash	—				2K (Data Flash: program/erase 10k times)			
	Program Security	Yes (ID code check function, ROM code protect function)							
CPU	CPU	R8C Core							
	Basic Instructions	89							
	Minimum Instruction Execution Time (ns)	50 (@20MHz)							
	Multiplier	16 × 16 → 32							
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32							
DMA	DTC/DMAC II	—							
Clock	Clock Generation Circuit	3 circuits (Main clock, High-speed on-chip oscillator, Low-speed on-chip oscillator)							
	PLL	—							
	Subclock	—							
	RTC	—							
	On-Chip Oscillator	2 circuits (High speed: 40MHz, Low speed: 125kHz)							
	Oscillation Stop Detection	Yes							
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)							
	Power Save	Wait/Stop							
Power Supply Voltage Detection	Power-On Reset/POR	Yes							
	Low Voltage Detection/LVD	Yes (Voltage detection 2)							
A/D Converter	Resolution x Channels (min. conversion time)	10-bit × 12 (3.3µs)							
	Sample and Hold	Yes							
D/A Converter	Resolution x Channels	8-bit × 2							
Timer	8-bit	3 (Timer RA, Timer RB, Timer RE)							
	16-bit	1 (Timer RC)							
	Input Capture	4 (shared with Timer RC)							
	Output Compare	5 (shared with Timer RC, Timer RE)							
	PWM Output	4 (shared with Timer RB, Timer RC)							
	Real-Time Port	—							
	Event Counter	1 (shared with Timer RA)							
	2-Phase Encoder Input	—							
	3-Phase Inverter Control	—							
Watchdog Timer		1 (with automatic start function, clock source protection function)							
Serial Interface	Clock Sync./Clock Async.	1 (UART 0)							
	Clock Sync. Only	—							
	Clock Async. Only	—							
I²C-bus		—							
Synchronous Serial Communication Unit/Special Serial I/O		—							
CAN	Channels	—							
	Message Box (Numbers)	—							
LCD		—							
I/O Ports	Input Only (Numbers)	3							
	CMOS Output Only (Numbers)	—							
	CMOS I/O (Numbers)	25							
	N-Channel Open Drain Port (Numbers)	—							
	High Current Drive Port	8							
	Pull-Up Resistor	25							
External Interrupts Pins		7							
Debugging Function	On-Chip Debug	Yes							
	On-Board Flash Program	Yes							
Other Functions	ROM Correction Function	—							
	Others	Comparator × 2							
Operating Frequency/Supply Voltage		20MHz/3.0 to 5.5V, 10MHz/2.7 to 5.5V							
Operating Ambient Temperature (°C)		–40 to 85	–20 to 85	–40 to 85	–20 to 85	–40 to 85	–20 to 85	–40 to 85	–20 to 85
Package*2		PLQP0032GB-A							
Part No.		R5F212E2DFP	R5F212E2NFP	R5F212E4DFP	R5F212E4NFP	R5F212F2DFP	R5F212F2NFP	R5F212F4DFP	R5F212F4NFP

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (R8C/2x Series)

Group		R8C/2C				R8C/2D			
Memory	ROM (Bytes)	48K	64K	96K	128K	48K + 2K	64K + 2K	96K + 2K	128K + 2K
	RAM (Bytes)	2.5K	3K	7K	7.5K	2.5K	3K	7K	7.5K
	ROM Type*1	F							
	Data Flash/E2 Data Flash	—				2K (Data Flash: program/erase 10k times)			
	Program Security	Yes (ID code check function, ROM code protect function)							
CPU	CPU	R8C Core							
	Basic Instructions	89							
	Minimum Instruction Execution Time (ns)	50 (@20MHz)							
	Multiplier	16 × 16 → 32							
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32							
DMA	DTC/DMAC II	—							
Clock	Clock Generation Circuit	4 circuits (Main clock, Sub-clock, High-speed on-chip oscillator, Low-speed on-chip oscillator)							
	PLL	—							
	Subclock	Yes (32.768kHz)							
	RTC	Yes (Timer RE)							
	On-Chip Oscillator	2 circuits (High speed: 40MHz, Low speed: 125kHz)							
	Oscillation Stop Detection	Yes							
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)							
	Power Save	Wait/Stop							
Power Supply Voltage Detection	Power-On Reset/POR	Yes							
	Low Voltage Detection/LVD	Yes (Voltage detection 3)							
A/D Converter	Resolution x Channels (min. conversion time)	10-bit × 20 (3.3µs)							
	Sample and Hold	Yes							
D/A Converter	Resolution x Channels	8-bit × 2							
Timer	8-bit	3 (Timer RA, Timer RB, Timer RE)							
	16-bit	4 (Timer RC, Timer RD, Timer RF)							
	Input Capture	13 (shared with Timer RC, Timer RD, Timer RF)							
	Output Compare	14 (shared with Timer RC, Timer RD, Timer RE, Timer RF)							
	PWM Output	10 (shared with Timer RB, Timer RC, Timer RD)							
	Real-Time Port	—							
	Event Counter	1 (shared with Timer RA)							
	2-Phase Encoder Input	—							
	3-Phase Inverter Control	1 (shared with Timer RD)							
Watchdog Timer		1 (with automatic start function, clock source protection function)							
Serial Interface	Clock Sync./Clock Async.	3 (UART 0 to UART 2)							
	Clock Sync. Only	—							
	Clock Async. Only	—							
I^2C-bus		1 (shared with SSU)							
Synchronous Serial Communication Unit/Special Serial I/O		1 (shared with I^2C)							
CAN	Channels	—							
	Message Box (Numbers)	—							
LCD		—							
I/O Ports	Input Only (Numbers)	2							
	CMOS Output Only (Numbers)	—							
	CMOS I/O (Numbers)	71							
	N-Channel Open Drain Port (Numbers)	—							
	High Current Drive Port	8							
	Pull-Up Resistor	71							
External Interrupts Pins		8							
Debugging Function	On-Chip Debug	Yes							
	On-Board Flash Program	Yes							
Other Functions	ROM Correction Function	—							
	Others	—							
Operating Frequency/Supply Voltage		20MHz/3.0 to 5.5V, 10MHz/2.7 to 5.5V, 5MHz/2.2 to 5.5V							
Operating Ambient Temperature (°C)		–20 to 85	–40 to 85	–20 to 85	–40 to 85	–20 to 85	–40 to 85	–20 to 85	–40 to 85	–20 to 85
Package*2		PLQP0080KB-A							
Part No.		R5F212C7SNFP	R5F212C7SDFP	R5F212C8SDFP	R5F212C8SNFP	R5F212CASNFP	R5F212CASDFP	R5F212CCSDFP	R5F212CCSNFP	R5F212D7SNFP	R5F212D7SDFP	R5F212D8SDFP	R5F212D8SNFP	R5F212DASNFP	R5F212DASDFP	R5F212DCSDFP	R5F212DCSNFP

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (R8C/2x Series)

Group		R8C/2A				R8C/2B			
Memory	ROM (Bytes)	48K	64K	96K	128K	48K + 2K	64K + 2K	96K + 2K	128K + 2K
	RAM (Bytes)	2.5K	3K	7K	7.5K	2.5K	3K	7K	7.5K
	ROM Type*1	F							
	Data Flash/E2 Data Flash	—				2K (Data Flash: program/erase 10k times)			
	Program Security	Yes (ID code check function, ROM code protect function)							
CPU	CPU	R8C Core							
	Basic Instructions	89							
	Minimum Instruction Execution Time (ns)	50 (@20MHz)							
	Multiplier	16 × 16 → 32							
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32							
DMA	DTC/DMAC II	—							
Clock	Clock Generation Circuit	4 circuits (Main clock, Sub-clock, High-speed on-chip oscillator, Low-speed on-chip oscillator)							
	PLL	—							
	Subclock	Yes (32.768kHz)							
	RTC	Yes (Timer RE)							
	On-Chip Oscillator	2 circuits (High speed: 40MHz, Low speed: 125kHz)							
	Oscillation Stop Detection	Yes							
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)							
	Power Save	Wait/Stop							
Power Supply Voltage Detection	Power-On Reset/POR	Yes							
	Low Voltage Detection/LVD	Yes (Voltage detection 3)							
A/D Converter	Resolution x Channels (min. conversion time)	10-bit × 12 (3.3µs)							
	Sample and Hold	Yes							
D/A Converter	Resolution × Channels	8-bit × 2							
Timer	8-bit	3 (Timer RA, Timer RB, Timer RE)							
	16-bit	4 (Timer RC, Timer RD, Timer RF)							
	Input Capture	13 (shared with Timer RC, Timer RD, Timer RF)							
	Output Compare	14 (shared with Timer RC, Timer RD, Timer RE, Timer RF)							
	PWM Output	10 (shared with Timer RB, Timer RC, Timer RD)							
	Real-Time Port	—							
	Event Counter	1 (shared with Timer RA)							
	2-Phase Encoder Input	—							
	3-Phase Inverter Control	1 (shared with Timer RD)							
Watchdog Timer		1 (with automatic start function, clock source protection function)							
Serial Interface	Clock Sync./Clock Async.	3 (UART 0 to UART 2)							
	Clock Sync. Only	—							
	Clock Async. Only	—							
I²C-bus		1 (shared with SSU)							
Synchronous Serial Communication Unit/Special Serial I/O		1 (shared with I²C)							
CAN	Channels	—							
	Message Box (Numbers)	—							
LCD		—							
I/O Ports	Input Only (Numbers)	2							
	CMOS Output Only (Numbers)	—							
	CMOS I/O (Numbers)	55							
	N-Channel Open Drain Port (Numbers)	—							
	High Current Drive Port	8							
	Pull-Up Resistor	55							
External Interrupts Pins		8							
Debugging Function	On-Chip Debug	Yes							
	On-Board Flash Program	Yes							
Other Functions	ROM Correction Function	—							
	Others	—							
Operating Frequency/Supply Voltage		20MHz/3.0 to 5.5V, 10MHz/2.7 to 5.5V, 5MHz/2.2 to 5.5V							

Group	ROM (Bytes)	Operating Ambient Temperature (°C)	Package*2	Part No.
R8C/2A	48K	–40 to 85	PLQP0064GA-A	R5F212A7SDFA
R8C/2A	48K	–40 to 85	PLQP0064KB-A	R5F212A7SDFP
R8C/2A	48K	–20 to 85	PLQP0064GA-A	R5F212A7SNFA
R8C/2A	48K	–20 to 85	PLQP0064KB-A	R5F212A7SNFP
R8C/2A	48K	–20 to 85	PTLG0064JA-A	R5F212A7SNLG
R8C/2A	64K	–40 to 85	PLQP0064GA-A	R5F212A8SDFA
R8C/2A	64K	–40 to 85	PLQP0064KB-A	R5F212A8SDFP
R8C/2A	64K	–20 to 85	PLQP0064GA-A	R5F212A8SNFA
R8C/2A	64K	–20 to 85	PLQP0064KB-A	R5F212A8SNFP
R8C/2A	64K	–20 to 85	PTLG0064JA-A	R5F212A8SNLG
R8C/2A	96K	–40 to 85	PLQP0064GA-A	R5F212AASDFA
R8C/2A	96K	–40 to 85	PLQP0064KB-A	R5F212AASDFP
R8C/2A	96K	–20 to 85	PLQP0064GA-A	R5F212AASNFA
R8C/2A	96K	–20 to 85	PLQP0064KB-A	R5F212AASNFP
R8C/2A	96K	–20 to 85	PTLG0064JA-A	R5F212AASNLG
R8C/2A	128K	–40 to 85	PLQP0064GA-A	R5F212ACSDFA
R8C/2A	128K	–40 to 85	PLQP0064KB-A	R5F212ACSDFP
R8C/2A	128K	–20 to 85	PLQP0064GA-A	R5F212ACSNFA
R8C/2A	128K	–20 to 85	PLQP0064KB-A	R5F212ACSNFP
R8C/2A	128K	–20 to 85	PTLG0064JA-A	R5F212ACSNLG
R8C/2B	48K + 2K	–40 to 85	PLQP0064GA-A	R5F212B7SDFA
R8C/2B	48K + 2K	–40 to 85	PLQP0064KB-A	R5F212B7SDFP
R8C/2B	48K + 2K	–20 to 85	PLQP0064GA-A	R5F212B7SNFA
R8C/2B	48K + 2K	–20 to 85	PLQP0064KB-A	R5F212B7SNFP
R8C/2B	48K + 2K	–20 to 85	PTLG0064JA-A	R5F212B7SNLG
R8C/2B	64K + 2K	–40 to 85	PLQP0064GA-A	R5F212B8SDFA
R8C/2B	64K + 2K	–40 to 85	PLQP0064KB-A	R5F212B8SDFP
R8C/2B	64K + 2K	–20 to 85	PLQP0064GA-A	R5F212B8SNFA
R8C/2B	64K + 2K	–20 to 85	PLQP0064KB-A	R5F212B8SNFP
R8C/2B	64K + 2K	–20 to 85	PTLG0064JA-A	R5F212B8SNLG
R8C/2B	96K + 2K	–40 to 85	PLQP0064GA-A	R5F212BASDFA
R8C/2B	96K + 2K	–40 to 85	PLQP0064KB-A	R5F212BASDFP
R8C/2B	96K + 2K	–20 to 85	PLQP0064GA-A	R5F212BASNFA
R8C/2B	96K + 2K	–20 to 85	PLQP0064KB-A	R5F212BASNFP
R8C/2B	96K + 2K	–20 to 85	PTLG0064JA-A	R5F212BASNLG
R8C/2B	128K + 2K	–40 to 85	PLQP0064GA-A	R5F212BCSDFA
R8C/2B	128K + 2K	–40 to 85	PLQP0064KB-A	R5F212BCSDFP
R8C/2B	128K + 2K	–20 to 85	PLQP0064GA-A	R5F212BCSNFA
R8C/2B	128K + 2K	–20 to 85	PLQP0064KB-A	R5F212BCSNFP
R8C/2B	128K + 2K	–20 to 85	PTLG0064JA-A	R5F212BCSNLG

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (R8C/2x Series)

Group		R8C/26				R8C/27				R8C/28		R8C/29	
Memory	ROM (Bytes)	8K	16K	24K	32K	8K + 2K	16K + 2K	24K + 2K	32K + 2K	8K	16K	8K + 2K	16K + 2K
	RAM (Bytes)	512	1K	1.5K		512	1K	1.5K		512	1K	512	1K
	ROM Type*1	F											
	Data Flash/E2 Data Flash	—				2K (Data Flash: program/erase 10k times)				—		2K (Data Flash: program/erase 10k times)	
	Program Security	Yes (ID code check function, ROM code protect function)											
CPU	CPU	R8C Core											
	Basic Instructions	89											
	Minimum Instruction Execution Time (ns)	50 (@20MHz)											
	Multiplier	16 × 16 → 32											
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32											
DMA	DTC/DMAC Ⅱ	—											
Clock	Clock Generation Circuit	4 circuits (Main clock, Sub-clock, High-speed on-chip oscillator, Low-speed on-chip oscillator)											
	PLL	—											
	Subclock	Yes (32.768kHz)											
	RTC	Yes (Timer RE)											
	On-Chip Oscillator	2 circuits (High speed: 40MHz, Low speed: 125kHz)											
	Oscillation Stop Detection	Yes											
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)											
	Power Save	Wait/Stop											
Power Supply Voltage Detection	Power-On Reset/POR	Yes											
	Low Voltage Detection/LVD	Yes (Voltage detection 3)											
A/D Converter	Resolution x Channels (min. conversion time)	10-bit × 12 (3.3µs)								10-bit × 4 (3.3µs)			
	Sample and Hold	Yes											
D/A Converter	Resolution x Channels	—											
Timer	8-bit	3 (Timer RA, Timer RB, Timer RE)											
	16-bit	1 (Timer RC)											
	Input Capture	4 (shared with Timer RC)											
	Output Compare	5 (shared with Timer RC, Timer RE)											
	PWM Output	4 (shared with Timer RB, Timer RC)											
	Real-Time Port	—											
	Event Counter	1 (shared with Timer RA)											
	2-Phase Encoder Input	—											
	3-Phase Inverter Control	—											
Watchdog Timer		1 (with automatic start function, clock source protection function)											
Serial Interface	Clock Sync./Clock Async.	2 (UART 0, UART 1)								1 (UART 0)			
	Clock Sync. Only	—											
	Clock Async. Only	—								1 (UART 1)			
I²C-bus		1 (shared with SSU)											
Synchronous Serial Communication Unit/Special Serial I/O		1 (shared with I²C)											
CAN	Channels	—											
	Message Box (Numbers)	—											
LCD		—											
I/O Ports	Input Only (Numbers)	3											
	CMOS Output Only (Numbers)	—											
	CMOS I/O (Numbers)	25								13			
	N-Channel Open Drain Port (Numbers)	—											
	High Current Drive Port	8											
	Pull-Up Resistor	25								13			
External Interrupts Pins		7											
Debugging Function	On-Chip Debug	Yes											
	On-Board Flash Program	Yes											
Other Functions	ROM Correction Function	—											
	Others	—											
Operating Frequency/Supply Voltage		20MHz/3.0 to 5.5V, 10MHz/2.7 to 5.5V, 5MHz/2.2 to 5.5V											
Operating Ambient Temperature (°C)		-20 to 85	–40 to 85	–20 to 85	–40 to 85	–20 to 85	–40 to 85	–20 to 85	–40 to 85	–20 to 85	–40 to 85	–20 to 85	–40 to 85	-20 to 85
Package*2		PLQP0032GB-A								PLSP0020JB-A				
Part No.		R5F21262SNFP	R5F21262SDFP	R5F21264SDFP	R5F21264SNFP	R5F21265SNFP	R5F21265SDFP	R5F21266SDFP	R5F21266SNFP	R5F21272SNFP	R5F21272SDFP	R5F21274SDFP	R5F21274SNFP	R5F21275SNFP	R5F21275SDFP	R5F21276SDFP	R5F21276SNFP	R5F21282SNSP	R5F21282SDSP	R5F21284SDSP	R5F21284SNSP	R5F21292SNSP	R5F21292SDSP	R5F21294SDSP	R5F21294SNSP

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (R8C/2x Series)

Group		R8C/24					R8C/25				
Memory	ROM (Bytes)	16K	24K	32K	48K	64K	16K + 2K	24K + 2K	32K + 2K	48K + 2K	64K + 2K
	RAM (Bytes)	1K	2K		2.5K	3K	1K	2K		2.5K	3K
	ROM Type*1	F									
	Data Flash/E2 Data Flash	—					2K (Data Flash: program/erase 10k times)				
	Program Security	Yes (ID code check function, ROM code protect function)									
CPU	CPU	R8C Core									
	Basic Instructions	89									
	Minimum Instruction Execution Time (ns)	50 (@20MHz)									
	Multiplier	16 × 16 → 32									
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32									
DMA	DTC/DMAC II	—									
Clock	Clock Generation Circuit	4 circuits (Main clock, Sub-clock, High-speed on-chip oscillator, Low-speed on-chip oscillator)									
	PLL	—									
	Subclock	Yes (32.768kHz)									
	RTC	Yes (Timer RE)									
	On-Chip Oscillator	2 circuits (High speed: 40MHz, Low speed: 125kHz)									
	Oscillation Stop Detection	Yes									
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)									
	Power Save	Wait/Stop									
Power Supply Voltage Detection	Power-On Reset/POR	Yes									
	Low Voltage Detection/LVD	Yes (Voltage detection 3)									
A/D Converter	Resolution x Channels (min. conversion time)	10-bit × 12 (3.3µs)									
	Sample and Hold	Yes									
D/A Converter	Resolution x Channels	—									
Timer	8-bit	3 (Timer RA, Timer RB, Timer RE)									
	16-bit	2 (Timer RD)									
	Input Capture	8 (shared with Timer RD)									
	Output Compare	9 (shared with Timer RD, Timer RE)									
	PWM Output	7 (shared with Timer RB, Timer RD)									
	Real-Time Port	—									
	Event Counter	1 (shared with Timer RA)									
	2-Phase Encoder Input	—									
	3-Phase Inverter Control	1 (shared with Timer RD)									
Watchdog Timer		1 (with automatic start function, clock source protection function)									
Serial Interface	Clock Sync./Clock Async.	2 (UART 0, UART 1)									
	Clock Sync. Only	—									
	Clock Async. Only	—									
I²C-bus		1 (shared with SSU)									
Synchronous Serial Communication Unit/Special Serial I/O		1 (shared with I²C)									
CAN	Channels	—									
	Message Box (Numbers)	—									
LCD		—									
I/O Ports	Input Only (Numbers)	3									
	CMOS Output Only (Numbers)	—									
	CMOS I/O (Numbers)	41									
	N-Channel Open Drain Port (Numbers)	—									
	High Current Drive Port	8									
	Pull-Up Resistor	41									
External Interrupts Pins		8									
Debugging Function	On-Chip Debug	Yes									
	On-Board Flash Program	Yes									
Other Functions	ROM Correction Function	—									
	Others	—									
Operating Frequency/Supply Voltage		20MHz/3.0 to 5.5V, 10MHz/2.7 to 5.5V, 5MHz/2.2 to 5.5V									
Operating Ambient Temperature (˚C)		-40 to 85	–20 to 85		–40 to 85		–20 to 85		–40 to 85	–20 to 85	
		–40 to 85	–20 to 85		–40 to 85		–20 to 85		–40 to 85	–20 to 85	-40 to 85
Package*2		PLQP0052JA-A	PTLG0064JA-A	PLQP0052JA-A	PTLG0064JA-A	PLQP0052JA-A	PTLG0064JA-A	PLQP0052JA-A	PTLG0064JA-A	PLQP0052JA-A	
Part No.		R5F21244SDFP	R5F21244SNFP	R5F21244SNLG	R5F21245SNFP	R5F21245SDFP	R5F21246SDFP	R5F21246SNFP	R5F21246SNLG	R5F21247SNFP	R5F21247SDFP	R5F21248SDFP	R5F21248SNFP	R5F21254SNFP	R5F21254SNLG	R5F21254SDFP	R5F21255SDFP	R5F21255SNFP	R5F21256SNFP	R5F21256SNLG	R5F21256SDFP	R5F21257SDFP	R5F21257SNFP	R5F21258SNFP	R5F21258SDFP

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (R8C/2x Series)

Group		R8C/22			R8C/23		
Memory	ROM (Bytes)	32K	48K	64K	32K + 2K	48K + 2K	64K + 2K
	RAM (Bytes)	2K	2.5K	3K	2K	2.5K	3K
	ROM Type*1	F					
	Data Flash/E2 Data Flash	—			2K (Data Flash: program/erase 10k times)		
	Program Security	Yes (ID code check function, ROM code protect function)					
CPU	CPU	R8C Core					
	Basic Instructions	89					
	Minimum Instruction Execution Time (ns)	50 (@20MHz)					
	Multiplier	16 × 16 → 32					
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32					
DMA	DTC/DMAC Ⅱ	—					
Clock	Clock Generation Circuit	3 circuits (Main clock, High-speed on-chip oscillator, Low-speed on-chip oscillator)					
	PLL	—					
	Subclock	—					
	RTC	—					
	On-Chip Oscillator	2 circuits (High speed: 40MHz, Low speed: 125kHz)					
	Oscillation Stop Detection	Yes					
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)					
	Power Save	Wait/Stop					
Power Supply Voltage Detection	Power-On Reset/POR	Yes					
	Low Voltage Detection/LVD	Yes (Voltage detection 2)					
A/D Converter	Resolution x Channels (min. conversion time)	10-bit × 12 (3.3µs)					
	Sample and Hold	Yes					
D/A Converter	Resolution x Channels	—					
Timer	8-bit	3 (Timer RA, Timer RB, Timer RE)					
	16-bit	2 (Timer RD)					
	Input Capture	8 (shared with Timer RD)					
	Output Compare	9 (shared with Timer RD, Timer RE)					
	PWM Output	7 (shared with Timer RB, Timer RD)					
	Real-Time Port	—					
	Event Counter	1 (shared with Timer RA)					
	2-Phase Encoder Input	—					
	3-Phase Inverter Control	1 (shared with Timer RD)					
Watchdog Timer		1 (with automatic start function, clock source protection function)					
Serial Interface	Clock Sync./Clock Async.	1 (UART 0)					
	Clock Sync. Only	—					
	Clock Async. Only	1 (UART 1)					
I²C-bus		1 (shared with SSU)					
Synchronous Serial Communication Unit/Special Serial I/O		1 (shared with I²C)					
CAN	Channels	1					
	Message Box (Numbers)	16					
LCD		—					
I/O Ports	Input Only (Numbers)	3					
	CMOS Output Only (Numbers)	—					
	CMOS I/O (Numbers)	41					
	N-Channel Open Drain Port (Numbers)	—					
	High Current Drive Port	—					
	Pull-Up Resistor	41					
External Interrupts Pins		8					
Debugging Function	On-Chip Debug	Yes					
	On-Board Flash Program	Yes					
Other Functions	ROM Correction Function	—					
	Others	—					
Operating Frequency/Supply Voltage		20MHz/3.0 to 5.5V, 10MHz/2.7 to 5.5V					
Operating Ambient Temperature (˚C)		–40 to 85					
Package*2		PLQP0048KB-A					
Part No.		R5F21226DFP	R5F21227DFP	R5F21228DFP	R5F21236DFP	R5F21237DFP	R5F21238DFP

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (R8C/1x Series)

Group		R8C/1A				R8C/1B			
Memory	ROM (Bytes)	4K	8K	12K	16K	4K + 2K	8K + 2K	12K + 2K	16K + 2K
	RAM (Bytes)	384	512	768	1K	384	512	768	1K
	ROM Type*1	F							
	Data Flash/E2 Data Flash	—				2K (Data Flash: program/erase 10k times)			
	Program Security	Yes (ID code check function, ROM code protect function)							
CPU	CPU	R8C Core							
	Basic Instructions	89							
	Minimum Instruction Execution Time (ns)	50 (@20MHz)							
	Multiplier	16 × 16 → 32							
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32							
DMA	DTC/DMAC II	—							
Clock	Clock Generation Circuit	3 circuits (Main clock, High-speed on-chip oscillator, Low-speed on-chip oscillator)							
	PLL	—							
	Subclock	—							
	RTC	—							
	On-Chip Oscillator	2 circuits (High speed: 8MHz, Low speed: 125kHz)							
	Oscillation Stop Detection	Yes							
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)							
	Power Save	Wait/Stop							
Power Supply Voltage Detection	Power-On Reset/POR	Yes							
	Low Voltage Detection/LVD	Yes (Voltage detection 2)							
A/D Converter	Resolution x Channels (min. conversion time)	10-bit × 4 (3.3µs)							
	Sample and Hold	Yes							
D/A Converter	Resolution x Channels	—							
Timer	8-bit	2 (Timer X, Timer Z)							
	16-bit	1 (Timer C)							
	Input Capture	1 (shared with Timer C)							
	Output Compare	1 (shared with Timer C)							
	PWM Output	1 (shared with Timer Z)							
	Real-Time Port	—							
	Event Counter	1 (shared with Timer X)							
	2-Phase Encoder Input	—							
	3-Phase Inverter Control	—							
Watchdog Timer		1 (with automatic start function, clock source protection function)							
Serial Interface	Clock Sync./Clock Async.	1 (UART 0)							
	Clock Sync. Only	—							
	Clock Async. Only	1 (UART 1)							
I²C-bus		1 (shared with SSU)							
Synchronous Serial Communication Unit/Special Serial I/O		1 (shared with I²C)							
CAN	Channels	—							
	Message Box (Numbers)	—							
LCD		—							
I/O Ports	Input Only (Numbers)	3							
	CMOS Output Only (Numbers)	—							
	CMOS I/O (Numbers)	13							
	N-Channel Open Drain Port (Numbers)	—							
	High Current Drive Port	4							
	Pull-Up Resistor	13							
External Interrupts Pins		7							
Debugging Function	On-Chip Debug	Yes							
	On-Board Flash Program	Yes							
Other Functions	ROM Correction Function	—							
	Others	—							
Operating Frequency/Supply Voltage		20MHz/3.0 to 5.5V, 10MHz/2.7 to 5.5V							
Operating Ambient Temperature (°C)		-40 to 85	–20 to 85		–40 to 85	–20 to 85		–40 to 85	–20 to 85		–40 to 85	–20 to 85		–40 to 85
Package*2		PLSP0020JB-A	PRDP0020BA-A	PLSP0020JB-A	PRDP0020BA-A	PWQN0028KA-B	PLSP0020JB-A	PRDP0020BA-A	PWQN0028KA-B	PLSP0020JB-A	PRDP0020BA-A	PWQN0028KA-B	PLSP0020JB-A	PRDP0020BA-A	PLSP0020JB-A	PRDP0020BA-A	PWQN0028KA-B	PLSP0020JB-A	PRDP0020BA-A	PWQN0028KA-B	PLSP0020JB-A	PRDP0020BA-A	PWQN0028KA-B	PLSP0020JB-A
Part No.		R5F211A1DSP	R5F211A1DD	R5F211A1SP	R5F211A2DD	R5F211A2NP	R5F211A2SP	R5F211A2DSP	R5F211A3DSP	R5F211A3DD	R5F211A3NP	R5F211A3SP	R5F211A4DD	R5F211A4NP	R5F211A4SP	R5F211A4DSP	R5F211B1DSP	R5F211B1DD	R5F211B1SP	R5F211B2DD	R5F211B2NP	R5F211B2SP	R5F211B2DSP	R5F211B3DSP	R5F211B3DD	R5F211B3NP	R5F211B3SP	R5F211B4DD	R5F211B4NP	R5F211B4SP	R5F211B4DSP

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (R8C/1x Series)

Group		R8C/18				R8C/19			
Memory	ROM (Bytes)	4K	8K	12K	16K	4K + 2K	8K + 2K	12K + 2K	16K + 2K
	RAM (Bytes)	384	512	768	1K	384	512	768	1K
	ROM Type*1	F							
	Data Flash/E2 Data Flash	—				2K (Data Flash: program/erase 10k times)			
	Program Security	Yes (ID code check function, ROM code protect function)							
CPU	CPU	R8C Core							
	Basic Instructions	89							
	Minimum Instruction Execution Time (ns)	50 (@20MHz)							
	Multiplier	16 × 16 → 32							
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32							
DMA	DTC/DMAC II	—							
Clock	Clock Generation Circuit	3 circuits (Main clock, High-speed on-chip oscillator, Low-speed on-chip oscillator)							
	PLL	—							
	Subclock	—							
	RTC	—							
	On-Chip Oscillator	2 circuits (High speed: 8MHz, Low speed: 125kHz)							
	Oscillation Stop Detection	Yes							
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)							
	Power Save	Wait/Stop							
Power Supply Voltage Detection	Power-On Reset/POR	Yes							
	Low Voltage Detection/LVD	Yes (Voltage detection 2)							
A/D Converter	Resolution × Channels	—							
	Sample and Hold	—							
D/A Converter	Resolution × Channels	—							
Timer	8-bit	2 (Timer X, Timer Z)							
	16-bit	1 (Timer C)							
	Input Capture	1 (shared with Timer C)							
	Output Compare	1 (shared with Timer C)							
	PWM Output	1 (shared with Timer Z)							
	Real-Time Port	—							
	Event Counter	1 (shared with Timer X)							
	2-Phase Encoder Input	—							
	3-Phase Inverter Control	—							
Watchdog Timer		1 (with automatic start function, clock source protection function)							
Serial Interface	Clock Sync./Clock Async.	1 (UART 0)							
	Clock Sync. Only	—							
	Clock Async. Only	1 (UART 1)							
I²C-bus		—							
Synchronous Serial Communication Unit/Special Serial I/O		—							
CAN	Channels	—							
	Message Box (Numbers)	—							
LCD		—							
I/O Ports	Input Only (Numbers)	3							
	CMOS Output Only (Numbers)	—							
	CMOS I/O (Numbers)	13							
	N-Channel Open Drain Port (Numbers)	—							
	High Current Drive Port	4							
	Pull-Up Resistor	13							
External Interrupts Pins		7							
Debugging Function	On-Chip Debug	Yes							
	On-Board Flash Program	Yes							
Other Functions	ROM Correction Function	—							
	Others	Comparator							
Operating Frequency/Supply Voltage		20MHz/3.0 to 5.5V, 10MHz/2.7 to 5.5V							
Operating Ambient Temperature (°C)		-40 to 85	–20 to 85		–40 to 85	–20 to 85		–40 to 85	–20 to 85		–40 to 85	–20 to 85		-40 to 85
Package*2		PLSP0020JB-A	PRDP0020BA-A	PLSP0020JB-A	PRDP0020BA-A	PWQN0028KA-B	PLSP0020JB-A	PRDP0020BA-A	PWQN0028KA-B	PLSP0020JB-A	PRDP0020BA-A	PWQN0028KA-B	PLSP0020JB-A	PRDP0020BA-A	PLSP0020JB-A	PRDP0020BA-A	PWQN0028KA-B	PLSP0020JB-A	PRDP0020BA-A	PWQN0028KA-B	PLSP0020JB-A	PRDP0020BA-A	PWQN0028KA-B	PLSP0020JB-A
Part No.		R5F21181DSP	R5F21181DD	R5F21181SP	R5F21182DD	R5F21182NP	R5F21182SP	R5F21182DSP	R5F21183DSP	R5F21183DD	R5F21183NP	R5F21183SP	R5F21184DD	R5F21184NP	R5F21184SP	R5F21184DSP	R5F21191DSP	R5F21191DD	R5F21191SP	R5F21192DD	R5F21192NP	R5F21192SP	R5F21192DSP	R5F21193DSP	R5F21193DD	R5F21193NP	R5F21193SP	R5F21194DD	R5F21194NP	R5F21194SP	R5F21194DSP

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

Overview of R8C/3xT Touch Key MCUs

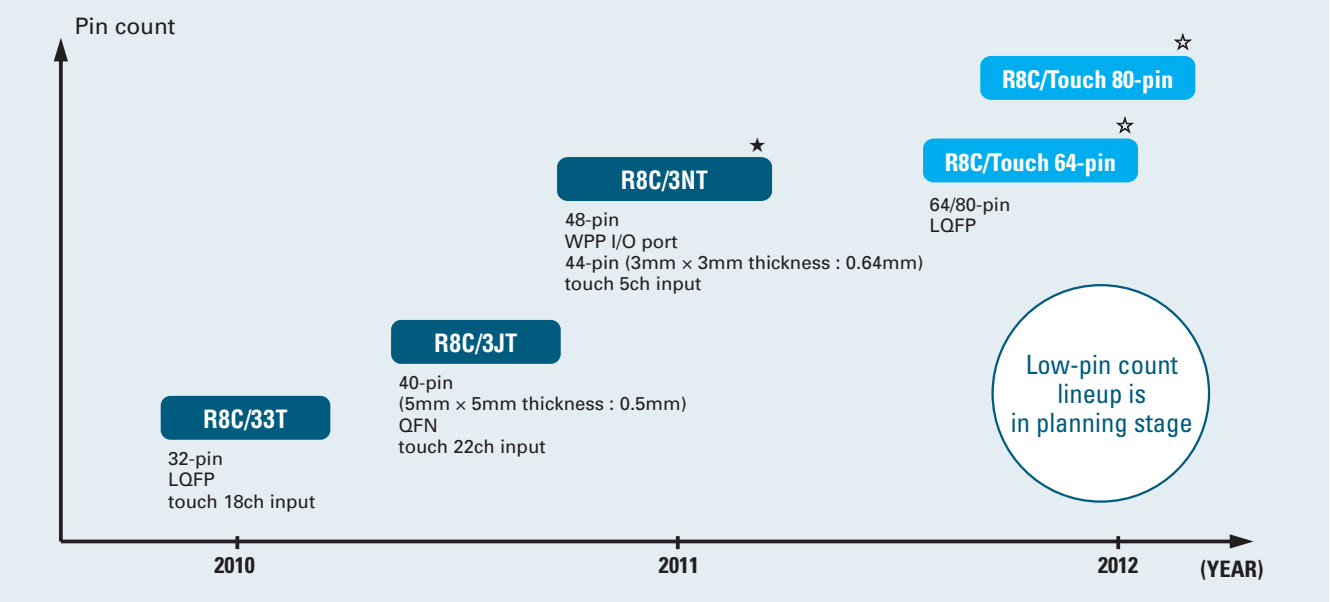
Many of today's electronic products—white goods, AV devices, OA machines, electronic games, mobile phones, and portable music players—use touch keys, fueling the growth of the touch sensor market. Moreover, to meet the strict requirements of electronic device manufacturers, touch sensor systems must be compact, affordable, power efficient, and high performing. This has led to increased demand for the touch sensor ICs that perform touch detection to be integrated into a single package together with the microcontroller required to control the detection system.
Renesas Electronics has therefore developed a touch key MCU that integrates a highly popular general-purpose R8C family microcontroller with a capacitance touch sensor, perfectly meeting the needs of developers wanting to create compact, low-power-consuming, noise-resistant systems.

R8C/3xT Features

The R8C/3xT touch key MCU integrates a general-purpose R8C/3x series microcontroller with a capacitance touch sensor, enabling touch key detection and system control using only a single chip.
This single-chip touch key solution meets the needs of customers in the touch key device market for the following three reasons:

- It enables the creation of a compact system.
- It is low power consuming.
- It is highly resistant to noise.

• R8C/3xT Roadmap



★ : New product ☆ : In planning stage

R8C/33T Group

- Integrated in a 32-pin QFP package (7 mm × 7 mm, 1.7-mm thickness), enabling the creation of a compact system.
- Provided with 27 universal ports for system control.
- Provided with 18 touch detection input pins.

R8C/3JT Group

- Integrated in a small 40-pin QFN package (5 mm × 5 mm, 0.5-mm thickness), enabling the creation of a slim, compact system.
- Provided with 31 universal ports for system control.
- Provided with 22 touch detection input pins.

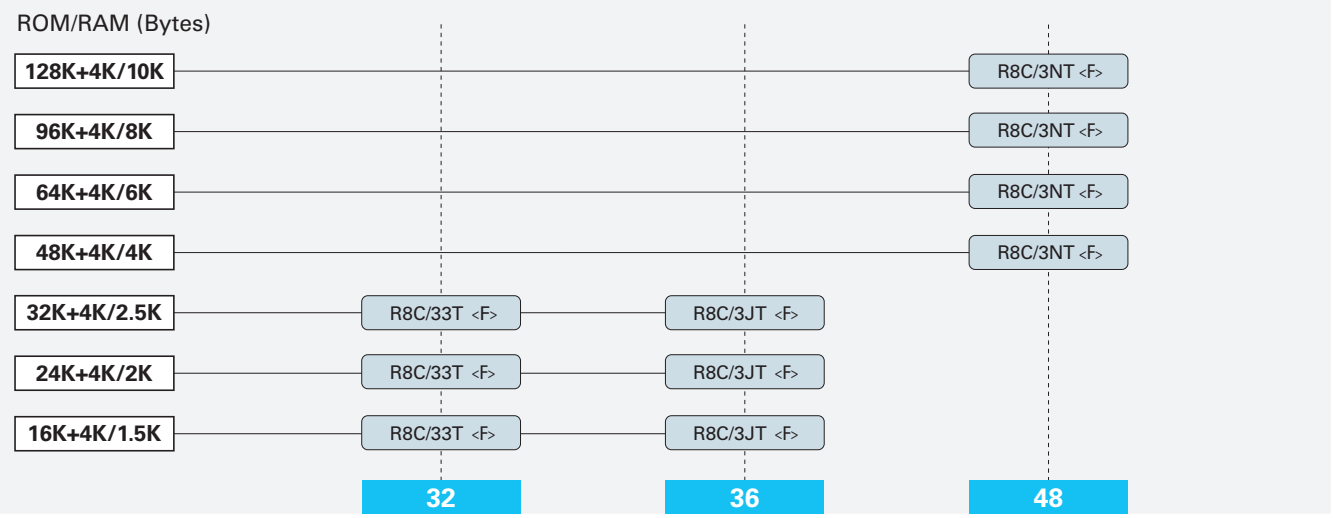
R8C/3NT Group

- Integrated in a 48-pin WPP package (3 mm × 3 mm, 0.64-mm thickness), enabling the creation of a slim, compact system.
- Provided with 43 universal ports for system control.
- Provided with 5 touch detection input pins.

Applications



• Memory Capacity (R8C/3x series)



• Specifications (R8C/3x Series)

Group		R8C/33T			R8C/3JT		
Memory	ROM (Bytes)	16K + 4K	24K + 4K	32K + 4K	16K + 4K	24K + 4K	32K + 4K
	RAM (Bytes)	1.5K (occupied 0.5KB when using the sensor control unit)	2K (occupied 0.5KB when using the sensor control unit)	2.5K (occupied 0.5KB when using the sensor control unit)	1.5K (occupied 0.5KB when using the sensor control unit)	2K (occupied 0.5KB when using the sensor control unit)	2.5K (occupied 0.5KB when using the sensor control unit)
	ROM Type*1	F					
	Data Flash/E2 Data Flash	4K (Data Flash: program/erase 10k times)					
	Program Security	Yes (ID code check function, ROM code protect function)					
CPU	CPU	R8C Core					
	Basic Instructions	89					
	Minimum Instruction Execution Time (ns)	50 (@20MHz)					
	Multiplier	16 × 16 → 32					
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32					
DMA	DTC/DMAC II	DTC (Activation sources: 22)					
Clock	Clock Generation Circuit	3 circuits (Main clock, High-speed on-chip oscillator, Low-speed on-chip oscillator)					
	PLL	—					
	Subclock	—					
	RTC	—					
	On-Chip Oscillator	2 circuits (High speed: 40MHz, Low speed: 125kHz)					
	Oscillation Stop Detection	Yes					
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)					
	Power Save	Wait/Stop					
Power Supply Voltage Detection	Power-On Reset/POR	Yes					
	Low Voltage Detection/LVD	Yes (Voltage detection 3)					
A/D Converter	Resolution × Channels	10-bit × 12					
	Sample and Hold	Yes					
D/A Converter	Resolution × Channels	—					
Timer	8-bit	2 (Timer RA, Timer RB)					
	16-bit	1 (Timer RC)					
	Input Capture	4 (shared with Timer RC)					
	Output Compare	4 (shared with Timer RC)					
	PWM Output	4 (shared with Timer RB, Timer RC)					
	Real-Time Port	—					
	Event Counter	1 (shared with Timer RA)					
	2-Phase Encoder Input	—					
	3-Phase Inverter Control	—					
Watchdog Timer		1 (with automatic start function, clock source protection function, low-speed on-chip oscillator for watchdog timer)					
Serial Interface	Clock Sync./Clock Async.	3 (UART 0 to UART 2)			2 (UART 0, UART 2)		
	Clock Sync. Only	—					
	Clock Async. Only	—					
I²C-bus		1 (UART 2 (simple I²C))					
Synchronous Serial Communication Unit/Special Serial I/O		—					
CAN	Channels	—					
	Message Box (Numbers)	—					
LCD		—					
I/O Ports	Input Only (Numbers)	1					
	CMOS Output Only (Numbers)	—					
	CMOS I/O (Numbers)	27			31		
	N-Channel Open Drain Port (Numbers)	—					
	High Current Drive Port	27			31		
	Pull-Up Resistor	27			31		
External Interrupts Pins		8					
Debugging Function	On-Chip Debug	Yes					
	On-Board Flash Program	Yes					
Other Functions	ROM Correction Function	—					
	Others	Sensor control unit (electrostatic capacitive touch detector CH × 18)			Sensor control unit (electrostatic capacitive touch detector CH × 22)		
Operating Frequency/Supply Voltage		20MHz/2.7 to 5.5V, 5MHz/1.8 to 5.5V					
Operating Ambient Temperature (°C)		–40 to 85	–20 to 85	–40 to 85	–20 to 85	–40 to 85	–20 to 85
Package*2		PLQP0032GB-A			PXQN0040LA-A		
Part No.		R5F21334TDFP	R5F21334TNFP	R5F21335TDFP	R5F21335TNFP	R5F21336TDFP	R5F21336TNFP	R5F213J4TNNP	R5F213J5TNNP	R5F213J6TNNP

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (R8C/3x Series)

Group		R8C/3NT			
Memory	ROM (Bytes)	48K + 4K	64K + 4K	96K + 4K	128K + 4K
	RAM (Bytes)	4K	6K	8K	10K
	ROM Type*1	F			
	Data Flash/E2 Data Flash	4K (Data Flash: program/erase 10k times)			
	Program Security	Yes (ID code check function, ROM code protect function)			
CPU	CPU	R8C core			
	Basic Instructions	89			
	Minimum Instruction Execution Time (ns)	50 (@20MHz)			
	Multiplier	16 × 16 → 32			
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32			
DMA	DTC/DMAC Ⅱ	DTC (Activation sources: 32)			
Clock	Clock Generation Circuit	4 circuits (Main clock, Sub-clock, High-speed on-chip oscillator, Low-speed on-chip oscillator)			
	PLL	—			
	Subclock	Yes (32.768kHz)			
	RTC	Yes (Timer RE)			
	On-Chip Oscillator	2 circuits(High-precision and High-speed : 40MHz, Low speed : 125kHz)			
	Oscillation Stop Detection	Yes			
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)			
	Power Save	Wait/Stop			
Power Supply Voltage Detection	Power-On Reset/POR	Yes			
	Low Voltage Detection/LVD	Yes(voltage detection 3)			
A/D Converter	Resolution × Channels	10-bit × 12			
	Sample and Hold	Yes			
D/A Converter	Resolution × Channels	—			
Timer	8-bit	3 (Timer RA, Timer RB, Timer RE)			
	16-bit	1 (Timer RC)			
	Input Capture	4 (shared with Timer RC)			
	Output Compare	4 (shared with Timer RC)			
	PWM Output	4 (shared with Timer RB, Timer RC)			
	Real-Time Port	—			
	Event Counter	1 (shared with Timer RA)			
	2-Phase Encoder Input	—			
	3-Phase Inverter Control	—			
Watchdog Timer		1 (with automatic start function, clock source protection function, low-speed on-chip oscillator for watchdog timer)			
Serial Interface	Clock Sync./Clock Async.	3 (UART0, UART1, UART2)			
	Clock Sync. Only	—			
	Clock Async. Only	—			
I²C-bus		4 (shared with SSU)			
Synchronous Serial Communication Unit/Special Serial I/O		4 (shared with I²C)			
CAN	Channels	—			
	Message Box (Numbers)	—			
LCD		—			
I/O Ports	Input Only (Numbers)	1			
	CMOS Output Only (Numbers)	—			
	CMOS I/O (Numbers)	43			
	N-Channel Open Drain Port (Numbers)	—			
	High Current Drive Port	43			
	Pull-Up Resistor	43			
External Interrupts Pins		9			
Debugging Function	On-Chip Debug	Yes			
	On-Board Flash Program	Yes			
Other Functions	ROM Correction Function	—			
	Others	Sensor control unit (Electrostatic capacitive touch detection CH × 5)			
Operating Frequency/Supply Voltage		20MHz/2.7 to 5.5V, 5MHz/1.8 to 5.5V			
Operating Ambient Temperature (°C)		–20 to 85			
Package*2		SWBG0048LA-A			
Part No.		R5F213N7TNBX*	R5F213N8TNBX*	R5F213NATNBX*	R5F213NCTNBX*

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

Outline of R8C/Lx Series

These products feature an on-chip LCD drive control circuit. They retain many peripheral functions from the R8C/3x Series, such as a multifunction timer and communication functions, while adding the easy-to-use LCD drive control circuit from the 38000/740 Series and H8/300L Super Low Power Series. The R8C/Lx Series provides the features listed below and includes versions suitable for a wide variety of products incorporating liquid crystal display panels.

R8C/Lx Series Features

- 32-pin, 52-pin, 64-pin, 80-pin and 100-pin packages
- 8, 16, 32, 48, 64, 96, or 128 KB on-chip Flash (differs by Group)
- 8 MHz operation at 1.8 V supply voltage (R8C/LAxA group), and 20 MHz operation from 2.7 V available
- Built-in Power-Off Mode great for power-saving applications
- Inherits selected timers from the R8C/3x, 38000/740 and H8
- On-chip Voltage Detection Circuit and Power-on Reset Circuit take the place of external reset IC (R8C/L3xC, R8C/L3xM group, LAxA group)
- Built-in High-speed On-chip Oscillator takes the place of external oscillator (R8C/L3xC Group, R8C/L3xM group, R8C/LAxA Group)
- Built-in pin-level LCD port/general port switching function cuts down on invalid pins

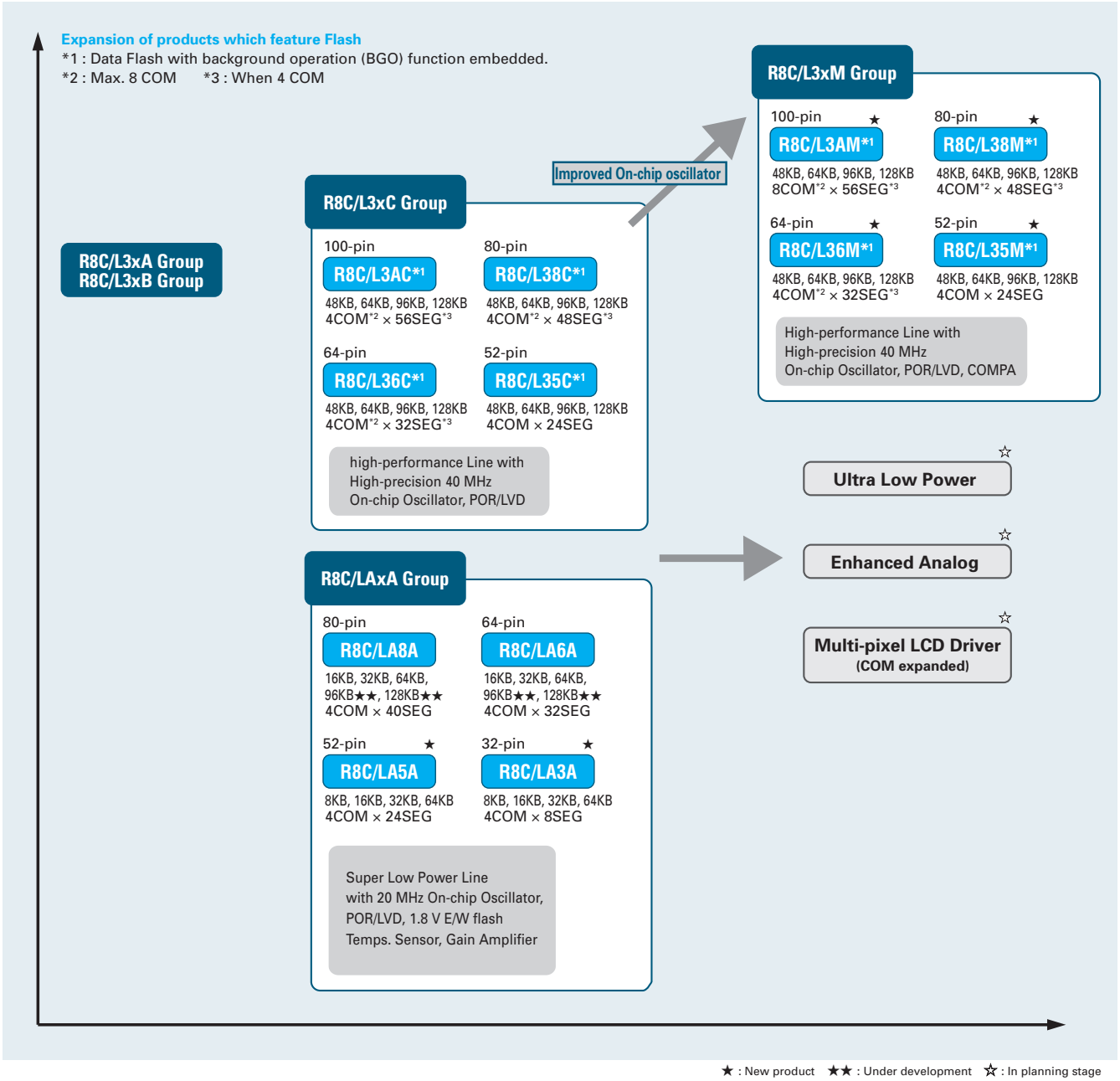
Industry top-class functions are built-in (R8C/L3xC Group, and R8C/L3xM Group)

- Industry top-class ROM/RAM: Max. 128 KB ROM, max. 10 KB RAM
- High-function LCD drive control circuit
  - LCD drive control circuit supports up to 8COM and is capable of multi-pixel LCD panel display
  - On-chip LCD power supply voltage multiplier makes external power supply unnecessary
  - Built-in display control function in pixel units
    - automatic on/off display - → Further reduce power consumption during wait
- DTC (Data Transfer Controller) great for data transfer
- Data Flash with BGO (background operation) Function makes it possible to continue operating the CPU during data flash write/erase
- Complementary PWM timer great for driving motors, etc.

Achieves industry top-class ultralow power consumption (R8C/LAxA Group)

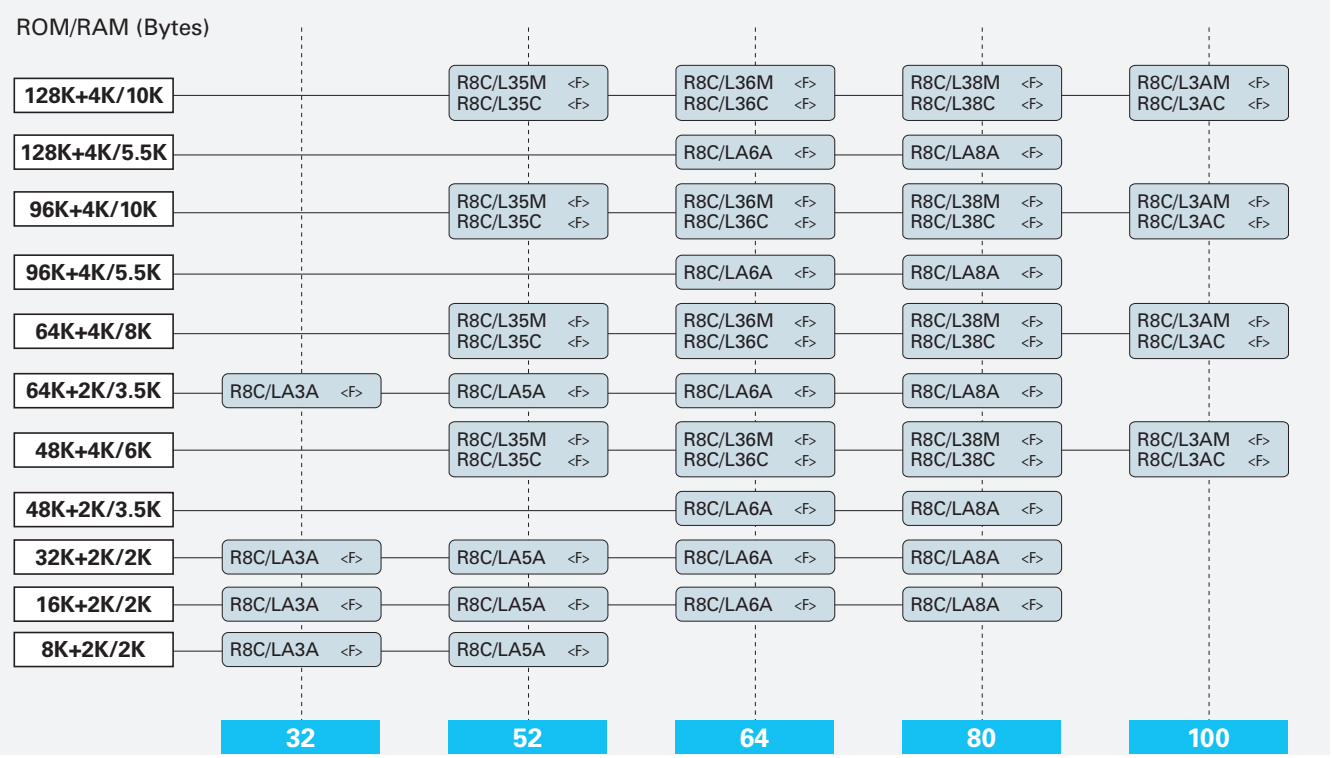
- Less than half the operating power consumption and standby power consumption compared to previous Renesas products
- Built-in functions conducive to lowering system power consumption
  - Flash memory erasing/writing/reading at 1.8 V
  - Industry's first LCD with memory effect
  - Full calendar RTC with automatic correction function

• R8C/Lx Series Roadmap



★ : New product ★★ : Under development ☆ : In planning stage

• Memory Capacity (ROM/RAM) (R8C/Lx Series)



Letters in brackets < > indicate memory variations.
F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

R8C/LA8A Group

• These products use an 80-pin package and have on-chip flash memory capacities ranging from 16 KB to 128 KB. They provide up to four common outputs and up to 40 segment outputs for the LCD drive control circuit. Incorporates LCD with memory effect.

R8C/LA5A Group

• These products use an 52-pin package and have on-chip flash memory capacities ranging from 8 KB to 64 KB. They provide up to four common outputs and up to 27 segment outputs for the LCD drive control circuit. Incorporates LCD with memory effect.

R8C/L3AC, R8C/L3AM Group

• These products use a 100-pin package and have on-chip flash memory capacities ranging from 48 KB to 128 KB. They provide up to eight common outputs and up to 56 segment outputs (when four common outputs are selected) for the LCD drive control circuit.

R8C/L36C, R8C/L36M Group

• These products use a 64-pin package and have on-chip flash memory capacities ranging from 48 KB to 128 KB. They provide up to eight common outputs and up to 32 segment outputs (when four common outputs are selected) for the LCD drive control circuit.

R8C/LA6A Group

• These products use an 64-pin package and have on-chip flash memory capacities ranging from 16 KB to 128 KB. They provide up to four common outputs and up to 32 segment outputs for the LCD drive control circuit. Incorporates LCD with memory effect.

R8C/LA3A Group

• These products use an 32-pin package and have on-chip flash memory capacities ranging from 8 KB to 64 KB. They provide up to four common outputs and up to 12 segment outputs for the LCD drive control circuit. Incorporates LCD with memory effect.

R8C/L38C, R8C/L38M Group

• These products use an 80-pin package and have on-chip flash memory capacities ranging from 48 KB to 128 KB. They provide up to eight common outputs and up to 48 segment outputs (when four common outputs are selected) for the LCD drive control circuit.

R8C/L35C, R8C/L35M Group

• These products use a 52-pin package and have on-chip flash memory capacities ranging from 48 KB to 128 KB. They provide up to four common outputs and up to 24 segment outputs for the LCD drive control circuit.

• Specifications (R8C/Lx Series)

Group		R8C/LA8A					
Memory	ROM (Bytes)	16K + 2K	32K + 2K	48K + 2K	64K + 2K	96K + 4K	128K + 4K
	RAM (Bytes)	2K		3.5K		5.5K	
	ROM Type*1	F					
	Data Flash/E2 Data Flash	2K (Data Flash: program/erase 10k times)				4K (Data Flash: program/erase 10k times)	
	Program Security	Yes (ID code check function, ROM code protect function)					
CPU	CPU	R8C core					
	Basic Instructions	89					
	Minimum Instruction Execution Time (ns)	50 (@20MHz)					
	Multiplier	16 × 16 → 32					
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32					
DMA	DTC/DMAC II	—					
Clock	Clock Generation Circuit	4 circuits (Main clock, Sub-clock, High-speed on-chip oscillator, Low-speed on-chip oscillator)					
	PLL	—					
	Subclock	Yes (32.768kHz)					
	RTC	Yes (Timer RH)					
	On-Chip Oscillator	2 circuits (High speed: 20MHz, Low speed: 125kHz)					
	Oscillation Stop Detection	Yes					
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)					
	Power Save	Wait/Stop/Power off					
Power Supply Voltage Detection	Power-On Reset/POR	Yes					
	Low Voltage Detection/LVD	Yes (Voltage detection 3)					
A/D Converter	Resolution × Channels	10-bit × 12					
	Sample and Hold	Yes					
D/A Converter	Resolution × Channels	—					
Timer	8-bit	3 (Timer RB0, Timer RB1, Timer RH)					
	16-bit	4 (Timer RC, Timer RJ0, Timer RJ1, Timer RJ2)					
	Input Capture	4 (shared with Timer RC)					
	Output Compare	5 (shared with Timer RC, Timer RH)					
	PWM Output	5 (shared with Timer RB0, Timer RB1, Timer RC)					
	Real-Time Port	—					
	Event Counter	3 (shared with Timer RJ0, Timer RJ1, Timer RJ2)					
	2-Phase Encoder Input	—					
	3-Phase Inverter Control	—					
Watchdog Timer		1 (with automatic start function, clock source protection function, low-speed on-chip oscillator for watchdog timer)					
Serial Interface	Clock Sync./Clock Async.	2 (UART0, UART2)					
	Clock Sync. Only	—					
	Clock Async. Only	—					
I²C-bus		1 (shared with SSU) + 1 (UART 2 (simple I²C))					
Synchronous Serial Communication Unit/Special Serial I/O		1 (shared with I²C))					
CAN	Channels	—					
	Message Box (Numbers)	—					
LCD		40seg × 4com					
I/O Ports	Input Only (Numbers)	—					
	CMOS Output Only (Numbers)	—					
	CMOS I/O (Numbers)	72					
	N-Channel Open Drain Port (Numbers)	—					
	High Current Drive Port	10					
	Pull-Up Resistor	69					
External Interrupts Pins		16					
Debugging Function	On-Chip Debug	Yes					
	On-Board Flash Program	Yes					
Other Functions	ROM Correction Function	—					
	Others	Comparator B × 2					
Operating Frequency/Supply Voltage		20MHz/2.7 to 5.5V, 8MHz/1.8 to 5.5V					
Operating Ambient Temperature (°C)		–20 to 85	–40 to 85	–20 to 85	–40 to 85	–20 to 85	–40 to 85	–20 to 85	–40 to 85	–20 to 85	–40 to 85	–20 to 85	–40 to 85	–20 to 85	–40 to 85	–20 to 85	–40 to 85
Package*2		PLQP0080KB-A	PLQP0080JA-A	PLQP0080KB-A	PLQP0080JA-A	PLQP0080KB-A	PLQP0080JA-A	PLQP0080KB-A	PLQP0080JA-A	PLQP0080KB-A	PLQP0080JA-A	PLQP0080KB-A	PLQP0080JA-A	PLQP0080KB-A	PLQP0080JA-A	PLQP0080KB-A	PLQP0080JA-A	PLQP0080KB-A	PLQP0080JA-A	PLQP0080KB-A	PLQP0080JA-A	PLQP0080KB-A	PLQP0080JA-A
Part No.		R5F2LA84ANFP	R5F2LA84ANFA	R5F2LA84ADFP	R5F2LA84ADFA	R5F2LA86ANFP	R5F2LA86ANFA	R5F2LA86ADFP	R5F2LA86ADFA	R5F2LA87ANFP	R5F2LA87ANFA	R5F2LA87ADFP	R5F2LA87ADFA	R5F2LA88ANFP	R5F2LA88ANFA	R5F2LA88ADFP	R5F2LA88ADFA	R5F2LA8AANFP**	R5F2LA8AANFA**	R5F2LA8AADFP**	R5F2LA8AADFA**	R5F2LA8CANFP**	R5F2LA8CANFA**	R5F2LA8CADFP**	R5F2LA8CADFA**

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (R8C/Lx Series)

Group		R8C/LA6A																							
Memory	ROM (Bytes)	16K + 2K		32K + 2K		48K + 2K		64K + 2K		96K + 4K		128K + 4K													
	RAM (Bytes)	2K				3.5K				5.5K															
	ROM Type*1	F																							
	Data Flash/E2 Data Flash	2K (Data Flash: program/erase 10k times)								4K (Data Flash: program/erase 10k times)															
	Program Security	Yes (ID code check function, ROM code protect function)																							
CPU	CPU	R8C core																							
	Basic Instructions	89																							
	Minimum Instruction Execution Time (ns)	50 (@20MHz)																							
	Multiplier	16 × 16 → 32																							
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32																							
DMA	DTC/DMAC Ⅱ	—																							
Clock	Clock Generation Circuit	4 circuits (Main clock, Sub-clock, High-speed on-chip oscillator, Low-speed on-chip oscillator)																							
	PLL	—																							
	Subclock	Yes (32.768kHz)																							
	RTC	Yes (Timer RH)																							
	On-Chip Oscillator	2 circuits (High speed: 20MHz, Low speed: 125kHz)																							
	Oscillation Stop Detection	Yes																							
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)																							
	Power Save	Wait/Stop/Power off																							
Power Supply Voltage Detection	Power-On Reset/POR	Yes																							
	Low Voltage Detection/LVD	Yes (Voltage detection 3)																							
A/D Converter	Resolution × Channels	10-bit × 8																							
	Sample and Hold	Yes																							
D/A Converter	Resolution × Channels	—																							
Timer	8-bit	3 (Timer RB0, Timer RB1, Timer RH)																							
	16-bit	3 (Timer RC, Timer RJ0, Timer RJ1)																							
	Input Capture	4 (shared with Timer RC)																							
	Output Compare	5 (shared with Timer RC, Timer RH)																							
	PWM Output	5 (shared with Timer RB0, Timer RB1, Timer RC)																							
	Real-Time Port	—																							
	Event Counter	2 (shared with Timer RJ0, Timer RJ1)																							
	2-Phase Encoder Input	—																							
	3-Phase Inverter Control	—																							
Watchdog Timer		1 (with automatic start function, clock source protection function, low-speed on-chip oscillator for watchdog timer)																							
Serial Interface	Clock Sync./Clock Async.	2 (UART0, UART2)																							
	Clock Sync. Only	—																							
	Clock Async. Only	—																							
I²C-bus		1 (shared with SSU)																							
Synchronous Serial Communication Unit/Special Serial I/O		1 (shared with I²C))																							
CAN	Channels	—																							
	Message Box (Numbers)	—																							
LCD		32seg × 4com																							
I/O Ports	Input Only (Numbers)	—																							
	CMOS Output Only (Numbers)	—																							
	CMOS I/O (Numbers)	56																							
	N-Channel Open Drain Port (Numbers)	—																							
	High Current Drive Port	8																							
	Pull-Up Resistor	53																							
External Interrupts Pins		16		13		16		13		16		13		16		13		16		13		16			
Debugging Function	On-Chip Debug	Yes																							
	On-Board Flash Program	Yes																							
Other Functions	ROM Correction Function	—																							
	Others	Comparator B × 2																							
Operating Frequency/Supply Voltage		20MHz/2.7 to 5.5V, 8MHz/1.8 to 5.5V																							
Operating Ambient Temperature (°C)		–20 to 85		–40 to 85		–20 to 85		–40 to 85		–20 to 85		–40 to 85		–20 to 85		–40 to 85		–20 to 85		–40 to 85		–20 to 85		–40 to 85	
Package*2		PLQP0064KB-A	PLQP0064GA-A	PLQP0064KB-A	PLQP0064GA-A	PLQP0064KB-A	PLQP0064GA-A	PLQP0064KB-A	PLQP0064GA-A	PLQP0064KB-A	PLQP0064GA-A	PLQP0064KB-A	PLQP0064GA-A	PLQP0064KB-A	PLQP0064GA-A	PLQP0064KB-A	PLQP0064GA-A	PLQP0064KB-A	PLQP0064GA-A	PLQP0064KB-A	PLQP0064GA-A	PLQP0064KB-A	PLQP0064GA-A	PLQP0064KB-A	PLQP0064GA-A
Part No.		R5F2LA64ANFP	R5F2LA64ANFA	R5F2LA64ADFP	R5F2LA64ADFA	R5F2LA66ANFP	R5F2LA66ANFA	R5F2LA66ADFP	R5F2LA66ADFA	R5F2LA67ANFP	R5F2LA67ANFA	R5F2LA67ADFP	R5F2LA67ADFA	R5F2LA68ANFP	R5F2LA68ANFA	R5F2LA68ADFP	R5F2LA68ADFA	R5F2LA6AANFP**	R5F2LA6AANFA**	R5F2LA6ADFP**	R5F2LA6ADFA**	R5F2LA6CANFP**	R5F2LA6CANFA**	R5F2LA6CADFP**	R5F2LA6CADFA**

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (R8C/Lx Series)

Group		R8C/LA5A				R8C/LA3A			
Memory	ROM (Bytes)	8K + 2K	16K + 2K	32K + 2K	64K + 2K	8K + 2K	16K + 2K	32K + 2K	64K + 2K
	RAM (Bytes)	2K			3.5K	2K			3.5K
	ROM Type*1	F							
	Data Flash/E2 Data Flash	2K (Data Flash: program/erase 10k times)							
	Program Security	Yes (ID code check function, ROM code protect function)							
CPU	CPU	R8C Core							
	Basic Instructions	89							
	Minimum Instruction Execution Time (ns)	50 (@20MHz)							
	Multiplier	16 × 16 → 32							
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32							
DMA	DTC/DMAC II	—							
Clock	Clock Generation Circuit	4 circuits (Main clock, Sub-clock, High-speed on-chip oscillator, On-chip oscillator)							
	PLL	—							
	Subclock	Yes (32.768kHz)							
	RTC	Yes (Timer RH)							
	On-Chip Oscillator	2 circuits (High speed: 20MHz, Low speed: 125kHz)							
	Oscillation Stop Detection	Yes							
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)							
	Power Save	Wait/Stop/Power off							
Power Supply Voltage Detection	Power-On Reset/POR	Yes							
	Low Voltage Detection/LVD	Yes (Voltage detection 3)							
A/D Converter	Resolution × Channels	10-bit × 7				10-bit × 5			
	Sample and Hold	Yes							
D/A Converter	Resolution × Channels	—							
Timer	8-bit	3 (Timer RB0, Timer RB1, Timer RH)							
	16-bit	3 (Timer RC, Timer RJ0, Timer RJ1)							
	Input Capture	4 (shared with Timer RC)							
	Output Compare	5 (shared with Timer RC, Timer RH)							
	PWM Output	5 (shared with Timer RB0, Timer RB1, Timer RC)							
	Real-Time Port	—							
	Event Counter	2 (shared with Timer RJ0, Timer RJ1)							
	2-Phase Encoder Input	—							
	3-Phase Inverter Control	—							
Watchdog Timer		1 (with automatic start function, clock source protection function, low-speed on-chip oscillator for watchdog timer)							
Serial Interface	Clock Sync./Clock Async.	1 (UART 0)							
	Clock Sync. Only	—							
	Clock Async. Only	—							
I²C-bus		1 (shared with SSU)							
Synchronous Serial Communication Unit/Special Serial I/O		1 (shared with I²C)							
CAN	Channels	—							
	Message Box (Numbers)	—							
LCD		24seg × 4com				8seg × 4com			
I/O Ports	Input Only (Numbers)	—							
	CMOS Output Only (Numbers)	—							
	CMOS I/O (Numbers)	44				26			
	N-Channel Open Drain Port (Numbers)	—							
	High Current Drive Port	8							
	Pull-Up Resistor	41				23			
External Interrupts Pins		14				13			
Debugging Function	On-Chip Debug	Yes							
	On-Board Flash Program	Yes							
Other Functions	ROM Correction Function	—							
	Others	Comparator B × 2, LCD with memory effect, temperature sensor, Gain Amp.(Max.8 times)				Comparator B × 1, LCD with memory effect, temperature sensor, Gain Amp.(Max. 8 times)			
Operating Frequency/Supply Voltage		20MHz/2.7 to 5.5V, 8 MHz/1.8 to 5.5V							
Operating Ambient Temperature (°C)		-20 to 85	–40 to 85	–20 to 85	–40 to 85	–20 to 85	–40 to 85	–20 to 85	–40 to 85	-20 to 85
Package*2		PLQP0052JA-A					PLQP0032GB-A			
Part No.		R5F2LA52ANFP*	R5F2LA52ADFP**	R5F2LA54ADFP**	R5F2LA54ANFP*	R5F2LA56ANFP*	R5F2LA56ADFP**	R5F2LA58ADFP**	R5F2LA58ANFP*	R5F2LA32ANFP*	R5F2LA32ADFP**	R5F2LA34ADFP**	R5F2LA34ANFP*	R5F2LA36ANFP*	R5F2LA36ADFP**	R5F2LA38ADFP**	R5F2LA38ANFP*

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (R8C/Lx Series)

Group		R8C/L3AC															
Memory	ROM (Bytes)	48K + 4K		64K + 4K		96K + 4K		128K + 4K									
	RAM (Bytes)	6K		8K		10K											
	ROM Type*1	F															
	Data Flash/E2 Data Flash	4K (Data Flash: program/erase 10k times)															
	Program Security	Yes (ID code check function, ROM code protect function)															
CPU	CPU	R8C Core															
	Basic Instructions	89															
	Minimum Instruction Execution Time (ns)	50 (@20MHz)															
	Multiplier	16 × 16 → 32															
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32															
DMA	DTC/DMAC Ⅱ	DTC (Activation sources: 38)															
Clock	Clock Generation Circuit	4 circuits (Main clock, Sub-clock, High-speed on-chip oscillator, Low-speed on-chip oscillator)															
	PLL	—															
	Subclock	Yes (32.768kHz)															
	RTC	Yes (Timer RE)															
	On-Chip Oscillator	2 circuits (High speed: 40MHz, Low speed: 125kHz)															
	Oscillation Stop Detection	Yes															
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)															
	Power Save	Wait/Stop/Power off															
Power Supply Voltage Detection	Power-On Reset/POR	Yes															
	Low Voltage Detection/LVD	Yes (Voltage detection 3)															
A/D Converter	Resolution × Channels	10-bit × 20															
	Sample and Hold	Yes															
D/A Converter	Resolution × Channels	8-bit × 2															
Timer	8-bit	3 (Timer RA, Timer RB, Timer RE)															
	16-bit	4 (Timer RC, Timer RD, Timer RG)															
	Input Capture	14 (shared with Timer RC, Timer RD, Timer RG)															
	Output Compare	15 (shared with Timer RC, Timer RD, Timer RE, Timer RG)															
	PWM Output	11 (shared with Timer RB, Timer RC, Timer RD, Timer RG)															
	Real-Time Port	—															
	Event Counter	2 (shared with Timer RA, Timer RG)															
	2-Phase Encoder Input	1 (shared with Timer RG)															
	3-Phase Inverter Control	1 (shared with Timer RD)															
Watchdog Timer		1 (with automatic start function, clock source protection function, low-speed on-chip oscillator for watchdog timer)															
Serial Interface	Clock Sync./Clock Async.	3 (UART 0 to UART 2)															
	Clock Sync. Only	—															
	Clock Async. Only	—															
I²C-bus		1 (shared with SSU) + 1 (UART 2 (simple I²C))															
Synchronous Serial Communication Unit/Special Serial I/O		1 (shared with I²C)															
CAN	Channels	—															
	Message Box (Numbers)	—															
LCD		56seg × 4com, 52seg × 8com															
I/O Ports	Input Only (Numbers)	—															
	CMOS Output Only (Numbers)	—															
	CMOS I/O (Numbers)	88															
	N-Channel Open Drain Port (Numbers)	—															
	High Current Drive Port	16															
	Pull-Up Resistor	88															
External Interrupts Pins		16															
Debugging Function	On-Chip Debug	Yes															
	On-Board Flash Program	Yes															
Other Functions	ROM Correction Function	—															
	Others	Comparator B × 2															
Operating Frequency/Supply Voltage		20MHz/2.7 to 5.5V, 5MHz/1.8 to 5.5V															
Operating Ambient Temperature (°C)		–40 to 85		–20 to 85		–40 to 85		–20 to 85		–40 to 85		–20 to 85		–40 to 85		–20 to 85	
Package*2		PRQP0100JD-B	PLQP0100KB-A	PRQP0100JD-B	PLQP0100KB-A	PRQP0100JD-B	PLQP0100KB-A	PRQP0100JD-B	PLQP0100KB-A	PRQP0100JD-B	PLQP0100KB-A	PRQP0100JD-B	PLQP0100KB-A	PRQP0100JD-B	PLQP0100KB-A	PRQP0100JD-B	PLQP0100KB-A
Part No.		R5F2L3A7CDFA	R5F2L3A7CDFP	R5F2L3A7CNFA	R5F2L3A7CNFP	R5F2L3A8CDFA	R5F2L3A8CDFP	R5F2L3A8CNFA	R5F2L3A8CNFP	R5F2L3AACDFA	R5F2L3AACDFP	R5F2L3AACNFA	R5F2L3AACNFP	R5F2L3ACCDFA	R5F2L3ACCDFP	R5F2L3ACCNFA	R5F2L3ACCNFP

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (R8C/Lx Series)

Group		R8C/L3AM													
Memory	ROM (Bytes)	48K + 4K		64K + 4K		96K + 4K		128K + 4K							
	RAM (Bytes)	6K		8K		10K									
	ROM Type*1	F													
	Data Flash/E2 Data Flash	4K (Data Flash: program/erase 10k times)													
	Program Security	Yes (ID code check function, ROM code protect function)													
CPU	CPU	R8C Core													
	Basic Instructions	89													
	Minimum Instruction Execution Time (ns)	50 (@20MHz)													
	Multiplier	16 × 16 → 32													
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32													
DMA	DTC/DMAC II	DTC (Activation sources: 38)													
Clock	Clock Generation Circuit	4 circuits (Main clock, Sub-clock, High-speed on-chip oscillator, Low-speed on-chip oscillator)													
	PLL	—													
	Subclock	Yes (32.768kHz)													
	RTC	Yes (Timer RE)													
	On-Chip Oscillator	2 circuits (High speed: 40MHz, Low speed: 125kHz)													
	Oscillation Stop Detection	Yes													
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)													
	Power Save	Wait/Stop/Power off													
Power Supply Voltage Detection	Power-On Reset/POR	Yes													
	Low Voltage Detection/LVD	Yes (Voltage detection 3)													
A/D Converter	Resolution × Channels	10-bit × 20													
	Sample and Hold	Yes													
D/A Converter	Resolution × Channels	8-bit × 2													
Timer	8-bit	3 (Timer RA, Timer RB, Timer RE)													
	16-bit	4 (Timer RC, Timer RD, Timer RG)													
	Input Capture	14 (shared with Timer RC, Timer RD, Timer RG)													
	Output Compare	15 (shared with Timer RC, Timer RD, Timer RE, Timer RG)													
	PWM Output	11 (shared with Timer RB, Timer RC, Timer RD, Timer RG)													
	Real-Time Port	—													
	Event Counter	2 (shared with Timer RA, Timer RG)													
	2-Phase Encoder Input	1 (shared with Timer RG)													
	3-Phase Inverter Control	1 (shared with Timer RD)													
Watchdog Timer		1 (with automatic start function, clock source protection function, low-speed on-chip oscillator for watchdog timer)													
Serial Interface	Clock Sync./Clock Async.	3 (UART 0 to UART 2)													
	Clock Sync. Only	—													
	Clock Async. Only	—													
I²C-bus		1 (shared with SSU) + 1 (UART 2 (simple I²C))													
Synchronous Serial Communication Unit/Special Serial I/O		1 (shared with I²C)													
CAN	Channels	—													
	Message Box (Numbers)	—													
LCD		56seg × 4com, 52seg × 8com													
I/O Ports	Input Only (Numbers)	—													
	CMOS Output Only (Numbers)	—													
	CMOS I/O (Numbers)	88													
	N-Channel Open Drain Port (Numbers)	—													
	High Current Drive Port	16													
	Pull-Up Resistor	88													
External Interrupts Pins		16													
Debugging Function	On-Chip Debug	Yes													
	On-Board Flash Program	Yes													
Other Functions	ROM Correction Function	—													
	Others	Comparator A × 2, Comparator B × 2													
Operating Frequency/Supply Voltage		20MHz/2.7 to 5.5V, 5MHz/1.8 to 5.5V													
Operating Ambient Temperature (°C)		–40 to 85		–20 to 85		–40 to 85		–20 to 85		–40 to 85		–20 to 85		–40 to 85		–20 to 85	
Package*2		PRQP0100JD-B	PLQP0100KB-A	PRQP0100JD-B	PLQP0100KB-A	PRQP0100JD-B	PLQP0100KB-A	PRQP0100JD-B	PLQP0100KB-A	PRQP0100JD-B	PLQP0100KB-A	PRQP0100JD-B	PLQP0100KB-A	PRQP0100JD-B	PLQP0100KB-A	PRQP0100JD-B	PLQP0100KB-A
Part No.		R5F2L3A7MDFA*	R5F2L3A7MDFP*	R5F2L3A7MNFA*	R5F2L3A7MNFP*	R5F2L3A8MDFA*	R5F2L3A8MDFP*	R5F2L3A8MNFA*	R5F2L3A8MNFP*	R5F2L3AAMDFA*	R5F2L3AAMDFP*	R5F2L3AAMNFA*	R5F2L3AAMNFP*	R5F2L3ACMDFA*	R5F2L3ACMDFP*	R5F2L3ACMNFA*	R5F2L3ACMNFP*

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (R8C/Lx Series)

Group		R8C/L38C															
Memory	ROM (Bytes)	48K + 4K		64K + 4K		96K + 4K		128K + 4K									
	RAM (Bytes)	6K		8K		10K											
	ROM Type*1	F															
	Data Flash/E2 Data Flash	4K (Data Flash: program/erase 10k times)															
	Program Security	Yes (ID code check function, ROM code protect function)															
CPU	CPU	R8C Core															
	Basic Instructions	89															
	Minimum Instruction Execution Time (ns)	50 (@20MHz)															
	Multiplier	16 × 16 → 32															
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32															
DMA	DTC/DMAC Ⅱ	DTC (Activation sources: 38)															
Clock	Clock Generation Circuit	4 circuits (Main clock, Sub-clock, High-speed on-chip oscillator, Low-speed on-chip oscillator)															
	PLL	—															
	Subclock	Yes (32.768kHz)															
	RTC	Yes (Timer RE)															
	On-Chip Oscillator	2 circuits (High speed: 40MHz, Low speed: 125kHz)															
	Oscillation Stop Detection	Yes															
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)															
	Power Save	Wait/Stop/Power off															
Power Supply Voltage Detection	Power-On Reset/POR	Yes															
	Low Voltage Detection/LVD	Yes (Voltage detection 3)															
A/D Converter	Resolution x Channels (min. conversion time)	10-bit × 16															
	Sample and Hold	Yes															
D/A Converter	Resolution x Channels	8-bit × 2															
Timer	8-bit	3 (Timer RA, Timer RB, Timer RE)															
	16-bit	4 (Timer RC, Timer RD, Timer RG)															
	Input Capture	14 (shared with Timer RC, Timer RD, Timer RG)															
	Output Compare	15 (shared with Timer RC, Timer RD, Timer RE, Timer RG)															
	PWM Output	11 (shared with Timer RB, Timer RC, Timer RD, Timer RG)															
	Real-Time Port	—															
	Event Counter	2 (shared with Timer RA, Timer RG)															
	2-Phase Encoder Input	1 (shared with Timer RG)															
	3-Phase Inverter Control	1 (shared with Timer RD)															
Watchdog Timer		1 (with automatic start function, clock source protection function, low-speed on-chip oscillator for watchdog timer)															
Serial Interface	Clock Sync./Clock Async.	3 (UART 0 to UART 2)															
	Clock Sync. Only	—															
	Clock Async. Only	—															
I²C-bus		1 (shared with SSU) + 1 (UART 2 (simple I²C))															
Synchronous Serial Communication Unit/Special Serial I/O		1 (shared with I²C)															
CAN	Channels	—															
	Message Box (Numbers)	—															
LCD		48seg × 4com, 44seg × 8com															
I/O Ports	Input Only (Numbers)	—															
	CMOS Output Only (Numbers)	—															
	CMOS I/O (Numbers)	68															
	N-Channel Open Drain Port (Numbers)	—															
	High Current Drive Port	8															
	Pull-Up Resistor	68															
External Interrupts Pins		16															
Debugging Function	On-Chip Debug	Yes															
	On-Board Flash Program	Yes															
Other Functions	ROM Correction Function	—															
	Others	Comparator B × 2															
Operating Frequency/Supply Voltage		20MHz/2.7 to 5.5V, 5MHz/1.8 to 5.5V															
Operating Ambient Temperature (°C)		–40 to 85		–20 to 85		–40 to 85		–20 to 85		–40 to 85		–20 to 85		–40 to 85		–20 to 85	
Package*2		PLQP0080JA-A	PLQP0080KB-A	PLQP0080JA-A	PLQP0080KB-A	PLQP0080JA-A	PLQP0080KB-A	PLQP0080JA-A	PLQP0080KB-A	PLQP0080JA-A	PLQP0080KB-A	PLQP0080JA-A	PLQP0080KB-A	PLQP0080JA-A	PLQP0080KB-A	PLQP0080JA-A	PLQP0080KB-A
Part No.		R5F2L387CDFA	R5F2L387CDFP	R5F2L387CNFA	R5F2L387CNFP	R5F2L388CDFA	R5F2L388CDFP	R5F2L388CNFA	R5F2L388CNFP	R5F2L38ACDFA	R5F2L38ACDFP	R5F2L38ACNFA	R5F2L38ACNFP	R5F2L38CCDFA	R5F2L38CCDFP	R5F2L38CCNFA	R5F2L38CCNFP

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (R8C/Lx Series)

Group		R8C/L38M			
Memory	ROM (Bytes)	48K + 4K	64K + 4K	96K + 4K	128K + 4K
	RAM (Bytes)	6K	8K	10K	
	ROM Type*1	F			
	Data Flash/E2 Data Flash	4K (Data Flash: program/erase 10k times)			
	Program Security	Yes (ID code check function, ROM code protect function)			
CPU	CPU	R8C Core			
	Basic Instructions	89			
	Minimum Instruction Execution Time (ns)	50 (@20MHz)			
	Multiplier	16 × 16 → 32			
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32			
DMA	DTC/DMAC II	DTC (Activation sources: 38)			
Clock	Clock Generation Circuit	4 circuits (Main clock, Sub-clock, High-speed on-chip oscillator, Low-speed on-chip oscillator)			
	PLL	—			
	Subclock	Yes (32.768kHz)			
	RTC	Yes (Timer RE)			
	On-Chip Oscillator	2 circuits (High speed: 40MHz, Low speed: 125kHz)			
	Oscillation Stop Detection	Yes			
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)			
	Power Save	Wait/Stop/Power off			
Power Supply Voltage Detection	Power-On Reset/POR	Yes			
	Low Voltage Detection/LVD	Yes (Voltage detection 3)			
A/D Converter	Resolution x Channels (min. conversion time)	10-bit × 16			
	Sample and Hold	Yes			
D/A Converter	Resolution × Channels	8-bit × 2			
Timer	8-bit	3 (Timer RA, Timer RB, Timer RE)			
	16-bit	4 (Timer RC, Timer RD, Timer RG)			
	Input Capture	14 (shared with Timer RC, Timer RD, Timer RG)			
	Output Compare	15 (shared with Timer RC, Timer RD, Timer RE, Timer RG)			
	PWM Output	11 (shared with Timer RB, Timer RC, Timer RD, Timer RG)			
	Real-Time Port	—			
	Event Counter	2 (shared with Timer RA, Timer RG)			
	2-Phase Encoder Input	1 (shared with Timer RG)			
	3-Phase Inverter Control	1 (shared with Timer RD)			
Watchdog Timer		1 (with automatic start function, clock source protection function, low-speed on-chip oscillator for watchdog timer)			
Serial Interface	Clock Sync./Clock Async.	3 (UART 0 to UART 2)			
	Clock Sync. Only	—			
	Clock Async. Only	—			
I²C-bus		1 (shared with SSU) + 1 (UART 2 (simple I²C))			
Synchronous Serial Communication Unit/Special Serial I/O		1 (shared with I²C)			
CAN	Channels	—			
	Message Box (Numbers)	—			
LCD		48seg × 4com, 44seg × 8com			
I/O Ports	Input Only (Numbers)	—			
	CMOS Output Only (Numbers)	—			
	CMOS I/O (Numbers)	68			
	N-Channel Open Drain Port (Numbers)	—			
	High Current Drive Port	8			
	Pull-Up Resistor	68			
External Interrupts Pins		16			
Debugging Function	On-Chip Debug	Yes			
	On-Board Flash Program	Yes			
Other Functions	ROM Correction Function	—			
	Others	Comparator A × 2, Comparator B × 2			
Operating Frequency/Supply Voltage		20MHz/2.7 to 5.5V, 5MHz/1.8 to 5.5V			
Operating Ambient Temperature (°C)		–40 to 85	–20 to 85	–40 to 85	–20 to 85	–40 to 85	–20 to 85	–40 to 85	–20 to 85
Package*2		PLQP0080JA-A	PLQP0080KB-A	PLQP0080JA-A	PLQP0080KB-A	PLQP0080JA-A	PLQP0080KB-A	PLQP0080JA-A	PLQP0080KB-A	PLQP0080JA-A	PLQP0080KB-A	PLQP0080JA-A	PLQP0080KB-A	PLQP0080JA-A	PLQP0080KB-A
Part No.		R5F2L387MDFA*	R5F2L387MDFP*	R5F2L387MNFA*	R5F2L387MNFP*	R5F2L388MDFA*	R5F2L388MDFP*	R5F2L388MNFA*	R5F2L388MNFP*	R5F2L38AMDFA*	R5F2L38AMDFP*	R5F2L38AMNFA*	R5F2L38AMNFP*	R5F2L38CMDFA*	R5F2L38CMDFP*	R5F2L38CMNFA*	R5F2L38CM NFP*

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (R8C/Lx Series)

Group		R8C/L36C															
Memory	ROM (Bytes)	48K + 4K		64K + 4K		96K + 4K		128K + 4K									
	RAM (Bytes)	6K		8K		10K											
	ROM Type*1	F															
	Data Flash/E2 Data Flash	4K (Data Flash: program/erase 10k times)															
	Program Security	Yes (ID code check function, ROM code protect function)															
CPU	CPU	R8C Core															
	Basic Instructions	89															
	Minimum Instruction Execution Time (ns)	50 (@20MHz)															
	Multiplier	16 × 16 → 32															
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32															
DMA	DTC/DMAC Ⅱ	DTC (Activation sources: 38)															
Clock	Clock Generation Circuit	4 circuits (Main clock, Sub-clock, High-speed on-chip oscillator, Low-speed on-chip oscillator)															
	PLL	—															
	Subclock	Yes (32.768kHz)															
	RTC	Yes (Timer RE)															
	On-Chip Oscillator	2 circuits (High speed: 40MHz, Low speed: 125kHz)															
	Oscillation Stop Detection	Yes															
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)															
	Power Save	Wait/Stop/Power off															
Power Supply Voltage Detection	Power-On Reset/POR	Yes															
	Low Voltage Detection/LVD	Yes (Voltage detection 3)															
A/D Converter	Resolution x Channels (min. conversion time)	10-bit × 10															
	Sample and Hold	Yes															
D/A Converter	Resolution x Channels	8-bit × 2															
Timer	8-bit	3 (Timer RA, Timer RB, Timer RE)															
	16-bit	4 (Timer RC, Timer RD, Timer RG)															
	Input Capture	14 (shared with Timer RC, Timer RD, Timer RG)															
	Output Compare	15 (shared with Timer RC, Timer RD, Timer RE, Timer RG)															
	PWM Output	11 (shared with Timer RB, Timer RC, Timer RD, Timer RG)															
	Real-Time Port	—															
	Event Counter	2 (shared with Timer RA, Timer RG)															
	2-Phase Encoder Input	1 (shared with Timer RG)															
	3-Phase Inverter Control	1 (shared with Timer RD)															
Watchdog Timer		1 (with automatic start function, clock source protection function, low-speed on-chip oscillator for watchdog timer)															
Serial Interface	Clock Sync./Clock Async.	3 (UART 0 to UART 2)															
	Clock Sync. Only	—															
	Clock Async. Only	—															
I²C-bus		1 (shared with SSU) + 1 (UART 2 (simple I²C))															
Synchronous Serial Communication Unit/Special Serial I/O		1 (shared with I²C)															
CAN	Channels	—															
	Message Box (Numbers)	—															
LCD		32seg × 4com, 28seg × 8com															
I/O Ports	Input Only (Numbers)	—															
	CMOS Output Only (Numbers)	—															
	CMOS I/O (Numbers)	52															
	N-Channel Open Drain Port (Numbers)	—															
	High Current Drive Port	8															
	Pull-Up Resistor	52															
External Interrupts Pins		12															
Debugging Function	On-Chip Debug	Yes															
	On-Board Flash Program	Yes															
Other Functions	ROM Correction Function	—															
	Others	Comparator B × 2															
Operating Frequency/Supply Voltage		20MHz/2.7 to 5.5V, 5MHz/1.8 to 5.5V															
Operating Ambient Temperature (°C)		–40 to 85		–20 to 85		–40 to 85		–20 to 85		–40 to 85		–20 to 85		–40 to 85		–20 to 85	
Package*2		PLQP0064GA-A	PLQP0064KB-A	PLQP0064GA-A	PLQP0064KB-A	PLQP0064GA-A	PLQP0064KB-A	PLQP0064GA-A	PLQP0064KB-A	PLQP0064GA-A	PLQP0064KB-A	PLQP0064GA-A	PLQP0064KB-A	PLQP0064GA-A	PLQP0064KB-A	PLQP0064GA-A	PLQP0064KB-A
Part No.		R5F2L367CDFA	R5F2L367CDFP	R5F2L367CNFA	R5F2L367CNFP	R5F2L368CDFA	R5F2L368CDFP	R5F2L368CNFA	R5F2L368CNFP	R5F2L36ACDFA	R5F2L36ACDFP	R5F2L36ACNFA	R5F2L36ACNFP	R5F2L36CCDFA	R5F2L36CCDFP	R5F2L36CCNFA	R5F2L36CCNFP

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (R8C/Lx Series)

Group		R8C/L36M															
Memory	ROM (Bytes)	48K + 4K		64K + 4K		96K + 4K		128K + 4K									
	RAM (Bytes)	6K		8K		10K											
	ROM Type*1	F															
	Data Flash/E2 Data Flash	4K (Data Flash: program/erase 10k times)															
	Program Security	Yes (ID code check function, ROM code protect function)															
CPU	CPU	R8C Core															
	Basic Instructions	89															
	Minimum Instruction Execution Time (ns)	50 (@20MHz)															
	Multiplier	16 × 16 → 32															
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32															
DMA	DTC/DMAC II	DTC (Activation sources: 38)															
Clock	Clock Generation Circuit	4 circuits (Main clock, Sub-clock, High-speed on-chip oscillator, Low-speed on-chip oscillator)															
	PLL	—															
	Subclock	Yes (32.768kHz)															
	RTC	Yes (Timer RE)															
	On-Chip Oscillator	2 circuits (High speed: 40MHz, Low speed: 125kHz)															
	Oscillation Stop Detection	Yes															
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)															
	Power Save	Wait/Stop/Power off															
Power Supply Voltage Detection	Power-On Reset/POR	Yes															
	Low Voltage Detection/LVD	Yes (Voltage detection 3)															
A/D Converter	Resolution x Channels (min. conversion time)	10-bit × 10															
	Sample and Hold	Yes															
D/A Converter	Resolution x Channels	8-bit × 2															
Timer	8-bit	3 (Timer RA, Timer RB, Timer RE)															
	16-bit	4 (Timer RC, Timer RD, Timer RG)															
	Input Capture	14 (shared with Timer RC, Timer RD, Timer RG)															
	Output Compare	15 (shared with Timer RC, Timer RD, Timer RE, Timer RG)															
	PWM Output	11 (shared with Timer RB, Timer RC, Timer RD, Timer RG)															
	Real-Time Port	—															
	Event Counter	2 (shared with Timer RA, Timer RG)															
	2-Phase Encoder Input	1 (shared with Timer RG)															
	3-Phase Inverter Control	1 (shared with Timer RD)															
Watchdog Timer		1 (with automatic start function, clock source protection function, low-speed on-chip oscillator for watchdog timer)															
Serial Interface	Clock Sync./Clock Async.	3 (UART 0 to UART 2)															
	Clock Sync. Only	—															
	Clock Async. Only	—															
I²C-bus		1 (shared with SSU) + 1 (UART 2 (simple I²C))															
Synchronous Serial Communication Unit/Special Serial I/O		1 (shared with I²C)															
CAN	Channels	—															
	Message Box (Numbers)	—															
LCD		32seg × 4com, 28seg × 8com															
I/O Ports	Input Only (Numbers)	—															
	CMOS Output Only (Numbers)	—															
	CMOS I/O (Numbers)	52															
	N-Channel Open Drain Port (Numbers)	—															
	High Current Drive Port	8															
	Pull-Up Resistor	52															
External Interrupts Pins		12															
Debugging Function	On-Chip Debug	Yes															
	On-Board Flash Program	Yes															
Other Functions	ROM Correction Function	—															
	Others	Comparator A × 2, Comparator B × 2															
Operating Frequency/Supply Voltage		20MHz/2.7 to 5.5V, 5MHz/1.8 to 5.5V															
Operating Ambient Temperature (°C)		–40 to 85		–20 to 85		–40 to 85		–20 to 85		–40 to 85		–20 to 85		–40 to 85		–20 to 85	
Package*2		PLQP0064GA-A	PLQP0064KB-A	PLQP0064GA-A	PLQP0064KB-A	PLQP0064GA-A	PLQP0064KB-A	PLQP0064GA-A	PLQP0064KB-A	PLQP0064GA-A	PLQP0064KB-A	PLQP0064GA-A	PLQP0064KB-A	PLQP0064GA-A	PLQP0064KB-A	PLQP0064GA-A	PLQP0064KB-A
Part No.		R5F2L367MDFA*	R5F2L367MDFP*	R5F2L367MNFA*	R5F2L367MNFP*	R5F2L368MDFA*	R5F2L368MDFP*	R5F2L368MNFA*	R5F2L368MNFP*	R5F2L36AMDFA*	R5F2L36AMDFP*	R5F2L36AMNFA*	R5F2L36AMNFP*	R5F2L36CMDFA*	R5F2L36CMDFP*	R5F2L36CMNFA*	R5F2L36CMNFP*

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (R8C/Lx Series)

Group		R8C/L35C				R8C/L35M			
Memory	ROM (Bytes)	48K + 4K	64K + 4K	96K + 4K	128K + 4K	48K + 4K	64K + 4K	96K + 4K	128K + 4K
	RAM (Bytes)	6K	8K	10K		6K	8K	10K	
	ROM Type*1	F							
	Data Flash/E2 Data Flash	4K (Data Flash: program/erase 10k times)							
	Program Security	Yes (ID code check function, ROM code protect function)							
CPU	CPU	R8C core							
	Basic Instructions	89							
	Minimum Instruction Execution Time (ns)	50 (@20MHz)							
	Multiplier	16 × 16 → 32							
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32							
DMA	DTC/DMAC II	DTC (Activation sources: 38)							
Clock	Clock Generation Circuit	4 circuits (Main clock, Sub-clock, High-speed on-chip oscillator, Low-speed on-chip oscillator)							
	PLL	—							
	Subclock	Yes (32.768kHz)							
	RTC	Yes (Timer RE)							
	On-Chip Oscillator	2 circuits (High speed: 40MHz, Low speed: 125kHz)							
	Oscillation Stop Detection	Yes							
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)							
	Power Save	Wait/Stop/Power off							
Power Supply Voltage Detection	Power-On Reset/POR	Yes							
	Low Voltage Detection/LVD	Yes (Voltage detection 3)							
A/D Converter	Resolution x Channels (min. conversion time)	10-bit × 10							
	Sample and Hold	Yes							
D/A Converter	Resolution x Channels	8-bit × 2							
Timer	8-bit	3 (Timer RA, Timer RB, Timer RE)							
	16-bit	4 (Timer RC, Timer RD, Timer RG)							
	Input Capture	14 (shared with Timer RC, Timer RD, Timer RG)							
	Output Compare	15 (shared with Timer RC, Timer RD, Timer RE, Timer RG)							
	PWM Output	11 (shared with Timer RB, Timer RC, Timer RD, Timer RG)							
	Real-Time Port	—							
	Event Counter	2 (shared with Timer RA, Timer RG)							
	2-Phase Encoder Input	1 (shared with Timer RG)							
	3-Phase Inverter Control	1 (shared with Timer RD)							
Watchdog Timer		1 (with automatic start function, clock source protection function, low-speed on-chip oscillator for watchdog timer)							
Serial Interface	Clock Sync./Clock Async.	3 (UART0 to UART2)							
	Clock Sync. Only	—							
	Clock Async. Only	—							
I²C-bus		1 (shared with SSU) + 1 (UART 2 (simple I²C))							
Synchronous Serial Communication Unit/Special Serial I/O		1 (shared with I²C)							
CAN	Channels	—							
	Message Box (Numbers)	—							
LCD		24seg× 4com							
I/O Ports	Input Only (Numbers)	—							
	CMOS Output Only (Numbers)	—							
	CMOS I/O (Numbers)	41							
	N-Channel Open Drain Port (Numbers)	—							
	High Current Drive Port	5							
	Pull-Up Resistor	41							
External Interrupts Pins		9							
Debugging Function	On-Chip Debug	Yes							
	On-Board Flash Program	Yes							
Other Functions	ROM Correction Function	—							
	Others	Comparator B × 2				Comparator A × 2, Comparator B × 2			
Operating Frequency/Supply Voltage		20MHz/2.7 to 5.5V, 5MHz/1.8 to 5.5V							
Operating Ambient Temperature (°C)		–40 to 85	–20 to 85	–40 to 85	–20 to 85	–40 to 85	–20 to 85	–40 to 85	–20 to 85	–40 to 85	–20 to 85	–40 to 85	–20 to 85	–40 to 85	–20 to 85	–40 to 85	–20 to 85
Package*2		PLQP0052JA-A							
Part No.		R5F2L357CDFP	R5F2L357CNFP	R5F2L358CDFP	R5F2L358CNFP	R5F2L35ACDFP	R5F2L35ACNFP	R5F2L35CCDFP	R5F2L35CCNFP	R5F2L357MDFP*	R5F2L357MNFP*	R5F2L358MDFP*	R5F2L358MNFP*	R5F2L35AMDFP*	R5F2L35AMNFP*	R5F2L35CMDFP*	R5F2L35CMNFP*

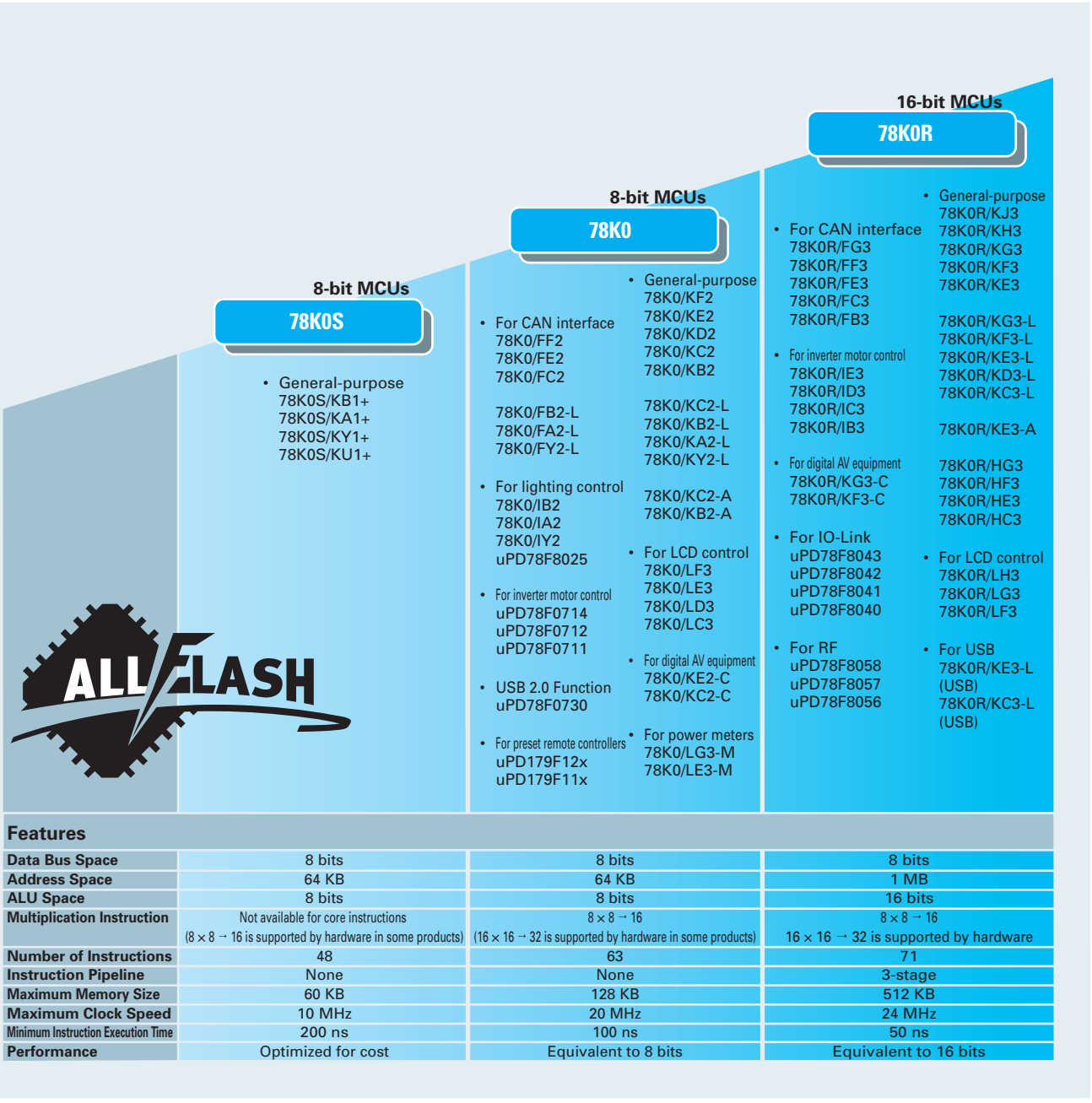
*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

Affordable, low-power 78K family

The 78K family of MCUs features an extensive lineup of products, including 78K0S microcontrollers, which are ideal for compact applications, 78K0 microcontrollers, which provide an easy-to-handle CPU core and a wide range of peripheral functions, and 78K0R microcontrollers, which deliver a RISC-level performance and are highly compatible with the 78K0 series. The 78K family is an affordable, low-power solution that provides peace of mind and expands the way people see CISC microcontrollers.

• 78K Family Product Roadmap

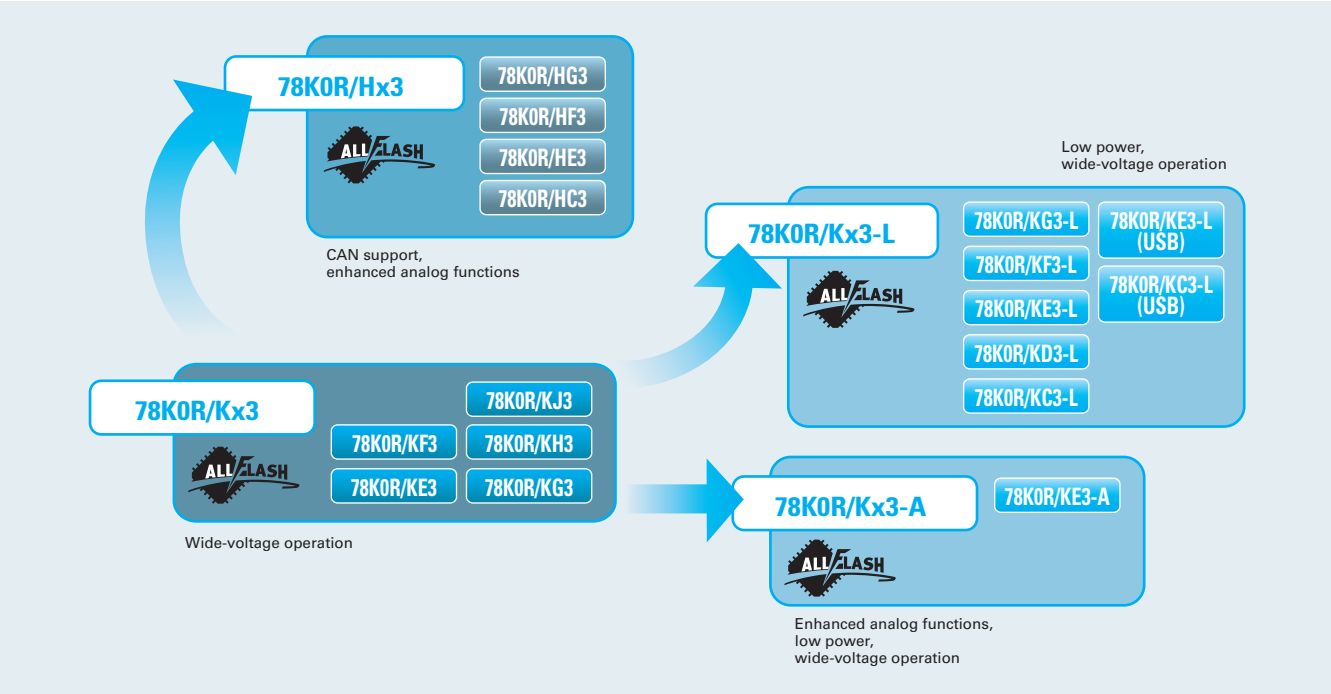


Features			
Data Bus Space	8 bits	8 bits	8 bits
Address Space	64 KB	64 KB	1 MB
ALU Space	8 bits	8 bits	16 bits
Multiplication Instruction	Not available for core instructions (8 × 8 → 16 is supported by hardware in some products)	8 × 8 → 16 (16 × 16 → 32 is supported by hardware in some products)	8 × 8 → 16 16 × 16 → 32 is supported by hardware
Number of Instructions	48	63	71
Instruction Pipeline	None	None	3-stage
Maximum Memory Size	60 KB	128 KB	512 KB
Maximum Clock Speed	10 MHz	20 MHz	24 MHz
Minimum Instruction Execution Time	200 ns	100 ns	50 ns
Performance	Optimized for cost	Equivalent to 8 bits	Equivalent to 16 bits

Overview of 16-bit 78K0R MCUs

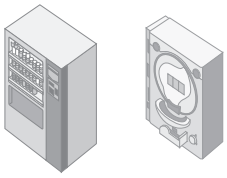
Our 78K0R MCUs are All Flash microcontrollers that feature a RISC-level performance while achieving low power consumption. All products in the extensive lineup can operate at 20 MHz, including the 78K0R/Kx3, which provides a wide range of peripheral functions, the ultra-low-power 78K0R/Kx3-L with enhanced analog functions (such as a converter and PGA), and the 78K0R/Kx3-A, featuring a 12-bit A/D converter and 12-bit D/A converter, making it ideal for measurement applications.

• 78K0R MCU Roadmap

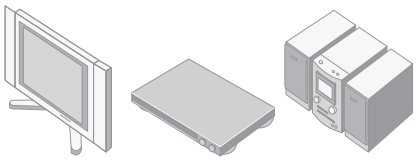


• Application Examples

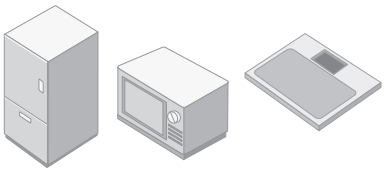
Industrial equipment
Industrial motors, controllers, vending machines, power meters



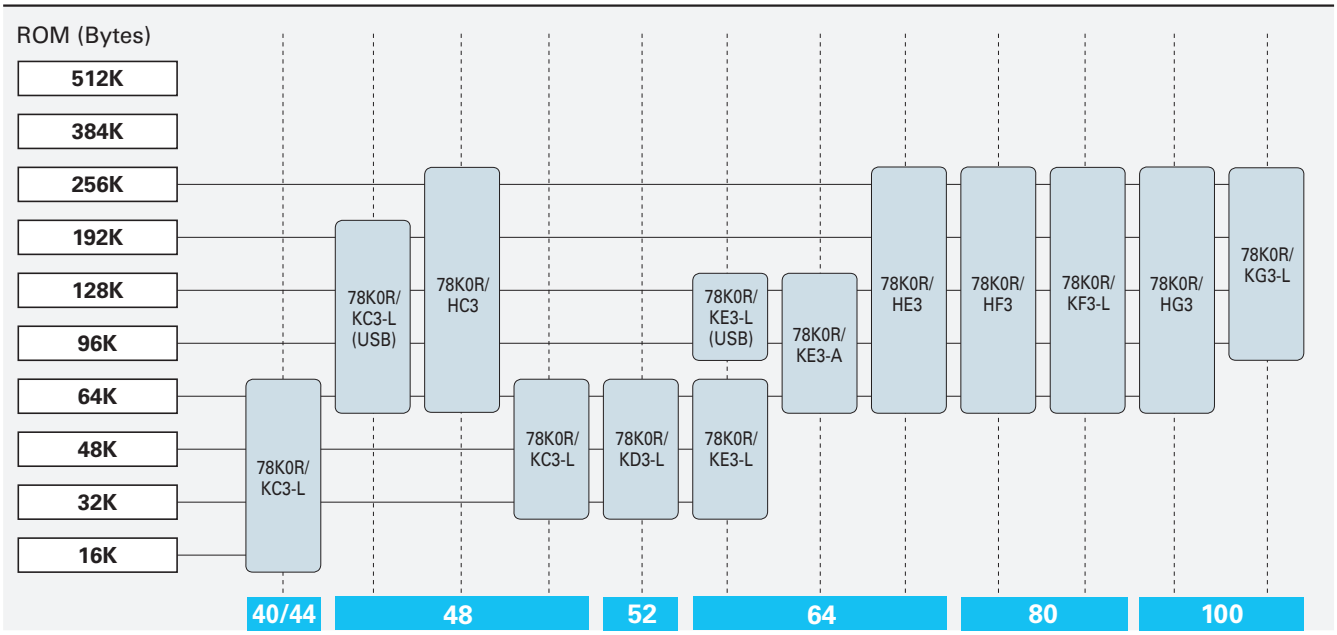
AV Equipment
Digital TVs, Blu-ray recorders, stereos, home theater systems, professional cameras

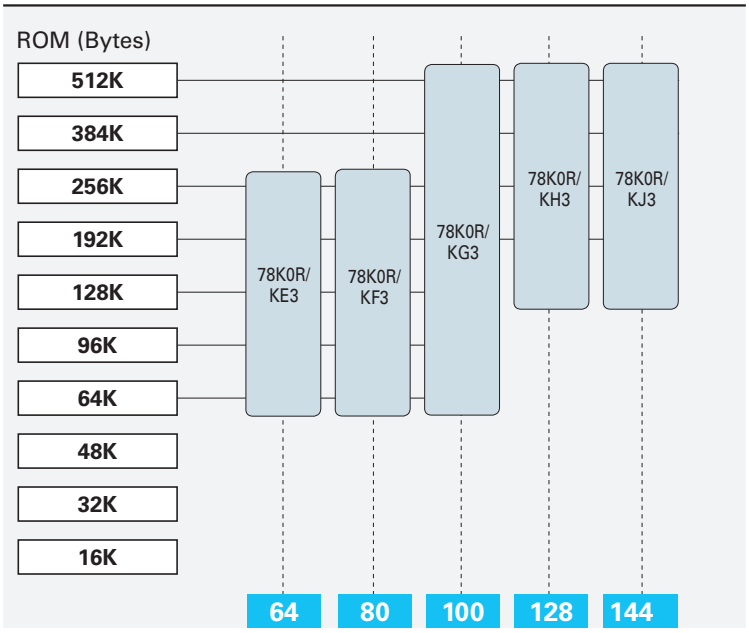


Consumer devices
Refrigerators, microwave ovens, washing machines, air conditioners, health and beauty equipment



• Memory Capacity





• Specifications (78K0R/KC3-L (40 Pins))

Group		μPD78F1000	μPD78F1001	μPD78F1002	μPD78F1003
Memory	ROM Size (Bytes)	16K	32K	48K	64K
	ROM Type	Flash			
	Single-Power-Supply Flash Memory	Yes			
	RAM Size (Bytes)	1K	1.5K	2K	3K
Clock	Maximum Operating Frequency (MHz)	20			
	On-Chip Oscillator (Hz)	20M, 8M, 1M, 30k			
	Subclock (32.768kHz)	—			
I/O	I/O Ports	33			
Bus	External Data/Address Bus	—/—			
Timer	16-bit Timer	8			
	Real-Time Counter	—			
	Watchdog Timer	1			
	PWM Output	PWM: 16 bits × 3, multiplexed PWM: 16 bits × 6			
Serial Interface	CSI, UART	—			
	CSI: 2ch, UART: 1ch	—			
	CSI, UART, Simplified I²C	1			
	CSI: 2ch, UART: 1ch, Simplified I²C: 2ch	—			
	CSI: 2ch, UART Supporting LIN-bus: 1ch	1			
	UART Supporting LIN-bus	—			
	I²C	—			
OCD	On-Chip Debugger	Yes			
Peripheral Functions	10-bit A/D Converter	10			
	8-bit D/A Converter	—			
	Multiplier/Divider (bits × bits, bits ÷ bits)	16 × 16 32 ÷ 32			
	Other Functions	POC, LVI, DMA, comparator × 2, programmable gain amplifier			
Others	Power Supply Voltage (V)	1.8 to 5.5			
	Package (size: mm)	40-WQFN (6 × 6)			
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-78K0RIX3 (IECUBE)			
Package		P40K8-50-4B4			
Part No.		μPD78F1000K8-4B4-AX**	μPD78F1001K8-4B4-AX**	μPD78F1002K8-4B4-AX**	μPD78F1003K8-4B4-AX**

Remark POC: Power-on clear
LVI: Low-voltage indicator

★ : New product ★★ : Under development

• Specifications (78K0R/KC3-L (44 Pins))

Group		μPD78F1000	μPD78F1001	μPD78F1002	μPD78F1003
Memory	ROM Size (Bytes)	16K	32K	48K	64K
	ROM Type	Flash			
	Single-Power-Supply Flash Memory	Yes			
	RAM Size (Bytes)	1K	1.5K	2K	3K
Clock	Maximum Operating Frequency (MHz)	20			
	On-Chip Oscillator (Hz)	20M, 8M, 1M, 30k			
	Subclock (32.768kHz)	Yes			
I/O	I/O Ports	37			
Bus	External Data/Address Bus	—/—			
Timer	16-bit Timer	8			
	Real-Time Counter	1			
	Watchdog Timer	1			
	PWM Output	PWM: 16 bits × 4, multiplexed PWM: 16 bits × 7			
Serial Interface	CSI, UART	—			
	CSI: 2ch, UART: 1ch	—			
	CSI, UART, Simplified I²C	1			
	CSI: 2ch, UART: 1ch, Simplified I²C: 2ch	—			
	CSI: 2ch, UART Supporting LIN-bus: 1ch	1			
	UART Supporting LIN-bus	—			
	I²C	—			
OCD	On-Chip Debugger	Yes			
Peripheral Functions	10-bit A/D Converter	10			
	8-bit D/A Converter	—			
	Multiplier/Divider (bits x bits, bits ÷ bits)	16 × 16 32 ÷ 32			
	Other Functions	POC, LVI, DMA, comparator × 2, programmable gain amplifier			
Others	Power Supply Voltage (V)	1.8 to 5.5			
	Package (size: mm)	44-LQFP (10 × 10)			
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-78K0RIX3 (IECUBE)			
Package		P44GB-80-GAF			
Part No.		μPD78F1000GB-GAF-AX	μPD78F1001GB-GAF-AX	μPD78F1002GB-GAF-AX	μPD78F1003GB-GAF-AX

Remark POC: Power-on clear
LVI: Low-voltage indicator

★ : New product ★★ : Under development

• Specifications (78K0R/KC3-L (48 Pins))

Group		μPD78F1001	μPD78F1002	μPD78F1003
Memory	ROM Size (Bytes)	32K	48K	64K
	ROM Type	Flash		
	Single-Power-Supply Flash Memory	Yes		
	RAM Size (Bytes)	1.5K	2K	3K
Clock	Maximum Operating Frequency (MHz)	20		
	On-Chip Oscillator (Hz)	20M, 8M, 1M, 30k		
	Subclock (32.768kHz)	Yes		
I/O	I/O Ports	41		
Bus	External Data/Address Bus	—/—		
Timer	16-bit Timer	8		
	Real-Time Counter	1		
	Watchdog Timer	1		
	PWM Output	PWM: 16 bits × 4, multiplexed PWM: 16 bits × 7		
Serial Interface	CSI, UART	—		
	CSI: 2ch, UART: 1ch	—		
	CSI, UART, Simplified I²C	1		
	CSI: 2ch, UART: 1ch, Simplified I²C: 2ch	—		
	CSI: 2ch, UART Supporting LIN-bus: 1ch	1		
	UART Supporting LIN-bus	—		
	I²C	1		
OCD	On-Chip Debugger	Yes		
Peripheral Functions	10-bit A/D Converter	11		
	8-bit D/A Converter	—		
	Multiplier/Divider (bits × bits, bits ÷ bits)	16 × 16 32 ÷ 32		
	Other Functions	POC, LVI, DMA, comparator × 2, programmable gain amplifier		
Others	Power Supply Voltage (V)	1.8 to 5.5		
	Package (size: mm)	48-TQFP (7 × 7) 48-WQFN (7 × 7)		
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-78K0RIX3 (IECUBE)		
Package		P48GA-50-HAA P48K8-50-5B4		
Part No.		μPD78F1001GA-HAA-AX μPD78F1001K8-5B4-AX	μPD78F1002GA-HAA-AX μPD78F1002K8-5B4-AX	μPD78F1003GA-HAA-AX μPD78F1003K8-5B4-AX

Remark POC: Power-on clear
LVI: Low-voltage indicator

★ : New product ★★ : Under development

• Specifications (78K0R/KD3-L)

Group		μPD78F1004	μPD78F1005	μPD78F1006
Memory	ROM Size (Bytes)	32K	48K	64K
	ROM Type	Flash		
	Single-Power-Supply Flash Memory	Yes		
	RAM Size (Bytes)	1.5K	2K	3K
Clock	Maximum Operating Frequency (MHz)	20		
	On-Chip Oscillator (Hz)	20M, 8M, 1M, 30k		
	Subclock (32.768kHz)	Yes		
I/O	I/O Ports	45		
Bus	External Data/Address Bus	—/—		
Timer	16-bit Timer	8		
	Real-Time Counter	1		
	Watchdog Timer	1		
	PWM Output	PWM: 16 bits × 4, multiplexed PWM: 16 bits × 7		
Serial Interface	CSI, UART	—		
	CSI: 2ch, UART: 1ch	—		
	CSI, UART, Simplified I²C	1		
	CSI: 2ch, UART: 1ch, Simplified I²C: 2ch	—		
	CSI: 2ch, UART Supporting LIN-bus: 1ch	1		
	UART Supporting LIN-bus	—		
	I²C	1		
OCD	On-Chip Debugger	Yes		
Peripheral Functions	10-bit A/D Converter	11		
	8-bit D/A Converter	—		
	Multiplier/Divider (bits x bits, bits ÷ bits)	16 × 16 32 ÷ 32		
	Other Functions	POC, LVI, DMA, comparator × 2, programmable gain amplifier		
Others	Power Supply Voltage (V)	1.8 to 5.5		
	Package (size: mm)	52-LQFP (10 × 10)		
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-78K0RIX3 (IECUBE)		
Package		P52GB-65-GAG		
Part No.		μPD78F1004GB-GAG-AX	μPD78F1005GB-GAG-AX	μPD78F1006GB-GAG-AX

Remark POC: Power-on clear
LVI: Low-voltage indicator

★ : New product ★★ : Under development

• Specifications (78K0R/KE3-L)

Group		μPD78F1007	μPD78F1008	μPD78F1009
Memory	ROM Size (Bytes)	32K	48K	64K
	ROM Type	Flash		
	Single-Power-Supply Flash Memory	Yes		
	RAM Size (Bytes)	1.5K	2K	3K
Clock	Maximum Operating Frequency (MHz)	20		
	On-Chip Oscillator (Hz)	20M, 8M, 1M, 30k		
	Subclock (32.768kHz)	Yes		
I/O	I/O Ports	55		
Bus	External Data/Address Bus	—/—		
Timer	16-bit Timer	8		
	Real-Time Counter	1		
	Watchdog Timer	1		
	PWM Output	PWM: 16 bits × 4, multiplexed PWM: 16 bits × 7		
Serial Interface	CSI, UART	—		
	CSI: 2ch, UART: 1ch	—		
	CSI, UART, Simplified I²C	1		
	CSI: 2ch, UART: 1ch, Simplified I²C: 2ch	—		
	CSI: 2ch, UART Supporting LIN-bus: 1ch	1		
	UART Supporting LIN-bus	—		
	I²C	1		
OCD	On-Chip Debugger	Yes		
Peripheral Functions	10-bit A/D Converter	12		
	8-bit D/A Converter	—		
	Multiplier/Divider (bits × bits, bits ÷ bits)	16 × 16 32 ÷ 32		
	Other Functions	POC, LVI, DMA, comparator × 2, programmable gain amplifier		
Others	Power Supply Voltage (V)	1.8 to 5.5		
	Package (size: mm)	64-TQFP (7 × 7) 64-LQFP (10 × 10) 64-LQFP (12 × 12) 64-FBGA (5 × 5) 64-FBGA (4 × 4)		
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-78K0RIX3 (IECUBE)		
Package		P64GK-65-GAJ P64GB-50-GAH P64GA-40-HAB P64F1-50-AN1 P64F1-40-AA2		
Part No.		μPD78F1007GK-GAJ-AX μPD78F1007GB-GAH-AX μPD78F1007GA-HAB-AX μPD78F1007F1-AN1-A μPD78F1007F1-AA2-A	μPD78F1008GK-GAJ-AX μPD78F1008GB-GAH-AX μPD78F1008GA-HAB-AX μPD78F1008F1-AN1-A μPD78F1008F1-AA2-A	μPD78F1009GK-GAJ-AX μPD78F1009GB-GAH-AX μPD78F1009GA-HAB-AX μPD78F1009F1-AN1-A μPD78F1009F1-AA2-A

Remark POC: Power-on clear
LVI: Low-voltage indicator

★ : New product ★★ : Under development

• Specifications (78K0R/KF3-L, 78K0R/KG3-L)

Group		78K0R/KF3-L					78K0R/KG3-L			
		μPD78F1010	μPD78F1011	μPD78F1012	μPD78F1027	μPD78F1028	μPD78F1013	μPD78F1014	μPD78F1029	μPD78F1030
Memory	ROM Size (Bytes)	64K	96K	128K	192K	256K	96K	128K	192K	256K
	ROM Type	Flash								
	Single-Power-Supply Flash Memory	Yes								
	RAM Size (Bytes)	4K	6K	8K	10K	12K	6K	8K	10K	12K
Clock	Maximum Operating Frequency (MHz)	20								
	On-Chip Oscillator (Hz)	20M, 8M, 1M, 30k								
	Subclock (32.768kHz)	Yes								
I/O	I/O Ports	71					89			
Bus	External Data/Address Bus	—/—								
Timer	16-bit Timer	12								
	Real-Time Counter	1								
	Watchdog Timer	1								
	PWM Output	PWM: 16 bits × 6, multiplexed PWM: 16 bits × 7, multiplexed PWM: 16 bits × 3								
Serial Interface	CSI, UART	—								
	CSI: 2ch, UART: 1ch	1			2		1		2	
	CSI, UART, Simplified I²C	2								
	CSI: 2ch, UART: 1ch, Simplified I²C: 2ch	—								
	CSI: 2ch, UART Supporting LIN-bus: 1ch	—								
	UART Supporting LIN-bus	1								
	I²C	1								
OCD	On-Chip Debugger	Yes								
Peripheral Functions	10-bit A/D Converter	12					16			
	8-bit D/A Converter	—								
	Multiplier/Divider (bits × bits, bits ÷ bits)	16 × 16 32 ÷ 32								
	Other Functions	POC, LVI, DMA								
Others	Power Supply Voltage (V)	1.8 to 5.5								
	Package (size: mm)	80-LQFP (14 × 14) 80-LQFP (12 × 12)					100-LQFP (14 × 14) 100-LQFP (14 × 20) 100-FBGA (6 × 6)		100-LQFP (14 × 14) 100-LQFP (14 × 20)	
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-78K0RKX3C (IECUBE)			QB-MINI2 (MINICUBE2) QB-78F1030 (IECUBE)		QB-MINI2 (MINICUBE2) QB-78K0RKX3C (IECUBE)		QB-MINI2 (MINICUBE2) QB-78F1030 (IECUBE)	
Package		P80GC-65-GAD P80GK-50-GAK					P100GF-65-GAS P100GC-50-UEU-1 P100F1-50-BAK		P100GF-65-GAS P100GC-50-UEU-1	
Part No.		μPD78F1010GC-GAD-AX μPD78F1010GK-GAK-AX	μPD78F1011GC-GAD-AX μPD78F1011GK-GAK-AX	μPD78F1012GC-GAD-AX μPD78F1012GK-GAK-AX	μPD78F1027GC-GAD-AX μPD78F1027GK-GAK-AX	μPD78F1028GC-GAD-AX μPD78F1028GK-GAK-AX	μPD78F1013GF-GAS-AX μPD78F1013GC-UEU-AX μPD78F1013F1-BAK-A	μPD78F1014GF-GAS-AX μPD78F1014GC-UEU-AX μPD78F1014F1-BAK-A	μPD78F1029GF-GAS-AX μPD78F1029GC-UEU-AX	μPD78F1030GF-GAS-AX μPD78F1030GC-UEU-AX

Remark POC: Power-on clear
LVI: Low-voltage indicator

★ : New product ★★ : Under development

• Specifications (78K0R/KE3)

Group		μPD78F1142A	μPD78F1143A	μPD78F1144A	μPD78F1145A	μPD78F1146A
Memory	ROM Size (Bytes)	64K	96K	128K	192K	256K
	ROM Type	Flash				
	Single-Power-Supply Flash Memory	Yes				
	RAM Size (Bytes)	4K	6K	8K	10K	12K
Clock	Maximum Operating Frequency (MHz)	20				
	On-Chip Oscillator (Hz)	8M, 240k				
	Subclock (32.768kHz)	Yes				
I/O	I/O Ports	55				
Bus	External Data/Address Bus	—/—				
Timer	16-bit Timer	8				
	Real-Time Counter	1				
	Watchdog Timer	1				
	PWM Output	PWM: 16 bits × 3, multiplexed PWM: 16 bits × 6				
Serial Interface	CSI, UART	1				
	CSI: 2ch, UART: 1ch	—				
	CSI, UART, Simplified I²C	1				
	CSI: 2ch, UART: 1ch, Simplified I²C: 2ch	—				
	CSI: 2ch, UART Supporting LIN-bus: 1ch	—				
	UART Supporting LIN-bus	1				
	I²C	1				
OCD	On-Chip Debugger	Yes				
Peripheral Functions	10-bit A/D Converter	8				
	8-bit D/A Converter	—				
	Multiplier/Divider (bits × bits, bits ÷ bits)	16 × 16				
	Other Functions	POC, LVI, DMA, temperature sensor				
Others	Power Supply Voltage (V)	1.8 to 5.5				
	Package (size: mm)	64-TQFP (7 × 7) 64-LQFP (10 × 10) 64-LQFP (12 × 12) 64-FBGA (5 × 5) 64-FBGA (6 × 6)				
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-78K0RKX3 (IECUBE)				
Package		P64GK-65-GAJ P64GB-50-GAH P64GA-40-HAB P64F1-50-AN1 P64F1-65-BA4				
Part No.		μPD78F1142AGK-GAJ-AX μPD78F1142AGB-GAH-AX μPD78F1142AGA-HAB-AX μPD78F1142AF1-AN1-A μPD78F1142AF1-BA4-A	μPD78F1143AGK-GAJ-AX μPD78F1143AGB-GAH-AX μPD78F1143AGA-HAB-AX μPD78F1143AF1-AN1-A μPD78F1143AF1-BA4-A	μPD78F1144AGK-GAJ-AX μPD78F1144AGB-GAH-AX μPD78F1144AGA-HAB-AX μPD78F1144AF1-AN1-A μPD78F1144AF1-BA4-A	μPD78F1145AGK-GAJ-AX μPD78F1145AGB-GAH-AX μPD78F1145AGA-HAB-AX μPD78F1145AF1-AN1-A μPD78F1145AF1-BA4-A	μPD78F1146AGK-GAJ-AX μPD78F1146AGB-GAH-AX μPD78F1146AGA-HAB-AX μPD78F1146AF1-AN1-A μPD78F1146AF1-BA4-A

Remark POC: Power-on clear
LVI: Low-voltage indicator

★ : New product ★★ : Under development

• Specifications (78K0R/KF3)

Group		μPD78F1152A	μPD78F1153A	μPD78F1154A	μPD78F1155A	μPD78F1156A
Memory	ROM Size (Bytes)	64K	96K	128K	192K	256K
	ROM Type	Flash				
	Single-Power-Supply Flash Memory	Yes				
	RAM Size (Bytes)	4K	6K	8K	10K	12K
Clock	Maximum Operating Frequency (MHz)	20				
	On-Chip Oscillator (Hz)	8M, 240k				
	Subclock (32.768kHz)	Yes				
I/O	I/O Ports	70				
Bus	External Data/Address Bus	—/—				
Timer	16-bit Timer	8				
	Real-Time Counter	1				
	Watchdog Timer	1				
	PWM Output	PWM: 16 bits × 4, multiplexed PWM: 16 bits × 7				
Serial Interface	CSI, UART	—				
	CSI: 2ch, UART: 1ch	1				
	CSI, UART, Simplified I²C	2				
	CSI: 2ch, UART: 1ch, Simplified I²C: 2ch	—				
	CSI: 2ch, UART Supporting LIN-bus: 1ch	—				
	UART Supporting LIN-bus	1				
	I²C	1				
OCD	On-Chip Debugger	Yes				
Peripheral Functions	10-bit A/D Converter	8				
	8-bit D/A Converter	2				
	Multiplier/Divider (bits x bits, bits ÷ bits)	16 × 16				
	Other Functions	POC, LVI, DMA, temperature sensor				
Others	Power Supply Voltage (V)	1.8 to 5.5				
	Package (size: mm)	80-LQFP (12 × 12) 80-LQFP (14 × 14)				
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-78K0RKX3 (IECUBE)				
Package		P80GC-65-GAD P80GK-50-GAK				
Part No.		μPD78F1152AGC-GAD-AX μPD78F1152AGK-GAK-AX	μPD78F1153AGC-GAD-AX μPD78F1153AGK-GAK-AX	μPD78F1154AGC-GAD-AX μPD78F1154AGK-GAK-AX	μPD78F1155AGC-GAD-AX μPD78F1155AGK-GAK-AX	μPD78F1156AGC-GAD-AX μPD78F1156AGK-GAK-AX

Remark POC: Power-on clear
LVI: Low-voltage indicator

★ : New product ★★ : Under development

• Specifications (78K0R/KG3 (1/2))

Group		μPD78F1162A	μPD78F1163A	μPD78F1164A	μPD78F1165A
Memory	ROM Size (Bytes)	64K	96K	128K	192K
	ROM Type	Flash			
	Single-Power-Supply Flash Memory	Yes			
	RAM Size (Bytes)	4K	6K	8K	10K
Clock	Maximum Operating Frequency (MHz)	20			
	On-Chip Oscillator (Hz)	8M, 240k			
	Subclock (32.768kHz)	Yes			
I/O	I/O Ports	88			
Bus	External Data/Address Bus	16/20			
Timer	16-bit Timer	8			
	Real-Time Counter	1			
	Watchdog Timer	1			
	PWM Output	PWM: 16 bits × 4, multiplexed PWM: 16 bits × 7			
Serial Interface	CSI, UART	—			
	CSI: 2ch, UART: 1ch	1			
	CSI, UART, Simplified I²C	2			
	CSI: 2ch, UART: 1ch, Simplified I²C: 2ch	—			
	CSI: 2ch, UART Supporting LIN-bus: 1ch	—			
	UART Supporting LIN-bus	1			
	I²C	1			
OCD	On-Chip Debugger	Yes			
Peripheral Functions	10-bit A/D Converter	16			
	8-bit D/A Converter	2			
	Multiplier/Divider (bits × bits, bits ÷ bits)	16 × 16			
	Other Functions	POC, LVI, DMA, temperature sensor			
Others	Power Supply Voltage (V)	1.8 to 5.5			
	Package (size: mm)	100-LQFP (14 × 14) 100-LQFP (14 × 20)			
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-78K0RKX3 (IECUBE)			
Package		P100GC-50-UEU-1 P100GF-65-GAS			
Part No.		μPD78F1162AGC-UEU-AX μPD78F1162AGF-GAS-AX	μPD78F1163AGC-UEU-AX μPD78F1163AGF-GAS-AX	μPD78F1164AGC-UEU-AX μPD78F1164AGF-GAS-AX	μPD78F1165AGC-UEU-AX μPD78F1165AGF-GAS-AX

Remark POC: Power-on clear
LVI: Low-voltage indicator

★ : New product ★★ : Under development

• Specifications (78K0R/KG3 (2/2))

Group		μPD78F1166A	μPD78F1167A	μPD78F1168A
Memory	ROM Size (Bytes)	256K	384K	512K
	ROM Type	Flash		
	Single-Power-Supply Flash Memory	Yes		
	RAM Size (Bytes)	12K	24K	30K
Clock	Maximum Operating Frequency (MHz)	20		
	On-Chip Oscillator (Hz)	8M, 240k		
	Subclock (32.768kHz)	Yes		
I/O	I/O Ports	88		
Bus	External Data/Address Bus	16/20		
Timer	16-bit Timer	8		
	Real-Time Counter	1		
	Watchdog Timer	1		
	PWM Output	PWM: 16 bits × 4, multiplexed PWM: 16 bits × 7		
Serial Interface	CSI, UART	—		
	CSI: 2ch, UART: 1ch	1		
	CSI, UART, Simplified I²C	2		
	CSI: 2ch, UART: 1ch, Simplified I²C: 2ch	—		
	CSI: 2ch, UART Supporting LIN-bus: 1ch	—		
	UART Supporting LIN-bus	1		
	I²C	1		
OCD	On-Chip Debugger	Yes		
Peripheral Functions	10-bit A/D Converter	16		
	8-bit D/A Converter	2		
	Multiplier/Divider (bits x bits, bits ÷ bits)	16 × 16		
	Other Functions	POC, LVI, DMA, temperature sensor		
Others	Power Supply Voltage (V)	1.8 to 5.5		
	Package (size: mm)	100-LQFP (14 × 14) 100-LQFP (14 × 20)		
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-78K0RKX3 (IECUBE)		
Package		P100GC-50-UEU-1 P100GF-65-GAS		
Part No.		μPD78F1166AGC-UEU-AX μPD78F1166AGF-GAS-AX	μPD78F1167AGC-UEU-AX μPD78F1167AGF-GAS-AX	μPD78F1168AGC-UEU-AX μPD78F1168AGF-GAS-AX

Remark POC: Power-on clear
LVI: Low-voltage indicator

★ : New product ★★ : Under development

• Specifications (78K0R/KH3)

Group		μPD78F1174A	μPD78F1175A	μPD78F1176A	μPD78F1177A	μPD78F1178A
Memory	ROM Size (Bytes)	128K	192K	256K	384K	512K
	ROM Type	Flash				
	Single-Power-Supply Flash Memory	Yes				
	RAM Size (Bytes)	8K	10K	12K	24K	30K
Clock	Maximum Operating Frequency (MHz)	20				
	On-Chip Oscillator (Hz)	8M, 240k				
	Subclock (32.768kHz)	Yes				
I/O	I/O Ports	116				
Bus	External Data/Address Bus	16/20				
Timer	16-bit Timer	12				
	Real-Time Counter	1				
	Watchdog Timer	1				
	PWM Output	PWM: 16 bits × 6, multiplexed PWM: 16 bits × 7, multiplexed PWM: 16 bits × 3				
Serial Interface	CSI, UART	—				
	CSI: 2ch, UART: 1ch	1				
	CSI, UART, Simplified I²C	—				
	CSI: 2ch, UART: 1ch, Simplified I²C: 2ch	2				
	CSI: 2ch, UART Supporting LIN-bus: 1ch	—				
	UART Supporting LIN-bus	1				
	I²C	1				
OCD	On-Chip Debugger	Yes				
Peripheral Functions	10-bit A/D Converter	16				
	8-bit D/A Converter	2				
	Multiplier/Divider (bits × bits, bits ÷ bits)	16 × 16				
	Other Functions	POC, LVI, DMA, temperature sensor				
Others	Power Supply Voltage (V)	1.8 to 5.5				
	Package (size: mm)	128-LQFP (14 × 20)				
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-78K0RKX3 (IECUBE)				
Package		P128GF-50-GAT				
Part No.		μPD78F1174AGF-GAT-AX	μPD78F1175AGF-GAT-AX	μPD78F1176AGF-GAT-AX	μPD78F1177AGF-GAT-AX	μPD78F1178AGF-GAT-AX

Remark POC: Power-on clear
LVI: Low-voltage indicator

★ : New product ★★ : Under development

• Specifications (78K0R/KJ3)

Group		μPD78F1184A	μPD78F1185A	μPD78F1186A	μPD78F1187A	μPD78F1188A
Memory	ROM Size (Bytes)	128K	192K	256K	384K	512K
	ROM Type	Flash				
	Single-Power-Supply Flash Memory	Yes				
	RAM Size (Bytes)	8K	10K	12K	24K	30K
Clock	Maximum Operating Frequency (MHz)	20				
	On-Chip Oscillator (Hz)	8M, 240k				
	Subclock (32.768kHz)	Yes				
I/O	I/O Ports	132				
Bus	External Data/Address Bus	16/20				
Timer	16-bit Timer	12				
	Real-Time Counter	1				
	Watchdog Timer	1				
	PWM Output	PWM: 16 bits × 6, multiplexed PWM: 16 bits × 7, multiplexed PWM: 16 bits × 3				
Serial Interface	CSI, UART	—				
	CSI: 2ch, UART: 1ch	1				
	CSI, UART, Simplified I²C	—				
	CSI: 2ch, UART: 1ch, Simplified I²C: 2ch	2				
	CSI: 2ch, UART Supporting LIN-bus: 1ch	—				
	UART Supporting LIN-bus	1				
	I²C	1				
OCD	On-Chip Debugger	Yes				
Peripheral Functions	10-bit A/D Converter	16				
	8-bit D/A Converter	2				
	Multiplier/Divider (bits × bits, bits ÷ bits)	16 × 16				
	Other Functions	POC, LVI, DMA, temperature sensor				
Others	Power Supply Voltage (V)	1.8 to 5.5				
	Package (size: mm)	144-LQFP (20 × 20)				
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-78K0RKX3 (IECUBE)				
Package		P144GJ-50-GAE-1				
Part No.		μPD78F1184AGJ-GAE-AX	μPD78F1185AGJ-GAE-AX	μPD78F1186AGJ-GAE-AX	μPD78F1187AGJ-GAE-AX	μPD78F1188AGJ-GAE-AX

Remark POC: Power-on clear
LVI: Low-voltage indicator

★ : New product ★★ : Under development

• Specifications (78K0R/KE3-A)

Group		μPD78F1016	μPD78F1017	μPD78F1018
Memory	ROM Size (Bytes)	64K	96K	128K
	ROM Type	Flash		
	Single-Power-Supply Flash Memory	Yes		
	RAM Size (Bytes)	4K	6K	7K
Clock	Maximum Operating Frequency (MHz)	20		
	On-Chip Oscillator (Hz)	20M, 8M, 1M, 30k		
	Subclock (32.768kHz)	Yes		
I/O	I/O Ports	53		
Bus	External Data/Address Bus	—/—		
Timer	16-bit Timer	12		
	Real-Time Counter	1		
	Watchdog Timer	1		
	PWM Output	PWM: 16 bits × 4, multiplexed PWM: 16 bits × 7		
Serial Interface	CSI, UART	1		
	CSI: 2ch, UART: 1ch	—		
	CSI, UART, Simplified I²C	2		
	CSI: 2ch, UART: 1ch, Simplified I²C: 2ch	—		
	CSI: 2ch, UART Supporting LIN-bus: 1ch	—		
	UART Supporting LIN-bus	1		
	I²C	1		
OCD	On-Chip Debugger	Yes		
Peripheral Functions	12-bit A/D Converter	12		
	10-bit A/D Converter	—		
	12-bit D/A Converter	2		
	8-bit D/A Converter	—		
	Multiplier/Divider (bits × bits, bits ÷ bits)	16 × 16 32 ÷ 32		
	Other Functions	POC, LVI, DMA, operational amplifier		
Others	Power Supply Voltage (V)	1.8 to 5.5		
	Package (size: mm)	64-FBGA (6 × 6)		
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-78K0RLX3 (IECUBE)		
Package		P64F1-65-BA4		
Part No.		μPD78F1016F1-BA4-A	μPD78F1017F1-BA4-A	μPD78F1018F1-BA4-A

Remark POC: Power-on clear
LVI: Low-voltage indicator

★ : New product ★★ : Under development

• Specifications (78K0R/HC3)

Group		μPD78F1031	μPD78F1032	μPD78F1033	μPD78F1034	μPD78F1035
Memory	ROM Size (Bytes)	64K	96K	128K	192K	256K
	ROM Type	Flash				
	Single-Power-Supply Flash Memory	Yes				
	RAM Size (Bytes)	4K	6K	8K	12K	16K
Clock	Maximum Operating Frequency (MHz)	24				
	On-Chip Oscillator (Hz)	8M, 4M, 30k				
	Subclock (32.768kHz)	—				
I/O	I/O Ports	41				
Bus	External Data/Address Bus	—				
Timer	16-bit Timer	17				
	Real-Time Counter	—				
	Watchdog Timer	1				
	PWM Output	PWM: 16 bits × 8, multiplexed PWM: 16 bits × 7, multiplexed PWM: 16 bits × 7				
Serial Interface	CSI	2				
	CSI, Simplified I²C	—				
	CSI (2ch), Simplified I²C	—				
	UART, Simplified I²C	—				
	Simplified I²C	1				
	CAN	1				
	UART Supporting LIN-bus	2				
	I²C	—				
OCD	On-Chip Debugger	Yes				
Peripheral Functions	10-bit A/D Converter	11				
	8-bit D/A Converter	—				
	Multiplier/Divider (bits × bits, bits ÷ bits)	16 × 16 32 ÷ 32				
	Other Functions	POC, LVI, DMA, CLM, data flash: 16 KB				
Others	Power Supply Voltage (V)	2.7 to 5.5				
	Package (size: mm)	48-LQFP (7 × 7)				
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-78K0RFX3 (IECUBE)				
Package		P48GA-50-GAM				
Part No.		μPD78F1031GA-GAM-AX*	μPD78F1032GA-GAM-AX*	μPD78F1033GA-GAM-AX*	μPD78F1034GA-GAM-AX*	μPD78F1035GA-GAM-AX*

Remark POC: Power-on clear
LVI: Low-voltage indicator
CLM: Clock monitor

★ : New product ★★ : Under development

• Specifications (78K0R/HE3)

Group		μPD78F1036	μPD78F1037	μPD78F1038	μPD78F1039	μPD78F1040
Memory	ROM Size (Bytes)	64K	96K	128K	192K	256K
	ROM Type	Flash				
	Single-Power-Supply Flash Memory	Yes				
	RAM Size (Bytes)	4K	6K	8K	12K	16K
Clock	Maximum Operating Frequency (MHz)	24				
	On-Chip Oscillator (Hz)	8M, 4M, 30k				
	Subclock (32.768kHz)	—				
I/O	I/O Ports	55				
Bus	External Data/Address Bus	—				
Timer	16-bit Timer	21				
	Real-Time Counter	—				
	Watchdog Timer	1				
	PWM Output	PWM: 16 bits × 10, multiplexed PWM: 16 bits × 7, multiplexed PWM: 16 bits × 7, multiplexed PWM: 16 bits × 3				
Serial Interface	CSI	3				
	CSI, Simplified I²C	—				
	CSI (2ch), Simplified I²C	—				
	UART, Simplified I²C	1				
	Simplified I²C	1				
	CAN	1				
	UART Supporting LIN-bus	2				
	I²C	—				
OCD	On-Chip Debugger	Yes				
Peripheral Functions	10-bit A/D Converter	15				
	8-bit D/A Converter	—				
	Multiplier/Divider (bits × bits, bits ÷ bits)	16 × 16 32 ÷ 32				
	Other Functions	POC, LVI, DMA, CLM, data flash: 16 KB				
Others	Power Supply Voltage (V)	2.7 to 5.5				
	Package (size: mm)	64-LQFP (10 × 10)				
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-78K0RFX3 (IECUBE)				
Package		P64GB-50-GAH				
Part No.		μPD78F1036GB-GAH-AX*	μPD78F1037GB-GAH-AX*	μPD78F1038GB-GAH-AX*	μPD78F1039GB-GAH-AX*	μPD78F1040GB-GAH-AX*

Remark POC: Power-on clear
LVI: Low-voltage indicator
CLM: Clock monitor

★ : New product ★★ : Under development

• Specifications (78K0R/HF3)

Group		μPD78F1041	μPD78F1042	μPD78F1043	μPD78F1044	μPD78F1045
Memory	ROM Size (Bytes)	64K	96K	128K	192K	256K
	ROM Type	Flash				
	Single-Power-Supply Flash Memory	Yes				
	RAM Size (Bytes)	4K	6K	8K	12K	16K
Clock	Maximum Operating Frequency (MHz)	24				
	On-Chip Oscillator (Hz)	8M, 4M, 30k				
	Subclock (32.768kHz)	—				
I/O	I/O Ports	71				
Bus	External Data/Address Bus	—				
Timer	16-bit Timer	21				
	Real-Time Counter	—				
	Watchdog Timer	1				
	PWM Output	PWM: 16 bits × 10, multiplexed PWM: 16 bits × 7, multiplexed PWM: 16 bits × 7, multiplexed PWM: 16 bits × 3				
Serial Interface	CSI	3				
	CSI, Simplified I²C	—				
	CSI (2ch), Simplified I²C	—				
	UART, Simplified I²C	1				
	Simplified I²C	1				
	CAN	1				
	UART Supporting LIN-bus	2				
	I²C	—				
OCD	On-Chip Debugger	Yes				
Peripheral Functions	10-bit A/D Converter	16				
	8-bit D/A Converter	—				
	Multiplier/Divider (bits x bits, bits ÷ bits)	16 × 16 32 ÷ 32				
	Other Functions	POC, LVI, DMA, CLM, data flash: 16 KB				
Others	Power Supply Voltage (V)	2.7 to 5.5				
	Package (size: mm)	80-LQFP (12 × 12)				
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-78K0RFX3 (IECUBE)				
Package		P80GK-50-GAK				
Part No.		μPD78F1041GK-GAK-AX*	μPD78F1042GK-GAK-AX*	μPD78F1043GK-GAK-AX*	μPD78F1044GK-GAK-AX*	μPD78F1045GK-GAK-AX*

Remark POC: Power-on clear
LVI: Low-voltage indicator
CLM: Clock monitor

★ : New product ★★ : Under development

• Specifications (78K0R/HG3)

Group		μPD78F1046	μPD78F1047	μPD78F1048	μPD78F1049	μPD78F1050
Memory	ROM Size (Bytes)	64K	96K	128K	192K	256K
	ROM Type	Flash				
	Single-Power-Supply Flash Memory	Yes				
	RAM Size (Bytes)	4K	6K	8K	12K	16K
Clock	Maximum Operating Frequency (MHz)	24				
	On-Chip Oscillator (Hz)	8M, 4M, 30k				
	Subclock (32.768kHz)	—				
I/O	I/O Ports	89				
Bus	External Data/Address Bus	—				
Timer	16-bit Timer	25				
	Real-Time Counter	—				
	Watchdog Timer	1				
	PWM Output	PWM: 16 bits × 12, multiplexed PWM: 16 bits × 7, multiplexed PWM: 16 bits × 7, multiplexed PWM: 16 bits × 7				
Serial Interface	CSI	3				
	CSI, Simplified I²C	1				
	CSI (2ch), Simplified I²C	—				
	UART, Simplified I²C	1				
	Simplified I²C	—				
	CAN	1				
	UART Supporting LIN-bus	2				
	I²C	—				
OCD	On-Chip Debugger	Yes				
Peripheral Functions	10-bit A/D Converter	24				
	8-bit D/A Converter	—				
	Multiplier/Divider (bits × bits, bits ÷ bits)	16 × 16 32 ÷ 32				
	Other Functions	POC, LVI, DMA, CLM, data flash: 16 KB				
Others	Power Supply Voltage (V)	2.7 to 5.5				
	Package (size: mm)	100-LQFP (14 × 14)				
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-78K0RFX3 (IECUBE)				
Package		P100GC-50-UEU-1				
Part No.		μPD78F1046GC-UEU-AX*	μPD78F1047GC-UEU-AX*	μPD78F1048GC-UEU-AX*	μPD78F1049GC-UEU-AX*	μPD78F1050GC-UEU-AX*

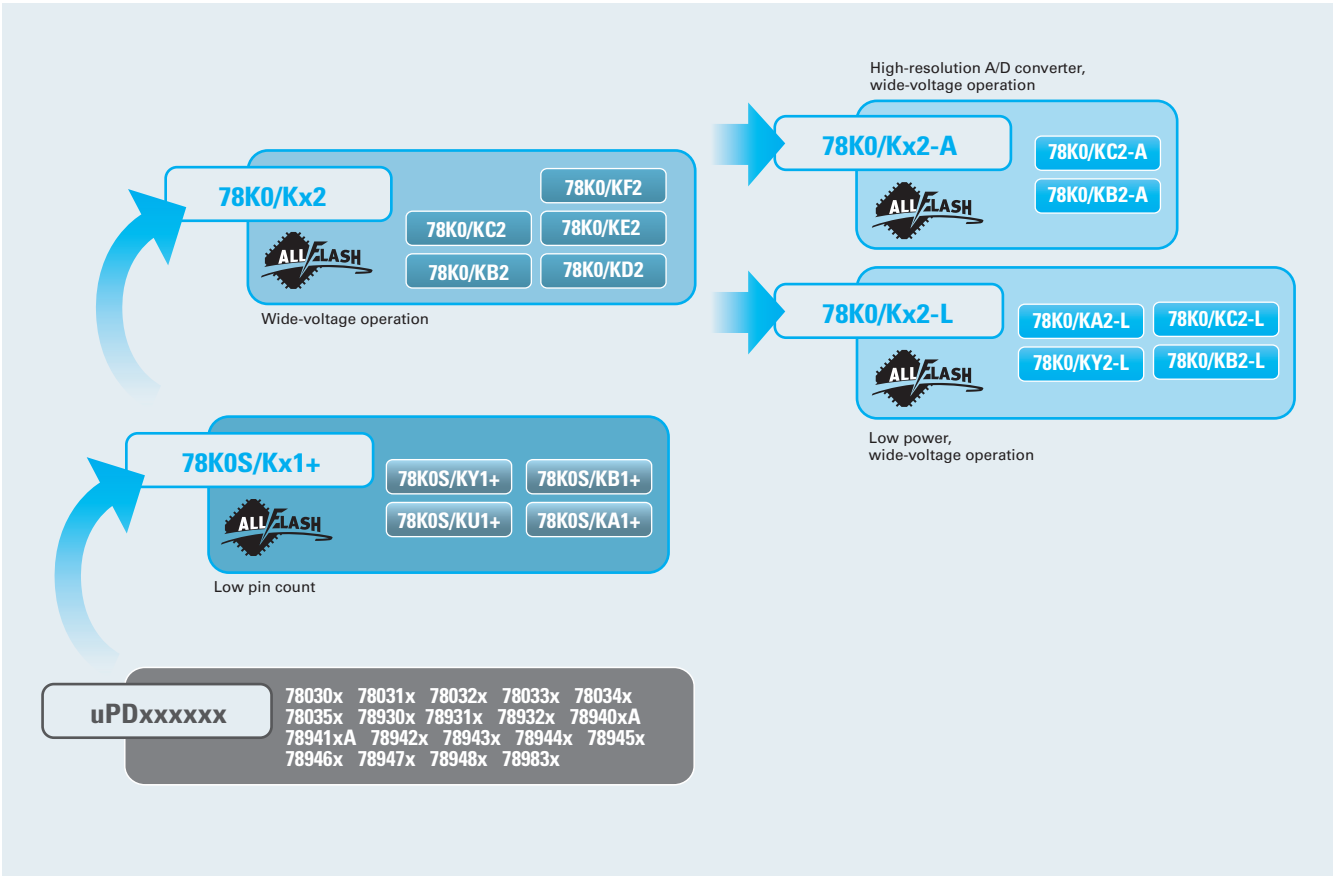
Remark POC: Power-on clear
LVI: Low-voltage indicator
CLM: Clock monitor

★ : New product ★★ : Under development

Overview of 8-bit 78K0 and 78K0S MCUs

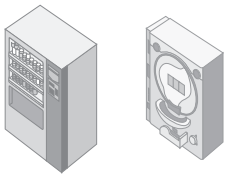
The 78K0/Kx2 is one of our most popular MCUs, featuring an easy-to-handle CPU core and an extensive range of peripheral functions that exceed the traditional expectations of microcontrollers. The 78K0/Kx2 series also includes the low-power 78K0/Kx2-L, which was designed for applications requiring extended battery operation and which provides enhanced analog functions. These products can therefore be used in a wide range of systems. For customers requiring space-saving MCUs for their control applications, look no further than the 78K0S/Kx1+, which features a compact CPU core and easy-to-handle peripheral functions, letting you create a cost-effective system.

• 78K0, 78K0S MCU Roadmap

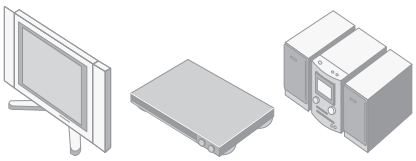


• Application Examples

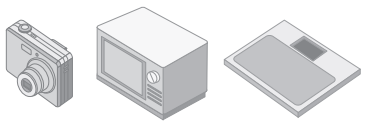
Industrial equipment
Industrial motors, controllers, vending machines, power meters



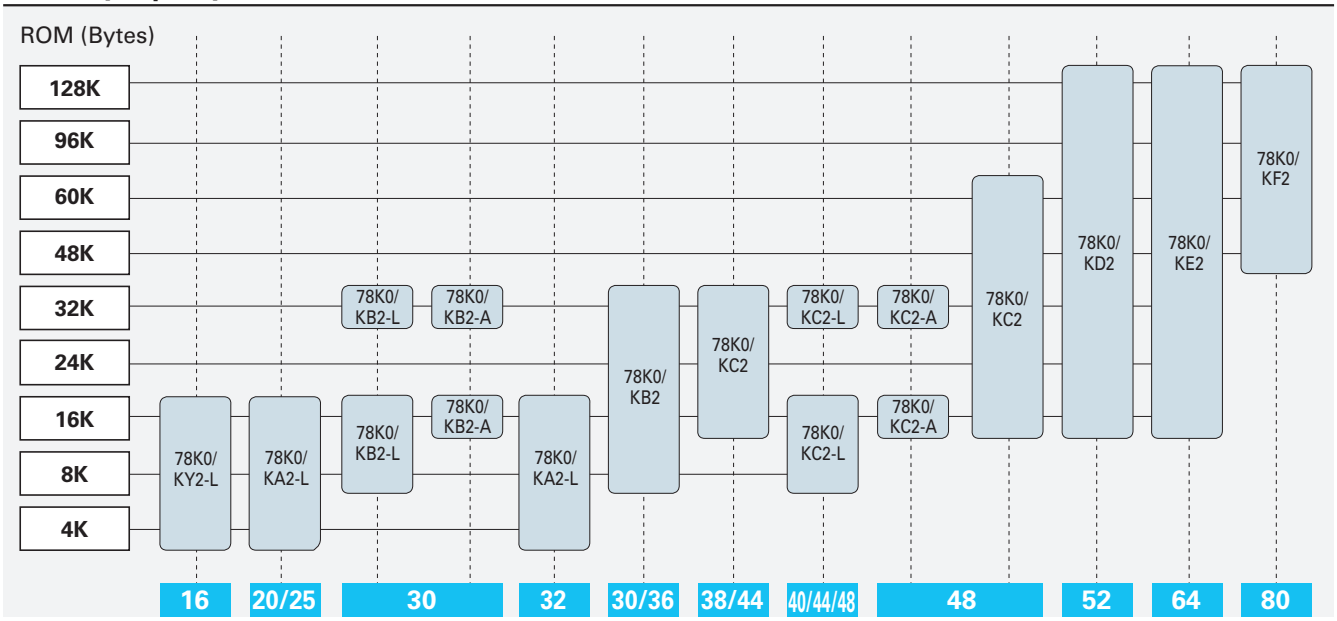
AV Equipment
Digital TVs, Blu-ray recorders, stereos, home theater systems, professional cameras

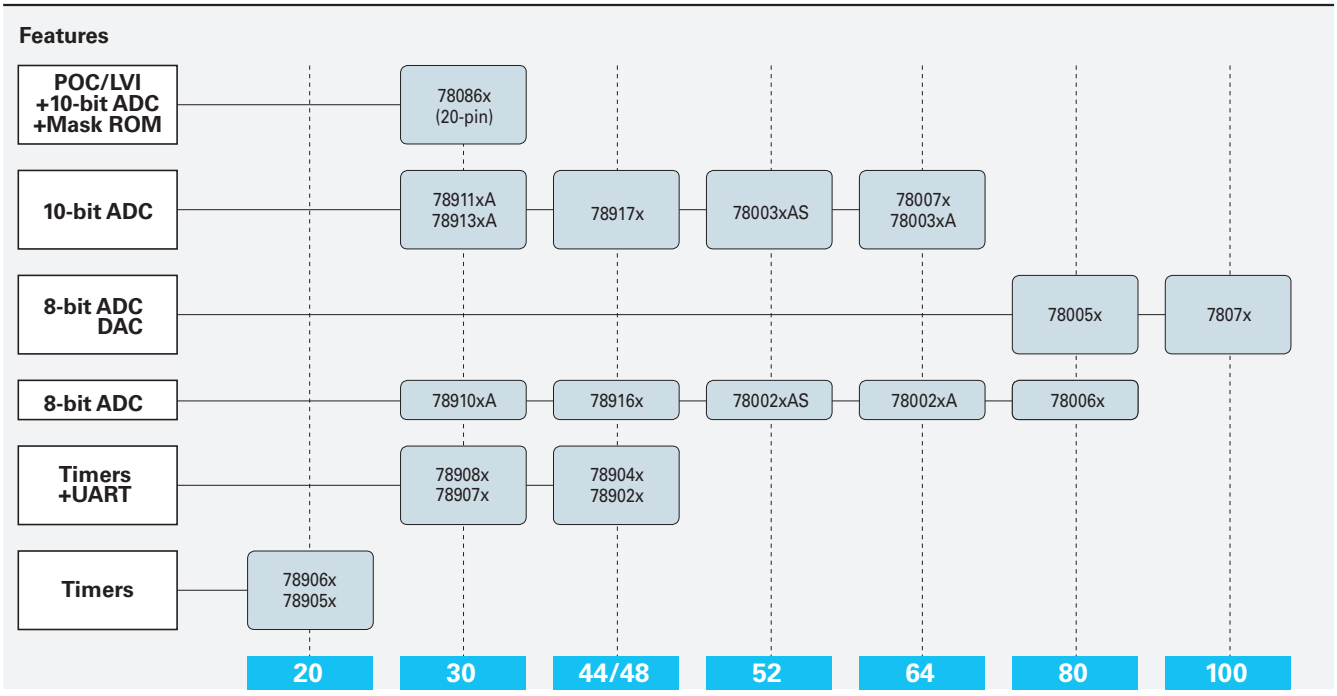


Consumer devices
Digital cameras, mobile phones



• Memory Capacity (78K0)





• Specifications (78K0/KY2-L)

Group		μPD78F0550	μPD78F0551	μPD78F0552	μPD78F0555	μPD78F0556	μPD78F0557
Memory	ROM Size (Bytes)	4K	8K	16K	4K	8K	16K
	ROM Type	Flash					
	Single-Power-Supply Flash Memory	Yes					
	RAM Size (Bytes)	384	512	768	384	512	768
Clock	Maximum Operating Frequency (MHz)	10					
	On-Chip Oscillator (Hz)	8M, 4M, 30k					
	Subclock (32.768kHz)	—					
I/O	I/O Ports	12					
Bus	External Data/Address Bus	—/—					
Timer	16-bit Timer	1					
	8-bit Timer	2					
	Other Timers	—					
	Watch Timer	—					
	Real-Time Counter	—					
	Watchdog Timer	1					
	PWM Output	16 bits × 1, 8 bits × 1					
Serial Interface	UART	—					
	UART Supporting LIN-bus	1					
	UART, CSI	—					
	UART Supporting LIN-bus, CSI	—					
	CSI	—					
	CSI, I^2C	—					
	CSI with Automatic Transmission/ Reception Function	—					
	I^2C	1					
	IEBus	—					
	CAN	—					
OCD	On-Chip Debugger	Yes					
Peripheral Functions	LCD (Segments x Commons)	—					
	16-bit ΔΣ A/D Converter	—					
	10-bit A/D Converter	4					
	8-bit A/D Converter	—					
	8-bit D/A Converter	—					
	Multiplier/Divider (bits x bits, bits ÷ bits)	—					
	Other Functions	POC, LVI			POC, LVI, operational amplifier		
Others	Power Supply Voltage (V)	1.8 to 5.5					
	Package (size: mm)	16-SSOP (5.72)					
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-78K0KX2L (IECUBE)					
Package		P16MA-65-FAA					
Part No.		μPD78F0550MA-FAA-AX	μPD78F0551MA-FAA-AX	μPD78F0552MA-FAA-AX	μPD78F0555MA-FAA-AX	μPD78F0556MA-FAA-AX	μPD78F0557MA-FAA-AX

Remark POC: Power-on clear
LVI: Low-voltage indicator

★ : New product ★★ : Under development

• Specifications (78K0/KA2-L (20 Pins))

Group		μPD78F0560	μPD78F0561	μPD78F0562	μPD78F0565	μPD78F0566	μPD78F0567
Memory	ROM Size (Bytes)	4K	8K	16K	4K	8K	16K
	ROM Type	Flash					
	Single-Power-Supply Flash Memory	Yes					
	RAM Size (Bytes)	384	512	768	384	512	768
Clock	Maximum Operating Frequency (MHz)	10					
	On-Chip Oscillator (Hz)	8M, 4M, 30k					
	Subclock (32.768kHz)	—					
I/O	I/O Ports	16					
Bus	External Data/Address Bus	—/—					
Timer	16-bit Timer	1					
	8-bit Timer	2					
	Other Timers	—					
	Watch Timer	—					
	Real-Time Counter	—					
	Watchdog Timer	1					
	PWM Output	16 bits × 1, 8 bits × 1					
Serial Interface	UART	—					
	UART Supporting LIN-bus	1					
	UART, CSI	—					
	UART Supporting LIN-bus, CSI	—					
	CSI	—					
	CSI, I^2C	—					
	CSI with Automatic Transmission/ Reception Function	—					
	I^2C	1					
	IEBus	—					
	CAN	—					
OCD	On-Chip Debugger	Yes					
Peripheral Functions	LCD (Segments x Commons)	—					
	16-bit ΔΣ A/D Converter	—					
	10-bit A/D Converter	6					
	8-bit A/D Converter	—					
	8-bit D/A Converter	—					
	Multiplier/Divider (bits x bits, bits ÷ bits)	—					
	Other Functions	POC, LVI			POC, LVI, operational amplifier		
Others	Power Supply Voltage (V)	1.8 to 5.5					
	Package (size: mm)	20-SSOP (7.62)					
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-78K0KX2L (IECUBE)					
Package		P20MC-65-CAA					
Part No.		μPD78F0560MC-CAA-AX	μPD78F0561MC-CAA-AX	μPD78F0562MC-CAA-AX	μPD78F0565MC-CAA-AX	μPD78F0566MC-CAA-AX	μPD78F0567MC-CAA-AX

Remark POC: Power-on clear
LVI: Low-voltage indicator

★ : New product ★★ : Under development

• Specifications (78K0/KA2-L (25 Pins))

Group		μPD78F0560	μPD78F0561	μPD78F0562	μPD78F0565	μPD78F0566	μPD78F0567
Memory	ROM Size (Bytes)	4K	8K	16K	4K	8K	16K
	ROM Type	Flash					
	Single-Power-Supply Flash Memory	Yes					
	RAM Size (Bytes)	384	512	768	384	512	768
Clock	Maximum Operating Frequency (MHz)	10					
	On-Chip Oscillator (Hz)	8M, 4M, 30k					
	Subclock (32.768kHz)	—					
I/O	I/O Ports	21					
Bus	External Data/Address Bus	—/—					
Timer	16-bit Timer	1					
	8-bit Timer	2					
	Other Timers	—					
	Watch Timer	—					
	Real-Time Counter	—					
	Watchdog Timer	1					
	PWM Output	16 bits × 1, 8 bits × 1					
Serial Interface	UART	—					
	UART Supporting LIN-bus	1					
	UART, CSI	—					
	UART Supporting LIN-bus, CSI	—					
	CSI	1					
	CSI, I^2C	—					
	CSI with Automatic Transmission/ Reception Function	—					
	I^2C	1					
	IEBus	—					
	CAN	—					
OCD	On-Chip Debugger	Yes					
Peripheral Functions	LCD (Segments × Commons)	—					
	16-bit ΔΣ A/D Converter	—					
	10-bit A/D Converter	7					
	8-bit A/D Converter	—					
	8-bit D/A Converter	—					
	Multiplier/Divider (bits × bits, bits ÷ bits)	—					
	Other Functions	POC, LVI			POC, LVI, operational amplifier		
Others	Power Supply Voltage (V)	1.8 to 5.5					
	Package (size: mm)	25-LGA (3 × 3)					
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-78K0KX2L (IECUBE)					
Package		P25FC-50-2N2					
Part No.		μPD78F0560FC-2N2-A**	μPD78F0561FC-2N2-A**	μPD78F0562FC-2N2-A**	μPD78F0565FC-2N2-A**	μPD78F0566FC-2N2-A**	μPD78F0567FC-2N2-A**

Remark POC: Power-on clear
LVI: Low-voltage indicator

★ : New product ★★ : Under development

• Specifications (78K0/KA2-L (32 Pins))

Group		μPD78F0560	μPD78F0561	μPD78F0562	μPD78F0565	μPD78F0566	μPD78F0567
Memory	ROM Size (Bytes)	4K	8K	16K	4K	8K	16K
	ROM Type	Flash					
	Single-Power-Supply Flash Memory	Yes					
	RAM Size (Bytes)	384	512	768	384	512	768
Clock	Maximum Operating Frequency (MHz)	10					
	On-Chip Oscillator (Hz)	8M, 4M, 30k					
	Subclock (32.768kHz)	—					
I/O	I/O Ports	25					
Bus	External Data/Address Bus	—/—					
Timer	16-bit Timer	1					
	8-bit Timer	2					
	Other Timers	—					
	Watch Timer	—					
	Real-Time Counter	—					
	Watchdog Timer	1					
	PWM Output	16 bits × 1, 8 bits × 1					
Serial Interface	UART	—					
	UART Supporting LIN-bus	1					
	UART, CSI	—					
	UART Supporting LIN-bus, CSI	—					
	CSI	1					
	CSI, I²C	—					
	CSI with Automatic Transmission/ Reception Function	—					
	I²C	1					
	IEBus	—					
	CAN	—					
OCD	On-Chip Debugger	Yes					
Peripheral Functions	LCD (Segments x Commons)	—					
	16-bit ΔΣ A/D Converter	—					
	10-bit A/D Converter	11					
	8-bit A/D Converter	—					
	8-bit D/A Converter	—					
	Multiplier/Divider (bits x bits, bits ÷ bits)	—					
	Other Functions	POC, LVI			POC, LVI, operational amplifier		
Others	Power Supply Voltage (V)	1.8 to 5.5					
	Package (size: mm)	32-WQFN (5 × 5)					
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-78K0KX2L (IECUBE)					
Package		P32K8-50-3B4-1					
Part No.		μPD78F0560K8-3B4-AX**	μPD78F0561K8-3B4-AX**	μPD78F0562K8-3B4-AX**	μPD78F0565K8-3B4-AX**	μPD78F0566K8-3B4-AX**	μPD78F0567K8-3B4-AX**

Remark POC: Power-on clear
LVI: Low-voltage indicator

★ : New product ★★ : Under development

• Specifications (78K0/KB2-L)

Group		μPD78F0571	μPD78F0572	μPD78F0573	μPD78F0576	μPD78F0577	μPD78F0578
Memory	ROM Size (Bytes)	8K	16K	32K	8K	16K	32K
	ROM Type	Flash					
	Single-Power-Supply Flash Memory	Yes					
	RAM Size (Bytes)	512	768	1K	512	768	1K
Clock	Maximum Operating Frequency (MHz)	10					
	On-Chip Oscillator (Hz)	8M, 4M, 30k					
	Subclock (32.768kHz)	—					
I/O	I/O Ports	24					
Bus	External Data/Address Bus	—/—					
Timer	16-bit Timer	1					
	8-bit Timer	4					
	Other Timers	—					
	Watch Timer	—					
	Real-Time Counter	—					
	Watchdog Timer	1					
	PWM Output	16 bits × 1, 8 bits × 4					
Serial Interface	UART	—					
	UART Supporting LIN-bus	1					
	UART, CSI	—					
	UART Supporting LIN-bus, CSI	—					
	CSI	1					
	CSI, I^2C	—					
	CSI with Automatic Transmission/ Reception Function	—					
	I^2C	1					
	IEBus	—					
	CAN	—					
OCD	On-Chip Debugger	Yes					
Peripheral Functions	LCD (Segments x Commons)	—					
	16-bit ΔΣ A/D Converter	—					
	10-bit A/D Converter	7					
	8-bit A/D Converter	—					
	8-bit D/A Converter	—					
	Multiplier/Divider (bits x bits, bits ÷ bits)	—					
	Other Functions	POC, LVI			POC, LVI, operational amplifier × 2		
Others	Power Supply Voltage (V)	1.8 to 5.5					
	Package (size: mm)	30-SSOP (7.62)					
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-78K0KX2L (IECUBE)					
Package		P30MC-65-CAB					
Part No.		μPD78F0571MC-CAB-AX	μPD78F0572MC-CAB-AX	μPD78F0573MC-CAB-AX	μPD78F0576MC-CAB-AX	μPD78F0577MC-CAB-AX	μPD78F0578MC-CAB-AX

Remark POC: Power-on clear
LVI: Low-voltage indicator

★ : New product ★★ : Under development

• Specifications (78K0/KC2-L (40 Pins))

Group		μPD78F0581	μPD78F0582	μPD78F0583	μPD78F0586	μPD78F0587	μPD78F0588
Memory	ROM Size (Bytes)	8K	16K	32K	8K	16K	32K
	ROM Type	Flash					
	Single-Power-Supply Flash Memory	Yes					
	RAM Size (Bytes)	512	768	1K	512	768	1K
Clock	Maximum Operating Frequency (MHz)	10					
	On-Chip Oscillator (Hz)	8M, 4M, 30k					
	Subclock (32.768kHz)	Yes					
I/O	I/O Ports	34					
Bus	External Data/Address Bus	—/—					
Timer	16-bit Timer	1					
	8-bit Timer	4					
	Other Timers	—					
	Watch Timer	—					
	Real-Time Counter	1					
	Watchdog Timer	1					
	PWM Output	16 bits × 1, 8 bits × 4					
Serial Interface	UART	—					
	UART Supporting LIN-bus	1					
	UART, CSI	—					
	UART Supporting LIN-bus, CSI	—					
	CSI	2					
	CSI, I^2C	—					
	CSI with Automatic Transmission/ Reception Function	—					
	I^2C	1					
	IEBus	—					
	CAN	—					
OCD	On-Chip Debugger	Yes					
Peripheral Functions	LCD (Segments x Commons)	—					
	16-bit ΔΣ A/D Converter	—					
	10-bit A/D Converter	10					
	8-bit A/D Converter	—					
	8-bit D/A Converter	—					
	Multiplier/Divider (bits x bits, bits ÷ bits)	—					
	Other Functions	POC, LVI			POC, LVI, operational amplifier × 2		
Others	Power Supply Voltage (V)	1.8 to 5.5					
	Package (size: mm)	40-WQFN (6 × 6)					
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-78K0KX2L (IECUBE)					
Package		P40K8-50-4B4-1					
Part No.		μPD78F0581K8-4B4-AX**	μPD78F0582K8-4B4-AX**	μPD78F0583K8-4B4-AX**	μPD78F0586K8-4B4-AX**	μPD78F0587K8-4B4-AX**	μPD78F0588K8-4B4-AX**

Remark POC: Power-on clear
LVI: Low-voltage indicator

★ : New product ★★ : Under development

• Specifications (78K0/KC2-L (44 Pins))

Group		μPD78F0581	μPD78F0582	μPD78F0583	μPD78F0586	μPD78F0587	μPD78F0588
Memory	ROM Size (Bytes)	8K	16K	32K	8K	16K	32K
	ROM Type	Flash					
	Single-Power-Supply Flash Memory	Yes					
	RAM Size (Bytes)	512	768	1K	512	768	1K
Clock	Maximum Operating Frequency (MHz)	10					
	On-Chip Oscillator (Hz)	8M, 4M, 30k					
	Subclock (32.768kHz)	Yes					
I/O	I/O Ports	38					
Bus	External Data/Address Bus	—/—					
Timer	16-bit Timer	1					
	8-bit Timer	4					
	Other Timers	—					
	Watch Timer	—					
	Real-Time Counter	1					
	Watchdog Timer	1					
	PWM Output	16 bits × 1, 8 bits × 4					
Serial Interface	UART	—					
	UART Supporting LIN-bus	1					
	UART, CSI	—					
	UART Supporting LIN-bus, CSI	—					
	CSI	2					
	CSI, I^2C	—					
	CSI with Automatic Transmission/ Reception Function	—					
	I^2C	1					
	IEBus	—					
	CAN	—					
OCD	On-Chip Debugger	Yes					
Peripheral Functions	LCD (Segments x Commons)	—					
	16-bit ΔΣ A/D Converter	—					
	10-bit A/D Converter	11					
	8-bit A/D Converter	—					
	8-bit D/A Converter	—					
	Multiplier/Divider (bits x bits, bits ÷ bits)	—					
	Other Functions	POC, LVI			POC, LVI, operational amplifier × 2		
Others	Power Supply Voltage (V)	1.8 to 5.5					
	Package (size: mm)	44-LQFP (10 × 10)					
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-78K0KX2L (IECUBE)					
Package		P44GB-80-GAF					
Part No.		μPD78F0581GB-GAF-AX	μPD78F0582GB-GAF-AX	μPD78F0583GB-GAF-AX	μPD78F0586GB-GAF-AX	μPD78F0587GB-GAF-AX	μPD78F0588GB-GAF-AX

Remark POC: Power-on clear
LVI: Low-voltage indicator

★ : New product ★★ : Under development

• Specifications (78K0/KC2-L (48 Pins))

Group		μPD78F0581	μPD78F0582	μPD78F0583	μPD78F0586	μPD78F0587	μPD78F0588
Memory	ROM Size (Bytes)	8K	16K	32K	8K	16K	32K
	ROM Type	Flash					
	Single-Power-Supply Flash Memory	Yes					
	RAM Size (Bytes)	512	768	1K	512	768	1K
Clock	Maximum Operating Frequency (MHz)	10					
	On-Chip Oscillator (Hz)	8M, 4M, 30k					
	Subclock (32.768kHz)	Yes					
I/O	I/O Ports	42					
Bus	External Data/Address Bus	—/—					
Timer	16-bit Timer	1					
	8-bit Timer	4					
	Other Timers	—					
	Watch Timer	—					
	Real-Time Counter	1					
	Watchdog Timer	1					
	PWM Output	16 bits × 1, 8 bits × 4					
Serial Interface	UART	—					
	UART Supporting LIN-bus	1					
	UART, CSI	—					
	UART Supporting LIN-bus, CSI	—					
	CSI	2					
	CSI, I²C	—					
	CSI with Automatic Transmission/ Reception Function	—					
	I²C	1					
	IEBus	—					
	CAN	—					
OCD	On-Chip Debugger	Yes					
Peripheral Functions	LCD (Segments x Commons)	—					
	16-bit ΔΣ A/D Converter	—					
	10-bit A/D Converter	11					
	8-bit A/D Converter	—					
	8-bit D/A Converter	—					
	Multiplier/Divider (bits x bits, bits ÷ bits)	—					
	Other Functions	POC, LVI, clock output			POC, LVI, operational amplifier × 2, clock output		
Others	Power Supply Voltage (V)	1.8 to 5.5					
	Package (size: mm)	48-LQFP (7 × 7)					
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-78K0KX2L (IECUBE)					
Package		P48GA-50-GAM					
Part No.		μPD78F0581GA-GAM-AX	μPD78F0582GA-GAM-AX	μPD78F0583GA-GAM-AX	μPD78F0586GA-GAM-AX	μPD78F0587GA-GAM-AX	μPD78F0588GA-GAM-AX

Remark POC: Power-on clear
LVI: Low-voltage indicator

★ : New product ★★ : Under development

• Specifications (78K0/KB2)

Group		μPD78F0500A	μPD78F0501A	μPD78F0502A	μPD78F0503A	μPD78F0503DA
Memory	ROM Size (Bytes)	8K	16K	24K	32K	
	ROM Type	Flash				
	Single-Power-Supply Flash Memory	Yes				
	RAM Size (Bytes)	512	768	1K		
Clock	Maximum Operating Frequency (MHz)	20				
	On-Chip Oscillator (Hz)	8M, 240k				
	Subclock (32.768kHz)	—				
I/O	I/O Ports	23				
Bus	External Data/Address Bus	—/—				
Timer	16-bit Timer	1				
	8-bit Timer	4				
	Other Timers	—				
	Watch Timer	—				
	Real-Time Counter	—				
	Watchdog Timer	1				
	PWM Output	16 bits × 1, 8 bits × 4				
Serial Interface	UART	—				
	UART Supporting LIN-bus	1				
	UART, CSI	1				
	UART Supporting LIN-bus, CSI	—				
	CSI	—				
	CSI, I^2C	—				
	CSI with Automatic Transmission/ Reception Function	—				
	I^2C	1				
	IEBus	—				
	CAN	—				
OCD	On-Chip Debugger	—				Yes
Peripheral Functions	LCD (Segments x Commons)	—				
	16-bit ΔΣ A/D Converter	—				
	10-bit A/D Converter	4				
	8-bit A/D Converter	—				
	8-bit D/A Converter	—				
	Multiplier/Divider (bits x bits, bits ÷ bits)	—				
	Other Functions	POC, LVI				
Others	Power Supply Voltage (V)	1.8 to 5.5				
	Package (size: mm)	30-SSOP (7.62) 36-FLGA (4 × 4)				
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-78K0KX2 (IECUBE)				
Package		S30MC-65-CAB P36FC-50-AA3-2				
Part No.		μPD78F0500AMC-CAB-AX μPD78F0500AFC-AA3-A	μPD78F0501AMC-CAB-AX μPD78F0501AFC-AA3-A	μPD78F0502AMC-CAB-AX μPD78F0502AFC-AA3-A	μPD78F0503AMC-CAB-AX μPD78F0503AFC-AA3-A	μPD78F0503DAMC-CAB-AX μPD78F0503ADAFC-AA3-A

Remark POC: Power-on clear
LVI: Low-voltage indicator

★ : New product ★★ : Under development

• Specifications (78K0/KC2 (38 Pins))

Group		μPD78F0511A	μPD78F0512A	μPD78F0513A	μPD78F0513DA
Memory	ROM Size (Bytes)	16K	24K	32K	
	ROM Type	Flash			
	Single-Power-Supply Flash Memory	Yes			
	RAM Size (Bytes)	768	1K		
Clock	Maximum Operating Frequency (MHz)	20			
	On-Chip Oscillator (Hz)	8M, 240k			
	Subclock (32.768kHz)	Yes			
I/O	I/O Ports	31			
Bus	External Data/Address Bus	—/—			
Timer	16-bit Timer	1			
	8-bit Timer	4			
	Other Timers	—			
	Watch Timer	1			
	Real-Time Counter	—			
	Watchdog Timer	1			
	PWM Output	16 bits × 1, 8 bits × 4			
Serial Interface	UART	—			
	UART Supporting LIN-bus	1			
	UART, CSI	1			
	UART Supporting LIN-bus, CSI	—			
	CSI	—			
	CSI, I^2C	—			
	CSI with Automatic Transmission/ Reception Function	—			
	I^2C	1			
	IEBus	—			
	CAN	—			
OCD	On-Chip Debugger	—			Yes
Peripheral Functions	LCD (Segments x Commons)	—			
	16-bit ΔΣ A/D Converter	—			
	10-bit A/D Converter	6			
	8-bit A/D Converter	—			
	8-bit D/A Converter	—			
	Multiplier/Divider (bits x bits, bits ÷ bits)	—			
	Other Functions	POC, LVI			
Others	Power Supply Voltage (V)	1.8 to 5.5			
	Package (size: mm)	38-SSOP (7.62)			
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-78K0KX2 (IECUBE)			
Package		P38MC-65-GAA			
Part No.		μPD78F0511AMC-GAA-AX	μPD78F0512AMC-GAA-AX	μPD78F0513AMC-GAA-AX	μPD78F0513DAMC-GAA-AX

Remark POC: Power-on clear
LVI: Low-voltage indicator

★ : New product ★★ : Under development

• Specifications (78K0/KC2 (44 Pins))

Group		μPD78F0511A	μPD78F0512A	μPD78F0513A	μPD78F0513DA
Memory	ROM Size (Bytes)	16K	24K	32K	
	ROM Type	Flash			
	Single-Power-Supply Flash Memory	Yes			
	RAM Size (Bytes)	768	1K		
Clock	Maximum Operating Frequency (MHz)	20			
	On-Chip Oscillator (Hz)	8M, 240k			
	Subclock (32.768kHz)	Yes			
I/O	I/O Ports	37			
Bus	External Data/Address Bus	—/—			
Timer	16-bit Timer	1			
	8-bit Timer	4			
	Other Timers	—			
	Watch Timer	1			
	Real-Time Counter	—			
	Watchdog Timer	1			
	PWM Output	16 bits × 1, 8 bits × 4			
Serial Interface	UART	—			
	UART Supporting LIN-bus	1			
	UART, CSI	1			
	UART Supporting LIN-bus, CSI	—			
	CSI	—			
	CSI, I^2C	—			
	CSI with Automatic Transmission/ Reception Function	—			
	I^2C	1			
	IEBus	—			
	CAN	—			
OCD	On-Chip Debugger	—			Yes
Peripheral Functions	LCD (Segments x Commons)	—			
	16-bit ΔΣ A/D Converter	—			
	10-bit A/D Converter	8			
	8-bit A/D Converter	—			
	8-bit D/A Converter	—			
	Multiplier/Divider (bits x bits, bits ÷ bits)	—			
	Other Functions	POC, LVI			
Others	Power Supply Voltage (V)	1.8 to 5.5			
	Package (size: mm)	44-LQFP (10 × 10)			
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-78K0KX2 (IECUBE)			
Package		P44GB-80-GAF			
Part No.		μPD78F0511AGB-GAF-AX	μPD78F0512AGB-GAF-AX	μPD78F0513AGB-GAF-AX	μPD78F0513DAGB-GAF-AX

Remark POC: Power-on clear
LVI: Low-voltage indicator

★ : New product ★★ : Under development

• Specifications (78K0/KC2 (48 Pins))

Group		μPD78F0511A	μPD78F0512A	μPD78F0513A	μPD78F0514A	μPD78F0515A	μPD78F0515DA
Memory	ROM Size (Bytes)	16K	24K	32K	48K	60K	
	ROM Type	Flash					
	Single-Power-Supply Flash Memory	Yes					
	RAM Size (Bytes)	768	1K		2K	3K	
Clock	Maximum Operating Frequency (MHz)	20					
	On-Chip Oscillator (Hz)	8M, 240k					
	Subclock (32.768kHz)	Yes					
I/O	I/O Ports	41					
Bus	External Data/Address Bus	—/—					
Timer	16-bit Timer	1					
	8-bit Timer	4					
	Other Timers	—					
	Watch Timer	1					
	Real-Time Counter	—					
	Watchdog Timer	1					
	PWM Output	16 bits × 1, 8 bits × 4					
Serial Interface	UART	—					
	UART Supporting LIN-bus	1					
	UART, CSI	1					
	UART Supporting LIN-bus, CSI	—					
	CSI	—					
	CSI, I²C	—					
	CSI with Automatic Transmission/ Reception Function	—					
	I²C	1					
	IEBus	—					
	CAN	—					
OCD	On-Chip Debugger	—					Yes
Peripheral Functions	LCD (Segments x Commons)	—					
	16-bit ΔΣ A/D Converter	—					
	10-bit A/D Converter	8					
	8-bit A/D Converter	—					
	8-bit D/A Converter	—					
	Multiplier/Divider (bits x bits, bits ÷ bits)	—				16 × 16 32 ÷ 16	
	Other Functions	POC, LVI					
Others	Power Supply Voltage (V)	1.8 to 5.5					
	Package (size: mm)	48-LQFP (7 × 7)					
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-78K0KX2 (IECUBE)					
Package		P48GA-50-GAM					
Part No.		μPD78F0511AGA-GAM-AX	μPD78F0512AGA-GAM-AX	μPD78F0513AGA-GAM-AX	μPD78F0514AGA-GAM-AX	μPD78F0515AGA-GAM-AX	μPD78F0515DAGA-GAM-AX

Remark POC: Power-on clear
LVI: Low-voltage indicator

★ : New product ★★ : Under development

• Specifications (78K0/KD2)

Group		μPD78F0521A	μPD78F0522A	μPD78F0523A	μPD78F0524A	μPD78F0525A	μPD78F0526A	μPD78F0527A	μPD78F0527DA
Memory	ROM Size (Bytes)	16K	24K	32K	48K	60K	96K	128K	
	ROM Type	Flash							
	Single-Power-Supply Flash Memory	Yes							
	RAM Size (Bytes)	768	1K		2K	3K	5K	7K	
Clock	Maximum Operating Frequency (MHz)	20							
	On-Chip Oscillator (Hz)	8M, 240k							
	Subclock (32.768kHz)	Yes							
I/O	I/O Ports	45							
Bus	External Data/Address Bus	—/—							
Timer	16-bit Timer	1							
	8-bit Timer	4							
	Other Timers	—							
	Watch Timer	1							
	Real-Time Counter	—							
	Watchdog Timer	1							
	PWM Output	16 bits × 1, 8 bits × 4							
Serial Interface	UART	—							
	UART Supporting LIN-bus	1							
	UART, CSI	1							
	UART Supporting LIN-bus, CSI	—							
	CSI	—							
	CSI, I^2C	—							
	CSI with Automatic Transmission/ Reception Function	—							
	I^2C	1							
	IEBus	—							
	CAN	—							
OCD	On-Chip Debugger	—							Yes
Peripheral Functions	LCD (Segments x Commons)	—							
	16-bit ΔΣ A/D Converter	—							
	10-bit A/D Converter	8							
	8-bit A/D Converter	—							
	8-bit D/A Converter	—							
	Multiplier/Divider (bits x bits, bits ÷ bits)	—			16 × 16 32 ÷ 16				
	Other Functions	POC, LVI							
Others	Power Supply Voltage (V)	1.8 to 5.5							
	Package (size: mm)	52-LQFP (10 × 10)							
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-78K0KX2 (IECUBE)							
Package		P52GB-65-GAG							
Part No.		μPD78F0521AGB-GAG-AX	μPD78F0522AGB-GAG-AX	μPD78F0523AGB-GAG-AX	μPD78F0524AGB-GAG-AX	μPD78F0525AGB-GAG-AX	μPD78F0526AGB-GAG-AX	μPD78F0527AGB-GAG-AX	μPD78F0527DAGB-GAG-AX

Remark POC: Power-on clear
LVI: Low-voltage indicator

★ : New product ★★ : Under development

• Specifications (78K0/KE2)

Group		μPD78F0531A	μPD78F0532A	μPD78F0533A	μPD78F0534A	μPD78F0535A	μPD78F0536A	μPD78F0537A	μPD78F0537DA
Memory	ROM Size (Bytes)	16K	24K	32K	48K	60K	96K	128K	
	ROM Type	Flash							
	Single-Power-Supply Flash Memory	Yes							
	RAM Size (Bytes)	768	1K		2K	3K	5K	7K	
Clock	Maximum Operating Frequency (MHz)	20							
	On-Chip Oscillator (Hz)	8M, 240k							
	Subclock (32.768kHz)	Yes							
I/O	I/O Ports	55							
Bus	External Data/Address Bus	—/—							
Timer	16-bit Timer	1			2				
	8-bit Timer	4							
	Other Timers	—							
	Watch Timer	1							
	Real-Time Counter	—							
	Watchdog Timer	1							
	PWM Output	16 bits × 1, 8 bits × 4			16 bits × 2, 8 bits × 4				
Serial Interface	UART	—							
	UART Supporting LIN-bus	1							
	UART, CSI	1							
	UART Supporting LIN-bus, CSI	—							
	CSI	—			1				
	CSI, I²C	—							
	CSI with Automatic Transmission/ Reception Function	—							
	I²C	1							
	IEBus	—							
	CAN	—							
OCD	On-Chip Debugger	—							Yes
Peripheral Functions	LCD (Segments x Commons)	—							
	16-bit ΔΣ A/D Converter	—							
	10-bit A/D Converter	8							
	8-bit A/D Converter	—							
	8-bit D/A Converter	—							
	Multiplier/Divider (bits x bits, bits ÷ bits)	—			16 × 16 32 ÷ 16				
	Other Functions	POC, LVI							
Others	Power Supply Voltage (V)	1.8 to 5.5							
	Package (size: mm)	64-LQFP (10 × 10), 64-LQFP (12 × 12) 64-LQFP (14 × 14), 64-TQFP (7 × 7) 64-FLGA (5 × 5), 64-FBGA (4 × 4)							
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-78K0KX2 (IECUBE)							
Package		P64GB-50-GAH, P64GC-80-GAL, P64GK-65-GAJ, P64GA-40-HAB, P64FC-50-AA1-1, P64F1-40-AA2							
Part No.		μPD78F0531AGB-GAH-AX, μPD78F0531AGC-GAL-AX, μPD78F0531AGK-GAJ-AX, μPD78F0531AGA-HAB-AX, μPD78F0531AFC-AA1-A, μPD78F0531AF1-AA2-A	μPD78F0532AGB-GAH-AX, μPD78F0532AGC-GAL-AX, μPD78F0532AGK-GAJ-AX, μPD78F0532AGA-HAB-AX, μPD78F0532AFC-AA1-A, μPD78F0532AF1-AA2-A	μPD78F0533AGB-GAH-AX, μPD78F0533AGC-GAL-AX, μPD78F0533AGK-GAJ-AX, μPD78F0533AGA-HAB-AX, μPD78F0533AFC-AA1-A, μPD78F0533AF1-AA2-A	μPD78F0534AGB-GAH-AX, μPD78F0534AGC-GAL-AX, μPD78F0534AGK-GAJ-AX, μPD78F0534AGA-HAB-AX, μPD78F0534AFC-AA1-A, μPD78F0534AF1-AA2-A	μPD78F0535AGB-GAH-AX, μPD78F0535AGC-GAL-AX, μPD78F0535AGK-GAJ-AX, μPD78F0535AGA-HAB-AX, μPD78F0535AFC-AA1-A, μPD78F0535AF1-AA2-A	μPD78F0536AGB-GAH-AX, μPD78F0536AGC-GAL-AX, μPD78F0536AGK-GAJ-AX, μPD78F0536AGA-HAB-AX, μPD78F0536AFC-AA1-A, μPD78F0536AF1-AA2-A	μPD78F0537AGB-GAH-AX, μPD78F0537AGC-GAL-AX, μPD78F0537AGK-GAJ-AX, μPD78F0537AGA-HAB-AX, μPD78F0537AFC-AA1-A, μPD78F0537AF1-AA2-A	μPD78F0537DAGB-GAH-AX, μPD78F0537DAGC-GAL-AX, μPD78F0537DAGK-GAJ-AX, μPD78F0537DAGA-HAB-AX, μPD78F0537DAFC-AA1-A, μPD78F0537DAF1-AA2-A

Remark POC: Power-on clear
LVI: Low-voltage indicator

★ : New product ★★ : Under development

• Specifications (78K0/KF2)

Group		μPD78F0544A	μPD78F0545A	μPD78F0546A	μPD78F0547A	μPD78F0547DA
Memory	ROM Size (Bytes)	48K	60K	96K	128K	
	ROM Type	Flash				
	Single-Power-Supply Flash Memory	Yes				
	RAM Size (Bytes)	2K	3K	5K	7K	
Clock	Maximum Operating Frequency (MHz)	20				
	On-Chip Oscillator (Hz)	8M, 240k				
	Subclock (32.768kHz)	Yes				
I/O	I/O Ports	71				
Bus	External Data/Address Bus	—/—				
Timer	16-bit Timer	2				
	8-bit Timer	4				
	Other Timers	—				
	Watch Timer	1				
	Real-Time Counter	—				
	Watchdog Timer	1				
	PWM Output	16 bits × 2, 8 bits × 4				
Serial Interface	UART	—				
	UART Supporting LIN-bus	1				
	UART, CSI	1				
	UART Supporting LIN-bus, CSI	—				
	CSI	1				
	CSI, I^2C	—				
	CSI with Automatic Transmission/ Reception Function	1				
	I^2C	1				
	IEBus	—				
	CAN	—				
OCD	On-Chip Debugger	—				Yes
Peripheral Functions	LCD (Segments x Commons)	—				
	16-bit ΔΣ A/D Converter	—				
	10-bit A/D Converter	8				
	8-bit A/D Converter	—				
	8-bit D/A Converter	—				
	Multiplier/Divider (bits x bits, bits ÷ bits)	16 × 16 32 ÷ 16				
	Other Functions	POC, LVI				
Others	Power Supply Voltage (V)	1.8 to 5.5				
	Package (size: mm)	80-LQFP (12 × 12) 80-LQFP (14 × 14)				
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-78K0KX2 (IECUBE)				
Package		P80GC-65-GAD P80GK-50-GAK				
Part No.		μPD78F0544AGC-GAD-AX μPD78F0544AGK-GAK-AX	μPD78F0545AGC-GAD-AX μPD78F0545AGK-GAK-AX	μPD78F0546AGC-GAD-AX μPD78F0546AGK-GAK-AX	μPD78F0547AGC-GAD-AX μPD78F0547AGK-GAK-AX	μPD78F0547DAGC-GAD-AX μPD78F0547DAGK-GAK-AX

Remark POC: Power-on clear
LVI: Low-voltage indicator

★ : New product ★★ : Under development

• Specifications (78K0/KB2-A)

Group		μPD78F0590	μPD78F0591
Memory	ROM Size (Bytes)	16K	32K
	ROM Type	Flash	
	Single-Power-Supply Flash Memory	Yes	
	RAM Size (Bytes)	1K	
Clock	Maximum Operating Frequency (MHz)	20	
	On-Chip Oscillator (Hz)	8M, 240k	
	Subclock (32.768kHz)	—	
I/O	I/O Ports	22	
Bus	External Data/Address Bus	—/—	
Timer	16-bit Timer	1	
	8-bit Timer	4	
	Other Timers	—	
	Watch Timer	—	
	Real-Time Counter	—	
	Watchdog Timer	1	
	PWM Output	16 bits × 1, 8 bits × 4	
Serial Interface	UART	—	
	UART Supporting LIN-bus	1	
	UART, CSI	—	
	UART Supporting LIN-bus, CSI	—	
	CSI	1	
	CSI, I^2C	—	
	CSI with Automatic Transmission/ Reception Function	—	
	I^2C	1	
	IEBus	—	
	CAN	—	
OCD	On-Chip Debugger	Yes	
Peripheral Functions	LCD (Segments x Commons)	—	
	16-bit ΔΣ A/D Converter	—	
	12-bit A/D Converter	10	
	10-bit A/D Converter	—	
	8-bit A/D Converter	—	
	8-bit D/A Converter	—	
	Multiplier/Divider (bits x bits, bits ÷ bits)	16 × 16 32 ÷ 16	
	Other Functions	POC, LVI, operational amplifier × 3	
Others	Power Supply Voltage (V)	1.8 to 5.5	
	Package (size: mm)	30-SSOP (7.62)	
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-78F0593 (IECUBE)	
Package		P30MC-65-CAB	
Part No.		μPD78F0590MC-CAB-AX	μPD78F0591MC-CAB-AX

Remark POC: Power-on clear
LVI: Low-voltage indicator

★ : New product ★★ : Under development

• Specifications (78K0/KC2-A (36 Pins))

Group		μPD78F0592	μPD78F0593
Memory	ROM Size (Bytes)	16K	32K
	ROM Type	Flash	
	Single-Power-Supply Flash Memory	Yes	
	RAM Size (Bytes)	1K	
Clock	Maximum Operating Frequency (MHz)	20	
	On-Chip Oscillator (Hz)	8M, 240k	
	Subclock (32.768kHz)	—	
I/O	I/O Ports	28	
Bus	External Data/Address Bus	—/—	
Timer	16-bit Timer	1	
	8-bit Timer	4	
	Other Timers	—	
	Watch Timer	—	
	Real-Time Counter	—	
	Watchdog Timer	1	
	PWM Output	16 bits × 1, 8 bits × 4	
Serial Interface	UART	—	
	UART Supporting LIN-bus	1	
	UART, CSI	—	
	UART Supporting LIN-bus, CSI	—	
	CSI	1	
	CSI, I^2C	—	
	CSI with Automatic Transmission/ Reception Function	—	
	I^2C	1	
	IEBus	—	
	CAN	—	
OCD	On-Chip Debugger	Yes	
Peripheral Functions	LCD (Segments x Commons)	—	
	16-bit ΔΣ A/D Converter	—	
	12-bit A/D Converter	12	
	10-bit A/D Converter	—	
	8-bit A/D Converter	—	
	8-bit D/A Converter	—	
	Multiplier/Divider (bits x bits, bits ÷ bits)	16 × 16 32 ÷ 16	
	Other Functions	POC, LVI, operational amplifier × 3	
Others	Power Supply Voltage (V)	1.8 to 5.5	
	Package (size: mm)	36-FLGA (4 × 4)	
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-78F0593 (IECUBE)	
Package		P36FC-50-AA4	
Part No.		μPD78F0592FC-AA4-A**	μPD78F0593FC-AA4-A**

Remark POC: Power-on clear
LVI: Low-voltage indicator

★ : New product ★★ : Under development

• Specifications (78K0/KC2-A (48 Pins))

Group		μPD78F0592	μPD78F0593
Memory	ROM Size (Bytes)	16K	32K
	ROM Type	Flash	
	Single-Power-Supply Flash Memory	Yes	
	RAM Size (Bytes)	1K	
Clock	Maximum Operating Frequency (MHz)	20	
	On-Chip Oscillator (Hz)	8M, 240k	
	Subclock (32.768kHz)	Yes	
I/O	I/O Ports	40	
Bus	External Data/Address Bus	—/—	
Timer	16-bit Timer	1	
	8-bit Timer	4	
	Other Timers	—	
	Watch Timer	—	
	Real-Time Counter	1	
	Watchdog Timer	1	
	PWM Output	16 bits × 1, 8 bits × 4	
Serial Interface	UART	—	
	UART Supporting LIN-bus	1	
	UART, CSI	—	
	UART Supporting LIN-bus, CSI	—	
	CSI	1	
	CSI, I^2C	—	
	CSI with Automatic Transmission/ Reception Function	—	
	I^2C	1	
	IEBus	—	
	CAN	—	
OCD	On-Chip Debugger	Yes	
Peripheral Functions	LCD (Segments x Commons)	—	
	16-bit ΔΣ A/D Converter	—	
	12-bit A/D Converter	12	
	10-bit A/D Converter	—	
	8-bit A/D Converter	—	
	8-bit D/A Converter	—	
	Multiplier/Divider (bits x bits, bits ÷ bits)	16 × 16 32 ÷ 16	
	Other Functions	POC, LVI, operational amplifier × 3, clock output	
Others	Power Supply Voltage (V)	1.8 to 5.5	
	Package (size: mm)	48-LQFP (7 × 7)	
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-78F0593 (IECUBE)	
Package		P48GA-50-GAM	
Part No.		μPD78F0592GA-GAM-AX	μPD78F0593GA-GAM-AX

Remark POC: Power-on clear
LVI: Low-voltage indicator

★ : New product ★★ : Under development

• Specifications (μPD78002xA)

Group		μPD780021A (/Y)	μPD780022A (/Y)	μPD780023A (/Y)	μPD780024A (/Y)
Memory	ROM Size (Bytes)	8K	16K	24K	32K
	ROM Type	Mask			
	Single-Power-Supply Flash Memory	—			
	RAM Size (Bytes)	512		1K	
Clock	Maximum Operating Frequency (MHz)	12 (8.38)			
	On-Chip Oscillator (Hz)	—			
	Subclock (32.768kHz)	Yes			
I/O	I/O Ports	51			
Bus	External Data/Address Bus	8/16			
Timer	16-bit Timer	1			
	8-bit Timer	2			
	Other Timers	—			
	Watch Timer	1			
	Real-Time Counter	—			
	Watchdog Timer	1			
	PWM Output	16 bits × 1, 8 bits × 2			
Serial Interface	UART	1			
	UART Supporting LIN-bus	—			
	UART, CSI	—			
	UART Supporting LIN-bus, CSI	—			
	CSI	2 (1)			
	CSI, I^2C	—			
	CSI with Automatic Transmission/ Reception Function	—			
	I^2C	0 (1)			
	IEBus	—			
	CAN	—			
OCD	On-Chip Debugger	—			
Peripheral Functions	LCD (Segments x Commons)	—			
	16-bit ΔΣ A/D Converter	—			
	10-bit A/D Converter	—			
	8-bit A/D Converter	4			
	8-bit D/A Converter	—			
	Multiplier/Divider (bits x bits, bits ÷ bits)	—			
	Other Functions	—			
Others	Power Supply Voltage (V)	1.8 to 5.5			
	Package (size: mm)	64-LQFP (10 × 10), 64-TQFP (12 × 12), 64-LQFP (14 × 14)			
	In-Circuit Emulator Emulation Board	IE-78K0S-NS/-A, IE-780034-NS-EM1			
Package		P64GC-80-8BS P64GK-65-9ET-3 S64GB-50-8EU-2			
Part No.		μPD780021A (/Y)GC-xxx-8BS-A μPD780021A (/Y)GK-xxx-9ET-A μPD780021A (/Y)GB-xxx-8EU-A	μPD780022A (/Y)GCxxx-8BS-A μPD780022A (/Y)GK-xxx-9ET-A μPD780022A (/Y)GB-xxx-8EU-A	μPD780023A (/Y)GC-xxx-8BS-A μPD780023A (/Y)GK-xxx-9ET-A μPD780023A (/Y)GB-xxx-8EU-A	μPD780024A (/Y)GC-xxx-8BS-A μPD780024A (/Y)GK-xxx-9ET-A μPD780024A (/Y)GB-xxx-8EU-A

★ : New product ★★ : Under development

• Specifications (μPD78003xA)

Group		μPD780031A (/Y)	μPD780032A (/Y)	μPD780033A (/Y)	μPD780034A (/Y)	μPD78F0034B (/Y)
Memory	ROM Size (Bytes)	8K	16K	24K	32K	
	ROM Type	Mask				Flash
	Single-Power-Supply Flash Memory	—				
	RAM Size (Bytes)	512		1K		
Clock	Maximum Operating Frequency (MHz)	12 (8.38)				
	On-Chip Oscillator (Hz)	—				
	Subclock (32.768kHz)	Yes				
I/O	I/O Ports	51				
Bus	External Data/Address Bus	8/16				
Timer	16-bit Timer	1				
	8-bit Timer	2				
	Other Timers	—				
	Watch Timer	1				
	Real-Time Counter	—				
	Watchdog Timer	1				
	PWM Output	16 bits × 1, 8 bits × 2				
Serial Interface	UART	1				
	UART Supporting LIN-bus	—				
	UART, CSI	—				
	UART Supporting LIN-bus, CSI	—				
	CSI	2 (1)				
	CSI, I^2C	—				
	CSI with Automatic Transmission/ Reception Function	—				
	I^2C	0 (1)				
	IEBus	—				
	CAN	—				
OCD	On-Chip Debugger	—				
Peripheral Functions	LCD (Segments x Commons)	—				
	16-bit ΔΣ A/D Converter	—				
	10-bit A/D Converter	4				
	8-bit A/D Converter	—				
	8-bit D/A Converter	—				
	Multiplier/Divider (bits x bits, bits ÷ bits)	—				
	Other Functions	—				
Others	Power Supply Voltage (V)	1.8 to 5.5				
	Package (size: mm)	64-LQFP (10 × 10), 64-TQFP (12 × 12) 64-LQFP (14 × 14)				
	In-Circuit Emulator Emulation Board	IE-78K0S-NS/-A, IE-780034-NS-EM1				
Package		P64GC-80-8BS P64GK-65-9ET-3 S64GB-50-8EU-2				
Part No.		μPD780031A (/Y)GC-xxx-8BS-A μPD780031A (/Y)GK-xxx-9ET-A μPD780031A (/Y)GB-xxx-8EU-A	μPD780032A (/Y)GC-xxx-8BS-A μPD780032A (/Y)GK-xxx-9ET-A μPD780032A (/Y)GB-xxx-8EU-A	μPD780033A (/Y)GC-xxx-8BS-A μPD780033A (/Y)GK-xxx-9ET-A μPD780033A (/Y)GB-xxx-8EU-A	μPD780034A (/Y)GC-xxx-8BS-A μPD780034A (/Y)GK-xxx-9ET-A μPD780034A (/Y)GB-xxx-8EU-A	μPD780034B (/Y)GC-8BS-A μPD780034B (/Y)GK-9ET-A μPD780034B (/Y)GB-8EU-A

★ : New product ★★ : Under development

• Specifications (μPD78002xAS)

Group		μPD780021AS	μPD780022AS	μPD780023AS	μPD780024AS
Memory	ROM Size (Bytes)	8K	16K	24K	32K
	ROM Type	Mask			
	Single-Power-Supply Flash Memory	—			
	RAM Size (Bytes)	512		1K	
Clock	Maximum Operating Frequency (MHz)	12			
	On-Chip Oscillator (Hz)	—			
	Subclock (32.768kHz)	Yes			
I/O	I/O Ports	39			
Bus	External Data/Address Bus	—/—			
Timer	16-bit Timer	1			
	8-bit Timer	2			
	Other Timers	—			
	Watch Timer	1			
	Real-Time Counter	—			
	Watchdog Timer	1			
	PWM Output	16 bits × 1, 8 bits × 2			
Serial Interface	UART	1			
	UART Supporting LIN-bus	—			
	UART, CSI	—			
	UART Supporting LIN-bus, CSI	—			
	CSI	2			
	CSI, I²C	—			
	CSI with Automatic Transmission/ Reception Function	—			
	I²C	—			
	IEBus	—			
	CAN	—			
OCD	On-Chip Debugger	—			
Peripheral Functions	LCD (Segments x Commons)	—			
	16-bit ΔΣ A/D Converter	—			
	10-bit A/D Converter	—			
	8-bit A/D Converter	4			
	8-bit D/A Converter	—			
	Multiplier/Divider (bits x bits, bits ÷ bits)	—			
	Other Functions	—			
Others	Power Supply Voltage (V)	1.8 to 5.5			
	Package (size: mm)	52-LQFP (10 × 10)			
	In-Circuit Emulator Emulation Board	IE-78K0S-NS/-A, IE-780034-NS-EM1			
Package		S52GB-65-8ET-2			
Part No.		μPD780021ASGB-xxx-8ET-A	μPD780022ASGB-xxx-8ET-A	μPD780023ASGB-xxx-8ET-A	μPD780024ASGB-xxx-8ET-A

★ : New product ★★ : Under development

• Specifications (μPD78003xAS)

Group		μPD780031AS	μPD780032AS	μPD780033AS	μPD780034AS	μPD78F0034BS
Memory	ROM Size (Bytes)	8K	16K	24K	32K	
	ROM Type	Mask				Flash
	Single-Power-Supply Flash Memory	—				
	RAM Size (Bytes)	512		1K		
Clock	Maximum Operating Frequency (MHz)	12				
	On-Chip Oscillator (Hz)	—				
	Subclock (32.768kHz)	Yes				
I/O	I/O Ports	39				
Bus	External Data/Address Bus	—/—				
Timer	16-bit Timer	1				
	8-bit Timer	2				
	Other Timers	—				
	Watch Timer	1				
	Real-Time Counter	—				
	Watchdog Timer	1				
	PWM Output	16 bits × 1, 8 bits × 2				
Serial Interface	UART	1				
	UART Supporting LIN-bus	—				
	UART, CSI	—				
	UART Supporting LIN-bus, CSI	—				
	CSI	2				
	CSI, I^2C	—				
	CSI with Automatic Transmission/ Reception Function	—				
	I^2C	—				
	IEBus	—				
	CAN	—				
OCD	On-Chip Debugger	—				
Peripheral Functions	LCD (Segments x Commons)	—				
	16-bit ΔΣ A/D Converter	—				
	10-bit A/D Converter	4				
	8-bit A/D Converter	—				
	8-bit D/A Converter	—				
	Multiplier/Divider (bits x bits, bits ÷ bits)	—				
	Other Functions	—				
Others	Power Supply Voltage (V)	1.8 to 5.5				
	Package (size: mm)	52-LQFP (10 × 10)				
	In-Circuit Emulator Emulation Board	IE-78K0S-NS/-A, IE-780034-NS-EM1				
Package		S52GB-65-8ET-2				
Part No.		μPD780031ASGB-xxx-8ET-A	μPD780032ASGB-xxx-8ET-A	μPD780033ASGB-xxx-8ET-A	μPD780034ASGB-xxx-8ET-A	μPD78F0034BSGB-8ET-A

★ : New product ★★ : Under development

• Specifications (μPD78005x)

Group		μPD780053 (/Y)	μPD780054 (/Y)	μPD780055 (/Y)	μPD780056 (/Y)	μPD780058B (/Y)	μPD78F0058 (/Y)
Memory	ROM Size (Bytes)	24K	32K	40K	48K	60K	
	ROM Type	Mask					Flash
	Single-Power-Supply Flash Memory	—					
	RAM Size (Bytes)	1K				2K	
Clock	Maximum Operating Frequency (MHz)	5					
	On-Chip Oscillator (Hz)	—					
	Subclock (32.768kHz)	Yes					
I/O	I/O Ports	68					
Bus	External Data/Address Bus	8/16					
Timer	16-bit Timer	1					
	8-bit Timer	2					
	Other Timers	—					
	Watch Timer	1					
	Real-Time Counter	—					
	Watchdog Timer	1					
	PWM Output	14 bits × 1					
Serial Interface	UART	—					
	UART Supporting LIN-bus	—					
	UART, CSI	1					
	UART Supporting LIN-bus, CSI	—					
	CSI	1 (0)					
	CSI, I²C	0 (1)					
	CSI with Automatic Transmission/ Reception Function	1					
	I²C	—					
	IEBus	—					
	CAN	—					
OCD	On-Chip Debugger	—					
Peripheral Functions	LCD (Segments × Commons)	—					
	16-bit ΔΣ A/D Converter	—					
	10-bit A/D Converter	—					
	8-bit A/D Converter	8					
	8-bit D/A Converter	2					
	Multiplier/Divider (bits × bits, bits ÷ bits)	—					
	Other Functions	—				ROMC	
Others	Power Supply Voltage (V)	1.8 to 5.5					2.2 to 5.5
	Package (size: mm)	80-QFP (14 × 14) 80-TQFP (12 × 12)					
	In-Circuit Emulator Emulation Board	IE-78K0-NS/-A, IE-780308-NS-EM1					
Package		P80GC-65-8BT-1 S80GK-50-9EU-1					
Part No.		μPD780053 (/Y)GC-xxx-8BT-A μPD780053 (/Y)GK-xxx-9EU-A	μPD780054 (/Y)GC-xxx-8BT-A μPD780054 (/Y)GK-xxx-9EU-A	μPD780055 (/Y)GC-xxx-8BT-A μPD780055 (/Y)GK-xxx-9EU-A	μPD780056 (/Y)GC-xxx-8BT-A μPD780056 (/Y)GK-xxx-9EU-A	μPD780058B (/Y)GC-xxx-8BT-A μPD780058B (/Y)GK-xxx-9EU-A	μPD78F0058 (/Y)GC-8BT-A μPD78F0058 (/Y)GK-9EU-A

Remark ROMC: ROM correction

★ : New product ★★ : Under development

• Specifications (μPD78006x, μPD78007x)

Group		μPD78006x		μPD78007x		
		μPD780065	μPD78F0066	μPD780076 (/Y)	μPD780078 (/Y)	μPD78F0078 (/Y)
Memory	ROM Size (Bytes)	40K	48K		60K	
	ROM Type	Mask	Flash	Mask		Flash
	Single-Power-Supply Flash Memory	—				
	RAM Size (Bytes)	5K		2K		
Clock	Maximum Operating Frequency (MHz)	8.38		12 (8.38)		
	On-Chip Oscillator (Hz)	—				
	Subclock (32.768kHz)	Yes				
I/O	I/O Ports	60		52		
Bus	External Data/Address Bus	8/16				
Timer	16-bit Timer	1		2		
	8-bit Timer	2				
	Other Timers	—				
	Watch Timer	1				
	Real-Time Counter	—				
	Watchdog Timer	1				
	PWM Output	16 bits × 1, 8 bits × 2		16 bits × 2, 8 bits × 2		
Serial Interface	UART	1				
	UART Supporting LIN-bus	—				
	UART, CSI	—		1		
	UART Supporting LIN-bus, CSI	—				
	CSI	2		1		
	CSI, I^2C	—				
	CSI with Automatic Transmission/ Reception Function	1		—		
	I^2C	—		0 (1)		
	IEBus	—				
	CAN	—				
OCD	On-Chip Debugger	—				
Peripheral Functions	LCD (Segments x Commons)	—				
	16-bit ΔΣ A/D Converter	—				
	10-bit A/D Converter	—		8		
	8-bit A/D Converter	8		—		
	8-bit D/A Converter	—				
	Multiplier/Divider (bits x bits, bits ÷ bits)	—				
	Other Functions	—				
Others	Power Supply Voltage (V)	2.7 to 5.5		1.8 to 5.5		
	Package (size: mm)	80-QFP (14 × 14)		64-TQFP (12 × 12) 64-LQFP (14 × 14)		
	In-Circuit Emulator Emulation Board	IE-78K0-NS/-A, IE-780066-NS-EM4 + IE-78K0-NS-P01		IE-78K0-NS/-A, IE-780078-NS-EM1		
Package		P80GC-65-8BT-1		P64GC-80-8BS P64GK-65-9ET-3		
Part No.		μPD780065GC-xxx-8BT-A	μPD78F0066GC-8BT-A	μPD780076 (/Y)GC-xxx-8BS-A μPD780076 (/Y)GK-xxx-9ET-A	μPD780078 (/Y)GC-xxx-8BS-A μPD780078 (/Y)GK-xxx-9ET-A	μPD780078GC-8BS-A μPD780078GK-9ET-A

★ : New product ★★ : Under development

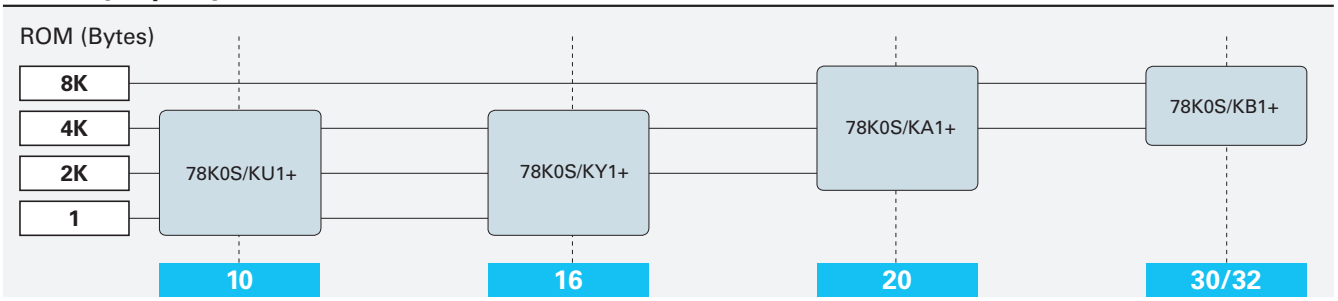
• Specifications (μPD78086x)

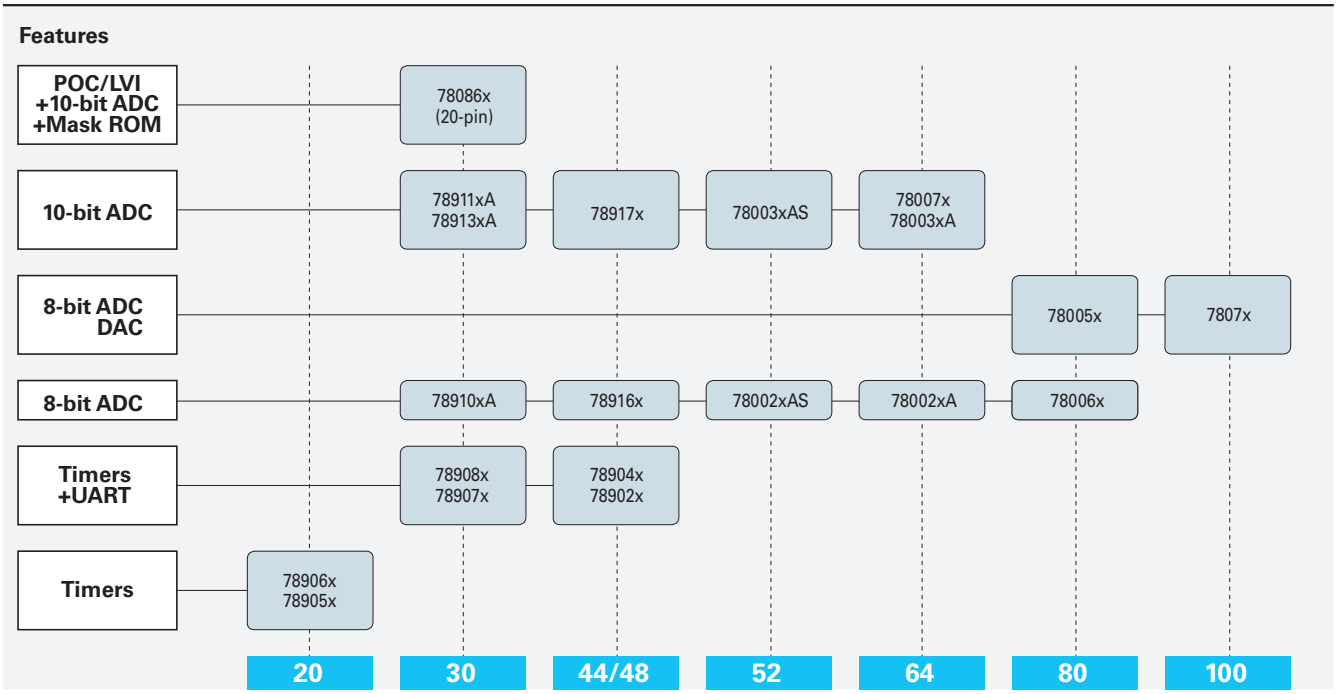
Group		μPD780861	μPD78F0862A
Memory	ROM Size (Bytes)	8K	16K
	ROM Type	Mask	Flash
	Single-Power-Supply Flash Memory	—	Yes
	RAM Size (Bytes)	512	768
Clock	Maximum Operating Frequency (MHz)	10	
	On-Chip Oscillator (Hz)	8M, 240k	
	Subclock (32.768kHz)	—	
I/O	I/O Ports	14	
Bus	External Data/Address Bus	—/—	
Timer	16-bit Timer	1	
	8-bit Timer	3	
	Other Timers	—	
	Watch Timer	—	
	Real-Time Counter	—	
	Watchdog Timer	1	
	PWM Output	16 bits × 1, 8 bits × 2	
Serial Interface	UART	—	
	UART Supporting LIN-bus	1	
	UART, CSI	—	
	UART Supporting LIN-bus, CSI	—	
	CSI	1	
	CSI, I^2C	—	
	CSI with Automatic Transmission/ Reception Function	—	
	I^2C	—	
	IEBus	—	
	CAN	—	
OCD	On-Chip Debugger	—	
Peripheral Functions	LCD (Segments x Commons)	—	
	16-bit ΔΣ A/D Converter	—	
	10-bit A/D Converter	4	
	8-bit A/D Converter	—	
	8-bit D/A Converter	—	
	Multiplier/Divider (bits x bits, bits ÷ bits)	—	
	Other Functions	POC, LVI, CLM, Manchester code generator	
Others	Power Supply Voltage (V)	2.7 to 5.5	
	Package (size: mm)	20-SSOP (7.62)	
	In-Circuit Emulator Emulation Board	IE-78K0-NS/-A, IE-780862-NS-EM1	
Package		S20MC-65-5A4-2	
Part No.		μPD780861MC-xxx-5A4-A	μPD78F0862AMC-5A4-A

Remark POC: Power-on clear
LVI: Low-voltage indicator
CLM: Clock monitor

★ : New product ★★ : Under development

• Memory Capacity (78K0S)





• Specifications (78K0S/KU1+)

Group		μPD78F9200	μPD78F9201	μPD78F9202	μPD78F9500	μPD78F9501	μPD78F9502
Memory	ROM Size (Bytes)	1K	2K	4K	1K	2K	4K
	ROM Type	Flash					
	Single-Power-Supply Flash Memory	Yes					
	RAM Size (Bytes)	128					
Clock	Maximum Operating Frequency (MHz)	10					
	On-Chip Oscillator (Hz)	8M, 240k					
	Subclock (32.768kHz)	—					
I/O	I/O Ports	8					
Bus	External Data/Address Bus	—/—					
Timer	16-bit Timer	1			—		
	8-bit Timer	1					
	Other Timers	—					
	Watch Timer	—					
	Real-Time Counter	—					
	Watchdog Timer	1					
	PWM Output	16 bits × 1, 8 bits × 1			8 bits × 1		
Serial Interface	UART	—					
	UART Supporting LIN-bus	—					
	UART, CSI	—					
	UART Supporting LIN-bus, CSI	—					
	CSI	—					
	CSI, I^2C	—					
	CSI with Automatic Transmission/ Reception Function	—					
	I^2C	—					
	IEBus	—					
	CAN	—					
OCD	On-Chip Debugger	—					
Peripheral Functions	LCD (Segments x Commons)	—					
	16-bit ΔΣ A/D Converter	—					
	10-bit A/D Converter	4			—		
	8-bit A/D Converter	—					
	8-bit D/A Converter	—					
	Multiplier/Divider (bits x bits, bits ÷ bits)	—					
	Other Functions	POC (2.1V ± 0.1V), LVI					
Others	Power Supply Voltage (V)	2.0 to 5.5					
	Package (size: mm)	10-SSOP (5.72)					
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-78K0SKX1 (IECUBE) IE-78K0S-NS/-A, IE-789234-NS-EM1					
Package		P10MA-65-CAC					
Part No.		μPD78F9200MA-CAC-A	μPD78F9201MA-CAC-A	μPD78F9202MA-CAC-A	μPD78F9500MA-CAC-A	μPD78F9501MA-CAC-A	μPD78F9502MA-CAC-A

Remark POC: Power-on clear
LVI: Low-voltage indicator

★ : New product ★★ : Under development

• Specifications (78K0S/KY1+)

Group		μPD78F9210	μPD78F9211	μPD78F9212	μPD78F9510	μPD78F9511	μPD78F9512
Memory	ROM Size (Bytes)	1K	2K	4K	1K	2K	4K
	ROM Type	Flash					
	Single-Power-Supply Flash Memory	Yes					
	RAM Size (Bytes)	128					
Clock	Maximum Operating Frequency (MHz)	10					
	On-Chip Oscillator (Hz)	8M, 240k					
	Subclock (32.768kHz)	—					
I/O	I/O Ports	14					
Bus	External Data/Address Bus	—/—					
Timer	16-bit Timer	1					
	8-bit Timer	1					
	Other Timers	—					
	Watch Timer	—					
	Real-Time Counter	—					
	Watchdog Timer	1					
	PWM Output	16 bits × 1, 8 bits × 1					
Serial Interface	UART	—					
	UART Supporting LIN-bus	—					
	UART, CSI	—					
	UART Supporting LIN-bus, CSI	—					
	CSI	—					
	CSI, I^2C	—					
	CSI with Automatic Transmission/ Reception Function	—					
	I^2C	—					
	IEBus	—					
	CAN	—					
OCD	On-Chip Debugger	—					
Peripheral Functions	LCD (Segments x Commons)	—					
	16-bit ΔΣ A/D Converter	—					
	10-bit A/D Converter	4			—		
	8-bit A/D Converter	—					
	8-bit D/A Converter	—					
	Multiplier/Divider (bits x bits, bits ÷ bits)	—					
	Other Functions	POC (2.1V ± 0.1V), LVI					
Others	Power Supply Voltage (V)	2.0 to 5.5					
	Package (size: mm)	16-SSOP (4.4 × 5.0) 16-SSOP (5.72) 16-SDIP (7.62) 16-WLBGA (2 × 2.3)			16-SSOP (5.72)		
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-78K0SKX1 (IECUBE) IE-78K0S-NS/-A, IE-789234-NS-EM1					
Package		P16MA-65-FAA P16GM-65-225B-5 P16CS-70-CAB P16FH-50-2A2-1			P16GM-65-225B-5		
Part No.		μPD78F9210MA-FAA-AX μPD78F9210GR-JJG-A μPD78F9210CS-CAB-A μPD78F9210FH-2A2-A	μPD78F9211MA-FAA-AX μPD78F9211GR-JJG-A μPD78F9211CS-CAB-A μPD78F9211FH-2A2-A	μPD78F9212MA-FAA-AX μPD78F9212GR-JJG-A μPD78F9212CS-CAB-A μPD78F9212FH-2A2-A	μPD78F9510GR-JJG-A	μPD78F9511GR-JJG-A	μPD78F9512GR-JJG-A

Remark POC: Power-on clear
LVI: Low-voltage indicator

★ : New product ★★ : Under development

• Specifications (78K0S/KA1+, 78K0S/KB1+)

Group		78K0S/KA1+			78K0S/KB1+	
		μPD78F9221	μPD78F9222	μPD78F9224	μPD78F9232	μPD78F9234
Memory	ROM Size (Bytes)	2K	4K	8K	4K	8K
	ROM Type	Flash				
	Single-Power-Supply Flash Memory	Yes				
	RAM Size (Bytes)	128	256			
Clock	Maximum Operating Frequency (MHz)	10				
	On-Chip Oscillator (Hz)	8M, 240k				
	Subclock (32.768kHz)	—				
I/O	I/O Ports	17			26	
Bus	External Data/Address Bus	—/—				
Timer	16-bit Timer	1				
	8-bit Timer	2				
	Other Timers	—				
	Watch Timer	—				
	Real-Time Counter	—				
	Watchdog Timer	1				
	PWM Output	16 bits × 1, 8 bits × 1				
Serial Interface	UART	—				
	UART Supporting LIN-bus	1				
	UART, CSI	—				
	UART Supporting LIN-bus, CSI	—				
	CSI	—				
	CSI, I^2C	—				
	CSI with Automatic Transmission/ Reception Function	—				
	I^2C	—				
	IEBus	—				
	CAN	—				
OCD	On-Chip Debugger	—				
Peripheral Functions	LCD (Segments x Commons)	—				
	16-bit ΔΣ A/D Converter	—				
	10-bit A/D Converter	4				
	8-bit A/D Converter	—				
	8-bit D/A Converter	—				
	Multiplier/Divider (bits x bits, bits ÷ bits)	—			8 × 8	
	Other Functions	POC (2.1V ± 0.1V), LVI				
Others	Power Supply Voltage (V)	2.0 to 5.5				
	Package (size: mm)	20-SSOP (7.62) 20-SDIP (7.62)			30-SSOP (7.62) 32-SDIP (7.62)	
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-78K0SKX1 (IECUBE) IE-78K0S-NS/-A, IE-789234-NS-EM1				
Package		S20MC-65-5A4-2 P20CS-70-CAC			S30MC-65-5A4-2 P32CS-70-CAA	
Part No.		μPD78F9221MC-5A4-A μPD78F9221CS-CAC-A	μPD78F9222MC-5A4-A μPD78F9222CS-CAC-A	μPD78F9224MC-5A4-A**	μPD78F9232MC-5A4-A μPD78F9232CS-CAA-A	μPD78F9234MC-5A4-A μPD78F9234CS-CAA-A

Remark POC: Power-on clear
LVI: Low-voltage indicator

★ : New product ★★ : Under development

• Specifications (μPD78902x, μPD78904x)

Group		μPD78F9026A	μPD78F9046
Memory	ROM Size (Bytes)	16K	
	ROM Type	Flash	
	Single-Power-Supply Flash Memory	—	
	RAM Size (Bytes)	512	
Clock	Maximum Operating Frequency (MHz)	5	
	On-Chip Oscillator (Hz)	—	
	Subclock (32.768kHz)	—	Yes
I/O	I/O Ports	34	
Bus	External Data/Address Bus	—/—	
Timer	16-bit Timer	1	
	8-bit Timer	1	
	Other Timers	—	
	Watch Timer	—	1
	Real-Time Counter	—	
	Watchdog Timer	1	
	PWM Output	—	8 bits × 1
Serial Interface	UART	—	
	UART Supporting LIN-bus	—	
	UART, CSI	1	
	UART Supporting LIN-bus, CSI	—	
	CSI	—	
	CSI, I²C	—	
	CSI with Automatic Transmission/ Reception Function	—	
	I²C	—	
	IEBus	—	
	CAN	—	
OCD	On-Chip Debugger	—	
Peripheral Functions	LCD (Segments x Commons)	—	
	16-bit ΔΣ A/D Converter	—	
	10-bit A/D Converter	—	
	8-bit A/D Converter	—	
	8-bit D/A Converter	—	
	Multiplier/Divider (bits x bits, bits ÷ bits)	—	
	Other Functions	—	
Others	Power Supply Voltage (V)	1.8 to 5.5	
	Package (size: mm)	44-LQFP (10 × 10)	
	In-Circuit Emulator Emulation Board	IE-78K0S-NS/-A, IE-789026-NS-EM1	
Package		S44GB-80-8ES-2	
Part No.		μPD78F9026AGB-8ES-A	μPD78F9046GB-8ES-A

★ : New product ★★ : Under development

• Specifications (μPD78905x, μPD78906x)

Group		μPD78905x	μPD78906x
		μPD789052	μPD789062
Memory	ROM Size (Bytes)	4K	
	ROM Type	Mask	
	Single-Power-Supply Flash Memory	—	
	RAM Size (Bytes)	128	
Clock	Maximum Operating Frequency (MHz)	5	1 (RC)
	On-Chip Oscillator (Hz)	—	
	Subclock (32.768kHz)	—	
I/O	I/O Ports	14	
Bus	External Data/Address Bus	—/—	
Timer	16-bit Timer	—	
	8-bit Timer	2	
	Other Timers	—	
	Watch Timer	—	
	Real-Time Counter	—	
	Watchdog Timer	1	
	PWM Output	8 bits × 1	
Serial Interface	UART	—	
	UART Supporting LIN-bus	—	
	UART, CSI	—	
	UART Supporting LIN-bus, CSI	—	
	CSI	—	
	CSI, I^2C	—	
	CSI with Automatic Transmission/ Reception Function	—	
	I^2C	—	
	IEBus	—	
	CAN	—	
OCD	On-Chip Debugger	—	
Peripheral Functions	LCD (Segments × Commons)	—	
	16-bit ΔΣ A/D Converter	—	
	10-bit A/D Converter	—	
	8-bit A/D Converter	—	
	8-bit D/A Converter	—	
	Multiplier/Divider (bits × bits, bits ÷ bits)	—	
	Other Functions	BSB	
Others	Power Supply Voltage (V)	1.8 to 5.5	1.8 to 3.6
	Package (size: mm)	20-SSOP (7.62)	
	In-Circuit Emulator Emulation Board	IE-78K0S-NS/-A, IE-789860-NS-EM1	
Package		S20MC-65-5A4-2	
Part No.		μPD789052MC-xxx-5A4-A	μPD789062MC-xxx-5A4-A

Remark BSB: Bit-sequential buffer

★ : New product ★★ : Under development

• Specifications (μPD78907x, μPD78908x)

Group		μPD78907x		μPD78908x
		μPD789074	μPD78F9076	μPD78F9088
Memory	ROM Size (Bytes)	8K	16K	32K
	ROM Type	Mask	Flash	
	Single-Power-Supply Flash Memory	—		
	RAM Size (Bytes)	256		576
Clock	Maximum Operating Frequency (MHz)	10		5
	On-Chip Oscillator (Hz)	—		
	Subclock (32.768kHz)	—		
I/O	I/O Ports	24		
Bus	External Data/Address Bus	—/—		
Timer	16-bit Timer	—		1
	8-bit Timer	2		3
	Other Timers	—		
	Watch Timer	—		
	Real-Time Counter	—		
	Watchdog Timer	1		
	PWM Output	8 bits × 1		
Serial Interface	UART	—		
	UART Supporting LIN-bus	—		
	UART, CSI	1		
	UART Supporting LIN-bus, CSI	—		
	CSI	—		
	CSI, I²C	—		
	CSI with Automatic Transmission/ Reception Function	—		
	I²C	—		
	IEBus	—		
	CAN	—		
OCD	On-Chip Debugger	—		
Peripheral Functions	LCD (Segments x Commons)	—		
	16-bit ΔΣ A/D Converter	—		
	10-bit A/D Converter	—		
	8-bit A/D Converter	—		
	8-bit D/A Converter	—		
	Multiplier/Divider (bits x bits, bits ÷ bits)	—		
	Other Functions	—		POC, LVI
Others	Power Supply Voltage (V)	1.8 to 5.5		
	Package (size: mm)	30-SSOP (7.62)		
	In-Circuit Emulator Emulation Board	IE-78K0S-NS/-A, IE-789046-NS-EM1 + NP-K907		IE-78K0S-NS/-A, IE-789088-NS-EM1
Package		S30MC-65-5A4-2		
Part No.		μPD789074MC-xxx-5A4-A	μPD78F9076MC-5A4-A	μPD78F9088M1MC-5A4-A

Remark POC: Power-on clear
LVI: Low-voltage indicator

★ : New product ★★ : Under development

• Specifications (μPD78910xA, μPD78911xA)

Group		μPD78910xA		μPD78911xA
		μPD789101A	μPD789102A	μPD78F9116B
Memory	ROM Size (Bytes)	2K	4K	16K
	ROM Type	Mask		Flash
	Single-Power-Supply Flash Memory	—		
	RAM Size (Bytes)	256		
Clock	Maximum Operating Frequency (MHz)	10		
	On-Chip Oscillator (Hz)	—		
	Subclock (32.768kHz)	—		
I/O	I/O Ports	20		
Bus	External Data/Address Bus	—/—		
Timer	16-bit Timer	1		
	8-bit Timer	1		
	Other Timers	—		
	Watch Timer	—		
	Real-Time Counter	—		
	Watchdog Timer	1		
	PWM Output	8 bits × 1		
Serial Interface	UART	—		
	UART Supporting LIN-bus	—		
	UART, CSI	1		
	UART Supporting LIN-bus, CSI	—		
	CSI	—		
	CSI, I²C	—		
	CSI with Automatic Transmission/ Reception Function	—		
	I²C	—		
	IEBus	—		
	CAN	—		
OCD	On-Chip Debugger	—		
Peripheral Functions	LCD (Segments x Commons)	—		
	16-bit ΔΣ A/D Converter	—		
	10-bit A/D Converter	—		4
	8-bit A/D Converter	4		—
	8-bit D/A Converter	—		
	Multiplier/Divider (bits x bits, bits ÷ bits)	8 × 8		
	Other Functions	—		
Others	Power Supply Voltage (V)	1.8 to 5.5		
	Package (size: mm)	30-SSOP (7.62)		
	In-Circuit Emulator Emulation Board	IE-78K0S-NS/-A, IE-789136-NS-EM1		
Package		S30MC-65-5A4-2		
Part No.		μPD789101AMC-xxx-5A4-A	μPD789102AMC-xxx-5A4-A	μPD78F9116BMC-5A4-A

★ : New product ★★ : Under development

• Specifications (μPD78F913xA)

Group		μPD78F9136B
Memory	ROM Size (Bytes)	16K
	ROM Type	Flash
	Single-Power-Supply Flash Memory	—
	RAM Size (Bytes)	256
Clock	Maximum Operating Frequency (MHz)	4 (RC)
	On-Chip Oscillator (Hz)	—
	Subclock (32.768kHz)	—
I/O	I/O Ports	20
Bus	External Data/Address Bus	—/—
Timer	16-bit Timer	1
	8-bit Timer	1
	Other Timers	—
	Watch Timer	—
	Real-Time Counter	—
	Watchdog Timer	1
	PWM Output	8 bits × 1
Serial Interface	UART	—
	UART Supporting LIN-bus	—
	UART, CSI	1
	UART Supporting LIN-bus, CSI	—
	CSI	—
	CSI, I^2C	—
	CSI with Automatic Transmission/ Reception Function	—
	I^2C	—
	IEBus	—
	CAN	—
OCD	On-Chip Debugger	—
Peripheral Functions	LCD (Segments x Commons)	—
	16-bit ΔΣ A/D Converter	—
	10-bit A/D Converter	4
	8-bit A/D Converter	—
	8-bit D/A Converter	—
	Multiplier/Divider (bits x bits, bits ÷ bits)	8 × 8
	Other Functions	—
Others	Power Supply Voltage (V)	1.8 to 5.5
	Package (size: mm)	30-SSOP (7.62)
	In-Circuit Emulator Emulation Board	IE-78K0S-NS/-A, IE-789136-NS-EM1
Package		S30MC-65-5A4-2
Part No.		μPD78F9136BMC-5A4-A

★ : New product ★★ : Under development

• Specifications (μPD78916x, μPD78917x)

Group		μPD78916x	μPD78917x	
		μPD789166 (/Y)	μPD789177 (/Y)	μPD78F9177A (/Y)
Memory	ROM Size (Bytes)	16K	24K	
	ROM Type	Mask		Flash
	Single-Power-Supply Flash Memory	—		
	RAM Size (Bytes)	512		
Clock	Maximum Operating Frequency (MHz)	10		
	On-Chip Oscillator (Hz)	—		
	Subclock (32.768kHz)	Yes		
I/O	I/O Ports	31		
Bus	External Data/Address Bus	—/—		
Timer	16-bit Timer	1		
	8-bit Timer	3		
	Other Timers	—		
	Watch Timer	1		
	Real-Time Counter	—		
	Watchdog Timer	1		
	PWM Output	8 bits × 3		
Serial Interface	UART	—		
	UART Supporting LIN-bus	—		
	UART, CSI	1		
	UART Supporting LIN-bus, CSI	—		
	CSI	—		
	CSI, I²C	—		
	CSI with Automatic Transmission/ Reception Function	—		
	I²C	—		
	IEBus	—		
	CAN	—		
OCD	On-Chip Debugger	—		
Peripheral Functions	LCD (Segments x Commons)	—		
	16-bit ΔΣ A/D Converter	—		
	10-bit A/D Converter	—	8	
	8-bit A/D Converter	8	—	
	8-bit D/A Converter	—		
	Multiplier/Divider (bits x bits, bits ÷ bits)	8 × 8		
	Other Functions	—		
Others	Power Supply Voltage (V)	1.8 to 5.5		
	Package (size: mm)	44-LQFP (10 × 10)		
	In-Circuit Emulator Emulation Board	IE-78K0S-NS/-A, IE-789177-NS-EM1		
Package		S44GB-80-8ES-2		
Part No.		μPD789166 (/Y)GB-xxx-8ES-A	μPD789177 (/Y)GB-xxx-8ES-A	μPD78F9177A (/Y)GB-8ES-A

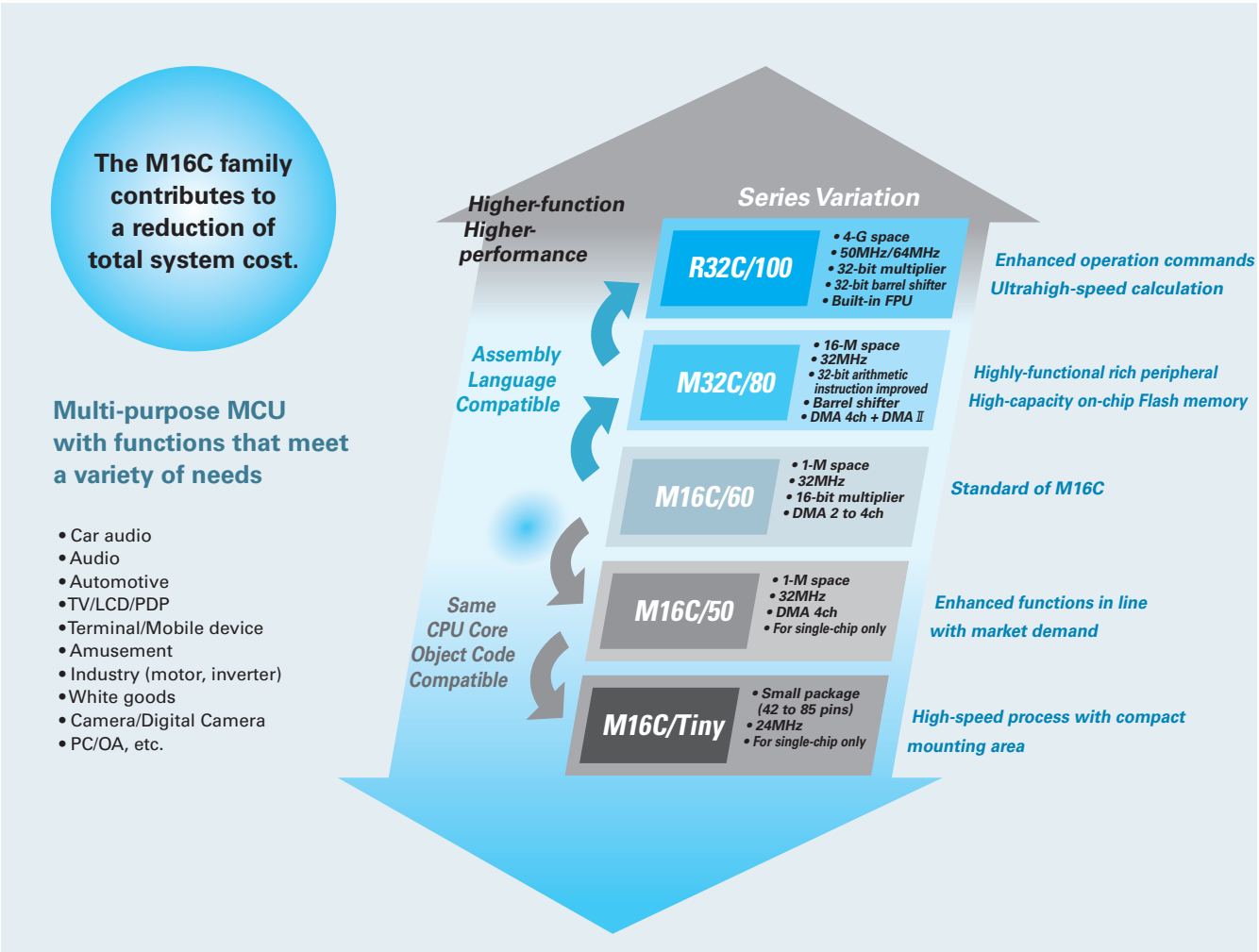
★ : New product ★★ : Under development

The M16C family of MCU models is designed under Renesas's new design concept developed from the users' viewpoint. Fully suitable for C programming, the devices provide high memory efficiency and low power consumption, together with low noise emissions and improved noise immunity to meet contemporary needs. They are guaranteed to operate within a wide temperature range and include a built-in program correction function that can be used as a countermeasure against system problems occurring in the market.

M16C Family Features

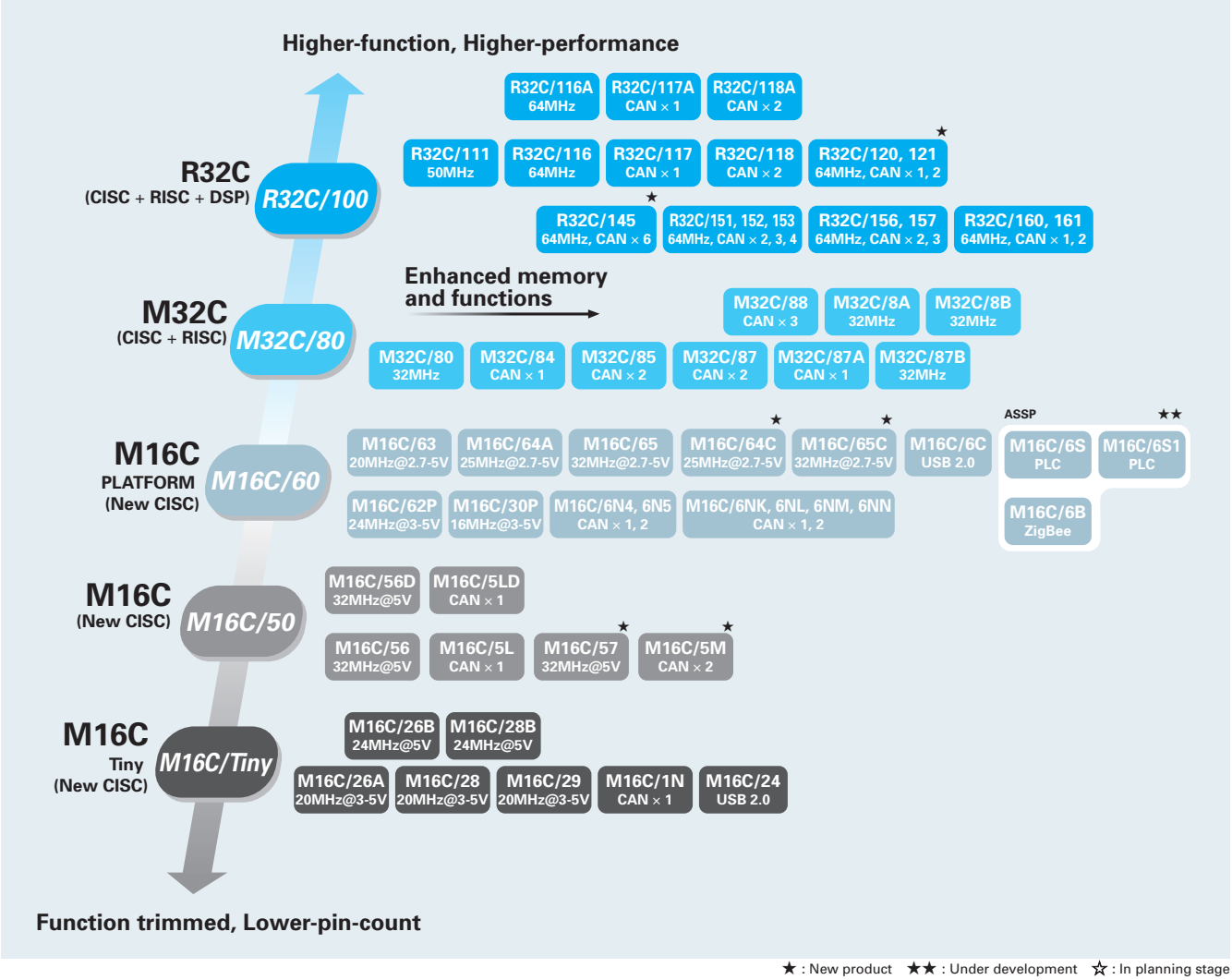
- Excellent C programming efficiency
  Extremely high programming object efficiency allows C language programs to achieve the smallest possible object size.
- High-speed processing
  Many instructions are executed in one cycle and the reduction in instruction execution cycles lets CPU deliver higher throughput.
- Low-voltage operation and ultra-low power consumption
  The low-voltage operation and ultra-low power consumption of the M16C family match those of previous Renesas MCUs.
- Powerful instructions
  An on-chip multiplier provides high-speed multiplication, and more flexible addressing and improved bit-manipulation instructions enhance memory-to-memory operations.
- Succeeding the compatibility
  The compatibility of pin assignment in a package and the upward compatibility of peripheral functions made the interfamily model change easy, and provided a solution to the retired model issue.
- Large address space
  The M16C/60, M16C/50, M16C/Tiny Series support a 1-MB address space. The M32C/80 Series support a 16-MB address space. The R32C/100 Series supports a 4-GB address space.
- High-functionality on-chip peripherals
  Ample memory, DMAC, etc., on-chip make the M16C family suitable for a broad range of applications.
- Low noise emission
  Enhanced countermeasures have been implemented to reduce noise emission.
- Measures to prevent malfunctions
  The M16C family provides greater immunity against external noise.
- Program correction function
  External E²PROM can be used when performing program debugging.
- Wide-ranging development environment
  Compact, high-performance emulators and complete software tools are available.

• M16C Family Roadmap



Note) New series of variation which was developed after Renesas starts is specified by the code "R" added to the head of product name.

• M16C Family Roadmap



★ : New product ★★ : Under development ☆ : In planning stage

• Broad Range of Applications

Digital audio players	Low electromagnetic interference, large memory capacity
Mobile phones/telephones	Ultra-low power consumption, processing capabilities, small package
Household appliances	High-functionality peripherals
Cameras	Ultra-low power consumption, processing capabilities
PC-related products	Low power consumption, low electromagnetic susceptibility, peripherals, on-chip flash memory

Automotive	Low electromagnetic susceptibility, low electromagnetic interference, low power consumption, processing capabilities
Memory devices	Processing capabilities, low power consumption, on-chip flash memory
VCRs, TVs	Peripherals, low electromagnetic interference, low power consumption
Wireless data terminals	Ultra-low power consumption, ultra-low electromagnetic interference
General industrial equipment	Processing capabilities, low electromagnetic susceptibility, peripherals, on-chip flash memory

Outline of R32C/100 Series

The R32C/100 Series is upwardly compatible with the M32C/80 and supports key features of the M16C Family: low power consumption, low noise emissions, and high EMI/EMS performance.

R32C/100 Series Features

- Incorporates a new generation of the R32C/100 Series 32-bit CISC CPU core and has inherited the M16C/M32C concept.
- Contains a built-in 32-bit barrel shifter, 32-bit multiplier, and single precision FPU.
- Performs multiplication and addition such as "32 bits × 32 bits + 64 bits to 64 bits" minimum in 1 clock cycle.
- The register-bit length was extended and the number of registers was increased compared with the M32C/80.
- Incorporating a new single wire debugger (NSD) that can be connected over a single pin.
- Retains the M16C family's features (i.e. low power consumption, low noise emission, and improved noise immunity) while operating at high speed.

• R32C/100 Series CPU Overview

Performance	Machine cycles	15.6ns (64MHz)
	Address space	4G bytes
Number of Instructions	108	
Registers	Data registers : 32-bit × 4 Address registers : 32-bit × 4 Dedicated registers : 32-bit × 4 High-speed interrupt registers and DMAC-related registers (4 set) are implemented.	

R32C/111 Group

- Incorporates 128K, 256K, 384K, and 512K bytes flash memory, 8K bytes data flash memory, and 32 to 63K bytes RAM.
- Incorporates 9-channel serial (clock synchronous/asynchronous) interface
- Incorporates a low-voltage detector circuit (optional) and oscillation stop detection function
- Intelligent I/O
  Incorporates input capture, output comparison, and communications functions.
- 100-pin LGA (5.5 mm × 5.5 mm) and 64-pin LQFP (10 mm × 10 mm) packages are prepared.

R32C/116, 117, 118 Group

- Incorporates 128K bytes to 1MB flash memory, 8K bytes data flash memory, and 20 to 63K bytes RAM
- Incorporates 1-channel (R32C/117 group) and 2-channel (R32C/118 group) CAN interfaces (for 32 message boxes)
- I^2C-bus interface has two channels for use in systems with multiple master devices
- Incorporates a low-voltage detector circuit (optional) and oscillation stop detection function
- Intelligent I/O
  Incorporates input capture, output compare, and communications functions.

R32C/116A, 117A, 118A Group

- Incorporates 512K bytes to 1MB flash memory, 8K bytes data flash memory, and 96K bytes RAM
- Incorporates 1-channel (R32C/117A group) and 2-channel (R32C/118A group) CAN interfaces (for 32 message boxes)
- I^2C-bus interface has two channels for use in systems with multiple master devices
- Incorporates a low-voltage detector circuit (optional) and oscillation stop detection function
- Intelligent I/O
  Incorporates input capture, output compare, and communications functions.
- Support 176-pin LQFP packages (24 × 24mm)

R32C/120, 121 Group

- Incorporates 128K, 256K, 384K, and 512K bytes flash memory, 4K bytes E^2 data flash memory, and 8K bytes data flash memory.
- Incorporates 1-channel (R32C/120 group) and 2-channel (R32C/121 group) CAN interfaces (for 32 message boxes)
- Incorporates 2-channel LIN function
- Incorporates a low-voltage detector circuit (optional) and oscillation stop detection function.
- Intelligent I/O
  Incorporates input capture, output compare, and communications functions.

* Refer to "Automotive MCUs" in this catalog.

R32C/145 Group

- Incorporates 256K and 512K bytes flash memory and 8K bytes data flash memory.
- Incorporates 6-channel CAN interface (for 16 message boxes).
- Incorporates 2-channel LIN function
- Intelligent I/O
  Incorporates input capture, output compare, and communications functions.
- Incorporates oscillation stop detection function

* Refer to "Automotive MCUs" in this catalog.

R32C/151, 152, 153 Group

- Incorporates 768K bytes and 1M byte flash memory, 8K bytes E^2 data flash memory, and 8K bytes data flash memory.
- Incorporates 2-channel (R32C/151 group), 3-channel (R32C/152 group), and 4-channel (R32C/153 group) CAN interfaces (for 32 message boxes)
- Incorporates 8-channel LIN
- Incorporates a low-voltage detector circuit (optional) and oscillation stop detection function
- Intelligent I/O
  Incorporates input capture, output compare, and communications functions.

* Refer to "Automotive MCUs" in this catalog.

R32C/156, 157 Group

- Incorporates 256K to 512K bytes flash memory, 4K bytes E^2 data flash memory, and 8K bytes data flash memory.
- Incorporates 2-channel (R32C/156 group) and 3-channel (R32C/157 group) CAN interfaces (for 32 message boxes)
- Incorporates 4-channel LIN
- Incorporates a low-voltage detector circuit (optional) and oscillation stop detection function
- Intelligent I/O
  Incorporates input capture, output compare, and communications functions

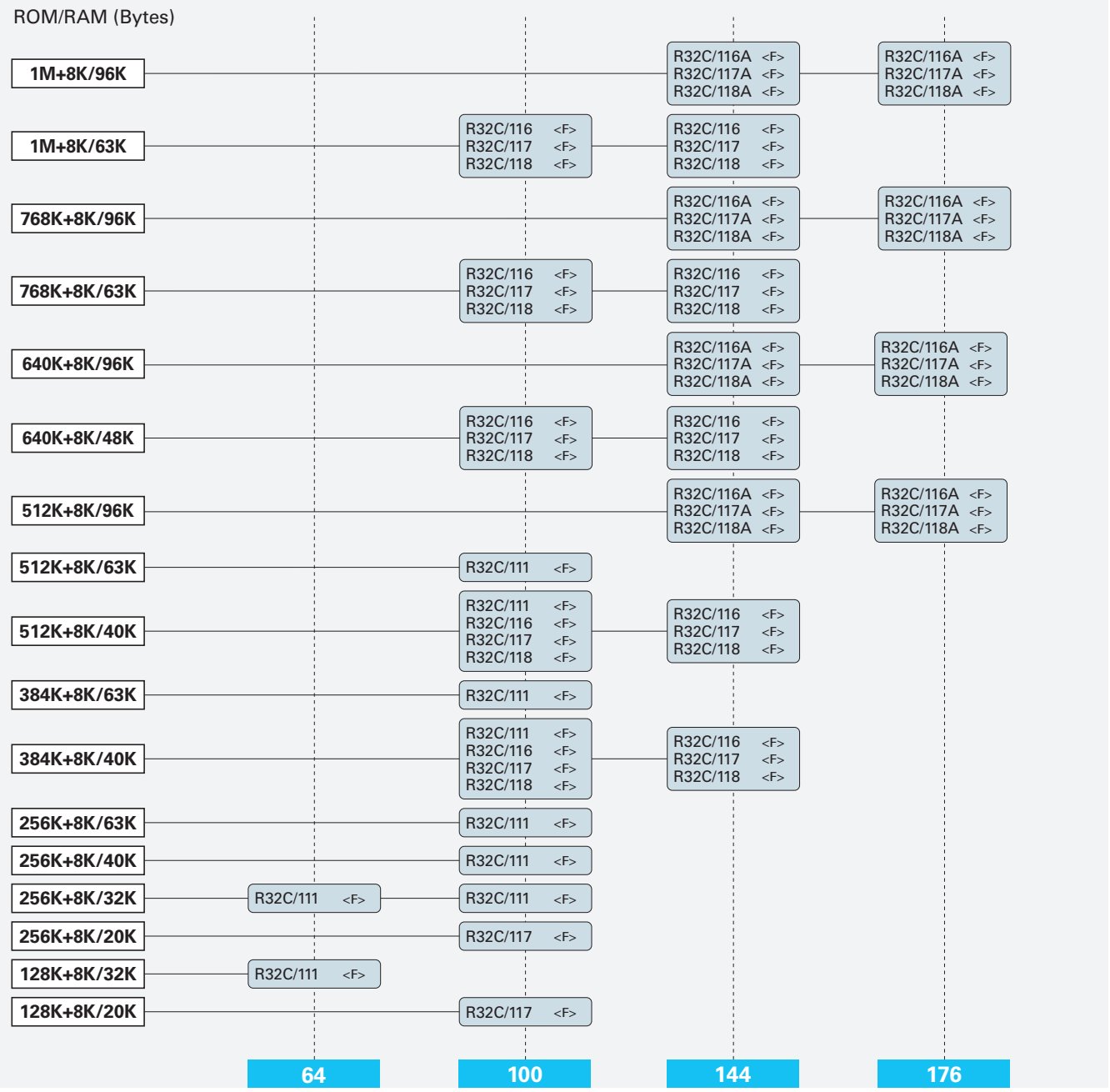
* Refer to "Automotive MCUs" in this catalog.

R32C/160, 161 Group

- Incorporates 128K and 256K bytes flash memory, 4K bytes E^2 data flash memory, and 8K bytes data flash memory.
- Incorporates 1-channel (R32C/160 Group) and 2-channel (R32C/161 Group) CAN interfaces (for 32 message boxes)
- Incorporates 1-channel LIN
- Incorporates a low-voltage detector circuit (optional) and oscillation stop detection function
- Intelligent I/O
  Incorporates input capture, output compare, and communications functions.

* Refer to "Automotive MCUs" in this catalog.

• Memory Capacity (ROM/RAM) (R32C/100 Series)



Letters in brackets < > indicate memory variations.
F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

• Specifications (R32C/100 Series)

Group		R32C/111									
Memory	ROM (Bytes)	128K + 8K	256K + 8K			384K + 8K		512K + 8K			
	RAM (Bytes)	32K	40K	63K		40K	63K	40K	63K		
	ROM Type*1	F									
	Data Flash/E2 Data Flash	8K (Data Flash: program/Erase 10k times)									
	Program Security	Yes (ID code check function, ROM code protect function)									
CPU	CPU	R32C/100 Core									
	Basic Instructions	108									
	Minimum Instruction Execution Time (ns)	20 (@50MHz)									
	Multiplier	32 × 32 → 64									
	Multiply-Accumulate Instruction	32 × 32 + 64 → 64									
	Barrel Shifter	Yes									
DMA	DMAC (Channels)	4									
	DTC/DMACⅡ	DMACⅡ (Starts by all peripheral interrupt factors)									
External Bus Expansion	Address Space (Bytes)	—	64M								
	External Bus Interface	—	Support for insertion of wait states, Outputs 4 chip-select signals								
	Bus Structure	—	Selectable from Separate bus, Multiplex bus, Data bus width can be selected (8/16-bit)								
	DRAM Controller	—									
Clock	Clock Generation Circuit	4 circuits (Main clock, Sub-clock, PLL and on-chip oscillator)									
	PLL	Yes									
	Subclock	Yes									
	RTC	—									
	On-Chip Oscillator	Yes									
	Oscillation Stop Detection	Yes									
	Frequency Divider	1/n (n = 2 to 24)									
	Power Save	Wait/Stop									
Power Supply Voltage Detection	Power-On Reset/POR	—									
	Low Voltage Detection/LVD	Yes (Low voltage detection)									
A/D Converter	Resolution × Channels	10-bit × 20	10-bit × 26								
	Sample and Hold	Yes									
	Multi-Channel Sample and Hold	—									
D/A Converter	Resolution × Channels	8-bit × 1	8-bit × 2								
Timer	8-bit	—									
	16-bit	11 (Timer A, Timer B)									
	Input Capture	16 (Intelligent I/O)									
	Output Compare	19 (Intelligent I/O)									
	PWM Output	24 (Timer A, Intelligent I/O)									
	Real-Time Port	3 (Intelligent I/O)									
	Event Counter	10 (Timer A, Timer B)	11 (Timer A, Timer B)								
	2-Phase Encoder Input	3 (Timer A) + 2 (Intelligent I/O)									
	3-Phase Inverter Control	1 (shared with Timer A1, Timer A2, Timer A4, Timer B2, Dead time timer)									
Watchdog Timer		1									
Serial Interface	Clock Sync./Clock Async.	6 (UART)	9 (UART)								
	Clock Sync. Only	1 (Intelligent I/O)									
	Clock Async. Only	—									
I²C-bus		5 (UART)	7 (UART)								
IEBus		6 (UART, Intelligent I/O)	8 (UART, Intelligent I/O)								
Smart Card/SIM		—									
Synchronous Serial Communication Unit/Special Serial I/O		5 (UART)	7 (UART)								
CAN	Channels	—									
	Message Box (Numbers)	—									
IrDA		—									
CRC Calculation Circuit		1 (CRC-CCITT ($X^{16} + X^{12} + X^5 + 1$))									
X/Y Converter		Yes									
I/O Ports	Input Only (Numbers)	1	2								
	CMOS I/O (Numbers)	49	82								
	N-Channel Open Drain Port (Numbers)	2									
	High Current Drive Port	—									
	Pull-Up Resistor	49	85								
External Interrupts Pins		11									
Debugging Function	On-Chip Debug	Yes									
	On-Board Flash Program	Yes									
Other Functions	ROM Correction Function	—									
	Others	—	3V, 5V interface								
Operating Frequency/Supply Voltage		50MHz/3.0 to 5.5V									
Operating Ambient Temperature (˚C)		–40 to 85	–20 to 85	–40 to 85				–20 to 85	–40 to 85		–20 to 85
Package*2		PLQP0064KB-A	PTLG0100KA-A	PLQP0100KB-A				PTLG0100KA-A	PLQP0100KB-A		PTLG0100KA-A
Part No.		R5F6411EDFN	R5F6411FDFN	R5F6411FNLG	R5F64114DFB	R5F64110DFB	R5F64115DFB	R5F64111DFB	R5F64111NLG	R5F64116DFB	R5F64112DFB	R5F64112NLG

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (R32C/100 Series)

Group		R32C/116					
Memory	ROM (Bytes)	384K + 8K		512K + 8K		640K + 8K	
	RAM (Bytes)	40K				48K	
	ROM Type*1	F					
	Data Flash/E2 Data Flash	8K (Data Flash: program/Erase 10k times)					
	Program Security	Yes (ID code check function, ROM code protect function)					
CPU	CPU	R32C/100 Core					
	Basic Instructions	108					
	Minimum Instruction Execution Time (ns)	20 (@50MHz)					
	Multiplier	32 × 32 → 64					
	Multiply-Accumulate Instruction	32 × 32 + 64 → 64					
	Barrel Shifter	Yes					
DMA	DMAC (Channels)	4					
	DTC/DMACⅡ	DMACⅡ (Starts by all peripheral interrupt factors)					
External Bus Expansion	Address Space (Bytes)	64M					
	External Bus Interface	Support for insertion of wait states, Outputs 4 chip-select signals					
	Bus Structure	Selectable from Separate bus, Multiplex bus, Data bus width can be selected (8/16/32-bit)					
	DRAM Controller	—					
Clock	Clock Generation Circuit	4 circuits (Main clock, Sub-clock, PLL and on-chip oscillator)					
	PLL	Yes					
	Subclock	Yes					
	RTC	—					
	On-Chip Oscillator	Yes (Low-speed: 125kHz)					
	Oscillation Stop Detection	Yes					
	Frequency Divider	1/n (n = 2 to 24)					
	Power Save	Wait/Stop					
Power Supply Voltage Detection	Power-On Reset/POR	—					
	Low Voltage Detection/LVD	Yes (Low voltage detection)					
A/D Converter	Resolution × Channels	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34
	Sample and Hold	Yes					
	Multi-Channel Sample and Hold	—					
D/A Converter	Resolution × Channels	8-bit × 2					
Timer	8-bit	—					
	16-bit	11 (Timer A, Timer B)					
	Input Capture	16 (Intelligent I/O)					
	Output Compare	19 (Intelligent I/O)	24 (Intelligent I/O)	19 (Intelligent I/O)	24 (Intelligent I/O)	19 (Intelligent I/O)	24 (Intelligent I/O)
	PWM Output	24 (Timer A, Intelligent I/O)	29 (Timer A, Intelligent I/O)	24 (Timer A, Intelligent I/O)	29 (Timer A, Intelligent I/O)	24 (Timer A, Intelligent I/O)	29 (Timer A, Intelligent I/O)
	Real-Time Port	3 (Intelligent I/O)					
	Event Counter	11 (Timer A, Timer B)					
	2-Phase Encoder Input	3 (Timer A) + 2 (Intelligent I/O)					
	3-Phase Inverter Control	1 (shared with Timer A1, Timer A2, Timer A4, Timer B2, Dead time timer)					
Watchdog Timer		1					
Serial Interface	Clock Sync./Clock Async.	9 (UART)					
	Clock Sync. Only	1 (Intelligent I/O)					
	Clock Async. Only	—					
I²C-bus		8 (UART, Multi master I²C)					
IEBus		8 (UART, Intelligent I/O)					
Smart Card/SIM		—					
Synchronous Serial Communication Unit/Special Serial I/O		7 (UART)					
CAN	Channels	—					
	Message Box (Numbers)	—					
IrDA		—					
CRC Calculation Circuit		1 (CRC-CCITT ($X^{16} + X^{12} + X^5 + 1$))					
X/Y Converter		Yes					
I/O Ports	Input Only (Numbers)	2					
	CMOS I/O (Numbers)	84	120	84	120	84	120
	N-Channel Open Drain Port (Numbers)	36 (Programmable)	56 (Programmable)	36 (Programmable)	56 (Programmable)	36 (Programmable)	56 (Programmable)
	High Current Drive Port	—					
	Pull-Up Resistor	53	89	53	89	53	89
External Interrupts Pins		11	14	11	14	11	14
Debugging Function	On-Chip Debug	Yes					
	On-Board Flash Program	Yes					
Other Functions	ROM Correction Function	—					
	Others	5V Tolerant Input					
Operating Frequency/Supply Voltage		50MHz/3.0 to 5.5V					
Operating Ambient Temperature (°C)		–40 to 85					
Package*2		PLQP0100KB-A	PLQP0144KA-A	PLQP0100KB-A	PLQP0144KA-A	PLQP0100KB-A	PLQP0144KA-A
Part No.		R5F64165DFB	R5F64165PFB	R5F64165DFD	R5F64165PFD	R5F64166DFB	R5F64166PFB	R5F64166DFD	R5F64166PFD	R5F64167DFB	R5F64167PFB	R5F64167DFD	R5F64167PFD

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (R32C/100 Series)

Group		R32C/116			
Memory	ROM (Bytes)	768K + 8K		1024K + 8K	
	RAM (Bytes)	63K			
	ROM Type*1	F			
	Data Flash/E2 Data Flash	8K (Data Flash: program/Erase 10k times)			
	Program Security	Yes (ID code check function, ROM code protect function)			
CPU	CPU	R32C/100 Core			
	Basic Instructions	108			
	Minimum Instruction Execution Time (ns)	20 (@50MHz)			
	Multiplier	32 × 32 → 64			
	Multiply-Accumulate Instruction	32 × 32 + 64 → 64			
	Barrel Shifter	Yes			
DMA	DMAC (Channels)	4			
	DTC/DMACⅡ	DMACⅡ (Starts by all peripheral interrupt factors)			
External Bus Expansion	Address Space (Bytes)	64M			
	External Bus Interface	Support for insertion of wait states, Outputs 4 chip-select signals			
	Bus Structure	Selectable from Separate bus, Multiplex bus, Data bus width can be selected (8/16/32-bit)			
	DRAM Controller	—			
Clock	Clock Generation Circuit	4 circuits (Main clock, Sub-clock, PLL and on-chip oscillator)			
	PLL	Yes			
	Subclock	Yes			
	RTC	—			
	On-Chip Oscillator	Yes (Low-speed: 125kHz)			
	Oscillation Stop Detection	Yes			
	Frequency Divider	1/n (n = 2 to 24)			
	Power Save	Wait/Stop			
Power Supply Voltage Detection	Power-On Reset/POR	—			
	Low Voltage Detection/LVD	Yes (Low voltage detection)			
A/D Converter	Resolution × Channels	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34
	Sample and Hold	Yes			
	Multi-Channel Sample and Hold	—			
D/A Converter	Resolution × Channels	8-bit × 2			
Timer	8-bit	—			
	16-bit	11 (Timer A, Timer B)			
	Input Capture	16 (Intelligent I/O)			
	Output Compare	19 (Intelligent I/O)	24 (Intelligent I/O)	19 (Intelligent I/O)	24 (Intelligent I/O)
	PWM Output	24 (Timer A, Intelligent I/O)	29 (Timer A, Intelligent I/O)	24 (Timer A, Intelligent I/O)	29 (Timer A, Intelligent I/O)
	Real-Time Port	3 (Intelligent I/O)			
	Event Counter	11 (Timer A, Timer B)			
	2-Phase Encoder Input	3 (Timer A) + 2 (Intelligent I/O)			
	3-Phase Inverter Control	1 (shared with Timer A1, Timer A2, Timer A4, Timer B2, Dead time timer)			
Watchdog Timer		1			
Serial Interface	Clock Sync./Clock Async.	9 (UART)			
	Clock Sync. Only	1 (Intelligent I/O)			
	Clock Async. Only	—			
I^2C-bus		8 (UART, Multi master I^2C)			
IEBus		8 (UART, Intelligent I/O)			
Smart Card/SIM		—			
Synchronous Serial Communication Unit/Special Serial I/O		7 (UART)			
CAN	Channels	—			
	Message Box (Numbers)	—			
IrDA		—			
CRC Calculation Circuit		1 (CRC-CCITT ($X^{16} + X^{12} + X^5 + 1$))			
X/Y Converter		Yes			
I/O Ports	Input Only (Numbers)	2			
	CMOS I/O (Numbers)	84	120	84	120
	N-Channel Open Drain Port (Numbers)	36 (Programmable)	56 (Programmable)	36 (Programmable)	56 (Programmable)
	High Current Drive Port	—			
	Pull-Up Resistor	53	89	53	89
External Interrupts Pins		11	14	11	14
Debugging Function	On-Chip Debug	Yes			
	On-Board Flash Program	Yes			
Other Functions	ROM Correction Function	—			
	Others	5V Tolerant Input			
Operating Frequency/Supply Voltage		50MHz/3.0 to 5.5V			
Operating Ambient Temperature (°C)		–40 to 85			
Package*2		PLQP0100KB-A	PLQP0144KA-A	PLQP0100KB-A	PLQP0144KA-A
Part No.		R5F64168DFB / R5F64168PFB	R5F64168DFD / R5F64168PFD	R5F64169DFB / R5F64169PFB	R5F64169DFD / R5F64169PFD

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (R32C/100 Series)

Group		R32C/117								
Memory	ROM (Bytes)	128K + 8K	256K + 8K	384K + 8K		512K + 8K				
	RAM (Bytes)	20K		40K						
	ROM Type*1	F								
	Data Flash/E2 Data Flash	8K (Data Flash: program/Erase 10k times)								
	Program Security	Yes (ID code check function, ROM code protect function)								
CPU	CPU	R32C/100 Core								
	Basic Instructions	108								
	Minimum Instruction Execution Time (ns)	20 (@50MHz)								
	Multiplier	32 × 32 → 64								
	Multiply-Accumulate Instruction	32 × 32 + 64 → 64								
	Barrel Shifter	Yes								
DMA	DMAC (Channels)	4								
	DTC/DMACⅡ	DMACⅡ (Starts by all peripheral interrupt factors)								
External Bus Expansion	Address Space (Bytes)	64M								
	External Bus Interface	Support for insertion of wait states, Outputs 4 chip-select signals								
	Bus Structure	Selectable from Separate bus, Multiplex bus, Data bus width can be selected (8/16/32-bit)								
	DRAM Controller	—								
Clock	Clock Generation Circuit	4 circuits (Main clock, Sub-clock, PLL and on-chip oscillator)								
	PLL	Yes								
	Subclock	Yes								
	RTC	—								
	On-Chip Oscillator	Yes (Low-speed: 125kHz)								
	Oscillation Stop Detection	Yes								
	Frequency Divider	1/n (n = 2 to 24)								
	Power Save	Wait/Stop								
Power Supply Voltage Detection	Power-On Reset/POR	—								
	Low Voltage Detection/LVD	Yes (Low voltage detection)								
A/D Converter	Resolution × Channels	10-bit × 26		10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34
	Sample and Hold	Yes								
	Multi-Channel Sample and Hold	—								
D/A Converter	Resolution × Channels	8-bit × 2								
Timer	8-bit	—								
	16-bit	11 (Timer A, Timer B)								
	Input Capture	16 (Intelligent I/O)								
	Output Compare	19 (Intelligent I/O)		24 (Intelligent I/O)	19 (Intelligent I/O)	24 (Intelligent I/O)	19 (Intelligent I/O)	24 (Intelligent I/O)	19 (Intelligent I/O)	24 (Intelligent I/O)
	PWM Output	24 (Timer A, Intelligent I/O)		29 (Timer A, Intelligent I/O)	24 (Timer A, Intelligent I/O)	29 (Timer A, Intelligent I/O)	24 (Timer A, Intelligent I/O)	29 (Timer A, Intelligent I/O)	24 (Timer A, Intelligent I/O)	29 (Timer A, Intelligent I/O)
	Real-Time Port	3 (Intelligent I/O)								
	Event Counter	11 (Timer A, Timer B)								
	2-Phase Encoder Input	3 (Timer A) + 2 (Intelligent I/O)								
	3-Phase Inverter Control	1 (shared with Timer A1, Timer A2, Timer A4, Timer B2, Dead time timer)								
Watchdog Timer		1								
Serial Interface	Clock Sync./Clock Async.	9 (UART)								
	Clock Sync. Only	1 (Intelligent I/O)								
	Clock Async. Only	—								
I²C-bus		8 (UART, Multi master I²C)								
IEBus		8 (UART, Intelligent I/O)								
Smart Card/SIM		—								
Synchronous Serial Communication Unit/Special Serial I/O		7 (UART)								
CAN	Channels	1								
	Message Box (Numbers)	32								
IrDA		—								
CRC Calculation Circuit		1 (CRC-CCITT ($X^{16} + X^{12} + X^5 + 1$))								
X/Y Converter		Yes								
I/O Ports	Input Only (Numbers)	2								
	CMOS I/O (Numbers)	84		120	84	120	84	120	84	120
	N-Channel Open Drain Port (Numbers)	36 (Programmable)		56 (Programmable)	36 (Programmable)	56 (Programmable)	36 (Programmable)	56 (Programmable)	36 (Programmable)	56 (Programmable)
	High Current Drive Port	—								
	Pull-Up Resistor	53		89	53	89	53	89	53	89
External Interrupts Pins		11		14	11	14	11	14	11	14
Debugging Function	On-Chip Debug	Yes								
	On-Board Flash Program	Yes								
Other Functions	ROM Correction Function	—								
	Others	5V Tolerant Input								
Operating Frequency/Supply Voltage		50MHz/3.0 to 5.5V								
Operating Ambient Temperature (°C)		–40 to 85								
Package*2		PLQP0100KB-A		PLQP0144KA-A	PLQP0100KB-A	PLQP0144KA-A	PLQP0100KB-A	PLQP0144KA-A	PLQP0100KB-A	PLQP0144KA-A
Part No.		R5F64178DFB	R5F64178ADFB	R5F64175DFB	R5F64175DFD	R5F64175PFB	R5F64175PFD	R5F64176DFB	R5F64176DFD	R5F64176PFB	R5F64176PFD

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (R32C/100 Series)

Group		R32C/117											
Memory	ROM (Bytes)	640K + 8K				768K + 8K				1024K + 8K			
	RAM (Bytes)	48K				63K							
	ROM Type*1	F											
	Data Flash/E2 Data Flash	8K (Data Flash: program/Erase 10k times)											
	Program Security	Yes (ID code check function, ROM code protect function)											
CPU	CPU	R32C/100 Core											
	Basic Instructions	108											
	Minimum Instruction Execution Time (ns)	20 (@50MHz)											
	Multiplier	32 × 32 → 64											
	Multiply-Accumulate Instruction	32 × 32 + 64 → 64											
	Barrel Shifter	Yes											
DMA	DMAC (Channels)	4											
	DTC/DMACⅡ	DMACⅡ (Starts by all peripheral interrupt factors)											
External Bus Expansion	Address Space (Bytes)	64M											
	External Bus Interface	Support for insertion of wait states, Outputs 4 chip-select signals											
	Bus Structure	Selectable from Separate bus, Multiplex bus, Data bus width can be selected (8/16/32-bit)											
	DRAM Controller	—											
Clock	Clock Generation Circuit	4 circuits (Main clock, Sub-clock, PLL and on-chip oscillator)											
	PLL	Yes											
	Subclock	Yes											
	RTC	—											
	On-Chip Oscillator	Yes (Low-speed: 125kHz)											
	Oscillation Stop Detection	Yes											
	Frequency Divider	1/n (n = 2 to 24)											
	Power Save	Wait/Stop											
Power Supply Voltage Detection	Power-On Reset/POR	—											
	Low Voltage Detection/LVD	Yes (Low voltage detection)											
A/D Converter	Resolution × Channels	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34
	Sample and Hold	Yes											
	Multi-Channel Sample and Hold	—											
D/A Converter	Resolution × Channels	8-bit × 2											
Timer	8-bit	—											
	16-bit	11 (Timer A, Timer B)											
	Input Capture	16 (Intelligent I/O)											
	Output Compare	19 (Intelligent I/O)	24 (Intelligent I/O)	19 (Intelligent I/O)	24 (Intelligent I/O)	19 (Intelligent I/O)	24 (Intelligent I/O)	19 (Intelligent I/O)	24 (Intelligent I/O)	19 (Intelligent I/O)	24 (Intelligent I/O)	19 (Intelligent I/O)	24 (Intelligent I/O)
	PWM Output	24 (Timer A, Intelligent I/O)	29 (Timer A, Intelligent I/O)	24 (Timer A, Intelligent I/O)	29 (Timer A, Intelligent I/O)	24 (Timer A, Intelligent I/O)	29 (Timer A, Intelligent I/O)	24 (Timer A, Intelligent I/O)	29 (Timer A, Intelligent I/O)	24 (Timer A, Intelligent I/O)	29 (Timer A, Intelligent I/O)	24 (Timer A, Intelligent I/O)	29 (Timer A, Intelligent I/O)
	Real-Time Port	3 (Intelligent I/O)											
	Event Counter	11 (Timer A, Timer B)											
	2-Phase Encoder Input	3 (Timer A) + 2(Intelligent I/O)											
	3-Phase Inverter Control	1 (shared with Timer A1, Timer A2, Timer A4, Timer B2, Dead time timer)											
Watchdog Timer		1											
Serial Interface	Clock Sync./Clock Async.	9 (UART)											
	Clock Sync. Only	1 (Intelligent I/O)											
	Clock Async. Only	—											
I²C-bus		8 (UART, Multi master I²C)											
IEBus		8 (UART, Intelligent I/O)											
Smart Card/SIM		—											
Synchronous Serial Communication Unit/Special Serial I/O		7 (UART)											
CAN	Channels	1											
	Message Box (Numbers)	32											
IrDA		—											
CRC Calculation Circuit		1 (CRC-CCITT ($X^{16} + X^{12} + X^5 + 1$))											
X/Y Converter		Yes											
I/O Ports	Input Only (Numbers)	2											
	CMOS I/O (Numbers)	84	120	84	120	84	120	84	120	84	120	84	120
	N-Channel Open Drain Port (Numbers)	36 (Programmable)	56 (Programmable)	36 (Programmable)	56 (Programmable)	36 (Programmable)	56 (Programmable)	36 (Programmable)	56 (Programmable)	36 (Programmable)	56 (Programmable)	36 (Programmable)	56 (Programmable)
	High Current Drive Port	—											
	Pull-Up Resistor	53	89	53	89	53	89	53	89	53	89	53	89
External Interrupts Pins		11	14	11	14	11	14	11	14	11	14	11	14
Debugging Function	On-Chip Debug	Yes											
	On-Board Flash Program	Yes											
Other Functions	ROM Correction Function	—											
	Others	5V Tolerant Input											
Operating Frequency/Supply Voltage		50MHz/3.0 to 5.5V											
Operating Ambient Temperature (°C)		–40 to 85											
Package*2		PLQP0100KB-A	PLQP0144KA-A	PLQP0100KB-A	PLQP0144KA-A	PLQP0100KB-A	PLQP0144KA-A	PLQP0100KB-A	PLQP0144KA-A	PLQP0100KB-A	PLQP0144KA-A	PLQP0100KB-A	PLQP0144KA-A
Part No.		R5F64177DFB	R5F64177DFD	R5F64177PFB	R5F64177PFD	R5F64178DFB	R5F64178DFD	R5F64178PFB	R5F64178PFD	R5F64179DFB	R5F64179DFD	R5F64179PFB	R5F64179PFD

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (R32C/100 Series)

Group		R32C/118									
Memory	ROM (Bytes)	384K + 8K				512K + 8K					
	RAM (Bytes)	40K									
	ROM Type*1	F									
	Data Flash/E2 Data Flash	8K (Data Flash: program/Erase 10k times)									
	Program Security	Yes (ID code check function, ROM code protect function)									
CPU	CPU	R32C/100 Core									
	Basic Instructions	108									
	Minimum Instruction Execution Time (ns)	20 (@50MHz)				15.625 (@64MHz)		20 (@50MHz)			
	Multiplier	32 × 32 → 64									
	Multiply-Accumulate Instruction	32 × 32 + 64 → 64									
	Barrel Shifter	Yes									
DMA	DMAC (Channels)	4									
	DTC/DMACⅡ	DMACⅡ (Starts by all peripheral interrupt factors)									
External Bus Expansion	Address Space (Bytes)	64M									
	External Bus Interface	Support for insertion of wait states, Outputs 4 chip-select signals									
	Bus Structure	Selectable from Separate bus, Multiplex bus, Data bus width can be selected (8/16/32-bit)									
	DRAM Controller	—									
Clock	Clock Generation Circuit	4 circuits (Main clock, Sub-clock, PLL and on-chip oscillator)									
	PLL	Yes									
	Subclock	Yes									
	RTC	—									
	On-Chip Oscillator	Yes (Low-speed: 125kHz)									
	Oscillation Stop Detection	Yes									
	Frequency Divider	1/n (n = 2 to 24)									
	Power Save	Wait/Stop									
Power Supply Voltage Detection	Power-On Reset/POR	—									
	Low Voltage Detection/LVD	Yes (Low voltage detection)									
A/D Converter	Resolution × Channels	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34
	Sample and Hold	Yes									
	Multi-Channel Sample and Hold	—									
D/A Converter	Resolution × Channels	8-bit × 2									
Timer	8-bit	—									
	16-bit	11 (Timer A, Timer B)									
	Input Capture	16 (Intelligent I/O)									
	Output Compare	19 (Intelligent I/O)	24 (Intelligent I/O)	19 (Intelligent I/O)	24 (Intelligent I/O)	19 (Intelligent I/O)	24 (Intelligent I/O)	19 (Intelligent I/O)	24 (Intelligent I/O)	19 (Intelligent I/O)	24 (Intelligent I/O)
	PWM Output	24 (Timer A, Intelligent I/O)	29 (Timer A, Intelligent I/O)	24 (Timer A, Intelligent I/O)	29 (Timer A, Intelligent I/O)	24 (Timer A, Intelligent I/O)	29 (Timer A, Intelligent I/O)	24 (Timer A, Intelligent I/O)	29 (Timer A, Intelligent I/O)	24 (Timer A, Intelligent I/O)	29 (Timer A, Intelligent I/O)
	Real-Time Port	3 (Intelligent I/O)									
	Event Counter	11 (Timer A, Timer B)									
	2-Phase Encoder Input	3 (Timer A) + 2 (Intelligent I/O)									
	3-Phase Inverter Control	1 (shared with Timer A1, Timer A2, Timer A4, Timer B2, Dead time timer)									
Watchdog Timer		1									
Serial Interface	Clock Sync./Clock Async.	9 (UART)									
	Clock Sync. Only	1 (Intelligent I/O)									
	Clock Async. Only	—									
I^2C-bus		8 (UART, Multi master I^2C)									
IEBus		8 (UART, Intelligent I/O)									
Smart Card/SIM		—									
Synchronous Serial Communication Unit/Special Serial I/O		7 (UART)									
CAN	Channels	2									
	Message Box (Numbers)	32									
IrDA		—									
CRC Calculation Circuit		1 (CRC-CCITT ($X^{16} + X^{12} + X^5 + 1$))									
X/Y Converter		Yes									
I/O Ports	Input Only (Numbers)	2									
	CMOS I/O (Numbers)	84	120	84	120	84	120	84	120	84	120
	N-Channel Open Drain Port (Numbers)	36(Programmable)	56(Programmable)	36(Programmable)	56(Programmable)	36(Programmable)	56(Programmable)	36(Programmable)	56(Programmable)	36(Programmable)	56(Programmable)
	High Current Drive Port	—									
	Pull-Up Resistor	53	89	53	89	53	89	53	89	53	89
External Interrupts Pins		11	14	11	14	11	14	11	14	11	14
Debugging Function	On-Chip Debug	Yes									
	On-Board Flash Program	Yes									
Other Functions	ROM Correction Function	—									
	Others	5V Tolerant Input									
Operating Frequency/Supply Voltage		50MHz/3.0 to 5.5V				64MHz/3.0 to 5.5V		50MHz/3.0 to 5.5V			
Operating Ambient Temperature (˚C)		–40 to 85									
Package*2		PLQP0100KB-A	PLQP0144KA-A	PLQP0100KB-A	PLQP0144KA-A	PLQP0100KB-A	PLQP0144KA-A	PLQP0100KB-A	PLQP0144KA-A	PLQP0100KB-A	PLQP0144KA-A
Part No.		R5F64185DFB	R5F64185DFD	R5F64185PFB	R5F64185PFD	R5F64186HDFB	R5F64186HDFD	R5F64186DFB	R5F64186DFD	R5F64186PFB	R5F64186PFD

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (R32C/100 Series)

Group		R32C/118													
Memory	ROM (Bytes)	640K + 8K				768K + 8K				1024K + 8K					
	RAM (Bytes)	48K				63K									
	ROM Type*1	F													
	Data Flash/E2 Data Flash	8K (Data Flash: program/Erase 10k times)													
	Program Security	Yes (ID code check function, ROM code protect function)													
CPU	CPU	R32C/100 Core													
	Basic Instructions	108													
	Minimum Instruction Execution Time (ns)	20 (@50MHz)								15.625 (@64MHz)		20 (@50MHz)			
	Multiplier	32 × 32 → 64													
	Multiply-Accumulate Instruction	32 × 32 + 64 → 64													
	Barrel Shifter	Yes													
DMA	DMAC (Channels)	4													
	DTC/DMACⅡ	DMACⅡ (Starts by all peripheral interrupt factors)													
External Bus Expansion	Address Space (Bytes)	64M													
	External Bus Interface	Support for insertion of wait states, Outputs 4 chip-select signals													
	Bus Structure	Selectable from Separate bus, Multiplex bus, Data bus width can be selected (8/16/32-bit)													
	DRAM Controller	—													
Clock	Clock Generation Circuit	4 circuits (Main clock, Sub-clock, PLL and on-chip oscillator)													
	PLL	Yes													
	Subclock	Yes													
	RTC	—													
	On-Chip Oscillator	Yes (Low-speed: 125kHz)													
	Oscillation Stop Detection	Yes													
	Frequency Divider	1/n (n = 2 to 24)													
	Power Save	Wait/Stop													
Power Supply Voltage Detection	Power-On Reset/POR	—													
	Low Voltage Detection/LVD	Yes (Low voltage detection)													
A/D Converter	Resolution × Channels	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34
	Sample and Hold	Yes													
	Multi-Channel Sample and Hold	—													
D/A Converter	Resolution × Channels	8-bit × 2													
Timer	8-bit	—													
	16-bit	11(Timer A, Timer B)													
	Input Capture	16(Intelligent I/O)													
	Output Compare	19 (Intelligent I/O)	24 (Intelligent I/O)	19 (Intelligent I/O)	24 (Intelligent I/O)	19 (Intelligent I/O)	24 (Intelligent I/O)	19 (Intelligent I/O)	24 (Intelligent I/O)	19 (Intelligent I/O)	24 (Intelligent I/O)	19 (Intelligent I/O)	24 (Intelligent I/O)	19 (Intelligent I/O)	24 (Intelligent I/O)
	PWM Output	24 (Timer A, Intelligent I/O)	29 (Timer A, Intelligent I/O)	24 (Timer A, Intelligent I/O)	29 (Timer A, Intelligent I/O)	24 (Timer A, Intelligent I/O)	29 (Timer A, Intelligent I/O)	24 (Timer A, Intelligent I/O)	29 (Timer A, Intelligent I/O)	24 (Timer A, Intelligent I/O)	29 (Timer A, Intelligent I/O)	24 (Timer A, Intelligent I/O)	29 (Timer A, Intelligent I/O)	24 (Timer A, Intelligent I/O)	29 (Timer A, Intelligent I/O)
	Real-Time Port	3 (Intelligent I/O)													
	Event Counter	11 (Timer A, Timer B)													
	2-Phase Encoder Input	3 (Timer A) + 2(Intelligent I/O)													
	3-Phase Inverter Control	1 (shared with Timer A1, Timer A2, Timer A4, Timer B2, Dead time timer)													
Watchdog Timer		1													
Serial Interface	Clock Sync./Clock Async.	9 (UART)													
	Clock Sync. Only	1 (Intelligent I/O)													
	Clock Async. Only	—													
I²C-bus		8 (UART, Multi master I²C)													
IEBus		8 (UART, Intelligent I/O)													
Smart Card/SIM		—													
Synchronous Serial Communication Unit/Special Serial I/O		7 (UART)													
CAN	Channels	2													
	Message Box (Numbers)	32													
IrDA		—													
CRC Calculation Circuit		1 (CRC-CCITT ($X^{16} + X^{12} + X^5 + 1$))													
X/Y Converter		Yes													
I/O Ports	Input Only (Numbers)	2													
	CMOS I/O (Numbers)	84	120	84	120	84	120	84	120	84	120	84	120	84	120
	N-Channel Open Drain Port (Numbers)	36 (Programmable)	56 (Programmable)	36 (Programmable)	56 (Programmable)	36 (Programmable)	56 (Programmable)	36 (Programmable)	56 (Programmable)	36 (Programmable)	56 (Programmable)	36 (Programmable)	56 (Programmable)	36 (Programmable)	56 (Programmable)
	High Current Drive Port	—													
	Pull-Up Resistor	53	89	53	89	53	89	53	89	53	89	53	89	53	89
External Interrupts Pins		11	14	11	14	11	14	11	14	11	14	11	14	11	14
Debugging Function	On-Chip Debug	Yes													
	On-Board Flash Program	Yes													
Other Functions	ROM Correction Function	—													
	Others	5V Tolerant Input													
Operating Frequency/Supply Voltage		50MHz/3.0 to 5.5V								64MHz/3.0 to 5.5V		50MHz/3.0 to 5.5V			
Operating Ambient Temperature (°C)		–40 to 85													
Package*2		PLQP0100KB-A	PLQP0144KA-A	PLQP0100KB-A	PLQP0144KA-A	PLQP0100KB-A	PLQP0144KA-A	PLQP0100KB-A	PLQP0144KA-A	PLQP0100KB-A	PLQP0144KA-A	PLQP0100KB-A	PLQP0144KA-A	PLQP0100KB-A	PLQP0144KA-A
Part No.		R5F64187DFB	R5F64187DFD	R5F64187PFB	R5F64187PFD	R5F64188DFB	R5F64188DFD	R5F64188PFB	R5F64188PFD	R5F64189HDFB	R5F64189HDFD	R5F64189DFB	R5F64189DFD	R5F64189PFB	R5F64189PFD

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (R32C/100 Series)

Group		R32C/116A							
Memory	ROM (Bytes)	512K + 8K		640K + 8K		768K + 8K		1024K + 8K	
	RAM (Bytes)	96K							
	ROM Type*1	F							
	Data Flash/E2 Data Flash	8K (Data Flash: program/Erase 10k times)							
	Program Security	Yes (ID code check function, ROM code protect function)							
CPU	CPU	R32C/100 Core							
	Basic Instructions	108							
	Minimum Instruction Execution Time (ns)	15.625 (@64MHz)							
	Multiplier	32 × 32 → 64							
	Multiply-Accumulate Instruction	32 × 32 + 64 → 64							
	Barrel Shifter	Yes							
DMA	DMAC (Channels)	4							
	DTC/DMACⅡ	DMACⅡ (Starts by all peripheral interrupt factors)							
External Bus Expansion	Address Space (Bytes)	64M							
	External Bus Interface	Support for insertion of wait states, Outputs 4 chip-select signals							
	Bus Structure	Selectable from Separate bus, Multiplex bus, Data bus width can be selected (8/16/32-bit)							
	DRAM Controller	—							
Clock	Clock Generation Circuit	4 circuits (Main clock, Sub-clock, PLL and on-chip oscillator)							
	PLL	Yes							
	Subclock	Yes							
	RTC	—							
	On-Chip Oscillator	Yes (Low-speed: 125kHz)							
	Oscillation Stop Detection	Yes							
	Frequency Divider	1/n (n = 2 to 24)							
	Power Save	Wait/Stop							
Power Supply Voltage Detection	Power-On Reset/POR	—							
	Low Voltage Detection/LVD	Yes (Low voltage detection)							
A/D Converter	Resolution × Channels	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34
	Sample and Hold	Yes							
	Multi-Channel Sample and Hold	—							
D/A Converter	Resolution × Channels	8-bit × 2							
Timer	8-bit	—							
	16-bit	11 (Timer A, Timer B)							
	Input Capture	16 (Intelligent I/O)							
	Output Compare	19 (Intelligent I/O)	24 (Intelligent I/O)	19 (Intelligent I/O)	24 (Intelligent I/O)	19 (Intelligent I/O)	24 (Intelligent I/O)	19 (Intelligent I/O)	24 (Intelligent I/O)
	PWM Output	24 (Timer A, Intelligent I/O)	29 (Timer A, Intelligent I/O)	24 (Timer A, Intelligent I/O)	29 (Timer A, Intelligent I/O)	24 (Timer A, Intelligent I/O)	29 (Timer A, Intelligent I/O)	24 (Timer A, Intelligent I/O)	29 (Timer A, Intelligent I/O)
	Real-Time Port	3 (Intelligent I/O)							
	Event Counter	11 (Timer A, Timer B)							
	2-Phase Encoder Input	3 (Timer A) + 2 (Intelligent I/O)							
	3-Phase Inverter Control	1 (shared with Timer A1, Timer A2, Timer A4, Timer B2, Dead time timer)							
Watchdog Timer		1							
Serial Interface	Clock Sync./Clock Async.	11 (UART)							
	Clock Sync. Only	1 (Intelligent I/O)							
	Clock Async. Only	—							
I²C-bus		8 (UART, Multi master I²C)							
IEBus		8 (UART, Intelligent I/O)							
Smart Card/SIM		—							
Synchronous Serial Communication Unit/Special Serial I/O		7 (UART)							
CAN	Channels	—							
	Message Box (Numbers)	—							
IrDA		—							
CRC Calculation Circuit		1 (CRC-CCITT ($X^{16} + X^{12} + X^5 + 1$))							
X/Y Converter		Yes							
I/O Ports	Input Only (Numbers)	2							
	CMOS I/O (Numbers)	126	158	126	158	126	158	126	158
	N-Channel Open Drain Port (Numbers)	56 (Programmable)	68 (Programmable)	56 (Programmable)	68 (Programmable)	56 (Programmable)	68 (Programmable)	56 (Programmable)	68 (Programmable)
	High Current Drive Port	—							
	Pull-Up Resistor	85	105	85	105	85	105	85	105
External Interrupts Pins		14							
Debugging Function	On-Chip Debug	Yes							
	On-Board Flash Program	Yes							
Other Functions	ROM Correction Function	—							
	Others	5V Tolerant Input							
Operating Frequency/Supply Voltage		64MHz/3.0 to 5.5V							
Operating Ambient Temperature (°C)		–40 to 85							
Package*2		PLQP0144KA-A	PLQP0176KB-A	PLQP0144KA-A	PLQP0176KB-A	PLQP0144KA-A	PLQP0176KB-A	PLQP0144KA-A	PLQP0176KB-A
Part No.		R5F6416JADFD	R5F6416JAPFD	R5F6416JADFE	R5F6416JAPFE	R5F6416KADFD	R5F6416KAPFD	R5F6416KADFE	R5F6416KAPFE
		R5F6416LADFD	R5F6416LAPFD	R5F6416LADFE	R5F6416LAPFE	R5F6416MADFD	R5F6416MAPFD	R5F6416MADFE	R5F6416MAPFE

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (R32C/100 Series)

Group		R32C/117A							
Memory	ROM (Bytes)	512K + 8K		640K + 8K		768K + 8K		1024K + 8K	
	RAM (Bytes)	96K							
	ROM Type*1	F							
	Data Flash/E2 Data Flash	8K (Data Flash: program/Erase 10k times)							
	Program Security	Yes (ID code check function, ROM code protect function)							
CPU	CPU	R32C/100 Core							
	Basic Instructions	108							
	Minimum Instruction Execution Time (ns)	15.625 (@64MHz)							
	Multiplier	32 × 32 → 64							
	Multiply-Accumulate Instruction	32 × 32 + 64 → 64							
	Barrel Shifter	Yes							
DMA	DMAC (Channels)	4							
	DTC/DMACⅡ	DMACⅡ (Starts by all peripheral interrupt factors)							
External Bus Expansion	Address Space (Bytes)	64M							
	External Bus Interface	Support for insertion of wait states, Outputs 4 chip-select signals							
	Bus Structure	Selectable from Separate bus, Multiplex bus, Data bus width can be selected (8/16/32-bit)							
	DRAM Controller	—							
Clock	Clock Generation Circuit	4 circuits (Main clock, Sub-clock, PLL and on-chip oscillator)							
	PLL	Yes							
	Subclock	Yes							
	RTC	—							
	On-Chip Oscillator	Yes (Low-speed: 125kHz)							
	Oscillation Stop Detection	Yes							
	Frequency Divider	1/n (n = 2 to 24)							
	Power Save	Wait/Stop							
Power Supply Voltage Detection	Power-On Reset/POR	—							
	Low Voltage Detection/LVD	Yes (Low voltage detection)							
A/D Converter	Resolution × Channels	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34
	Sample and Hold	Yes							
	Multi-Channel Sample and Hold	—							
D/A Converter	Resolution × Channels	8-bit × 2							
Timer	8-bit	—							
	16-bit	11 (Timer A, Timer B)							
	Input Capture	16 (Intelligent I/O)							
	Output Compare	19 (Intelligent I/O)	24 (Intelligent I/O)	19 (Intelligent I/O)	24 (Intelligent I/O)	19 (Intelligent I/O)	24 (Intelligent I/O)	19 (Intelligent I/O)	24 (Intelligent I/O)
	PWM Output	29 (Timer A, Intelligent I/O)				24 (Timer A, Intelligent I/O)	29 (Timer A, Intelligent I/O)	24 (Timer A, Intelligent I/O)	29 (Timer A, Intelligent I/O)
	Real-Time Port	3 (Intelligent I/O)							
	Event Counter	11 (Timer A, Timer B)							
	2-Phase Encoder Input	3 (Timer A) + 2 (Intelligent I/O)							
	3-Phase Inverter Control	1 (shared with Timer A1, Timer A2, Timer A4, Timer B2, Dead time timer)							
Watchdog Timer		1							
Serial Interface	Clock Sync./Clock Async.	11 (UART)							
	Clock Sync. Only	1 (Intelligent I/O)							
	Clock Async. Only	—							
I²C-bus		8 (UART, Multi master I²C)							
IEBus		8 (UART, Intelligent I/O)							
Smart Card/SIM		—							
Synchronous Serial Communication Unit/Special Serial I/O		7 (UART)							
CAN	Channels	1							
	Message Box (Numbers)	32							
IrDA		—							
CRC Calculation Circuit		1 (CRC-CCITT ($X^{16} + X^{12} + X^5 + 1$))							
X/Y Converter		Yes							
I/O Ports	Input Only (Numbers)	2							
	CMOS I/O (Numbers)	126	158	126	158	126	158	126	158
	N-Channel Open Drain Port (Numbers)	56 (Programmable)	68 (Programmable)	56 (Programmable)	68 (Programmable)	56 (Programmable)	68 (Programmable)	56 (Programmable)	68 (Programmable)
	High Current Drive Port	—							
	Pull-Up Resistor	85	105	85	105	85	105	85	105
External Interrupts Pins		14							
Debugging Function	On-Chip Debug	Yes							
	On-Board Flash Program	Yes							
Other Functions	ROM Correction Function	—							
	Others	5V Tolerant Input							
Operating Frequency/Supply Voltage		64MHz/3.0 to 5.5V							
Operating Ambient Temperature (°C)		–40 to 85							
Package*2		PLQP0144KA-A	PLQP0176KB-A	PLQP0144KA-A	PLQP0176KB-A	PLQP0144KA-A	PLQP0176KB-A	PLQP0144KA-A	PLQP0176KB-A
Part No.		R5F6417JADFD	R5F6417JAPFD	R5F6417JADFE	R5F6417JAPFE	R5F6417KADFD	R5F6417KAPFD	R5F6417KADFE	R5F6417KAPFE
		R5F6417LADFD	R5F6417LAPFD	R5F6417LADFE	R5F6417LAPFE	R5F6417MADFD	R5F6417MAPFD	R5F6417MADFE	R5F6417MAPFE

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (R32C/100 Series)

Group		R32C/118A					
Memory	ROM (Bytes)	512K + 8K	640K + 8K	768K + 8K	1024K + 8K		
	RAM (Bytes)	96K					
	ROM Type*1	F					
	Data Flash/E2 Data Flash	8K (Data Flash: program/Erase 10k times)					
	Program Security	Yes (ID code check function, ROM code protect function)					
CPU	CPU	R32C/100 Core					
	Basic Instructions	108					
	Minimum Instruction Execution Time (ns)	15.625 (@64MHz)					
	Multiplier	32 × 32 → 64					
	Multiply-Accumulate Instruction	32 × 32 + 64 → 64					
	Barrel Shifter	Yes					
DMA	DMAC (Channels)	4					
	DTC/DMACⅡ	DMACⅡ (Starts by all peripheral interrupt factors)					
External Bus Expansion	Address Space (Bytes)	64M					
	External Bus Interface	Support for insertion of wait states, Outputs 4 chip-select signals					
	Bus Structure	Selectable from Separate bus, Multiplex bus, Data bus width can be selected (8/16/32-bit)					
	DRAM Controller	—					
Clock	Clock Generation Circuit	4 circuits (Main clock, Sub-clock, PLL and on-chip oscillator)					
	PLL	Yes					
	Subclock	Yes					
	RTC	—					
	On-Chip Oscillator	Yes (Low-speed: 125kHz)					
	Oscillation Stop Detection	Yes					
	Frequency Divider	1/n (n = 2 to 24)					
	Power Save	Wait/Stop					
Power Supply Voltage Detection	Power-On Reset/POR	—					
	Low Voltage Detection/LVD	Yes (Low voltage detection)					
A/D Converter	Resolution × Channels	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34
	Sample and Hold	Yes					
	Multi-Channel Sample and Hold	—					
D/A Converter	Resolution × Channels	8-bit × 2					
Timer	8-bit	—					
	16-bit	11 (Timer A, Timer B)					
	Input Capture	16 (Intelligent I/O)					
	Output Compare	19 (Intelligent I/O)	24 (Intelligent I/O)	19 (Intelligent I/O)	24 (Intelligent I/O)	19 (Intelligent I/O)	24 (Intelligent I/O)
	PWM Output	24 (Timer A, Intelligent I/O)	29 (Timer A, Intelligent I/O)	24 (Timer A, Intelligent I/O)	29 (Timer A, Intelligent I/O)	24 (Timer A, Intelligent I/O)	29 (Timer A, Intelligent I/O)
	Real-Time Port	3 (Intelligent I/O)					
	Event Counter	11 (Timer A, Timer B)					
	2-Phase Encoder Input	3 (Timer A) + 2 (Intelligent I/O)					
	3-Phase Inverter Control	1 (shared with Timer A1, Timer A2, Timer A4, Timer B2, Dead time timer)					
Watchdog Timer		1					
Serial Interface	Clock Sync./Clock Async.	11 (UART)					
	Clock Sync. Only	1 (Intelligent I/O)					
	Clock Async. Only	—					
I²C-bus		8 (UART, Multi master I²C)					
IEBus		8 (UART, Intelligent I/O)					
Smart Card/SIM		—					
Synchronous Serial Communication Unit/Special Serial I/O		7 (UART)					
CAN	Channels	2					
	Message Box (Numbers)	32					
IrDA		—					
CRC Calculation Circuit		1 (CRC-CCITT ($X^{16} + X^{12} + X^5 + 1$))					
X/Y Converter		Yes					
I/O Ports	Input Only (Numbers)	2					
	CMOS I/O (Numbers)	126	158	126	158	126	158
	N-Channel Open Drain Port (Numbers)	56 (Programmable)	68 (Programmable)	56 (Programmable)	68 (Programmable)	56 (Programmable)	68 (Programmable)
	High Current Drive Port	—					
	Pull-Up Resistor	85	105	85	105	85	105
External Interrupts Pins		14					
Debugging Function	On-Chip Debug	Yes					
	On-Board Flash Program	Yes					
Other Functions	ROM Correction Function	—					
	Others	5V Tolerant Input					
Operating Frequency/Supply Voltage		64MHz/3.0 to 5.5V					
Operating Ambient Temperature (˚C)		–40 to 85					
Package*2		PLQP0144KA-A	PLQP0176KB-A	PLQP0144KA-A	PLQP0176KB-A	PLQP0144KA-A	PLQP0176KB-A
Part No.		R5F6418JADFD	R5F6418JAPFD	R5F6418JADFE	R5F6418JAPFE	R5F6418KADFD	R5F6418KAPFD
		R5F6418KADFE	R5F6418KAPFE	R5F6418LADFE	R5F6418LAPFE	R5F6418LAPFD	R5F6418LADFD
		R5F6418MADFD	R5F6418MAPFD	R5F6418MADFE	R5F6418MAPFE		

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

Outline of M32C/80 Series

The M32C/80 Series is an upgraded version of the M16C/60 Series with enhanced 32-bit operating instructions, improvement in operating speed (32 MHz), and high peripheral functions.

Note: For CAN MCUs used for automotive, Refer to "Automotive MCUs" in this catalog.

M32C/80 Series Features

- Maintains upward compatibility with the M16C/60, and ensures ease of data overwriting if 32MHz high speed at 5V is required.
- In addition to 32-bit four arithmetic operations, transfer instructions, multiplication-and-division instructions, and high-speed 32-bit multiple shift instructions with the built-in barrel shifter are available. Furthermore, high-speed operation processing is supported.
- In addition to standard functions, the multi-function timer (intelligent I/O) allows adding input capture timer, output compare timer, PWM, and serial I/O functions, which are ideal for sensor applications and motor control applications.
- Incorporates a CAN (with a maximum of two channels for the M32C/85, M32C/87 and a maximum of three channels for the M32C/88), thus supporting a variety of fields.

M32C/80 Group

- ROMless products incorporating an 8K bytes RAM.
- Driven by a two-line peripheral power supply, which allows simultaneous connection of 3V for the memory block and 5V for the driver block.

M32C/83 Group

- Intelligent I/O
  Incorporates an input capture timer, output compare timer, PWM, communications function, and real-time port.
- Incorporates one-channel CAN interface
- Incorporates two A/D converters, thus allowing simultaneous sampling.
- Incorporates DRAM controller
- Incorporates HDLC data processing function

M32C/84, M32C/85 Group

- Intelligent I/O
  Incorporates an input capture timer, output compare timer, PWM and communications function.
- Equipped with 512K bytes flash memory and 4K bytes data flash memory.
- Enhanced external bus interface (with one- to six-wait insertion and variable setup/hold time).
- Incorporates low-voltage detection circuit (optional) and oscillation stop detection function.
- Incorporates two-channel CAN interface (M32C/85)
- Driven by two-line peripheral power supply, which makes it possible to connect 3V for the memory block and 5V for the driver block simultaneously (excluding models for automobile applications).

• M32C/80 Series CPU Overview

Performance	Machine cycles	31.3ns (5V at 32MHz)
	Address space	16M bytes
Number of Instructions	108	
Registers	Data registers : 16-bit × 4 × 2 banks Address registers : 24-bit × 2 × 2 banks Dedicated registers : 16-bit × 1, 24-bit × 4 High-speed interrupt registers and DMAC-related registers are implemented.	

M32C/87 Group

- Intelligent I/O
  Incorporates an input capture timer, output compare timer, PWM, communications function, and real-time port.
- Equipped with 384K bytes to 1M byte flash memory and 4K bytes data flash memory.
- A lineup of products incorporating a two-channel CAN interface (M32C/87) or a single-channel CAN interface (M32C/87A) or with no CAN interface (M32C/87B).
- Incorporates serial interface (clock synchronous/asynchronous) with up to seven channels.
- Incorporates IrDA function
- Driven by a two-line peripheral power supply, which allows simultaneous connection of 3V for the memory block and 5V for the driver block.

M32C/88 Group

- Intelligent I/O
  Incorporates an input capture timer, output compare timer, PWM, and communications function.
- Incorporates three-channel CAN interface.
- Incorporates cold start/warm start judging function (optional).

* Refer to "Automotive MCUs" in this catalog.

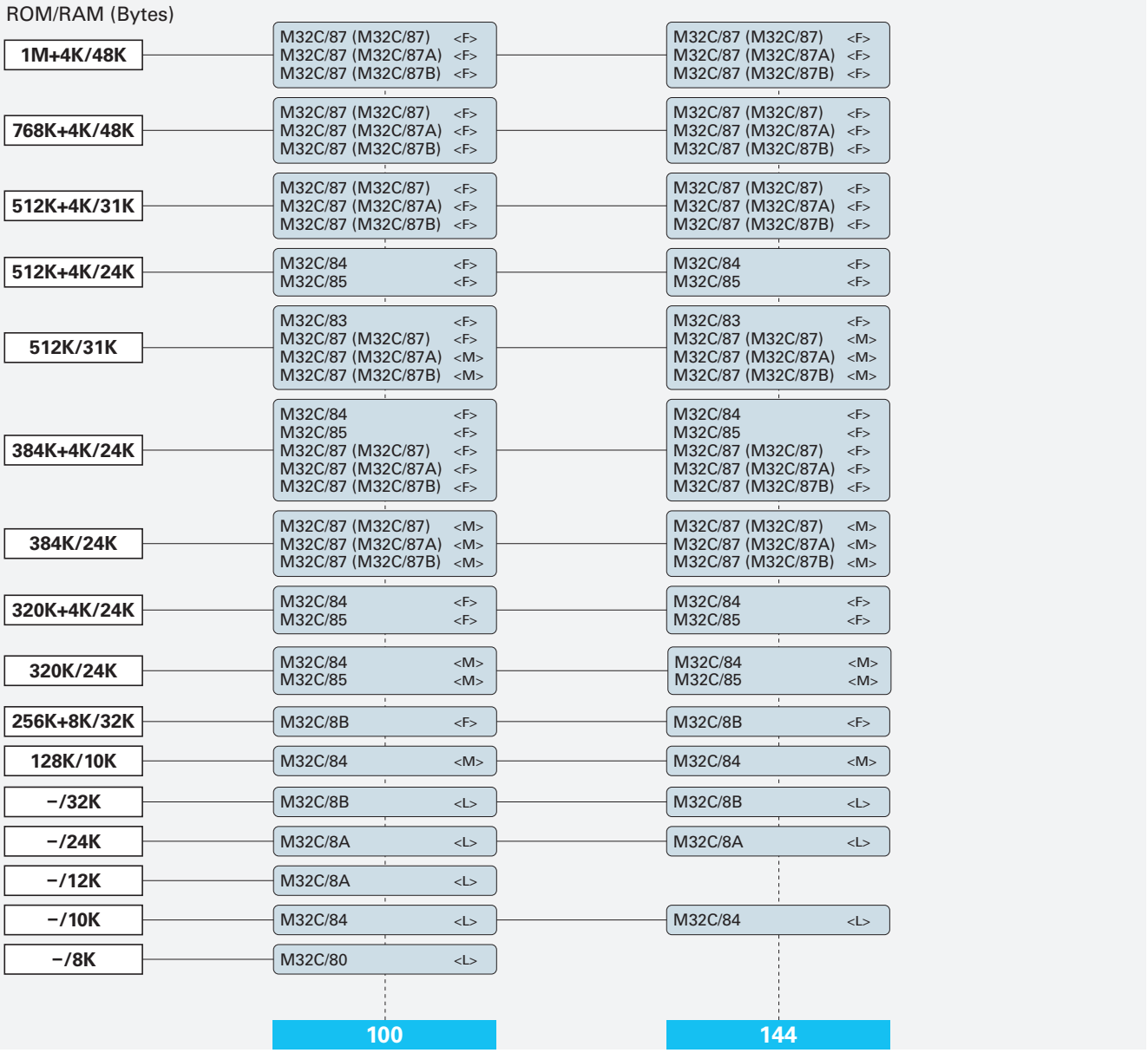
M32C/8A Group

- ROM-less products with 12K to 24K bytes of built-in RAM.
- Incorporates low-voltage detection circuit (optional) and oscillation stop detection function.
- Utilizes two lines for peripheral power supply to allow both a 3V line for memory and 5V line for drivers to be connected at the same time.

M32C/8B Group

- Equipped with 256K bytes flash memory and 8K bytes data flash memory.
- ROM-less products with 32K bytes of built-in RAM.
- Incorporates low-voltage detection circuit (optional) and oscillation stop detection function.
- Driven by a two-line peripheral power supply, which allows simultaneous connection of 3V for the memory block and 5V for the driver block.

• Memory Capacity (ROM/RAM) (M32C/80 Series)



Letters in brackets < > indicate memory variations.
F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

Pin count

• Specifications (M32C/80 Series)

Group		M32C/8A		M32C/8B			M32C/80	M32C/83	
Memory	ROM (Bytes)	—			256K + 8K		—	512K	
	RAM (Bytes)	12K	24K	32K			8K	31K	
	ROM Type*1	L			F		L	F	
	Data Flash/E2 Data Flash	—			8K (Data Flash: program/ Erase 100 times)		—		
	Program Security	—			Yes (ID code check function, ROM code protect function)		—	Yes (ID code check function, ROM code protect function)	
CPU	CPU	M32C/80 Core							
	Basic Instructions	108							
	Minimum Instruction Execution Time (ns)	31.3 (@32MHz)							
	Multiplier	16 × 16 → 32							
	Multiply-Accumulate Instruction	16 × 16 + 48 → 48							
	Barrel Shifter	Yes							
DMA	DMAC (Channels)	4							
	DTC/DMACⅡ	DMACⅡ (Starts by all peripheral interrupt factors)							
External Bus Expansion	Address Space (Bytes)	16M							
	External Bus Interface	Support for insertion of 1 to 6 wait states, Outputs 4 chip-select signals, Page mode support		Support for insertion of 1 to 7 wait states, Outputs 4 chip-select signals, Page mode support	Support for insertion of 1 to 7 wait states, Outputs 4 chip-select signals		Support for insertion of 1 to 6 wait states, Outputs 4 chip-select signals	Support for insertion of 1 to 3 wait states, Outputs 4 chip-select signals	
	Bus Structure	Selectable from Separate bus, Multiplex bus, Data bus width can be selected (8/16-bit), The number of output address buses can be selected (16/20)		Selectable from Separate bus, Multiplex bus, Data bus width can be selected (8/16-bit), The number of output address buses can be selected (20 to 24)			Selectable from Separate bus, Multiplex bus, Data bus width can be selected (8/16-bit), The number of output address buses can be selected (16/20)		
	DRAM Controller	—						Yes	
Clock	Clock Generation Circuit	4 circuits (Main clock, Sub-clock, PLL and on-chip oscillator)							
	PLL	Yes							
	Subclock	Yes							
	RTC	—							
	On-Chip Oscillator	Yes							
	Oscillation Stop Detection	Yes							
	Frequency Divider	1/n (n = 1, 2, 3, 4, 6, 8, 10, 12, 14, 16)							
	Power Save	Wait/Stop							
Power Supply Voltage Detection	Power-On Reset/POR	—							
	Low Voltage Detection/LVD	Yes (Low voltage detection)						—	
A/D Converter	Resolution × Channels	10-bit × 10	10-bit × 18	10-bit × 10	10-bit × 26	10-bit × 34	10-bit × 10	10-bit × 26 (shared with 2 circuits)	10-bit × 34 (shared with 2 circuits)
	Sample and Hold	Yes							
	Multi-Channel Sample and Hold	—						Yes	
D/A Converter	Resolution × Channels	8-bit × 2							
Timer	8-bit	—							
	16-bit	11 (Timer A, Timer B)							
	Input Capture	—						5 (Intelligent I/O)	12 (Intelligent I/O)
	Output Compare	—						10 (Intelligent I/O)	28 (Intelligent I/O)
	PWM Output	5 (Timer A)						15 (Timer A, Intelligent I/O)	33 (Timer A, Intelligent I/O)
	Real-Time Port	—						4 (Intelligent I/O)	16 (Intelligent I/O)
	Event Counter	11 (Timer A, Timer B)							
	2-Phase Encoder Input	3 (Timer A)						3 (Timer A) + 2 (Intelligent I/O)	
	3-Phase Inverter Control	1 (shared with Timer A1, Timer A2, Timer A4, Timer B2, Dead time timer)							
Watchdog Timer		1							
Serial Interface	Clock Sync./Clock Async.	5 (UART)						7 (UART, Intelligent I/O)	
	Clock Sync. Only	—					2 (Intelligent I/O)		
	Clock Async. Only	—							
I²C-bus		5 (UART)							
IEBus		5 (UART)						6 (UART, Intelligent I/O)	
Smart Card/SIM		5 (UART)							
Synchronous Serial Communication Unit/Special Serial I/O		5 (UART)							
CAN	Channels	—						1	
	Message Box (Numbers)	—						16	
IrDA		—							
CRC Calculation Circuit		1 (CRC-CCITT ($X^{16} + X^{12} + X^5 + 1$))							
X/Y Converter		Yes							
I/O Ports	Input Only (Numbers)	1							
	CMOS I/O (Numbers)	45	81	45	85	121	45	85	121
	N-Channel Open Drain Port (Numbers)	2							
	High Current Drive Port	—							
	Pull-Up Resistor	45	81	45	85	121	45	85	121
External Interrupts Pins		11							
Debugging Function	On-Chip Debug	—			Yes		—	Yes	
	On-Board Flash Program	—			Yes		—	Yes	
Other Functions	ROM Correction Function	—							
	Others	3V, 5V interface						—	
Operating Frequency/Supply Voltage		32MHz/4.2 to 5.5V, 24MHz/3.0 to 5.5V		32MHz/3.0 to 5.5V			32MHz/4.2 to 5.5V, 24MHz/3.0 to 5.5V	32MHz/4.2 to 5.5V, 20MHz/3.0 to 5.5V	
Operating Ambient Temperature (°C)		–20 to 85		–20 to 85, –40 to 85					
Package*2		PLQP0100KB-A	PLQP0144KA-A	PLQP0100KB-A	PLQP0144KA-A		PRQP0100JB-A	PLQP0100KB-A	PRQP0100JB-A	PLQP0100KB-A	PLQP0144KA-A
Part No.		M308A0SGP	M308A3SGP	M308A5SGP	M308B8SGP	M308B6SGP	M308B6FGGP	M308B8FGGP	M30800SAFP	M30800SAFP-BL Note 1	M30800SAGP	M30800SAGP-BL Note 1	M30833FJFP	M30833FJGP	M30835FJGP

Note1 Built-in boot loader function ROM-less version

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (M32C/80 Series)

Group		M32C/84																			
Memory	ROM (Bytes)	—		128K		320K		320K + 4K		384K + 4K				512K + 4K							
	RAM (Bytes)	10K				24K															
	ROM Type*1	L		M				F													
	Data Flash/E2 Data Flash	—						4K (Data flash)													
	Program Security	—						Yes (ID code check function, ROM code protect function)													
CPU	CPU	M32C/80 Core																			
	Basic Instructions	108																			
	Minimum Instruction Execution Time (ns)	31.3 (@32MHz)																			
	Multiplier	16 × 16 → 32																			
	Multiply-Accumulate Instruction	16 × 16 + 48 → 48																			
	Barrel Shifter	Yes																			
DMA	DMAC (Channels)	4																			
	DTC/DMAC II	DMAC II (Starts by all peripheral interrupt factors)																			
External Bus Expansion	Address Space (Bytes)	16M																			
	External Bus Interface	Support for insertion of 1 to 6 wait states, Outputs 4 chip-select signals, Page mode support	Support for insertion of 1 to 6 wait states, Outputs 4 chip-select signals																		
	Bus Structure	Selectable from Separate bus, Multiplex bus, Data bus width can be selected (8/16-bit), The number of output address buses can be selected (16/20)																			
	DRAM Controller	—																			
Clock	Clock Generation Circuit	4 circuits (Main clock, Sub-clock, PLL and on-chip oscillator)																			
	PLL	Yes																			
	Subclock	Yes																			
	RTC	—																			
	On-Chip Oscillator	Yes																			
	Oscillation Stop Detection	Yes																			
	Frequency Divider	1/n (n = 1, 2, 3, 4, 6, 8, 10, 12, 14, 16)																			
	Power Save	Wait/Stop																			
Power Supply Voltage Detection	Power-On Reset/POR	—																			
	Low Voltage Detection/LVD	Yes (Low voltage detection)																			
A/D Converter	Resolution × Channels	10-bit × 10	10-bit × 18	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34								
	Sample and Hold	Yes																			
	Multi-Channel Sample and Hold	—																			
D/A Converter	Resolution × Channels	8-bit × 2																			
Timer	8-bit	—																			
	16-bit	11 (Timer A, Timer B)																			
	Input Capture	8 (Intelligent I/O)																			
	Output Compare	8 (Intelligent I/O)																			
	PWM Output	13 (Timer A, Intelligent I/O)																			
	Real-Time Port	—																			
	Event Counter	11 (Timer A, Timer B)																			
	2-Phase Encoder Input	3 (Timer A) + 1 (Intelligent I/O)																			
	3-Phase Inverter Control	1 (shared with Timer A1, Timer A2, Timer A4, Timer B2, Dead time timer)																			
Watchdog Timer		1																			
Serial Interface	Clock Sync./Clock Async.	6 (UART, Intelligent I/O)																			
	Clock Sync. Only	1 (Intelligent I/O)																			
	Clock Async. Only	—																			
I²C-bus		5 (UART)																			
IEBus		5 (UART)																			
Smart Card/SIM		5 (UART)																			
Synchronous Serial Communication Unit/Special Serial I/O		5 (UART)																			
CAN	Channels	1																			
	Message Box (Numbers)	16																			
IrDA		—																			
CRC Calculation Circuit		1 (CRC-CCITT ($X^{16} + X^{12} + X^5 + 1$))																			
X/Y Converter		Yes																			
I/O Ports	Input Only (Numbers)	1																			
	CMOS I/O (Numbers)	45	81	85	121	85	121	85	121	85	121	85	121								
	N-Channel Open Drain Port (Numbers)	2																			
	High Current Drive Port	—																			
	Pull-Up Resistor	45	81	85	121	85	121	85	121	85	121	85	121								
External Interrupts Pins		11																			
Debugging Function	On-Chip Debug	—						Yes													
	On-Board Flash Program	—						Yes													
Others	ROM Correction Function	—		Yes				—													
	Others	3V, 5V interface																			
Operating Frequency/Supply Voltage		32MHz/4.2 to 5.5V, 24MHz/3.0 to 5.5V																			
Operating Ambient Temperature (°C)		–20 to 85, –40 to 85																			
Package*2		PRQP0100JB-A	PLQP0100KB-A	PLQP0144KA-A	PRQP0100JB-A	PLQP0100KB-A	PLQP0144KA-A	PRQP0100JB-A	PLQP0100KB-A	PLQP0144KA-A	PLQP0100KB-A	PLQP0144KA-A	PRQP0100JB-A	PLQP0100KB-A	PLQP0144KA-A	PRQP0100JB-A	PLQP0100KB-A	PLQP0144KA-A			
Part No.		M30840SFP	M30840SGP	M30842SGP	M30840MC-XXXFP	M30840MC-XXXGP	M30842MC-XXXGP	M30843MW-XXXFP	M30843MW-XXXGP	M30845MW-XXXGP	M30843FWGP	M30845FWGP	M30843FHFP	M30843FHGP	M30845FHGP	M30843FJFP	M30843FJGP	M30845FJGP			

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (M32C/80 Series)

Group		M32C/85											
Memory	ROM (Bytes)	320K		320K + 4K		384K + 4K		512K + 4K					
	RAM (Bytes)	24K											
	ROM Type*1	M		F									
	Data Flash/E2 Data Flash	—		4K (Data flash)									
	Program Security	—		Yes (ID code check function, ROM code protect function)									
CPU	CPU	M32C/80 Core											
	Basic Instructions	108											
	Minimum Instruction Execution Time (ns)	31.3 (@32MHz)											
	Multiplier	16 × 16 → 32											
	Multiply-Accumulate Instruction	16 × 16 + 48 → 48											
	Barrel Shifter	Yes											
DMA	DMAC (Channels)	4											
	DTC/DMACⅡ	DMACⅡ (Starts by all peripheral interrupt factors)											
External Bus Expansion	Address Space (Bytes)	16M											
	External Bus Interface	Support for insertion of 1 to 6 wait states, Outputs 4 chip-select signals											
	Bus Structure	Selectable from Separate bus, Multiplex bus, Data bus width can be selected (8/16-bit), The number of output address buses can be selected (16/20)											
	DRAM Controller	—											
Clock	Clock Generation Circuit	4 circuits (Main clock, Sub-clock, PLL and on-chip oscillator)											
	PLL	Yes											
	Subclock	Yes											
	RTC	—											
	On-Chip Oscillator	Yes											
	Oscillation Stop Detection	Yes											
	Frequency Divider	1/n (n = 1, 2, 3, 4, 6, 8, 10, 12, 14, 16)											
	Power Save	Wait/Stop											
Power Supply Voltage Detection	Power-On Reset/POR	—											
	Low Voltage Detection/LVD	Yes (Low voltage detection)											
A/D Converter	Resolution × Channels	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34				
	Sample and Hold	Yes											
	Multi-Channel Sample and Hold	—											
D/A Converter	Resolution × Channels	8-bit × 2											
Timer	8-bit	—											
	16-bit	11 (Timer A, Timer B)											
	Input Capture	8 (Intelligent I/O)											
	Output Compare	8 (Intelligent I/O)											
	PWM Output	13 (Timer A, Intelligent I/O)											
	Real-Time Port	—											
	Event Counter	11 (Timer A, Timer B)											
	2-Phase Encoder Input	3 (Timer A) + 1 (Intelligent I/O)											
	3-Phase Inverter Control	1 (shared with Timer A1, Timer A2, Timer A4, Timer B2, Dead time timer)											
Watchdog Timer		1											
Serial Interface	Clock Sync./Clock Async.	6 (UART, Intelligent I/O)											
	Clock Sync. Only	1 (Intelligent I/O)											
	Clock Async. Only	—											
I²C-bus		5 (UART)											
IEBus		5 (UART)											
Smart Card/SIM		5 (UART)											
Synchronous Serial Communication Unit/Special Serial I/O		5 (UART)											
CAN	Channels	2											
	Message Box (Numbers)	16 × 2											
IrDA		—											
CRC Calculation Circuit		1 (CRC-CCITT ($X^{16} + X^{12} + X^5 + 1$))											
X/Y Converter		Yes											
I/O Ports	Input Only (Numbers)	1											
	CMOS I/O (Numbers)	85	121	85	121	85	121	85	121				
	N-Channel Open Drain Port (Numbers)	2											
	High Current Drive Port	—											
	Pull-Up Resistor	85	121	85	121	85	121	85	121				
External Interrupts Pins		11											
Debugging Function	On-Chip Debug	—		Yes									
	On-Board Flash Program	—		Yes									
Others	ROM Correction Function	Yes		—									
	Others	3V, 5V interface											
Operating Frequency/Supply Voltage		32MHz/4.2 to 5.5V, 24MHz/3.0 to 5.5V											
Operating Ambient Temperature (°C)		–20 to 85, –40 to 85											
Package*2		PRQP0100JB-A	PLQP0100KB-A	PLQP0144KA-A	PRQP0100JB-A	PLQP0100KB-A	PLQP0144KA-A	PRQP0100JB-A	PLQP0100KB-A	PLQP0144KA-A	PRQP0100JB-A	PLQP0100KB-A	PLQP0144KA-A
Part No.		M30853MW-XXXFP	M30853MW-XXXGP	M30855MW-XXXGP	M30853FWFP	M30853FWGP	M30855FWGP	M30853FHFP	M30853FHGP	M30855FHGP	M30853FJFP	M30853FJGP	M30855FJGP

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (M32C/80 Series)

Group		M32C/87 (M32C/87)												M32C/87 (M32C/87A)											
Memory	ROM (Bytes)	384K		384K + 4K		512K		512K + 4K		768K + 4K		1M + 4K		384K		384K + 4K		512K							
	RAM (Bytes)	24K				31K				48K				24K				31K							
	ROM Type*1	M		F		M		F						M		F		M							
	Data Flash/E2 Data Flash	—		4K (Data flash)		—		4K (Data flash)						—		4K (Data flash)		—							
	Program Security	—		Yes (ID code check function, ROM code protect function)		—		Yes (ID code check function, ROM code protect function)						—		Yes (ID code check function, ROM code protect function)		—							
CPU	CPU	M32C/80 Core																							
	Basic Instructions	108																							
	Minimum Instruction Execution Time (ns)	31.3 (@32MHz)																							
	Multiplier	16 × 16 → 32																							
	Multiply-Accumulate Instruction	16 × 16 + 48 → 48																							
	Barrel Shifter	Yes																							
DMA	DMAC (Channels)	4																							
	DTC/DMAC II	DMAC II (Starts by all peripheral interrupt factors)																							
External Bus Expansion	Address Space (Bytes)	16M																							
	External Bus Interface	Support for insertion of 1 to 7 wait states, Outputs 4 chip-select signals																							
	Bus Structure	Selectable from Separate bus, Multiplex bus, Data bus width can be selected (8/16-bit), The number of output address buses can be selected (16/20)																							
	DRAM Controller	—																							
Clock	Clock Generation Circuit	4 circuits (Main clock, Sub-clock, PLL and on-chip oscillator)																							
	PLL	Yes																							
	Subclock	Yes																							
	RTC	—																							
	On-Chip Oscillator	Yes																							
	Oscillation Stop Detection	Yes																							
	Frequency Divider	1/n (n = 1, 2, 3, 4, 6, 8, 10, 12, 14, 16)																							
	Power Save	Wait/Stop																							
Power Supply Voltage Detection	Power-On Reset/POR	—																							
	Low Voltage Detection/LVD	Yes (Low voltage detection)																							
A/D Converter	Resolution × Channels	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34						
	Sample and Hold	Yes																							
	Multi-Channel Sample and Hold	—																							
D/A Converter	Resolution × Channels	8-bit × 2																							
Timer	8-bit	—																							
	16-bit	11 (Timer A, Timer B)																							
	Input Capture	8 (Intelligent I/O)																							
	Output Compare	10 (Intelligent I/O)	16 (Intelligent I/O)	10 (Intelligent I/O)	16 (Intelligent I/O)	10 (Intelligent I/O)	16 (Intelligent I/O)	10 (Intelligent I/O)	16 (Intelligent I/O)	10 (Intelligent I/O)	16 (Intelligent I/O)	10 (Intelligent I/O)	16 (Intelligent I/O)	10 (Intelligent I/O)	16 (Intelligent I/O)	10 (Intelligent I/O)	16 (Intelligent I/O)	10 (Intelligent I/O)	16 (Intelligent I/O)						
	PWM Output	15 (Timer A, Intelligent I/O)	21 (Timer A, Intelligent I/O)	15 (Timer A, Intelligent I/O)	21 (Timer A, Intelligent I/O)	15 (Timer A, Intelligent I/O)	21 (Timer A, Intelligent I/O)	15 (Timer A, Intelligent I/O)	21 (Timer A, Intelligent I/O)	15 (Timer A, Intelligent I/O)	21 (Timer A, Intelligent I/O)	15 (Timer A, Intelligent I/O)	21 (Timer A, Intelligent I/O)	15 (Timer A, Intelligent I/O)	21 (Timer A, Intelligent I/O)	15 (Timer A, Intelligent I/O)	21 (Timer A, Intelligent I/O)	15 (Timer A, Intelligent I/O)	21 (Timer A, Intelligent I/O)						
	Real-Time Port	3 (Intelligent I/O)	8 (Intelligent I/O)	3 (Intelligent I/O)	8 (Intelligent I/O)	3 (Intelligent I/O)	8 (Intelligent I/O)	3 (Intelligent I/O)	8 (Intelligent I/O)	3 (Intelligent I/O)	8 (Intelligent I/O)	3 (Intelligent I/O)	8 (Intelligent I/O)	3 (Intelligent I/O)	8 (Intelligent I/O)	3 (Intelligent I/O)	8 (Intelligent I/O)	3 (Intelligent I/O)	8 (Intelligent I/O)						
	Event Counter	11 (Timer A, Timer B)																							
	2-Phase Encoder Input	3 (Timer A) + 1 (Intelligent I/O)																							
	3-Phase Inverter Control	1 (shared with Timer A1, Timer A2, Timer A4, Timer B2, Dead time timer)																							
Watchdog Timer		1																							
Serial Interface	Clock Sync./Clock Async.	7 (UART, Intelligent I/O)	8 (UART, Intelligent I/O)	7 (UART, Intelligent I/O)	8 (UART, Intelligent I/O)	7 (UART, Intelligent I/O)	8 (UART, Intelligent I/O)	7 (UART, Intelligent I/O)	8 (UART, Intelligent I/O)	7 (UART, Intelligent I/O)	8 (UART, Intelligent I/O)	7 (UART, Intelligent I/O)	8 (UART, Intelligent I/O)	7 (UART, Intelligent I/O)	8 (UART, Intelligent I/O)	7 (UART, Intelligent I/O)	8 (UART, Intelligent I/O)	7 (UART, Intelligent I/O)	8 (UART, Intelligent I/O)						
	Clock Sync. Only	2 (Intelligent I/O)																							
	Clock Async. Only	—																							
I²C-bus		5 (UART)																							
IEBus		6 (UART, Intelligent I/O)																							
Smart Card/SIM		5 (UART)																							
Synchronous Serial Communication Unit/Special Serial I/O		5 (UART)																							
CAN	Channels	2												1											
	Message Box (Numbers)	16 × 2												16											
IrDA		Yes (UART)																							
CRC Calculation Circuit		1 (CRC-CCITT ($X^{16} + X^{12} + X^5 + 1$))																							
X/Y Converter		Yes																							
I/O Ports	Input Only (Numbers)	1																							
	CMOS I/O (Numbers)	85	121	85	121	85	121	85	121	85	121	85	121	85	121	85	121	85	121						
	N-Channel Open Drain Port (Numbers)	2																							
	High Current Drive Port	—																							
	Pull-Up Resistor	85	121	85	121	85	121	85	121	85	121	85	121	85	121	85	121	85	121						
External Interrupts Pins		11	14	11	14	11	14	11	14	11	14	11	14	11	14	11	14	11	14						
Debugging Function	On-Chip Debug	—		Yes		—		Yes						—		Yes		—							
	On-Board Flash Program	—		Yes		—		Yes						—		Yes		—							
Others	ROM Correction Function	Yes		—		Yes		—						Yes		—		Yes							
	Others	3V, 5V interface																							
Operating Frequency/Supply Voltage		32MHz/4.2 to 5.5V, 24MHz/3.0 to 5.5V																							
Operating Ambient Temperature (°C)		–20 to 85, –40 to 85																							
Package*2		PLQP0100KB-A	PLQP0144KA-A	PLQP0100KB-A	PLQP0144KA-A	PRQP0100JB-A	PLQP0100KB-A	PLQP0144KA-A	PLQP0100KB-A	PLQP0144KA-A	PLQP0100KB-A	PLQP0144KA-A	PRQP0100JB-A	PLQP0100KB-A	PLQP0144KA-A	PLQP0100KB-A	PLQP0144KA-A	PLQP0100KB-A	PLQP0144KA-A	PRQP0100JB-A	PLQP0100KB-A	PLQP0144KA-A			
Part No.		M30873MH-XXXGP	M30875MH-XXXGP	M30873FHGP	M30875FHGP	M30876MJ-XXXFP	M30876MJ-XXXGP	M30878MJ-XXXGP	M30876FJGP	M30878FJGP	M30879FKGP	M30879BFKGP	M30879FLFP	M30879FLGP	M30879BFLGP	M30873MHA-XXXGP	M30875MHA-XXXGP	M30873FHAGP	M30875FHAGP	M30876MJA-XXXFP	M30876MJA-XXXGP	M30878MJA-XXXGP			

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (M32C/80 Series)

Group		M32C/87 (M32C/87A)						M32C/87 (M32C/87B)											
Memory	ROM (Bytes)	512K + 4K	768K + 4K		1M + 4K			384K	384K + 4K		512K		512K + 4K		768K + 4K		1M + 4K		
	RAM (Bytes)	31K	48K					24K			31K		48K						
	ROM Type*1	F						M	F		M		F						
	Data Flash/E2 Data Flash	4K (Data flash)						—	4K (Data flash)		—		4K (Data flash)						
	Program Security	Yes (ID code check function, ROM code protect function)						—	Yes (ID code check function, ROM code protect function)		—		Yes (ID code check function, ROM code protect function)						
CPU	CPU	M32C/80 Core																	
	Basic Instructions	108																	
	Minimum Instruction Execution Time (ns)	31.3 (@32MHz)																	
	Multiplier	16 × 16 → 32																	
	Multiply-Accumulate Instruction	16 × 16 + 48 → 48																	
	Barrel Shifter	Yes																	
DMA	DMAC (Channels)	4																	
	DTC/DMACⅡ	DMACⅡ (Starts by all peripheral interrupt factors)																	
External Bus Expansion	Address Space (Bytes)	16M																	
	External Bus Interface	Support for insertion of 1 to 7 wait states, Outputs 4 chip-select signals																	
	Bus Structure	Selectable from Separate bus, Multiplex bus, Data bus width can be selected (8/16-bit), The number of output address buses can be selected (16/20)																	
	DRAM Controller	—																	
Clock	Clock Generation Circuit	4 circuits (Main clock, Sub-clock, PLL and on-chip oscillator)																	
	PLL	Yes																	
	Subclock	Yes																	
	RTC	—																	
	On-Chip Oscillator	Yes																	
	Oscillation Stop Detection	Yes																	
	Frequency Divider	1/n (n = 1, 2, 3, 4, 6, 8, 10, 12, 14, 16)																	
	Power Save	Wait/Stop																	
Power Supply Voltage Detection	Power-On Reset/POR	—																	
	Low Voltage Detection/LVD	Yes (Low voltage detection)																	
A/D Converter	Resolution × Channels	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34
	Sample and Hold	Yes																	
	Multi-Channel Sample and Hold	—																	
D/A Converter	Resolution × Channels	8-bit × 2																	
Timer	8-bit	—																	
	16-bit	11 (Timer A, Timer B)																	
	Input Capture	8 (Intelligent I/O)																	
	Output Compare	10 (Intelligent I/O)	16 (Intelligent I/O)	10 (Intelligent I/O)	16 (Intelligent I/O)	10 (Intelligent I/O)	16 (Intelligent I/O)	10 (Intelligent I/O)	16 (Intelligent I/O)	10 (Intelligent I/O)	16 (Intelligent I/O)	10 (Intelligent I/O)	16 (Intelligent I/O)	10 (Intelligent I/O)	16 (Intelligent I/O)	10 (Intelligent I/O)	16 (Intelligent I/O)	10 (Intelligent I/O)	16 (Intelligent I/O)
	PWM Output	15 (Timer A, Intelligent I/O)	21 (Timer A, Intelligent I/O)	15 (Timer A, Intelligent I/O)	21 (Timer A, Intelligent I/O)	15 (Timer A, Intelligent I/O)	21 (Timer A, Intelligent I/O)	15 (Timer A, Intelligent I/O)	21 (Timer A, Intelligent I/O)	15 (Timer A, Intelligent I/O)	21 (Timer A, Intelligent I/O)	15 (Timer A, Intelligent I/O)	21 (Timer A, Intelligent I/O)	15 (Timer A, Intelligent I/O)	21 (Timer A, Intelligent I/O)	15 (Timer A, Intelligent I/O)	21 (Timer A, Intelligent I/O)	15 (Timer A, Intelligent I/O)	21 (Timer A, Intelligent I/O)
	Real-Time Port	3 (Intelligent I/O)	8 (Intelligent I/O)	3 (Intelligent I/O)	8 (Intelligent I/O)	3 (Intelligent I/O)	8 (Intelligent I/O)	3 (Intelligent I/O)	8 (Intelligent I/O)	3 (Intelligent I/O)	8 (Intelligent I/O)	3 (Intelligent I/O)	8 (Intelligent I/O)	3 (Intelligent I/O)	8 (Intelligent I/O)	3 (Intelligent I/O)	8 (Intelligent I/O)	3 (Intelligent I/O)	8 (Intelligent I/O)
	Event Counter	11 (Timer A, Timer B)																	
	2-Phase Encoder Input	3 (Timer A) + 1 (Intelligent I/O)																	
	3-Phase Inverter Control	1 (shared with Timer A1, Timer A2, Timer A4, Timer B2, Dead time timer)																	
Watchdog Timer		1																	
Serial Interface	Clock Sync./Clock Async.	7 (UART, Intelligent I/O)	8 (UART, Intelligent I/O)	7 (UART, Intelligent I/O)	8 (UART, Intelligent I/O)	7 (UART, Intelligent I/O)	8 (UART, Intelligent I/O)	7 (UART, Intelligent I/O)	8 (UART, Intelligent I/O)	7 (UART, Intelligent I/O)	8 (UART, Intelligent I/O)	7 (UART, Intelligent I/O)	8 (UART, Intelligent I/O)	7 (UART, Intelligent I/O)	8 (UART, Intelligent I/O)	7 (UART, Intelligent I/O)	8 (UART, Intelligent I/O)	7 (UART, Intelligent I/O)	8 (UART, Intelligent I/O)
	Clock Sync. Only	2 (Intelligent I/O)																	
	Clock Async. Only	—																	
I²C-bus		5 (UART)																	
IEBus		6 (UART, Intelligent I/O)																	
Smart Card/SIM		5 (UART)																	
Synchronous Serial Communication Unit/Special Serial I/O		5 (UART)																	
CAN	Channels	1						—											
	Message Box (Numbers)	16						—											
IrDA		Yes (UART)																	
CRC Calculation Circuit		1 (CRC-CCITT ($X^{16} + X^{12} + X^5 + 1$))																	
X/Y Converter		Yes																	
I/O Ports	Input Only (Numbers)	1																	
	CMOS I/O (Numbers)	85	121	85	121	85	121	85	121	85	121	85	121	85	121	85	121	85	121
	N-Channel Open Drain Port (Numbers)	2																	
	High Current Drive Port	—																	
	Pull-Up Resistor	85	121	85	121	85	121	85	121	85	121	85	121	85	121	85	121	85	121
External Interrupts Pins		11	14	11	14	11	14	11	14	11	14	11	14	11	14	11	14	11	14
Debugging Function	On-Chip Debug	Yes						—		Yes		—		Yes					
	On-Board Flash Program	Yes						—		Yes		—		Yes					
Others	ROM Correction Function	—						Yes		—		Yes		—					
	Others	3V, 5V interface																	
Operating Frequency/Supply Voltage		32MHz/4.2 to 5.5V, 24MHz/3.0 to 5.5V																	
Operating Ambient Temperature (°C)		–20 to 85, –40 to 85																	
Package*2		PLQP0100KB-A	PLQP0144KA-A	PLQP0100KB-A	PLQP0144KA-A	PRQP0100JB-A	PLQP0100KB-A	PLQP0144KA-A	PLQP0100KB-A	PLQP0144KA-A	PLQP0100KB-A	PLQP0144KA-A	PRQP0100JB-A	PLQP0100KB-A	PLQP0144KA-A	PLQP0100KB-A	PLQP0144KA-A	PLQP0100KB-A	PLQP0144KA-A	PRQP0100JB-A	PLQP0100KB-A	PLQP0144KA-A
Part No.		M30876FJAGP	M30878FJAGP	M30879FKAGP	M3087BFKAGP	M30879FLAFP	M30879FLAGP	M3087BFLAGP	M30873MHB-XXXGP	M30875MHB-XXXGP	M30873FHBGP	M30875FHBGP	M30876MJB-XXXFP	M30876MJB-XXXGP	M30878MJB-XXXGP	M30876FJBGP	M30878FJBGP	M30879FKBGP	M3087BFKBGP	M30879FLBFP	M30879FLBGP	M3087BFLBGP

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

Outline of M16C/60 Series

The M16C/60 Series is a core product group of the M16C Family (M16C/M32C/R32C), and incorporates a variety of standard peripheral functions. These functions include a 16-bit multi-function timer (including a timer function for three-phase motor control), UART/clock synchronous serial interface, clock synchronous serial interface, 10-bit A/D converter, 8-bit D/A converter, DMAC, CRC calculation circuit, and watchdog timer.

Note: Refer to "Automotive MCUs" for the M16C/60 Series for automotive use.

M16C/60 Series Features

- Achieves high speed operation with low voltage operation
  The M16C/65 provides 32-MHz high-speed operation, while the M16C/63 provides 1.8-V low voltage operation
- Establishes the center of the popular M16C MCU family
  A true workhorse for embedded systems, encompassing a broad range of devices that includes MCUs optimized for general-purpose, automotive/industrial and PC applications, among many others
- Has extensive on-chip peripheral functions
  Span of built-in functions includes 11 timers, 8 serial interfaces, up to 26-ch A/D converter (M16C/65), 4-ch DMAC, etc.
- Incorporating a high-function timer that is also available for the inverter control.
  Simplifies design of systems for controlling 3-phase motors
- Offers a special multiple-capability serial I/O function
  Provides UART/serial interface, plus connectivity to I²C-bus, IEBus, SIM interface
- Offers super-low consumption current, extremely-low radiated noise, and a wide-temperature-range operation, accommodating a broad span of applications

M16C/65C Group

- Enhances the functions of the M16C/65 Group
- Incorporates high speed on-chip oscillator 40MHz±5%
- Incorporates 128K to 512K byte flash memory and 12K to 47K byte RAM
- Spports a wide range of voltage, from 2.7 to 5.5V, enabling 32-MHz operation
- Incorporates remote control signal receiving function : 2 circuits and CEC circuit
- Contributes to reduction of system costs by incorporating power-on reset function
- Incorporates a synchronous/asynchronous clock × 6ch, DMAC × 4ch, 8-bit PWM × 2ch, multi-master I²C bus × 1ch, and a real-time clock (built in one-week timer)

M16C/64C Group

- Enhances the functions of the M16C/64A Group
- Incorporates 128K to 512K byte flash memory
- Incorporates remote control signal receiving function : 2 circuits and CEC circuit
- Contributes to reduction of system costs by incorporating power-on reset function
- Incorporates a synchronous/asynchronous clock × 6ch, DMAC × 4ch, 8-bit PWM × 2ch, multi-master I²C bus × 1ch, and a real-time clock (built in one-week timer)

M16C/63 Group

- Low voltage operation — 1.8V
- Low power consumption at maximum operating frequency 20MHz.
- Incorparate 128K to 512K byte flash memory
- Built-in real-time clock (full calendar, automatic correction function)
- Remote control signal receiving function: incorporates 2 circuits and a CEC circuit
- Contributes to reduction of system costs by incorporating a power-on reset function
- 100-pin LGA (5.5 × 5.5mm) package is prepared

M16C/6C Group

- On-chip USB2.0 Full-speed
- Inherits M16C/65 Group functions
- Incorporates a voltage detector circuit (voltage detection at 3 points), power-on reset, PLL frequency synthesizer, oscillation stop detection, and an input capture/output compare timer
- Incorporates 10-bit A/D converter 2 circuits

* Please refer to the page for "USB MPUs and MCUs."

• M16C/60 Series CPU Overview

Performance	Machine cycles	M16C/65 31.3ns (32MHz)
	Address space	1M byte
Number of Instructions	91	
Registers	Data registers : 16-bit × 4 × 2 banks Address registers : 16-bit × 2 × 2 banks Dedicated registers : 16-bit × 5	

M16C/65 Group

- Inherits features from the M16C/62A, 62N, 62M, and 62P and supports many fields
- Incorporates 128K to 768K byte flash memory and 12K to 47K byte RAM
- Supports a wide range of voltages, from 2.7 to 5.5 V, enabling 32-MHz operation
- Remote control signal receiving function: incorporates 2 circuits and a CEC circuit
- Incorporates a synchronous/asynchronous clock × 6ch, DMAC × 4ch, 8-bit PWM × 2ch, multi-master I²C bus × 1ch, and a real-time clock (built in one-week timer)

M16C/64A Group

- Enhances the functions of the M16C/64 Group
- Incorporates 128K to 512K flash memory
- Remote control signal receiving function: incorporates 2 circuits and a CEC circuit
- Incorporates a synchronous/asynchronous clock × 6ch, DMAC × 4ch, 8-bit PWM × 2ch, multi-master I²C bus × 1ch, and a real-time clock (built in one-week timer)

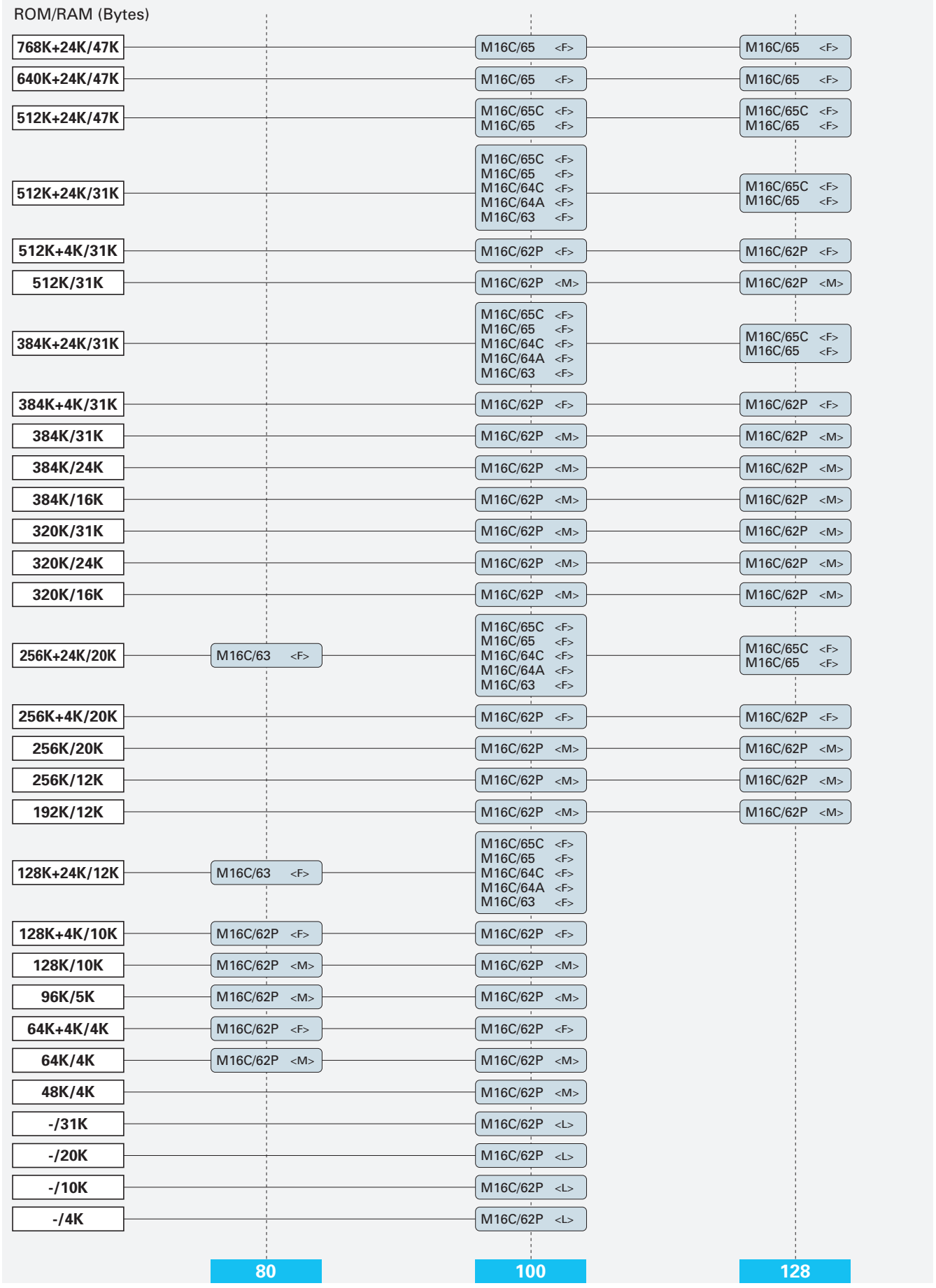
M16C/62P Group

- Inherits features of M16C/62A, 62N and 62M groups, enabling support for many applications
- High-speed processing (24MHz@3-5V, On-chip PLL), 1.5 times speed of M16C/62A and M16C/62N
- Can use 3V and 5V power supply, enabling the direct connection of 3V type memory to 5V type device
- Can connect with large number of devices through IEBus and I²C-bus subset supported SIO (3ch)
- Can choose a wait-cycle insertion from 0 to 3, enabling connection to slow devices
- Offers even higher reliability with enhancement of watchdog timer, internal oscillation-stop detection circuit and new reset circuit

M16C/62A Group

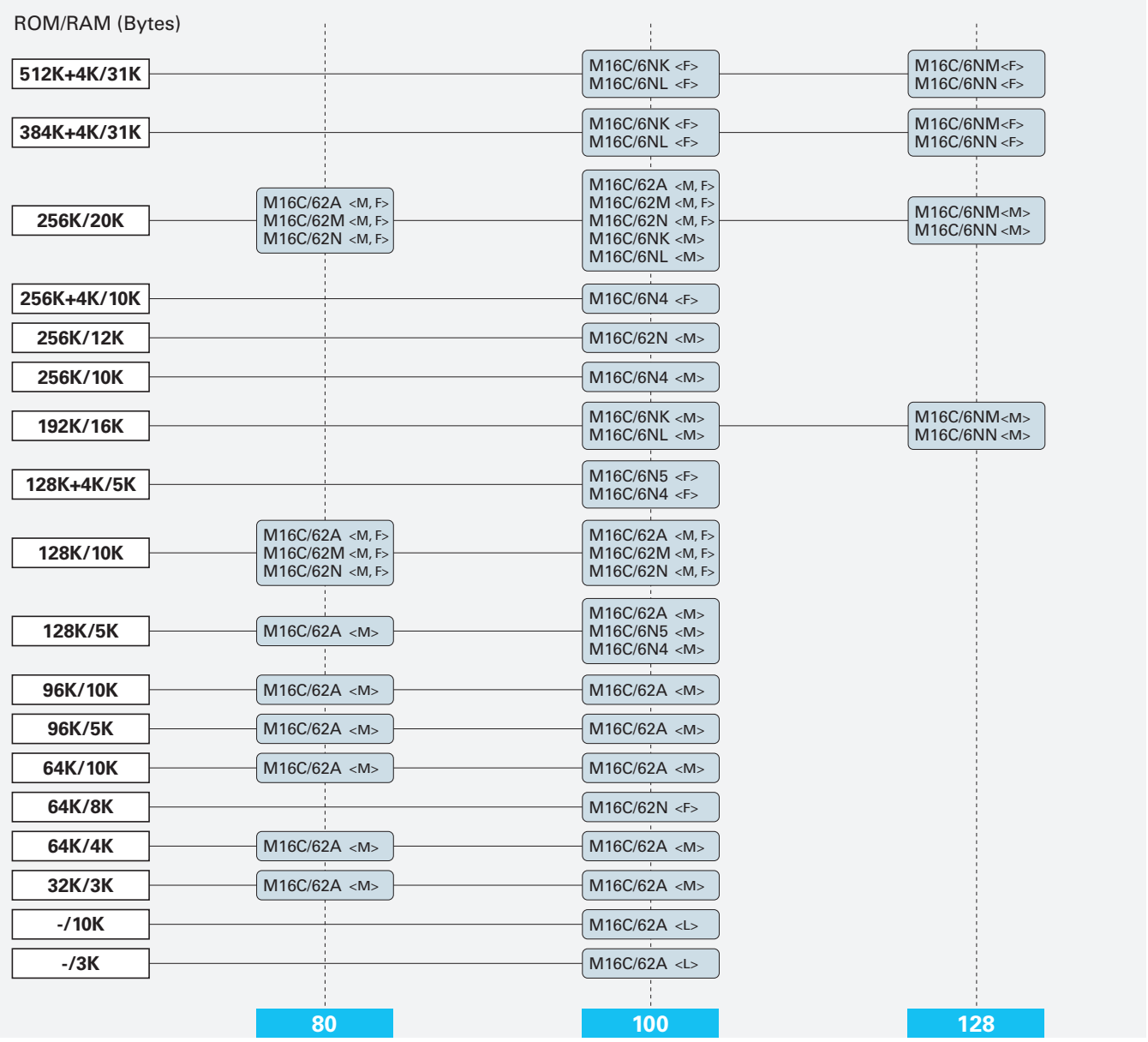
- Operates over a large supply voltage range: 2.7V to 5.5V
- Has many on-chip peripheral functions, including 11 16-bit timers, 5-ch serial interface, 10-ch 10-bit A/D converter, 2-ch 8-bit D/A converter, and DMAC
- Provides a 3-phase inverter PWM function for motor control applications
- Addresses 1M byte of memory space for data-intensive applications such as test-system probe tips
- Includes versions Flash memory with high-speed rewrite capability

• Memory Capacity (ROM/RAM) (M16C/60 Series: M16C/63/64/64A/65/62P Group)



Letters in brackets < > indicate memory variations.
F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

• Memory Capacity (ROM/RAM) (M16C/60 Series: M16C/62A/62M/62N/6N Group)



Letters in brackets < > indicate memory variations.
F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

• Specifications (M16C/60 Series: M16C/63 Group)

Group		M16C/63			
Memory	ROM (Bytes)	128K + 24K		256K + 24K	
	RAM (Bytes)	12K		20K	
	ROM Type*1	F			
	Data Flash/E2 Data Flash	8K (Data Flash: program/Erase 10k times)			
	Program Security	Yes (ID code check function, ROM code protect function)			
CPU	CPU	M16C/60 Core			
	Basic Instructions	91			
	Minimum Instruction Execution Time (ns)	50 (@20MHz)			
	Multiplier	16 × 16 → 32			
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32			
	Barrel Shifter	—			
DMA	DMAC (Channels)	4			
	DTC/DMAC Ⅱ	—			
External Bus Expansion	Address Space (Bytes)	1M			
	External Bus Interface	Support for insertion of 0 to 8 wait states, Outputs 4 chip-select signals, Available to 4M bytes by address space expansion function			—
	Bus Structure	Selectable from Separate bus, Multiplex bus, Data bus width can be selected (8/16-bit), The number of output address buses can be selected (12/16/20)			—
	DRAM Controller	—			
Clock	Clock Generation Circuit	4 circuits (Main clock, Sub-clock, High-speed on-chip oscillator, Low-speed on-chip oscillator)			
	PLL	—			
	Subclock	Yes (32.768kHz)			
	RTC	Yes (Count: second, minute, hour, day of week, month, year, Automatic correction function)			
	On-Chip Oscillator	2 circuits (High speed: 40MHz, Low speed: 125kHz)			
	Oscillation Stop Detection	Yes			
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)			
	Power Save	Wait/Stop			
Power Supply Voltage Detection	Power-On Reset/POR	Yes			
	Low Voltage Detection/LVD	Yes (Voltage detection 3)			
A/D Converter	Resolution × Channels	10-bit × 26			
	Sample and Hold	Yes			
	Multi-Channel Sample and Hold	—			
D/A Converter	Resolution × Channels	8-bit × 2			
Timer	8-bit	—			
	16-bit	11 (Timer A, Timer B)			
	Input Capture	—			
	Output Compare	—			
	PWM Output	7 (Timer A, PWM Function)	5 (Timer A, PWM Function)	7 (Timer A, PWM Function)	5 (Timer A, PWM Function)
	Real-Time Port	—			
	Event Counter	11 (Timer A, Timer B)			
	2-Phase Encoder Input	3 (Timer A)			
	3-Phase Inverter Control	1 (shared with Timer A4, Timer A1, Timer A2, Timer B2, Dead time timer)			—
Watchdog Timer		1			
Serial Interface	Clock Sync./Clock Async.	6 (UART)	3 (UART)	6 (UART)	3 (UART)
	Clock Sync. Only	2 (Serial I/O)			
	Clock Async. Only	—	1 (UART)	—	1 (UART)
I²C-bus		7 (Multi master I²C, UART)	5 (Multi master I²C, UART)	7 (Multi master I²C, UART)	5 (Multi master I²C, UART)
IEBus		6 (UART)	3 (UART)	6 (UART)	3 (UART)
Smart Card/SIM		1 (UART)			
Synchronous Serial Communication Unit/Special Serial I/O		6 (UART)	3 (UART)	6 (UART)	3 (UART)
CAN	Channels	—			
	Message Box (Numbers)	—			
IrDA		—			
CRC Calculation Circuit		1 (CRC-CCITT ($X^{16} + X^{12} + X^5 + 1$) /CRC-16 ($X^{16} + X^{15} + X^2 + 1$))			
X/Y Converter		—			
I/O Ports	Input Only (Numbers)	—			
	CMOS I/O (Numbers)	85	68	85	68
	N-Channel Open Drain Port (Numbers)	3			
	High Current Drive Port	—			
	Pull-Up Resistor	85	68	85	68
External Interrupts Pins		17			
Debugging Function	On-Chip Debug	Yes			
	On-Board Flash Program	Yes			
Other Functions	ROM Correction Function	—			
	Others	3V, 5V interface , Remote control signal receiver, CEC Function	Remote control signal receiver, CEC Function	3V, 5V interface , Remote control signal receiver, CEC Function	Remote control signal receiver, CEC Function
Operating Frequency/Supply Voltage		20MHz/2.7 to 5.5V 5MHz/1.8 to 5.5V			
Operating Ambient Temperature (°C)		–20 to 85	–40 to 85	–20 to 85	–40 to 85	–20 to 85	–40 to 85	–20 to 85	–40 to 85
Package*2		PRQP0100JD-B	PLQP0100KB-A	PRQP0100JD-B	PLQP0100KB-A	PTLG0100KA-A	PLQP0080KB-A	PRQP0100JD-B	PLQP0100KB-A	PTLG0100KA-A	PRQP0100JD-B	PLQP0100KB-A	PLQP0080KB-A	
Part No.		R5F363A6NFA	R5F363A6NFB	R5F363A6DFA	R5F363A6DFB	R5F363A6NLG	R5F363B6NFE	R5F363B6DFE	R5F363AENFA	R5F363AENFB	R5F363AENLG	R5F363AEDFA	R5F363AEDFB	R5F363BEDFE	R5F363BENFE

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (M16C/60 Series: M16C/63 Group)

Group		M16C/63									
Memory	ROM (Bytes)	384K + 24K					512K + 24K				
	RAM (Bytes)	31K									
	ROM Type*1	F									
	Data Flash/E2 Data Flash	8K (Data Flash: program/Erase 10k times)									
	Program Security	Yes (ID code check function, ROM code protect function)									
CPU	CPU	M16C/60 Core									
	Basic Instructions	91									
	Minimum Instruction Execution Time (ns)	50 (@20MHz)									
	Multiplier	16 × 16 → 32									
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32									
	Barrel Shifter	—									
DMA	DMAC (Channels)	4									
	DTC/DMAC II	—									
External Bus Expansion	Address Space (Bytes)	1M									
	External Bus Interface	Support for insertion of 0 to 8 wait states, Outputs 4 chip-select signals, Available to 4M bytes by address space expansion function									
	Bus Structure	Selectable from Separate bus, Multiplex bus, Data bus width can be selected (8/16-bit), The number of output address buses can be selected (12/16/20)									
	DRAM Controller	—									
Clock	Clock Generation Circuit	4 circuits (Main clock, Sub-clock, High-speed on-chip oscillator, Low-speed on-chip oscillator)									
	PLL	—									
	Subclock	Yes (32.768kHz)									
	RTC	Yes (Count: second, minute, hour, day of week, month, year, Automatic correction function)									
	On-Chip Oscillator	2 circuits (High speed: 40MHz, Low speed: 125kHz)									
	Oscillation Stop Detection	Yes									
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)									
	Power Save	Wait/Stop									
Power Supply Voltage Detection	Power-On Reset/POR	Yes									
	Low Voltage Detection/LVD	Yes (Voltage detection 3)									
A/D Converter	Resolution × Channels	10-bit × 26									
	Sample and Hold	Yes									
	Multi-Channel Sample and Hold	—									
D/A Converter	Resolution × Channels	8-bit × 2									
Timer	8-bit	—									
	16-bit	11 (Timer A, Timer B)									
	Input Capture	—									
	Output Compare	—									
	PWM Output	7 (Timer A, PWM Function)									
	Real-Time Port	—									
	Event Counter	11 (Timer A, Timer B)									
	2-Phase Encoder Input	3 (Timer A)									
	3-Phase Inverter Control	1 (shared with Timer A4, Timer A1, Timer A2, Timer B2, Dead time timer)									
Watchdog Timer		1									
Serial Interface	Clock Sync./Clock Async.	6 (UART)									
	Clock Sync. Only	2 (Serial I/O)									
	Clock Async. Only	—									
I^2C-bus		7 (Multi master I^2C, UART)									
IEBus		6 (UART)									
Smart Card/SIM		1 (UART)									
Synchronous Serial Communication Unit/Special Serial I/O		6 (UART)									
CAN	Channels	—									
	Message Box (Numbers)	—									
IrDA		—									
CRC Calculation Circuit		1 (CRC-CCITT ($X^{16} + X^{12} + X^5 + 1$) /CRC-16 ($X^{16} + X^{15} + X^2 + 1$))									
X/Y Converter		—									
I/O Ports	Input Only (Numbers)	—									
	CMOS I/O (Numbers)	85									
	N-Channel Open Drain Port (Numbers)	3									
	High Current Drive Port	—									
	Pull-Up Resistor	85									
External Interrupts Pins		17									
Debugging Function	On-Chip Debug	Yes									
	On-Board Flash Program	Yes									
Other Functions	ROM Correction Function	—									
	Others	3V, 5V interface , Remote control signal receiver, CEC Function									
Operating Frequency/Supply Voltage		20MHz/2.7 to 5.5V 5MHz/1.8 to 5.5V									
Operating Ambient Temperature (˚C)		–40 to 85		–20 to 85						–40 to 85	
Package*2		PRQP0100JD-B	PLQP0100KB-A	PRQP0100JD-B	PLQP0100KB-A	PTLG0100KA-A	PRQP0100JD-B	PLQP0100KB-A	PTLG0100KA-A	PRQP0100JD-B	PLQP0100KB-A
Part No.		R5F363AKDFA	R5F363AKDFB	R5F363AKNFA	R5F363AKNFB	R5F363AKNLG	R5F363AMNFA	R5F363AMNFB	R5F363AMNLG	R5F363AMDFA	R5F363AMDFB

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (M16C/60 Series: M16C/64A Group)

Group		M16C/64A															
Memory	ROM (Bytes)	128K + 24K		256K + 24K		384K + 24K		512K + 24K									
	RAM (Bytes)	12K		20K		31K											
	ROM Type*1	F															
	Data Flash/E2 Data Flash	8K (Data Flash: program/Erase 10k times)															
	Program Security	Yes (ID code check function, ROM code protect function)															
CPU	CPU	M16C/60 Core															
	Basic Instructions	91															
	Minimum Instruction Execution Time (ns)	40.0 (@25MHz)															
	Multiplier	16 × 16 → 32															
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32															
	Barrel Shifter	—															
DMA	DMAC (Channels)	4															
	DTC/DMAC Ⅱ	—															
External Bus Expansion	Address Space (Bytes)	1M															
	External Bus Interface	Support for insertion of 0 to 3 wait states, Outputs 4 chip-select signals, Available to 4M bytes by address space expansion function															
	Bus Structure	Selectable from Separate bus, Multiplex bus, Data bus width can be selected (8/16-bit), The number of output address buses can be selected (12/16/20)															
	DRAM Controller	—															
Clock	Clock Generation Circuit	4 circuits (Main clock, PLL, Sub-clock, Low-speed on-chip oscillator)															
	PLL	Yes															
	Subclock	Yes (32.768kHz)															
	RTC	Yes															
	On-Chip Oscillator	Yes (Low-speed: 125kHz)															
	Oscillation Stop Detection	Yes															
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)															
	Power Save	Wait/Stop															
Power Supply Voltage Detection	Power-On Reset/POR	Yes															
	Low Voltage Detection/LVD	Yes (Voltage detection 3)															
A/D Converter	Resolution × Channels	10-bit × 26															
	Sample and Hold	Yes															
	Multi-Channel Sample and Hold	—															
D/A Converter	Resolution × Channels	8-bit × 2															
Timer	8-bit	—															
	16-bit	11 (Timer A, Timer B)															
	Input Capture	—															
	Output Compare	—															
	PWM Output	7 (Timer A, PWM Function)															
	Real-Time Port	—															
	Event Counter	11 (Timer A, Timer B)															
	2-Phase Encoder Input	3 (Timer A)															
	3-Phase Inverter Control	1 (shared with Timer A4, Timer A1, Timer A2, Timer B2, Dead time timer)															
Watchdog Timer		1															
Serial Interface	Clock Sync./Clock Async.	6 (UART)															
	Clock Sync. Only	2 (Serial I/O)															
	Clock Async. Only	—															
I²C-bus		7 (Multi master I²C, UART)															
IEBus		6 (UART)															
Smart Card/SIM		1 (UART)															
Synchronous Serial Communication Unit/Special Serial I/O		6 (UART)															
CAN	Channels	—															
	Message Box (Numbers)	—															
IrDA		—															
CRC Calculation Circuit		1 (CRC-CCITT ($X^{16} + X^{12} + X^5 + 1$) /CRC-16 ($X^{16} + X^{15} + X^2 + 1$))															
X/Y Converter		—															
I/O Ports	Input Only (Numbers)	—															
	CMOS I/O (Numbers)	85															
	N-Channel Open Drain Port (Numbers)	3															
	High Current Drive Port	—															
	Pull-Up Resistor	85															
External Interrupts Pins		13															
Debugging Function	On-Chip Debug	Yes															
	On-Board Flash Program	Yes															
Other Functions	ROM Correction Function	—															
	Others	3V, 5V interface Remote control signal receiver, CEC Function															
Operating Frequency/Supply Voltage		25MHz/2.7 to 5.5V															
Operating Ambient Temperature (°C)		–40 to 85		–20 to 85		–40 to 85		–20 to 85		–40 to 85		–20 to 85		–40 to 85		–20 to 85	
Package*2		PRQP0100JD-B	PLQP0100KB-A	PRQP0100JD-B	PLQP0100KB-A	PRQP0100JD-B	PLQP0100KB-A	PRQP0100JD-B	PLQP0100KB-A	PRQP0100JD-B	PLQP0100KB-A	PRQP0100JD-B	PLQP0100KB-A	PRQP0100JD-B	PLQP0100KB-A	PRQP0100JD-B	PLQP0100KB-A
Part No.		R5F364A6DFA	R5F364A6DFB	R5F364A6NFA	R5F364A6NFB	R5F364AEDFA	R5F364AEDFB	R5F364AENFA	R5F364AENFB	R5F364AKDFA	R5F364AKDFB	R5F364AKNFA	R5F364AKNFB	R5F364AMDFA	R5F364AMDFB	R5F364AMNFA	R5F364AMNFB

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (M16C/60 Series: M16C/64C Group)

Group		M16C/64C			
Memory	ROM (Bytes)	128K + 24K	256K + 24K	384K + 24K	512K + 24K
	RAM (Bytes)	12K	20K	31K	
	ROM Type*1	F			
	Data Flash/E2 Data Flash	8K (Data Flash: program/Erase 10k times)			
	Program Security	Yes (ID code check function, ROM code protect function)			
CPU	CPU	M16C/60 Core			
	Basic Instructions	91			
	Minimum Instruction Execution Time (ns)	40.0 (@25MHz)			
	Multiplier	16 × 16 → 32			
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32			
	Barrel Shifter	—			
DMA	DMAC (Channels)	4			
	DTC/DMAC Ⅱ	—			
External Bus Expansion	Address Space (Bytes)	1M			
	External Bus Interface	Support for insertion of 0 to 3 wait states, Outputs 4 chip-select signals, Available to 4M bytes by address space expansion function			
	Bus Structure	Selectable from Separate bus, Multiplex bus, Data bus width can be selected (8/16-bit), The number of output address buses can be selected (12/16/20)			
	DRAM Controller	—			
Clock	Clock Generation Circuit	4 circuits (Main clock, PLL, Sub-clock, Low-speed on-chip oscillator)			
	PLL	Yes			
	Subclock	Yes (32.768kHz)			
	RTC	Yes			
	On-Chip Oscillator	Yes (Low-speed: 125kHz)			
	Oscillation Stop Detection	Yes			
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)			
	Power Save	Wait/Stop			
Power Supply Voltage Detection	Power-On Reset/POR	Yes			
	Low Voltage Detection/LVD	Yes (Voltage detection 3)			
A/D Converter	Resolution × Channels	10-bit × 26			
	Sample and Hold	Yes			
	Multi-Channel Sample and Hold	—			
D/A Converter	Resolution × Channels	8-bit × 2			
Timer	8-bit	—			
	16-bit	11 (Timer A, Timer B)			
	Input Capture	—			
	Output Compare	—			
	PWM Output	7 (Timer A, PWM Function)			
	Real-Time Port	—			
	Event Counter	11 (Timer A, Timer B)			
	2-Phase Encoder Input	3 (Timer A)			
	3-Phase Inverter Control	1 (shared with Timer A4, Timer A1, Timer A2, Timer B2, Dead time timer)			
Watchdog Timer		1			
Serial Interface	Clock Sync./Clock Async.	6 (UART)			
	Clock Sync. Only	2(Serial I/O)			
	Clock Async. Only	—			
I²C-bus		7 (Multi master I²C, UART)			
IEBus		6 (UART)			
Smart Card/SIM		1 (UART)			
Synchronous Serial Communication Unit/Special Serial I/O		6 (UART)			
CAN	Channels	—			
	Message Box (Numbers)	—			
IrDA		—			
CRC Calculation Circuit		1 (CRC-CCITT ($X^{16} + X^{12} + X^5 + 1$)/CRC-16 ($X^{16} + X^{15} + X^2 + 1$))			
X/Y Converter		—			
I/O Ports	Input Only (Numbers)	—			
	CMOS I/O (Numbers)	85			
	N-Channel Open Drain Port (Numbers)	3			
	High Current Drive Port	—			
	Pull-Up Resistor	85			
External Interrupts Pins		13			
Debugging Function	On-Chip Debug	Yes			
	On-Board Flash Program	Yes			
Other Functions	ROM Correction Function	—			
	Others	3V, 5V interface Remote control signal receiver, CEC Function			
Operating Frequency/Supply Voltage		25MHz/2.7 to 5.5V			

Operating Ambient Temperature (°C)	–40 to 85	–20 to 85	–40 to 85	–20 to 85	–40 to 85	–20 to 85	–40 to 85	–20 to 85	–40 to 85	–20 to 85	–40 to 85	–20 to 85	–40 to 85	–20 to 85	–40 to 85
Package*2	PRQP0100JD-B	PLQP0100KB-A		PRQP0100JD-B	PLQP0100KB-A		PRQP0100JD-B		PLQP0100KB-A	PRQP0100JD-B		PLQP0100KB-A		PRQP0100JD-B	
Part No.	R5F36406CDFA*	R5F36406CNFB*	R5F36406CDFB*	R5F36406CNFA*	R5F3640ECNFB*	R5F3640ECDFB*	R5F3640ECNFA*	R5F3640ECDFA*	R5F3640KCNFB*	R5F3640KCNFA*	R5F3640KCDFA*	R5F3640KCDFB*	R5F3640MCNFB*	R5F3640MCDFB*	R5F3640MCNFA*	R5F3640MCDFA*

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (M16C/60 Series: M16C/65 Group)

Group		M16C/65													
Memory	ROM (Bytes)	128K + 24K				256K + 24K				384K + 24K					
	RAM (Bytes)	12K				20K				31K					
	ROM Type*1	F													
	Data Flash/E2 Data Flash	8K (Data Flash: program/Erase 10k times)													
	Program Security	Yes (ID code check function, ROM code protect function)													
CPU	CPU	M16C/60 Core													
	Basic Instructions	91													
	Minimum Instruction Execution Time (ns)	31.25 (@32MHz)													
	Multiplier	16 × 16 → 32													
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32													
	Barrel Shifter	—													
DMA	DMAC (Channels)	4													
	DTC/DMAC Ⅱ	—													
External Bus Expansion	Address Space (Bytes)	1M													
	External Bus Interface	Support for insertion of 0 to 8 wait states, Outputs 4 chip-select signals, Available to 4M bytes by address space expansion function													
	Bus Structure	Selectable from Separate bus, Multiplex bus, Data bus width can be selected (8/16-bit), The number of output address buses can be selected (12/16/20)													
	DRAM Controller	—													
Clock	Clock Generation Circuit	5 circuits (Main clock, PLL, Sub-clock, High-speed on-chip oscillator, Low-speed on-chip oscillator)													
	PLL	Yes													
	Subclock	Yes (32.768kHz)													
	RTC	Yes													
	On-Chip Oscillator	2 circuits (High speed: 40MHz, Low speed: 125kHz)													
	Oscillation Stop Detection	Yes													
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)													
	Power Save	Wait/Stop													
Power Supply Voltage Detection	Power-On Reset/POR	Yes													
	Low Voltage Detection/LVD	Yes (Voltage detection 3)													
A/D Converter	Resolution × Channels	10-bit × 26													
	Sample and Hold	Yes													
	Multi-Channel Sample and Hold	—													
D/A Converter	Resolution × Channels	8-bit × 2													
Timer	8-bit	—													
	16-bit	11 (Timer A, Timer B)													
	Input Capture	—													
	Output Compare	—													
	PWM Output	7 (Timer A, PWM Function)													
	Real-Time Port	—													
	Event Counter	11 (Timer A, Timer B)													
	2-Phase Encoder Input	3 (Timer A)													
	3-Phase Inverter Control	1 (shared with Timer A4, Timer A1, Timer A2, Timer B2, Dead time timer)													
Watchdog Timer		1													
Serial Interface	Clock Sync./Clock Async.	6 (UART)													
	Clock Sync. Only	2 (Serial I/O)													
	Clock Async. Only	—													
I²C-bus		7 (Multi master I²C, UART)													
IEBus		6 (UART)													
Smart Card/SIM		1 (UART)													
Synchronous Serial Communication Unit/Special Serial I/O		6 (UART)													
CAN	Channels	—													
	Message Box (Numbers)	—													
IrDA		—													
CRC Calculation Circuit		1 (CRC-CCITT ($X^{16} + X^{12} + X^5 + 1$) /CRC-16 ($X^{16} + X^{15} + X^2 + 1$))													
X/Y Converter		—													
I/O Ports	Input Only (Numbers)	—													
	CMOS I/O (Numbers)	85				111				85				111	
	N-Channel Open Drain Port (Numbers)	3													
	High Current Drive Port	—													
	Pull-Up Resistor	85				111				85				111	
External Interrupts Pins		13													
Debugging Function	On-Chip Debug	Yes													
	On-Board Flash Program	Yes													
Other Functions	ROM Correction Function	—													
	Others	3V, 5V interface , Remote control signal receiver, CEC Function													
Operating Frequency/Supply Voltage		32MHz/2.7 to 5.5V													
Operating Ambient Temperature (°C)		–40 to 85		–20 to 85		–40 to 85			–20 to 85			–40 to 85		–20 to 85	–40 to 85
Package*2		PRQP0100JD-B	PLQP0100KB-A	PRQP0100JD-B	PLQP0100KB-A	PRQP0100JD-B	PLQP0100KB-A	PLQP0128KB-A		PRQP0100JD-B	PLQP0100KB-A	PRQP0100JD-B	PLQP0100KB-A	PRQP0100JD-B	PLQP0128KB-A
Part No.		R5F36506DFA	R5F36506DFB	R5F36506NFA	R5F36506NFB	R5F3650EDFA	R5F3650EDFB	R5F3651EDFC	R5F3651ENFC	R5F3650ENFA	R5F3650ENFB	R5F3650KDFA	R5F3650KDFB	R5F3650KNFA	R5F3650KNFB	R5F3651KNFC	R5F3651KDFC

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (M16C/60 Series: M16C/65 Group)

Group		M16C/65																													
Memory	ROM (Bytes)	512K + 24K												640K + 24K								768K + 24K									
	RAM (Bytes)	31K				47K																									
	ROM Type*1	F																													
	Data Flash/E2 Data Flash	8K (Data Flash: program/Erase 10k times)																													
	Program Security	Yes (ID code check function, ROM code protect function)																													
CPU	CPU	M16C/60 Core																													
	Basic Instructions	91																													
	Minimum Instruction Execution Time (ns)	31.25 (@32MHz)																													
	Multiplier	16 × 16 → 32																													
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32																													
	Barrel Shifter	—																													
DMA	DMAC (Channels)	4																													
	DTC/DMAC II	—																													
External Bus Expansion	Address Space (Bytes)	1M																													
	External Bus Interface	Support for insertion of 0 to 8 wait states, Outputs 4 chip-select signals, Available to 4M bytes by address space expansion function																													
	Bus Structure	Selectable from Separate bus, Multiplex bus, Data bus width can be selected (8/16-bit), The number of output address buses can be selected (12/16/20)																													
	DRAM Controller	—																													
Clock	Clock Generation Circuit	5 circuits (Main clock, PLL, Sub-clock, High-speed on-chip oscillator, Low-speed on-chip oscillator)																													
	PLL	Yes																													
	Subclock	Yes (32.768kHz)																													
	RTC	Yes																													
	On-Chip Oscillator	2 circuits (High speed: 40MHz, Low speed: 125kHz)																													
	Oscillation Stop Detection	Yes																													
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)																													
	Power Save	Wait/Stop																													
Power Supply Voltage Detection	Power-On Reset/POR	Yes																													
	Low Voltage Detection/LVD	Yes (Voltage detection 3)																													
A/D Converter	Resolution × Channels	10-bit × 26																													
	Sample and Hold	Yes																													
	Multi-Channel Sample and Hold	—																													
D/A Converter	Resolution × Channels	8-bit × 2																													
Timer	8-bit	—																													
	16-bit	11 (Timer A, Timer B)																													
	Input Capture	—																													
	Output Compare	—																													
	PWM Output	7 (Timer A, PWM Function)																													
	Real-Time Port	—																													
	Event Counter	11 (Timer A, Timer B)																													
	2-Phase Encoder Input	3 (Timer A)																													
	3-Phase Inverter Control	1 (shared with Timer A4, Timer A1, Timer A2, Timer B2, Dead time timer)																													
Watchdog Timer		1																													
Serial Interface	Clock Sync./Clock Async.	6 (UART)																													
	Clock Sync. Only	2 (Serial I/O)																													
	Clock Async. Only	—																													
I²C-bus		7 (Multi master I²C, UART)																													
IEBus		6 (UART)																													
Smart Card/SIM		1 (UART)																													
Synchronous Serial Communication Unit/Special Serial I/O		6 (UART)																													
CAN	Channels	—																													
	Message Box (Numbers)	—																													
IrDA		—																													
CRC Calculation Circuit		1 (CRC-CCITT ($X^{16} + X^{12} + X^5 + 1$) /CRC-16 ($X^{16} + X^{15} + X^2 + 1$))																													
X/Y Converter		—																													
I/O Ports	Input Only (Numbers)	—																													
	CMOS I/O (Numbers)	85		111		85		111		85		111		85		111															
	N-Channel Open Drain Port (Numbers)	3																													
	High Current Drive Port	—																													
	Pull-Up Resistor	85		111		85		111		85		111		85		111															
External Interrupts Pins		13																													
Debugging Function	On-Chip Debug	Yes																													
	On-Board Flash Program	Yes																													
Other Functions	ROM Correction Function	—																													
	Others	3V, 5V interface , Remote control signal receiver, CEC Function																													
Operating Frequency/Supply Voltage		32MHz/2.7 to 5.5V																													
Operating Ambient Temperature (˚C)		–40 to 85		–20 to 85		–40 to 85		–20 to 85		–40 to 85		–20 to 85		–40 to 85		–20 to 85		–40 to 85													
Package*2		PRQP0100JD-B	PLQP0100KB-A	PRQP0100JD-B	PLQP0100KB-A	PLQP0128KB-A		PRQP0100JD-B	PLQP0100KB-A	PRQP0100JD-B	PLQP0100KB-A	PLQP0128KB-A		PRQP0100JD-B	PLQP0100KB-A	PLQP0128KB-A		PRQP0100JD-B	PLQP0100KB-A	PLQP0128KB-A		PRQP0100JD-B	PLQP0100KB-A	PLQP0128KB-A							
Part No.		R5F36650MDFA	R5F36650MDFB	R5F36650MNFA	R5F36650MNFB	R5F36651MNFC	R5F36651MDFC	R5F36650NDFA	R5F36650NDFB	R5F36650NNFA	R5F36650NNFB	R5F36651NNFC	R5F36651NDFC	R5F36650RDFA	R5F36650RDFB	R5F36650RNFA	R5F36650RNFB	R5F36651RNFC	R5F36651RDFC	R5F36650TDFA	R5F36650TDFB	R5F36650TNFA	R5F36650TNFB	R5F36651TNFC	R5F36651TDFC						

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (M16C/60 Series: M16C/65C Group)

Group		M16C/65C
Memory	ROM (Bytes)	128K + 24K / 256K + 24K / 384K + 24K / 512K + 24K (see part table below)
	RAM (Bytes)	12K / 20K / 31K / 47K (see part table below)
	ROM Type*[1]	F
	Data Flash/E2 Data Flash	8K (Data Flash: program/Erase 10k times)
	Program Security	Yes (ID code check function, ROM code protect function)
CPU	CPU	M16C/60 Core
	Basic Instructions	91
	Minimum Instruction Execution Time (ns)	31.25 (@32MHz)
	Multiplier	16 × 16 → 32
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32
	Barrel Shifter	—
DMA	DMAC (Channels)	4
	DTC/DMAC II	—
External Bus Expansion	Address Space (Bytes)	1M
	External Bus Interface	Support for insertion of 0 to 8 wait states, Outputs 4 chip-select signals, Available to 4M bytes by address space expansion function
	Bus Structure	Selectable from Separate bus, Multiplex bus, Data bus width can be selected (8/16-bit), The number of output address buses can be selected (12/16/20)
	DRAM Controller	—
Clock	Clock Generation Circuit	5 circuits (Main clock, PLL, Sub-clock, High-speed on-chip oscillator, Low-speed on-chip oscillator)
	PLL	Yes
	Subclock	Yes (32.768kHz)
	RTC	Yes
	On-Chip Oscillator	2 circuits (High speed: 40MHz, Low speed: 125kHz)
	Oscillation Stop Detection	Yes
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)
	Power Save	Wait/Stop
Power Supply Voltage Detection	Power-On Reset/POR	Yes
	Low Voltage Detection/LVD	Yes (Voltage detection 3)
A/D Converter	Resolution × Channels	10-bit × 26
	Sample and Hold	Yes
	Multi-Channel Sample and Hold	—
D/A Converter	Resolution × Channels	8-bit × 2
Timer	8-bit	—
	16-bit	11 (Timer A, Timer B)
	Input Capture	—
	Output Compare	—
	PWM Output	7 (Timer A, PWM function)
	Real-Time Port	—
	Event Counter	11 (Timer A, Timer B)
	2-Phase Encoder Input	3 (Timer A)
	3-Phase Inverter Control	1 (shared with Timer A4, Timer A1, Timer A2, Timer B2, Dead time timer)
Watchdog Timer		1
Serial Interface	Clock Sync./Clock Async.	6 (UART)
	Clock Sync. Only	2 (Serial I/O)
	Clock Async. Only	—
I^2C-bus		7 (Multi master I^2C, UART)
IEBus		6 (UART)
Smart Card/SIM		1 (UART)
Synchronous Serial Communication Unit/Special Serial I/O		6 (UART)
CAN	Channels	—
	Message Box (Numbers)	—
IrDA		—
CRC Calculation Circuit		1 (CRC-CCITT ($X^{16} + X^{12} + X^5 + 1$)/CRC-16 ($X^{16} + X^{15} + X^2 + 1$))
X/Y Converter		—
I/O Ports	Input Only (Numbers)	—
	CMOS I/O (Numbers)	85 / 111 (see part table below)
	N-Channel Open Drain Port (Numbers)	3
	High Current Drive Port	—
	Pull-Up Resistor	85 / 111 (see part table below)
External Interrupts Pins		13
Debugging Function	On-Chip Debug	Yes
	On-Board Flash Program	Yes
Other Functions	ROM Correction Function	—
	Others	3V, 5V interface , Remote control signal receiver, CEC Function
Operating Frequency/Supply Voltage		32MHz/2.7 to 5.5V

Part No.	ROM (Bytes)	RAM (Bytes)	CMOS I/O (Numbers)	Pull-Up Resistor	Operating Ambient Temperature (°C)	Package*[2]
R5F36506CDFB*	128K + 24K	12K	85	85	–40 to 85	PLQP0100KB-A
R5F36506CNFB*	128K + 24K	12K	85	85	–20 to 85	PLQP0100KB-A
R5F36506CNFA*	128K + 24K	12K	85	85	–20 to 85	PRQP0100JD-B
R5F36506CDFA*	128K + 24K	12K	85	85	–40 to 85	PRQP0100JD-B
R5F3650ECDFA*	256K + 24K	20K	85	85	–40 to 85	PRQP0100JD-B
R5F3651ECNFC*	256K + 24K	20K	111	111	–40 to 85	PLQP0128KB-A
R5F3651ECDFC*	256K + 24K	20K	111	111	–40 to 85	PLQP0128KB-A
R5F3650ECNFB*	256K + 24K	20K	85	85	–20 to 85	PLQP0100KB-A
R5F3650ECDFB*	256K + 24K	20K	85	85	–40 to 85	PLQP0100KB-A
R5F3650ECNFA*	256K + 24K	20K	85	85	–20 to 85	PRQP0100JD-B
R5F3651KCNFC*	384K + 24K	31K	111	111	–20 to 85	PLQP0128KB-A
R5F3651KCDFC*	384K + 24K	31K	111	111	–40 to 85	PLQP0128KB-A
R5F3650KCNFB*	384K + 24K	31K	85	85	–20 to 85	PLQP0100KB-A
R5F3650KCDFB*	384K + 24K	31K	85	85	–40 to 85	PLQP0100KB-A
R5F3650KCNFA*	384K + 24K	31K	85	85	–20 to 85	PRQP0100JD-B
R5F3650KCDFA*	384K + 24K	31K	85	85	–40 to 85	PRQP0100JD-B
R5F3651MCDFC*	512K + 24K	31K	111	111	–40 to 85	PLQP0128KB-A
R5F3650MCNFB*	512K + 24K	31K	85	85	–20 to 85	PLQP0100KB-A
R5F3650MCDFB*	512K + 24K	31K	85	85	–40 to 85	PLQP0100KB-A
R5F3650MCNFA*	512K + 24K	31K	85	85	–20 to 85	PRQP0100JD-B
R5F3650MCDFA*	512K + 24K	31K	85	85	–40 to 85	PRQP0100JD-B
R5F3651MCNFC*	512K + 24K	31K	111	111	–20 to 85	PLQP0128KB-A
R5F3651NCDFC*	512K + 24K	47K	111	111	–40 to 85	PLQP0128KB-A
R5F3651NCNFC*	512K + 24K	47K	111	111	–20 to 85	PLQP0128KB-A
R5F3650NCNFB*	512K + 24K	47K	85	85	–20 to 85	PLQP0100KB-A
R5F3650NCDFB*	512K + 24K	47K	85	85	–40 to 85	PLQP0100KB-A
R5F3650NCNFA*	512K + 24K	47K	85	85	–20 to 85	PRQP0100JD-B
R5F3650NCDFA*	512K + 24K	47K	85	85	–40 to 85	PRQP0100JD-B

*[1] F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*[2] Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (M16C/60 Series: M16C/62P Group)

Group		M16C/62P																	
Memory	ROM (Bytes)	—				48K		64K		64K + 4K		96K							
	RAM (Bytes)	4K		10K		20K		31K		4K							5K		
	ROM Type*1	L								M				F		M			
	Data Flash/E2 Data Flash	—												4K (Data flash)		—			
	Program Security	—												Yes (ID code check function, ROM code protect function)		—			
CPU	CPU	M16C/60 Core																	
	Basic Instructions	91																	
	Minimum Instruction Execution Time (ns)	41.7 (@24MHz)																	
	Multiplier	16 × 16 → 32																	
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32																	
	Barrel Shifter	—																	
DMA	DMAC (Channels)	2																	
	DTC/DMAC II	—																	
External Bus Expansion	Address Space (Bytes)	1M								—		1M		—		1M		—	
	External Bus Interface	Support for insertion of 1 to 3 wait states, Outputs 4 chip-select signals, Available to 4M bytes by address space expansion function								—		Support for insertion of 1 to 3 wait states, Outputs 4 chip-select signals, Available to 4M bytes by address space expansion function		—		Support for insertion of 1 to 3 wait states, Outputs 4 chip-select signals, Available to 4M bytes by address space expansion function		—	
	Bus Structure	Selectable from Separate bus, Multiplex bus, Data bus width can be selected (8/16-bit), The number of output address buses can be selected (12/16/20)								—		Selectable from Separate bus, Multiplex bus, Data bus width can be selected (8/16-bit), The number of output address buses can be selected (12/16/20)		—		Selectable from Separate bus, Multiplex bus, Data bus width can be selected (8/16-bit), The number of output address buses can be selected (12/16/20)		—	
	DRAM Controller	—																	
Clock	Clock Generation Circuit	4 circuits (Main clock, PLL, Sub-clock, On-chip oscillator)																	
	PLL	Yes																	
	Subclock	Yes																	
	RTC	—																	
	On-Chip Oscillator	Yes																	
	Oscillation Stop Detection	Yes																	
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)																	
	Power Save	Wait/Stop																	
Power Supply Voltage Detection	Power-On Reset/POR	—																	
	Low Voltage Detection/LVD	Yes (Low voltage detection)																	
A/D Converter	Resolution × Channels	10-bit × 26																	
	Sample and Hold	Yes																	
	Multi-Channel Sample and Hold	—																	
D/A Converter	Resolution × Channels	8-bit × 2																	
Timer	8-bit	—																	
	16-bit	11 (Timer A, Timer B)																	
	Input Capture	—																	
	Output Compare	—																	
	PWM Output	5 (Timer A)								3 (Timer A)		5 (Timer A)		3 (Timer A)		5 (Timer A)		3 (Timer A)	
	Real-Time Port	—																	
	Event Counter	11 (Timer A, Timer B)																	
	2-Phase Encoder Input	3 (Timer A)								2 (Timer A)		3 (Timer A)		2 (Timer A)		3 (Timer A)		2 (Timer A)	
	3-Phase Inverter Control	1 (shared with Timer A4, Timer A1, Timer A2, Timer B2, Dead time timer)								—		1 (shared with Timer A4, Timer A1, Timer A2, Timer B2, Dead time timer)		—		1 (shared with Timer A4, Timer A1, Timer A2, Timer B2, Dead time timer)		—	
Watchdog Timer		1																	
Serial Interface	Clock Sync./Clock Async.	3 (UART)								2 (UART)		3 (UART)		2 (UART)		3 (UART)		2 (UART)	
	Clock Sync. Only	2 (Serial I/O)																	
	Clock Async. Only	—								1 (UART)		—		1 (UART)		—		1 (UART)	
I²C-bus		3 (UART)																	
IEBus		3 (UART)																	
Smart Card/SIM		1 (UART)																	
Synchronous Serial Communication Unit/Special Serial I/O		3 (UART)																	
CAN	Channels	—																	
	Message Box (Numbers)	—																	
IrDA		—																	
CRC Calculation Circuit		1 (CRC-CCITT ($X^{16} + X^{12} + X^5 + 1$))																	
X/Y Converter		—																	
I/O Ports	Input Only (Numbers)	1																	
	CMOS I/O (Numbers)	50								85				68		85		68	
	N-Channel Open Drain Port (Numbers)	2																	
	High Current Drive Port	—																	
	Pull-Up Resistor	50								85				68		85		68	
External Interrupts Pins		11												8		11		8	
Debugging Function	On-Chip Debug	—												Yes		—			
	On-Board Flash Program	—												Yes		—			
Others	ROM Correction Function	Yes												—		Yes			
	Others	3V, 5V interface																	
Operating Frequency/Supply Voltage		24MHz/3.0 to 5.5V, 10MHz/2.7 to 5.5V																	
Operating Ambient Temperature (°C)		–20 to 85, –40 to 85																	
Package*2		PRQP0100JB-A	PLQP0100KB-A	PRQP0100JB-A	PLQP0100KB-A	PRQP0100JB-A	PLQP0100KB-A	PRQP0100JB-A	PLQP0100KB-A	PRQP0100JB-A	PLQP0100KB-A	PRQP0100JB-A	PLQP0100KB-A	PRQP0080JA-A	PRQP0100JB-A	PLQP0100KB-A	PRQP0080JA-A	PRQP0100JB-A	PLQP0100KB-A	PRQP0080JA-A
Part No.		M30622SPFP	M30622SPGP	M30620SPFP	M30620SPGP	M30624SPFP	M30624SPGP	M30626SPFP	M30626SPGP	M30622M6P-XXXFP	M30622M6P-XXXGP	M30622M8P-XXXFP	M30622M8P-XXXGP	M30623M8P-XXXGP	M30622F8PFP	M30622F8PGP	M30623F8PGP	M30622MAP-XXXFP	M30622MAP-XXXGP	M30623MAP-XXXGP

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (M16C/60 Series: M16C/62P Group)

Group		M16C/62P																					
Memory	ROM (Bytes)	128K		128K + 4K		192K		256K				256K + 4K		320K									
	RAM (Bytes)	10K				12K				20K				16K									
	ROM Type*1	M		F		M						F		M									
	Data Flash/E2 Data Flash	—		4K (Data flash)		—						4K (Data flash)		—									
	Program Security	—		Yes (ID code check function, ROM code protect function)		—						Yes (ID code check function, ROM code protect function)		—									
CPU	CPU	M16C/60 Core																					
	Basic Instructions	91																					
	Minimum Instruction Execution Time (ns)	41.7 (@24MHz)																					
	Multiplier	16 × 16 → 32																					
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32																					
	Barrel Shifter	—																					
DMA	DMAC (Channels)	2																					
	DTC/DMAC II	—																					
External Bus Expansion	Address Space (Bytes)	1M	—	1M	—	1M																	
	External Bus Interface	Support for insertion of 1 to 3 wait states, Outputs 4 chip-select signals, Available to 4M bytes by address space expansion function	—	Support for insertion of 1 to 3 wait states, Outputs 4 chip-select signals, Available to 4M bytes by address space expansion function	—	Support for insertion of 1 to 3 wait states, Outputs 4 chip-select signals, Available to 4M bytes by address space expansion function																	
	Bus Structure	Selectable from Separate bus, Multiplex bus, Data bus width can be selected (8/16-bit), The number of output address buses can be selected (12/16/20)	—	Selectable from Separate bus, Multiplex bus, Data bus width can be selected (8/16-bit), The number of output address buses can be selected (12/16/20)	—	Selectable from Separate bus, Multiplex bus, Data bus width can be selected (8/16-bit), The number of output address buses can be selected (12/16/20)																	
	DRAM Controller	—																					
Clock	Clock Generation Circuit	4 circuits (Main clock, PLL, Sub-clock, On-chip oscillator)																					
	PLL	Yes																					
	Subclock	Yes																					
	RTC	—																					
	On-Chip Oscillator	Yes																					
	Oscillation Stop Detection	Yes																					
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)																					
	Power Save	Wait/Stop																					
Power Supply Voltage Detection	Power-On Reset/POR	—																					
	Low Voltage Detection/LVD	Yes (Low voltage detection)																					
A/D Converter	Resolution × Channels	10-bit × 26																					
	Sample and Hold	Yes																					
	Multi-Channel Sample and Hold	—																					
D/A Converter	Resolution × Channels	8-bit × 2																					
Timer	8-bit	—																					
	16-bit	11 (Timer A, Timer B)																					
	Input Capture	—																					
	Output Compare	—																					
	PWM Output	5 (Timer A)	3 (Timer A)	5 (Timer A)	3 (Timer A)	5 (Timer A)																	
	Real-Time Port	—																					
	Event Counter	11 (Timer A, Timer B)																					
	2-Phase Encoder Input	3 (Timer A)	2 (Timer A)	3 (Timer A)	2 (Timer A)	3 (Timer A)																	
	3-Phase Inverter Control	1 (shared with Timer A4, Timer A1, Timer A2, Timer B2, Dead time timer)	—	1 (shared with Timer A4, Timer A1, Timer A2, Timer B2, Dead time timer)	—	1 (shared with Timer A4, Timer A1, Timer A2, Timer B2, Dead time timer)																	
Watchdog Timer		1																					
Serial Interface	Clock Sync./Clock Async.	3 (UART)	2 (UART)	3 (UART)	2 (UART)	3 (UART)																	
	Clock Sync. Only	2 (Serial I/O)																					
	Clock Async. Only	—	1 (UART)	—	1 (UART)	—																	
I²C-bus		3 (UART)																					
IEBus		3 (UART)																					
Smart Card/SIM		1 (UART)																					
Synchronous Serial Communication Unit/Special Serial I/O		3 (UART)																					
CAN	Channels	—																					
	Message Box (Numbers)	—																					
IrDA		—																					
CRC Calculation Circuit		1 (CRC-CCITT ($X^{16} + X^{12} + X^5 + 1$))																					
X/Y Converter		—																					
I/O Ports	Input Only (Numbers)	1																					
	CMOS I/O (Numbers)	85	68	85	68	85	111	85	111	85	111	85	111	85	111								
	N-Channel Open Drain Port (Numbers)	2																					
	High Current Drive Port	—																					
	Pull-Up Resistor	85	68	85	68	85	111	85	111	85	111	85	111	85	111								
External Interrupts Pins		11	8	11	8	11																	
Debugging Function	On-Chip Debug	—		Yes		—						Yes		—									
	On-Board Flash Program	—		Yes		—						Yes		—									
Others	ROM Correction Function	Yes		—		Yes						—		Yes									
	Others	3V, 5V interface																					
Operating Frequency/Supply Voltage		24MHz/3.0 to 5.5V, 10MHz/2.7 to 5.5V																					
Operating Ambient Temperature (°C)		–20 to 85, –40 to 85																					
Package*2		PRQP0100JB-A	PLQP0100KB-A	PRQP0080JA-A	PRQP0100JB-A	PLQP0100KB-A	PRQP0080JA-A	PRQP0100JB-A	PLQP0100KB-A	PLQP0128KB-A	PRQP0100JB-A	PLQP0100KB-A	PLQP0128KB-A	PRQP0100JB-A	PLQP0100KB-A	PLQP0128KB-A	PRQP0100JB-A	PLQP0100KB-A	PLQP0128KB-A	PRQP0100JB-A	PLQP0100KB-A	PRQP0100JB-A	PLQP0100KB-A	PLQP0128KB-A
Part No.		M30620MCP-XXXFP	M30620MCP-XXXGP	M30621MCP-XXXGP	M30620FCPFP	M30620FCPGP	M30621FCPGP	M30622MEP-XXXFP	M30622MEP-XXXGP	M30623MEP-XXXGP	M30622MGP-XXXFP	M30622MGP-XXXGP	M30623MGP-XXXGP	M30624MGP-XXXFP	M30624MGP-XXXGP	M30625MGP-XXXGP	M30624FGPFP	M30624FGPGP	M30625FGPGP	M3062LFGPFP	M3062LFGPGP	M30622MWP-XXXFP	M30622MWP-XXXGP	M30623MWP-XXXGP

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (M16C/60 Series: M16C/62P Group)

Group		M16C/62P																					
Memory	ROM (Bytes)	320K				384K								384K + 4K		512K		512K + 4K					
	RAM (Bytes)	24K		31K		16K		24K		31K													
	ROM Type*1	M												F		M		F					
	Data Flash/E2 Data Flash	—												4K (Data flash)		—		4K (Data flash)					
	Program Security	—												Yes (ID code check function, ROM code protect function)		—		Yes (ID code check function, ROM code protect function)					
CPU	CPU	M16C/60 Core																					
	Basic Instructions	91																					
	Minimum Instruction Execution Time (ns)	41.7 (@24MHz)																					
	Multiplier	16 × 16 → 32																					
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32																					
	Barrel Shifter	—																					
DMA	DMAC (Channels)	2																					
	DTC/DMAC II	—																					
External Bus Expansion	Address Space (Bytes)	1M																					
	External Bus Interface	Support for insertion of 1 to 3 wait states, Outputs 4 chip-select signals, Available to 4M bytes by address space expansion function																					
	Bus Structure	Selectable from Separate bus, Multiplex bus, Data bus width can be selected (8/16-bit), The number of output address buses can be selected (12/16/20)																					
	DRAM Controller	—																					
Clock	Clock Generation Circuit	4 circuits (Main clock, PLL, Sub-clock, On-chip oscillator)																					
	PLL	Yes																					
	Subclock	Yes																					
	RTC	—																					
	On-Chip Oscillator	Yes																					
	Oscillation Stop Detection	Yes																					
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)																					
	Power Save	Wait/Stop																					
Power Supply Voltage Detection	Power-On Reset/POR	—																					
	Low Voltage Detection/LVD	Yes (Low voltage detection)																					
A/D Converter	Resolution × Channels	10-bit × 26																					
	Sample and Hold	Yes																					
	Multi-Channel Sample and Hold	—																					
D/A Converter	Resolution × Channels	8-bit × 2																					
Timer	8-bit	—																					
	16-bit	11 (Timer A, Timer B)																					
	Input Capture	—																					
	Output Compare	—																					
	PWM Output	5 (Timer A)																					
	Real-Time Port	—																					
	Event Counter	11 (Timer A, Timer B)																					
	2-Phase Encoder Input	3 (Timer A)																					
	3-Phase Inverter Control	1 (shared with Timer A4, Timer A1, Timer A2, Timer B2, Dead time timer)																					
Watchdog Timer		1																					
Serial Interface	Clock Sync./Clock Async.	3 (UART)																					
	Clock Sync. Only	2 (Serial I/O)																					
	Clock Async. Only	—																					
I²C-bus		3 (UART)																					
IEBus		3 (UART)																					
Smart Card/SIM		1 (UART)																					
Synchronous Serial Communication Unit/Special Serial I/O		3 (UART)																					
CAN	Channels	—																					
	Message Box (Numbers)	—																					
IrDA		—																					
CRC Calculation Circuit		1 (CRC-CCITT ($X^{16} + X^{12} + X^5 + 1$))																					
X/Y Converter		—																					
I/O Ports	Input Only (Numbers)	1																					
	CMOS I/O (Numbers)	85	111	85	111	85	111	85	111	85	111	85	111	85	111	85	111	85	111				
	N-Channel Open Drain Port (Numbers)	2																					
	High Current Drive Port	—																					
	Pull-Up Resistor	85	111	85	111	85	111	85	111	85	111	85	111	85	111	85	111	85	111				
External Interrupts Pins		11																					
Debugging Function	On-Chip Debug	—												Yes		—		Yes					
	On-Board Flash Program	—												Yes		—		Yes					
Others	ROM Correction Function	Yes												—		Yes		—					
	Others	3V, 5V interface																					
Operating Frequency/Supply Voltage		24MHz/3.0 to 5.5V, 10MHz/2.7 to 5.5V																					
Operating Ambient Temperature (°C)		–20 to 85, –40 to 85																					
Package*2		PRQP0100JB-A	PLQP0100KB-A	PLQP0128KB-A	PRQP0100JB-A	PLQP0100KB-A	PLQP0128KB-A	PRQP0100JB-A	PLQP0100KB-A	PLQP0128KB-A	PRQP0100JB-A	PLQP0100KB-A	PLQP0128KB-A	PRQP0100JB-A	PLQP0100KB-A	PLQP0128KB-A	PRQP0100JB-A	PLQP0100KB-A	PLQP0128KB-A	PRQP0100JB-A	PLQP0100KB-A	PLQP0128KB-A	PRQP0100JB-A	PLQP0100KB-A	PLQP0128KB-A
Part No.		M30624MWP-XXXFP	M30624MWP-XXXGP	M30625MWP-XXXGP	M30626MWP-XXXFP	M30626MWP-XXXGP	M30627MWP-XXXGP	M30622MHP-XXXFP	M30622MHP-XXXGP	M30623MHP-XXXGP	M30624MHP-XXXFP	M30624MHP-XXXGP	M30625MHP-XXXGP	M30626MHP-XXXFP	M30626MHP-XXXGP	M30627MHP-XXXGP	M30626FHPFP	M30626FHPGP	M30627FHPGP	M30626MJP-XXXFP	M30626MJP-XXXGP	M30627MJP-XXXGP	M30626FJPFP	M30626FJPGP	M30627FJPGP

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (M16C/60 Series: M16C/62A Group)

Group		M16C/62A																	
Memory	ROM (Bytes)	—		32K		64K				96K									
	RAM (Bytes)	10K		3K		4K		10K		5K		10K							
	ROM Type*1	L		M															
	Data Flash/E2 Data Flash	—																	
	Program Security	—																	
CPU	CPU	M16C/60 Core																	
	Basic Instructions	91																	
	Minimum Instruction Execution Time (ns)	62.5 (@16MHz)																	
	Multiplier	16 × 16 → 32																	
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32																	
	Barrel Shifter	—																	
DMA	DMAC (Channels)	2																	
	DTC/DMAC II	—																	
External Bus Expansion	Address Space (Bytes)	1M		—		1M		—		1M		—		1M		—		1M	
	External Bus Interface	Support for insertion of 1 wait states, Outputs 4 chip-select signals		—		Support for insertion of 1 wait states, Outputs 4 chip-select signals		—		Support for insertion of 1 wait states, Outputs 4 chip-select signals		—		Support for insertion of 1 wait states, Outputs 4 chip-select signals		—		Support for insertion of 1 wait states, Outputs 4 chip-select signals	
	Bus Structure	Selectable from Separate bus, Multiplex bus, Data bus width can be selected (8/16-bit), The number of output address buses can be selected (16/20)		—		Selectable from Separate bus, Multiplex bus, Data bus width can be selected (8/16-bit), The number of output address buses can be selected (16/20)		—		Selectable from Separate bus, Multiplex bus, Data bus width can be selected (8/16-bit), The number of output address buses can be selected (16/20)		—		Selectable from Separate bus, Multiplex bus, Data bus width can be selected (8/16-bit), The number of output address buses can be selected (16/20)		—		Selectable from Separate bus, Multiplex bus, Data bus width can be selected (8/16-bit), The number of output address buses can be selected (16/20)	
	DRAM Controller	—																	
Clock	Clock Generation Circuit	2 circuits (Main clock, Sub-clock)																	
	PLL	—																	
	Subclock	Yes																	
	RTC	—																	
	On-Chip Oscillator	—																	
	Oscillation Stop Detection	—																	
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)																	
	Power Save	Wait/Stop																	
Power Supply Voltage Detection	Power-On Reset/POR	—																	
	Low Voltage Detection/LVD	—																	
A/D Converter	Resolution × Channels	10-bit × 10																	
	Sample and Hold	Yes																	
	Multi-Channel Sample and Hold	—																	
D/A Converter	Resolution × Channels	8-bit × 2																	
Timer	8-bit	—																	
	16-bit	11 (Timer A, Timer B)																	
	Input Capture	—																	
	Output Compare	—																	
	PWM Output	5 (Timer A)		3 (Timer A)		5 (Timer A)		3 (Timer A)		5 (Timer A)		3 (Timer A)		5 (Timer A)		3 (Timer A)		5 (Timer A)	3 (Timer A)
	Real-Time Port	—																	
	Event Counter	11 (Timer A, Timer B)																	
	2-Phase Encoder Input	3 (Timer A)		2 (Timer A)		3 (Timer A)		2 (Timer A)		3 (Timer A)		2 (Timer A)		3 (Timer A)		2 (Timer A)		3 (Timer A)	2 (Timer A)
	3-Phase Inverter Control	1 (shared with Timer A4, Timer A1, Timer A2, Timer B2, Dead time timer)		—		1 (shared with Timer A4, Timer A1, Timer A2, Timer B2, Dead time timer)		—		1 (shared with Timer A4, Timer A1, Timer A2, Timer B2, Dead time timer)		—		1 (shared with Timer A4, Timer A1, Timer A2, Timer B2, Dead time timer)		—		1 (shared with Timer A4, Timer A1, Timer A2, Timer B2, Dead time timer)	—
Watchdog Timer		1																	
Serial Interface	Clock Sync./Clock Async.	3 (UART)		2 (UART)		3 (UART)		2 (UART)		3 (UART)		2 (UART)		3 (UART)		2 (UART)		3 (UART)	2 (UART)
	Clock Sync. Only	2 (Serial I/O)																	
	Clock Async. Only	—		1 (UART)		—		1 (UART)		—		1 (UART)		—		1 (UART)		—	1 (UART)
I²C-bus		1 (UART)																	
IEBus		1 (UART)																	
Smart Card/SIM		1 (UART)																	
Synchronous Serial Communication Unit/Special Serial I/O		—																	
CAN	Channels	—																	
	Message Box (Numbers)	—																	
IrDA		—																	
CRC Calculation Circuit		1 (CRC-CCITT ($X^{16} + X^{12} + X^5 + 1$))																	
X/Y Converter		—																	
I/O Ports	Input Only (Numbers)	1																	
	CMOS I/O (Numbers)	50		85		68		85		68		85		68		85		68	
	N-Channel Open Drain Port (Numbers)	2																	
	High Current Drive Port	—																	
	Pull-Up Resistor	50		85		68		85		68		85		68		85		68	
External Interrupts Pins		11				8		11		8		11		8		11		8	
Debugging Function	On-Chip Debug	—																	
	On-Board Flash Program	—																	
Others	ROM Correction Function	Yes																	
	Others	—																	
Operating Frequency/Supply Voltage		16MHz/4.2 to 5.5V, 10MHz (1 wait) /2.7 to 5.5V																	
Operating Ambient Temperature (°C)		–20 to 85, –40 to 85																	
Package*2		PRQP0100JB-A	PLQP0100KB-A	PRQP0100JB-A	PLQP0100KB-A	PRQP0100JB-A	PLQP0100KB-A	PRQP0080JA-A	PRQP0100JB-A	PLQP0100KB-A	PRQP0080JA-A	PRQP0100JB-A	PLQP0100KB-A	PRQP0080JA-A	PRQP0100JB-A	PLQP0100KB-A	PRQP0080JA-A	PRQP0100JB-A	PLQP0100KB-A	PRQP0080JA-A
Part No.		M30620SAFP	M30620SAGP	M30622SAFP	M30622SAGP	M30622M4A-XXXFP	M30622M4A-XXXGP	M30623M4A-XXXGP	M30622M8A-XXXFP	M30622M8A-XXXGP	M30623M8A-XXXGP	M30620M8A-XXXFP	M30620M8A-XXXGP	M30621M8A-XXXGP	M30622MAA-XXXFP	M30622MAA-XXXGP	M30623MAA-XXXGP	M30620MAA-XXXFP	M30620MAA-XXXGP	M30621MAA-XXXGP

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (M16C/60 Series: M16C/62A Group)

Group		M16C/62A											
Memory	ROM (Bytes)	128K						256K					
	RAM (Bytes)	5K		10K				20K					
	ROM Type*1	M		F		M		F		M			
	Data Flash/E2 Data Flash	—											
	Program Security	—		Yes (ID code check function, ROM code protect function)		—		Yes (ID code check function, ROM code protect function)		—			
CPU	CPU	M16C/60 Core											
	Basic Instructions	91											
	Minimum Instruction Execution Time (ns)	62.5 (@16MHz)											
	Multiplier	16 × 16 → 32											
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32											
	Barrel Shifter	—											
DMA	DMAC (Channels)	2											
	DTC/DMAC II	—											
External Bus Expansion	Address Space (Bytes)	1M	—	1M	—	1M	—	1M	—	1M	—		
	External Bus Interface	Support for insertion of 1 wait states, Outputs 4 chip-select signals	—	Support for insertion of 1 wait states, Outputs 4 chip-select signals	—	Support for insertion of 1 wait states, Outputs 4 chip-select signals	—	Support for insertion of 1 wait states, Outputs 4 chip-select signals	—	Support for insertion of 1 wait states, Outputs 4 chip-select signals	—		
	Bus Structure	Selectable from Separate bus, Multiplex bus, Data bus width can be selected (8/16-bit), The number of output address buses can be selected (16/20)	—	Selectable from Separate bus, Multiplex bus, Data bus width can be selected (8/16-bit), The number of output address buses can be selected (16/20)	—	Selectable from Separate bus, Multiplex bus, Data bus width can be selected (8/16-bit), The number of output address buses can be selected (16/20)	—	Selectable from Separate bus, Multiplex bus, Data bus width can be selected (8/16-bit), The number of output address buses can be selected (16/20)	—	Selectable from Separate bus, Multiplex bus, Data bus width can be selected (8/16-bit), The number of output address buses can be selected (16/20)	—		
	DRAM Controller	—											
Clock	Clock Generation Circuit	2 circuits (Main clock, Sub-clock)											
	PLL	—											
	Subclock	Yes											
	RTC	—											
	On-Chip Oscillator	—											
	Oscillation Stop Detection	—											
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)											
	Power Save	Wait/Stop											
Power Supply Voltage Detection	Power-On Reset/POR	—											
	Low Voltage Detection/LVD	—											
A/D Converter	Resolution × Channels	10-bit × 10											
	Sample and Hold	Yes											
	Multi-Channel Sample and Hold	—											
D/A Converter	Resolution × Channels	8-bit × 2											
Timer	8-bit	—											
	16-bit	11 (Timer A, Timer B)											
	Input Capture	—											
	Output Compare	—											
	PWM Output	5 (Timer A)	3 (Timer A)	5 (Timer A)	3 (Timer A)	5 (Timer A)	3 (Timer A)	5 (Timer A)	3 (Timer A)	5 (Timer A)	3 (Timer A)		
	Real-Time Port	—											
	Event Counter	11 (Timer A, Timer B)											
	2-Phase Encoder Input	3 (Timer A)	2 (Timer A)	3 (Timer A)	2 (Timer A)	3 (Timer A)	2 (Timer A)	3 (Timer A)	2 (Timer A)	3 (Timer A)	2 (Timer A)		
	3-Phase Inverter Control	1 (shared with Timer A4, Timer A1, Timer A2, Timer B2, Dead time timer)	—	1 (shared with Timer A4, Timer A1, Timer A2, Timer B2, Dead time timer)	—	1 (shared with Timer A4, Timer A1, Timer A2, Timer B2, Dead time timer)	—	1 (shared with Timer A4, Timer A1, Timer A2, Timer B2, Dead time timer)	—	1 (shared with Timer A4, Timer A1, Timer A2, Timer B2, Dead time timer)	—		
Watchdog Timer		1											
Serial Interface	Clock Sync./Clock Async.	3 (UART)	2 (UART)	3 (UART)	2 (UART)	3 (UART)	2 (UART)	3 (UART)	2 (UART)	3 (UART)	2 (UART)		
	Clock Sync. Only	2 (Serial I/O)											
	Clock Async. Only	—	1 (UART)	—	1 (UART)	—	1 (UART)	—	1 (UART)	—	1 (UART)		
I²C-bus		1 (UART)											
IEBus		1 (UART)											
Smart Card/SIM		1 (UART)											
Synchronous Serial Communication Unit/Special Serial I/O		—											
CAN	Channels	—											
	Message Box (Numbers)	—											
IrDA		—											
CRC Calculation Circuit		1 (CRC-CCITT ($X^{16} + X^{12} + X^5 + 1$))											
X/Y Converter		—											
I/O Ports	Input Only (Numbers)	1											
	CMOS I/O (Numbers)	85	68	85	68	85	68	85	68	85	68		
	N-Channel Open Drain Port (Numbers)	2											
	High Current Drive Port	—											
	Pull-Up Resistor	85	68	85	68	85	68	85	68	85	68		
External Interrupts Pins		11	8	11	8	11	8	11	8	11	8		
Debugging Function	On-Chip Debug	—		Yes		—		Yes		—			
	On-Board Flash Program	—		Yes		—		Yes		—			
Others	ROM Correction Function	Yes		—		Yes		—		Yes			
	Others	—											
Operating Frequency/Supply Voltage		16MHz/4.2 to 5.5V, 10MHz (1 wait) /2.7 to 5.5V											
Operating Ambient Temperature (°C)		–20 to 85, –40 to 85											
Package*2		PRQP0100JB-A	PLQP0100KB-A	PRQP0080JA-A	PRQP0100JB-A	PLQP0100KB-A	PRQP0080JA-A	PRQP0100JB-A	PLQP0100KB-A	PRQP0080JA-A	PRQP0100JB-A	PLQP0100KB-A	PRQP0080JA-A	PRQP0100JB-A	PLQP0100KB-A	PRQP0080JA-A
Part No.		M30622MCA-XXXFP	M30622MCA-XXXGP	M30623MCA-XXXGP	M30620FCAFP	M30620FCAGP	M30621FCAGP	M30620MCA-XXXFP	M30620MCA-XXXGP	M30621MCA-XXXGP	M30624FGAFP	M30624FGAGP	M30625FGAGP	M30624MGA-XXXFP	M30624MGA-XXXGP	M30625MGA-XXXGP

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (M16C/60 Series: M16C/62M Group)

Group		M16C/62M							
Memory	ROM (Bytes)	128K				256K			
	RAM (Bytes)	10K				20K			
	ROM Type*1	F		M		F		M	
	Data Flash/E2 Data Flash	—							
	Program Security	Yes (ID code check function, ROM code protect function)		—		Yes (ID code check function, ROM code protect function)		—	
CPU	CPU	M16C/60 Core							
	Basic Instructions	91							
	Minimum Instruction Execution Time (ns)	100 (@10MHz)							
	Multiplier	16 × 16 → 32							
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32							
	Barrel Shifter	—							
DMA	DMAC (Channels)	2							
	DTC/DMAC Ⅱ	—							
External Bus Expansion	Address Space (Bytes)	1M	—	1M	—	1M	—	1M	—
	External Bus Interface	Support for insertion of 1 wait states, Outputs 4 chip-select signals	—	Support for insertion of 1 wait states, Outputs 4 chip-select signals	—	Support for insertion of 1 wait states, Outputs 4 chip-select signals	—	Support for insertion of 1 wait states, Outputs 4 chip-select signals	—
	Bus Structure	Selectable from Separate bus, Multiplex bus, Data bus width can be selected (8/16-bit), The number of output address buses can be selected (16/20)	—	Selectable from Separate bus, Multiplex bus, Data bus width can be selected (8/16-bit), The number of output address buses can be selected (16/20)	—	Selectable from Separate bus, Multiplex bus, Data bus width can be selected (8/16-bit), The number of output address buses can be selected (16/20)	—	Selectable from Separate bus, Multiplex bus, Data bus width can be selected (8/16-bit), The number of output address buses can be selected (16/20)	—
	DRAM Controller	—							
Clock	Clock Generation Circuit	2 circuits (Main clock, Sub-clock)							
	PLL	—							
	Subclock	Yes							
	RTC	—							
	On-Chip Oscillator	—							
	Oscillation Stop Detection	—							
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)							
	Power Save	Wait/Stop							
Power Supply Voltage Detection	Power-On Reset/POR	—							
	Low Voltage Detection/LVD	—							
A/D Converter	Resolution × Channels	10-bit × 10							
	Sample and Hold	Yes							
	Multi-Channel Sample and Hold	—							
D/A Converter	Resolution × Channels	8-bit × 2							
Timer	8-bit	—							
	16-bit	11 (Timer A, Timer B)							
	Input Capture	—							
	Output Compare	—							
	PWM Output	5 (Timer A)	3 (Timer A)	5 (Timer A)	3 (Timer A)	5 (Timer A)	3 (Timer A)	5 (Timer A)	3 (Timer A)
	Real-Time Port	—							
	Event Counter	11 (Timer A, Timer B)							
	2-Phase Encoder Input	3 (Timer A)	2 (Timer A)	3 (Timer A)	2 (Timer A)	3 (Timer A)	2 (Timer A)	3 (Timer A)	2 (Timer A)
	3-Phase Inverter Control	1 (shared with Timer A4, Timer A1, Timer A2, Timer B2, Dead time timer)	—	1 (shared with Timer A4, Timer A1, Timer A2, Timer B2, Dead time timer)	—	1 (shared with Timer A4, Timer A1, Timer A2, Timer B2, Dead time timer)	—	1 (shared with Timer A4, Timer A1, Timer A2, Timer B2, Dead time timer)	—
Watchdog Timer		1							
Serial Interface	Clock Sync./Clock Async.	3 (UART)	2 (UART)	3 (UART)	2 (UART)	3 (UART)	2 (UART)	3 (UART)	2 (UART)
	Clock Sync. Only	2 (Serial I/O)							
	Clock Async. Only	—	1 (UART)	—	1 (UART)	—	1 (UART)	—	1 (UART)
I²C-bus		1 (UART)							
IEBus		1 (UART)							
Smart Card/SIM		1 (UART)							
Synchronous Serial Communication Unit/Special Serial I/O		—							
CAN	Channels	—							
	Message Box (Numbers)	—							
IrDA		—							
CRC Calculation Circuit		1 (CRC-CCITT ($X^{16} + X^{12} + X^5 + 1$))							
X/Y Converter		—							
I/O Ports	Input Only (Numbers)	1							
	CMOS I/O (Numbers)	85	68	85	68	85	68	85	68
	N-Channel Open Drain Port (Numbers)	2							
	High Current Drive Port	—							
	Pull-Up Resistor	85	68	85	68	85	68	85	68
External Interrupts Pins		11	8	11	8	11	8	11	8
Debugging Function	On-Chip Debug	Yes		—		Yes		—	
	On-Board Flash Program	Yes		—		Yes		—	
Others	ROM Correction Function	—		Yes		—		Yes	
	Others	—							
Operating Frequency/Supply Voltage		10MHz/2.7 to 3.6V, 7MHz/2.4 to 3.6V, 7MHz (1 wait) /2.2 to 3.6V							
Operating Ambient Temperature (°C)		–20 to 85, –40 to 85							
Package*2		PRQP0100JB-A	PLQP0100KB-A	PRQP0080JA-A	PRQP0100JB-A	PLQP0100KB-A	PRQP0080JA-A	PRQP0100JB-A	PLQP0100KB-A	PRQP0080JA-A	PRQP0100JB-A	PLQP0100KB-A	PRQP0080JA-A
Part No.		M30620FCMFP	M30620FCMGP	M30621FCMGP	M30620MCM-XXXFP	M30620MCM-XXXGP	M30621MCM-XXXGP	M30624FGMFP	M30624FGMGP	M30625FGMGP	M30624MGM-XXXFP	M30624MGM-XXXGP	M30625MGM-XXXGP

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (M16C/60 Series: M16C/62N Group)

Group		M16C/62N																			
Memory	ROM (Bytes)	64K	128K							256K											
	RAM (Bytes)	8K	10K							12K				20K							
	ROM Type*1	F				M				F				M							
	Data Flash/E2 Data Flash	—																			
	Program Security	Yes (ID code check function, ROM code protect function)				—				Yes (ID code check function, ROM code protect function)				—							
CPU	CPU	M16C/60 Core																			
	Basic Instructions	91																			
	Minimum Instruction Execution Time (ns)	100 (@10MHz)	62.5 (@16MHz)																		
	Multiplier	16 × 16 → 32																			
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32																			
	Barrel Shifter	—																			
DMA	DMAC (Channels)	2																			
	DTC/DMAC II	—																			
External Bus Expansion	Address Space (Bytes)	1M		—		1M		—		1M				—		1M				—	
	External Bus Interface	Support for insertion of 1 wait states, Outputs 4 chip-select signals	Support for insertion of 1 wait states, Outputs 4 chip-select signals, Available to 4M bytes by address space expansion function	—		Support for insertion of 1 wait states, Outputs 4 chip-select signals, Available to 4M bytes by address space expansion function		—		Support for insertion of 1 wait states, Outputs 4 chip-select signals, Available to 4M bytes by address space expansion function				—		Support for insertion of 1 wait states, Outputs 4 chip-select signals, Available to 4M bytes by address space expansion function				—	
	Bus Structure	Selectable from Separate bus, Multiplex bus, Data bus width can be selected (8/16-bit), The number of output address buses can be selected (16/20)		—		Selectable from Separate bus, Multiplex bus, Data bus width can be selected (8/16-bit), The number of output address buses can be selected (16/20)		—		Selectable from Separate bus, Multiplex bus, Data bus width can be selected (8/16-bit), The number of output address buses can be selected (16/20)				—		Selectable from Separate bus, Multiplex bus, Data bus width can be selected (8/16-bit), The number of output address buses can be selected (16/20)				—	
	DRAM Controller	—																			
Clock	Clock Generation Circuit	2 circuits (Main clock, Sub-clock)																			
	PLL	—																			
	Subclock	Yes																			
	RTC	—																			
	On-Chip Oscillator	—																			
	Oscillation Stop Detection	—																			
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)																			
	Power Save	Wait/Stop																			
Power Supply Voltage Detection	Power-On Reset/POR	—																			
	Low Voltage Detection/LVD	—																			
A/D Converter	Resolution × Channels	10-bit × 10	10-bit × 18																		
	Sample and Hold	Yes																			
	Multi-Channel Sample and Hold	—																			
D/A Converter	Resolution × Channels	8-bit × 2																			
Timer	8-bit	—																			
	16-bit	11 (Timer A, Timer B)																			
	Input Capture	—																			
	Output Compare	—																			
	PWM Output	5 (Timer A)		3 (Timer A)		5 (Timer A)		3 (Timer A)		5 (Timer A)				3 (Timer A)		5 (Timer A)				3 (Timer A)	
	Real-Time Port	—																			
	Event Counter	11 (Timer A, Timer B)																			
	2-Phase Encoder Input	3 (Timer A)		2 (Timer A)		3 (Timer A)		2 (Timer A)		3 (Timer A)				2 (Timer A)		3 (Timer A)				2 (Timer A)	
	3-Phase Inverter Control	1 (shared with Timer A4, Timer A1, Timer A2, Timer B2, Dead time timer)		—		1 (shared with Timer A4, Timer A1, Timer A2, Timer B2, Dead time timer)		—		1 (shared with Timer A4, Timer A1, Timer A2, Timer B2, Dead time timer)				—		1 (shared with Timer A4, Timer A1, Timer A2, Timer B2, Dead time timer)				—	
Watchdog Timer		1																			
Serial Interface	Clock Sync./Clock Async.	3 (UART)		2 (UART)		3 (UART)		2 (UART)		3 (UART)				2 (UART)		3 (UART)				2 (UART)	
	Clock Sync. Only	2 (Serial I/O)																			
	Clock Async. Only	—		1 (UART)		—		1 (UART)		—				1 (UART)		—				1 (UART)	
I²C-bus		1 (UART)																			
IEBus		1 (UART)																			
Smart Card/SIM		1 (UART)																			
Synchronous Serial Communication Unit/Special Serial I/O		—																			
CAN	Channels	—																			
	Message Box (Numbers)	—																			
IrDA		—																			
CRC Calculation Circuit		1 (CRC-CCITT ($X^{16} + X^{12} + X^5 + 1$))																			
X/Y Converter		—																			
I/O Ports	Input Only (Numbers)	1																			
	CMOS I/O (Numbers)	85		68		85		68		85				68		85				68	
	N-Channel Open Drain Port (Numbers)	2																			
	High Current Drive Port	—																			
	Pull-Up Resistor	85		68		85		68		85				68		85				68	
External Interrupts Pins		11		8		11		8		11				8		11				8	
Debugging Function	On-Chip Debug	Yes				—				Yes						—					
	On-Board Flash Program	Yes				—				Yes						—					
Others	ROM Correction Function	—				Yes				—						Yes					
	Others	—																			
Operating Frequency/Supply Voltage		10MHz/2.7 to 3.6V	16MHz/3.0 to 3.6V, 7MHz/2.4 to 3.6V			16MHz/3.0 to 3.6V, 7MHz/2.4 to 3.6V, 7MHz (1 wait) /2.2 to 3.6V				16MHz/3.0 to 3.6V, 7MHz/2.4 to 3.6V						16MHz/3.0 to 3.6V, 7MHz/2.4 to 3.6V, 7MHz (1 wait) /2.2 to 3.6V					
Operating Ambient Temperature (°C)		–20 to 85, –40 to 85																			
Package*2		PRQP0100JB-A	PLQP0100KB-A	PRQP0100JB-A	PLQP0100KB-A	PRQP0080JA-A	PRQP0100JB-A	PLQP0100KB-A	PTQP0100LB-A	PRQP0080JA-A	PRQP0100JB-A	PLQP0100KB-A	PTQP0100LB-A	PRQP0100JB-A	PLQP0100KB-A	PTQP0100LB-A	PRQP0080JA-A	PRQP0100JB-A	PLQP0100KB-A	PTQP0100LB-A	PRQP0080JA-A
Part No.		M3062GF8NFP	M3062GF8NGP	M30620FCNFP	M30620FCNGP	M30621FCNGP	M30620MCN-XXXFP	M30620MCN-XXXGP	M30620MCN-XXXHP	M30621MCN-XXXGP	M30622MGN-XXXFP	M30622MGN-XXXGP	M30622MGN-XXXHP	M30624FGNFP	M30624FGNGP	M30624FGNHP	M30625FGNGP	M30624MGN-XXXFP	M30624MGN-XXXGP	M30624MGN-XXXHP	M30625MGN-XXXGP

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (M16C/60 Series: M16C/6N Group)

Group		M16C/6N4				M16C/6N5	
Memory	ROM (Bytes)	128K	128K + 4K	256K	256K + 4K	128K	128K + 4K
	RAM (Bytes)	5K		10K		5K	
	ROM Type*1	M	F	M	F	M	F
	Data Flash/E2 Data Flash	—	4K (Data flash)	—	4K (Data flash)	—	4K (Data flash)
	Program Security	—	Yes (ID code check function, ROM code protect function)	—	Yes (ID code check function, ROM code protect function)	—	Yes (ID code check function, ROM code protect function)
CPU	CPU	M16C/60 Core					
	Basic Instructions	91					
	Minimum Instruction Execution Time (ns)	41.7 (@24MHz)					
	Multiplier	16 × 16 → 32					
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32					
	Barrel Shifter	—					
DMA	DMAC (Channels)	2					
	DTC/DMAC Ⅱ	—					
External Bus Expansion	Address Space (Bytes)	1M					
	External Bus Interface	Support for insertion of 1 to 3 wait states, Outputs 4 chip-select signals					
	Bus Structure	Selectable from Separate bus, Multiplex bus, Data bus width can be selected (8/16-bit), The number of output address buses can be selected (12/16/20)					
	DRAM Controller	—					
Clock	Clock Generation Circuit	4 circuits (Main clock, PLL, Sub-clock, On-chip oscillator)					
	PLL	Yes					
	Subclock	Yes					
	RTC	—					
	On-Chip Oscillator	Yes					
	Oscillation Stop Detection	Yes					
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)					
	Power Save	Wait/Stop					
Power Supply Voltage Detection	Power-On Reset/POR	—					
	Low Voltage Detection/LVD	—					
A/D Converter	Resolution × Channels	10-bit × 26					
	Sample and Hold	Yes					
	Multi-Channel Sample and Hold	—					
D/A Converter	Resolution × Channels	8-bit × 2					
Timer	8-bit	—					
	16-bit	11 (Timer A, Timer B)					
	Input Capture	—					
	Output Compare	—					
	PWM Output	5 (Timer A)					
	Real-Time Port	—					
	Event Counter	11 (Timer A, Timer B)					
	2-Phase Encoder Input	3 (Timer A)					
	3-Phase Inverter Control	1 (shared with Timer A4, Timer A1, Timer A2, Timer B2, Dead time timer)					
Watchdog Timer		1					
Serial Interface	Clock Sync./Clock Async.	3 (UART)					
	Clock Sync. Only	1 (SI/O)					
	Clock Async. Only	—					
I²C-bus		3 (UART)					
IEBus		3 (UART)					
Smart Card/SIM		1 (UART)					
Synchronous Serial Communication Unit/Special Serial I/O		3 (UART)					
CAN	Channels	2				1	
	Message Box (Numbers)	16 + 16				16	
IrDA		—					
CRC Calculation Circuit		1 (CRC-CCITT ($X^{16} + X^{12} + X^5 + 1$))					
X/Y Converter		—					
I/O Ports	Input Only (Numbers)	1					
	CMOS I/O (Numbers)	85					
	N-Channel Open Drain Port (Numbers)	2					
	High Current Drive Port	—					
	Pull-Up Resistor	85					
External Interrupts Pins		11					
Debugging Function	On-Chip Debug	—	Yes	—	Yes	—	Yes
	On-Board Flash Program	—	Yes	—	Yes	—	Yes
Others	ROM Correction Function	Yes	—	Yes	—	Yes	—
	Others	—					
Operating Frequency/Supply Voltage		24MHz/3.0 to 5.5V					
Operating Ambient Temperature (°C)		–40 to 85					
Package*2		PLQP0100KB-A	PRQP0100JB-A	PLQP0100KB-A	PRQP0100JB-A	PLQP0100KB-A	PRQP0100JB-A / PLQP0100KB-A
Part No.		M306N4MC-XXXGP	M306N4FCFP	M306N4FCGP	M306N4MG-XXXGP	M306N4FGFP	M306N4FGGP / M306N5MC-XXXGP / M306N5FCFP / M306N5FCGP

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (M16C/60 Series: M16C/6N Group)

Group		M16C/6NK				M16C/6NL				M16C/6NM				M16C/6NN			
Memory	ROM (Bytes)	192K	256K	384K + 4K	512K + 4K	192K	256K	384K + 4K	512K + 4K	192K	256K	384K + 4K	512K + 4K	192K	256K	384K + 4K	512K + 4K
	RAM (Bytes)	16K	20K	31K		16K	20K	31K		16K	20K	31K		16K	20K	31K	
	ROM Type*1	M		F		M		F		M		F		M		F	
	Data Flash/E2 Data Flash	—		4K (Data flash)		—		4K (Data flash)		—		4K (Data flash)		—		4K (Data flash)	
	Program Security	—		Yes (ID code check function, ROM code protect function)		—		Yes (ID code check function, ROM code protect function)		—		Yes (ID code check function, ROM code protect function)		—		Yes (ID code check function, ROM code protect function)	
CPU	CPU	M16C/60 Core															
	Basic Instructions	91															
	Minimum Instruction Execution Time (ns)	41.7 (@24MHz)															
	Multiplier	16 × 16 → 32															
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32															
	Barrel Shifter	—															
DMA	DMAC (Channels)	2															
	DTC/DMAC II	—															
External Bus Expansion	Address Space (Bytes)	1M															
	External Bus Interface	Support for insertion of 1 to 3 wait states, Outputs 4 chip-select signals															
	Bus Structure	Selectable from Separate bus, Multiplex bus, Data bus width can be selected (8/16-bit), The number of output address buses can be selected (12/16/20)															
	DRAM Controller	—															
Clock	Clock Generation Circuit	4 circuits (Main clock, PLL, Sub-clock, On-chip oscillator)															
	PLL	Yes															
	Subclock	Yes															
	RTC	—															
	On-Chip Oscillator	Yes															
	Oscillation Stop Detection	Yes															
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)															
	Power Save	Wait/Stop															
Power Supply Voltage Detection	Power-On Reset/POR	—															
	Low Voltage Detection/LVD	—															
A/D Converter	Resolution × Channels	10-bit × 26															
	Sample and Hold	Yes															
	Multi-Channel Sample and Hold	—															
D/A Converter	Resolution × Channels	8-bit × 2															
Timer	8-bit	—															
	16-bit	11 (Timer A, Timer B)															
	Input Capture	—															
	Output Compare	—															
	PWM Output	5 (Timer A)															
	Real-Time Port	—															
	Event Counter	11 (Timer A, Timer B)															
	2-Phase Encoder Input	3 (Timer A)															
	3-Phase Inverter Control	1 (shared with Timer A4, Timer A1, Timer A2, Timer B2, Dead time timer)															
Watchdog Timer		1															
Serial Interface	Clock Sync./Clock Async.	3 (UART)															
	Clock Sync. Only	2 (Serial I/O)								4 (Serial I/O)							
	Clock Async. Only	—															
I²C-bus		3 (UART)															
IEBus		3 (UART)															
Smart Card/SIM		1 (UART)															
Synchronous Serial Communication Unit/Special Serial I/O		3 (UART)															
CAN	Channels	2				1				2				1			
	Message Box (Numbers)	16 + 16				16				16 + 16				16			
IrDA		—															
CRC Calculation Circuit		1 (CRC-CCITT ($X^{16} + X^{12} + X^5 + 1$))															
X/Y Converter		—															
I/O Ports	Input Only (Numbers)	1															
	CMOS I/O (Numbers)	85								111							
	N-Channel Open Drain Port (Numbers)	2															
	High Current Drive Port	—															
	Pull-Up Resistor	85								111							
External Interrupts Pins		11								14							
Debugging Function	On-Chip Debug	—		Yes		—		Yes		—		Yes		—		Yes	
	On-Board Flash Program	—		Yes		—		Yes		—		Yes		—		Yes	
Others	ROM Correction Function	Yes		—		Yes		—		Yes		—		Yes		—	
	Others	—															
Operating Frequency/Supply Voltage		24MHz/3.0 to 5.5V															
Operating Ambient Temperature (°C)		–40 to 85															
Package*2		PLQP0100KB-A								PLQP0128KB-A							
Part No.		M306NKME-XXXGP	M306NKMG-XXXGP	M306NKFHGP	M306NKFJGP	M306NLME-XXXGP	M306NLMG-XXXGP	M306NLFHGP	M306NLFJGP	M306NMME-XXXGP	M306NMMG-XXXGP	M306NMFHGP	M306NMFJGP	M306NNME-XXXGP	M306NNMG-XXXGP	M306NNFHGP	M306NNFJGP

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

Outline of M16C/50 Series

This high-performance and highly functional series of MCUs offers features for automotive applications, such as CAN support, and on-chip peripheral functions that help reduce overall system cost.

M16C/50 Series Features

- Maintains the compatibility features (pin and peripheral compatibility) of the M16C/M32C and inherits features such as low EMI noise and low current consumption
- Performance improvements
  32-MHz operation and enhanced DMAC (DMAC 2 ch → 4 ch)
- Enhances lineup and functions of M16C/Tiny

• M16C/50 Series CPU Overview

Performance	Machine cycles	31.25ns (3V to 5.5V at 32MHz)
	Address space	—
Number of Instructions	91	
Registers	Data registers : 16-bit × 4 × 2 banks Address registers : 16-bit × 2 × 2 banks Dedicated registers : 16-bit × 1 × 2 banks : 16-bit × 2 : 20-bit × 1	

M16C/5LD Group

- Extends the functions of the M16C/29 Group
- Incorporates 1 CAN (number of message boxes: 32) channel
- 2.7 V operation (at 25 MHz operation)
- Incorporates 10bit A/D converter 2 circuits
- Incorporates input capture, output compare timer and PWM
- Incorporates 64K to 256K bytes of flash memory
- 64-pin and 80-pin packages

M16C/56D Group

- Extends the functions of the M16C/28 Group
- 2.7 V operation (at 25 MHz operation)
- Incorporates 10bit A/D converter 2 circuits
- Incorporates input capture, output compare timer and PWM
- Incorporates 64K to 256K bytes of flash memory
- 64-pin and 80-pin packages

M16C/5M Group

- Incorporates 96K, 128K and 256K bytes of flash memory, 8K bytes of data flash memory and 4K bytes of E2 data flash memory
- Incorporates 1 LIN channel and 2 CAN (number of message boxes: 32) channels
- Incorporates oscillation-stop detection circuit, low-voltage detection circuit and CRC calculation circuit
- Incorporates input capture, output compare timer and PWM
- 64-pin, 80-pin and 100-pin packages

* Please refer to the page for "Automotive MCUs."

M16C/57 Group

- Incorporates 96K, 128K, 256K bytes of flash memory and 8K bytes of data flash and 4K bytes of E2 data flash
- LIN : 1ch
- Incorporates Oscillation-stop detection circuit, Low voltage detection circuit, CR calculation circuit
- Incorporates Input capture, output compare timer and PWM
- 64-pin, 80-pin, 100-pin packages

* Please refer to the page for "Automotive MCUs."

M16C/5L Group

- Extends the functions of the M16C/29 Group
- Incorporates 64K, 96K, 128K, and 256K bytes of flash memory and 8K bytes of data flash memory
- Incorporates 1 CAN (number of message boxes: 32) channel
- Incorporates oscillation-stop detection circuit, low-voltage detection circuit and CRC calculation circuit
- Incorporates input capture, output compare timer and PWM
- 64-pin and 80-pin packages

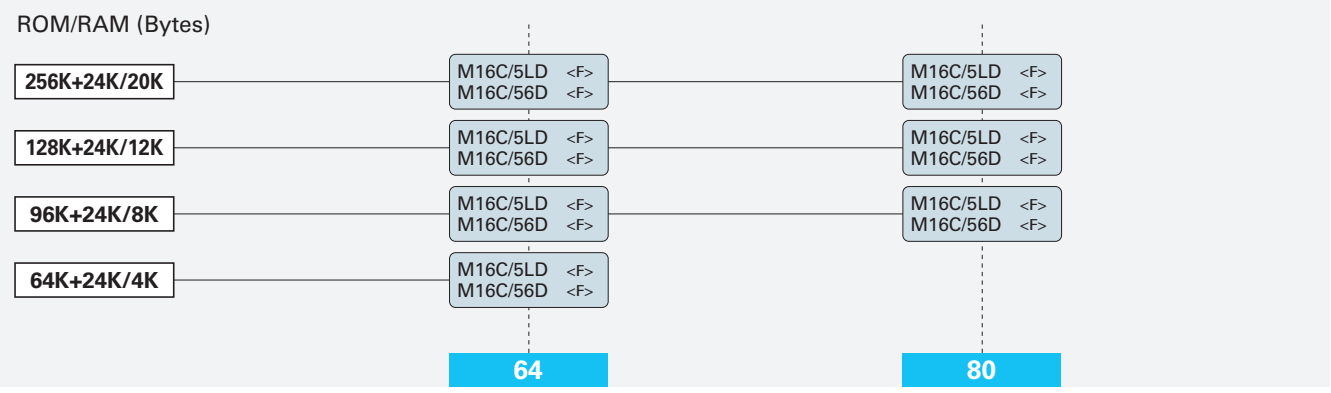
* Please refer to the page for "Automotive MCUs."

M16C/56 Group

- Extends the functions of the M16C/28 Group
- Incorporates 64K, 96K, 128K, and 256K bytes of flash memory and 8K bytes of data flash memory
- Incorporates oscillation-stop detection circuit, low-voltage detection circuit and CRC calculation circuit
- Incorporates input capture, output compare timer and PWM
- 64-pin and 80-pin packages

* Please refer to the page for "Automotive MCUs."

• Memory Capacity (ROM/RAM) (M16C/50 Series)



Letters in brackets < > indicate memory variations.
F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

• Specifications (M16C/50 Series)

Group		M16C/56D				M16C/5LD			
Memory	ROM (Bytes)	64K + 24K	96K + 24K	128K + 24K	256K + 24K	64K + 24K	96K + 24K	128K + 24K	256K + 24K
	RAM (Bytes)	4K	8K	12K	20K	4K	8K	12K	20K
	ROM Type*1	F							
	Data Flash/E2 Data Flash	8K (Data Flash: program/Erase 10k times)							
	Program Security	Yes (ID code check function, ROM code protect function)							
CPU	CPU	M16C/60 Core							
	Basic Instructions	91							
	Minimum Instruction Execution Time (ns)	31.25 (@32MHz)							
	Multiplier	16 × 16 → 32							
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32							
	Barrel Shifter	—							
DMA	DMAC (Channels)	4							
	DTC/DMAC II	—							
External Bus Expansion	Address Space (Bytes)	—							
	External Bus Interface	—							
	Bus Structure	—							
	DRAM Controller	—							
Clock	Clock Generation Circuit	4 circuits (Main clock, PLL, Sub-clock, Low-speed on-chip oscillator)							
	PLL	Yes							
	Subclock	Yes (32.768kHz)							
	RTC	Yes							
	On-Chip Oscillator	Yes (Low-speed: 125kHz)							
	Oscillation Stop Detection	Yes							
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)							
	Power Save	Wait/Stop							
Power Supply Voltage Detection	Power-On Reset/POR	—							
	Low Voltage Detection/LVD	Yes (Voltage detection 2)							
A/D Converter	Resolution × Channels	10-bit × 16 (shared with 2 circuits)	10-bit × 27 (shared with 2 circuits)	10-bit × 16 (shared with 2 circuits)	10-bit × 27 (shared with 2 circuits)	10-bit × 16 (shared with 2 circuits)	10-bit × 27 (shared with 2 circuits)	10-bit × 16 (shared with 2 circuits)	10-bit × 27 (shared with 2 circuits)
	Sample and Hold	Yes							
	Multi-Channel Sample and Hold	—							
D/A Converter	Resolution × Channels	—							
Timer	8-bit	—							
	16-bit	8 (Timer A, Timer B)							
	Input Capture	8 (Timer S)							
	Output Compare	8 (Timer S)							
	PWM Output	13 (Timer A, Timer S)							
	Real-Time Port	—							
	Event Counter	8 (Timer A, Timer B)							
	2-Phase Encoder Input	3 (Timer A) + 1 (Timer S)							
	3-Phase Inverter Control	1 (shared with Timer A4, Timer A1, Timer A2, Timer B2, Dead time timer)							
Watchdog Timer		1 (with automatic start function, clock source protection function, low-speed on-chip oscillator for watchdog timer)							
Serial Interface	Clock Sync./Clock Async.	4 (UART)	5 (UART)	4 (UART)	5 (UART)	4 (UART)	5 (UART)	4 (UART)	5 (UART)
	Clock Sync. Only	—							
	Clock Async. Only	—							
I^2C-bus		2 (Multi master I^2C, UART)							
IEBus		1 (UART)							
Smart Card/SIM		1 (UART)							
Synchronous Serial Communication Unit/Special Serial I/O		1 (UART)							
CAN	Channels	—				1			
	Message Box (Numbers)	—				32			
IrDA		—							
CRC Calculation Circuit		1 (CRC-CCITT ($X^{16} + X^{12} + X^5 + 1$) /CRC-16 ($X^{16} + X^{15} + X^2 + 1$))							
X/Y Converter		—							
I/O Ports	Input Only (Numbers)	—							
	CMOS I/O (Numbers)	55	71	55	71	55	71	55	71
	N-Channel Open Drain Port (Numbers)	—							
	High Current Drive Port	—							
	Pull-Up Resistor	55	71	55	71	55	71	55	71
External Interrupts Pins		11							
Debugging Function	On-Chip Debug	Yes							
	On-Board Flash Program	Yes							
Other Functions	ROM Correction Function	—							
	Others	—							
Operating Frequency/Supply Voltage		32MHz/3.0 to 5.5V, 25MHz/2.7 to 5.5V							
Operating Ambient Temperature (˚C)		–40 to 85							
Package*2		PLQP0064KB-A	PLQP0080KB-A	PLQP0064KB-A	PLQP0080KB-A	PLQP0064KB-A	PLQP0080KB-A	PLQP0064KB-A	PLQP0080KB-A
Part No.		R5F35630DFF	R5F35633DFF	R5F35623DFE	R5F35626DFE	R5F35636DFF	R5F3563EDFF	R5F3562EDFE	R5F35L30DFF	R5F35L33DFF	R5F35L23DFE	R5F35L26DFE	R5F35L36DFF	R5F35L3EDFF	R5F35L2EDFE

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

Outline of M16C/30 Series

The M16C/30 Series incorporates frequently used functions selected from the peripheral functions of the M16C/60 Series, along with optimized memory capacity, so that it can be offered at an affordable price.

M16C/30 Series Features

- The best choice for applications that have small memory requirements
  The M16C/30 series MCUs have the features of devices in the M16C/62P, M16C/62N and M16C/62A Groups and are ideal for systems that use small amounts of ROM and RAM
- Low-voltage version provided
  M16C/30L supports low-voltage operation at least 2.2 V
- Optimized for frequently used peripheral functions.

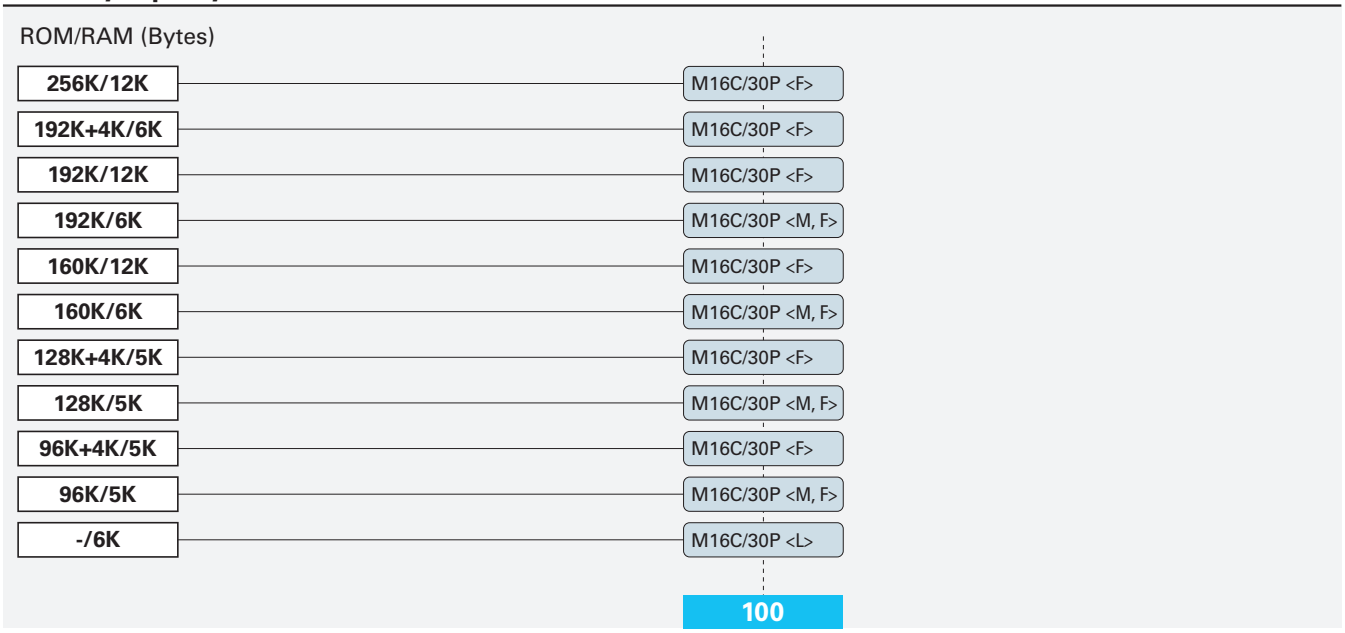
M16C/30P Group

- MCUs in the M16C/30P Group have features similar to those in the M16C/62P Group, but offer less on-chip functionality and operate at clock frequencies up to 16MHz
- Optimized for frequently used functions in limited manner.
  (6-ch timer, 3-ch serial interface, 18-ch 10-bit A/D and 2-ch DMA)
- Package choices are limited to 100-pin FP/GP types
- A full lineup of a wide variety of memory types (i.e., flash memory, mask ROM, ROM-less, and one-time flash models).
- Development support tool: use M16C/62P tools

• M16C/30 Series CPU Overview

Performance	Machine cycles	62.5ns (16MHz)
	Address space	1M byte
Number of Instructions	91	
Registers	Data registers : 16-bit × 4 × 2 banks Address registers : 16-bit × 2 × 2 banks Dedicated registers : 16-bit × 5	

• Memory Capacity (M16C/30 Series)



Letters in brackets < > indicate memory variations.
F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

• Specifications (M16C/30 Series)

Group		M16C/30P											
Memory	ROM (Bytes)	—	96K				96K + 4K		128K				
	RAM (Bytes)	6K	5K										
	ROM Type*1	L	F		M		F				M		
	Data Flash/E2 Data Flash	—					4K (Data flash)		—				
	Program Security	—	Yes (ID code check function)		—		Yes (ID code check function, ROM code protect function)		Yes (ID code check function)		—		
CPU	CPU	M16C/60 Core											
	Basic Instructions	91											
	Minimum Instruction Execution Time (ns)	62.5 (@16MHz)											
	Multiplier	16 × 16 → 32											
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32											
	Barrel Shifter	—											
DMA	DMAC (Channels)	2											
	DTC/DMAC II	—											
External Bus Expansion	Address Space (Bytes)	1M											
	External Bus Interface	Support for insertion of 1 wait states, Outputs 4 chip-select signals											
	Bus Structure	Selectable from Separate bus, Multiplex bus, Data bus width can be selected (8/16-bit), The number of output address buses can be selected (16/20)											
	DRAM Controller	—											
Clock	Clock Generation Circuit	2 circuits (Main clock, Sub-clock)											
	PLL	—											
	Subclock	Yes											
	RTC	—											
	On-Chip Oscillator	—											
	Oscillation Stop Detection	—											
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)											
	Power Save	Wait/Stop											
Power Supply Voltage Detection	Power-On Reset/POR	—											
	Low Voltage Detection/LVD	—											
A/D Converter	Resolution × Channels	10-bit × 18											
	Sample and Hold	Yes											
	Multi-Channel Sample and Hold	—											
D/A Converter	Resolution × Channels	—											
Timer	8-bit	—											
	16-bit	6 (Timer A, Timer B)											
	Input Capture	—											
	Output Compare	—											
	PWM Output	3 (Timer A)											
	Real-Time Port	—											
	Event Counter	6 (Timer A, Timer B)											
	2-Phase Encoder Input	1 (Timer A)											
	3-Phase Inverter Control	—											
Watchdog Timer		1											
Serial Interface	Clock Sync./Clock Async.	3 (UART)											
	Clock Sync. Only	—											
	Clock Async. Only	—											
I^2C-bus		3 (UART)											
IEBus		1 (UART)											
Smart Card/SIM		1 (UART)											
Synchronous Serial Communication Unit/Special Serial I/O		1 (UART)											
CAN	Channels	—											
	Message Box (Numbers)	—											
IrDA		—											
CRC Calculation Circuit		1 (CRC-CCITT ($X^{16} + X^{12} + X^5 + 1$))											
X/Y Converter		—											
I/O Ports	Input Only (Numbers)	1											
	CMOS I/O (Numbers)	85											
	N-Channel Open Drain Port (Numbers)	2											
	High Current Drive Port	—											
	Pull-Up Resistor	85											
External Interrupts Pins		10											
Debugging Function	On-Chip Debug	—					Yes		—				
	On-Board Flash Program	—	Yes (Only Rewriting is possible)		—		Yes		Yes (Only Rewriting is possible)		—		
Others	ROM Correction Function	Yes					—		Yes				
	Others	—											
Operating Frequency/Supply Voltage		16MHz/3.0 to 5.5V, 10MHz/2.7 to 5.5V											
Operating Ambient Temperature (°C)		–20 to 85, –40 to 85											
Package*2		PRQP0100JB-A	PLQP0100KB-A	PRQP0100JB-A	PLQP0100KB-A	PRQP0100JB-A	PLQP0100KB-A	PRQP0100JB-A	PLQP0100KB-A	PRQP0100JB-A	PLQP0100KB-A	PRQP0100JB-A	PLQP0100KB-A
Part No.		M30302SPFP	M30302SPGP	M30302GAPFP*Note1	M30302GAPGP*Note1	M30302MAP-XXXFP	M30302MAP-XXXGP	M30302FAPFP	M30302FAPGP	M30302GCPFP*Note1	M30302GCPGP*Note1	M30302MCP-XXXFP	M30302MCP-XXXGP

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code
Note1 Data can only be written once and cannot be erased.

★ : New product ★★ : Under development

• Specifications (M16C/30 Series)

Group		M16C/30P															
Memory	ROM (Bytes)	128K + 4K	160K				192K							192K + 4K		256K	
	RAM (Bytes)	5K	6K			12K	6K				12K			6K		12K	
	ROM Type*1	F		M		F		M			F			F			
	Data Flash/E2 Data Flash	4K (Data flash)	—											4K (Data flash)		—	
	Program Security	Yes (ID code check function, ROM code protect function)	Yes (ID code check function)	—		Yes (ID code check function)		—			Yes (ID code check function)			Yes (ID code check function, ROM code protect function)		Yes (ID code check function)	
CPU	CPU	M16C/60 Core															
	Basic Instructions	91															
	Minimum Instruction Execution Time (ns)	62.5 (@16MHz)															
	Multiplier	16 × 16 → 32															
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32															
	Barrel Shifter	—															
DMA	DMAC (Channels)	2															
	DTC/DMAC II	—															
External Bus Expansion	Address Space (Bytes)	1M															
	External Bus Interface	Support for insertion of 1 wait states, Outputs 4 chip-select signals															
	Bus Structure	Selectable from Separate bus, Multiplex bus, Data bus width can be selected (8/16-bit), The number of output address buses can be selected (16/20)															
	DRAM Controller	—															
Clock	Clock Generation Circuit	2 circuits (Main clock, Sub-clock)															
	PLL	—															
	Subclock	Yes															
	RTC	—															
	On-Chip Oscillator	—															
	Oscillation Stop Detection	—															
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)															
	Power Save	Wait/Stop															
Power Supply Voltage Detection	Power-On Reset/POR	—															
	Low Voltage Detection/LVD	—															
A/D Converter	Resolution x Channels	10-bit × 18															
	Sample and Hold	Yes															
	Multi-Channel Sample and Hold	—															
D/A Converter	Resolution x Channels	—															
Timer	8-bit	—															
	16-bit	6 (Timer A, Timer B)															
	Input Capture	—															
	Output Compare	—															
	PWM Output	3 (Timer A)															
	Real-Time Port	—															
	Event Counter	6 (Timer A, Timer B)															
	2-Phase Encoder Input	1 (Timer A)															
	3-Phase Inverter Control	—															
Watchdog Timer		1															
Serial Interface	Clock Sync./Clock Async.	3 (UART)															
	Clock Sync. Only	—															
	Clock Async. Only	—															
I^2C-bus		3 (UART)															
IEBus		1 (UART)															
Smart Card/SIM		1 (UART)															
Synchronous Serial Communication Unit/Special Serial I/O		1 (UART)															
CAN	Channels	—															
	Message Box (Numbers)	—															
IrDA		—															
CRC Calculation Circuit		1 (CRC-CCITT ($X^{16} + X^{12} + X^5 + 1$))															
X/Y Converter		—															
I/O Ports	Input Only (Numbers)	1															
	CMOS I/O (Numbers)	85															
	N-Channel Open Drain Port (Numbers)	2															
	High Current Drive Port	—															
	Pull-Up Resistor	85															
External Interrupts Pins		10															
Debugging Function	On-Chip Debug	Yes	—											Yes		—	
	On-Board Flash Program	Yes	Yes (Only Rewriting is possible)		—		Yes (Only Rewriting is possible)		—		Yes (Only Rewriting is possible)			Yes		Yes (Only Rewriting is possible)	
Others	ROM Correction Function	—	Yes											—		Yes	
	Others	—															
Operating Frequency/Supply Voltage		16MHz/3.0 to 5.5V, 10MHz/2.7 to 5.5V															
Operating Ambient Temperature (°C)		–20 to 85, –40 to 85															
Package*2		PRQP0100JB-A	PLQP0100KB-A	PRQP0100JB-A	PLQP0100KB-A	PRQP0100JB-A	PLQP0100KB-A	PRQP0100JB-A	PLQP0100KB-A	PRQP0100JB-A	PLQP0100KB-A	PRQP0100JB-A	PLQP0100KB-A	PRQP0100JB-A	PLQP0100KB-A	PRQP0100JB-A	PLQP0100KB-A	PRQP0100JB-A	PLQP0100KB-A
Part No.		M30302FCPFP	M30302FCPGP	M30302GDPFP* Note1	M30302GDPGP* Note1	M30302MDP-XXXFP	M30302MDP-XXXGP	M30304GDPFP* Note1	M30304GDPGP* Note1	M30302GEPFP* Note1	M30302GEPGP* Note1	M30302MEP-XXXFP	M30302MEP-XXXGP	M30304GEPFP* Note1	M30304GEPGP* Note1	M30302FEPFP	M30302FEPGP	M30302GGPFP* Note1	M30302GGPGP* Note1

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code
Note1 Data can only be written once and cannot be erased.

★ : New product ★★ : Under development

Outline of M16C/10 Series

The M16C/10 Series has a 1M byte memory space. Standard on-chip peripherals, including 8- and 16-bit multifunction timers, UART/Clock synchronous serial interfaces, 10-bit A/D converters, 8-bit D/A converters and a watchdog timer.

M16C/10 Series Features

- MCUs use popular 16-bit M16C/60 series core that operates at up to 16MHz with low power consumption
- Ultra-small package: 48 pins with 7 × 7-mm body size
- Built-in oscillator circuit with main-clock oscillation-stop detection function can be used as a back-up clock to enhance system reliability
- Flash memory built-in

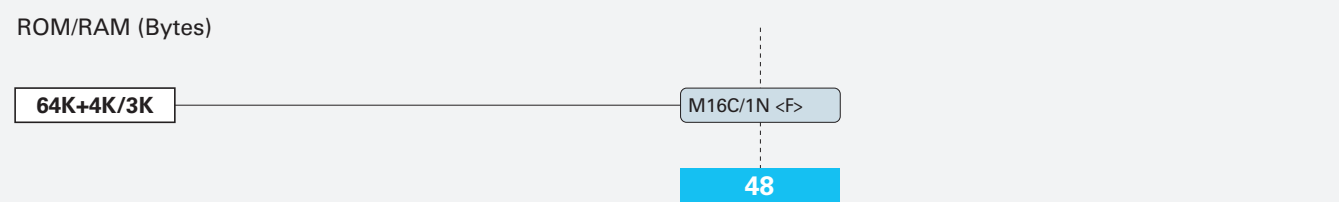
• M16C/10 Series CPU Overview

Performance	Machine cycles	62.5ns (5V at 16MHz)
	Address space	1M bytes
Number of Instructions	91	
Registers	Data registers : 16-bit × 4 × 2 banks Address registers : 16-bit × 2 × 2 banks Dedicated registers : 16-bit × 5	

M16C/1N Group

- In addition to standard peripheral functions, the M16C/1N Group incorporates a one-channel controller area network (CAN) at a maximum operating frequency of 16MHz. Besides, 48-pin packages are available.

• Memory Capacity (ROM/RAM) (M16C/1N Group)



Letters in brackets < > indicate memory variations.
F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

• Specifications (ROM/RAM) (M16C/1N Group)

Group		M16C/1N
Memory	ROM (Bytes)	64K + 4K
	RAM (Bytes)	3K
	ROM Type*1	F
	Data Flash	Yes (4K)
	Program Security	Yes (ID code check function, ROM code protect function)
CPU	CPU	M16C/60 Core
	Basic Instructions	91
	Minimum Instruction Execution Time (ns)	62.5 (@16MHz)
	Multiplier	16 × 16 → 32
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32
	Barrel Shifter	—
DMA	DMAC (Channels)	—
	DTC/DMAC II	—
External Bus Expansion	Address Space (Bytes)	—
	External Bus Interface	—
	Bus Structure	—
	DRAM Controller	—
Clock	Clock Generation Circuit	3 circuits (Main clock, Sub-clock, On-chip oscillator)
	PLL	—
	Subclock	Yes
	On-Chip Oscillator	Yes
	Oscillation Stop Detection	Yes
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)
	Power Save	Wait/Stop
Power Supply Voltage Detection	Power-On Reset/POR	—
	Low Voltage Detection/LVD	—
A/D Converter	Resolution × Channels	10-bit × 14
	Sample and Hold	Yes
	Multi-Channel Sample and Hold	—
D/A Converter	Resolution × Channels	8-bit × 1
Timer	8-bit	4 (Timer 1, Timer X, Timer Y, Timer Z)
	16-bit	1 (Timer C)
	Input Capture	1 (Timer C)
	Output Compare	—
	PWM Output	2 (Timer Y, Timer Z)
	Real-Time Port	—
	Event Counter	1 (Timer X)
	2-Phase Encoder Input	—
	3-Phase Inverter Control	—
Watchdog Timer		—
Serial Interface	Clock Sync./Clock Async.	2 (UART)
	Clock Sync. Only	—
	Clock Async. Only	—
I²C-bus		—
IEBus		—
Smart Card/SIM		—
Synchronous Serial Communication Unit/Special Serial I/O		—
CAN	Channels	1
	Message Box (Numbers)	16
IrDA		—
CRC Calculation Circuit		—
X/Y Converter		—
I/O Ports	Input Only (Numbers)	—
	CMOS I/O (Numbers)	37
	N-Channel Open Drain Port (Numbers)	—
	High Current Drive Port	8
	Pull-Up Resistor	37
External Interrupts Pins		8
Debugging Function	On-Chip Debug	Yes
	On-Board Flash Program	Yes
Others	ROM Correction Function	—
	Others	—
Operating Frequency/Supply Voltage		16MHz/4.2 to 5.5V
Operating Ambient Temperature (°C)		–40 to 85
Package*2		PLQP0048KB-A
Part No.		M301N2F8FP

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

Outline of M16C/Tiny Series

The M16C/Tiny Series is a product group incorporating the M16C/60-series core and supporting low-pin count and subminiature packages, with the number of pins ranging from 42 to 85.
In addition to the standard peripheral functions of the M16C family, the M16C/Tiny Series offers a rich variety of functions, such as a built-in reset circuit, input capture/output compare function, and a delay trigger mode for the A/D converter, thus allowing a reduction in the number of external components.

M16C/Tiny Series Features

- M16C/60 CPU core achieves 24MHz maximum operating frequency (M16C/26B, M16C/28B)
- Compact packages (from 48-pin 7 × 7-mm to 80-pin 12 × 12-mm) save circuit board space. Furthermore, 85-pin (7 × 7 mm) packages are also available.
- Built-in inverter control function simplifies design of systems that control 3-phase motors
- On-chip peripheral functions include reset circuit, input capture/output compare function, and A/D converter with delay trigger mode

• M16C/Tiny Series CPU Overview

Performance	Machine cycles	M16C/26B, 28B 41.7ns (24MHz)
	Address space	1M bytes
Number of Instructions	91	
Registers	Data registers : 16-bit × 4 × 2 banks Address registers : 16-bit × 2 × 2 banks Dedicated registers : 16-bit × 5	

M16C/26A Group

- Devices operate at high speed (up to 24MHz at 5V : M16C/26B) and have a small mounting area (7 × 7-mm 48-pin LQFP) [M16C/26A, M16C/26B will have 42-pin SSOP]
- Maintains instruction and peripheral function compatibility with M16C/62P MCUs to facilitate code reuse.
- Provides same timer for 3-phase motor control as M16C/62P MCUs, for controlling motors in small apparatus
- A versatile dedicated motor control function is built in and a wide range of control is possible
- Incorporates reset circuit eliminates need for external components, saving space and cost
- Optional on-chip 4K bytes data flash memory eliminates need for external EEPROM

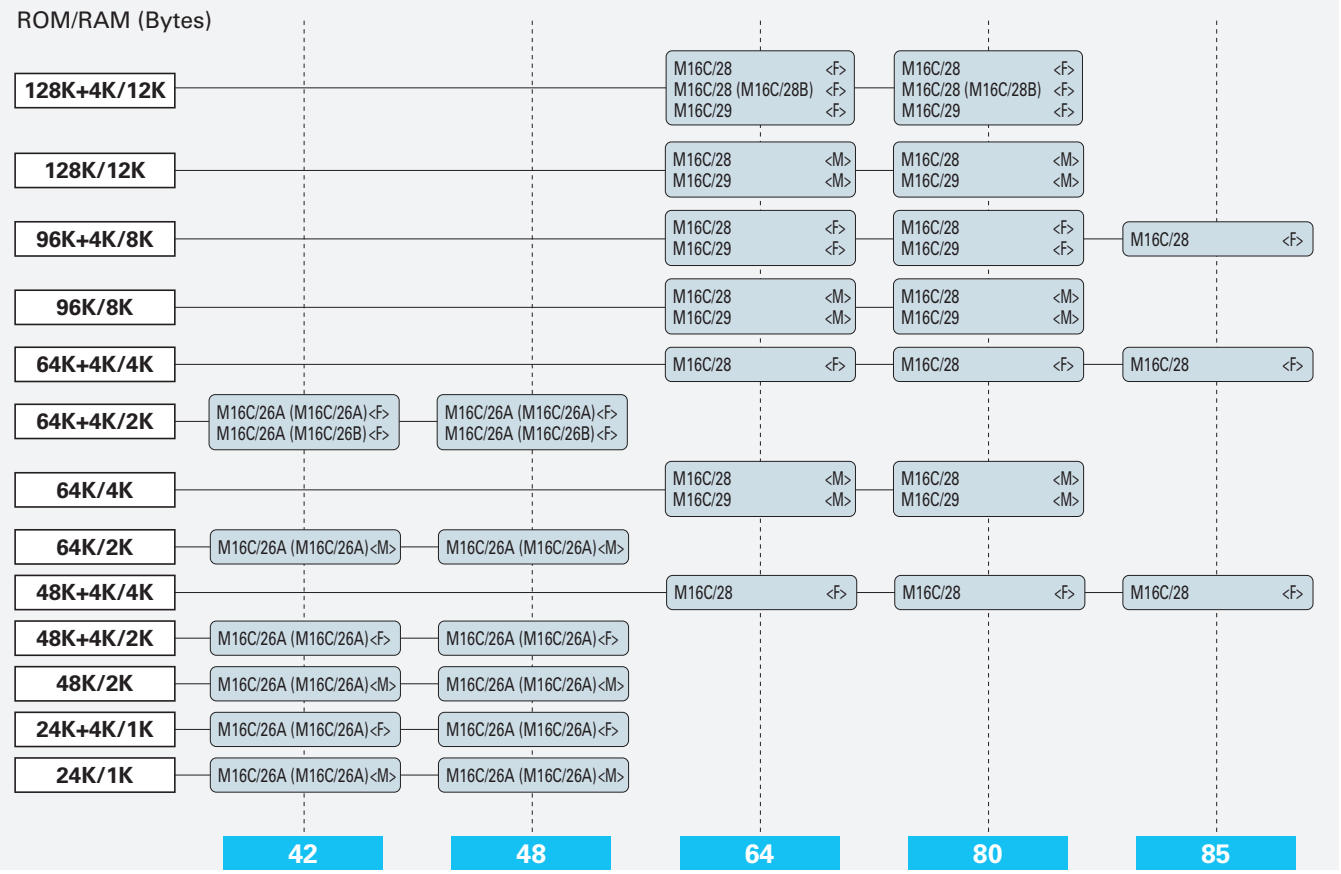
M16C/28 Group

- High-speed operation (24MHz at 5V : M16C/28B) is possible in small mounting area
- 85-pin FLGA (7 × 7 mm) packages are also available (M16C/28).
- Maintains instruction and peripheral function compatibility with M16C/62P MCUs to facilitate code reuse
- Provides same timer for 3-phase motor control as M16C/62P MCUs for controlling motors in small apparatus, and incorporates a versatile dedicated motor control function.
- Input-capture and output-compare function enable more flexible signal control
- I^2C-bus interface has two channels for use in systems with multiple master devices
- Incorporates reset circuit eliminates need for external components, saving space and cost
- Optional on-chip 4K bytes data flash memory eliminates need for external EEPROM

M16C/29 Group

- Upwards compatibility of M16C/28 group
- Version added CAN2.0B interface to M16C/28 group
- High-speed operation (20MHz at 5V) is possible in small mounting area
- Maintains instruction and peripheral function compatibility with M16C/62P MCUs to facilitate code reuse
- Provides same timer for 3-phase motor control as M16C/62P MCUs for controlling motors in small apparatus, and incorporates a versatile dedicated motor control function.
- Input-capture and output-compare function enable more flexible signal control
- I^2C-bus interface has two channels for use in systems with multiple master devices
- Incorporates reset circuit eliminates need for external components, saving space and cost
- Optional on-chip 4K bytes data flash memory eliminates need for external EEPROM

• Memory Capacity (ROM/RAM) (M16C/Tiny Series)



Letters in brackets < > indicate memory variations.
F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

Pin count

• Specifications (M16C/Tiny Series)

Group		M16C/26A (M16C/26A)												M16C/26A (M16C/26B)	
Memory	ROM (Bytes)	24K		24K + 4K		48K		48K + 4K		64K		64K + 4K			
	RAM (Bytes)	1K				2K									
	ROM Type*1	M		F		M		F		M		F			
	Data Flash/E2 Data Flash	—		4K (Data flash)		—		4K (Data flash)		—		4K (Data flash)			
	Program Security	—		Yes (ID code check function, ROM code protect function)		—		Yes (ID code check function, ROM code protect function)		—		Yes (ID code check function, ROM code protect function)			
CPU	CPU	M16C/60 Core													
	Basic Instructions	91													
	Minimum Instruction Execution Time (ns)	50 (@20MHz)												41.7 (@24MHz)	
	Multiplier	16 × 16 → 32													
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32													
	Barrel Shifter	—													
DMA	DMAC (Channels)	2													
	DTC/DMAC II	—													
External Bus Expansion	Address Space (Bytes)	—													
	External Bus Interface	—													
	Bus Structure	—													
	DRAM Controller	—													
Clock	Clock Generation Circuit	4 circuits (Main clock, PLL, Sub-clock, On-chip oscillator)													
	PLL	Yes													
	Subclock	Yes													
	RTC	—													
	On-Chip Oscillator	Yes													
	Oscillation Stop Detection	Yes													
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)													
	Power Save	Wait/Stop													
Power Supply Voltage Detection	Power-On Reset/POR	—													
	Low Voltage Detection/LVD	Yes (Low voltage detection)													
A/D Converter	Resolution × Channels	10-bit × 12	10-bit × 10	10-bit × 12	10-bit × 10	10-bit × 12	10-bit × 10	10-bit × 12	10-bit × 10	10-bit × 12	10-bit × 10	10-bit × 12	10-bit × 10	10-bit × 12	10-bit × 10
	Sample and Hold	Yes													
	Multi-Channel Sample and Hold	Yes													
D/A Converter	Resolution × Channels	—													
Timer	8-bit	—													
	16-bit	8 (Timer A, Timer B)													
	Input Capture	—													
	Output Compare	—													
	PWM Output	5 (Timer A)													
	Real-Time Port	—													
	Event Counter	8 (Timer A, Timer B)													
	2-Phase Encoder Input	3 (Timer A)													
	3-Phase Inverter Control	1 (shared with Timer A4, Timer A1, Timer A2, Timer B2, Dead time timer)													
Watchdog Timer		1													
Serial Interface	Clock Sync./Clock Async.	3 (UART)	2 (UART)	3 (UART)	2 (UART)	3 (UART)	2 (UART)	3 (UART)	2 (UART)	3 (UART)	2 (UART)	3 (UART)	2 (UART)	3 (UART)	2 (UART)
	Clock Sync. Only	—													
	Clock Async. Only	—													
I²C-bus		1 (UART)													
IEBus		1 (UART)													
Smart Card/SIM		1 (UART)													
Synchronous Serial Communication Unit/Special Serial I/O		1 (UART)													
CAN	Channels	—													
	Message Box (Numbers)	—													
IrDA		—													
CRC Calculation Circuit		1 (CRC-CCITT ($X^{16} + X^{12} + X^5 + 1$) /CRC-16 ($X^{16} + X^{15} + X^2 + 1$))													
X/Y Converter		—													
I/O Ports	Input Only (Numbers)	—													
	CMOS I/O (Numbers)	39	33	39	33	39	33	39	33	39	33	39	33	39	33
	N-Channel Open Drain Port (Numbers)	—													
	High Current Drive Port	—													
	Pull-Up Resistor	39	33	39	33	39	33	39	33	39	33	39	33	39	33
External Interrupts Pins		11													
Debugging Function	On-Chip Debug	—		Yes		—		Yes		—		Yes			
	On-Board Flash Program	—		Yes		—		Yes		—		Yes			
Others	ROM Correction Function	Yes (Address match × 2)		—		Yes (Address match × 2)		—		Yes (Address match × 2)		—			
	Others	—													
Operating Frequency/Supply Voltage		20MHz/3.0 to 5.5V, 10MHz/2.7 to 5.5V												24MHz/4.2 to 5.5V, 20MHz/3.0 to 5.5V, 10MHz/2.7 to 5.5V	
Operating Ambient Temperature (°C)		–20 to 85, –40 to 85												–40 to 85	–20 to 85
Package*2		PLQP0048KB-A	PRSP0042GA-B	PLQP0048KB-A	PRSP0042GA-B	PLQP0048KB-A	PRSP0042GA-B	PLQP0048KB-A	PRSP0042GA-B	PLQP0048KB-A	PRSP0042GA-B	PLQP0048KB-A	PRSP0042GA-B	PLQP0048KB-A	PRSP0042GA-B
Part No.		M30260M3A-XXXGP	M30263M3A-XXXFP	M30260F3AGP	M30263F3AFP	M30260M6A-XXXGP	M30263M6A-XXXFP	M30260F6AGP	M30263F6AFP	M30260M8A-XXXGP	M30263M8A-XXXFP	M30260F8AGP	M30263F8AFP	M30260F8BGP	M30263F8BFP

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (M16C/Tiny Series)

Group		M16C/28														M16C/28 (M16C/28B)	
Memory	ROM (Bytes)	48K + 4K		64K		64K + 4K		96K		96K + 4K		128K		128K + 4K			
	RAM (Bytes)	4K						8K				12K					
	ROM Type*1	F		M		F		M		F		M		F			
	Data Flash/E2 Data Flash	4K (Data flash)		—		4K (Data flash)		—		4K (Data flash)		—		4K (Data flash)			
	Program Security	Yes (ID code check function, ROM code protect function)		—		Yes (ID code check function, ROM code protect function)		—		Yes (ID code check function, ROM code protect function)		—		Yes (ID code check function, ROM code protect function)			
CPU	CPU	M16C/60 Core															
	Basic Instructions	91															
	Minimum Instruction Execution Time (ns)	50 (@20MHz)														41.7 (@24MHz)	
	Multiplier	16 × 16 → 32															
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32															
	Barrel Shifter	—															
DMA	DMAC (Channels)	2															
	DTC/DMAC II	—															
External Bus Expansion	Address Space (Bytes)	—															
	External Bus Interface	—															
	Bus Structure	—															
	DRAM Controller	—															
Clock	Clock Generation Circuit	4 circuits (Main clock, PLL, Sub-clock, On-chip oscillator)															
	PLL	Yes															
	Subclock	Yes															
	RTC	—															
	On-Chip Oscillator	Yes															
	Oscillation Stop Detection	Yes															
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)															
	Power Save	Wait/Stop															
Power Supply Voltage Detection	Power-On Reset/POR	—															
	Low Voltage Detection/LVD	Yes (Low voltage detection)															
A/D Converter	Resolution x Channels	10-bit × 24	10-bit x 13	10-bit x 24	10-bit x 13	10-bit × 24	10-bit x 13	10-bit x 24	10-bit x 13	10-bit × 24	10-bit x 13	10-bit x 24	10-bit x 13	10-bit x 24	10-bit x 13	10-bit x 24	10-bit x 13
	Sample and Hold	Yes															
	Multi-Channel Sample and Hold	Yes															
D/A Converter	Resolution x Channels	—															
Timer	8-bit	—															
	16-bit	8 (Timer A, Timer B)															
	Input Capture	8 (Timer S)															
	Output Compare	8 (Timer S)															
	PWM Output	13 (Timer A, Timer S)															
	Real-Time Port	—															
	Event Counter	8 (Timer A, Timer B)															
	2-Phase Encoder Input	3 (Timer A) + 1 (Timer S)															
	3-Phase Inverter Control	1 (shared with Timer A4, Timer A1, Timer A2, Timer B2, Dead time timer)															
Watchdog Timer		1															
Serial Interface	Clock Sync./Clock Async.	3 (UART)															
	Clock Sync. Only	2 (Serial I/O)	1 (Serial I/O)	2 (Serial I/O)	1 (Serial I/O)	2 (Serial I/O)	1 (Serial I/O)	2 (Serial I/O)	1 (Serial I/O)	2 (Serial I/O)	1 (Serial I/O)	2 (Serial I/O)	1 (Serial I/O)	2 (Serial I/O)	1 (Serial I/O)	2 (Serial I/O)	1 (Serial I/O)
	Clock Async. Only	—															
I^2C-bus		2 (Multi master I^2C, UART)															
IEBus		1 (UART)															
Smart Card/SIM		1 (UART)															
Synchronous Serial Communication Unit/Special Serial I/O		1 (UART)															
CAN	Channels	—															
	Message Box (Numbers)	—															
IrDA		—															
CRC Calculation Circuit		—															
X/Y Converter		—															
I/O Ports	Input Only (Numbers)	—															
	CMOS I/O (Numbers)	71	55	71	55	71	55	71	55	71	55	71	55	71	55	71	55
	N-Channel Open Drain Port (Numbers)	—															
	High Current Drive Port	—															
	Pull-Up Resistor	71	55	71	55	71	55	71	55	71	55	71	55	71	55	71	55
External Interrupts Pins		11															
Debugging Function	On-Chip Debug	Yes		—		Yes		—		Yes		—		Yes			
	On-Board Flash Program	Yes		—		Yes		—		Yes		—		Yes			
Others	ROM Correction Function	—		Yes (Address match x 2)		—		Yes (Address match x 2)		—		Yes (Address match x 2)		—			
	Others	—															
Operating Frequency/Supply Voltage		20MHz/3.0 to 5.5V, 10MHz/2.7 to 5.5V														24MHz/4.2 to 5.5V, 20MHz/3.0 to 5.5V, 10MHz/2.7 to 5.5V	
Operating Ambient Temperature (°C)		-20 to 85, -40 to 85	-20 to 85	–20 to 85, –40 to 85				–20 to 85	–20 to 85, –40 to 85			–20 to 85	–20 to 85, –40 to 85			–40 to 85	
Package*2		PLQP0080KB-A	PTLG0085JB-A	PLQP0064KB-A	PLQP0080KB-A	PLQP0064KB-A	PLQP0080KB-A	PTLG0085JB-A	PLQP0064KB-A	PLQP0080KB-A	PLQP0064KB-A	PLQP0080KB-A	PTLG0085JB-A	PLQP0064KB-A	PLQP0080KB-A	PLQP0064KB-A	PLQP0080KB-A	PLQP0064KB-A	PLQP0080KB-A	PLQP0064KB-A
Part No.		M30280F6HP	M30280F6WG	M30281F6HP	M30280M8-XXXHP	M30281M8-XXXHP	M30280F8HP	M30280F8WG	M30281F8HP	M30280MA-XXXHP	M30281MA-XXXHP	M30280FAHP	M30280FAWG	M30281FAHP	M30280MC-XXXHP	M30281MC-XXXHP	M30280FCHP	M30281FCHP	M30280FCBHP	M30281FCBHP

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (M16C/Tiny Series)

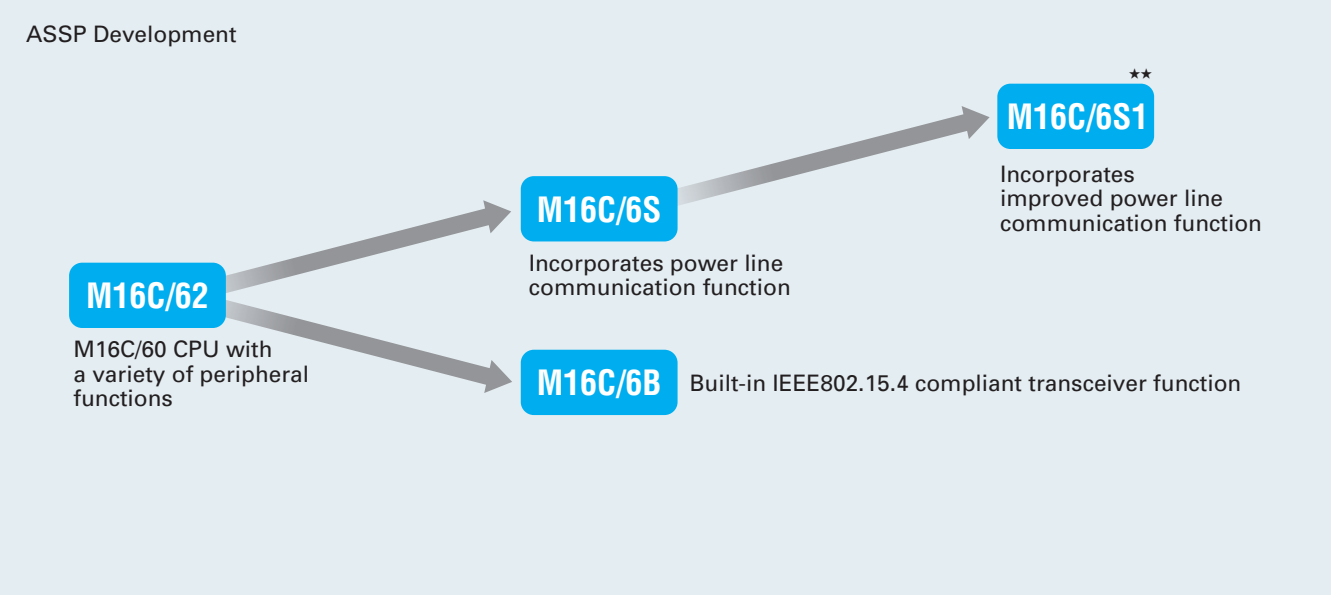
Group		M16C/29									
Memory	ROM (Bytes)	64K		96K		96K + 4K		128K		128K + 4K	
	RAM (Bytes)	4K		8K				12K			
	ROM Type*1	M				F		M		F	
	Data Flash/E2 Data Flash	—				4K (Data flash)		—		4K (Data flash)	
	Program Security	—				Yes (ID code check function, ROM code protect function)		—		Yes (ID code check function, ROM code protect function)	
CPU	CPU	M16C/60 Core									
	Basic Instructions	91									
	Minimum Instruction Execution Time (ns)	50 (@20MHz)									
	Multiplier	16 × 16 → 32									
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32									
	Barrel Shifter	—									
DMA	DMAC (Channels)	2									
	DTC/DMAC II	—									
External Bus Expansion	Address Space (Bytes)	—									
	External Bus Interface	—									
	Bus Structure	—									
	DRAM Controller	—									
Clock	Clock Generation Circuit	4 circuits (Main clock, PLL, Sub-clock, On-chip oscillator)									
	PLL	Yes									
	Subclock	Yes									
	RTC	—									
	On-Chip Oscillator	Yes									
	Oscillation Stop Detection	Yes									
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)									
	Power Save	Wait/Stop									
Power Supply Voltage Detection	Power-On Reset/POR	—									
	Low Voltage Detection/LVD	Yes (Low voltage detection)									
A/D Converter	Resolution × Channels	10-bit × 27	10-bit × 16	10-bit × 27	10-bit × 16	10-bit × 27	10-bit × 16	10-bit × 27	10-bit × 16	10-bit × 27	10-bit × 16
	Sample and Hold	Yes									
	Multi-Channel Sample and Hold	Yes									
D/A Converter	Resolution × Channels	—									
Timer	8-bit	—									
	16-bit	8 (Timer A, Timer B)									
	Input Capture	8 (Timer S)									
	Output Compare	8 (Timer S)									
	PWM Output	13 (Timer A, Timer S)									
	Real-Time Port	—									
	Event Counter	8 (Timer A, Timer B)									
	2-Phase Encoder Input	3 (Timer A) + 1 (Timer S)									
	3-Phase Inverter Control	1 (shared with Timer A4, Timer A1, Timer A2, Timer B2, Dead time timer)									
Watchdog Timer		1									
Serial Interface	Clock Sync./Clock Async.	3 (UART)									
	Clock Sync. Only	2 (Serial I/O)	1 (Serial I/O)	2 (Serial I/O)	1 (Serial I/O)	2 (Serial I/O)	1 (Serial I/O)	2 (Serial I/O)	1 (Serial I/O)	2 (Serial I/O)	1 (Serial I/O)
	Clock Async. Only	—									
I²C-bus		2 (Multi master I²C, UART)									
IEBus		1 (UART)									
Smart Card/SIM		1 (UART)									
Synchronous Serial Communication Unit/Special Serial I/O		1 (UART)									
CAN	Channels	1									
	Message Box (Numbers)	16									
IrDA		—									
CRC Calculation Circuit		1 (CRC-CCITT ($X^{16} + X^{12} + X^5 + 1$) /CRC-16 ($X^{16} + X^{15} + X^2 + 1$))									
X/Y Converter		—									
I/O Ports	Input Only (Numbers)	—									
	CMOS I/O (Numbers)	71	55	71	55	71	55	71	55	71	55
	N-Channel Open Drain Port (Numbers)	—									
	High Current Drive Port	—									
	Pull-Up Resistor	71	55	71	55	71	55	71	55	71	55
External Interrupts Pins		11									
Debugging Function	On-Chip Debug	—				Yes		—		Yes	
	On-Board Flash Program	—				Yes		—		Yes	
Others	ROM Correction Function	Yes (Address match × 2)				—		Yes (Address match × 2)		—	
	Others	—									
Operating Frequency/Supply Voltage		20MHz/3.0 to 5.5V, 10MHz/2.7 to 5.5V									
Operating Ambient Temperature (°C)		–20 to 85, –40 to 85									
Package*2		PLQP0080KB-A	PLQP0064KB-A	PLQP0080KB-A	PLQP0064KB-A	PLQP0080KB-A	PLQP0064KB-A	PLQP0080KB-A	PLQP0064KB-A	PLQP0080KB-A	PLQP0064KB-A
Part No.		M30290M8-XXXHP	M30291M8-XXXHP	M30290MA-XXXHP	M30291MA-XXXHP	M30290FAHP	M30291FAHP	M30290MC-XXXHP	M30291MC-XXXHP	M30290FCHP	M30291FCHP

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

M16C/ASSP Development

• M16C/60 Series Development

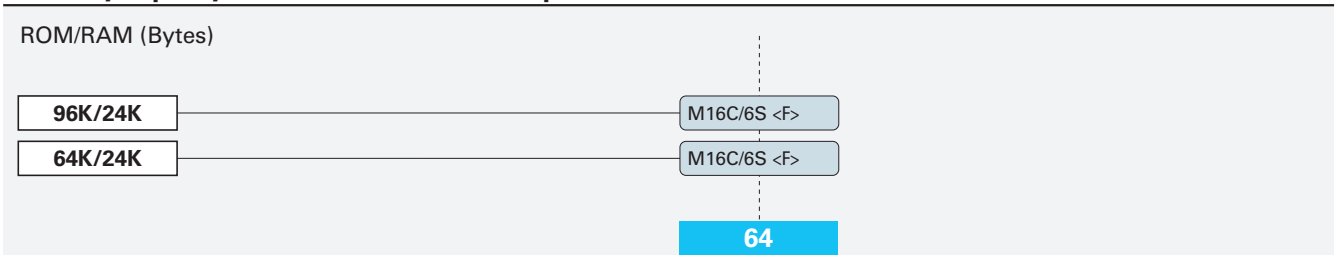


★★ : Under development

MCUs with Built-in Power Line Communications Function (PLC MCUs)
M16C/6S Group

The M16C/6S Group are single-chip microcomputers composed of a built-in power line communication modem incorporating the IT800PLC modem (standard system per U.S. HomePlug C&C V1.0) developed by Yitran Communications Ltd. and an analog front end integrated into a single chip. Power line communication utilizes the 100–400 kHz frequency band, which enables a maximum communication speed of 7.5 Kbps. Renesas also offers a standard data link layer library, D2DL.

• Memory Capacity (ROM/RAM) (M16C/6S Group)



Letters in brackets < > indicate memory variations.
F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

• Specifications (M16C/6S Group)

Group		M16C/6S		
Memory	ROM (Bytes)	64K	96K	
	RAM (Bytes)	24K		
	ROM Type*1	F		
	Data Flash	—		
	Program Security	Yes (ID code check function, ROM code protect function)		
CPU	CPU	M16C/60 Core		
	Basic Instructions	91		
	Minimum Instruction Execution Time (ns)	65.1 (@15.36MHz)		
	Multiplier	16 × 16 → 32		
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32		
	Barrel Shifter	—		
DMA	DMAC (Channels)	2		
	DTC/DMAC II	—		
External Bus Expansion	Address Space (Bytes)	—		
	External Bus Interface	—		
	Bus Structure	—		
	DRAM Controller	—		
Clock	Clock Generation Circuit	2 circuits (Main clock, On-chip oscillator)		
	PLL	—		
	Subclock	—		
	RTC	—		
	On-Chip Oscillator	Yes		
	Oscillation Stop Detection	—		
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)		
	Power Save	Normal operation (High-speed, medium-speed) /Wait/Stop		
Power Supply Voltage Detection	Power-On Reset/POR	—		
	Low Voltage Detection/LVD	—		
A/D Converter	Resolution × Channels	—		
	Sample and Hold	—		
	Multi-Channel Sample and Hold	—		
D/A Converter	Resolution × Channels	—		
Timer	8-bit	—		
	16-bit	5 (Timer A)		
	Input Capture	—		
	Output Compare	—		
	PWM Output	—		
	Real-Time Port	—		
	Event Counter	—		
	2-Phase Encoder Input	—		
	3-Phase Inverter Control	—		
Watchdog Timer		—		
Serial Interface	Clock Sync./Clock Async.	2 (UART 0, UART 1)		
	Clock Sync. Only	2 (one of them is internally connected to IT800)		
	Clock Async. Only	1 (UART 2)		
I^2C-bus		3 (UART 0 to UART 2)		
IEBus		—		
Smart Card/SIM		—		
Synchronous Serial Communication Unit/Special Serial I/O		—		
CAN	Channels	—		
	Message Box (Numbers)	—		
IrDA		—		
CRC Calculation Circuit		—		
X/Y Converter		—		
I/O Ports	Input Only (Numbers)	1		
	CMOS I/O (Numbers)	20		
	N-Channel Open Drain Port (Numbers)	1 (P7_0)		
	High Current Drive Port	—		
	Pull-Up Resistor	20 (Pull-up resistor can be set every four ports)		
External Interrupts Pins		3 (INT1-INT3)		
Debugging Function	On-Chip Debug	Yes		
	On-Board Flash Program	Yes		
Others	ROM Correction Function	—		
	Others	Power line communication function		
Operating Frequency/Supply Voltage		15.36MHz/3.0 to 3.6V		
Operating Ambient Temperature (°C)		–40 to 105	–20 to 85, –40 to 85	–40 to 105
Package*2		PLQP0064KB-A		
Part No.		**M306S0F8DGP**	**M306S0FAGP**	**M306S0FADGP**

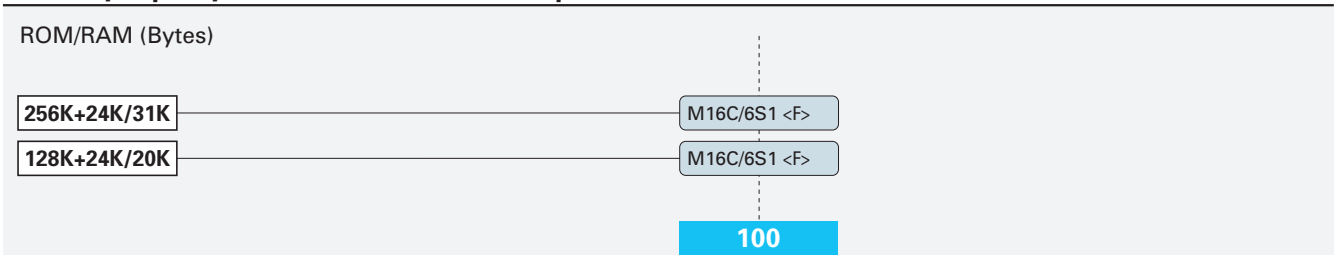
*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

MCUs with Built-in Power Line Communications Function (PLC MCUs)
M16C/6S1 Group

The M16C/6S1 Group are single-chip microcomputers composed of a built-in power line communication modem incorporating the IT900PLC modem (standard system per U.S. HomePlug C&C V1.0) developed by Yitran Communications Ltd. and an analog front end integrated into a single chip. Power line communication utilizes the 100 to 400 kHz frequency band, which enables a maximum communication speed of 500 Kbps. Renesas also offers a standard data link layer library, D2DL.

• Memory Capacity (ROM/RAM) (M16C/6S1 Group)



Letters in brackets < > indicate memory variations.
F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

• Specifications (M16C/6S1 Group)

Group		M16C/6S1			
Memory	ROM (Bytes)	128K		256K	
	RAM (Bytes)	20K		31K	
	ROM Type*1	F			
	Data Flash	8K (Data Flash: program/Erase 10k times)			
	Program Security	Yes (ID code check function, ROM code protect function)			
CPU	CPU	M16C/60 Core			
	Basic Instructions	91			
	Minimum Instruction Execution Time (ns)	32.6 (@30.72MHz)			
	Multiplier	16 × 16 → 32			
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32			
	Barrel Shifter	—			
DMA	DMAC (Channels)	4			
	DTC/DMAC II	—			
External Bus Expansion	Address Space (Bytes)	—			
	External Bus Interface	—			
	Bus Structure	—			
	DRAM Controller	—			
Clock	Clock Generation Circuit	4 circuits (Main clock, PLL, Sub clock, On-chip oscillator (125kHz))			
	PLL	Yes			
	Subclock	Yes (32.768kHz)			
	RTC	Yes			
	On-Chip Oscillator	Yes (Low speed : 125kHz)			
	Oscillation Stop Detection	Yes			
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)			
	Power Save	Wait/Stop			
Power Supply Voltage Detection	Power-On Reset/POR	—			
	Low Voltage Detection/LVD	Yes (Voltage detection 1)			
A/D Converter	Resolution × Channels	10-bit × 18			
	Sample and Hold	Yes			
	Multi-Channel Sample and Hold	—			
D/A Converter	Resolution × Channels	—			
Timer	8-bit	—			
	16-bit	5 (Timer A), 6 (Timer B)			
	Input Capture	—			
	Output Compare	—			
	PWM Output	3 (Timer A)			
	Real-Time Port	—			
	Event Counter	5 (Timer A), 6 (Timer B)			
	2-Phase Encoder Input	3 (Timer A)			
	3-Phase Inverter Control	—			
Watchdog Timer		1			
Serial Interface	Clock Sync./Clock Async.	6 (1 of UART is for PLC control)			
	Clock Sync. Only	2			
	Clock Async. Only	—			
I²C-bus		1			
IEBus		—			
Smart Card/SIM		—			
Synchronous Serial Communication Unit/Special Serial I/O		—			
CAN	Channels	—			
	Message Box (Numbers)	—			
IrDA		—			
CRC Calculation Circuit		1 (CRC-CCITT ($X^{16}+X^{12}+X^5+1$), CRC-16 ($X^{16}+X^{15}+X^2+1$)) compliant			
X/Y Converter		—			
I/O Ports	Input Only (Numbers)	—			
	CMOS I/O (Numbers)	53			
	N-Channel Open Drain Port (Numbers)	3			
	High Current Drive Port	—			
	Pull-Up Resistor	53			
External Interrupts Pins		14			
Debugging Function	On-Chip Debug	Yes			
	On-Board Flash Program	Yes			
Others	ROM Correction Function	—			
	Others	Power line communication function			
Operating Frequency/Supply Voltage		30.72MHz/3.0 to 3.6V			
Operating Ambient Temperature (°C)		–20 to 85	–40 to 85	–20 to 85	–40 to 85
Package*2		PTQP0100KE-A			
Part No.		**R5F36S16NFD****	**R5F36S16DFD****	**R5F36S1ENFB****	**R5F36S1EDFB****

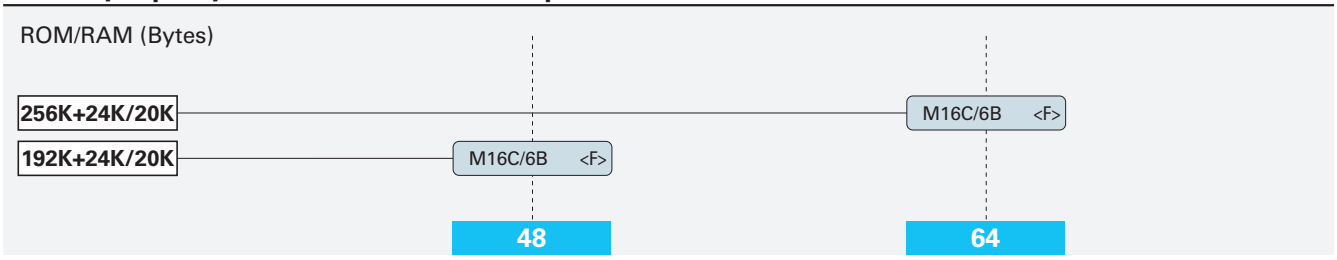
*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

Type with on-chip transceiver compatible with IEEE 802.15.4 standard M16C/6B Group

The M16C/6B Group of MCUs with on-chip flash memory are built around the M16C/60 CPU core and integrate low current-consumption transceiver functions for near field communication (2.4GHz). The on-chip wireless functions provide partial implementation of physical (PHY) and MAC layers compatible with the IEEE 802.15.4 standard to accommodate applications ranging from simple communication systems to the ZigBee protocol.

• Memory Capacity (ROM/RAM) (M16C/6B Group)



Letters in brackets < > indicate memory variations.
F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

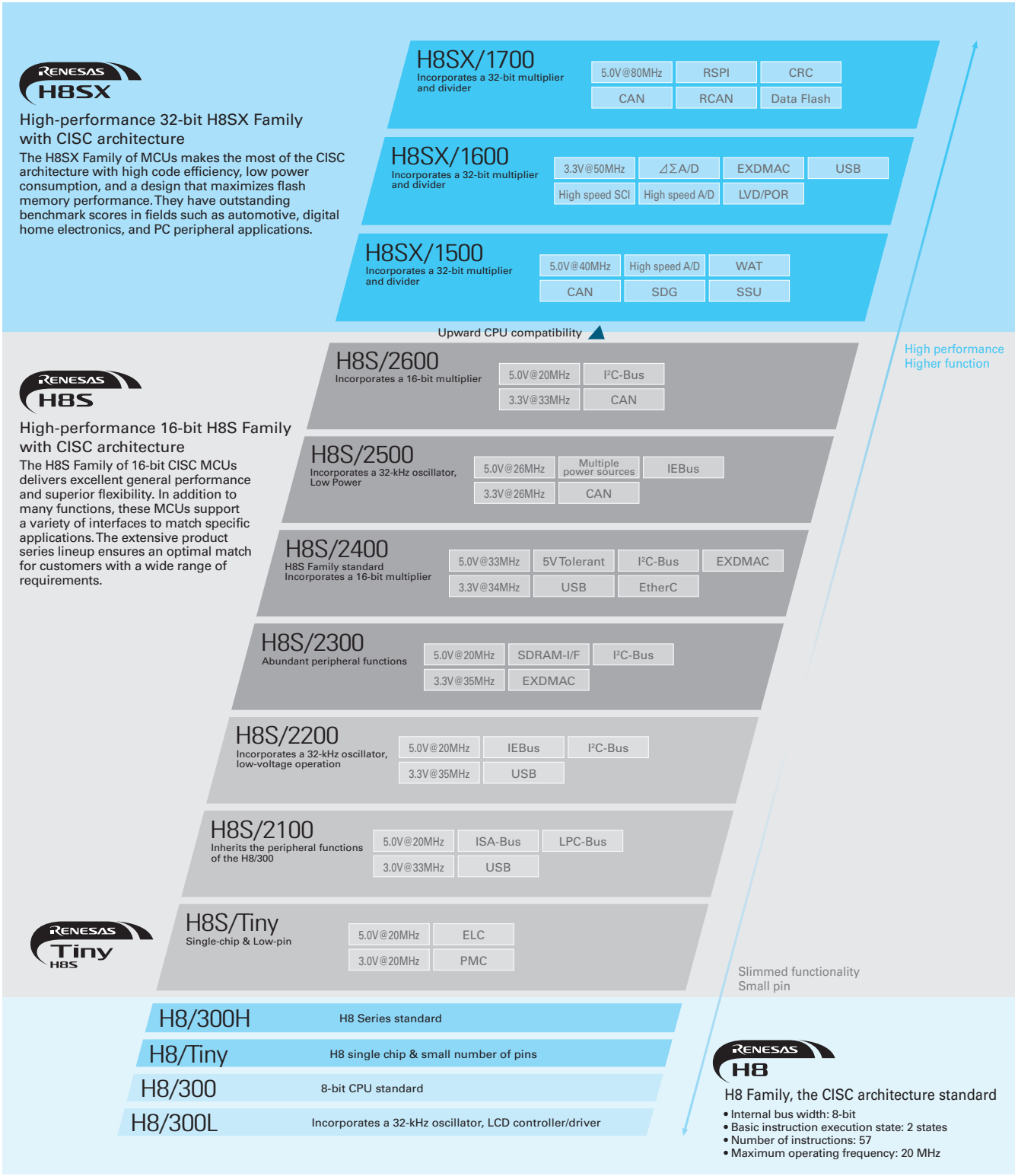
• Specifications (M16C/6B Group)

Group		M16C/6B	
Memory	ROM (Bytes)	192K + 24K	256K + 24K
	RAM (Bytes)	20K	
	ROM Type*1	F	
	Data Flash	8K (Data Flash: program/Erase 10k times)	
	Program Security	Yes (ID code check function, ROM code protect function)	
CPU	CPU	M16C/60 Core	
	Basic Instructions	91	
	Minimum Instruction Execution Time (ns)	62.5 (@16MHz)	
	Multiplier	16 × 16 → 32	
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32	
	Barrel Shifter	—	
DMA	DMAC (Channels)	4	
	DTC/DMAC II	—	
External Bus Expansion	Address Space (Bytes)	—	
	External Bus Interface	—	
	Bus Structure	—	
	DRAM Controller	—	
Clock	Clock Generation Circuit	3 circuits (Main clock, Sub-clock, On-chip oscillator (125kHz))	
	PLL	—	
	Subclock	Yes (32.768kHz)	
	RTC	—	
	On-Chip Oscillator	Yes (Low-speed: 125kHz)	
	Oscillation Stop Detection	Yes	
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)	
	Power Save	Wait/Stop	
Power Supply Voltage Detection	Power-On Reset/POR	—	
	Low Voltage Detection/LVD	—	
A/D Converter	Resolution × Channels	—	10-bit × 8
	Sample and Hold	—	Yes
	Multi-Channel Sample and Hold	—	
D/A Converter	Resolution × Channels	—	
Timer	8-bit	—	
	16-bit	5 (Timer A), 6 (Timer B)	
	Input Capture	—	
	Output Compare	—	
	PWM Output	2 (Timer A)	5 (Timer A)
	Real-Time Port	—	
	Event Counter	2 (Timer A)	5 (Timer A)
	2-Phase Encoder Input	—	
	3-Phase Inverter Control	—	
Watchdog Timer		—	
Serial Interface	Clock Sync./Clock Async.	3 (UART 0 to UART 2)	
	Clock Sync. Only	—	
	Clock Async. Only	—	
I^2C-bus		3 (UART 0 to UART 2)	
IEBus		—	
Smart Card/SIM		1 (UART)	
Synchronous Serial Communication Unit/Special Serial I/O		—	
CAN	Channels	—	
	Message Box (Numbers)	—	
IrDA		—	
CRC Calculation Circuit		1 (CRC-CCITT ($X^{16} + X^{12} + X^5 + 1$))	
X/Y Converter		—	
I/O Ports	Input Only (Numbers)	—	
	CMOS I/O (Numbers)	16	30
	N-Channel Open Drain Port (Numbers)	3	
	High Current Drive Port	—	
	Pull-Up Resistor	16 (Settable)	30 (Settable)
External Interrupts Pins		7 (NMI, INT × 2, Key Input × 4)	11 (NMI, INT × 2, Key Input × 8)
Debugging Function	On-Chip Debug	Yes	
	On-Board Flash Program	Yes	
Others	ROM Correction Function	—	
	Others	IEEE802.15.4 compliant transceiver function/MAC: address filtering, automatic CSMA-CA, automatic ACK transmission/Encryption function: 128bit CCM-AES, intrinsic random number generation	
Operating Frequency/Supply Voltage		16MHz (Without dividing) /2.7 to 3.6V, 16MHz (2 division) /2.2 to 2.7V	
Operating Ambient Temperature (°C)		–20 to 85	
Package*2		PVQN0048KB-A	PVQN0064KA-A
Part No.		R5F36B4BNNP	R5F36B3ENNP

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• H8SX, H8S, H8 Family Roadmap

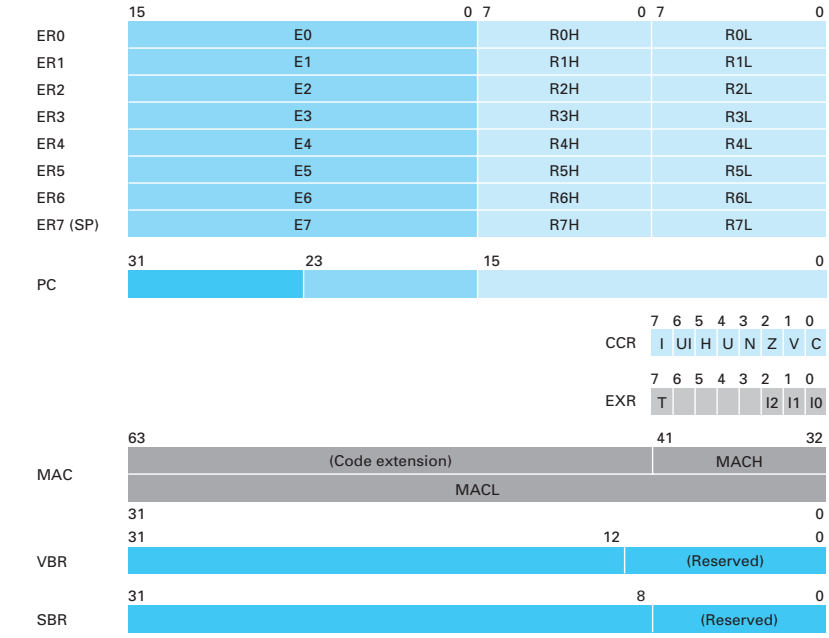


• Continuity with the H8 architecture

High performance CISC architecture

The emphasis during core development was ensuring compatibility in the assignment and function of registers between the H8S Family and H8SX Family. This simplifies reuse of existing software resources. Each family also features added functions designed to increase flexibility.

CPU register structure

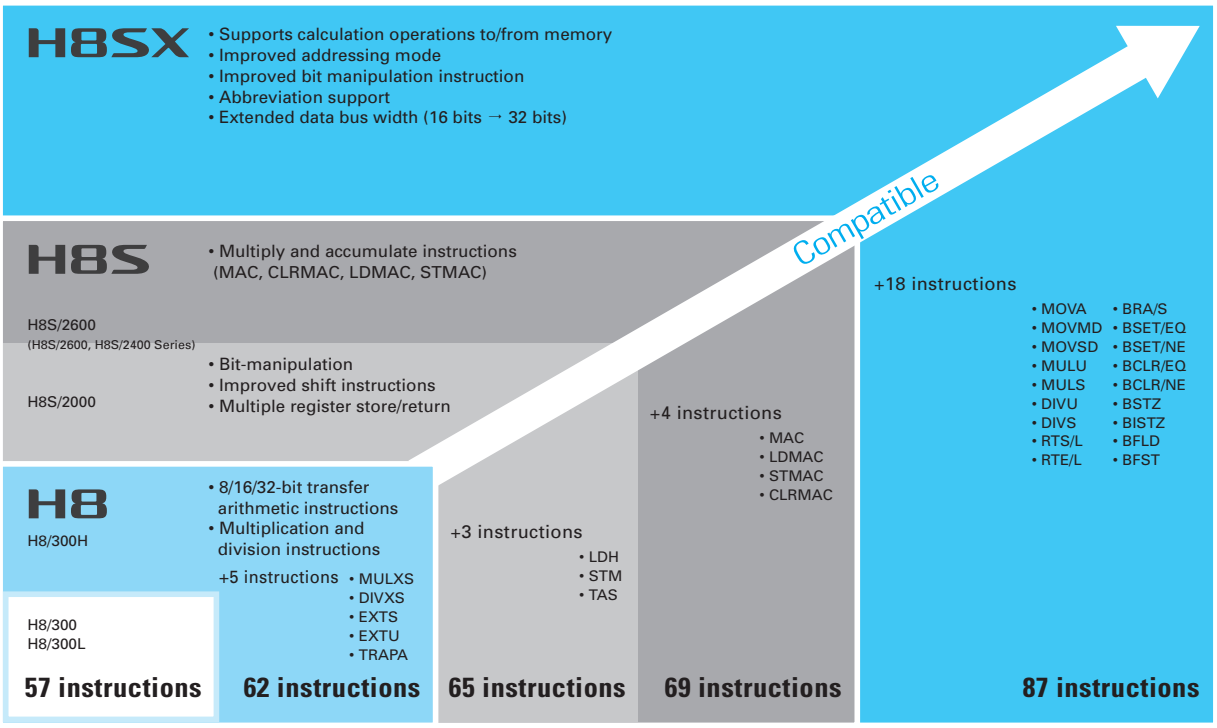


H8/300, 300L-CPU
H8/300H-CPU (Addition)
H8S/2000-CPU (Addition)
H8S/2600-CPU (Addition)
H8SX-CPU (Addition)

SP : Stack pointer
PC : Program counter
CCR : Condition code register
I : Interruption mask bit
UI : User bit/interruption mask bit
H : Half carry flag
U : User bit
N : Negative flag
Z : Zero flag
V : Overflow flag
C : Carry flag
EXR : Extend register
T : Trace bit
I2 to I0 : Interruption mask bit
MAC : Multiply-accumulate register
VBR : Vector base register
SBR : Short address base register

Ensures compatibility at the object level

Firmware developed for H8-CPUs can be used with 16-bit H8S-CPUs and 32-bit H8SX-CPUs.



The H8SX Family of controllers employ a CISC architecture that provides the advantages of excellent code efficiency and low power consumption, enabling these MCUs to exploit the full performance of their on-chip flash memory. They have established outstanding benchmarks in specialized fields such as automotive systems, digital consumer electronics, and PC peripherals. The lineup of products in the H8SX Family is currently being extended. Versions with 256K bytes to 1M byte of on-chip memory further expand of the range of applications.

H8SX Family Features

- High performance and low power consumption
  - Execution of basic instructions in 1 state/minimum instruction execution time of 12.5ns (80MHz operation)
  - 1MIPS/MHz operation and maximum processing performance of 50MIPS (50MHz operation)
  - On-chip multiplier and divider, one-state execution of 16-bit × 16-bit operations
  - Vector base register for improved interrupt responsiveness
  - Short address base register for more compact code size and shorter fetch cycles
- Emphasis on continuity with H8 Family and H8S Family while adding new advances
  - Retains peripheral functions of H8 and H8S while adding new functions such as endian conversion and address multiplex bus.
  - Retains instruction set of H8 and H8S while adding new instructions and addressing modes.
  - New instructions for improved code efficiency
- 1-state access to on-chip flash memory in all H8SX products
  - Available on-chip flash capacities of 256K, 384K, 512K, 768K and 1M bytes
  - On-chip flash minimum access time of 12.5ns (80MHz operation)
- C language support for high efficiency
  - Excellent program object code efficiency
  - Object code size is among the most compact in the industry.
- Powerful instructions
  - On-chip multiplier and divider for high-speed arithmetic operations
  - Flexible addressing modes supporting indirect memory-to-memory operations, etc., and more powerful bit manipulation instructions
- Backward compatibility
  - Design emphasis on pin compatibility with same-package versions of earlier MCUs and backward compatibility of peripheral functions
- Large address space
  - Support for maximum program area of 16M byte

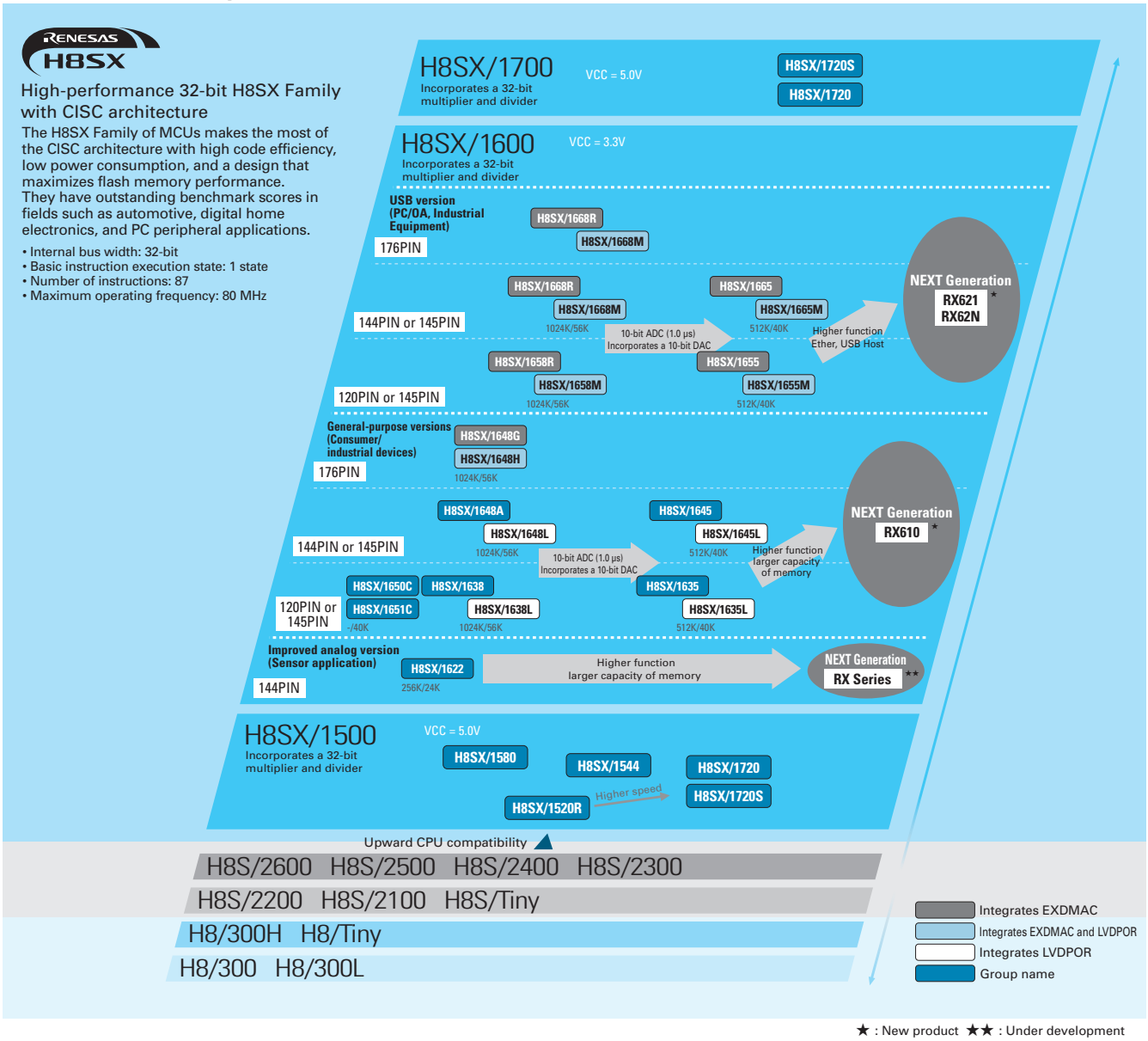
• H8SX Family Roadmap

RENESAS H8SX

High-performance 32-bit H8SX Family with CISC architecture

The H8SX Family of MCUs makes the most of the CISC architecture with high code efficiency, low power consumption, and a design that maximizes flash memory performance. They have outstanding benchmark scores in fields such as automotive, digital home electronics, and PC peripheral applications.

- Internal bus width: 32-bit
- Basic instruction execution state: 1 state
- Number of instructions: 87
- Maximum operating frequency: 80 MHz



★ : New product ★★ : Under development

• Application Examples

Airbag,
Dashboard



Industrial equipment
Robot, NC, general-purpose inverter, servo, and FA control equipment



OA equipment
Printer, Fax/MFP, and copy machine



Commercial equipment
LCD projector and DVD player/recorder



Home electronics equipment
Air conditioner, refrigerator, and washing machine



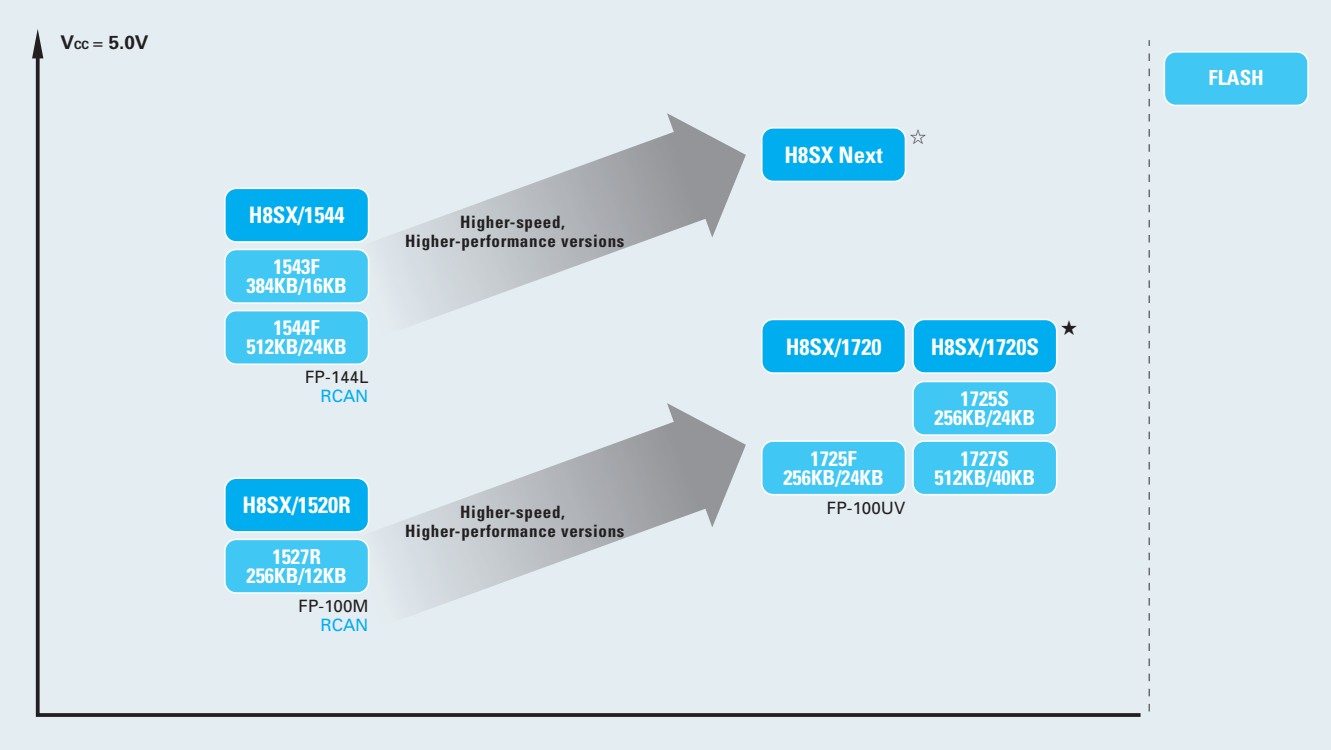
Outline of H8SX/1700 Series

The H8SX/1700 Series incorporates a 32-bit multiplier and divider and supports 5V.

H8SX/1700 Series Features

- Incorporates H8SX V2 core
- Maximum operating frequency of 80MHz at Vcc = 5.0V (Minimum instruction execution time: 12.5ns)
- 5V single power supply
- Incorporates RCAN that controls CAN for real-time communication
- Upgrade lineup for dashboard and airbag applications
- Incorporates a MONOS flash memory, allowing flash access time as low as 12.5ns (at an operating frequency of 80MHz)
- Incorporates a 16K bytes data flash that can be rewritten 30,000 times
- Incorporates two A/D converters for high-speed A/D conversion

• H8SX/1700 Family Roadmap



★ : New product ☆ : In planning stage

H8SX/1720, 1720S Group

- Maximum operating frequency of 80MHz at Vcc = 5.0V (minimum instruction execution time: 12.5ns)
- Incorporates 256K bytes flash memory (H8SX/1720S group incorporates 512K bytes flash memory)
- Incorporates 32K bytes data flash memory
- Incorporates RCAN that controls CAN for real-time communication
- Ideal for automotive applications for network communications.
- Incorporates a 100-pin LQFP package

*Refer to “Automotive MCUs” in this catalog.

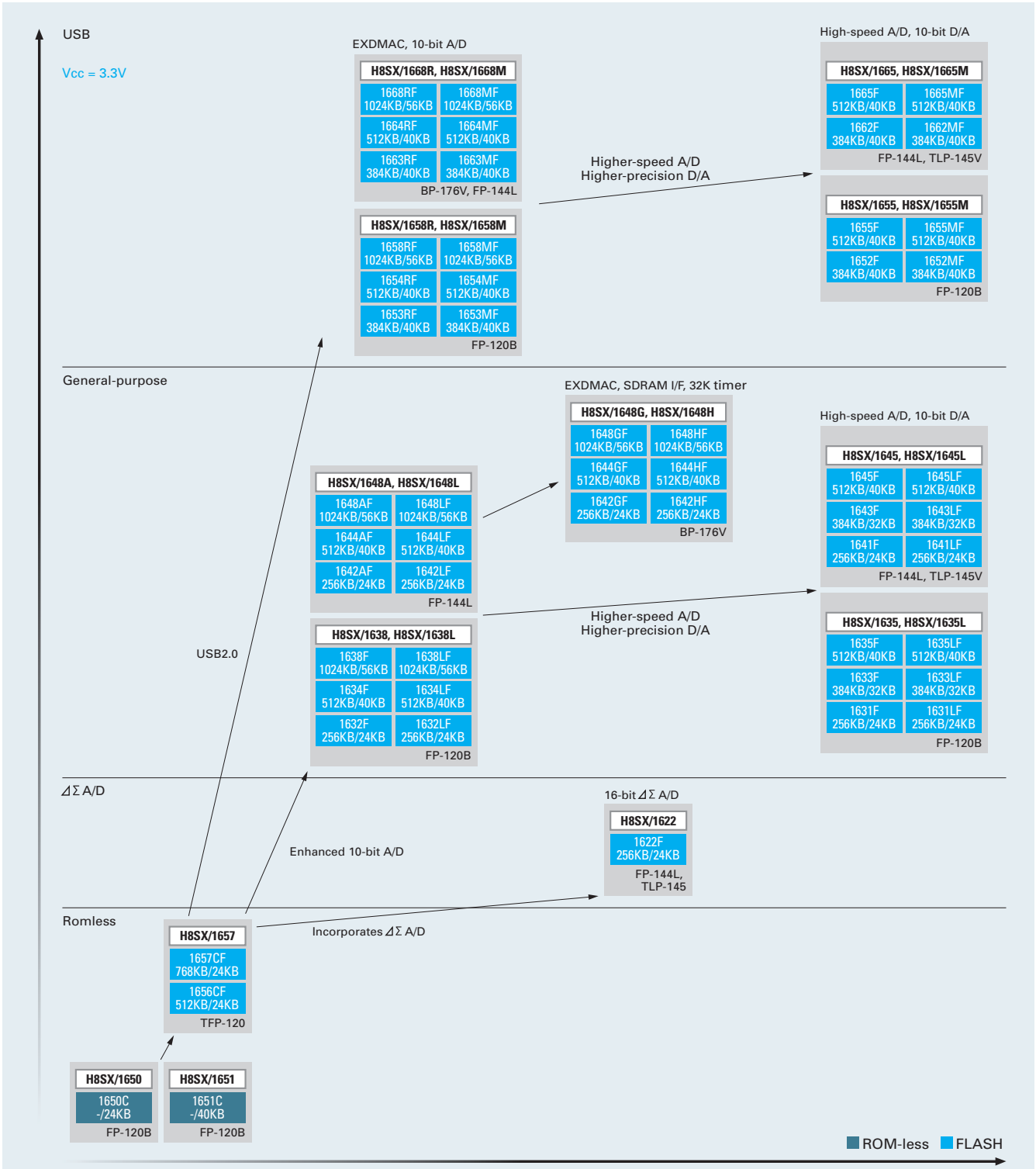
Outline of H8SX/1600 Series

The H8SX/1600 Series incorporates a 32-bit multiplier/divider/multiply-accumulator and supports 3V.

H8SX/1600 Series Features

- Maximum operating frequency of 50MHz at Vcc = 3.3V
- Extensive lineup with available on-chip flash capacities of 256K, 384K, 512K, 768K and 1M bytes
- Available with on-chip ΔΣ or successive comparison type A/D converter for high-speed conversion.
- ROM-less specification but supports on-board programming of external ROM data in initial state.
- Lineup of pin-compatible versions using 120-pin package available.
- Added a new standby mode and subclock and achieved lower power consumption
- Incorporates a low-voltage detection circuit and power-on reset (H8SX/1668M, H8SX/1658M)

• H8SX/1600 Family Roadmap



H8SX/1645, H8SX/1645L Group

- The H8SX/1645 and H8SX/1645L Group are pin-to-pin compatible with the H8SX/1648 Group.
- Incorporate three ultra-high-speed 10-bit A/D converters (minimum conversion time: 1.0 µs), and enhanced 10-bit D/A converter
- The H8SX/1645L Group incorporates LVD and POR
- Enhanced peripheral functions, including two TPU/PPG units and hi-speed SCI/I²C bus support

H8SX/1648A, H8SX/1648G, H8SX/1648H, H8SX/1648L Group

- 256K bytes/24K bytes through 1M byte/56K bytes flash memory/RAM configurations available.
- Enhanced peripheral functions, including two TPU/PPG units and hi-speed SCI/I²C bus support
- Three high-speed A/D converter units and support for synchronized, independent or successive trigger operation per-unit
- Newly added standby mode for reduced standby power consumption
- Incorporate a low-voltage detection circuit and power-on reset (H8SX/1648H, H8SX/1648L Group)
- Lineup of 176-pin packages (H8SX/1648G, H8SX/1648H Group)
- On-chip EXDMAC*1 that can transfer data on the external bus and with the external memory, in place of the CPU

*1: Support H8SX/1648G, H8SX/1648H group only

H8SX/1635, H8SX/1635L Group

- The H8SX/1635 and H8SX/1635L Group are pin-to-pin compatible with the H8SX/1638 Group.
- Incorporates two ultra-high-speed 10-bit A/D converters (minimum conversion time: 1.0 µs), and enhanced 10-bit D/A converter
- The H8SX/1635L Group incorporates LVD and POR
- Enhanced peripheral functions, including two TPU/PPG units and hi-speed SCI/I²C bus support

H8SX/1638, H8SX/1638L Group

- 256K bytes/24K bytes through 1M byte/56K bytes flash memory/RAM configurations available. (H8SX/1638, H8SX/1638L)
- Enhanced peripheral functions, including two TPU/PPG units and hi-speed SCI/I²C bus support
- H8SX/1650 Group, H8SX/1651 Group and H8SX/1657 Group are pin-compatible.
- Two high-speed A/D converter units and support for synchronized, independent, or successive trigger operation per-unit
- Newly added standby mode for reduced standby power consumption
- Incorporates a low-voltage detection circuit and power-on reset (H8SX/1638L Group)

H8SX/1622 Group

- On-chip 16-bit ΔΣ A/D converter allowing A/D conversion in minimum 91.5µs (25MHz operation)
- Successive comparison type A/D converter also implemented on-chip, allowing use of different A/D converters for different types of measurement samples.
- LGA 145-pin package (9 × 9 mm) available for compact wiring boards.
- Newly added standby mode for reduced standby power consumption

H8SX/1650C, H8SX/1651 Group

- Large-capacity RAM (maximum 40K bytes) (H8SX/1651 Group only)
- Using boot function, supports on-board programming of external ROM data in initial state.*
- H8SX/1657 Group and H8SX/1650 Group are pin compatible, and both are forward pin-compatible with H8SX/1651 Group.
- Support for E6000H full emulator and E10A-USB on-chip emulator (H8SX/1651 Group only) as development environments

* External flash memory not employing programming service

H8SX/1658R, H8SX/1658M, H8SX/1655, H8SX/1655M, H8SX/1653 Group

- Support for USB 2.0 Full Speed Function
- 120-pin package allowing easy implementation of simple and high-performance USB devices
- Support for numerous peripheral functions, including USB 2.0 Full Speed Function, serial I/F, I²C, hi-speed serial, start-stop, IrDA, smart card interface
- The H8SX/1658R, H8SX/1658M, H8SX/1655 and H8SX/1655M Group newly incorporate a high-speed A/D converter and EXDMAC. Furthermore, a new standby mode is provided to reduce power consumption.
- Incorporate a low-voltage detector circuit and power-on reset (H8SX/1658M, H8SX/1655M Group)
- Incorporate an ultra-high speed A/D converter (minimum conversion time: 1.0µs) (H8SX/1655, H8SX/1655M Group)
- On-chip EXDMAC*1 that can transfer data on the external bus and with the external memory, in place of the CPU

*1: H8SX/1653 group does not support EXDMAC.

Note: Refer to “USB MPUs and MCUs” in this catalog.

H8SX/1668R, H8SX/1668M, H8SX/1665, H8SX/1665M, H8SX/1663 Group

- 144-pin package enabling full utilization of on-chip functions
- Support for numerous peripheral functions, including USB 2.0 Full Speed Function, serial I/F, I²C, hi-speed serial, start-stop, IrDA, smart card interface
- Addition of SDARM interface and 32kHz subclock to H8SX/1657 Group for forward compatibility
- The H8SX/1668R, H8SX/1668M, H8SX/1665 and H8SX/1655M Group newly incorporate a high-speed A/D converter and EXDMAC. Furthermore, a new standby mode is provided to reduce power consumption.
- Incorporate a low-voltage detection circuit and power-on reset (H8SX/1668M, H8SX/1655M Group)
- Incorporate an ultra-high speed A/D converter (minimum conversion time: 1.0µs) (H8SX/1665, H8SX/1665M Group)
- On-chip EXDMAC*1 that can transfer data on the external bus and with the external memory, in place of the CPU

*1: H8SX/1663 group does not support EXDMAC.

Note: Refer to “USB MPUs and MCUs” in this catalog.

• H8SX/1600 Series Roadmap

General-purpose versions lineup

Flash ROMLess

164X 144-pin 145-pin

✳1648G, 1648H — BP-176

1642H 256K/24K	1644H 512K/40K	1648H 1024K/56K	With LVD/POR
1642G 256K/24K	1644G 512K/40K	1648G 1024K/56K	Without LVD/POR

Incorporates EXDMAC and 32-K timer
Supports SRAM I/F, small package

✳1648A, 1648L — FP-144L

1642L 256K/24K	1644L 512K/40K	1648L 1024K/56K	With LVD/POR
1642A 256K/24K	1644A 512K/40K	1648A 1024K/56K	Without LVD/POR

Improved 10-bit A/D conversion speed
Incorporates 10-bit D/A converter

✳1645, 1645L — FP-144L TLP-145

1641L 256K/24K	1643L 384K/32K	1645L 512K/40K	With LVD/POR
1641 256K/24K	1643 384K/32K	1645 512K/40K	Without LVD/POR

163X 120-pin 145-pin

✳1638, 1638L — FP-120B

1632L 256K/24K	1634L 512K/40K	1638L 1024K/56K	With LVD/POR
1632 256K/24K	1634 512K/40K	1638 1024K/56K	Without LVD/POR

Enhanced 10-bit A/D converters
Improved timer

✳1651, 1650 — FP-120B　1657 — TFP-120

1650C –/24K	1651C –/40K	1656C 512K/24K	1657C 768K/24K

Improved 10-bit A/D conversion speed
Incorporates 10-bit D/A converter

✳1635, 1635L — FP-120B

1631L 256K/24K	1633L 384K/32K	1635L 512K/40K	With LVD/POR
1631 256K/24K	1633 384K/32K	1635 512K/40K	Without LVD/POR

USB lineup

166X 144-pin 145-pin

✳1668R, 1668M — FP-144L BP-176

1663M 384/40K	1664M 512K/40K	1668M 1024K/56K	With LVD/POR
1663R 384K/40K	1664R 512K/40K	1668R 1024K/56K	Without LVD/POR

Incorporates EXDMAC,
Enhanced 10-bit A/D converters,
Improved timer, Compact package

✳1663 — FP-144L

1663 384K/40K	1664 512K/40K

Improved 10-bit A/D conversion speed
Incorporates 10-bit D/A converter

✳1665, 1665M — FP-144L TLP-145

1662M 384K/40K	1665M 512K/40K	With LVD/POR
1662 384K/40K	1665 512K/40K	Without LVD/POR

165X 120-pin 145-pin

✳1658R, 1658M — FP-120B

1653M 384K/40K	1654M 512K/40K	1658M 1024K/56K	With LVD/POR
1653R 384K/40K	1654R 512K/40K	1658R 1024K/56K	Without LVD/POR

Incorporates EXDMAC,
Enhanced 10-bit A/D converters,
Improved timer

✳1653 — TFP-120

1653 384K/40K	1654 512K/40K

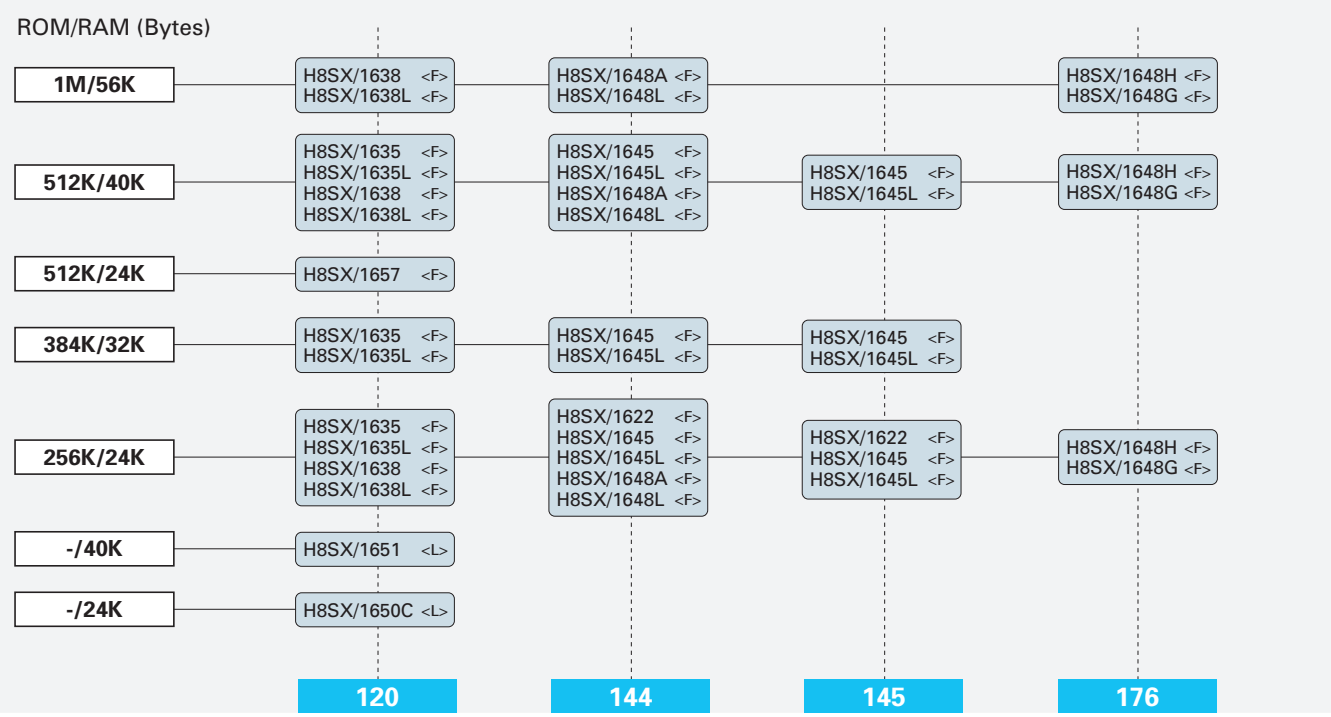
Improved 10-bit A/D conversion speed
Incorporates 10-bit D/A converter

✳1655, 1655M — FP-120B TLP-145V

1652M 384K/40K	1655M 512K/40K	With LVD/POR
1652 384K/40K	1655 512K/40K	Without LVD/POR

✳: Supports E10A-USB.

• Memory Capacity (ROM/RAM) (H8SX/1600 Series)



Letters in brackets < > indicate memory variations.
F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

• Specifications (H8SX/1600 Series)

Group		H8SX/1645			H8SX/1645L		
Memory	ROM (Bytes)	256K	384K	512K	256K	384K	512K
	RAM (Bytes)	24K	32K	40K	24K	32K	40K
	ROM Type*1	F					
	Data Flash/E2 Data Flash	—					
	Cache Memory	—					
	Program Security	Yes					
CPU	CPU	H8SX Core					
	Basic Instructions	87					
	Minimum Instruction Execution Time (ns)	20 (@50MHz)					
	Multiplier	16 × 16 → 32					
	Multiply-Accumulate Instruction	16 × 16 + 42 → 42					
DMA	DMAC (Channels)	4					
	DTC/DMAC II	DTC					
External Bus Expansion	Address Space (Bytes)	16M					
	Bus State Controller	ROM/Burst ROM/SRAM/Byte Control SRAM/Address/Data Multiplexed I/O					
	Bus Structure	Separate bus (8/16-bit)/Multiplex bus (8/16-bit)					
	Endian Conversion	Yes					
Clock	Clock Generation Circuit	1 circuit (Main clock)					
	PLL	Yes					
	Subclock	—					
	Frequency Divider	1/n (n = 1, 2, 4, 8)			1/n (n = 1/2, 1, 2, 4)		
	Power Save	Sleep/Software standby/Hardware standby/Deep software standby/Full module clock stop					
Power Supply Voltage Detection	Power-On Reset/POR	—			Yes		
	Low Voltage Detection/LVD	—			Yes		
A/D Converter	Resolution × Channels	10-bit × 12					
	Sample and Hold	Yes					
	Multi-Channel Sample and Hold	Yes (3 circuits)					
D/A Converter	Resolution × Channels	10-bit × 2					
Timer	8-bit	8 (TMR)					
	16-bit	12 (TPU)					
	32-bit	4 (TPU)					
	Input Capture	32 (shared with TPU)					
	Output Compare	32 (shared with TPU)					
	PWM Output	15 × 2 (shared with TPU)					
	Programmable Pulse Generator	32 (shared with PPG and TPU)					
	Event Counter	8 (shared with TPU)					
	2-Phase Encoder Input	4 (shared with TPU)					
Watchdog Timer		1					
Serial Interface	Clock Sync./Clock Async.	7					
	Clock Sync. Only	—					
	Clock Async. Only	—					
I²C-bus		4					
Smart Card/SIM		7					
Synchronous Serial Communication Unit/Special Serial I/O		—					
CAN	Channels	—					
	Message Box (Numbers)	—					
USB Function		—					
IrDA		Yes					
I/O Ports	Input Only (Numbers)	13					
	CMOS I/O (Numbers)	97					
	N-Channel Open Drain Port (Numbers)	—					
	Pull-Up Resistor	40					
External Interrupts Pins		17 (NMI × 1 + INT × 16)					
Debugging Function	On-Chip Debug	Yes					
	On-Board Flash Program	Yes					
Operating Frequency/Supply Voltage		50MHz/3.0 to 3.6V				50MHz/2.95 to 3.6V	
Operating Ambient Temperature (˚C)		–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75
Package*2		PLQP0144KA-A	PTLG0145JB-A	PLQP0144KA-A	PTLG0145JB-A	PLQP0144KA-A	PTLG0145JB-A
Part No.		R5F61641D50FPV	R5F61641D50LGV	R5F61641N50FPV	R5F61641N50LGV	R5F61643D50FPV	R5F61643D50LGV

Group		H8SX/1645											
Operating Ambient Temperature (˚C)		–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75
Package*2		PLQP0144KA-A	PTLG0145JB-A	PLQP0144KA-A	PTLG0145JB-A	PLQP0144KA-A	PTLG0145JB-A	PLQP0144KA-A	PTLG0145JB-A	PLQP0144KA-A	PTLG0145JB-A	PLQP0144KA-A	PTLG0145JB-A
Part No.		R5F61643N50FPV	R5F61643N50LGV	R5F61645D50FPV	R5F61645D50LGV	R5F61645N50FPV	R5F61645N50LGV	R5F61641LD50FPV	R5F61641LD50LGV	R5F61641LN50FPV	R5F61641LN50LGV	R5F61643LD50FPV	R5F61643LD50LGV

Group		H8SX/1645L											
Operating Ambient Temperature (˚C)		–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75
Package*2		PLQP0144KA-A	PTLG0145JB-A	PLQP0144KA-A	PTLG0145JB-A	PLQP0144KA-A	PTLG0145JB-A	PLQP0144KA-A	PTLG0145JB-A	PLQP0144KA-A	PTLG0145JB-A	PLQP0144KA-A	PTLG0145JB-A
Part No.		R5F61643LN50FPV	R5F61643LN50LGV	R5F61645LD50FPV	R5F61645LD50LGV	R5F61645LN50FPV	R5F61645LN50LGV						

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8SX/1600 Series)

Group		H8SX/1648A			H8SX/1648L			H8SX/1648G			H8SX/1648H		
Memory	ROM (Bytes)	256K	512K	1024K	256K	512K	1024K	256K	512K	1024K	256K	512K	1024K
	RAM (Bytes)	24K	40K	56K	24K	40K	56K	24K	40K	56K	24K	40K	56K
	ROM Type*1	F											
	Data Flash/E2 Data Flash	—											
	Cache Memory	—											
	Program Security	Yes											
CPU	CPU	H8SX Core											
	Basic Instructions	87											
	Minimum Instruction Execution Time (ns)	20 (@50MHz)											
	Multiplier	16 × 16 → 32											
	Multiply-Accumulate Instruction	16 × 16 + 42 → 42											
DMA	DMAC (Channels)	4											
	DTC/DMAC II	DTC											
External Bus Expansion	Address Space (Bytes)	16M											
	Bus State Controller	ROM/Burst ROM/SRAM/Byte Control SRAM/Address/Data Multiplexed I/O						ROM/Burst ROM/SRAM/Byte Control SRAM/Address/Data Multiplexed I/O/DRAM/SDRAM					
	Bus Structure	Separate bus (8/16-bit)/Multiplex bus (8/16-bit)											
	Endian Conversion	Yes											
Clock	Clock Generation Circuit	1 circuit (Main clock)											
	PLL	Yes											
	Subclock	—						Yes					
	Frequency Divider	1/n (n = 1/2, 1, 2, 4)											
	Power Save	Sleep/Software standby/Hardware standby/Deep software standby/Full module clock stop											
Power Supply Voltage Detection	Power-On Reset/POR	—			Yes			—			Yes		
	Low Voltage Detection/LVD	—			Yes			—			Yes		
A/D Converter	Resolution × Channels	10-bit × 12											
	Sample and Hold	Yes											
	Multi-Channel Sample and Hold	Yes (3 circuits)											
D/A Converter	Resolution × Channels	8-bit × 2											
Timer	8-bit	8 (TMR)											
	16-bit	12 (TPU)											
	32-bit	4 (TPU)											
	Input Capture	32 (shared with TPU)											
	Output Compare	32 (shared with TPU)											
	PWM Output	15 × 2 (shared with TPU)											
	Programmable Pulse Generator	32 (shared with PPG and TPU)											
	Event Counter	8 (shared with TPU)											
	2-Phase Encoder Input	4 (shared with TPU)											
Watchdog Timer		1											
Serial Interface	Clock Sync./Clock Async.	7											
	Clock Sync. Only	—											
	Clock Async. Only	—											
I²C-bus		4											
Smart Card/SIM		7											
Synchronous Serial Communication Unit/Special Serial I/O		—											
CAN	Channels	—											
	Message Box (Numbers)	—											
USB Function		—											
IrDA		Yes											
I/O Ports	Input Only (Numbers)	13											
	CMOS I/O (Numbers)	97						102					
	N-Channel Open Drain Port (Numbers)	4						—					
	Pull-Up Resistor	40											
External Interrupts Pins		17 (NMI × 1 + INT × 16)											
Debugging Function	On-Chip Debug	Yes											
	On-Board Flash Program	Yes											
Operating Frequency/Supply Voltage		50MHz/3.0 to 3.6V						50MHz/2.95 to 3.6V					
Operating Ambient Temperature (°C)		–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75
		–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75
Package*2		PLQP0144KA-A						PLBG0176GA-A					
Part No.		R5F61642AD50FPV	R5F61642AN50FPV	R5F61644AD50FPV	R5F61644AN50FPV	R5F61648AD50FPV	R5F61648AN50FPV	R5F61642LD50FPV	R5F61642LN50FPV	R5F61644LD50FPV	R5F61644LN50FPV	R5F61648LD50FPV	R5F61648LN50FPV
		R5F61642GD50BGV	R5F61642GN50BGV	R5F61644GD50BGV	R5F61644GN50BGV	R5F61648GD50BGV	R5F61648GN50BGV	R5F61642HD50BGV	R5F61642HN50BGV	R5F61644HD50BGV	R5F61644HN50BGV	R5F61648HD50BGV	R5F61648HN50BGV

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8SX/1600 Series)

Group		H8SX/1635			H8SX/1635L		
Memory	ROM (Bytes)	256K	384K	512K	256K	384K	512K
	RAM (Bytes)	24K	32K	40K	24K	32K	40K
	ROM Type*1	F					
	Data Flash/E2 Data Flash	—					
	Cache Memory	—					
	Program Security	Yes					
CPU	CPU	H8SX Core					
	Basic Instructions	87					
	Minimum Instruction Execution Time (ns)	20 (@50MHz)					
	Multiplier	16 × 16 → 32					
	Multiply-Accumulate Instruction	16 × 16 + 42 → 42					
DMA	DMAC (Channels)	4					
	DTC/DMAC Ⅱ	DTC					
External Bus Expansion	Address Space (Bytes)	16M					
	Bus State Controller	ROM/Burst ROM/SRAM/Byte Control SRAM/Address/Data Multiplexed I/O					
	Bus Structure	Separate bus (8/16-bit)/Multiplex bus (8/16-bit)					
	Endian Conversion	Yes					
Clock	Clock Generation Circuit	1 circuit (Main clock)					
	PLL	Yes					
	Subclock	—					
	Frequency Divider	1/n (n = 1/2, 1, 2, 4)			1/n (n = 1/2, 1, 2, 4)		
	Power Save	Sleep/Software standby/Hardware standby/Deep software standby/Full module clock stop					
Power Supply Voltage Detection	Power-On Reset/POR	—			Yes		
	Low Voltage Detection/LVD	—			Yes		
A/D Converter	Resolution × Channels	10-bit × 8					
	Sample and Hold	Yes					
	Multi-Channel Sample and Hold	Yes (2 circuits)					
D/A Converter	Resolution × Channels	10-bit × 2					
Timer	8-bit	8 (TMR)					
	16-bit	12 (TPU)					
	32-bit	4 (TPU)					
	Input Capture	32 (shared with TPU)					
	Output Compare	32 (shared with TPU)					
	PWM Output	15 × 2 (shared with TPU)					
	Programmable Pulse Generator	32 (shared with PPG and TPU)					
	Event Counter	8 (shared with TPU)					
	2-Phase Encoder Input	4 (shared with TPU)					
Watchdog Timer		1					
Serial Interface	Clock Sync./Clock Async.	7					
	Clock Sync. Only	—					
	Clock Async. Only	—					
I²C-bus		2					
Smart Card/SIM		7					
Synchronous Serial Communication Unit/Special Serial I/O		—					
CAN	Channels	—					
	Message Box (Numbers)	—					
USB Function		—					
IrDA		Yes					
I/O Ports	Input Only (Numbers)	9					
	CMOS I/O (Numbers)	81					
	N-Channel Open Drain Port (Numbers)	—					
	Pull-Up Resistor	40					
External Interrupts Pins		17 (NMI × 1 + INT × 16)					
Debugging Function	On-Chip Debug	Yes					
	On-Board Flash Program	Yes					
Operating Frequency/Supply Voltage		50MHz/3.0 to 3.6V			50MHz/2.95 to 3.6V		
Operating Ambient Temperature (˚C)		–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75
Package*2		PLQP0120LA-A					
Part No.		R5F61631D50FPV	R5F61631N50FPV	R5F61633D50FPV	R5F61633N50FPV	R5F61635D50FPV	R5F61635N50FPV	R5F61631LD50FPV	R5F61631LN50FPV	R5F61633LD50FPV	R5F61633LN50FPV	R5F61635LD50FPV	R5F61635LN50FPV

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8SX/1600 Series)

Group		H8SX/1638			H8SX/1638L			H8SX/1622			
Memory	ROM (Bytes)	256K	512K	1024K	256K	512K	1024K	256K			
	RAM (Bytes)	24K	40K	56K	24K	40K	56K	24K			
	ROM Type*1	F									
	Data Flash/E2 Data Flash	—									
	Cache Memory	—									
	Program Security	Yes									
CPU	CPU	H8SX Core									
	Basic Instructions	87									
	Minimum Instruction Execution Time (ns)	20 (@50MHz)									
	Multiplier	16 × 16 → 32									
	Multiply-Accumulate Instruction	16 × 16 + 42 → 42									
DMA	DMAC (Channels)	4						2			
	DTC/DMAC II	DTC									
External Bus Expansion	Address Space (Bytes)	16M									
	Bus State Controller	ROM/Burst ROM/SRAM/Byte Control SRAM/Address/Data Multiplexed I/O									
	Bus Structure	Separate bus (8/16-bit)/Multiplex bus (8/16-bit)									
	Endian Conversion	Yes									
Clock	Clock Generation Circuit	1 circuit (Main clock)									
	PLL	Yes									
	Subclock	—									
	Frequency Divider	1/n (n = 1/2, 1, 2, 4)									
	Power Save	Sleep/Software standby/Hardware standby/Deep software standby/Full module clock stop									
Power Supply Voltage Detection	Power-On Reset/POR	—			Yes			—			
	Low Voltage Detection/LVD	—			Yes			—			
A/D Converter	Resolution × Channels	10-bit × 8						16-bit ΔΣ × 6 10-bit × 8			
	Sample and Hold	Yes									
	Multi-Channel Sample and Hold	Yes (2 circuits)						—			
D/A Converter	Resolution × Channels	8-bit × 2									
Timer	8-bit	8 (TMR)									
	16-bit	12 (TPU)						6 (TPU)			
	32-bit	4 (TPU)						2 (TPU)			
	Input Capture	32 (shared with TPU)						16 (shared with TPU)			
	Output Compare	32 (shared with TPU)						16 (shared with TPU)			
	PWM Output	15 × 2 (shared with TPU)						15 (shared with TPU)			
	Programmable Pulse Generator	32 (shared with PPG and TPU)						16 (shared with PPG and TPU)			
	Event Counter	8 (shared with TPU)						4 (shared with TPU)			
	2-Phase Encoder Input	4 (shared with TPU)						2 (shared with TPU)			
Watchdog Timer		1									
Serial Interface	Clock Sync./Clock Async.	7						5			
	Clock Sync. Only	—									
	Clock Async. Only	—									
I²C-bus		2									
Smart Card/SIM		7						5			
Synchronous Serial Communication Unit/Special Serial I/O		—									
CAN	Channels	—									
	Message Box (Numbers)	—									
USB Function		—									
IrDA		Yes						—			
I/O Ports	Input Only (Numbers)	9						17			
	CMOS I/O (Numbers)	81						74			
	N-Channel Open Drain Port (Numbers)	—									
	Pull-Up Resistor	40						37			
External Interrupts Pins		17 (NMI × 1 + INT × 16)						13 (NMI × 1 + INT × 12)			
Debugging Function	On-Chip Debug	Yes									
	On-Board Flash Program	Yes									
Operating Frequency/Supply Voltage		50MHz/3.0 to 3.6V						50MHz/3.0 to 3.6V			
Operating Ambient Temperature (°C)		–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85
Package*2		PLQP0120LA-A										PLQP0144KA-A	PTLG0145JB-A	PLQP0144KA-A	PTLG0145JB-A
Part No.		R5F61632N50FPV	R5F61632D50FPV	R5F61634N50FPV	R5F61634D50FPV	R5F61638N50FPV	R5F61638D50FPV	R5F61632LN50FPV	R5F61632LD50FPV	R5F61634LN50FPV	R5F61634LD50FPV	R5F61638LN50FPV	R5F61638LD50FPV	R5F61622N50FPV	R5F61622D50FPV	R5F61622N50LGV	R5F61622D50LGV

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8SX/1600 Series)

Group		H8SX/1650C		H8SX/1651		H8SX/1657	
Memory	ROM (Bytes)	—				512K	
	RAM (Bytes)	24K		40K		24K	
	ROM Type*1	L				F	
	Data Flash/E2 Data Flash	—					
	Cache Memory	—					
	Program Security	—				Yes	
CPU	CPU	H8SX Core					
	Basic Instructions	87					
	Minimum Instruction Execution Time (ns)	20 (@50MHz)				28.6 (@35MHz)	
	Multiplier	16 × 16 → 32					
	Multiply-Accumulate Instruction	16 × 16 + 42 → 42					
DMA	DMAC (Channels)	—		4			
	DTC/DMAC Ⅱ	DTC					
External Bus Expansion	Address Space (Bytes)	16M					
	Bus State Controller	ROM/Burst ROM/SRAM/Byte Control SRAM/Address/Data Multiplexed I/O					
	Bus Structure	Separate bus (8/16-bit)/Multiplex bus (8/16-bit)					
	Endian Conversion	Yes					
Clock	Clock Generation Circuit	1 circuit (Main clock)					
	PLL	Yes					
	Subclock	—					
	Frequency Divider	1/n (n = 1/2, 1, 2, 4)		1/n (n = 1, 2, 4, 8)			
	Power Save	Sleep/Software standby/Full module clock stop/Hardware standby					
Power Supply Voltage Detection	Power-On Reset/POR	—					
	Low Voltage Detection/LVD	—					
A/D Converter	Resolution × Channels	10-bit × 8					
	Sample and Hold	Yes					
	Multi-Channel Sample and Hold	—					
D/A Converter	Resolution × Channels	8-bit × 2					
Timer	8-bit	4 (TMR)					
	16-bit	6 (TPU)					
	32-bit	2 (TPU)					
	Input Capture	16 (shared with TPU)					
	Output Compare	16 (shared with TPU)					
	PWM Output	15 (shared with TPU)					
	Programmable Pulse Generator	16 (shared with PPG and TPU)					
	Event Counter	4 (shared with TPU)					
	2-Phase Encoder Input	2 (shared with TPU)					
Watchdog Timer		1					
Serial Interface	Clock Sync./Clock Async.	4		5		4	
	Clock Sync. Only	—					
	Clock Async. Only	—					
I²C-bus		—					
Smart Card/SIM		4		5		4	
Synchronous Serial Communication Unit/Special Serial I/O		—					
CAN	Channels	—					
	Message Box (Numbers)	—					
USB Function		—					
IrDA		—					
I/O Ports	Input Only (Numbers)	8				9	
	CMOS I/O (Numbers)	50				81	
	N-Channel Open Drain Port (Numbers)	—					
	Pull-Up Resistor	19		40			
External Interrupts Pins		13 (NMI × 1 + INT × 12)					
Debugging Function	On-Chip Debug	—		Yes		—	
	On-Board Flash Program	Yes					
Operating Frequency/Supply Voltage		50MHz/3.0 to 3.6V				35MHz/3.0 to 3.6V	
Operating Ambient Temperature (˚C)		–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85
Package*2		PLQP0120LA-A				PTQP0120LA-A	
Part No.		R5S61650CN50FPV	R5S61650CW50FPV	R5S61651CN50FPV	R5S61651CW50FPV	R5F61656CN35FTV	R5F61656CW35FTV

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

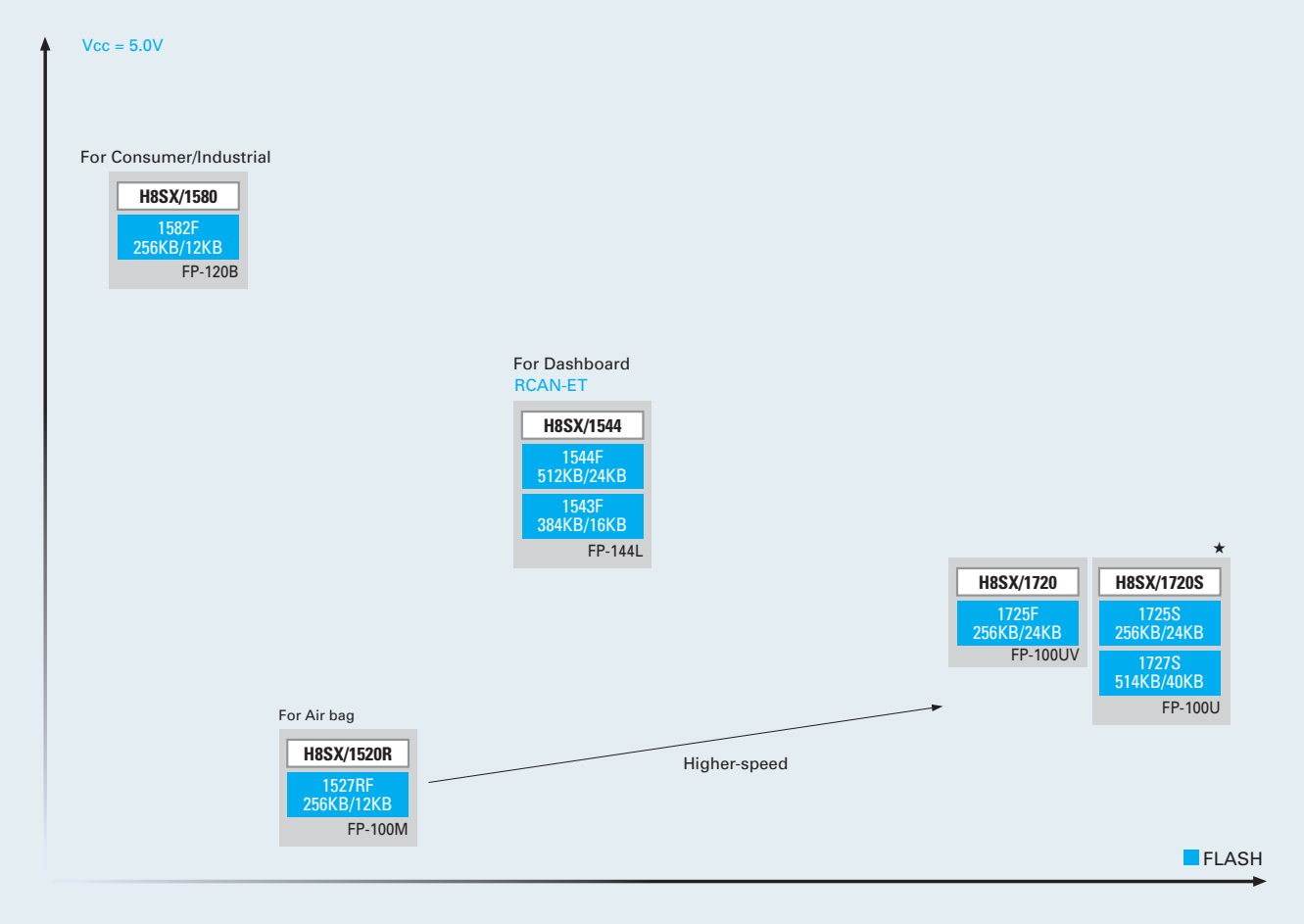
Outline of H8SX/1500 Series

The H8SX/1500 Series incorporates a 32-bit multiplier and divider and supports 5V.

H8SX/1500 Series Features

- Maximum operating frequency of 48MHz at Vcc = 5.0V
- ASSP lineup available for automotive applications (CAN, Synchronous serial communication unit, two A/D converter units).
- Available on-chip flash capacities of 256K, 384K, 512K and 1M bytes
- High-grade versions available for applications such as dashboard and airbag systems.

• H8SX/1500 Series Roadmap



★ : New product

H8SX/1544 Group

- Supports for external extensions, such as connection of external memory
- In addition to TPU/PPG, on-chip PWM modules supporting up to 16 10-bit outputs and 12 16-bit outputs
- Extensive support for communication interfaces such as SCI, Synchronous serial communications unit, I²C, and CAN
- Sound generator (SDG) supporting output of 20kHz to 31kHz sine waves with precision within 1%

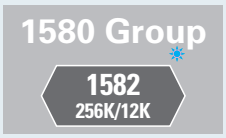
Note: Refer to “Automotive MCUs” in this catalog.

H8SX/1580 Group

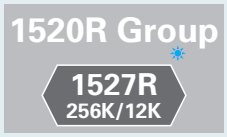
- Maximum operating frequency of 48MHz at Vcc = 5.0V (minimum instruction execution time of 21ns)
- Two on-chip TPU units supporting maximum of 32 pulse I/O channels
- Two on-chip 8-channel successive comparison type A/D converter units (maximum 16 channels)
- On-chip DMAC and DTC supporting data transfer

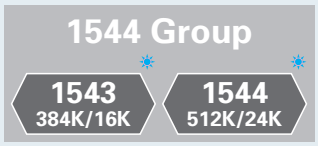
• H8SX/1500 Series Roadmap

Lineup of standard products



Lineup of products with on-chip CAN







✳ : Support on-chip emulator

*Refer to "Automotive MCUs" in this catalog for the H8SX/1544 and H8SX/1520R Groups.

• Memory Capacity (ROM/RAM) (H8SX/1500 Series)



Letters in brackets < > indicate memory variations.
F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

Pin count

• Specifications (H8SX/1500 Series)

Group		H8SX/1580
Memory	ROM (Bytes)	256K
	RAM (Bytes)	12K
	ROM Type*1	F
	Data Flash/E2 Data Flash	—
	Cache Memory	—
	Program Security	Yes
CPU	CPU	H8SX Core
	Basic Instructions	87
	Minimum Instruction Execution Time (ns)	21 (@48MHz)
	Multiplier	16 × 16 → 32
	Multiply-Accumulate Instruction	16 × 16 + 42 → 42
DMA	DMAC (Channels)	4
	DTC/DMAC Ⅱ	—
External Bus Expansion	Address Space (Bytes)	16M
	Bus State Controller	—
	Bus Structure	—
	Endian Conversion	—
Clock	Clock Generation Circuit	1 circuit (Main clock)
	PLL	Yes
	Subclock	—
	Frequency Divider	1/n (n = 1, 2, 4, 8)
	Power Save	Sleep/Full module clock stop/Software standby/Hardware standby
Power Supply Voltage Detection	Power-On Reset/POR	—
	Low Voltage Detection/LVD	—
A/D Converter	Resolution × Channels	10-bit × 16
	Sample and Hold	Yes
	Multi-Channel Sample and Hold	—
D/A Converter	Resolution × Channels	—
Timer	8-bit	—
	16-bit	12 (TPU)
	32-bit	4 (TPU)
	Input Capture	32 (shared with TPU)
	Output Compare	32 (shared with TPU)
	PWM Output	30 (shared with TPU)
	Programmable Pulse Generator	8 (shared with PPG and TPU)
	Event Counter	8 (shared with TPU)
	2-Phase Encoder Input	4 (shared with TPU)
Watchdog Timer		1
Serial Interface	Clock Sync./Clock Async.	2
	Clock Sync. Only	—
	Clock Async. Only	—
I²C-bus		—
Smart Card/SIM		2
Synchronous Serial Communication Unit/Special Serial I/O		3
CAN	Channels	—
	Message Box (Numbers)	—
USB Function		—
IrDA		—
I/O Ports	Input Only (Numbers)	17
	CMOS I/O (Numbers)	82
	N-Channel Open Drain Port (Numbers)	—
	Pull-Up Resistor	40
External Interrupts Pins		17 (NMI × 1 + INT × 16)
Debugging Function	On-Chip Debug	Yes
	On-Board Flash Program	Yes
Operating Frequency/Supply Voltage		48MHz/4.5 to 5.5V
Operating Ambient Temperature (˚C)		–20 to 75
Package*2		PLQP0120LA-A
Part No.		R5F61582N48FPV

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

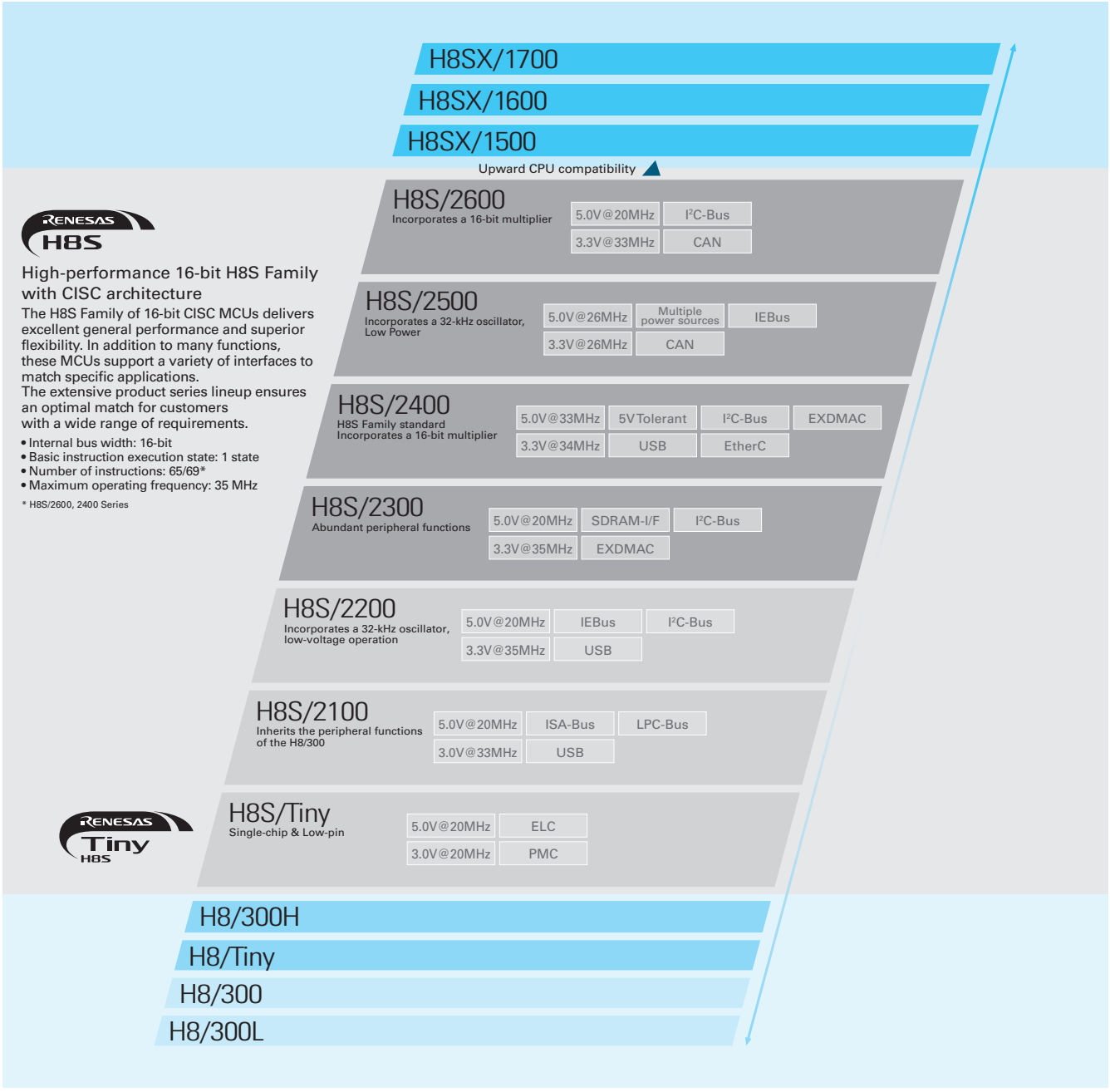
★ : New product ★★ : Under development

The H8S Family of 16-bit CISC MCUs delivers excellent general performance and superior flexibility. In addition to many functions, these MCUs support a variety of interfaces to match specific applications. The extensive product series lineup ensures an optimal match for customers with a wide range of requirements.

H8S Family Features

- 16-bit MCUs with static circuitry for low power
- Basic instructions are executed in one state, for a minimum instruction execution time of 28.6ns when operating at 3.3V and 35MHz
- Available in versions for different applications
- Low-noise versions reduce noise emission to 10 to 20dB less than conventional MCUs
- Instruction set is upward compatible with the H8/300 and H8/300H series

• H8S Family Roadmap



High-performance 16-bit H8S Family with CISC architecture

The H8S Family of 16-bit CISC MCUs delivers excellent general performance and superior flexibility. In addition to many functions, these MCUs support a variety of interfaces to match specific applications.
The extensive product series lineup ensures an optimal match for customers with a wide range of requirements.

- Internal bus width: 16-bit
- Basic instruction execution state: 1 state
- Number of instructions: 65/69*
- Maximum operating frequency: 35 MHz

* H8S/2600, 2400 Series

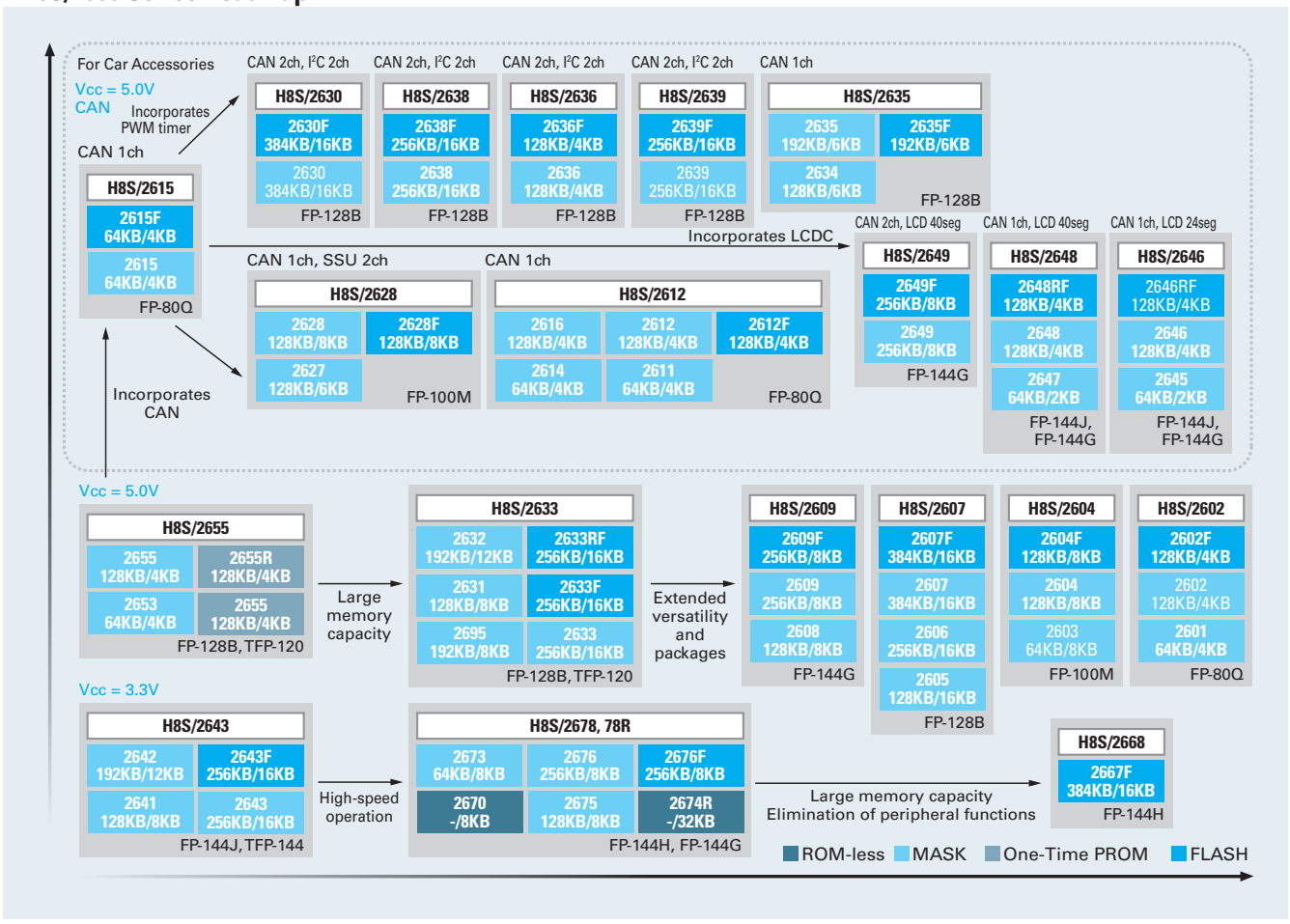
Outline of H8S/2600 Series

The top of H8S Family incorporating a 16-bit multiplier

H8S/2600 Series Features

- A lineup of products for automotives reliable at a wide range of temperatures (–40 to +105°C, –40 to +125°C)
- Incorporates special communication functions (I^2C-Bus, CAN-Bus, synchronous serial communications unit)
- Incorporates characteristic peripheral functions (such as motor control PWM output and LCD controller)

• H8S/2600 Series Roadmap



H8S/2609, H8S/2607, H8S/2604, H8S/2602 Group

- Operate at 20MHz/5V.
- Built-in multiplier.
- 144, 128, 100, and 80-pin packages.

H8S/2636, H8S/2638, H8S/2630 Group

- On-chip 2-channel CAN interface
- On-chip micro-step motor control timer
- On-chip I²C-bus interface (2638, 2639)

* Refer to “Automotive MCUs” in this catalog.

H8S/2635, H8S/2639 Group

- On-chip CAN interface (H8S/2639: 2ch)
- On-chip subclock divider

* Refer to "Automotive MCUs" in this catalog regarding H8S/2635 group.

H8S/2628 Group

- On-chip CAN interface
- On-chip 2-channel synchronous serial communication unit
- 24MHz operation

* Refer to “Automotive MCUs” in this catalog.

H8S/2678, H8S/2678R Group

- High-speed operation (33MHz, 3.3V)
- On-chip multiplier
- Improved DMAC (4 EXDMAC channels added)
- User-friendly bus controller (supports detailed wait settings for direct interface linkage)
- On-chip SDRAM interface (2678R)
- External interrupt: 17
- Multiplier oscillator (PLL) (× 1, × 2, × 4)

Applications PPC, Printer, communications devices

H8S/2646, H8S/2648, H8S/2649 Group

- On-chip CAN interface
- On-chip micro-step motor control timer
- On-chip LCD controller/driver

* Refer to “Automotive MCUs” in this catalog.

H8S/2612 Group

- On-chip motor control timer (MMT)
- On-chip CAN interface
- 80-pin packages

* Refer to “Automotive MCUs” in this catalog.

H8S/2615 Group

- On-chip CAN interface
- On-chip sub-clock divider

* Refer to “Automotive MCUs” in this catalog.

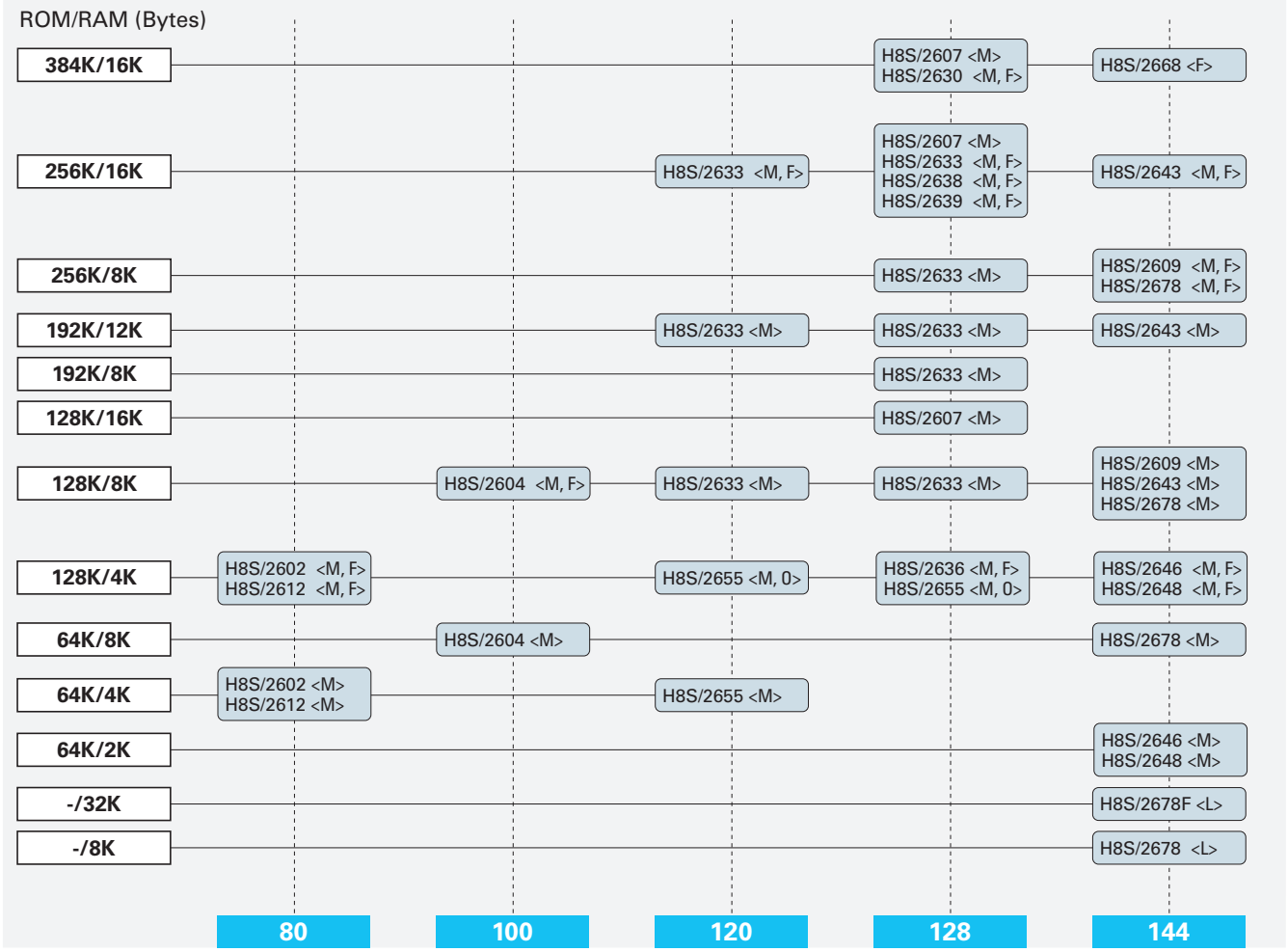
H8S/2668 Group

- High-speed operation (33MHz, 3.3V)
- On-chip multiplier
- 384K bytes of on-chip flash memory
- Compact peripheral function

H8S/2655 Group

- On-chip 16 × 16-bit multiplier for high-speed multiplication and multiply and accumulate operations
- High-speed on-chip A/D converter (conversion time: 1µs in scan mode)

• Memory Capacity (ROM/RAM) (H8S/2600 Series)



Letters in brackets < > indicate memory variations.
F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

• Specifications (H8S/2600 Series)

Group		H8S/2602						H8S/2604					
Memory	ROM (Bytes)	64K		128K				64K		128K			
	RAM (Bytes)	4K						8K					
	ROM Type*1	M		F		M				F		M	
	Program Security	—		Yes (H/W Protect, S/W Protect, Error Protect)		—				Yes (H/W Protect, S/W Protect, Error Protect)		—	
CPU	CPU	H8S/2600 Core											
	Basic Instructions	69											
	Minimum Instruction Execution Time (ns)	50 (@20MHz)											
	Multiplier	16 × 16 → 32											
	Multiply-Accumulate Instruction	16 × 16 + 42 → 42											
DMA	DMAC (Channels)	—											
	EXDMAC	—											
	DTC/DMAC II	DTC											
External Bus Expansion	Address Space (Bytes)	16M											
	Bus State Controller	—											
	Bus Structure	—											
	SDRAM Controller	—											
	DRAM Controller	—											
	Host Interface	—											
Clock	Clock Generation Circuit	1 circuit (Main clock)											
	PLL	Yes (× 1, × 2, × 4)											
	Subclock	—											
	RTC	—											
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16, 32)											
	Power Save	Medium-speed/Sleep/Module stop/Software standby/Hardware standby											
A/D Converter	Resolution × Channels	10-bit × 12						10-bit × 16					
	Sample and Hold	Yes											
D/A Converter	Resolution × Channels	—											
Timer	8-bit	—						4 (TMR)					
	16-bit	6 (TPU)											
	32-bit	—											
	Input Capture	6 (shared with TPU)											
	Output Compare	6 (shared with TPU)											
	PWM Output	6 (shared with TPU)											
	Real-Time Port	—											
	Programmable Pulse Generator	8 (shared with TPU + PPG)											
	Event Counter	4 (shared with TPU)						2 (shared with TMR), 4 (shared with TPU)					
	2-Phase Encoder Input	2 (shared with TPU)											
Watchdog Timer		1											
Serial Interface	Clock Sync./Clock Async.	3						2					
I²C-bus		—											
IEBus		—											
Smart Card/SIM		3						2					
Synchronous Serial Communication Unit/Special Serial I/O		—						2					
CAN	Channels	—											
	Message Box (Numbers)	—											
Ethernet		—											
USB Function		—											
LPC/ISA		—											
IrDA		—											
LCD		—											
CRC Calculation Circuit		—											
I/O Ports	Input Only (Numbers)	12						16					
	CMOS Output Only (Numbers)	—											
	CMOS I/O (Numbers)	44						60					
	High Voltage Port (Numbers)	—											
	N-Channel Open Drain Port (Numbers)	20						28					
	DTMF	—											
	High Current Drive Port	—											
	Pull-Up Resistor	28											
	NMOS Push-Pull	—											
External Interrupts Pins		7 (NMI + IRQ (6))											
Debugging Function	Boundary Scan/JTAG	—											
	On-Chip Debug	Yes (PC break)											
	On-Board Flash Program	—		Yes		—				Yes		—	
Other Functions	ROM Correction Function	—											
	Others	—											
Operating Frequency/Supply Voltage		20MHz/4.5 to 5.5V											
Operating Ambient Temperature (°C)		–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85
Package*2		PRQP0080JD-A						PRQP0100KB-A					
Part No.		HD6432601XXXFA	HD6432601XXXFAW	HD64F2602FA20V	HD64F2602FA20WV	HD6432602XXXFA	HD6432602XXXFAW	HD6432603XXXFA	HD6432603XXXFAW	HD64F2604FA20V	HD64F2604FA20WV	HD6432604XXXFA	HD6432604XXXFAW

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8S/2600 Series)

Group		H8S/2607								H8S/2609					
Memory	ROM (Bytes)	128K		256K		384K				128K		256K			
	RAM (Bytes)	16K								8K					
	ROM Type*1	M				F		M			F		M		
	Program Security	—				Yes (H/W Protect, S/W Protect, Error Protect)		—			Yes (H/W Protect, S/W Protect, Error Protect)		—		
CPU	CPU	H8S/2600 Core													
	Basic Instructions	69													
	Minimum Instruction Execution Time (ns)	50 (@20MHz)													
	Multiplier	16 × 16 → 32													
	Multiply-Accumulate Instruction	16 × 16 + 42 → 42													
DMA	DMAC (Channels)	—													
	EXDMAC	—													
	DTC/DMAC II	DTC													
External Bus Expansion	Address Space (Bytes)	16M													
	Bus State Controller	Direct connection to ROM/SRAM is supported													
	Bus Structure	Separate bus (8/16-bit)													
	SDRAM Controller	—													
	DRAM Controller	—													
	Host Interface	—													
Clock	Clock Generation Circuit	2 circuits (Main clock, Sub clock)													
	PLL	Yes (× 1, × 2, × 4)													
	Subclock	Yes													
	RTC	Yes (WDT for watch)													
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16, 32)													
	Power Save	Medium-speed/Sleep/Module stop/Watch/Sub active/Sub sleep/Software standby/Hardware standby													Normal operating/ Medium-speed/ Sleep/Module stop/Watch/ Sub active/Sub sleep/Software standby/ Hardware standby
A/D Converter	Resolution × Channels	10-bit × 12								10-bit × 16					
	Sample and Hold	Yes													
D/A Converter	Resolution × Channels	8-bit × 2								—					
Timer	8-bit	—													
	16-bit	6 (TPU)													
	32-bit	—													
	Input Capture	6 (shared with TPU)													
	Output Compare	6 (shared with TPU)													
	PWM Output	8 (shared with 2 (PWM) + 6 (TPU))													8 (2 (PWM) + 6 (shared with TPU))
	Real-Time Port	—													
	Programmable Pulse Generator	8 (shared with TPU + PPG)													
	Event Counter	4 (shared with TPU)													
	2-Phase Encoder Input	2 (shared with TPU)													
Watchdog Timer		2													
Serial Interface	Clock Sync./Clock Async.	3								4					
I²C-bus		2								—					
IEBus		—													
Smart Card/SIM		3								4					
Synchronous Serial Communication Unit/Special Serial I/O		—													
CAN	Channels	—													
	Message Box (Numbers)	—													
Ethernet		—													
USB Function		—													
LPC/ISA		—													
IrDA		—													
LCD		—													
CRC Calculation Circuit		—													
I/O Ports	Input Only (Numbers)	12								16					28
	CMOS Output Only (Numbers)	—													1
	CMOS I/O (Numbers)	72								92		97	92		97
	High Voltage Port (Numbers)	—										48	—		48
	N-Channel Open Drain Port (Numbers)	26								32					
	DTMF	—													
	High Current Drive Port	16													32
	Pull-Up Resistor	36								40					
	NMOS Push-Pull	2								—					
External Interrupts Pins		7 (NMI + IRQ (6))										7 (NMI + 6 (8 level))	7 (NMI + IRQ (6))		7 (NMI + 6 (8 level))
Debugging Function	Boundary Scan/JTAG	—													
	On-Chip Debug	Yes (PC break)													—
	On-Board Flash Program	—				Yes		—			Yes		—		
Other Functions	ROM Correction Function	—													Yes (PC break)
	Others	10-bit PWM Timer × 2													
Operating Frequency/Supply Voltage		20MHz/4.5 to 5.5V													
Operating Ambient Temperature (˚C)		–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85		–20 to 75
Package*2		PRQP0128KB-A								PRQP0144KA-A					
Part No.		HD6432605WXXXF	HD6432605WXXXFW	HD6432606WXXXF	HD6432606WXXXFW	HD64F2607WF20V	HD64F2607WF20WV	HD6432607WXXXF	HD6432607WXXXFW	HD6432608XXXFC	HD6432608XXXFCW	HD64F2609FC20V	HD64F2609FC20WV	HD6432609XXXFCW	HD6432609XXXFC

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8S/2600 Series)

Group		H8S/2612					H8S/2630						H8S/2636			
Memory	ROM (Bytes)	64K		128K			384K						128K			
	RAM (Bytes)	4K					16K						4K			
	ROM Type*1	M				F			M				F		M	
	Program Security	—				Yes (H/W Protect, S/W Protect, Error Protect)			—				Yes (H/W Protect, S/W Protect, Error Protect)		—	
CPU	CPU	H8S/2600 Core														
	Basic Instructions	69														
	Minimum Instruction Execution Time (ns)	50 (@20MHz)														
	Multiplier	16 × 16 → 32														
	Multiply-Accumulate Instruction	16 × 16 + 42 → 42														
DMA	DMAC (Channels)	—														
	EXDMAC	—														
	DTC/DMAC II	DTC	—	DTC	—	DTC										
External Bus Expansion	Address Space (Bytes)	16M														
	Bus State Controller	—				Direct connection to SRAM/ROM is supported										
	Bus Structure	—				Separate bus (8/16-bit)										
	SDRAM Controller	—														
	DRAM Controller	—														
	Host Interface	—														
Clock	Clock Generation Circuit	1 circuit (Main clock)					2 circuits (Main clock, Sub clock)					1 circuit (Main clock)	2 circuits (Main clock, sub clock)		1 circuit (Main clock)	
	PLL	Yes (× 1, × 2, × 4)														
	Subclock	—					Yes					—	Yes		—	
	RTC	—					Yes (WDT for watch)					—	Yes (WDT for watch)		—	
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16, 32)														
	Power Save	Medium-speed/Sleep/Module stop/Software standby/ Hardware standby					Medium-speed/Sleep/Module stop/ Watch/Sub active/Sub sleep/ Software standby/ Hardware standby					Medium-speed/ Sleep/ Module stop/ Software standby/ Hardware standby	Medium-speed/Sleep/Module stop/ Watch/Sub active/ Sub sleep/Software standby/ Hardware standby		Medium-speed/ Sleep/ Module stop/ Software standby/ Hardware standby	
A/D Converter	Resolution × Channels	10-bit × 12														
	Sample and Hold	Yes														
D/A Converter	Resolution × Channels	—					8-bit × 2									
Timer	8-bit	—														
	16-bit	6 (TPU)														
	32-bit	—														
	Input Capture	6 (shared with TPU)														
	Output Compare	6 (shared with TPU)														
	PWM Output	7 (shared with (1 (MMT) + 6 (TPU))	6 (shared with TPU)	7 (shared with (1 (MMT) + 6 (TPU))	6 (shared with TPU)	7 (shared with (1 (MMT) + 6 (TPU))	8 (shared with 2 (PWM) + 6 (TPU))									
	Real-Time Port	—														
	Programmable Pulse Generator	8 (shared with TPU + PPG)	—	8 (shared with TPU + PPG)	—	8 (shared with TPU + PPG)										
	Event Counter	4 (shared with TPU)														
	2-Phase Encoder Input	2 (shared with TPU)														
Watchdog Timer		1					2									
Serial Interface	Clock Sync./Clock Async.	3														
I²C-bus		—					2		—		2		—			
IEBus		—														
Smart Card/SIM		3														
Synchronous Serial Communication Unit/Special Serial I/O		—														
CAN	Channels	1					2									
	Message Box (Numbers)	16 × 1					16 × 2									
Ethernet		—														
USB Function		—														
LPC/ISA		—														
IrDA		—														
LCD		—														
CRC Calculation Circuit		—														
I/O Ports	Input Only (Numbers)	12														
	CMOS Output Only (Numbers)	—														
	CMOS I/O (Numbers)	44					72									
	High Voltage Port (Numbers)	—														
	N-Channel Open Drain Port (Numbers)	20					26									
	DTMF	—														
	High Current Drive Port	—					16									
	Pull-Up Resistor	28					36									
	NMOS Push-Pull	—					2		—		2		—			
External Interrupts Pins		7 (NMI + IRQ (6))														
Debugging Function	Boundary Scan/JTAG	—														
	On-Chip Debug	Yes (PC break)	—	Yes (PC break)	—	Yes (PC break)										
	On-Board Flash Program	—				Yes			—				Yes		—	
Other Functions	ROM Correction Function	—														
	Others	MMT (× 1)	—	MMT (× 1)	—	MMT (× 1)	10-bit PWM Timer (× 2)									
Operating Frequency/Supply Voltage		20MHz/4.5 to 5.5V														
Operating Ambient Temperature (˚C)		–20 to 75														
Package*2		PRQP0080JD-A					PRQP0128KB-A									
Part No.		HD6432611XXXFA	HD6432614XXXFA	HD6432612XXXFA	HD6432616XXXFA	HD64F2612FA20V	HD64F2630F20V	HD64F2630UF20V	HD64F2630WF20V	HD6432630UXXXF	HD6432630WXXXF	HD6432630XXXF	HD64F2636F20V	HD64F2636UF20V	HD6432636UXXXF	HD6432636XXXF

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8S/2600 Series)

Group		H8S/2638						H8S/2639			
Memory	ROM (Bytes)	256K									
	RAM (Bytes)	16K									
	ROM Type*1	M		F				M			
	Program Security	—		Yes (H/W Protect, S/W Protect, Error Protect)				—			
CPU	CPU	H8S/2600 Core									
	Basic Instructions	69									
	Minimum Instruction Execution Time (ns)	50 (@20MHz)									
	Multiplier	16 × 16 → 32									
	Multiply-Accumulate Instruction	16 × 16 + 42 → 42									
DMA	DMAC (Channels)	—									
	EXDMAC	—									
	DTC/DMAC II	DTC									
External Bus Expansion	Address Space (Bytes)	16M									
	Bus State Controller	Direct connection to SRAM/ROM is supported									
	Bus Structure	Separate bus (8/16-bit)									
	SDRAM Controller	—									
	DRAM Controller	—									
	Host Interface	—									
Clock	Clock Generation Circuit	2 circuits (Main clock, Sub clock)		1 circuit (Main clock)		2 circuits (Main clock, Sub clock)		1 circuit (Main clock)			
	PLL	Yes (× 1, × 2, × 4)									
	Subclock	Yes		—		Yes		Yes (128 division)			
	RTC	Yes (WDT for watch)		—		Yes (WDT for watch)					
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16, 32)									
	Power Save	Medium-speed/Sleep/Module stop/ Watch/Sub active/Sub sleep/ Software standby/ Hardware standby		Medium-speed/Sleep/ Module stop/ Software standby/ Hardware standby		Medium-speed/Sleep/Module stop/Watch/Sub active/ Sub sleep/Software standby/Hardware standby					
A/D Converter	Resolution × Channels	10-bit × 12									
	Sample and Hold	Yes									
D/A Converter	Resolution × Channels	8-bit × 2									
Timer	8-bit	—									
	16-bit	6 (TPU)									
	32-bit	—									
	Input Capture	6 (shared with TPU)									
	Output Compare	6 (shared with TPU)									
	PWM Output	8 (shared with 2 (PWM) + 6 (TPU))									
	Real-Time Port	—									
	Programmable Pulse Generator	8 (shared with TPU + PPG)									
	Event Counter	4 (shared with TPU)									
	2-Phase Encoder Input	2 (shared with TPU)									
Watchdog Timer		2									
Serial Interface	Clock Sync./Clock Async.	3									
I²C-bus		—	2	—		2		—	2	—	2
IEBus		—									
Smart Card/SIM		3									
Synchronous Serial Communication Unit/Special Serial I/O		—									
CAN	Channels	2									
	Message Box (Numbers)	16 × 2									
Ethernet		—									
USB Function		—									
LPC/ISA		—									
IrDA		—									
LCD		—									
CRC Calculation Circuit		—									
I/O Ports	Input Only (Numbers)	12									
	CMOS Output Only (Numbers)	—									
	CMOS I/O (Numbers)	72									
	High Voltage Port (Numbers)	—									
	N-Channel Open Drain Port (Numbers)	26									
	DTMF	—									
	High Current Drive Port	16									
	Pull-Up Resistor	36									
	NMOS Push-Pull	2		—		2		—	2	—	2
External Interrupts Pins		7 (NMI + IRQ (6))									
Debugging Function	Boundary Scan/JTAG	—									
	On-Chip Debug	Yes (PC break)									
	On-Board Flash Program	—		Yes				—			
Other Functions	ROM Correction Function	—									
	Others	10-bit PWM Timer (× 2)									
Operating Frequency/Supply Voltage		20MHz/4.5 to 5.5V						5MHz (PLL: 20MHz)/4.5 to 5.5V			
Operating Ambient Temperature (°C)		–20 to 75									
Package*2		PRQP0128KB-A									
Part No.		HD6432638UXXXF	HD6432638WXXXF	HD6432638XXXF	HD64F2638F20V	HD64F2638UF20V	HD64F2638WF20V	HD64F2639UF20V	HD64F2639WF20V	HD6432639UXXXF	HD6432639WXXXF

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8S/2600 Series)

Group		H8S/2633																			
Memory	ROM (Bytes)	128K				192K					256K										
	RAM (Bytes)	8K					12K				16K										
	ROM Type*1	M									F							M			
	Program Security	—									Yes (H/W Protect, S/W Protect, Error Protect)							—			
CPU	CPU	H8S/2600 Core																			
	Basic Instructions	69																			
	Minimum Instruction Execution Time (ns)	40 (@25MHz), 62.5 (@16MHz)				35.7 (@28MHz)	40 (@25MHz), 62.5 (@16MHz)				40 (@25MHz), 62.5 (@16MHz)				35.7 (@28MHz)			40 (@25MHz), 62.5 (@16MHz)			
	Multiplier	16 × 16 → 32																			
	Multiply-Accumulate Instruction	—				16 × 16 + 42 → 42	—				16 × 16 + 42 → 42							—			
DMA	DMAC (Channels)	4				—	4														
	EXDMAC	—																			
	DTC/DMAC II	DTC				—	DTC														
External Bus Expansion	Address Space (Bytes)	16M																			
	Bus State Controller	Direct connection to ROM/Burst ROM/SRAM/DRAM is supported																			
	Bus Structure	Separate bus (8/16-bit)																			
	SDRAM Controller	—																			
	DRAM Controller	Yes																			
	Host Interface	—																			
Clock	Clock Generation Circuit	3 circuits (Main clock, PLL, Sub clock)				1 circuit (Main clock)	3 circuits (Main clock, PLL, Sub clock)				2 circuits (Main clock, Sub clock)							3 circuits (Main clock, PLL, Sub clock)			
	PLL	Yes				Yes (× 1, × 2, × 4)	Yes				Yes (× 1, × 2, × 4)							Yes			
	Subclock	Yes				—	Yes														
	RTC	—																			
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16, 32)																			
	Power Save	Medium-speed/Sub active/ Sleep/Sub sleep/Watch/ Software standby/ Hardware standby/ Module stop				Medium-speed/ Sleep/ Module stop/ Software standby/ Hardware standby	Medium-speed/Sub active/Sleep/Sub sleep/ Watch/Software standby/ Hardware standby/Module stop														
A/D Converter	Resolution × Channels	10-bit × 16																			
	Sample and Hold	Yes																			
D/A Converter	Resolution × Channels	8-bit × 4				—	8-bit × 4														
Timer	8-bit	4 (TMR)				—	4 (TMR)														
	16-bit	6 (TPU)																			
	32-bit	—																			
	Input Capture	6 (shared with TPU)																			
	Output Compare	6 (shared with TPU)																			
	PWM Output	6 (shared with TPU)									8 (shared with 2 (PWM) + 6 (TPU))							6 (shared with TPU)			
	Real-Time Port	—																			
	Programmable Pulse Generator	Yes				—	Yes				8 (shared with TPU + PPG)							Yes			
	Event Counter	10 (shared with TMR, TPU)				2 (shared with TMR), 4 (shared with TPU)	10 (shared with TMR, TPU)				2 (shared with TMR), 4 (shared with TPU)							10 (shared with TMR, TPU)			
	2-Phase Encoder Input	6 (shared with TPU)				2 (shared with TPU)	6 (shared with TPU)				2 (shared with TPU)							6 (shared with TPU)			
Watchdog Timer		2				1	2														
Serial Interface	Clock Sync./Clock Async.	5																			
I^{2}C-bus		2				—	2														
IEBus		—																			
Smart Card/SIM		Yes				5	Yes				5							Yes			
Synchronous Serial Communication Unit/Special Serial I/O		1 (Multiprocessor communication function)				—	1 (Multiprocessor communication function)				—							1 (Multiprocessor communication function)			
CAN	Channels	—																			
	Message Box (Numbers)	—																			
Ethernet		—																			
USB Function		—																			
LPC/ISA		—																			
IrDA		Yes				—	Yes														
LCD		—																			
CRC Calculation Circuit		—																			
I/O Ports	Input Only (Numbers)	16																			
	CMOS Output Only (Numbers)	—																			
	CMOS I/O (Numbers)	73																			
	High Voltage Port (Numbers)	—																			
	N-Channel Open Drain Port (Numbers)	24				28	24				28							24			
	DTMF	—																			
	High Current Drive Port	73				—	73				—							73			
	Pull-Up Resistor	36																			
	NMOS Push-Pull	—									2							—			
External Interrupts Pins		9				9 (NMI + IRQ (8))	9				9 (NMI + IRQ (8))							9			
Debugging Function	Boundary Scan/JTAG	—																			
	On-Chip Debug	—									Yes (PC break)							—			
	On-Board Flash Program	—									Yes							—			
Other Functions	ROM Correction Function	—																			
	Others	—																			
Operating Frequency/Supply Voltage		25MHz/3.0 to 3.6V, 16MHz/3.0 to 3.6V				28MHz/4.5 to 5.5V	25MHz/3.0 to 3.6V, 16MHz/3.0 to 3.6V				25MHz/3.0 to 3.6V	16MHz/3.0 to 3.6V		25MHz/3.0 to 3.6V	28MHz/4.5 to 5.5V			25MHz/3.0 to 3.6V, 16MHz/3.0 to 3.6V			
Operating Ambient Temperature (˚C)		–20 to 75, –40 to 85				–20 to 75	–20 to 75, –40 to 85				–20 to 75				–40 to 85	–20 to 75		–20 to 75, –40 to 85			
Package*2		PRQP0128KB-A	PTQP0120LA-A	PRQP0128KB-A	PTQP0120LA-A	PRQP0128KB-A		PTQP0120LA-A	PRQP0128KB-A	PTQP0120LA-A	PRQP0128KB-A		PTQP0120LA-A	PRQP0128KB-A			PTQP0120LA-A	PRQP0128KB-A	PTQP0120LA-A	PRQP0128KB-A	PTQP0120LA-A
Part No.		HD6432631WXXXF	HD6432631WXXXTE	HD6432631XXXF	HD6432631XXXTE	HD6432695XXXF	HD6432632WXXXF	HD6432632WXXXTE	HD6432632XXXF	HD6432632XXXTE	HD64F2633F25V	HD64F2633F16V	HD64F2633TE16V	HD64F2633TE25V	HD64F2633RF28JV	HD64F2633RF28V	HD64F2633RTE28V	HD6432633WXXXF	HD6432633WXXXTE	HD6432633XXXF	HD6432633XXXTE

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8S/2600 Series)

Group		H8S/2643															
Memory	ROM (Bytes)	128K			192K			256K									
	RAM (Bytes)	8K			12K			16K									
	ROM Type*1	M						F						M			
	Program Security	—						Yes (H/W Protect, S/W Protect, Error Protect)						—			
CPU	CPU	H8S/2600 Core															
	Basic Instructions	69															
	Minimum Instruction Execution Time (ns)	40 (@25MHz), 62.5 (@16MHz)															
	Multiplier	16 × 16 → 32															
	Multiply-Accumulate Instruction	16 × 16 + 42 → 42															
DMA	DMAC (Channels)	4															
	EXDMAC	—															
	DTC/DMAC II	DTC															
External Bus Expansion	Address Space (Bytes)	16M															
	Bus State Controller	Direct connection to ROM/Burst ROM/SRAM/DRAM is supported															
	Bus Structure	Separate bus (8/16-bit)															
	SDRAM Controller	—															
	DRAM Controller	Yes															
	Host Interface	—															
Clock	Clock Generation Circuit	2 circuits (Main clock, Sub clock)															
	PLL	Yes (× 1, × 2, × 4)															
	Subclock	Yes															
	RTC	—															
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16, 32)															
	Power Save	Medium-speed/Sleep/Module stop/Watch/Sub active/Sub sleep/Software standby/Hardware standby															
A/D Converter	Resolution x Channels	10-bit × 16															
	Sample and Hold	Yes															
D/A Converter	Resolution x Channels	8-bit × 4															
Timer	8-bit	4 (TMR)															
	16-bit	6 (TPU)															
	32-bit	—															
	Input Capture	6 (shared with TPU)															
	Output Compare	6 (shared with TPU)															
	PWM Output	8 (shared with 2 (PWM) + 6 (TPU))															
	Real-Time Port	—															
	Programmable Pulse Generator	8 (shared with TPU + PPG)															
	Event Counter	2 (shared with TMR), 4 (shared with TPU)															
	2-Phase Encoder Input	2 (shared with TPU)															
Watchdog Timer		2															
Serial Interface	Clock Sync./Clock Async.	5															
I²C-bus		2		—		2		—		2						—	
IEBus		—															
Smart Card/SIM		5															
Synchronous Serial Communication Unit/Special Serial I/O		—															
CAN	Channels	—															
	Message Box (Numbers)	—															
Ethernet		—															
USB Function		—															
LPC/ISA		—															
IrDA		Yes															
LCD		—															
CRC Calculation Circuit		—															
I/O Ports	Input Only (Numbers)	16															
	CMOS Output Only (Numbers)	—															
	CMOS I/O (Numbers)	96															
	High Voltage Port (Numbers)	—															
	N-Channel Open Drain Port (Numbers)	32															
	DTMF	—															
	High Current Drive Port	—															
	Pull-Up Resistor	40															
	NMOS Push-Pull	2															
External Interrupts Pins		9 (NMI + IRQ (8))															
Debugging Function	Boundary Scan/JTAG	—															
	On-Chip Debug	Yes (PC break)															
	On-Board Flash Program	—						Yes						—			
Other Functions	ROM Correction Function	—															
	Others	—															
Operating Frequency/Supply Voltage		25MHz/3.0 to 3.6V, 16MHz/3.0 to 3.6V						16MHz/3.0 to 3.6V	25MHz/3.0 to 3.6V	16MHz/3.0 to 3.6V	25MHz/3.0 to 3.6V	25MHz/3.0 to 3.6V, 16MHz/3.0 to 3.6V					
Operating Ambient Temperature (°C)		–20 to 75															
Package*2		PRQP0144KB-A	PRQP0128KB-A	PRQP0144KB-A													
Part No.		HD6432641WXXXFC	HD6432641WXXXTF	HD6432641XXXFC	HD6432641XXXTF	HD6432642WXXXFC	HD6432642WXXXTF	HD6432642XXXFC	HD6432642XXXTF	HD64F2643FC16V	HD64F2643FC25V	HD64F2643TF16V	HD64F2643TF25V	HD6432643WXXXFC	HD6432643WXXXTF	HD6432643XXXFC	HD6432643XXXTF

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8S/2600 Series)

Group		H8S/2646			H8S/2648	
Memory	ROM (Bytes)	64K	128K		64K	128K
	RAM (Bytes)	2K	4K		2K	4K
	ROM Type*1	M	F	M	F	M
	Program Security	—	Yes (H/W Protect, S/W Protect, Error Protect)	—	Yes (H/W Protect, S/W Protect, Error Protect)	—
CPU	CPU	H8S/2600 Core				
	Basic Instructions	69				
	Minimum Instruction Execution Time (ns)	50 (@20MHz)				
	Multiplier	16 × 16 → 32				
	Multiply-Accumulate Instruction	16 × 16 + 42 → 42				
DMA	DMAC (Channels)	—				
	EXDMAC	—				
	DTC/DMAC II	DTC				
External Bus Expansion	Address Space (Bytes)	16M				
	Bus State Controller	Direct connection to SRAM/ROM is supported				
	Bus Structure	Separate bus (8/16-bit)				
	SDRAM Controller	—				
	DRAM Controller	—				
	Host Interface	—				
Clock	Clock Generation Circuit	2 circuits (Main clock, Sub clock)				
	PLL	Yes (× 1, × 2, × 4)				
	Subclock	Yes				
	RTC	Yes (WDT for watch)				
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16, 32)				
	Power Save	Medium-speed/Sleep/Module stop/Watch/Sub active/Sub sleep/Software standby/Hardware standby				
A/D Converter	Resolution × Channels	10-bit × 12				
	Sample and Hold	Yes				
D/A Converter	Resolution × Channels	—				
Timer	8-bit	—				
	16-bit	6 (TPU)				
	32-bit	—				
	Input Capture	6 (shared with TPU)				
	Output Compare	6 (shared with TPU)				
	PWM Output	8 (shared with 2 (PWM) + 6 (TPU))				
	Real-Time Port	—				
	Programmable Pulse Generator	8 (shared with TPU + PPG)				
	Event Counter	4 (shared with TPU)				
	2-Phase Encoder Input	2 (shared with TPU)				
Watchdog Timer		2				
Serial Interface	Clock Sync./Clock Async.	2			3	
I²C-bus		—				
IEBus		—				
Smart Card/SIM		2			3	
Synchronous Serial Communication Unit/Special Serial I/O		—				
CAN	Channels	1				
	Message Box (Numbers)	16 × 1				
Ethernet		—				
USB Function		—				
LPC/ISA		—				
IrDA		—				
LCD		24seg × 4com			40seg × 4com	
CRC Calculation Circuit		—				
I/O Ports	Input Only (Numbers)	16				
	CMOS Output Only (Numbers)	—				
	CMOS I/O (Numbers)	92				
	High Voltage Port (Numbers)	—				
	N-Channel Open Drain Port (Numbers)	32				
	DTMF	—				
	High Current Drive Port	16				
	Pull-Up Resistor	40				
	NMOS Push-Pull	—				
External Interrupts Pins		7 (NMI + IRQ (6))				
Debugging Function	Boundary Scan/JTAG	—				
	On-Chip Debug	Yes (PC break)				
	On-Board Flash Program	—	Yes	—	Yes	—
Other Functions	ROM Correction Function	—				
	Others	10-bit PWM Timer (× 2)				
Operating Frequency/Supply Voltage		20MHz/4.5 to 5.5V				
Operating Ambient Temperature (°C)		–20 to 75				
Package*2		PRQP0144KA-A	PRQP0144KB-A	PRQP0144KA-A	PRQP0144KB-A	PRQP0144KA-A
Part No.		HD6432645XXXFC	HD64F2646RFC20V	HD6432646XXXFC	HD6432647XXXFC	HD64F2648RFC20V	HD6432648XXXFC

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8S/2600 Series)

Group		H8S/2655												
Memory	ROM (Bytes)	64K	128K											
	RAM (Bytes)	4K												
	ROM Type*1	M	O											
	Program Security	—												
CPU	CPU	H8S/2600 Core												
	Basic Instructions	69												
	Minimum Instruction Execution Time (ns)	50 (@20MHz)												
	Multiplier	16 × 16 → 32												
	Multiply-Accumulate Instruction	16 × 16 + 42 → 42												
DMA	DMAC (Channels)	4												
	EXDMAC	—												
	DTC/DMAC II	DTC												
External Bus Expansion	Address Space (Bytes)	16M												
	Bus State Controller	Direct connection to ROM/SRAM is supported												
	Bus Structure	Separate bus (8/16-bit)												
	SDRAM Controller	—												
	DRAM Controller	Yes												
	Host Interface	—												
Clock	Clock Generation Circuit	1 circuit (Main clock)												
	PLL	—												
	Subclock	—												
	RTC	—												
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16, 32)												
	Power Save	Medium-speed/Sleep/Module stop/Software standby/Hardware standby												
A/D Converter	Resolution × Channels	10-bit × 8												
	Sample and Hold	Yes												
D/A Converter	Resolution × Channels	8-bit × 2												
Timer	8-bit	2 (TMR)												
	16-bit	6 (TPU)												
	32-bit	—												
	Input Capture	6 (shared with TPU)												
	Output Compare	6 (shared with TPU)												
	PWM Output	6 (shared with TPU)												
	Real-Time Port	—												
	Programmable Pulse Generator	Yes												
	Event Counter	8 (shared with TMR, TPU)												
	2-Phase Encoder Input	6 (shared with TPU)												
Watchdog Timer		1												
Serial Interface	Clock Sync./Clock Async.	3												
I^2C-bus		—												
IEBus		—												
Smart Card/SIM		3												
Synchronous Serial Communication Unit/Special Serial I/O		1 (Multiprocessor communication function)												
CAN	Channels	—												
	Message Box (Numbers)	—												
Ethernet		—												
USB Function		—												
LPC/ISA		—												
IrDA		—												
LCD		—												
CRC Calculation Circuit		—												
I/O Ports	Input Only (Numbers)	8												
	CMOS Output Only (Numbers)	—												
	CMOS I/O (Numbers)	74												
	High Voltage Port (Numbers)	—												
	N-Channel Open Drain Port (Numbers)	14												
	DTMF	—												
	High Current Drive Port	—												
	Pull-Up Resistor	40												
	NMOS Push-Pull	—												
External Interrupts Pins		9												
Debugging Function	Boundary Scan/JTAG	—												
	On-Chip Debug	—												
	On-Board Flash Program	—												
Other Functions	ROM Correction Function	—												
	Others	—												
Operating Frequency/Supply Voltage		20MHz/4.5 to 5.5V, 10MHz/2.7 to 5.5V					20MHz/4.5 to 5.5V				10MHz/2.7 to 5.5V			
Operating Ambient Temperature (°C)		–20 to 75	–40 to 85	–20 to 75	–40 to 85		–20 to 75	–40 to 85	–20 to 75		–40 to 85	–20 to 75	–40 to 85	–20 to 75
Package*2		PTQP0120LA-A	PRQP0128KB-A	PTQP0144LC-A	PTQP0120LA-A	PTQP0144LC-A	PRQP0128KB-A		PTQP0120LA-A		PRQP0128KB-A	PTQP0144LC-A	PTQP0120LA-A	
Part No.		HD6432653BXXXTE	HD6432655XXXF	HD6432655XXXFI	HD6432655XXXTE	HD6432655XXXTEI	HD6472655RFIV	HD6472655RFV	HD6472655RTEIV	HD6472655RTEV	HD6472655RVFIV	HD6472655RVFV	HD6472655RVTEIV	HD6472655RVTEV

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8S/2600 Series)

Group		H8S/2668	H8S/2678								H8S/2678R	
Memory	ROM (Bytes)	384K	—	64K	128K	256K					—	
	RAM (Bytes)	16K	8K								32K	
	ROM Type*1	F	L	M			F	M			L	
	Program Security	—					Yes	—				
CPU	CPU	H8S/2600 Core										
	Basic Instructions	69										
	Minimum Instruction Execution Time (ns)	30 (@33MHz)										
	Multiplier	16 × 16 → 32										
	Multiply-Accumulate Instruction	16 × 16 + 42 → 42										
DMA	DMAC (Channels)	—	4									
	EXDMAC	—	4									
	DTC/DMAC Ⅱ	—	DTC									—
External Bus Expansion	Address Space (Bytes)	16M										
	Bus State Controller	Direct connection to ROM/SRAM is supported										
	Bus Structure	Separate bus (8/16-bit)										
	SDRAM Controller	—										
	DRAM Controller	—	Yes									—
	Host Interface	—										
Clock	Clock Generation Circuit	2 circuits (Main clock, PLL)										
	PLL	Yes										
	Subclock	—										
	RTC	—										
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16, 32)										
	Power Save	Clock division/Sleep/Module stop/All module clock stop/Software standby/Hardware standby										
A/D Converter	Resolution × Channels	10-bit × 12										
	Sample and Hold	Yes										
D/A Converter	Resolution × Channels	8-bit × 4										
Timer	8-bit	2 (TMR)										
	16-bit	6 (TPU)										
	32-bit	—										
	Input Capture	6 (shared with TPU)										
	Output Compare	6 (shared with TPU)										
	PWM Output	6 (shared with TPU)										
	Real-Time Port	—										
	Programmable Pulse Generator	Yes										
	Event Counter	8 (shared with TMR, TPU)										
	2-Phase Encoder Input	6 (shared with TPU)										
Watchdog Timer		1										
Serial Interface	Clock Sync./Clock Async.	3										
I²C-bus		—										
IEBus		—										
Smart Card/SIM		3										
Synchronous Serial Communication Unit/Special Serial I/O		1 (Multiprocessor communication function)										
CAN	Channels	—										
	Message Box (Numbers)	—										
Ethernet		—										
USB Function		—										
LPC/ISA		—										
IrDA		Yes										
LCD		—										
CRC Calculation Circuit		—										
I/O Ports	Input Only (Numbers)	—										
	CMOS Output Only (Numbers)	—										
	CMOS I/O (Numbers)	115										
	High Voltage Port (Numbers)	—										
	N-Channel Open Drain Port (Numbers)	14										
	DTMF	—										
	High Current Drive Port	—										
	Pull-Up Resistor	40										
	NMOS Push-Pull	—										
External Interrupts Pins		9	17									
Debugging Function	Boundary Scan/JTAG	—										
	On-Chip Debug	—										
	On-Board Flash Program	Yes	—				Yes	—				
Other Functions	ROM Correction Function	—										
	Others	—										
Operating Frequency/Supply Voltage		33MHz/3.0 to 3.6V										
Operating Ambient Temperature (˚C)		–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85		–20 to 75		–40 to 85	–20 to 70
Package*2		PLQP0144KC-A	PRQP0144KA-A								PLQP0144KC-A	
Part No.		HD64F2667VFQ33	HD6412670VFC33IV	HD6412670VFC33V	HD6432673XXXFC	HD6432673XXXFCI	HD6432675XXXFC	HD6432675XXXFCI	HD64F2676VFC33IV	HD64F2676VFC33V	HD6432676XXXFC	HD6432676XXXFCI	HD6412674RVFQ33DV	HD6412674RVFQ33V

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

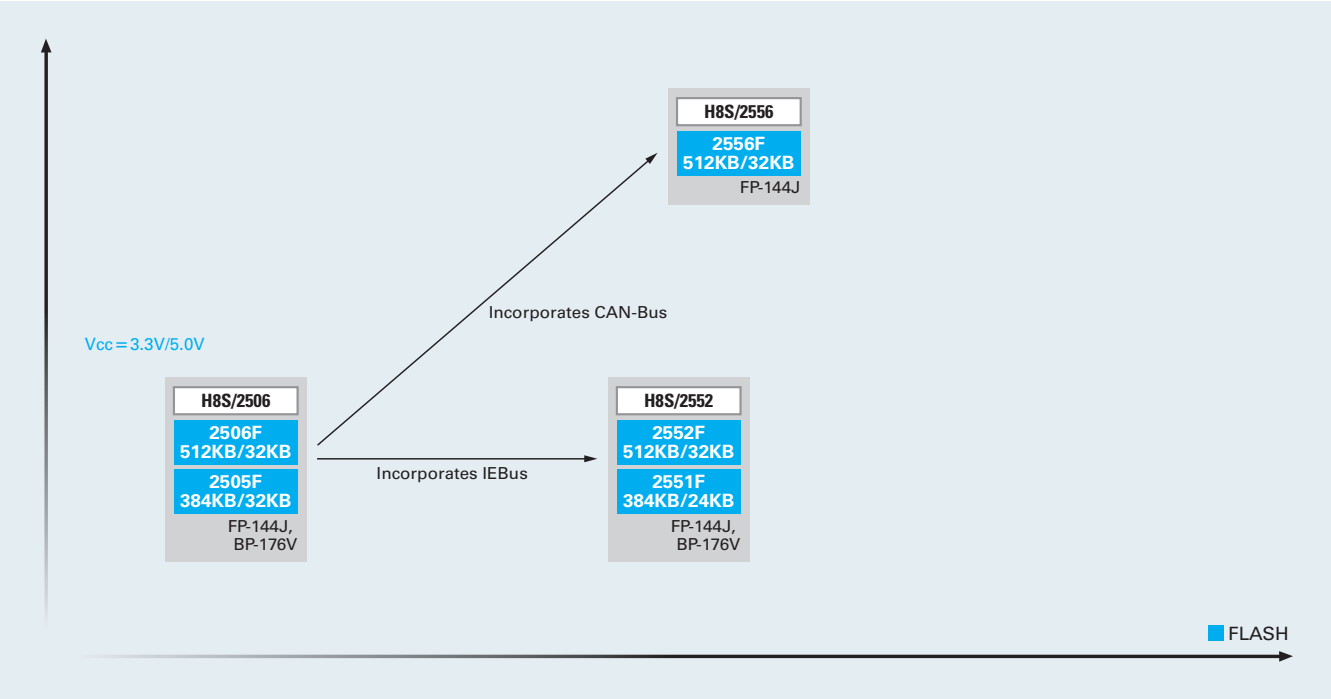
Outline of H8S/2500 Series

A low-power series with 5 V compatibility that retains the on-chip 32 kHz oscillator of the H8S/2200

H8S/2500 Series Features

- Incorporates characteristic communication functions (I²CBus, IEBus, CAN-Bus)
- Supports systems with 5 V or 3 V interfaces using port pin power supplies.
  The H8S/2500 Series can accommodate 5 V/3 V mixed systems through the use of different port pin power supplies.

• H8S/2500 Series Roadmap



H8S/2556 Group

- 512K bytes of on-chip flash memory
- On-chip CAN interface
- On-chip I²C-bus interface
- Power supply pin selectable from 3.0 to 5.5V

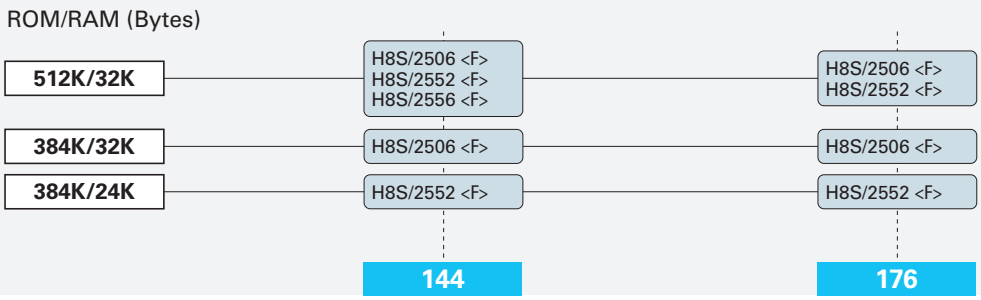
H8S/2552 Group

- 512K bytes of on-chip flash memory
- On-chip IEBus™ interface
- On-chip I²C-bus interface
- Power supply pin selectable from 3.0 to 5.5V

H8S/2506 Group

- 512K bytes of on-chip flash memory
- On-chip I²C-bus interface
- Power supply pin selectable from 3.0 to 5.5V

• Memory Capacity (ROM/RAM) (H8S/2500 Series)



Letters in brackets < > indicate memory variations.
F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

Pin count

• Specifications (H8S/2500 Series)

Group		H8S/2506				H8S/2552				H8S/2556
Memory	ROM (Bytes)	384K		512K		384K		512K		
	RAM (Bytes)	32K				24K		32K		
	ROM Type*1	F								
	Program Security	Yes								
CPU	CPU	H8S/2000 Core								
	Basic Instructions	65								
	Minimum Instruction Execution Time (ns)	38 (@26MHz)								50 (@20MHz)
	Multiplier	—								
	Multiply-Accumulate Instruction	—								
DMA	DMAC (Channels)	—								
	EXDMAC	—								
	DTC/DMAC Ⅱ	DTC								
External Bus Expansion	Address Space (Bytes)	16M								
	Bus State Controller	Direct connection to SRAM/ROM is supported								
	Bus Structure	Separate bus (8/16-bit)								
	SDRAM Controller	—								
	DRAM Controller	—								
	Host Interface	—								
Clock	Clock Generation Circuit	2 circuits (Main clock, Sub clock)								
	PLL	Yes (× 1, × 2)								
	Subclock	Yes								
	RTC	Yes (WDT for watch)								
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16, 32)								
	Power Save	Normal operating/Medium-speed/Sleep/Module stop/Watch/Software standby/Hardware standby								
A/D Converter	Resolution × Channels	10-bit × 16								
	Sample and Hold	Yes								
D/A Converter	Resolution × Channels	8-bit × 2								
Timer	8-bit	4 (TMR)								
	16-bit	6 (TPU)								
	32-bit	—								
	Input Capture	6 (shared with TPU)								
	Output Compare	6 (shared with TPU)								
	PWM Output	6 (shared with TPU)								
	Real-Time Port	—								
	Programmable Pulse Generator	—								
	Event Counter	10 (shared with TMR, TPU)								
	2-Phase Encoder Input	6 (shared with TPU)								
Watchdog Timer		2								
Serial Interface	Clock Sync./Clock Async.	5								
I²C-bus		2								
IEBus		—				1				—
Smart Card/SIM		1								
Synchronous Serial Communication Unit/Special Serial I/O		—								
CAN	Channels	—								1
	Message Box (Numbers)	—								16
Ethernet		—								
USB Function		—								
LPC/ISA		—								
IrDA		—								
LCD		—								
CRC Calculation Circuit		—								
I/O Ports	Input Only (Numbers)	16								17
	CMOS Output Only (Numbers)	—								1
	CMOS I/O (Numbers)	104								102
	High Voltage Port (Numbers)	—								
	N-Channel Open Drain Port (Numbers)	10								
	DTMF	—								
	High Current Drive Port	—								
	Pull-Up Resistor	40								
	NMOS Push-Pull	2								
External Interrupts Pins		9								
Debugging Function	Boundary Scan/JTAG	—								
	On-Chip Debug	—								
	On-Board Flash Program	Yes								
Other Functions	ROM Correction Function	Yes (PC break)								
	Others	—								
Operating Frequency/Supply Voltage		26MHz/3.0 to 5.5V								20MHz/3.0 to 5.5V
Operating Ambient Temperature (˚C)		–40 to 85								
Package*2		PLBG0176GA-A	PRQP0144KB-A	PLBG0176GA-A	PRQP0144KB-A	PLBG0176GA-A	PRQP0144KB-A	PLBG0176GA-A	PRQP0144KB-A	
Part No.		HD64F2505BR26DV	HD64F2505FC26DV	HD64F2506BR26DV	HD64F2506FC26DV	HD64F2551BR26DV	HD64F2551FC26DV	HD64F2552BR26DV	HD64F2552FC26DV	HD64F2556FC20DV

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

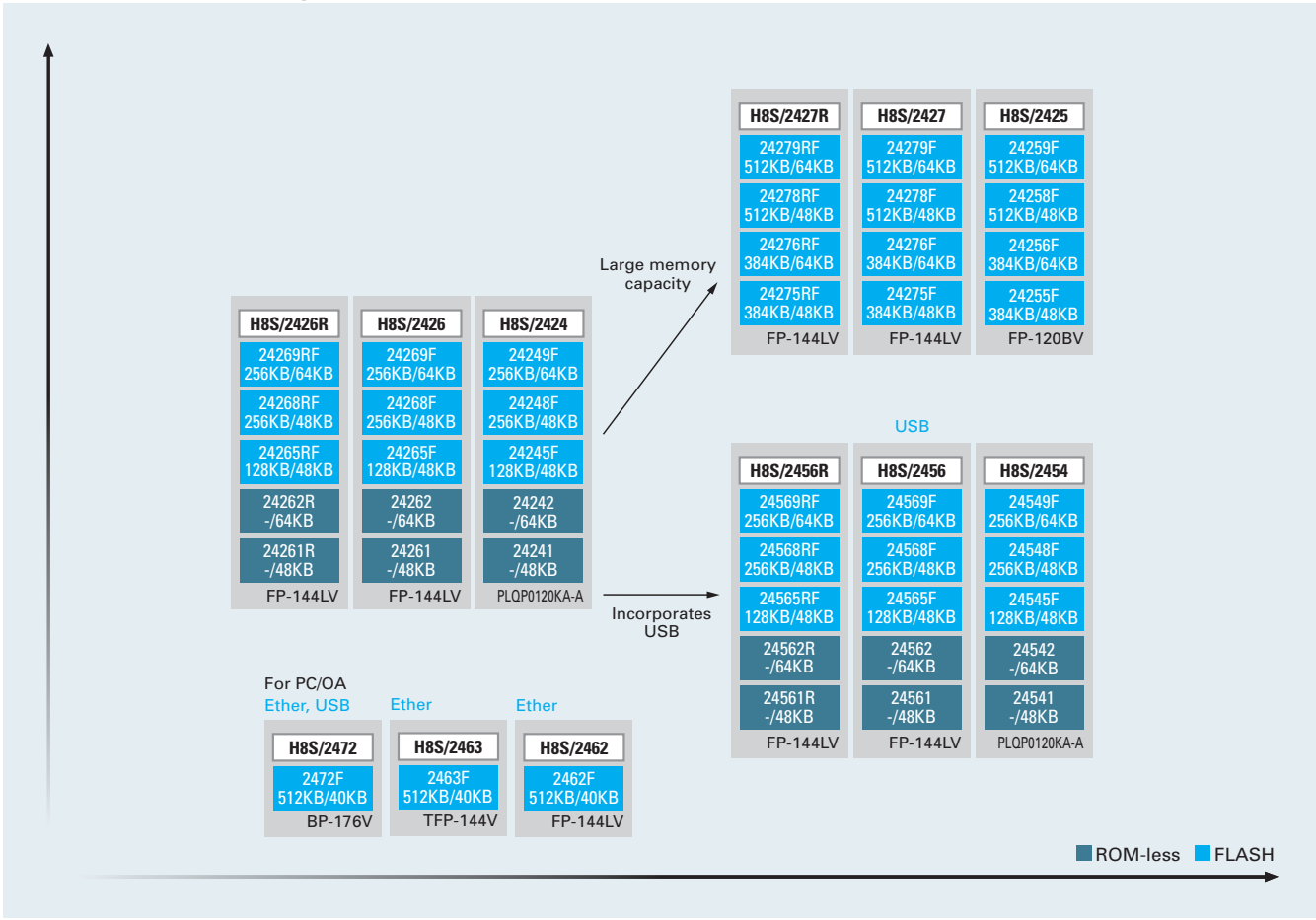
Outline of H8S/2400 Series

New products that incorporate abundant peripheral functions

H8S/2400 Series Features

- Improved calculation process capability by incorporating the top H8S/2600 CPU in the H8S family
- Added new products incorporating USB and Ethernet to the lineup
- New series capable of low voltage, high-speed operation (3.0V@34MHz) and incorporating abundant low power consumption modes

• H8S/2400 Series Roadmap



H8S/2472 Group
- Operates at 34MHz/3V.
- Incorporates multiplier.
- Built-in Ether-C and Ether-Mac.
- Incorporates USB interface.
- Incorporates I²C bus interface.
- Supports E10A-USB.
- Compact package with 176 pins.

* Refer to “USB MPUs and MCUs” in this catalog.

H8S/2462, 2463 Group
- Operate at 34MHz/3V.
- Incorporate multiplier.
- Built-in Ether-C and Ether-Mac.
- Incorporate I²C bus interface.
- Support E10A-USB.
- 144 pins

H8S/2456R, 2456 Group
- Operate at 32MHz/3V.
- Incorporate multiplier.
- Incorporate USB interface.
- Incorporate I²C bus interface.
- Support E10A-USB.
- Compact package with 144 pins.

* Refer to “USB MPUs and MCUs“ in this catalog.

H8S/2454 Group
- Operates at 32MHz/3V.
- Incorporates multiplier.
- Incorporates USB interface.
- Incorporates I²C bus interface.
- Supports E10A-USB.
- Compact package with 120 pins.

* Refer to "USB MPUs and MCUs" in this catalog.

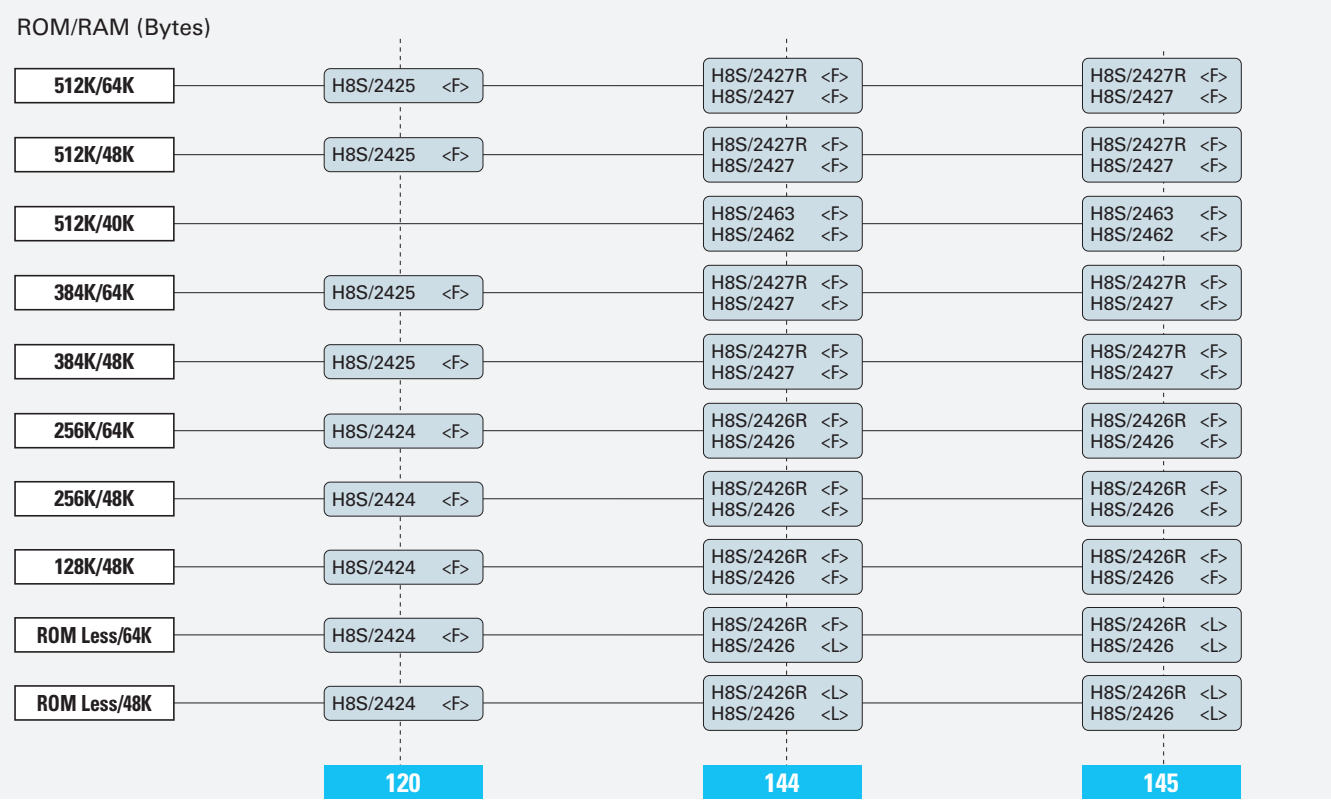
H8S/2426R, 2426 Group
- Operate at 33MHz/3V (2426R Group), Operate at 33MHz/3V, 5V (2426 Group).
- Incorporate multiplier.
- Incorporate I²C bus interface.
- Support E10A-USB.
- Compact package with 144 pins.

H8S/2424 Group
- Operates at 33MHz/3V, 5V.
- Incorporates multiplier.
- Incorporates I²C bus interface.
- Supports E10A-USB.
- Compact package with 120 pins.

H8S/2427R, 2427 Group
- Operates at 33MHz/3V (2427R Group), Operates at 33MHz/3V, 5V (2427 Group).
- Incorporate multiplier.
- Incorporate I²C bus interface.
- Support E10A-USB.
- Supports E100.
- Compact package with 144 pins.

H8S/2425 Group
- Operates at 33MHz/3V, 5V.
- Incorporates multiplier.
- Incorporates I²C bus interface.
- Supports E10A-USB.
- Supports E100.
- Compact package with 120 pins.

• Memory Capacity (ROM/RAM) (H8S/2400 Series)



Letters in brackets < > indicate memory variations.
F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

• Specifications (H8S/2400 Series)

Group		H8S/2424		
Memory	ROM (Bytes)	—		128K
	RAM (Bytes)	48K	64K	48K
	ROM Type*1	L		F
	Program Security	—		Yes
CPU	CPU	H8S/2600 Core		
	Basic Instructions	69		
	Minimum Instruction Execution Time (ns)	30 (@33MHz)		
	Multiplier	16 × 16 → 32		
	Multiply-Accumulate Instruction	16 × 16 + 42 → 42		
DMA	DMAC (Channels)	4		
	EXDMAC	—		
	DTC/DMAC II	DTC		
External Bus Expansion	Address Space (Bytes)	16M		
	Bus State Controller	Direct connection to ROM/SRAM/DRAM is supported		
	Bus Structure	Separate bus (8/16-bit), Multiplex bus		
	SDRAM Controller	—		
	DRAM Controller	Yes		
	Host Interface	—		
Clock	Clock Generation Circuit	2 circuits (Main clock, PLL)		
	PLL	Yes		
	Subclock	—		
	RTC	—		
	Frequency Divider	1/n (n = 1, 2)		
	Power Save	Clock division/Sleep/Module stop/All module clocks stop/Software standby/Hardware standby		
A/D Converter	Resolution × Channels	10-bit × 10 (2 units)		
	Sample and Hold	Yes		
D/A Converter	Resolution × Channels	8-bit × 2		
Timer	8-bit	2 (TMR)		
	16-bit	12 (TPU)		
	32-bit	—		
	Input Capture	12 (shared with TPU)		
	Output Compare	12 (shared with TPU)		
	PWM Output	12 (shared with TPU)		
	Real-Time Port	—		
	Programmable Pulse Generator	16 (shared with DMAC, DTC, TMR, TPU)		
	Event Counter	14 (shared with TMR, TPU)		
	2-Phase Encoder Input	12 (shared with TPU)		
Watchdog Timer		1		
Serial Interface	Clock Sync./Clock Async.	5		
I^2C-bus		4		
IEBus		—		
Smart Card/SIM		5		
Synchronous Serial Communication Unit/Special Serial I/O		1 (Multiprocessor communication function)		
CAN	Channels	—		
	Message Box (Numbers)	—		
Ethernet		—		
USB Function		—		
LPC/ISA		—		
IrDA		Yes		
LCD		—		
CRC Calculation Circuit		—		
I/O Ports	Input Only (Numbers)	11		
	CMOS Output Only (Numbers)	—		
	CMOS I/O (Numbers)	83		
	High Voltage Port (Numbers)	—		
	N-Channel Open Drain Port (Numbers)	91		
	DTMF	—		
	High Current Drive Port	—		
	Pull-Up Resistor	40		
	NMOS Push-Pull	—		
External Interrupts Pins		9 (NMI, IRQ × 8)		
Debugging Function	Boundary Scan/JTAG	—		
	On-Chip Debug	Yes		
	On-Board Flash Program	Yes — Yes — Yes — Yes — Yes — Yes — Yes — Yes —		Yes
Other Functions	ROM Correction Function	—		
	Others	—		
Operating Frequency/Supply Voltage		33MHz/4.5 to 5.5V | 33MHz/3.0 to 3.6V | 33MHz/4.5 to 5.5V | 33MHz/3.0 to 3.6V | 33MHz/4.5 to 5.5V | 33MHz/3.0 to 3.6V | 33MHz/4.5 to 5.5V | 33MHz/3.0 to 3.6V		33MHz/4.5 to 5.5V | 33MHz/3.0 to 3.6V | 33MHz/4.5 to 5.5V | 33MHz/3.0 to 3.6V
Operating Ambient Temperature (˚C)		–40 to 85 | –20 to 75 | –40 to 85 | –20 to 75		–40 to 85 | –20 to 75
Package*2		PLQP0120KA-A | PLQP0120LA-A | PLQP0120KA-A | PLQP0120LA-A | PLQP0120KA-A | PLQP0120LA-A | PLQP0120KA-A | PLQP0120LA-A | PLQP0120KA-A | PLQP0120LA-A | PLQP0120KA-A | PLQP0120LA-A | PLQP0120KA-A | PLQP0120LA-A | PLQP0120KA-A | PLQP0120LA-A		PLQP0120KA-A | PLQP0120LA-A | PLQP0120KA-A | PLQP0120LA-A | PLQP0120KA-A | PLQP0120LA-A | PLQP0120KA-A | PLQP0120LA-A
Part No.		R4S24241DFAU | R4S24241DFPV | R4S24241DVFAU | R4S24241DVFPV | R4S24241NFAU | R4S24241NFPV | R4S24241NVFAU | R4S24241NVFPV | R4S24242DFAU | R4S24242DFPV | R4S24242DVFAU | R4S24242DVFPV | R4S24242NFAU | R4S24242NFPV | R4S24242NVFAU | R4S24242NVFPV		R4F24245DFAU | R4F24245DFPV | R4F24245DVFAU | R4F24245DVFPV | R4F24245NFAU | R4F24245NFPV | R4F24245NVFAU | R4F24245NVFPV

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8S/2400 Series)

Group		H8S/2424															
Memory	ROM (Bytes)	256K															
	RAM (Bytes)	48K								64K							
	ROM Type*1	F															
	Program Security	Yes															
CPU	CPU	H8S/2600 Core															
	Basic Instructions	69															
	Minimum Instruction Execution Time (ns)	30 (@33MHz)															
	Multiplier	16 × 16 → 32															
	Multiply-Accumulate Instruction	16 × 16 + 42 → 42															
DMA	DMAC (Channels)	4															
	EXDMAC	—															
	DTC/DMAC II	DTC															
External Bus Expansion	Address Space (Bytes)	16M															
	Bus State Controller	Direct connection to ROM/SRAM/DRAM is supported															
	Bus Structure	Separate bus (8/16-bit), Multiplex bus															
	SDRAM Controller	—															
	DRAM Controller	Yes															
	Host Interface	—															
Clock	Clock Generation Circuit	2 circuits (Main clock, PLL)															
	PLL	Yes															
	Subclock	—															
	RTC	—															
	Frequency Divider	1/n (n = 1, 2)															
	Power Save	Clock division/Sleep/Module stop/All module clocks stop/Software standby/Hardware standby															
A/D Converter	Resolution × Channels	10-bit × 10 (2 units)															
	Sample and Hold	Yes															
D/A Converter	Resolution × Channels	8-bit × 2															
Timer	8-bit	2 (TMR)															
	16-bit	12 (TPU)															
	32-bit	—															
	Input Capture	12 (shared with TPU)															
	Output Compare	12 (shared with TPU)															
	PWM Output	12 (shared with TPU)															
	Real-Time Port	—															
	Programmable Pulse Generator	16 (shared with DMAC, DTC, TMR, TPU)															
	Event Counter	14 (shared with TMR, TPU)															
	2-Phase Encoder Input	12 (shared with TPU)															
Watchdog Timer		1															
Serial Interface	Clock Sync./Clock Async.	5															
I²C-bus		4															
IEBus		—															
Smart Card/SIM		5															
Synchronous Serial Communication Unit/Special Serial I/O		1 (Multiprocessor communication function)															
CAN	Channels	—															
	Message Box (Numbers)	—															
Ethernet		—															
USB Function		—															
LPC/ISA		—															
IrDA		Yes															
LCD		—															
CRC Calculation Circuit		—															
I/O Ports	Input Only (Numbers)	11															
	CMOS Output Only (Numbers)	—															
	CMOS I/O (Numbers)	83															
	High Voltage Port (Numbers)	—															
	N-Channel Open Drain Port (Numbers)	91															
	DTMF	—															
	High Current Drive Port	—															
	Pull-Up Resistor	40															
	NMOS Push-Pull	—															
External Interrupts Pins		9 (NMI, IRQ × 8)															
Debugging Function	Boundary Scan/JTAG	—															
	On-Chip Debug	Yes															
	On-Board Flash Program	Yes															
Other Functions	ROM Correction Function	—															
	Others	—															
Operating Frequency/Supply Voltage		33MHz/4.5 to 5.5V		33MHz/3.0 to 3.6V		33MHz/4.5 to 5.5V		33MHz/3.0 to 3.6V		33MHz/4.5 to 5.5V		33MHz/3.0 to 3.6V		33MHz/4.5 to 5.5V		33MHz/3.0 to 3.6V	
Operating Ambient Temperature (˚C)		–40 to 85				–20 to 75				–40 to 85				–20 to 75			
Package*2		PLQP0120KA-A	PLQP0120LA-A	PLQP0120KA-A	PLQP0120LA-A	PLQP0120KA-A	PLQP0120LA-A	PLQP0120KA-A	PLQP0120LA-A	PLQP0120KA-A	PLQP0120LA-A	PLQP0120KA-A	PLQP0120LA-A	PLQP0120KA-A	PLQP0120LA-A	PLQP0120KA-A	PLQP0120LA-A
Part No.		R4F24248DFAU	R4F24248DFPV	R4F24248DVFAU	R4F24248DVFPV	R4F24248NFAU	R4F24248NFPV	R4F24248NVFAU	R4F24248NVFPV	R4F24249DFAU	R4F24249DFPV	R4F24249DVFAU	R4F24249DVFPV	R4F24249NFAU	R4F24249NFPV	R4F24249NVFAU	R4F24249NVFPV

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8S/2400 Series)

Group		H8S/2425																	
Memory	ROM (Bytes)	384K																	
	RAM (Bytes)	48K						64K											
	ROM Type*1	F																	
	Program Security	Yes																	
CPU	CPU	H8S/2600 Core																	
	Basic Instructions	69																	
	Minimum Instruction Execution Time (ns)	30 (@33MHz)																	
	Multiplier	16 × 16 → 32																	
	Multiply-Accumulate Instruction	16 × 16 + 42 → 42																	
DMA	DMAC (Channels)	4																	
	EXDMAC	—																	
	DTC/DMAC II	DTC																	
External Bus Expansion	Address Space (Bytes)	16M																	
	Bus State Controller	Direct connection to ROM/SRAM/DRAM is supported																	
	Bus Structure	Separate bus (8/16-bit), Multiplex bus																	
	SDRAM Controller	—																	
	DRAM Controller	Yes																	
	Host Interface	—																	
Clock	Clock Generation Circuit	2 circuits (Main clock, PLL)																	
	PLL	Yes																	
	Subclock	—																	
	RTC	—																	
	Frequency Divider	1/n (n = 1, 2)																	
	Power Save	Clock division/Sleep/Module stop/All module clocks stop/Software standby/Hardware standby																	
A/D Converter	Resolution × Channels	10-bit × 10 (2 units)																	
	Sample and Hold	Yes																	
D/A Converter	Resolution × Channels	8-bit × 2																	
Timer	8-bit	2 (TMR)																	
	16-bit	12 (TPU)																	
	32-bit	—																	
	Input Capture	12 (shared with TPU)																	
	Output Compare	12 (shared with TPU)																	
	PWM Output	12 (shared with TPU)																	
	Real-Time Port	—																	
	Programmable Pulse Generator	16 (shared with DMAC, DTC, TMR, TPU)																	
	Event Counter	14 (shared with TMR, TPU)																	
	2-Phase Encoder Input	12 (shared with TPU)																	
Watchdog Timer		1																	
Serial Interface	Clock Sync./Clock Async.	5																	
I²C-bus		4																	
IEBus		—																	
Smart Card/SIM		5																	
Synchronous Serial Communication Unit/Special Serial I/O		1 (Multiprocessor communication function)																	
CAN	Channels	—																	
	Message Box (Numbers)	—																	
Ethernet		—																	
USB Function		—																	
LPC/ISA		—																	
IrDA		Yes																	
LCD		—																	
CRC Calculation Circuit		—																	
I/O Ports	Input Only (Numbers)	11																	
	CMOS Output Only (Numbers)	—																	
	CMOS I/O (Numbers)	83																	
	High Voltage Port (Numbers)	—																	
	N-Channel Open Drain Port (Numbers)	91																	
	DTMF	—																	
	High Current Drive Port	—																	
	Pull-Up Resistor	40																	
	NMOS Push-Pull	—																	
External Interrupts Pins		9 (NMI, IRQ × 8)																	
Debugging Function	Boundary Scan/JTAG	—																	
	On-Chip Debug	Yes																	
	On-Board Flash Program	Yes																	
Other Functions	ROM Correction Function	—																	
	Others	—																	
Operating Frequency/Supply Voltage		25MHz/2.7 to 3.6V		33MHz/4.5 to 5.5V		33MHz/3.0 to 3.6V		33MHz/4.5 to 5.5V		33MHz/3.0 to 3.6V		25MHz/2.7 to 3.6V		33MHz/4.5 to 5.5V		33MHz/3.0 to 3.6V		33MHz/4.5 to 5.5V		33MHz/3.0 to 3.6V	
Operating Ambient Temperature (˚C)		–40 to 85						–20 to 75				–40 to 85						–20 to 75			
Package*2		PLQP0120KA-A	PLQP0120LA-A	PLQP0120KA-A	PLQP0120LA-A	PLQP0120KA-A	PLQP0120LA-A	PLQP0120KA-A	PLQP0120LA-A	PLQP0120KA-A	PLQP0120LA-A	PLQP0120KA-A	PLQP0120LA-A	PLQP0120KA-A	PLQP0120LA-A	PLQP0120KA-A	PLQP0120LA-A	PLQP0120KA-A	PLQP0120LA-A	PLQP0120KA-A	PLQP0120LA-A
Part No.		R4F24255DWFAU*	R4F24255DWFPU*	R4F24255DFAU	R4F24255DFPU	R4F24255DVFAU	R4F24255DVFPU	R4F24255NFAU	R4F24255NFPU	R4F24255NVFAU	R4F24255NVFPU	R4F24256DWFAU*	R4F24256DWFPU*	R4F24256DFAU	R4F24256DFPU	R4F24256DVFAU	R4F24256DVFPU	R4F24256NFAU	R4F24256NFPU	R4F24256NVFAU	R4F24256NVFPU

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8S/2400 Series)

Group		H8S/2425																	
Memory	ROM (Bytes)	512K																	
	RAM (Bytes)	48K						64K											
	ROM Type*1	F																	
	Program Security	Yes																	
CPU	CPU	H8S/2600 Core																	
	Basic Instructions	69																	
	Minimum Instruction Execution Time (ns)	30 (@33MHz)																	
	Multiplier	16 × 16 → 32																	
	Multiply-Accumulate Instruction	16 × 16 + 42 → 42																	
DMA	DMAC (Channels)	4																	
	EXDMAC	—																	
	DTC/DMAC II	DTC																	
External Bus Expansion	Address Space (Bytes)	16M																	
	Bus State Controller	Direct connection to ROM/SRAM/DRAM is supported																	
	Bus Structure	Separate bus (8/16-bit), Multiplex bus																	
	SDRAM Controller	—																	
	DRAM Controller	Yes																	
	Host Interface	—																	
Clock	Clock Generation Circuit	2 circuits (Main clock, PLL)																	
	PLL	Yes																	
	Subclock	—																	
	RTC	—																	
	Frequency Divider	1/n (n = 1, 2)																	
	Power Save	Clock division/Sleep/Module stop/All module clocks stop/Software standby/Hardware standby																	
A/D Converter	Resolution × Channels	10-bit × 10 (2 units)																	
	Sample and Hold	Yes																	
D/A Converter	Resolution × Channels	8-bit × 2																	
Timer	8-bit	2 (TMR)																	
	16-bit	12 (TPU)																	
	32-bit	—																	
	Input Capture	12 (shared with TPU)																	
	Output Compare	12 (shared with TPU)																	
	PWM Output	12 (shared with TPU)																	
	Real-Time Port	—																	
	Programmable Pulse Generator	16 (shared with DMAC, DTC, TMR, TPU)																	
	Event Counter	14 (shared with TMR, TPU)																	
	2-Phase Encoder Input	12 (shared with TPU)																	
Watchdog Timer		1																	
Serial Interface	Clock Sync./Clock Async.	5																	
I²C-bus		4																	
IEBus		—																	
Smart Card/SIM		5																	
Synchronous Serial Communication Unit/Special Serial I/O		1 (Multiprocessor communication function)																	
CAN	Channels	—																	
	Message Box (Numbers)	—																	
Ethernet		—																	
USB Function		—																	
LPC/ISA		—																	
IrDA		Yes																	
LCD		—																	
CRC Calculation Circuit		—																	
I/O Ports	Input Only (Numbers)	11																	
	CMOS Output Only (Numbers)	—																	
	CMOS I/O (Numbers)	83																	
	High Voltage Port (Numbers)	—																	
	N-Channel Open Drain Port (Numbers)	91																	
	DTMF	—																	
	High Current Drive Port	—																	
	Pull-Up Resistor	40																	
	NMOS Push-Pull	—																	
External Interrupts Pins		9 (NMI, IRQ × 8)																	
Debugging Function	Boundary Scan/JTAG	—																	
	On-Chip Debug	Yes																	
	On-Board Flash Program	Yes																	
Other Functions	ROM Correction Function	—																	
	Others	—																	
Operating Frequency/Supply Voltage		25MHz/2.7 to 3.6V	33MHz/4.5 to 5.5V	33MHz/3.0 to 3.6V	33MHz/4.5 to 5.5V	33MHz/3.0 to 3.6V	25MHz/2.7 to 3.6V	33MHz/4.5 to 5.5V	33MHz/3.0 to 3.6V	33MHz/4.5 to 5.5V	33MHz/3.0 to 3.6V							
Operating Ambient Temperature (°C)		–40 to 85			–20 to 75		–40 to 85			–20 to 75									
Package*2		PLQP0120KA-A	PLQP0120LA-A	PLQP0120KA-A	PLQP0120LA-A	PLQP0120KA-A	PLQP0120LA-A	PLQP0120KA-A	PLQP0120LA-A	PLQP0120KA-A	PLQP0120LA-A	PLQP0120KA-A	PLQP0120LA-A	PLQP0120KA-A	PLQP0120LA-A	PLQP0120KA-A	PLQP0120LA-A	PLQP0120KA-A	PLQP0120LA-A	PLQP0120KA-A	PLQP0120LA-A
Part No.		R4F24258DWFAU*	R4F24258DWFPU*	R4F24258DFAU	R4F24258DFPU	R4F24258DVFAU	R4F24258DVFPU	R4F24258NFAU	R4F24258NFPU	R4F24258NVFAU	R4F24258NVFPU	R4F24259DWFAU*	R4F24259DWFPU*	R4F24259DFAU	R4F24259DFPU	R4F24259DVFAU	R4F24259DVFPU	R4F24259NFAU	R4F24259NFPU	R4F24259NVFAU	R4F24259NVFPU

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8S/2400 Series)

Group		H8S/2426		
Memory	ROM (Bytes)	—		128K
	RAM (Bytes)	48K	64K	48K
	ROM Type*1	L		F
	Program Security	—		Yes
CPU	CPU	H8S/2600 Core		
	Basic Instructions	69		
	Minimum Instruction Execution Time (ns)	30 (@33MHz)		
	Multiplier	16 × 16 → 32		
	Multiply-Accumulate Instruction	16 × 16 + 42 → 42		
DMA	DMAC (Channels)	4		
	EXDMAC	2		
	DTC/DMAC II	DTC		
External Bus Expansion	Address Space (Bytes)	16M		
	Bus State Controller	Direct connection to ROM/SRAM/DRAM is supported		
	Bus Structure	Separate bus (8/16-bit), Multiplex bus		
	SDRAM Controller	—		
	DRAM Controller	Yes		
	Host Interface	—		
Clock	Clock Generation Circuit	2 circuits (Main clock, PLL)		
	PLL	Yes		
	Subclock	—		
	RTC	—		
	Frequency Divider	1/n (n = 1, 2)		
	Power Save	Clock division/Sleep/Module stop/All module clocks stop/Software standby/Hardware standby		
A/D Converter	Resolution × Channels	10-bit × 16 (2 units)		
	Sample and Hold	Yes		
D/A Converter	Resolution × Channels	8-bit × 2		
Timer	8-bit	2 (TMR)		
	16-bit	12 (TPU)		
	32-bit	—		
	Input Capture	12 (shared with TPU)		
	Output Compare	12 (shared with TPU)		
	PWM Output	12 (shared with TPU)		
	Real-Time Port	—		
	Programmable Pulse Generator	16 (shared with DMAC, DTC, TMR, TPU)		
	Event Counter	14 (shared with TMR, TPU)		
	2-Phase Encoder Input	12 (shared with TPU)		
Watchdog Timer		1		
Serial Interface	Clock Sync./Clock Async.	5		
I^2C-bus		4		
IEBus		—		
Smart Card/SIM		5		
Synchronous Serial Communication Unit/Special Serial I/O		1 (Multiprocessor communication function)		
CAN	Channels	—		
	Message Box (Numbers)	—		
Ethernet		—		
USB Function		—		
LPC/ISA		—		
IrDA		Yes		
LCD		—		
CRC Calculation Circuit		—		
I/O Ports	Input Only (Numbers)	18		
	CMOS Output Only (Numbers)	—		
	CMOS I/O (Numbers)	96		
	High Voltage Port (Numbers)	—		
	N-Channel Open Drain Port (Numbers)	91		
	DTMF	—		
	High Current Drive Port	—		
	Pull-Up Resistor	40		
	NMOS Push-Pull	—		
External Interrupts Pins		17 (NMI, IRQ × 16)		
Debugging Function	Boundary Scan/JTAG	—		
	On-Chip Debug	Yes		
	On-Board Flash Program	—		Yes
Other Functions	ROM Correction Function	—		
	Others	—		

Operating Frequency/Supply Voltage	33MHz/4.5 to 5.5V	33MHz/3.0 to 3.6V	33MHz/4.5 to 5.5V	33MHz/3.0 to 3.6V	33MHz/4.5 to 5.5V	33MHz/3.0 to 3.6V	33MHz/4.5 to 5.5V	33MHz/4.5 to 5.5V	33MHz/3.0 to 3.6V	33MHz/4.5 to 5.5V
Operating Ambient Temperature (°C)	–20 to 75	–40 to 85	–20 to 75 / –40 to 85 / –40 to 85	–20 to 75	–40 to 85	–20 to 75 / –40 to 85 / –40 to 85	–20 to 75	–40 to 85	–20 to 75 / –40 to 85 / –20 to 75

Package*2	PLQP0144KA-A	PTLG0145JB-A	PLQP0144KA-A	PTLG0145JB-A	PLQP0144KA-A	PTLG0145JB-A

Part No.	R4S24261NFQV	R4S24261NVFQV	R4S24261DVFQV	R4S24261DFQV	R4S24261DLPV	R4S24261NLPV	R4S24261DVLPV	R4S24261NVLPV	R4S24262NFQV	R4S24262DFQV	R4S24262NVFQV	R4S24262DVFQV	R4S24262DLPV	R4S24262NLPV	R4S24262DVLPV	R4S24262NVLPV	R4F24265NVFQV	R4F24265NFQV	R4F24265DFQV	R4F24265DVFQV	R4F24265DLPV	R4F24265NLPV	R4F24265DVLPV	R4F24265NVLPV

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8S/2400 Series)

Group		H8S/2426															
Memory	ROM (Bytes)	256K															
	RAM (Bytes)	48K										64K					
	ROM Type*1	F															
	Program Security	Yes															
CPU	CPU	H8S/2600 Core															
	Basic Instructions	69															
	Minimum Instruction Execution Time (ns)	30 (@33MHz)															
	Multiplier	16 × 16 → 32															
	Multiply-Accumulate Instruction	16 × 16 + 42 → 42															
DMA	DMAC (Channels)	4															
	EXDMAC	2															
	DTC/DMAC Ⅱ	DTC															
External Bus Expansion	Address Space (Bytes)	16M															
	Bus State Controller	Direct connection to ROM/SRAM/DRAM is supported															
	Bus Structure	Separate bus (8/16-bit), Multiplex bus															
	SDRAM Controller	—															
	DRAM Controller	Yes															
	Host Interface	—															
Clock	Clock Generation Circuit	2 circuits (Main clock, PLL)															
	PLL	Yes															
	Subclock	—															
	RTC	—															
	Frequency Divider	1/n (n = 1, 2)															
	Power Save	Clock division/Sleep/Module stop/All module clocks stop/Software standby/Hardware standby															
A/D Converter	Resolution × Channels	10-bit × 16 (2 units)															
	Sample and Hold	Yes															
D/A Converter	Resolution × Channels	8-bit × 2															
Timer	8-bit	2 (TMR)															
	16-bit	12 (TPU)															
	32-bit	—															
	Input Capture	12 (shared with TPU)															
	Output Compare	12 (shared with TPU)															
	PWM Output	12 (shared with TPU)															
	Real-Time Port	—															
	Programmable Pulse Generator	16 (shared with DMAC, DTC, TMR, TPU)															
	Event Counter	14 (shared with TMR, TPU)															
	2-Phase Encoder Input	12 (shared with TPU)															
Watchdog Timer		1															
Serial Interface	Clock Sync./Clock Async.	5															
I²C-bus		4															
IEBus		—															
Smart Card/SIM		5															
Synchronous Serial Communication Unit/Special Serial I/O		1 (Multiprocessor communication function)															
CAN	Channels	—															
	Message Box (Numbers)	—															
Ethernet		—															
USB Function		—															
LPC/ISA		—															
IrDA		Yes															
LCD		—															
CRC Calculation Circuit		—															
I/O Ports	Input Only (Numbers)	18															
	CMOS Output Only (Numbers)	—															
	CMOS I/O (Numbers)	96															
	High Voltage Port (Numbers)	—															
	N-Channel Open Drain Port (Numbers)	91															
	DTMF	—															
	High Current Drive Port	—															
	Pull-Up Resistor	40															
	NMOS Push-Pull	—															
External Interrupts Pins		17 (NMI, IRQ × 16)															
Debugging Function	Boundary Scan/JTAG	—															
	On-Chip Debug	Yes															
	On-Board Flash Program	Yes															
Other Functions	ROM Correction Function	—															
	Others	—															
Operating Frequency/Supply Voltage		33MHz/4.5 to 5.5V	33MHz/3.0 to 3.6V	33MHz/4.5 to 5.5V	33MHz/3.0 to 3.6V 33MHz/4.5 to 5.5V	33MHz/4.5 to 5.5V						33MHz/3.0 to 3.6V 33MHz/4.5 to 5.5V	33MHz/3.0 to 3.6V	33MHz/4.5 to 5.5V					
Operating Ambient Temperature (°C)		–20 to 75	–40 to 85		–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75
Package*2		PLQP0144KA-A				PTLG0145JB-A				PLQP0144KA-A				PTLG0145JB-A			
Part No.		R4F24268NFQV	R4F24268DVFQV	R4F24268DFQV	R4F24268NVFQV	R4F24268DLPV	R4F24268NLPV	R4F24268DVLPV	R4F24268NVLPV	R4F24269DFQV	R4F24269NVFQV	R4F24269DVFQV	R4F24269NFQV	R4F24269DLPV	R4F24269NLPV	R4F24269DVLPV	R4F24269NVLPV

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8S/2400 Series)

Group		H8S/2426R																	
Memory	ROM (Bytes)	—						128K				256K							
	RAM (Bytes)	48K		64K				48K				64K							
	ROM Type*1	L						F											
	Program Security	—						Yes											
CPU	CPU	H8S/2600 Core																	
	Basic Instructions	69																	
	Minimum Instruction Execution Time (ns)	30 (@33MHz)																	
	Multiplier	16 × 16 → 32																	
	Multiply-Accumulate Instruction	16 × 16 + 42 → 42																	
DMA	DMAC (Channels)	4																	
	EXDMAC	2																	
	DTC/DMAC II	DTC																	
External Bus Expansion	Address Space (Bytes)	16M																	
	Bus State Controller	Direct connection to ROM/SRAM/SDRAM/DRAM is supported																	
	Bus Structure	Separate bus (8/16-bit), Multiplex bus																	
	SDRAM Controller	Yes																	
	DRAM Controller	Yes																	
	Host Interface	—																	
Clock	Clock Generation Circuit	2 circuits (Main clock, PLL)																	
	PLL	Yes																	
	Subclock	—																	
	RTC	—																	
	Frequency Divider	1/n (n = 1, 2)																	
	Power Save	Clock division/Sleep/Module stop/All module clocks stop/Software standby/Hardware standby																	
A/D Converter	Resolution × Channels	10-bit × 16 (2 units)																	
	Sample and Hold	Yes																	
D/A Converter	Resolution × Channels	8-bit × 2																	
Timer	8-bit	2 (TMR)																	
	16-bit	12 (TPU)																	
	32-bit	—																	
	Input Capture	12 (shared with TPU)																	
	Output Compare	12 (shared with TPU)																	
	PWM Output	12 (shared with TPU)																	
	Real-Time Port	—																	
	Programmable Pulse Generator	16 (shared with DMAC, DTC, TMR, TPU)																	
	Event Counter	14 (shared with TMR, TPU)																	
	2-Phase Encoder Input	12 (shared with TPU)																	
Watchdog Timer		1																	
Serial Interface	Clock Sync./Clock Async.	5																	
I²C-bus		4																	
IEBus		—																	
Smart Card/SIM		5																	
Synchronous Serial Communication Unit/Special Serial I/O		1 (Multiprocessor communication function)																	
CAN	Channels	—																	
	Message Box (Numbers)	—																	
Ethernet		—																	
USB Function		—																	
LPC/ISA		—																	
IrDA		Yes																	
LCD		—																	
CRC Calculation Circuit		—																	
I/O Ports	Input Only (Numbers)	18																	
	CMOS Output Only (Numbers)	—																	
	CMOS I/O (Numbers)	96																	
	High Voltage Port (Numbers)	—																	
	N-Channel Open Drain Port (Numbers)	91																	
	DTMF	—																	
	High Current Drive Port	—																	
	Pull-Up Resistor	40																	
	NMOS Push-Pull	—																	
External Interrupts Pins		17 (NMI, IRQ × 16)																	
Debugging Function	Boundary Scan/JTAG	—																	
	On-Chip Debug	Yes																	
	On-Board Flash Program	—						Yes											
Other Functions	ROM Correction Function	—																	
	Others	—																	
Operating Frequency/Supply Voltage		33MHz/3.0 to 3.6V																	
Operating Ambient Temperature (˚C)		–40 to 85		–20 to 75		–40 to 85		–20 to 75		–40 to 85		–20 to 75		–40 to 85		–20 to 75		–40 to 85		–20 to 75	
Package*2		PLQP0144KA-A	PTLG0145JB-A	PLQP0144KA-A	PTLG0145JB-A	PLQP0144KA-A	PTLG0145JB-A	PLQP0144KA-A	PTLG0145JB-A	PLQP0144KA-A	PTLG0145JB-A	PLQP0144KA-A	PTLG0145JB-A	PLQP0144KA-A	PTLG0145JB-A	PLQP0144KA-A	PTLG0145JB-A	PLQP0144KA-A	PTLG0145JB-A	PLQP0144KA-A	PTLG0145JB-A
Part No.		R4S24261DVRFQV	R4S24261DVRLPV	R4S24261NVRFQV	R4S24261NVRLPV	R4S24262DVRFQV	R4S24262DVRLPV	R4S24262NVRFQV	R4S24262NVRLPV	R4F24265DVRFQV	R4F24265DVRLPV	R4F24265NVRFQV	R4F24265NVRLPV	R4F24268DVRFQV	R4F24268DVRLPV	R4F24268NVRFQV	R4F24268NVRLPV	R4F24269DVRFQV	R4F24269DVRLPV	R4F24269NVRFQV	R4F24269NVRLPV

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8S/2400 Series)

Group		H8S/2427																	
Memory	ROM (Bytes)	384K																	
	RAM (Bytes)	48K						64K											
	ROM Type*1	F																	
	Program Security	Yes																	
CPU	CPU	H8S/2600 Core																	
	Basic Instructions	69																	
	Minimum Instruction Execution Time (ns)	30 (@33MHz)																	
	Multiplier	16 × 16 → 32																	
	Multiply-Accumulate Instruction	16 × 16 + 42 → 42																	
DMA	DMAC (Channels)	4																	
	EXDMAC	2																	
	DTC/DMAC II	DTC																	
External Bus Expansion	Address Space (Bytes)	16M																	
	Bus State Controller	Direct connection to ROM/SRAM/DRAM is supported																	
	Bus Structure	Separate bus (8/16-bit), Multiplex bus																	
	SDRAM Controller	—																	
	DRAM Controller	Yes																	
	Host Interface	—																	
Clock	Clock Generation Circuit	2 circuits (Main clock, PLL)																	
	PLL	Yes																	
	Subclock	—																	
	RTC	—																	
	Frequency Divider	1/n (n = 1, 2)																	
	Power Save	Clock division/Sleep/Module stop/All module clocks stop/Software standby/Hardware standby																	
A/D Converter	Resolution × Channels	10-bit × 16 (2 units)																	
	Sample and Hold	Yes																	
D/A Converter	Resolution × Channels	8-bit × 2																	
Timer	8-bit	2 (TMR)																	
	16-bit	12 (TPU)																	
	32-bit	—																	
	Input Capture	12 (shared with TPU)																	
	Output Compare	12 (shared with TPU)																	
	PWM Output	12 (shared with TPU)																	
	Real-Time Port	—																	
	Programmable Pulse Generator	16 (shared with DMAC, DTC, TMR, TPU)																	
	Event Counter	14 (shared with TMR, TPU)																	
	2-Phase Encoder Input	12 (shared with TPU)																	
Watchdog Timer		1																	
Serial Interface	Clock Sync./Clock Async.	5																	
I^2C-bus		4																	
IEBus		—																	
Smart Card/SIM		5																	
Synchronous Serial Communication Unit/Special Serial I/O		1 (Multiprocessor communication function)																	
CAN	Channels	—																	
	Message Box (Numbers)	—																	
Ethernet		—																	
USB Function		—																	
LPC/ISA		—																	
IrDA		Yes																	
LCD		—																	
CRC Calculation Circuit		—																	
I/O Ports	Input Only (Numbers)	18																	
	CMOS Output Only (Numbers)	—																	
	CMOS I/O (Numbers)	96																	
	High Voltage Port (Numbers)	—																	
	N-Channel Open Drain Port (Numbers)	91																	
	DTMF	—																	
	High Current Drive Port	—																	
	Pull-Up Resistor	40																	
	NMOS Push-Pull	—																	
External Interrupts Pins		17 (NMI, IRQ × 16)																	
Debugging Function	Boundary Scan/JTAG	—																	
	On-Chip Debug	Yes																	
	On-Board Flash Program	Yes																	
Other Functions	ROM Correction Function	—																	
	Others	—																	
Operating Frequency/Supply Voltage		25MHz/2.7 to 3.6V		33MHz/4.5 to 5.5V		33MHz/3.0 to 3.6V		33MHz/4.5 to 5.5V		33MHz/3.0 to 3.6V		25MHz/2.7 to 3.6V		33MHz/4.5 to 5.5V		33MHz/3.0 to 3.6V		33MHz/4.5 to 5.5V		33MHz/3.0 to 3.6V	
Operating Ambient Temperature (°C)		–40 to 85						–20 to 75				–40 to 85						–20 to 75			
Package*2		PLQP0144KA-A	PTLG0145JB-A	PLQP0144KA-A	PTLG0145JB-A	PLQP0144KA-A	PTLG0145JB-A	PLQP0144KA-A	PTLG0145JB-A	PLQP0144KA-A	PTLG0145JB-A	PLQP0144KA-A	PTLG0145JB-A	PLQP0144KA-A	PTLG0145JB-A	PLQP0144KA-A	PTLG0145JB-A	PLQP0144KA-A	PTLG0145JB-A	PLQP0144KA-A	PTLG0145JB-A
Part No.		R4F24275DWFQU*	R4F24275DWLPV*	R4F24275DFQU	R4F24275DLPV	R4F24275DVFQU	R4F24275DVLPV	R4F24275NFQU	R4F24275NLPV	R4F24275NVFQU	R4F24275NVLPV	R4F24276DWFQU*	R4F24276DWLPV*	R4F24276DFQU	R4F24276DLPV	R4F24276DVFQU	R4F24276DVLPV	R4F24276NFQU	R4F24276NLPV	R4F24276NVFQU	R4F24276NVLPV

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8S/2400 Series)

Group		H8S/2427																	
Memory	ROM (Bytes)	512K																	
	RAM (Bytes)	48K						64K											
	ROM Type*1	F																	
	Program Security	Yes																	
CPU	CPU	H8S/2600 Core																	
	Basic Instructions	69																	
	Minimum Instruction Execution Time (ns)	30 (@33MHz)																	
	Multiplier	16 × 16 → 32																	
	Multiply-Accumulate Instruction	16 × 16 + 42 → 42																	
DMA	DMAC (Channels)	4																	
	EXDMAC	2																	
	DTC/DMAC II	DTC																	
External Bus Expansion	Address Space (Bytes)	16M																	
	Bus State Controller	Direct connection to ROM/SRAM/DRAM is supported																	
	Bus Structure	Separate bus (8/16-bit), Multiplex bus																	
	SDRAM Controller	—																	
	DRAM Controller	Yes																	
	Host Interface	—																	
Clock	Clock Generation Circuit	2 circuits (Main clock, PLL)																	
	PLL	Yes																	
	Subclock	—																	
	RTC	—																	
	Frequency Divider	1/n (n = 1, 2)																	
	Power Save	Clock division/Sleep/Module stop/All module clocks stop/Software standby/Hardware standby																	
A/D Converter	Resolution × Channels	10-bit × 16 (2 units)																	
	Sample and Hold	Yes																	
D/A Converter	Resolution × Channels	8-bit × 2																	
Timer	8-bit	2 (TMR)																	
	16-bit	12 (TPU)																	
	32-bit	—																	
	Input Capture	12 (shared with TPU)																	
	Output Compare	12 (shared with TPU)																	
	PWM Output	12 (shared with TPU)																	
	Real-Time Port	—																	
	Programmable Pulse Generator	16 (shared with DMAC, DTC, TMR, TPU)																	
	Event Counter	14 (shared with TMR, TPU)																	
	2-Phase Encoder Input	12 (shared with TPU)																	
Watchdog Timer		1																	
Serial Interface	Clock Sync./Clock Async.	5																	
I²C-bus		4																	
IEBus		—																	
Smart Card/SIM		5																	
Synchronous Serial Communication Unit/Special Serial I/O		1 (Multiprocessor communication function)																	
CAN	Channels	—																	
	Message Box (Numbers)	—																	
Ethernet		—																	
USB Function		—																	
LPC/ISA		—																	
IrDA		Yes																	
LCD		—																	
CRC Calculation Circuit		—																	
I/O Ports	Input Only (Numbers)	18																	
	CMOS Output Only (Numbers)	—																	
	CMOS I/O (Numbers)	96																	
	High Voltage Port (Numbers)	—																	
	N-Channel Open Drain Port (Numbers)	91																	
	DTMF	—																	
	High Current Drive Port	—																	
	Pull-Up Resistor	40																	
	NMOS Push-Pull	—																	
External Interrupts Pins		17 (NMI, IRQ × 16)																	
Debugging Function	Boundary Scan/JTAG	—																	
	On-Chip Debug	Yes																	
	On-Board Flash Program	Yes																	
Other Functions	ROM Correction Function	—																	
	Others	—																	
Operating Frequency/Supply Voltage		25MHz/2.7 to 3.6V		33MHz/4.5 to 5.5V		33MHz/3.0 to 3.6V		33MHz/4.5 to 5.5V		33MHz/3.0 to 3.6V		25MHz/2.7 to 3.6V		33MHz/4.5 to 5.5V		33MHz/3.0 to 3.6V		33MHz/4.5 to 5.5V		33MHz/3.0 to 3.6V	
Operating Ambient Temperature (˚C)		–40 to 85						–20 to 75				–40 to 85						–20 to 75			
Package*2		PLQP0144KA-A	PTLG0145JB-A	PLQP0144KA-A	PTLG0145JB-A	PLQP0144KA-A	PTLG0145JB-A	PLQP0144KA-A	PTLG0145JB-A	PLQP0144KA-A	PTLG0145JB-A	PLQP0144KA-A	PTLG0145JB-A	PLQP0144KA-A	PTLG0145JB-A	PLQP0144KA-A	PTLG0145JB-A	PLQP0144KA-A	PTLG0145JB-A	PLQP0144KA-A	PTLG0145JB-A
Part No.		R4F24278DWFQU*	R4F24278DWLPV*	R4F24278DFQU	R4F24278DLPV	R4F24278DVFQU	R4F24278DVLPV	R4F24278NFQU	R4F24278NLPV	R4F24278NVFQU	R4F24278NVLPV	R4F24279DWFQU*	R4F24279DWLPV*	R4F24279DFQU	R4F24279DLPV	R4F24279DVFQU	R4F24279DVLPV	R4F24279NFQU	R4F24279NLPV	R4F24279NVFQU	R4F24279NVLPV

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8S/2400 Series)

Group		H8S/2427R																							
Memory	ROM (Bytes)	384K										512K													
	RAM (Bytes)	48K				64K						48K				64K									
	ROM Type*1	F																							
	Program Security	Yes																							
CPU	CPU	H8S/2600 Core																							
	Basic Instructions	69																							
	Minimum Instruction Execution Time (ns)	30 (@33MHz)																							
	Multiplier	16 × 16 → 32																							
	Multiply-Accumulate Instruction	16 × 16 + 42 → 42																							
DMA	DMAC (Channels)	4																							
	EXDMAC	2																							
	DTC/DMAC Ⅱ	DTC																							
External Bus Expansion	Address Space (Bytes)	16M																							
	Bus State Controller	Direct connection to ROM/SRAM/SDRAM/DRAM is supported																							
	Bus Structure	Separate bus (8/16-bit), Multiplex bus																							
	SDRAM Controller	Yes																							
	DRAM Controller	Yes																							
	Host Interface	—																							
Clock	Clock Generation Circuit	2 circuits (Main clock, PLL)																							
	PLL	Yes																							
	Subclock	—																							
	RTC	—																							
	Frequency Divider	1/n (n = 1, 2)																							
	Power Save	Clock division/Sleep/Module stop/All module clocks stop/Software standby/Hardware standby																							
A/D Converter	Resolution × Channels	10-bit × 16 (2 units)																							
	Sample and Hold	Yes																							
D/A Converter	Resolution × Channels	8-bit × 2																							
Timer	8-bit	2 (TMR)																							
	16-bit	12 (TPU)																							
	32-bit	—																							
	Input Capture	12 (shared with TPU)																							
	Output Compare	12 (shared with TPU)																							
	PWM Output	12 (shared with TPU)																							
	Real-Time Port	—																							
	Programmable Pulse Generator	16 (shared with DMAC, DTC, TMR, TPU)																							
	Event Counter	14 (shared with TMR, TPU)																							
	2-Phase Encoder Input	12 (shared with TPU)																							
Watchdog Timer		1																							
Serial Interface	Clock Sync./Clock Async.	5																							
I²C-bus		4																							
IEBus		—																							
Smart Card/SIM		5																							
Synchronous Serial Communication Unit/Special Serial I/O		1 (Multiprocessor communication function)																							
CAN	Channels	—																							
	Message Box (Numbers)	—																							
Ethernet		—																							
USB Function		—																							
LPC/ISA		—																							
IrDA		Yes																							
LCD		—																							
CRC Calculation Circuit		—																							
I/O Ports	Input Only (Numbers)	18																							
	CMOS Output Only (Numbers)	—																							
	CMOS I/O (Numbers)	96																							
	High Voltage Port (Numbers)	—																							
	N-Channel Open Drain Port (Numbers)	91																							
	DTMF	—																							
	High Current Drive Port	—																							
	Pull-Up Resistor	40																							
	NMOS Push-Pull	—																							
External Interrupts Pins		17 (NMI, IRQ × 16)																							
Debugging Function	Boundary Scan/JTAG	—																							
	On-Chip Debug	Yes																							
	On-Board Flash Program	Yes																							
Other Functions	ROM Correction Function	—																							
	Others	—																							
Operating Frequency/Supply Voltage		25MHz/2.7 to 3.6V		33MHz/3.0 to 3.6V				25MHz/2.7 to 3.6V		33MHz/3.0 to 3.6V				25MHz/2.7 to 3.6V		33MHz/3.0 to 3.6V				25MHz/2.7 to 3.6V		33MHz/3.0 to 3.6V			
Operating Ambient Temperature (˚C)		–40 to 85				–20 to 75		–40 to 85				–20 to 75		–40 to 85				–20 to 75		–40 to 85				–20 to 75	
Package*2		PLQP0144KA-A	PTLG0145JB-A	PLQP0144KA-A	PTLG0145JB-A	PLQP0144KA-A	PTLG0145JB-A	PLQP0144KA-A	PTLG0145JB-A	PLQP0144KA-A	PTLG0145JB-A	PLQP0144KA-A	PTLG0145JB-A	PLQP0144KA-A	PTLG0145JB-A	PLQP0144KA-A	PTLG0145JB-A	PLQP0144KA-A	PTLG0145JB-A	PLQP0144KA-A	PTLG0145JB-A	PLQP0144KA-A	PTLG0145JB-A	PLQP0144KA-A	PTLG0145JB-A
Part No.		R4F24275DWRFQU*	R4F24275DWRLPV*	R4F24275DVRFQU	R4F24275DVRLPV	R4F24275NVRFQU	R4F24275NVRLPV	R4F24276DWRFQU*	R4F24276DWRLPV*	R4F24276DVRFQU	R4F24276DVRLPV	R4F24276NVRFQU	R4F24276NVRLPV	R4F24278DWRFQU*	R4F24278DWRLPV*	R4F24278DVRFQU	R4F24278DVRLPV	R4F24278NVRFQU	R4F24278NVRLPV	R4F24279DWRFQU*	R4F24279DWRLPV*	R4F24279DVRFQU	R4F24279DVRLPV	R4F24279NVRFQU	R4F24279NVRLPV

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8S/2400 Series)

Group		H8S/2462		H8S/2463	
Memory	ROM (Bytes)	512K			
	RAM (Bytes)	40K			
	ROM Type*1	F			
	Program Security	Yes (H/W Protect, S/W Protect, Error Protect)			
CPU	CPU	H8S/2600 Core			
	Basic Instructions	69			
	Minimum Instruction Execution Time (ns)	29 (@34MHz)			
	Multiplier	16 × 16 → 32			
	Multiply-Accumulate Instruction	16 × 16 + 42 → 42			
DMA	DMAC (Channels)	—			
	EXDMAC	—			
	DTC/DMAC Ⅱ	DTC			
External Bus Expansion	Address Space (Bytes)	16M			
	Bus State Controller	Direct connection to SRAM/ROM is supported			
	Bus Structure	Separate bus (8/16-bit)			
	SDRAM Controller	—			
	DRAM Controller	—			
	Host Interface	—			
Clock	Clock Generation Circuit	1 circuit (Main clock)			
	PLL	Yes (× 4)			
	Subclock	Yes			
	RTC	—			
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16, 32)			
	Power Save	Normal operating/Medium-speed/Sleep/Module stop/Software standby/Hardware standby			
A/D Converter	Resolution × Channels	10-bit × 8			
	Multi-Channel Sample and Hold	Yes			
D/A Converter	Resolution × Channels	—			
Timer	8-bit	4 (TMR)			
	16-bit	1 (Free run)			
	32-bit	—			
	Input Capture	—			
	Output Compare	—			
	PWM Output	4 (PWM)			
	Real-Time Port	—			
	Programmable Pulse Generator	—			
	Event Counter	—			
	2-Phase Encoder Input	—			
Watchdog Timer		2			
Serial Interface	Clock Sync./Clock Async.	3			
I^2C-bus		6			
IEBus		—			
Smart Card/SIM		2			
Synchronous Serial Communication Unit/Special Serial I/O		1 (SSU)			
CAN	Channels	—			
	Message Box (Numbers)	—			
Ethernet		1			
USB Function		—			
LPC/ISA		Yes (LPC)			
IrDA		—			
LCD		—			
CRC Calculation Circuit		1 ($X^8 + X^2 + X^1 + 1$, $X^{16} + X^{15} + X^2 + 1$, $X^{16} + X^{12} + X^5 + 1$)			
I/O Ports	Input Only (Numbers)	9			
	CMOS Output Only (Numbers)	—			
	CMOS I/O (Numbers)	106			
	High Voltage Port (Numbers)	—			
	N-Channel Open Drain Port (Numbers)	—			
	DTMF	—			
	High Current Drive Port	8			
	Pull-Up Resistor	54			
	NMOS Push-Pull	—		12	
External Interrupts Pins		33			
Debugging Function	Boundary Scan/JTAG	Yes			
	On-Chip Debug	Yes			
	On-Board Flash Program	Yes			
Other Functions	ROM Correction Function	—			
	Others	14-bit PWM Timer (× 4) PECI		14-bit PWM Timer (× 4)	
Operating Frequency/Supply Voltage		34MHz/3.0 to 3.6V			
Operating Ambient Temperature (˚C)		–40 to 85	–20 to 75	–40 to 85	–20 to 75
Package*2		PLQP0144KA-A		PTQP0144LC-A	
Part No.		R4F2462VFQ34DV	R4F2462VFQ34V	R4F2463VTE34DV	R4F2463VTE34V

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

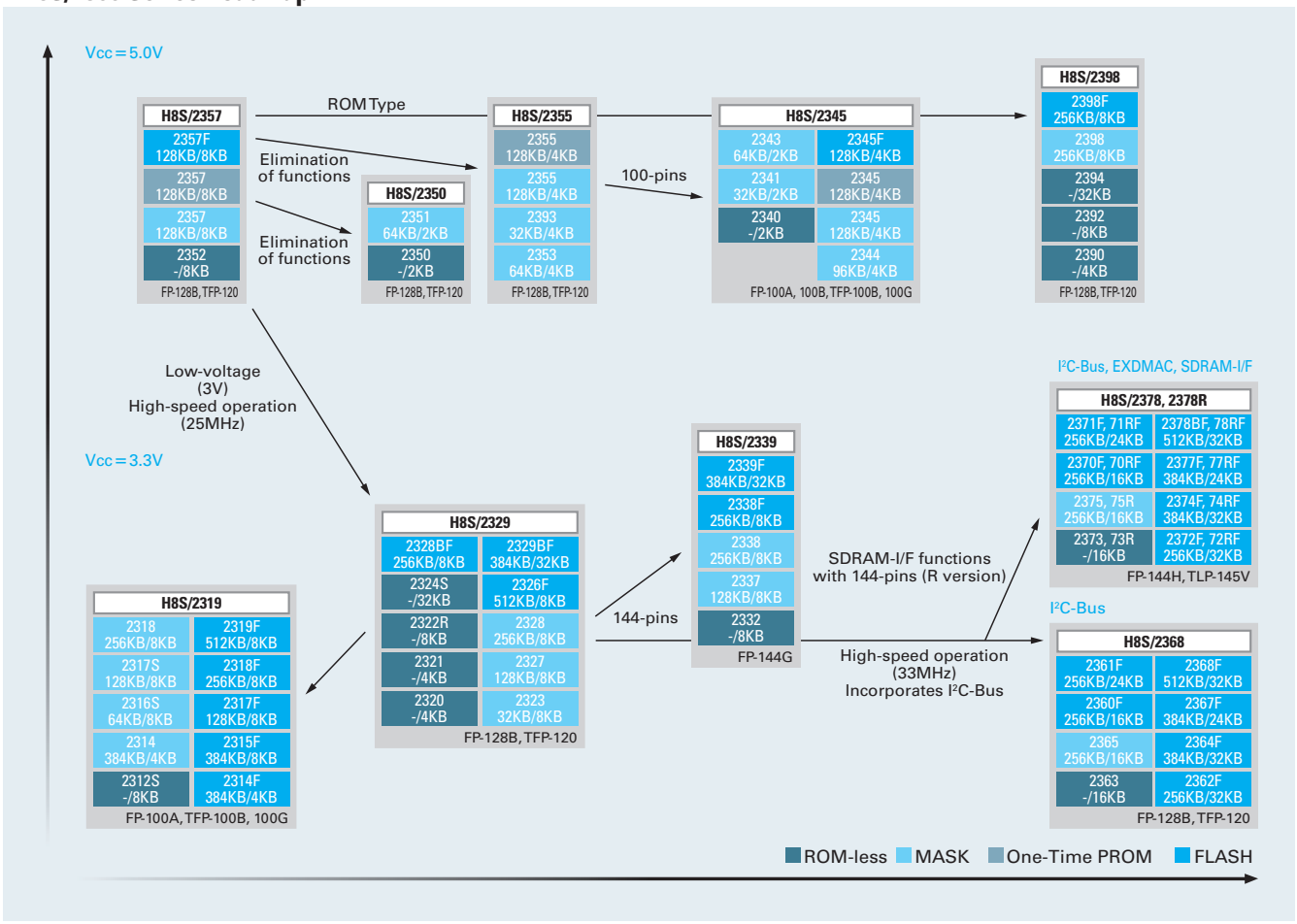
Outline of H8S/2300 Series

Standard series of the H8S family, optimal for a wide range of fields

H8S/2300 Series Features

- A lineup of the world's fastest 16-bit CPUs (28.6ns@35 MHz: H8S/2378 Group)
- General purpose series optimal for a wide range of fields and incorporating SDRAM I/F, with an extensive lineup of memory options ranging from 32KB/2KB to 512KB/32KB for the smallest package (TLP-112:8mm) in the H8S family

• H8S/2300 Series Roadmap



H8S/2319 Group

- 512K bytes, 384K bytes, 256K bytes, or 128K bytes of 3.3V single power supply on-chip flash memory
- Versions are pin-compatible with the H8S/2345 groups (H8S/2319 has EMLE pin)
- Low-voltage, high-speed operation (25MHz, 3.3V)
- On-chip debug functions (H8S/2319EF)

H8S/2329 Group

- 512K bytes, 384K bytes, or 256K bytes of 3.3V single power supply on-chip flash memory
- Versions that are pin-compatible with the H8S/2357 groups (H8S/2329 has EMLE pin)
- Low-voltage, high-speed operation (25MHz, 3.3V)
- On-chip debug functions (H8S/2329EF)

H8S/2339 Group

- 384K bytes or 256K bytes of 3.3V single power supply on-chip flash memory
- High-pin-count (144-pin) package
- Low-voltage, high-speed operation (25MHz, 3.3V)
- On-chip debug functions (H8S/2339EF)

H8S/2345 Group

- H8S/2355 group 100-pin version
- On-chip high-functionality timers, A/D converter and D/A converter

H8S/2350 Group

- 5V ROM-less version
- H8S standard 120- and 128-pin versions
- High-speed operation (20MHz, 5V)

H8S/2355, H8S/2357 Group

- 128K bytes of 5V single power supply on-chip flash memory (H8S/2357F)
- H8S standard 120- and 128-pin versions
- High-speed operation (20MHz, 5V)

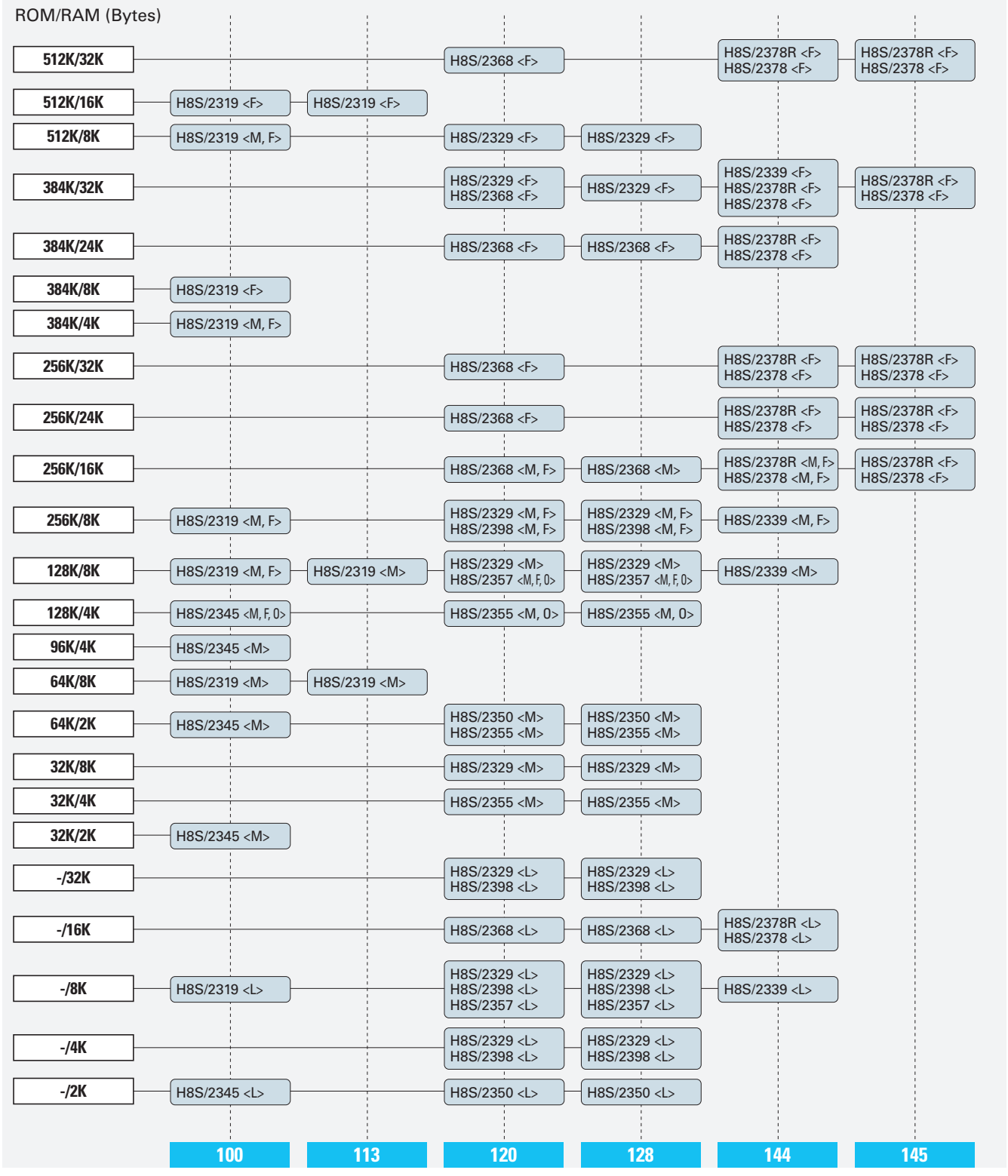
H8S/2378, H8S/2378R, H8S/2368 Group

- 384K bytes of 3.3V single power supply on-chip flash memory
- Low-voltage, high-speed operation (33MHz, 3.3V)
- Improved peripheral functions: 5-channel serial I/O (I^2C-bus × 2 channels), 16-channel A/D converter, etc.
- On-chip debug functions (Except H8S/2363, H8S/2373, H8S/2373R)
- On-chip SDRAM interface (H8S/2378R Group only)

H8S/2398 Group

- 256K bytes of 5V single power supply on-chip flash memory (H8S/2398F)
- 5V ROM-less versions (H8S/2390, H8S/2392, H8S/2394)
- High-speed operation (20MHz, 5V, internal operation at 3.3V)
- Versions that are pin-compatible with H8S/2350 and H8S/2357 groups (H8S/2398 group has VCL internal voltage pull-down pin)

• Memory Capacity (ROM/RAM) (H8S/2300 Series)



Letters in brackets < > indicate memory variations.
F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

• Specifications (H8S/2300 Series)

Group		H8S/2319			
Memory	ROM (Bytes)	—	64K	128K	
	RAM (Bytes)	8K			
	ROM Type*1	L	M	F	M
	Program Security	—		Yes	—
CPU	CPU	H8S/2000 Core			
	Basic Instructions	65			
	Minimum Instruction Execution Time (ns)	40 (@25MHz)			
	Multiplier	—			
	Multiply-Accumulate Instruction	—			
DMA	DMAC (Channels)	—			
	EXDMAC	—			
	DTC/DMAC II	DTC			
External Bus Expansion	Address Space (Bytes)	16M			
	Bus State Controller	Direct connection to ROM/SRAM is supported			
	Bus Structure	Separate bus (8/16-bit)			
	SDRAM Controller	—			
	DRAM Controller	—			
	Host Interface	—			
Clock	Clock Generation Circuit	1 circuit (Main clock)			
	PLL	—			
	Subclock	—			
	RTC	—			
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16, 32)			
	Power Save	Medium-speed/Sleep/Module stop/Software standby/Hardware standby			
A/D Converter	Resolution × Channels	10-bit × 8			
	Sample and Hold	Yes			
D/A Converter	Resolution × Channels	8-bit × 2			
Timer	8-bit	2 (TMR)			
	16-bit	6 (TPU)			
	32-bit	—			
	Input Capture	6 (shared with TPU)			
	Output Compare	6 (shared with TPU)			
	PWM Output	6 (shared with TPU)			
	Real-Time Port	—			
	Programmable Pulse Generator	—			
	Event Counter	8 (shared with TMR, TPU)			
	2-Phase Encoder Input	6 (shared with TPU)			
Watchdog Timer		1			
Serial Interface	Clock Sync./Clock Async.	2			
I²C-bus		—			
IEBus		—			
Smart Card/SIM		2			
Synchronous Serial Communication Unit/Special Serial I/O		1 (Multiprocessor communication function)			
CAN	Channels	—			
	Message Box (Numbers)	—			
Ethernet		—			
USB Function		—			
LPC/ISA		—			
IrDA		—			
LCD		—			
CRC Calculation Circuit		—			
I/O Ports	Input Only (Numbers)	9			
	CMOS Output Only (Numbers)	—			
	CMOS I/O (Numbers)	70			
	High Voltage Port (Numbers)	—			
	N-Channel Open Drain Port (Numbers)	10			
	DTMF	—			
	High Current Drive Port	—			
	Pull-Up Resistor	36			
	NMOS Push-Pull	—			
External Interrupts Pins		9 (NMI, IRQ × 8)			
Debugging Function	Boundary Scan/JTAG	—			
	On-Chip Debug	—			
	On-Board Flash Program	—		Yes	—
Other Functions	ROM Correction Function	—			
	Others	—			

Operating Frequency/Supply Voltage	20MHz/ 2.7 to 3.6V	25MHz/ 3.0 to 3.6V	20MHz/ 2.7 to 3.6V	25MHz/ 3.0 to 3.6V	25MHz/3.0 to 3.6V, 20MHz/2.7 to 3.6V	25MHz/3.0 to 3.6V	25MHz/3.0 to 3.6V, 20MHz/2.7 to 3.6V
Operating Ambient Temperature (°C)	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85
Package*2	PRQP0100JE-B		PTQP0100KA-A		PRQP0100JE-B	PTLG0113JA-A	PTQP0100KA-A	PTQP0100LC-A	PRQP0100JE-B	PTQP0100KA-A	PRQP0100JE-B	PTLG0113JA-A	PTQP0100KA-A	PTQP0100LC-A													
Part No.	HD6412312SVF20IV	HD6412312SVF20V	HD6412312SVF25IV	HD6412312SVF25V	HD6412312SVTE20IV	HD6412312SVTE20V	HD6412312SVTE25IV	HD6412312SVTE25V	HD6432316SXXXF	HD6432316SXXXFW	HD6432316SXXXLP	HD6432316SXXXLPW	HD6432316SXXXTE	HD6432316SXXXTEW	HD6432316SXXXTF	HD6432316SXXXTFW	HD64F2317VF25IV	HD64F2317VF25V	HD64F2317VTE25IV	HD64F2317VTE25V	HD6432317SXXXF	HD6432317SXXXFW	HD6432317SXXXLP	HD6432317SXXXLPW	HD6432317SXXXTE	HD6432317SXXXTEW	HD6432317SXXXTF	HD6432317SXXXTFW

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8S/2300 Series)

<table>
<tr><th colspan="2">Group</th><th colspan="27">H8S/2319</th></tr>
<tr><td rowspan="4">Memory</td><td>ROM (Bytes)</td><td colspan="4">256K</td><td colspan="8">384K</td><td colspan="15">512K</td></tr>
<tr><td>RAM (Bytes)</td><td colspan="4">8K</td><td colspan="4">4K</td><td colspan="14">8K</td><td colspan="5">16K</td></tr>
<tr><td>ROM Type*1</td><td colspan="6">F</td><td colspan="2">M</td><td colspan="12">F</td><td colspan="2">M</td><td colspan="5">F</td></tr>
<tr><td>Program Security</td><td colspan="6">Yes</td><td colspan="2">—</td><td colspan="12">Yes</td><td colspan="2">—</td><td colspan="5">Yes</td></tr>
<tr><td rowspan="5">CPU</td><td>CPU</td><td colspan="27">H8S/2000 Core</td></tr>
<tr><td>Basic Instructions</td><td colspan="27">65</td></tr>
<tr><td>Minimum Instruction Execution Time (ns)</td><td colspan="27">40 (@25MHz)</td></tr>
<tr><td>Multiplier</td><td colspan="27">—</td></tr>
<tr><td>Multiply-Accumulate Instruction</td><td colspan="27">—</td></tr>
<tr><td rowspan="3">DMA</td><td>DMAC (Channels)</td><td colspan="27">—</td></tr>
<tr><td>EXDMAC</td><td colspan="27">—</td></tr>
<tr><td>DTC/DMAC II</td><td colspan="27">DTC</td></tr>
<tr><td rowspan="6">External Bus Expansion</td><td>Address Space (Bytes)</td><td colspan="27">16M</td></tr>
<tr><td>Bus State Controller</td><td colspan="27">Direct connection to ROM/SRAM is supported</td></tr>
<tr><td>Bus Structure</td><td colspan="27">Separate bus (8/16-bit)</td></tr>
<tr><td>SDRAM Controller</td><td colspan="27">—</td></tr>
<tr><td>DRAM Controller</td><td colspan="27">—</td></tr>
<tr><td>Host Interface</td><td colspan="27">—</td></tr>
<tr><td rowspan="6">Clock</td><td>Clock Generation Circuit</td><td colspan="27">1 circuit (Main clock)</td></tr>
<tr><td>PLL</td><td colspan="27">—</td></tr>
<tr><td>Subclock</td><td colspan="27">—</td></tr>
<tr><td>RTC</td><td colspan="27">—</td></tr>
<tr><td>Frequency Divider</td><td colspan="27">1/n (n = 1, 2, 4, 8, 16, 32)</td></tr>
<tr><td>Power Save</td><td colspan="27">Medium-speed/Sleep/Module stop/Software standby/Hardware standby</td></tr>
<tr><td rowspan="2">A/D Converter</td><td>Resolution × Channels</td><td colspan="27">10-bit × 8</td></tr>
<tr><td>Sample and Hold</td><td colspan="27">Yes</td></tr>
<tr><td>D/A Converter</td><td>Resolution × Channels</td><td colspan="27">8-bit × 2</td></tr>
<tr><td rowspan="10">Timer</td><td>8-bit</td><td colspan="27">2 (TMR)</td></tr>
<tr><td>16-bit</td><td colspan="27">6 (TPU)</td></tr>
<tr><td>32-bit</td><td colspan="27">—</td></tr>
<tr><td>Input Capture</td><td colspan="27">6 (shared with TPU)</td></tr>
<tr><td>Output Compare</td><td colspan="27">6 (shared with TPU)</td></tr>
<tr><td>PWM Output</td><td colspan="27">6 (shared with TPU)</td></tr>
<tr><td>Real-Time Port</td><td colspan="27">—</td></tr>
<tr><td>Programmable Pulse Generator</td><td colspan="27">—</td></tr>
<tr><td>Event Counter</td><td colspan="27">8 (shared with TMR, TPU)</td></tr>
<tr><td>2-Phase Encoder Input</td><td colspan="27">6 (shared with TPU)</td></tr>
<tr><td colspan="2">Watchdog Timer</td><td colspan="27">1</td></tr>
<tr><td>Serial Interface</td><td>Clock Sync./Clock Async.</td><td colspan="27">2</td></tr>
<tr><td colspan="2">I²C-bus</td><td colspan="27">—</td></tr>
<tr><td colspan="2">IEBus</td><td colspan="27">—</td></tr>
<tr><td colspan="2">Smart Card/SIM</td><td colspan="27">2</td></tr>
<tr><td colspan="2">Synchronous Serial Communication Unit/Special Serial I/O</td><td colspan="27">1 (Multiprocessor communication function)</td></tr>
<tr><td rowspan="2">CAN</td><td>Channels</td><td colspan="27">—</td></tr>
<tr><td>Message Box (Numbers)</td><td colspan="27">—</td></tr>
<tr><td colspan="2">Ethernet</td><td colspan="27">—</td></tr>
<tr><td colspan="2">USB Function</td><td colspan="27">—</td></tr>
<tr><td colspan="2">LPC/ISA</td><td colspan="27">—</td></tr>
<tr><td colspan="2">IrDA</td><td colspan="27">—</td></tr>
<tr><td colspan="2">LCD</td><td colspan="27">—</td></tr>
<tr><td colspan="2">CRC Calculation Circuit</td><td colspan="27">—</td></tr>
<tr><td rowspan="9">I/O Ports</td><td>Input Only (Numbers)</td><td colspan="27">9</td></tr>
<tr><td>CMOS Output Only (Numbers)</td><td colspan="27">—</td></tr>
<tr><td>CMOS I/O (Numbers)</td><td colspan="27">70</td></tr>
<tr><td>High Voltage Port (Numbers)</td><td colspan="27">—</td></tr>
<tr><td>N-Channel Open Drain Port (Numbers)</td><td colspan="27">10</td></tr>
<tr><td>DTMF</td><td colspan="27">—</td></tr>
<tr><td>High Current Drive Port</td><td colspan="27">—</td></tr>
<tr><td>Pull-Up Resistor</td><td colspan="27">36</td></tr>
<tr><td>NMOS Push-Pull</td><td colspan="27">—</td></tr>
<tr><td colspan="2">External Interrupts Pins</td><td colspan="27">9 (NMI, IRQ × 8)</td></tr>
<tr><td rowspan="3">Debugging Function</td><td>Boundary Scan/JTAG</td><td colspan="27">—</td></tr>
<tr><td>On-Chip Debug</td><td colspan="12">—</td><td colspan="4">Yes</td><td colspan="11">—</td></tr>
<tr><td>On-Board Flash Program</td><td colspan="6">Yes</td><td colspan="2">—</td><td colspan="12">Yes</td><td colspan="2">—</td><td colspan="5">Yes</td></tr>
<tr><td rowspan="2">Other Functions</td><td>ROM Correction Function</td><td colspan="27">—</td></tr>
<tr><td>Others</td><td colspan="27">—</td></tr>
<tr><td colspan="2">Operating Frequency/Supply Voltage</td><td colspan="6">25MHz/3.0 to 3.6V</td><td colspan="2">25MHz/3.0 to 3.6V, 20MHz/2.7 to 3.6V</td><td colspan="12">25MHz/3.0 to 3.6V</td><td colspan="2">25MHz/3.0 to 3.6V, 20MHz/2.7 to 3.6V</td><td colspan="5">25MHz/3.0 to 3.6V</td></tr>
<tr><td colspan="2">Operating Ambient Temperature (˚C)</td><td>–40 to 85</td><td>–20 to 75</td><td>–40 to 85</td><td colspan="5">–20 to 75</td><td>–40 to 85</td><td>–20 to 75</td><td>–40 to 85</td><td colspan="2">–20 to 75</td><td>–40 to 85</td><td>–20 to 75</td><td>–40 to 85</td><td>–20 to 75</td><td>–40 to 85</td><td>–20 to 75</td><td>–40 to 85</td><td colspan="2">–20 to 75, –40 to 85</td><td>–20 to 75</td><td>–40 to 85</td><td colspan="2">–20 to 75</td><td>–40 to 85</td></tr>
<tr><td colspan="2">Package*2</td><td colspan="2">PRQP0100JE-B</td><td colspan="2">PTQP0100KA-A</td><td>PRQP0100JE-B</td><td colspan="2">PTQP0100KA-A</td><td colspan="3">PRQP0100JE-B</td><td colspan="2">PTQP0100KA-A</td><td colspan="2">PRQP0100JE-B</td><td colspan="2">PTQP0100KA-A</td><td colspan="2">PRQP0100JE-B</td><td colspan="2">PTQP0100KA-A</td><td>PRQP0100JE-B</td><td>PTQP0100KA-A</td><td colspan="2">PRQP0100JE-B</td><td>PTLG0113JA-A</td><td colspan="2">PTQP0100KA-A</td></tr>
<tr><td colspan="2">Part No.</td><td>HD64F2318VF25IV</td><td>HD64F2318VF25V</td><td>HD64F2318VTE25IV</td><td>HD64F2318VTE25V</td><td>HD64F2314VF25</td><td>HD64F2314VTE25</td><td>HD6432314XXXF</td><td>HD6432314XXXTE</td><td>HD64F2315VF25IV</td><td>HD64F2315VF25V</td><td>HD64F2315VTE25IV</td><td>HD64F2315VTE25V</td><td>HD64F2319EVF25V</td><td>HD64F2319EVF25WV</td><td>HD64F2319EVTE25V</td><td>HD64F2319EVTE25WV</td><td>HD64F2319VF25V</td><td>HD64F2319VF25WV</td><td>HD64F2319VTE25V</td><td>HD64F2319VTE25WV</td><td>HD6432319XXXF</td><td>HD6432319XXXTE</td><td>HD64F2319CVF25V</td><td>HD64F2319CVF25WV</td><td>HD64F2319CVLP25V</td><td>HD64F2319CVTE25V</td><td>HD64F2319CVTE25WV</td></tr>
</table>

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8S/2300 Series)

Group		H8S/2329		
Memory	ROM (Bytes)	—		
	RAM (Bytes)	4K		8K
	ROM Type*1	L		
	Program Security	—		
CPU	CPU	H8S/2000 Core		
	Basic Instructions	65		
	Minimum Instruction Execution Time (ns)	40 (@25MHz)		
	Multiplier	—		
	Multiply-Accumulate Instruction	—		
DMA	DMAC (Channels)	4	—	4
	EXDMAC	—		
	DTC/DMAC Ⅱ	DTC		
External Bus Expansion	Address Space (Bytes)	16M		
	Bus State Controller	Direct connection to ROM/SRAM/DRAM is supported	Direct connection to ROM/SRAM is supported	Direct connection to ROM/SRAM/DRAM is supported
	Bus Structure	Separate bus (8/16-bit)		
	SDRAM Controller	—		
	DRAM Controller	Yes	—	Yes
	Host Interface	—		
Clock	Clock Generation Circuit	1 circuit (Main clock)		
	PLL	—		
	Subclock	—		
	RTC	—		
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16, 32)		
	Power Save	Medium-speed/Sleep/Module stop/Software standby/Hardware standby		
A/D Converter	Resolution × Channels	10-bit × 8		
	Sample and Hold	Yes		
D/A Converter	Resolution × Channels	8-bit × 2		
Timer	8-bit	2 (TMR)		
	16-bit	6 (TPU)		
	32-bit	—		
	Input Capture	6 (shared with TPU)		
	Output Compare	6 (shared with TPU)		
	PWM Output	6 (shared with TPU)		
	Real-Time Port	—		
	Programmable Pulse Generator	16 (shared with DTC, TMR, TPU)		16 (shared with DMAC, DTC, TMR, TPU)
	Event Counter	8 (shared with TMR, TPU)		
	2-Phase Encoder Input	6 (shared with TPU)		
Watchdog Timer		1		
Serial Interface	Clock Sync./Clock Async.	3		
I²C-bus		—		
IEBus		—		
Smart Card/SIM		3		
Synchronous Serial Communication Unit/Special Serial I/O		1 (Multiprocessor communication function)		
CAN	Channels	—		
	Message Box (Numbers)	—		
Ethernet		—		
USB Function		—		
LPC/ISA		—		
IrDA		—		
LCD		—		
CRC Calculation Circuit		—		
I/O Ports	Input Only (Numbers)	9		
	CMOS Output Only (Numbers)	—		
	CMOS I/O (Numbers)	86		
	High Voltage Port (Numbers)	—		
	N-Channel Open Drain Port (Numbers)	14		
	DTMF	—		
	High Current Drive Port	—		
	Pull-Up Resistor	40		
	NMOS Push-Pull	—		
External Interrupts Pins		9 (NMI, IRQ × 8)		
Debugging Function	Boundary Scan/JTAG	—		
	On-Chip Debug	—		
	On-Board Flash Program	—		
Other Functions	ROM Correction Function	—		
	Others	—		
Operating Frequency/Supply Voltage		20MHz/2.7 to 3.6V	25MHz/3.0 to 3.6V	20MHz/2.7 to 3.6V	25MHz/3.0 to 3.6V	20MHz/2.7 to 3.6V	25MHz/3.0 to 3.6V	20MHz/2.7 to 3.6V	25MHz/3.0 to 3.6V	20MHz/2.7 to 3.6V	25MHz/3.0 to 3.6V	20MHz/2.7 to 3.6V	25MHz/3.0 to 3.6V	20MHz/2.7 to 3.6V	25MHz/3.0 to 3.6V	20MHz/2.7 to 3.6V	25MHz/3.0 to 3.6V
Operating Ambient Temperature (°C)		–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75
Package*2		PRQP0128KB-A		PTQP0120LA-A		PRQP0128KB-A		PTQP0120LA-A		PRQP0128KB-A		PTQP0120LA-A								
Part No.		HD6412320VF20DV	HD6412320VF20IV	HD6412320VF20V	HD6412320VF25IV	HD6412320VF25V	HD6412320VTE20IV	HD6412320VTE20V	HD6412320VTE25IV	HD6412320VTE25V	HD6412321VF20V	HD6412321VF20WV	HD6412321VF25V	HD6412321VF25WV	HD6412321VTE20V	HD6412321VTE20WV	HD6412321VTE25V	HD6412321VTE25WV	HD6412322RVF20IV	HD6412322RVF20V	HD6412322RVF25IV	HD6412322RVF25V	HD6412322RVTE20IV	HD6412322RVTE20V	HD6412322RVTE25IV	HD6412322RVTE25V

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8S/2300 Series)

Group		H8S/2329																															
Memory	ROM (Bytes)	—								32K		128K				256K								384K						512K			
	RAM (Bytes)	32K								8K														32K						8K			
	ROM Type*1	L								M						F				M				F									
	Program Security	—														Yes				—				Yes									
CPU	CPU	H8S/2000 Core																															
	Basic Instructions	65																															
	Minimum Instruction Execution Time (ns)	40 (@25MHz)																															
	Multiplier	—																															
	Multiply-Accumulate Instruction	—																															
DMA	DMAC (Channels)	4																															
	EXDMAC	—																															
	DTC/DMAC II	DTC																															
External Bus Expansion	Address Space (Bytes)	16M																															
	Bus State Controller	Direct connection to ROM/SRAM/DRAM is supported																															
	Bus Structure	Separate bus (8/16-bit)																															
	SDRAM Controller	—																															
	DRAM Controller	Yes																															
	Host Interface	—																															
Clock	Clock Generation Circuit	1 circuit (Main clock)																															
	PLL	—																															
	Subclock	—																															
	RTC	—																															
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16, 32)																															
	Power Save	Medium-speed/Sleep/Module stop/Software standby/Hardware standby																															
A/D Converter	Resolution × Channels	10-bit × 8																															
	Sample and Hold	Yes																															
D/A Converter	Resolution × Channels	8-bit × 2																															
Timer	8-bit	2 (TMR)																															
	16-bit	6 (TPU)																															
	32-bit	—																															
	Input Capture	6 (shared with TPU)																															
	Output Compare	6 (shared with TPU)																															
	PWM Output	6 (shared with TPU)																															
	Real-Time Port	—																															
	Programmable Pulse Generator	16 (shared with DMAC, DTC, TMR, TPU)																															
	Event Counter	8 (shared with TMR, TPU)																															
	2-Phase Encoder Input	6 (shared with TPU)																															
Watchdog Timer		1																															
Serial Interface	Clock Sync./Clock Async.	3																															
I²C-bus		—																															
IEBus		—																															
Smart Card/SIM		3																															
Synchronous Serial Communication Unit/Special Serial I/O		1 (Multiprocessor communication function)																															
CAN	Channels	—																															
	Message Box (Numbers)	—																															
Ethernet		—																															
USB Function		—																															
LPC/ISA		—																															
IrDA		—																															
LCD		—																															
CRC Calculation Circuit		—																															
I/O Ports	Input Only (Numbers)	9																															
	CMOS Output Only (Numbers)	—																															
	CMOS I/O (Numbers)	86																															
	High Voltage Port (Numbers)	—																															
	N-Channel Open Drain Port (Numbers)	14																															
	DTMF	—																															
	High Current Drive Port	—																															
	Pull-Up Resistor	40																															
	NMOS Push-Pull	—																															
External Interrupts Pins		9 (NMI, IRQ × 8)																															
Debugging Function	Boundary Scan/JTAG	—																															
	On-Chip Debug	—																										Yes		—			
	On-Board Flash Program	—														Yes				—				Yes									
Other Functions	ROM Correction Function	—																															
	Others	—																															
Operating Frequency/Supply Voltage		20MHz/2.7 to 3.6V		25MHz/3.0 to 3.6V		20MHz/2.7 to 3.6V		25MHz/3.0 to 3.6V		25MHz/3.0 to 3.6V, 20MHz/2.7 to 3.6V						25MHz/3.0 to 3.6V				25MHz/3.0 to 3.6V, 20MHz/2.7 to 3.6V				25MHz/3.0 to 3.6V									
Operating Ambient Temperature (˚C)		–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75			–40 to 85	–20 to 75	–40 to 85
Package*2		PRQP0128KB-A				PTQP0120LA-A				PRQP0128KB-A				PTQP0120LA-A		PRQP0128KB-A		PTQP0120LA-A		PRQP0128KB-A		PTQP0120LA-A		PRQP0128KB-A		PTQP0120LA-A		PRQP0128KB-A	PTQP0120LA-A	PRQP0128KB-A		PTQP0120LA-A	
Part No.		HD6412324SVF20	HD6412324SVF20W	HD6412324SVF25	HD6412324SVF25W	HD6412324SVTE20	HD6412324SVTE20W	HD6412324SVTE25	HD6412324SVTE25W	HD6432323XXXF	HD6432323XXXFI	HD6432327XXXF	HD6432327XXXFI	HD6432327XXXTE	HD6432327XXXTEI	HD64F2328BVF25V	HD64F2328BVF25WV	HD64F2328BVTE25V	HD64F2328BVTE25WV	HD6432328XXXF	HD6432328XXXFI	HD6432328XXXTE	HD6432328XXXTEI	HD64F2329BVF25	HD64F2329BVF25W	HD64F2329BVTE25	HD64F2329BVTE25W	HD64F2329EVF25V	HD64F2329EVTE25V	HD64F2326VF25V	HD64F2326VF25WV	HD64F2326VTE25V	HD64F2326VTE25WV

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8S/2300 Series)

Group		H8S/2339										
Memory	ROM (Bytes)	—			256K						384K	
	RAM (Bytes)	8K									32K	
	ROM Type*1	L			M				F			
	Program Security	—							Yes			
CPU	CPU	H8S/2000 Core										
	Basic Instructions	65										
	Minimum Instruction Execution Time (ns)	40 (@25MHz)										
	Multiplier	—										
	Multiply-Accumulate Instruction	—										
DMA	DMAC (Channels)	4										
	EXDMAC	—										
	DTC/DMAC Ⅱ	DTC										
External Bus Expansion	Address Space (Bytes)	16M										
	Bus State Controller	Direct connection to ROM/Burst ROM/SRAM/DRAM is supported										
	Bus Structure	Separate bus (8/16-bit)										
	SDRAM Controller	—										
	DRAM Controller	Yes										
	Host Interface	—										
Clock	Clock Generation Circuit	1 circuit (Main clock)										
	PLL	—										
	Subclock	—										
	RTC	—										
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16, 32)										
	Power Save	Medium-speed/Sleep/Module stop/Software standby/Hardware standby										
A/D Converter	Resolution × Channels	10-bit × 12										
	Sample and Hold	Yes										
D/A Converter	Resolution × Channels	8-bit × 4										
Timer	8-bit	2 (TMR)										
	16-bit	6 (TPU)										
	32-bit	—										
	Input Capture	6 (shared with TPU)										
	Output Compare	6 (shared with TPU)										
	PWM Output	6 (shared with TPU)										
	Real-Time Port	—										
	Programmable Pulse Generator	16 (shared with DMAC, DTC, TMR, TPU)										
	Event Counter	8 (shared with TMR, TPU)										
	2-Phase Encoder Input	6 (shared with TPU)										
Watchdog Timer		1										
Serial Interface	Clock Sync./Clock Async.	3										
I²C-bus		—										
IEBus		—										
Smart Card/SIM		1										
Synchronous Serial Communication Unit/Special Serial I/O		1 (Multiprocessor communication function)										
CAN	Channels	—										
	Message Box (Numbers)	—										
Ethernet		—										
USB Function		—										
LPC/ISA		—										
IrDA		—										
LCD		—										
CRC Calculation Circuit		—										
I/O Ports	Input Only (Numbers)	12										
	CMOS Output Only (Numbers)	—										
	CMOS I/O (Numbers)	106										
	High Voltage Port (Numbers)	—										
	N-Channel Open Drain Port (Numbers)	14										
	DTMF	—										
	High Current Drive Port	—										
	Pull-Up Resistor	40										
	NMOS Push-Pull	—										
External Interrupts Pins		9 (NMI, IRQ × 8)										
Debugging Function	Boundary Scan/JTAG	—										
	On-Chip Debug	—								Yes		—
	On-Board Flash Program	—							Yes			
Other Functions	ROM Correction Function	—										
	Others	—										
Operating Frequency/Supply Voltage		20MHz/2.7 to 3.6V		25MHz/3.0 to 3.6V		25MHz/3.0 to 3.6V, 20MHz/2.7 to 3.6V		25MHz/3.0 to 3.6V				
Operating Ambient Temperature (˚C)		–40 to 85	–20 to 75	–40 to 85	–20 to 75		–40 to 85		–20 to 75		–40 to 85	–20 to 75
Package*2		PRQP0144KA-A										
Part No.		HD6412332VFC20IV	HD6412332VFC20V	HD6412332VFC25IV	HD6412332VFC25V	HD6432338XXXFC	HD6432338XXXFCI	HD64F2338VFC25IV	HD64F2338VFC25V	HD64F2339EVFC25V	HD64F2339VFC25IV	HD64F2339VFC25V

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8S/2300 Series)

Group		H8S/2345		
Memory	ROM (Bytes)	—	32K	64K
	RAM (Bytes)	2K		
	ROM Type*1	L	M	
	Program Security	—		
CPU	CPU	H8S/2000 Core		
	Basic Instructions	65		
	Minimum Instruction Execution Time (ns)	100 (@10MHz) | 50 (@20MHz) | 100 (@10MHz) | 50 (@20MHz) | 100 (@10MHz) | 50 (@20MHz) | 100 (@10MHz)	50 (@20MHz)	
	Multiplier	—		
	Multiply-Accumulate Instruction	—		
DMA	DMAC (Channels)	—		
	EXDMAC	—		
	DTC/DMAC II	DTC		
External Bus Expansion	Address Space (Bytes)	16M		
	Bus State Controller	Direct connection to ROM/SRAM is supported		
	Bus Structure	Separate bus (8/16-bit)		
	SDRAM Controller	—		
	DRAM Controller	—		
	Host Interface	—		
Clock	Clock Generation Circuit	1 circuit (Main clock)		
	PLL	—		
	Subclock	—		
	RTC	—		
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16, 32)		
	Power Save	Medium-speed/Sleep/Module stop/Software standby/Hardware standby		
A/D Converter	Resolution × Channels	10-bit × 8		
	Sample and Hold	Yes		
D/A Converter	Resolution × Channels	8-bit × 2		
Timer	8-bit	2 (TMR)		
	16-bit	6 (TPU)		
	32-bit	—		
	Input Capture	6 (shared with TPU)		
	Output Compare	6 (shared with TPU)		
	PWM Output	6 (shared with TPU)		
	Real-Time Port	—		
	Programmable Pulse Generator	—		
	Event Counter	8 (shared with TMR, TPU)		
	2-Phase Encoder Input	6 (shared with TPU)		
Watchdog Timer		1		
Serial Interface	Clock Sync./Clock Async.	2		
I^2C-bus		—		
IEBus		—		
Smart Card/SIM		2		
Synchronous Serial Communication Unit/Special Serial I/O		1 (Multiprocessor communication function)		
CAN	Channels	—		
	Message Box (Numbers)	—		
Ethernet		—		
USB Function		—		
LPC/ISA		—		
IrDA		—		
LCD		—		
CRC Calculation Circuit		—		
I/O Ports	Input Only (Numbers)	8		
	CMOS Output Only (Numbers)	—		
	CMOS I/O (Numbers)	71		
	High Voltage Port (Numbers)	—		
	N-Channel Open Drain Port (Numbers)	10		
	DTMF	—		
	High Current Drive Port	28 (port for LED drive)		
	Pull-Up Resistor	36		
	NMOS Push-Pull	—		
External Interrupts Pins		9 (NMI, IRQ × 8)		
Debugging Function	Boundary Scan/JTAG	—		
	On-Chip Debug	—		
	On-Board Flash Program	—		
Other Functions	ROM Correction Function	—		
	Others	—		

Operating Frequency/Supply Voltage	10MHz/2.7 to 5.5V	20MHz/4.5 to 5.5V	10MHz/2.7 to 5.5V	20MHz/4.5 to 5.5V	10MHz/2.7 to 5.5V	20MHz/4.5 to 5.5V	10MHz/2.7 to 5.5V	20MHz/4.5 to 5.5V	20MHz/4.5 to 5.5V, 10MHz/2.7 to 5.5V
Operating Ambient Temperature (°C)	–40 to 85 / –20 to 75	–40 to 85 / –20 to 75	–40 to 85 / –20 to 75	–40 to 85 / –20 to 75	–40 to 85 / –20 to 75	–40 to 85 / –20 to 75	–40 to 85 / –20 to 75	–40 to 85 / –20 to 75	–20 to 75	–40 to 85	–20 to 75 / –40 to 85 / –20 to 75 / –40 to 85	–20 to 75	–40 to 85	–20 to 75 / –40 to 85 / –20 to 75 / –40 to 85
Package*2	PRQP0100JE-B	PRQP0100KA-A	PTQP0100KA-A	PTQP0100LC-A	PRQP0100JE-B	PRQP0100KA-A	PRQP0100JE-B	PTQP0100KA-A	PTQP0100LC-A	PRQP0100JE-B	PRQP0100KA-A	PRQP0100JE-B	PTQP0100KA-A	PTQP0100LC-A
Part No.	HD6412340F10IV	HD6412340F10V	HD6412340F20IV	HD6412340F20V	HD6412340FA10IV	HD6412340FA10V	HD6412340FA20IV	HD6412340FA20V	HD6412340TE10IV	HD6412340TE10V	HD6412340TE20IV	HD6412340TE20V	HD6412340TF10IV	HD6412340TF10V	HD6412340TF20IV	HD6412340TF20V	HD6432341XXXF	HD6432341XXXFA	HD6432341XXXFAI	HD6432341XXXFI	HD6432341XXXTE	HD6432341XXXTEI	HD6432341XXXTF	HD6432341XXXTFI	HD6432343XXXF	HD6432343XXXFA	HD6432343XXXFAI	HD6432343XXXFI	HD6432343XXXTE	HD6432343XXXTEI	HD6432343XXXTF	HD6432343XXXTFI

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8S/2300 Series)

<table>
<tr><th colspan="2">Group</th><th colspan="40">H8S/2345</th></tr>
<tr><td rowspan="4">Memory</td><td>ROM (Bytes)</td><td colspan="8">96K</td><td colspan="32">128K</td></tr>
<tr><td>RAM (Bytes)</td><td colspan="40">4K</td></tr>
<tr><td>ROM Type*1</td><td colspan="8">M</td><td colspan="8">F</td><td colspan="8">M</td><td colspan="16">O</td></tr>
<tr><td>Program Security</td><td colspan="8">—</td><td colspan="8">Yes</td><td colspan="8">—</td><td colspan="16">Yes</td></tr>
<tr><td rowspan="5">CPU</td><td>CPU</td><td colspan="40">H8S/2000 Core</td></tr>
<tr><td>Basic Instructions</td><td colspan="40">65</td></tr>
<tr><td>Minimum Instruction Execution Time (ns)</td><td colspan="24">50 (@20MHz)</td><td colspan="2">100 (@10MHz)</td><td colspan="2">50 (@20MHz)</td><td colspan="2">100 (@10MHz)</td><td colspan="2">50 (@20MHz)</td><td colspan="2">100 (@10MHz)</td><td colspan="2">50 (@20MHz)</td><td colspan="2">100 (@10MHz)</td><td colspan="2">50 (@20MHz)</td></tr>
<tr><td>Multiplier</td><td colspan="40">—</td></tr>
<tr><td>Multiply-Accumulate Instruction</td><td colspan="40">—</td></tr>
<tr><td rowspan="3">DMA</td><td>DMAC (Channels)</td><td colspan="40">—</td></tr>
<tr><td>EXDMAC</td><td colspan="40">—</td></tr>
<tr><td>DTC/DMAC II</td><td colspan="40">DTC</td></tr>
<tr><td rowspan="6">External Bus Expansion</td><td>Address Space (Bytes)</td><td colspan="40">16M</td></tr>
<tr><td>Bus State Controller</td><td colspan="40">Direct connection to ROM/SRAM is supported</td></tr>
<tr><td>Bus Structure</td><td colspan="40">Separate bus (8/16-bit)</td></tr>
<tr><td>SDRAM Controller</td><td colspan="40">—</td></tr>
<tr><td>DRAM Controller</td><td colspan="40">—</td></tr>
<tr><td>Host Interface</td><td colspan="40">—</td></tr>
<tr><td rowspan="6">Clock</td><td>Clock Generation Circuit</td><td colspan="40">1 circuit (Main clock)</td></tr>
<tr><td>PLL</td><td colspan="40">—</td></tr>
<tr><td>Subclock</td><td colspan="40">—</td></tr>
<tr><td>RTC</td><td colspan="40">—</td></tr>
<tr><td>Frequency Divider</td><td colspan="40">1/n (n = 1, 2, 4, 8, 16, 32)</td></tr>
<tr><td>Power Save</td><td colspan="40">Medium-speed/Sleep/Module stop/Software standby/Hardware standby</td></tr>
<tr><td rowspan="2">A/D Converter</td><td>Resolution × Channels</td><td colspan="40">10-bit × 8</td></tr>
<tr><td>Sample and Hold</td><td colspan="40">Yes</td></tr>
<tr><td>D/A Converter</td><td>Resolution × Channels</td><td colspan="40">8-bit × 2</td></tr>
<tr><td rowspan="10">Timer</td><td>8-bit</td><td colspan="40">2 (TMR)</td></tr>
<tr><td>16-bit</td><td colspan="40">6 (TPU)</td></tr>
<tr><td>32-bit</td><td colspan="40">—</td></tr>
<tr><td>Input Capture</td><td colspan="40">6 (shared with TPU)</td></tr>
<tr><td>Output Compare</td><td colspan="40">6 (shared with TPU)</td></tr>
<tr><td>PWM Output</td><td colspan="40">6 (shared with TPU)</td></tr>
<tr><td>Real-Time Port</td><td colspan="40">—</td></tr>
<tr><td>Programmable Pulse Generator</td><td colspan="40">—</td></tr>
<tr><td>Event Counter</td><td colspan="40">8 (shared with TMR, TPU)</td></tr>
<tr><td>2-Phase Encoder Input</td><td colspan="40">6 (shared with TPU)</td></tr>
<tr><td colspan="2">Watchdog Timer</td><td colspan="40">1</td></tr>
<tr><td>Serial Interface</td><td>Clock Sync./Clock Async.</td><td colspan="40">2</td></tr>
<tr><td colspan="2">I^2C-bus</td><td colspan="40">—</td></tr>
<tr><td colspan="2">IEBus</td><td colspan="40">—</td></tr>
<tr><td colspan="2">Smart Card/SIM</td><td colspan="40">2</td></tr>
<tr><td colspan="2">Synchronous Serial Communication Unit/Special Serial I/O</td><td colspan="40">1 (Multiprocessor communication function)</td></tr>
<tr><td rowspan="2">CAN</td><td>Channels</td><td colspan="40">—</td></tr>
<tr><td>Message Box (Numbers)</td><td colspan="40">—</td></tr>
<tr><td colspan="2">Ethernet</td><td colspan="40">—</td></tr>
<tr><td colspan="2">USB Function</td><td colspan="40">—</td></tr>
<tr><td colspan="2">LPC/ISA</td><td colspan="40">—</td></tr>
<tr><td colspan="2">IrDA</td><td colspan="40">—</td></tr>
<tr><td colspan="2">LCD</td><td colspan="40">—</td></tr>
<tr><td colspan="2">CRC Calculation Circuit</td><td colspan="40">—</td></tr>
<tr><td rowspan="9">I/O Ports</td><td>Input Only (Numbers)</td><td colspan="40">8</td></tr>
<tr><td>CMOS Output Only (Numbers)</td><td colspan="40">—</td></tr>
<tr><td>CMOS I/O (Numbers)</td><td colspan="40">71</td></tr>
<tr><td>High Voltage Port (Numbers)</td><td colspan="40">—</td></tr>
<tr><td>N-Channel Open Drain Port (Numbers)</td><td colspan="40">10</td></tr>
<tr><td>DTMF</td><td colspan="40">—</td></tr>
<tr><td>High Current Drive Port</td><td colspan="40">28 (port for LED drive)</td></tr>
<tr><td>Pull-Up Resistor</td><td colspan="40">36</td></tr>
<tr><td>NMOS Push-Pull</td><td colspan="40">—</td></tr>
<tr><td colspan="2">External Interrupts Pins</td><td colspan="40">9 (NMI, IRQ × 8)</td></tr>
<tr><td rowspan="3">Debugging Function</td><td>Boundary Scan/JTAG</td><td colspan="40">—</td></tr>
<tr><td>On-Chip Debug</td><td colspan="40">—</td></tr>
<tr><td>On-Board Flash Program</td><td colspan="8">—</td><td colspan="8">Yes</td><td colspan="24">—</td></tr>
<tr><td rowspan="2">Other Functions</td><td>ROM Correction Function</td><td colspan="40">—</td></tr>
<tr><td>Others</td><td colspan="40">—</td></tr>
<tr><td colspan="2">Operating Frequency/Supply Voltage</td><td colspan="8">20MHz/4.5 to 5.5V, 10MHz/2.7 to 5.5V</td><td colspan="8">20MHz/4.5 to 5.5V</td><td colspan="8">20MHz/4.5 to 5.5V, 10MHz/2.7 to 5.5V</td><td colspan="2">10MHz/ 2.7 to 5.5V</td><td colspan="2">20MHz/ 4.5 to 5.5V</td><td colspan="2">10MHz/ 2.7 to 5.5V</td><td colspan="2">20MHz/ 4.5 to 5.5V</td><td colspan="2">10MHz/ 2.7 to 5.5V</td><td colspan="2">20MHz/ 4.5 to 5.5V</td><td colspan="2">10MHz/ 2.7 to 5.5V</td><td colspan="2">20MHz/ 4.5 to 5.5V</td></tr>
<tr><td colspan="2">Operating Ambient Temperature (°C)</td><td colspan="2">-20 to 75</td><td colspan="2">-40 to 85</td><td>-20 to 75</td><td>-40 to 85</td><td>-20 to 75</td><td colspan="2">-40 to 85</td><td>-20 to 75</td><td>-40 to 85</td><td>-20 to 75</td><td>-40 to 85</td><td>-20 to 75</td><td>-40 to 85</td><td colspan="3">–20 to 75</td><td colspan="2">-40 to 85</td><td>-20 to 75</td><td>-40 to 85</td><td>-20 to 75</td><td colspan="2">-40 to 85</td><td>-20 to 75</td><td>-40 to 85</td><td>-20 to 75</td><td>-40 to 85</td><td>-20 to 75</td><td>-40 to 85</td><td>-20 to 75</td><td>-40 to 85</td><td>-20 to 75</td><td>-40 to 85</td><td>-20 to 75</td><td>-40 to 85</td><td>-20 to 75</td><td>-40 to 85</td><td>-20 to 75</td></tr>
<tr><td colspan="2">Package*2</td><td>PRQP0100JE-B</td><td colspan="2">PRQP0100KA-A</td><td>PRQP0100JE-B</td><td colspan="2">PTQP0100KA-A</td><td colspan="2">PTQP0100LC-A</td><td colspan="2">PRQP0100JE-B</td><td colspan="2">PRQP0100KA-A</td><td colspan="2">PTQP0100KA-A</td><td colspan="2">PTQP0100LC-A</td><td>PRQP0100JE-B</td><td colspan="2">PRQP0100KA-A</td><td>PRQP0100JE-B</td><td colspan="2">PTQP0100KA-A</td><td colspan="2">PTQP0100LC-A</td><td colspan="4">PRQP0100JE-B</td><td colspan="4">PRQP0100KA-A</td><td colspan="4">PTQP0100KA-A</td><td colspan="4">PTQP0100LC-A</td></tr>
<tr><td colspan="2">Part No.</td><td>HD6432344XXXF</td><td>HD6432344XXXFA</td><td>HD6432344XXXFAI</td><td>HD6432344XXXFI</td><td>HD6432344XXXTE</td><td>HD6432344XXXTEI</td><td>HD6432344XXXTF</td><td>HD6432344XXXTFI</td><td>HD64F2345F20IV</td><td>HD64F2345F20V</td><td>HD64F2345FA20IV</td><td>HD64F2345FA20V</td><td>HD64F2345TE20IV</td><td>HD64F2345TE20V</td><td>HD64F2345TF20IV</td><td>HD64F2345TF20V</td><td>HD6432345XXXF</td><td>HD6432345XXXFA</td><td>HD6432345XXXFAI</td><td>HD6432345XXXFI</td><td>HD6432345XXXTE</td><td>HD6432345XXXTEI</td><td>HD6432345XXXTF</td><td>HD6432345XXXTFI</td><td>HD6472345F10IV</td><td>HD6472345F10V</td><td>HD6472345F20IV</td><td>HD6472345F20V</td><td>HD6472345FA10IV</td><td>HD6472345FA10V</td><td>HD6472345FA20IV</td><td>HD6472345FA20V</td><td>HD6472345TE10IV</td><td>HD6472345TE10V</td><td>HD6472345TE20IV</td><td>HD6472345TE20V</td><td>HD6472345TF10IV</td><td>HD6472345TF10V</td><td>HD6472345TF20IV</td><td>HD6472345TF20V</td></tr>
</table>

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8S/2300 Series)

Group		H8S/2350															
Memory	ROM (Bytes)	—												64K			
	RAM (Bytes)	2K															
	ROM Type*1	L												M			
	Program Security	—															
CPU	CPU	H8S/2000 Core															
	Basic Instructions	65															
	Minimum Instruction Execution Time (ns)	77 (@13MHz)		50 (@20MHz)				77 (@13MHz)				50 (@20MHz)					
	Multiplier	—															
	Multiply-Accumulate Instruction	—															
DMA	DMAC (Channels)	4															
	EXDMAC	—															
	DTC/DMAC II	DTC															
External Bus Expansion	Address Space (Bytes)	16M															
	Bus State Controller	Direct connection to ROM/Burst ROM/SRAM/DRAM is supported															
	Bus Structure	Separate bus (8/16-bit)															
	SDRAM Controller	—															
	DRAM Controller	Yes															
	Host Interface	—															
Clock	Clock Generation Circuit	1 circuit (Main clock)															
	PLL	—															
	Subclock	—															
	RTC	—															
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16, 32)															
	Power Save	Medium-speed/Sleep/Module stop/Software standby/Hardware standby															
A/D Converter	Resolution × Channels	10-bit × 8															
	Sample and Hold	Yes															
D/A Converter	Resolution × Channels	8-bit × 2															
Timer	8-bit	—															
	16-bit	6 (TPU)															
	32-bit	—															
	Input Capture	6 (shared with TPU)															
	Output Compare	6 (shared with TPU)															
	PWM Output	6 (shared with TPU)															
	Real-Time Port	—															
	Programmable Pulse Generator	16 (shared with DMAC, DTC, TMR, TPU)															
	Event Counter	6 (shared with TPU)															
	2-Phase Encoder Input	6 (shared with TPU)															
Watchdog Timer		1															
Serial Interface	Clock Sync./Clock Async.	2															
I^2C-bus		—															
IEBus		—															
Smart Card/SIM		2															
Synchronous Serial Communication Unit/Special Serial I/O		1 (Multiprocessor communication function)															
CAN	Channels	—															
	Message Box (Numbers)	—															
Ethernet		—															
USB Function		—															
LPC/ISA		—															
IrDA		—															
LCD		—															
CRC Calculation Circuit		—															
I/O Ports	Input Only (Numbers)	8															
	CMOS Output Only (Numbers)	—															
	CMOS I/O (Numbers)	87															
	High Voltage Port (Numbers)	—															
	N-Channel Open Drain Port (Numbers)	6												14			
	DTMF	—															
	High Current Drive Port	32 (port for LED drive)															
	Pull-Up Resistor	—												40			
	NMOS Push-Pull	—															
External Interrupts Pins		9 (NMI, IRQ × 8)															
Debugging Function	Boundary Scan/JTAG	—															
	On-Chip Debug	—															
	On-Board Flash Program	—															
Other Functions	ROM Correction Function	—															
	Others	—															
Operating Frequency/Supply Voltage		10MHz/2.7 to 5.5V		13MHz/3.0 to 5.5V		20MHz/4.5 to 5.5V		10MHz/2.7 to 5.5V		13MHz/3.0 to 5.5V		20MHz/4.5 to 5.5V		20MHz/4.5 to 5.5V, 10MHz/2.7 to 5.5V			
Operating Ambient Temperature (˚C)		–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75			–40 to 85	–20 to 75
Package*2		PRQP0128KB-A						PTQP0120LA-A						PRQP0128KB-A		PTQP0120LA-A	
Part No.		HD6412350F10IV	HD6412350F10V	HD6412350F13IV	HD6412350F13V	HD6412350F20IV	HD6412350F20V	HD6412350TE10IV	HD6412350TE10V	HD6412350TE13IV	HD6412350TE13V	HD6412350TE20IV	HD6412350TE20V	HD6432351XXXF	HD6432351XXXFI	HD6432351XXXTE	HD6432351XXXTEI

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8S/2300 Series)

Group		H8S/2355																			
Memory	ROM (Bytes)	32K		64K		128K															
	RAM (Bytes)	4K		2K		4K															
	ROM Type*1	M										O									
	Program Security	—																			
CPU	CPU	H8S/2000 Core																			
	Basic Instructions	65																			
	Minimum Instruction Execution Time (ns)	50 (@20MHz)										100 (@10MHz)		50 (@20MHz)		100 (@10MHz)		50 (@20MHz)			
	Multiplier	—																			
	Multiply-Accumulate Instruction	—																			
DMA	DMAC (Channels)	—																			
	EXDMAC	—																			
	DTC/DMAC II	DTC																			
External Bus Expansion	Address Space (Bytes)	16M																			
	Bus State Controller	Direct connection to ROM/Burst ROM/SRAM is supported																			
	Bus Structure	Separate bus (8/16-bit)																			
	SDRAM Controller	—																			
	DRAM Controller	—																			
	Host Interface	—																			
Clock	Clock Generation Circuit	1 circuit (Main clock)																			
	PLL	—																			
	Subclock	—																			
	RTC	—																			
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16, 32)																			
	Power Save	Medium-speed/Sleep/Module stop/Software standby/Hardware standby																			
A/D Converter	Resolution × Channels	10-bit × 8																			
	Sample and Hold	Yes																			
D/A Converter	Resolution × Channels	—		8-bit × 2																	
Timer	8-bit	2 (TMR)																			
	16-bit	6 (TPU)																			
	32-bit	—																			
	Input Capture	6 (shared with TPU)																			
	Output Compare	6 (shared with TPU)																			
	PWM Output	6 (shared with TPU)																			
	Real-Time Port	—																			
	Programmable Pulse Generator	—																			
	Event Counter	8 (shared with TMR, TPU)																			
	2-Phase Encoder Input	6 (shared with TPU)																			
Watchdog Timer		1																			
Serial Interface	Clock Sync./Clock Async.	3																			
I²C-bus		—																			
IEBus		—																			
Smart Card/SIM		3																			
Synchronous Serial Communication Unit/Special Serial I/O		1 (Multiprocessor communication function)																			
CAN	Channels	—																			
	Message Box (Numbers)	—																			
Ethernet		—																			
USB Function		—																			
LPC/ISA		—																			
IrDA		—																			
LCD		—																			
CRC Calculation Circuit		—																			
I/O Ports	Input Only (Numbers)	8																			
	CMOS Output Only (Numbers)	—																			
	CMOS I/O (Numbers)	87																			
	High Voltage Port (Numbers)	—																			
	N-Channel Open Drain Port (Numbers)	14																			
	DTMF	—																			
	High Current Drive Port	32 (port for LED drive)																			
	Pull-Up Resistor	40																			
	NMOS Push-Pull	—																			
External Interrupts Pins		9 (NMI, IRQ × 8)																			
Debugging Function	Boundary Scan/JTAG	—																			
	On-Chip Debug	—																			
	On-Board Flash Program	—																			
Other Functions	ROM Correction Function	—																			
	Others	—																			
Operating Frequency/Supply Voltage		20MHz/4.5 to 5.5V, 13MHz/3.0 to 5.5V, 10MHz/2.7 to 5.5V										10MHz/ 2.7 to 5.5V		20MHz/ 4.5 to 5.5V		10MHz/ 2.7 to 5.5V		20MHz/ 4.5 to 5.5V			
Operating Ambient Temperature (°C)		–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–40 to 85		–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75
Package*2		PRQP0128KB-A		PTQP0120LA-A		PRQP0128KB-A		PTQP0120LA-A		PRQP0128KB-A		PTQP0120LA-A		PRQP0128KB-A						PTQP0120LA-A				
Part No.		HD6432393XXXF	HD6432393XXXFI	HD6432393XXXTE	HD6432393XXXTEI	HD6432353XXXF	HD6432353XXXFI	HD6432353XXXTE	HD6432353XXXTEI	HD6432355XXXF	HD6432355XXXFI	HD6432355XXXTE	HD6432355XXXTEI	HD6472355F10IV	HD6472355F10V	HD6472355F20IV	HD6472355F20V	HD6472355TE10IV	HD6472355TE10V	HD6472355TE20IV	HD6472355TE20V

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*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8S/2300 Series)

Group		H8S/2357			
Memory	ROM (Bytes)	—	128K		
	RAM (Bytes)	8K			
	ROM Type*1	L	F	M	O
	Program Security	—	Yes	—	Yes
CPU	CPU	H8S/2000 Core			
	Basic Instructions	65			
	Minimum Instruction Execution Time (ns)	50 (@20MHz)	77 (@13MHz)	50 (@20MHz)	
	Multiplier	—			
	Multiply-Accumulate Instruction	—			
DMA	DMAC (Channels)	4			
	EXDMAC	—			
	DTC/DMAC II	DTC			
External Bus Expansion	Address Space (Bytes)	16M			
	Bus State Controller	Direct connection to ROM/Burst ROM/SRAM/DRAM is supported			
	Bus Structure	Separate bus (8/16-bit)			
	SDRAM Controller	—			
	DRAM Controller	Yes			
	Host Interface	—			
Clock	Clock Generation Circuit	1 circuit (Main clock)			
	PLL	—			
	Subclock	—			
	RTC	—			
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16, 32)			
	Power Save	Medium-speed/Sleep/Module stop/Software standby/Hardware standby			
A/D Converter	Resolution × Channels	10-bit × 8			
	Sample and Hold	Yes			
D/A Converter	Resolution × Channels	8-bit × 2			
Timer	8-bit	2 (TMR)			
	16-bit	6 (TPU)			
	32-bit	—			
	Input Capture	6 (shared with TPU)			
	Output Compare	6 (shared with TPU)			
	PWM Output	6 (shared with TPU)			
	Real-Time Port	—			
	Programmable Pulse Generator	16 (shared with DMAC, DTC, TMR, TPU)			
	Event Counter	8 (shared with TMR, TPU)			
	2-Phase Encoder Input	6 (shared with TPU)			
Watchdog Timer		1			
Serial Interface	Clock Sync./Clock Async.	3			
I^2C-bus		—			
IEBus		—			
Smart Card/SIM		3			
Synchronous Serial Communication Unit/Special Serial I/O		1 (Multiprocessor communication function)			
CAN	Channels	—			
	Message Box (Numbers)	—			
Ethernet		—			
USB Function		—			
LPC/ISA		—			
IrDA		—			
LCD		—			
CRC Calculation Circuit		—			
I/O Ports	Input Only (Numbers)	8			
	CMOS Output Only (Numbers)	—			
	CMOS I/O (Numbers)	87			
	High Voltage Port (Numbers)	—			
	N-Channel Open Drain Port (Numbers)	6	14		
	DTMF	—			
	High Current Drive Port	32 (port for LED drive)			
	Pull-Up Resistor	40			
	NMOS Push-Pull	—			
External Interrupts Pins		9 (NMI, IRQ × 8)			
Debugging Function	Boundary Scan/JTAG	—			
	On-Chip Debug	—			
	On-Board Flash Program	—	Yes	—	
Other Functions	ROM Correction Function	—			
	Others	—			

Operating Frequency/Supply Voltage	10MHz/2.7 to 5.5V	13MHz/3.0 to 5.5V	20MHz/4.5 to 5.5V	10MHz/2.7 to 5.5V	13MHz/3.0 to 5.5V	20MHz/4.5 to 5.5V	13MHz/3.0 to 5.5V	20MHz/4.5 to 5.5V, 13MHz/3.0 to 5.5V, 10MHz/2.7 to 5.5V	10MHz/2.7 to 5.5V	13MHz/3.0 to 5.5V	20MHz/4.5 to 5.5V	10MHz/2.7 to 5.5V	13MHz/3.0 to 5.5V	20MHz/4.5 to 5.5V
Operating Ambient Temperature (°C)	-40 to 85 / -20 to 75	-40 to 85 / -20 to 75	-40 to 85 / -20 to 75	-40 to 85 / -20 to 75	-40 to 85 / -20 to 75	-40 to 85 / -20 to 75	-40 to 85 / -20 to 75	-40 to 85 / -20 to 75 / -20 to 75	-40 to 85 / -20 to 75	-40 to 85 / -20 to 75	-40 to 85 / -20 to 75	-40 to 85 / -20 to 75	-40 to 85 / -20 to 75	-40 to 85 / -20 to 75
Package*2	PRQP0128KB-A			PTQP0120LA-A			PRQP0128KB-A	PTQP0120LA-A	PRQP0128KB-A	PTQP0120LA-A	PRQP0128KB-A	PTQP0120LA-A	PRQP0128KB-A	PTQP0120LA-A

Part No.	HD6412352F10IV	HD6412352F10V	HD6412352F13IV	HD6412352F13V	HD6412352F20IV	HD6412352F20V	HD6412352TE10IV	HD6412352TE10V	HD6412352TE13IV	HD6412352TE13V	HD6412352TE20IV	HD6412352TE20V	HD64F2357F20IV	HD64F2357F20V	HD64F2357TE20IV	HD64F2357TE20V	HD64F2357VF13IV	HD64F2357VF13V	HD64F2357VTE13IV	HD64F2357VTE13V	HD6432357XXXF	HD6432357XXXFEI	HD6432357XXXTE	HD6432357XXXTEI	HD6472357F10IV	HD6472357F10V	HD6472357F13IV	HD6472357F13V	HD6472357F20IV	HD6472357F20V	HD6472357TE10IV	HD6472357TE10V	HD6472357TE13IV	HD6472357TE13V	HD6472357TE20IV	HD6472357TE20V
	PRQP0128KB-A						PTQP0120LA-A						PRQP0128KB-A		PTQP0120LA-A		PRQP0128KB-A		PTQP0120LA-A		PRQP0128KB-A		PTQP0120LA-A		PRQP0128KB-A						PTQP0120LA-A					

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8S/2300 Series)

Group		H8S/2368															
Memory	ROM (Bytes)	—		256K													
	RAM (Bytes)	16K															
	ROM Type*1	L		F		M											
	Program Security	—		Yes		—											
CPU	CPU	H8S/2000 Core															
	Basic Instructions	65															
	Minimum Instruction Execution Time (ns)	30 (@33MHz)		29 (@34MHz)		30 (@33MHz)											
	Multiplier	—															
	Multiply-Accumulate Instruction	—															
DMA	DMAC (Channels)	4															
	EXDMAC	—															
	DTC/DMAC II	DTC															
External Bus Expansion	Address Space (Bytes)	16M															
	Bus State Controller	Direct connection to ROM/SRAM/DRAM is supported															
	Bus Structure	Separate bus (8/16-bit)															
	SDRAM Controller	—															
	DRAM Controller	Yes															
	Host Interface	—															
Clock	Clock Generation Circuit	2 circuits (Main clock, PLL)															
	PLL	Yes															
	Subclock	—															
	RTC	—															
	Frequency Divider	1/n (n = 1, 2, 4)															
	Power Save	Clock division/Sleep/Module stop/Software standby/Hardware standby															
A/D Converter	Resolution × Channels	10-bit × 10															
	Sample and Hold	Yes															
D/A Converter	Resolution × Channels	8-bit × 2															
Timer	8-bit	2 (TMR)															
	16-bit	6 (TPU)															
	32-bit	—															
	Input Capture	6 (shared with TPU)															
	Output Compare	6 (shared with TPU)															
	PWM Output	6 (shared with TPU)															
	Real-Time Port	—															
	Programmable Pulse Generator	16 (shared with DMAC, DTC, TMR, TPU)															
	Event Counter	8 (shared with TMR, TPU)															
	2-Phase Encoder Input	6 (shared with TPU)															
Watchdog Timer		1															
Serial Interface	Clock Sync./Clock Async.	5															
I²C-bus		2												—			
IEBus		—															
Smart Card/SIM		5															
Synchronous Serial Communication Unit/Special Serial I/O		1 (Multiprocessor communication function)															
CAN	Channels	—															
	Message Box (Numbers)	—															
Ethernet		—															
USB Function		—															
LPC/ISA		—															
IrDA		Yes															
LCD		—															
CRC Calculation Circuit		—															
I/O Ports	Input Only (Numbers)	11															
	CMOS Output Only (Numbers)	—															
	CMOS I/O (Numbers)	83															
	High Voltage Port (Numbers)	—															
	N-Channel Open Drain Port (Numbers)	14															
	DTMF	—															
	High Current Drive Port	—															
	Pull-Up Resistor	40															
	NMOS Push-Pull	—															
External Interrupts Pins		9 (NMI, IRQ × 8)															
Debugging Function	Boundary Scan/JTAG	—															
	On-Chip Debug	—				Yes				—							
	On-Board Flash Program	—				Yes				—							
Other Functions	ROM Correction Function	—															
	Others	—															
Operating Frequency/Supply Voltage		33MHz/3.0 to 3.6V				34MHz/3.0 to 3.6V			33MHz/3.0 to 3.6V								
Operating Ambient Temperature (˚C)		–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85		–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	
Package*2		PRQP0128KB-A		PTQP0120LA-A					PRQP0128KB-A		PTQP0120LA-A		PRQP0128KB-A		PTQP0120LA-A		
Part No.		HD6412363VF33WV	HD6412363VF33V	HD6412363VTE33V	HD6412363VTE33WV	HD64F2360VTE34V	HD64F2360VTE34WV	HD64F2360VTE34DV	HD6432365WXXXF	HD6432365WXXXFW	HD6432365WXXXTE	HD6432365WXXXTEW	HD6432365XXXF	HD6432365XXXFW	HD6432365XXXTE	HD6432365XXXTEW	

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8S/2300 Series)

Group		H8S/2368															
Memory	ROM (Bytes)	256K						384K						512K			
	RAM (Bytes)	24K		32K				24K			32K						
	ROM Type*1	F															
	Program Security	Yes															
CPU	CPU	H8S/2000 Core															
	Basic Instructions	65															
	Minimum Instruction Execution Time (ns)	29 (@34MHz)						30 (@33MHz)			29 (@34MHz)						
	Multiplier	—															
	Multiply-Accumulate Instruction	—															
DMA	DMAC (Channels)	4															
	EXDMAC	—															
	DTC/DMAC II	DTC															
External Bus Expansion	Address Space (Bytes)	16M															
	Bus State Controller	Direct connection to ROM/SRAM/DRAM is supported															
	Bus Structure	Separate bus (8/16-bit)															
	SDRAM Controller	—															
	DRAM Controller	Yes															
	Host Interface	—															
Clock	Clock Generation Circuit	2 circuits (Main clock, PLL)															
	PLL	Yes															
	Subclock	—															
	RTC	—															
	Frequency Divider	1/n (n = 1, 2, 4)															
	Power Save	Clock division/Sleep/Module stop/Software standby/Hardware standby															
A/D Converter	Resolution × Channels	10-bit × 10															
	Sample and Hold	Yes															
D/A Converter	Resolution × Channels	8-bit × 2															
Timer	8-bit	2 (TMR)															
	16-bit	6 (TPU)															
	32-bit	—															
	Input Capture	6 (shared with TPU)															
	Output Compare	6 (shared with TPU)															
	PWM Output	6 (shared with TPU)															
	Real-Time Port	—															
	Programmable Pulse Generator	16 (shared with DMAC, DTC, TMR, TPU)															
	Event Counter	8 (shared with TMR, TPU)															
	2-Phase Encoder Input	6 (shared with TPU)															
Watchdog Timer		1															
Serial Interface	Clock Sync./Clock Async.	5															
I²C-bus		2															
IEBus		—															
Smart Card/SIM		5															
Synchronous Serial Communication Unit/Special Serial I/O		1 (Multiprocessor communication function)															
CAN	Channels	—															
	Message Box (Numbers)	—															
Ethernet		—															
USB Function		—															
LPC/ISA		—															
IrDA		Yes															
LCD		—															
CRC Calculation Circuit		—															
I/O Ports	Input Only (Numbers)	11															
	CMOS Output Only (Numbers)	—															
	CMOS I/O (Numbers)	83															
	High Voltage Port (Numbers)	—															
	N-Channel Open Drain Port (Numbers)	14															
	DTMF	—															
	High Current Drive Port	—															
	Pull-Up Resistor	40															
	NMOS Push-Pull	—															
External Interrupts Pins		9 (NMI, IRQ × 8)															
Debugging Function	Boundary Scan/JTAG	—															
	On-Chip Debug	Yes															
	On-Board Flash Program	Yes															
Other Functions	ROM Correction Function	—															
	Others	—															
Operating Frequency/Supply Voltage		34MHz/3.0 to 3.6V						33MHz/3.0 to 3.6V			34MHz/3.0 to 3.6V						
Operating Ambient Temperature (°C)		–40 to 85	–20 to 75	–40 to 85		–20 to 75	–40 to 85	–20 to 75		–40 to 85	–20 to 75	–40 to 85		–20 to 75	–40 to 85		
Package*2		PTQP0120LA-A						PRQP0128KB-A			PTQP0120LA-A						
Part No.		HD64F2361VTE34WV	HD64F2361VTE34DV	HD64F2361VTE34V	HD64F2362VTE34WV	HD64F2362VTE34DV	HD64F2362VTE34V	HD64F2367VF33V	HD64F2367VF33WV	HD64F2367VTE33V	HD64F2367VTE33WV	HD64F2364VTE34WV	HD64F2364VTE34V	HD64F2364VTE34DV	HD64F2368VTE34WV	HD64F2368VTE34V	HD64F2368VTE34DV

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8S/2300 Series)

Group		H8S/2378			
Memory	ROM (Bytes)	—	256K		
	RAM (Bytes)	16K		24K	
	ROM Type*1	L	F	M	F
	Program Security	—	Yes	—	Yes
CPU	CPU	H8S/2000 Core			
	Basic Instructions	65			
	Minimum Instruction Execution Time (ns)	30 (@33MHz)	29 (@34MHz)	30 (@33MHz)	29 (@34MHz)
	Multiplier	—			
	Multiply-Accumulate Instruction	—			
DMA	DMAC (Channels)	4			
	EXDMAC	—	2	—	2
	DTC/DMAC Ⅱ	DTC			
External Bus Expansion	Address Space (Bytes)	16M			
	Bus State Controller	Direct connection to ROM/SRAM is supported			
	Bus Structure	Separate bus (8/16-bit)			
	SDRAM Controller	—	Yes	—	Yes
	DRAM Controller	Yes			
	Host Interface	—			
Clock	Clock Generation Circuit	2 circuits (Main clock, PLL)			
	PLL	Yes			
	Subclock	—			
	RTC	—			
	Frequency Divider	1/n (n = 1, 2, 4, 8)			
	Power Save	Clock division/Sleep/Module stop/Software standby/Hardware standby			
A/D Converter	Resolution × Channels	10-bit × 16			
	Sample and Hold	Yes			
D/A Converter	Resolution × Channels	8-bit × 2	8-bit × 6	8-bit × 2	8-bit × 6
Timer	8-bit	2 (TMR)			
	16-bit	6 (TPU)			
	32-bit	—			
	Input Capture	6 (shared with TPU)			
	Output Compare	6 (shared with TPU)			
	PWM Output	6 (shared with TPU)			
	Real-Time Port	—			
	Programmable Pulse Generator	16 (shared with DMAC, DTC, TMR, TPU)			
	Event Counter	8 (shared with TMR, TPU)			
	2-Phase Encoder Input	6 (shared with TPU)			
Watchdog Timer		1			
Serial Interface	Clock Sync./Clock Async.	5			
I²C-bus		2			
IEBus		—			
Smart Card/SIM		5			
Synchronous Serial Communication Unit/Special Serial I/O		1 (Multiprocessor communication function)			
CAN	Channels	—			
	Message Box (Numbers)	—			
Ethernet		—			
USB Function		—			
LPC/ISA		—			
IrDA		Yes			
LCD		—			
CRC Calculation Circuit		—			
I/O Ports	Input Only (Numbers)	17			
	CMOS Output Only (Numbers)	—			
	CMOS I/O (Numbers)	96			
	High Voltage Port (Numbers)	—			
	N-Channel Open Drain Port (Numbers)	14			
	DTMF	—			
	High Current Drive Port	—			
	Pull-Up Resistor	40			
	NMOS Push-Pull	—			
External Interrupts Pins		17 (NMI, IRQ × 16)			
Debugging Function	Boundary Scan/JTAG	—			
	On-Chip Debug	—	Yes	—	Yes
	On-Board Flash Program	—	Yes	—	Yes
Other Functions	ROM Correction Function	—			
	Others	—			
Operating Frequency/Supply Voltage		33MHz/3.0 to 3.6V	34MHz/3.0 to 3.6V	33MHz/3.0 to 3.6V	34MHz/3.0 to 3.6V
Operating Ambient Temperature (˚C)		–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85
Package*2		PLQP0144KC-A				PTLG0145JB-A				PLQP0144KC-A				PTLG0145JB-A			
Part No.		HD6412373VFQ33V	HD6412373VFQ33WV	HD64F2370VFQ34DV	HD64F2370VFQ34V	HD64F2370VFQ34WV	HD64F2370VLP34DV	HD64F2370VLP34V	HD64F2370VLP34WV	HD6432375WXXXFQ	HD6432375WXXXFQW	HD6432375XXXFQ	HD6432375XXXFQW	HD64F2371VFQ34DV	HD64F2371VFQ34V	HD64F2371VFQ34WV	HD64F2371VLP34DV	HD64F2371VLP34V	HD64F2371VLP34WV

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8S/2300 Series)

<table>
<tr><th colspan="2">Group</th><th colspan="20">H8S/2378</th></tr>
<tr><td rowspan="4">Memory</td><td>ROM (Bytes)</td><td colspan="6">256K</td><td colspan="8">384K</td><td colspan="6">512K</td></tr>
<tr><td>RAM (Bytes)</td><td colspan="6">32K</td><td colspan="2">24K</td><td colspan="12">32K</td></tr>
<tr><td>ROM Type*[1]</td><td colspan="20">F</td></tr>
<tr><td>Program Security</td><td colspan="20">Yes</td></tr>
<tr><td rowspan="5">CPU</td><td>CPU</td><td colspan="20">H8S/2000 Core</td></tr>
<tr><td>Basic Instructions</td><td colspan="20">65</td></tr>
<tr><td>Minimum Instruction Execution Time (ns)</td><td colspan="6">29 (@34MHz)</td><td colspan="2">30 (@33MHz)</td><td colspan="6">29 (@34MHz)</td><td colspan="6">29 (@35MHz)</td></tr>
<tr><td>Multiplier</td><td colspan="20">—</td></tr>
<tr><td>Multiply-Accumulate Instruction</td><td colspan="20">—</td></tr>
<tr><td rowspan="3">DMA</td><td>DMAC (Channels)</td><td colspan="20">4</td></tr>
<tr><td>EXDMAC</td><td colspan="20">2</td></tr>
<tr><td>DTC/DMAC II</td><td colspan="20">DTC</td></tr>
<tr><td rowspan="6">External Bus Expansion</td><td>Address Space (Bytes)</td><td colspan="20">16M</td></tr>
<tr><td>Bus State Controller</td><td colspan="20">Direct connection to ROM/SRAM is supported</td></tr>
<tr><td>Bus Structure</td><td colspan="20">Separate bus (8/16-bit)</td></tr>
<tr><td>SDRAM Controller</td><td colspan="6">Yes</td><td colspan="2">—</td><td colspan="6">Yes</td><td colspan="6">—</td></tr>
<tr><td>DRAM Controller</td><td colspan="20">Yes</td></tr>
<tr><td>Host Interface</td><td colspan="20">—</td></tr>
<tr><td rowspan="6">Clock</td><td>Clock Generation Circuit</td><td colspan="20">2 circuits (Main clock, PLL)</td></tr>
<tr><td>PLL</td><td colspan="20">Yes</td></tr>
<tr><td>Subclock</td><td colspan="20">—</td></tr>
<tr><td>RTC</td><td colspan="20">—</td></tr>
<tr><td>Frequency Divider</td><td colspan="20">1/n (n = 1, 2, 4, 8)</td></tr>
<tr><td>Power Save</td><td colspan="20">Clock division/Sleep/Module stop/Software standby/Hardware standby</td></tr>
<tr><td rowspan="2">A/D Converter</td><td>Resolution × Channels</td><td colspan="20">10-bit × 16</td></tr>
<tr><td>Sample and Hold</td><td colspan="20">Yes</td></tr>
<tr><td>D/A Converter</td><td>Resolution × Channels</td><td colspan="20">8-bit × 6</td></tr>
<tr><td rowspan="10">Timer</td><td>8-bit</td><td colspan="20">2 (TMR)</td></tr>
<tr><td>16-bit</td><td colspan="20">6 (TPU)</td></tr>
<tr><td>32-bit</td><td colspan="20">—</td></tr>
<tr><td>Input Capture</td><td colspan="20">6 (shared with TPU)</td></tr>
<tr><td>Output Compare</td><td colspan="20">6 (shared with TPU)</td></tr>
<tr><td>PWM Output</td><td colspan="20">6 (shared with TPU)</td></tr>
<tr><td>Real-Time Port</td><td colspan="20">—</td></tr>
<tr><td>Programmable Pulse Generator</td><td colspan="20">16 (shared with DMAC, DTC, TMR, TPU)</td></tr>
<tr><td>Event Counter</td><td colspan="20">8 (shared with TMR, TPU)</td></tr>
<tr><td>2-Phase Encoder Input</td><td colspan="20">6 (shared with TPU)</td></tr>
<tr><td colspan="2">Watchdog Timer</td><td colspan="20">1</td></tr>
<tr><td>Serial Interface</td><td>Clock Sync./Clock Async.</td><td colspan="20">5</td></tr>
<tr><td colspan="2">I^2C-bus</td><td colspan="20">2</td></tr>
<tr><td colspan="2">IEBus</td><td colspan="20">—</td></tr>
<tr><td colspan="2">Smart Card/SIM</td><td colspan="20">5</td></tr>
<tr><td colspan="2">Synchronous Serial Communication Unit/Special Serial I/O</td><td colspan="20">1 (Multiprocessor communication function)</td></tr>
<tr><td rowspan="2">CAN</td><td>Channels</td><td colspan="20">—</td></tr>
<tr><td>Message Box (Numbers)</td><td colspan="20">—</td></tr>
<tr><td colspan="2">Ethernet</td><td colspan="20">—</td></tr>
<tr><td colspan="2">USB Function</td><td colspan="20">—</td></tr>
<tr><td colspan="2">LPC/ISA</td><td colspan="20">—</td></tr>
<tr><td colspan="2">IrDA</td><td colspan="20">Yes</td></tr>
<tr><td colspan="2">LCD</td><td colspan="20">—</td></tr>
<tr><td colspan="2">CRC Calculation Circuit</td><td colspan="20">—</td></tr>
<tr><td rowspan="9">I/O Ports</td><td>Input Only (Numbers)</td><td colspan="20">17</td></tr>
<tr><td>CMOS Output Only (Numbers)</td><td colspan="20">—</td></tr>
<tr><td>CMOS I/O (Numbers)</td><td colspan="20">96</td></tr>
<tr><td>High Voltage Port (Numbers)</td><td colspan="20">—</td></tr>
<tr><td>N-Channel Open Drain Port (Numbers)</td><td colspan="20">14</td></tr>
<tr><td>DTMF</td><td colspan="20">—</td></tr>
<tr><td>High Current Drive Port</td><td colspan="20">—</td></tr>
<tr><td>Pull-Up Resistor</td><td colspan="20">40</td></tr>
<tr><td>NMOS Push-Pull</td><td colspan="20">—</td></tr>
<tr><td colspan="2">External Interrupts Pins</td><td colspan="20">17 (NMI, IRQ × 16)</td></tr>
<tr><td rowspan="3">Debugging Function</td><td>Boundary Scan/JTAG</td><td colspan="20">—</td></tr>
<tr><td>On-Chip Debug</td><td colspan="20">Yes</td></tr>
<tr><td>On-Board Flash Program</td><td colspan="20">Yes</td></tr>
<tr><td rowspan="2">Other Functions</td><td>ROM Correction Function</td><td colspan="20">—</td></tr>
<tr><td>Others</td><td colspan="20">—</td></tr>
<tr><td colspan="2">Operating Frequency/Supply Voltage</td><td colspan="6">34MHz/3.0 to 3.6V</td><td colspan="2">33MHz/3.0 to 3.6V</td><td colspan="6">34MHz/3.0 to 3.6V</td><td colspan="6">35MHz/3.0 to 3.6V</td></tr>
<tr><td colspan="2">Operating Ambient Temperature (˚C)</td><td>−40 to 85</td><td>−20 to 75</td><td colspan="2">−40 to 85</td><td>−20 to 75</td><td>−40 to 85</td><td>−20 to 75</td><td colspan="2">−40 to 85</td><td>−20 to 75</td><td colspan="2">−40 to 85</td><td>−20 to 75</td><td colspan="2">−40 to 85</td><td>−20 to 75</td><td colspan="2">−40 to 85</td><td>−20 to 75</td><td>−40 to 85</td></tr>
<tr><td colspan="2">Package*[2]</td><td colspan="3">PLQP0144KC-A</td><td colspan="3">PTLG0145JB-A</td><td colspan="5">PLQP0144KC-A</td><td colspan="3">PTLG0145JB-A</td><td colspan="3">PLQP0144KC-A</td><td colspan="3">PTLG0145JB-A</td></tr>
<tr><td colspan="2">Part No.</td><td>HD64F2372VFQ34DV</td><td>HD64F2372VFQ34V</td><td>HD64F2372VFQ34WV</td><td>HD64F2372VLP34DV</td><td>HD64F2372VLP34V</td><td>HD64F2372VLP34WV</td><td>HD64F2377VFQ33V</td><td>HD64F2377VFQ33WV</td><td>HD64F2374VFQ34DV</td><td>HD64F2374VFQ34V</td><td>HD64F2374VFQ34WV</td><td>HD64F2374VLP34DV</td><td>HD64F2374VLP34V</td><td>HD64F2374VLP34WV</td><td>HD64F2378BVFQ35DV</td><td>HD64F2378BVFQ35V</td><td>HD64F2378BVFQ35WV</td><td>HD64F2378BVLP35DV</td><td>HD64F2378BVLP35V</td><td>HD64F2378BVLP35WV</td></tr>
</table>

*[1] F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*[2] Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8S/2300 Series)

Group		H8S/2378R			
Memory	ROM (Bytes)	—	256K		
	RAM (Bytes)	16K		24K	
	ROM Type*1	L	F	M	F
	Program Security	—	Yes	—	Yes
CPU	CPU	H8S/2000 Core			
	Basic Instructions	65			
	Minimum Instruction Execution Time (ns)	30 (@33MHz)	29 (@34MHz)	30 (@33MHz)	29 (@34MHz)
	Multiplier	—			
	Multiply-Accumulate Instruction	—			
DMA	DMAC (Channels)	4			
	EXDMAC	—	2	—	2
	DTC/DMAC II	DTC			
External Bus Expansion	Address Space (Bytes)	16M			
	Bus State Controller	Direct connection to ROM/SRAM/SDRAM/DRAM is supported			
	Bus Structure	Separate bus (8/16-bit)			
	SDRAM Controller	Yes			
	DRAM Controller	Yes			
	Host Interface	—			
Clock	Clock Generation Circuit	2 circuits (Main clock, PLL)			
	PLL	Yes			
	Subclock	—			
	RTC	—			
	Frequency Divider	1/n (n = 1, 2, 4, 8)			
	Power Save	Clock division/Sleep/Module stop/Software standby/Hardware standby			
A/D Converter	Resolution × Channels	10-bit × 16			
	Sample and Hold	Yes			
D/A Converter	Resolution × Channels	8-bit × 2	8-bit × 6	8-bit × 2	8-bit × 6
Timer	8-bit	2 (TMR)			
	16-bit	6 (TPU)			
	32-bit	—			
	Input Capture	6 (shared with TPU)			
	Output Compare	6 (shared with TPU)			
	PWM Output	6 (shared with TPU)			
	Real-Time Port	—			
	Programmable Pulse Generator	16 (shared with DMAC, DTC, TMR, TPU)			
	Event Counter	8 (shared with TMR, TPU)			
	2-Phase Encoder Input	6 (shared with TPU)			
Watchdog Timer		1			
Serial Interface	Clock Sync./Clock Async.	5			
I^2C-bus		2			
IEBus		—			
Smart Card/SIM		5			
Synchronous Serial Communication Unit/Special Serial I/O		1 (Multiprocessor communication function)			
CAN	Channels	—			
	Message Box (Numbers)	—			
Ethernet		—			
USB Function		—			
LPC/ISA		—			
IrDA		Yes			
LCD		—			
CRC Calculation Circuit		—			
I/O Ports	Input Only (Numbers)	17			
	CMOS Output Only (Numbers)	—			
	CMOS I/O (Numbers)	96			
	High Voltage Port (Numbers)	—			
	N-Channel Open Drain Port (Numbers)	14			
	DTMF	—			
	High Current Drive Port	—			
	Pull-Up Resistor	40			
	NMOS Push-Pull	—			
External Interrupts Pins		17 (NMI, IRQ × 16)			
Debugging Function	Boundary Scan/JTAG	—			
	On-Chip Debug	—	Yes	—	Yes
	On-Board Flash Program	—	Yes	—	Yes
Other Functions	ROM Correction Function	—			
	Others	—			
Operating Frequency/Supply Voltage		33MHz/3.0 to 3.6V	34MHz/3.0 to 3.6V	33MHz/3.0 to 3.6V	34MHz/3.0 to 3.6V
Operating Ambient Temperature (°C)		–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85
Package*2		PLQP0144KC-A					PTLG0145JB-A			PLQP0144KC-A							PTLG0145JB-A		
Part No.		HD6412373RVFQ33V	HD6412373RVFQ33WV	HD64F2370RVFQ34DV	HD64F2370RVFQ34V	HD64F2370RVFQ34WV	HD64F2370RVLP34DV	HD64F2370RVLP34V	HD64F2370RVLP34WV	HD6432375RXXXFQ	HD6432375RXXXFQW	HD6432375TXXXFQ	HD6432375TXXXFQW	HD64F2371RVFQ34DV	HD64F2371RVFQ34V	HD64F2371RVFQ34WV	HD64F2371RVLP34DV	HD64F2371RVLP34V	HD64F2371RVLP34WV

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*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8S/2300 Series)

Group		H8S/2378R																			
Memory	ROM (Bytes)	256K						384K								512K					
	RAM (Bytes)	32K						24K		32K											
	ROM Type*1	F																			
	Program Security	Yes																			
CPU	CPU	H8S/2000 Core																			
	Basic Instructions	65																			
	Minimum Instruction Execution Time (ns)	29 (@34MHz)						30 (@33MHz)		29 (@34MHz)											
	Multiplier	—																			
	Multiply-Accumulate Instruction	—																			
DMA	DMAC (Channels)	4																			
	EXDMAC	2																			
	DTC/DMAC II	DTC																			
External Bus Expansion	Address Space (Bytes)	16M																			
	Bus State Controller	Direct connection to ROM/SRAM/SDRAM/DRAM is supported																			
	Bus Structure	Separate bus (8/16-bit)																			
	SDRAM Controller	Yes																			
	DRAM Controller	Yes																			
	Host Interface	—																			
Clock	Clock Generation Circuit	2 circuits (Main clock, PLL)																			
	PLL	Yes																			
	Subclock	—																			
	RTC	—																			
	Frequency Divider	1/n (n = 1, 2, 4, 8)																			
	Power Save	Clock division/Sleep/Module stop/Software standby/Hardware standby																			
A/D Converter	Resolution × Channels	10-bit × 16																			
	Sample and Hold	Yes																			
D/A Converter	Resolution × Channels	8-bit × 6																			
Timer	8-bit	2 (TMR)																			
	16-bit	6 (TPU)																			
	32-bit	—																			
	Input Capture	6 (shared with TPU)																			
	Output Compare	6 (shared with TPU)																			
	PWM Output	6 (shared with TPU)																			
	Real-Time Port	—																			
	Programmable Pulse Generator	16 (shared with DMAC, DTC, TMR, TPU)																			
	Event Counter	8 (shared with TMR, TPU)																			
	2-Phase Encoder Input	6 (shared with TPU)																			
Watchdog Timer		1																			
Serial Interface	Clock Sync./Clock Async.	5																			
I²C-bus		2																			
IEBus		—																			
Smart Card/SIM		5																			
Synchronous Serial Communication Unit/Special Serial I/O		1 (Multiprocessor communication function)																			
CAN	Channels	—																			
	Message Box (Numbers)	—																			
Ethernet		—																			
USB Function		—																			
LPC/ISA		—																			
IrDA		Yes																			
LCD		—																			
CRC Calculation Circuit		—																			
I/O Ports	Input Only (Numbers)	17																			
	CMOS Output Only (Numbers)	—																			
	CMOS I/O (Numbers)	96																			
	High Voltage Port (Numbers)	—																			
	N-Channel Open Drain Port (Numbers)	14																			
	DTMF	—																			
	High Current Drive Port	—																			
	Pull-Up Resistor	40																			
	NMOS Push-Pull	—																			
External Interrupts Pins		17 (NMI, IRQ × 16)																			
Debugging Function	Boundary Scan/JTAG	—																			
	On-Chip Debug	Yes																			
	On-Board Flash Program	Yes																			
Other Functions	ROM Correction Function	—																			
	Others	—																			
Operating Frequency/Supply Voltage		34MHz/3.0 to 3.6V						33MHz/3.0 to 3.6V		34MHz/3.0 to 3.6V											
Operating Ambient Temperature (°C)		–40 to 85	–20 to 75	–40 to 85		–20 to 75	–40 to 85	–20 to 75	–40 to 85		–20 to 75	–40 to 85		–20 to 75	–40 to 85		–20 to 75	–40 to 85		–20 to 75	–40 to 85
Package*2		PLQP0144KC-A			PTLG0145JB-A			PLQP0144KC-A					PTLG0145JB-A			PLQP0144KC-A			PTLG0145JB-A		
Part No.		HD64F2372RVFQ34DV	HD64F2372RVFQ34V	HD64F2372RVFQ34WV	HD64F2372RVLP34DV	HD64F2372RVLP34V	HD64F2372RVLP34WV	HD64F2377RVFQ33V	HD64F2377RVFQ33WV	HD64F2374RVFQ34DV	HD64F2374RVFQ34V	HD64F2374RVFQ34WV	HD64F2374RVLP34DV	HD64F2374RVLP34V	HD64F2374RVLP34WV	HD64F2378RVFQ34DV	HD64F2378RVFQ34V	HD64F2378RVFQ34WV	HD64F2378RVLP34DV	HD64F2378RVLP34V	HD64F2378RVLP34WV

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8S/2300 Series)

Group		H8S/2398																							
Memory	ROM (Bytes)	—												256K											
	RAM (Bytes)	4K		8K				32K						8K											
	ROM Type*1	L												F									M		
	Program Security	—												Yes									—		
CPU	CPU	H8S/2000 Core																							
	Basic Instructions	65																							
	Minimum Instruction Execution Time (ns)	50 (@20MHz)																							
	Multiplier	—																							
	Multiply-Accumulate Instruction	—																							
DMA	DMAC (Channels)	4																							
	EXDMAC	—																							
	DTC/DMAC II	DTC																							
External Bus Expansion	Address Space (Bytes)	16M																							
	Bus State Controller	Direct connection to ROM/Burst ROM/SRAM/DRAM is supported																							
	Bus Structure	Separate bus (8/16-bit)																							
	SDRAM Controller	—																							
	DRAM Controller	Yes																							
	Host Interface	—																							
Clock	Clock Generation Circuit	1 circuit (Main clock)																							
	PLL	—																							
	Subclock	—																							
	RTC	—																							
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16, 32)																							
	Power Save	Medium-speed/Sleep/Module stop/Software standby/Hardware standby																							
A/D Converter	Resolution × Channels	10-bit × 8																							
	Sample and Hold	Yes																							
D/A Converter	Resolution × Channels	8-bit × 2																							
Timer	8-bit	2 (TMR)																							
	16-bit	6 (TPU)																							
	32-bit	—																							
	Input Capture	6 (shared with TPU)																							
	Output Compare	6 (shared with TPU)																							
	PWM Output	6 (shared with TPU)																							
	Real-Time Port	—																							
	Programmable Pulse Generator	16 (shared with DMAC, DTC, TMR, TPU)																							
	Event Counter	8 (shared with TMR, TPU)																							
	2-Phase Encoder Input	6 (shared with TPU)																							
Watchdog Timer		1																							
Serial Interface	Clock Sync./Clock Async.	3																							
I^2C-bus		—																							
IEBus		—																							
Smart Card/SIM		3																							
Synchronous Serial Communication Unit/Special Serial I/O		1 (Multiprocessor communication function)																							
CAN	Channels	—																							
	Message Box (Numbers)	—																							
Ethernet		—																							
USB Function		—																							
LPC/ISA		—																							
IrDA		—																							
LCD		—																							
CRC Calculation Circuit		—																							
I/O Ports	Input Only (Numbers)	8																							
	CMOS Output Only (Numbers)	—																							
	CMOS I/O (Numbers)	87																							
	High Voltage Port (Numbers)	—																							
	N-Channel Open Drain Port (Numbers)	6												14											
	DTMF	—																							
	High Current Drive Port	32 (port for LED drive)																							
	Pull-Up Resistor	—												40											
	NMOS Push-Pull	—																							
External Interrupts Pins		9 (NMI, IRQ × 8)																							
Debugging Function	Boundary Scan/JTAG	—																							
	On-Chip Debug	—																							
	On-Board Flash Program	—												Yes									—		
Other Functions	ROM Correction Function	—																							
	Others	—																							
Operating Frequency/Supply Voltage		20MHz/4.5 to 5.5V																							
Operating Ambient Temperature (°C)		–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75		–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85		
Package*2		PRQP0128KB-A		PTQP0120LA-A		PRQP0128KB-A		PTQP0120LA-A		PRQP0128KB-A		PTQP0120LA-A		PRQP0128KB-A		PTQP0120LA-A		PRQP0128KB-A		PTQP0120LA-A		PRQP0128KB-A		PTQP0120LA-A	
Part No.		HD6412390F20IV	HD6412390F20V	HD6412390TE20IV	HD6412390TE20V	HD6412392F20IV	HD6412392F20V	HD6412392TE20IV	HD6412392TE20V	HD6412394F20V	HD6412394F20WV	HD6412394TE20V	HD6412394TE20WV	HD64F2398F20	HD64F2398F20W	HD64F2398TE20	HD64F2398TE20W	HD6432398XXXF	HD6432398XXXFW	HD6432398XXXTE	HD6432398XXXTEW				

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

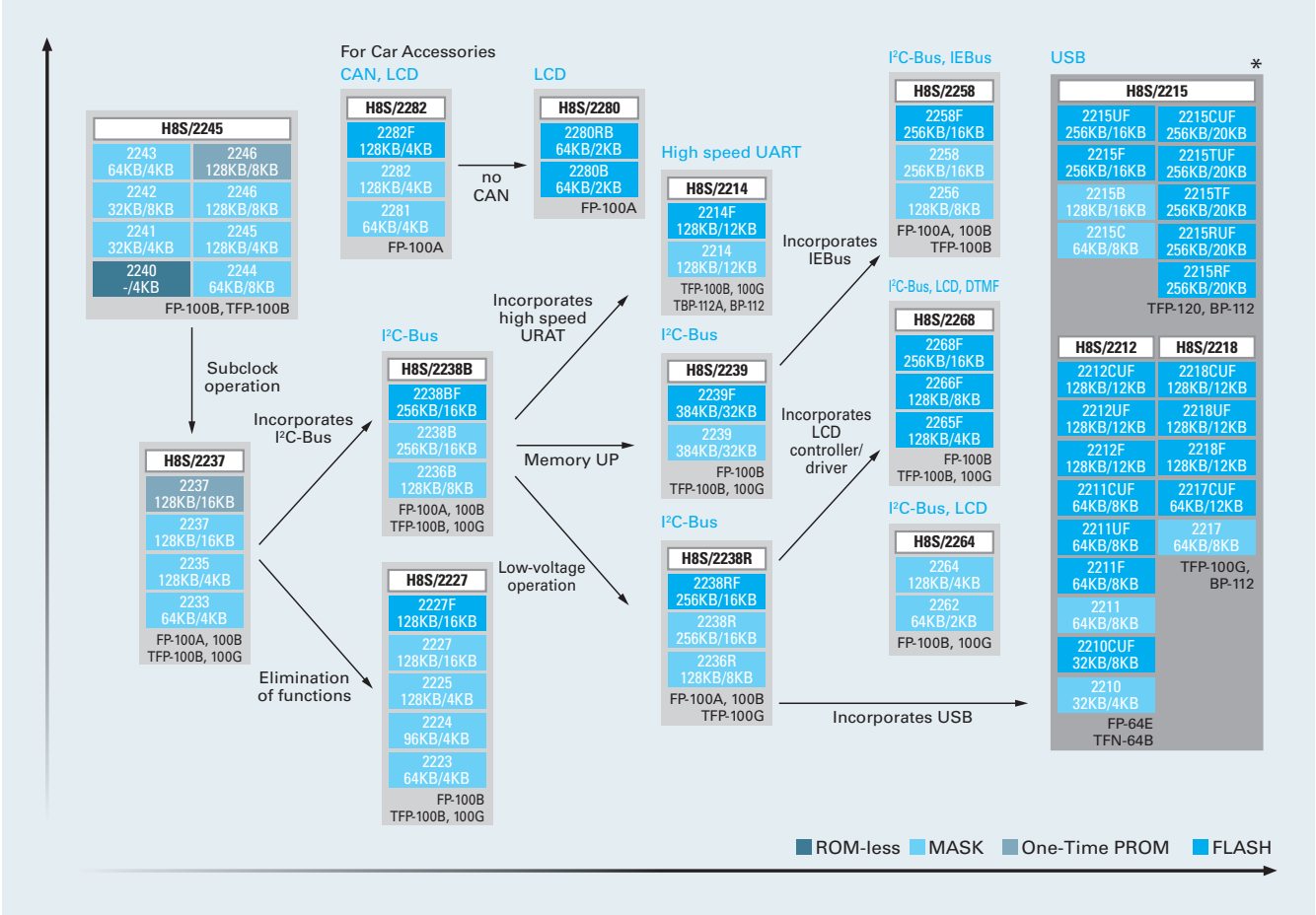
Outline of H8S/2200 Series

The series incorporating a 32-kHz oscillator to lower power consumption

H8S/2200 Series Features

- A lineup with a minimum operation assured voltage of 2.2 V
- Incorporates strong communication functions (SCI: 4 ch, I²C-Bus: 2 ch, IEBus, high speed SCI, USB 2.0)
- Pursued low power consumption by incorporating a 32-kHz oscillator

• H8S/2200 Series Roadmap



* Please refer to the "Renesas USB Device Catalog" for details.

H8S/2212, H8S/2215, H8S/2218 Group

- On-chip SCI, DMAC, and DTC for high-speed data transfer
- On-chip USB interface
- Compact package
- Flash memory programming via USB supported
- Support E10A-USB

* Refer to "USB MPUs and MCUs" in this catalog.

H8S/2214 Group

- On-chip SCI, DMAC, and DTC for high-speed data transfer
- Compact package

H8S/2238B, H8S/2239, H8S/2238R Group

- 2.2V low-voltage operation (H8S/2238R, H8S/2239)
- On-chip I²C-bus interface
- On-chip 384K bytes flash memory (H8S/2239)

H8S/2245 Group

- A single-chip MCU with 128K bytes of on-chip ROM and 8K bytes of on-chip RAM
- 32kHz external clock operation

H8S/2227, H8S/2237 Group

- A single-chip MCU with 128K bytes of on-chip ROM and 16K bytes of on-chip RAM
- 32kHz external clock operation

H8S/2258 Group

- On-chip IEBus™ and I²C-bus interfaces
- On-chip 256K bytes flash memory

H8S/2268 Group

- On-chip I²C-bus interface
- On-chip DTMF output circuit
- On-chip LCD controller/driver
- On-chip 32kHz oscillator
- On-chip 256K bytes flash memory

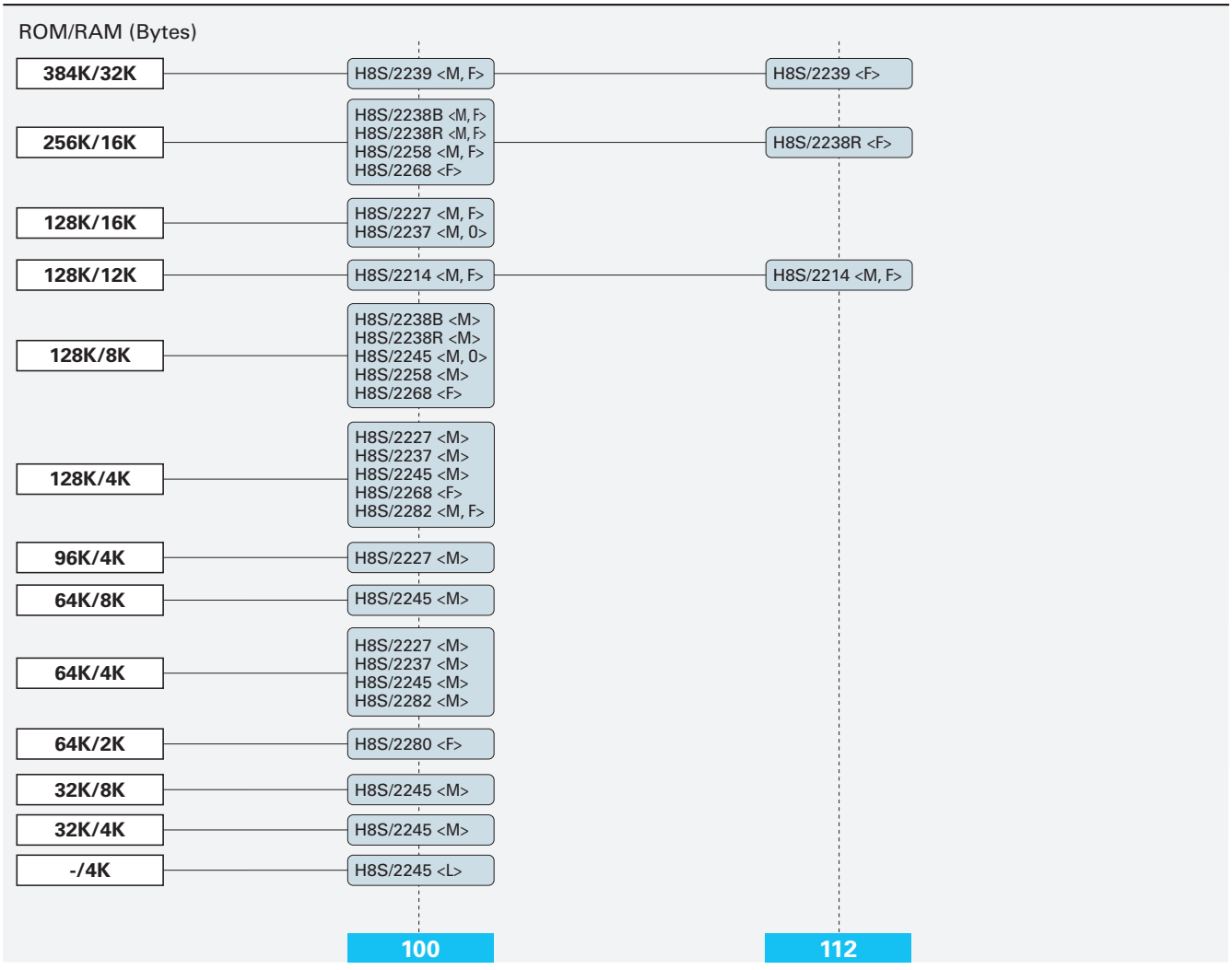
H8S/2282 Group

- On-chip CAN interface
- On-chip subclock divider

* Refer to "Automotive MCUs" in this catalog.

*Please refer to the H8S/2264 Group on the "H8S Super Low Power Series" page when examining the mask ROM version of the H8S/2268 Group.

• Memory Capacity (ROM/RAM) (H8S/2200 Series)



Letters in brackets < > indicate memory variations.
F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

• Specifications (H8S/2200 Series)

Group		H8S/2214															
Memory	ROM (Bytes)	128K															
	RAM (Bytes)	12K															
	ROM Type*1	F												M			
	Program Security	Yes												—			
CPU	CPU	H8S/2000 Core															
	Basic Instructions	65															
	Minimum Instruction Execution Time (ns)	63 (@16MHz)															
	Multiplier	—															
	Multiply-Accumulate Instruction	—															
DMA	DMAC (Channels)	6															
	EXDMAC	—															
	DTC/DMAC II	DTC															
External Bus Expansion	Address Space (Bytes)	16M															
	Bus State Controller	Direct connection to SRAM/ROM is supported															
	Bus Structure	Separate bus (8/16-bit)															
	SDRAM Controller	—															
	DRAM Controller	—															
	Host Interface	—															
Clock	Clock Generation Circuit	1 circuit (Main clock)															
	PLL	—															
	Subclock	—															
	RTC	—															
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16, 32)															
	Power Save	Normal operating/Medium-speed/Sleep/Module stop/Software standby/Hardware standby															
A/D Converter	Resolution × Channels	—															
	Sample and Hold	—															
D/A Converter	Resolution × Channels	8-bit × 1															
Timer	8-bit	—															
	16-bit	3 (TPU)															
	32-bit	—															
	Input Capture	3 (shared with TPU)															
	Output Compare	3 (shared with TPU)															
	PWM Output	3 (shared with TPU)															
	Real-Time Port	—															
	Programmable Pulse Generator	—															
	Event Counter	3 (shared with TPU)															
	2-Phase Encoder Input	3 (shared with TPU)															
Watchdog Timer		1															
Serial Interface	Clock Sync./Clock Async.	3															
I^2C-bus		—															
IEBus		—															
Smart Card/SIM		—															
Synchronous Serial Communication Unit/Special Serial I/O		—															
CAN	Channels	—															
	Message Box (Numbers)	—															
Ethernet		—															
USB Function		—															
LPC/ISA		—															
IrDA		—															
LCD		—															
CRC Calculation Circuit		—															
I/O Ports	Input Only (Numbers)	18															
	CMOS Output Only (Numbers)	—															
	CMOS I/O (Numbers)	72															
	High Voltage Port (Numbers)	—															
	N-Channel Open Drain Port (Numbers)	11															
	DTMF	—															
	High Current Drive Port	—															
	Pull-Up Resistor	36															
	NMOS Push-Pull	—															
External Interrupts Pins		9															
Debugging Function	Boundary Scan/JTAG	—															
	On-Chip Debug	—															
	On-Board Flash Program	Yes												—			
Other Functions	ROM Correction Function	—															
	Others	SCIO for high-speed UART															
Operating Frequency/Supply Voltage		16MHz/2.7 to 3.6V															
Operating Ambient Temperature (°C)		–20 to 75	–40 to 85	–20 to 75	–40 to 85		–20 to 75	–40 to 85	–20 to 75		–40 to 85	–20 to 75		–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85
Package*2		TTBG0112GA-A		PLBG0112GA-A		PTQP0100KA-A		PTQP0100LC-A		PLBG0112GA-A		PTQP0100KA-A			PTQP0100LC-A		
Part No.		HD64F2214BQ16V	HD64F2214BQ16WV	HD64F2214BR16V	HD64F2214BR16WV	HD64F2214TE16IV	HD64F2214TE16V	HD64F2214TF16IV	HD64F2214TF16V	HD6432214XXXXBR	HD6432214XXXXBRW	HD6432214XXXXTE	HD6432214XXXXTEI		HD6432214XXXXTF	HD6432214XXXXTFI	

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8S/2200 Series)

Group		H8S/2227											
Memory	ROM (Bytes)	64K						96K					
	RAM (Bytes)	4K											
	ROM Type*1	M											
	Program Security	—											
CPU	CPU	H8S/2000 Core											
	Basic Instructions	65											
	Minimum Instruction Execution Time (ns)	74 (@13.5MHz)											
	Multiplier	—											
	Multiply-Accumulate Instruction	—											
DMA	DMAC (Channels)	—											
	EXDMAC	—											
	DTC/DMAC II	DTC											
External Bus Expansion	Address Space (Bytes)	16M											
	Bus State Controller	Direct connection to SRAM/ROM is supported											
	Bus Structure	Separate bus (8/16-bit)											
	SDRAM Controller	—											
	DRAM Controller	—											
	Host Interface	—											
Clock	Clock Generation Circuit	2 circuits (Main clock, Sub clock)											
	PLL	—											
	Subclock	Yes											
	RTC	Yes (WDT for watch)											
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16, 32)											
	Power Save	Normal operating/Medium-speed/Sleep/Module stop/Watch/Sub active/Sub sleep/Software standby/Hardware standby											
A/D Converter	Resolution × Channels	10-bit × 8											
	Sample and Hold	Yes											
D/A Converter	Resolution × Channels	—											
Timer	8-bit	2 (TMR)											
	16-bit	3 (TPU)											
	32-bit	—											
	Input Capture	3 (shared with TPU)											
	Output Compare	3 (shared with TPU)											
	PWM Output	3 (shared with TPU)											
	Real-Time Port	—											
	Programmable Pulse Generator	—											
	Event Counter	5 (shared with TMR, TPU)											
	2-Phase Encoder Input	3 (shared with TPU)											
Watchdog Timer		2											
Serial Interface	Clock Sync./Clock Async.	3											
I^2C-bus		—											
IEBus		—											
Smart Card/SIM		3											
Synchronous Serial Communication Unit/Special Serial I/O		—											
CAN	Channels	—											
	Message Box (Numbers)	—											
Ethernet		—											
USB Function		—											
LPC/ISA		—											
IrDA		—											
LCD		—											
CRC Calculation Circuit		—											
I/O Ports	Input Only (Numbers)	19											
	CMOS Output Only (Numbers)	—											
	CMOS I/O (Numbers)	72											
	High Voltage Port (Numbers)	—											
	N-Channel Open Drain Port (Numbers)	11											
	DTMF	—											
	High Current Drive Port	—											
	Pull-Up Resistor	36											
	NMOS Push-Pull	—											
External Interrupts Pins		9											
Debugging Function	Boundary Scan/JTAG	—											
	On-Chip Debug	—											
	On-Board Flash Program	—											
Other Functions	ROM Correction Function	Yes (PC break)											
	Others	—											
Operating Frequency/Supply Voltage		13.5MHz/2.7 to 3.6V, 6.25MHz/2.2 to 3.6V											
Operating Ambient Temperature (˚C)		–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85
Package*2		PRQP0100KA-A		PTQP0100KA-A		PTQP0100LC-A		PRQP0100KA-A		PTQP0100KA-A		PTQP0100LC-A	
Part No.		HD6432223XXXFA	HD6432223XXXFAI	HD6432223XXXTE	HD6432223XXXTEI	HD6432223XXXTF	HD6432223XXXTFI	HD6432224XXXFA	HD6432224XXXFAI	HD6432224XXXTE	HD6432224XXXTEI	HD6432224XXXTF	HD6432224XXXTFI

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8S/2200 Series)

Group		H8S/2227
Memory	ROM (Bytes)	128K
Memory	RAM (Bytes)	4K / 16K (see part table)
Memory	ROM Type*[1]	M / F (see part table)
Memory	Program Security	— / Yes (see part table)
CPU	CPU	H8S/2000 Core
CPU	Basic Instructions	65
CPU	Minimum Instruction Execution Time (ns)	74 (@13.5MHz)
CPU	Multiplier	—
CPU	Multiply-Accumulate Instruction	—
DMA	DMAC (Channels)	—
DMA	EXDMAC	—
DMA	DTC/DMAC II	DTC
External Bus Expansion	Address Space (Bytes)	16M
External Bus Expansion	Bus State Controller	Direct connection to SRAM/ROM is supported
External Bus Expansion	Bus Structure	Separate bus (8/16-bit)
External Bus Expansion	SDRAM Controller	—
External Bus Expansion	DRAM Controller	—
External Bus Expansion	Host Interface	—
Clock	Clock Generation Circuit	2 circuits (Main clock, Sub clock)
Clock	PLL	—
Clock	Subclock	Yes
Clock	RTC	Yes (WDT for watch)
Clock	Frequency Divider	1/n (n = 1, 2, 4, 8, 16, 32)
Clock	Power Save	Normal operating/Medium-speed/Sleep/Module stop/Watch/Sub active/Sub sleep/Software standby/Hardware standby
A/D Converter	Resolution × Channels	10-bit × 8
A/D Converter	Sample and Hold	Yes
D/A Converter	Resolution × Channels	—
Timer	8-bit	2 (TMR)
Timer	16-bit	3 (TPU)
Timer	32-bit	—
Timer	Input Capture	3 (shared with TPU)
Timer	Output Compare	3 (shared with TPU)
Timer	PWM Output	3 (shared with TPU)
Timer	Real-Time Port	—
Timer	Programmable Pulse Generator	—
Timer	Event Counter	5 (shared with TMR, TPU)
Timer	2-Phase Encoder Input	3 (shared with TPU)
Watchdog Timer		2
Serial Interface	Clock Sync./Clock Async.	3
I²C-bus		—
IEBus		—
Smart Card/SIM		3
Synchronous Serial Communication Unit/Special Serial I/O		—
CAN	Channels	—
CAN	Message Box (Numbers)	—
Ethernet		—
USB Function		—
LPC/ISA		—
IrDA		—
LCD		—
CRC Calculation Circuit		—
I/O Ports	Input Only (Numbers)	19
I/O Ports	CMOS Output Only (Numbers)	—
I/O Ports	CMOS I/O (Numbers)	72
I/O Ports	High Voltage Port (Numbers)	—
I/O Ports	N-Channel Open Drain Port (Numbers)	11
I/O Ports	DTMF	—
I/O Ports	High Current Drive Port	—
I/O Ports	Pull-Up Resistor	36
I/O Ports	NMOS Push-Pull	—
External Interrupts Pins		9
Debugging Function	Boundary Scan/JTAG	—
Debugging Function	On-Chip Debug	—
Debugging Function	On-Board Flash Program	— / Yes (see part table)
Other Functions	ROM Correction Function	Yes (PC break)
Other Functions	Others	—

Part No.	RAM (Bytes)	ROM Type*[1]	Program Security	On-Board Flash Program	Operating Frequency/Supply Voltage	Operating Ambient Temperature (°C)	Package*[2]
HD6432225XXXFA	4K	M	—	—	13.5MHz/2.7 to 3.6V, 6.25MHz/2.2 to 3.6V	–20 to 75	PRQP0100KA-A
HD6432225XXXFAI	4K	M	—	—	13.5MHz/2.7 to 3.6V, 6.25MHz/2.2 to 3.6V	–40 to 85	PRQP0100KA-A
HD6432225XXXTE	4K	M	—	—	13.5MHz/2.7 to 3.6V, 6.25MHz/2.2 to 3.6V	–20 to 75	PTQP0100KA-A
HD6432225XXXTEI	4K	M	—	—	13.5MHz/2.7 to 3.6V, 6.25MHz/2.2 to 3.6V	–40 to 85	PTQP0100KA-A
HD6432225XXXTF	4K	M	—	—	13.5MHz/2.7 to 3.6V, 6.25MHz/2.2 to 3.6V	–20 to 75	PTQP0100LC-A
HD6432225XXXTFI	4K	M	—	—	13.5MHz/2.7 to 3.6V, 6.25MHz/2.2 to 3.6V	–40 to 85	PTQP0100LC-A
HD6432227XXXF	16K	M	—	—	13.5MHz/2.7 to 3.6V, 6.25MHz/2.2 to 3.6V	–20 to 75	PRQP0100JE-B
HD6432227XXXFA	16K	M	—	—	13.5MHz/2.7 to 3.6V, 6.25MHz/2.2 to 3.6V	–20 to 75	PRQP0100KA-A
HD6432227XXXFAI	16K	M	—	—	13.5MHz/2.7 to 3.6V, 6.25MHz/2.2 to 3.6V	–40 to 85	PRQP0100KA-A
HD6432227XXXFI	16K	M	—	—	13.5MHz/2.7 to 3.6V, 6.25MHz/2.2 to 3.6V	–40 to 85	PRQP0100JE-B
HD6432227XXXTE	16K	M	—	—	13.5MHz/2.7 to 3.6V, 6.25MHz/2.2 to 3.6V	–20 to 75	PTQP0100KA-A
HD6432227XXXTEI	16K	M	—	—	13.5MHz/2.7 to 3.6V, 6.25MHz/2.2 to 3.6V	–40 to 85	PTQP0100KA-A
HD6432227XXXTF	16K	M	—	—	13.5MHz/2.7 to 3.6V, 6.25MHz/2.2 to 3.6V	–20 to 75	PTQP0100LC-A
HD6432227XXXTFI	16K	M	—	—	13.5MHz/2.7 to 3.6V, 6.25MHz/2.2 to 3.6V	–40 to 85	PTQP0100LC-A
HD64F2227TE13IV	16K	F	Yes	Yes	13.5MHz/2.7 to 3.6V	–40 to 85	PTQP0100KA-A
HD64F2227TE13V	16K	F	Yes	Yes	13.5MHz/2.7 to 3.6V	–20 to 75	PTQP0100KA-A
HD64F2227TF13V	16K	F	Yes	Yes	13.5MHz/2.7 to 3.6V	–20 to 75	PTQP0100LC-A

*[1] F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*[2] Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8S/2200 Series)

Group		H8S/2237															
Memory	ROM (Bytes)	64K							128K								
	RAM (Bytes)	4K															
	ROM Type*1	M															
	Program Security	—															
CPU	CPU	H8S/2000 Core															
	Basic Instructions	65															
	Minimum Instruction Execution Time (ns)	74 (@13.5MHz)															
	Multiplier	—															
	Multiply-Accumulate Instruction	—															
DMA	DMAC (Channels)	—															
	EXDMAC	—															
	DTC/DMAC II	DTC															
External Bus Expansion	Address Space (Bytes)	16M															
	Bus State Controller	Direct connection to SRAM/ROM is supported															
	Bus Structure	Separate bus (8/16-bit)															
	SDRAM Controller	—															
	DRAM Controller	—															
	Host Interface	—															
Clock	Clock Generation Circuit	2 circuits (Main clock, Sub clock)															
	PLL	—															
	Subclock	Yes															
	RTC	Yes (WDT for watch)															
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16, 32)															
	Power Save	Normal operating/Medium-speed/Sleep/Module stop/Watch/Sub active/Sub sleep/Software standby/Hardware standby															
A/D Converter	Resolution × Channels	10-bit × 8															
	Sample and Hold	Yes															
D/A Converter	Resolution × Channels	8-bit × 2															
Timer	8-bit	2 (TMR)															
	16-bit	6 (TPU)															
	32-bit	—															
	Input Capture	6 (shared with TPU)															
	Output Compare	6 (shared with TPU)															
	PWM Output	6 (shared with TPU)															
	Real-Time Port	—															
	Programmable Pulse Generator	—															
	Event Counter	8 (shared with TMR, TPU)															
	2-Phase Encoder Input	6 (shared with TPU)															
Watchdog Timer		2															
Serial Interface	Clock Sync./Clock Async.	4															
I²C-bus		—															
IEBus		—															
Smart Card/SIM		4															
Synchronous Serial Communication Unit/Special Serial I/O		—															
CAN	Channels	—															
	Message Box (Numbers)	—															
Ethernet		—															
USB Function		—															
LPC/ISA		—															
IrDA		—															
LCD		—															
CRC Calculation Circuit		—															
I/O Ports	Input Only (Numbers)	19															
	CMOS Output Only (Numbers)	—															
	CMOS I/O (Numbers)	72															
	High Voltage Port (Numbers)	—															
	N-Channel Open Drain Port (Numbers)	11															
	DTMF	—															
	High Current Drive Port	—															
	Pull-Up Resistor	36															
	NMOS Push-Pull	—															
External Interrupts Pins		9															
Debugging Function	Boundary Scan/JTAG	—															
	On-Chip Debug	—															
	On-Board Flash Program	—															
Other Functions	ROM Correction Function	Yes (PC break)															
	Others	—															
Operating Frequency/Supply Voltage		13.5MHz/2.7 to 3.6V, 6.25MHz/2.2 to 3.6V															
Operating Ambient Temperature (˚C)		–20 to 75		–40 to 85		–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75		–40 to 85		–20 to 75	–40 to 85	–20 to 75	–40 to 85
Package*2		PRQP0100JE-B	PRQP0100KA-A	PRQP0100JE-B		PTQP0100KA-A		PTQP0100LC-A		PRQP0100JE-B	PRQP0100KA-A		PRQP0100JE-B	PTQP0100KA-A		PTQP0100LC-A	
Part No.		HD6432233XXXF	HD6432233XXXFA	HD6432233XXXFAI	HD6432233XXXFI	HD6432233XXXTE	HD6432233XXXTEI	HD6432233XXXTF	HD6432233XXXTFI	HD6432235XXXF	HD6432235XXXFA	HD6432235XXXFAI	HD6432235XXXFI	HD6432235XXXTE	HD6432235XXXTEI	HD6432235XXXTF	HD6432235XXXTFI

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8S/2200 Series)

Group		H8S/2237									
Memory	ROM (Bytes)	128K									
	RAM (Bytes)	16K									
	ROM Type*1	M							O		
	Program Security	—							Yes		
CPU	CPU	H8S/2000 Core									
	Basic Instructions	65									
	Minimum Instruction Execution Time (ns)	74 (@13.5MHz)									
	Multiplier	—									
	Multiply-Accumulate Instruction	—									
DMA	DMAC (Channels)	—									
	EXDMAC	—									
	DTC/DMAC II	DTC									
External Bus Expansion	Address Space (Bytes)	16M									
	Bus State Controller	Direct connection to SRAM/ROM is supported									
	Bus Structure	Separate bus (8/16-bit)									
	SDRAM Controller	—									
	DRAM Controller	—									
	Host Interface	—									
Clock	Clock Generation Circuit	2 circuits (Main clock, Sub clock)									
	PLL	—									
	Subclock	Yes									
	RTC	Yes (WDT for watch)									
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16, 32)									
	Power Save	Normal operating/Medium-speed/Sleep/Module stop/Watch/Sub active/Sub sleep/Software standby/Hardware standby									
A/D Converter	Resolution × Channels	10-bit × 8									
	Sample and Hold	Yes									
D/A Converter	Resolution × Channels	8-bit × 2									
Timer	8-bit	2 (TMR)									
	16-bit	6 (TPU)									
	32-bit	—									
	Input Capture	6 (shared with TPU)									
	Output Compare	6 (shared with TPU)									
	PWM Output	6 (shared with TPU)									
	Real-Time Port	—									
	Programmable Pulse Generator	—									
	Event Counter	8 (shared with TMR, TPU)									
	2-Phase Encoder Input	6 (shared with TPU)									
Watchdog Timer		2									
Serial Interface	Clock Sync./Clock Async.	4									
I^2C-bus		—									
IEBus		—									
Smart Card/SIM		4									
Synchronous Serial Communication Unit/Special Serial I/O		—									
CAN	Channels	—									
	Message Box (Numbers)	—									
Ethernet		—									
USB Function		—									
LPC/ISA		—									
IrDA		—									
LCD		—									
CRC Calculation Circuit		—									
I/O Ports	Input Only (Numbers)	19									
	CMOS Output Only (Numbers)	—									
	CMOS I/O (Numbers)	72									
	High Voltage Port (Numbers)	—									
	N-Channel Open Drain Port (Numbers)	11									
	DTMF	—									
	High Current Drive Port	—									
	Pull-Up Resistor	36									
	NMOS Push-Pull	—									
External Interrupts Pins		9									
Debugging Function	Boundary Scan/JTAG	—									
	On-Chip Debug	—									
	On-Board Flash Program	—									
Other Functions	ROM Correction Function	Yes (PC break)									
	Others	—									
Operating Frequency/Supply Voltage		13.5MHz/2.7 to 3.6V, 6.25MHz/2.2 to 3.6V							10MHz/2.7 to 3.6V		
Operating Ambient Temperature (°C)		–20 to 75		–40 to 85		–20 to 75		–40 to 85	–20 to 75		–40 to 85
Package*2		PRQP0100JE-B	PRQP0100KA-A	PRQP0100JE-B	PTQP0100KA-A		PTQP0100LC-A		PRQP0100JE-B	PRQP0100KA-A	PTQP0100KA-A
Part No.		HD6432237XXXF	HD6432237XXXFA	HD6432237XXXFAI	HD6432237XXXFI	HD6432237XXXTE	HD6432237XXXTEI	HD6432237XXXTF	HD6432237XXXTFI	HD6472237F10V	HD6472237FA10V	HD6472237TE10V

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8S/2200 Series)

Group		H8S/2238B																	
Memory	ROM (Bytes)	128K																	
	RAM (Bytes)	8K																	
	ROM Type*1	M																	
	Program Security	—																	
CPU	CPU	H8S/2000 Core																	
	Basic Instructions	65																	
	Minimum Instruction Execution Time (ns)	74 (@13.5MHz)																	
	Multiplier	—																	
	Multiply-Accumulate Instruction	—																	
DMA	DMAC (Channels)	—																	
	EXDMAC	—																	
	DTC/DMAC II	DTC																	
External Bus Expansion	Address Space (Bytes)	16M																	
	Bus State Controller	Direct connection to SRAM/ROM is supported																	
	Bus Structure	Separate bus (8/16-bit)																	
	SDRAM Controller	—																	
	DRAM Controller	—																	
	Host Interface	—																	
Clock	Clock Generation Circuit	2 circuits (Main clock, Sub clock)																	
	PLL	—																	
	Subclock	Yes																	
	RTC	Yes (WDT for watch)																	
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16, 32)																	
	Power Save	Normal operating/Medium-speed/Sleep/Module stop/Watch/Sub active/Sub sleep/Software standby/Hardware standby																	
A/D Converter	Resolution × Channels	10-bit × 8																	
	Sample and Hold	Yes																	
D/A Converter	Resolution × Channels	8-bit × 2																	
Timer	8-bit	4 (TMR)																	
	16-bit	6 (TPU)																	
	32-bit	—																	
	Input Capture	6 (shared with TPU)																	
	Output Compare	6 (shared with TPU)																	
	PWM Output	6 (shared with TPU)																	
	Real-Time Port	—																	
	Programmable Pulse Generator	—																	
	Event Counter	10 (shared with TMR, TPU)																	
	2-Phase Encoder Input	6 (shared with TPU)																	
Watchdog Timer		2																	
Serial Interface	Clock Sync./Clock Async.	4																	
I²C-bus		2												—					
IEBus		—																	
Smart Card/SIM		1																	
Synchronous Serial Communication Unit/Special Serial I/O		—																	
CAN	Channels	—																	
	Message Box (Numbers)	—																	
Ethernet		—																	
USB Function		—																	
LPC/ISA		—																	
IrDA		—																	
LCD		—																	
CRC Calculation Circuit		—																	
I/O Ports	Input Only (Numbers)	19																	
	CMOS Output Only (Numbers)	—																	
	CMOS I/O (Numbers)	72																	
	High Voltage Port (Numbers)	—																	
	N-Channel Open Drain Port (Numbers)	9																	
	DTMF	—																	
	High Current Drive Port	—																	
	Pull-Up Resistor	36																	
	NMOS Push-Pull	2																	
External Interrupts Pins		9																	
Debugging Function	Boundary Scan/JTAG	—																	
	On-Chip Debug	—																	
	On-Board Flash Program	—																	
Other Functions	ROM Correction Function	Yes (PC break)																	
	Others	—																	
Operating Frequency/Supply Voltage		13.5MHz/2.7 to 5.5V																	
Operating Ambient Temperature (˚C)		–20 to 75		–40 to 85		–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75		–40 to 85				–20 to 75	–40 to 85	–20 to 75	–40 to 85
Package*2		PRQP0100JE-B	PRQP0100KA-A	PRQP0100JE-B		PTQP0100KA-A		PTQP0100LC-A		PRQP0100JE-B	PRQP0100KA-A		PRQP0100JE-B			PTQP0100KA-A		PTQP0100LC-A	
Part No.		HD6432236BWXXXF	HD6432236BWXXXFA	HD6432236BWXXXFAI	HD6432236BWXXXFI	HD6432236BWXXXTE	HD6432236BWXXXTEI	HD6432236BWXXXTF	HD6432236BWXXXTFI	HD6432236BXXXF	HD6432236BXXXFA	HD6432236BXXXFAI	HD6432236BXXXFI	HD6432236BXXXTE	HD6432236BXXXTEI	HD6432236BXXXTF	HD6432236BXXXTFI		

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8S/2200 Series)

Group		H8S/2238B																													
Memory	ROM (Bytes)	256K																													
	RAM (Bytes)	16K																													
	ROM Type*1	F								M																					
	Program Security	Yes								—																					
CPU	CPU	H8S/2000 Core																													
	Basic Instructions	65																													
	Minimum Instruction Execution Time (ns)	74 (@13.5MHz)																													
	Multiplier	—																													
	Multiply-Accumulate Instruction	—																													
DMA	DMAC (Channels)	—																													
	EXDMAC	—																													
	DTC/DMAC Ⅱ	DTC																													
External Bus Expansion	Address Space (Bytes)	16M																													
	Bus State Controller	Direct connection to SRAM/ROM is supported																													
	Bus Structure	Separate bus (8/16-bit)																													
	SDRAM Controller	—																													
	DRAM Controller	—																													
	Host Interface	—																													
Clock	Clock Generation Circuit	2 circuits (Main clock, Sub clock)																													
	PLL	—																													
	Subclock	Yes																													
	RTC	Yes (WDT for watch)																													
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16, 32)																													
	Power Save	Normal operating/Medium-speed/Sleep/Module stop/Watch/Sub active/Sub sleep/Software standby/Hardware standby																													
A/D Converter	Resolution × Channels	10-bit × 8																													
	Sample and Hold	Yes																													
D/A Converter	Resolution × Channels	8-bit × 2																													
Timer	8-bit	4 (TMR)																													
	16-bit	6 (TPU)																													
	32-bit	—																													
	Input Capture	6 (shared with TPU)																													
	Output Compare	6 (shared with TPU)																													
	PWM Output	6 (shared with TPU)																													
	Real-Time Port	—																													
	Programmable Pulse Generator	—																													
	Event Counter	10 (shared with TMR, TPU)																													
	2-Phase Encoder Input	6 (shared with TPU)																													
Watchdog Timer		2																													
Serial Interface	Clock Sync./Clock Async.	4																													
I²C-bus		2																													
IEBus		—																													
Smart Card/SIM		1																													
Synchronous Serial Communication Unit/Special Serial I/O		—																													
CAN	Channels	—																													
	Message Box (Numbers)	—																													
Ethernet		—																													
USB Function		—																													
LPC/ISA		—																													
IrDA		—																													
LCD		—																													
CRC Calculation Circuit		—																													
I/O Ports	Input Only (Numbers)	19																													
	CMOS Output Only (Numbers)	—																													
	CMOS I/O (Numbers)	72																													
	High Voltage Port (Numbers)	—																													
	N-Channel Open Drain Port (Numbers)	9																													
	DTMF	—																													
	High Current Drive Port	—																													
	Pull-Up Resistor	36																													
	NMOS Push-Pull	2																													
External Interrupts Pins		9																													
Debugging Function	Boundary Scan/JTAG	—																													
	On-Chip Debug	—																													
	On-Board Flash Program	Yes								—																					
Other Functions	ROM Correction Function	Yes (PC break)																													
	Others	—																													
Operating Frequency/Supply Voltage		13.5MHz/3.0 to 5.5V								13.5MHz/2.7 to 5.5V																					
Operating Ambient Temperature (°C)		–40 to 85	–20 to 75				–40 to 85		–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75		–40 to 85		–20 to 75	–40 to 85	–20 to 75	–40 to 85										
Package*2		PRQP0100KA-A	PTQP0100KA-A	PTQP0100LC-A	PRQP0100JE-B	PRQP0100KA-A	PRQP0100JE-B	PTQP0100KA-A	PTQP0100LC-A	PRQP0100JE-B	PRQP0100KA-A	PRQP0100JE-B	PTQP0100KA-A	PTQP0100LC-A																	
Part No.		HD64F2238BFA13IV	HD64F2238BFA13V	HD64F2238BTE13V	HD64F2238BTF13V	HD6432238BWXXXF	HD6432238BWXXXFA	HD6432238BWXXXFAI	HD6432238BWXXXFI	HD6432238BWXXXTE	HD6432238BWXXXTEI	HD6432238BWXXXTF	HD6432238BWXXXTFI	HD6432238BXXXF	HD6432238BXXXFA	HD6432238BXXXFAI	HD6432238BXXXFI	HD6432238BXXXTE	HD6432238BXXXTEI	HD6432238BXXXTF	HD6432238BXXXTFI									

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8S/2200 Series)

Group		H8S/2238R											
Memory	ROM (Bytes)	128K											
	RAM (Bytes)	8K											
	ROM Type*1	M											
	Program Security	—											
CPU	CPU	H8S/2000 Core											
	Basic Instructions	65											
	Minimum Instruction Execution Time (ns)	74 (@13.5MHz)											
	Multiplier	—											
	Multiply-Accumulate Instruction	—											
DMA	DMAC (Channels)	—											
	EXDMAC	—											
	DTC/DMAC II	DTC											
External Bus Expansion	Address Space (Bytes)	16M											
	Bus State Controller	Direct connection to SRAM/ROM is supported											
	Bus Structure	Separate bus (8/16-bit)											
	SDRAM Controller	—											
	DRAM Controller	—											
	Host Interface	—											
Clock	Clock Generation Circuit	2 circuits (Main clock, Sub clock)											
	PLL	—											
	Subclock	Yes											
	RTC	Yes (WDT for watch)											
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16, 32)											
	Power Save	Normal operating/Medium-speed/Sleep/Module stop/Watch/Sub active/Sub sleep/Software standby/Hardware standby											
A/D Converter	Resolution × Channels	10-bit × 8											
	Sample and Hold	Yes											
D/A Converter	Resolution × Channels	8-bit × 2											
Timer	8-bit	4 (TMR)											
	16-bit	6 (TPU)											
	32-bit	—											
	Input Capture	6 (shared with TPU)											
	Output Compare	6 (shared with TPU)											
	PWM Output	6 (shared with TPU)											
	Real-Time Port	—											
	Programmable Pulse Generator	—											
	Event Counter	10 (shared with TMR, TPU)											
	2-Phase Encoder Input	6 (shared with TPU)											
Watchdog Timer		2											
Serial Interface	Clock Sync./Clock Async.	4											
I²C-bus		2								—			
IEBus		—											
Smart Card/SIM		1											
Synchronous Serial Communication Unit/Special Serial I/O		—											
CAN	Channels	—											
	Message Box (Numbers)	—											
Ethernet		—											
USB Function		—											
LPC/ISA		—											
IrDA		—											
LCD		—											
CRC Calculation Circuit		—											
I/O Ports	Input Only (Numbers)	19											
	CMOS Output Only (Numbers)	—											
	CMOS I/O (Numbers)	72											
	High Voltage Port (Numbers)	—											
	N-Channel Open Drain Port (Numbers)	9											
	DTMF	—											
	High Current Drive Port	—											
	Pull-Up Resistor	36											
	NMOS Push-Pull	2											
External Interrupts Pins		9											
Debugging Function	Boundary Scan/JTAG	—											
	On-Chip Debug	—											
	On-Board Flash Program	—											
Other Functions	ROM Correction Function	Yes (PC break)											
	Others	—											
Operating Frequency/Supply Voltage		13.5MHz/2.7 to 3.6V, 6.25MHz/2.2 to 3.6V											
Operating Ambient Temperature (˚C)		–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85
Package*2		PRQP0100KA-A		PTQP0100KA-A		PTQP0100LC-A		PRQP0100KA-A		PTQP0100KA-A		PTQP0100LC-A	
Part No.		HD6432236RWXXXFA	HD6432236RWXXXFAI	HD6432236RWXXXTE	HD6432236RWXXXTEI	HD6432236RWXXXTF	HD6432236RWXXXTFI	HD6432236RXXXFA	HD6432236RXXXFAI	HD6432236RXXXTE	HD6432236RXXXTEI	HD6432236RXXXTF	HD6432236RXXXTFI

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8S/2200 Series)

Group		H8S/2238R	
Memory	ROM (Bytes)	256K	
	RAM (Bytes)	16K	
	ROM Type*1	F	M
	Program Security	Yes	—
CPU	CPU	H8S/2000 Core	
	Basic Instructions	65	
	Minimum Instruction Execution Time (ns)	74 (@13.5MHz)	
	Multiplier	—	
	Multiply-Accumulate Instruction	—	
DMA	DMAC (Channels)	—	
	EXDMAC	—	
	DTC/DMAC II	DTC	
External Bus Expansion	Address Space (Bytes)	16M	
	Bus State Controller	Direct connection to SRAM/ROM is supported	
	Bus Structure	Separate bus (8/16-bit)	
	SDRAM Controller	—	
	DRAM Controller	—	
	Host Interface	—	
Clock	Clock Generation Circuit	2 circuits (Main clock, Sub clock)	
	PLL	—	
	Subclock	Yes	
	RTC	Yes (WDT for watch)	
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16, 32)	
	Power Save	Normal operating/Medium-speed/Sleep/Module stop/Watch/Sub active/Sub sleep/Software standby/Hardware standby	
A/D Converter	Resolution × Channels	10-bit × 8	
	Sample and Hold	Yes	
D/A Converter	Resolution × Channels	8-bit × 2	
Timer	8-bit	4 (TMR)	
	16-bit	6 (TPU)	
	32-bit	—	
	Input Capture	6 (shared with TPU)	
	Output Compare	6 (shared with TPU)	
	PWM Output	6 (shared with TPU)	
	Real-Time Port	—	
	Programmable Pulse Generator	—	
	Event Counter	10 (shared with TMR, TPU)	
	2-Phase Encoder Input	6 (shared with TPU)	
Watchdog Timer		2	
Serial Interface	Clock Sync./Clock Async.	4	
I²C-bus		2	—
IEBus		—	
Smart Card/SIM		1	
Synchronous Serial Communication Unit/Special Serial I/O		—	
CAN	Channels	—	
	Message Box (Numbers)	—	
Ethernet		—	
USB Function		—	
LPC/ISA		—	
IrDA		—	
LCD		—	
CRC Calculation Circuit		—	
I/O Ports	Input Only (Numbers)	19	
	CMOS Output Only (Numbers)	—	
	CMOS I/O (Numbers)	72	
	High Voltage Port (Numbers)	—	
	N-Channel Open Drain Port (Numbers)	9	
	DTMF	—	
	High Current Drive Port	—	
	Pull-Up Resistor	36	
	NMOS Push-Pull	2	
External Interrupts Pins		9	
Debugging Function	Boundary Scan/JTAG	—	
	On-Chip Debug	—	
	On-Board Flash Program	Yes	—
Other Functions	ROM Correction Function	Yes (PC break)	
	Others	—	

Operating Frequency/Supply Voltage	13.5MHz/2.7 to 3.6V	6.25MHz/2.2 to 3.6V	13.5MHz/2.7 to 3.6V	6.25MHz/2.2 to 3.6V	13.5MHz/2.7 to 3.6V	6.25MHz/2.2 to 3.6V	13.5MHz/2.7 to 3.6V	6.25MHz/2.2 to 3.6V	13.5MHz/2.7 to 3.6V	6.25MHz/2.2 to 3.6V	13.5MHz/2.7 to 3.6V	6.25MHz/2.2 to 3.6V	13.5MHz/2.7 to 3.6V, 6.25MHz/2.2 to 3.6V
Operating Ambient Temperature (°C)	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–40 to 85
Package*2	TTBG0112GA-A		PLBG0112GA-A		PRQP0100KA-A		PTQP0100KA-A		PTQP0100LC-A		PRQP0100KA-A		PTQP0100KA-A
Part No.	HD64F2238RBQ13V	HD64F2238RBQ13WV	HD64F2238RBQ6V	HD64F2238RBR13V	HD64F2238RBR13WV	HD64F2238RBR6V	HD64F2238RFA13IV	HD64F2238RFA13V	HD64F2238RFA6V	HD64F2238RTE13IV	HD64F2238RTE13V	HD64F2238RTE6V	HD64F2238RTF13V

Operating Frequency/Supply Voltage	13.5MHz/2.7 to 3.6V, 6.25MHz/2.2 to 3.6V																							
Operating Ambient Temperature (°C)	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85
Package*2	PTQP0100LC-A		PRQP0100KA-A		PTQP0100KA-A		PTQP0100LC-A		PRQP0100KA-A		PTQP0100KA-A		PTQP0100LC-A		PRQP0100KA-A		PTQP0100KA-A		PTQP0100LC-A					
Part No.	HD64F2238RTF6V	HD6432238RWXXXFA	HD6432238RWXXXFAI	HD6432238RWXXXTE	HD6432238RWXXXTEI	HD6432238RWXXXTF	HD6432238RWXXXTFI	HD6432238RXXXFA	HD6432238RXXXFAI	HD6432238RXXXTE	HD6432238RXXXTEI	HD6432238RXXXTF	HD6432238RXXXTFI										

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8S/2200 Series)

Group		H8S/2239										
Memory	ROM (Bytes)	384K										
	RAM (Bytes)	32K										
	ROM Type*1	F										
	Program Security	Yes										
CPU	CPU	H8S/2000 Core										
	Basic Instructions	65										
	Minimum Instruction Execution Time (ns)	50 (@20MHz)										
	Multiplier	—										
	Multiply-Accumulate Instruction	—										
DMA	DMAC (Channels)	4										
	EXDMAC	—										
	DTC/DMAC II	DTC										
External Bus Expansion	Address Space (Bytes)	16M										
	Bus State Controller	Direct connection to SRAM/ROM is supported										
	Bus Structure	Separate bus (8/16-bit)										
	SDRAM Controller	—										
	DRAM Controller	—										
	Host Interface	—										
Clock	Clock Generation Circuit	2 circuits (Main clock, Sub clock)										
	PLL	—										
	Subclock	Yes										
	RTC	Yes (WDT for watch)										
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16, 32)										
	Power Save	Normal operating/Medium-speed/Sleep/Module stop/Watch/Sub active/Sub sleep/Software standby/Hardware standby										
A/D Converter	Resolution × Channels	10-bit × 8										
	Sample and Hold	Yes										
D/A Converter	Resolution × Channels	8-bit × 2										
Timer	8-bit	2 (TMR)										
	16-bit	6 (TPU)										
	32-bit	—										
	Input Capture	6 (shared with TPU)										
	Output Compare	6 (shared with TPU)										
	PWM Output	6 (shared with TPU)										
	Real-Time Port	—										
	Programmable Pulse Generator	—										
	Event Counter	10 (shared with TMR, TPU)										
	2-Phase Encoder Input	6 (shared with TPU)										
Watchdog Timer		2										
Serial Interface	Clock Sync./Clock Async.	4										
I^2C-bus		2										
IEBus		—										
Smart Card/SIM		1										
Synchronous Serial Communication Unit/Special Serial I/O		—										
CAN	Channels	—										
	Message Box (Numbers)	—										
Ethernet		—										
USB Function		—										
LPC/ISA		—										
IrDA		—										
LCD		—										
CRC Calculation Circuit		—										
I/O Ports	Input Only (Numbers)	19										
	CMOS Output Only (Numbers)	—										
	CMOS I/O (Numbers)	72										
	High Voltage Port (Numbers)	—										
	N-Channel Open Drain Port (Numbers)	9										
	DTMF	—										
	High Current Drive Port	—										
	Pull-Up Resistor	36										
	NMOS Push-Pull	2										
External Interrupts Pins		9										
Debugging Function	Boundary Scan/JTAG	—										
	On-Chip Debug	—										
	On-Board Flash Program	Yes										
Other Functions	ROM Correction Function	Yes (PC break)										
	Others	SCIO for high-speed UART										
Operating Frequency/Supply Voltage		16MHz/ 2.7 to 3.6V	20MHz/3.0 to 3.6V		16MHz/ 2.7 to 3.6V	20MHz/3.0 to 3.6V		16MHz/ 2.7 to 3.6V	20MHz/3.0 to 3.6V		16MHz/ 2.7 to 3.6V	20MHz/ 3.0 to 3.6V
Operating Ambient Temperature (˚C)		–20 to 75		–40 to 85	–20 to 75	–40 to 85		–20 to 75		–40 to 85	–20 to 75	
Package*2		TTBG0112GA-A			PRQP0100KA-A			PTQP0100KA-A			PTQP0100LC-A	
Part No.		HD64F2239BQ16V	HD64F2239BQ20V	HD64F2239BQ20WV	HD64F2239FA16V	HD64F2239FA20IV	HD64F2239FA20V	HD64F2239TE16V	HD64F2239TE20IV	HD64F2239TE20V	HD64F2239TF16V	HD64F2239TF20V

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8S/2200 Series)

Group		H8S/2239											
Memory	ROM (Bytes)	384K											
	RAM (Bytes)	32K											
	ROM Type*1	M											
	Program Security	—											
CPU	CPU	H8S/2000 Core											
	Basic Instructions	65											
	Minimum Instruction Execution Time (ns)	50 (@20MHz)											
	Multiplier	—											
	Multiply-Accumulate Instruction	—											
DMA	DMAC (Channels)	4											
	EXDMAC	—											
	DTC/DMAC II	DTC											
External Bus Expansion	Address Space (Bytes)	16M											
	Bus State Controller	Direct connection to SRAM/ROM is supported											
	Bus Structure	Separate bus (8/16-bit)											
	SDRAM Controller	—											
	DRAM Controller	—											
	Host Interface	—											
Clock	Clock Generation Circuit	2 circuits (Main clock, Sub clock)											
	PLL	—											
	Subclock	Yes											
	RTC	Yes (WDT for watch)											
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16, 32)											
	Power Save	Normal operating/Medium-speed/Sleep/Module stop/Watch/Sub active/Sub sleep/Software standby/Hardware standby											
A/D Converter	Resolution × Channels	10-bit × 8											
	Sample and Hold	Yes											
D/A Converter	Resolution × Channels	8-bit × 2											
Timer	8-bit	2 (TMR)											
	16-bit	6 (TPU)											
	32-bit	—											
	Input Capture	6 (shared with TPU)											
	Output Compare	6 (shared with TPU)											
	PWM Output	6 (shared with TPU)											
	Real-Time Port	—											
	Programmable Pulse Generator	—											
	Event Counter	10 (shared with TMR, TPU)											
	2-Phase Encoder Input	6 (shared with TPU)											
Watchdog Timer		2											
Serial Interface	Clock Sync./Clock Async.	4											
I²C-bus		2								—			
IEBus		—											
Smart Card/SIM		1											
Synchronous Serial Communication Unit/Special Serial I/O		—											
CAN	Channels	—											
	Message Box (Numbers)	—											
Ethernet		—											
USB Function		—											
LPC/ISA		—											
IrDA		—											
LCD		—											
CRC Calculation Circuit		—											
I/O Ports	Input Only (Numbers)	19											
	CMOS Output Only (Numbers)	—											
	CMOS I/O (Numbers)	72											
	High Voltage Port (Numbers)	—											
	N-Channel Open Drain Port (Numbers)	9											
	DTMF	—											
	High Current Drive Port	—											
	Pull-Up Resistor	36											
	NMOS Push-Pull	2											
External Interrupts Pins		9											
Debugging Function	Boundary Scan/JTAG	—											
	On-Chip Debug	—											
	On-Board Flash Program	—											
Other Functions	ROM Correction Function	Yes (PC break)											
	Others	SCIO for high-speed UART											
Operating Frequency/Supply Voltage		20MHz/3.0 to 3.6V, 16MHz/2.7 to 3.6V, 6.25MHz/2.2 to 3.6V											
Operating Ambient Temperature (°C)		–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85
Package*2		PRQP0100KA-A		PTQP0100KA-A		PTQP0100LC-A		PRQP0100KA-A		PTQP0100KA-A		PTQP0100LC-A	
Part No.		HD6432239WXXXFA	HD6432239WXXXFAI	HD6432239WXXXTE	HD6432239WXXXTEI	HD6432239WXXXTF	HD6432239WXXXTFI	HD6432239XXXFA	HD6432239XXXFAI	HD6432239XXXTE	HD6432239XXXTEI	HD6432239XXXTF	HD6432239XXXTFI

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8S/2200 Series)

Group		H8S/2245
Memory	ROM (Bytes)	(see per-part table below)
	RAM (Bytes)	(see per-part table below)
	ROM Type*[1]	(see per-part table below)
	Program Security	—
CPU	CPU	H8S/2000 Core
	Basic Instructions	65
	Minimum Instruction Execution Time (ns)	50 (@20MHz)
	Multiplier	—
	Multiply-Accumulate Instruction	—
DMA	DMAC (Channels)	—
	EXDMAC	—
	DTC/DMAC II	DTC
External Bus Expansion	Address Space (Bytes)	16M
	Bus State Controller	Direct connection to SRAM/ROM is supported
	Bus Structure	Separate bus (8/16-bit)
	SDRAM Controller	—
	DRAM Controller	—
	Host Interface	—
Clock	Clock Generation Circuit	1 circuit (Main clock)
	PLL	—
	Subclock	—
	RTC	—
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16, 32)
	Power Save	Normal operating/Medium-speed/Sleep/Module stop/Software standby/Hardware standby
A/D Converter	Resolution × Channels	10-bit × 4
	Sample and Hold	Yes
D/A Converter	Resolution × Channels	—
Timer	8-bit	2 (TMR)
	16-bit	3 (TPU)
	32-bit	—
	Input Capture	3 (shared with TPU)
	Output Compare	3 (shared with TPU)
	PWM Output	3 (shared with TPU)
	Real-Time Port	—
	Programmable Pulse Generator	—
	Event Counter	5 (shared with TMR, TPU)
	2-Phase Encoder Input	3 (shared with TPU)
Watchdog Timer		1
Serial Interface	Clock Sync./Clock Async.	3
I^2C-bus		—
IEBus		—
Smart Card/SIM		1
Synchronous Serial Communication Unit/Special Serial I/O		—
CAN	Channels	—
	Message Box (Numbers)	—
Ethernet		—
USB Function		—
LPC/ISA		—
IrDA		—
LCD		—
CRC Calculation Circuit		—
I/O Ports	Input Only (Numbers)	12
	CMOS Output Only (Numbers)	1
	CMOS I/O (Numbers)	75
	High Voltage Port (Numbers)	52
	N-Channel Open Drain Port (Numbers)	10
	DTMF	—
	High Current Drive Port	28 (port for LED drive)
	Pull-Up Resistor	36
	NMOS Push-Pull	—
External Interrupts Pins		9
Debugging Function	Boundary Scan/JTAG	—
	On-Chip Debug	—
	On-Board Flash Program	—
Other Functions	ROM Correction Function	—
	Others	—

Part No.	ROM (Bytes)	RAM (Bytes)	ROM Type*[1]	Operating Frequency/Supply Voltage	Operating Ambient Temperature (˚C)	Package*[2]
HD64122240FA13IV	—	4K	L	13MHz/ 2.7 to 5.5V	–40 to 85	PRQP0100KA-A
HD64122240FA13V	—	4K	L	13MHz/ 2.7 to 5.5V	–20 to 75	PRQP0100KA-A
HD64122240FA20IV	—	4K	L	20MHz/ 4.5 to 5.5V	–40 to 85	PRQP0100KA-A
HD64122240FA20V	—	4K	L	20MHz/ 4.5 to 5.5V	–20 to 75	PRQP0100KA-A
HD64122240TE13IV	—	4K	L	13MHz/ 2.7 to 5.5V	–40 to 85	PTQP0100KA-A
HD64122240TE13V	—	4K	L	13MHz/ 2.7 to 5.5V	–20 to 75	PTQP0100KA-A
HD64122240TE20IV	—	4K	L	20MHz/ 4.5 to 5.5V	–40 to 85	PTQP0100KA-A
HD64122240TE20V	—	4K	L	20MHz/ 4.5 to 5.5V	–20 to 75	PTQP0100KA-A
HD64322241RXXXFA	32K	4K	M	20MHz/4.5 to 5.5V, 13MHz/2.7 to 5.5V	–20 to 75	PRQP0100KA-A
HD64322241RXXXFAI	32K	4K	M	20MHz/4.5 to 5.5V, 13MHz/2.7 to 5.5V	–40 to 85	PRQP0100KA-A
HD64322241RXXXTE	32K	4K	M	20MHz/4.5 to 5.5V, 13MHz/2.7 to 5.5V	–20 to 75	PTQP0100KA-A
HD64322241RXXXTEI	32K	4K	M	20MHz/4.5 to 5.5V, 13MHz/2.7 to 5.5V	–40 to 85	PTQP0100KA-A
HD64322242XXXFA	32K	8K	M	20MHz/4.5 to 5.5V, 13MHz/2.7 to 5.5V	–20 to 75	PRQP0100KA-A
HD64322242XXXFAI	32K	8K	M	20MHz/4.5 to 5.5V, 13MHz/2.7 to 5.5V	–40 to 85	PRQP0100KA-A
HD64322242XXXTE	32K	8K	M	20MHz/4.5 to 5.5V, 13MHz/2.7 to 5.5V	–20 to 75	PTQP0100KA-A
HD64322242XXXTEI	32K	8K	M	20MHz/4.5 to 5.5V, 13MHz/2.7 to 5.5V	–40 to 85	PTQP0100KA-A
HD64322243XXXFA	64K	4K	M	20MHz/4.5 to 5.5V, 13MHz/2.7 to 5.5V	–20 to 75	PRQP0100KA-A
HD64322243XXXFAI	64K	4K	M	20MHz/4.5 to 5.5V, 13MHz/2.7 to 5.5V	–40 to 85	PRQP0100KA-A
HD64322243XXXTE	64K	4K	M	20MHz/4.5 to 5.5V, 13MHz/2.7 to 5.5V	–20 to 75	PTQP0100KA-A
HD64322243XXXTEI	64K	4K	M	20MHz/4.5 to 5.5V, 13MHz/2.7 to 5.5V	–40 to 85	PTQP0100KA-A
HD64322244XXXFA	64K	8K	M	20MHz/4.5 to 5.5V, 13MHz/2.7 to 5.5V	–20 to 75	PRQP0100KA-A
HD64322244XXXFAI	64K	8K	M	20MHz/4.5 to 5.5V, 13MHz/2.7 to 5.5V	–40 to 85	PRQP0100KA-A
HD64322244XXXTE	64K	8K	M	20MHz/4.5 to 5.5V, 13MHz/2.7 to 5.5V	–20 to 75	PTQP0100KA-A
HD64322244XXXTEI	64K	8K	M	20MHz/4.5 to 5.5V, 13MHz/2.7 to 5.5V	–40 to 85	PTQP0100KA-A

*[1] F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*[2] Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8S/2200 Series)

Group		H8S/2245														
Memory	ROM (Bytes)	128K														
	RAM (Bytes)	4K						8K								
	ROM Type*1	M						O								
	Program Security	—						Yes								
CPU	CPU	H8S/2000 Core														
	Basic Instructions	65														
	Minimum Instruction Execution Time (ns)	50 (@20MHz)														
	Multiplier	—														
	Multiply-Accumulate Instruction	—														
DMA	DMAC (Channels)	—														
	EXDMAC	—														
	DTC/DMAC II	DTC														
External Bus Expansion	Address Space (Bytes)	16M														
	Bus State Controller	Direct connection to SRAM/ROM is supported														
	Bus Structure	Separate bus (8/16-bit)														
	SDRAM Controller	—														
	DRAM Controller	—														
	Host Interface	—														
Clock	Clock Generation Circuit	1 circuit (Main clock)														
	PLL	—														
	Subclock	—														
	RTC	—														
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16, 32)														
	Power Save	Normal operating/Medium-speed/Sleep/Module stop/Software standby/Hardware standby														
A/D Converter	Resolution × Channels	10-bit × 4														
	Sample and Hold	Yes														
D/A Converter	Resolution × Channels	—														
Timer	8-bit	2 (TMR)														
	16-bit	3 (TPU)														
	32-bit	—														
	Input Capture	3 (shared with TPU)														
	Output Compare	3 (shared with TPU)														
	PWM Output	3 (shared with TPU)														
	Real-Time Port	—														
	Programmable Pulse Generator	—														
	Event Counter	5 (shared with TMR, TPU)														
	2-Phase Encoder Input	3 (shared with TPU)														
Watchdog Timer		1														
Serial Interface	Clock Sync./Clock Async.	3														
I^2C-bus		—														
IEBus		—														
Smart Card/SIM		1														
Synchronous Serial Communication Unit/Special Serial I/O		—														
CAN	Channels	—														
	Message Box (Numbers)	—														
Ethernet		—														
USB Function		—														
LPC/ISA		—														
IrDA		—														
LCD		—														
CRC Calculation Circuit		—														
I/O Ports	Input Only (Numbers)	12														
	CMOS Output Only (Numbers)	1														
	CMOS I/O (Numbers)	75														
	High Voltage Port (Numbers)	52														
	N-Channel Open Drain Port (Numbers)	10														
	DTMF	—														
	High Current Drive Port	28 (port for LED drive)														
	Pull-Up Resistor	36														
	NMOS Push-Pull	—														
External Interrupts Pins		9														
Debugging Function	Boundary Scan/JTAG	—														
	On-Chip Debug	—														
	On-Board Flash Program	—														
Other Functions	ROM Correction Function	—														
	Others	—														
Operating Frequency/Supply Voltage		20MHz/4.5 to 5.5V, 13MHz/2.7 to 5.5V								10MHz/2.7 to 5.5V		20MHz/4.5 to 5.5V		10MHz/2.7 to 5.5V	20MHz/4.5 to 5.5V	
Operating Ambient Temperature (˚C)		–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75		–40 to 85	–20 to 75			–40 to 85	–20 to 75
Package*2		PRQP0100KA-A		PTQP0100KA-A		PRQP0100KA-A		PTQP0100KA-A		PRQP0100KA-A				PTQP0100KA-A		
Part No.		HD6432245XXXFA	HD6432245XXXFAI	HD6432245XXXTE	HD6432245XXXTEI	HD6432246XXXFA	HD6432246XXXFAI	HD6432246XXXTE	HD6432246XXXTEI	HD6472246FA10IV	HD6472246FA10V	HD6472246FA20IV	HD6472246FA20V	HD6472246TE10V	HD6472246TE20IV	HD6472246TE20V

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8S/2200 Series)

Group		H8S/2258											
Memory	ROM (Bytes)	128K											
	RAM (Bytes)	8K											
	ROM Type*1	M											
	Program Security	—											
CPU	CPU	H8S/2000 Core											
	Basic Instructions	65											
	Minimum Instruction Execution Time (ns)	74 (@13.5MHz)											
	Multiplier	—											
	Multiply-Accumulate Instruction	—											
DMA	DMAC (Channels)	—											
	EXDMAC	—											
	DTC/DMAC II	DTC											
External Bus Expansion	Address Space (Bytes)	16M											
	Bus State Controller	Direct connection to SRAM/ROM is supported											
	Bus Structure	Separate bus (8/16-bit)											
	SDRAM Controller	—											
	DRAM Controller	—											
	Host Interface	—											
Clock	Clock Generation Circuit	2 circuits (Main clock, Sub clock)											
	PLL	—											
	Subclock	Yes											
	RTC	Yes (WDT for watch)											
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16, 32)											
	Power Save	Normal operating/Medium-speed/Sleep/Module stop/Watch/Sub active/Sub sleep/Software standby/Hardware standby											
A/D Converter	Resolution × Channels	10-bit × 8											
	Sample and Hold	Yes											
D/A Converter	Resolution × Channels	8-bit × 2											
Timer	8-bit	4 (TMR)											
	16-bit	6 (TPU)											
	32-bit	—											
	Input Capture	6 (shared with TPU)											
	Output Compare	6 (shared with TPU)											
	PWM Output	6 (shared with TPU)											
	Real-Time Port	—											
	Programmable Pulse Generator	—											
	Event Counter	10 (shared with TMR, TPU)											
	2-Phase Encoder Input	6 (shared with TPU)											
Watchdog Timer		2											
Serial Interface	Clock Sync./Clock Async.	4											
I^2C-bus		2						—					
IEBus		1											
Smart Card/SIM		1											
Synchronous Serial Communication Unit/Special Serial I/O		—											
CAN	Channels	—											
	Message Box (Numbers)	—											
Ethernet		—											
USB Function		—											
LPC/ISA		—											
IrDA		—											
LCD		—											
CRC Calculation Circuit		—											
I/O Ports	Input Only (Numbers)	19											
	CMOS Output Only (Numbers)	—											
	CMOS I/O (Numbers)	72											
	High Voltage Port (Numbers)	—											
	N-Channel Open Drain Port (Numbers)	9											
	DTMF	—											
	High Current Drive Port	—											
	Pull-Up Resistor	36											
	NMOS Push-Pull	2											
External Interrupts Pins		9											
Debugging Function	Boundary Scan/JTAG	—											
	On-Chip Debug	—											
	On-Board Flash Program	—											
Other Functions	ROM Correction Function	Yes (PC break)											
	Others	—											
Operating Frequency/Supply Voltage		13.5MHz/4.5 to 5.5V											
Operating Ambient Temperature (˚C)		–20 to 75		–40 to 85		–20 to 75	–40 to 85	–20 to 75		–40 to 85		–20 to 75	–40 to 85
Package*2		PRQP0100JE-B	PRQP0100KA-A	PRQP0100JE-B		PTQP0100KA-A		PRQP0100JE-B	PRQP0100KA-A	PRQP0100JE-B		PTQP0100KA-A	
Part No.		HD6432256WXXXF	HD6432256WXXXFA	HD6432256WXXXFAI	HD6432256WXXXFI	HD6432256WXXXTE	HD6432256WXXXTEI	HD6432256XXXF	HD6432256XXXFA	HD6432256XXXFAI	HD6432256XXXFI	HD6432256XXXTE	HD6432256XXXTEI

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8S/2200 Series)

Group		H8S/2258														
Memory	ROM (Bytes)	256K														
	RAM (Bytes)	16K														
	ROM Type*1	M														F
	Program Security	—														Yes
CPU	CPU	H8S/2000 Core														
	Basic Instructions	65														
	Minimum Instruction Execution Time (ns)	74 (@13.5MHz)														
	Multiplier	—														
	Multiply-Accumulate Instruction	—														
DMA	DMAC (Channels)	—														
	EXDMAC	—														
	DTC/DMAC II	DTC														
External Bus Expansion	Address Space (Bytes)	16M														
	Bus State Controller	Direct connection to SRAM/ROM is supported														
	Bus Structure	Separate bus (8/16-bit)														
	SDRAM Controller	—														
	DRAM Controller	—														
	Host Interface	—														
Clock	Clock Generation Circuit	2 circuits (Main clock, Sub clock)														
	PLL	—														
	Subclock	Yes														
	RTC	Yes (WDT for watch)														
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16, 32)														
	Power Save	Normal operating/Medium-speed/Sleep/Module stop/Watch/Sub active/Sub sleep/Software standby/Hardware standby														
A/D Converter	Resolution × Channels	10-bit × 8														
	Sample and Hold	Yes														
D/A Converter	Resolution × Channels	8-bit × 2														
Timer	8-bit	4 (TMR)														
	16-bit	6 (TPU)														
	32-bit	—														
	Input Capture	6 (shared with TPU)														
	Output Compare	6 (shared with TPU)														
	PWM Output	6 (shared with TPU)														
	Real-Time Port	—														
	Programmable Pulse Generator	—														
	Event Counter	10 (shared with TMR, TPU)														
	2-Phase Encoder Input	6 (shared with TPU)														
Watchdog Timer		2														
Serial Interface	Clock Sync./Clock Async.	4														
I²C-bus		2								—						2
IEBus		1														
Smart Card/SIM		1														
Synchronous Serial Communication Unit/Special Serial I/O		—														
CAN	Channels	—														
	Message Box (Numbers)	—														
Ethernet		—														
USB Function		—														
LPC/ISA		—														
IrDA		—														
LCD		—														
CRC Calculation Circuit		—														
I/O Ports	Input Only (Numbers)	19														
	CMOS Output Only (Numbers)	—														
	CMOS I/O (Numbers)	72														
	High Voltage Port (Numbers)	—														
	N-Channel Open Drain Port (Numbers)	9														
	DTMF	—														
	High Current Drive Port	—														
	Pull-Up Resistor	36														
	NMOS Push-Pull	2														
External Interrupts Pins		9														
Debugging Function	Boundary Scan/JTAG	—														
	On-Chip Debug	—														
	On-Board Flash Program	—														Yes
Other Functions	ROM Correction Function	Yes (PC break)														
	Others	—														
Operating Frequency/Supply Voltage		13.5MHz/4.5 to 5.5V														
Operating Ambient Temperature (°C)		–20 to 75		–40 to 85		–20 to 75	–40 to 85	–20 to 75		–40 to 85		–20 to 75	–40 to 85			–20 to 75
Package*2		PRQP0100JE-B	PRQP0100KA-A	PRQP0100JE-B		PTQP0100KA-A		PRQP0100JE-B	PRQP0100KA-A		PRQP0100JE-B	PTQP0100KA-A		PRQP0100KA-A		
Part No.		HD6432258WXXXF	HD6432258WXXXFA	HD6432258WXXXFAI	HD6432258WXXXFI	HD6432258WXXXTE	HD6432258WXXXTEI	HD6432258XXXF	HD6432258XXXFA	HD6432258XXXFAI	HD6432258XXXFI	HD6432258XXXTE	HD6432258XXXTEI	HD64F2258FA13IV		HD64F2258FA13V

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8S/2200 Series)

Group		H8S/2268																			
Memory	ROM (Bytes)	128K						256K													
	RAM (Bytes)	4K		8K				16K													
	ROM Type*1	F																			
	Program Security	Yes																			
CPU	CPU	H8S/2000 Core																			
	Basic Instructions	65																			
	Minimum Instruction Execution Time (ns)	49 (@20.5MHz)																			
	Multiplier	—																			
	Multiply-Accumulate Instruction	—																			
DMA	DMAC (Channels)	—																			
	EXDMAC	—																			
	DTC/DMAC Ⅱ	DTC																			
External Bus Expansion	Address Space (Bytes)	16M																			
	Bus State Controller	—																			
	Bus Structure	—																			
	SDRAM Controller	—																			
	DRAM Controller	—																			
	Host Interface	—																			
Clock	Clock Generation Circuit	2 circuits (Main clock, Sub clock)																			
	PLL	—																			
	Subclock	Yes																			
	RTC	Yes (WDT for watch)																			
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16, 32)																			
	Power Save	Normal operating/Medium-speed/Sleep/Module stop/Watch/Sub active/Sub sleep/Software standby/Hardware standby																			
A/D Converter	Resolution × Channels	10-bit × 10																			
	Sample and Hold	Yes																			
D/A Converter	Resolution × Channels	8-bit × 2																			
Timer	8-bit	8 (TMR0, TMR1, TMR2, TMR3, TMR4 × 4)																			
	16-bit	3 (TPU)																			
	32-bit	—																			
	Input Capture	3 (shared with TPU)																			
	Output Compare	3 (shared with TPU)																			
	PWM Output	3 (shared with TPU)																			
	Real-Time Port	—																			
	Programmable Pulse Generator	—																			
	Event Counter	7 (shared with TMR0, TMR1, TMR2, TMR3, TPU)																			
	2-Phase Encoder Input	3 (shared with TPU)																			
Watchdog Timer		2																			
Serial Interface	Clock Sync./Clock Async.	3																			
I²C-bus		2																			
IEBus		—																			
Smart Card/SIM		1																			
Synchronous Serial Communication Unit/Special Serial I/O		—																			
CAN	Channels	—																			
	Message Box (Numbers)	—																			
Ethernet		—																			
USB Function		—																			
LPC/ISA		—																			
IrDA		—																			
LCD		40seg × 4com																			
CRC Calculation Circuit		—																			
I/O Ports	Input Only (Numbers)	18																			
	CMOS Output Only (Numbers)	—																			
	CMOS I/O (Numbers)	67																			
	High Voltage Port (Numbers)	—																			
	N-Channel Open Drain Port (Numbers)	4																			
	DTMF	Yes																			
	High Current Drive Port	—																			
	Pull-Up Resistor	8																			
	NMOS Push-Pull	2																			
External Interrupts Pins		14																			
Debugging Function	Boundary Scan/JTAG	—																			
	On-Chip Debug	—																			
	On-Board Flash Program	Yes																			
Other Functions	ROM Correction Function	Yes (PC break)																			
	Others	SCIO for high-speed UART																			
Operating Frequency/Supply Voltage		13.5MHz/3.0 to 5.5V		20.5MHz/4.5 to 5.5V	13.5MHz/3.0 to 5.5V		20.5MHz/4.5 to 5.5V	13.5MHz/3.0 to 5.5V		20.5MHz/4.5 to 5.5V		13.5MHz/3.0 to 5.5V		20.5MHz/4.5 to 5.5V		13.5MHz/3.0 to 5.5V		20.5MHz/4.5 to 5.5V			
Operating Ambient Temperature (˚C)		–20 to 75	–40 to 85	–20 to 75				–40 to 85	–20 to 75	–40 to 85		–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85
Package*2		PRQP0100KA-A		PTQP0100KA-A	PRQP0100KA-A	PTQP0100LC-A		PRQP0100KA-A				PTQP0100KA-A				PTQP0100LC-A					
Part No.		HD64F2265FA13V	HD64F2265FA13WV	HD64F2265FA20V	HD64F2265TE13V	HD64F2266FA13V	HD64F2266TF13V	HD64F2266TF20V	HD64F2268FA13V	HD64F2268FA13WV	HD64F2268FA20V	HD64F2268FA20WV	HD64F2268TE13V	HD64F2268TE13WV	HD64F2268TE20V	HD64F2268TE20WV	HD64F2268TF13V	HD64F2268TF13WV	HD64F2268TF20V	HD64F2268TF20WV	

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8S/2200 Series)

Group		H8S/2280		H8S/2282	
Memory	ROM (Bytes)	64K		128K	
	RAM (Bytes)	2K		4K	
	ROM Type*1	F			M
	Program Security	Yes (H/W Protect, S/W Protect, Error Protect)			—
CPU	CPU	H8S/2000 Core			
	Basic Instructions	65			
	Minimum Instruction Execution Time (ns)	50 (@20MHz)			
	Multiplier	—			
	Multiply-Accumulate Instruction	—			
DMA	DMAC (Channels)	—			
	EXDMAC	—			
	DTC/DMAC II	—			
External Bus Expansion	Address Space (Bytes)	16M			
	Bus State Controller	—			
	Bus Structure	—			
	SDRAM Controller	—			
	DRAM Controller	—			
	Host Interface	—			
Clock	Clock Generation Circuit	1 circuit (Main clock)			
	PLL	Yes (× 1, × 2, × 4)			
	Subclock	Yes (128 division)			
	RTC	Yes (WDT for watch)			
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16, 32)			
	Power Save	Medium-speed/Sleep/Module stop/ Watch/Sub active/Sub sleep/ Software standby/ Hardware standby			
A/D Converter	Resolution × Channels	10-bit × 8	10-bit × 6		10-bit × 8
	Sample and Hold	Yes			
D/A Converter	Resolution × Channels	—			
Timer	8-bit	—			
	16-bit	3 (TPU)			
	32-bit	—			
	Input Capture	3 (shared with TPU)			
	Output Compare	3 (shared with TPU)			
	PWM Output	5 (shared with 2 (PWM), 3 (TPU))			
	Real-Time Port	—			
	Programmable Pulse Generator	—			
	Event Counter	3 (shared with TPU)			
	2-Phase Encoder Input	2 (shared with TPU)			
Watchdog Timer		2			
Serial Interface	Clock Sync./Clock Async.	2			
I^2C-bus		—			
IEBus		—			
Smart Card/SIM		2			
Synchronous Serial Communication Unit/Special Serial I/O		—			
CAN	Channels	—			1
	Message Box (Numbers)	—			16
Ethernet		—			
USB Function		—			
LPC/ISA		—			
IrDA		—			
LCD		28seg × 4com	32seg × 4com		28seg × 4com
CRC Calculation Circuit		—			
I/O Ports	Input Only (Numbers)	8			
	CMOS Output Only (Numbers)	—			
	CMOS I/O (Numbers)	66			64
	High Voltage Port (Numbers)	—			
	N-Channel Open Drain Port (Numbers)	30			
	DTMF	—			
	High Current Drive Port	—			
	Pull-Up Resistor	—			
	NMOS Push-Pull	—			
External Interrupts Pins		7 (NMI + IRQ (6))			
Debugging Function	Boundary Scan/JTAG	—			
	On-Chip Debug	—			
	On-Board Flash Program	Yes			—
Other Functions	ROM Correction Function	—			
	Others	10-bit PWM Timer (× 2)			
Operating Frequency/Supply Voltage		20MHz/4.5 to 5.5V			
Operating Ambient Temperature (°C)		–20 to 75			
Package*2		PRQP0100JE-B			
Part No.		HD64F2280F20BV	HD64F2280RF20BV	HD64F2282F20V	HD6432282XXXF

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

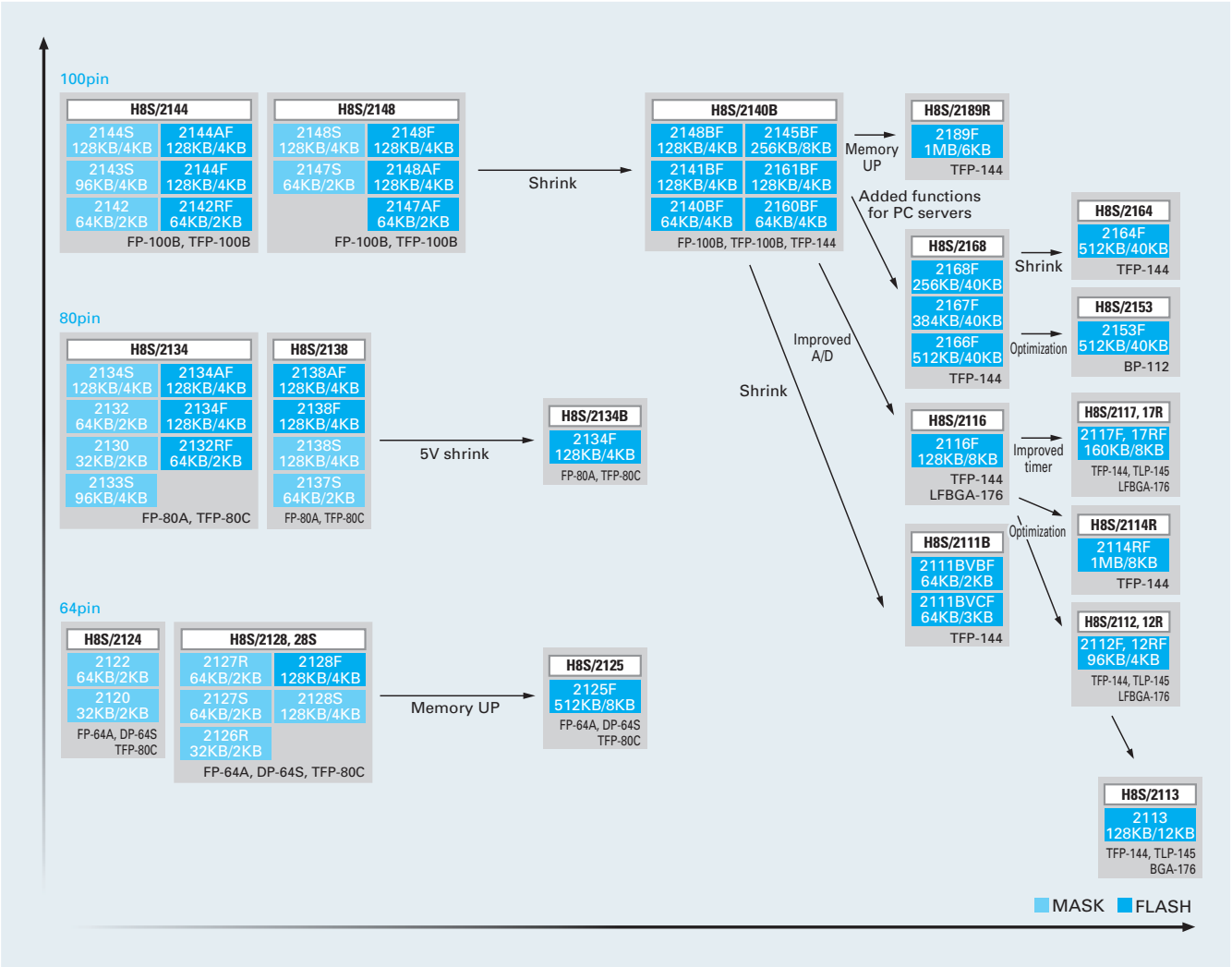
Outline of H8S/2100 Series

A 16-bit MCU Series that inherits the peripheral functions of the 8-bit MCU H8/300

H8S/2100 Series Features

- Easy replacement because the pin locations are the same as the H8/300 series
- Incorporates various PC peripheral functions (I²C-Bus, keyboard buffer controller, ISA-Bus, LPC)
- Wide range of memory (ROM: 32KB to 1 MB/RAM: 2KB to 40KB)

• H8S/2100 Series Roadmap



H8S/2111B Group

- Single power supply on-chip flash memory
- On-chip LPC interface
- Provides optimized versions of the functions of H8S/2160B

* Refer to "MCUs for Notebook PCs/PC servers" in this catalog.

H8S/2112, H8S/2112R Group

- Single power supply on-chip flash memory
- On-chip LPC interface
- Functionally streamlined version of H8S/2117 Group

H8S/2113 Group

- On-chip LPC interface
- Incorparates I²C-bus
- Incorporates data flash

* Refer to "MCUs for Notebook PCs/PC servers" in this catalog.

H8S/2114, H8S/2114R Group

- On-chip 1M byte Flash memory
- On-chip LPC interface
- On-chip emulator (E10A) support

* Refer to "MCUs for Notebook PCs/PC servers" in this catalog.

H8S/2116 Group

- Single power supply on-chip flash memory
- On-chip LPC interface
- Provides optimized versions of the functions of the H8S/2114 group
- Provides BGA package

* Refer to "MCUs for Notebook PCs/PC servers" in this catalog.

H8S/2117, H8S/2117R Group

- Contain built-in single power supply flash memory.
- Contain a built-in LPC interface.
- Support COM interface.
- Support BGA and TLP packages.

* Refer to "MCUs for Notebook PCs/PC servers" in this catalog.

H8S/2124, H8S/2128S, H8S/2128 Group

- Lineup includes versions with single power supply on-chip flash memory
- Upward compatible with the H8/3297 group
- Enhance the functions of the H8/300 series and supports a subclock operating mode

H8S/2125 Group

- The product lineup contains built-in single power supply flash memory.
- Possesses additional functions compared with the H8S/2128 Group.
- Supports on-chip emulators (E10A).

H8S/2134, H8S/2138 Group

- Lineup includes versions with single power supply on-chip flash memory
- Upward compatible with the H8/3337Y group
- Enhance the functions of the H8/300 series and supports a subclock operating mode

H8S/2134B Group

- Lineup includes versions with single power supply onchip flash memory
- Upward compatible with the H8/3337Y group
- Enhances the functions of the H8/300 series and supports a subclock operating mode

H8S/2140B Group

- Lineup includes versions with single power supply on-chip flash memory
- H8S/2148 group implements extended functions
- 256K bytes of on-chip flash memory H8S/2145B

* Refer to "MCUs for Notebook PCs/PC servers" in this catalog.

H8S/2144 Group

- Lineup includes versions with single power supply on-chip flash memory
- Upward compatible with the H8S/3437 group
- Enhances the functions of the H8/300 series and supports a subclock operating mode

H8S/2148 Group

- Lineup includes versions with single power supply on-chip flash memory
- Upward compatible with the H8S/3437 group
- Enhances the functions of the H8/300 series and supports a subclock operating mode

* Refer to "MCUs for Notebook PCs/PC servers" in this catalog.

H8S/2153 Group

- On-chip LPC interface
- On-chip I²C-bus
- Large-capacity RAM
- Provides optimized versions of the functions of H8S/2164 Group

* Refer to "MCUs for Notebook PCs/PC servers" in this catalog.

H8S/2164 Group

- On-chip LPC interface
- On-chip I²C-bus
- Low-voltage, high-speed operation (3V, 34MHz)
- On-chip large-capacity RAM (40KB)

* Refer to "MCUs for Notebook PCs/PC servers" in this catalog.

H8S/2168 Group

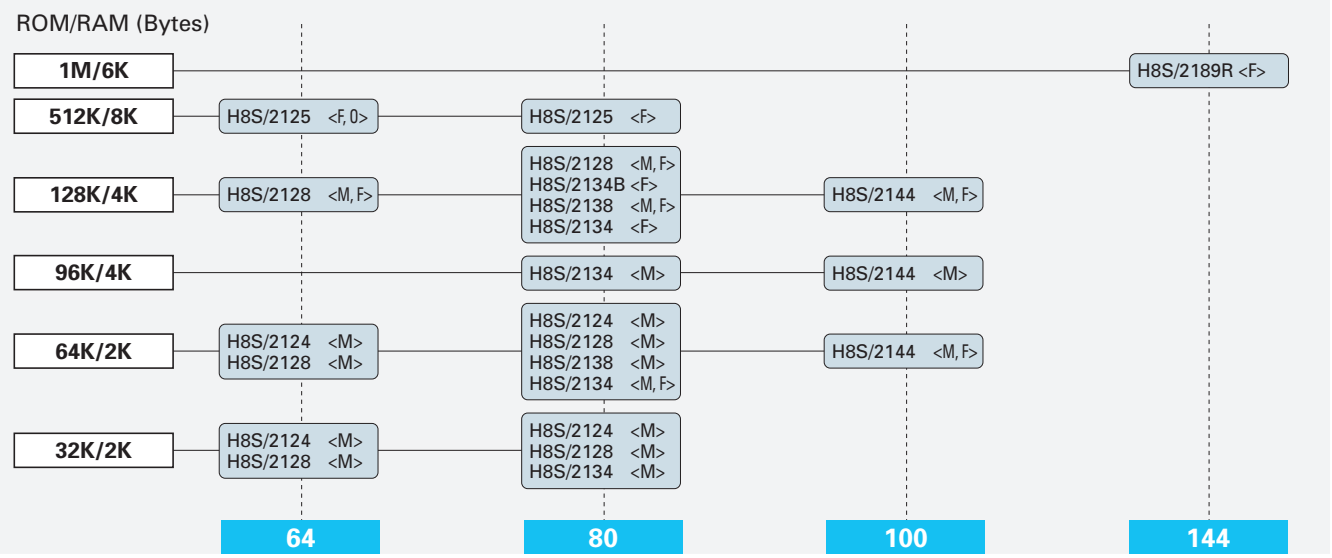
- On-chip LPC interface
- On-chip I²C-bus
- Low-voltage, high-speed operation (3V, 33MHz)
- On-chip large-capacity RAM (40KB)

* Refer to "MCUs for Notebook PCs/PC servers" in this catalog.

H8S/2189R Group

- 1M bytes of built-in flash memory.
- Built-in memory protection function.
- Supports on-chip emulators (E10A).

• Memory Capacity (ROM/RAM) (H8S/2100 Series)



Letters in brackets < > indicate memory variations.
F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

• Specifications (H8S/2100 Series)

Group		H8S/2124		H8S/2125	
Memory	ROM (Bytes)	32K	64K	512K	
	RAM (Bytes)	2K		8K	
	ROM Type*1	M		F	O
	Program Security	—		Yes	
CPU	CPU	H8S/2000 Core			
	Basic Instructions	65			
	Minimum Instruction Execution Time (ns)	100 (@10MHz), 50 (@20MHz)		50 (@20MHz)	
	Multiplier	—			
	Multiply-Accumulate Instruction	—			
DMA	DMAC (Channels)	—			
	EXDMAC	—			
	DTC/DMAC II	—		DTC (85 channels)	
External Bus Expansion	Address Space (Bytes)	16M			
	Bus State Controller	Direct connection to SRAM/ROM is supported			
	Bus Structure	Separate bus (8-bit)			
	SDRAM Controller	—			
	DRAM Controller	—			
	Host Interface	—			
Clock	Clock Generation Circuit	1 circuit (System clock)			
	PLL	—			
	Subclock	—			
	RTC	—			
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16, 32)			
	Power Save	Medium-speed/Sub active/Sleep/Sub sleep/Watch/Software standby/Hardware standby/Module stop			
A/D Converter	Resolution × Channels	10-bit × 8, 10-bit × 8 (expanded A/D input)			
	Sample and Hold	Yes			
D/A Converter	Resolution × Channels	—			
Timer	8-bit	3 (TMR0, TMR1, TMRY)		4 (TMR0, TMR1, TMRX, TMRY)	
	16-bit	1 (FRT)		3 (FRT × 1, TCM × 2)	
	32-bit	—			
	Input Capture	4 (shared with FRT)		7 (shared with FRT, TCM, TMR)	
	Output Compare	5 (shared with FRT, TMR)		6 (shared with FRT, TMR)	
	PWM Output	—		18 (PWMX × 2, PWM × 16)	
	Real-Time Port	—			
	Programmable Pulse Generator	—			
	Event Counter	—			
	2-Phase Encoder Input	—			
Watchdog Timer		2			
Serial Interface	Clock Sync./Clock Async.	2			
I²C-bus		—		2	
IEBus		—			
Smart Card/SIM		—			
Synchronous Serial Communication Unit/Special Serial I/O		—			
CAN	Channels	—			
	Message Box (Numbers)	—			
Ethernet		—			
USB Function		—			
LPC/ISA		—			
IrDA		—			
LCD		—			
CRC Calculation Circuit		—			
I/O Ports	Input Only (Numbers)	9			
	CMOS Output Only (Numbers)	—			
	CMOS I/O (Numbers)	42			
	High Voltage Port (Numbers)	—			
	N-Channel Open Drain Port (Numbers)	—		2	
	DTMF	—			
	High Current Drive Port	24			
	Pull-Up Resistor	24		27	
	NMOS Push-Pull	—		2	
External Interrupts Pins		4		9	
Debugging Function	Boundary Scan/JTAG	—			
	On-Chip Debug	—		Yes	—
	On-Board Flash Program	—		Yes	—
Other Functions	ROM Correction Function	—			
	Others	—			
Operating Frequency/Supply Voltage		20MHz/4.5 to 5.5V, 16MHz/4.0 to 5.5V, 10MHz/2.7 to 5.5V		20MHz/3.0 to 3.6V	
Operating Ambient Temperature (°C)		–40 to 85 / –20 to 75	–40 to 85 / –20 to 75	–40 to 85 / –20 to 75	–40 to 85 / –20 to 75 / –40 to 85 / –20 to 75 / –40 to 85
Package*2		PRQP0064GB-A	PRDP0064BB-A	PTQP0080KC-A	PRQP0064GB-A / PRDP0064BB-A / PTQP0080KC-A / PRDP0064BB-A / PTQP0080KC-A
Part No.		HD6432120XXXFAI	HD6432120XXXFA	HD6432120XXXPSI	HD6432120XXXPS
		HD6432120XXXTFI	HD6432120XXXTF	HD6432122XXXFAI	HD6432122XXXFA
		HD6432122XXXPSI	HD6432122XXXPS	HD6432122XXXTFI	HD6432122XXXTF
		R4F2125VFA20V	R4F2125VPS20V	R4F2125VTF20V	R4P2125VPS20V

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8S/2100 Series)

Group		H8S/2128S			
Memory	ROM (Bytes)	64K		128K	
	RAM (Bytes)	2K		4K	
	ROM Type*1	M			
	Program Security	—			
CPU	CPU	H8S/2000 Core			
	Basic Instructions	65			
	Minimum Instruction Execution Time (ns)	50 (@20MHz)			
	Multiplier	—			
	Multiply-Accumulate Instruction	—			
DMA	DMAC (Channels)	—			
	EXDMAC	—			
	DTC/DMAC Ⅱ	DTC (85 channels)			
External Bus Expansion	Address Space (Bytes)	16M			
	Bus State Controller	Direct connection to SRAM/ROM is supported			
	Bus Structure	Separate bus (8-bit)			
	SDRAM Controller	—			
	DRAM Controller	—			
	Host Interface	—			
Clock	Clock Generation Circuit	1 circuit (System clock)			
	PLL	—			
	Subclock	—			
	RTC	—			
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16, 32)			
	Power Save	Medium-speed/Sub active/Sleep/Sub sleep/Watch/Software standby/Hardware standby/Module stop			
A/D Converter	Resolution × Channels	10-bit × 8, 10-bit × 8 (expanded A/D input)			
	Sample and Hold	Yes			
D/A Converter	Resolution × Channels	—			
Timer	8-bit	4 (TMR0, TMR1, TMRX, TMRY)			
	16-bit	1 (FRT)			
	32-bit	—			
	Input Capture	5 (shared with FRT, TMR)			
	Output Compare	5 (shared with FRT, TMR)			
	PWM Output	18 (PWMX × 2, PWM × 16)			
	Real-Time Port	—			
	Programmable Pulse Generator	—			
	Event Counter	—			
	2-Phase Encoder Input	—			
Watchdog Timer		2			
Serial Interface	Clock Sync./Clock Async.	2			
I²C-bus		2	—	2	—
IEBus		—			
Smart Card/SIM		—			
Synchronous Serial Communication Unit/Special Serial I/O		—			
CAN	Channels	—			
	Message Box (Numbers)	—			
Ethernet		—			
USB Function		—			
LPC/ISA		—			
IrDA		—			
LCD		—			
CRC Calculation Circuit		—			
I/O Ports	Input Only (Numbers)	9			
	CMOS Output Only (Numbers)	—			
	CMOS I/O (Numbers)	40			
	High Voltage Port (Numbers)	—			
	N-Channel Open Drain Port (Numbers)	2			
	DTMF	—			
	High Current Drive Port	24			
	Pull-Up Resistor	24			
	NMOS Push-Pull	2			
External Interrupts Pins		4			
Debugging Function	Boundary Scan/JTAG	—			
	On-Chip Debug	—			
	On-Board Flash Program	—			
Other Functions	ROM Correction Function	—			
	Others	—			
Operating Frequency/Supply Voltage		20MHz/4.5 to 5.5V, 16MHz/4.0 to 5.5V			
Operating Ambient Temperature (˚C)		–20 to 75	–40 to 85	–20 to 75	–40 to 85
Package*2		PRQP0064GB-A		PRDP0064BB-A	
Part No.		HD6432127SWXXXFA	HD6432127SWXXXFAI	HD6432127SWXXXPS	HD6432127SWXXXPSI

Group		H8S/2128S			
Memory	ROM (Bytes)	64K		128K	
	RAM (Bytes)	2K		4K	
	ROM Type*1	M			
	Program Security	—			
CPU	CPU	H8S/2000 Core			
	Basic Instructions	65			
	Minimum Instruction Execution Time (ns)	50 (@20MHz)			
	Multiplier	—			
	Multiply-Accumulate Instruction	—			
DMA	DMAC (Channels)	—			
	EXDMAC	—			
	DTC/DMAC Ⅱ	DTC (85 channels)			
External Bus Expansion	Address Space (Bytes)	16M			
	Bus State Controller	Direct connection to SRAM/ROM is supported			
	Bus Structure	Separate bus (8-bit)			
	SDRAM Controller	—			
	DRAM Controller	—			
	Host Interface	—			
Clock	Clock Generation Circuit	1 circuit (System clock)			
	PLL	—			
	Subclock	—			
	RTC	—			
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16, 32)			
	Power Save	Medium-speed/Sub active/Sleep/Sub sleep/Watch/Software standby/Hardware standby/Module stop			
A/D Converter	Resolution × Channels	10-bit × 8, 10-bit × 8 (expanded A/D input)			
	Sample and Hold	Yes			
D/A Converter	Resolution × Channels	—			
Timer	8-bit	4 (TMR0, TMR1, TMRX, TMRY)			
	16-bit	1 (FRT)			
	32-bit	—			
	Input Capture	5 (shared with FRT, TMR)			
	Output Compare	5 (shared with FRT, TMR)			
	PWM Output	18 (PWMX × 2, PWM × 16)			
	Real-Time Port	—			
	Programmable Pulse Generator	—			
	Event Counter	—			
	2-Phase Encoder Input	—			
Watchdog Timer		2			
Serial Interface	Clock Sync./Clock Async.	2			
I²C-bus		2	—	2	—
IEBus		—			
Smart Card/SIM		—			
Synchronous Serial Communication Unit/Special Serial I/O		—			
CAN	Channels	—			
	Message Box (Numbers)	—			
Ethernet		—			
USB Function		—			
LPC/ISA		—			
IrDA		—			
LCD		—			
CRC Calculation Circuit		—			
I/O Ports	Input Only (Numbers)	9			
	CMOS Output Only (Numbers)	—			
	CMOS I/O (Numbers)	40			
	High Voltage Port (Numbers)	—			
	N-Channel Open Drain Port (Numbers)	2			
	DTMF	—			
	High Current Drive Port	24			
	Pull-Up Resistor	24			
	NMOS Push-Pull	2			
External Interrupts Pins		4			
Debugging Function	Boundary Scan/JTAG	—			
	On-Chip Debug	—			
	On-Board Flash Program	—			
Other Functions	ROM Correction Function	—			
	Others	—			
Operating Frequency/Supply Voltage		20MHz/4.5 to 5.5V, 16MHz/4.0 to 5.5V			
Operating Ambient Temperature (˚C)		–20 to 75	–40 to 85	–20 to 75	–40 to 85
Package*2		PRQP0064GB-A		PRDP0064BB-A	
Part No.		HD6432127SXXXFA	HD6432127SXXXFAI	HD6432127SXXXPS	HD6432127SXXXPSI

Group		H8S/2128S			
Memory	ROM (Bytes)	64K		128K	
	RAM (Bytes)	2K		4K	
	ROM Type*1	M			
	Program Security	—			
CPU	CPU	H8S/2000 Core			
	Basic Instructions	65			
	Minimum Instruction Execution Time (ns)	50 (@20MHz)			
	Multiplier	—			
	Multiply-Accumulate Instruction	—			
DMA	DMAC (Channels)	—			
	EXDMAC	—			
	DTC/DMAC Ⅱ	DTC (85 channels)			
External Bus Expansion	Address Space (Bytes)	16M			
	Bus State Controller	Direct connection to SRAM/ROM is supported			
	Bus Structure	Separate bus (8-bit)			
	SDRAM Controller	—			
	DRAM Controller	—			
	Host Interface	—			
Clock	Clock Generation Circuit	1 circuit (System clock)			
	PLL	—			
	Subclock	—			
	RTC	—			
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16, 32)			
	Power Save	Medium-speed/Sub active/Sleep/Sub sleep/Watch/Software standby/Hardware standby/Module stop			
A/D Converter	Resolution × Channels	10-bit × 8, 10-bit × 8 (expanded A/D input)			
	Sample and Hold	Yes			
D/A Converter	Resolution × Channels	—			
Timer	8-bit	4 (TMR0, TMR1, TMRX, TMRY)			
	16-bit	1 (FRT)			
	32-bit	—			
	Input Capture	5 (shared with FRT, TMR)			
	Output Compare	5 (shared with FRT, TMR)			
	PWM Output	18 (PWMX × 2, PWM × 16)			
	Real-Time Port	—			
	Programmable Pulse Generator	—			
	Event Counter	—			
	2-Phase Encoder Input	—			
Watchdog Timer		2			
Serial Interface	Clock Sync./Clock Async.	2			
I²C-bus		2	—	2	—
IEBus		—			
Smart Card/SIM		—			
Synchronous Serial Communication Unit/Special Serial I/O		—			
CAN	Channels	—			
	Message Box (Numbers)	—			
Ethernet		—			
USB Function		—			
LPC/ISA		—			
IrDA		—			
LCD		—			
CRC Calculation Circuit		—			
I/O Ports	Input Only (Numbers)	9			
	CMOS Output Only (Numbers)	—			
	CMOS I/O (Numbers)	40			
	High Voltage Port (Numbers)	—			
	N-Channel Open Drain Port (Numbers)	2			
	DTMF	—			
	High Current Drive Port	24			
	Pull-Up Resistor	24			
	NMOS Push-Pull	2			
External Interrupts Pins		4			
Debugging Function	Boundary Scan/JTAG	—			
	On-Chip Debug	—			
	On-Board Flash Program	—			
Other Functions	ROM Correction Function	—			
	Others	—			
Operating Frequency/Supply Voltage		20MHz/4.5 to 5.5V, 16MHz/4.0 to 5.5V			
Operating Ambient Temperature (˚C)		–20 to 75	–40 to 85	–20 to 75	–40 to 85
Package*2		PRQP0064GB-A		PRDP0064BB-A	
Part No.		HD6432128SWXXXFA	HD6432128SWXXXFAI	HD6432128SWXXXPS	HD6432128SWXXXPSI

Group		H8S/2128S			
Memory	ROM (Bytes)	64K		128K	
	RAM (Bytes)	2K		4K	
	ROM Type*1	M			
	Program Security	—			
CPU	CPU	H8S/2000 Core			
	Basic Instructions	65			
	Minimum Instruction Execution Time (ns)	50 (@20MHz)			
	Multiplier	—			
	Multiply-Accumulate Instruction	—			
DMA	DMAC (Channels)	—			
	EXDMAC	—			
	DTC/DMAC Ⅱ	DTC (85 channels)			
External Bus Expansion	Address Space (Bytes)	16M			
	Bus State Controller	Direct connection to SRAM/ROM is supported			
	Bus Structure	Separate bus (8-bit)			
	SDRAM Controller	—			
	DRAM Controller	—			
	Host Interface	—			
Clock	Clock Generation Circuit	1 circuit (System clock)			
	PLL	—			
	Subclock	—			
	RTC	—			
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16, 32)			
	Power Save	Medium-speed/Sub active/Sleep/Sub sleep/Watch/Software standby/Hardware standby/Module stop			
A/D Converter	Resolution × Channels	10-bit × 8, 10-bit × 8 (expanded A/D input)			
	Sample and Hold	Yes			
D/A Converter	Resolution × Channels	—			
Timer	8-bit	4 (TMR0, TMR1, TMRX, TMRY)			
	16-bit	1 (FRT)			
	32-bit	—			
	Input Capture	5 (shared with FRT, TMR)			
	Output Compare	5 (shared with FRT, TMR)			
	PWM Output	18 (PWMX × 2, PWM × 16)			
	Real-Time Port	—			
	Programmable Pulse Generator	—			
	Event Counter	—			
	2-Phase Encoder Input	—			
Watchdog Timer		2			
Serial Interface	Clock Sync./Clock Async.	2			
I²C-bus		2	—	2	—
IEBus		—			
Smart Card/SIM		—			
Synchronous Serial Communication Unit/Special Serial I/O		—			
CAN	Channels	—			
	Message Box (Numbers)	—			
Ethernet		—			
USB Function		—			
LPC/ISA		—			
IrDA		—			
LCD		—			
CRC Calculation Circuit		—			
I/O Ports	Input Only (Numbers)	9			
	CMOS Output Only (Numbers)	—			
	CMOS I/O (Numbers)	40			
	High Voltage Port (Numbers)	—			
	N-Channel Open Drain Port (Numbers)	2			
	DTMF	—			
	High Current Drive Port	24			
	Pull-Up Resistor	24			
	NMOS Push-Pull	2			
External Interrupts Pins		4			
Debugging Function	Boundary Scan/JTAG	—			
	On-Chip Debug	—			
	On-Board Flash Program	—			
Other Functions	ROM Correction Function	—			
	Others	—			
Operating Frequency/Supply Voltage		20MHz/4.5 to 5.5V, 16MHz/4.0 to 5.5V			
Operating Ambient Temperature (˚C)		–20 to 75	–40 to 85	–20 to 75	–40 to 85
Package*2		PRQP0064GB-A		PRDP0064BB-A	
Part No.		HD6432128SXXXFA	HD6432128SXXXFAI	HD6432128SXXXPS	HD6432128SXXXPSI

Group		H8S/2128S			
Memory	ROM (Bytes)	64K		128K	
	RAM (Bytes)	2K		4K	
	ROM Type*1	M			
	Program Security	—			
CPU	CPU	H8S/2000 Core			
	Basic Instructions	65			
	Minimum Instruction Execution Time (ns)	50 (@20MHz)			
	Multiplier	—			
	Multiply-Accumulate Instruction	—			
DMA	DMAC (Channels)	—			
	EXDMAC	—			
	DTC/DMAC Ⅱ	DTC (85 channels)			
External Bus Expansion	Address Space (Bytes)	16M			
	Bus State Controller	Direct connection to SRAM/ROM is supported			
	Bus Structure	Separate bus (8-bit)			
	SDRAM Controller	—			
	DRAM Controller	—			
	Host Interface	—			
Clock	Clock Generation Circuit	1 circuit (System clock)			
	PLL	—			
	Subclock	—			
	RTC	—			
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16, 32)			
	Power Save	Medium-speed/Sub active/Sleep/Sub sleep/Watch/Software standby/Hardware standby/Module stop			
A/D Converter	Resolution × Channels	10-bit × 8, 10-bit × 8 (expanded A/D input)			
	Sample and Hold	Yes			
D/A Converter	Resolution × Channels	—			
Timer	8-bit	4 (TMR0, TMR1, TMRX, TMRY)			
	16-bit	1 (FRT)			
	32-bit	—			
	Input Capture	5 (shared with FRT, TMR)			
	Output Compare	5 (shared with FRT, TMR)			
	PWM Output	18 (PWMX × 2, PWM × 16)			
	Real-Time Port	—			
	Programmable Pulse Generator	—			
	Event Counter	—			
	2-Phase Encoder Input	—			
Watchdog Timer		2			
Serial Interface	Clock Sync./Clock Async.	2			
I²C-bus		2	—	2	—
IEBus		—			
Smart Card/SIM		—			
Synchronous Serial Communication Unit/Special Serial I/O		—			
CAN	Channels	—			
	Message Box (Numbers)	—			
Ethernet		—			
USB Function		—			
LPC/ISA		—			
IrDA		—			
LCD		—			
CRC Calculation Circuit		—			
I/O Ports	Input Only (Numbers)	9			
	CMOS Output Only (Numbers)	—			
	CMOS I/O (Numbers)	40			
	High Voltage Port (Numbers)	—			
	N-Channel Open Drain Port (Numbers)	2			
	DTMF	—			
	High Current Drive Port	24			
	Pull-Up Resistor	24			
	NMOS Push-Pull	2			
External Interrupts Pins		4			
Debugging Function	Boundary Scan/JTAG	—			
	On-Chip Debug	—			
	On-Board Flash Program	—			
Other Functions	ROM Correction Function	—			
	Others	—			
Operating Frequency/Supply Voltage		20MHz/4.5 to 5.5V, 16MHz/4.0 to 5.5V			
Operating Ambient Temperature (˚C)		–20 to 75	–40 to 85	–20 to 75	–40 to 85
Package*2		PRQP0080KC-A		PTQP0080KC-A	
Part No.		HD6432127SWXXXTF	HD6432127SWXXXTFI	HD6432127SXXXTF	HD6432127SXXXTFI

Group		H8S/2128S			
Memory	ROM (Bytes)	64K		128K	
	RAM (Bytes)	2K		4K	
	ROM Type*1	M			
	Program Security	—			
CPU	CPU	H8S/2000 Core			
	Basic Instructions	65			
	Minimum Instruction Execution Time (ns)	50 (@20MHz)			
	Multiplier	—			
	Multiply-Accumulate Instruction	—			
DMA	DMAC (Channels)	—			
	EXDMAC	—			
	DTC/DMAC Ⅱ	DTC (85 channels)			
External Bus Expansion	Address Space (Bytes)	16M			
	Bus State Controller	Direct connection to SRAM/ROM is supported			
	Bus Structure	Separate bus (8-bit)			
	SDRAM Controller	—			
	DRAM Controller	—			
	Host Interface	—			
Clock	Clock Generation Circuit	1 circuit (System clock)			
	PLL	—			
	Subclock	—			
	RTC	—			
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16, 32)			
	Power Save	Medium-speed/Sub active/Sleep/Sub sleep/Watch/Software standby/Hardware standby/Module stop			
A/D Converter	Resolution × Channels	10-bit × 8, 10-bit × 8 (expanded A/D input)			
	Sample and Hold	Yes			
D/A Converter	Resolution × Channels	—			
Timer	8-bit	4 (TMR0, TMR1, TMRX, TMRY)			
	16-bit	1 (FRT)			
	32-bit	—			
	Input Capture	5 (shared with FRT, TMR)			
	Output Compare	5 (shared with FRT, TMR)			
	PWM Output	18 (PWMX × 2, PWM × 16)			
	Real-Time Port	—			
	Programmable Pulse Generator	—			
	Event Counter	—			
	2-Phase Encoder Input	—			
Watchdog Timer		2			
Serial Interface	Clock Sync./Clock Async.	2			
I²C-bus		2	—	2	—
IEBus		—			
Smart Card/SIM		—			
Synchronous Serial Communication Unit/Special Serial I/O		—			
CAN	Channels	—			
	Message Box (Numbers)	—			
Ethernet		—			
USB Function		—			
LPC/ISA		—			
IrDA		—			
LCD		—			
CRC Calculation Circuit		—			
I/O Ports	Input Only (Numbers)	9			
	CMOS Output Only (Numbers)	—			
	CMOS I/O (Numbers)	40			
	High Voltage Port (Numbers)	—			
	N-Channel Open Drain Port (Numbers)	2			
	DTMF	—			
	High Current Drive Port	24			
	Pull-Up Resistor	24			
	NMOS Push-Pull	2			
External Interrupts Pins		4			
Debugging Function	Boundary Scan/JTAG	—			
	On-Chip Debug	—			
	On-Board Flash Program	—			
Other Functions	ROM Correction Function	—			
	Others	—			
Operating Frequency/Supply Voltage		20MHz/4.5 to 5.5V, 16MHz/4.0 to 5.5V			
Operating Ambient Temperature (˚C)		–20 to 75	–40 to 85	–20 to 75	–40 to 85
Package*2		PRQP0064GB-A		PRDP0064BB-A	
Part No.		HD6432128SWXXXFA	HD6432128SWXXXFAI	HD6432128SWXXXPS	HD6432128SWXXXPSI

Group		H8S/2128S			
Memory	ROM (Bytes)	64K		128K	
	RAM (Bytes)	2K		4K	
	ROM Type*1	M			
	Program Security	—			
CPU	CPU	H8S/2000 Core			
	Basic Instructions	65			
	Minimum Instruction Execution Time (ns)	50 (@20MHz)			
	Multiplier	—			
	Multiply-Accumulate Instruction	—			
DMA	DMAC (Channels)	—			
	EXDMAC	—			
	DTC/DMAC Ⅱ	DTC (85 channels)			
External Bus Expansion	Address Space (Bytes)	16M			
	Bus State Controller	Direct connection to SRAM/ROM is supported			
	Bus Structure	Separate bus (8-bit)			
	SDRAM Controller	—			
	DRAM Controller	—			
	Host Interface	—			
Clock	Clock Generation Circuit	1 circuit (System clock)			
	PLL	—			
	Subclock	—			
	RTC	—			
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16, 32)			
	Power Save	Medium-speed/Sub active/Sleep/Sub sleep/Watch/Software standby/Hardware standby/Module stop			
A/D Converter	Resolution × Channels	10-bit × 8, 10-bit × 8 (expanded A/D input)			
	Sample and Hold	Yes			
D/A Converter	Resolution × Channels	—			
Timer	8-bit	4 (TMR0, TMR1, TMRX, TMRY)			
	16-bit	1 (FRT)			
	32-bit	—			
	Input Capture	5 (shared with FRT, TMR)			
	Output Compare	5 (shared with FRT, TMR)			
	PWM Output	18 (PWMX × 2, PWM × 16)			
	Real-Time Port	—			
	Programmable Pulse Generator	—			
	Event Counter	—			
	2-Phase Encoder Input	—			
Watchdog Timer		2			
Serial Interface	Clock Sync./Clock Async.	2			
I²C-bus		2	—	2	—
IEBus		—			
Smart Card/SIM		—			
Synchronous Serial Communication Unit/Special Serial I/O		—			
CAN	Channels	—			
	Message Box (Numbers)	—			
Ethernet		—			
USB Function		—			
LPC/ISA		—			
IrDA		—			
LCD		—			
CRC Calculation Circuit		—			
I/O Ports	Input Only (Numbers)	9			
	CMOS Output Only (Numbers)	—			
	CMOS I/O (Numbers)	40			
	High Voltage Port (Numbers)	—			
	N-Channel Open Drain Port (Numbers)	2			
	DTMF	—			
	High Current Drive Port	24			
	Pull-Up Resistor	24			
	NMOS Push-Pull	2			
External Interrupts Pins		4			
Debugging Function	Boundary Scan/JTAG	—			
	On-Chip Debug	—			
	On-Board Flash Program	—			
Other Functions	ROM Correction Function	—			
	Others	—			
Operating Frequency/Supply Voltage		20MHz/4.5 to 5.5V, 16MHz/4.0 to 5.5V			
Operating Ambient Temperature (˚C)		–20 to 75	–40 to 85	–20 to 75	–40 to 85
Package*2		PRQP0064GB-A		PRDP0064BB-A	
Part No.		HD6432128SXXXFA	HD6432128SXXXFAI	HD6432128SXXXPS	HD6432128SXXXPSI

Group		H8S/2128S			
Memory	ROM (Bytes)	64K		128K	
	RAM (Bytes)	2K		4K	
	ROM Type*1	M			
	Program Security	—			
CPU	CPU	H8S/2000 Core			
	Basic Instructions	65			
	Minimum Instruction Execution Time (ns)	50 (@20MHz)			
	Multiplier	—			
	Multiply-Accumulate Instruction	—			
DMA	DMAC (Channels)	—			
	EXDMAC	—			
	DTC/DMAC Ⅱ	DTC (85 channels)			
External Bus Expansion	Address Space (Bytes)	16M			
	Bus State Controller	Direct connection to SRAM/ROM is supported			
	Bus Structure	Separate bus (8-bit)			
	SDRAM Controller	—			
	DRAM Controller	—			
	Host Interface	—			
Clock	Clock Generation Circuit	1 circuit (System clock)			
	PLL	—			
	Subclock	—			
	RTC	—			
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16, 32)			
	Power Save	Medium-speed/Sub active/Sleep/Sub sleep/Watch/Software standby/Hardware standby/Module stop			
A/D Converter	Resolution × Channels	10-bit × 8, 10-bit × 8 (expanded A/D input)			
	Sample and Hold	Yes			
D/A Converter	Resolution × Channels	—			
Timer	8-bit	4 (TMR0, TMR1, TMRX, TMRY)			
	16-bit	1 (FRT)			
	32-bit	—			
	Input Capture	5 (shared with FRT, TMR)			
	Output Compare	5 (shared with FRT, TMR)			
	PWM Output	18 (PWMX × 2, PWM × 16)			
	Real-Time Port	—			
	Programmable Pulse Generator	—			
	Event Counter	—			
	2-Phase Encoder Input	—			
Watchdog Timer		2			
Serial Interface	Clock Sync./Clock Async.	2			
I²C-bus		2	—	2	—
IEBus		—			
Smart Card/SIM		—			
Synchronous Serial Communication Unit/Special Serial I/O		—			
CAN	Channels	—			
	Message Box (Numbers)	—			
Ethernet		—			
USB Function		—			
LPC/ISA		—			
IrDA		—			
LCD		—			
CRC Calculation Circuit		—			
I/O Ports	Input Only (Numbers)	9			
	CMOS Output Only (Numbers)	—			
	CMOS I/O (Numbers)	40			
	High Voltage Port (Numbers)	—			
	N-Channel Open Drain Port (Numbers)	2			
	DTMF	—			
	High Current Drive Port	24			
	Pull-Up Resistor	24			
	NMOS Push-Pull	2			
External Interrupts Pins		4			
Debugging Function	Boundary Scan/JTAG	—			
	On-Chip Debug	—			
	On-Board Flash Program	—			
Other Functions	ROM Correction Function	—			
	Others	—			
Operating Frequency/Supply Voltage		20MHz/4.5 to 5.5V, 16MHz/4.0 to 5.5V			
Operating Ambient Temperature (˚C)		–20 to 75	–40 to 85	–20 to 75	–40 to 85
Package*2		PRQP0080KC-A		PTQP0080KC-A	
Part No.		HD6432128SWXXXTF	HD6432128SWXXXTFI	HD6432128SXXXTF	HD6432128SXXXTFI

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8S/2100 Series)

Group		H8S/2128				
Memory	ROM (Bytes)	32K		64K		128K
	RAM (Bytes)	2K				4K
	ROM Type*[1]	M				F
	Program Security	—				Yes
CPU	CPU	H8S/2000 Core				
	Basic Instructions	65				
	Minimum Instruction Execution Time (ns)	100 (@10MHz), 50 (@20MHz)				
	Multiplier	—				
	Multiply-Accumulate Instruction	—				
DMA	DMAC (Channels)	—				
	EXDMAC	—				
	DTC/DMAC II	DTC (85 channels)				
External Bus Expansion	Address Space (Bytes)	16M				
	Bus State Controller	Direct connection to SRAM/ROM is supported				
	Bus Structure	Separate bus (8-bit)				
	SDRAM Controller	—				
	DRAM Controller	—				
	Host Interface	—				
Clock	Clock Generation Circuit	1 circuit (System clock)				
	PLL	—				
	Subclock	—				
	RTC	—				
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16, 32)				
	Power Save	Medium-speed/Sub active/Sleep/Sub sleep/Watch/Software standby/Hardware standby/Module stop				
A/D Converter	Resolution × Channels	10-bit × 8, 10-bit × 8 (expanded A/D input)				
	Sample and Hold	Yes				
D/A Converter	Resolution × Channels	—				
Timer	8-bit	4 (TMR0, TMR1, TMRX, TMRY)				
	16-bit	1 (FRT)				
	32-bit	—				
	Input Capture	5 (shared with FRT, TMR)				
	Output Compare	5 (shared with FRT, TMR)				
	PWM Output	18 (PWMX × 2, PWM × 16)				
	Real-Time Port	—				
	Programmable Pulse Generator	—				
	Event Counter	—				
	2-Phase Encoder Input	—				
Watchdog Timer		2				
Serial Interface	Clock Sync./Clock Async.	2				
I^2C-bus		2	—	2	—	2
IEBus		—				
Smart Card/SIM		—				
Synchronous Serial Communication Unit/Special Serial I/O		—				
CAN	Channels	—				
	Message Box (Numbers)	—				
Ethernet		—				
USB Function		—				
LPC/ISA		—				
IrDA		—				
LCD		—				
CRC Calculation Circuit		—				
I/O Ports	Input Only (Numbers)	9				
	CMOS Output Only (Numbers)	—				
	CMOS I/O (Numbers)	40				
	High Voltage Port (Numbers)	—				
	N-Channel Open Drain Port (Numbers)	2				
	DTMF	—				
	High Current Drive Port	24				
	Pull-Up Resistor	24				
	NMOS Push-Pull	2				
External Interrupts Pins		4				
Debugging Function	Boundary Scan/JTAG	—				
	On-Chip Debug	—				
	On-Board Flash Program	—				Yes
Other Functions	ROM Correction Function	—				
	Others	—				

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Operating Frequency/Supply Voltage	20MHz/4.5 to 5.5V, 16MHz/4.0 to 5.5V, 10MHz/2.7 to 5.5V																								20MHz/4.5 to 5.5V, 16MHz/4.0 to 5.5V				10MHz/3.0 to 3.6V		
Operating Ambient Temperature (°C)	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75		–40 to 85	–20 to 75			
Package*[2]	PRQP0064GB-A		PRDP0064BB-A		PTQP0080KC-A		PRQP0064GB-A		PRDP0064BB-A		PTQP0080KC-A		PRQP0064GB-A		PRDP0064BB-A		PTQP0080KC-A		PRQP0064GB-A		PRDP0064BB-A		PTQP0080KC-A		PRQP0064GB-A	PRDP0064BB-A	PTQP0080KC-A		PRDP0064BB-A	PRQP0064GB-A	PTQP0080KC-A
Part No.	HD6432126RWXXXFA	HD6432126RWXXXFAI	HD6432126RWXXXPS	HD6432126RWXXXPSI	HD6432126RWXXXTF	HD6432126RWXXXTFI	HD6432126RXXXFA	HD6432126RXXXFAI	HD6432126RXXXPS	HD6432126RXXXPSI	HD6432126RXXXTF	HD6432126RXXXTFI	HD6432127RWXXXFA	HD6432127RWXXXFAI	HD6432127RWXXXPS	HD6432127RWXXXPSI	HD6432127RWXXXTF	HD6432127RWXXXTFI	HD6432127RXXXFA	HD6432127RXXXFAI	HD6432127RXXXPS	HD6432127RXXXPSI	HD6432127RXXXTF	HD6432127RXXXTFI	HD64F2128FA20V	HD64F2128PS20V	HD64F2128TF20IV	HD64F2128TF20V	HD64F2128PS10	HD64F2128VFA10V	HD64F2128VTF10

*[1] F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*[2] Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8S/2100 Series)

Group		H8S/2134																			
Memory	ROM (Bytes)	32K				64K								96K							
	RAM (Bytes)	2K												4K							
	ROM Type*1	M								F				M							
	Program Security	—								Yes				—							
CPU	CPU	H8S/2000 Core																			
	Basic Instructions	65																			
	Minimum Instruction Execution Time (ns)	100 (@10MHz), 50 (@20MHz)																			
	Multiplier	—																			
	Multiply-Accumulate Instruction	—																			
DMA	DMAC (Channels)	—																			
	EXDMAC	—																			
	DTC/DMAC II	—																			
External Bus Expansion	Address Space (Bytes)	16M																			
	Bus State Controller	Direct connection to SRAM/ROM is supported																			
	Bus Structure	Separate bus (8-bit)																			
	SDRAM Controller	—																			
	DRAM Controller	—																			
	Host Interface	—																			
Clock	Clock Generation Circuit	1 circuit (System clock)																			
	PLL	—																			
	Subclock	—																			
	RTC	—																			
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16, 32)																			
	Power Save	Medium-speed/Sub active/Sleep/Sub sleep/Watch/Software standby/Hardware standby/Module stop																			
A/D Converter	Resolution × Channels	10-bit × 8, 10-bit × 8 (expanded A/D input)																			
	Sample and Hold	Yes																			
D/A Converter	Resolution × Channels	8-bit × 2																			
Timer	8-bit	3 (TMR0, TMR1, TMRY)																			
	16-bit	1 (FRT)																			
	32-bit	—																			
	Input Capture	4 (shared with FRT)																			
	Output Compare	5 (shared with FRT, TMR)																			
	PWM Output	2 (PWMX)																			
	Real-Time Port	—																			
	Programmable Pulse Generator	—																			
	Event Counter	—																			
	2-Phase Encoder Input	—																			
Watchdog Timer		2																			
Serial Interface	Clock Sync./Clock Async.	3																			
I²C-bus		—																			
IEBus		—																			
Smart Card/SIM		—																			
Synchronous Serial Communication Unit/Special Serial I/O		—																			
CAN	Channels	—																			
	Message Box (Numbers)	—																			
Ethernet		—																			
USB Function		—																			
LPC/ISA		—																			
IrDA		Yes																			
LCD		—																			
CRC Calculation Circuit		—																			
I/O Ports	Input Only (Numbers)	9																			
	CMOS Output Only (Numbers)	—																			
	CMOS I/O (Numbers)	57																			
	High Voltage Port (Numbers)	—																			
	N-Channel Open Drain Port (Numbers)	—																			
	DTMF	—																			
	High Current Drive Port	24																			
	Pull-Up Resistor	24																			
	NMOS Push-Pull	—																			
External Interrupts Pins		9																			
Debugging Function	Boundary Scan/JTAG	—																			
	On-Chip Debug	—																			
	On-Board Flash Program	—								Yes				—							
Other Functions	ROM Correction Function	—																			
	Others	—																			
Operating Frequency/Supply Voltage		20MHz/4.5 to 5.5V, 16MHz/4.0 to 5.5V, 10MHz/2.7 to 5.5V								20MHz/4.5 to 5.5V, 16MHz/4.0 to 5.5V		10MHz/3.0 to 5.5V		10MHz/2.7 to 3.6V				20MHz/4.5 to 5.5V, 16MHz/4.0 to 5.5V			
Operating Ambient Temperature (°C)		–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75					–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85
Package*2		PRQP0080JB-A		PTQP0080KC-A		PRQP0080JB-A		PTQP0080KC-A		PRQP0080JB-A	PTQP0080KC-A	PRQP0080JB-A	PTQP0080KC-A	PRQP0080JB-A		PTQP0080KC-A		PRQP0080JB-A		PTQP0080KC-A	
Part No.		HD6432130XXXFA	HD6432130XXXFAI	HD6432130XXXTF	HD6432130XXXTFI	HD6432132XXXFA	HD6432132XXXFAI	HD6432132XXXTF	HD6432132XXXTFI	HD64F2132RFA20V	HD64F2132RTF20V	HD64F2132RVFA10	HD64F2132RVTF10V	HD6432133SVXXXFA	HD6432133SVXXXFAI	HD6432133SVXXXTF	HD6432133SVXXXTFI	HD6432133SXXXFA	HD6432133SXXXFAI	HD6432133SXXXTF	HD6432133SXXXTFI

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8S/2100 Series)

Group		H8S/2134																			
Memory	ROM (Bytes)	128K																			
	RAM (Bytes)	4K																			
	ROM Type*1	M										F									
	Program Security	—										Yes									
CPU	CPU	H8S/2000 Core																			
	Basic Instructions	65																			
	Minimum Instruction Execution Time (ns)	100 (@10MHz), 50 (@20MHz)																			
	Multiplier	—																			
	Multiply-Accumulate Instruction	—																			
DMA	DMAC (Channels)	—																			
	EXDMAC	—																			
	DTC/DMAC II	—																			
External Bus Expansion	Address Space (Bytes)	16M																			
	Bus State Controller	Direct connection to SRAM/ROM is supported																			
	Bus Structure	Separate bus (8-bit)																			
	SDRAM Controller	—																			
	DRAM Controller	—																			
	Host Interface	—																			
Clock	Clock Generation Circuit	1 circuit (System clock)																			
	PLL	—																			
	Subclock	—																			
	RTC	—																			
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16, 32)																			
	Power Save	Medium-speed/Sub active/Sleep/Sub sleep/Watch/Software standby/Hardware standby/Module stop																			
A/D Converter	Resolution × Channels	10-bit × 8, 10-bit × 8 (expanded A/D input)																			
	Sample and Hold	Yes																			
D/A Converter	Resolution × Channels	8-bit × 2																			
Timer	8-bit	3 (TMR0, TMR1, TMRY)																			
	16-bit	1 (FRT)																			
	32-bit	—																			
	Input Capture	4 (shared with FRT)																			
	Output Compare	5 (shared with FRT, TMR)																			
	PWM Output	2 (PWMX)																			
	Real-Time Port	—																			
	Programmable Pulse Generator	—																			
	Event Counter	—																			
	2-Phase Encoder Input	—																			
Watchdog Timer		2																			
Serial Interface	Clock Sync./Clock Async.	3																			
I²C-bus		—																			
IEBus		—																			
Smart Card/SIM		—																			
Synchronous Serial Communication Unit/Special Serial I/O		—																			
CAN	Channels	—																			
	Message Box (Numbers)	—																			
Ethernet		—																			
USB Function		—																			
LPC/ISA		—																			
IrDA		Yes																			
LCD		—																			
CRC Calculation Circuit		—																			
I/O Ports	Input Only (Numbers)	9																			
	CMOS Output Only (Numbers)	—																			
	CMOS I/O (Numbers)	57																			
	High Voltage Port (Numbers)	—																			
	N-Channel Open Drain Port (Numbers)	—																			
	DTMF	—																			
	High Current Drive Port	24																			
	Pull-Up Resistor	24																			
	NMOS Push-Pull	—																			
External Interrupts Pins		9																			
Debugging Function	Boundary Scan/JTAG	—																			
	On-Chip Debug	—																			
	On-Board Flash Program	—										Yes									
Other Functions	ROM Correction Function	—																			
	Others	—																			
Operating Frequency/Supply Voltage		10MHz/2.7 to 3.6V				20MHz/4.5 to 5.5V, 16MHz/4.0 to 5.5V						10MHz/2.7 to 3.6V		20MHz/4.5 to 5.5V, 16MHz/4.0 to 5.5V		10MHz/3.0 to 5.5V					
Operating Ambient Temperature (°C)		–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75			–40 to 85	–20 to 75					
Package*2		PRQP0080UB-A		PTQP0080KC-A		PRQP0080UB-A		PTQP0080KC-A		PRQP0080UB-A	PTQP0080KC-A	PRQP0080UB-A	PTQP0080KC-A	PRQP0080UB-A	PTQP0080KC-A	PRQP0080UB-A	PTQP0080KC-A				
Part No.		HD6432134SVXXXFA	HD6432134SVXXXFAI	HD6432134SVXXXTF	HD6432134SVXXXTFI	HD6432134SXXXFA	HD6432134SXXXFAI	HD6432134SXXXTF	HD6432134SXXXTFI	HD64F2134AFA20V	HD64F2134ATF20I	HD64F2134ATF20V	HD64F2134AVFA10V	HD64F2134AVTF10V	HD64F2134FA20V	HD64F2134TF20I	HD64F2134TF20V	HD64F2134VFA10V	HD64F2134VTF10		

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8S/2100 Series)

Group		H8S/2134B	H8S/2138															
Memory	ROM (Bytes)	128K	64K															
	RAM (Bytes)	4K	2K															
	ROM Type*1	F	M															
	Program Security	Yes	—															
CPU	CPU	H8S/2000 Core																
	Basic Instructions	65																
	Minimum Instruction Execution Time (ns)	50 (@20MHz)	100 (@10MHz), 50 (@20MHz)															
	Multiplier	—																
	Multiply-Accumulate Instruction	—																
DMA	DMAC (Channels)	—																
	EXDMAC	—																
	DTC/DMAC Ⅱ	—	DTC (85 channels)															
External Bus Expansion	Address Space (Bytes)	16M																
	Bus State Controller	Direct connection to SRAM/ROM is supported																
	Bus Structure	Separate bus (8-bit)																
	SDRAM Controller	—																
	DRAM Controller	—																
	Host Interface	—	Yes (ISA)															
Clock	Clock Generation Circuit	1 circuit (System clock)																
	PLL	—																
	Subclock	—																
	RTC	—																
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16, 32)																
	Power Save	Medium-speed/Sub active/Sleep/Sub sleep/Watch/Software standby/Hardware standby/Module stop																
A/D Converter	Resolution × Channels	10-bit × 8	10-bit × 8, 10-bit × 8 (expanded A/D input)															
	Sample and Hold	Yes																
D/A Converter	Resolution × Channels	8-bit × 2																
Timer	8-bit	3 (TMR0, TMR1, TMRY)	4 (TMR0, TMR1, TMRX, TMRY)															
	16-bit	1 (FRT)																
	32-bit	—																
	Input Capture	4 (shared with FRT)	5 (shared with FRT, TMR)															
	Output Compare	5 (shared with FRT, TMR)																
	PWM Output	2 (PWMX)	18 (PWMX × 2, PWM × 16)															
	Real-Time Port	—																
	Programmable Pulse Generator	—																
	Event Counter	—																
	2-Phase Encoder Input	—																
Watchdog Timer		2																
Serial Interface	Clock Sync./Clock Async.	3																
I²C-bus		—	2				—				2				—			
IEBus		—																
Smart Card/SIM		—																
Synchronous Serial Communication Unit/Special Serial I/O		—																
CAN	Channels	—																
	Message Box (Numbers)	—																
Ethernet		—																
USB Function		—																
LPC/ISA		—	Yes															
IrDA		Yes																
LCD		—																
CRC Calculation Circuit		—																
I/O Ports	Input Only (Numbers)	9																
	CMOS Output Only (Numbers)	—																
	CMOS I/O (Numbers)	57	55															
	High Voltage Port (Numbers)	—																
	N-Channel Open Drain Port (Numbers)	—	2															
	DTMF	—																
	High Current Drive Port	24																
	Pull-Up Resistor	32	24															
	NMOS Push-Pull	—	2															
External Interrupts Pins		9																
Debugging Function	Boundary Scan/JTAG	—																
	On-Chip Debug	—																
	On-Board Flash Program	Yes	—															
Other Functions	ROM Correction Function	—																
	Others	—																
Operating Frequency/Supply Voltage		20MHz/4.5 to 5.5V, 16MHz/4.0 to 5.5V	10MHz/2.7 to 3.6V								20MHz/4.5 to 5.5V, 16MHz/4.0 to 5.5V							
Operating Ambient Temperature (˚C)		–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85
Package*2		PRQP0080JB-A	PTQP0080KC-A	PRQP0080JB-A		PTQP0080KC-A		PRQP0080JB-A		PTQP0080KC-A		PRQP0080JB-A		PTQP0080KC-A		PRQP0080JB-A		PTQP0080KC-A	
Part No.		HD64F2134BFA20V	HD64F2134BTF20V	HD6432137SVWXXXFA	HD6432137SVWXXXFAI	HD6432137SVWXXXTF	HD6432137SVWXXXTFI	HD6432137SVXXXFA	HD6432137SVXXXFAI	HD6432137SVXXXTF	HD6432137SVXXXTFI	HD6432137SWXXXFA	HD6432137SWXXXFAI	HD6432137SWXXXTF	HD6432137SWXXXTFI	HD6432137SXXXFA	HD6432137SXXXFAI	HD6432137SXXXTF	HD6432137SXXXTFI

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8S/2100 Series)

Group		H8S/2138																						
Memory	ROM (Bytes)	128K																						
	RAM (Bytes)	4K																						
	ROM Type*1	M																F						
	Program Security	—																Yes						
CPU	CPU	H8S/2000 Core																						
	Basic Instructions	65																						
	Minimum Instruction Execution Time (ns)	100 (@10MHz), 50 (@20MHz)																						
	Multiplier	—																						
	Multiply-Accumulate Instruction	—																						
DMA	DMAC (Channels)	—																						
	EXDMAC	—																						
	DTC/DMAC II	DTC (85 channels)																						
External Bus Expansion	Address Space (Bytes)	16M																						
	Bus State Controller	Direct connection to SRAM/ROM is supported																						
	Bus Structure	Separate bus (8-bit)																						
	SDRAM Controller	—																						
	DRAM Controller	—																						
	Host Interface	Yes (ISA)																						
Clock	Clock Generation Circuit	1 circuit (System clock)																						
	PLL	—																						
	Subclock	—																						
	RTC	—																						
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16, 32)																						
	Power Save	Medium-speed/Sub active/Sleep/Sub sleep/Watch/Software standby/Hardware standby/Module stop																						
A/D Converter	Resolution × Channels	10-bit × 8, 10-bit × 8 (expanded A/D input)																						
	Sample and Hold	Yes																						
D/A Converter	Resolution × Channels	8-bit × 2																						
Timer	8-bit	4 (TMR0, TMR1, TMRX, TMRY)																						
	16-bit	1 (FRT)																						
	32-bit	—																						
	Input Capture	5 (shared with FRT, TMR)																						
	Output Compare	5 (shared with FRT, TMR)																						
	PWM Output	18 (PWMX × 2, PWM × 16)																						
	Real-Time Port	—																						
	Programmable Pulse Generator	—																						
	Event Counter	—																						
	2-Phase Encoder Input	—																						
Watchdog Timer		2																						
Serial Interface	Clock Sync./Clock Async.	3																						
I²C-bus		2				—				2				—				2						
IEBus		—																						
Smart Card/SIM		—																						
Synchronous Serial Communication Unit/Special Serial I/O		—																						
CAN	Channels	—																						
	Message Box (Numbers)	—																						
Ethernet		—																						
USB Function		—																						
LPC/ISA		Yes																						
IrDA		Yes																						
LCD		—																						
CRC Calculation Circuit		—																						
I/O Ports	Input Only (Numbers)	9																						
	CMOS Output Only (Numbers)	—																						
	CMOS I/O (Numbers)	55																						
	High Voltage Port (Numbers)	—																						
	N-Channel Open Drain Port (Numbers)	2																						
	DTMF	—																						
	High Current Drive Port	24																						
	Pull-Up Resistor	24																						
	NMOS Push-Pull	2																						
External Interrupts Pins		9																						
Debugging Function	Boundary Scan/JTAG	—																						
	On-Chip Debug	—																						
	On-Board Flash Program	—																Yes						
Other Functions	ROM Correction Function	—																						
	Others	—																						
Operating Frequency/Supply Voltage		10MHz/2.7 to 3.6V								20MHz/4.5 to 5.5V, 16MHz/4.0 to 5.5V												10MHz/ 2.7 to 3.6V		10MHz/ 3.0 to 5.5V
Operating Ambient Temperature (°C)		–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85		–20 to 75					
Package*2		PRQP0080JB-A		PTQP0080KC-A		PRQP0080JB-A		PTQP0080KC-A		PRQP0080JB-A		PTQP0080KC-A		PRQP0080JB-A		PTQP0080KC-A		PRQP0080JB-A		PTQP0080KC-A	PRQP0080JB-A		PTQP0080KC-A	PRQP0080JB-A
Part No.		HD6432138SVWXXXFA	HD6432138SVWXXXFAI	HD6432138SVWXXXTF	HD6432138SVWXXXTFI	HD6432138SVXXXFA	HD6432138SVXXXFAI	HD6432138SVXXXTF	HD6432138SVXXXTFI	HD6432138SWXXXFA	HD6432138SWXXXFAI	HD6432138SWXXXTF	HD6432138SWXXXTFI	HD6432138SXXXFA	HD6432138SXXXFAI	HD6432138SXXXTF	HD6432138SXXXTFI	HD64F2138AFA20IV	HD64F2138AFA20V	HD64F2138ATF20V	HD64F2138FA20V	HD64F2138AVFA10V	HD64F2138AVTF10V	HD64F2138VFA10

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8S/2100 Series)

Group		H8S/2144															
Memory	ROM (Bytes)	64K						96K									
	RAM (Bytes)	2K						4K									
	ROM Type*1	M				F		M									
	Program Security	—				Yes		—									
CPU	CPU	H8S/2000 Core															
	Basic Instructions	65															
	Minimum Instruction Execution Time (ns)	100 (@10MHz), 50 (@20MHz)															
	Multiplier	—															
	Multiply-Accumulate Instruction	—															
DMA	DMAC (Channels)	—															
	EXDMAC	—															
	DTC/DMAC II	—															
External Bus Expansion	Address Space (Bytes)	16M															
	Bus State Controller	Direct connection to SRAM/ROM is supported															
	Bus Structure	Separate bus (8/16-bit)															
	SDRAM Controller	—															
	DRAM Controller	—															
	Host Interface	—															
Clock	Clock Generation Circuit	1 circuit (System clock)															
	PLL	—															
	Subclock	—															
	RTC	—															
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16, 32)															
	Power Save	Medium-speed/Sub active/Sleep/Sub sleep/Watch/Software standby/Hardware standby/Module stop															
A/D Converter	Resolution × Channels	10-bit × 8, 10-bit × 16 (expanded A/D input)															
	Sample and Hold	Yes															
D/A Converter	Resolution × Channels	8-bit × 2															
Timer	8-bit	3 (TMR0, TMR1, TMRY)															
	16-bit	1 (FRT)															
	32-bit	—															
	Input Capture	4 (shared with FRT)															
	Output Compare	5 (shared with FRT, TMR)															
	PWM Output	2 (PWMX)															
	Real-Time Port	—															
	Programmable Pulse Generator	—															
	Event Counter	—															
	2-Phase Encoder Input	—															
Watchdog Timer		2															
Serial Interface	Clock Sync./Clock Async.	3															
I²C-bus		—															
IEBus		—															
Smart Card/SIM		—															
Synchronous Serial Communication Unit/Special Serial I/O		—															
CAN	Channels	—															
	Message Box (Numbers)	—															
Ethernet		—															
USB Function		—															
LPC/ISA		—															
IrDA		Yes															
LCD		—															
CRC Calculation Circuit		—															
I/O Ports	Input Only (Numbers)	9															
	CMOS Output Only (Numbers)	—															
	CMOS I/O (Numbers)	73															
	High Voltage Port (Numbers)	—															
	N-Channel Open Drain Port (Numbers)	—															
	DTMF	—															
	High Current Drive Port	24															
	Pull-Up Resistor	48															
	NMOS Push-Pull	—															
External Interrupts Pins		9															
Debugging Function	Boundary Scan/JTAG	—															
	On-Chip Debug	—															
	On-Board Flash Program	—				Yes		—									
Other Functions	ROM Correction Function	—															
	Others	—															
Operating Frequency/Supply Voltage		20MHz/4.5 to 5.5V, 16MHz/4.0 to 5.5V, 10MHz/2.7 to 5.5V				20MHz/4.5 to 5.5V, 16MHz/4.0 to 5.5V		10MHz/2.7 to 3.6V						20MHz/4.5 to 5.5V, 16MHz/4.0 to 5.5V			
Operating Ambient Temperature (°C)		–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75		–40 to 85	–20 to 75	–40 to 85				–20 to 75	–40 to 85	–20 to 75	–40 to 85
Package*2		PRQP0100KA-A		PTQP0100KA-A		PRQP0100KA-A		PLQP0064KB-A	PTQP0100KA-A					PRQP0100KA-A	PLQP0064KB-A	PTQP0100KA-A	
Part No.		HD6432142XXXFA	HD6432142XXXFAI	HD6432142XXXTE	HD6432142XXXTEI	HD64F2142RFA20V	HD6432143SVXXXFA	HD6432143SVXXXFAI	HD6432143SVXXXTE	HD6432143SVXXXTEI				HD6432143SXXXFA	HD6432143SXXXFAI	HD6432143SXXXTE	HD6432143SXXXTEI

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8S/2100 Series)

Group		H8S/2144																H8S/2189R
Memory	ROM (Bytes)	128K																1M
	RAM (Bytes)	4K																6K
	ROM Type*1	F										M						F
	Program Security	Yes										—						
CPU	CPU	H8S/2000 Core																
	Basic Instructions	65																
	Minimum Instruction Execution Time (ns)	100 (@10MHz), 50 (@20MHz)																50 (@20MHz)
	Multiplier	—																
	Multiply-Accumulate Instruction	—																
DMA	DMAC (Channels)	—																
	EXDMAC	—																
	DTC/DMAC II	—																
External Bus Expansion	Address Space (Bytes)	16M																
	Bus State Controller	Direct connection to SRAM/ROM is supported																—
	Bus Structure	Separate bus (8/16-bit)																—
	SDRAM Controller	—																
	DRAM Controller	—																
	Host Interface	—																
Clock	Clock Generation Circuit	1 circuit (System clock)																
	PLL	—																
	Subclock	—																
	RTC	—																
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16, 32)																
	Power Save	Medium-speed/Sub active/Sleep/Sub sleep/Watch/Software standby/Hardware standby/Module stop																
A/D Converter	Resolution × Channels	10-bit × 8, 10-bit × 16 (expanded A/D input)																10-bit × 8
	Sample and Hold	Yes																
D/A Converter	Resolution × Channels	8-bit × 2																—
Timer	8-bit	3 (TMR0, TMR1, TMRY)																4 (TMR0, TMR1, TMRX, TMRY)
	16-bit	1 (FRT)																4 (FRT, TPU × 3)
	32-bit	—																
	Input Capture	4 (shared with FRT)																8 (FRT, shared with TPU)
	Output Compare	5 (shared with FRT, TMR)																14 (FRT, shared with TPU)
	PWM Output	2 (PWMX)																10 (PWMX × 2, PWM × 8)
	Real-Time Port	—																
	Programmable Pulse Generator	—																
	Event Counter	—																
	2-Phase Encoder Input	—																Yes
Watchdog Timer		2																
Serial Interface	Clock Sync./Clock Async.	3																2
I²C-bus		—																2
IEBus		—																
Smart Card/SIM		—																1
Synchronous Serial Communication Unit/Special Serial I/O		—																
CAN	Channels	—																
	Message Box (Numbers)	—																
Ethernet		—																
USB Function		—																
LPC/ISA		—																
IrDA		Yes																
LCD		—																
CRC Calculation Circuit		—																
I/O Ports	Input Only (Numbers)	9																
	CMOS Output Only (Numbers)	—																
	CMOS I/O (Numbers)	73																85
	High Voltage Port (Numbers)	—																
	N-Channel Open Drain Port (Numbers)	—																
	DTMF	—																
	High Current Drive Port	24																14
	Pull-Up Resistor	48																78
	NMOS Push-Pull	—																20
External Interrupts Pins		9																17
Debugging Function	Boundary Scan/JTAG	—																Yes
	On-Chip Debug	—																Yes
	On-Board Flash Program	Yes										—						Yes
Other Functions	ROM Correction Function	—																
	Others	—																
Operating Frequency/Supply Voltage		20MHz/4.5 to 5.5V, 16MHz/4.0 to 5.5V		10MHz/2.7 to 3.6V		20MHz/4.5 to 5.5V, 16MHz/4.0 to 5.5V				10MHz/3.0 to 5.5V		10MHz/2.7 to 3.6V				20MHz/4.5 to 5.5V, 16MHz/4.0 to 5.5V				20MHz/3.0 to 3.6V
Operating Ambient Temperature (°C)		–20 to 75				–40 to 85	–20 to 75	–40 to 85		–20 to 75		–40 to 85	–20 to 75	–40 to 85		–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75
Package*2		PRQP0100KA-A	PTQP0100KA-A	PRQP0100KA-A	PTQP0100KA-A	PRQP0100KA-A		PTQP0100KA-A		PRQP0100KA-A	PTQP0100KA-A	PRQP0100KA-A	PTQP0100KA-A			PRQP0100KA-A		PTQP0100KA-A		PTQP0144LC-A
Part No.		HD64F2144AFA20V	HD64F2144ATE20V	HD64F2144AVFA10V	HD64F2144AVTE10V	HD64F2144FA20IV	HD64F2144FA20V	HD64F2144TE20I	HD64F2144TE20V	HD64F2144VFA10V	HD64F2144VTE10V	HD6432144SVXXXFA	HD6432144SVXXXFAI	HD6432144SVXXXTE	HD6432144SVXXXTEI	HD6432144SXXXFA	HD6432144SXXXFAI	HD6432144SXXXTE	HD6432144SXXXTEI	R4F2189RVTE20V

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

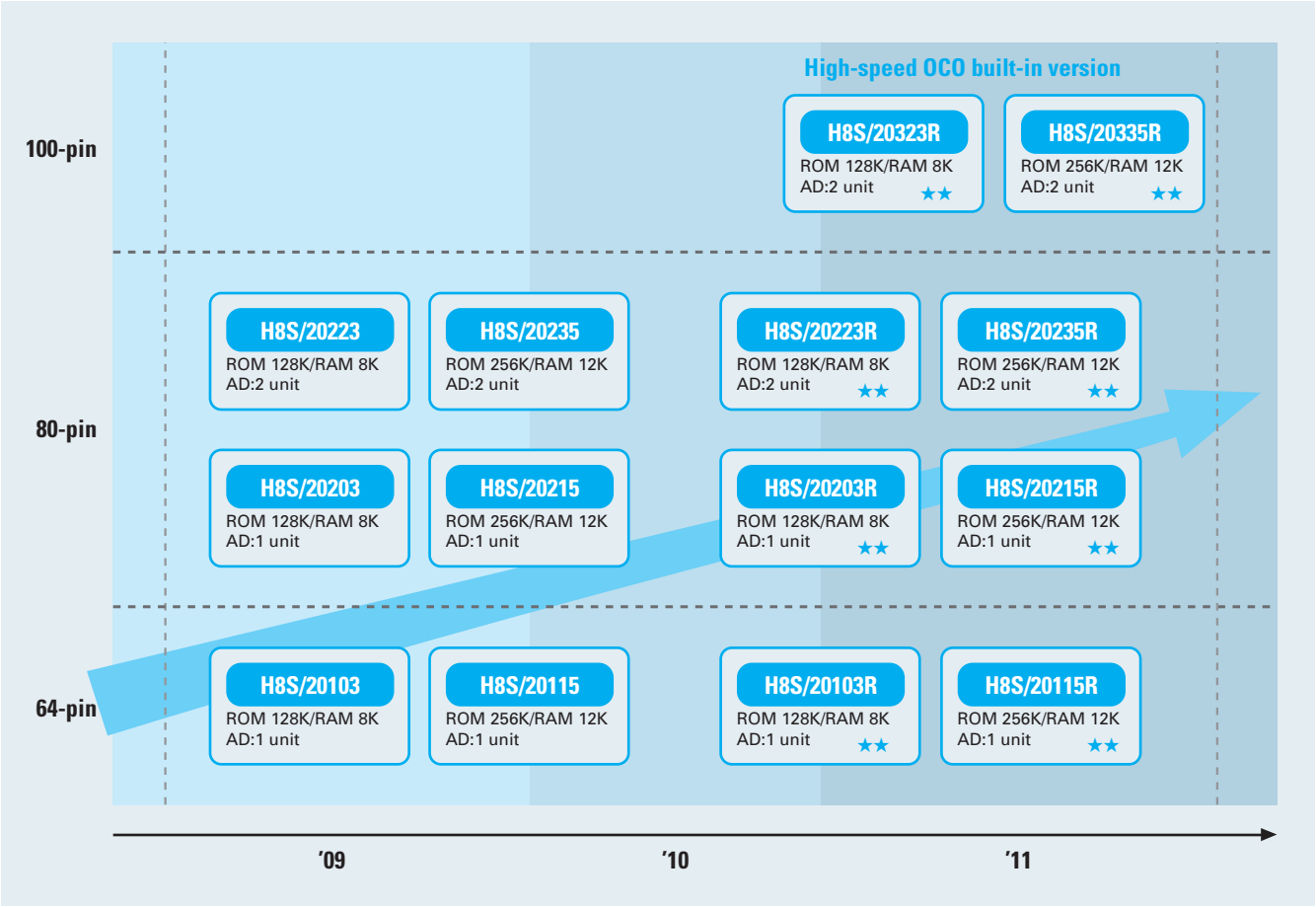
★ : New product ★★ : Under development

Single-chip 16-bit MCUs for home electronics equipment, industrial equipment and measuring devices

H8S/Tiny Series Features

- A new series inheriting the performance of the existing H8/300H Tiny series, with the H8S/2000 CPU core for improving performance and responding to high-performance needs
- Incorporates new functions for reducing the CPU processing load and improving ease of use, including an event link controller (ELC) and peripheral I/O mapping controller (PMC)
- Load reduction in software processing with a reinforced interruption controller
- Improvement in data transfer performance with a built-in DTC
- Incorporates a data flash memory

• H8S/Tiny Series Roadmap



★★ : Under development

H8S/20103 Group

- Loaded with new functions such as event link controller (ELC) and peripheral I/O mapping controller (PMC) functions
- Incorporates 8-channel 10-bit A/D, and 2-channel 8-bit D/A converters
- Improved interrupt function
- 64-pin package

H8S/20203 Group

- Loaded with new functions such as event link controller (ELC) and peripheral I/O mapping controller (PMC) functions
- Incorporates 12-channel 10-bit A/D, and 2-channel 8-bit D/A converters
- Improved interrupt function
- 80-pin package

H8S/20103R Group

- Functionally reinforced version of the H8/3687
- Loaded with new functions such as event link controller (ELC) and peripheral I/O mapping controller (PMC) functions
- Incorporates 8-channel 10-bit A/D, and 2-channel 8-bit D/A converters
- Improved interrupt function
- Incorporates high- and low-speed on-chip oscillators
- 64-pin package

H8S/20203R Group

- Functionally reinforced version of the H8/36049
- Loaded with new functions such as event link controller (ELC) and peripheral I/O mapping controller (PMC) functions
- Incorporates 12-channel 10-bit A/D, and 2-channel 8-bit D/A converters
- Improved interrupt function
- Incorporates high- and low-speed on-chip oscillators
- 80-pin package

H8S/20223 Group

- Loaded with new functions such as event link controller(ELC) and peripheral I/O mapping controller (PMC) functions
- Incorporates 16-channel 10-bit A/D, and 2-channel 8-bit D/A converters
- Improved interrupt function
- 80-pin package

H8S/20223R Group

- Functionally reinforced version of the H8/36049
- Loaded with new functions such as event link controller(ELC) and peripheral I/O mapping controller (PMC) functions
- Incorporates 16-channel 10-bit A/D (2 units), and 2-channel 8-bit D/A converters
- Improved interrupt function
- Incorporates high- and low-speed on-chip oscillators
- 80-pin package

H8S/20115 Group

- ROM/RAM size reinforced version of the H8/20103 group

H8S/20115R Group

- ROM/RAM size reinforced version of the H8/20103R group

H8S/20215 Group

- ROM/RAM size reinforced version of the H8/20203 group

H8S/20215R Group

- ROM/RAM size reinforced version of the H8/20203R group

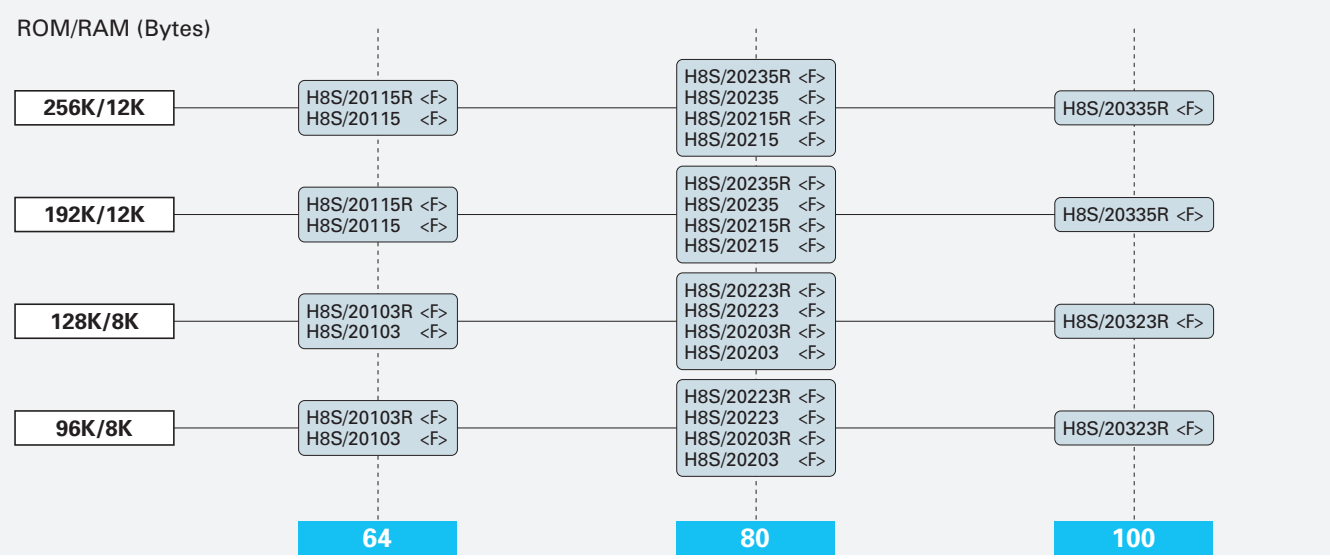
H8S/20235 Group

- ROM/RAM size reinforced version of the H8/20223 group

H8S/20235R Group

- ROM/RAM size reinforced version of the H8/20223R group

• Memory Capacity (ROM/RAM) (H8S/Tiny Series)



Letters in brackets < > indicate memory variations.
F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

• Specifications (H8S/Tiny Series)

Group		H8S/20103								H8S/20203				H8S/20223			
Memory	ROM (Bytes)	96K				128K				96K		128K		96K		128K	
	RAM (Bytes)	8K															
	ROM Type*1	F															
	Data Flash/E2 Data Flash	4K × 2 (Data flash)															
	Program Security	—															
CPU	CPU	H8S/2000 Core															
	Basic Instructions	65															
	Minimum Instruction Execution Time (ns)	50 (@20MHz)															
	Multiplier	—															
	Multiply-Accumulate Instruction	16 × 16 → 32															
DMA	DMAC (Channels)	—															
	EXDMAC	—															
	DTC/DMAC Ⅱ	DTC															
External Bus Expansion	Address Space (Bytes)	16M															
	Bus State Controller	—															
	Bus Structure	—															
	SDRAM Controller	—															
	DRAM Controller	—															
	Host Interface	—															
Clock	Clock Generation Circuit	2 circuits (Main clock, sub clock)															
	PLL	—															
	Subclock	Yes															
	RTC	Yes															
	On-Chip Oscillator	Yes (Low-speed)															
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16, 32, 64, 128)															
	Power Save	Sleep/Standby/Bus master low speed operating function/Module standby/PSC circuit stop															
Power Supply Voltage Detection	Power-On Reset/POR	Yes															
	Low Voltage Detection/LVD	Yes															
A/D Converter	Resolution × Channels	10-bit × 8								10-bit × 12				10-bit × 16			
	Sample and Hold	Yes															
D/A Converter	Resolution × Channels	8-bit × 2															
Timer	8-bit	2 (RA, RB)															
	16-bit	4 (RC, RD, RG)								5 (RD × 2, RG)							
	32-bit	—															
	Input Capture	14 (shared with RC, RD, RG)								19 (shared with RD × 2, RF, RG)							
	Output Compare	15 (shared with RC, RD, RE, RG)								20 (shared with RD × 2, RE, RF, RG)							
	PWM Output	11 (RC, RD, RG)								14 (RD × 2, RG)							
	Real-Time Port	—								—							
	Programmable Pulse Generator	—															
	Event Counter	2 (RA)															
	2-Phase Encoder Input	1 (RG)															
	3-Phase Inverter Control	1 (RD)								2 (RD × 2)							
Watchdog Timer		1															
Serial Interface	Clock Sync./Clock Async.	3															
I²C-bus		1															
IEBus		—															
Smart Card/SIM		—															
Synchronous Serial Communication Unit/Special Serial I/O		1															
CAN	Channels	—															
	Message Box (Numbers)	—															
Ethernet		—															
USB Function		—															
LPC/ISA		—															
IrDA		Yes															
LCD		—															
CRC Calculation Circuit		—															
I/O Ports	Input Only (Numbers)	—															
	CMOS Output Only (Numbers)	—															
	CMOS I/O (Numbers)	55								69							
	High Voltage Port (Numbers)	55								69							
	N-Channel Open Drain Port (Numbers)	—															
	DTMF	—															
	High Current Drive Port	55								69							
	Pull-Up Resistor	55								69							
	NMOS Push-Pull	2															
External Interrupts Pins		9															
Debugging Function	Boundary Scan/JTAG	—															
	On-Chip Debug	Yes															
	On-Board Flash Program	Yes															
Other Functions	ROM Correction Function	—															
	Others	—															
Operating Frequency/Supply Voltage		20MHz/2.7 to 5.5V															
Operating Ambient Temperature (˚C)		–40 to 85		–20 to 85		–40 to 85		–20 to 85		–40 to 85		–20 to 85		–40 to 85		–20 to 85	
Package*2		PLQP0064KB-A	PLQP0064GA-A	PLQP0064KB-A	PLQP0064GA-A	PLQP0064KB-A	PLQP0064GA-A	PLQP0064KB-A	PLQP0064GA-A	PLQP0080JA-A							
Part No.		R4F20102DFA	R4F20102DFB	R4F20102NFA	R4F20102NFB	R4F20103DFA	R4F20103DFB	R4F20103NFA	R4F20103NFB	R4F20202NFD	R4F20202DFD	R4F20203DFD	R4F20203NFD	R4F20222NFD	R4F20222DFD	R4F20223DFD	R4F20223NFD

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8S/Tiny Series)

Group		H8S/20115								H8S/20215				H8S/20235			
Memory	ROM (Bytes)	192K				256K				192K		256K		192K		256K	
	RAM (Bytes)	12K															
	ROM Type*1	F															
	Data Flash/E2 Data Flash	4K × 2 (Data flash)															
	Program Security	—															
CPU	CPU	H8S/2000 Core															
	Basic Instructions	65															
	Minimum Instruction Execution Time (ns)	50 (@20MHz)															
	Multiplier	—															
	Multiply-Accumulate Instruction	16 × 16 → 32															
DMA	DMAC (Channels)	—															
	EXDMAC	—															
	DTC/DMAC Ⅱ	DTC															
External Bus Expansion	Address Space (Bytes)	16M															
	Bus State Controller	—															
	Bus Structure	—															
	SDRAM Controller	—															
	DRAM Controller	—															
	Host Interface	—															
Clock	Clock Generation Circuit	2 circuits (Main clock, sub clock)															
	PLL	—															
	Subclock	Yes															
	RTC	Yes															
	On-Chip Oscillator	Yes (Low-speed)															
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16, 32, 64, 128)															
	Power Save	Sleep/Standby/Bus master low speed operating function/Module standby/PSC circuit stop															
Power Supply Voltage Detection	Power-On Reset/POR	Yes															
	Low Voltage Detection/LVD	Yes															
A/D Converter	Resolution × Channels	10-bit × 8								10-bit × 12				10-bit × 16			
	Sample and Hold	Yes															
D/A Converter	Resolution × Channels	8-bit × 2															
Timer	8-bit	2 (RA, RB)															
	16-bit	4 (RC, RD, RG)								5 (RD × 2, RG)							
	32-bit	—															
	Input Capture	14 (shared with RC, RD, RG)								19 (shared with RD × 2, RF, RG)							
	Output Compare	15 (shared with RC, RD, RE, RG)								20 (shared with RD × 2, RE, RF, RG)							
	PWM Output	11 (RC, RD, RG)								14 (RD × 2, RG)							
	Real-Time Port	—								—							
	Programmable Pulse Generator	—															
	Event Counter	2 (RA)															
	2-Phase Encoder Input	1 (RG)															
	3-Phase Inverter Control	1 (RD)								2 (RD × 2)							
Watchdog Timer		1															
Serial Interface	Clock Sync./Clock Async.	3															
I²C-bus		1															
IEBus		—															
Smart Card/SIM		—															
Synchronous Serial Communication Unit/Special Serial I/O		1															
CAN	Channels	—															
	Message Box (Numbers)	—															
Ethernet		—															
USB Function		—															
LPC/ISA		—															
IrDA		Yes															
LCD		—															
CRC Calculation Circuit		—															
I/O Ports	Input Only (Numbers)	—															
	CMOS Output Only (Numbers)	—															
	CMOS I/O (Numbers)	55								69							
	High Voltage Port (Numbers)	55								69							
	N-Channel Open Drain Port (Numbers)	—															
	DTMF	—															
	High Current Drive Port	55								69							
	Pull-Up Resistor	55								69							
	NMOS Push-Up	2															
External Interrupts Pins		9															
Debugging Function	Boundary Scan/JTAG	—															
	On-Chip Debug	Yes															
	On-Board Flash Program	Yes															
Other Functions	ROM Correction Function	—															
	Others	—															
Operating Frequency/Supply Voltage		20MHz/2.7 to 5.5V															
Operating Ambient Temperature (˚C)		–40 to 85		–20 to 85		–40 to 85		–20 to 85		–40 to 85		–20 to 85		–40 to 85		–20 to 85	
Package*2		PLQP0064KB-A	PLQP0064GA-A	PLQP0064KB-A	PLQP0064GA-A	PLQP0064KB-A	PLQP0064GA-A	PLQP0064KB-A	PLQP0064GA-A	PLQP0080JA-A							
Part No.		R4F20114DFA	R4F20114DFB	R4F20114NFA	R4F20114NFB	R4F20115DFA	R4F20115DFB	R4F20115NFA	R4F20115NFB	R4F20214NFD	R4F20214DFD	R4F20215DFD	R4F20215NFD	R4F20234NFD	R4F20234DFD	R4F20235DFD	R4F20235NFD

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8S/Tiny Series)

Group		H8S/20103R				H8S/20203R				H8S/20223R			
Memory	ROM (Bytes)	96K		128K		96K		128K		96K		128K	
	RAM (Bytes)	8K											
	ROM Type*1	F											
	Data Flash/E2 Data Flash	4K × 2 (Data flash)											
	Program Security	—											
CPU	CPU	H8S/2000 Core											
	Basic Instructions	65											
	Minimum Instruction Execution Time (ns)	50 (@20MHz)											
	Multiplier	—											
	Multiply-Accumulate Instruction	16 × 16 → 32											
DMA	DMAC (Channels)	—											
	EXDMAC	—											
	DTC/DMAC Ⅱ	DTC											
External Bus Expansion	Address Space (Bytes)	16M											
	Bus State Controller	—											
	Bus Structure	—											
	SDRAM Controller	—											
	DRAM Controller	—											
	Host Interface	—											
Clock	Clock Generation Circuit	3 circuits (Main clock, sub clock, on-chip ocsillator)											
	PLL	—											
	Subclock	Yes											
	RTC	Yes											
	On-Chip Oscillator	Yes (High speed, low speed)											
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16, 32, 64, 128)											
	Power Save	Sleep/Standby/Bus master low speed operating function/Module standby/PSC circuit stop											
Power Supply Voltage Detection	Power-On Reset/POR	Yes											
	Low Voltage Detection/LVD	Yes											
A/D Converter	Resolution × Channels	10-bit × 8				10-bit × 12				10-bit × 16			
	Sample and Hold	Yes											
D/A Converter	Resolution × Channels	8-bit × 2											
Timer	8-bit	3 (RA, RB, TMR)								2 (RA, RB)			
	16-bit	4 (RC, RD, RG)				2 (RA, RB)							
	32-bit	—											
	Input Capture	14 (shared with RC, RD, RG)				19 (shared with RD × 2, RF, RG)							
	Output Compare	15 (shared with RC, RD, RE, RG)				20 (shared with RD × 2, RE, RF, RG)							
	PWM Output	11 (RC, RD, RG)				14 (RD × 2, RG)							
	Real-Time Port	—											
	Programmable Pulse Generator	—											
	Event Counter	2 (RA)											
	2-Phase Encoder Input	1 (RG)											
	3-Phase Inverter Control	1 (RD)				2 (RD × 2)							
Watchdog Timer		1											
Serial Interface	Clock Sync./Clock Async.	3											
I²C-bus		1											
IEBus		—											
Smart Card/SIM		—											
Synchronous Serial Communication Unit/Special Serial I/O		1											
CAN	Channels	—											
	Message Box (Numbers)	—											
Ethernet		—											
USB Function		—											
LPC/ISA		—											
IrDA		Yes											
LCD		—											
CRC Calculation Circuit		Yes											
I/O Ports	Input Only (Numbers)	—											
	CMOS Output Only (Numbers)	—											
	CMOS I/O (Numbers)	55				69							
	High Voltage Port (Numbers)	55				69							
	N-Channel Open Drain Port (Numbers)	—											
	DTMF	—											
	High Current Drive Port	55				69							
	Pull-Up Resistor	55				69							
	NMOS Push-Pull	2											
External Interrupts Pins		9											
Debugging Function	Boundary Scan/JTAG	—											
	On-Chip Debug	Yes											
	On-Board Flash Program	Yes											
Other Functions	ROM Correction Function	—											
	Others	—											
Operating Frequency/Supply Voltage		20MHz/2.7 to 5.5V											
Operating Ambient Temperature (˚C)		–40 to 85		–20 to 85		–40 to 85		–20 to 85		–40 to 85	–20 to 85	–40 to 85	–20 to 85
Package*2		PLQP0064KB-A	PLQP0064GA-A	PLQP0064KB-A	PLQP0064GA-A	PLQP0064KB-A	PLQP0064GA-A	PLQP0064KB-A	PLQP0064GA-A	PLQP0080JA-A			
Part No.		R4F20102RDFA**	R4F20102RDFB**	R4F20102RNFA**	R4F20102RNFB**	R4F20103RDFA**	R4F20103RDFB**	R4F20103RNFA**	R4F20103RNFB**	R4F20202RDFD**	R4F20202RNFD**	R4F20203RDFD**	R4F20203RNFD**

Group		H8S/20223R			
Memory	ROM (Bytes)	96K		128K	
	RAM (Bytes)				
	ROM Type*1				
	Data Flash/E2 Data Flash				
	Program Security				
CPU	CPU				
	Basic Instructions				
	Minimum Instruction Execution Time (ns)				
	Multiplier				
	Multiply-Accumulate Instruction				
DMA	DMAC (Channels)				
	EXDMAC				
	DTC/DMAC Ⅱ				
External Bus Expansion	Address Space (Bytes)				
	Bus State Controller				
	Bus Structure				
	SDRAM Controller				
	DRAM Controller				
	Host Interface				
Clock	Clock Generation Circuit				
	PLL				
	Subclock				
	RTC				
	On-Chip Oscillator				
	Frequency Divider				
	Power Save				
Power Supply Voltage Detection	Power-On Reset/POR				
	Low Voltage Detection/LVD				
A/D Converter	Resolution × Channels				
	Sample and Hold				
D/A Converter	Resolution × Channels				
Timer	8-bit				
	16-bit				
	32-bit				
	Input Capture				
	Output Compare				
	PWM Output				
	Real-Time Port				
	Programmable Pulse Generator				
	Event Counter				
	2-Phase Encoder Input				
	3-Phase Inverter Control				
Watchdog Timer					
Serial Interface	Clock Sync./Clock Async.				
I²C-bus					
IEBus					
Smart Card/SIM					
Synchronous Serial Communication Unit/Special Serial I/O					
CAN	Channels				
	Message Box (Numbers)				
Ethernet					
USB Function					
LPC/ISA					
IrDA					
LCD					
CRC Calculation Circuit					
I/O Ports	Input Only (Numbers)				
	CMOS Output Only (Numbers)				
	CMOS I/O (Numbers)				
	High Voltage Port (Numbers)				
	N-Channel Open Drain Port (Numbers)				
	DTMF				
	High Current Drive Port				
	Pull-Up Resistor				
	NMOS Push-Pull				
External Interrupts Pins					
Debugging Function	Boundary Scan/JTAG				
	On-Chip Debug				
	On-Board Flash Program				
Other Functions	ROM Correction Function				
	Others				
Operating Frequency/Supply Voltage					
Operating Ambient Temperature (˚C)		–40 to 85	–20 to 85	–40 to 85	–20 to 85
Package*2					
Part No.		R4F20222RDFD**	R4F20222RNFD**	R4F20223RDFD**	R4F20223RNFD**

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8S/Tiny Series)

Group		H8S/20115R				H8S/20215R				H8S/20235R			
Memory	ROM (Bytes)	192K		256K		192K		256K		192K		256K	
	RAM (Bytes)	12K											
	ROM Type*1	F											
	Data Flash/E2 Data Flash	4K × 2 (Data flash)											
	Program Security	—											
CPU	CPU	H8S/2000 Core											
	Basic Instructions	65											
	Minimum Instruction Execution Time (ns)	50 (@20MHz)											
	Multiplier	—											
	Multiply-Accumulate Instruction	16 × 16 → 32											
DMA	DMAC (Channels)	—											
	EXDMAC	—											
	DTC/DMAC Ⅱ	DTC											
External Bus Expansion	Address Space (Bytes)	16M											
	Bus State Controller	—											
	Bus Structure	—											
	SDRAM Controller	—											
	DRAM Controller	—											
	Host Interface	—											
Clock	Clock Generation Circuit	3 circuits (Main clock, sub clock, on-chip ocsillator)											
	PLL	—											
	Subclock	Yes											
	RTC	Yes											
	On-Chip Oscillator	Yes (High speed, low speed)											
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16, 32, 64, 128)											
	Power Save	Sleep/Standby/Bus master low speed operating function/Module standby/PSC circuit stop											
Power Supply Voltage Detection	Power-On Reset/POR	Yes											
	Low Voltage Detection/LVD	Yes											
A/D Converter	Resolution × Channels	10-bit × 8				10-bit × 12				10-bit × 16			
	Sample and Hold	Yes											
D/A Converter	Resolution × Channels	8-bit × 2											
Timer	8-bit	3 (RA, RB, TMR)											
	16-bit	4 (RC, RD, RG)				5 (RD × 2, RG)							
	32-bit	—											
	Input Capture	14 (shared with RC, RD, RG)				19 (shared with RD × 2, RF, RG)							
	Output Compare	15 (shared with RC, RD, RE, RG)				20 (shared with RD × 2, RE, RF, RG)							
	PWM Output	11 (RC, RD, RG)				14 (RD × 2, RG)							
	Real-Time Port	—											
	Programmable Pulse Generator	—											
	Event Counter	1 (RA)											
	2-Phase Encoder Input	1 (RG)											
	3-Phase Inverter Control	1 (RD)				2 (RD × 2)							
Watchdog Timer		1											
Serial Interface	Clock Sync./Clock Async.	3											
I²C-bus		1											
IEBus		—											
Smart Card/SIM		—											
Synchronous Serial Communication Unit/Special Serial I/O		1											
CAN	Channels	—											
	Message Box (Numbers)	—											
Ethernet		—											
USB Function		—											
LPC/ISA		—											
IrDA		Yes											
LCD		—											
CRC Calculation Circuit		Yes											
I/O Ports	Input Only (Numbers)	—											
	CMOS Output Only (Numbers)	—											
	CMOS I/O (Numbers)	55				69							
	High Voltage Port (Numbers)	55				69							
	N-Channel Open Drain Port (Numbers)	—											
	DTMF	—											
	High Current Drive Port	55				69							
	Pull-Up Resistor	55				69							
	NMOS Push-Pull	2											
External Interrupts Pins		9											
Debugging Function	Boundary Scan/JTAG	—											
	On-Chip Debug	Yes											
	On-Board Flash Program	Yes											
Other Functions	ROM Correction Function	—											
	Others	—											
Operating Frequency/Supply Voltage		20MHz/2.7 to 5.5V											
Operating Ambient Temperature (°C)		–40 to 85		–20 to 85		–40 to 85		–20 to 85		–40 to 85	–20 to 85	–40 to 85	–20 to 85	–40 to 85	–20 to 85	–40 to 85	–20 to 85
Package*2		PLQP0064KB-A	PLQP0064GA-A	PLQP0064KB-A	PLQP0064GA-A	PLQP0064KB-A	PLQP0064GA-A	PLQP0064KB-A	PLQP0064GA-A	PLQP0080JA-A							
Part No.		R4F20114RDFA**	R4F20114RDFB**	R4F20114RNFA**	R4F20114RNFB**	R4F20115RDFA**	R4F20115RDFB**	R4F20115RNFA**	R4F20115RNFB**	R4F20214RDFD**	R4F20214RNFD**	R4F20215RDFD**	R4F20215RNFD**	R4F20234RDFD**	R4F20234RNFD**	R4F20235RDFD**	R4F20235RNFD**

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8S/Tiny Series)

Group		H8S/20323R				H8S/20335R			
Memory	ROM (Bytes)	96K		128K		192K		256K	
	RAM (Bytes)	8K				12K			
	ROM Type*1	F							
	Data Flash/E2 Data Flash	4K × 2 (Data flash)							
	Program Security	—							
CPU	CPU	H8S/2000 Core							
	Basic Instructions	65							
	Minimum Instruction Execution Time (ns)	50 (@20MHz)							
	Multiplier	—							
	Multiply-Accumulate Instruction	16 × 16 → 32							
DMA	DMAC (Channels)	—							
	EXDMAC	—							
	DTC/DMAC Ⅱ	DTC							
External Bus Expansion	Address Space (Bytes)	16M							
	Bus State Controller	—							
	Bus Structure	—							
	SDRAM Controller	—							
	DRAM Controller	—							
	Host Interface	—							
Clock	Clock Generation Circuit	3 circuits (Main clock, sub clock, on-chip ocsillator)							
	PLL	—							
	Subclock	Yes							
	RTC	Yes							
	On-Chip Oscillator	Yes (High speed, low speed)							
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16, 32, 64, 128)							
	Power Save	Sleep/Standby/Bus master low speed operating function/Module standby/PSC circuit stop							
Power Supply Voltage Detection	Power-On Reset/POR	Yes							
	Low Voltage Detection/LVD	Yes							
A/D Converter	Resolution × Channels	10-bit × 16							
	Sample and Hold	Yes							
D/A Converter	Resolution × Channels	8-bit × 2							
Timer	8-bit	2 (RA, RB)							
	16-bit	5 (RD × 2, RG)							
	32-bit	—							
	Input Capture	23 (shared with RC, RD × 2, RF, RG)							
	Output Compare	23 (shared with RC, RD × 2, RE, RF, RG)							
	PWM Output	17 (RC, RD × 2, RG)							
	Real-Time Port	—							
	Programmable Pulse Generator	—							
	Event Counter	1 (RA)							
	2-Phase Encoder Input	1 (RG)							
	3-Phase Inverter Control	2 (RD × 2)							
Watchdog Timer		1							
Serial Interface	Clock Sync./Clock Async.	3							
I²C-bus		1							
IEBus		—							
Smart Card/SIM		—							
Synchronous Serial Communication Unit/Special Serial I/O		1							
CAN	Channels	—							
	Message Box (Numbers)	—							
Ethernet		—							
USB Function		—							
LPC/ISA		—							
IrDA		Yes							
LCD		—							
CRC Calculation Circuit		Yes							
I/O Ports	Input Only (Numbers)	—							
	CMOS Output Only (Numbers)	—							
	CMOS I/O (Numbers)	88							
	High Voltage Port (Numbers)	88							
	N-Channel Open Drain Port (Numbers)	—							
	DTMF	—							
	High Current Drive Port	88							
	Pull-Up Resistor	88							
	NMOS Push-Pull	2							
External Interrupts Pins		9							
Debugging Function	Boundary Scan/JTAG	—							
	On-Chip Debug	Yes							
	On-Board Flash Program	Yes							
Other Functions	ROM Correction Function	—							
	Others	—							
Operating Frequency/Supply Voltage		20MHz/2.7 to 5.5V							
Operating Ambient Temperature (˚C)		–20 to 85	–40 to 85	–20 to 85	–40 to 85	–20 to 85	–40 to 85	–20 to 85	–40 to 85
Package*2		PLQP0100KB-A							
Part No.		R4F20322RNFE**	R4F20322RDFE**	R4F20323RNFE**	R4F20323RDFE**	R4F20334RNFE**	R4F20334RDFE**	R4F20335RNFE**	R4F20335RDFE**

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

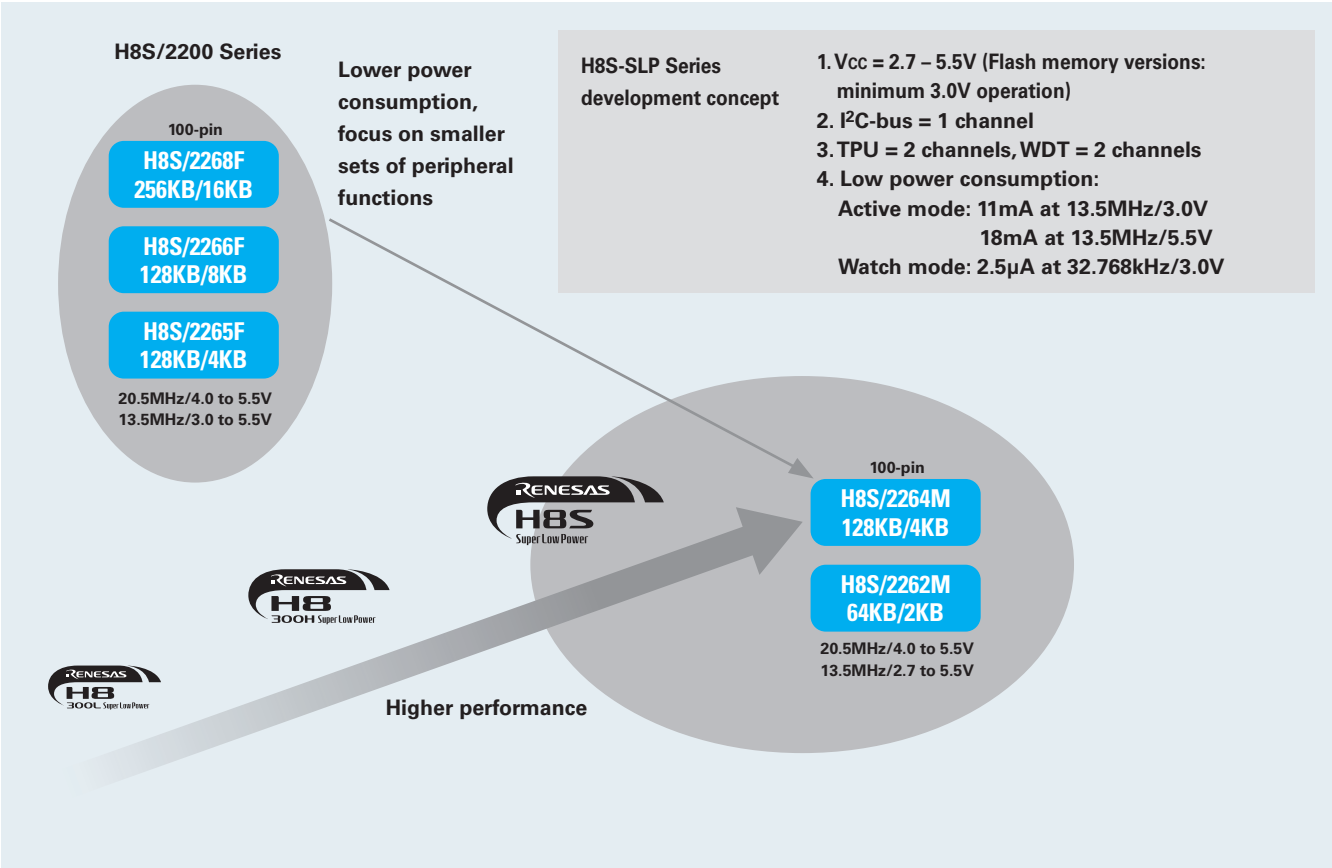
★ : New product ★★ : Under development

Single-chip 16-bit MCUs for measuring devices and communications equipment

H8S Super Low Power Series Features

- High-performance MCUs that consume very little power
- Improved processing speed (1:1 oscillator; basic instructions executed in 1 state)
- 16MB linear address space
- Employs 16-bit H8S/2000 CPU with proven track record in a wide range of applications
- Upward compatible with the H8/300L and H8/300H Super Low Power series
- Supports debugging using full emulator
- Peripheral functions for a wide range of requirements (Single power supply flash memory, I²C-bus, 10-bit A/D converter, serial interface, multi-function timer)

• H8S Super Low Power Series Roadmap



100-pin package, high-performance, super-low power consumption

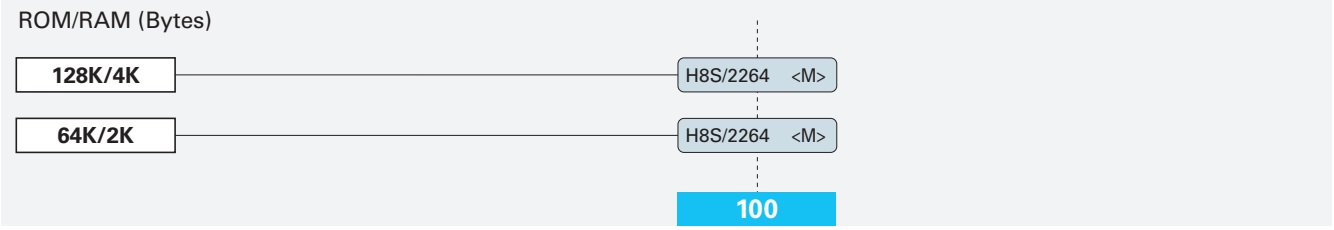
H8S/2264 Group

- Pin-compatible with H8S/2268 group
- World-class low-power MCUs
- LCD controller/driver, 40SEG × 4COM
- Lineup includes versions with 128K bytes of ROM and 4K bytes of RAM
- On-chip high-speed serial functionality (asynchronous transmission: 720k bps)
- 100-pin QFP package

Applications Measuring devices, communications equipment

* Please refer to the H8S/2268 Group on the "H8S/2200 Series" page when examining the flash memory version of the H8S/2264 Group.

• Memory Capacity (ROM/RAM) (H8S Super Low Power Series)



Letters in brackets < > indicate memory variations.
F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

Pin count

• Specifications (H8S Super Low Power Series)

Group		H8S/2264															
Memory	ROM (Bytes)	64K								128K							
	RAM (Bytes)	2K								4K							
	ROM Type*1	M															
CPU	CPU	H8S/2000 Core															
	Basic Instructions	65															
	Minimum Instruction Execution Time (ns)	48.8 (@20.5MHz)															
External Bus Expansion	Address Space (Bytes)	16M															
	Bus State Controller	Yes															
	Bus Structure	Address/Data Separate bus															
Clock	Clock Generation Circuit	2 circuits (Main clock, Sub clock)															
	Subclock	Yes															
	Frequency Divider	Medium-speed clock divider															
	Power Save	Medium-speed/Sub active/Sleep/Sub sleep/Watch/Software standby/Hardware standby/Module stop															
A/D Converter	Resolution × Channels	10-bit × 10															
	Sample and Hold	Yes															
Timer	8-bit	2 (TMR0, TMR1)															
	16-bit	2 (TPU)															
	32-bit	2 (TPU)															
	Input Capture	1 (shared with TPU)															
	Output Compare	2 (shared with TPU)															
	PWM Output	2 (shared with TPU)															
	2-Phase Encoder Input	—															
Watchdog Timer		2															
Serial Interface	Clock Sync./Clock Async.	3															
I²C-bus		1				—				1				—			
Smart Card/SIM		1															
LCD		40seg × 4com															
I/O Ports	Input Only (Numbers)	11															
	CMOS I/O (Numbers)	59															
	High Current Drive Port	7 (10mA × 7)															
	Pull-Up Resistor	2															
	NMOS Push-Pull	2															
External Interrupts Pins		13															
Operating Frequency/Supply Voltage		20.5MHz/4.0 to 5.5V, 13.5MHz/2.7 to 5.5V															
Operating Ambient Temperature (˚C)		–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85
Package*2		PRQP0100KA-A		PTQP0100LC-A		PRQP0100KA-A		PTQP0100LC-A		PRQP0100KA-A		PTQP0100LC-A		PRQP0100KA-A		PTQP0100LC-A	
Part No.		HD6432262WXXXFA	HD6432262WXXXFAW	HD6432262WXXXTF	HD6432262WXXXTFW	HD6432262XXXFA	HD6432262XXXFAW	HD6432262XXXTF	HD6432262XXXTFW	HD6432264WXXXFA	HD6432264WXXXFAW	HD6432264WXXXTF	HD6432264WXXXTFW	HD6432264XXXFA	HD6432264XXXFAW	HD6432264XXXTF	HD6432264XXXTFW

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

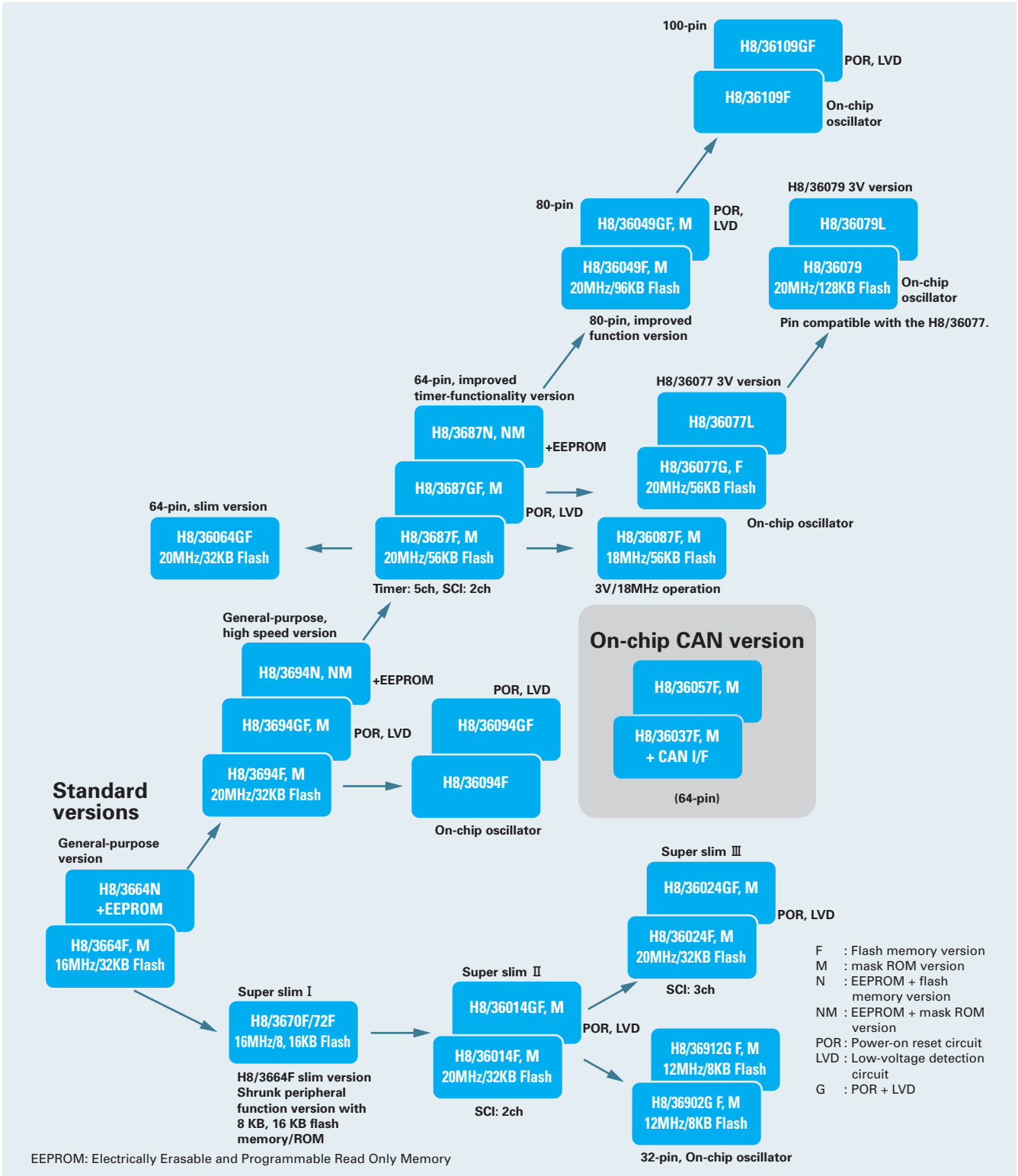
★ : New product ★★ : Under development

MCUs designed for compact systems and shorter development cycles in a wide range of fields

H8/300H Tiny Series Features

- Employs 16-bit H8/300H CPU with proven track record in a wide span of applications
  · Maximum operating frequency of 20MHz, minimum instruction execution time of 100ns
- Small package (10mm × 10mm, 7mm × 7mm) eases design of compact systems
- On-board debugging function allows program debugging with the MCU mounted in the system, simplifying development and adjustment and reducing the overall time required for product development
- Peripheral functions for a variety of requirements
  · Flash memory, I²C-bus, 10-bit A/D converter, serial interface, multifunction timer, etc.

• H8/300H Tiny Series Roadmap



H8/3672 Group
- On-chip low-capacity Flash memory (16K bytes, 8K bytes)
- Slim version of the H8/3664 group
- On-chip emulator (E8a) support

H8/3687 Group
- Single power supply on-chip Flash memory
- On-chip I²C-bus interface
- On-chip emulator (E8a) support
- On-chip power-on reset and low-voltage detection circuits

H8/36087 Group
- Single power supply on-chip Flash memory
- On-chip I²C-bus interface
- On-chip emulator (E8a) support
- 3V/18MHz operation version of H8/3687 group

H8/36024 Group
- Capabilities of the H8/36014 plus improved communication functions
- SCI interface: 3 channels
- On-chip emulator (E8a) support
- On-chip power-on reset and low-voltage detection circuits

H8/36037, H8/36057 Group
- TinyHCAN: 1 channel
- Synchronous serial communication unit: 1 channel
- On-chip subsystem timer (subtimer): RC oscillator operation
- On-chip power-on reset and low-voltage detection circuits
- On-chip emulator (E8a) support

H8/36077, H8/36079 Group
- Improved safe design functionality version of H8/3687 group
- Single power supply on-chip Flash memory
- On-chip high-precision oscillator
- On-chip emulator (E8a) support
- On-chip external clock oscillator halt detector
- Support 5V and 3V versions.

H8/36094 Group
- Improved safe design functionality version of H8/3694 group
- Single power supply on-chip Flash memory
- On-chip high-precision oscillator
- On-chip emulator (E8a) support
- On-chip external clock oscillator halt detector

H8/36109 Group
- Single power supply on-chip Flash memory
- On-chip oscillator : operation at 40MHz
- On-chip emulator (E8a) support
- On-chip external clock oscillator halt detector

H8/3694 Group
- Single power supply on-chip Flash memory
- On-chip I²C-bus interface
- On-chip emulator (E8a) support
- Compact package (7mm × 7mm)
- On-chip power-on reset and low-voltage detection circuits

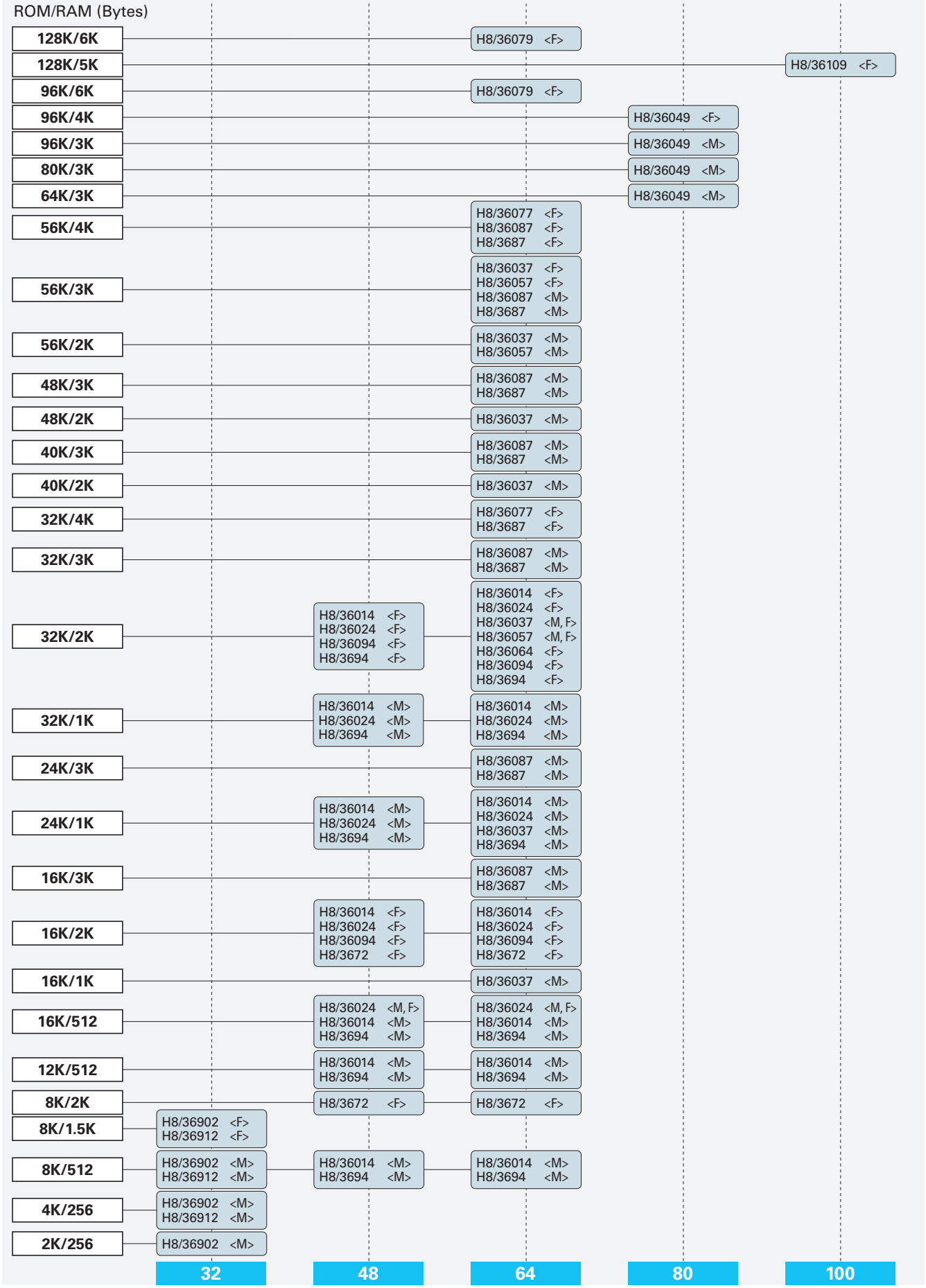
H8/36014 Group
- Single power supply on-chip Flash memory
- On-chip SCI interface: 2 channels
- On-chip emulator (E8a) support
- On-chip power-on reset and low-voltage detection circuits

H8/36064 Group
- Single power supply on-chip Flash memory (32KB)
- On-chip I²C-bus interface
- On-chip emulator (E8a) support
- On-chip power-on reset and low-voltage detection circuits

H8/36049 Group
- Single power supply on-chip Flash memory
- Numerous peripheral functions (on-chip RTC, timer B1, timer V, and timer W (all 1 channel); timer W: 2 channels; SCI: 3 channels; 14-bit PWM: 1 channel)
- On-chip emulator (E8a) support
- On-chip power-on reset and low-voltage detection circuits

H8/36902, H8/36912 Group
- High-accuracy on-chip oscillator
- On-chip power-on reset and low-voltage detection circuits
- 32-pin version
- On-chip emulator (E8a) support

• Memory Capacity (ROM/RAM) (H8/300H Tiny Series)



Letters in brackets < > indicate memory variations.
F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

• Specifications (H8/300H Tiny Series)

Group		H8/36109		H8/36049													
Memory	ROM (Bytes)	128K		64K		80K		96K									
	RAM (Bytes)	5K		3K								4K					
	EEPROM (Bytes)	—															
	ROM Type*1	F		M								F					
	Program Security	Yes		—								Yes					
CPU	CPU	H8/300H Core															
	Basic Instructions	62															
	Minimum Instruction Execution Time (ns)	100 (@20MHz)															
Clock	Clock Generation Circuit	3 circuits (System clock, Sub clock, On-chip oscillator)		2 circuits (System clock, Sub clock)													
	PLL	—															
	Subclock	Yes															
	On-Chip Oscillator	Yes (40MHz)		—													
	Oscillation Stop Detection	Yes		—													
	Frequency Divider	1/n (n = 1, 8, 16, 32, 64)															
	Power Save	Standby/Sub active (When using sub clock at 32kHz)/Sleep/Sub sleep (When using sub clock at 32kHz)/Module standby/System clock divider															
Power Supply Voltage Detection	Power-On Reset/POR	—	Yes	—	Yes	—	Yes	—	Yes	—	Yes	—	Yes	—	Yes	—	Yes	—	Yes	—
	Low Voltage Detection/LVD	—	Yes	—	Yes	—	Yes	—	Yes	—	Yes	—	Yes	—	Yes	—	Yes	—	Yes	—
A/D Converter	Resolution × Channels	10-bit × 16		10-bit × 8													
	Sample and Hold	Yes															
Timer	8-bit	3 (RTC, Timer B1, Timer V)															
	16-bit	5 (Timer RC × 1, Timer RD × 2)		3 (Timer W, Timer Z)													
	Input Capture	Timer RC, Timer RD		Timer W, Timer Z													
	Output Compare	Timer V, Timer RC, Timer RD		Timer V, Timer W, Timer Z													
	PWM Output	Timer V, 14-bit PWM, Timer RC, Timer RD		14-bit PWM, Timer V, Timer W, Timer Z													
	Event Counter	Timer B1															
	3-Phase Inverter Control	Timer RD		Timer Z													
Watchdog Timer		1 (selectable internal oscillator)															
Serial Interface	Clock Sync./Clock Async.	3															
I²C-bus		1															
Synchronous Serial Communication Unit/Special Serial I/O		—															
CAN	Channels	—															
	Message Box (Numbers)	—															
I/O Ports	Input Only (Numbers)	8															
	CMOS I/O (Numbers)	79		59													
	High Current Drive Port	20		13													
	Pull-Up Resistor	13															
	NMOS Push-Pull	2															
External Interrupts Pins		11															
Debugging Function	On-Chip Debug	Yes		—								Yes					
	On-Board Flash Program	Yes		—								Yes					
Other Functions	ROM Correction Function	—		Yes								—					
Operating Frequency/Supply Voltage		4 to 10MHz/3.0 to 5.5V, 4 to 20MHz/4.0 to 5.5V		4 to 10MHz/3.0 to 5.5V, 4 to 20MHz/4.0 to 5.5V (When using LVD: 4 to 16MHz/4.5 to 5.5V)		1 to 10MHz/2.7 to 5.5V, 1 to 20MHz/4.0 to 5.5V								1 to 10MHz/3.0 to 5.5V, 1 to 20MHz/4.0 to 5.5V					
Operating Ambient Temperature (°C)		–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75
Package*2		PRQP0100JE-B		PLQP0100KB-A		PRQP0100JE-B		PLQP0100KB-A		PRQP0080JB-A							
Part No.		HD64F36109FWV	HD64F36109FV	HD64F36109GHV	HD64F36109GHWV	HD64F36109GFWV	HD64F36109GFV	HD64F36109HV	HD64F36109HWV	HD64336047GXXXH	HD64336047XXXH	HD64336047GXXXHW	HD64336047XXXHW	HD64336048GXXXHW	HD64336048GXXXH	HD64336048XXXH	HD64336048XXXHW	HD64336049GXXXHW	HD64336049XXXHW	HD64336049GXXXH	HD64336049XXXH	HD64F36049GHWV	HD64F36049HWV	HD64F36049GHV	HD64F36049HV

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8/300H Tiny Series)

Group		H8/36087																											
Memory	ROM (Bytes)	16K				24K				32K				40K				48K				56K							
	RAM (Bytes)	3K																								4K			
	EEPROM (Bytes)	—																											
	ROM Type*1	M																								F			
	Program Security	—																								Yes			
CPU	CPU	H8/300H Core																											
	Basic Instructions	62																											
	Minimum Instruction Execution Time (ns)	111 (@18MHz)																											
Clock	Clock Generation Circuit	2 circuits (System clock, Sub clock)																											
	PLL	—																											
	Subclock	Yes																											
	On-Chip Oscillator	—																											
	Oscillation Stop Detection	—																											
	Frequency Divider	1/n (n = 1, 8, 16, 32, 64)																											
	Power Save	Standby/Sub active (When using sub clock at 32kHz)/Sleep/Sub sleep (When using sub clock at 32kHz)/Module standby/System clock divider																											
Power Supply Voltage Detection	Power-On Reset/POR	—																											
	Low Voltage Detection/LVD	—																											
A/D Converter	Resolution × Channels	10-bit × 8																											
	Sample and Hold	Yes																											
Timer	8-bit	3 (RTC, Timer B1, Timer V)																											
	16-bit	2 (Timer Z)																											
	Input Capture	Timer Z																											
	Output Compare	Timer V, Timer Z																											
	PWM Output	14-bit PWM, Timer V, Timer Z																											
	Event Counter	Timer B1																											
	3-Phase Inverter Control	Timer Z																											
Watchdog Timer		1 (selectable internal oscillator)																											
Serial Interface	Clock Sync./Clock Async.	2																											
I²C-bus		1																											
Synchronous Serial Communication Unit/Special Serial I/O		—																											
CAN	Channels	—																											
	Message Box (Numbers)	—																											
I/O Ports	Input Only (Numbers)	8																											
	CMOS I/O (Numbers)	45																											
	High Current Drive Port	8																											
	Pull-Up Resistor	13																											
	NMOS Push-Pull	2																											
External Interrupts Pins		11																											
Debugging Function	On-Chip Debug	—																								Yes			
	On-Board Flash Program	—																								Yes			
Other Functions	ROM Correction Function	Yes																								—			
Operating Frequency/Supply Voltage		4 to 18MHz/3.0 to 3.6V																											
Operating Ambient Temperature (°C)		–20 to 75		–40 to 85		–20 to 75		–40 to 85				–20 to 75		–40 to 85		–20 to 75				–40 to 85		–20 to 75		–40 to 85		–20 to 75		–40 to 85	
Package*2		PLQP0064KC-A	PRQP0064GB-A	PLQP0064KC-A	PRQP0064GB-A	PLQP0064KC-A	PRQP0064GB-A	PLQP0064KC-A	PRQP0064GB-A	PLQP0064KC-A	PRQP0064GB-A	PLQP0064KC-A	PRQP0064GB-A	PLQP0064KC-A	PRQP0064GB-A	PLQP0064KC-A	PRQP0064GB-A	PLQP0064KC-A	PRQP0064GB-A	PLQP0064KC-A	PRQP0064GB-A	PLQP0064KC-A	PRQP0064GB-A	PLQP0064KC-A	PRQP0064GB-A	PLQP0064KC-A	PRQP0064GB-A	PLQP0064KC-A	PRQP0064GB-A
Part No.		HD64336082XXXFP	HD64336082XXXH	HD64336082XXXFPW	HD64336082XXXHW	HD64336083XXXFP	HD64336083XXXH	HD64336083XXXFPW	HD64336083XXXHW	HD64336084XXXFPW	HD64336084XXXHW	HD64336084XXXFP	HD64336084XXXHV	HD64336085XXXFPW	HD64336085XXXHW	HD64336085XXXFP	HD64336085XXXH	HD64336086XXXFP	HD64336086XXXH	HD64336086XXXFPW	HD64336086XXXHW	HD64336087XXXFP	HD64336087XXXH	HD64336087XXXFPW	HD64336087XXXHW	HD64F36087FPV	HD64F36087HV	HD64F36087FPWV	HD64F36087HWV

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8/300H Tiny Series)

Group		H8/36064	H8/36077																			
Memory	ROM (Bytes)	32K												56K								
	RAM (Bytes)	2K	4K																			
	EEPROM (Bytes)	—																				
	ROM Type*1	F																				
	Program Security	Yes																				
CPU	CPU	H8/300H Core																				
	Basic Instructions	62																				
	Minimum Instruction Execution Time (ns)	100 (@20MHz)																				
Clock	Clock Generation Circuit	2 circuits (System clock, Sub clock)	3 circuits (System clock, Sub clock, On-chip oscillator)																			
	PLL	—																				
	Subclock	—	Yes																			
	On-Chip Oscillator	—	Yes (20MHz)																			
	Oscillation Stop Detection	—	Yes																			
	Frequency Divider	1/n (n = 1, 8, 16, 32, 64)																				
	Power Save	Standby/Sleep/Sub sleep/ Module standby/System clock divider	Standby/Sub active (When using sub clock at 32kHz)/Sleep/Sub sleep (When using sub clock at 32kHz)/ Module standby/System clock divider																			
Power Supply Voltage Detection	Power-On Reset/POR	Yes																				
	Low Voltage Detection/LVD	Yes	Yes (It is possible to input comparative voltage externally)																			
A/D Converter	Resolution × Channels	10-bit × 8																				
	Sample and Hold	Yes																				
Timer	8-bit	2 (Timer B1, Timer V)	3 (RTC, Timer B1, Timer V)																			
	16-bit	2 (Timer Z)																				
	Input Capture	Timer Z																				
	Output Compare	Timer V, Timer Z																				
	PWM Output	14-bit PWM, Timer V, Timer Z	14-bit PWM, Timer Z, Timer V																			
	Event Counter	Timer B1																				
	3-Phase Inverter Control	Timer Z																				
Watchdog Timer		1 (selectable internal oscillator)																				
Serial Interface	Clock Sync./Clock Async.	2																				
I²C-bus		1																				
Synchronous Serial Communication Unit/Special Serial I/O		—																				
CAN	Channels	—																				
	Message Box (Numbers)	—																				
I/O Ports	Input Only (Numbers)	8																				
	CMOS I/O (Numbers)	45	47																			
	High Current Drive Port	8																				
	Pull-Up Resistor	13																				
	NMOS Push-Pull	2																				
External Interrupts Pins		11																				
Debugging Function	On-Chip Debug	Yes																				
	On-Board Flash Program	Yes																				
Other Functions	ROM Correction Function	—																				
Operating Frequency/Supply Voltage		1 to 10MHz/3.0 to 5.5V, 1 to 20MHz/4.0 to 5.5V (When using LVD: 4 to 16MHz/4.5 to 5.5V)					4 to 20MHz/4.5 to 5.5V			4 to 16MHz/3.0 to 3.6V			–20 to 75		4 to 20MHz/4.5 to 5.5V				4 to 16MHz/3.0 to 3.6V			
Operating Ambient Temperature (˚C)		–40 to 85			–20 to 75				–40 to 85							–40 to 85		–20 to 75		–40 to 85		–20 to 75	
Package*2		PLQP0064KC-A	PLQP0064KB-A	PRQP0064GB-A	PLQP0064KC-A	PLQP0064KB-A	PRQP0064GB-A	PLQP0064KB-A		PRQP0064GB-A	PLQP0064KB-A	PRQP0064GB-A	PLQP0064KB-A	PRQP0064GB-A	PLQP0064KB-A	PRQP0064GB-A	PLQP0064KB-A	PRQP0064GB-A	PLQP0064KB-A	PRQP0064GB-A	PLQP0064KB-A	PRQP0064GB-A
Part No.		HD64F36064GFPWV	HD64F36064GFZWV	HD64F36064GHWV	HD64F36064GFPV	HD64F36064GFZV	HD64F36064GHV	HD64F36074GHV	HD64F36074GFZV	HD64F36074GFZWV	HD64F36074GHWV	HD64F36074LFZWV	HD64F36074LHWV	HD64F36074LFZV	HD64F36074LHV	HD64F36077GFZWV	HD64F36077GHWV	HD64F36077GFZV	HD64F36077GHV	HD64F36077LFZWV	HD64F36077LHWV	HD64F36077LFZV	HD64F36077LHV

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8/300H Tiny Series)

Group		H8/36079															
Memory	ROM (Bytes)	96K						128K									
	RAM (Bytes)	6K															
	EEPROM (Bytes)	—															
	ROM Type*1	F															
	Program Security	Yes															
CPU	CPU	H8/300H Core															
	Basic Instructions	62															
	Minimum Instruction Execution Time (ns)	100 (@20MHz)															
Clock	Clock Generation Circuit	3 circuits (System clock, Sub clock, On-chip oscillator)															
	PLL	—															
	Subclock	Yes															
	On-Chip Oscillator	Yes (20MHz)															
	Oscillation Stop Detection	Yes															
	Frequency Divider	1/n (n = 1, 8, 16, 32, 64)															
	Power Save	Standby/Sub active (When using sub clock at 32kHz)/Sleep/Sub sleep (When using sub clock at 32kHz)/Module standby/System clock divider															
Power Supply Voltage Detection	Power-On Reset/POR	Yes															
	Low Voltage Detection/LVD	Yes (It is possible to input comparative voltage externally)															
A/D Converter	Resolution x Channels	10-bit × 8															
	Sample and Hold	Yes															
Timer	8-bit	3 (RTC, Timer B1, Timer V)															
	16-bit	2 (Timer Z)															
	Input Capture	Timer Z															
	Output Compare	Timer V, Timer Z															
	PWM Output	14-bit PWM, Timer Z, Timer V															
	Event Counter	Timer B1															
	3-Phase Inverter Control	Timer Z															
Watchdog Timer		1 (selectable internal oscillator)															
Serial Interface	Clock Sync./Clock Async.	2															
I²C-bus		1															
Synchronous Serial Communication Unit/Special Serial I/O		—															
CAN	Channels	—															
	Message Box (Numbers)	—															
I/O Ports	Input Only (Numbers)	8															
	CMOS I/O (Numbers)	47															
	High Current Drive Port	8															
	Pull-Up Resistor	13															
	NMOS Push-Pull	2															
External Interrupts Pins		11															
Debugging Function	On-Chip Debug	Yes															
	On-Board Flash Program	Yes															
Other Functions	ROM Correction Function	—															
Operating Frequency/Supply Voltage		20MHz															
Operating Ambient Temperature (°C)		–20 to 75		–40 to 85				–20 to 75			–40 to 85			–20 to 75			–40 to 85
Package*2		PLQP0064KB-A	PRQP0064GB-A	PLQP0064KB-A	PRQP0064GB-A	PLQP0064KB-A	PRQP0064GB-A	PLQP0064KB-A	PRQP0064GB-A		PLQP0064KB-A		PRQP0064GB-A	PLQP0064KB-A		PRQP0064GB-A	PLQP0064KB-A
Part No.		HD64F36078GFZV	HD64F36078GHV	HD64F36078GFZWV	HD64F36078GHWV	HD64F36078LFZWV	HD64F36078LHWV	HD64F36078LFZV	HD64F36078LHV	HD64F36079LHV	HD64F36079LHWV	HD64F36079LFZWV	HD64F36079LFZV	HD64F36079GHV	HD64F36079GFZV	HD64F36079GHWV	HD64F36079GFZWV

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8/300H Tiny Series)

Group		H8/3687																	
Memory	ROM (Bytes)	16K				24K				32K									
	RAM (Bytes)	3K												4K					
	EEPROM (Bytes)	—																	
	ROM Type*1	M												F					
	Program Security	—												Yes					
CPU	CPU	H8/300H Core																	
	Basic Instructions	62																	
	Minimum Instruction Execution Time (ns)	100 (@20MHz)																	
Clock	Clock Generation Circuit	2 circuits (System clock, Sub clock)																	
	PLL	—																	
	Subclock	Yes																	
	On-Chip Oscillator	—																	
	Oscillation Stop Detection	—																	
	Frequency Divider	1/n (n = 1, 8, 16, 32, 64)																	
	Power Save	Standby/Sub active (When using sub clock at 32kHz)/Sleep/Sub sleep (When using sub clock at 32kHz)/Module standby/System clock divider																	
Power Supply Voltage Detection	Power-On Reset/POR	Yes	—	Yes	—	Yes	—	Yes	—	Yes	—	Yes	—	Yes	—	Yes	—		
	Low Voltage Detection/LVD	Yes	—	Yes	—	Yes	—	Yes	—	Yes	—	Yes	—	Yes	—	Yes	—		
A/D Converter	Resolution × Channels	10-bit × 8																	
	Sample and Hold	Yes																	
Timer	8-bit	3 (RTC, Timer B1, Timer V)																	
	16-bit	2 (Timer Z)																	
	Input Capture	Timer Z																	
	Output Compare	Timer Z, Timer V																	
	PWM Output	14-bit PWM, Timer Z, Timer V																	
	Event Counter	Timer B1																	
	3-Phase Inverter Control	Timer Z																	
Watchdog Timer		1 (selectable internal oscillator)																	
Serial Interface	Clock Sync./Clock Async.	2																	
I²C-bus		1																	
Synchronous Serial Communication Unit/Special Serial I/O		—																	
CAN	Channels	—																	
	Message Box (Numbers)	—																	
I/O Ports	Input Only (Numbers)	8																	
	CMOS I/O (Numbers)	45																	
	High Current Drive Port	8																	
	Pull-Up Resistor	13																	
	NMOS Push-Pull	2																	
External Interrupts Pins		11																	
Debugging Function	On-Chip Debug	—												Yes					
	On-Board Flash Program	—												Yes					
Other Functions	ROM Correction Function	Yes												—					
Operating Frequency/Supply Voltage		1 to 10MHz/2.7 to 5.5V, 1 to 20MHz/4.0 to 5.5V												1 to 10MHz/3.0 to 5.5V, 1 to 20MHz/4.0 to 5.5V					
Operating Ambient Temperature (˚C)		–40 to 85				–20 to 75				–40 to 85		–20 to 75		–40 to 85		–20 to 75		–40 to 85	–20 to 75
Package*2		PLQP0064KC-A	PLQP0064KB-A	PLQP0064KC-A	PRQP0064GB-A	PLQP0064KC-A	PRQP0064GB-A	PLQP0064KC-A	PRQP0064GB-A	PLQP0064KC-A	PRQP0064GB-A	PLQP0064KC-A	PRQP0064GB-A	PLQP0064KC-A	PRQP0064GB-A	PLQP0064KC-A	PRQP0064GB-A	PLQP0064KC-A	PRQP0064GB-A
Part No.		HD6433682XXXGFPI	HD6433682GXXXHI	HD6433682XXXFPI	HD6433682XXXHI	HD6433682GXXXFP	HD6433682GXXXH	HD6433682XXXFP	HD6433682XXXH	HD6433683GXXXFPI	HD6433683GXXXHI	HD6433683XXXHI	HD6433683XXXFPI	HD6433683GXXXFP	HD6433683GXXXH	HD6433683XXXFP	HD6433683XXXH	HD6433684GXXXFPI	HD6433684GXXXHI	HD6433684XXXFPI	HD6433684XXXHI	HD6433684GXXXFP	HD6433684GXXXH	HD6433684XXXFP	HD6433684XXXH	HD64F3684FPIV	HD64F3684GFPIV	HD64F3684GHIV	HD64F3684HIV	HD64F3684FPV	HD64F3684GFPV	HD64F3684GHV	HD64F3684HV

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8/300H Tiny Series)

Group		H8/3687																																			
Memory	ROM (Bytes)	40K								48K								56K																			
	RAM (Bytes)	3K																										4K									
	EEPROM (Bytes)	—																								512		—								512	
	ROM Type*1	M																										F									
	Program Security	—																										Yes									
CPU	CPU	H8/300H Core																																			
	Basic Instructions	62																																			
	Minimum Instruction Execution Time (ns)	100 (@20MHz)																																			
Clock	Clock Generation Circuit	2 circuits (System clock, Sub clock)																																			
	PLL	—																																			
	Subclock	Yes																																			
	On-Chip Oscillator	—																																			
	Oscillation Stop Detection	—																																			
	Frequency Divider	1/n (n = 1, 8, 16, 32, 64)																																			
	Power Save	Standby/Sub active (When using sub clock at 32kHz)/Sleep/Sub sleep (When using sub clock at 32kHz)/Module standby/System clock divider																																			
Power Supply Voltage Detection	Power-On Reset/POR	Yes		—		Yes		—		Yes		—		Yes		—		Yes		—		Yes		—		Yes		—	Yes		—		Yes		—	Yes	
	Low Voltage Detection/LVD	Yes		—		Yes		—		Yes		—		Yes		—		Yes		—		Yes		—		Yes		—	Yes		—		Yes		—	Yes	
A/D Converter	Resolution × Channels	10-bit × 8																																			
	Sample and Hold	Yes																																			
Timer	8-bit	3 (RTC, Timer B1, Timer V)																																			
	16-bit	2 (Timer Z)																																			
	Input Capture	Timer Z																																			
	Output Compare	Timer Z, Timer V																																			
	PWM Output	14-bit PWM, Timer Z, Timer V																																			
	Event Counter	Timer B1																																			
	3-Phase Inverter Control	Timer Z																																			
Watchdog Timer		1 (selectable internal oscillator)																																			
Serial Interface	Clock Sync./Clock Async.	2																																			
I^2C-bus		1																																			
Synchronous Serial Communication Unit/Special Serial I/O		—																																			
CAN	Channels	—																																			
	Message Box (Numbers)	—																																			
I/O Ports	Input Only (Numbers)	8																																			
	CMOS I/O (Numbers)	45																								43		45								43	
	High Current Drive Port	8																																			
	Pull-Up Resistor	13																																			
	NMOS Push-Pull	2																																			
External Interrupts Pins		11																																			
Debugging Function	On-Chip Debug	—																										Yes									
	On-Board Flash Program	—																										Yes									
Other Functions	ROM Correction Function	Yes																										—									
Operating Frequency/Supply Voltage		1 to 10MHz/2.7 to 5.5V, 1 to 20MHz/4.0 to 5.5V																										1 to 10MHz/3.0 to 5.5V, 1 to 20MHz/4.0 to 5.5V									
Operating Ambient Temperature (°C)		–40 to 85				–20 to 75				–40 to 85				–20 to 75				–40 to 85				–20 to 75					–40 to 85					–20 to 75					–40 to 85
Package*2		PLQP0064KC-A	PRQP0064GB-A	PLQP0064KC-A	PRQP0064GB-A	PLQP0064KC-A	PRQP0064GB-A	PLQP0064KC-A	PRQP0064GB-A	PLQP0064KC-A	PRQP0064GB-A	PLQP0064KC-A	PRQP0064GB-A	PLQP0064KC-A	PRQP0064GB-A	PLQP0064KC-A	PRQP0064GB-A	PLQP0064KC-A	PRQP0064GB-A	PLQP0064KC-A	PRQP0064GB-A	PLQP0064KC-A	PRQP0064GB-A	PLQP0064KC-A	PRQP0064GB-A	PLQP0064KC-A				PRQP0064GB-A		PLQP0064KC-A		PRQP0064GB-A		PLQP0064KC-A	
Part No.		HD6433685GXXXFPI	HD6433685GXXXHI	HD6433685XXXFPI	HD6433685XXXHI	HD6433685GXXXFP	HD6433685GXXXH	HD6433685XXXFP	HD6433685XXXH	HD6433686GXXXFPI	HD6433686GXXXHI	HD6433686XXXFPI	HD6433686XXXHI	HD6433686GXXXFP	HD6433686GXXXH	HD6433686XXXFP	HD6433686XXXH	HD6433687GXXXFPI	HD6433687GXXXHI	HD6433687XXXFPI	HD6433687XXXHI	HD6433687GXXXFP	HD6433687GXXXH	HD6433687XXXFP	HD6433687XXXH	HD6483687GXXXFP	HD6483687GXXXFPI	HD64F3687FPIV	HD64F3687GFPIV	HD64F3687GHIV	HD64F3687HIV	HD64F3687FPV	HD64F3687GFPV	HD64F3687GHV	HD64F3687HV	HD64N3687GFPV	HD64N3687GFPIV

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8/300H Tiny Series)

Group		H8/36037																			
Memory	ROM (Bytes)	16K				24K				32K											
	RAM (Bytes)	1K								2K											
	EEPROM (Bytes)	—																			
	ROM Type*1	M								F				M							
	Program Security	—								Yes				—							
CPU	CPU	H8/300H Core																			
	Basic Instructions	62																			
	Minimum Instruction Execution Time (ns)	100 (@20MHz)																			
Clock	Clock Generation Circuit	2 circuits (System clock, Sub clock)																			
	PLL	—																			
	Subclock	Yes																			
	On-Chip Oscillator	—																			
	Oscillation Stop Detection	—																			
	Frequency Divider	1/n (n = 1, 8, 16, 32, 64)																			
	Power Save	Standby/Sub active (When using sub clock at 32kHz)/Sleep/Sub sleep (When using sub clock at 32kHz)/Module standby/System clock divider																			
Power Supply Voltage Detection	Power-On Reset/POR	Yes	—	Yes	—	Yes	—	Yes	—	Yes	—	Yes	—	Yes	—	Yes	—				
	Low Voltage Detection/LVD	Yes	—	Yes	—	Yes	—	Yes	—	Yes	—	Yes	—	Yes	—	Yes	—				
A/D Converter	Resolution × Channels	10-bit × 8																			
	Sample and Hold	Yes																			
Timer	8-bit	3 (Timer B1, Timer V, Sub-Timer)																			
	16-bit	2 (Timer Z)																			
	Input Capture	Timer Z																			
	Output Compare	Timer V, Timer Z																			
	PWM Output	Timer V, Timer Z																			
	Event Counter	Shared with Timer B1																			
	3-Phase Inverter Control	Shared with Timer Z																			
Watchdog Timer		1 (selectable internal oscillator)																			
Serial Interface	Clock Sync./Clock Async.	1																			
I²C-bus		—																			
Synchronous Serial Communication Unit/Special Serial I/O		1																			
CAN	Channels	1																			
	Message Box (Numbers)	4																			
I/O Ports	Input Only (Numbers)	8																			
	CMOS I/O (Numbers)	45																			
	High Current Drive Port	8																			
	Pull-Up Resistor	13																			
	NMOS Push-Pull	—																			
External Interrupts Pins		11																			
Debugging Function	On-Chip Debug	—								Yes				—							
	On-Board Flash Program	—								Yes				—							
Other Functions	ROM Correction Function	Yes								—				Yes							
Operating Frequency/Supply Voltage		1 to 10MHz/2.7 to 5.5V, 1 to 20MHz/4.0 to 5.5V								1 to 10MHz/3.0 to 5.5V, 1 to 20MHz/4.0 to 5.5V				1 to 10MHz/2.7 to 5.5V, 1 to 20MHz/4.0 to 5.5V							
Operating Ambient Temperature (˚C)		–40 to 85				–20 to 75				–40 to 85				–20 to 75				–40 to 85			
Package*2		PLQP0064KB-A	PRQP0064GB-A	PLQP0064KB-A	PRQP0064GB-A	PLQP0064KB-A	PRQP0064GB-A	PLQP0064KB-A	PRQP0064GB-A	PLQP0064KB-A	PRQP0064GB-A	PLQP0064KB-A	PRQP0064GB-A	PLQP0064KB-A	PRQP0064GB-A	PLQP0064KB-A	PRQP0064GB-A	PLQP0064KB-A	PRQP0064GB-A	PLQP0064KB-A	PRQP0064GB-A
Part No.		HD64336032GXXXFZW	HD64336032GXXXHW	HD64336032XXXFZW	HD64336032XXXHW	HD64336032GXXXFZ	HD64336032GXXXH	HD64336032XXXFZ	HD64336032XXXH	HD64336033GXXXFZW	HD64336033GXXXHW	HD64336033XXXFZW	HD64336033XXXHW	HD64336033GXXXFZ	HD64336033GXXXH	HD64336033XXXFZ	HD64336033XXXH	HD64F36034FZWV	HD64F36034GFZWV	HD64F36034GHWV	HD64F36034HWV
		HD64F36034FZV	HD64F36034GFZV	HD64F36034GHV	HD64F36034HV	HD64336034GXXXFZW	HD64336034GXXXHW	HD64336034XXXFZW	HD64336034XXXHW	HD64336034GXXXFZ	HD64336034GXXXH	HD64336034XXXFZ	HD64336034XXXH								

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8/300H Tiny Series)

Group		H8/36037																			
Memory	ROM (Bytes)	40K				48K				56K											
	RAM (Bytes)	2K																3K			
	EEPROM (Bytes)	—																			
	ROM Type*1	M																F			
	Program Security	—																Yes			
CPU	CPU	H8/300H Core																			
	Basic Instructions	62																			
	Minimum Instruction Execution Time (ns)	100 (@20MHz)																			
Clock	Clock Generation Circuit	2 circuits (System clock, Sub clock)																			
	PLL	—																			
	Subclock	Yes																			
	On-Chip Oscillator	—																			
	Oscillation Stop Detection	—																			
	Frequency Divider	1/n (n = 1, 8, 16, 32, 64)																			
	Power Save	Standby/Sub active (When using sub clock at 32kHz)/Sleep/Sub sleep (When using sub clock at 32kHz)/Module standby/System clock divider																			
Power Supply Voltage Detection	Power-On Reset/POR	Yes	—	Yes	—	Yes	—	Yes	—	Yes	—	Yes	—	Yes	—	Yes	—	Yes	—		
	Low Voltage Detection/LVD	Yes	—	Yes	—	Yes	—	Yes	—	Yes	—	Yes	—	Yes	—	Yes	—	Yes	—		
A/D Converter	Resolution x Channels	10-bit × 8																			
	Sample and Hold	Yes																			
Timer	8-bit	3 (Timer B1, Timer V, Sub-Timer)																			
	16-bit	2 (Timer Z)																			
	Input Capture	Timer Z																			
	Output Compare	Timer V, Timer Z																			
	PWM Output	Timer V, Timer Z																			
	Event Counter	Shared with Timer B1																			
	3-Phase Inverter Control	Shared with Timer Z																			
Watchdog Timer		1 (selectable internal oscillator)																			
Serial Interface	Clock Sync./Clock Async.	1																			
I²C-bus		—																			
Synchronous Serial Communication Unit/Special Serial I/O		1																			
CAN	Channels	1																			
	Message Box (Numbers)	4																			
I/O Ports	Input Only (Numbers)	8																			
	CMOS I/O (Numbers)	45																			
	High Current Drive Port	8																			
	Pull-Up Resistor	13																			
	NMOS Push-Pull	—																			
External Interrupts Pins		11																			
Debugging Function	On-Chip Debug	—																Yes			
	On-Board Flash Program	—																Yes			
Other Functions	ROM Correction Function	Yes																—			
Operating Frequency/Supply Voltage		1 to 10MHz/2.7 to 5.5V, 1 to 20MHz/4.0 to 5.5V																1 to 10MHz/3.0 to 5.5V, 1 to 20MHz/4.0 to 5.5V			
Operating Ambient Temperature (°C)		–40 to 85				–20 to 75				–40 to 85				–20 to 75				–40 to 85		–20 to 75	
Package*2		PLQP0064KB-A	PRQP0064GB-A	PLQP0064KB-A	PRQP0064GB-A	PLQP0064KB-A	PRQP0064GB-A	PLQP0064KB-A	PRQP0064GB-A	PLQP0064KB-A	PRQP0064GB-A	PLQP0064KB-A	PRQP0064GB-A	PLQP0064KB-A	PRQP0064GB-A	PLQP0064KB-A	PRQP0064GB-A	PLQP0064KB-A	PRQP0064GB-A	PLQP0064KB-A	PRQP0064GB-A
Part No.		HD64336035GXXXFZW	HD64336035GXXXHW	HD64336035XXXFZW	HD64336035XXXHW	HD64336035GXXXFZ	HD64336035GXXXH	HD64336035XXXFZ	HD64336035XXXH	HD64336036GXXXFZW	HD64336036GXXXHW	HD64336036XXXFZW	HD64336036XXXHW	HD64336036GXXXFZ	HD64336036GXXXH	HD64336036XXXFZ	HD64336036XXXH	HD64336037GXXXFZW	HD64336037GXXXHW	HD64336037XXXFZW	HD64336037XXXHW	HD64336037GXXXFZ	HD64336037GXXXH	HD64336037XXXFZ	HD64336037XXXH	HD64F36037FZWV	HD64F36037GFZWV	HD64F36037GHWV	HD64F36037HWV	HD64F36037FZV	HD64F36037GFZV	HD64F36037GHV	HD64F36037HV

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8/300H Tiny Series)

Group		H8/36057																															
Memory	ROM (Bytes)	32K																56K															
Memory	RAM (Bytes)	2K																								3K							
Memory	EEPROM (Bytes)	—																															
Memory	ROM Type*1	F								M																F							
Memory	Program Security	Yes								—																Yes							
CPU	CPU	H8/300H Core																															
CPU	Basic Instructions	62																															
CPU	Minimum Instruction Execution Time (ns)	100 (@20MHz)																															
Clock	Clock Generation Circuit	2 circuits (System clock, Sub clock)																															
Clock	PLL	—																															
Clock	Subclock	Yes																															
Clock	On-Chip Oscillator	—																															
Clock	Oscillation Stop Detection	—																															
Clock	Frequency Divider	1/n (n = 1, 8, 16, 32, 64)																															
Clock	Power Save	Standby/Sub active (When using sub clock at 32kHz)/Sleep/Sub sleep (When using sub clock at 32kHz)/Module standby/System clock divider																															
Power Supply Voltage Detection	Power-On Reset/POR	—	Yes		—	Yes	—	Yes	—	Yes		—		Yes		—		Yes		—		Yes		—			Yes		—		Yes		—
Power Supply Voltage Detection	Low Voltage Detection/LVD	—	Yes		—	Yes	—	Yes	—	Yes		—		Yes		—		Yes		—		Yes		—			Yes		—		Yes		—
A/D Converter	Resolution × Channels	10-bit × 8																															
A/D Converter	Sample and Hold	Yes																															
Timer	8-bit	3 (Timer B1, Timer V, Sub-Timer)																															
Timer	16-bit	2 (Timer Z)																															
Timer	Input Capture	Timer Z																															
Timer	Output Compare	Timer V, Timer Z																															
Timer	PWM Output	Timer V, Timer Z																															
Timer	Event Counter	Shared with Timer B1																															
Timer	3-Phase Inverter Control	Shared with Timer Z																															
Watchdog Timer		1 (selectable internal oscillator)																															
Serial Interface	Clock Sync./Clock Async.	2																															
I²C-bus		—																															
Synchronous Serial Communication Unit/Special Serial I/O		1																															
CAN	Channels	1																															
CAN	Message Box (Numbers)	4																															
I/O Ports	Input Only (Numbers)	8																															
I/O Ports	CMOS I/O (Numbers)	45																															
I/O Ports	High Current Drive Port	8																															
I/O Ports	Pull-Up Resistor	13																															
I/O Ports	NMOS Push-Pull	—																															
External Interrupts Pins		11																															
Debugging Function	On-Chip Debug	Yes								—																Yes							
Debugging Function	On-Board Flash Program	Yes								—																Yes							
Other Functions	ROM Correction Function	—								Yes																—							
Operating Frequency/Supply Voltage		1 to 10MHz/3.0 to 5.5V, 1 to 20MHz/4.0 to 5.5V								1 to 10MHz/2.7 to 5.5V, 1 to 20MHz/4.0 to 5.5V																1 to 10MHz/3.0 to 5.5V, 1 to 20MHz/4.0 to 5.5V							
Operating Ambient Temperature (°C)		–40 to 85				–20 to 75				–40 to 85				–20 to 75				–40 to 85				–20 to 75				–40 to 85				–20 to 75			
Package*2		PLQP0064KB-A		PRQP0064GB-A		PLQP0064KB-A		PRQP0064GB-A		PLQP0064KB-A	PRQP0064GB-A	PLQP0064KB-A	PRQP0064GB-A	PLQP0064KB-A	PRQP0064GB-A	PLQP0064KB-A	PRQP0064GB-A	PLQP0064KB-A	PRQP0064GB-A	PLQP0064KB-A	PRQP0064GB-A	PLQP0064KB-A	PRQP0064GB-A	PLQP0064KB-A	PRQP0064GB-A	PLQP0064KB-A		PRQP0064GB-A		PLQP0064KB-A		PRQP0064GB-A	
Part No.		HD64F36054FZWV	HD64F36054GFZWV	HD64F36054HWV	HD64F36054GHWV	HD64F36054GFZV	HD64F36054FZV	HD64F36054HV	HD64F36054GHV	HD64336054GXXXFZW	HD64336054GXXXHW	HD64336054XXXFZW	HD64336054XXXHW	HD64336054GXXXFZ	HD64336054GXXXH	HD64336054XXXFZ	HD64336054XXXH	HD64336057GXXXFZW	HD64336057GXXXHW	HD64336057XXXFZW	HD64336057XXXHW	HD64336057GXXXFZ	HD64336057GXXXH	HD64336057XXXFZ	HD64336057XXXH	HD64F36057FZWV	HD64F36057GFZWV	HD64F36057GHWV	HD64F36057HWV	HD64F36057FZV	HD64F36057GFZV	HD64F36057GHV	HD64F36057HV

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8/300H Tiny Series)

Group		H8/36014							
Memory	ROM (Bytes)	8K				12K			
	RAM (Bytes)	512							
	EEPROM (Bytes)	—							
	ROM Type*1	M							
	Program Security	—							
CPU	CPU	H8/300H Core							
	Basic Instructions	62							
	Minimum Instruction Execution Time (ns)	100 (@20MHz)							
Clock	Clock Generation Circuit	1 circuit (System clock)							
	PLL	—							
	Subclock	—							
	On-Chip Oscillator	—							
	Oscillation Stop Detection	—							
	Frequency Divider	1/n (n = 1, 8, 16, 32, 64)							
	Power Save	Standby/Sleep/Sub sleep/Module standby/System clock divider							
Power Supply Voltage Detection	Power-On Reset/POR	Yes	—	Yes	—	Yes	—	Yes	—
	Low Voltage Detection/LVD	Yes	—	Yes	—	Yes	—	Yes	—
A/D Converter	Resolution x Channels	10-bit × 4							
	Sample and Hold	Yes							
Timer	8-bit	1 (Timer V)							
	16-bit	1 (Timer W)							
	Input Capture	Timer W							
	Output Compare	Timer V, Timer W							
	PWM Output	Timer V, Timer W							
	Event Counter	—							
	3-Phase Inverter Control	—							
Watchdog Timer		1 (selectable internal oscillator)							
Serial Interface	Clock Sync./Clock Async.	2							
I^2C-bus		—							
Synchronous Serial Communication Unit/Special Serial I/O		—							
CAN	Channels	—							
	Message Box (Numbers)	—							
I/O Ports	Input Only (Numbers)	4							
	CMOS I/O (Numbers)	30							
	High Current Drive Port	5							
	Pull-Up Resistor	13							
	NMOS Push-Pull	—							
External Interrupts Pins		9							
Debugging Function	On-Chip Debug	—							
	On-Board Flash Program	—							
Other Functions	ROM Correction Function	Yes							
Operating Frequency/Supply Voltage		1 to 10MHz/2.7 to 5.5V, 1 to 20MHz/4.0 to 5.5V							
Operating Ambient Temperature (°C)		–40 to 85				–20 to 75			
Package*2		PLQP0064KC-A	PVQN0048KA-A	PLQP0048JA-A	PLQP0048KC-A	PLQP0064KC-A	PVQN0048KA-A	PLQP0048JA-A	PLQP0048KC-A
Part No.		HD64336010GXXXFPW	HD64336010GXXXFTW	HD64336010GXXXFXW	HD64336010GXXXFYW	HD64336010XXXFPW	HD64336010XXXFTW	HD64336010XXXFXW	HD64336010XXXFYW

Group		H8/36014							
Memory	ROM (Bytes)	8K				12K			
	RAM (Bytes)	512							
	EEPROM (Bytes)	—							
	ROM Type*1	M							
	Program Security	—							
CPU	CPU	H8/300H Core							
	Basic Instructions	62							
	Minimum Instruction Execution Time (ns)	100 (@20MHz)							
Clock	Clock Generation Circuit	1 circuit (System clock)							
	PLL	—							
	Subclock	—							
	On-Chip Oscillator	—							
	Oscillation Stop Detection	—							
	Frequency Divider	1/n (n = 1, 8, 16, 32, 64)							
	Power Save	Standby/Sleep/Sub sleep/Module standby/System clock divider							
Power Supply Voltage Detection	Power-On Reset/POR	Yes	—	Yes	—	Yes	—	Yes	—
	Low Voltage Detection/LVD	Yes	—	Yes	—	Yes	—	Yes	—
A/D Converter	Resolution x Channels	10-bit × 4							
	Sample and Hold	Yes							
Timer	8-bit	1 (Timer V)							
	16-bit	1 (Timer W)							
	Input Capture	Timer W							
	Output Compare	Timer V, Timer W							
	PWM Output	Timer V, Timer W							
	Event Counter	—							
	3-Phase Inverter Control	—							
Watchdog Timer		1 (selectable internal oscillator)							
Serial Interface	Clock Sync./Clock Async.	2							
I^2C-bus		—							
Synchronous Serial Communication Unit/Special Serial I/O		—							
CAN	Channels	—							
	Message Box (Numbers)	—							
I/O Ports	Input Only (Numbers)	4							
	CMOS I/O (Numbers)	30							
	High Current Drive Port	5							
	Pull-Up Resistor	13							
	NMOS Push-Pull	—							
External Interrupts Pins		9							
Debugging Function	On-Chip Debug	—							
	On-Board Flash Program	—							
Other Functions	ROM Correction Function	Yes							
Operating Frequency/Supply Voltage		1 to 10MHz/2.7 to 5.5V, 1 to 20MHz/4.0 to 5.5V							
Operating Ambient Temperature (°C)		–40 to 85				–20 to 75			
Package*2		PLQP0064KC-A	PVQN0048KA-A	PLQP0048JA-A	PLQP0048KC-A	PLQP0064KC-A	PVQN0048KA-A	PLQP0048JA-A	PLQP0048KC-A
Part No.		HD64336011GXXXFPW	HD64336011GXXXFTW	HD64336011GXXXFXW	HD64336011GXXXFYW	HD64336011XXXFPW	HD64336011XXXFTW	HD64336011XXXFXW	HD64336011XXXFYW

Group		H8/36014							
Memory	ROM (Bytes)	8K				12K			
	RAM (Bytes)	512							
	EEPROM (Bytes)	—							
	ROM Type*1	M							
	Program Security	—							
CPU	CPU	H8/300H Core							
	Basic Instructions	62							
	Minimum Instruction Execution Time (ns)	100 (@20MHz)							
Clock	Clock Generation Circuit	1 circuit (System clock)							
	PLL	—							
	Subclock	—							
	On-Chip Oscillator	—							
	Oscillation Stop Detection	—							
	Frequency Divider	1/n (n = 1, 8, 16, 32, 64)							
	Power Save	Standby/Sleep/Sub sleep/Module standby/System clock divider							
Power Supply Voltage Detection	Power-On Reset/POR	Yes	—	Yes	—	Yes	—	Yes	—
	Low Voltage Detection/LVD	Yes	—	Yes	—	Yes	—	Yes	—
A/D Converter	Resolution x Channels	10-bit × 4							
	Sample and Hold	Yes							
Timer	8-bit	1 (Timer V)							
	16-bit	1 (Timer W)							
	Input Capture	Timer W							
	Output Compare	Timer V, Timer W							
	PWM Output	Timer V, Timer W							
	Event Counter	—							
	3-Phase Inverter Control	—							
Watchdog Timer		1 (selectable internal oscillator)							
Serial Interface	Clock Sync./Clock Async.	2							
I^2C-bus		—							
Synchronous Serial Communication Unit/Special Serial I/O		—							
CAN	Channels	—							
	Message Box (Numbers)	—							
I/O Ports	Input Only (Numbers)	4							
	CMOS I/O (Numbers)	30							
	High Current Drive Port	5							
	Pull-Up Resistor	13							
	NMOS Push-Pull	—							
External Interrupts Pins		9							
Debugging Function	On-Chip Debug	—							
	On-Board Flash Program	—							
Other Functions	ROM Correction Function	Yes							
Operating Frequency/Supply Voltage		1 to 10MHz/2.7 to 5.5V, 1 to 20MHz/4.0 to 5.5V							
Operating Ambient Temperature (°C)		–20 to 75							
Package*2		PLQP0064KC-A	PVQN0048KA-A	PLQP0048JA-A	PLQP0048KC-A	PLQP0064KC-A	PVQN0048KA-A	PLQP0048JA-A	PLQP0048KC-A
Part No.		HD64336011GXXXFP	HD64336011GXXXFT	HD64336011GXXXFX	HD64336011GXXXFY	HD64336011XXXFP	HD64336011XXXFT	HD64336011XXXFX	HD64336011XXXFY

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8/300H Tiny Series)

Group		H8/36014																													
Memory	ROM (Bytes)	16K																													
	RAM (Bytes)	512												2K																	
	EEPROM (Bytes)	—																													
	ROM Type*1	M												F																	
	Program Security	—																													
CPU	CPU	H8/300H Core																													
	Basic Instructions	62																													
	Minimum Instruction Execution Time (ns)	100 (@20MHz)																													
Clock	Clock Generation Circuit	1 circuit (System clock)																													
	PLL	—																													
	Subclock	—																													
	On-Chip Oscillator	—																													
	Oscillation Stop Detection	—																													
	Frequency Divider	1/n (n = 1, 8, 16, 32, 64)																													
	Power Save	Standby/Sleep/Sub sleep/Module standby/System clock divider																													
Power Supply Voltage Detection	Power-On Reset/POR	Yes		—		Yes		—		Yes		—		Yes		—		Yes													
	Low Voltage Detection/LVD	Yes		—		Yes		—		Yes		—		Yes		—		Yes													
A/D Converter	Resolution × Channels	10-bit × 4																													
	Sample and Hold	Yes																													
Timer	8-bit	1 (Timer V)																													
	16-bit	1 (Timer W)																													
	Input Capture	Timer W																													
	Output Compare	Timer V, Timer W																													
	PWM Output	Timer V, Timer W																													
	Event Counter	—																													
	3-Phase Inverter Control	—																													
Watchdog Timer		1 (selectable internal oscillator)																													
Serial Interface	Clock Sync./Clock Async.	2																													
I²C-bus		—																													
Synchronous Serial Communication Unit/Special Serial I/O		—																													
CAN	Channels	—																													
	Message Box (Numbers)	—																													
I/O Ports	Input Only (Numbers)	4																													
	CMOS I/O (Numbers)	30																													
	High Current Drive Port	5																													
	Pull-Up Resistor	13																													
	NMOS Push-Pull	—																													
External Interrupts Pins		9																													
Debugging Function	On-Chip Debug	—												Yes																	
	On-Board Flash Program	—												Yes																	
Other Functions	ROM Correction Function	Yes												—																	
Operating Frequency/Supply Voltage		1 to 10MHz/2.7 to 5.5V, 1 to 20MHz/4.0 to 5.5V												1 to 10MHz/3.0 to 5.5V, 1 to 20MHz/4.0 to 5.5V																	
Operating Ambient Temperature (˚C)		–40 to 85								–20 to 75								–40 to 85							–20 to 75						
Package*2		PLQP0064KC-A	PVQN0048KA-A	PLQP0048JA-A	PLQP0048KC-A	PLQP0064KC-A	PVQN0048KA-A	PLQP0048JA-A	PLQP0048KC-A	PLQP0064KC-A	PVQN0048KA-A	PLQP0048JA-A	PLQP0048KC-A	PLQP0064KC-A	PVQN0048KA-A	PLQP0048JA-A	PLQP0048KC-A	PLQP0064KC-A	PLQP0048JA-A	PLQP0048KC-A	PLQP0064KC-A	PLQP0048JA-A	PLQP0048KC-A	PLQP0064KC-A	PVQN0048KA-A	PLQP0048JA-A	PLQP0048KC-A	PLQP0064KC-A	PVQN0048KA-A	PLQP0048JA-A	PLQP0048KC-A
Part No.		HD64336012GXXXFPW	HD64336012GXXXFTW	HD64336012GXXXFXW	HD64336012GXXXFYW	HD64336012XXXFPW	HD64336012XXXFTW	HD64336012XXXFXW	HD64336012XXXFYW	HD64336012GXXXFP	HD64336012GXXXFT	HD64336012GXXXFX	HD64336012GXXXFY	HD64336012XXXFP	HD64336012XXXFT	HD64336012XXXFX	HD64336012XXXFY	HD64F36012FPWV	HD64F36012FXWV	HD64F36012FYWV	HD64F36012GFPWV	HD64F36012GFXWV	HD64F36012GFYWV	HD64F36012FPV	HD64F36012FTV	HD64F36012FXV	HD64F36012FYV	HD64F36012GFPV	HD64F36012GFTV	HD64F36012GFXV	HD64F36012GFYV

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8/300H Tiny Series)

Group		H8/36014																													
Memory	ROM (Bytes)	24K														32K															
	RAM (Bytes)	1K																													
	EEPROM (Bytes)	—																													
	ROM Type*1	M																													
	Program Security	—																													
CPU	CPU	H8/300H Core																													
	Basic Instructions	62																													
	Minimum Instruction Execution Time (ns)	100 (@20MHz)																													
Clock	Clock Generation Circuit	1 circuit (System clock)																													
	PLL	—																													
	Subclock	—																													
	On-Chip Oscillator	—																													
	Oscillation Stop Detection	—																													
	Frequency Divider	1/n (n = 1, 8, 16, 32, 64)																													
	Power Save	Standby/Sleep/Sub sleep/Module standby/System clock divider																													
Power Supply Voltage Detection	Power-On Reset/POR	Yes		—		Yes		—		Yes		—		Yes		—															
	Low Voltage Detection/LVD	Yes		—		Yes		—		Yes		—		Yes		—															
A/D Converter	Resolution x Channels	10-bit × 4																													
	Sample and Hold	Yes																													
Timer	8-bit	1 (Timer V)																													
	16-bit	1 (Timer W)																													
	Input Capture	Timer W																													
	Output Compare	Timer V, Timer W																													
	PWM Output	Timer V, Timer W																													
	Event Counter	—																													
	3-Phase Inverter Control	—																													
Watchdog Timer		1 (selectable internal oscillator)																													
Serial Interface	Clock Sync./Clock Async.	2																													
I²C-bus		—																													
Synchronous Serial Communication Unit/Special Serial I/O		—																													
CAN	Channels	—																													
	Message Box (Numbers)	—																													
I/O Ports	Input Only (Numbers)	4																													
	CMOS I/O (Numbers)	30																													
	High Current Drive Port	5																													
	Pull-Up Resistor	13																													
	NMOS Push-Pull	—																													
External Interrupts Pins		9																													
Debugging Function	On-Chip Debug	—																													
	On-Board Flash Program	—																													
Other Functions	ROM Correction Function	Yes																													
Operating Frequency/Supply Voltage		1 to 10MHz/2.7 to 5.5V, 1 to 20MHz/4.0 to 5.5V																													
Operating Ambient Temperature (°C)		–40 to 85								–20 to 75								–40 to 85								–20 to 75					
Package*2		PLQP0064KC-A	PVQN0048KA-A	PLQP0048JA-A	PLQP0048KC-A	PLQP0064KC-A	PVQN0048KA-A	PLQP0048JA-A	PLQP0048KC-A	PLQP0064KC-A	PVQN0048KA-A	PLQP0048JA-A	PLQP0048KC-A	PLQP0064KC-A	PVQN0048KA-A	PLQP0048JA-A	PLQP0048KC-A	PLQP0064KC-A	PVQN0048KA-A	PLQP0048JA-A	PLQP0048KC-A	PLQP0064KC-A	PVQN0048KA-A	PLQP0048JA-A	PLQP0048KC-A	PLQP0064KC-A	PVQN0048KA-A	PLQP0048JA-A	PLQP0048KC-A	PLQP0064KC-A	PVQN0048KA-A	PLQP0048JA-A	PLQP0048KC-A
Part No.		HD64336013GXXXFPW	HD64336013GXXXFTW	HD64336013GXXXFXW	HD64336013GXXXFYW	HD64336013XXXFPW	HD64336013XXXFTW	HD64336013XXXFXW	HD64336013XXXFYW	HD64336013GXXXFP	HD64336013GXXXFT	HD64336013GXXXFX	HD64336013GXXXFY	HD64336013XXXFP	HD64336013XXXFT	HD64336013XXXFX	HD64336013XXXFY	HD64336014GXXXFPW	HD64336014GXXXFTW	HD64336014GXXXFXW	HD64336014GXXXFYW	HD64336014XXXFPW	HD64336014XXXFTW	HD64336014XXXFXW	HD64336014XXXFYW	HD64336014GXXXFP	HD64336014GXXXFT	HD64336014GXXXFX	HD64336014GXXXFY	HD64336014XXXFP	HD64336014XXXFT	HD64336014XXXFX	HD64336014XXXFY

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8/300H Tiny Series)

Group		H8/36014												
Memory	ROM (Bytes)	32K												
	RAM (Bytes)	2K												
	EEPROM (Bytes)	—												
	ROM Type*1	F												
	Program Security	—												
CPU	CPU	H8/300H Core												
	Basic Instructions	62												
	Minimum Instruction Execution Time (ns)	100 (@20MHz)												
Clock	Clock Generation Circuit	1 circuit (System clock)												
	PLL	—												
	Subclock	—												
	On-Chip Oscillator	—												
	Oscillation Stop Detection	—												
	Frequency Divider	1/n (n = 1, 8, 16, 32, 64)												
	Power Save	Standby/Sleep/Sub sleep/Module standby/System clock divider												
Power Supply Voltage Detection	Power-On Reset/POR	—		Yes		—		Yes						
	Low Voltage Detection/LVD	—		Yes		—		Yes						
A/D Converter	Resolution × Channels	10-bit × 4												
	Sample and Hold	Yes												
Timer	8-bit	1 (Timer V)												
	16-bit	1 (Timer W)												
	Input Capture	Timer W												
	Output Compare	Timer V, Timer W												
	PWM Output	Timer V, Timer W												
	Event Counter	—												
	3-Phase Inverter Control	—												
Watchdog Timer		1 (selectable internal oscillator)												
Serial Interface	Clock Sync./Clock Async.	2												
I²C-bus		—												
Synchronous Serial Communication Unit/Special Serial I/O		—												
CAN	Channels	—												
	Message Box (Numbers)	—												
I/O Ports	Input Only (Numbers)	4												
	CMOS I/O (Numbers)	30												
	High Current Drive Port	5												
	Pull-Up Resistor	13												
	NMOS Push-Pull	—												
External Interrupts Pins		9												
Debugging Function	On-Chip Debug	Yes												
	On-Board Flash Program	Yes												
Other Functions	ROM Correction Function	—												
Operating Frequency/Supply Voltage		1 to 10MHz/3.0 to 5.5V, 1 to 20MHz/4.0 to 5.5V												
Operating Ambient Temperature (˚C)		–40 to 85						–20 to 75						
Package*2		PLQP0064KC-A	PLQP0048JA-A	PLQP0048KC-A	PLQP0064KC-A	PLQP0048JA-A	PLQP0048KC-A	PLQP0064KC-A	PVQN0048KA-A	PLQP0048JA-A	PLQP0048KC-A	PLQP0064KC-A	PVQN0048KA-A	PLQP0048JA-A	PLQP0048KC-A
Part No.		HD64F36014FPW	HD64F36014FXWV	HD64F36014FYWV	HD64F36014GFPWV	HD64F36014GFXWV	HD64F36014GFYWV	HD64F36014FPV	HD64F36014FTV	HD64F36014FXV	HD64F36014FYV	HD64F36014GFPV	HD64F36014GFTV	HD64F36014GFXV	HD64F36014GFYV

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8/300H Tiny Series)

Group		H8/36024																																												
Memory	ROM (Bytes)	16K																												24K															
	RAM (Bytes)	512																												1K															
	EEPROM (Bytes)	—																																											
	ROM Type*1	F														M																													
	Program Security	—																																											
CPU	CPU	H8/300H Core																																											
	Basic Instructions	62																																											
	Minimum Instruction Execution Time (ns)	100 (@20MHz)																																											
Clock	Clock Generation Circuit	1 circuit (System clock)																																											
	PLL	—																																											
	Subclock	—																																											
	On-Chip Oscillator	—																																											
	Oscillation Stop Detection	—																																											
	Frequency Divider	1/n (n = 1, 8, 16, 32, 64)																																											
	Power Save	Standby/Sleep/Sub sleep/Module standby/System clock divider																																											
Power Supply Voltage Detection	Power-On Reset/POR	—			Yes			—				Yes								—				Yes				—				Yes				—				Yes				—			
	Low Voltage Detection/LVD	—			Yes			—				Yes								—				Yes				—				Yes				—				Yes				—			
A/D Converter	Resolution × Channels	10-bit × 4																																											
	Sample and Hold	Yes																																											
Timer	8-bit	1 (Timer V)																																											
	16-bit	1 (Timer W)																																											
	Input Capture	Timer W																																											
	Output Compare	Timer V, Timer W																																											
	PWM Output	Timer V, Timer W																																											
	Event Counter	—																																											
	3-Phase Inverter Control	—																																											
Watchdog Timer		1 (selectable internal oscillator)																																											
Serial Interface	Clock Sync./Clock Async.	3																																											
I^2C-bus		—																																											
Synchronous Serial Communication Unit/Special Serial I/O		—																																											
CAN	Channels	—																																											
	Message Box (Numbers)	—																																											
I/O Ports	Input Only (Numbers)	4																																											
	CMOS I/O (Numbers)	30																																											
	High Current Drive Port	5																																											
	Pull-Up Resistor	13																																											
	NMOS Push-Pull	—																																											
External Interrupts Pins		9																																											
Debugging Function	On-Chip Debug	Yes														—																													
	On-Board Flash Program	Yes														—																													
Other Functions	ROM Correction Function	—														Yes																													
Operating Frequency/Supply Voltage		1 to 10MHz/3.0 to 5.5V, 1 to 20MHz/4.0 to 5.5V														1 to 10MHz/2.7 to 5.5V, 1 to 20MHz/4.0 to 5.5V																													
Operating Ambient Temperature (°C)		–40 to 85						–20 to 75								–40 to 85								–20 to 75								–40 to 85								–20 to 75							
Package*2		PLQP0064KC-A	PLQP0048JA-A	PLQP0048KC-A	PLQP0064KC-A	PLQP0048JA-A	PLQP0048KC-A	PLQP0064KC-A	PVQN0048KA-A	PLQP0048JA-A	PLQP0048KC-A	PLQP0064KC-A	PVQN0048KA-A	PLQP0048JA-A	PLQP0048KC-A	PLQP0064KC-A	PVQN0048KA-A	PLQP0048JA-A	PLQP0048KC-A	PLQP0064KC-A	PVQN0048KA-A	PLQP0048JA-A	PLQP0048KC-A	PLQP0064KC-A	PVQN0048KA-A	PLQP0048JA-A	PLQP0048KC-A	PLQP0064KC-A	PVQN0048KA-A	PLQP0048JA-A	PLQP0048KC-A	PLQP0064KC-A	PVQN0048KA-A	PLQP0048JA-A	PLQP0048KC-A	PLQP0064KC-A	PVQN0048KA-A	PLQP0048JA-A	PLQP0048KC-A	PLQP0064KC-A	PVQN0048KA-A	PLQP0048JA-A	PLQP0048KC-A	PLQP0064KC-A	PVQN0048KA-A	PLQP0048JA-A	PLQP0048KC-A
Part No.		HD64F36022FPWV	HD64F36022FXWV	HD64F36022FYWV	HD64F36022GFPWV	HD64F36022GFXWV	HD64F36022GFYWV	HD64F36022FPV	HD64F36022FTV	HD64F36022FXV	HD64F36022FYV	HD64F36022GFPV	HD64F36022GFTV	HD64F36022GFXV	HD64F36022GFYV	HD64336022GXXXFPW	HD64336022GXXXFTW	HD64336022GXXXFXW	HD64336022GXXXFYW	HD64336022XXXFPW	HD64336022XXXFTW	HD64336022XXXFXW	HD64336022XXXFYW	HD64336022GXXXFP	HD64336022GXXXFT	HD64336022GXXXFX	HD64336022GXXXFY	HD64336022XXXFP	HD64336022XXXFT	HD64336022XXXFX	HD64336022XXXFY	HD64336023GXXXFPW	HD64336023GXXXFTW	HD64336023GXXXFXW	HD64336023GXXXFYW	HD64336023XXXFPW	HD64336023XXXFTW	HD64336023XXXFXW	HD64336023XXXFYW	HD64336023GXXXFP	HD64336023GXXXFT	HD64336023GXXXFX	HD64336023GXXXFY	HD64336023XXXFP	HD64336023XXXFT	HD64336023XXXFX	HD64336023XXXFY

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8/300H Tiny Series)

Group		H8/36024																														
Memory	ROM (Bytes)	32K																														
	RAM (Bytes)	1K														2K																
	EEPROM (Bytes)	—																														
	ROM Type*1	M														F																
	Program Security	—																														
CPU	CPU	H8/300H Core																														
	Basic Instructions	62																														
	Minimum Instruction Execution Time (ns)	100 (@20MHz)																														
Clock	Clock Generation Circuit	1 circuit (System clock)																														
	PLL	—																														
	Subclock	—																														
	On-Chip Oscillator	—																														
	Oscillation Stop Detection	—																														
	Frequency Divider	1/n (n = 1, 8, 16, 32, 64)																														
	Power Save	Standby/Sleep/Sub sleep/Module standby/System clock divider																														
Power Supply Voltage Detection	Power-On Reset/POR	Yes			—				Yes				—				Yes				—				Yes							
	Low Voltage Detection/LVD	Yes			—				Yes				—				Yes				—				Yes							
A/D Converter	Resolution × Channels	10-bit × 4																														
	Sample and Hold	Yes																														
Timer	8-bit	1 (Timer V)																														
	16-bit	1 (Timer W)																														
	Input Capture	Timer W																														
	Output Compare	Timer V, Timer W																														
	PWM Output	Timer V, Timer W																														
	Event Counter	—																														
	3-Phase Inverter Control	—																														
Watchdog Timer		1 (selectable internal oscillator)																														
Serial Interface	Clock Sync./Clock Async.	3																														
I²C-bus		—																														
Synchronous Serial Communication Unit/Special Serial I/O		—																														
CAN	Channels	—																														
	Message Box (Numbers)	—																														
I/O Ports	Input Only (Numbers)	4																														
	CMOS I/O (Numbers)	30																														
	High Current Drive Port	5																														
	Pull-Up Resistor	13																														
	NMOS Push-Pull	—																														
External Interrupts Pins		9																														
Debugging Function	On-Chip Debug	—														Yes																
	On-Board Flash Program	—														Yes																
Other Functions	ROM Correction Function	Yes														—																
Operating Frequency/Supply Voltage		1 to 10MHz/2.7 to 5.5V, 1 to 20MHz/4.0 to 5.5V														1 to 10MHz/3.0 to 5.5V, 1 to 20MHz/4.0 to 5.5V																
Operating Ambient Temperature (˚C)		–40 to 85							–20 to 75								–40 to 85							–20 to 75							
Package*2		PLQP0064KC-A	PVQN0048KA-A	PLQP0048JA-A	PLQP0048KC-A	PLQP0064KC-A	PVQN0048KA-A	PLQP0048JA-A	PLQP0048KC-A	PLQP0064KC-A	PVQN0048KA-A	PLQP0048JA-A	PLQP0048KC-A	PLQP0064KC-A	PVQN0048KA-A	PLQP0048JA-A	PLQP0048KC-A	PLQP0064KC-A	PLQP0048JA-A	PLQP0048KC-A	PLQP0064KC-A	PLQP0048JA-A	PLQP0048KC-A	PLQP0064KC-A	PVQN0048KA-A	PLQP0048JA-A	PLQP0048KC-A	PLQP0064KC-A	PVQN0048KA-A	PLQP0048JA-A	PLQP0048KC-A
Part No.		HD64336024GXXXFPW	HD64336024GXXXFTW	HD64336024GXXXFXW	HD64336024GXXXFYW	HD64336024XXXFPW	HD64336024XXXFTW	HD64336024XXXFXW	HD64336024XXXFYW	HD64336024GXXXFP	HD64336024GXXXFT	HD64336024GXXXFX	HD64336024GXXXFY	HD64336024XXXFP	HD64336024XXXFT	HD64336024XXXFX	HD64336024XXXFY	HD64F36024FPWV	HD64F36024FXWV	HD64F36024FYWV	HD64F36024GFPWV	HD64F36024GFXWV	HD64F36024GFYWV	HD64F36024FPV	HD64F36024FTV	HD64F36024FXV	HD64F36024FYV	HD64F36024GFPV	HD64F36024GFTV	HD64F36024GFXV	HD64F36024GFYV

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8/300H Tiny Series)

Group		H8/3694							
Memory	ROM (Bytes)	8K				12K			
	RAM (Bytes)	512							
	EEPROM (Bytes)	—							
	ROM Type*1	M							
	Program Security	—							
CPU	CPU	H8/300H Core							
	Basic Instructions	62							
	Minimum Instruction Execution Time (ns)	100 (@20MHz)							
Clock	Clock Generation Circuit	2 circuits (System clock, Sub clock)							
	PLL	—							
	Subclock	Yes							
	On-Chip Oscillator	—							
	Oscillation Stop Detection	—							
	Frequency Divider	1/n (n = 1, 8, 16, 32, 64)							
	Power Save	Standby/Sub active (When using sub clock at 32kHz)/Sleep/Sub sleep (When using sub clock at 32kHz)/Module standby/System clock divider							
Power Supply Voltage Detection	Power-On Reset/POR	Yes	—	Yes	—	Yes	—	Yes	—
	Low Voltage Detection/LVD	Yes	—	Yes	—	Yes	—	Yes	—
A/D Converter	Resolution x Channels	10-bit × 8							
	Sample and Hold	Yes							
Timer	8-bit	3 (Timer A, Timer B1, Timer V)							
	16-bit	1 (Timer W)							
	Input Capture	Timer W							
	Output Compare	Timer W							
	PWM Output	Timer V, Timer W							
	Event Counter	Timer B1							
	3-Phase Inverter Control	—							
Watchdog Timer		1 (selectable internal oscillator)							
Serial Interface	Clock Sync./Clock Async.	1							
I²C-bus		1							
Synchronous Serial Communication Unit/Special Serial I/O		—							
CAN	Channels	—							
	Message Box (Numbers)	—							
I/O Ports	Input Only (Numbers)	8							
	CMOS I/O (Numbers)	29							
	High Current Drive Port	8							
	Pull-Up Resistor	13							
	NMOS Push-Pull	2							
External Interrupts Pins		11							
Debugging Function	On-Chip Debug	—							
	On-Board Flash Program	—							
Other Functions	ROM Correction Function	Yes							
Operating Frequency/Supply Voltage		1 to 10MHz/2.7 to 5.5V, 1 to 20MHz/4.0 to 5.5V							
Operating Ambient Temperature (°C)		–40 to 85				–20 to 75		–40 to 85	–20 to 75
Package*2		PLQP0064KC-A	PLQP0064KB-A	PLQP0048KC-A	PRQP0064GB-A	PLQP0064KC-A	PVQN0048KA-A	PLQP0064KB-A	PLQP0048KC-A	PRQP0064GB-A	PLQP0064KC-A	PVQN0048KA-A	PLQP0048JA-A	PLQP0048KC-A	PRQP0064GB-A	PLQP0064KC-A	PLQP0048JA-A	PLQP0048KC-A	PRQP0064GB-A	PLQP0064KC-A	PLQP0064KB-A	PLQP0048KC-A	PRQP0064GB-A	PLQP0064KC-A	PLQP0064KB-A	PLQP0048KC-A	PRQP0064GB-A	PLQP0064KC-A	PVQN0048KA-A	PLQP0048JA-A	PLQP0048KC-A	PRQP0064GB-A	PLQP0064KC-A	PVQN0048KA-A	PLQP0048JA-A	PLQP0048KC-A	PRQP0064GB-A
Part No.		HD6433690GXXXFPI	HD6433690GXXXFTI	HD6433690GXXXFXI	HD6433690GXXXFYI	HD6433690GXXXHI	HD6433690XXXFPI	HD6433690XXXFTI	HD6433690XXXFXI	HD6433690XXXFYI	HD6433690XXXHI	HD6433690GXXXFP	HD6433690GXXXFT	HD6433690GXXXFX	HD6433690GXXXFY	HD6433690GXXXH	HD6433690XXXFP	HD6433690XXXFX	HD6433690XXXFY	HD6433690XXXH	HD6433691GXXXFPI	HD6433691GXXXFTI	HD6433691GXXXFXI	HD6433691GXXXFYI	HD6433691GXXXHI	HD6433691XXXFPI	HD6433691XXXFTI	HD6433691XXXFXI	HD6433691XXXFYI	HD6433691XXXHI	HD6433691GXXXFP	HD6433691GXXXFT	HD6433691GXXXFX	HD6433691GXXXFY	HD6433691GXXXH	HD6433691XXXFP	HD6433691XXXFT	HD6433691XXXFX	HD6433691XXXFY	HD6433691XXXH

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8/300H Tiny Series)

Group		H8/3694							
Memory	ROM (Bytes)	16K				24K			
	RAM (Bytes)	512				1K			
	EEPROM (Bytes)	—							
	ROM Type*1	M							
	Program Security	—							
CPU	CPU	H8/300H Core							
	Basic Instructions	62							
	Minimum Instruction Execution Time (ns)	100 (@20MHz)							
Clock	Clock Generation Circuit	2 circuits (System clock, Sub clock)							
	PLL	—							
	Subclock	Yes							
	On-Chip Oscillator	—							
	Oscillation Stop Detection	—							
	Frequency Divider	1/n (n = 1, 8, 16, 32, 64)							
	Power Save	Standby/Sub active (When using sub clock at 32kHz)/Sleep/Sub sleep (When using sub clock at 32kHz)/Module standby/System clock divider							
Power Supply Voltage Detection	Power-On Reset/POR	Yes	—	Yes	—	Yes	—	Yes	—
	Low Voltage Detection/LVD	Yes	—	Yes	—	Yes	—	Yes	—
A/D Converter	Resolution × Channels	10-bit × 8							
	Sample and Hold	Yes							
Timer	8-bit	3 (Timer A, Timer B1, Timer V)							
	16-bit	1 (Timer W)							
	Input Capture	Timer W							
	Output Compare	Timer W							
	PWM Output	Timer V, Timer W							
	Event Counter	Timer B1							
	3-Phase Inverter Control	—							
Watchdog Timer		1 (selectable internal oscillator)							
Serial Interface	Clock Sync./Clock Async.	1							
I²C-bus		1							
Synchronous Serial Communication Unit/Special Serial I/O		—							
CAN	Channels	—							
	Message Box (Numbers)	—							
I/O Ports	Input Only (Numbers)	8							
	CMOS I/O (Numbers)	29							
	High Current Drive Port	8							
	Pull-Up Resistor	13							
	NMOS Push-Pull	2							
External Interrupts Pins		11							
Debugging Function	On-Chip Debug	—							
	On-Board Flash Program	—							
Other Functions	ROM Correction Function	Yes							
Operating Frequency/Supply Voltage		1 to 10MHz/2.7 to 5.5V, 1 to 20MHz/4.0 to 5.5V							
Operating Ambient Temperature (°C)		–40 to 85				–20 to 75			
		–40 to 85				–20 to 75			
Package*2		PLQP0064KC-A	PLQP0064KB-A	PLQP0048KC-A	PRQP0064GB-A	PLQP0064KC-A	PLQP0064KB-A	PLQP0048KC-A	PRQP0064GB-A
		PLQP0064KC-A	PVQN0048KA-A	PLQP0048JA-A	PLQP0048KC-A	PRQP0064GB-A	PLQP0064KC-A	PVQN0048KA-A	PLQP0048JA-A
		PLQP0048KC-A	PRQP0064GB-A	PLQP0064KC-A	PLQP0064KB-A	PLQP0048KC-A	PRQP0064GB-A	PLQP0064KC-A	PLQP0064KB-A
		PLQP0048KC-A	PRQP0064GB-A						
		PLQP0064KC-A	PVQN0048KA-A	PLQP0048JA-A	PLQP0048KC-A	PRQP0064GB-A	PLQP0064KC-A	PVQN0048KA-A	PLQP0048JA-A
		PLQP0048KC-A	PRQP0064GB-A						
Part No.		HD6433692GXXXFPI	HD6433692GXXXFTI	HD6433692GXXXFXI	HD6433692GXXXFYI	HD6433692GXXXHI	HD6433692XXXFPI	HD6433692XXXFTI	HD6433692XXXFXI
		HD6433692XXXFYI	HD6433692XXXHI	HD6433692GXXXFP	HD6433692GXXXFT	HD6433692GXXXFX	HD6433692GXXXFY	HD6433692GXXXH	HD6433692XXXFP
		HD6433692XXXFT	HD6433692XXXFX	HD6433692XXXFY	HD6433692XXXH	HD6433693GXXXFPI	HD6433693GXXXFTI	HD6433693GXXXFXI	HD6433693GXXXFYI
		HD6433693GXXXHI	HD6433693XXXFPI	HD6433693XXXFTI	HD6433693XXXFXI	HD6433693XXXFYI	HD6433693XXXHI	HD6433693GXXXFP	HD6433693GXXXFT
		HD6433693GXXXFX	HD6433693GXXXFY	HD6433693GXXXH	HD6433693XXXFP	HD6433693XXXFT	HD6433693XXXFX	HD6433693XXXFY	HD6433693XXXH

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8/300H Tiny Series)

Group		H8/3694										
Memory	ROM (Bytes)	32K										
	RAM (Bytes)	1K					2K					
	EEPROM (Bytes)	—				512	—					512
	ROM Type*¹	M					F					
	Program Security	—					Yes					
CPU	CPU	H8/300H Core										
	Basic Instructions	62										
	Minimum Instruction Execution Time (ns)	100 (@20MHz)										
Clock	Clock Generation Circuit	2 circuits (System clock, Sub clock)										
	PLL	—										
	Subclock	Yes										
	On-Chip Oscillator	—										
	Oscillation Stop Detection	—										
	Frequency Divider	1/n (n = 1, 8, 16, 32, 64)										
	Power Save	Standby/Sub active (When using sub clock at 32kHz)/Sleep/Sub sleep (When using sub clock at 32kHz)/Module standby/System clock divider										
Power Supply Voltage Detection	Power-On Reset/POR	Yes	—	Yes	—	Yes	—	Yes	—	Yes	—	Yes
	Low Voltage Detection/LVD	Yes	—	Yes	—	Yes	—	Yes	—	Yes	—	Yes
A/D Converter	Resolution × Channels	10-bit × 8										
	Sample and Hold	Yes										
Timer	8-bit	3 (Timer A, Timer B1, Timer V)										
	16-bit	1 (Timer W)										
	Input Capture	Timer W										
	Output Compare	Timer W										
	PWM Output	Timer V, Timer W										
	Event Counter	Timer B1										
	3-Phase Inverter Control	—										
Watchdog Timer		1 (selectable internal oscillator)										
Serial Interface	Clock Sync./Clock Async.	1										
I²C-bus		1										
Synchronous Serial Communication Unit/Special Serial I/O		—										
CAN	Channels	—										
	Message Box (Numbers)	—										
I/O Ports	Input Only (Numbers)	8										
	CMOS I/O (Numbers)	29				27	29					27
	High Current Drive Port	8										
	Pull-Up Resistor	13										
	NMOS Push-Pull	2										
External Interrupts Pins		11										
Debugging Function	On-Chip Debug	—					Yes					
	On-Board Flash Program	—					Yes					
Other Functions	ROM Correction Function	Yes					—					
Operating Frequency/Supply Voltage		1 to 10MHz/2.7 to 5.5V, 1 to 20MHz/4.0 to 5.5V					1 to 10MHz/3.0 to 5.5V, 1 to 20MHz/4.0 to 5.5V					
Operating Ambient Temperature (°C)		–40 to 85		–20 to 75			–40 to 85		–20 to 75			–40 to 85

Package*²
PLQP0064KC-A, PLQP0064KB-A, PLQP0048KC-A, PRQP0064GB-A, PLQP0064KC-A, PLQP0064KB-A, PLQP0048KC-A, PRQP0064GB-A, PLQP0064KC-A, PVQN0048KA-A, PLQP0048JA-A, PLQP0048KC-A, PRQP0064GB-A, PLQP0064KC-A, PVQN0048KA-A, PLQP0048JA-A, PLQP0048KC-A, PRQP0064GB-A, PLQP0064KC-A, PLQP0064KB-A, PLQP0048KC-A, PLQP0064KC-A, PVQN0048KA-A, PLQP0064KB-A, PLQP0048KC-A, PRQP0064GB-A, PLQP0064KC-A, PVQN0048KA-A, PLQP0048JA-A, PLQP0048KC-A, PLQP0064KC-A, PVQN0048KA-A, PLQP0048JA-A, PLQP0048KC-A, PRQP0064GB-A, PLQP0064KC-A

Part No.
HD6433694GXXXFPI, HD6433694GXXXFTI, HD6433694GXXXFXI, HD6433694GXXXFYI, HD6433694GXXXHI, HD6433694XXXFPI, HD6433694XXXFTI, HD6433694XXXFXI, HD6433694XXXFYI, HD6433694XXXHI, HD6433694GXXXFP, HD6433694GXXXFT, HD6433694GXXXFX, HD6433694GXXXFY, HD6433694GXXXH, HD6433694XXXFP, HD6433694XXXFT, HD6433694XXXFX, HD6433694XXXFY, HD6433694XXXH, HD6483694GXXXFP, HD6483694GXXXFPI, HD64F3694FPIV, HD64F3694FTIV, HD64F3694FXIV, HD64F3694FYIV, HD64F3694GFPIV, HD64F3694GFTIV, HD64F3694GFXIV, HD64F3694GFYIV, HD64F3694GHIV, HD64F3694HIV, HD64F3694FPV, HD64F3694FTV, HD64F3694FXV, HD64F3694FYV, HD64F3694GFPV, HD64F3694GFTV, HD64F3694GFXV, HD64F3694GFYV, HD64F3694GHV, HD64F3694HV, HD64N3694GFPV, HD64N3694GFPIV

*¹ F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*² Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8/300H Tiny Series)

Group		H8/36094							
Memory	ROM (Bytes)	16K				32K			
	RAM (Bytes)	2K							
	EEPROM (Bytes)	—							
	ROM Type*1	F							
	Program Security	Yes							
CPU	CPU	H8/300H Core							
	Basic Instructions	62							
	Minimum Instruction Execution Time (ns)	100 (@20MHz)							
Clock	Clock Generation Circuit	3 circuits (System clock, Sub clock, On-chip oscillator)							
	PLL	—							
	Subclock	Yes							
	On-Chip Oscillator	Yes (20MHz)							
	Oscillation Stop Detection	Yes							
	Frequency Divider	1/n (n = 1, 8, 16, 32, 64)							
	Power Save	Standby/Sub active (When using sub clock at 32kHz)/Sleep/Sub sleep (When using sub clock at 32kHz)/Module standby/System clock divider							
Power Supply Voltage Detection	Power-On Reset/POR	—	Yes	—	Yes	—	Yes	—	Yes
	Low Voltage Detection/LVD	—	Yes	—	Yes	—	Yes	—	Yes
A/D Converter	Resolution × Channels	10-bit × 8							
	Sample and Hold	Yes							
Timer	8-bit	3 (Timer A, Timer B1, Timer V)							
	16-bit	1 (Timer W)							
	Input Capture	Timer W							
	Output Compare	Timer V, Timer W							
	PWM Output	Timer V, Timer W							
	Event Counter	Timer B1							
	3-Phase Inverter Control	—							
Watchdog Timer		1 (selectable internal oscillator)							
Serial Interface	Clock Sync./Clock Async.	1							
I²C-bus		1							
Synchronous Serial Communication Unit/Special Serial I/O		—							
CAN	Channels	—							
	Message Box (Numbers)	—							
I/O Ports	Input Only (Numbers)	8							
	CMOS I/O (Numbers)	31							
	High Current Drive Port	8							
	Pull-Up Resistor	13							
	NMOS Push-Pull	2							
External Interrupts Pins		11							
Debugging Function	On-Chip Debug	Yes							
	On-Board Flash Program	Yes							
Other Functions	ROM Correction Function	—							
Operating Frequency/Supply Voltage		4 to 10MHz/3.0 to 5.5V, 4 to 20MHz/4.0 to 5.5V	4 to 10MHz/3.0 to 5.5V, 4 to 20MHz/4.0 to 5.5V (When using LVD: 4 to 16MHz/4.5 to 5.5V)	4 to 10MHz/3.0 to 5.5V, 4 to 20MHz/4.0 to 5.5V	4 to 10MHz/3.0 to 5.5V, 4 to 20MHz/4.0 to 5.5V (When using LVD: 4 to 16MHz/4.5 to 5.5V)	4 to 10MHz/3.0 to 5.5V, 4 to 20MHz/4.0 to 5.5V	4 to 10MHz/3.0 to 5.5V, 4 to 20MHz/4.0 to 5.5V (When using LVD: 4 to 16MHz/4.5 to 5.5V)	4 to 10MHz/3.0 to 5.5V, 4 to 20MHz/4.0 to 5.5V	4 to 10MHz/3.0 to 5.5V, 4 to 20MHz/4.0 to 5.5V (When using LVD: 4 to 16MHz/4.5 to 5.5V)
Operating Ambient Temperature (°C)		–40 to 85		–20 to 75		–40 to 85		–20 to 75	
Package*2		PLQP0048JA-A	PLQP0048KC-A	PLQP0064KB-A	PRQP0144KB-A	PRQP0144KA-A	PLQP0064KB-A	PRQP0112JB-A	PRQP0144KB-A
		PLQP0048JA-A	PLQP0048KC-A	PLQP0064KB-A	PLQP0048JA-A	PLQP0048KC-A	PLQP0064KB-A	PRQP0064GB-A	
		PRQP0144KB-A	PLQP0064KB-A		PLQP0048JA-A	PLQP0048KC-A	PRQP0112JB-A	PRQP0064GB-A	
		PLQP0048JA-A	PLQP0048KC-A	PLQP0064KB-A	PLQP0064GB-A	PLQP0048JA-A	PLQP0048KC-A	PLQP0064KB-A	PRQP0064GB-A
Part No.		HD64F36092FXWV	HD64F36092YWV	HD64F36092FZWV	HD64F36092GFXWV	HD64F36092GFYWV	HD64F36092GFZWV	HD64F36092GHWV	HD64F36092HWV
		HD64F36092FXV	HD64F36092FYV	HD64F36092FZV	HD64F36092GFXV	HD64F36092GFYV	HD64F36092GFZV	HD64F36092GHV	HD64F36092HV
		HD64F36094FXWV	HD64F36094FYWV	HD64F36094FZWV	HD64F36094GFXWV	HD64F36094GFYWV	HD64F36094GFZWV	HD64F36094GHWV	HD64F36094HWV
		HD64F36094FXV	HD64F36094FYV	HD64F36094FZV	HD64F36094HV	HD64F36094GFXV	HD64F36094GFYV	HD64F36094GFZV	HD64F36094GHV

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8/300H Tiny Series)

Group		H8/3672												H8/36902											
Memory	ROM (Bytes)	8K						16K						2K			4K			8K					
	RAM (Bytes)	2K												256						512			1.5K		
	EEPROM (Bytes)	—																							
	ROM Type*1	F												M									F		
	Program Security	—																							
CPU	CPU	H8/300H Core																							
	Basic Instructions	62																							
	Minimum Instruction Execution Time (ns)	125 (@16MHz)												167 (@12MHz)											
Clock	Clock Generation Circuit	1 circuit (System clock)												2 circuits (System clock, On-chip oscillator)											
	PLL	—																							
	Subclock	—																							
	On-Chip Oscillator	—												Yes (10MHz)											
	Oscillation Stop Detection	—																							
	Frequency Divider	1/n (n = 1, 8, 16, 32, 64)																							
	Power Save	Standby/Sleep/Sub sleep/Module standby/System clock divider																							
Power Supply Voltage Detection	Power-On Reset/POR	—												Yes											
	Low Voltage Detection/LVD	—												Yes											
A/D Converter	Resolution x Channels	10-bit × 4																							
	Sample and Hold	Yes																							
Timer	8-bit	1 (Timer V)																							
	16-bit	1 (Timer W)																							
	Input Capture	Timer W																							
	Output Compare	Timer V, Timer W																							
	PWM Output	Timer V, Timer W																							
	Event Counter	—																							
	3-Phase Inverter Control	—																							
Watchdog Timer		1 (selectable internal oscillator)																							
Serial Interface	Clock Sync./Clock Async.	1																							
I^2C-bus		—																							
Synchronous Serial Communication Unit/Special Serial I/O		—																							
CAN	Channels	—																							
	Message Box (Numbers)	—																							
I/O Ports	Input Only (Numbers)	4																							
	CMOS I/O (Numbers)	26												18											
	High Current Drive Port	5																							
	Pull-Up Resistor	13												3											
	NMOS Push-Pull	—																							
External Interrupts Pins		9												4											
Debugging Function	On-Chip Debug	Yes												—									Yes		
	On-Board Flash Program	Yes												—									Yes		
Other Functions	ROM Correction Function	—												Yes									—		
Operating Frequency/Supply Voltage		1 to 10MHz/3.0 to 5.5V, 1 to 16MHz/4.0 to 5.5V												2 to 12MHz/2.7 to 5.5V									2 to 12MHz/3.0 to 5.5V		
Operating Ambient Temperature (°C)		–40 to 85			–20 to 75			–40 to 85			–20 to 75			–40 to 85	–20 to 75, –40 to 85		–40 to 85	–20 to 75	–20 to 75, –40 to 85	–40 to 85	–20 to 75	–20 to 75, –40 to 85	–20 to 75	–40 to 85	–20 to 75, –40 to 85
Package*2		PLQP0064KC-A	PLQP0048JA-A	PLQP0048KC-A	PLQP0064KC-A	PLQP0048JA-A	PLQP0048KC-A	PLQP0064KC-A	PLQP0048JA-A	PLQP0048KC-A	PLQP0064KC-A	PLQP0048JA-A	PLQP0048KC-A	FP-32A	DP-32S	PRSP0032DC-A	FP-32A	DP-32S	PRSP0032DC-A	FP-32A	DP-32S	PRSP0032DC-A	FP-32A	DP-32S	PRSP0032DC-A
Part No.		HD64F3670FPIV	HD64F3670FXIV	HD64F3670FYIV	HD64F3670FPV	HD64F3670FXV	HD64F3670FYV	HD64F3672FPIV	HD64F3672FXIV	HD64F3672FYIV	HD64F3672FPV	HD64F3672FXV	HD64F3672FYV	HD6436900GXXXFHV	HD6436900GXXXFHWV	HD6436900GXXXP	HD6436900GXXXTP	HD6436901GXXXFHWV	HD6436901GXXXFHV	HD6436901GXXXP	HD6436901GXXXTP	HD6436902GXXXFHWV	HD6436902GXXXFHV	HD6436902GXXXP	HD6436902GXXXTP	HD64F36902GFHV	HD64F36902GFHWV	HD64F36902GP	HD64F36902GTP

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8/300H Tiny Series)

Group		H8/36912											
Memory	ROM (Bytes)	4K				8K							
	RAM (Bytes)	256				512				1.5K			
	EEPROM (Bytes)	—											
	ROM Type*1	M								F			
	Program Security	—											
CPU	CPU	H8/300H Core											
	Basic Instructions	62											
	Minimum Instruction Execution Time (ns)	167 (@12MHz)											
Clock	Clock Generation Circuit	2 circuits (System clock, On-chip oscillator)											
	PLL	—											
	Subclock	—											
	On-Chip Oscillator	Yes (10MHz)											
	Oscillation Stop Detection	—											
	Frequency Divider	1/n (n = 1, 8, 16, 32, 64)											
	Power Save	Standby/Sleep/Sub sleep/Module standby/System clock divider											
Power Supply Voltage Detection	Power-On Reset/POR	Yes											
	Low Voltage Detection/LVD	Yes											
A/D Converter	Resolution × Channels	10-bit × 4											
	Sample and Hold	Yes											
Timer	8-bit	2 (Timer B1, Timer V)											
	16-bit	1 (Timer W)											
	Input Capture	Timer W											
	Output Compare	Timer V, Timer W											
	PWM Output	Timer V, Timer W											
	Event Counter	Timer B1											
	3-Phase Inverter Control	—											
Watchdog Timer		1 (selectable internal oscillator)											
Serial Interface	Clock Sync./Clock Async.	1											
I²C-bus		1											
Synchronous Serial Communication Unit/Special Serial I/O		—											
CAN	Channels	—											
	Message Box (Numbers)	—											
I/O Ports	Input Only (Numbers)	4											
	CMOS I/O (Numbers)	18											
	High Current Drive Port	5											
	Pull-Up Resistor	3											
	NMOS Push-Pull	2											
External Interrupts Pins		4											
Debugging Function	On-Chip Debug	—								Yes			
	On-Board Flash Program	—								Yes			
Other Functions	ROM Correction Function	Yes								—			
Operating Frequency/Supply Voltage		1 to 12MHz/2.7 to 5.5V								1 to 12MHz/3.0 to 5.5V			
Operating Ambient Temperature (˚C)		–40 to 85	–20 to 75	–20 to 75, –40 to 85		–20 to 75	–40 to 85	–20 to 75, –40 to 85		–40 to 85	–20 to 75	–20 to 75, –40 to 85	
Package*2		FP-32A		DP-32S	PRSP0032DC-A	FP-32A		DP-32S	PRSP0032DC-A	FP-32A		DP-32S	PRSP0032DC-A
Part No.		HD64336911GXXXFHWV	HD64336911GXXXFHV	HD64336911GXXXP	HD64336911GXXXTP	HD64336912GXXXFHV	HD64336912GXXXFHWV	HD64336912GXXXP	HD64336912GXXXTP	HD64F36912GFHWV	HD64F36912GFHV	HD64F36912GP	HD64F36912GTP

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

16-bit single-chip MCUs designed for health and beauty equipment and digital consumer products

H8/300H Super Low Power Series Features

- Low power consumption and low-voltage operation
- 1.8V operation, on-chip Flash memory (in some devices)
- Employs 16-bit H8/300H CPU with proven track record in a wide range of applications
- Upward compatible with H8/300L Super Low Power series
- Small packages (Adopts 7-mm square TLP-85V 5 mm × 6 mm QFN (TNP-32))
- On-board debugging function allows program debugging with the MCU mounted in the system, simplifying development and adjustment and reducing the overall time required for product development
- Peripheral functions for a variety of requirements
  Single power supply flash memory, I²C-bus, 10-bit A/D converter, serial interface, multifunction timer, etc.
- H8/38086R group has on-chip 14-bit ΔΣ A/D converter

H8/300H Super Low power Series Roadmap

	[LCD Built-in version]	[Standard product (with no LCD)]
		H8/38799
100-pin	H8/38099	
	H8/38086R	H8/38776
	H8/38076R	
	H8/38537	
80-pin	H8/38524	
		H8/38704
64-pin		H8/38702S
		H8/38602R
32-pin		H8/38606

Flash memory versions support on-chip emulator (E8a).

80-pin, Multifunction Super Low Power

H8/38076R, H8/38776 Group

- 1.8V operation on-chip flash memory
- World class low-power MCUs
- Much shorter oscillator stabilization time than previous models
- On-board debugging function
- Small package (7mm × 7mm)
- Reduced electromagnetic noise emission and improved noise immunity
- Built-in 32seg × 4com LCD controller/driver (H8/38076R Group only)

Applications Health and beauty equipment, digital consumer products, mobile phones

On-chip high-precision ΔΣ A/D converter Super Low Power

H8/38086R Group

- On-chip high-resolution 14-bit ΔΣ A/D converter
- 1.8V operation on-chip flash memory
- World class low-power MCUs
- Much shorter oscillator stabilization time than previous models
- On-board debugging function
- Small package (7mm × 7mm)
- Reduced electromagnetic noise emission and improved noise immunity
- Built-in 32seg × 4com LCD controller/driver

Applications Health and beauty equipment, scales

80-pin built-in LCD controller/driver Super Low Power

H8/38537 Group

- Built-in 32seg × 4com LCD controller/driver
- Pin and function compatible with the H8/300L Super Low-power H8/38327

Applications Measuring devices, communications equipment

80-pin built-in LCD controller/driver Super Low Power

H8/38524 Group

- Built-in 32seg × 4com LCD controller/driver
- Pin and function compatible with the H8/300L Super Low-power H8/38124

Applications White goods, health and beauty equipment, power meters

32-pin, small Super Low Power

H8/38602R, H8/38606 Group

- 1.8V operation on-chip flash memory
- World class low-power MCUs
- Much shorter oscillator stabilization time than previous models
- On-board debugging function
- Small package (QFN 5 × 6mm, QFP 7 × 7mm)
- On-chip oscillator, power-on reset
- On-chip voltage comparator

Applications Sensor equipment, monitor equipment, and power supply control

100-pin built-in LCD controller/driver Super Low Power

H8/38099, H8/38799 Group

- 1.8V operation on-chip flash memory
- On-board debugging function
- Large capacity memory
- Built-in 40seg × 4com LCD controller/driver (H8/38099 Group only)

Applications Digital consumer applications, industrial scales

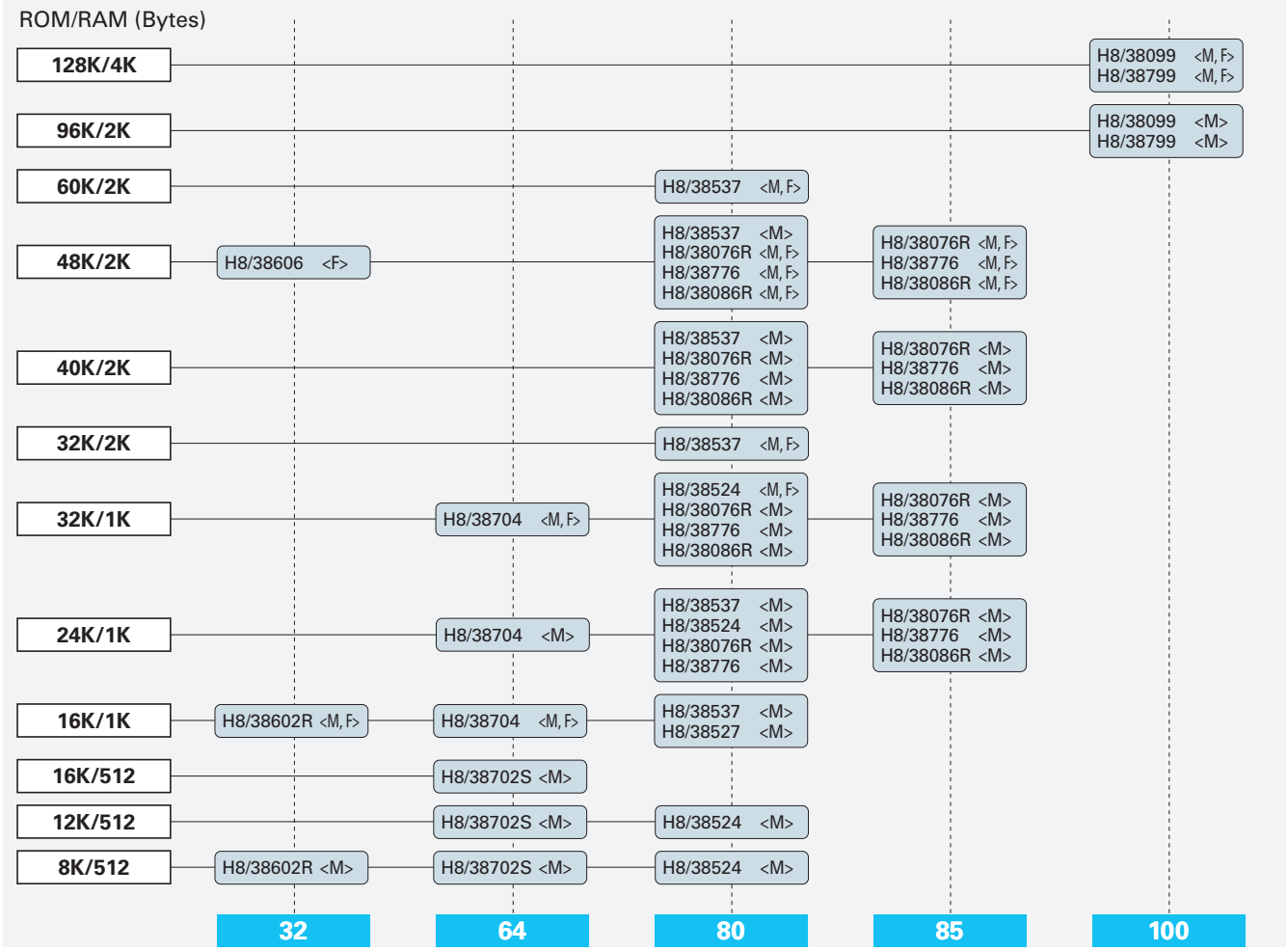
64-pin slim Super Low Power

H8/38704, H8/38702S Group

- The first 2.2V operation flash memory version in the Super Low Power Series.
- World class low power MCUs.
- Oscillation stabilization time reduced to 1/1000 that of previous models.
- Reduced electromagnetic noise emission and improved noise immunity

Applications General battery powered devices (communication devices, health and beauty equipment, digital consumer products)

• Memory Capacity (ROM/RAM) (H8/300H Super Low Power Series)



Letters in brackets < > indicate memory variations.
F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

• Specifications (H8/300H Super Low Power Series)

Group		H8/38099							H8/38799						
Memory	ROM (Bytes)	96K	128K						96K	128K					
	RAM (Bytes)	2K	4K						2K	4K					
	ROM Type*1	M	F			M			M	F			M		
CPU	CPU	H8/300H Core													
	Basic Instructions	62													
	Minimum Instruction Execution Time (ns)	200 (@10MHz)													
Clock	Clock Generation Circuit	2 circuits (System clock, Sub clock)													
	Subclock	Yes													
	RTC	—													
	On-Chip Oscillator	Yes													
	Frequency Divider	Yes													
	Power Save	Active (Medium-speed) /Sub active/Sleep (High-speed) /Sleep (Medium-speed) /Sub sleep/Watch/Standby/Module standby													
Power Supply Voltage Detection	Power-On Reset/POR	Yes													
A/D Converter	Resolution × Channels	10-bit × 8													
	Sample and Hold	Yes													
Timer	8-bit	2 (Timer C, Timer G)													
	14-bit	4 (14-bit PWM)													
	16-bit	4 (Timer F × 1, TPU × 2, AEC × 1)													
	Input Capture	5 (TPU, Timer G)													
	Output Compare	6 (TPU, Timer F)													
	PWM Output	7 (TPU, 14-bit PWM)													
	Event Counter	7 (TPU, Timer C, Timer F, AEC)													
Watchdog Timer		1 (On-chip internal oscillator, available as interval timer)													
Serial Interface	Clock Sync./Clock Async.	3 (SCI3_1, SCI3_2, SCI3_3)													
	Clock Sync. Only	1 (I^2C2)	2 (IIC2, SCI4)			1 (I^2C2)			1 (I^2C2)	2 (I^2C2, SCI4)			1 (I^2C2)		
I^2C-bus		1													
Synchronous Serial Communication Unit/Special Serial I/O		—													
IrDA		Yes (SCI3_1 × 1)													
LCD		40seg × 4com, built-in average voltage circuit for LCD							—						
I/O Ports	Input Only (Numbers)	8													
	CMOS I/O (Numbers)	75													
	High Current Drive Port	4													
	Pull-Up Resistor	26													
External Interrupts Pins		14													
Debugging Function	On-Chip Debug	—	Yes (supports E8 emulator)			—				Yes (supports E8 emulator)			—		
	On-Board Flash Program	—	Yes			—				Yes			—		
Other Functions	Others	RTC (available as a week counter, 8-bit interval timer)													
Operating Frequency/Supply Voltage		4.2MHz/ 1.8 to 3.6V, 10MHz/ 2.7 to 3.6V	10MHz/2.7 to 3.6V			4.2MHz/ 1.8 to 3.6V	4.2MHz/ 1.8 to 3.6V, 10MHz/ 2.7 to 3.6V	10MHz/ 2.7 to 3.6V	4.2MHz/ 1.8 to 3.6V, 10MHz/ 2.7 to 3.6V	10MHz/2.7 to 3.6V			4.2MHz/ 1.8 to 3.6V	4.2MHz/ 1.8 to 3.6V, 10MHz/ 2.7 to 3.6V	10MHz/ 2.7 to 3.6V
Operating Ambient Temperature (°C)		–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75		–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75		–40 to 85
Package*2		PLQP0100KB-A													
Part No.		HD64338098XXXFP	HD64338098XXXFPW	HD64F38099FP10V	HD64F38099FP10WV	HD64F38099FP4V	HD64338099XXXFP	HD64338099XXXFPW	HD64338798XXXFP	HD64338798XXXFPW	HD64F38799FP10V	HD64F38799FP10WV	HD64F38799FP4V	HD64338799XXXFP	HD64338799XXXFPW

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8/300H Super Low Power Series)

Group		H8/38076R																	
Memory	ROM (Bytes)	24K				32K				40K									
	RAM (Bytes)	1K								2K									
	ROM Type*1	M																	
CPU	CPU	H8/300H Core																	
	Basic Instructions	62																	
	Minimum Instruction Execution Time (ns)	200 (@10MHz)																	
Clock	Clock Generation Circuit	2 circuits (System clock, Sub clock)																	
	Subclock	Yes																	
	RTC	—																	
	On-Chip Oscillator	Yes																	
	Frequency Divider	Yes																	
	Power Save	Active (Medium-speed) /Sub active/Sleep (High-speed) /Sleep (Medium-speed) /Sub sleep/Watch/Standby/Module standby																	
Power Supply Voltage Detection	Power-On Reset/POR	Yes																	
A/D Converter	Resolution × Channels	10-bit × 8																	
	Sample and Hold	Yes																	
Timer	8-bit	—																	
	14-bit	2 (14-bit PWM)																	
	16-bit	4 (Timer F × 1, TPU × 2, AEC × 1)																	
	Input Capture	4 (TPU)																	
	Output Compare	6 (TPU, Timer F)																	
	PWM Output	4 (TPU, 14-bit PWM)																	
	Event Counter	6 (TPU, Timer F, AEC)																	
Watchdog Timer		1 (On-chip internal oscillator, available as interval timer)																	
Serial Interface	Clock Sync./Clock Async.	2 (SCI3_1, SCI3_2)																	
	Clock Sync. Only	1 (I^2C2)																	
I^2C-bus		1																	
Synchronous Serial Communication Unit/Special Serial I/O		—																	
IrDA		Yes (SCI3_1 × 1)																	
LCD		32seg × 4com, built-in average voltage circuit for LCD																	
I/O Ports	Input Only (Numbers)	8																	
	CMOS I/O (Numbers)	55																	
	High Current Drive Port	4																	
	Pull-Up Resistor	26																	
External Interrupts Pins		14																	
Debugging Function	On-Chip Debug	—																	
	On-Board Flash Program	—																	
Other Functions	Others	RTC (available as a week counter, 8-bit interval timer)																	
Operating Frequency/Supply Voltage		4.2MHz/ 1.8 to 3.6V, 10MHz/ 2.7 to 3.6V	10MHz/ 2.7 to 3.6V	4.2MHz/ 1.8 to 3.6V, 10MHz/ 2.7 to 3.6V	10MHz/ 2.7 to 3.6V	4.2MHz/ 1.8 to 3.6V, 10MHz/ 2.7 to 3.6V	10MHz/ 2.7 to 3.6V	4.2MHz/ 1.8 to 3.6V, 10MHz/ 2.7 to 3.6V	10MHz/ 2.7 to 3.6V	4.2MHz/ 1.8 to 3.6V, 10MHz/ 2.7 to 3.6V	10MHz/ 2.7 to 3.6V	4.2MHz/ 1.8 to 3.6V, 10MHz/ 2.7 to 3.6V	10MHz/ 2.7 to 3.6V	4.2MHz/ 1.8 to 3.6V, 10MHz/ 2.7 to 3.6V	10MHz/ 2.7 to 3.6V	4.2MHz/ 1.8 to 3.6V, 10MHz/ 2.7 to 3.6V	10MHz/ 2.7 to 3.6V	4.2MHz/ 1.8 to 3.6V, 10MHz/ 2.7 to 3.6V	10MHz/ 2.7 to 3.6V
Operating Ambient Temperature (˚C)		–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85
Package*2		PRQP0080JB-A		PTLG0085JA-A		PTQP0080KC-A		PRQP0080JB-A		PTLG0085JA-A		PTQP0080KC-A		PRQP0080JB-A		PTLG0085JA-A		PTQP0080KC-A	
Part No.		HD64338073RXXXH	HD64338073RXXXHW	HD64338073RXXXLP	HD64338073RXXXLPW	HD64338073RXXXW	HD64338073RXXXWW	HD64338074RXXXH	HD64338074RXXXHW	HD64338074RXXXLP	HD64338074RXXXLPW	HD64338074RXXXW	HD64338074RXXXWW	HD64338075RXXXH	HD64338075RXXXHW	HD64338075RXXXLP	HD64338075RXXXLPW	HD64338075RXXXW	HD64338075RXXXWW

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8/300H Super Low Power Series)

Group		H8/38076R																	
Memory	ROM (Bytes)	48K																	
	RAM (Bytes)	2K																	
	ROM Type*1	F										M							
CPU	CPU	H8/300H Core																	
	Basic Instructions	62																	
	Minimum Instruction Execution Time (ns)	200 (@10MHz)																	
Clock	Clock Generation Circuit	2 circuits (System clock, Sub clock)																	
	Subclock	Yes																	
	RTC	—																	
	On-Chip Oscillator	—										Yes							
	Frequency Divider	Yes																	
	Power Save	Active (Medium-speed) /Sub active/Sleep (High-speed) /Sleep (Medium-speed) /Sub sleep/Watch/Standby/Module standby																	
Power Supply Voltage Detection	Power-On Reset/POR	Yes																	
A/D Converter	Resolution × Channels	10-bit × 8																	
	Sample and Hold	Yes																	
Timer	8-bit	—																	
	14-bit	2 (14-bit PWM)																	
	16-bit	4 (Timer F × 1, TPU × 2, AEC × 1)																	
	Input Capture	4 (TPU)																	
	Output Compare	6 (TPU, Timer F)																	
	PWM Output	4 (TPU, 14-bit PWM)																	
	Event Counter	6 (TPU, Timer F, AEC)																	
Watchdog Timer		1 (On-chip internal oscillator, available as interval timer)																	
Serial Interface	Clock Sync./Clock Async.	2 (SCI3_1, SCI3_2)																	
	Clock Sync. Only	2 (IIC2, SCI4)										1 (I^2C2)							
I^2C-bus		1																	
Synchronous Serial Communication Unit/Special Serial I/O		—																	
IrDA		Yes (SCI3_1 × 1)																	
LCD		32seg × 4com, built-in average voltage circuit for LCD																	
I/O Ports	Input Only (Numbers)	8																	
	CMOS I/O (Numbers)	55																	
	High Current Drive Port	4																	
	Pull-Up Resistor	26																	
External Interrupts Pins		14																	
Debugging Function	On-Chip Debug	Yes (Supports E7, E8 emulator)										—							
	On-Board Flash Program	Yes										—							
Other Functions	Others	RTC (available as a week counter, 8-bit interval timer)																	
Operating Frequency/Supply Voltage		10MHz/2.7 to 3.6V		4.2MHz/1.8 to 3.6V		10MHz/2.7 to 3.6V		4.2MHz/1.8 to 3.6V		10MHz/2.7 to 3.6V		4.2MHz/1.8 to 3.6V		4.2MHz/1.8 to 3.6V, 10MHz/2.7 to 3.6V		10MHz/2.7 to 3.6V		4.2MHz/1.8 to 3.6V, 10MHz/2.7 to 3.6V		10MHz/2.7 to 3.6V		4.2MHz/1.8 to 3.6V, 10MHz/2.7 to 3.6V		10MHz/2.7 to 3.6V	
Operating Ambient Temperature (°C)		–20 to 75	–40 to 85	–20 to 75		–40 to 85		–20 to 75		–40 to 85		–20 to 75		–40 to 85		–20 to 75		–40 to 85		–20 to 75		–40 to 85		–20 to 75	–40 to 85
Package*2		PRQP0080JB-A				PTLG0085JA-A				PTQP0080KC-A				PRQP0080JB-A				PTLG0085JA-A				PTQP0080KC-A			
Part No.		HD64F38076RH10V	HD64F38076RH10WV	HD64F38076RH4V		HD64F38076RLP10V	HD64F38076RLP10WV	HD64F38076RLP4V		HD64F38076RW10V	HD64F38076RW10WV	HD64F38076RW4V		HD64338076RXXXH	HD64338076RXXXHW			HD64338076RXXXLP	HD64338076RXXXLPW			HD64338076RXXXW	HD64338076RXXXWW		

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8/300H Super Low Power Series)

Group		H8/38776																	
Memory	ROM (Bytes)	24K				32K				40K									
	RAM (Bytes)	1K								2K									
	ROM Type*1	M																	
CPU	CPU	H8/300H Core																	
	Basic Instructions	62																	
	Minimum Instruction Execution Time (ns)	200 (@10MHz)																	
Clock	Clock Generation Circuit	2 circuits (System clock, Sub clock)																	
	Subclock	Yes																	
	RTC	—																	
	On-Chip Oscillator	Yes																	
	Frequency Divider	Yes																	
	Power Save	Active (Medium-speed) /Sub active/Sleep (High-speed) /Sleep (Medium-speed) /Sub sleep/Watch/Standby/Module standby																	
Power Supply Voltage Detection	Power-On Reset/POR	Yes																	
A/D Converter	Resolution × Channels	10-bit × 8																	
	Sample and Hold	Yes																	
Timer	8-bit	—																	
	14-bit	2 (14-bit PWM)																	
	16-bit	4 (Timer F × 1, TPU × 2, AEC × 1)																	
	Input Capture	4 (TPU)																	
	Output Compare	6 (TPU, Timer F)																	
	PWM Output	4 (TPU, 14-bit PWM)																	
	Event Counter	6 (TPU, Timer F, AEC)																	
Watchdog Timer		1 (On-chip internal oscillator, available as interval timer)																	
Serial Interface	Clock Sync./Clock Async.	2 (SCI3_1, SCI3_2)																	
	Clock Sync. Only	1 (I^2C2)																	
I^2C-bus		1																	
Synchronous Serial Communication Unit/Special Serial I/O		—																	
IrDA		Yes (SCI3_1 × 1)																	
LCD		—																	
I/O Ports	Input Only (Numbers)	8																	
	CMOS I/O (Numbers)	55																	
	High Current Drive Port	4																	
	Pull-Up Resistor	26																	
External Interrupts Pins		14																	
Debugging Function	On-Chip Debug	—																	
	On-Board Flash Program	—																	
Other Functions	Others	RTC (available as a week counter, 8-bit interval timer)																	
Operating Frequency/Supply Voltage		4.2MHz/ 1.8 to 3.6V, 10MHz/ 2.7 to 3.6V	10MHz/ 2.7 to 3.6V	4.2MHz/ 1.8 to 3.6V, 10MHz/ 2.7 to 3.6V	10MHz/ 2.7 to 3.6V	4.2MHz/ 1.8 to 3.6V, 10MHz/ 2.7 to 3.6V	10MHz/ 2.7 to 3.6V	4.2MHz/ 1.8 to 3.6V, 10MHz/ 2.7 to 3.6V	10MHz/ 2.7 to 3.6V	4.2MHz/ 1.8 to 3.6V, 10MHz/ 2.7 to 3.6V	10MHz/ 2.7 to 3.6V	4.2MHz/ 1.8 to 3.6V, 10MHz/ 2.7 to 3.6V	10MHz/ 2.7 to 3.6V	4.2MHz/ 1.8 to 3.6V, 10MHz/ 2.7 to 3.6V	10MHz/ 2.7 to 3.6V	4.2MHz/ 1.8 to 3.6V, 10MHz/ 2.7 to 3.6V	10MHz/ 2.7 to 3.6V	4.2MHz/ 1.8 to 3.6V, 10MHz/ 2.7 to 3.6V	10MHz/ 2.7 to 3.6V
Operating Ambient Temperature (˚C)		–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85
Package*2		PRQP0080JB-A		PTLG0085JA-A		PTQP0080KC-A		PRQP0080JB-A		PTLG0085JA-A		PTQP0080KC-A		PRQP0080JB-A		PTLG0085JA-A		PTQP0080KC-A	
Part No.		HD64338773XXXHV	HD64338773XXXHWV	HD64338773XXXLPV	HD64338773XXXLPWV	HD64338773XXXWV	HD64338773XXXWWV	HD64338774XXXHV	HD64338774XXXHWV	HD64338774XXXLPV	HD64338774XXXLPWV	HD64338774XXXWV	HD64338774XXXWWV	HD64338775XXXHV	HD64338775XXXHWV	HD64338775XXXLPV	HD64338775XXXLPWV	HD64338775XXXWV	HD64338775XXXWWV

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8/300H Super Low Power Series)

Group		H8/38776															
Memory	ROM (Bytes)	48K															
	RAM (Bytes)	2K															
	ROM Type*1	F								M							
CPU	CPU	H8/300H Core															
	Basic Instructions	62															
	Minimum Instruction Execution Time (ns)	200 (@10MHz)															
Clock	Clock Generation Circuit	2 circuits (System clock, Sub clock)															
	Subclock	Yes															
	RTC	—															
	On-Chip Oscillator	—								Yes							
	Frequency Divider	Yes															
	Power Save	Active (Medium-speed) /Sub active/Sleep (High-speed) /Sleep (Medium-speed) /Sub sleep/Watch/Standby/Module standby															
Power Supply Voltage Detection	Power-On Reset/POR	Yes															
A/D Converter	Resolution × Channels	10-bit × 8															
	Sample and Hold	Yes															
Timer	8-bit	—															
	14-bit	2 (14-bit PWM)															
	16-bit	4 (Timer F × 1, TPU × 2, AEC × 1)															
	Input Capture	4 (TPU)															
	Output Compare	6 (TPU, Timer F)															
	PWM Output	4 (TPU, 14-bit PWM)															
	Event Counter	6 (TPU, Timer F, AEC)															
Watchdog Timer		1 (On-chip internal oscillator, available as interval timer)															
Serial Interface	Clock Sync./Clock Async.	2 (SCI3_1, SCI3_2)															
	Clock Sync. Only	2 (I^2C2, SCI4)								1 (I^2C2)							
I^2C-bus		1															
Synchronous Serial Communication Unit/Special Serial I/O		—															
IrDA		Yes (SCI3_1 × 1)															
LCD		—															
I/O Ports	Input Only (Numbers)	8															
	CMOS I/O (Numbers)	55															
	High Current Drive Port	4															
	Pull-Up Resistor	26															
External Interrupts Pins		14															
Debugging Function	On-Chip Debug	Yes (Supports E7, E8 emulator)								—							
	On-Board Flash Program	Yes								—							
Other Functions	Others	RTC (available as a week counter, 8-bit interval timer)															
Operating Frequency/Supply Voltage		10MHz/2.7 to 3.6V	4.2MHz/1.8 to 3.6V	10MHz/2.7 to 3.6V	4.2MHz/1.8 to 3.6V	10MHz/2.7 to 3.6V	4.2MHz/1.8 to 3.6V	4.2MHz/1.8 to 3.6V, 10MHz/2.7 to 3.6V	10MHz/2.7 to 3.6V	4.2MHz/1.8 to 3.6V, 10MHz/2.7 to 3.6V	10MHz/2.7 to 3.6V	4.2MHz/1.8 to 3.6V, 10MHz/2.7 to 3.6V	10MHz/2.7 to 3.6V				
Operating Ambient Temperature (°C)		–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75			–40 to 85	–20 to 75	–40 to 85	–20 to 75				
Package*2		PRQP0080JB-A		PTLG0085JA-A		PTQP0080KC-A		PRQP0080JB-A		PTLG0085JA-A		PTQP0080KC-A					
Part No.		HD64F38776H10V	HD64F38776H10WV	HD64F38776H4V	HD64F38776LP10V	HD64F38776LP10WV	HD64F38776LP4V	HD64F38776W10V	HD64F38776W10WV	HD64F38776W4V	HD64338776XXXHV	HD64338776XXXHWV	HD64338776XXXLPV	HD64338776XXXLPWV	HD64338776XXXWV	HD64338776XXXWWV	

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8/300H Super Low Power Series)

Group		H8/38086R																	
Memory	ROM (Bytes)	24K		32K								40K							
	RAM (Bytes)	1K										2K							
	ROM Type*1	M																	
CPU	CPU	H8/300H Core																	
	Basic Instructions	62																	
	Minimum Instruction Execution Time (ns)	200 (@10MHz)																	
Clock	Clock Generation Circuit	2 circuits (System clock, Sub clock)																	
	Subclock	Yes																	
	RTC	—																	
	On-Chip Oscillator	Yes																	
	Frequency Divider	Yes																	
	Power Save	Active (Medium-speed) /Sub active/Sleep (High-speed) /Sleep (Medium-speed) /Sub sleep/Watch/Standby/Module standby																	
Power Supply Voltage Detection	Power-On Reset/POR	Yes																	
A/D Converter	Resolution × Channels	10-bit × 3, 14-bit ΔΣ × 2																	
	Sample and Hold	Yes																	
Timer	8-bit	—																	
	14-bit	2 (14-bit PWM)																	
	16-bit	4 (Timer F × 1, TPU × 2, AEC × 1)																	
	Input Capture	4 (TPU)																	
	Output Compare	6 (TPU, Timer F)																	
	PWM Output	4 (TPU, 14-bit PWM)																	
	Event Counter	6 (TPU, Timer F, AEC)																	
Watchdog Timer		1 (On-chip internal oscillator, available as interval timer)																	
Serial Interface	Clock Sync./Clock Async.	2 (SCI3_1, SCI3_2)																	
	Clock Sync. Only	1 (I^2C2)																	
I^2C-bus		1																	
Synchronous Serial Communication Unit/Special Serial I/O		—																	
IrDA		Yes (SCI3_1 × 1)																	
LCD		32seg × 4com, built-in average voltage circuit for LCD																	
I/O Ports	Input Only (Numbers)	6																	
	CMOS I/O (Numbers)	55																	
	High Current Drive Port	4																	
	Pull-Up Resistor	26																	
External Interrupts Pins		14																	
Debugging Function	On-Chip Debug	—																	
	On-Board Flash Program	—																	
Other Functions	Others	RTC (available as a week counter, 8-bit interval timer)																	
Operating Frequency/Supply Voltage		4.2MHz/ 1.8 to 3.6V, 10MHz/ 2.7 to 3.6V	10MHz/ 2.7 to 3.6V	4.2MHz/ 1.8 to 3.6V, 10MHz/ 2.7 to 3.6V	10MHz/ 2.7 to 3.6V	4.2MHz/ 1.8 to 3.6V, 10MHz/ 2.7 to 3.6V	10MHz/ 2.7 to 3.6V	4.2MHz/ 1.8 to 3.6V, 10MHz/ 2.7 to 3.6V	10MHz/ 2.7 to 3.6V	4.2MHz/ 1.8 to 3.6V, 10MHz/ 2.7 to 3.6V	10MHz/ 2.7 to 3.6V	4.2MHz/ 1.8 to 3.6V, 10MHz/ 2.7 to 3.6V	10MHz/ 2.7 to 3.6V	4.2MHz/ 1.8 to 3.6V, 10MHz/ 2.7 to 3.6V	10MHz/ 2.7 to 3.6V	4.2MHz/ 1.8 to 3.6V, 10MHz/ 2.7 to 3.6V	10MHz/ 2.7 to 3.6V
Operating Ambient Temperature (˚C)		–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85
Package*2		PTLG0085JA-A		PRQP0080JB-A		PTLG0085JA-A		PTQP0080KC-A		PRQP0080JB-A		PTLG0085JA-A		PTQP0080KC-A					
Part No.		HD6438083RXXXLP	HD6438083RXXXLPW	HD6438084RXXXH	HD6438084RXXXHW	HD6438084RXXXLP	HD6438084RXXXLPW	HD6438084RXXXW	HD6438084RXXXWW	HD6438085RXXXH	HD6438085RXXXHW	HD6438085RXXXLP	HD6438085RXXXLPW	HD6438085RXXXW	HD6438085RXXXWW				

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8/300H Super Low Power Series)

Group		H8/38086R																	
Memory	ROM (Bytes)	48K																	
	RAM (Bytes)	2K																	
	ROM Type*1	F										M							
CPU	CPU	H8/300H Core																	
	Basic Instructions	62																	
	Minimum Instruction Execution Time (ns)	200 (@10MHz)																	
Clock	Clock Generation Circuit	2 circuits (System clock, Sub clock)																	
	Subclock	Yes																	
	RTC	—																	
	On-Chip Oscillator	—										Yes							
	Frequency Divider	Yes																	
	Power Save	Active (Medium-speed) /Sub active/Sleep (High-speed) /Sleep (Medium-speed) /Sub sleep/Watch/Standby/Module standby																	
Power Supply Voltage Detection	Power-On Reset/POR	Yes																	
A/D Converter	Resolution × Channels	10-bit × 3, 14-bit ΔΣ × 2																	
	Sample and Hold	Yes																	
Timer	8-bit	—																	
	14-bit	2 (14-bit PWM)																	
	16-bit	4 (Timer F × 1, TPU × 2, AEC × 1)																	
	Input Capture	4 (TPU)																	
	Output Compare	6 (TPU, Timer F)																	
	PWM Output	4 (TPU, 14-bit PWM)																	
	Event Counter	6 (TPU, Timer F, AEC)																	
Watchdog Timer		1 (On-chip internal oscillator, available as interval timer)																	
Serial Interface	Clock Sync./Clock Async.	2 (SCI3_1, SCI3_2)																	
	Clock Sync. Only	2 (IIC2, SCI4)										1 (I^2C2)							
I^2C-bus		1																	
Synchronous Serial Communication Unit/Special Serial I/O		—																	
IrDA		Yes (SCI3_1 × 1)																	
LCD		32seg × 4com, built-in average voltage circuit for LCD																	
I/O Ports	Input Only (Numbers)	6																	
	CMOS I/O (Numbers)	55																	
	High Current Drive Port	4																	
	Pull-Up Resistor	26																	
External Interrupts Pins		14																	
Debugging Function	On-Chip Debug	Yes (Supports E7, E8 emulator)										—							
	On-Board Flash Program	Yes										—							
Other Functions	Others	RTC (available as a week counter, 8-bit interval timer)																	
Operating Frequency/Supply Voltage		10MHz/2.7 to 3.6V		4.2MHz/1.8 to 3.6V		10MHz/2.7 to 3.6V		4.2MHz/1.8 to 3.6V		10MHz/2.7 to 3.6V		4.2MHz/1.8 to 3.6V	4.2MHz/1.8 to 3.6V, 10MHz/2.7 to 3.6V	10MHz/2.7 to 3.6V	4.2MHz/1.8 to 3.6V, 10MHz/2.7 to 3.6V	10MHz/2.7 to 3.6V	4.2MHz/1.8 to 3.6V, 10MHz/2.7 to 3.6V	10MHz/2.7 to 3.6V
Operating Ambient Temperature (˚C)		–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85
Package*2		PRQP0080JB-A			PTLG0085JA-A			PTQP0080KC-A			PRQP0080JB-A		PTLG0085JA-A		PTQP0080KC-A				
Part No.		HD64F38086RH10V	HD64F38086RH10WV	HD64F38086RH4V	HD64F38086RLP10V	HD64F38086RLP10WV	HD64F38086RLP4V	HD64F38086RW10V	HD64F38086RW10WV	HD64F38086RW4V	HD64338086RXXXH	HD64338086RXXXHW	HD64338086RXXXLP	HD64338086RXXXLPW	HD64338086RXXXW	HD64338086RXXXWW			

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8/300H Super Low Power Series)

Group		H8/38602R																	
Memory	ROM (Bytes)	8K				16K													
	RAM (Bytes)	512				1K													
	ROM Type*1	M				F										M			
CPU	CPU	H8/300H Core																	
	Basic Instructions	62																	
	Minimum Instruction Execution Time (ns)	200 (@10MHz)																	
Clock	Clock Generation Circuit	2 circuits (System clock, Sub clock)																	
	Subclock	Yes																	
	RTC	—																	
	On-Chip Oscillator	Yes																	
	Frequency Divider	Yes																	
	Power Save	Active (Medium-speed) /Sub active/Sleep (High-speed) /Sleep (Medium-speed) /Sub sleep/Watch/Standby/Module standby																	
Power Supply Voltage Detection	Power-On Reset/POR	Yes																	
A/D Converter	Resolution × Channels	10-bit × 6																	
	Sample and Hold	Yes																	
Timer	8-bit	1 (Timer B1)																	
	14-bit	—																	
	16-bit	2 (Timer W, AEC)																	
	Input Capture	4 (Timer W)																	
	Output Compare	4 (Timer W)																	
	PWM Output	4 (Timer W, AEC)																	
	Event Counter	3 (Timer W, AEC)																	
Watchdog Timer		1 (On-chip internal oscillator, available as interval timer)																	
Serial Interface	Clock Sync./Clock Async.	1 (SCI3)																	
	Clock Sync. Only	1 (I^2C2/SSU)																	
I^2C-bus		1																	
Synchronous Serial Communication Unit/Special Serial I/O		1																	
IrDA		Yes (SCI3 × 1)																	
LCD		—																	
I/O Ports	Input Only (Numbers)	6																	
	CMOS I/O (Numbers)	13																	
	High Current Drive Port	3																	
	Pull-Up Resistor	13																	
External Interrupts Pins		3																	
Debugging Function	On-Chip Debug	—				Yes (Supports E7, E8 emulator)										—			
	On-Board Flash Program	—				Yes										—			
Other Functions	Others	Comparator × 2, RTC (available as a week counter, 8-bit interval timer)																	
Operating Frequency/Supply Voltage		4.2MHz/ 1.8 to 3.6V, 10MHz/ 2.7 to 3.6V, 32.768kHz/ 1.8 to 3.6V	10MHz/ 2.7 to 3.6V, 32.768kHz/ 1.8 to 3.6V	4.2MHz/ 1.8 to 3.6V, 10MHz/ 2.7 to 3.6V, 32.768kHz/ 1.8 to 3.6V	10MHz/2.7 to 3.6V, 32.768kHz/1.8 to 3.6V			4.2MHz/1.8 to 3.6V, 32.768kHz/1.8 to 3.6V	10MHz/ 2.7 to 3.6V, 32.768kHz/ 1.8 to 3.6V		4.2MHz/1.8 to 3.6V, 32.768kHz/1.8 to 3.6V	4.2MHz/ 1.8 to 3.6V, 10MHz/ 2.7 to 3.6V, 32.768kHz/ 1.8 to 3.6V	10MHz/ 2.7 to 3.6V, 32.768kHz/ 1.8 to 3.6V	4.2MHz/ 1.8 to 3.6V, 10MHz/ 2.7 to 3.6V, 32.768kHz/ 1.8 to 3.6V	10MHz/ 2.7 to 3.6V, 32.768kHz/ 1.8 to 3.6V
Operating Ambient Temperature (°C)		–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75		–40 to 85	–20 to 75		–40 to 85	–20 to 75		–40 to 85	–20 to 75		–40 to 85
Package*2		PLQP0032GB-A		PVQN0032KA-A		PLQP0032GB-A		PVQN0032KA-A			PLQP0032GB-A			PVQN0032KA-A					
Part No.		HD64338600RXXXFHV	HD64338600RXXXFHWV	HD64338600RXXXFTV	HD64338600RXXXFTWV	HD64F38602RFH10V	HD64F38602RFH10WV	HD64F38602RFH4V	HD64F38602RFT10V	HD64F38602RFT10WV	HD64F38602RFT4V	HD64338602RXXXFHV	HD64338602RXXXFHWV	HD64338602RXXXFTV	HD64338602RXXXFTWV				

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8/300H Super Low Power Series)

Group		H8/38704																				
Memory	ROM (Bytes)	16K															24K					
	RAM (Bytes)	1K																				
	ROM Type*1	F									M											
CPU	CPU	H8/300H Core																				
	Basic Instructions	62																				
	Minimum Instruction Execution Time (ns)	400 (@5MHz)																				
Clock	Clock Generation Circuit	2 circuits																				
	Subclock	Yes																				
	RTC	—																				
	On-Chip Oscillator	—																				
	Frequency Divider	1/n (n = 16, 32, 64, 128)																				
	Power Save	Medium-speed/Sub active/Sleep/Sub sleep/Watch/Standby/Module standby																				
Power Supply Voltage Detection	Power-On Reset/POR	—																				
A/D Converter	Resolution × Channels	10-bit × 4																				
	Sample and Hold	Yes																				
Timer	8-bit	1 (Timer A)																				
	14-bit	—																				
	16-bit	2 (Timer F, AEC)																				
	Input Capture	—																				
	Output Compare	2 (Timer F)																				
	PWM Output	2 (10-bit PWM)																				
	Event Counter	4 (Timer F, AEC)																				
Watchdog Timer		1																				
Serial Interface	Clock Sync./Clock Async.	1 (SCI3)																				
	Clock Sync. Only	—																				
I²C-bus		—																				
Synchronous Serial Communication Unit/Special Serial I/O		—																				
IrDA		—																				
LCD		—																				
I/O Ports	Input Only (Numbers)	5																				
	CMOS I/O (Numbers)	39																				
	High Current Drive Port	6																				
	Pull-Up Resistor	23																				
External Interrupts Pins		11																				
Debugging Function	On-Chip Debug	Yes									—											
	On-Board Flash Program	Yes									—											
Other Functions	Others	Oscillation Stable Time Shortening Circuit																				
Operating Frequency/Supply Voltage		2MHz/2.2 to 3.6V	5MHz/2.7 to 3.6V	2MHz/2.2 to 3.6V		5MHz/2.7 to 3.6V	2MHz/2.2 to 3.6V		5MHz/2.7 to 3.6V	2MHz/2.2 to 3.6V	2MHz/1.8 to 3.6V, 5MHz/2.7 to 3.6V											
Operating Ambient Temperature (˚C)		–20 to 75	–40 to 85	–20 to 75		–40 to 85	–20 to 75		–40 to 85	–20 to 75		–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85
Package*2		PLQP0064KC-A			PVQN0064LB-A			PRQP0064GB-A			PLQP0064KC-A		PVQN0064LB-A		PRQP0064GB-A		PLQP0064KC-A		PVQN0064LB-A		PRQP0064GB-A	
Part No.		HD64F38702FP10V	HD64F38702FP10WV	HD64F38702FP4V	HD64F38702FT10V	HD64F38702FT10WV	HD64F38702FT4V	HD64F38702H10V	HD64F38702H10WV	HD64F38702H4V	HD64338702XXXFP	HD64338702XXXFPW	HD64338702XXXFT	HD64338702XXXFTW	HD64338702XXXH	HD64338702XXXHW	HD64338703XXXFP	HD64338703XXXFPW	HD64338703XXXFT	HD64338703XXXFTW	HD64338703XXXH	HD64338703XXXHW

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8/300H Super Low Power Series)

Group		H8/38704																	
Memory	ROM (Bytes)	32K																	
	RAM (Bytes)	1K																	
	ROM Type*1	F												M					
CPU	CPU	H8/300H Core																	
	Basic Instructions	62																	
	Minimum Instruction Execution Time (ns)	400 (@5MHz)																	
Clock	Clock Generation Circuit	2 circuits																	
	Subclock	Yes																	
	RTC	—																	
	On-Chip Oscillator	—																	
	Frequency Divider	1/n (n = 16, 32, 64, 128)																	
	Power Save	Medium-speed/Sub active/Sleep/Sub sleep/Watch/Standby/Module standby																	
Power Supply Voltage Detection	Power-On Reset/POR	—																	
A/D Converter	Resolution × Channels	10-bit × 4																	
	Sample and Hold	Yes																	
Timer	8-bit	1 (Timer A)																	
	14-bit	—																	
	16-bit	2 (Timer F, AEC)																	
	Input Capture	—																	
	Output Compare	2 (Timer F)																	
	PWM Output	2 (10-bit PWM)																	
	Event Counter	4 (Timer F, AEC)																	
Watchdog Timer		1																	
Serial Interface	Clock Sync./Clock Async.	1 (SCI3)																	
	Clock Sync. Only	—																	
I^2C-bus		—																	
Synchronous Serial Communication Unit/Special Serial I/O		—																	
IrDA		—																	
LCD		—																	
I/O Ports	Input Only (Numbers)	5																	
	CMOS I/O (Numbers)	39																	
	High Current Drive Port	6																	
	Pull-Up Resistor	23																	
External Interrupts Pins		11																	
Debugging Function	On-Chip Debug	Yes												—					
	On-Board Flash Program	Yes												—					
Other Functions	Others	Oscillation Stable Time Shortening Circuit																	
Operating Frequency/Supply Voltage		2MHz/2.2 to 3.6V	5MHz/2.7 to 3.6V	2MHz/2.2 to 3.6V		5MHz/2.7 to 3.6V	2MHz/2.2 to 3.6V		5MHz/2.7 to 3.6V	2MHz/2.2 to 3.6V		2MHz/1.8 to 3.6V, 5MHz/2.7 to 3.6V						
Operating Ambient Temperature (°C)		–20 to 75	–40 to 85	–20 to 75		–40 to 85	–20 to 75		–40 to 85	–20 to 75		–40 to 85		–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85
Package*2		PLQP0064KC-A		PVQN0064LB-A			PRQP0064GB-A			PLQP0064KC-A		PVQN0064LB-A			PRQP0064GB-A				
Part No.		HD64F38704FP10V	HD64F38704FP10WV	HD64F38704FP4V	HD64F38704FT10V	HD64F38704FT10WV	HD64F38704FT4V	HD64F38704H10V	HD64F38704H10WV	HD64F38704H4V	HD64338704XXXFP	HD64338704XXXFPW	HD64338704XXXFT	HD64338704XXXFTW	HD64338704XXXH	HD64338704XXXHW			

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8/300H Super Low Power Series)

Group		H8/38702S											
Memory	ROM (Bytes)	8K				12K				16K			
	RAM (Bytes)	512											
	ROM Type*1	M											
CPU	CPU	H8/300H Core											
	Basic Instructions	62											
	Minimum Instruction Execution Time (ns)	400 (@5MHz)											
Clock	Clock Generation Circuit	2 circuits											
	Subclock	Yes											
	RTC	—											
	On-Chip Oscillator	—											
	Frequency Divider	1/n (n = 16, 32, 64, 128)											
	Power Save	Medium-speed/Sub active/Sleep/Sub sleep/Watch/Standby/Module standby											
Power Supply Voltage Detection	Power-On Reset/POR	—											
A/D Converter	Resolution × Channels	10-bit × 4											
	Sample and Hold	Yes											
Timer	8-bit	1 (Timer A)											
	14-bit	—											
	16-bit	2 (Timer F, AEC)											
	Input Capture	—											
	Output Compare	2 (Timer F)											
	PWM Output	2 (10-bit PWM)											
	Event Counter	4 (Timer F, AEC)											
Watchdog Timer		1											
Serial Interface	Clock Sync./Clock Async.	1 (SCI3)											
	Clock Sync. Only	—											
I²C-bus		—											
Synchronous Serial Communication Unit/Special Serial I/O		—											
IrDA		—											
LCD		—											
I/O Ports	Input Only (Numbers)	5											
	CMOS I/O (Numbers)	39											
	High Current Drive Port	6											
	Pull-Up Resistor	23											
External Interrupts Pins		11											
Debugging Function	On-Chip Debug	Yes (using H8/38704F)											
	On-Board Flash Program	—											
Other Functions	Others	Oscillation Stable Time Shortening Circuit											
Operating Frequency/Supply Voltage		2MHz/1.8 to 3.6V, 5MHz/2.7 to 3.6V											
Operating Ambient Temperature (˚C)		–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85
Package*2		PVQN0064LB-A		PLQP0064KB-A		PVQN0064LB-A		PLQP0064KB-A		PVQN0064LB-A		PLQP0064KB-A	
Part No.		HD64338700SXXXFTV	HD64338700SXXXFTWV	HD64338700SXXXFZV	HD64338700SXXXFZWV	HD64338701SXXXFTV	HD64338701SXXXFTWV	HD64338701SXXXFZV	HD64338701SXXXFZWV	HD64338702SXXXFTV	HD64338702SXXXFTWV	HD64338702SXXXFZV	HD64338702SXXXFZWV

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8/300H Super Low Power Series)

Group		H8/38524											
Memory	ROM (Bytes)	8K				12K				16K			
	RAM (Bytes)	512								1K			
	ROM Type*1	M											
CPU	CPU	H8/300H Core											
	Basic Instructions	62											
	Minimum Instruction Execution Time (ns)	200 (@10MHz)											
Clock	Clock Generation Circuit	3 circuits											
	Subclock	Yes											
	RTC	—											
	On-Chip Oscillator	Yes											
	Frequency Divider	1/n (n = 16, 32, 64, 128)											
	Power Save	Medium-speed/Sub active/Sleep/Sub sleep/Watch/Standby/Module standby											
Power Supply Voltage Detection	Power-On Reset/POR	Yes											
A/D Converter	Resolution × Channels	10-bit × 8											
	Sample and Hold	Yes											
Timer	8-bit	3 (Timer A, Timer C, Timer G)											
	14-bit	—											
	16-bit	2 (Timer F, AEC)											
	Input Capture	1 (Timer G)											
	Output Compare	2 (Timer F)											
	PWM Output	2 (10-bit PWM, AEC)											
	Event Counter	5 (Timer C, Timer F, AEC)											
Watchdog Timer		1 (Possible to Select Built in Oscillator)											
Serial Interface	Clock Sync./Clock Async.	1 (SCI3)											
	Clock Sync. Only	—											
I^2C-bus		—											
Synchronous Serial Communication Unit/Special Serial I/O		—											
IrDA		—											
LCD		32seg × 4com											
I/O Ports	Input Only (Numbers)	9											
	CMOS I/O (Numbers)	50											
	High Current Drive Port	14											
	Pull-Up Resistor	28											
External Interrupts Pins		13											
Debugging Function	On-Chip Debug	—											
	On-Board Flash Program	—											
Other Functions	Others	—											
Operating Frequency/Supply Voltage		10MHz/2.7 to 5.5V											
Operating Ambient Temperature (°C)		–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85
Package*2		PRQP0080JB-A		PTQP0080KC-A		PRQP0080JB-A		PTQP0080KC-A		PRQP0080JB-A		PTQP0080KC-A	
Part No.		HD64338520XXXHV	HD64338520XXXHWV	HD64338520XXXWV	HD64338520XXXWWV	HD64338521XXXHV	HD64338521XXXHWV	HD64338521XXXWV	HD64338521XXXWWV	HD64338522XXXHV	HD64338522XXXHWV	HD64338522XXXWV	HD64338522XXXWWV

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8/300H Super Low Power Series)

Group		H8/38524											
Memory	ROM (Bytes)	24K				32K							
	RAM (Bytes)	1K											
	ROM Type*1	M				F				M			
CPU	CPU	H8/300H Core											
	Basic Instructions	62											
	Minimum Instruction Execution Time (ns)	200 (@10MHz)											
Clock	Clock Generation Circuit	3 circuits											
	Subclock	Yes											
	RTC	—											
	On-Chip Oscillator	Yes											
	Frequency Divider	1/n (n = 16, 32, 64, 128)											
	Power Save	Medium-speed/Sub active/Sleep/Sub sleep/Watch/Standby/Module standby											
Power Supply Voltage Detection	Power-On Reset/POR	Yes											
A/D Converter	Resolution × Channels	10-bit × 8											
	Sample and Hold	Yes											
Timer	8-bit	3 (Timer A, Timer C, Timer G)											
	14-bit	—											
	16-bit	2 (Timer F, AEC)											
	Input Capture	1 (Timer G)											
	Output Compare	2 (Timer F)											
	PWM Output	2 (10-bit PWM, AEC)											
	Event Counter	5 (Timer C, Timer F, AEC)											
Watchdog Timer		1 (Possible to Select Built in Oscillator)											
Serial Interface	Clock Sync./Clock Async.	1 (SCI3)											
	Clock Sync. Only	—											
I²C-bus		—											
Synchronous Serial Communication Unit/Special Serial I/O		—											
IrDA		—											
LCD		32seg × 4com											
I/O Ports	Input Only (Numbers)	9											
	CMOS I/O (Numbers)	50											
	High Current Drive Port	14											
	Pull-Up Resistor	28											
External Interrupts Pins		13											
Debugging Function	On-Chip Debug	—				Yes				—			
	On-Board Flash Program	—				Yes				—			
Other Functions	Others	—											
Operating Frequency/Supply Voltage		10MHz/2.7 to 5.5V											
Operating Ambient Temperature (˚C)		–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85
Package*2		PRQP0080JB-A		PTQP0080KC-A		PRQP0080JB-A		PTQP0080KC-A		PRQP0080JB-A		PTQP0080KC-A	
Part No.		HD64338523XXXHV	HD64338523XXXHWV	HD64338523XXXWV	HD64338523XXXWWV	HD64F38524HV	HD64F38524HWV	HD64F38524WV	HD64F38524WWV	HD64338524XXXHV	HD64338524XXXHWV	HD64338524XXXWV	HD64338524XXXWWV

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8/300H Super Low Power Series)

Group		H8/38537																	
Memory	ROM (Bytes)	16K				24K				32K									
	RAM (Bytes)	1K				1K				2K									
	ROM Type*1	M				M				F				M					
CPU	CPU	H8/300H Core																	
	Basic Instructions	62																	
	Minimum Instruction Execution Time (ns)	250 (@8MHz)																	
Clock	Clock Generation Circuit	2 circuits																	
	Subclock	Yes																	
	RTC	—																	
	On-Chip Oscillator	—																	
	Frequency Divider	1/n (n = 16, 32, 64, 128)																	
	Power Save	Medium-speed/Sub active/Sleep/Sub sleep/Watch/Standby/Module standby																	
Power Supply Voltage Detection	Power-On Reset/POR	—																	
A/D Converter	Resolution × Channels	10-bit × 8																	
	Sample and Hold	Yes																	
Timer	8-bit	3 (Timer A, Timer C, Timer G)																	
	14-bit	1 (14-bit PWM)																	
	16-bit	2 (Timer F, AEC)																	
	Input Capture	1 (Timer G)																	
	Output Compare	2 (Timer F)																	
	PWM Output	1 (14-bit PWM)																	
	Event Counter	5 (Timer C, Timer F, AEC)																	
Watchdog Timer		1																	
Serial Interface	Clock Sync./Clock Async.	2 (SCI3)																	
	Clock Sync. Only	—																	
I²C-bus		—																	
Synchronous Serial Communication Unit/Special Serial I/O		—																	
IrDA		—																	
LCD		32seg × 4com																	
I/O Ports	Input Only (Numbers)	9																	
	CMOS I/O (Numbers)	55																	
	High Current Drive Port	8																	
	Pull-Up Resistor	32																	
External Interrupts Pins		13																	
Debugging Function	On-Chip Debug	—								Yes				—					
	On-Board Flash Program	—								Yes				—					
Other Functions	Others	Oscillation Stable Time Shortening Circuit																	
Operating Frequency/Supply Voltage		8MHz/2.7 to 5.5V																	
Operating Ambient Temperature (˚C)		–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85
Package*2		PRQP0080JB-A		PTQP0080KC-A		PRQP0080JB-A		PTQP0080KC-A		PRQP0080JB-A		PTQP0080KC-A		PRQP0080JB-A		PTQP0080KC-A			
Part No.		HD64338532XXXHV	HD64338532XXXHWV	HD64338532XXXWV	HD64338532XXXWWV	HD64338533XXXHV	HD64338533XXXHWV	HD64338533XXXWV	HD64338533XXXWWV	HD64F38534HV	HD64F38534HWV	HD64F38534WV	HD64F38534WWV	HD64338534XXXHV	HD64338534XXXHWV	HD64338534XXXWV	HD64338534XXXWWV		

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8/300H Super Low Power Series)

Group		H8/38537																	
Memory	ROM (Bytes)	40K				48K				60K									
	RAM (Bytes)	2K																	
	ROM Type*1	M								F				M					
CPU	CPU	H8/300H Core																	
	Basic Instructions	62																	
	Minimum Instruction Execution Time (ns)	250 (@8MHz)																	
Clock	Clock Generation Circuit	2 circuits																	
	Subclock	Yes																	
	RTC	—																	
	On-Chip Oscillator	—																	
	Frequency Divider	1/n (n = 16, 32, 64, 128)																	
	Power Save	Medium-speed/Sub active/Sleep/Sub sleep/Watch/Standby/Module standby																	
Power Supply Voltage Detection	Power-On Reset/POR	—																	
A/D Converter	Resolution × Channels	10-bit × 8																	
	Sample and Hold	Yes																	
Timer	8-bit	3 (Timer A, Timer C, Timer G)																	
	14-bit	1 (14-bit PWM)																	
	16-bit	2 (Timer F, AEC)																	
	Input Capture	1 (Timer G)																	
	Output Compare	2 (Timer F)																	
	PWM Output	1 (14-bit PWM)																	
	Event Counter	5 (Timer C, Timer F, AEC)																	
Watchdog Timer		1																	
Serial Interface	Clock Sync./Clock Async.	2 (SCI3)																	
	Clock Sync. Only	—																	
I²C-bus		—																	
Synchronous Serial Communication Unit/Special Serial I/O		—																	
IrDA		—																	
LCD		32seg × 4com																	
I/O Ports	Input Only (Numbers)	9																	
	CMOS I/O (Numbers)	55																	
	High Current Drive Port	8																	
	Pull-Up Resistor	32																	
External Interrupts Pins		13																	
Debugging Function	On-Chip Debug	—								Yes				—					
	On-Board Flash Program	—								Yes				—					
Other Functions	Others	Oscillation Stable Time Shortening Circuit																	
Operating Frequency/Supply Voltage		8MHz/2.7 to 5.5V																	
Operating Ambient Temperature (˚C)		–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85
Package*2		PRQP0080JB-A		PTQP0080KC-A		PRQP0080JB-A		PTQP0080KC-A		PRQP0080JB-A		PTQP0080KC-A		PRQP0080JB-A		PTQP0080KC-A			
Part No.		HD64338535XXXHV	HD64338535XXXHWV	HD64338535XXXWV	HD64338535XXXWWV	HD64338536XXXHV	HD64338536XXXHWV	HD64338536XXXWV	HD64338536XXXWWV	HD64F38537HV	HD64F38537HWV	HD64F38537WV	HD64F38537WWV	HD64338537XXXHV	HD64338537XXXHWV	HD64338537XXXWV	HD64338537XXXWWV		

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

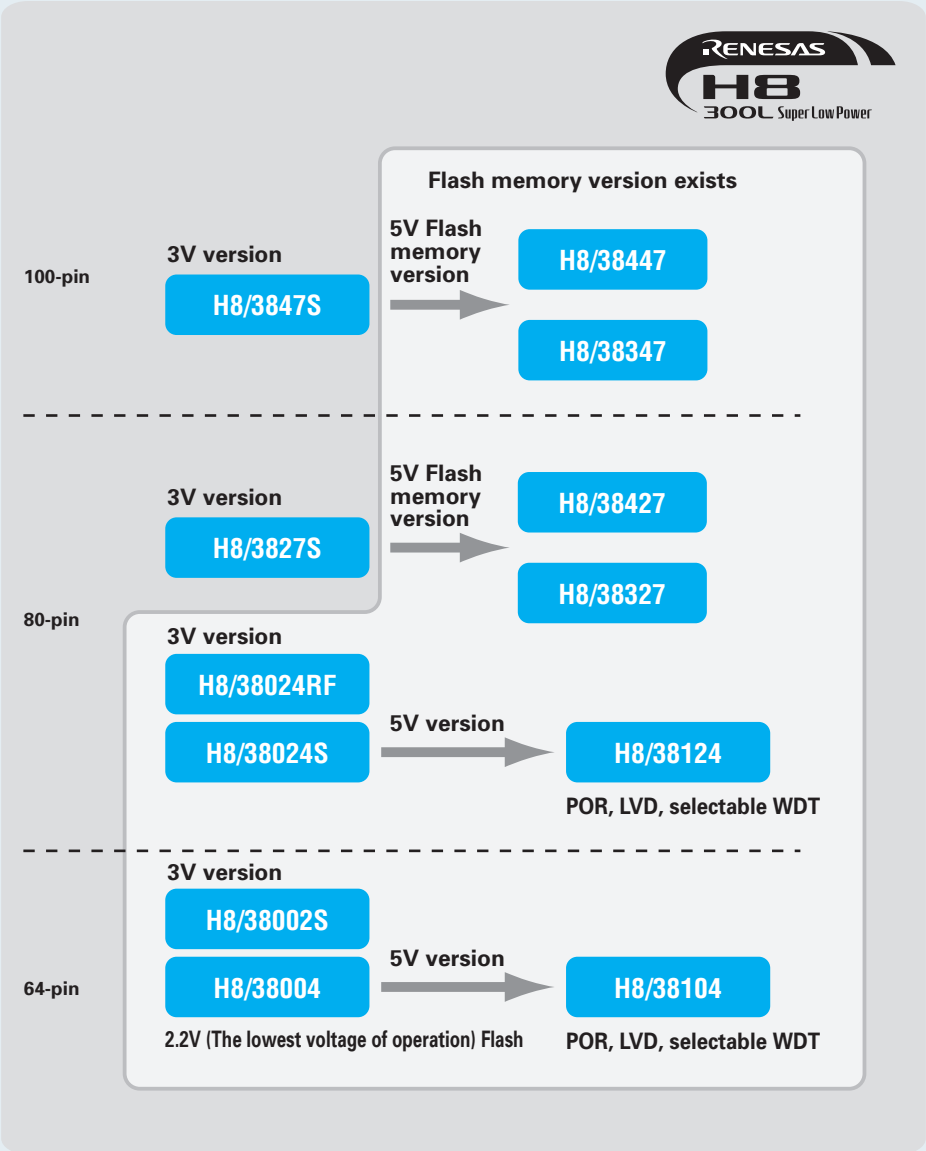
8-bit single-chip MCUs designed for consumer products and communications equipment

H8/300L Super Low Power Series Features

- Low power consumption and low-voltage operation
- Employs the H8/300L CPU
- Complete instruction set compatibility with the H8/300 CPU, allowing effective utilization of software resources
- Minimum instruction execution time: 0.4µs (f = 10MHz)
  - 8-bit and 16-bit addition and subtraction: 0.4µs
  - 8-bit × 8-bit multiplication: 2.8µs
  - 16-bit ÷ 8-bit division: 2.8µs
- On-chip peripheral functions suitable for the consumer product and communications equipment fields
- LCD controller/driver
- Flash memory
- Power-on reset, low-voltage detection circuit
- On-chip debugger

• H8/300L Super Low Power Series Roadmap

For LCD control and general control applications



Flash memory versions support on-chip emulator (E8a).

64-pin, 5V Super Low Power

H8/38104 Group

- On-chip flash memory and 5V operation
- World-class low-power MCUs
- Power-on reset
- Low-voltage detector
- Selectable WDT
- Reduced electromagnetic noise and improved noise immunity

Applications White goods, portable communication devices, health and beauty equipment, power meters

H8/38124 Group

- On-chip flash memory and 5V operation
- World-class low-power MCUs
- Power-on reset
- Low-voltage detector
- Selectable WDT
- Reduced electromagnetic noise and improved noise immunity
- Built-in 32seg × 4com LCD controller/driver

Applications White goods, portable communication devices, health and beauty equipment, power meters

H8/38327, H8/38427 Group

- Successor to H8/3867, H8/3827, H8/3827R group
- Support flash memory versions
- ROM: 16K to 60K
- On-chip debugger
- 80-pin serial 2ch
- H8/38427 group supports E6000 (full ICE) emulator
- Built-in 32seg × 4com LCD controller/driver

Applications Measuring devices, communications equipment

H8/38347, H8/38447 Group

- Successor to H8/3887, H8/3847, H8/3847R group
- Support flash memory versions
- ROM: 16K to 60K
- On-chip debugger
- 100-pin serial 3ch
- H8/38447 group supports E6000 (full ICE) emulator
- Built-in 40seg × 4com LCD controller/driver

Applications Industrial scales

Slim 64-pin MCUs with super low power requirements

H8/38004, H8/38002S Group

- First in the Super Low Power series with on-chip flash memory and 2.2V operation
- World-class low-power MCUs
- Oscillator stabilization time reduced to 1/1,000 that of previous models
- Reduced electromagnetic noise emission and improved noise immunity
- Built-in 25seg × 4com LCD controller/driver

Applications General battery powered devices (communication devices, health and beauty equipment, digital consumer products)

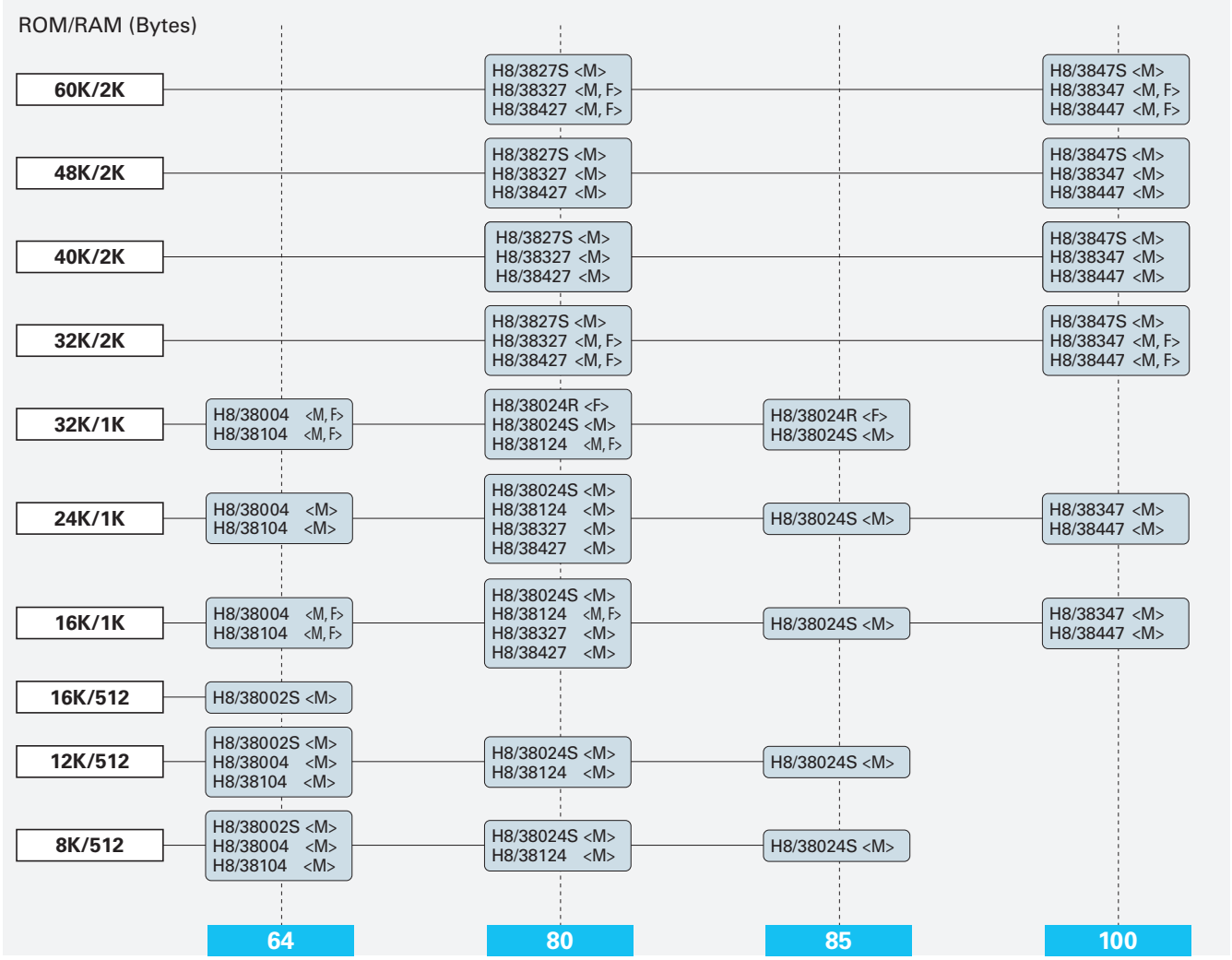
Slim 80-pin MCUs with super low power requirements

H8/38024R, H8/38024S Group

- First in the Super Low Power series with on-chip flash memory
- World-class low-power MCUs
- Oscillator stabilization time reduced to 1/1,000 that of previous models
- Reduced electromagnetic noise emission and improved noise immunity
- Built-in 32seg × 4com LCD controller/driver

Applications White goods, portable communication devices, health and beauty equipment

• Memory Capacity (ROM/RAM) (H8/300L Super Low Power Series)



Letters in brackets < > indicate memory variations.
F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

• Specifications (H8/300L Super Low Power Series)

Group		H8/38002S																			
Memory	ROM (Bytes)	8K						12K						16K							
	RAM (Bytes)	512																			
	ROM Type*1	M																			
CPU	CPU	H8/300L Core																			
	Basic Instructions	57																			
	Minimum Instruction Execution Time (ns)	400 (@5MHz)																			
Clock	Clock Generation Circuit	2 circuits																			
	Subclock	Yes																			
	On-Chip Oscillator	—																			
	Frequency Divider	1/n (n = 16, 32, 64, 128)																			
	Power Save	Medium-speed/Sleep/Sub active/Sub sleep/Watch/Standby/Module standby																			
Power Supply Voltage Detection	Power-On Reset/POR	—																			
	Low Voltage Detection/LVD	—																			
A/D Converter	Resolution × Channels	10-bit × 4																			
	Sample and Hold	Yes																			
Timer	8-bit	1 (Timer A)																			
	16-bit	2 (Timer F, AEC)																			
	Input Capture	—																			
	Output Compare	2 (Timer F)																			
	PWM Output	2 (10-bit PWM)																			
	Event Counter	4 (Timer F, AEC)																			
Watchdog Timer		1																			
Serial Interface	Clock Sync./Clock Async.	1 (SCI3)																			
	Clock Sync. Only	—																			
LCD		25seg × 4com																			
I/O Ports	Input Only (Numbers)	5																			
	CMOS I/O (Numbers)	39																			
	High Voltage Port (Numbers)	—																			
	N-Channel Open Drain Port (Numbers)	6																			
	High Current Drive Port	6																			
	Pull-Up Resistor	23																			
External Interrupts Pins		11																			
Debugging Function	On-Chip Debug	Yes (using H8/38004F)																			
	On-Board Flash Program	—																			
Operating Frequency/Supply Voltage		2MHz/1.8 to 3.6V, 5MHz/2.7 to 3.6V																			
Operating Ambient Temperature (˚C)		–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85
Package*2		PVQN0064LB-A		PLQP0064KB-A		PRQP0064GB-A		PVQN0064LB-A		PLQP0064KB-A		PRQP0064GB-A		PVQN0064LB-A		PLQP0064KB-A		PRQP0064GB-A			
Part No.		HD64338000SXXXFT	HD64338000SXXXFTW	HD64338000SXXXFZ	HD64338000SXXXFZW	HD64338000SXXXH	HD64338000SXXXHW	HD64338001SXXXFT	HD64338001SXXXFTW	HD64338001SXXXFZ	HD64338001SXXXFZW	HD64338001SXXXH	HD64338001SXXXHW	HD64338002SXXXFT	HD64338002SXXXFTW	HD64338002SXXXFZ	HD64338002SXXXFZW	HD64338002SXXXH	HD64338002SXXXHW		

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8/300L Super Low Power Series)

Group		H8/38004																													
Memory	ROM (Bytes)	8K				12K				16K																					
	RAM (Bytes)	512								1K																					
	ROM Type*1	M								F																		M			
CPU	CPU	H8/300L Core																													
	Basic Instructions	57																													
	Minimum Instruction Execution Time (ns)	400 (@5MHz)																													
Clock	Clock Generation Circuit	2 circuits																													
	Subclock	Yes																													
	On-Chip Oscillator	—																													
	Frequency Divider	1/n (n = 16, 32, 64, 128)																													
	Power Save	Medium-speed/Sleep/Sub active/Sub sleep/Watch/Standby/Module standby																													
Power Supply Voltage Detection	Power-On Reset/POR	—																													
	Low Voltage Detection/LVD	—																													
A/D Converter	Resolution × Channels	10-bit × 4																													
	Sample and Hold	Yes																													
Timer	8-bit	1 (Timer A)																													
	16-bit	2 (Timer F, AEC)																													
	Input Capture	—																													
	Output Compare	2 (Timer F)																													
	PWM Output	2 (10-bit PWM)																													
	Event Counter	4 (Timer F, AEC)																													
Watchdog Timer		1																													
Serial Interface	Clock Sync./Clock Async.	1 (SCI3)																													
	Clock Sync. Only	—																													
LCD		25seg × 4com																													
I/O Ports	Input Only (Numbers)	5																													
	CMOS I/O (Numbers)	39																													
	High Voltage Port (Numbers)	—																													
	N-Channel Open Drain Port (Numbers)	6																													
	High Current Drive Port	6																													
	Pull-Up Resistor	23																													
External Interrupts Pins		11																													
Debugging Function	On-Chip Debug	—								Yes																		—			
	On-Board Flash Program	—								Yes																		—			
Operating Frequency/Supply Voltage		2MHz/1.8 to 3.6V, 5MHz/2.7 to 3.6V								5MHz/ 2.7 to 3.6V		2MHz/ 2.2 to 3.6V		5MHz/ 2.7 to 3.6V		2MHz/ 2.2 to 3.6V		5MHz/ 2.7 to 3.6V		2MHz/ 2.2 to 3.6V		2MHz/1.8 to 3.6V, 5MHz/2.7 to 3.6V									
Operating Ambient Temperature (°C)		–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75		–40 to 85		–20 to 75		–40 to 85		–20 to 75		–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85
Package*2		PLQP0064KC-A		PRQP0064GB-A		PLQP0064KC-A		PRQP0064GB-A		PLQP0064KC-A				PVQN0064LB-A				PRQP0064GB-A				PLQP0064KC-A		PVQN0064LB-A		PRQP0064GB-A					
Part No.		HD64338000XXXFP	HD64338000XXXFPW	HD64338000XXXH	HD64338000XXXHW	HD64338001XXXFP	HD64338001XXXFPW	HD64338001XXXH	HD64338001XXXHW	HD64F38002FP10V	HD64F38002FP10WV	HD64F38002FP4V		HD64F38002FT10V		HD64F38002FT10WV		HD64F38002FT4V		HD64F38002H10V		HD64F38002H10WV	HD64F38002H4V			HD64338002XXXFP	HD64338002XXXFPW	HD64338002XXXFT	HD64338002XXXFTW	HD64338002XXXH	HD64338002XXXHW

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8/300L Super Low Power Series)

Group		H8/38004																				
Memory	ROM (Bytes)	24K						32K														
	RAM (Bytes)	1K																				
	ROM Type*1	M						F									M					
CPU	CPU	H8/300L Core																				
	Basic Instructions	57																				
	Minimum Instruction Execution Time (ns)	400 (@5MHz)																				
Clock	Clock Generation Circuit	2 circuits																				
	Subclock	Yes																				
	On-Chip Oscillator	—																				
	Frequency Divider	1/n (n = 16, 32, 64, 128)																				
	Power Save	Medium-speed/Sleep/Sub active/Sub sleep/Watch/Standby/Module standby																				
Power Supply Voltage Detection	Power-On Reset/POR	—																				
	Low Voltage Detection/LVD	—																				
A/D Converter	Resolution × Channels	10-bit × 4																				
	Sample and Hold	Yes																				
Timer	8-bit	1 (Timer A)																				
	16-bit	2 (Timer F, AEC)																				
	Input Capture	—																				
	Output Compare	2 (Timer F)																				
	PWM Output	2 (10-bit PWM)																				
	Event Counter	4 (Timer F, AEC)																				
Watchdog Timer		1																				
Serial Interface	Clock Sync./Clock Async.	1 (SCI3)																				
	Clock Sync. Only	—																				
LCD		25seg × 4com																				
I/O Ports	Input Only (Numbers)	5																				
	CMOS I/O (Numbers)	39																				
	High Voltage Port (Numbers)	—																				
	N-Channel Open Drain Port (Numbers)	6																				
	High Current Drive Port	6																				
	Pull-Up Resistor	23																				
External Interrupts Pins		11																				
Debugging Function	On-Chip Debug	—						Yes									—					
	On-Board Flash Program	—						Yes									—					
Operating Frequency/Supply Voltage		2MHz/1.8 to 3.6V, 5MHz/2.7 to 3.6V						5MHz/ 2.7 to 3.6V		2MHz/ 2.2 to 3.6V	5MHz/ 2.7 to 3.6V		2MHz/ 2.2 to 3.6V	5MHz/ 2.7 to 3.6V		2MHz/ 2.2 to 3.6V	2MHz/1.8 to 3.6V, 5MHz/2.7 to 3.6V					
Operating Ambient Temperature (°C)		–20 to 75	–40 to 85	–20 to 75, –40 to 85		–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75		–40 to 85	–20 to 75		–40 to 85	–20 to 75		–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85
Package*2		PLQP0064KC-A		PVQN0064LB-A		PRQP0064GB-A		PLQP0064KC-A			PVQN0064LB-A			PRQP0064GB-A			PLQP0064KC-A		PVQN0064LB-A		PRQP0064GB-A	
Part No.		HD64338003XXXFP	HD64338003XXXFPW	HD64338003XXXFT	HD64338003XXXFTW	HD64338003XXXH	HD64338003XXXHW	HD64F38004FP10V	HD64F38004FP10WV	HD64F38004FP4V	HD64F38004FT10V	HD64F38004FT10WV	HD64F38004FT4V	HD64F38004H10V	HD64F38004H10WV	HD64F38004H4V	HD64338004XXXFP	HD64338004XXXFPW	HD64338004XXXFT	HD64338004XXXFTW	HD64338004XXXH	HD64338004XXXHW

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8/300L Super Low Power Series)

Group		H8/38104																	
Memory	ROM (Bytes)	8K				12K				16K									
	RAM (Bytes)	512								1K									
	ROM Type*1	M								F				M					
CPU	CPU	H8/300L Core																	
	Basic Instructions	57																	
	Minimum Instruction Execution Time (ns)	200 (@10MHz)																	
Clock	Clock Generation Circuit	3 circuits																	
	Subclock	Yes																	
	On-Chip Oscillator	Yes																	
	Frequency Divider	1/n (n = 16, 32, 64, 128)																	
	Power Save	Medium-speed/Sleep/Sub active/Sub sleep/Watch/Standby/Module standby																	
Power Supply Voltage Detection	Power-On Reset/POR	Yes																	
	Low Voltage Detection/LVD	Yes																	
A/D Converter	Resolution × Channels	10-bit × 4																	
	Sample and Hold	Yes																	
Timer	8-bit	1 (Timer A)																	
	16-bit	2 (Timer F, AEC)																	
	Input Capture	—																	
	Output Compare	2 (Timer F)																	
	PWM Output	2 (10-bit PWM, AEC)																	
	Event Counter	4 (Timer F, AEC)																	
Watchdog Timer		1 (Possible to Select Built in Oscillator)																	
Serial Interface	Clock Sync./Clock Async.	1 (SCI3)																	
	Clock Sync. Only	—																	
LCD		25seg × 4com																	
I/O Ports	Input Only (Numbers)	5																	
	CMOS I/O (Numbers)	39																	
	High Voltage Port (Numbers)	—																	
	N-Channel Open Drain Port (Numbers)	5																	
	High Current Drive Port	12																	
	Pull-Up Resistor	23																	
External Interrupts Pins		11																	
Debugging Function	On-Chip Debug	—								Yes				—					
	On-Board Flash Program	—								Yes				—					
Operating Frequency/Supply Voltage		10MHz/2.7 to 5.5V																	
Operating Ambient Temperature (°C)		–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85
Package*2		PLQP0064KC-A		PRQP0064GB-A		PLQP0064KC-A		PRQP0064GB-A		PLQP0064KC-A		PRQP0064GB-A		PLQP0064KC-A		PRQP0064GB-A			
Part No.		HD6433810 0XXXFPV	HD6433810 0XXXFPWV	HD6433810 0XXXHV	HD6433810 0XXXHWV	HD6433810 1XXXFPV	HD6433810 1XXXFPWV	HD6433810 1XXXHV	HD6433810 1XXXHWV	HD64F38102FPV	HD64F38102FPWV	HD64F38102HV	HD64F38102HWV	HD6433810 2XXXFPV	HD6433810 2XXXFPWV	HD6433810 2XXXHV	HD6433810 2XXXHWV		

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8/300L Super Low Power Series)

Group		H8/38104											
Memory	ROM (Bytes)	24K				32K							
	RAM (Bytes)	1K											
	ROM Type*1	M				F				M			
CPU	CPU	H8/300L Core											
	Basic Instructions	57											
	Minimum Instruction Execution Time (ns)	200 (@10MHz)											
Clock	Clock Generation Circuit	3 circuits											
	Subclock	Yes											
	On-Chip Oscillator	Yes											
	Frequency Divider	1/n (n = 16, 32, 64, 128)											
	Power Save	Medium-speed/Sleep/Sub active/Sub sleep/Watch/Standby/Module standby											
Power Supply Voltage Detection	Power-On Reset/POR	Yes											
	Low Voltage Detection/LVD	Yes											
A/D Converter	Resolution × Channels	10-bit × 4											
	Sample and Hold	Yes											
Timer	8-bit	1 (Timer A)											
	16-bit	2 (Timer F, AEC)											
	Input Capture	—											
	Output Compare	2 (Timer F)											
	PWM Output	2 (10-bit PWM, AEC)											
	Event Counter	4 (Timer F, AEC)											
Watchdog Timer		1 (Possible to Select Built in Oscillator)											
Serial Interface	Clock Sync./Clock Async.	1 (SCI3)											
	Clock Sync. Only	—											
LCD		25seg × 4com											
I/O Ports	Input Only (Numbers)	5											
	CMOS I/O (Numbers)	39											
	High Voltage Port (Numbers)	—											
	N-Channel Open Drain Port (Numbers)	5											
	High Current Drive Port	12											
	Pull-Up Resistor	23											
External Interrupts Pins		11											
Debugging Function	On-Chip Debug	—				Yes				—			
	On-Board Flash Program	—				Yes				—			
Operating Frequency/Supply Voltage		10MHz/2.7 to 5.5V											
Operating Ambient Temperature (˚C)		–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85
Package*2		PLQP0064KC-A		PRQP0064GB-A		PLQP0064KC-A		PRQP0064GB-A		PLQP0064KC-A		PRQP0064GB-A	
Part No.		HD64338103XXXFPV	HD64338103XXXFPWV	HD64338103XXXHV	HD64338103XXXHWV	HD64F38104FPV	HD64F38104FPWV	HD64F38104HV	HD64F38104HWV	HD64338104XXXFPV	HD64338104XXXFPWV	HD64338104XXXHV	HD64338104XXXHWV

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8/300L Super Low Power Series)

Group		H8/38024R	H8/38024S	
Memory	ROM (Bytes)	32K	8K	12K
	RAM (Bytes)	1K	512	
	ROM Type*1	F	M	
CPU	CPU	H8/300L Core		
	Basic Instructions	57		
	Minimum Instruction Execution Time (ns)	400 (@5MHz)		
Clock	Clock Generation Circuit	2 circuits		
	Subclock	Yes		
	On-Chip Oscillator	—		
	Frequency Divider	1/n (n = 16, 32, 64, 128)		
	Power Save	Medium-speed/Sleep/Sub active/Sub sleep/Watch/Standby/Module standby		
Power Supply Voltage Detection	Power-On Reset/POR	—		
	Low Voltage Detection/LVD	—		
A/D Converter	Resolution × Channels	10-bit × 8		
	Sample and Hold	Yes		
Timer	8-bit	3 (Timer A, Timer C, Timer G)		
	16-bit	2 (Timer F, AEC)		
	Input Capture	1 (Timer G)		
	Output Compare	2 (Timer F)		
	PWM Output	2 (10-bit PWM)		
	Event Counter	5 (Timer C, Timer F, AEC)		
Watchdog Timer		1		
Serial Interface	Clock Sync./Clock Async.	1 (SCI3)		
	Clock Sync. Only	—		
LCD		32seg × 4com		
I/O Ports	Input Only (Numbers)	9		
	CMOS I/O (Numbers)	51		
	High Voltage Port (Numbers)	7 (7V High-voltage)	—	
	N-Channel Open Drain Port (Numbers)	7		
	High Current Drive Port	6		
	Pull-Up Resistor	28		
External Interrupts Pins		13		
Debugging Function	On-Chip Debug	Yes	—	
	On-Board Flash Program	Yes	—	
Operating Frequency/Supply Voltage		5MHz/2.7 to 3.6V	2MHz/1.8 to 3.6V, 5MHz/2.7 to 3.6V	
Operating Ambient Temperature (°C)		–40 to 85 / –20 to 75 / –40 to 85 / –20 to 75 / –40 to 85 / –20 to 75	–40 to 85 / –20 to 75 / –40 to 85 / –20 to 75 / –40 to 85 / –20 to 75 / –40 to 85 / –20 to 75 / –40 to 85 / –20 to 75 / –40 to 85	
Package*2		PRQP0080JB-A / PTLG0085JA-A / PTQP0080KC-A	PRQP0080JB-A / PTLG0085JA-A / PTQP0080KC-A / PRQP0080JB-A / PTLG0085JA-A / PTQP0080KC-A	
Part No.		HD64F38024RHIV / HD64F38024RHV / HD64F38024RLPIV / HD64F38024RLPV / HD64F38024RWIV / HD64F38024RWV	HD64338020SXXXH / HD64338020SXXXHI / HD64338020SXXXLP / HD64338020SXXXLPI / HD64338020SXXXW / HD64338020SXXXWI / HD64338021SXXXH / HD64338021SXXXHI / HD64338021SXXXLP / HD64338021SXXXLPI / HD64338021SXXXW / HD64338021SXXXWI	

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8/300L Super Low Power Series)

Group		H8/38024S																	
Memory	ROM (Bytes)	16K						24K						32K					
	RAM (Bytes)	1K																	
	ROM Type*1	M																	
CPU	CPU	H8/300L Core																	
	Basic Instructions	57																	
	Minimum Instruction Execution Time (ns)	400 (@5MHz)																	
Clock	Clock Generation Circuit	2 circuits																	
	Subclock	Yes																	
	On-Chip Oscillator	—																	
	Frequency Divider	1/n (n = 16, 32, 64, 128)																	
	Power Save	Medium-speed/Sleep/Sub active/Sub sleep/Watch/Standby/Module standby																	
Power Supply Voltage Detection	Power-On Reset/POR	—																	
	Low Voltage Detection/LVD	—																	
A/D Converter	Resolution × Channels	10-bit × 8																	
	Sample and Hold	Yes																	
Timer	8-bit	3 (Timer A, Timer C, Timer G)																	
	16-bit	2 (Timer F, AEC)																	
	Input Capture	1 (Timer G)																	
	Output Compare	2 (Timer F)																	
	PWM Output	2 (10-bit PWM)																	
	Event Counter	5 (Timer C, Timer F, AEC)																	
Watchdog Timer		1																	
Serial Interface	Clock Sync./Clock Async.	1 (SCI3)																	
	Clock Sync. Only	—																	
LCD		32seg × 4com																	
I/O Ports	Input Only (Numbers)	9																	
	CMOS I/O (Numbers)	51																	
	High Voltage Port (Numbers)	—																	
	N-Channel Open Drain Port (Numbers)	7																	
	High Current Drive Port	6																	
	Pull-Up Resistor	28																	
External Interrupts Pins		13																	
Debugging Function	On-Chip Debug	—																	
	On-Board Flash Program	—																	
Operating Frequency/Supply Voltage		2MHz/1.8 to 3.6V, 5MHz/2.7 to 3.6V																	
Operating Ambient Temperature (°C)		–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85
Package*2		PRQP0080JB-A		PTLG0085JA-A		PTQP0080KC-A		PRQP0080JB-A		PTLG0085JA-A		PTQP0080KC-A		PRQP0080JB-A		PTLG0085JA-A		PTQP0080KC-A	
Part No.		HD64338022SXXXH	HD64338022SXXXHI	HD64338022SXXXLP	HD64338022SXXXLPI	HD64338022SXXXW	HD64338022SXXXWI	HD64338023SXXXH	HD64338023SXXXHI	HD64338023SXXXLP	HD64338023SXXXLPI	HD64338023SXXXW	HD64338023SXXXWI	HD64338024SXXXH	HD64338024SXXXHI	HD64338024SXXXLP	HD64338024SXXXLPI	HD64338024SXXXW	HD64338024SXXXWI

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8/300L Super Low Power Series)

Group		H8/38124																	
Memory	ROM (Bytes)	8K				12K				16K									
	RAM (Bytes)	512								1K									
	ROM Type*1	M								F				M					
CPU	CPU	H8/300L Core																	
	Basic Instructions	57																	
	Minimum Instruction Execution Time (ns)	200 (@10MHz)																	
Clock	Clock Generation Circuit	3 circuits																	
	Subclock	Yes																	
	On-Chip Oscillator	Yes																	
	Frequency Divider	1/n (n = 16, 32, 64, 128)																	
	Power Save	Medium-speed/Sleep/Sub active/Sub sleep/Watch/Standby/Module standby																	
Power Supply Voltage Detection	Power-On Reset/POR	Yes																	
	Low Voltage Detection/LVD	Yes																	
A/D Converter	Resolution × Channels	10-bit × 8																	
	Sample and Hold	Yes																	
Timer	8-bit	3 (Timer A, Timer C, Timer G)																	
	16-bit	2 (Timer F, AEC)																	
	Input Capture	1 (Timer G)																	
	Output Compare	2 (Timer F)																	
	PWM Output	2 (10-bit PWM, AEC)																	
	Event Counter	5 (Timer C, Timer F, AEC)																	
Watchdog Timer		1 (Possible to Select Built in Oscillator)																	
Serial Interface	Clock Sync./Clock Async.	1 (SCI3)																	
	Clock Sync. Only	—																	
LCD		32seg × 4com																	
I/O Ports	Input Only (Numbers)	9																	
	CMOS I/O (Numbers)	50																	
	High Voltage Port (Numbers)	—																	
	N-Channel Open Drain Port (Numbers)	7																	
	High Current Drive Port	14																	
	Pull-Up Resistor	28																	
External Interrupts Pins		13																	
Debugging Function	On-Chip Debug	—								Yes				—					
	On-Board Flash Program	—								Yes				—					
Operating Frequency/Supply Voltage		10MHz/2.7 to 5.5V																	
Operating Ambient Temperature (°C)		–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85
Package*2		PRQP0080JB-A		PTQP0080KC-A		PRQP0080JB-A		PTQP0080KC-A		PRQP0080JB-A		PTQP0080KC-A		PRQP0080JB-A		PTQP0080KC-A			
Part No.		HD6433812 0XXXHV	HD6433812 0XXXHWV	HD6433812 0XXXWV	HD6433812 0XXXWWV	HD6433812 1XXXHV	HD6433812 1XXXHWV	HD6433812 1XXXWV	HD6433812 1XXXWWV	HD64F38122HV	HD64F38122HWV	HD64F38122WV	HD64F38122WWV	HD6433812 2XXXHV	HD6433812 2XXXHWV	HD6433812 2XXXWV	HD6433812 2XXXWWV		

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8/300L Super Low Power Series)

Group		H8/38124											
Memory	ROM (Bytes)	24K				32K							
	RAM (Bytes)	1K											
	ROM Type*1	M				F				M			
CPU	CPU	H8/300L Core											
	Basic Instructions	57											
	Minimum Instruction Execution Time (ns)	200 (@10MHz)											
Clock	Clock Generation Circuit	3 circuits											
	Subclock	Yes											
	On-Chip Oscillator	Yes											
	Frequency Divider	1/n (n = 16, 32, 64, 128)											
	Power Save	Medium-speed/Sleep/Sub active/Sub sleep/Watch/Standby/Module standby											
Power Supply Voltage Detection	Power-On Reset/POR	Yes											
	Low Voltage Detection/LVD	Yes											
A/D Converter	Resolution × Channels	10-bit × 8											
	Sample and Hold	Yes											
Timer	8-bit	3 (Timer A, Timer C, Timer G)											
	16-bit	2 (Timer F, AEC)											
	Input Capture	1 (Timer G)											
	Output Compare	2 (Timer F)											
	PWM Output	2 (10-bit PWM, AEC)											
	Event Counter	5 (Timer C, Timer F, AEC)											
Watchdog Timer		1 (Possible to Select Built in Oscillator)											
Serial Interface	Clock Sync./Clock Async.	1 (SCI3)											
	Clock Sync. Only	—											
LCD		32seg × 4com											
I/O Ports	Input Only (Numbers)	9											
	CMOS I/O (Numbers)	50											
	High Voltage Port (Numbers)	—											
	N-Channel Open Drain Port (Numbers)	7											
	High Current Drive Port	14											
	Pull-Up Resistor	28											
External Interrupts Pins		13											
Debugging Function	On-Chip Debug	—				Yes				—			
	On-Board Flash Program	—				Yes				—			
Operating Frequency/Supply Voltage		10MHz/2.7 to 5.5V											
Operating Ambient Temperature (˚C)		–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85
Package*2		PRQP0080JB-A		PTQP0080KC-A		PRQP0080JB-A		PTQP0080KC-A		PRQP0080JB-A		PTQP0080KC-A	
Part No.		HD6433812 3XXXHV	HD6433812 3XXXHWV	HD6433812 3XXXWV	HD6433812 3XXXWWV	HD64F38124HV	HD64F38124HWV	HD64F38124WV	HD64F38124WWV	HD6433812 4XXXHV	HD6433812 4XXXHWV	HD6433812 4XXXWV	HD6433812 4XXXWWV

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8/300L Super Low Power Series)

Group		H8/3827S															
Memory	ROM (Bytes)	32K				40K				48K				60K			
	RAM (Bytes)	2K															
	ROM Type*1	M															
CPU	CPU	H8/300L Core															
	Basic Instructions	57															
	Minimum Instruction Execution Time (ns)	400 (@5MHz)															
Clock	Clock Generation Circuit	2 circuits															
	Subclock	Yes															
	On-Chip Oscillator	—															
	Frequency Divider	1/n (n = 16, 32, 64, 128)															
	Power Save	Medium-speed/Sleep/Sub active/Sub sleep/Watch/Standby/Module standby															
Power Supply Voltage Detection	Power-On Reset/POR	—															
	Low Voltage Detection/LVD	—															
A/D Converter	Resolution × Channels	10-bit × 8															
	Sample and Hold	Yes															
Timer	8-bit	3 (Timer A, Timer C, Timer G)															
	16-bit	2 (Timer F, AEC)															
	Input Capture	1 (Timer G)															
	Output Compare	2 (Timer F)															
	PWM Output	1 (14-bit PWM)															
	Event Counter	5 (Timer C, Timer F, AEC)															
Watchdog Timer		1															
Serial Interface	Clock Sync./Clock Async.	2 (SCI3)															
	Clock Sync. Only	—															
LCD		32seg × 4com															
I/O Ports	Input Only (Numbers)	9															
	CMOS I/O (Numbers)	55															
	High Voltage Port (Numbers)	—															
	N-Channel Open Drain Port (Numbers)	—															
	High Current Drive Port	—															
	Pull-Up Resistor	32															
External Interrupts Pins		13															
Debugging Function	On-Chip Debug	—															
	On-Board Flash Program	—															
Operating Frequency/Supply Voltage		2MHz/1.8 to 3.6V, 5MHz/2.7 to 3.6V															
Operating Ambient Temperature (°C)		–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85
Package*2		PRQP0080JB-A		PTQP0080KC-A		PRQP0080JB-A		PTQP0080KC-A		PRQP0080JB-A		PTQP0080KC-A		PRQP0080JB-A		PTQP0080KC-A	
Part No.		HD64338245SXXXH	HD64338245SXXXHI	HD64338245SXXXW	HD64338245SXXXWI	HD64338255SXXXH	HD64338255SXXXHI	HD64338255SXXXW	HD64338255SXXXWI	HD64338265SXXXH	HD64338265SXXXHI	HD64338265SXXXW	HD64338265SXXXWI	HD64338275SXXXH	HD64338275SXXXHI	HD64338275SXXXW	HD64338275SXXXWI

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8/300L Super Low Power Series)

Group		H8/38327															
Memory	ROM (Bytes)	16K				24K				32K							
	RAM (Bytes)	1K								2K							
	ROM Type*1	M								F				M			
CPU	CPU	H8/300L Core															
	Basic Instructions	57															
	Minimum Instruction Execution Time (ns)	250 (@8MHz)															
Clock	Clock Generation Circuit	2 circuits															
	Subclock	Yes															
	On-Chip Oscillator	—															
	Frequency Divider	1/n (n = 16, 32, 64, 128)															
	Power Save	Medium-speed/Sleep/Sub active/Sub sleep/Watch/Standby/Module standby															
Power Supply Voltage Detection	Power-On Reset/POR	—															
	Low Voltage Detection/LVD	—															
A/D Converter	Resolution × Channels	10-bit × 8															
	Sample and Hold	Yes															
Timer	8-bit	3 (Timer A, Timer C, Timer G)															
	16-bit	2 (Timer F, AEC)															
	Input Capture	1 (Timer G)															
	Output Compare	2 (Timer F)															
	PWM Output	1 (14-bit PWM)															
	Event Counter	5 (Timer C, Timer F, AEC)															
Watchdog Timer		1															
Serial Interface	Clock Sync./Clock Async.	2 (SCI3)															
	Clock Sync. Only	—															
LCD		32seg × 4com															
I/O Ports	Input Only (Numbers)	9															
	CMOS I/O (Numbers)	55															
	High Voltage Port (Numbers)	—															
	N-Channel Open Drain Port (Numbers)	—															
	High Current Drive Port	8															
	Pull-Up Resistor	32															
External Interrupts Pins		13															
Debugging Function	On-Chip Debug	—								Yes				—			
	On-Board Flash Program	—								Yes				—			
Operating Frequency/Supply Voltage		8MHz/2.7 to 5.5V															
Operating Ambient Temperature (˚C)		–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85
Package*2		PRQP0080JB-A		PTQP0080KC-A		PRQP0080JB-A		PTQP0080KC-A		PRQP0080JB-A		PTQP0080KC-A		PRQP0080JB-A		PTQP0080KC-A	
Part No.		HD64338322XXXHV	HD64338322XXXHWV	HD64338322XXXWV	HD64338322XXXWWV	HD64338323XXXHV	HD64338323XXXHWV	HD64338323XXXWV	HD64338323XXXWWV	HD64F38324HV	HD64F38324HWV	HD64F38324WV	HD64F38324WWV	HD64338324XXXHV	HD64338324XXXHWV	HD64338324XXXWV	HD64338324XXXWWV

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8/300L Super Low Power Series)

Group		H8/38327															
Memory	ROM (Bytes)	40K				48K				60K							
	RAM (Bytes)	2K															
	ROM Type*1	M								F				M			
CPU	CPU	H8/300L Core															
	Basic Instructions	57															
	Minimum Instruction Execution Time (ns)	250 (@8MHz)															
Clock	Clock Generation Circuit	2 circuits															
	Subclock	Yes															
	On-Chip Oscillator	—															
	Frequency Divider	1/n (n = 16, 32, 64, 128)															
	Power Save	Medium-speed/Sleep/Sub active/Sub sleep/Watch/Standby/Module standby															
Power Supply Voltage Detection	Power-On Reset/POR	—															
	Low Voltage Detection/LVD	—															
A/D Converter	Resolution × Channels	10-bit × 8															
	Sample and Hold	Yes															
Timer	8-bit	3 (Timer A, Timer C, Timer G)															
	16-bit	2 (Timer F, AEC)															
	Input Capture	1 (Timer G)															
	Output Compare	2 (Timer F)															
	PWM Output	1 (14-bit PWM)															
	Event Counter	5 (Timer C, Timer F, AEC)															
Watchdog Timer		1															
Serial Interface	Clock Sync./Clock Async.	2 (SCI3)															
	Clock Sync. Only	—															
LCD		32seg × 4com															
I/O Ports	Input Only (Numbers)	9															
	CMOS I/O (Numbers)	55															
	High Voltage Port (Numbers)	—															
	N-Channel Open Drain Port (Numbers)	—															
	High Current Drive Port	8															
	Pull-Up Resistor	32															
External Interrupts Pins		13															
Debugging Function	On-Chip Debug	—								Yes				—			
	On-Board Flash Program	—								Yes				—			
Operating Frequency/Supply Voltage		8MHz/2.7 to 5.5V															
Operating Ambient Temperature (°C)		–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85
Package*2		PRQP0080JB-A		PTQP0080KC-A		PRQP0080JB-A		PTQP0080KC-A		PRQP0080JB-A		PTQP0080KC-A		PRQP0080JB-A		PTQP0080KC-A	
Part No.		HD64338325XXXHV	HD64338325XXXHWV	HD64338325XXXWV	HD64338325XXXWWV	HD64338326XXXHV	HD64338326XXXHWV	HD64338326XXXWV	HD64338326XXXWWV	HD64F38327HV	HD64F38327HWV	HD64F38327WV	HD64F38327WWV	HD64338327XXXHV	HD64338327XXXHWV	HD64338327XXXWV	HD64338327XXXWWV

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8/300L Super Low Power Series)

Group		H8/38427															
Memory	ROM (Bytes)	16K				24K				32K							
	RAM (Bytes)	1K								2K							
	ROM Type*1	M								F				M			
CPU	CPU	H8/300L Core															
	Basic Instructions	57															
	Minimum Instruction Execution Time (ns)	250 (@8MHz)															
Clock	Clock Generation Circuit	2 circuits															
	Subclock	Yes															
	On-Chip Oscillator	—															
	Frequency Divider	1/n (n = 16, 32, 64, 128)															
	Power Save	Medium-speed/Sleep/Sub active/Sub sleep/Watch/Standby/Module standby															
Power Supply Voltage Detection	Power-On Reset/POR	—															
	Low Voltage Detection/LVD	—															
A/D Converter	Resolution × Channels	10-bit × 8															
	Sample and Hold	Yes															
Timer	8-bit	3 (Timer A, Timer C, Timer G)															
	16-bit	2 (Timer F, AEC)															
	Input Capture	1 (Timer G)															
	Output Compare	2 (Timer F)															
	PWM Output	1 (14-bit PWM)															
	Event Counter	5 (Timer C, Timer F, AEC)															
Watchdog Timer		1															
Serial Interface	Clock Sync./Clock Async.	2 (SCI3)															
	Clock Sync. Only	—															
LCD		32seg × 4com															
I/O Ports	Input Only (Numbers)	9															
	CMOS I/O (Numbers)	55															
	High Voltage Port (Numbers)	—															
	N-Channel Open Drain Port (Numbers)	—															
	High Current Drive Port	8															
	Pull-Up Resistor	32															
External Interrupts Pins		13															
Debugging Function	On-Chip Debug	—								Yes				—			
	On-Board Flash Program	—								Yes				—			
Operating Frequency/Supply Voltage		5MHz/2.7 to 4.5V, 8MHz/4.5 to 5.5V															
Operating Ambient Temperature (˚C)		–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85
Package*2		PRQP0080JB-A		PTQP0080KC-A		PRQP0080JB-A		PTQP0080KC-A		PRQP0080JB-A		PTQP0080KC-A		PRQP0080JB-A		PTQP0080KC-A	
Part No.		HD64338422XXXHV	HD64338422XXXHWV	HD64338422XXXWV	HD64338422XXXWWV	HD64338423XXXHV	HD64338423XXXHWV	HD64338423XXXWV	HD64338423XXXWWV	HD64F38424HV	HD64F38424HWV	HD64F38424WV	HD64F38424WWV	HD64338424XXXHV	HD64338424XXXHWV	HD64338424XXXWV	HD64338424XXXWWV

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8/300L Super Low Power Series)

Group		H8/38427															
Memory	ROM (Bytes)	40K				48K				60K							
	RAM (Bytes)	2K															
	ROM Type*1	M								F				M			
CPU	CPU	H8/300L Core															
	Basic Instructions	57															
	Minimum Instruction Execution Time (ns)	250 (@8MHz)															
Clock	Clock Generation Circuit	2 circuits															
	Subclock	Yes															
	On-Chip Oscillator	—															
	Frequency Divider	1/n (n = 16, 32, 64, 128)															
	Power Save	Medium-speed/Sleep/Sub active/Sub sleep/Watch/Standby/Module standby															
Power Supply Voltage Detection	Power-On Reset/POR	—															
	Low Voltage Detection/LVD	—															
A/D Converter	Resolution × Channels	10-bit × 8															
	Sample and Hold	Yes															
Timer	8-bit	3 (Timer A, Timer C, Timer G)															
	16-bit	2 (Timer F, AEC)															
	Input Capture	1 (Timer G)															
	Output Compare	2 (Timer F)															
	PWM Output	1 (14-bit PWM)															
	Event Counter	5 (Timer C, Timer F, AEC)															
Watchdog Timer		1															
Serial Interface	Clock Sync./Clock Async.	2 (SCI3)															
	Clock Sync. Only	—															
LCD		32seg × 4com															
I/O Ports	Input Only (Numbers)	9															
	CMOS I/O (Numbers)	55															
	High Voltage Port (Numbers)	—															
	N-Channel Open Drain Port (Numbers)	—															
	High Current Drive Port	8															
	Pull-Up Resistor	32															
External Interrupts Pins		13															
Debugging Function	On-Chip Debug	—								Yes				—			
	On-Board Flash Program	—								Yes				—			
Operating Frequency/Supply Voltage		5MHz/2.7 to 4.5V, 8MHz/4.5 to 5.5V															
Operating Ambient Temperature (°C)		–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85
Package*2		PRQP0080JB-A		PTQP0080KC-A		PRQP0080JB-A		PTQP0080KC-A		PRQP0080JB-A		PTQP0080KC-A		PRQP0080JB-A		PTQP0080KC-A	
Part No.		HD64338425XXXHV	HD64338425XXXHWV	HD64338425XXXWV	HD64338425XXXWWV	HD64338426XXXHV	HD64338426XXXHWV	HD64338426XXXWV	HD64338426XXXWWV	HD64F38427HV	HD64F38427HWV	HD64F38427WV	HD64F38427WWV	HD64338427XXXHV	HD64338427XXXHWV	HD64338427XXXWV	HD64338427XXXWWV

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8/300L Super Low Power Series)

Group		H8/3847S																			
Memory	ROM (Bytes)	32K				40K				48K				60K							
	RAM (Bytes)	2K																			
	ROM Type*1	M																			
CPU	CPU	H8/300L Core																			
	Basic Instructions	57																			
	Minimum Instruction Execution Time (ns)	400 (@5MHz)																			
Clock	Clock Generation Circuit	2 circuits																			
	Subclock	Yes																			
	On-Chip Oscillator	—																			
	Frequency Divider	1/n (n = 16, 32, 64, 128)																			
	Power Save	Medium-speed/Sleep/Sub active/Sub sleep/Watch/Standby/Module standby																			
Power Supply Voltage Detection	Power-On Reset/POR	—																			
	Low Voltage Detection/LVD	—																			
A/D Converter	Resolution × Channels	10-bit × 12																			
	Sample and Hold	Yes																			
Timer	8-bit	3 (Timer A, Timer C, Timer G)																			
	16-bit	2 (Timer F, AEC)																			
	Input Capture	1 (Timer G)																			
	Output Compare	2 (Timer F)																			
	PWM Output	1 (14-bit PWM)																			
	Event Counter	5 (Timer C, Timer F, AEC)																			
Watchdog Timer		1																			
Serial Interface	Clock Sync./Clock Async.	2 (SCI3)																			
	Clock Sync. Only	1 (SCI1)																			
LCD		40seg × 4com																			
I/O Ports	Input Only (Numbers)	13																			
	CMOS I/O (Numbers)	71																			
	High Voltage Port (Numbers)	—																			
	N-Channel Open Drain Port (Numbers)	—																			
	High Current Drive Port	—																			
	Pull-Up Resistor	32																			
External Interrupts Pins		13																			
Debugging Function	On-Chip Debug	—																			
	On-Board Flash Program	—																			
Operating Frequency/Supply Voltage		2MHz/1.8 to 3.6V, 5MHz/2.7 to 3.6V																			
Operating Ambient Temperature (˚C)		–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85
Package*2		PRQP0100KA-A		PTQP0100LC-A		PTQP0100KA-A		PRQP0100KA-A		PTQP0100LC-A		PTQP0100KA-A		PRQP0100KA-A		PTQP0100LC-A		PTQP0100KA-A		PRQP0100KA-A		PTQP0100LC-A		PTQP0100KA-A			
Part No.		HD6433844SXXXH	HD6433844SXXXHI	HD6433844SXXXW	HD6433844SXXXWI	HD6433844SXXXX	HD6433844SXXXXI	HD6433845SXXXH	HD6433845SXXXHI	HD6433845SXXXW	HD6433845SXXXWI	HD6433845SXXXX	HD6433845SXXXXI	HD6433846SXXXH	HD6433846SXXXHI	HD6433846SXXXW	HD6433846SXXXWI	HD6433846SXXXX	HD6433846SXXXXI	HD6433847SXXXH	HD6433847SXXXHI	HD6433847SXXXW	HD6433847SXXXWI	HD6433847SXXXX	HD6433847SXXXXI		

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8/300L Super Low Power Series)

<table>
<tr><th colspan="2">Group</th><th colspan="24">H8/38347</th></tr>
<tr><td rowspan="3">Memory</td><td>ROM (Bytes)</td><td colspan="6">16K</td><td colspan="6">24K</td><td colspan="12">32K</td></tr>
<tr><td>RAM (Bytes)</td><td colspan="12">1K</td><td colspan="12">2K</td></tr>
<tr><td>ROM Type*1</td><td colspan="12">M</td><td colspan="6">F</td><td colspan="6">M</td></tr>
<tr><td rowspan="3">CPU</td><td>CPU</td><td colspan="24">H8/300L Core</td></tr>
<tr><td>Basic Instructions</td><td colspan="24">57</td></tr>
<tr><td>Minimum Instruction Execution Time (ns)</td><td colspan="24">250 (@8MHz)</td></tr>
<tr><td rowspan="5">Clock</td><td>Clock Generation Circuit</td><td colspan="24">2 circuits</td></tr>
<tr><td>Subclock</td><td colspan="24">Yes</td></tr>
<tr><td>On-Chip Oscillator</td><td colspan="24">—</td></tr>
<tr><td>Frequency Divider</td><td colspan="24">1/n (n = 16, 32, 64, 128)</td></tr>
<tr><td>Power Save</td><td colspan="24">Medium-speed/Sleep/Sub active/Sub sleep/Watch/Standby/Module standby</td></tr>
<tr><td rowspan="2">Power Supply Voltage Detection</td><td>Power-On Reset/POR</td><td colspan="24">—</td></tr>
<tr><td>Low Voltage Detection/LVD</td><td colspan="24">—</td></tr>
<tr><td rowspan="2">A/D Converter</td><td>Resolution × Channels</td><td colspan="24">10-bit × 12</td></tr>
<tr><td>Sample and Hold</td><td colspan="24">Yes</td></tr>
<tr><td rowspan="6">Timer</td><td>8-bit</td><td colspan="24">3 (Timer A, Timer C, Timer G)</td></tr>
<tr><td>16-bit</td><td colspan="24">2 (Timer F, AEC)</td></tr>
<tr><td>Input Capture</td><td colspan="24">1 (Timer G)</td></tr>
<tr><td>Output Compare</td><td colspan="24">2 (Timer F)</td></tr>
<tr><td>PWM Output</td><td colspan="24">1 (14-bit PWM)</td></tr>
<tr><td>Event Counter</td><td colspan="24">5 (Timer C, Timer F, AEC)</td></tr>
<tr><td colspan="2">Watchdog Timer</td><td colspan="24">1</td></tr>
<tr><td rowspan="2">Serial Interface</td><td>Clock Sync./Clock Async.</td><td colspan="24">2 (SCI3)</td></tr>
<tr><td>Clock Sync. Only</td><td colspan="24">1 (SCI1)</td></tr>
<tr><td colspan="2">LCD</td><td colspan="24">40seg × 4com</td></tr>
<tr><td rowspan="6">I/O Ports</td><td>Input Only (Numbers)</td><td colspan="24">13</td></tr>
<tr><td>CMOS I/O (Numbers)</td><td colspan="24">71</td></tr>
<tr><td>High Voltage Port (Numbers)</td><td colspan="24">—</td></tr>
<tr><td>N-Channel Open Drain Port (Numbers)</td><td colspan="24">—</td></tr>
<tr><td>High Current Drive Port</td><td colspan="24">16</td></tr>
<tr><td>Pull-Up Resistor</td><td colspan="24">32</td></tr>
<tr><td colspan="2">External Interrupts Pins</td><td colspan="24">13</td></tr>
<tr><td rowspan="2">Debugging Function</td><td>On-Chip Debug</td><td colspan="12">—</td><td colspan="6">Yes</td><td colspan="6">—</td></tr>
<tr><td>On-Board Flash Program</td><td colspan="12">—</td><td colspan="6">Yes</td><td colspan="6">—</td></tr>
<tr><td colspan="2">Operating Frequency/Supply Voltage</td><td colspan="24">8MHz/2.7 to 5.5V</td></tr>
<tr><td colspan="2">Operating Ambient Temperature (°C)</td><td>–20 to 75</td><td>–40 to 85</td><td>–20 to 75</td><td>–40 to 85</td><td>–20 to 75</td><td>–40 to 85</td><td>–20 to 75</td><td>–40 to 85</td><td>–20 to 75</td><td>–40 to 85</td><td>–20 to 75</td><td>–40 to 85</td><td>–20 to 75</td><td>–40 to 85</td><td>–20 to 75</td><td>–40 to 85</td><td>–20 to 75</td><td>–40 to 85</td><td>–20 to 75</td><td>–40 to 85</td><td>–20 to 75</td><td>–40 to 85</td><td>–20 to 75</td><td>–40 to 85</td></tr>
<tr><td colspan="2">Package*2</td><td colspan="2">PRQP0100KA-A</td><td colspan="2">PTQP0100LC-A</td><td colspan="2">PTQP0100KA-A</td><td colspan="2">PRQP0100KA-A</td><td colspan="2">PTQP0100LC-A</td><td colspan="2">PTQP0100KA-A</td><td colspan="2">PRQP0100KA-A</td><td colspan="2">PTQP0100LC-A</td><td colspan="2">PTQP0100KA-A</td><td colspan="2">PRQP0100KA-A</td><td colspan="2">PTQP0100LC-A</td><td colspan="2">PTQP0100KA-A</td></tr>
<tr><td colspan="2">Part No.</td><td>HD64338342XXXHV</td><td>HD64338342XXXHWV</td><td>HD64338342XXXWV</td><td>HD64338342XXXWWV</td><td>HD64338342XXXXV</td><td>HD64338342XXXXWV</td><td>HD64338343XXXHV</td><td>HD64338343XXXHWV</td><td>HD64338343XXXWV</td><td>HD64338343XXXWWV</td><td>HD64338343XXXXV</td><td>HD64338343XXXXWV</td><td>HD64F38344HV</td><td>HD64F38344HWV</td><td>HD64F38344WV</td><td>HD64F38344WWV</td><td>HD64F38344XV</td><td>HD64F38344XWV</td><td>HD64338344XXXHV</td><td>HD64338344XXXHWV</td><td>HD64338344XXXWV</td><td>HD64338344XXXWWV</td><td>HD64338344XXXXV</td><td>HD64338344XXXXWV</td></tr>
</table>

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8/300L Super Low Power Series)

Group		H8/38347																			
Memory	ROM (Bytes)	40K				48K				60K											
	RAM (Bytes)	2K																			
	ROM Type*1	M								F				M							
CPU	CPU	H8/300L Core																			
	Basic Instructions	57																			
	Minimum Instruction Execution Time (ns)	250 (@8MHz)																			
Clock	Clock Generation Circuit	2 circuits																			
	Subclock	Yes																			
	On-Chip Oscillator	—																			
	Frequency Divider	1/n (n = 16, 32, 64, 128)																			
	Power Save	Medium-speed/Sleep/Sub active/Sub sleep/Watch/Standby/Module standby																			
Power Supply Voltage Detection	Power-On Reset/POR	—																			
	Low Voltage Detection/LVD	—																			
A/D Converter	Resolution × Channels	10-bit × 12																			
	Sample and Hold	Yes																			
Timer	8-bit	3 (Timer A, Timer C, Timer G)																			
	16-bit	2 (Timer F, AEC)																			
	Input Capture	1 (Timer G)																			
	Output Compare	2 (Timer F)																			
	PWM Output	1 (14-bit PWM)																			
	Event Counter	5 (Timer C, Timer F, AEC)																			
Watchdog Timer		1																			
Serial Interface	Clock Sync./Clock Async.	2 (SCI3)																			
	Clock Sync. Only	1 (SCI1)																			
LCD		40seg × 4com																			
I/O Ports	Input Only (Numbers)	13																			
	CMOS I/O (Numbers)	71																			
	High Voltage Port (Numbers)	—																			
	N-Channel Open Drain Port (Numbers)	—																			
	High Current Drive Port	16																			
	Pull-Up Resistor	32																			
External Interrupts Pins		13																			
Debugging Function	On-Chip Debug	—								Yes				—							
	On-Board Flash Program	—								Yes				—							
Operating Frequency/Supply Voltage		8MHz/2.7 to 5.5V																			
Operating Ambient Temperature (°C)		–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85
Package*2		PRQP0100KA-A		PTQP0100LC-A		PTQP0100KA-A		PRQP0100KA-A		PTQP0100LC-A		PTQP0100KA-A		PRQP0100KA-A		PTQP0100LC-A		PTQP0100KA-A		PRQP0100KA-A		PTQP0100LC-A		PTQP0100KA-A	
Part No.		HD6433845XXXHV	HD6433845XXXHWV	HD6433845XXXWV	HD6433845XXXWWV	HD6433845XXXXV	HD6433845XXXXWV	HD6433846XXXHV	HD6433846XXXHWV	HD6433846XXXWV	HD6433846XXXWWV	HD6433846XXXXV	HD6433846XXXXWV	HD64F38347HV	HD64F38347HWV	HD64F38347WV	HD64F38347WWV	HD64F38347XV	HD64F38347XWV	HD6433847XXXHV	HD6433847XXXHWV	HD6433847XXXWV	HD6433847XXXWWV	HD6433847XXXXV	HD6433847XXXXWV

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8/300L Super Low Power Series)

Group		H8/38447			
Memory	ROM (Bytes)	16K	24K	32K	
	RAM (Bytes)	1K		2K	
	ROM Type*1	M		F	M
CPU	CPU	H8/300L Core			
	Basic Instructions	57			
	Minimum Instruction Execution Time (ns)	250 (@8MHz)			
Clock	Clock Generation Circuit	2 circuits			
	Subclock	Yes			
	On-Chip Oscillator	—			
	Frequency Divider	1/n (n = 16, 32, 64, 128)			
	Power Save	Medium-speed/Sleep/Sub active/Sub sleep/Watch/Standby/Module standby			
Power Supply Voltage Detection	Power-On Reset/POR	—			
	Low Voltage Detection/LVD	—			
A/D Converter	Resolution × Channels	10-bit × 12			
	Sample and Hold	Yes			
Timer	8-bit	3 (Timer A, Timer C, Timer G)			
	16-bit	2 (Timer F, AEC)			
	Input Capture	1 (Timer G)			
	Output Compare	2 (Timer F)			
	PWM Output	1 (14-bit PWM)			
	Event Counter	5 (Timer C, Timer F, AEC)			
Watchdog Timer		1			
Serial Interface	Clock Sync./Clock Async.	2 (SCI3)			
	Clock Sync. Only	1 (SCI1)			
LCD		40seg × 4com			
I/O Ports	Input Only (Numbers)	13			
	CMOS I/O (Numbers)	71			
	High Voltage Port (Numbers)	—			
	N-Channel Open Drain Port (Numbers)	—			
	High Current Drive Port	16			
	Pull-Up Resistor	32			
External Interrupts Pins		13			
Debugging Function	On-Chip Debug	—		Yes	—
	On-Board Flash Program	—		Yes	—
Operating Frequency/Supply Voltage		5MHz/2.7 to 4.5V, 8MHz/4.5 to 5.5V			

Package*2	Operating Ambient Temperature (˚C)	Part No.
PRQP0100KA-A	–20 to 75	HD64338442XXXHV
	–40 to 85	HD64338442XXXHWV
PTQP0100LC-A	–20 to 75	HD64338442XXXWV
	–40 to 85	HD64338442XXXWWV
PTQP0100KA-A	–20 to 75	HD64338442XXXV
	–40 to 85	HD64338442XXXWV
PRQP0100KA-A	–20 to 75	HD64338443XXXHV
	–40 to 85	HD64338443XXXHWV
PTQP0100LC-A	–20 to 75	HD64338443XXXWV
	–40 to 85	HD64338443XXXWWV
PTQP0100KA-A	–20 to 75	HD64338443XXXV
	–40 to 85	HD64338443XXXWV
PRQP0100KA-A	–20 to 75	HD64F38444HV
	–40 to 85	HD64F38444HWV
PTQP0100LC-A	–20 to 75	HD64F38444WV
	–40 to 85	HD64F38444WWV
PTQP0100KA-A	–20 to 75	HD64F38444XV
	–40 to 85	HD64F38444XWV
PRQP0100KA-A	–20 to 75	HD64338444XXXHV
	–40 to 85	HD64338444XXXHWV
PTQP0100LC-A	–20 to 75	HD64338444XXXWV
	–40 to 85	HD64338444XXXWWV
PTQP0100KA-A	–20 to 75	HD64338444XXXV
	–40 to 85	HD64338444XXXWV

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8/300L Super Low Power Series)

Group		H8/38447																							
Memory	ROM (Bytes)	40K						48K						60K											
	RAM (Bytes)	2K																							
	ROM Type*1	M												F						M					
CPU	CPU	H8/300L Core																							
	Basic Instructions	57																							
	Minimum Instruction Execution Time (ns)	250 (@8MHz)																							
Clock	Clock Generation Circuit	2 circuits																							
	Subclock	Yes																							
	On-Chip Oscillator	—																							
	Frequency Divider	1/n (n = 16, 32, 64, 128)																							
	Power Save	Medium-speed/Sleep/Sub active/Sub sleep/Watch/Standby/Module standby																							
Power Supply Voltage Detection	Power-On Reset/POR	—																							
	Low Voltage Detection/LVD	—																							
A/D Converter	Resolution × Channels	10-bit × 12																							
	Sample and Hold	Yes																							
Timer	8-bit	3 (Timer A, Timer C, Timer G)																							
	16-bit	2 (Timer F, AEC)																							
	Input Capture	1 (Timer G)																							
	Output Compare	2 (Timer F)																							
	PWM Output	1 (14-bit PWM)																							
	Event Counter	5 (Timer C, Timer F, AEC)																							
Watchdog Timer		1																							
Serial Interface	Clock Sync./Clock Async.	2 (SCI3)																							
	Clock Sync. Only	1 (SCI1)																							
LCD		40seg × 4com																							
I/O Ports	Input Only (Numbers)	13																							
	CMOS I/O (Numbers)	71																							
	High Voltage Port (Numbers)	—																							
	N-Channel Open Drain Port (Numbers)	—																							
	High Current Drive Port	16																							
	Pull-Up Resistor	32																							
External Interrupts Pins		13																							
Debugging Function	On-Chip Debug	—												Yes						—					
	On-Board Flash Program	—												Yes						—					
Operating Frequency/Supply Voltage		5MHz/2.7 to 4.5V, 8MHz/4.5 to 5.5V																							
Operating Ambient Temperature (°C)		–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85
Package*2		PRQP0100KA-A		PTQP0100LC-A		PTQP0100KA-A		PRQP0100KA-A		PTQP0100LC-A		PTQP0100KA-A		PRQP0100KA-A		PTQP0100LC-A		PTQP0100KA-A		PRQP0100KA-A		PTQP0100LC-A		PTQP0100KA-A	
Part No.		HD64338445XXXHV	HD64338445XXXHWV	HD64338445XXXWV	HD64338445XXXWWV	HD64338445XXXXV	HD64338445XXXXWV	HD64338446XXXHV	HD64338446XXXHWV	HD64338446XXXWV	HD64338446XXXWWV	HD64338446XXXXV	HD64338446XXXXWV	HD64F38447HV	HD64F38447HWV	HD64F38447WV	HD64F38447WWV	HD64F38447XV	HD64F38447XWV	HD64338447XXXHV	HD64338447XXXHWV	HD64338447XXXWV	HD64338447XXXWWV	HD64338447XXXXV	HD64338447XXXXWV

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

The 740 family meets extensive span of system requirements through superior features such as instruction sets suitable for control applications, high-level peripheral functions, and low power consumption. It is comprised of a wide variety of MCUs with a rich array of functions for applications ranging from household appliances to industrial equipment.

740 Family Features

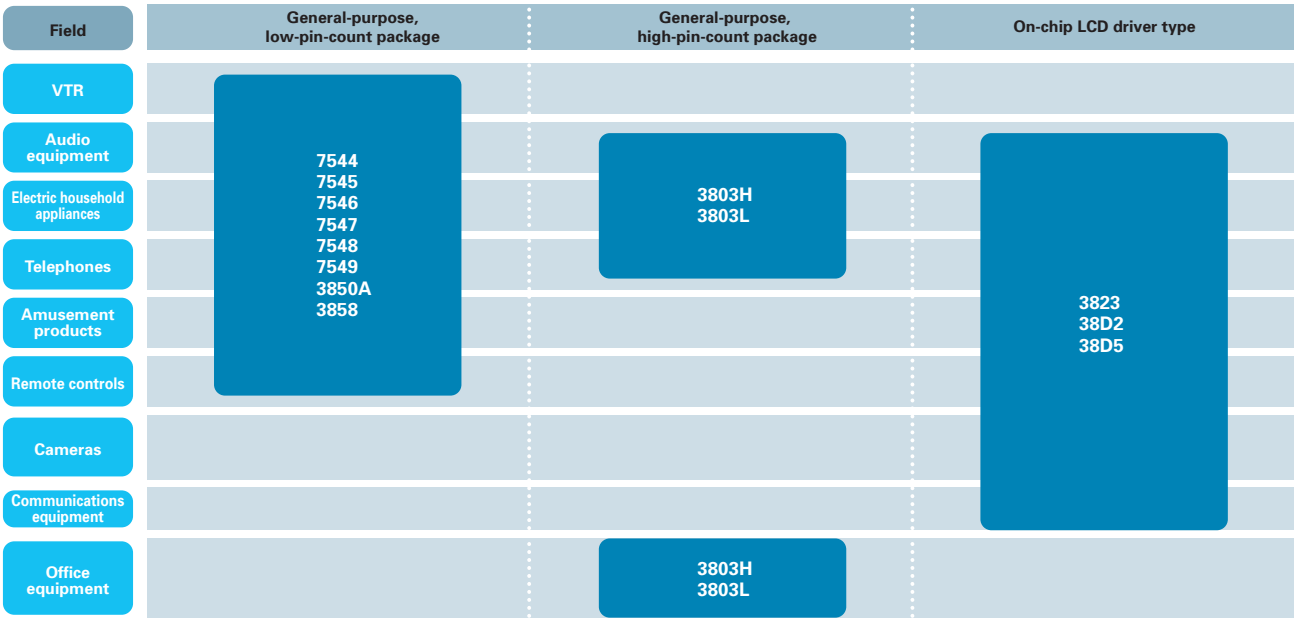
Proprietary 8-bit CPU core
- Broad array of functions suitable for a variety of applications
- Diverse product lineup, encompassing 20-pin to 80-pin versions
- High-level software development environment
- Pin compatibility and numerous ROM and RAM configurations
- Increased speed, enhanced peripheral functions
- Flash memory and QzROM versions
- Low voltage and low power consumption

QzROM Version

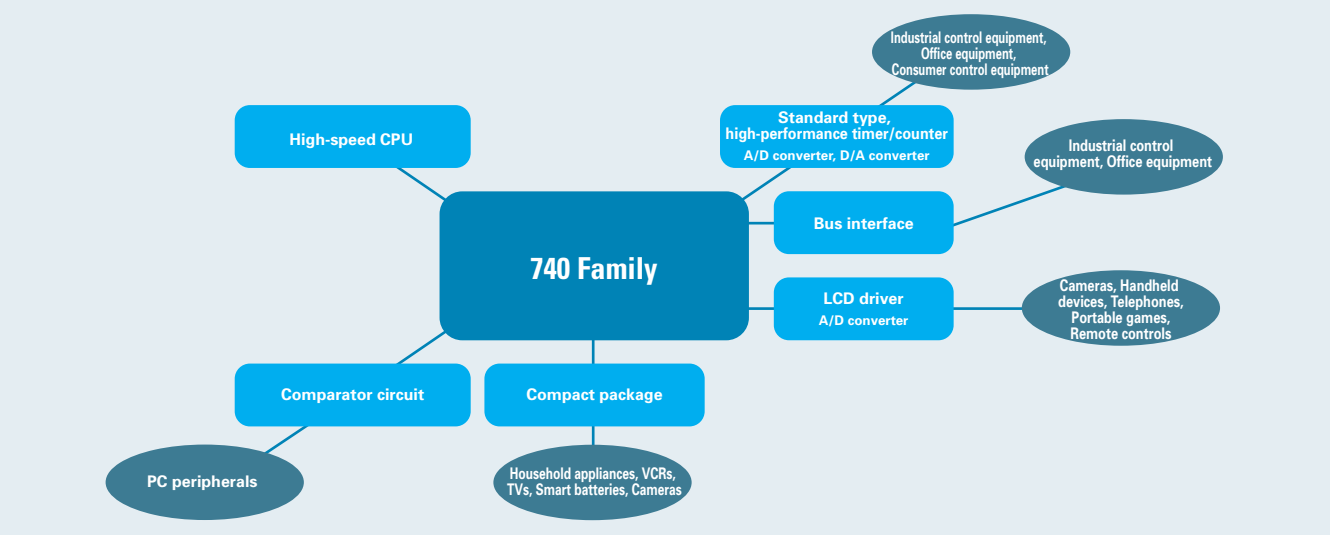
Devices are included in the Groups shown in below.

740 Series	7544 Group
	7545 Group
	7546 Group
	7547 Group
	7548 Group
	7549 Group
38000 Series	3803H Group
	3823 Group
	3850A Group
	3858 Group
	38D2 Group
	38D5 Group

• Application Map



• Applications



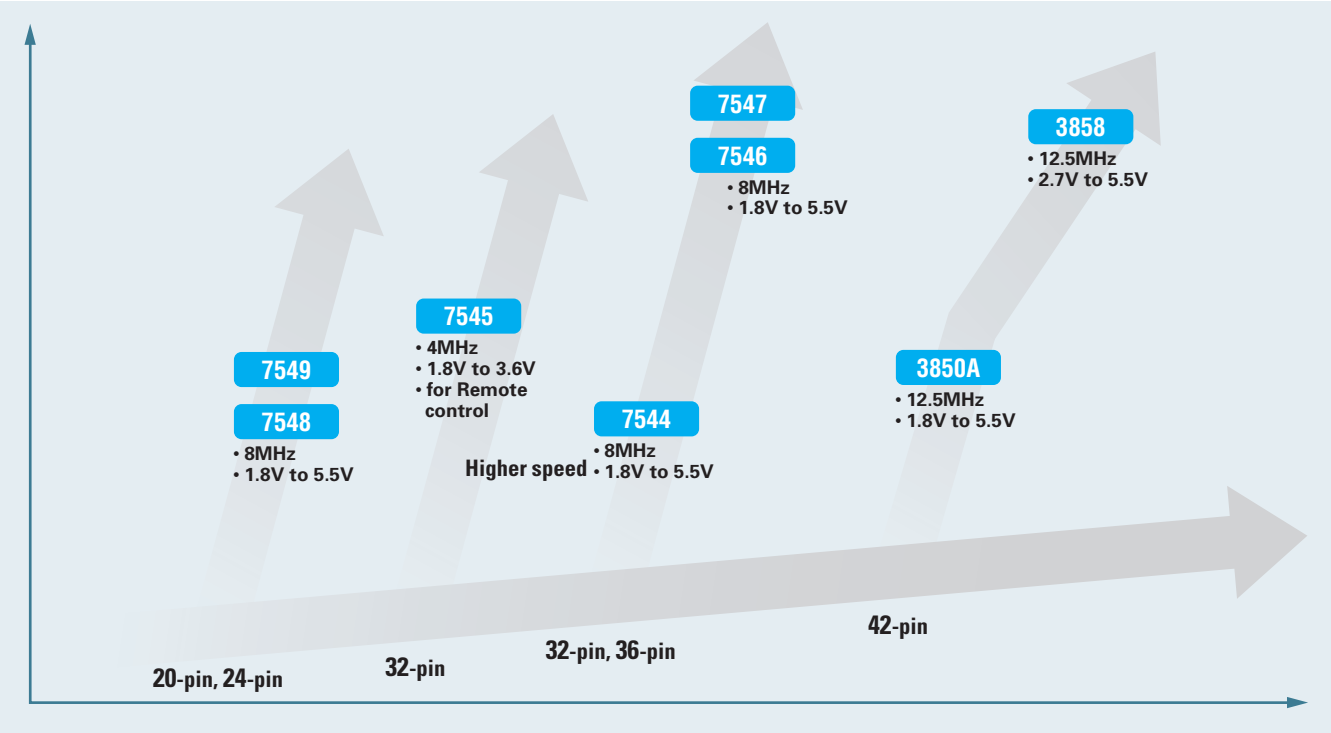
38000/740 Series

Offering four microcomputer types to meet all system design requirement: low-pin and high-pin count general purpose MCUs, MCUs with built-in LCD driver, and MCUs with built-in dedicated function. Now debuting the QzROM version.

The trend toward more compact and lightweight products and reduced system costs is aided by general-purpose Renesas MCUs that integrate the functions and performance of conventional 8-bit processors into smaller (low-pincount) packages. These MCUs have on-chip serial I/O for clock synchronous/asynchronous communication and A/D converters to transform analog signals into data for digital signal processors. They are ideal for use in compact electric household appliances.

Applications Remote controls, VCRs, audio equipment, household appliances, telephones, amusement products

• Roadmap (General-Purpose Type (Low-Pin-Count Package): 740 Family



7544 Group

- General-purpose 32-pin model: Incorporating versatile functions, such as an A/D converter, serial interface, and on-chip oscillator.
- A maximum oscillation frequency of 8MHz.
- Minimum instruction execution time: 0.25µs (at oscillation frequency of 8MHz while in double-speed mode)

7545 Group

- General-purpose 32-pin model: Incorporating a carrier generation circuit.
- Incorporates a power-on reset circuit and voltage drop detection circuit.
- A maximum oscillation frequency of 4MHz.

*Refer to "Remote Control MCUs" in this catalog.

7546 Group

- General-purpose 32-pin model: Incorporating versatile functions, such as an input capture/output comparator, A/D converter, serial interface, and on-chip oscillator.
- Incorporates a power-on reset circuit and voltage drop detection circuit.
- Minimum instruction execution time: 0.25µs (at oscillation frequency of 8MHz while in double-speed mode)

7547 Group

- General-purpose 36-pin model: Incorporating versatile functions, such as an input capture/output comparator, A/D converter, serial interface, and on-chip oscillator.
- Incorporates a power-on reset circuit and voltage drop detection circuit.
- Minimum instruction execution time: 0.25µs (at oscillation frequency of 8MHz while in double-speed mode)

7548 Group

- General-purpose 20-pin model: Incorporating versatile functions, such as an input capture/output comparator, A/D converter, serial interface, and high-speed and low-speed on-chip oscillators.
- Incorporating a power-on reset circuit and voltage drop detection circuit.
- Minimum instruction execution time: 0.25µs (at an oscillation frequency of 8MHz while in double-speed mode).

7549 Group

- General-purpose 24-pin model: Incorporating versatile functions, such as an input capture/output comparator, A/D converter, serial interface, and high-speed and low-speed on-chip oscillators.
- Incorporating a power-on reset circuit and voltage drop detection circuit.
- Minimum instruction execution time: 0.25µs (at an oscillation frequency of 8MHz while in double-speed mode).

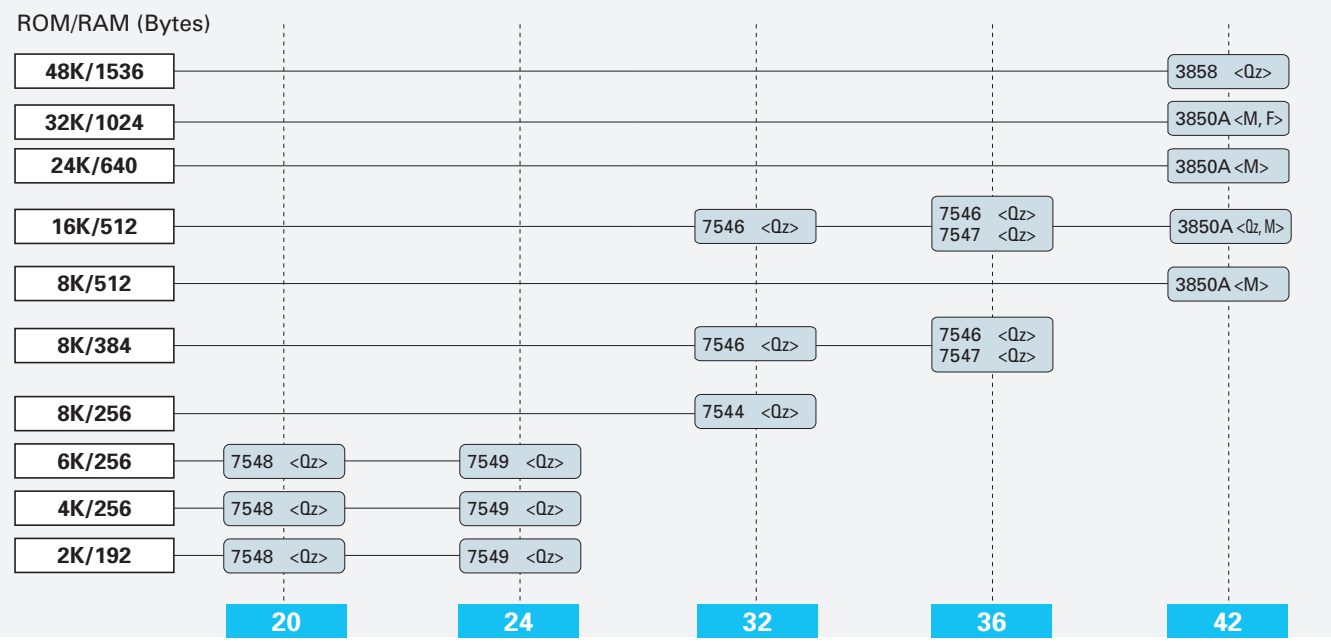
3850A Group

- General-purpose 42-pin model: Incorporating an A/D converter, serial interface, and sub clock.
- A maximum oscillation frequency of 12.5MHz.
- Minimum instruction execution time: 0.32µs (at oscillation frequency of 12.5MHz)

3858 Group

- General-purpose 42-pin model: Incorporating an A/D converter, serial interface, and 16-bit timer.
- A maximum oscillation frequency of 12.5MHz.
- Minimum instruction execution time: 0.32µs (at oscillation frequency of 12.5MHz)

• Memory Capacity (ROM/RAM) (General-Purpose Type (Low-Pin-Count Package): 740 Series)



Letters in brackets < > indicate memory variations.
F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

• Specifications (General-Purpose Type(Low-Pin-Count Package): 740 Series)

Series		740			
Group		7544			
Memory	ROM (Bytes)	8K			
	RAM (Bytes)	256			
	ROM Type*1	Qz			
	Data Flash/E2 Data Flash	—			
	Program Security	Yes (ROM code protect function)			
CPU	CPU	740 Core			
	Basic Instructions	71			
	Minimum Instruction Execution Time (ns)	250 (@8MHz)			
DMA	DMAC (Channels)	—			
External Bus Expansion	Host Interface	—			
Clock	Clock Generation Circuit	2 circuits (Main clock, On-chip oscillator)			
	PLL	—			
	Subclock	—			
	On-Chip Oscillator	Yes			
	Oscillation Stop Detection	Yes			
	Frequency Divider	Main clock: 1/n (n = 1, 2, 8), On-chip oscillator: 1/n (n = 8)			
	Power Save	Wait/Stop			
Power Supply Voltage Detection	Power-On Reset/POR	—			
	Low Voltage Detection/LVD	—			
A/D Converter	Resolution × Channels	8-bit × 6			
D/A Converter	Resolution × Channels	—			
Timer	8-bit	2 (Timer 1, Timer X)			
	16-bit	2 (Timer A)			
	Input Capture	—			
	Output Compare	—			
	PWM Output	—			
	Real-Time Port	—			
	Event Counter	2 (shared with Timer A, Timer X)			
Watchdog Timer		1			
Serial Interface	Clock Sync./Clock Async.	1 (Serial I/O)			
	Clock Sync. Only	—			
	Clock Async. Only	—			
I²C-bus		—			
USB Function		—			
LPC/ISA		—			
LCD		—			
I/O Ports	Input Only (Numbers)	—			
	CMOS Output Only (Numbers)	—			
	CMOS I/O (Numbers)	25			
	High Voltage Port (Numbers)	—			
	N-Channel Open Drain Port (Numbers)	—			
	DTMF	—			
	High Current Drive Port	14			
	Pull-Up Resistor	14			
External Interrupts Pins		12 (INT × 2, CNTR × 2, Key Input × 8)			
Debugging Function	On-Board Flash Program	—			
Other Functions	ROM Correction Function	—			
	Others	Permitting RC oscillation			
Operating Frequency/Supply Voltage		1.8 to 5.5V			
Operating Ambient Temperature (˚C)		–20 to 85			
Package*2		PLQP0032GB-A	PRDP0032BA-A	PLQP0032GB-A	PRDP0032BA-A
Part No.		M37544G2AGP	M37544G2ASP	M37544G2A-XXXGP	M37544G2A-XXXSP

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (General-Purpose Type(Low-Pin-Count Package): 740 Series)

Series		740																	
Group		7546						7547				7548				7549			
Memory	ROM (Bytes)	8K			16K			8K		16K		2K	4K		6K	2K	4K		6K
	RAM (Bytes)	384			512			384		512		192	256			192	256		
	ROM Type*1	Qz																	
	Data Flash/E2 Data Flash	—																	
	Program Security	Yes (ROM code protect function)																	
CPU	CPU	740 Core																	
	Basic Instructions	71																	
	Minimum Instruction Execution Time (ns)	250 (@8MHz)																	
DMA	DMAC (Channels)	—																	
External Bus Expansion	Host Interface	—																	
Clock	Clock Generation Circuit	2 circuits (Main clock, On-chip oscillator)										4 circuits (Main clock, Sub clock, High speed on-chip oscillator, Low speed on-chip oscillator)							
	PLL	—																	
	Subclock	—										Yes							
	On-Chip Oscillator	Yes										2 circuits (High speed: 4MHz, Low speed: 250kHz)							
	Oscillation Stop Detection	Yes																	
	Frequency Divider	Main clock: 1/n (n = 1, 2, 8), On-chip oscillator: 1/n (n = 1, 2, 8, 128)										1/n (n = 1, 2, 4, 8)							
	Power Save	Wait/Stop																	
Power Supply Voltage Detection	Power-On Reset/POR	Yes																	
	Low Voltage Detection/LVD	Yes																	
A/D Converter	Resolution × Channels	10-bit × 6						10-bit × 8				10-bit × 6				10-bit × 8			
D/A Converter	Resolution × Channels	—																	
Timer	8-bit	2 (Timer 1, Timer X)										2 (Timer 1, Timer 2)							
	16-bit	2 (Timer A, Timer B)										1 (Timer A)							
	Input Capture	2 (shared with Timer A, Timer B)										1 (shared with Timer A)							
	Output Compare	4 (shared with Timer A, Timer B)										3 (shared with Timer A)							
	PWM Output	4 (shared with Timer A, Timer B)										3 (shared with Timer A)							
	Real-Time Port	4 (shared with Timer A, Timer B)										3 (shared with Timer A)							
	Event Counter	1 (shared with Timer X)										—							
Watchdog Timer		1																	
Serial Interface	Clock Sync./Clock Async.	2 (Serial I/O 1, Serial I/O 2)										1 (Serial I/O)							
	Clock Sync. Only	—																	
	Clock Async. Only	—																	
I²C-bus		—																	
USB Function		—																	
LPC/ISA		—																	
LCD		—																	
I/O Ports	Input Only (Numbers)	—																	
	CMOS Output Only (Numbers)	—										1							
	CMOS I/O (Numbers)	25						29				15				19			
	High Voltage Port (Numbers)	—																	
	N-Channel Open Drain Port (Numbers)	—																	
	DTMF	—																	
	High Current Drive Port	14						16				8							
	Pull-Up Resistor	14						16				14				16			
External Interrupts Pins		12 (INT × 1, CNTR × 1, Key Input × 8, Input capture × 2)						13 (INT × 2, CNTR × 1, Key Input × 8, Input capture × 2)				9 (INT × 2, Key Input × 6, Input capture × 1)				11 (INT × 2, Key Input × 8, Input capture × 1)			
Debugging Function	On-Board Flash Program	—																	
Other Functions	ROM Correction Function	—																	
	Others	Permitting RC oscillation										—							
Operating Frequency/Supply Voltage		1.8 to 5.5V																	
Operating Ambient Temperature (˚C)		–20 to 85																	
Package*2		PLQP0032GB-A	PWQN0036KA-A	PRDP0032BA-A	PLQP0032GB-A	PWQN0036KA-A	PRDP0032BA-A	PLQP0032GB-A	PWQN0036KA-A	PRDP0032BA-A	PLQP0032GB-A	PWQN0036KA-A	PRDP0032BA-A	PRSP0036GA-B				PLSP0020JB-A						PRSP0024GA-A					
Part No.		M37546G2GP	M37546G2HP	M37546G2SP	M37546G2-XXXGP	M37546G2-XXXHP	M37546G2-XXXSP	M37546G4GP	M37546G4HP	M37546G4SP	M37546G4-XXXGP	M37546G4-XXXHP	M37546G4-XXXSP	M37547G2FP	M37547G2-XXXFP	M37547G4FP	M37547G4-XXXFP	M37548G1FP	M37548G1-XXXFP	M37548G2FP	M37548G2-XXXFP	M37548G3FP	M37548G3-XXXFP	M37549G1FP	M37549G1-XXXFP	M37549G2FP	M37549G2-XXXFP	M37549G3FP	M37549G3-XXXFP

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (General-Purpose Type (Low-Pin-Count Package): 38000 Series)

Series		38000												
Group		3850A												
Memory	ROM (Bytes)	8K	16K					24K		32K				
	RAM (Bytes)	512						640		1024				
	ROM Type*1	M		Qz				M		F		M		
	Data Flash/E2 Data Flash	—												
	Program Security	—		Yes (ROM code protect function)				—		Yes (ID code check function, ROM code protect function)		—		
CPU	CPU	740 Core												
	Basic Instructions	71												
	Minimum Instruction Execution Time (ns)	320 (@12.5MHz)												
DMA	DMAC (Channels)	—												
External Bus Expansion	Host Interface	—												
Clock	Clock Generation Circuit	2 circuits (Main clock, Sub clock)												
	PLL	—												
	Subclock	Yes												
	On-Chip Oscillator	—												
	Oscillation Stop Detection	—												
	Frequency Divider	Main clock: 1/n (n = 2, 8), Sub clock: 1/n (n = 2)												
	Power Save	Wait/Stop												
Power Supply Voltage Detection	Power-On Reset/POR	—												
	Low Voltage Detection/LVD	—												
A/D Converter	Resolution × Channels	10-bit × 9												
D/A Converter	Resolution × Channels	—												
Timer	8-bit	4 (Timer X, Timer Y, Timer 1, Timer 2)												
	16-bit	—												
	Input Capture	—												
	Output Compare	—												
	PWM Output	1												
	Real-Time Port	—												
	Event Counter	2 (shared with Timer X, Timer Y)												
Watchdog Timer		1												
Serial Interface	Clock Sync./Clock Async.	1 (Serial I/O 1)												
	Clock Sync. Only	1 (Serial I/O 2)												
	Clock Async. Only	—												
I²C-bus		—												
USB Function		—												
LPC/ISA		—												
LCD		—												
I/O Ports	Input Only (Numbers)	—												
	CMOS Output Only (Numbers)	—												
	CMOS I/O (Numbers)	32												
	High Voltage Port (Numbers)	—												
	N-Channel Open Drain Port (Numbers)	2												
	DTMF	—												
	High Current Drive Port	8												
	Pull-Up Resistor	32												
External Interrupts Pins		6 (INT × 4, CNTR × 2)												
Debugging Function	On-Board Flash Program	—										Yes		—
Other Functions	ROM Correction Function	—												
	Others	—												
Operating Frequency/Supply Voltage		2.7 to 5.5V				1.8 to 5.5V				2.7 to 5.5V				
Operating Ambient Temperature (°C)		–20 to 85												
Package*2		PRSP0042GA-B	PRDP0042BA-A	PRSP0042GA-B	PRDP0042BA-A	PRSP0042GA-B	PRDP0042BA-A	PRSP0042GA-B	PRDP0042BA-A	PRSP0042GA-B	PRDP0042BA-A	PRSP0042GA-B	PRDP0042BA-A	PRSP0042GA-B	PRDP0042BA-A
Part No.		M38503M2A-XXXFP	M38503M2A-XXXSP	M38503M4A-XXXFP	M38503M4A-XXXSP	M38503G4AFP	M38503G4ASP	M38503G4A-XXXFP	M38503G4A-XXXSP	M38504M6A-XXXFP	M38504M6A-XXXSP	M38507F8AFP	M38507F8ASP	M38507M8A-XXXFP	M38507M8A-XXXSP

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (General-Purpose Type (Low-Pin-Count Package): 38000 Series)

Series		38000			
Group		3858			
Memory	ROM (Bytes)	48K			
	RAM (Bytes)	1536			
	ROM Type*1	Qz			
	Data Flash/E2 Data Flash	—			
	Program Security	Yes (ROM code protect function)			
CPU	CPU	740 Core			
	Basic Instructions	71			
	Minimum Instruction Execution Time (ns)	320 (@12.5MHz)			
DMA	DMAC (Channels)	—			
External Bus Expansion	Host Interface	—			
Clock	Clock Generation Circuit	2 circuits (Main clock, Sub clock)			
	PLL	—			
	Subclock	Yes			
	On-Chip Oscillator	—			
	Oscillation Stop Detection	—			
	Frequency Divider	Main clock: 1/n (n = 2, 8), Sub clock: 1/n (n = 2)			
	Power Save	Wait/Stop			
Power Supply Voltage Detection	Power-On Reset/POR	—			
	Low Voltage Detection/LVD	—			
A/D Converter	Resolution × Channels	8-bit × 9			
D/A Converter	Resolution × Channels	—			
Timer	8-bit	4 (Timer X, Timer Y, Timer 1, Timer 2)			
	16-bit	2 (Timer Z1, Timer Z2)			
	Input Capture	—			
	Output Compare	—			
	PWM Output	1			
	Real-Time Port	—			
	Event Counter	4 (shared with Timer X, Timer Y, Timer Z1, Timer Z2)			
Watchdog Timer		1			
Serial Interface	Clock Sync./Clock Async.	1 (Serial I/O 1)			
	Clock Sync. Only	1 (Serial I/O 2)			
	Clock Async. Only	—			
I²C-bus		—			
USB Function		—			
LPC/ISA		—			
LCD		—			
I/O Ports	Input Only (Numbers)	—			
	CMOS Output Only (Numbers)	—			
	CMOS I/O (Numbers)	34			
	High Voltage Port (Numbers)	—			
	N-Channel Open Drain Port (Numbers)	—			
	DTMF	—			
	High Current Drive Port	8			
	Pull-Up Resistor	34			
External Interrupts Pins		8 (INT × 4, CNTR × 4)			
Debugging Function	On-Board Flash Program	—			
Other Functions	ROM Correction Function	—			
	Others	—			
Operating Frequency/Supply Voltage		2.7 to 5.5V			
Operating Ambient Temperature (°C)		–20 to 85			
Package*2		PRSP0042GA-B	PRDP0042BA-A	PRSP0042GA-B	PRDP0042BA-A
Part No.		M38588GCFP	M38588GCSP	M38588GC-XXXFP	M38588GC-XXXSP

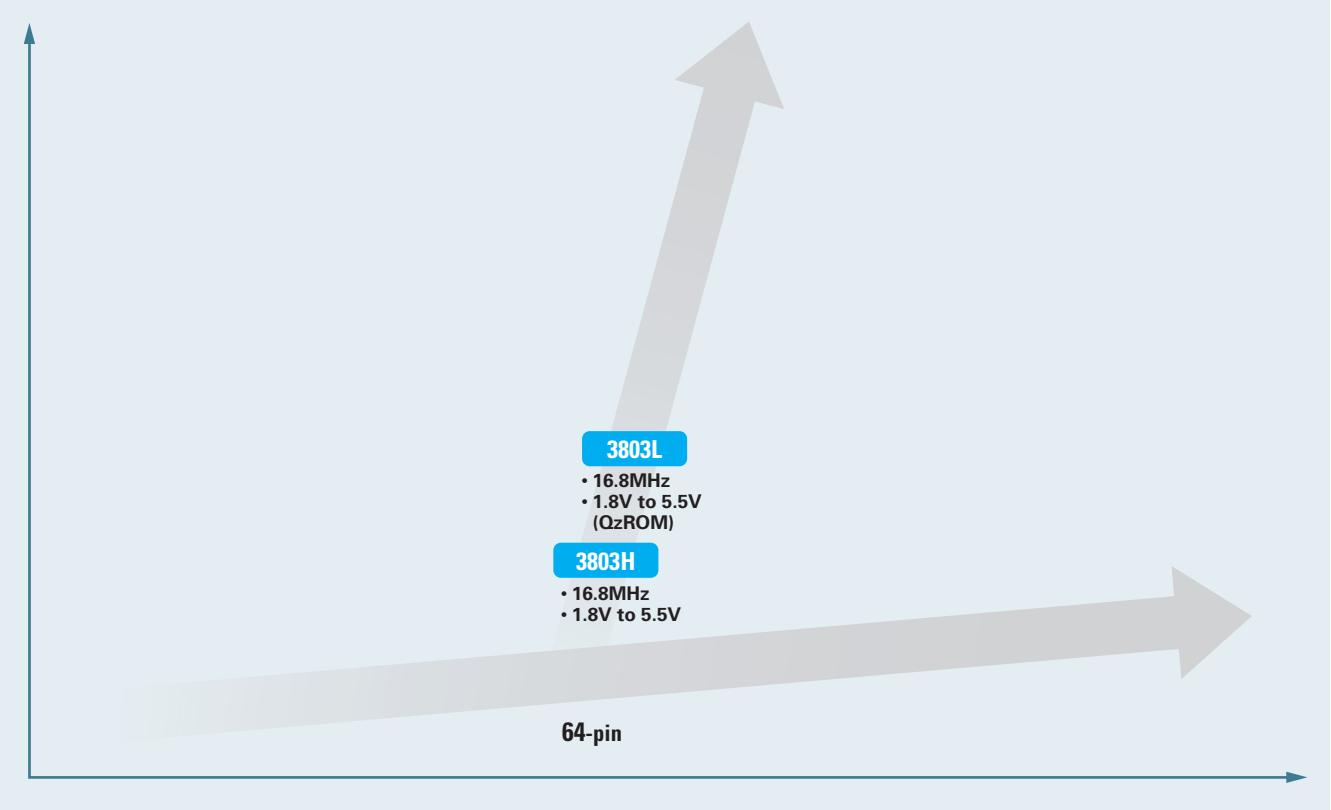
*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

These general-purpose 64-pin through 80-pin MCUs implement standard CMOS I/O ports. They are available in a wide range of memory and package configurations and include on-chip peripheral functions such as A/D converters, D/A converters, multifunction timers, and serial I/O functions.

Applications Audio equipment, household appliances, telephones, amusement products, office equipment, PCs

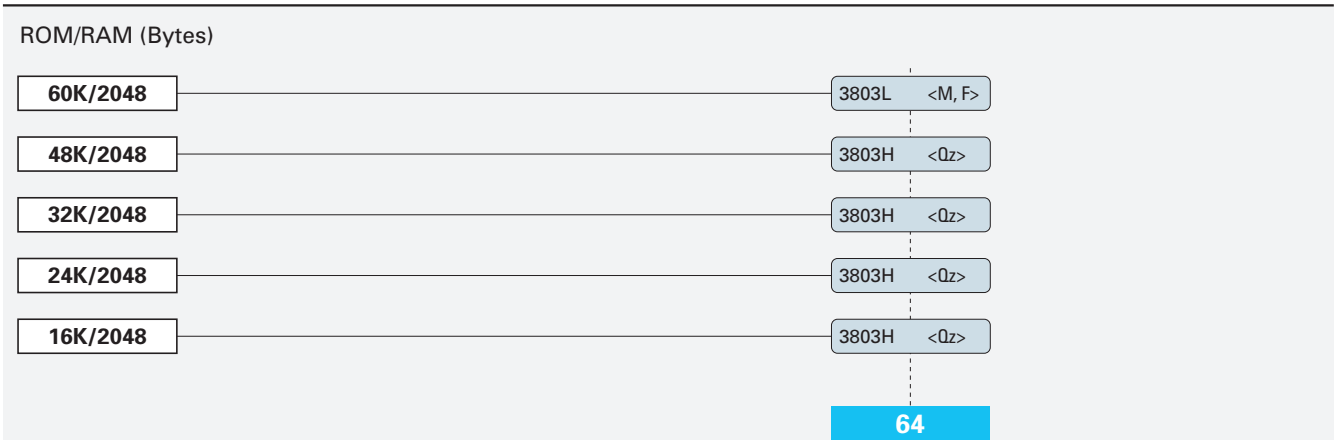
• Roadmap (General-Purpose Type (High-Pin-Count Package): 740 Family



3803H, 3803L Group

- Incorporate as A/D converter, D/A converter, serial interface, and sub clock.
- A maximum oscillation frequency of 16.8MHz.
- Minimum instruction execution time: 0.24μs (at oscillation frequency of 16.8MHz)

• Memory Capacity (ROM/RAM) (General-Purpose Type (High-Pin-Count Package): 38000 Series)



Letters in brackets < > indicate memory variations.
F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

• Specifications (General-Purpose Type (High-Pin-Count Package): 38000 Series)

Series		38000			
Group		3803H			
Memory	ROM (Bytes)	16K	24K	32K	48K
	RAM (Bytes)	2048			
	ROM Type*1	Qz			
	Data Flash/E2 Data Flash	—			
	Program Security	Yes (ROM code protect function)			
CPU	CPU	740 Core			
	Basic Instructions	71			
	Minimum Instruction Execution Time (ns)	240 (@16.8MHz)			
DMA	DMAC (Channels)	—			
External Bus Expansion	Host Interface	—			
Clock	Clock Generation Circuit	2 circuits (Main clock, Sub clock)			
	PLL	—			
	Subclock	Yes			
	On-Chip Oscillator	—			
	Oscillation Stop Detection	—			
	Frequency Divider	Main clock: 1/n (n = 2, 8), Sub clock: 1/n (n = 2)			
	Power Save	Wait/Stop			
Power Supply Voltage Detection	Power-On Reset/POR	—			
	Low Voltage Detection/LVD	—			
A/D Converter	Resolution × Channels	10-bit × 16			
D/A Converter	Resolution × Channels	8-bit × 2			
Timer	8-bit	4 (Timer X, Timer Y, Timer 1, Timer 2)			
	16-bit	1 (Timer Z)			
	Input Capture	—			
	Output Compare	—			
	PWM Output	1			
	Real-Time Port	1 (shared with Timer Z)			
	Event Counter	3 (shared with Timer X, Timer Y, Timer Z)			
Watchdog Timer		1			
Serial Interface	Clock Sync./Clock Async.	2 (Serial I/O 1, Serial I/O 3)			
	Clock Sync. Only	1 (Serial I/O 2)			
	Clock Async. Only	—			
I²C-bus		—			
USB Function		—			
LPC/ISA		—			
LCD		—			
I/O Ports	Input Only (Numbers)	—			
	CMOS Output Only (Numbers)	—			
	CMOS I/O (Numbers)	54			
	High Voltage Port (Numbers)	—			
	N-Channel Open Drain Port (Numbers)	2			
	DTMF	—			
	High Current Drive Port	8			
	Pull-Up Resistor	54			
External Interrupts Pins		8 (INT × 5, CNTR × 3)			
Debugging Function	On-Board Flash Program	—			
Other Functions	ROM Correction Function	—			
	Others	—			
Operating Frequency/Supply Voltage		1.8 to 5.5V			
Operating Ambient Temperature (˚C)		–20 to 85			

Package*2	PLQP0064KB-A	PLQP0064GA-A	PRDP0064BA-A	PLQP0064KB-A	PLQP0064GA-A	PLQP0064KB-A	PLQP0064GA-A	PRDP0064BA-A	PLQP0064KB-A	PLQP0064GA-A	PLQP0064KB-A	PLQP0064GA-A	PRDP0064BA-A	PLQP0064KB-A	PLQP0064GA-A	PLQP0064KB-A	PLQP0064GA-A	PRDP0064BA-A	PTLG0064JA-A	PLQP0064KB-A	PLQP0064GA-A	PTLG0064JA-A
Part No.	M38039G4HHP	M38039G4HKP	M38039G4HSP	M38039G4H-XXXHP	M38039G4H-XXXKP	M38039G6HHP	M38039G6HKP	M38039G6HSP	M38039G6H-XXXHP	M38039G6H-XXXKP	M38039G8HHP	M38039G8HKP	M38039G8HSP	M38039G8H-XXXHP	M38039G8H-XXXKP	M38039GCHHP	M38039GCHKP	M38039GCHSP	M38039GCHWG	M38039GCH-XXXHP	M38039GCH-XXXKP	M38039GCH-XXXWG

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (General-Purpose Type (High-Pin-Count Package): 38000 Series)

Series		38000							
Group		3803L							
Memory	ROM (Bytes)	60K							
	RAM (Bytes)	2048							
	ROM Type*1	F				M			
	Data Flash/E2 Data Flash	—							
	Program Security	Yes (ID code check function, ROM code protect function)				—			
CPU	CPU	740 Core							
	Basic Instructions	71							
	Minimum Instruction Execution Time (ns)	240 (@16.8MHz)							
DMA	DMAC (Channels)	—							
External Bus Expansion	Host Interface	—							
Clock	Clock Generation Circuit	2 circuits (Main clock, Sub clock)							
	PLL	—							
	Subclock	Yes							
	On-Chip Oscillator	—							
	Oscillation Stop Detection	—							
	Frequency Divider	Main clock: 1/n (n = 2, 8), Sub clock: 1/n (n = 2)							
	Power Save	Wait/Stop							
Power Supply Voltage Detection	Power-On Reset/POR	—							
	Low Voltage Detection/LVD	—							
A/D Converter	Resolution × Channels	10-bit × 16							
D/A Converter	Resolution × Channels	8-bit × 2							
Timer	8-bit	4 (Timer X, Timer Y, Timer 1, Timer 2)							
	16-bit	1 (Timer Z)							
	Input Capture	—							
	Output Compare	—							
	PWM Output	1							
	Real-Time Port	1 (shared with Timer Z)							
	Event Counter	3 (shared with Timer X, Timer Y, Timer Z)							
Watchdog Timer		1							
Serial Interface	Clock Sync./Clock Async.	2 (Serial I/O 1, Serial I/O 3)							
	Clock Sync. Only	1 (Serial I/O 2)							
	Clock Async. Only	—							
I²C-bus		—							
USB Function		—							
LPC/ISA		—							
LCD		—							
I/O Ports	Input Only (Numbers)	—							
	CMOS Output Only (Numbers)	—							
	CMOS I/O (Numbers)	54							
	High Voltage Port (Numbers)	—							
	N-Channel Open Drain Port (Numbers)	2							
	DTMF	—							
	High Current Drive Port	8							
	Pull-Up Resistor	54							
External Interrupts Pins		8 (INT × 5, CNTR × 3)							
Debugging Function	On-Board Flash Program	Yes				—			
Other Functions	ROM Correction Function	—							
	Others	—							
Operating Frequency/Supply Voltage		2.7 to 5.5V				1.8 to 5.5V			
Operating Ambient Temperature (°C)		–20 to 85							
Package*2		PLQP0064KB-A	PLQP0064GA-A	PRDP0064BA-A	PTLG0064JA-A	PLQP0064KB-A	PLQP0064GA-A	PRDP0064BA-A	PTLG0064JA-A
Part No.		M38039FFLHP	M38039FFLKP	M38039FFLSP	M38039FFLWG	M38039MFL-XXXHP	M38039MFL-XXXKP	M38039MFL-XXXSP	M38039MFL-XXXWG

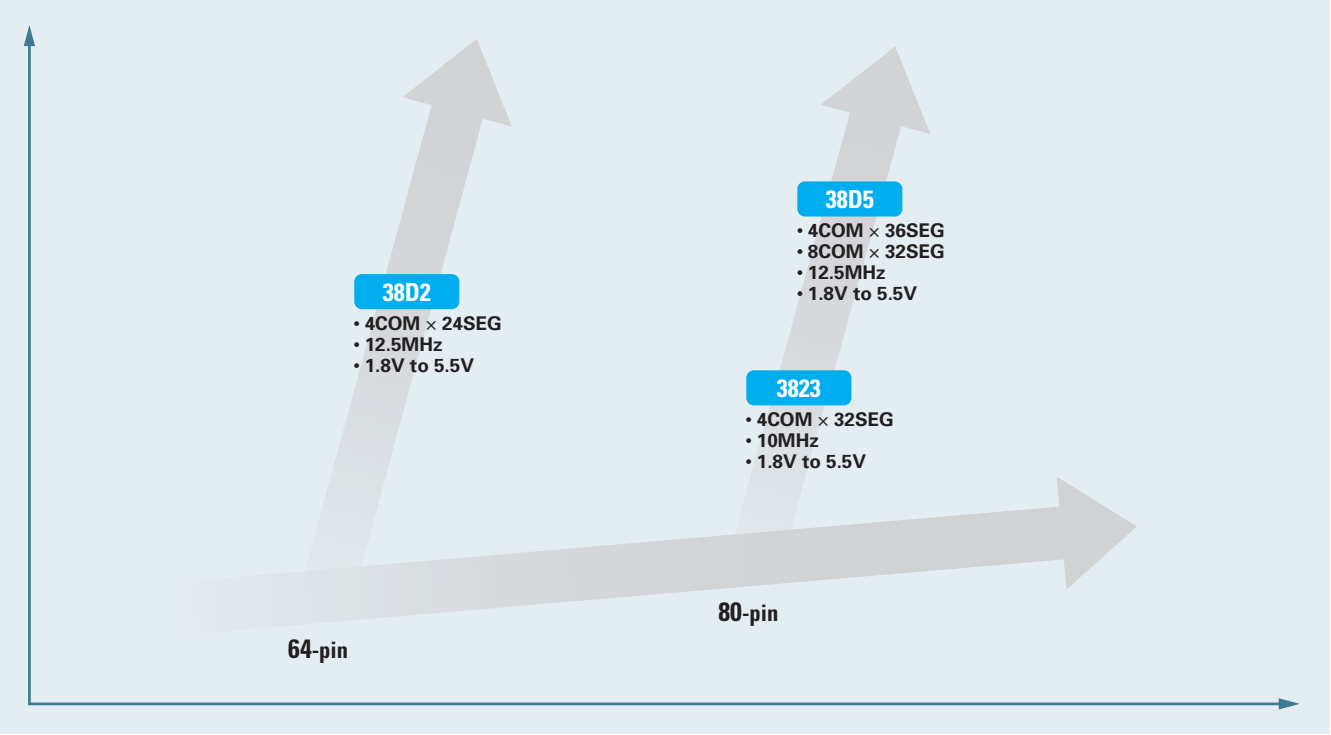
*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

These MCUs include an LCD controller and driver for display applications. They are ideal for systems employing segment or dot-matrix displays. In addition, features such as a subclock oscillation circuit and key-on wakeup function help reduce power consumption, making them well suited for use in portable equipment.

Applications Remote controls, VCRs, audio equipment, household appliances, telephones, amusement products

• Roadmap (On-Chip LCD Driver Type): 740 Family



3823 Group

- Incorporates as A/D converter, serial interface, and subclock.
- Incorporates a ROM correction function and watchdog timer.
- A maximum oscillation frequency of 10MHz.
- Minimum instruction execution time: 0.4μs (at oscillation frequency of 10MHz while in high-speed mode)

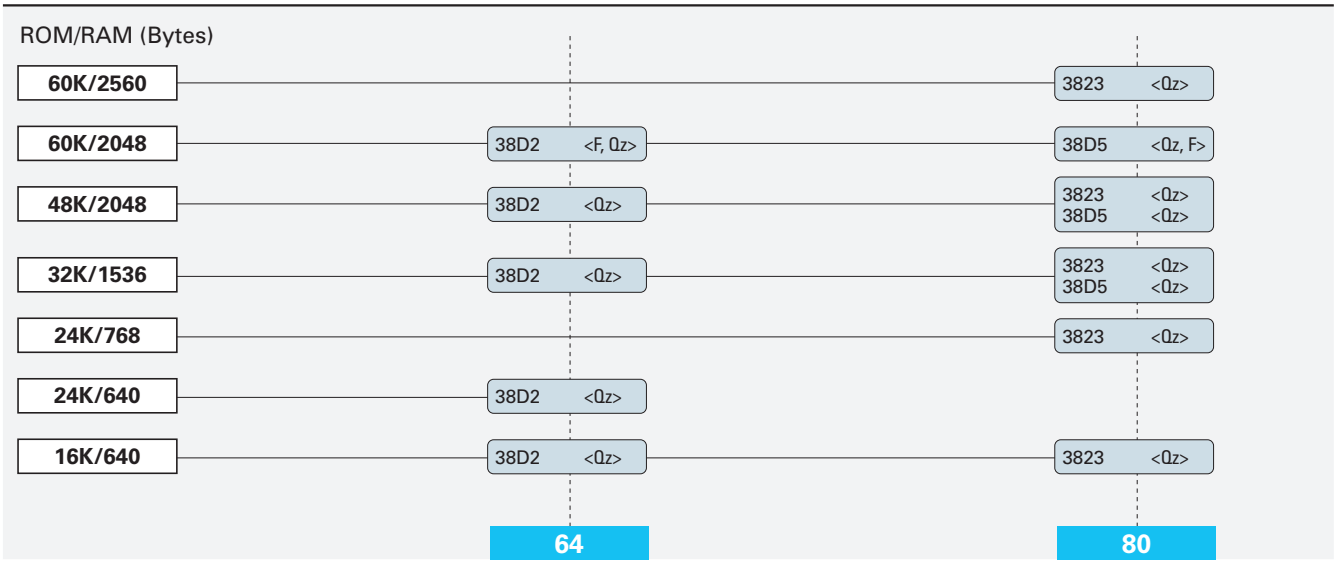
38D2 Group

- Incorporates as A/D converter, serial interface and subclock.
- A ROM correction function and on-chip oscillator.
- A maximum oscillation frequency of 16MHz (not available while in divide-by-2 mode) .
- Minimum instruction execution time: 0.32μs (at oscillation frequency of 12.5MHz)

38D5 Group

- Incorporates as A/D converter, serial interface, subclock, on-chip oscillator, and ROM correction function.
- A maximum oscillation frequency of 16MHz (not available while in divide-by-2 mode) .
- Minimum instruction execution time: 0.32μs (at oscillation frequency of 12.5MHz)

• Memory Capacity (ROM/RAM) (On-Chip LCD Driver Type: 38000 Series)



Letters in brackets < > indicate memory variations.
F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

• Specifications (On-Chip LCD Driver Type: 38000 Series)

Series		38000				
Group		3823				
Memory	ROM (Bytes)	16K	24K	32K	48K	60K
	RAM (Bytes)	640	768	1536	2048	2560
	ROM Type*1	Qz				
	Data Flash/E2 Data Flash	—				
	Program Security	Yes (ROM code protect function)				
CPU	CPU	740 Core				
	Basic Instructions	71				
	Minimum Instruction Execution Time (ns)	400 (@10MHz)				
DMA	DMAC (Channels)	—				
External Bus Expansion	Host Interface	—				
Clock	Clock Generation Circuit	3 circuits (Main clock, Sub clock, On-chip oscillator)				
	PLL	—				
	Subclock	Yes				
	On-Chip Oscillator	Yes				
	Oscillation Stop Detection	—				
	Frequency Divider	Main clock: 1/n (n = 2, 4, 8), Sub clock: 1/n (n = 2), On-chip oscillator: 1/n (n = 2)				
	Power Save	Wait/Stop				
Power Supply Voltage Detection	Power-On Reset/POR	—				
	Low Voltage Detection/LVD	—				
A/D Converter	Resolution × Channels	10-bit × 8				
D/A Converter	Resolution × Channels	—				
Timer	8-bit	3 (Timer 1, Timer 2, Timer 3)				
	16-bit	2 (Timer X, Timer Y)				
	Input Capture	—				
	Output Compare	—				
	PWM Output	—				
	Real-Time Port	1 (shared with Timer X)				
	Event Counter	2 (shared with Timer X, Timer Y)				
Watchdog Timer		1				
Serial Interface	Clock Sync./Clock Async.	1 (Serial I/O)				
	Clock Sync. Only	—				
	Clock Async. Only	—				
I²C-bus		—				
USB Function		—				
LPC/ISA		—				
LCD		32seg × 4com				
I/O Ports	Input Only (Numbers)	5				
	CMOS Output Only (Numbers)	—				
	CMOS I/O (Numbers)	49				
	High Voltage Port (Numbers)	—				
	N-Channel Open Drain Port (Numbers)	—				
	DTMF	—				
	High Current Drive Port	—				
	Pull-Up Resistor	49				
External Interrupts Pins		14 (INT × 4, CNTR × 2, Key Input × 8)				
Debugging Function	On-Board Flash Program	—				
Other Functions	ROM Correction Function	Yes				
	Others	—				
Operating Frequency/Supply Voltage		1.8 to 5.5V				
Operating Ambient Temperature (°C)		–20 to 85				

Package*2	PRQP0080GB-A	PLQP0080KB-A	PRQP0080GB-A	PLQP0080KB-A	PRQP0080GB-A	PLQP0080KB-A	PRQP0080GB-A	PLQP0080KB-A	PRQP0080GB-A	PLQP0080KB-A	PRQP0080GB-A	PLQP0080KB-A	PRQP0080GB-A	PLQP0080KB-A	PRQP0080GB-A	PLQP0080KB-A	PRQP0080GB-A	PLQP0080KB-A	PRQP0080GB-A	PLQP0080KB-A
Part No.	M38234G4FP	M38234G4HP	M38234G4-XXXFP	M38234G4-XXXHP	M38235G6FP	M38235G6HP	M38235G6-XXXFP	M38235G6-XXXHP	M38238G8FP	M38238G8HP	M38238G8-XXXFP	M38238G8-XXXHP	M38239GCFP	M38239GCHP	M38239GC-XXXFP	M38239GC-XXXHP	M3823AGFFP	M3823AGFHP	M3823AGF-XXXFP	M3823AGF-XXXHP

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (On-Chip LCD Driver Type: 38000 Series)

Series		38000							
Group		38D2							
Memory	ROM (Bytes)	16K						24K	
	RAM (Bytes)	640							
	ROM Type*1	Qz							
	Data Flash/E2 Data Flash	—							
	Program Security	Yes (ROM code protect function)							
CPU	CPU	740 Core							
	Basic Instructions	71							
	Minimum Instruction Execution Time (ns)	320 (@12.5MHz)							
DMA	DMAC (Channels)	—							
External Bus Expansion	Host Interface	—							
Clock	Clock Generation Circuit	3 circuits (Main clock, Sub clock, On-chip oscillator)							
	PLL	—							
	Subclock	Yes							
	On-Chip Oscillator	Yes							
	Oscillation Stop Detection	—							
	Frequency Divider	Main clock: 1/n (n = 2, 4, 8), Sub clock: 1/n (n = 2), On-chip oscillator: 1/n (n = 32)							
	Power Save	Wait/Stop							
Power Supply Voltage Detection	Power-On Reset/POR	—							
	Low Voltage Detection/LVD	—							
A/D Converter	Resolution × Channels	10-bit × 8							
D/A Converter	Resolution × Channels	—							
Timer	8-bit	4 (Timer 1, Timer 2, Timer 3, Timer 4)							
	16-bit	2 (Timer X, Timer Y)							
	Input Capture	—							
	Output Compare	—							
	PWM Output	3 (shared with Timer 3, Timer 4, Timer X)							
	Real-Time Port	1 (shared with Timer Y)							
	Event Counter	2 (shared with Timer X, Timer Y)							
Watchdog Timer		1							
Serial Interface	Clock Sync./Clock Async.	2 (Serial I/O 1, Serial I/O 2)							
	Clock Sync. Only	—							
	Clock Async. Only	—							
I²C-bus		—							
USB Function		—							
LPC/ISA		—							
LCD		24seg × 4com							
I/O Ports	Input Only (Numbers)	—							
	CMOS Output Only (Numbers)	—							
	CMOS I/O (Numbers)	51							
	High Voltage Port (Numbers)	—							
	N-Channel Open Drain Port (Numbers)	—							
	DTMF	—							
	High Current Drive Port	8							
	Pull-Up Resistor	51							
External Interrupts Pins		13 (INT × 3, CNTR × 2, Key Input × 8)							
Debugging Function	On-Board Flash Program	—							
Other Functions	ROM Correction Function	Yes							
	Others	—							
Operating Frequency/Supply Voltage		1.8 to 5.5V							
Operating Ambient Temperature (°C)		–20 to 85							
Package*2		PLQP0064GA-A	PLQP0064KB-A	PLQP0064GA-A	PLQP0064KB-A	PLQP0064GA-A	PLQP0064KB-A	PLQP0064GA-A	PLQP0064KB-A
Part No.		M38D24G4FP	M38D24G4HP	M38D24G4-XXXFP	M38D24G4-XXXHP	M38D24G6FP	M38D24G6HP	M38D24G6-XXXFP	M38D24G6-XXXHP

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (On-Chip LCD Driver Type: 38000 Series)

Series		38000												
Group		38D2												
Memory	ROM (Bytes)	32K			48K			60K						
	RAM (Bytes)	1536			2048									
	ROM Type*1	Qz						F	Qz					
	Data Flash/E2 Data Flash	—												
	Program Security	Yes (ROM code protect function)						Yes (ID code check function, ROM code protect function)	Yes (ROM code protect function)					
CPU	CPU	740 Core												
	Basic Instructions	71												
	Minimum Instruction Execution Time (ns)	320 (@12.5MHz)												
DMA	DMAC (Channels)	—												
External Bus Expansion	Host Interface	—												
Clock	Clock Generation Circuit	3 circuits (Main clock, Sub clock, On-chip oscillator)												
	PLL	—												
	Subclock	Yes												
	On-Chip Oscillator	Yes												
	Oscillation Stop Detection	—												
	Frequency Divider	Main clock: 1/n (n = 2, 4, 8), Sub clock: 1/n (n = 2), On-chip oscillator: 1/n (n = 32)												
	Power Save	Wait/Stop												
Power Supply Voltage Detection	Power-On Reset/POR	—												
	Low Voltage Detection/LVD	—												
A/D Converter	Resolution × Channels	10-bit × 8												
D/A Converter	Resolution × Channels	—												
Timer	8-bit	4 (Timer 1, Timer 2, Timer 3, Timer 4)												
	16-bit	2 (Timer X, Timer Y)												
	Input Capture	—												
	Output Compare	—												
	PWM Output	3 (shared with Timer 3, Timer 4, Timer X)												
	Real-Time Port	1 (shared with Timer Y)												
	Event Counter	2 (shared with Timer X, Timer Y)												
Watchdog Timer		1												
Serial Interface	Clock Sync./Clock Async.	2 (Serial I/O 1, Serial I/O 2)												
	Clock Sync. Only	—												
	Clock Async. Only	—												
I²C-bus		—												
USB Function		—												
LPC/ISA		—												
LCD		24seg × 4com												
I/O Ports	Input Only (Numbers)	—												
	CMOS Output Only (Numbers)	—												
	CMOS I/O (Numbers)	51												
	High Voltage Port (Numbers)	—												
	N-Channel Open Drain Port (Numbers)	—												
	DTMF	—												
	High Current Drive Port	8												
	Pull-Up Resistor	51												
External Interrupts Pins		13 (INT × 3, CNTR × 2, Key Input × 8)												
Debugging Function	On-Board Flash Program	—							Yes		—			
Other Functions	ROM Correction Function	Yes												
	Others	—												
Operating Frequency/Supply Voltage		1.8 to 5.5V							2.7 to 5.5V		1.8 to 5.5V			
Operating Ambient Temperature (˚C)		–20 to 85												
Package*2		PLQP0064GA-A	PLQP0064KB-A	PLQP0064GA-A	PLQP0064KB-A	PLQP0064GA-A	PLQP0064KB-A	PLQP0064GA-A	PLQP0064KB-A	PLQP0064GA-A	PLQP0064KB-A	PLQP0064GA-A	PLQP0064KB-A	PLQP0064GA-A	PLQP0064KB-A
Part No.		M38D28G8FP	M38D28G8HP	M38D28G8-XXXFP	M38D28G8-XXXHP	M38D29GCFP	M38D29GCHP	M38D29GC-XXXFP	M38D29GC-XXXHP	M38D29FFFP	M38D29FFHP	M38D29GFFP	M38D29GFHP	M38D29GF-XXXFP	M38D29GF-XXXHP

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (On-Chip LCD Driver Type: 38000 Series)

Series		38000												
Group		38D5												
Memory	ROM (Bytes)	32K			48K			60K						
	RAM (Bytes)	1536			2048									
	ROM Type*1	Qz								F	Qz			
	Data Flash/E2 Data Flash	—												
	Program Security	Yes (ROM code protect function)								Yes (ID code check function, ROM code protect function)	Yes (ROM code protect function)			
CPU	CPU	740 Core												
	Basic Instructions	71												
	Minimum Instruction Execution Time (ns)	320 (@12.5MHz)												
DMA	DMAC (Channels)	—												
External Bus Expansion	Host Interface	—												
Clock	Clock Generation Circuit	3 circuits (Main clock, Sub clock, On-chip oscillator)												
	PLL	—												
	Subclock	Yes												
	On-Chip Oscillator	Yes												
	Oscillation Stop Detection	—												
	Frequency Divider	Main clock: 1/n (n = 2, 4, 8), Sub clock: 1/n (n = 2), On-chip oscillator: 1/n (n = 32)												
	Power Save	Wait/Stop												
Power Supply Voltage Detection	Power-On Reset/POR	—												
	Low Voltage Detection/LVD	—												
A/D Converter	Resolution × Channels	10-bit × 8												
D/A Converter	Resolution × Channels	—												
Timer	8-bit	4 (Timer 1, Timer 2, Timer 3, Timer 4)												
	16-bit	2 (Timer X, Timer Y)												
	Input Capture	—												
	Output Compare	—												
	PWM Output	3 (shared with Timer 3, Timer 4, Timer X)												
	Real-Time Port	1 (shared with Timer Y)												
	Event Counter	2 (shared with Timer X, Timer Y)												
Watchdog Timer		1												
Serial Interface	Clock Sync./Clock Async.	1 (Serial I/O 1)												
	Clock Sync. Only	1 (Serial I/O 2)												
	Clock Async. Only	—												
I²C-bus		—												
USB Function		—												
LPC/ISA		—												
LCD		36seg × 4com, 32seg × 8com												
I/O Ports	Input Only (Numbers)	2												
	CMOS Output Only (Numbers)	—												
	CMOS I/O (Numbers)	59												
	High Voltage Port (Numbers)	—												
	N-Channel Open Drain Port (Numbers)	—												
	DTMF	—												
	High Current Drive Port	6												
	Pull-Up Resistor	59												
External Interrupts Pins		13 (INT × 3, CNTR × 2, Key Input × 8)												
Debugging Function	On-Board Flash Program	—								Yes	—			
Other Functions	ROM Correction Function	Yes												
	Others	—												
Operating Frequency/Supply Voltage		1.8 to 5.5V								2.7 to 5.5V	1.8 to 5.5V			
Operating Ambient Temperature (°C)		–20 to 85												
Package*2		PRQP0080GB-A	PLQP0080KB-A	PRQP0080GB-A	PLQP0080KB-A	PRQP0080GB-A	PLQP0080KB-A	PRQP0080GB-A	PLQP0080KB-A	PRQP0080GB-A	PLQP0080KB-A	PRQP0080GB-A	PLQP0080KB-A	PRQP0080GB-A	PLQP0080KB-A
Part No.		M38D58G8FP	M38D58G8HP	M38D58G8-XXXFP	M38D58G8-XXXHP	M38D59GCFP	M38D59GCHP	M38D59GC-XXXFP	M38D59GC-XXXHP	M38D59FFFP	M38D59FFHP	M38D59GFFP	M38D59GFHP	M38D59GF-XXXFP	M38D59GF-XXXHP

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
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★ : New product ★★ : Under development

The 4-bit 4500 and 720 series MCUs are categorized into the following three types.

720 Family Features

- General-purpose MCUs used to control a variety of equipment
  4508, 4509
- MCUs with on-chip LCD drivers for driving LCD panels
  4559, 455A
- Remote control MCUs that output carrier waves of various types (Refer to "Remote Control MCUs" in this catalog.) These 4-bit MCUs have low voltage requirements and low power consumption, making them suitable for applications such as remote controls, compact electric household appliances, PC peripherals and battery chargers. On-chip peripheral functions reduce the overall number of component parts required.

4500, 720 Series Features

- 10-bit* instruction set with high ROM code efficiency.
  * 9-bit on the 720 series
- Compact package.
- High-performance peripheral functions (watchdog timer, low voltage detection circuit, etc.).
- QzROM versions available.
- Development support tools for Microsoft Windows* (4500 series).
  * Microsoft Windows is a registered trademark of Microsoft Corporation in the U.S.A. and other countries.

Applications Remote controls, small electric household appliances, input devices for PCs and game machines, battery chargers

QzROM Version

It appeared in the Group shown in below.

4500 Series	4508 Group
	4509 Group
	4559 Group
	4571 Group
	455A Group
720 Series	4286 Group

• 4500, 720 Series Roadmap

• General consumer products • Small electric household appliances • Battery chargers • Toys, etc.	General-purpose type On-chip A/D converter	4509 PWM function is added, The number of A/D channel is increased, Serial I/O is added 4508 Serial I/O is added
• Remote controls	LCD type	4559 QzROM version 52-pin version 455A Large-capacity ROM, Reinforced I/O
	Preset	4571 Low-pin count version QzROM version
	Single-function	4286 High-speed operation, Wide range version of operating ambient temperature

4508 Group

- Incorporates 10-bit A/D converter and serial interface.
- Maximum oscillation frequency of 6MHz
- Minimum instruction execution time: 0.5µs (at oscillation frequency of 6MHz while in through mode)

4509 Group

- Incorporates 10-bit A/D converter and serial interface.
- Maximum oscillation frequency of 6MHz.
- Minimum instruction execution time: 0.5µs (at oscillation frequency of 6MHz while in through mode)

• Specifications (4500 Series)

Group		4508								4509			
Memory	ROM (Word × 10-bit)	4096											
	RAM (Word × 4-bit)	256											
	ROM Type*1	Qz											
	Program Security	Yes											
CPU	Basic Instructions	131		132			131			134	135		134
	Minimum Instruction Execution Time (ns)	500 (@6MHz)											
Clock	Clock Generation Circuit	2 circuits (Ceramic resonator/RC oscillator, On-chip oscillator)											
	Subclock	—											
	On-Chip Oscillator	Yes											
	Frequency Divider	1/n (n = 1, 2, 4, 8)											
	Power Save	RAM backup mode											
Power Supply Voltage Detection	Power-On Reset/POR	—		Yes			—			Yes			—
	Low Voltage Detection/LVD	—		Yes			—			Yes			—
A/D Converter	Resolution × Channels	10-bit × 4								10-bit × 6			
Timer	8-bit	2 (Timer 1, Timer 2)											
	10-bit	—											
	16-bit	—											
	PWM Output	2 (shared with Timer 1, Timer 2)											
	Event Counter	2 (shared with Timer 1, Timer 2)											
Watchdog Timer		1											
Serial Interface	Clock Sync. Only	1											
LCD		—											
I/O Ports	Input Only (Numbers)	—											
	CMOS Output Only (Numbers)	—											
	CMOS I/O (Numbers)	14								18			
	N-Channel Open Drain Port (Numbers)	14								18			
	High Current Drive Port	4								6			
	Pull-Up Resistor	12											
External Interrupts Pins		1											
Other Functions	Others	—											
Operating Frequency/Supply Voltage		1.8 to 5.5V											
Operating Ambient Temperature (˚C)		–20 to 85											
Package*2		PRSP0020DA-A	PLSP0020JB-A	PRSP0020DA-A	PLSP0020JB-A	PRSP0020DA-A	PLSP0020JB-A	PRSP0020DA-A	PLSP0020JB-A	PRSP0024GA-A			
Part No.		M34508G4FP	M34508G4GP	M34508G4HFP	M34508G4HGP	M34508G4H-XXXFP	M34508G4H-XXXGP	M34508G4-XXXFP	M34508G4-XXXGP	M34509G4FP	M34509G4HFP	M34509G4H-XXXFP	M34509G4-XXXFP

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

4559 Group

- Incorporates LCD driver, carrier generation function for remote control, power-on reset circuit, and low voltage detection circuit.
- Maximum oscillation frequency of 6MHz.
- Minimum instruction execution time: 0.5µs (at oscillation frequency of 6MHz while in through mode)

455A Group

- The built-in LCD driver type and remote control type incorporate a carrier generation function, power-on reset, and low-voltage detection circuit.
- Maximum oscillation frequency of 6MHz
- Minimum instruction execution time: 0.5µs (at an oscillation frequency of 6MHz in through mode)

*Refer to "Remote Control MCUs" in this catalog for 4559 and 455A Groups.

Automotive MCUs

The use of electronics in automotive has increased rapidly in recent years, spurred by the addition of functions designed to address environmental and energy efficiency issues, provide enhanced safety, and address diversifying customer requirements. Advances in electronics technology are the key to improvements in all these areas. Renesas Electronics provides optimal solutions for applications covering all aspects of the automotive field. These include control systems in the categories of powertrain (emissions control and core control functions in electric vehicles), chassis (vehicle control functions such as electric power steering and power brakes), safety (driving support systems, airbags, etc.), and body (functions for improved driving comfort such as power windows and power seats); information systems such as car navigation and car stereo systems; and vehicle networks that link these systems to electronic control units (ECUs).

• Specifications (SH7050 Series)

Series		SH7050		
Group		SH7055	SH7058S	SH7059
Memory	ROM (Bytes)	512K	1M	1.5M
	RAM (Bytes)	32K	48K	80K
	ROM Type*1	F		
	Cache Memory	—		
	Program Security	—		
CPU	CPU	SH-2E Core		
	Basic Instructions	79		
	Minimum Instruction Execution Time (ns)	25 (@40MHz)	12.5 (@80MHz)	
	Dhrystone Performance	52MIPS (40MHz)	104MIPS (80MHz)	
	Multiplier	32 × 32 → 64		
	Multiply-Accumulate Instruction	32 × 32 + 64 → 64		
	Barrel Shifter	—		
	FPU	Yes		
	MMU	—		
DMA	DMAC (Channels)	4		
	DTC/DMAC Ⅱ	—		
External Bus Expansion	Address Space (Bytes)	16M		
	Bus State Controller	Yes		
	Bus Structure	SRAM		
	SDRAM Controller	—		
	DRAM Controller	—		
	PCI Controller	—		
	Endian Conversion	—		
	Host Interface	—		
Clock	Clock Generation Circuit	1 circuit		
	PLL	Yes	Yes (× 8 fixed)	
	RTC	—		
	Oscillation Stop Detection	—		
	Frequency Divider	—		
	Power Save	Sleep/Software standby/Hardware standby/Module standby		
Power Supply Voltage Detection	Power-On Reset/POR	—		
A/D Converter	Resolution × Channels	10-bit × 32		
	Sample and Hold	Yes (3)		
	Multi-Channel Sample and Hold	—		
D/A Converter	Resolution × Channels	—		
Timer	8-bit	—		
	16-bit	65 (ATU-Ⅱ)		
	32-bit	—		
	Input Capture	ATU-Ⅱ		
	Output Compare	ATU-Ⅱ		
	PWM Output	ATU-Ⅱ		
	Event Counter	ATU-Ⅱ		
	2-Phase Encoder Input	—		
	3-Phase Inverter Control	—		
Watchdog Timer		1		
Serial Interface	Clock Sync./Clock Async.	5		
	Clock Sync. Only	—		
	Clock Async. Only	—		
I²C-bus		—		
Smart Card/SIM		—		
Synchronous Serial Communication Unit/Special Serial I/O		—	2	
CAN	Channels	2		
	Message Box (Numbers)	16 × 2	32 × 2	
FlexRay		—		
Ethernet		—		
USB Host		—		
USB Function		—		
IrDA		—		
LCD		—		
I/O Ports	Input Only (Numbers)	—		
	CMOS I/O (Numbers)	149		
	High Voltage Port (Numbers)	—		
	N-Channel Open Drain Port (Numbers)	—		
	High Current Drive Port	—		
	Pull-Up Resistor	—		
External Interrupts Pins		9		
Debugging Function	Boundary Scan/JTAG	—	Yes	
	On-Chip Debug	—		
	On-Board Flash Program	Yes		
Other Functions	ROM Correction Function	—		
	Others	—		
Operating Frequency/Supply Voltage		40MHz/3.3V (external I/O: 5.0V, bus: 3.3V)	80MHz/3.3V (external I/O: 5.0V, bus: 3.3V)	
Operating Ambient Temperature (˚C)		–40 to 125		
Package*2		PRQP0256KB-A / PRBG0272FA-A	PRQP0256KB-A / PRBG0272FA-A	PRQP0256KB-A / PRBG0272FA-A
Part No.		HD64F7055SF40K / HD64F7055SBP40K	R4F70580SCK80FPV / R4F70580SCK80BGV	R4F70590K80FPV / R4F70590K80BGV

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (SH7250, 7450 Series)

Series		SH7250					SH7450			
Group		SH7253	SH7254R			SH7256R	SH7450	SH7451	SH7455	SH7456
Memory	ROM (Bytes)	1.25M	2.0M	2.5M	3.75M	4M	2M	1.5M	1M	
	RAM (Bytes)	64K	128K		256K		8K + 16K (High-speed) + 512K (Medium-speed)		8K + 16K (High-speed) + 256K (Medium-speed)	
	EEPROM (Byte)	32K	128K				—			
	ROM Type*1	F								
	Cache Memory	—					32K (instructions), 32K (data), 4-way set-associative			
	Program Security	—					Yes			
CPU	CPU	SH-2A Core					SH-4A Core			
	Basic Instructions	253					103			
	Minimum Instruction Execution Time (ns)	8.3 (@120MHz)	5.0 (@200MHz)				4.1 (@240MHz)		6.25 (@160MHz)	
	Dhrystone Performance	240MIPS (120MHz)	400MIPS (200MHz)				432MIPS (240MHz)		288MIPS (160MHz)	
	Multiplier	32 × 32 → 64								
	Multiply-Accumulate Instruction	32 × 32 + 64 → 64								
	Barrel Shifter	—					Yes			
	FPU	Yes								
	MMU	—					Yes			
DMA	DMAC (Channels)	66	74			86	12			
	DTC/DMAC II	—					Yes			
External Bus Expansion	Address Space (Bytes)	4G					160M		—	
	Bus State Controller	—	Yes				SRAM/ROM		—	
	Bus Structure	SRAM					Separate bus (8/16/32-bit)		—	
	SDRAM Controller	—								
	DRAM Controller	—								
	PCI Controller	—								
	Endian Conversion	—								
	Host Interface	—								
Clock	Clock Generation Circuit	1 circuit								
	PLL	Yes								
	RTC	—								
	Oscillation Stop Detection	—					Yes			
	Frequency Divider	Yes (1/n (n = 4, 6))	Yes (1/n (n = 4, 6, 8, 10))				Yes			
	Power Save	Sleep/Software standby/Hardware standby/Module standby					—			
Power Supply Voltage Detection	Power-On Reset/POR	—								
A/D Converter	Resolution × Channels	12-bit × 32	12-bit × 37				12-bit × 16, 12-bit × 8		12-bit × 8, 12-bit × 8	
	Sample and Hold	Yes								
	Multi-Channel Sample and Hold	Yes					—			
D/A Converter	Resolution × Channels	—								
Timer	8-bit	—								
	16-bit	28 (Timer E, G, J)	32 (Timer E, G, J)			36 (Timer E, G, J)	6 (Timer G)			
	24-bit	73 (Timer B, C, D, F)				81 (Timer B, C, D, F)	44 (Timer F × 4, TOU × 40)			
	32-bit	5 (Timer A, H)	7 (Timer A, H)				5 (Timer A × 12, TMU × 3)			
	Input Capture	26 (shared with Timer A, C, J)	28 (shared with Timer A, C, J)				16 (shared with Timer A, Timer F)		13 (shared with Timer A, Timer F)	
	Output Compare	36 (shared with Timer C, D)					40 (shared with TOU)			
	PWM Output	20 (shared with Timer E)	24 (shared with Timer E)			28 (shared with Timer E)	40 (shared with TOU)			
	Event Counter	20 (shared with Timer F)				28 (shared with Timer F)	4 (shared with Timer F)			
	2-Phase Encoder Input	—					4 (shared with Timer F)			
	3-Phase Inverter Control	—					5 (shared with TOU)			
Watchdog Timer		1								
Serial Interface	Clock Sync./Clock Async.	3	5				4			
	Clock Sync. Only	—					3			
	Clock Async. Only	—								
I²C-bus		—					1			
Smart Card/SIM		—								
Synchronous Serial Communication Unit/Special Serial I/O		2 (RSPI)	3 (RSPI)				—			
CAN	Channels	2	3			4	5		4	
	Message Box (Numbers)	32 × 2	32 × 3				64			
FlexRay		—				2	—		2	—
Ethernet		—								
USB Host		—								
USB Function		—								
IrDA		—								
LCD		—								
I/O Ports	Input Only (Numbers)	23	—				24			
	CMOS I/O (Numbers)	89	144				142		92	
	High Voltage Port (Numbers)	—								
	N-Channel Open Drain Port (Numbers)	—								
	High Current Drive Port	—								
	Pull-Up Resistor	—								
External Interrupts Pins		5	9						7	
Debugging Function	Boundary Scan/JTAG	Yes								
	On-Chip Debug	Yes								
	On-Board Flash Program	Yes								
Other Functions	ROM Correction Function	—								
	Others	—					Direct RAM Input Interface Direct RAM Output Interface Parallel PDAC control			
Operating Frequency/Supply Voltage		120MHz/3.3V (external I/O: 5.0V)	200MHz/3.3V (external I/O: 5.0V)				240MHz/ 1.5V (internal), 3.3V/5V 1.5V (internal), 3.3V 1.5V (internal), 5.0V		160MHz/ 1.5V (internal), 3.3V/5V 1.5V (internal), 3.3V 1.5V (internal), 5.0V	
Operating Ambient Temperature (˚C)		–40 to 125								
Package*2		LQFP-176	BP-272				PRBG0292GB-A		PRBG0176GA-A	
Part No.		R5F72531KFPU*	R5F72543RKBGV*	R5F72544RKBGV*	R5F72546RKBGV**	R5F72567RKBGV**	R5F74504KBG	R5F74513KBG	R5F74552KBG**	R5F74562KBG**

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Oz : OzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

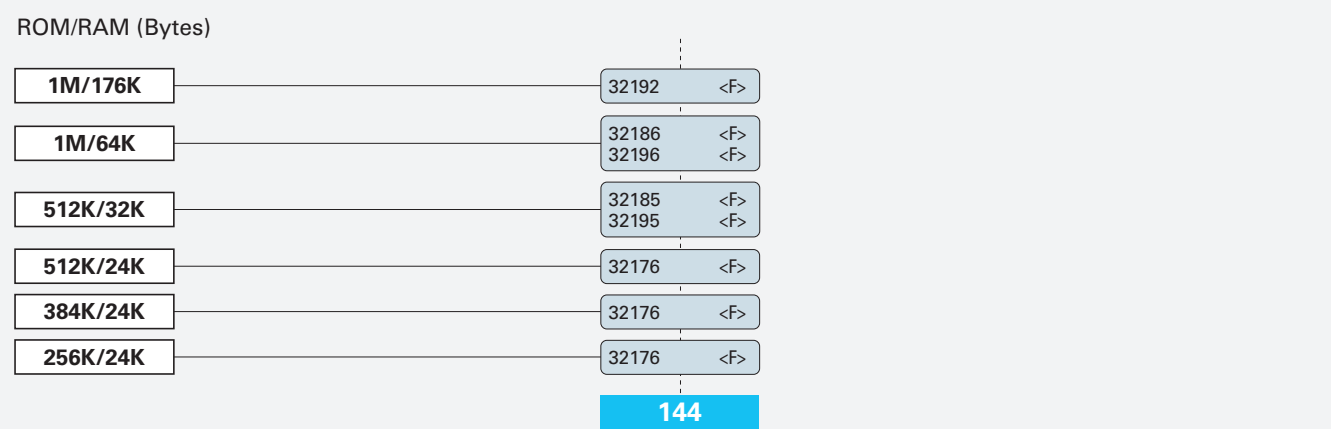
• Specifications (SH7047, SH7147 Series)

Series		SH7047		SH7147									
Group		SH7047	SH7049	SH7147									
Memory	ROM (Bytes)	256K	128K	256K			384K		512K				
	RAM (Bytes)	12K	8K	12K	16K	12K	16K						
	ROM Type*1	F	M	F									
	Cache Memory	—											
	Program Security	Yes	—	Yes									
CPU	CPU	SH-2 Core											
	Basic Instructions	62											
	Minimum Instruction Execution Time (ns)	25 (@40MHz)		15.6 (@64MHz)	12.5 (@80MHz)	15.6 (@64MHz)	12.5 (@80MHz)	15.6 (@64MHz)	12.5 (@80MHz)	15.6 (@64MHz)	12.5 (@80MHz)	15.6 (@64MHz)	12.5 (@80MHz)
	Dhrystone Performance	52MIPS (40MHz)		83.2MIPS (64MHz)	104MIPS (80MHz)	83.2MIPS (64MHz)	104MIPS (80MHz)	83.2MIPS (64MHz)	104MIPS (80MHz)	83.2MIPS (64MHz)	104MIPS (80MHz)	83.2MIPS (64MHz)	104MIPS (80MHz)
	Multiplier	32 × 32 → 64											
	Multiply-Accumulate Instruction	32 × 32 + 64 → 64											
	Barrel Shifter	—											
	FPU	—											
	MMU	—											
DMA	DMAC (Channels)	—											
	DTC/DMAC Ⅱ	DTC											
External Bus Expansion	Address Space (Bytes)	256K		64M + 64M									
	Bus State Controller	Wait state (1 to 15 wait, can be extended with an external signal)		Wait state (1 to 24 wait, can be extended by an external signal)									
	Bus Structure	Separate bus (8-bit)											
	SDRAM Controller	—											
	DRAM Controller	—											
	PCI Controller	—											
	Endian Conversion	—											
	Host Interface	—											
Clock	Clock Generation Circuit	1 circuit											
	PLL	Yes											
	RTC	—											
	Oscillation Stop Detection	Yes											
	Frequency Divider	1/n (n = 1, 2)		1/n (n = 1, 2, 3, 4, 8)									
	Power Save	Sleep/ Software standby/ Hardware standby/ Module standby		Sleep/Software standby/Deep software standby/Module standby/Hardware standby									
Power Supply Voltage Detection	Power-On Reset/POR	—											
A/D Converter	Resolution × Channels	10-bit × 8 × 2 circuits		12-bit × 8 × 2 circuits									
	Sample and Hold	Yes											
	Multi-Channel Sample and Hold	Yes (2 units)		Yes (6 units)									
D/A Converter	Resolution × Channels	—											
Timer	8-bit	—											
	16-bit	8 (MMT × 1, MTU × 5, CMT × 2)		10 (MTU2 × 5, MTU2S × 3, CMT × 2)									
	32-bit	—											
	Input Capture	16 (shared with MTU)		MTU2 (12), MTU2S (9)									
	Output Compare	16 (shared with MTU)		MTU2 (12), MTU2S (6)									
	PWM Output	16 (shared with MTU)		MTU2 (12), MTU2S (6)									
	Event Counter	7 (shared with MTU, CMT)		MTU2S (3)									
	2-Phase Encoder Input	2 (shared with MTU)		MTU2 (2)									
	3-Phase Inverter Control	2 (MTU, MMT)		MTU2, MTU2S (2)									
Watchdog Timer		1											
Serial Interface	Clock Sync./Clock Async.	3 (SCI)											
	Clock Sync. Only	—											
	Clock Async. Only	—											
I²C-bus		—											
Smart Card/SIM		—											
Synchronous Serial Communication Unit/Special Serial I/O		—		1 (SSU)									
CAN	Channels	1		2		1			2			1	
	Message Box (Numbers)	32		32 (16 × 2)		16			32 (16 × 2)			16	
FlexRay		—											
Ethernet		—											
USB Host		—											
USB Function		—											
IrDA		—											
LCD		—											
I/O Ports	Input Only (Numbers)	16		—									
	CMOS I/O (Numbers)	53		57									
	High Voltage Port (Numbers)	—											
	N-Channel Open Drain Port (Numbers)	—											
	High Current Drive Port	12		—									
	Pull-Up Resistor	—											
External Interrupts Pins		5											
Debugging Function	Boundary Scan/JTAG	Yes		—									
	On-Chip Debug	Yes (H-UDI)	—	Yes (Advanced users debugger)									
	On-Board Flash Program	Yes	—	Yes									
Other Functions	ROM Correction Function	—											
	Others	—											
Operating Frequency/Supply Voltage		40MHz/5.0V		64MHz/3.3V, 5.0V (I/O)	80MHz/5.0V	64MHz/3.3V, 5.0V (I/O)	80MHz/5.0V	64MHz/3.3V, 5.0V (I/O)	80MHz/5.0V	64MHz/3.3V, 5.0V (I/O)	80MHz/5.0V	64MHz/3.3V, 5.0V (I/O)	80MHz/5.0V
Operating Ambient Temperature (˚C)		–40 to 85		–40 to 125	–40 to 85	–40 to 125	–40 to 85	–40 to 125	–40 to 85	–40 to 125	–40 to 85	–40 to 125	–40 to 85
Package*2		PRQP0100KB-A		PLQP0100KB-A									
Part No.		HD64F7047FJ40V	HD6437048XXXFJ	R5F71424AK64FPV	R5F71424BJ80FPV	R5F71474AK64FPV	R5F71474BJ80FPV	R5F71475AK64FPV	R5F71475BJ80FPV	R5F71426AK64FPV	R5F71426BJ80FPV	R5F71476AK64FPV	R5F71476BJ80FPV

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Memory Capacity (ROM/RAM) (M32R/ECU Series)



Letters in brackets < > indicate memory variations.
F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

• Specifications (M32R/ECU Series)

Group		32176						32185	32186
Memory	ROM (Bytes)	256K		384K		512K			1M
	RAM (Bytes)	24K						32K	64K
	ROM Type*1	F							
	Data Flash/E2 Data Flash	Yes (Data flash: option)							
	Program Security	Yes (Flash memory protect ID, Protect via FP Terminal, Protect via FENTRY Bit, Protect via Lock Bit)							
CPU	CPU	M32R CPU Core						M32R-FPU Core (on-chip single precision FPU)	
	Basic Instructions	83						100	
	Minimum Instruction Execution Time (ns)	25 (@40MHz)	31.25 (@32MHz)	25 (@40MHz)	31.25 (@32MHz)	25 (@40MHz)	31.25 (@32MHz)	12.5 (@80MHz)	
	Multiplier	16 × 32 → 48							
	Multiply-Accumulate Instruction	16 × 32 + 56 → 56							
	Barrel Shifter	Yes							
	FPU	—						Yes	
DMA	DMAC (Channels)	10							
External Bus Expansion	Address Space (Bytes)	2M						31M	
	External Bus Interface	Wait controller (1 to 4 wait cycles inserted~prolonged by external WAIT signal input)						Wait controller (0 to 15 wait cycles inserted~prolonged by external WAIT signal input)	
	Bus Structure	Separate bus (16-bit)							
Clock	Clock Generation Circuit	2 circuits (Oscillation Circuit, PLL)							
	PLL	Yes (4-multiplier)						Yes (8-multiplier)	
	Oscillation Stop Detection	Yes							
A/D Converter	Resolution × Channels	10-bit × 16							
	Sample and Hold	Yes							
	Multi-Channel Sample and Hold	—						Yes (Simultaneous Sampling Function)	
D/A Converter	Resolution × Channels	—							
Timer	16-bit	29 (TOP × 11, TIO × 10, TMS × 8)						31 (TOP × 11, TIO × 10, TMS × 8, TID × 2)	
	24-bit	—						16 (TOU)	
	32-bit	8 (TML)							
	Input Capture	16 (shared with TMS, TML)							
	PWM Output	10 (shared with TIO)						26 (shared with TIO, TOU)	
	Event Counter	4 (shared with TMS, TIO)						6 (shared with TMS, TIO, TID)	
	2-Phase Encoder Input	—						2 (shared with TID)	
	3-Phase Inverter Control	—						2 (shared with TOU)	
Serial Interface	Clock Sync./Clock Async.	2 (SIO0, SIO1)						4 (SIO0, SIO1, SIO4, SIO5)	
	Clock Async. Only	2 (SIO2, SIO3)							
CAN	Channels	2							
	Message Box (Numbers)	16						32	
I/O Ports	Input Only (Numbers)	1 (Input level switching function)							
	CMOS I/O (Numbers)	95 (Input level switching function)						96 (Input level switching function, Output drive capability setting function, Noise canceller control function)	
External Interrupts Pins		11						27	
Debugging Function	Boundary Scan/JTAG	Yes							
	On-Chip Debug	Yes (Scalable debug interface, Real-time debugger)						Yes (Scalable debug interface, Real-time debugger, Non-break debug)	
	On-Board Flash Program	Yes							
Other Functions	Others	—						Direct RAM I/F	
Operating Frequency/Supply Voltage		40MHz/3.3V or 5.0V single-power-supply	32MHz/3.3V or 5.0V single-power-supply	40MHz/3.3V or 5.0V single-power-supply	32MHz/3.3V or 5.0V single-power-supply	40MHz/3.3V or 5.0V single-power-supply	32MHz/3.3V or 5.0V single-power-supply	80MHz/3.3V single, 5.0V single or 3.3 and 5.0V dual-power-supply	
Operating Ambient Temperature (°C)		–40 to 85	–40 to 125	–40 to 85	–40 to 125	–40 to 85	–40 to 125		
Package*2		PLQP0144KA-A							
Part No.		M32176F2TFP	M32176F2VFP	M32176F3TFP	M32176F3VFP	M32176F4TFP	M32176F4VFP	M32185F4VFP	M32186F8VFP

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

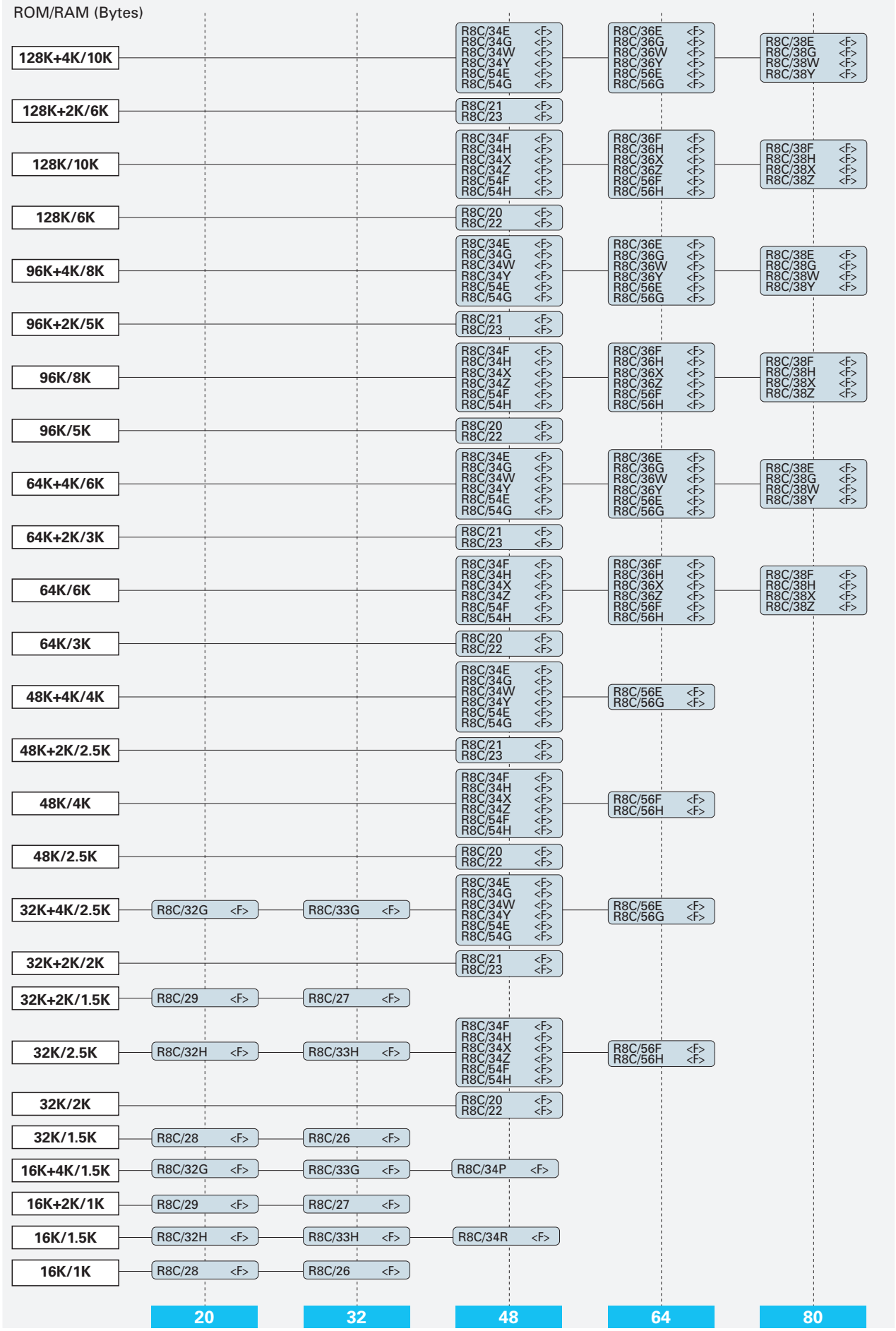
• Specifications (M32R/ECU Series)

Group		32192			32195			32196		
Memory	ROM (Bytes)	1M			512K			1M		
	RAM (Bytes)	176K			32K			64K		
	ROM Type*1	F								
	Data Flash/E2 Data Flash	Yes (Data flash: option)								
	Program Security	Yes (Flash memory protect ID, Protect via FP Terminal, Protect via FENTRY Bit, Protect via Lock Bit)								
CPU	CPU	M32R-FPU Core (on-chip single precision FPU)								
	Basic Instructions	100								
	Minimum Instruction Execution Time (ns)	6.25 (@160MHz)		7.8125 (@128MHz)	6.25 (@160MHz)		7.8125 (@128MHz)	6.25 (@160MHz)		7.8125 (@128MHz)
	Multiplier	16 × 32 → 48								
	Multiply-Accumulate Instruction	16 × 32 + 56 → 56								
	Barrel Shifter	Yes								
	FPU	Yes								
DMA	DMAC (Channels)	10								
External Bus Expansion	Address Space (Bytes)	31M								
	External Bus Interface	Wait controller (0 to 15 wait cycles inserted~prolonged by external WAIT signal input)								
	Bus Structure	Separate bus (16-bit)								
Clock	Clock Generation Circuit	2 circuits (Oscillation Circuit, PLL)								
	PLL	Yes (8-multiplier)								
	Oscillation Stop Detection	Yes								
A/D Converter	Resolution × Channels	10-bit × 16								
	Sample and Hold	Yes								
	Multi-Channel Sample and Hold	Yes (Simultaneous Sampling Function)								
D/A Converter	Resolution × Channels	—								
Timer	16-bit	31 (TOP × 11, TIO × 10, TMS × 8, TID × 2)								
	24-bit	16 (TOU)								
	32-bit	8 (TML)								
	Input Capture	16 (shared with TMS, TML)								
	PWM Output	26 (shared with TIO, TOU)								
	Event Counter	6 (shared with TMS, TIO, TID)								
	2-Phase Encoder Input	2 (shared with TID)								
	3-Phase Inverter Control	2 (shared with TOU)								
Serial Interface	Clock Sync./Clock Async.	4 (SIO0, SIO1, SIO4, SIO5)								
	Clock Async. Only	2 (SIO2, SIO3)								
CAN	Channels	2								
	Message Box (Numbers)	32								
I/O Ports	Input Only (Numbers)	1 (Input level switching function)								
	CMOS I/O (Numbers)	96 (Input level switching function, Output drive capability setting function, Noise canceller control function)								
External Interrupts Pins		27								
Debugging Function	Boundary Scan/JTAG	Yes								
	On-Chip Debug	Yes (Scalable debug interface, Real-time debugger, Non-break debug)								
	On-Board Flash Program	Yes								
Other Functions	Others	Direct RAM I/F								
Operating Frequency/Supply Voltage		160MHz/3.3V single, 5.0V single or 3.3 and 5.0V dual-power-supply	160MHz/3.3V single or 3.3 and 5.0V dual-power-supply	128MHz/3.3V single or 3.3 and 5.0V dual-power-supply	160MHz/3.3V single, 5.0V single or 3.3 and 5.0V dual-power-supply	160MHz/3.3V single or 3.3 and 5.0V dual-power-supply	128MHz/ 3.3V single or 3.3 and 5.0V dual-power-supply	160MHz/3.3V single, 5.0V single or 3.3 and 5.0V dual-power-supply	160MHz/3.3V single or 3.3 and 5.0V dual-power-supply	128MHz/3.3V single or 3.3 and 5.0V dual-power-supply
Operating Ambient Temperature (˚C)		–40 to 85	–40 to 105	–40 to 125	–40 to 85	–40 to 105	–40 to 125	–40 to 85	–40 to 105	–40 to 125
Package*2		PLQP0144KA-A								
Part No.		M32192F8TFP	M32192F8UFP	M32192F8VFP	M32195F4TFP	M32195F4UFP	M32195F4VFP	M32196F8TFP	M32196F8UFP	M32196F8VFP

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Memory Capacity (ROM/RAM) (R8C/2x, 3x, 5x Series)



Letters in brackets < > indicate memory variations.
F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

Pin count

• Specifications (R8C/2x Series)

Group		R8C/20					R8C/21				
Memory	ROM (Bytes)	32K	48K	64K	96K	128K	32K + 2K	48K + 2K	64K + 2K	96K + 2K	128K + 2K
	RAM (Bytes)	2K	2.5K	3K	5K	6K	2K	2.5K	3K	5K	6K
	ROM Type*1	F									
	Data Flash/E2 Data Flash	—					2K (Data flash: program/erase 10k times)				
	Program Security	Yes (ID code check function, ROM code protect function)									
CPU	CPU	R8C Core									
	Basic Instructions	89									
	Minimum Instruction Execution Time (ns)	50 (@20MHz)	62.5 (@16MHz)	50 (@20MHz)	62.5 (@16MHz)	50 (@20MHz)	62.5 (@16MHz)	50 (@20MHz)	62.5 (@16MHz)	50 (@20MHz)	62.5 (@16MHz)	50 (@20MHz)
	Multiplier	16 × 16 → 32									
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32									
DMA	DTC/DMAC II	—									
Clock	Clock Generation Circuit	3 circuits (Main clock, High-speed on-chip oscillator, Low-speed on-chip oscillator)									
	PLL	—									
	Subclock	—									
	RTC	—									
	On-Chip Oscillator	2 circuits (High speed: 40MHz, Low speed: 125kHz)									
	Oscillation Stop Detection	Yes									
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)									
	Power Save	Wait/Stop									
Power Supply Voltage Detection	Power-On Reset/POR	Yes									
	Low Voltage Detection/LVD	Yes (Voltage detection 2)									
A/D Converter	Resolution × Channels	10-bit × 12									
	Sample and Hold	Yes									
D/A Converter	Resolution × Channels	—									
Timer	8-bit	3 (Timer RA, Timer RB, Timer RE)									
	16-bit	2 (Timer RD)									
	Input Capture	8 (shared with Timer RD)									
	Output Compare	9 (shared with Timer RD, Timer RE)									
	PWM Output	7 (shared with Timer RB, Timer RD)									
	Real-Time Port	—									
	Event Counter	1 (shared with Timer RA)									
	2-Phase Encoder Input	—									
	3-Phase Inverter Control	1 (shared with Timer RD)									
Watchdog Timer		1 (with automatic starting function and clock source protection function)									
Serial Interface	Clock Sync./Clock Async.	1 (UART 0 (support LIN))									
	Clock Sync. Only	—									
	Clock Async. Only	1 (UART 1)									
I²C-bus		1 (shared with SSU)									
IEBus		—									
Synchronous Serial Communication Unit/Special Serial I/O		1 (shared with I²C)									
CAN	Channels	—									
	Message Box (Numbers)	—									
LCD		—									
I/O Ports	Input Only (Numbers)	3									
	CMOS Output Only (Numbers)	—									
	CMOS I/O (Numbers)	41									
	N-Channel Open Drain Port (Numbers)	—									
	High Current Drive Port	—									
	Pull-Up Resistor	41									
External Interrupts Pins		8									
Debugging Function	On-Chip Debug	Yes									
	On-Board Flash Program	Yes									
Other Functions	ROM Correction Function	—									
	Others	—									
Operating Frequency/Supply Voltage		20MHz/3.0 to 5.5V, 10MHz/2.7 to 5.5V	16MHz/3.0 to 5.5V, 10MHz/2.7 to 5.5V	20MHz/3.0 to 5.5V, 10MHz/2.7 to 5.5V	16MHz/3.0 to 5.5V, 10MHz/2.7 to 5.5V	20MHz/3.0 to 5.5V, 10MHz/2.7 to 5.5V	16MHz/3.0 to 5.5V, 10MHz/2.7 to 5.5V	20MHz/3.0 to 5.5V, 10MHz/2.7 to 5.5V	16MHz/3.0 to 5.5V, 10MHz/2.7 to 5.5V	20MHz/3.0 to 5.5V, 10MHz/2.7 to 5.5V	16MHz/3.0 to 5.5V, 10MHz/2.7 to 5.5V	20MHz/3.0 to 5.5V, 10MHz/2.7 to 5.5V
Operating Ambient Temperature (°C)		-40 to 85	-40 to 125	-40 to 85	-40 to 125	-40 to 85	-40 to 125	-40 to 85	-40 to 125	-40 to 85	-40 to 125	-40 to 85
Package*2		PLQP0048KB-A										
Part No.		R5F21206JFP	R5F21206KFP	R5F21207KFP	R5F21207JFP	R5F21208JFP	R5F21208KFP	R5F2120AKFP	R5F2120AJFP	R5F2120CJFP	R5F2120CKFP	R5F21216KFP	R5F21216JFP	R5F21217JFP	R5F21217KFP	R5F21218KFP	R5F21218JFP	R5F2121AJFP	R5F2121AKFP	R5F2121CKFP	R5F2121CJFP

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (R8C/2x Series)

Group		R8C/22					R8C/23				
Memory	ROM (Bytes)	32K	48K	64K	96K	128K	32K + 2K	48K + 2K	64K + 2K	96K + 2K	128K + 2K
	RAM (Bytes)	2K	2.5K	3K	5K	6K	2K	2.5K	3K	5K	6K
	ROM Type*1	F									
	Data Flash/E2 Data Flash	—					2K (Data flash: program/erase 10k times)				
	Program Security	Yes (ID code check function, ROM code protect function)									
CPU	CPU	R8C Core									
	Basic Instructions	89									
	Minimum Instruction Execution Time (ns)	62.5 (@16MHz)	50 (@20MHz)	62.5 (@16MHz)	50 (@20MHz)	62.5 (@16MHz)	50 (@20MHz)	62.5 (@16MHz)	50 (@20MHz)	62.5 (@16MHz)	50 (@20MHz)	62.5 (@16MHz)
	Multiplier	16 × 16 → 32									
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32									
DMA	DTC/DMAC II	—									
Clock	Clock Generation Circuit	3 circuits (Main clock, High-speed on-chip oscillator, Low-speed on-chip oscillator)									
	PLL	—									
	Subclock	—									
	RTC	—									
	On-Chip Oscillator	2 circuits (High speed: 40MHz, Low speed: 125kHz)									
	Oscillation Stop Detection	Yes									
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)									
	Power Save	Wait/Stop									
Power Supply Voltage Detection	Power-On Reset/POR	Yes									
	Low Voltage Detection/LVD	Yes (Voltage detection 2)									
A/D Converter	Resolution x Channels	10-bit × 12									
	Sample and Hold	Yes									
D/A Converter	Resolution x Channels	—									
Timer	8-bit	3 (Timer RA, Timer RB, Timer RE)									
	16-bit	2 (Timer RD)									
	Input Capture	8 (shared with Timer RD)									
	Output Compare	9 (shared with Timer RD, Timer RE)									
	PWM Output	7 (shared with Timer RB, Timer RD)									
	Real-Time Port	—									
	Event Counter	1 (shared with Timer RA)									
	2-Phase Encoder Input	—									
	3-Phase Inverter Control	1 (shared with Timer RD)									
Watchdog Timer		1 (with automatic starting function and clock source protection function)									
Serial Interface	Clock Sync./Clock Async.	1 (UART 0 (support LIN))									
	Clock Sync. Only	—									
	Clock Async. Only	1 (UART 1)									
I^2C-bus		1 (shared with SSU)									
IEBus		—									
Synchronous Serial Communication Unit/Special Serial I/O		1 (shared with I^2C)									
CAN	Channels	1									
	Message Box (Numbers)	16									
LCD		—									
I/O Ports	Input Only (Numbers)	3									
	CMOS Output Only (Numbers)	—									
	CMOS I/O (Numbers)	41									
	N-Channel Open Drain Port (Numbers)	—									
	High Current Drive Port	—									
	Pull-Up Resistor	41									
External Interrupts Pins		8									
Debugging Function	On-Chip Debug	Yes									
	On-Board Flash Program	Yes									
Other Functions	ROM Correction Function	—									
	Others	—									
Operating Frequency/Supply Voltage		16MHz/ 3.0 to 5.5V, 10MHz/ 2.7 to 5.5V	20MHz/ 3.0 to 5.5V, 10MHz/ 2.7 to 5.5V	16MHz/ 3.0 to 5.5V, 10MHz/ 2.7 to 5.5V	20MHz/ 3.0 to 5.5V, 10MHz/ 2.7 to 5.5V	16MHz/ 3.0 to 5.5V, 10MHz/ 2.7 to 5.5V	20MHz/ 3.0 to 5.5V, 10MHz/ 2.7 to 5.5V	16MHz/ 3.0 to 5.5V, 10MHz/ 2.7 to 5.5V	20MHz/ 3.0 to 5.5V, 10MHz/ 2.7 to 5.5V	16MHz/ 3.0 to 5.5V, 10MHz/ 2.7 to 5.5V	20MHz/ 3.0 to 5.5V, 10MHz/ 2.7 to 5.5V	16MHz/ 3.0 to 5.5V, 10MHz/ 2.7 to 5.5V
Operating Ambient Temperature (°C)		-40 to 125	–40 to 85	–40 to 125	–40 to 85	–40 to 125	–40 to 85	–40 to 125	–40 to 85	–40 to 125	–40 to 85	-40 to 125
Package*2		PLQP0048KB-A										
Part No.		R5F21226KFP	R5F21226JFP	R5F21227JFP	R5F21227KFP	R5F21228KFP	R5F21228JFP	R5F2122AJFP	R5F2122AKFP	R5F2122CKFP	R5F2122CJFP	R5F21236JFP	R5F21236KFP	R5F21237KFP	R5F21237JFP	R5F21238JFP	R5F21238KFP	R5F2123AKFP	R5F2123AJFP	R5F2123CJFP	R5F2123CKFP

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (R8C/2x Series)

Group		R8C/26		R8C/27		R8C/28		R8C/29	
Memory	ROM (Bytes)	16K	32K	16K + 2K	32K + 2K	16K	32K	16K + 2K	32K + 2K
	RAM (Bytes)	1K	1.5K	1K	1.5K	1K	1.5K	1K	1.5K
	ROM Type*1	F							
	Data Flash/E2 Data Flash	—		2K (Data flash: program/erase 10k times)		—		2K (Data flash: program/erase 10k times)	
	Program Security	Yes (ID code check function, ROM code protect function)							
CPU	CPU	R8C Core							
	Basic Instructions	89							
	Minimum Instruction Execution Time (ns)	62.5 (@16MHz)	50 (@20MHz)	62.5 (@16MHz)	50 (@20MHz)	62.5 (@16MHz)	50 (@20MHz)	62.5 (@16MHz)	50 (@20MHz)	62.5 (@16MHz)
	Multiplier	16 × 16 → 32							
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32							
DMA	DTC/DMAC II	—							
Clock	Clock Generation Circuit	3 circuits (Main clock, High-speed on-chip oscillator, Low-speed on-chip oscillator)							
	PLL	—							
	Subclock	—							
	RTC	—							
	On-Chip Oscillator	2 circuits (High speed: 40MHz, Low speed: 125kHz)							
	Oscillation Stop Detection	Yes							
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)							
	Power Save	Wait/Stop							
Power Supply Voltage Detection	Power-On Reset/POR	Yes							
	Low Voltage Detection/LVD	Yes (Voltage detection 2)							
A/D Converter	Resolution × Channels	10-bit × 12				10-bit × 4			
	Sample and Hold	Yes							
D/A Converter	Resolution × Channels	—							
Timer	8-bit	3 (Timer RA, Timer RB, Timer RE)							
	16-bit	1 (Timer RC)							
	Input Capture	4 (shared with Timer RC)							
	Output Compare	5 (shared with Timer RC, Timer RE)							
	PWM Output	4 (shared with Timer RB, Timer RC)							
	Real-Time Port	—							
	Event Counter	1 (shared with Timer RA)							
	2-Phase Encoder Input	—							
	3-Phase Inverter Control	—							
Watchdog Timer		1 (with automatic starting function and clock source protection function)							
Serial Interface	Clock Sync./Clock Async.	2 (UART 0 (support LIN), UART 1)				1 (UART 0 (support LIN))			
	Clock Sync. Only	—							
	Clock Async. Only	—				1 (UART 1)			
I²C-bus		1 (shared with SSU)							
IEBus		—							
Synchronous Serial Communication Unit/Special Serial I/O		1 (shared with I²C)							
CAN	Channels	—							
	Message Box (Numbers)	—							
LCD		—							
I/O Ports	Input Only (Numbers)	3							
	CMOS Output Only (Numbers)	—							
	CMOS I/O (Numbers)	25				13			
	N-Channel Open Drain Port (Numbers)	—							
	High Current Drive Port	—							
	Pull-Up Resistor	25				13			
External Interrupts Pins		7							
Debugging Function	On-Chip Debug	Yes							
	On-Board Flash Program	Yes							
Other Functions	ROM Correction Function	—							
	Others	—							
Operating Frequency/Supply Voltage		16MHz/3.0 to 5.5V, 10MHz/2.7 to 5.5V	20MHz/3.0 to 5.5V, 10MHz/2.7 to 5.5V	16MHz/3.0 to 5.5V, 10MHz/2.7 to 5.5V	20MHz/3.0 to 5.5V, 10MHz/2.7 to 5.5V	16MHz/3.0 to 5.5V, 10MHz/2.7 to 5.5V	20MHz/3.0 to 5.5V, 10MHz/2.7 to 5.5V	16MHz/3.0 to 5.5V, 10MHz/2.7 to 5.5V	20MHz/3.0 to 5.5V, 10MHz/2.7 to 5.5V	16MHz/3.0 to 5.5V, 10MHz/2.7 to 5.5V
Operating Ambient Temperature (°C)		–40 to 125	–40 to 85	–40 to 125	–40 to 85	–40 to 125	–40 to 85	–40 to 125	–40 to 85	–40 to 125
Package*2		PLQP0032GB-A				PLSP0020JB-A				
Part No.		R5F21264KFP	R5F21264JFP	R5F21266JFP	R5F21266KFP	R5F21274KFP	R5F21274JFP	R5F21276JFP	R5F21276KFP	R5F21284KSP	R5F21284JSP	R5F21286JSP	R5F21286KSP	R5F21294KSP	R5F21294JSP	R5F21296JSP	R5F21296KSP

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (R8C/3x Series)

Group		R8C/38W			R8C/38X			R8C/38Y			R8C/38Z		
Memory	ROM (Bytes)	64K + 4K	96K + 4K	128K + 4K	64K	96K	128K	64K + 4K	96K + 4K	128K + 4K	64K	96K	128K
	RAM (Bytes)	6K	8K	10K	6K	8K	10K	6K	8K	10K	6K	8K	10K
	ROM Type*1	F											
	Data Flash/E2 Data Flash	4K (Data flash: program/erase 10k times)			—			4K (Data flash: program/erase 10k times)			—		
	Program Security	Yes (ID code check function, ROM code protect function)											
CPU	CPU	R8C Core											
	Basic Instructions	89											
	Minimum Instruction Execution Time (ns)	50 (@20MHz)											
	Multiplier	16 × 16 → 32											
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32											
DMA	DTC/DMAC Ⅱ	DTC (Activation sources: 40)											
Clock	Clock Generation Circuit	3 circuits (Main clock, High-speed on-chip oscillator, Low-speed on-chip oscillator)											
	PLL	—											
	Subclock	—											
	RTC	—											
	On-Chip Oscillator	2 circuits (High precision and High speed: 40MHz, Low speed: 125kHz)											
	Oscillation Stop Detection	Yes											
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)											
	Power Save	Wait/Stop											
Power Supply Voltage Detection	Power-On Reset/POR	Yes											
	Low Voltage Detection/LVD	Yes (Voltage detection 3)											
A/D Converter	Resolution × Channels	10-bit × 20											
	Sample and Hold	Yes											
D/A Converter	Resolution × Channels	—											
Timer	8-bit	4 (Timer RA0, Timer RA1, Timer RB, Timer RE)											
	16-bit	5 (Timer RC, Timer RD, Timer RF, Timer RG)											
	Input Capture	15 (shared with Timer RC, Timer RD, Timer RF, Timer RG)											
	Output Compare	16 (shared with Timer RC, Timer RD, Timer RE, Timer RF, Timer RG)											
	PWM Output	11 (shared with Timer RB, Timer RC, Timer RD, Timer RG)											
	Real-Time Port	—											
	Event Counter	3 (shared with Timer RA0, Timer RA1, Timer RG)											
	2-Phase Encoder Input	1 (shared with Timer RG)											
	3-Phase Inverter Control	1 (shared with Timer RD)											
Watchdog Timer		1 (with automatic starting function and clock source protection function, low-speed on-chip oscillator for watchdog timer)											
Serial Interface	Clock Sync./Clock Async.	3 (UART 0, 1 (support LIN), UART 2)											
	Clock Sync. Only	—											
	Clock Async. Only	—											
I²C-bus		1 (UART 2 (simple I²C))											
IEBus		1 (UART 2)											
Synchronous Serial Communication Unit/Special Serial I/O		1											
CAN	Channels	1						—					
	Message Box (Numbers)	16						—					
LCD		—											
I/O Ports	Input Only (Numbers)	1											
	CMOS Output Only (Numbers)	—											
	CMOS I/O (Numbers)	75											
	N-Channel Open Drain Port (Numbers)	—											
	High Current Drive Port	—											
	Pull-Up Resistor	75											
External Interrupts Pins		9											
Debugging Function	On-Chip Debug	Yes											
	On-Board Flash Program	Yes											
Other Functions	ROM Correction Function	—											
	Others	—											
Operating Frequency/Supply Voltage		20MHz/2.7 to 5.5V											
Operating Ambient Temperature (°C)		-40 to 85	–40 to 125	–40 to 85	–40 to 125	–40 to 85	–40 to 125	–40 to 85	–40 to 125	–40 to 85	–40 to 125	–40 to 85	–40 to 125	-40 to 85
Package*2		PLQP0080KB-A											
Part No.		R5F21388WJFP	R5F21388WKFP	R5F2138AWKFP	R5F2138AWJFP	R5F2138CWJFP	R5F2138CWKFP	R5F21388XKFP	R5F21388XJFP	R5F2138AXJFP	R5F2138AXKFP	R5F2138CXKFP	R5F2138CXJFP	R5F21388YJFP	R5F21388YKFP	R5F2138AYKFP	R5F2138AYJFP	R5F2138CYJFP	R5F2138CYKFP	R5F21388ZKFP	R5F21388ZJFP	R5F2138AZJFP	R5F2138AZKFP	R5F2138CZKFP	R5F2138CZJFP

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (R8C/3x Series)

Group		R8C/36W			R8C/36X			R8C/36Y			R8C/36Z		
Memory	ROM (Bytes)	64K + 4K	96K + 4K	128K + 4K	64K	96K	128K	64K + 4K	96K + 4K	128K + 4K	64K	96K	128K
	RAM (Bytes)	6K	8K	10K	6K	8K	10K	6K	8K	10K	6K	8K	10K
	ROM Type*1	F											
	Data Flash/E2 Data Flash	4K (Data flash: program/erase 10k times)			—			4K (Data flash: program/erase 10k times)			—		
	Program Security	Yes (ID code check function, ROM code protect function)											
CPU	CPU	R8C Core											
	Basic Instructions	89											
	Minimum Instruction Execution Time (ns)	50 (@20MHz)											
	Multiplier	16 × 16 → 32											
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32											
DMA	DTC/DMAC II	DTC (Activation sources: 40)											
Clock	Clock Generation Circuit	3 circuits (Main clock, High-speed on-chip oscillator, Low-speed on-chip oscillator)											
	PLL	—											
	Subclock	—											
	RTC	—											
	On-Chip Oscillator	2 circuits (High precision and High speed: 40MHz, Low speed: 125kHz)											
	Oscillation Stop Detection	Yes											
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)											
	Power Save	Wait/Stop											
Power Supply Voltage Detection	Power-On Reset/POR	Yes											
	Low Voltage Detection/LVD	Yes (Voltage detection 3)											
A/D Converter	Resolution × Channels	10-bit × 16											
	Sample and Hold	Yes											
D/A Converter	Resolution × Channels	—											
Timer	8-bit	4 (Timer RA0, Timer RA1, Timer RB, Timer RE)											
	16-bit	5 (Timer RC, Timer RD, Timer RF, Timer RG)											
	Input Capture	15 (shared with Timer RC, Timer RD, Timer RF, Timer RG)											
	Output Compare	16 (shared with Timer RC, Timer RD, Timer RE, Timer RF, Timer RG)											
	PWM Output	11 (shared with Timer RB, Timer RC, Timer RD, Timer RG)											
	Real-Time Port	—											
	Event Counter	3 (shared with Timer RA0, Timer RA1, Timer RG)											
	2-Phase Encoder Input	1 (shared with Timer RG)											
	3-Phase Inverter Control	1 (shared with Timer RD)											
Watchdog Timer		1 (with automatic starting function and clock source protection function, low-speed on-chip oscillator for watchdog timer)											
Serial Interface	Clock Sync./Clock Async.	3 (UART 0, 1 (support LIN), UART 2)											
	Clock Sync. Only	—											
	Clock Async. Only	—											
I²C-bus		1 (UART 2 (simple I²C))											
IEBus		1 (UART 2)											
Synchronous Serial Communication Unit/Special Serial I/O		1											
CAN	Channels	1						—					
	Message Box (Numbers)	16						—					
LCD		—											
I/O Ports	Input Only (Numbers)	1											
	CMOS Output Only (Numbers)	—											
	CMOS I/O (Numbers)	59											
	N-Channel Open Drain Port (Numbers)	—											
	High Current Drive Port	—											
	Pull-Up Resistor	59											
External Interrupts Pins		9											
Debugging Function	On-Chip Debug	Yes											
	On-Board Flash Program	Yes											
Other Functions	ROM Correction Function	—											
	Others	—											
Operating Frequency/Supply Voltage		20MHz/2.7 to 5.5V											
Operating Ambient Temperature (°C)		-40 to 85	–40 to 125	–40 to 85	–40 to 125	–40 to 85	–40 to 125	–40 to 85	–40 to 125	–40 to 85	–40 to 125	–40 to 85	–40 to 125	-40 to 85
Package*2		PLQP0064KB-A											
Part No.		R5F21368WJFP	R5F21368WKFP	R5F2136AWKFP	R5F2136AWJFP	R5F2136CWJFP	R5F2136CWKFP	R5F21368XKFP	R5F21368XJFP	R5F2136AXJFP	R5F2136AXKFP	R5F2136CXKFP	R5F2136CXJFP	R5F21368YJFP	R5F21368YKFP	R5F2136AYKFP	R5F2136AYJFP	R5F2136CYJFP	R5F2136CYKFP	R5F21368ZKFP	R5F21368ZJFP	R5F2136AZJFP	R5F2136AZKFP	R5F2136CZKFP	R5F2136CZJFP

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (R8C/3x Series)

Group		R8C/34W					R8C/34X				
Memory	ROM (Bytes)	32K + 4K	48K + 4K	64K + 4K	96K + 4K	128K + 4K	32K	48K	64K	96K	128K
	RAM (Bytes)	2.5K	4K	6K	8K	10K	2.5K	4K	6K	8K	10K
	ROM Type*1	F									
	Data Flash/E2 Data Flash	4K (Data flash: program/erase 10k times)					—				
	Program Security	Yes (ID code check function, ROM code protect function)									
CPU	CPU	R8C Core									
	Basic Instructions	89									
	Minimum Instruction Execution Time (ns)	50 (@20MHz)									
	Multiplier	16 × 16 → 32									
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32									
DMA	DTC/DMAC Ⅱ	DTC (Activation sources: 31)									
Clock	Clock Generation Circuit	3 circuits (Main clock, High-speed on-chip oscillator, Low-speed on-chip oscillator)									
	PLL	—									
	Subclock	—									
	RTC	—									
	On-Chip Oscillator	2 circuits (High precision and High speed: 40MHz, Low speed: 125kHz)									
	Oscillation Stop Detection	Yes									
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)									
	Power Save	Wait/Stop									
Power Supply Voltage Detection	Power-On Reset/POR	Yes									
	Low Voltage Detection/LVD	Yes (Voltage detection 3)									
A/D Converter	Resolution × Channels	10-bit × 12									
	Sample and Hold	Yes									
D/A Converter	Resolution × Channels	—									
Timer	8-bit	3 (Timer RA, Timer RB, Timer RE)									
	16-bit	3 (Timer RC, Timer RD)									
	Input Capture	12 (shared with Timer RC, Timer RD)									
	Output Compare	13 (shared with Timer RC, Timer RD, Timer RE)									
	PWM Output	10 (shared with Timer RB, Timer RC, Timer RD)									
	Real-Time Port	—									
	Event Counter	1 (shared with Timer RA)									
	2-Phase Encoder Input	—									
	3-Phase Inverter Control	1 (shared with Timer RD)									
Watchdog Timer		1 (with automatic starting function and clock source protection function, low-speed on-chip oscillator for watchdog timer)									
Serial Interface	Clock Sync./Clock Async.	2 (UART 0 (support LIN), UART 2)									
	Clock Sync. Only	—									
	Clock Async. Only	—									
I²C-bus		1 (UART 2 (simple I²C))									
IEBus		1 (UART 2)									
Synchronous Serial Communication Unit/Special Serial I/O		1									
CAN	Channels	1									
	Message Box (Numbers)	16									
LCD		—									
I/O Ports	Input Only (Numbers)	1									
	CMOS Output Only (Numbers)	—									
	CMOS I/O (Numbers)	43									
	N-Channel Open Drain Port (Numbers)	—									
	High Current Drive Port	—									
	Pull-Up Resistor	43									
External Interrupts Pins		9									
Debugging Function	On-Chip Debug	Yes									
	On-Board Flash Program	Yes									
Other Functions	ROM Correction Function	—									
	Others	—									
Operating Frequency/Supply Voltage		20MHz/2.7 to 5.5V									
Operating Ambient Temperature (°C)		-40 to 85	–40 to 125	–40 to 85	–40 to 125	–40 to 85	–40 to 125	–40 to 85	–40 to 125	–40 to 85	–40 to 125	-40 to 85
Package*2		PLQP0048KB-A									
Part No.		R5F21346WJFP	R5F21346WKFP	R5F21347WKFP	R5F21347WJFP	R5F21348WJFP	R5F21348WKFP	R5F2134AWKFP	R5F2134AWJFP	R5F2134CWJFP	R5F2134CWKFP	R5F21346XKFP	R5F21346XJFP	R5F21347XJFP	R5F21347XKFP	R5F21348XKFP	R5F21348XJFP	R5F2134AXJFP	R5F2134AXKFP	R5F2134CXKFP	R5F2134CXJFP

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (R8C/3x Series)

Group		R8C/34Y					R8C/34Z				
Memory	ROM (Bytes)	32K + 4K	48K + 4K	64K + 4K	96K + 4K	128K + 4K	32K	48K	64K	96K	128K
	RAM (Bytes)	2.5K	4K	6K	8K	10K	2.5K	4K	6K	8K	10K
	ROM Type*1	F									
	Data Flash/E2 Data Flash	4K (Data flash: program/erase 10k times)					—				
	Program Security	Yes (ID code check function, ROM code protect function)									
CPU	CPU	R8C Core									
	Basic Instructions	89									
	Minimum Instruction Execution Time (ns)	50 (@20MHz)									
	Multiplier	16 × 16 → 32									
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32									
DMA	DTC/DMAC II	DTC (Activation sources: 31)									
Clock	Clock Generation Circuit	3 circuits (Main clock, High-speed on-chip oscillator, Low-speed on-chip oscillator)									
	PLL	—									
	Subclock	—									
	RTC	—									
	On-Chip Oscillator	2 circuits (High precision and High speed: 40MHz, Low speed: 125kHz)									
	Oscillation Stop Detection	Yes									
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)									
	Power Save	Wait/Stop									
Power Supply Voltage Detection	Power-On Reset/POR	Yes									
	Low Voltage Detection/LVD	Yes (Voltage detection 3)									
A/D Converter	Resolution × Channels	10-bit × 12									
	Sample and Hold	Yes									
D/A Converter	Resolution × Channels	—									
Timer	8-bit	3 (Timer RA, Timer RB, Timer RE)									
	16-bit	3 (Timer RC, Timer RD)									
	Input Capture	12 (shared with Timer RC, Timer RD)									
	Output Compare	13 (shared with Timer RC, Timer RD, Timer RE)									
	PWM Output	10 (shared with Timer RB, Timer RC, Timer RD)									
	Real-Time Port	—									
	Event Counter	1 (shared with Timer RA)									
	2-Phase Encoder Input	—									
	3-Phase Inverter Control	1 (shared with Timer RD)									
Watchdog Timer		1 (with automatic starting function and clock source protection function, low-speed on-chip oscillator for watchdog timer)									
Serial Interface	Clock Sync./Clock Async.	2 (UART 0 (support LIN), UART 2)									
	Clock Sync. Only	—									
	Clock Async. Only	—									
I²C-bus		1 (UART 2 (simple I²C))									
IEBus		1 (UART 2)									
Synchronous Serial Communication Unit/Special Serial I/O		1									
CAN	Channels	—									
	Message Box (Numbers)	—									
LCD		—									
I/O Ports	Input Only (Numbers)	1									
	CMOS Output Only (Numbers)	—									
	CMOS I/O (Numbers)	43									
	N-Channel Open Drain Port (Numbers)	—									
	High Current Drive Port	—									
	Pull-Up Resistor	43									
External Interrupts Pins		9									
Debugging Function	On-Chip Debug	Yes									
	On-Board Flash Program	Yes									
Other Functions	ROM Correction Function	—									
	Others	—									
Operating Frequency/Supply Voltage		20MHz/2.7 to 5.5V									
Operating Ambient Temperature (°C)		-40 to 85	–40 to 125	–40 to 85	–40 to 125	–40 to 85	–40 to 125	–40 to 85	–40 to 125	–40 to 85	–40 to 125	-40 to 85
Package*2		PLQP0048KB-A									
Part No.		R5F21346YJFP	R5F21346YKFP	R5F21347YKFP	R5F21347YJFP	R5F21348YJFP	R5F21348YKFP	R5F2134AYKFP	R5F2134AYJFP	R5F2134CYJFP	R5F2134CYKFP	R5F21346ZKFP	R5F21346ZJFP	R5F21347ZJFP	R5F21347ZKFP	R5F21348ZKFP	R5F21348ZJFP	R5F2134AZJFP	R5F2134AZKFP	R5F2134CZKFP	R5F2134CZJFP

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (R8C/3x Series)

Group		R8C/38E			R8C/38F			R8C/38G			R8C/38H		
Memory	ROM (Bytes)	64K + 4K	96K + 4K	128K + 4K	64K	96K	128K	64K + 4K	96K + 4K	128K + 4K	64K	96K	128K
	RAM (Bytes)	6K	8K	10K	6K	8K	10K	6K	8K	10K	6K	8K	10K
	ROM Type*1	F											
	Data Flash/E2 Data Flash	4K (Data flash: program/erase 10k times)			—			4K (Data flash: program/erase 10k times)			—		
	Program Security	Yes (ID code check function, ROM code protect function)											
CPU	CPU	R8C Core											
	Basic Instructions	89											
	Minimum Instruction Execution Time (ns)	50 (@20MHz)											
	Multiplier	16 × 16 → 32											
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32											
DMA	DTC/DMAC Ⅱ	DTC (Activation sources: 40)											
Clock	Clock Generation Circuit	3 circuits (Main clock, High-speed on-chip oscillator, Low-speed on-chip oscillator)											
	PLL	—											
	Subclock	—											
	RTC	—											
	On-Chip Oscillator	2 circuits (High speed: 40MHz, Low speed: 125kHz)											
	Oscillation Stop Detection	Yes											
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)											
	Power Save	Wait/Stop											
Power Supply Voltage Detection	Power-On Reset/POR	Yes											
	Low Voltage Detection/LVD	Yes (Voltage detection 3)											
A/D Converter	Resolution × Channels	10-bit × 20											
	Sample and Hold	Yes											
D/A Converter	Resolution × Channels	—											
Timer	8-bit	4 (Timer RA0, Timer RA1, Timer RB, Timer RE)											
	16-bit	5 (Timer RC, Timer RD, Timer RF, Timer RG)											
	Input Capture	15 (shared with Timer RC, Timer RD, Timer RF, Timer RG)											
	Output Compare	16 (shared with Timer RC, Timer RD, Timer RE, Timer RF, Timer RG)											
	PWM Output	11 (shared with Timer RB, Timer RC, Timer RD, Timer RG)											
	Real-Time Port	—											
	Event Counter	3 (shared with Timer RA0, Timer RA1, Timer RG)											
	2-Phase Encoder Input	1 (shared with Timer RG)											
	3-Phase Inverter Control	1 (shared with Timer RD)											
Watchdog Timer		1 (with automatic starting function and clock source protection function, low-speed on-chip oscillator for watchdog timer)											
Serial Interface	Clock Sync./Clock Async.	3 (UART 0, 1 (support LIN), UART 2)											
	Clock Sync. Only	—											
	Clock Async. Only	—											
I²C-bus		1 (UART 2 (simple I²C))											
IEBus		1 (UART 2)											
Synchronous Serial Communication Unit/Special Serial I/O		1											
CAN	Channels	1						—					
	Message Box (Numbers)	16						—					
LCD		—											
I/O Ports	Input Only (Numbers)	1											
	CMOS Output Only (Numbers)	—											
	CMOS I/O (Numbers)	75											
	N-Channel Open Drain Port (Numbers)	—											
	High Current Drive Port	—											
	Pull-Up Resistor	75											
External Interrupts Pins		9											
Debugging Function	On-Chip Debug	Yes											
	On-Board Flash Program	Yes											
Other Functions	ROM Correction Function	—											
	Others	—											
Operating Frequency/Supply Voltage		20MHz/2.7 to 5.5V											
Operating Ambient Temperature (°C)		-40 to 85	–40 to 125	–40 to 85	–40 to 125	–40 to 85	–40 to 125	–40 to 85	–40 to 125	–40 to 85	–40 to 125	–40 to 85	–40 to 125	-40 to 85
Package*2		PLQP0080KB-A											
Part No.		R5F21388EJFP	R5F21388EKFP	R5F2138AEKFP	R5F2138AEJFP	R5F2138CEJFP	R5F2138CEKFP	R5F21388FKFP	R5F21388FJFP	R5F2138AFJFP	R5F2138AFKFP	R5F2138CFKFP	R5F2138CFJFP	R5F21388GJFP	R5F21388GKFP	R5F2138AGKFP	R5F2138AGJFP	R5F2138CGJFP	R5F2138CGKFP	R5F21388HKFP	R5F21388HJFP	R5F2138AHJFP	R5F2138AHKFP	R5F2138CHKFP	R5F2138CHJFP

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (R8C/3x Series)

Group		R8C/36E			R8C/36F			R8C/36G			R8C/36H		
Memory	ROM (Bytes)	64K + 4K	96K + 4K	128K + 4K	64K	96K	128K	64K + 4K	96K + 4K	128K + 4K	64K	96K	128K
	RAM (Bytes)	6K	8K	10K	6K	8K	10K	6K	8K	10K	6K	8K	10K
	ROM Type*1	F											
	Data Flash/E2 Data Flash	4K (Data flash: program/erase 10k times)			—			4K (Data flash: program/erase 10k times)			—		
	Program Security	Yes (ID code check function, ROM code protect function)											
CPU	CPU	R8C Core											
	Basic Instructions	89											
	Minimum Instruction Execution Time (ns)	50 (@20MHz)											
	Multiplier	16 × 16 → 32											
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32											
DMA	DTC/DMAC II	DTC (Activation sources: 40)											
Clock	Clock Generation Circuit	3 circuits (Main clock, High-speed on-chip oscillator, Low-speed on-chip oscillator)											
	PLL	—											
	Subclock	—											
	RTC	—											
	On-Chip Oscillator	2 circuits (High speed: 40MHz, Low speed: 125kHz)											
	Oscillation Stop Detection	Yes											
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)											
	Power Save	Wait/Stop											
Power Supply Voltage Detection	Power-On Reset/POR	Yes											
	Low Voltage Detection/LVD	Yes (Voltage detection 3)											
A/D Converter	Resolution × Channels	10-bit × 16											
	Sample and Hold	Yes											
D/A Converter	Resolution × Channels	—											
Timer	8-bit	4 (Timer RA0, Timer RA1, Timer RB, Timer RE)											
	16-bit	5 (Timer RC, Timer RD, Timer RF, Timer RG)											
	Input Capture	15 (shared with Timer RC, Timer RD, Timer RF, Timer RG)											
	Output Compare	16 (shared with Timer RC, Timer RD, Timer RE, Timer RF, Timer RG)											
	PWM Output	11 (shared with Timer RB, Timer RC, Timer RD, Timer RG)											
	Real-Time Port	—											
	Event Counter	3 (shared with Timer RA0, Timer RA1, Timer RG)											
	2-Phase Encoder Input	1 (shared with Timer RG)											
	3-Phase Inverter Control	1 (shared with Timer RD)											
Watchdog Timer		1 (with automatic starting function and clock source protection function, low-speed on-chip oscillator for watchdog timer)											
Serial Interface	Clock Sync./Clock Async.	3 (UART 0, 1 (support LIN), UART 2)											
	Clock Sync. Only	—											
	Clock Async. Only	—											
I^2C-bus		1 (UART 2 (simple I^2C))											
IEBus		1 (UART 2)											
Synchronous Serial Communication Unit/Special Serial I/O		1											
CAN	Channels	1						—					
	Message Box (Numbers)	16						—					
LCD		—											
I/O Ports	Input Only (Numbers)	1											
	CMOS Output Only (Numbers)	—											
	CMOS I/O (Numbers)	59											
	N-Channel Open Drain Port (Numbers)	—											
	High Current Drive Port	—											
	Pull-Up Resistor	59											
External Interrupts Pins		9											
Debugging Function	On-Chip Debug	Yes											
	On-Board Flash Program	Yes											
Other Functions	ROM Correction Function	—											
	Others	—											
Operating Frequency/Supply Voltage		20MHz/2.7 to 5.5V											
Operating Ambient Temperature (˚C)		-40 to 85	–40 to 125	–40 to 85	–40 to 125	–40 to 85	–40 to 125	–40 to 85	–40 to 125	–40 to 85	–40 to 125	–40 to 85	–40 to 125	-40 to 85
Package*2		PLQP0064KB-A											
Part No.		R5F21368EJFP	R5F21368EKFP	R5F2136AEKFP	R5F2136AEJFP	R5F2136CEJFP	R5F2136CEKFP	R5F21368FKFP	R5F21368FJFP	R5F2136AFJFP	R5F2136AFKFP	R5F2136CFKFP	R5F2136CFJFP	R5F21368GJFP	R5F21368GKFP	R5F2136AGKFP	R5F2136AGJFP	R5F2136CGJFP	R5F2136CGKFP	R5F21368HKFP	R5F21368HJFP	R5F2136AHJFP	R5F2136AHKFP	R5F2136CHKFP	R5F2136CHJFP

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (R8C/3x Series)

Group		R8C/34E					R8C/34F				
Memory	ROM (Bytes)	32K + 4K	48K + 4K	64K + 4K	96K + 4K	128K + 4K	32K	48K	64K	96K	128K
	RAM (Bytes)	2.5K	4K	6K	8K	10K	2.5K	4K	6K	8K	10K
	ROM Type*1	F									
	Data Flash/E2 Data Flash	4K (Data flash: program/erase 10k times)					—				
	Program Security	Yes (ID code check function, ROM code protect function)									
CPU	CPU	R8C Core									
	Basic Instructions	89									
	Minimum Instruction Execution Time (ns)	50 (@20MHz)									
	Multiplier	16 × 16 → 32									
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32									
DMA	DTC/DMAC Ⅱ	DTC (Activation sources: 31)									
Clock	Clock Generation Circuit	3 circuits (Main clock, High-speed on-chip oscillator, Low-speed on-chip oscillator)									
	PLL	—									
	Subclock	—									
	RTC	—									
	On-Chip Oscillator	2 circuits (High speed: 40MHz, Low speed: 125kHz)									
	Oscillation Stop Detection	Yes									
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)									
	Power Save	Wait/Stop									
Power Supply Voltage Detection	Power-On Reset/POR	Yes									
	Low Voltage Detection/LVD	Yes (Voltage detection 3)									
A/D Converter	Resolution × Channels	10-bit × 12									
	Sample and Hold	Yes									
D/A Converter	Resolution × Channels	—									
Timer	8-bit	3 (Timer RA, Timer RB, Timer RE)									
	16-bit	3 (Timer RC, Timer RD)									
	Input Capture	12 (shared with Timer RC, Timer RD)									
	Output Compare	13 (shared with Timer RC, Timer RD, Timer RE)									
	PWM Output	10 (shared with Timer RB, Timer RC, Timer RD)									
	Real-Time Port	—									
	Event Counter	1 (shared with Timer RA)									
	2-Phase Encoder Input	—									
	3-Phase Inverter Control	1 (shared with Timer RD)									
Watchdog Timer		1 (with automatic starting function and clock source protection function, low-speed on-chip oscillator for watchdog timer)									
Serial Interface	Clock Sync./Clock Async.	2 (UART 0 (support LIN), UART 2)									
	Clock Sync. Only	—									
	Clock Async. Only	—									
I²C-bus		1 (UART 2 (simple I²C))									
IEBus		1 (UART 2)									
Synchronous Serial Communication Unit/Special Serial I/O		1									
CAN	Channels	1									
	Message Box (Numbers)	16									
LCD		—									
I/O Ports	Input Only (Numbers)	1									
	CMOS Output Only (Numbers)	—									
	CMOS I/O (Numbers)	43									
	N-Channel Open Drain Port (Numbers)	—									
	High Current Drive Port	—									
	Pull-Up Resistor	43									
External Interrupts Pins		9									
Debugging Function	On-Chip Debug	Yes									
	On-Board Flash Program	Yes									
Other Functions	ROM Correction Function	—									
	Others	—									
Operating Frequency/Supply Voltage		20MHz/2.7 to 5.5V									
Operating Ambient Temperature (°C)		-40 to 85	–40 to 125	–40 to 85	–40 to 125	–40 to 85	–40 to 125	–40 to 85	–40 to 125	–40 to 85	–40 to 125	-40 to 85
Package*2		PLQP0048KB-A									
Part No.		R5F21346EJFP	R5F21346EKFP	R5F21347EKFP	R5F21347EJFP	R5F21348EJFP	R5F21348EKFP	R5F2134AEKFP	R5F2134AEJFP	R5F2134CEJFP	R5F2134CEKFP	R5F21346FKFP	R5F21346FJFP	R5F21347FJFP	R5F21347FKFP	R5F21348FKFP	R5F21348FJFP	R5F2134AFJFP	R5F2134AFKFP	R5F2134CFKFP	R5F2134CFJFP

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (R8C/3x Series)

Group		R8C/34G					R8C/34H				
Memory	ROM (Bytes)	32K + 4K	48K + 4K	64K + 4K	96K + 4K	128K + 4K	32K	48K	64K	96K	128K
	RAM (Bytes)	2.5K	4K	6K	8K	10K	2.5K	4K	6K	8K	10K
	ROM Type*1	F									
	Data Flash/E2 Data Flash	4K (Data flash: program/erase 10k times)					—				
	Program Security	Yes (ID code check function, ROM code protect function)									
CPU	CPU	R8C Core									
	Basic Instructions	89									
	Minimum Instruction Execution Time (ns)	50 (@20MHz)									
	Multiplier	16 × 16 → 32									
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32									
DMA	DTC/DMAC II	DTC (Activation sources: 31)									
Clock	Clock Generation Circuit	3 circuits (Main clock, High-speed on-chip oscillator, Low-speed on-chip oscillator)									
	PLL	—									
	Subclock	—									
	RTC	—									
	On-Chip Oscillator	2 circuits (High speed: 40MHz, Low speed: 125kHz)									
	Oscillation Stop Detection	Yes									
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)									
	Power Save	Wait/Stop									
Power Supply Voltage Detection	Power-On Reset/POR	Yes									
	Low Voltage Detection/LVD	Yes (Voltage detection 3)									
A/D Converter	Resolution × Channels	10-bit × 12									
	Sample and Hold	Yes									
D/A Converter	Resolution × Channels	—									
Timer	8-bit	3 (Timer RA, Timer RB, Timer RE)									
	16-bit	3 (Timer RC, Timer RD)									
	Input Capture	12 (shared with Timer RC, Timer RD)									
	Output Compare	13 (shared with Timer RC, Timer RD, Timer RE)									
	PWM Output	10 (shared with Timer RB, Timer RC, Timer RD)									
	Real-Time Port	—									
	Event Counter	1 (shared with Timer RA)									
	2-Phase Encoder Input	—									
	3-Phase Inverter Control	1 (shared with Timer RD)									
Watchdog Timer		1 (with automatic starting function and clock source protection function, low-speed on-chip oscillator for watchdog timer)									
Serial Interface	Clock Sync./Clock Async.	2 (UART 0 (support LIN), UART 2)									
	Clock Sync. Only	—									
	Clock Async. Only	—									
I²C-bus		1 (UART 2 (simple I²C))									
IEBus		1 (UART 2)									
Synchronous Serial Communication Unit/Special Serial I/O		1									
CAN	Channels	—									
	Message Box (Numbers)	—									
LCD		—									
I/O Ports	Input Only (Numbers)	1									
	CMOS Output Only (Numbers)	—									
	CMOS I/O (Numbers)	43									
	N-Channel Open Drain Port (Numbers)	—									
	High Current Drive Port	—									
	Pull-Up Resistor	43									
External Interrupts Pins		9									
Debugging Function	On-Chip Debug	Yes									
	On-Board Flash Program	Yes									
Other Functions	ROM Correction Function	—									
	Others	—									
Operating Frequency/Supply Voltage		20MHz/2.7 to 5.5V									
Operating Ambient Temperature (°C)		-40 to 85	–40 to 125	–40 to 85	–40 to 125	–40 to 85	–40 to 125	–40 to 85	–40 to 125	–40 to 85	–40 to 125	-40 to 85
Package*2		PLQP0048KB-A									
Part No.		R5F21346GJFP	R5F21346GKFP	R5F21347GKFP	R5F21347GJFP	R5F21348GJFP	R5F21348GKFP	R5F2134AGKFP	R5F2134AGJFP	R5F2134CGJFP	R5F2134CGKFP	R5F21346HKFP	R5F21346HJFP	R5F21347HJFP	R5F21347HKFP	R5F21348HKFP	R5F21348HJFP	R5F2134AHJFP	R5F2134AHKFP	R5F2134CHKFP	R5F2134CHJFP

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (R8C/3x Series)

Group		R8C/34P				R8C/34R			
Memory	ROM (Bytes)	16K + 4K		32K + 4K		16K		32K	
	RAM (Bytes)	1.5K		2.5K		1.5K		2.5K	
	ROM Type*1	F							
	Data Flash/E2 Data Flash	4K (Data flash: program/erase 10k times)				—			
	Program Security	Yes (ID code check function, ROM code protect function)							
CPU	CPU	R8C Core							
	Basic Instructions	89							
	Minimum Instruction Execution Time (ns)	50 (@20MHz)							
	Multiplier	16 × 16 → 32							
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32							
Clock	Clock Generation Circuit	3 circuits (Main clock, High-speed on-chip oscillator, Low-speed on-chip oscillator)							
	PLL	—							
	Subclock	—							
	RTC	—							
	On-Chip Oscillator	2 circuits (High precision and High speed: 40MHz, Low speed: 125kHz)							
	Oscillation Stop Detection	Yes							
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)							
	Power Save	Wait/Stop							
Power Supply Voltage Detection	Power-On Reset/POR	Yes							
	Low Voltage Detection/LVD	Yes (Voltage detection 3)							
A/D Converter	Resolution × Channels	10-bit × 12							
	Sample and Hold	Yes							
D/A Converter	Resolution × Channels	8-bit × 2							
Timer	8-bit	2 (Timer RA, Timer RB)							
	16-bit	3 (Timer RC, Timer RD)							
	Input Capture	12 (shared with Timer RC, Timer RD)							
	Output Compare	12 (shared with Timer RC, Timer RD)							
	PWM Output	10 (shared with Timer RB, Timer RC, Timer RD)							
	Real-Time Port	—							
	Event Counter	1 (shared with Timer RA)							
	2-Phase Encoder Input	—							
	3-Phase Inverter Control	1 (shared with Timer RD)							
Watchdog Timer		1 (with automatic starting function and clock source protection function, low-speed on-chip oscillator for watchdog timer)							
Serial Interface	Clock Sync./Clock Async.	2 (UART 0 (support LIN), UART 2)							
	Clock Sync. Only	—							
	Clock Async. Only	—							
I²C-bus		1 (UART 2 (simple I²C))							
IEBus		1 (UART 2)							
Synchronous Serial Communication Unit/Special Serial I/O		1							
CAN	Channels	—							
	Message Box (Numbers)	—							
LCD		—							
I/O Ports	Input Only (Numbers)	1							
	CMOS Output Only (Numbers)	—							
	CMOS I/O (Numbers)	43							
	N-Channel Open Drain Port (Numbers)	—							
	High Current Drive Port	—							
	Pull-Up Resistor	43							
External Interrupts Pins		9							
Debugging Function	On-Chip Debug	Yes							
	On-Board Flash Program	Yes							
Other Functions	ROM Correction Function	—							
	Others	Comparator B × 2							
Operating Frequency/Supply Voltage		20MHz/2.7 to 5.5V							
Operating Ambient Temperature (°C)		–40 to 85	–40 to 125	–40 to 85	–40 to 125	–40 to 85	–40 to 125	–40 to 85	–40 to 125
Package*2		PLQP0048KB-A							
Part No.		R5F21344PJFP**	R5F21344PKFP**	R5F21346PJFP**	R5F21346PKFP**	R5F21344RJFP**	R5F21344RKFP**	R5F21346RJFP**	R5F21346RKFP**

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (R8C/3x Series)

Group		R8C/33G				R8C/33H			
Memory	ROM (Bytes)	16K + 4K		32K + 4K		16K		32K	
	RAM (Bytes)	1.5K		2.5K		1.5K		2.5K	
	ROM Type*1	F							
	Data Flash/E2 Data Flash	4K (Data flash: program/erase 10k times)				—			
	Program Security	Yes (ID code check function, ROM code protect function)							
CPU	CPU	R8C Core							
	Basic Instructions	89							
	Minimum Instruction Execution Time (ns)	50 (@20MHz)							
	Multiplier	16 × 16 → 32							
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32							
Clock	Clock Generation Circuit	3 circuits (Main clock, High-speed on-chip oscillator, Low-speed on-chip oscillator)							
	PLL	—							
	Subclock	—							
	RTC	—							
	On-Chip Oscillator	2 circuits (High precision and High speed: 40MHz, Low speed: 125kHz)							
	Oscillation Stop Detection	Yes							
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)							
	Power Save	Wait/Stop							
Power Supply Voltage Detection	Power-On Reset/POR	Yes							
	Low Voltage Detection/LVD	Yes (Voltage detection 3)							
A/D Converter	Resolution × Channels	10-bit × 12							
	Sample and Hold	Yes							
D/A Converter	Resolution × Channels	8-bit × 2							
Timer	8-bit	2 (Timer RA, Timer RB)							
	16-bit	3 (Timer RC, Timer RD*2)							
	Input Capture	12 (shared with Timer RC, Timer RD)							
	Output Compare	12 (shared with Timer RC, Timer RD)							
	PWM Output	10 (shared with Timer RB, Timer RC, Timer RD)							
	Real-Time Port	—							
	Event Counter	1 (shared with Timer RA)							
	2-Phase Encoder Input	—							
	3-Phase Inverter Control	1 (shared with Timer RD)							
Watchdog Timer		1 (with automatic starting function and clock source protection function, low-speed on-chip oscillator for watchdog timer)							
Serial Interface	Clock Sync./Clock Async.	2 (UART 0 (support LIN), UART 2)							
	Clock Sync. Only	—							
	Clock Async. Only	—							
I²C-bus		1 (UART 2 (simple I²C))							
IEBus		1 (UART 2)							
Synchronous Serial Communication Unit/Special Serial I/O		1							
CAN	Channels	—							
	Message Box (Numbers)	—							
LCD		—							
I/O Ports	Input Only (Numbers)	1							
	CMOS Output Only (Numbers)	—							
	CMOS I/O (Numbers)	27							
	N-Channel Open Drain Port (Numbers)	—							
	High Current Drive Port	—							
	Pull-Up Resistor	27							
External Interrupts Pins		7							
Debugging Function	On-Chip Debug	Yes							
	On-Board Flash Program	Yes							
Other Functions	ROM Correction Function	—							
	Others	Comparator B × 2							
Operating Frequency/Supply Voltage		20MHz/2.7 to 5.5V							
Operating Ambient Temperature (°C)		–40 to 85	–40 to 125	–40 to 85	–40 to 125	–40 to 85	–40 to 125	–40 to 85	–40 to 125
Package*3		PLQP0032GB-A							
Part No.		R5F21334GJFP**	R5F21334GKFP**	R5F21336GJFP**	R5F21336GKFP**	R5F21334HJFP**	R5F21334HKFP**	R5F21336HJFP**	R5F21336HKFP**

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Be sure to use an on-chip debugging emulator for debugging because the timer RD does not support full-spec emulators.
*3 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (R8C/3x Series)

Group		R8C/32G				R8C/32H			
Memory	ROM (Bytes)	16K + 4K		32K + 4K		16K		32K	
	RAM (Bytes)	1.5K		2.5K		1.5K		2.5K	
	ROM Type*1	F							
	Data Flash/E2 Data Flash	4K (Data flash: program/erase 10k times)				—			
	Program Security	Yes (ID code check function, ROM code protect function)							
CPU	CPU	R8C Core							
	Basic Instructions	89							
	Minimum Instruction Execution Time (ns)	50 (@20MHz)							
	Multiplier	16 × 16 → 32							
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32							
Clock	Clock Generation Circuit	3 circuits (Main clock, High-speed on-chip oscillator, Low-speed on-chip oscillator)							
	PLL	—							
	Subclock	—							
	RTC	—							
	On-Chip Oscillator	2 circuits (High precision and High speed: 40MHz, Low speed: 125kHz)							
	Oscillation Stop Detection	Yes							
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)							
	Power Save	Wait/Stop							
Power Supply Voltage Detection	Power-On Reset/POR	Yes							
	Low Voltage Detection/LVD	Yes (Voltage detection 3)							
A/D Converter	Resolution × Channels	10-bit × 4							
	Sample and Hold	Yes							
D/A Converter	Resolution × Channels	—							
Timer	8-bit	2 (Timer RA, Timer RB)							
	16-bit	3 (Timer RC, Timer RD*2)							
	Input Capture	12 (shared with Timer RC, Timer RD)							
	Output Compare	12 (shared with Timer RC, Timer RD)							
	PWM Output	10 (shared with Timer RB, Timer RC, Timer RD)							
	Real-Time Port	—							
	Event Counter	1 (shared with Timer RA)							
	2-Phase Encoder Input	—							
	3-Phase Inverter Control	1 (shared with Timer RD)							
Watchdog Timer		1 (with automatic starting function and clock source protection function, low-speed on-chip oscillator for watchdog timer)							
Serial Interface	Clock Sync./Clock Async.	2 (UART 0 (support LIN), UART 2)							
	Clock Sync. Only	—							
	Clock Async. Only	—							
I²C-bus		1 (UART 2 (simple I²C))							
IEBus		1 (UART 2)							
Synchronous Serial Communication Unit/Special Serial I/O		1							
CAN	Channels	—							
	Message Box (Numbers)	—							
LCD		—							
I/O Ports	Input Only (Numbers)	1							
	CMOS Output Only (Numbers)	—							
	CMOS I/O (Numbers)	15							
	N-Channel Open Drain Port (Numbers)	—							
	High Current Drive Port	—							
	Pull-Up Resistor	15							
External Interrupts Pins		7							
Debugging Function	On-Chip Debug	Yes							
	On-Board Flash Program	Yes							
Other Functions	ROM Correction Function	—							
	Others	Comparator B × 2							
Operating Frequency/Supply Voltage		20MHz/2.7 to 5.5V							
Operating Ambient Temperature (°C)		–40 to 85	–40 to 125	–40 to 85	–40 to 125	–40 to 85	–40 to 125	–40 to 85	–40 to 125
Package*3		PLSP0020JB-A							
Part No.		R5F21324GJSP**	R5F21324GKSP**	R5F21326GJSP**	R5F21326GKSP**	R5F21324HJSP**	R5F21324HKSP**	R5F21326HJSP**	R5F21326HKSP**

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Be sure to use an on-chip debugging emulator for debugging because the timer RD does not support full-spec emulators.
*3 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (R8C/5x Series)

Group		R8C/54E					R8C/54F				
Memory	ROM (Bytes)	32K + 4K	48K + 4K	64K + 4K	96K + 4K	128K + 4K	32K	48K	64K	96K	128K
	RAM (Bytes)	2.5K	4K	6K	8K	10K	2.5K	4K	6K	8K	10K
	ROM Type*1	F									
	Data Flash/E2 Data Flash	4K (Data flash: program/erase 10k times)					—				
	Program Security	Yes (ID code check function, ROM code protect function)									
CPU	CPU	R8C Core									
	Basic Instructions	89									
	Minimum Instruction Execution Time (ns)	31.25 (@32MHz)									
	Multiplier	16 × 16 → 32									
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32									
DMA	DTC/DMAC II	DTC (Activation sources: 36)									
Clock	Clock Generation Circuit	4 circuits (Main clock, PLL, High-speed on-chip oscillator, Low-speed on-chip oscillator)									
	PLL	Yes									
	Subclock	—									
	RTC	—									
	On-Chip Oscillator	2 circuits (High precision and High speed: 40MHz, Low speed: 125kHz)									
	Oscillation Stop Detection	Yes									
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)									
	Power Save	Wait/Stop									
Power Supply Voltage Detection	Power-On Reset/POR	Yes									
	Low Voltage Detection/LVD	Yes (Voltage detection 3)									
A/D Converter	Resolution × Channels	10-bit × 12									
	Sample and Hold	Yes									
D/A Converter	Resolution × Channels	—									
Timer	8-bit	1 (Timer RE2)									
	16-bit	6 (Timer RJ_0, Timer RJ_1, Timer RB2, Timer RC, Timer RD)									
	Input Capture	12 (shared with Timer RC, Timer RD)									
	Output Compare	13 (shared with Timer RC, Timer RD, Timer RE2)									
	PWM Output	10 (shared with Timer RB2, Timer RC, Timer RD)									
	Real-Time Port	—									
	Event Counter	2 (shared with Timer RJ_0. Timer RJ_1)									
	2-Phase Encoder Input	—									
	3-Phase Inverter Control	1 (shared with Timer RD)									
Watchdog Timer		1 (with automatic starting function and clock source protection function, low-speed on-chip oscillator for watchdog timer)									
Serial Interface	Clock Sync./Clock Async.	3 (UART0, 1 (support LIN), UART2)									
	Clock Sync. Only	—									
	Clock Async. Only	—									
I²C-bus		2 (shared with SSU)									
IEBus		1 (UART2)									
Synchronous Serial Communication Unit/Special Serial I/O		2									
CAN	Channels	1									
	Message Box (Numbers)	16									
LCD		—									
I/O Ports	Input Only (Numbers)	1									
	CMOS Output Only (Numbers)	—									
	CMOS I/O (Numbers)	43									
	N-Channel Open Drain Port (Numbers)	—									
	High Current Drive Port	—									
	Pull-Up Resistor	43									
External Interrupts Pins		9									
Debugging Function	On-Chip Debug	Yes									
	On-Board Flash Program	Yes									
Other Functions	ROM Correction Function	—									
	Others	Simplified PMC(Peripheral Mapping Controller) ELC(Event Link Controller) Comparator B × 2 circuits									
Operating Frequency/Supply Voltage		32 MHz (VCC = 2.7 V to 5.5 V) 5 MHz (VCC = 1.8 V to 2.7 V)									
Operating Ambient Temperature (°C)		–40 to 85	–40 to 125	–40 to 85	–40 to 125	–40 to 85	–40 to 125	–40 to 85	–40 to 125	–40 to 85	–40 to 125
		–40 to 85	–40 to 125	–40 to 85	–40 to 125	–40 to 85	–40 to 125	–40 to 85	–40 to 125	–40 to 85	–40 to 125
Package*2		PLQP0048KB-A									
Part No.		R5F21546EJFP**	R5F21546EKFP**	R5F21547EJFP**	R5F21547EKFP**	R5F21548EJFP**	R5F21548EKFP**	R5F2154AEJFP**	R5F2154AEKFP**	R5F2154CEJFP**	R5F2154CEKFP**
		R5F21546FJFP**	R5F21546FKFP**	R5F21547FJFP**	R5F21547FKFP**	R5F21548FJFP**	R5F21548FKFP**	R5F2154AFJFP**	R5F2154AFKFP**	R5F2154CFJFP**	R5F2154CFKFP**

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (R8C/5x Series)

Group		R8C/54G					R8C/54H				
Memory	ROM (Bytes)	32K + 4K	48K + 4K	64K + 4K	96K + 4K	128K + 4K	32K	48K	64K	96K	128K
	RAM (Bytes)	2.5K	4K	6K	8K	10K	2.5K	4K	6K	8K	10K
	ROM Type*1	F									
	Data Flash/E2 Data Flash	4K (Data flash: program/erase 10k times)					—				
	Program Security	Yes (ID code check function, ROM code protect function)									
CPU	CPU	R8C Core									
	Basic Instructions	89									
	Minimum Instruction Execution Time (ns)	31.25 (@32MHz)									
	Multiplier	16 × 16 → 32									
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32									
DMA	DTC/DMAC Ⅱ	DTC (Activation sources: 36)									
Clock	Clock Generation Circuit	4 circuits (Main clock, PLL, High-speed on-chip oscillator, Low-speed on-chip oscillator)									
	PLL	Yes									
	Subclock	—									
	RTC	—									
	On-Chip Oscillator	2 circuits (High precision and High speed: 40MHz, Low speed: 125kHz)									
	Oscillation Stop Detection	Yes									
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)									
	Power Save	Wait/Stop									
Power Supply Voltage Detection	Power-On Reset/POR	Yes									
	Low Voltage Detection/LVD	Yes (Voltage detection 3)									
A/D Converter	Resolution × Channels	10-bit × 12									
	Sample and Hold	Yes									
D/A Converter	Resolution × Channels	—									
Timer	8-bit	1 (Timer RE2)									
	16-bit	6 (Timer RJ_0, Timer RJ_1, Timer RB2, Timer RC, Timer RD)									
	Input Capture	12 (shared with Timer RC, Timer RD)									
	Output Compare	13 (shared with Timer RC, Timer RD, Timer RE2)									
	PWM Output	10 (shared with Timer RB2, Timer RC, Timer RD)									
	Real-Time Port	—									
	Event Counter	2 (shared with Timer RJ_0, Timer RJ_1)									
	2-Phase Encoder Input	—									
	3-Phase Inverter Control	1 (shared with Timer RD)									
Watchdog Timer		1 (with automatic starting function and clock source protection function, low-speed on-chip oscillator for watchdog timer)									
Serial Interface	Clock Sync./Clock Async.	3 (UART0, 1 (support LIN), UART2)									
	Clock Sync. Only	—									
	Clock Async. Only	—									
I^2C-bus		2 (shared with SSU)									
IEBus		1 (UART2)									
Synchronous Serial Communication Unit/Special Serial I/O		2									
CAN	Channels	—									
	Message Box (Numbers)	—									
LCD		—									
I/O Ports	Input Only (Numbers)	1									
	CMOS Output Only (Numbers)	—									
	CMOS I/O (Numbers)	43									
	N-Channel Open Drain Port (Numbers)	—									
	High Current Drive Port	—									
	Pull-Up Resistor	43									
External Interrupts Pins		9									
Debugging Function	On-Chip Debug	Yes									
	On-Board Flash Program	Yes									
Other Functions	ROM Correction Function	—									
	Others	Simplified PMC(Peripheral Mapping Controller) ELC(Event Link Controller) Comparator B × 2 circuits									
Operating Frequency/Supply Voltage		32 MHz (VCC = 2.7 V to 5.5 V) 5 MHz (VCC = 1.8 V to 2.7 V)									
Operating Ambient Temperature (°C)		–40 to 85	–40 to 125	–40 to 85	–40 to 125	–40 to 85	–40 to 125	–40 to 85	–40 to 125	–40 to 85	–40 to 125	–40 to 85	–40 to 125	–40 to 85	–40 to 125	–40 to 85	–40 to 125	–40 to 85	–40 to 125	–40 to 85	–40 to 125
Package*2		PLQP0048KB-A																			
Part No.		R5F21546GJFP**	R5F21546GKFP**	R5F21547GJFP**	R5F21547GKFP**	R5F21548GJFP**	R5F21548GKFP**	R5F2154AGJFP**	R5F2154AGKFP**	R5F2154CGJFP**	R5F2154CGKFP**	R5F21546HJFP**	R5F21546HKFP**	R5F21547HJFP**	R5F21547HKFP**	R5F21548HJFP**	R5F21548HKFP**	R5F2154AHJFP**	R5F2154AHKFP**	R5F2154CHJFP**	R5F2154CHKFP**

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (R8C/5x Series)

Group		R8C/56E					R8C/56F				
Memory	ROM (Bytes)	32K + 4K	48K + 4K	64K + 4K	96K + 4K	128K + 4K	32K	48K	64K	96K	128K
	RAM (Bytes)	2.5K	4K	6K	8K	10K	2.5K	4K	6K	8K	10K
	ROM Type*1	F									
	Data Flash/E2 Data Flash	4K (Data flash: program/erase 10k times)					—				
	Program Security	Yes (ID code check function, ROM code protect function)									
CPU	CPU	R8C Core									
	Basic Instructions	89									
	Minimum Instruction Execution Time (ns)	31.25 (@32MHz)									
	Multiplier	16 × 16 → 32									
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32									
DMA	DTC/DMAC II	DTC (Activation sources: 42)									
Clock	Clock Generation Circuit	4 circuits (Main clock, PLL, High-speed on-chip oscillator, Low-speed on-chip oscillator)									
	PLL	Yes									
	Subclock	—									
	RTC	—									
	On-Chip Oscillator	2 circuits (High precision and High speed: 40MHz, Low speed: 125kHz)									
	Oscillation Stop Detection	Yes									
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)									
	Power Save	Wait/Stop									
Power Supply Voltage Detection	Power-On Reset/POR	Yes									
	Low Voltage Detection/LVD	Yes (Voltage detection 3)									
A/D Converter	Resolution × Channels	10-bit × 16									
	Sample and Hold	Yes									
D/A Converter	Resolution × Channels	—									
Timer	8-bit	1 (Timer RE2)									
	16-bit	9 (Timer RJ_0, Timer RJ_1, Timer RB2, Timer RC_0, Timer RC_1, Timer RD, Timer RF, Timer RG)									
	Input Capture	19 (shared with Timer RC_0, Timer RC_1, Timer RD, Timer RF, Timer RG)									
	Output Compare	20 (shared with Timer RC_0, Timer RC_1, Timer RD, Timer RE2, Timer RF, Timer RG)									
	PWM Output	14 (shared with Timer RB2, Timer RC_0, Timer RC_1, Timer RD, Timer RG)									
	Real-Time Port	—									
	Event Counter	3 (shared with Timer RJ_0, Timer RJ_1, Timer RG)									
	2-Phase Encoder Input	—									
	3-Phase Inverter Control	1 (shared with Timer RD)									
Watchdog Timer		1 (with automatic starting function and clock source protection function, low-speed on-chip oscillator for watchdog timer)									
Serial Interface	Clock Sync./Clock Async.	3 (UART0, 1 (support LIN), UART2)									
	Clock Sync. Only	—									
	Clock Async. Only	—									
I²C-bus		2 (shared with SSU)									
IEBus		1 (UART2)									
Synchronous Serial Communication Unit/Special Serial I/O		2									
CAN	Channels	1									
	Message Box (Numbers)	16									
LCD		—									
I/O Ports	Input Only (Numbers)	1									
	CMOS Output Only (Numbers)	—									
	CMOS I/O (Numbers)	59									
	N-Channel Open Drain Port (Numbers)	—									
	High Current Drive Port	—									
	Pull-Up Resistor	59									
External Interrupts Pins		9									
Debugging Function	On-Chip Debug	Yes									
	On-Board Flash Program	Yes									
Other Functions	ROM Correction Function	—									
	Others	Simplified PMC(Peripheral Mapping Controller) ELC(Event Link Controller) Comparator B × 2 circuits									
Operating Frequency/Supply Voltage		32 MHz (VCC = 2.7 V to 5.5 V) 5 MHz (VCC = 1.8 V to 2.7 V)									
Operating Ambient Temperature (°C)		–40 to 85	–40 to 125	–40 to 85	–40 to 125	–40 to 85	–40 to 125	–40 to 85	–40 to 125	–40 to 85	–40 to 125
		–40 to 85	–40 to 125	–40 to 85	–40 to 125	–40 to 85	–40 to 125	–40 to 85	–40 to 125	–40 to 85	–40 to 125
Package*2		PLQP0064KB-A									
Part No.		R5F21566EJFP**	R5F21566EKFP**	R5F21567EJFP**	R5F21567EKFP**	R5F21568EJFP**	R5F21568EKFP**	R5F2156AEJFP**	R5F2156AEKFP**	R5F2156CEJFP**	R5F2156CEKFP**
		R5F21566FJFP**	R5F21566FKFP**	R5F21567FJFP**	R5F21567FKFP**	R5F21568FJFP**	R5F21568FKFP**	R5F2156AFJFP**	R5F2156AFKFP**	R5F2156CFJFP**	R5F2156CFKFP**

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

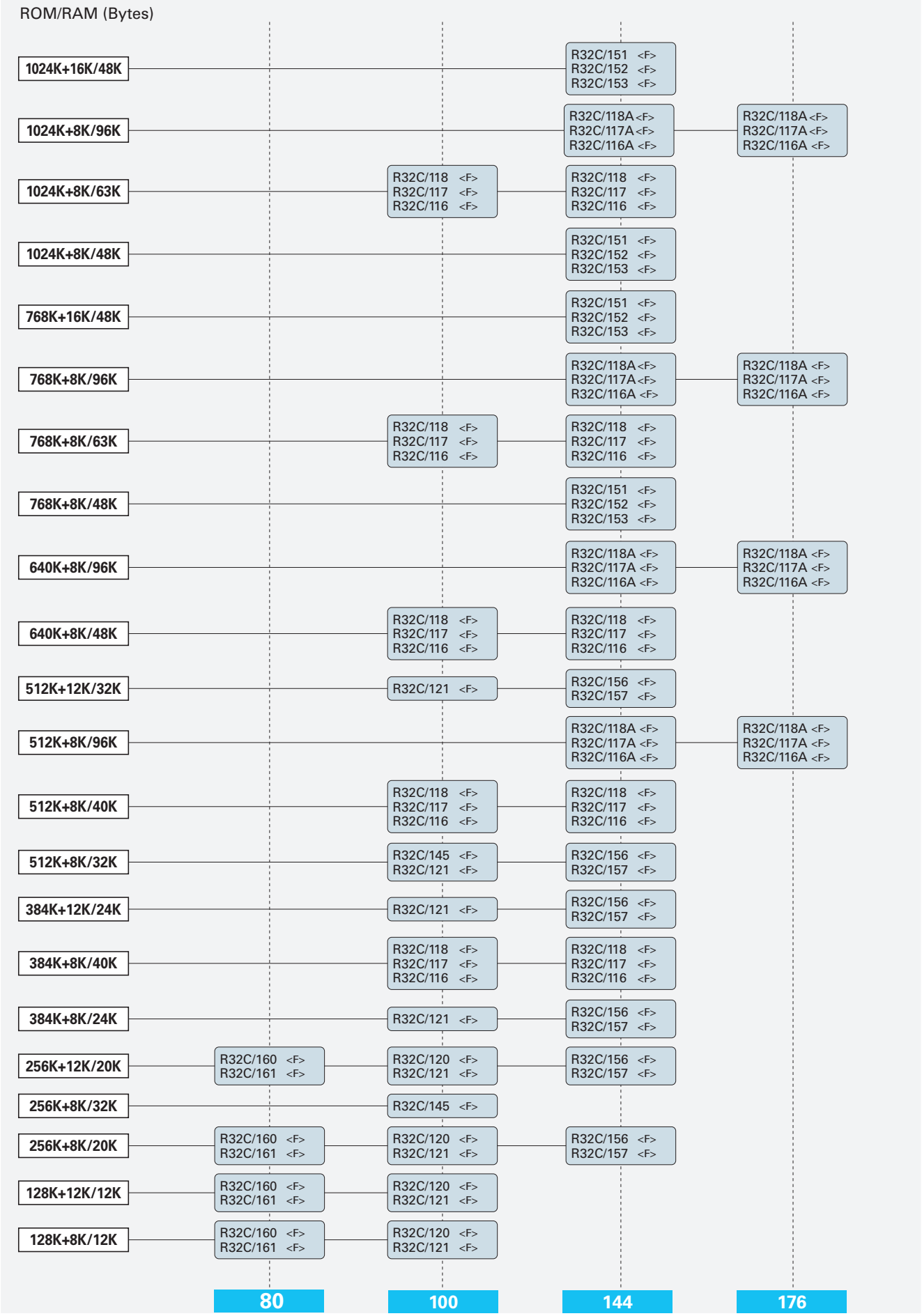
• Specifications (R8C/5x Series)

Group		R8C/56G					R8C/56H				
Memory	ROM (Bytes)	32K + 4K	48K + 4K	64K + 4K	96K + 4K	128K + 4K	32K	48K	64K	96K	128K
	RAM (Bytes)	2.5K	4K	6K	8K	10K	2.5K	4K	6K	8K	10K
	ROM Type*1	F									
	Data Flash/E2 Data Flash	4K (Data flash: program/erase 10k times)					—				
	Program Security	Yes (ID code check function, ROM code protect function)									
CPU	CPU	R8C Core									
	Basic Instructions	89									
	Minimum Instruction Execution Time (ns)	31.25 (@32MHz)									
	Multiplier	16 × 16 → 32									
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32									
DMA	DTC/DMAC Ⅱ	DTC (Activation sources: 42)									
Clock	Clock Generation Circuit	4 circuits (Main clock, PLL, High-speed on-chip oscillator, Low-speed on-chip oscillator)									
	PLL	Yes									
	Subclock	—									
	RTC	—									
	On-Chip Oscillator	2 circuits (High precision and High speed: 40MHz, Low speed: 125kHz)									
	Oscillation Stop Detection	Yes									
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)									
	Power Save	Wait/Stop									
Power Supply Voltage Detection	Power-On Reset/POR	Yes									
	Low Voltage Detection/LVD	Yes (Voltage detection 3)									
A/D Converter	Resolution × Channels	10-bit × 16									
	Sample and Hold	Yes									
D/A Converter	Resolution × Channels	—									
Timer	8-bit	1 (Timer RE2)									
	16-bit	9 (Timer RJ_0, Timer RJ_1, Timer RB2, Timer RC_0, Timer RC_1, Timer RD, Timer RF, Timer RG)									
	Input Capture	19 (shared with Timer RC_0, Timer RC_1, Timer RD, Timer RF, Timer RG)									
	Output Compare	20 (shared with Timer RC_0, Timer RC_1, Timer RD, Timer RE2, Timer RF, Timer RG)									
	PWM Output	14 (shared with Timer RB2, Timer RC_0, Timer RC_1, Timer RD, Timer RG)									
	Real-Time Port	—									
	Event Counter	3 (shared with Timer RJ_0, Timer RJ_1, Timer RG)									
	2-Phase Encoder Input	—									
	3-Phase Inverter Control	1 (shared with Timer RD)									
Watchdog Timer		1 (with automatic starting function and clock source protection function, low-speed on-chip oscillator for watchdog timer)									
Serial Interface	Clock Sync./Clock Async.	3 (UART0, 1 (support LIN), UART2)									
	Clock Sync. Only	—									
	Clock Async. Only	—									
I^2C-bus		2 (shared with SSU)									
IEBus		1 (UART2)									
Synchronous Serial Communication Unit/Special Serial I/O		2									
CAN	Channels	—									
	Message Box (Numbers)	—									
LCD		—									
I/O Ports	Input Only (Numbers)	1									
	CMOS Output Only (Numbers)	—									
	CMOS I/O (Numbers)	59									
	N-Channel Open Drain Port (Numbers)	—									
	High Current Drive Port	—									
	Pull-Up Resistor	59									
External Interrupts Pins		9									
Debugging Function	On-Chip Debug	Yes									
	On-Board Flash Program	Yes									
Other Functions	ROM Correction Function	—									
	Others	Simplified PMC(Peripheral Mapping Controller) ELC(Event Link Controller) Comparator B × 2 circuits									
Operating Frequency/Supply Voltage		32 MHz (VCC = 2.7 V to 5.5 V) 5 MHz (VCC = 1.8 V to 2.7 V)									
Operating Ambient Temperature (°C)		–40 to 85	–40 to 125	–40 to 85	–40 to 125	–40 to 85	–40 to 125	–40 to 85	–40 to 125	–40 to 85	–40 to 125	–40 to 85	–40 to 125	–40 to 85	–40 to 125	–40 to 85	–40 to 125	–40 to 85	–40 to 125	–40 to 85	–40 to 125
Package*2		PLQP0064KB-A									
Part No.		R5F21566GJFP**	R5F21566GKFP**	R5F21567GJFP**	R5F21567GKFP**	R5F21568GJFP**	R5F21568GKFP**	R5F2156AGJFP**	R5F2156AGKFP**	R5F2156CGJFP**	R5F2156CGKFP**	R5F21566HJFP**	R5F21566HKFP**	R5F21567HJFP**	R5F21567HKFP**	R5F21568HJFP**	R5F21568HKFP**	R5F2156AHJFP**	R5F2156AHKFP**	R5F2156CHJFP**	R5F2156CHKFP**

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Memory Capacity (ROM/RAM) (R32C/100 Series)



Letters in brackets < > indicate memory variations.
F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

• Specifications (R32C/100 Series)

Group		R32C/116									
Memory	ROM (Bytes)	384K + 8K		512K + 8K		640K + 8K		768K + 8K		1024K + 8K	
	RAM (Bytes)	40K				48K		63K			
	ROM Type*1	F									
	Data Flash/E2 Data Flash	8K (Data flash: program/erase 10k times)									
	Program Security	Yes (ID code check function, ROM code protect function)									
CPU	CPU	R32C/100 Core									
	Basic Instructions	108									
	Minimum Instruction Execution Time (ns)	20 (@50MHz)									
	Multiplier	32 × 32 → 64									
	Multiply-Accumulate Instruction	32 × 32 + 64 → 64									
	Barrel Shifter	Yes									
DMA	DMAC (Channels)	4									
	DTC/DMACⅡ	DMACⅡ (Starts by all peripheral interrupt factors)									
External Bus Expansion	Address Space (Bytes)	64M									
	External Bus Interface	Support for insertion of wait states, Outputs 4 chip-select signals									
	Bus Structure	Selectable from Separate bus, Multiplex bus, Data bus width can be selected (8/16/32-bit)									
	DRAM Controller	—									
Clock	Clock Generation Circuit	4 circuits (Main clock, Sub clock, PLL, On-chip oscillator)									
	PLL	Yes									
	Subclock	Yes									
	RTC	—									
	On-Chip Oscillator	Yes (Low-speed: 125kHz)									
	Oscillation Stop Detection	Yes									
	Frequency Divider	1/n (n = 2 to 24)									
	Power Save	Wait/Stop									
Power Supply Voltage Detection	Power-On Reset/POR	—									
	Low Voltage Detection/LVD	Yes (Low voltage detection)									
A/D Converter	Resolution × Channels	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34
	Sample and Hold	Yes									
	Multi-Channel Sample and Hold	—									
D/A Converter	Resolution × Channels	8-bit × 2									
Timer	8-bit	—									
	16-bit	11 (Timer A, Timer B)									
	Input Capture	16(Intelligent I/O)									
	Output Compare	19 (Intelligent I/O)	24 (Intelligent I/O)	19 (Intelligent I/O)	24 (Intelligent I/O)	19 (Intelligent I/O)	24 (Intelligent I/O)	19 (Intelligent I/O)	24 (Intelligent I/O)	19 (Intelligent I/O)	24 (Intelligent I/O)
	PWM Output	24 (Timer A, Intelligent I/O)	29 (Timer A, Intelligent I/O)	24 (Timer A, Intelligent I/O)	29 (Timer A, Intelligent I/O)	24 (Timer A, Intelligent I/O)	29 (Timer A, Intelligent I/O)	24 (Timer A, Intelligent I/O)	29 (Timer A, Intelligent I/O)	24 (Timer A, Intelligent I/O)	29 (Timer A, Intelligent I/O)
	Real-Time Port	3 (Intelligent I/O)									
	Event Counter	11 (Timer A, Timer B)									
	2-Phase Encoder Input	3 (Timer A) + 2 (Intelligent I/O)									
	3-Phase Inverter Control	1 (shared with Timer A1, Timer A2, Timer A4, Timer B2, Dead time timer)									
Watchdog Timer		1									
Serial Interface	Clock Sync./Clock Async.	9 (UART)									
	Clock Sync. Only	1 (Intelligent I/O)									
	Clock Async. Only	—									
I²C-bus		8 (UART, Multi master I²C)									
IEBus		8 (UART, Intelligent I/O)									
Smart Card/SIM		—									
Synchronous Serial Communication Unit/Special Serial I/O		7 (UART)									
CAN	Channels	—									
	Message Box (Numbers)	—									
FlexRay		—									
IrDA		—									
CRC Calculation Circuit		1 (CRC-CCITT ($X^{16} + X^{12} + X^5 + 1$))									
X/Y Converter		Yes									
I/O Ports	Input Only (Numbers)	2									
	CMOS I/O (Numbers)	84	120	84	120	84	120	84	120	84	120
	N-Channel Open Drain Port (Numbers)	36 (Programmable)	56 (Programmable)	36 (Programmable)	56 (Programmable)	36 (Programmable)	56 (Programmable)	36 (Programmable)	56 (Programmable)	36 (Programmable)	56 (Programmable)
	High Current Drive Port	—									
	Pull-Up Resistor	53	89	53	89	53	89	53	89	53	89
External Interrupts Pins		11	14	11	14	11	14	11	14	11	14
Debugging Function	On-Chip Debug	Yes									
	On-Board Flash Program	Yes									
Other Functions	ROM Correction Function	—									
	Others	5V Tolerant Input									
Operating Frequency/Supply Voltage		50MHz/3.0 to 5.5V									
Operating Ambient Temperature (˚C)		–40 to 85									
Package*2		PLQP0100KB-A	PLQP0144KA-A	PLQP0100KB-A	PLQP0144KA-A	PLQP0100KB-A	PLQP0144KA-A	PLQP0100KB-A	PLQP0144KA-A	PLQP0100KB-A	PLQP0144KA-A
Part No.		R5F64165PFB	R5F64165PFD	R5F64166PFB	R5F64166PFD	R5F64167PFB	R5F64167PFD	R5F64168PFB	R5F64168PFD	R5F64169PFB	R5F64169PFD

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (R32C/100 Series)

Group		R32C/117									
Memory	ROM (Bytes)	384K + 8K		512K + 8K		640K + 8K		768K + 8K		1024K + 8K	
	RAM (Bytes)	40K				48K		63K			
	ROM Type*1	F									
	Data Flash/E2 Data Flash	8K (Data flash: program/erase 10k times)									
	Program Security	Yes (ID code check function, ROM code protect function)									
CPU	CPU	R32C/100 Core									
	Basic Instructions	108									
	Minimum Instruction Execution Time (ns)	20 (@50MHz)									
	Multiplier	32 × 32 → 64									
	Multiply-Accumulate Instruction	32 × 32 + 64 → 64									
	Barrel Shifter	Yes									
DMA	DMAC (Channels)	4									
	DTC/DMACⅡ	DMACⅡ (Starts by all peripheral interrupt factors)									
External Bus Expansion	Address Space (Bytes)	64M									
	External Bus Interface	Support for insertion of wait states, Outputs 4 chip-select signals									
	Bus Structure	Selectable from Separate bus, Multiplex bus, Data bus width can be selected (8/16/32-bit)									
	DRAM Controller	—									
Clock	Clock Generation Circuit	4 circuits (Main clock, Sub clock, PLL, On-chip oscillator)									
	PLL	Yes									
	Subclock	Yes									
	RTC	—									
	On-Chip Oscillator	Yes (Low-speed: 125kHz)									
	Oscillation Stop Detection	Yes									
	Frequency Divider	1/n (n = 2 to 24)									
	Power Save	Wait/Stop									
Power Supply Voltage Detection	Power-On Reset/POR	—									
	Low Voltage Detection/LVD	Yes (Low voltage detection)									
A/D Converter	Resolution × Channels	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34
	Sample and Hold	Yes									
	Multi-Channel Sample and Hold	—									
D/A Converter	Resolution × Channels	8-bit × 2									
Timer	8-bit	—									
	16-bit	11 (Timer A, Timer B)									
	Input Capture	16 (Intelligent I/O)									
	Output Compare	19 (Intelligent I/O)	24 (Intelligent I/O)	19 (Intelligent I/O)	24 (Intelligent I/O)	19 (Intelligent I/O)	24 (Intelligent I/O)	19 (Intelligent I/O)	24 (Intelligent I/O)	19 (Intelligent I/O)	24 (Intelligent I/O)
	PWM Output	24 (Timer A, Intelligent I/O)	29 (Timer A, Intelligent I/O)	24 (Timer A, Intelligent I/O)	29 (Timer A, Intelligent I/O)	24 (Timer A, Intelligent I/O)	29 (Timer A, Intelligent I/O)	24 (Timer A, Intelligent I/O)	29 (Timer A, Intelligent I/O)	24 (Timer A, Intelligent I/O)	29 (Timer A, Intelligent I/O)
	Real-Time Port	3 (Intelligent I/O)									
	Event Counter	11 (Timer A, Timer B)									
	2-Phase Encoder Input	3 (Timer A) + 2 (Intelligent I/O)									
	3-Phase Inverter Control	1 (shared with Timer A1, Timer A2, Timer A4, Timer B2, Dead time timer)									
Watchdog Timer		1									
Serial Interface	Clock Sync./Clock Async.	9 (UART)									
	Clock Sync. Only	1 (Intelligent I/O)									
	Clock Async. Only	—									
I^2C-bus		8 (UART, Multi master I^2C)									
IEBus		8 (UART, Intelligent I/O)									
Smart Card/SIM		—									
Synchronous Serial Communication Unit/Special Serial I/O		7 (UART)									
CAN	Channels	1									
	Message Box (Numbers)	32									
FlexRay		—									
IrDA		—									
CRC Calculation Circuit		1 (CRC-CCITT ($X^{16} + X^{12} + X^5 + 1$))									
X/Y Converter		Yes									
I/O Ports	Input Only (Numbers)	2									
	CMOS I/O (Numbers)	84	120	84	120	84	120	84	120	84	120
	N-Channel Open Drain Port (Numbers)	36 (Programmable)	56 (Programmable)	36 (Programmable)	56 (Programmable)	36 (Programmable)	56 (Programmable)	36 (Programmable)	56 (Programmable)	36 (Programmable)	56 (Programmable)
	High Current Drive Port	—									
	Pull-Up Resistor	53	89	53	89	53	89	53	89	53	89
External Interrupts Pins		11	14	11	14	11	14	11	14	11	14
Debugging Function	On-Chip Debug	Yes									
	On-Board Flash Program	Yes									
Other Functions	ROM Correction Function	—									
	Others	5V Tolerant Input									
Operating Frequency/Supply Voltage		50MHz/3.0 to 5.5V									
Operating Ambient Temperature (˚C)		–40 to 85									
Package*2		PLQP0100KB-A	PLQP0144KA-A	PLQP0100KB-A	PLQP0144KA-A	PLQP0100KB-A	PLQP0144KA-A	PLQP0100KB-A	PLQP0144KA-A	PLQP0100KB-A	PLQP0144KA-A
Part No.		R5F64175PFB	R5F64175PFD	R5F64176PFB	R5F64176PFD	R5F64177PFB	R5F64177PFD	R5F64178PFB	R5F64178PFD	R5F64179PFB	R5F64179PFD

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (R32C/100 Series)

Group		R32C/118									
Memory	ROM (Bytes)	384K + 8K		512K + 8K		640K + 8K		768K + 8K		1024K + 8K	
	RAM (Bytes)	40K				48K		63K			
	ROM Type*1	F									
	Data Flash/E2 Data Flash	8K (Data flash: program/erase 10k times)									
	Program Security	Yes (ID code check function, ROM code protect function)									
CPU	CPU	R32C/100 Core									
	Basic Instructions	108									
	Minimum Instruction Execution Time (ns)	20(@50MHz)									
	Multiplier	32 × 32 → 64									
	Multiply-Accumulate Instruction	32 × 32 + 64 → 64									
	Barrel Shifter	Yes									
DMA	DMAC (Channels)	4									
	DTC/DMACⅡ	DMACⅡ (Starts by all peripheral interrupt factors)									
External Bus Expansion	Address Space (Bytes)	64M									
	External Bus Interface	Support for insertion of wait states, Outputs 4 chip-select signals									
	Bus Structure	Selectable from Separate bus, Multiplex bus, Data bus width can be selected (8/16/32-bit)									
	DRAM Controller	—									
Clock	Clock Generation Circuit	4 circuits (Main clock, Sub clock, PLL, On-chip oscillator)									
	PLL	Yes									
	Subclock	Yes									
	RTC	—									
	On-Chip Oscillator	Yes (Low-speed: 125kHz)									
	Oscillation Stop Detection	Yes									
	Frequency Divider	1/n (n = 2 to 24)									
	Power Save	Wait/Stop									
Power Supply Voltage Detection	Power-On Reset/POR	—									
	Low Voltage Detection/LVD	Yes (Low voltage detection)									
A/D Converter	Resolution × Channels	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34
	Sample and Hold	Yes									
	Multi-Channel Sample and Hold	—									
D/A Converter	Resolution × Channels	8-bit × 2									
Timer	8-bit	—									
	16-bit	11 (Timer A, Timer B)									
	Input Capture	16 (Intelligent I/O)									
	Output Compare	19 (Intelligent I/O)	24 (Intelligent I/O)	19 (Intelligent I/O)	24 (Intelligent I/O)	19 (Intelligent I/O)	24 (Intelligent I/O)	19 (Intelligent I/O)	24 (Intelligent I/O)	19 (Intelligent I/O)	24 (Intelligent I/O)
	PWM Output	24 (Timer A, Intelligent I/O)	29 (Timer A, Intelligent I/O)	24 (Timer A, Intelligent I/O)	29 (Timer A, Intelligent I/O)	24 (Timer A, Intelligent I/O)	29 (Timer A, Intelligent I/O)	24 (Timer A, Intelligent I/O)	29 (Timer A, Intelligent I/O)	24 (Timer A, Intelligent I/O)	29 (Timer A, Intelligent I/O)
	Real-Time Port	3 (Intelligent I/O)									
	Event Counter	11 (Timer A, Timer B)									
	2-Phase Encoder Input	3 (Timer A) + 2 (Intelligent I/O)									
	3-Phase Inverter Control	1 (shared with Timer A1, Timer A2, Timer A4, Timer B2, Dead time timer)									
Watchdog Timer		1									
Serial Interface	Clock Sync./Clock Async.	9 (UART)									
	Clock Sync. Only	1 (Intelligent I/O)									
	Clock Async. Only	—									
I^2C-bus		8 (UART, Multi master I^2C)									
IEBus		8 (UART, Intelligent I/O)									
Smart Card/SIM		—									
Synchronous Serial Communication Unit/Special Serial I/O		7 (UART)									
CAN	Channels	2									
	Message Box (Numbers)	32									
FlexRay		—									
IrDA		—									
CRC Calculation Circuit		1 (CRC-CCITT ($X^{16} + X^{12} + X^5 + 1$))									
X/Y Converter		Yes									
I/O Ports	Input Only (Numbers)	2									
	CMOS I/O (Numbers)	84	120	84	120	84	120	84	120	84	120
	N-Channel Open Drain Port (Numbers)	36(Programmable)	56(Programmable)	36(Programmable)	56(Programmable)	36(Programmable)	56(Programmable)	36(Programmable)	56(Programmable)	36(Programmable)	56(Programmable)
	High Current Drive Port	—									
	Pull-Up Resistor	53	89	53	89	53	89	53	89	53	89
External Interrupts Pins		11	14	11	14	11	14	11	14	11	14
Debugging Function	On-Chip Debug	Yes									
	On-Board Flash Program	Yes									
Other Functions	ROM Correction Function	—									
	Others	5V Tolerant Input									
Operating Frequency/Supply Voltage		50MHz/3.0 to 5.5V									
Operating Ambient Temperature (°C)		–40 to 85									
Package*2		PLQP0100KB-A	PLQP0144KA-A	PLQP0100KB-A	PLQP0144KA-A	PLQP0100KB-A	PLQP0144KA-A	PLQP0100KB-A	PLQP0144KA-A	PLQP0100KB-A	PLQP0144KA-A
Part No.		R5F64185PFB	R5F64185PFD	R5F64186PFB	R5F64186PFD	R5F64187PFB	R5F64187PFD	R5F64188PFB	R5F64188PFD	R5F64189PFB	R5F64189PFD

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (R32C/100 Series)

Group		R32C/116A								R32C/117A								R32C/118A							
Memory	ROM (Bytes)	512K + 8K		640K + 8K		768K + 8K		1024K + 8K		512K + 8K		640K + 8K		768K + 8K		1024K + 8K		512K + 8K		640K + 8K		768K + 8K		1024K + 8K	
	RAM (Bytes)	96K																							
	ROM Type*1	F																							
	Data Flash/E2 Data Flash	8K (Data flash: program/erase 10k times)																							
	Program Security	Yes (ID code check function, ROM code protect function)																							
CPU	CPU	R32C/100 Core																							
	Basic Instructions	108																							
	Minimum Instruction Execution Time (ns)	15.625 (@64MHz)																							
	Multiplier	32 × 32 → 64																							
	Multiply-Accumulate Instruction	32 × 32 + 64 → 64																							
	Barrel Shifter	Yes																							
DMA	DMAC (Channels)	4																							
	DTC/DMACⅡ	DMACⅡ (Starts by all peripheral interrupt factors)																							
External Bus Expansion	Address Space (Bytes)	64M																							
	External Bus Interface	Support for insertion of wait states, Outputs 4 chip-select signals																							
	Bus Structure	Selectable from Separate bus, Multiplex bus, Data bus width can be selected (8/16/32-bit)																							
	DRAM Controller	—																							
Clock	Clock Generation Circuit	4 circuits (Main clock, Sub clock, PLL, On-chip oscillator)																							
	PLL	Yes																							
	Subclock	Yes																							
	RTC	—																							
	On-Chip Oscillator	Yes (Low-speed: 125kHz)																							
	Oscillation Stop Detection	Yes																							
	Frequency Divider	1/n (n = 2 to 24)																							
	Power Save	Wait/Stop																							
Power Supply Voltage Detection	Power-On Reset/POR	—																							
	Low Voltage Detection/LVD	Yes (Low voltage detection)																							
A/D Converter	Resolution × Channels	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34
	Sample and Hold	Yes																							
	Multi-Channel Sample and Hold	—																							
D/A Converter	Resolution × Channels	8-bit × 2																							
Timer	8-bit	—																							
	16-bit	11 (Timer A, Timer B)																							
	Input Capture	16 (Intelligent I/O)																							
	Output Compare	19 (Intelligent I/O)	24 (Intelligent I/O)	19 (Intelligent I/O)	24 (Intelligent I/O)	19 (Intelligent I/O)	24 (Intelligent I/O)	19 (Intelligent I/O)	24 (Intelligent I/O)	19 (Intelligent I/O)	24 (Intelligent I/O)	19 (Intelligent I/O)	24 (Intelligent I/O)	19 (Intelligent I/O)	24 (Intelligent I/O)	19 (Intelligent I/O)	24 (Intelligent I/O)	19 (Intelligent I/O)	24 (Intelligent I/O)	19 (Intelligent I/O)	24 (Intelligent I/O)	19 (Intelligent I/O)	24 (Intelligent I/O)	19 (Intelligent I/O)	24 (Intelligent I/O)
	PWM Output	24 (Timer A, Intelligent I/O)	29 (Timer A, Intelligent I/O)	24 (Timer A, Intelligent I/O)	29 (Timer A, Intelligent I/O)	24 (Timer A, Intelligent I/O)	29 (Timer A, Intelligent I/O)	24 (Timer A, Intelligent I/O)	29 (Timer A, Intelligent I/O)	29 (Timer A, Intelligent I/O)					24 (Timer A, Intelligent I/O)	29 (Timer A, Intelligent I/O)	24 (Timer A, Intelligent I/O)	29 (Timer A, Intelligent I/O)					24 (Timer A, Intelligent I/O)	29 (Timer A, Intelligent I/O)	24 (Timer A, Intelligent I/O)	29 (Timer A, Intelligent I/O)	24 (Timer A, Intelligent I/O)	29 (Timer A, Intelligent I/O)
	Real-Time Port	3 (Intelligent I/O)																							
	Event Counter	11 (Timer A, Timer B)																							
	2-Phase Encoder Input	3 (Timer A) + 2 (Intelligent I/O)																							
	3-Phase Inverter Control	1 (shared with Timer A1, Timer A2, Timer A4, Timer B2, Dead time timer)																							
Watchdog Timer		1																							
Serial Interface	Clock Sync./Clock Async.	11 (UART)																							
	Clock Sync. Only	1 (Intelligent I/O)																							
	Clock Async. Only	—																							
I²C-bus		8 (UART, Multi master I²C)																							
IEBus		8 (UART, Intelligent I/O)																							
Smart Card/SIM		—																							
Synchronous Serial Communication Unit/Special Serial I/O		7 (UART)																							
CAN	Channels	—								1								2							
	Message Box (Numbers)	—								32															
FlexRay		—																							
IrDA		—																							
CRC Calculation Circuit		1 (CRC-CCITT ($X^{16} + X^{12} + X^5 + 1$))																							
X/Y Converter		Yes																							
I/O Ports	Input Only (Numbers)	2																							
	CMOS I/O (Numbers)	126	158	126	158	126	158	126	158	126	158	126	158	126	158	126	158	126	158	126	158	126	158	126	158
	N-Channel Open Drain Port (Numbers)	55 Programmable	68 Programmable	55 Programmable	68 Programmable	55 Programmable	68 Programmable	55 Programmable	68 Programmable	55 Programmable	68 Programmable	55 Programmable	68 Programmable	55 Programmable	68 Programmable	55 Programmable	68 Programmable	55 Programmable	68 Programmable	55 Programmable	68 Programmable	55 Programmable	68 Programmable	55 Programmable	68 Programmable
	High Current Drive Port	—																							
	Pull-Up Resistor	85	105	85	105	85	105	85	105	85	105	85	105	85	105	85	105	85	105	85	105	85	105	85	105
External Interrupts Pins		14																							
Debugging Function	On-Chip Debug	Yes																							
	On-Board Flash Program	Yes																							
Other Functions	ROM Correction Function	—																							
	Others	5V Tolerant Input																							
Operating Frequency/Supply Voltage		64MHz/3.0 to 5.5V																							
Operating Ambient Temperature (°C)		–40 to 85																							
Package*2		PLQP0144KA-A	PLQP0176KB-A	PLQP0144KA-A	PLQP0176KB-A	PLQP0144KA-A	PLQP0176KB-A	PLQP0144KA-A	PLQP0176KB-A	PLQP0144KA-A	PLQP0176KB-A	PLQP0144KA-A	PLQP0176KB-A	PLQP0144KA-A	PLQP0176KB-A	PLQP0144KA-A	PLQP0176KB-A	PLQP0144KA-A	PLQP0176KB-A	PLQP0144KA-A	PLQP0176KB-A	PLQP0144KA-A	PLQP0176KB-A	PLQP0144KA-A	PLQP0176KB-A
Part No.		R5F6416JAPFD	R5F6416JAPFE	R5F6416KAPFD	R5F6416KAPFE	R5F6416LAPFD	R5F6416LAPFE	R5F6416MAPFD	R5F6416MAPFE	R5F6417JAPFD	R5F6417JAPFE	R5F6417KAPFD	R5F6417KAPFE	R5F6417LAPFD	R5F6417LAPFE	R5F6417MAPFD	R5F6417MAPFE	R5F6418JAPFD	R5F6418JAPFE	R5F6418KAPFD	R5F6418KAPFE	R5F6418LAPFD	R5F6418LAPFE	R5F6418MAPFD	R5F6418MAPFE

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (R32C/100 Series)

Group		R32C/120											
Memory	ROM (Bytes)	128K + 8K			128K + 12K			256K + 8K			256K + 12K		
	RAM (Bytes)	12K						20K					
	ROM Type*1	F											
	Data Flash/E2 Data Flash	8K (Data flash: program/erase 10k times)			8K (Data flash: program/erase 10k times), 4K (E2 Data flash: program/erase 100k times)			8K (Data flash: program/erase 10k times)			8K (Data flash: program/erase 10k times), 4K (E2 Data flash: program/erase 100k times)		
	Program Security	Yes (ID code check function, ROM code protect function)											
CPU	CPU	R32C/100 Core											
	Basic Instructions	108											
	Minimum Instruction Execution Time (ns)	15.625 (@64MHz)											
	Multiplier	32 × 32 → 64											
	Multiply-Accumulate Instruction	32 × 32 + 64 → 64											
	Barrel Shifter	Yes											
DMA	DMAC (Channels)	4											
	DTC/DMACⅡ	DMACⅡ (Starts by all peripheral interrupt factors)											
External Bus Expansion	Address Space (Bytes)	4G											
	External Bus Interface	—											
	Bus Structure	—											
	DRAM Controller	—											
Clock	Clock Generation Circuit	4 circuits (Main clock, Sub clock, PLL, On-chip oscillator)											
	PLL	Yes											
	Subclock	Yes											
	RTC	—											
	On-Chip Oscillator	Yes											
	Oscillation Stop Detection	Yes											
	Frequency Divider	1/n (n = 2 to 24)											
	Power Save	Wait/Stop											
Power Supply Voltage Detection	Power-On Reset/POR	—											
	Low Voltage Detection/LVD	Yes (Low voltage detection)											
A/D Converter	Resolution × Channels	10-bit × 26											
	Sample and Hold	Yes											
	Multi-Channel Sample and Hold	—											
D/A Converter	Resolution × Channels	8-bit × 2											
Timer	8-bit	—											
	16-bit	11 (Timer A, Timer B)											
	Input Capture	16 (Intelligent I/O)											
	Output Compare	16 (Intelligent I/O)											
	PWM Output	21 (Timer A, Intelligent I/O)											
	Real-Time Port	—											
	Event Counter	11 (Timer A, Timer B)											
	2-Phase Encoder Input	3 (Timer A) + 2 (Intelligent I/O)											
	3-Phase Inverter Control	1 (shared with Timer A1, Timer A2, Timer A4, Timer B2, Dead time timer)											
Watchdog Timer		1											
Serial Interface	Clock Sync./Clock Async.	5 (UART)											
	Clock Sync. Only	—											
	Clock Async. Only	—											
I^2C-bus		3 (UART)											
IEBus		—											
Smart Card/SIM		—											
Synchronous Serial Communication Unit/Special Serial I/O		4 (3 (UART) + 1 (SBI))											
CAN	Channels	1											
	Message Box (Numbers)	32											
FlexRay		—											
IrDA		—											
CRC Calculation Circuit		1 (CRC-CCITT ($X^{16} + X^{12} + X^5 + 1$))											
X/Y Converter		Yes											
I/O Ports	Input Only (Numbers)	2											
	CMOS I/O (Numbers)	84											
	N-Channel Open Drain Port (Numbers)	—											
	High Current Drive Port	—											
	Pull-Up Resistor	85											
External Interrupts Pins		11											
Debugging Function	On-Chip Debug	Yes											
	On-Board Flash Program	Yes											
Other Functions	ROM Correction Function	—											
	Others	LIN: 2 channels											
Operating Frequency/Supply Voltage		64MHz/3.0 to 5.5V											
Operating Ambient Temperature (°C)		–40 to 85	–40 to 105	–40 to 125	–40 to 85	–40 to 105	–40 to 125	–40 to 85	–40 to 105	–40 to 125	–40 to 85	–40 to 105	–40 to 125
Package*2		PLQP0100KB-A											
Part No.		R5F6420AJFB	R5F6420ALFB	R5F6420AKFB	R5F6420JFB	R5F6420LFB	R5F6420KFB	R5F6420BJFB	R5F6420BLFB	R5F6420BKFB	R5F6420JFB	R5F6420LFB	R5F6420KFB

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code
Note1 Contact a Renesas Electronics sales representative regarding products with no E2 data flash.
Note2 Contact a Renesas Electronics sales representative regarding products with the optional low-voltage detection function.
Note3 Contact a Renesas Electronics sales representative regarding L version products (–40°C to 105°C).

★ : New product ★★ : Under development

• Specifications (R32C/100 Series)

Group		R32C/121							
Memory	ROM (Bytes)	128K + 8K	128K + 12K	256K + 8K	256K + 12K	384K + 8K	384K + 12K	512K + 8K	512K + 12K
	RAM (Bytes)	12K		20K		24K		32K	
	ROM Type*1	F							
	Data Flash/E2 Data Flash	8K (Data flash: program/erase 10k times)	8K (Data flash: program/erase 10k times), 4K (E2 Data flash: program/erase 100k times)	8K (Data flash: program/erase 10k times)	8K (Data flash: program/erase 10k times), 4K (E2 Data flash: program/erase 100k times)	8K (Data flash: program/erase 10k times)	8K (Data flash: program/erase 10k times), 4K (E2 Data flash: program/erase 100k times)	8K (Data flash: program/erase 10k times)	8K (Data flash: program/erase 10k times), 4K (E2 Data flash: program/erase 100k times)
	Program Security	Yes (ID code check function, ROM code protect function)							
CPU	CPU	R32C/100 Core							
	Basic Instructions	108							
	Minimum Instruction Execution Time (ns)	15.625 (@64MHz)							
	Multiplier	32 × 32 → 64							
	Multiply-Accumulate Instruction	32 × 32 + 64 → 64							
	Barrel Shifter	Yes							
DMA	DMAC (Channels)	4							
	DTC/DMACⅡ	DMACⅡ (Starts by all peripheral interrupt factors)							
External Bus Expansion	Address Space (Bytes)	4G							
	External Bus Interface	—							
	Bus Structure	—							
	DRAM Controller	—							
Clock	Clock Generation Circuit	4 circuits (Main clock, Sub clock, PLL, On-chip oscillator)							
	PLL	Yes							
	Subclock	Yes							
	RTC	—							
	On-Chip Oscillator	Yes							
	Oscillation Stop Detection	Yes							
	Frequency Divider	1/n (n = 2 to 24)							
	Power Save	Wait/Stop							
Power Supply Voltage Detection	Power-On Reset/POR	—							
	Low Voltage Detection/LVD	Yes (Low voltage detection)							
A/D Converter	Resolution × Channels	10-bit × 26							
	Sample and Hold	Yes							
	Multi-Channel Sample and Hold	—							
D/A Converter	Resolution × Channels	8-bit × 2							
Timer	8-bit	—							
	16-bit	11 (Timer A, Timer B)							
	Input Capture	16 (Intelligent I/O)							
	Output Compare	16 (Intelligent I/O)							
	PWM Output	21 (Timer A, Intelligent I/O)							
	Real-Time Port	—							
	Event Counter	11 (Timer A, Timer B)							
	2-Phase Encoder Input	3 (Timer A) + 2 (Intelligent I/O)							
	3-Phase Inverter Control	1 (shared with Timer A1, Timer A2, Timer A4, Timer B2, Dead time timer)							
Watchdog Timer		1							
Serial Interface	Clock Sync./Clock Async.	5 (UART)							
	Clock Sync. Only	—							
	Clock Async. Only	—							
I²C-bus		3 (UART)							
IEBus		—							
Smart Card/SIM		—							
Synchronous Serial Communication Unit/Special Serial I/O		6 (3 (UART) + 3 (SBI))							
CAN	Channels	2							
	Message Box (Numbers)	32							
FlexRay		—							
IrDA		—							
CRC Calculation Circuit		1 (CRC-CCITT ($X^{16} + X^{12} + X^5 + 1$))							
X/Y Converter		Yes							
I/O Ports	Input Only (Numbers)	2							
	CMOS I/O (Numbers)	84							
	N-Channel Open Drain Port (Numbers)	—							
	High Current Drive Port	—							
	Pull-Up Resistor	85							
External Interrupts Pins		11							
Debugging Function	On-Chip Debug	Yes							
	On-Board Flash Program	Yes							
Other Functions	ROM Correction Function	—							
	Others	LIN: 2 channels							
Operating Frequency/Supply Voltage		64MHz/3.0 to 5.5V							
Operating Ambient Temperature (°C)		−40 to 85	−40 to 105	−40 to 125	−40 to 85	−40 to 105	−40 to 125	−40 to 85	−40 to 105	−40 to 125	−40 to 85	−40 to 105	−40 to 125	−40 to 85	−40 to 105	−40 to 125	−40 to 85	−40 to 105	−40 to 125	−40 to 85	−40 to 105	−40 to 125	−40 to 85	−40 to 105	−40 to 125	−40 to 85	−40 to 105	−40 to 125
Package*2		PLQP0100KB-A																										
Part No.		R5F6421AJFB	R5F6421ALFB	R5F6421AKFB	R5F64216JFB	R5F64216LFB	R5F64216KFB	R5F6421BJFB	R5F6421BLFB	R5F6421BKFB	R5F64217JFB	R5F64217LFB	R5F64217KFB	R5F6421CJFB	R5F6421CLFB	R5F6421CKFB	R5F64218JFB	R5F64218LFB	R5F64218KFB	R5F6421DJFB	R5F6421DLFB	R5F6421DKFB	R5F64219JFB	R5F64219LFB	R5F64219KFB			

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

Note1 Contact a Renesas Electronics sales representative regarding products with no E2 data flash.

Note2 Contact a Renesas Electronics sales representative regarding products with the optional low-voltage detection function.

Note3 Contact a Renesas Electronics sales representative regarding L version products (–40°C to 105°C).

• Specifications (R32C/100 Series)

Group		R32C/145					
Memory	ROM (Bytes)	256K + 8K			512K + 8K		
	RAM (Bytes)	32K					
	ROM Type*1	F					
	Data Flash/E2 Data Flash	8K (Data flash)					
	Program Security	Yes (ID code check function, ROM code protect function)					
CPU	CPU	R32C/100 Core					
	Basic Instructions	108					
	Minimum Instruction Execution Time (ns)	15.625 (@64MHz)					
	Multiplier	32 × 32 → 64					
	Multiply-Accumulate Instruction	32 × 32 + 64 → 64					
	Barrel Shifter	Yes					
DMA	DMAC (Channels)	4					
	DTC/DMACⅡ	DMACⅡ (Starts by all peripheral interrupt factors)					
External Bus Expansion	Address Space (Bytes)	4G					
	External Bus Interface	—					
	Bus Structure	—					
	DRAM Controller	—					
Clock	Clock Generation Circuit	4 circuits (Main clock, Sub clock, PLL, On-chip oscillator)					
	PLL	Yes					
	Subclock	Yes					
	RTC	—					
	On-Chip Oscillator	Yes					
	Oscillation Stop Detection	Yes					
	Frequency Divider	1/n (n = 2 to 24)					
	Power Save	Wait/Stop					
Power Supply Voltage Detection	Power-On Reset/POR	—					
	Low Voltage Detection/LVD	—					
A/D Converter	Resolution × Channels	10-bit × 26					
	Sample and Hold	Yes					
	Multi-Channel Sample and Hold	—					
D/A Converter	Resolution × Channels	8-bit × 2					
Timer	8-bit	—					
	16-bit	11 (Timer A, Timer B)					
	Input Capture	16 (Intelligent I/O)					
	Output Compare	16 (Intelligent I/O)					
	PWM Output	21 (Timer A, Intelligent I/O)					
	Real-Time Port	—					
	Event Counter	11 (Timer A, Timer B)					
	2-Phase Encoder Input	3 (Timer A) + 2 (Intelligent I/O)					
	3-Phase Inverter Control	1 (shared with Timer A1, Timer A2, Timer A4, Timer B2, Dead time timer)					
Watchdog Timer		1					
Serial Interface	Clock Sync./Clock Async.	5 (UART)					
	Clock Sync. Only	—					
	Clock Async. Only	—					
I²C-bus		3 (UART)					
IEBus		—					
Smart Card/SIM		—					
Synchronous Serial Communication Unit/Special Serial I/O		5 (3 (UART) + 2 (SBI))					
CAN	Channels	6					
	Message Box (Numbers)	16					
FlexRay		—					
IrDA		—					
CRC Calculation Circuit		1 (CRC-CCITT ($X^{16} + X^{12} + X^5 + 1$))					
X/Y Converter		Yes					
I/O Ports	Input Only (Numbers)	2					
	CMOS I/O (Numbers)	84					
	N-Channel Open Drain Port (Numbers)	—					
	High Current Drive Port	—					
	Pull-Up Resistor	85					
External Interrupts Pins		11					
Debugging Function	On-Chip Debug	Yes					
	On-Board Flash Program	Yes					
Other Functions	ROM Correction Function	—					
	Others	CAN gateway (Routing possibility between maximum CAN 6 channels) LIN: 2 channels					
Operating Frequency/Supply Voltage		64MHz/VCC = 4.2 to 5.5V, VCC0 = 3.0 to 5.5V					
Operating Ambient Temperature (°C)		–40 to 85	–40 to 105	–40 to 125	–40 to 85	–40 to 105	–40 to 125
Package*2		PLQP0100KB-A					
Part No.		R5F6445FJFB	R5F6445FLFB	R5F6445FKFB	R5F6445HJFB	R5F6445HLFB	R5F6445HKFB

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code
Note1 Contact a Renesas Electronics sales representative regarding L version and K version products.

★ : New product ★★ : Under development

• Specifications (R32C/100 Series)

Group		R32C/151											
Memory	ROM (Bytes)	768K + 8K			768K + 16K			1024K + 8K			1024K + 16K		
	RAM (Bytes)	48K											
	ROM Type*1	F											
	Data Flash/E2 Data Flash	8K (Data flash: program/erase 10k times)			8K (Data flash: program/erase 10k times), 8K (E2 Data flash: program/erase 100k times)			8K (Data flash: program/erase 10k times)			8K (Data flash: program/erase 10k times), 8K (E2 Data flash: program/erase 100k times)		
	Program Security	Yes (ID code check function, ROM code protect function)											
CPU	CPU	R32C/100 Core											
	Basic Instructions	108											
	Minimum Instruction Execution Time (ns)	15.625 (@64MHz)											
	Multiplier	32 × 32 → 64											
	Multiply-Accumulate Instruction	32 × 32 + 64 → 64											
	Barrel Shifter	Yes											
DMA	DMAC (Channels)	4											
	DTC/DMACⅡ	DMACⅡ (Starts by all peripheral interrupt factors)											
External Bus Expansion	Address Space (Bytes)	4G											
	External Bus Interface	—											
	Bus Structure	—											
	DRAM Controller	—											
Clock	Clock Generation Circuit	4 circuits (Main clock, Sub clock, PLL, On-chip oscillator)											
	PLL	Yes											
	Subclock	Yes											
	RTC	—											
	On-Chip Oscillator	Yes											
	Oscillation Stop Detection	Yes											
	Frequency Divider	1/n (n = 2 to 24)											
	Power Save	Wait/Stop											
Power Supply Voltage Detection	Power-On Reset/POR	—											
	Low Voltage Detection/LVD	Yes (Low voltage detection)											
A/D Converter	Resolution × Channels	10-bit × 34											
	Sample and Hold	Yes											
	Multi-Channel Sample and Hold	—											
D/A Converter	Resolution × Channels	8-bit × 2											
Timer	8-bit	—											
	16-bit	11 (Timer A, Timer B)											
	Input Capture	32 (Intelligent I/O)											
	Output Compare	32 (Intelligent I/O)											
	PWM Output	37 (Timer A, Intelligent I/O)											
	Real-Time Port	—											
	Event Counter	11 (Timer A, Timer B)											
	2-Phase Encoder Input	3 (Timer A) + 2 (Intelligent I/O)											
	3-Phase Inverter Control	1 (shared with Timer A1, Timer A2, Timer A4, Timer B2, Dead time timer)											
Watchdog Timer		1											
Serial Interface	Clock Sync./Clock Async.	5 (UART)											
	Clock Sync. Only	—											
	Clock Async. Only	—											
I²C-bus		3 (UART)											
IEBus		—											
Smart Card/SIM		—											
Synchronous Serial Communication Unit/Special Serial I/O		6 (3 (UART) + 3 (SBI))											
CAN	Channels	2											
	Message Box (Numbers)	32											
FlexRay		—											
IrDA		—											
CRC Calculation Circuit		1 (CRC-CCITT ($X^{16} + X^{12} + X^5 + 1$))											
X/Y Converter		Yes											
I/O Ports	Input Only (Numbers)	2											
	CMOS I/O (Numbers)	120											
	N-Channel Open Drain Port (Numbers)	—											
	High Current Drive Port	—											
	Pull-Up Resistor	121											
External Interrupts Pins		14											
Debugging Function	On-Chip Debug	Yes											
	On-Board Flash Program	Yes											
Others	ROM Correction Function	—											
	Others	LIN: 8 channels											
Operating Frequency/Supply Voltage		64MHz/3.0 to 5.5V											
Operating Ambient Temperature (˚C)		–40 to 85	–40 to 105	–40 to 125	–40 to 85	–40 to 105	–40 to 125	–40 to 85	–40 to 105	–40 to 125	–40 to 85	–40 to 105	–40 to 125
Package*2		PLQP0144KA-A											
Part No.		R5F6451MJFD	R5F6451MLFD	R5F6451MKFD	R5F64514JFD	R5F64514LFD	R5F64514KFD	R5F6451NJFD	R5F6451NLFD	R5F6451NKFD	R5F64515JFD	R5F64515LFD	R5F64515KFD

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code
Note1 Contact a Renesas Electronics sales representative regarding products with no E2 data flash.
Note2 Contact a Renesas Electronics sales representative regarding products with the optional low-voltage detection function.
Note3 Contact a Renesas Electronics sales representative regarding L version products (–40°C to 105°C).

★ : New product ★★ : Under development

• Specifications (R32C/100 Series)

Group		R32C/152											
Memory	ROM (Bytes)	768K + 8K			768K + 16K			1024K + 8K			1024K + 16K		
	RAM (Bytes)	48K											
	ROM Type*1	F											
	Data Flash/E2 Data Flash	8K (Data flash: program/erase 10k times)			8K (Data flash: program/erase 10k times), 8K (E2 Data flash: program/erase 100k times)			8K (Data flash: program/erase 10k times)			8K (Data flash: program/erase 10k times), 8K (E2 Data flash: program/erase 100k times)		
	Program Security	Yes (ID code check function, ROM code protect function)											
CPU	CPU	R32C/100 Core											
	Basic Instructions	108											
	Minimum Instruction Execution Time (ns)	15.625 (@64MHz)											
	Multiplier	32 × 32 → 64											
	Multiply-Accumulate Instruction	32 × 32 + 64 → 64											
	Barrel Shifter	Yes											
DMA	DMAC (Channels)	4											
	DTC/DMAC Ⅱ	DMAC Ⅱ (Starts by all peripheral interrupt factors)											
External Bus Expansion	Address Space (Bytes)	4G											
	External Bus Interface	—											
	Bus Structure	—											
	DRAM Controller	—											
Clock	Clock Generation Circuit	4 circuits (Main clock, Sub clock, PLL, On-chip oscillator)											
	PLL	Yes											
	Subclock	Yes											
	RTC	—											
	On-Chip Oscillator	Yes											
	Oscillation Stop Detection	Yes											
	Frequency Divider	1/n (n = 2 to 24)											
	Power Save	Wait/Stop											
Power Supply Voltage Detection	Power-On Reset/POR	—											
	Low Voltage Detection/LVD	Yes (Low voltage detection)											
A/D Converter	Resolution × Channels	10-bit × 34											
	Sample and Hold	Yes											
	Multi-Channel Sample and Hold	—											
D/A Converter	Resolution × Channels	8-bit × 2											
Timer	8-bit	—											
	16-bit	11 (Timer A, Timer B)											
	Input Capture	32 (Intelligent I/O)											
	Output Compare	32 (Intelligent I/O)											
	PWM Output	37 (Timer A, Intelligent I/O)											
	Real-Time Port	—											
	Event Counter	11 (Timer A, Timer B)											
	2-Phase Encoder Input	3 (Timer A) + 2 (Intelligent I/O)											
	3-Phase Inverter Control	1 (shared with Timer A1, Timer A2, Timer A4, Timer B2, Dead time timer)											
Watchdog Timer		1											
Serial Interface	Clock Sync./Clock Async.	5 (UART)											
	Clock Sync. Only	—											
	Clock Async. Only	—											
I^2C-bus		3 (UART)											
IEBus		—											
Smart Card/SIM		—											
Synchronous Serial Communication Unit/Special Serial I/O		6 (3 (UART) + 3 (SBI))											
CAN	Channels	3											
	Message Box (Numbers)	32											
FlexRay		—											
IrDA		—											
CRC Calculation Circuit		1 (CRC-CCITT ($X^{16} + X^{12} + X^5 + 1$))											
X/Y Converter		Yes											
I/O Ports	Input Only (Numbers)	2											
	CMOS I/O (Numbers)	120											
	N-Channel Open Drain Port (Numbers)	—											
	High Current Drive Port	—											
	Pull-Up Resistor	121											
External Interrupts Pins		14											
Debugging Function	On-Chip Debug	Yes											
	On-Board Flash Program	Yes											
Others	ROM Correction Function	—											
	Others	LIN: 8 channels											
Operating Frequency/Supply Voltage		64MHz/3.0 to 5.5V											
Operating Ambient Temperature (°C)		–40 to 85	–40 to 105	–40 to 125	–40 to 85	–40 to 105	–40 to 125	–40 to 85	–40 to 105	–40 to 125	–40 to 85	–40 to 105	–40 to 125
Package*2		PLQP0144KA-A											
Part No.		R5F6452MJFD	R5F6452MLFD	R5F6452MKFD	R5F6452AJFD	R5F6452ALFD	R5F6452AKFD	R5F6452NJFD	R5F6452NLFD	R5F6452NKFD	R5F6452SJFD	R5F6452SLFD	R5F6452SKFD

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

Note1 Contact a Renesas Electronics sales representative regarding products with no E2 data flash.
Note2 Contact a Renesas Electronics sales representative regarding products with the optional low-voltage detection function.
Note3 Contact a Renesas Electronics sales representative regarding L version products (–40°C to 105°C).

• Specifications (R32C/100 Series)

Group		R32C/153											
Memory	ROM (Bytes)	768K + 8K			768K + 16K			1024K + 8K			1024K + 16K		
	RAM (Bytes)	48K											
	ROM Type*1	F											
	Data Flash/E2 Data Flash	8K (Data flash: program/erase 10k times)			8K (Data flash: program/erase 10k times), 8K (E2 Data flash: program/erase 100k times)			8K (Data flash: program/erase 10k times)			8K (Data flash: program/erase 10k times), 8K (E2 Data flash: program/erase 100k times)		
	Program Security	Yes (ID code check function, ROM code protect function)											
CPU	CPU	R32C/100 Core											
	Basic Instructions	108											
	Minimum Instruction Execution Time (ns)	15.625 (@64MHz)											
	Multiplier	32 × 32 → 64											
	Multiply-Accumulate Instruction	32 × 32 + 64 → 64											
	Barrel Shifter	Yes											
DMA	DMAC (Channels)	4											
	DTC/DMACⅡ	DMACⅡ (Starts by all peripheral interrupt factors)											
External Bus Expansion	Address Space (Bytes)	4G											
	External Bus Interface	—											
	Bus Structure	—											
	DRAM Controller	—											
Clock	Clock Generation Circuit	4 circuits (Main clock, Sub clock, PLL, On-chip oscillator)											
	PLL	Yes											
	Subclock	Yes											
	RTC	—											
	On-Chip Oscillator	Yes											
	Oscillation Stop Detection	Yes											
	Frequency Divider	1/n (n = 2 to 24)											
	Power Save	Wait/Stop											
Power Supply Voltage Detection	Power-On Reset/POR	—											
	Low Voltage Detection/LVD	Yes (Low voltage detection)											
A/D Converter	Resolution × Channels	10-bit × 34											
	Sample and Hold	Yes											
	Multi-Channel Sample and Hold	—											
D/A Converter	Resolution × Channels	8-bit × 2											
Timer	8-bit	—											
	16-bit	11 (Timer A, Timer B)											
	Input Capture	32 (Intelligent I/O)											
	Output Compare	32 (Intelligent I/O)											
	PWM Output	37 (Timer A, Intelligent I/O)											
	Real-Time Port	—											
	Event Counter	11 (Timer A, Timer B)											
	2-Phase Encoder Input	3 (Timer A) + 2 (Intelligent I/O)											
	3-Phase Inverter Control	1 (shared with Timer A1, Timer A2, Timer A4, Timer B2, Dead time timer)											
Watchdog Timer		1											
Serial Interface	Clock Sync./Clock Async.	5 (UART)											
	Clock Sync. Only	—											
	Clock Async. Only	—											
I²C-bus		3 (UART)											
IEBus		—											
Smart Card/SIM		—											
Synchronous Serial Communication Unit/Special Serial I/O		6 (3 (UART) + 3 (SBI))											
CAN	Channels	4											
	Message Box (Numbers)	32											
FlexRay		—											
IrDA		—											
CRC Calculation Circuit		1 (CRC-CCITT ($X^{16} + X^{12} + X^5 + 1$))											
X/Y Converter		Yes											
I/O Ports	Input Only (Numbers)	2											
	CMOS I/O (Numbers)	120											
	N-Channel Open Drain Port (Numbers)	—											
	High Current Drive Port	—											
	Pull-Up Resistor	121											
External Interrupts Pins		14											
Debugging Function	On-Chip Debug	Yes											
	On-Board Flash Program	Yes											
Others	ROM Correction Function	—											
	Others	LIN: 8 channels											
Operating Frequency/Supply Voltage		64MHz/3.0 to 5.5V											
Operating Ambient Temperature (˚C)		–40 to 85	–40 to 105	–40 to 125	–40 to 85	–40 to 105	–40 to 125	–40 to 85	–40 to 105	–40 to 125	–40 to 85	–40 to 105	–40 to 125
Package*2		PLQP0144KA-A											
Part No.		R5F64536MJFD	R5F64536MLFD	R5F64536MKFD	R5F64534JFD	R5F64534LFD	R5F64534KFD	R5F64536NJFD	R5F64536NLFD	R5F64536NKFD	R5F64535JFD	R5F64535LFD	R5F64535KFD

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code
Note1 Contact a Renesas Electronics sales representative regarding products with no E2 data flash.
Note2 Contact a Renesas Electronics sales representative regarding products with the optional low-voltage detection function.
Note3 Contact a Renesas Electronics sales representative regarding L version products (–40°C to 105°C).

★ : New product ★★ : Under development

• Specifications (R32C/100 Series)

Group		R32C/156					
Memory	ROM (Bytes)	256K + 8K	256K + 12K	384K + 8K	384K + 12K	512K + 8K	512K + 12K
	RAM (Bytes)	20K		24K		32K	
	ROM Type*1	F					
	Data Flash/E2 Data Flash	8K (Data flash: program/ erase 10k times)	8K (Data flash: program/ erase 10k times), 4K (E2 Data flash: program/erase 100k times)	8K (Data flash: program/ erase 10k times)	8K (Data flash: program/ erase 10k times), 4K (E2 Data flash: program/erase 100k times)	8K (Data flash: program/ erase 10k times)	8K (Data flash: program/ erase 10k times), 4K (E2 Data flash: program/erase 100k times)
	Program Security	Yes (ID code check function, ROM code protect function)					
CPU	CPU	R32C/100 Core					
	Basic Instructions	108					
	Minimum Instruction Execution Time (ns)	15.625 (@64MHz)					
	Multiplier	32 × 32 → 64					
	Multiply-Accumulate Instruction	32 × 32 + 64 → 64					
	Barrel Shifter	Yes					
DMA	DMAC (Channels)	4					
	DTC/DMACⅡ	DMACⅡ (Starts by all peripheral interrupt factors)					
External Bus Expansion	Address Space (Bytes)	4G					
	External Bus Interface	—					
	Bus Structure	—					
	DRAM Controller	—					
Clock	Clock Generation Circuit	4 circuits (Main clock, Sub clock, PLL, On-chip oscillator)					
	PLL	Yes					
	Subclock	Yes					
	RTC	—					
	On-Chip Oscillator	Yes					
	Oscillation Stop Detection	Yes					
	Frequency Divider	1/n (n = 2 to 24)					
	Power Save	Wait/Stop					
Power Supply Voltage Detection	Power-On Reset/POR	—					
	Low Voltage Detection/LVD	Yes (Low voltage detection)					
A/D Converter	Resolution x Channels	10-bit × 34					
	Sample and Hold	Yes					
	Multi-Channel Sample and Hold	—					
D/A Converter	Resolution x Channels	8-bit × 2					
Timer	8-bit	—					
	16-bit	11 (Timer A, Timer B)					
	Input Capture	32 (Intelligent I/O)					
	Output Compare	32 (Intelligent I/O)					
	PWM Output	37 (Timer A, Intelligent I/O)					
	Real-Time Port	—					
	Event Counter	11 (Timer A, Timer B)					
	2-Phase Encoder Input	3 (Timer A) + 2 (Intelligent I/O)					
	3-Phase Inverter Control	1 (shared with Timer A1, Timer A2, Timer A4, Timer B2, Dead time timer)					
Watchdog Timer		1					
Serial Interface	Clock Sync./Clock Async.	5 (UART)					
	Clock Sync. Only	—					
	Clock Async. Only	—					
I²C-bus		3 (UART)					
IEBus		—					
Smart Card/SIM		—					
Synchronous Serial Communication Unit/Special Serial I/O		6 (3 (UART) + 3 (SBI))					
CAN	Channels	2					
	Message Box (Numbers)	32					
FlexRay		—					
IrDA		—					
CRC Calculation Circuit		1 (CRC-CCITT ($X^{16} + X^{12} + X^5 + 1$))					
X/Y Converter		Yes					
I/O Ports	Input Only (Numbers)	2					
	CMOS I/O (Numbers)	120					
	N-Channel Open Drain Port (Numbers)	—					
	High Current Drive Port	—					
	Pull-Up Resistor	121					
External Interrupts Pins		14					
Debugging Function	On-Chip Debug	Yes					
	On-Board Flash Program	Yes					
Others	ROM Correction Function	—					
	Others	LIN: 4 channels					
Operating Frequency/Supply Voltage		64MHz/3.0 to 5.5V					
Operating Ambient Temperature (°C)		–40 to 85	–40 to 105	–40 to 125	–40 to 85	–40 to 105	–40 to 125
		–40 to 85	–40 to 105	–40 to 125	–40 to 85	–40 to 105	–40 to 125
		–40 to 85	–40 to 105	–40 to 125	–40 to 85	–40 to 105	–40 to 125
Package*2		PLQP0144KA-A					
Part No.		R5F6456FJFD	R5F6456FLFD	R5F6456FKFD	R5F64561JFD	R5F64561LFD	R5F64561KFD
		R5F6456GJFD	R5F6456GLFD	R5F6456GKFD	R5F64562JFD	R5F64562LFD	R5F64562KFD
		R5F6456HJFD	R5F6456HLFD	R5F6456HKFD	R5F64563JFD	R5F64563LFD	R5F64563KFD

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code
Note1 Contact a Renesas Electronics sales representative regarding products with no E2 data flash.
Note2 Contact a Renesas Electronics sales representative regarding products with the optional low-voltage detection function.
Note3 Contact a Renesas Electronics sales representative regarding L version products (–40°C to 105°C).

★ : New product ★★ : Under development

• Specifications (R32C/100 Series)

Group		R32C/157																			
Memory	ROM (Bytes)	256K + 8K		256K + 12K				384K + 8K		384K + 12K				512K + 8K				512K + 12K			
	RAM (Bytes)	20K						24K						32K							
	ROM Type*1	F																			
	Data Flash/E2 Data Flash	8K (Data flash: program/ erase 10k times)		8K (Data flash: program/ erase 10k times), 4K (E2 Data flash: program/erase 100k times)				8K (Data flash: program/ erase 10k times)		8K (Data flash: program/ erase 10k times), 4K (E2 Data flash: program/erase 100k times)				8K (Data flash: program/ erase 10k times)				8K (Data flash: program/ erase 10k times), 4K (E2 Data flash: program/erase 100k times)			
	Program Security	Yes (ID code check function, ROM code protect function)																			
CPU	CPU	R32C/100 Core																			
	Basic Instructions	108																			
	Minimum Instruction Execution Time (ns)	15.625 (@64MHz)																			
	Multiplier	32 × 32 → 64																			
	Multiply-Accumulate Instruction	32 × 32 + 64 → 64																			
	Barrel Shifter	Yes																			
DMA	DMAC (Channels)	4																			
	DTC/DMACⅡ	DMACⅡ (Starts by all peripheral interrupt factors)																			
External Bus Expansion	Address Space (Bytes)	4G																			
	External Bus Interface	—																			
	Bus Structure	—																			
	DRAM Controller	—																			
Clock	Clock Generation Circuit	4 circuits (Main clock, Sub clock, PLL, On-chip oscillator)																			
	PLL	Yes																			
	Subclock	Yes																			
	RTC	—																			
	On-Chip Oscillator	Yes																			
	Oscillation Stop Detection	Yes																			
	Frequency Divider	1/n (n = 2 to 24)																			
	Power Save	Wait/Stop																			
Power Supply Voltage Detection	Power-On Reset/POR	—																			
	Low Voltage Detection/LVD	Yes (Low voltage detection)																			
A/D Converter	Resolution × Channels	10-bit × 34																			
	Sample and Hold	Yes																			
	Multi-Channel Sample and Hold	—																			
D/A Converter	Resolution × Channels	8-bit × 2																			
Timer	8-bit	—																			
	16-bit	11 (Timer A, Timer B)																			
	Input Capture	32 (Intelligent I/O)																			
	Output Compare	32 (Intelligent I/O)																			
	PWM Output	37 (Timer A, Intelligent I/O)																			
	Real-Time Port	—																			
	Event Counter	11 (Timer A, Timer B)																			
	2-Phase Encoder Input	3 (Timer A) + 2 (Intelligent I/O)																			
	3-Phase Inverter Control	1 (shared with Timer A1, Timer A2, Timer A4, Timer B2, Dead time timer)																			
Watchdog Timer		1																			
Serial Interface	Clock Sync./Clock Async.	5 (UART)																			
	Clock Sync. Only	—																			
	Clock Async. Only	—																			
I²C-bus		3 (UART)																			
IEBus		—																			
Smart Card/SIM		—																			
Synchronous Serial Communication Unit/Special Serial I/O		6 (3 (UART) + 3 (SBI))																			
CAN	Channels	3																			
	Message Box (Numbers)	32																			
FlexRay		—																			
IrDA		—																			
CRC Calculation Circuit		1 (CRC-CCITT ($X^{16} + X^{12} + X^5 + 1$))																			
X/Y Converter		Yes																			
I/O Ports	Input Only (Numbers)	2																			
	CMOS I/O (Numbers)	120																			
	N-Channel Open Drain Port (Numbers)	—																			
	High Current Drive Port	—																			
	Pull-Up Resistor	121																			
External Interrupts Pins		14																			
Debugging Function	On-Chip Debug	Yes																			
	On-Board Flash Program	Yes																			
Others	ROM Correction Function	—																			
	Others	LIN: 4 channels																			
Operating Frequency/Supply Voltage		64MHz/3.0 to 5.5V																			
Operating Ambient Temperature (˚C)		–40 to 85	–40 to 105	–40 to 125	–40 to 85	–40 to 105	–40 to 125	–40 to 85	–40 to 105	–40 to 125	–40 to 85	–40 to 105	–40 to 125	–40 to 85	–40 to 105	–40 to 125	–40 to 85	–40 to 105	–40 to 125	–40 to 85	–40 to 105	–40 to 125
Package*2		PLQP0144KA-A																			
Part No.		R5F6457FJFD	R5F6457FLFD	R5F6457FKFD	R5F64571JFD	R5F64571LFD	R5F64571KFD	R5F6457GJFD	R5F6457GLFD	R5F6457GKFD	R5F64572JFD	R5F64572LFD	R5F64572KFD	R5F6457HJFD	R5F6457HLFD	R5F6457HKFD	R5F64573JFD	R5F64573LFD	R5F64573KFD			

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code
Note1 Contact a Renesas Electronics sales representative regarding products with no E2 data flash.
Note2 Contact a Renesas Electronics sales representative regarding products with the optional low-voltage detection function.
Note3 Contact a Renesas Electronics sales representative regarding L version products (–40°C to 105°C).

★ : New product ★★ : Under development

• Specifications (R32C/100 Series)

Group		R32C/160											
Memory	ROM (Bytes)	128K + 8K			128K + 12K			256K + 8K			256K + 12K		
	RAM (Bytes)	12K						20K					
	ROM Type*1	F											
	Data Flash/E2 Data Flash	8K (Data flash: program/erase 10k times)			8K (Data flash: program/erase 10k times), 4K (E2 Data flash: program/erase 100k times)			8K (Data flash: program/erase 10k times)			8K (Data flash: program/erase 10k times), 4K (E2 Data flash: program/erase 100k times)		
	Program Security	Yes (ID code check function, ROM code protect function)											
CPU	CPU	R32C/100 Core											
	Basic Instructions	108											
	Minimum Instruction Execution Time (ns)	20.8 (@48MHz)											
	Multiplier	32 × 32 → 64											
	Multiply-Accumulate Instruction	32 × 32 + 64 → 64											
	Barrel Shifter	Yes											
DMA	DMAC (Channels)	4											
	DTC/DMACⅡ	DMACⅡ (Starts by all peripheral interrupt factors)											
External Bus Expansion	Address Space (Bytes)	4G											
	External Bus Interface	—											
	Bus Structure	—											
	DRAM Controller	—											
Clock	Clock Generation Circuit	4 circuits (Main clock, Sub clock, PLL, On-chip oscillator)											
	PLL	Yes											
	Subclock	Yes											
	RTC	—											
	On-Chip Oscillator	Yes											
	Oscillation Stop Detection	Yes											
	Frequency Divider	1/n (n = 2 to 24)											
	Power Save	Wait/Stop											
Power Supply Voltage Detection	Power-On Reset/POR	—											
	Low Voltage Detection/LVD	Yes (Low voltage detection)											
A/D Converter	Resolution × Channels	10-bit × 23											
	Sample and Hold	Yes											
	Multi-Channel Sample and Hold	—											
D/A Converter	Resolution × Channels	—											
Timer	8-bit	—											
	16-bit	11 (Timer A, Timer B)											
	Input Capture	8 (Intelligent I/O)											
	Output Compare	8 (Intelligent I/O)											
	PWM Output	13 (Timer A, Intelligent I/O)											
	Real-Time Port	—											
	Event Counter	11 (Timer A, Timer B)											
	2-Phase Encoder Input	3 (Timer A) + 1 (Intelligent I/O)											
	3-Phase Inverter Control	1 (shared with Timer A1, Timer A2, Timer A4, Timer B2, Dead time timer)											
Watchdog Timer		1											
Serial Interface	Clock Sync./Clock Async.	5 (UART)											
	Clock Sync. Only	—											
	Clock Async. Only	—											
I^2C-bus		3 (UART)											
IEBus		—											
Smart Card/SIM		—											
Synchronous Serial Communication Unit/Special Serial I/O		4 (3 (UART) + 1 (SBI))											
CAN	Channels	1											
	Message Box (Numbers)	32											
FlexRay		—											
IrDA		—											
CRC Calculation Circuit		1 (CRC-CCITT ($X^{16} + X^{12} + X^5 + 1$))											
X/Y Converter		Yes											
I/O Ports	Input Only (Numbers)	2											
	CMOS I/O (Numbers)	64											
	N-Channel Open Drain Port (Numbers)	—											
	High Current Drive Port	—											
	Pull-Up Resistor	65											
External Interrupts Pins		7											
Debugging Function	On-Chip Debug	Yes											
	On-Board Flash Program	Yes											
Others	ROM Correction Function	—											
	Others	LIN: 1 channel											
Operating Frequency/Supply Voltage		48MHz/3.0 to 5.5V											
Operating Ambient Temperature (°C)		–40 to 85	–40 to 105	–40 to 125	–40 to 85	–40 to 105	–40 to 125	–40 to 85	–40 to 105	–40 to 125	–40 to 85	–40 to 105	–40 to 125
Package*2		PLQP080KB-A											
Part No.		R5F6460EJFP	R5F6460ELFP	R5F6460EKFP	R5F64600JFP	R5F64600LFP	R5F64600KFP	R5F6460FJFP	R5F6460FLFP	R5F6460FKFP	R5F64601JFP	R5F64601LFP	R5F64601KFP

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code
Note1 Contact a Renesas Electronics sales representative regarding products with no E2 data flash.
Note2 Contact a Renesas Electronics sales representative regarding products with the optional low-voltage detection function.
Note3 Contact a Renesas Electronics sales representative regarding L version products (–40°C to 105°C).

★ : New product ★★ : Under development

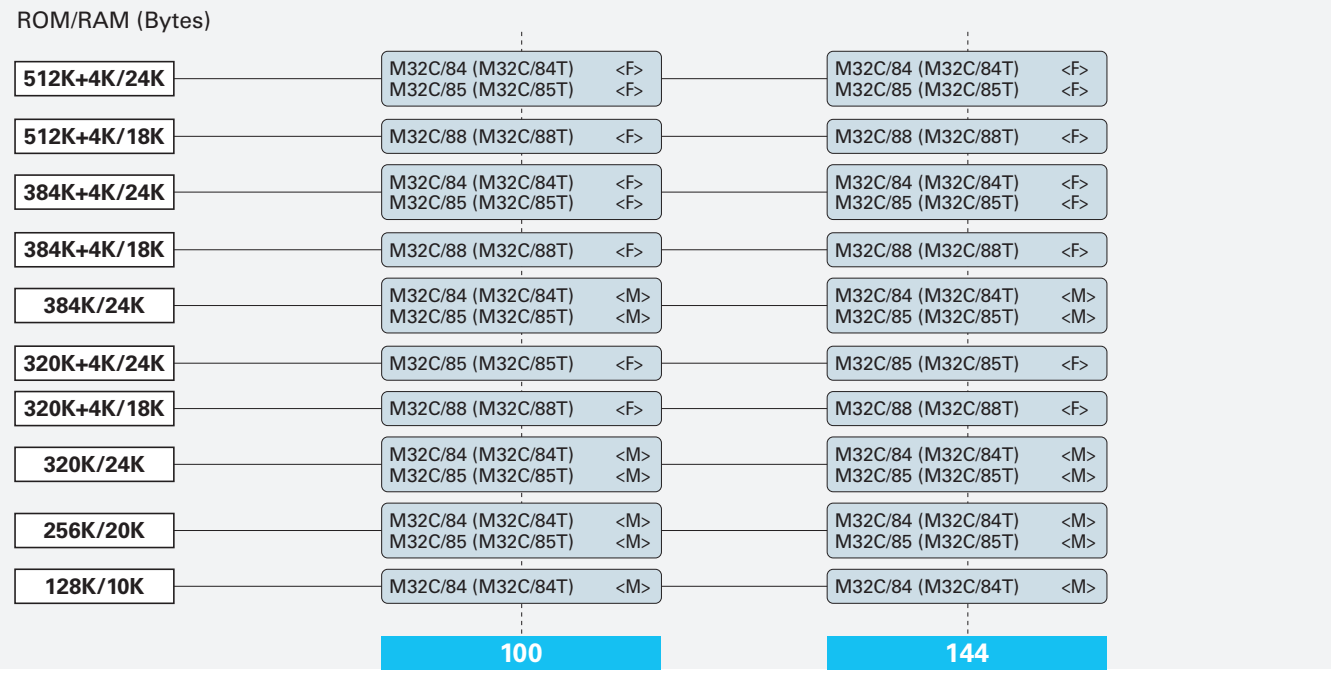
• Specifications (R32C/100 Series)

Group		R32C/161											
Memory	ROM (Bytes)	128K + 8K		128K + 12K		256K + 8K		256K + 12K					
	RAM (Bytes)	12K				20K							
	ROM Type*1	F											
	Data Flash/E2 Data Flash	8K (Data flash: program/erase 10k times)		8K (Data flash: program/erase 10k times), 4K (E2 Data flash: program/erase 100k times)		8K (Data flash: program/erase 10k times)		8K (Data flash: program/erase 10k times), 4K (E2 Data flash: program/erase 100k times)					
	Program Security	Yes (ID code check function, ROM code protect function)											
CPU	CPU	R32C/100 Core											
	Basic Instructions	108											
	Minimum Instruction Execution Time (ns)	20.8 (@48MHz)											
	Multiplier	32 × 32 → 64											
	Multiply-Accumulate Instruction	32 × 32 + 64 → 64											
	Barrel Shifter	Yes											
DMA	DMAC (Channels)	4											
	DTC/DMACⅡ	DMACⅡ (Starts by all peripheral interrupt factors)											
External Bus Expansion	Address Space (Bytes)	4G											
	External Bus Interface	—											
	Bus Structure	—											
	DRAM Controller	—											
Clock	Clock Generation Circuit	4 circuits (Main clock, Sub clock, PLL, On-chip oscillator)											
	PLL	Yes											
	Subclock	Yes											
	RTC	—											
	On-Chip Oscillator	Yes											
	Oscillation Stop Detection	Yes											
	Frequency Divider	1/n (n = 2 to 24)											
	Power Save	Wait/Stop											
Power Supply Voltage Detection	Power-On Reset/POR	—											
	Low Voltage Detection/LVD	Yes (Low voltage detection)											
A/D Converter	Resolution × Channels	10-bit × 23											
	Sample and Hold	Yes											
	Multi-Channel Sample and Hold	—											
D/A Converter	Resolution × Channels	—											
Timer	8-bit	—											
	16-bit	11 (Timer A, Timer B)											
	Input Capture	8 (Intelligent I/O)											
	Output Compare	8 (Intelligent I/O)											
	PWM Output	13 (Timer A, Intelligent I/O)											
	Real-Time Port	—											
	Event Counter	11 (Timer A, Timer B)											
	2-Phase Encoder Input	3 (Timer A) + 1 (Intelligent I/O)											
	3-Phase Inverter Control	1 (shared with Timer A1, Timer A2, Timer A4, Timer B2, Dead time timer)											
Watchdog Timer		1											
Serial Interface	Clock Sync./Clock Async.	5 (UART)											
	Clock Sync. Only	—											
	Clock Async. Only	—											
I²C-bus		3 (UART)											
IEBus		—											
Smart Card/SIM		—											
Synchronous Serial Communication Unit/Special Serial I/O		4 (3 (UART) + 1 (SBI))											
CAN	Channels	2											
	Message Box (Numbers)	32											
FlexRay		—											
IrDA		—											
CRC Calculation Circuit		1 (CRC-CCITT ($X^{16} + X^{12} + X^5 + 1$))											
X/Y Converter		Yes											
I/O Ports	Input Only (Numbers)	2											
	CMOS I/O (Numbers)	64											
	N-Channel Open Drain Port (Numbers)	—											
	High Current Drive Port	—											
	Pull-Up Resistor	65											
External Interrupts Pins		7											
Debugging Function	On-Chip Debug	Yes											
	On-Board Flash Program	Yes											
Others	ROM Correction Function	—											
	Others	LIN: 1 channel											
Operating Frequency/Supply Voltage		48MHz/3.0 to 5.5V											
Operating Ambient Temperature (˚C)		–40 to 85	–40 to 105	–40 to 125	–40 to 85	–40 to 105	–40 to 125	–40 to 85	–40 to 105	–40 to 125	–40 to 85	–40 to 105	–40 to 125
Package*2		PLQP080KB-A											
Part No.		R5F6461EJFP	R5F6461ELFP	R5F6461EKFP	R5F64610JFP	R5F64610LFP	R5F64610KFP	R5F6461FJFP	R5F6461FLFP	R5F6461FKFP	R5F64611JFP	R5F64611LFP	R5F64611KFP

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code
Note1 Contact a Renesas Electronics sales representative regarding products with no E2 data flash.
Note2 Contact a Renesas Electronics sales representative regarding products with the optional low-voltage detection function.
Note3 Contact a Renesas Electronics sales representative regarding L version products (–40°C to 105°C).

★ : New product ★★ : Under development

• Memory Capacity (ROM/RAM) (M32C/80 Series)



Letters in brackets < > indicate memory variations.
F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

• Specifications (M32C/80 Series)

Group		M32C/84 (M32C/84T)																					
Memory	ROM (Bytes)	128K		256K		320K		384K		384K + 4K		512K + 4K											
	RAM (Bytes)	10K		20K		24K																	
	ROM Type*1	M								F													
	Data Flash/E2 Data Flash	—								4K (Data flash)													
	Program Security	—								Yes (ID code check function, ROM code protect function)													
CPU	CPU	M32C/80 Core																					
	Basic Instructions	108																					
	Minimum Instruction Execution Time (ns)	31.3 (@32MHz)																					
	Multiplier	16 × 16 → 32																					
	Multiply-Accumulate Instruction	16 × 16 + 48 → 48																					
	Barrel Shifter	Yes																					
DMA	DMAC (Channels)	4																					
	DTC/DMAC II	DMAC II (Starts by all peripheral interrupt factors)																					
External Bus Expansion	Address Space (Bytes)	—																					
	External Bus Interface	—																					
	Bus Structure	—																					
	DRAM Controller	—																					
Clock	Clock Generation Circuit	4 circuits (Main clock, Sub clock, PLL, On-chip oscillator)																					
	PLL	Yes																					
	Subclock	Yes																					
	RTC	—																					
	On-Chip Oscillator	Yes																					
	Oscillation Stop Detection	Yes																					
	Frequency Divider	1/n (n = 1, 2, 3, 4, 6, 8, 10, 12, 14, 16)																					
	Power Save	Wait/Stop																					
Power Supply Voltage Detection	Power-On Reset/POR	—																					
	Low Voltage Detection/LVD	—																					
A/D Converter	Resolution × Channels	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34
	Sample and Hold	Yes																					
	Multi-Channel Sample and Hold	—																					
D/A Converter	Resolution × Channels	8-bit × 2																					
Timer	8-bit	—																					
	16-bit	11 (Timer A, Timer B)																					
	Input Capture	8 (Intelligent I/O)																					
	Output Compare	8 (Intelligent I/O)																					
	PWM Output	13 (Timer A, Intelligent I/O)																					
	Real-Time Port	—																					
	Event Counter	11 (Timer A, Timer B)																					
	2-Phase Encoder Input	3 (Timer A) + 1 (Intelligent I/O)																					
	3-Phase Inverter Control	1 (shared with Timer A1, Timer A2, Timer A4, Timer B2, Dead time timer)																					
Watchdog Timer		1																					
Serial Interface	Clock Sync./Clock Async.	6 (UART, Intelligent I/O)																					
	Clock Sync. Only	1 (Intelligent I/O)																					
	Clock Async. Only	—																					
I²C-bus		5 (UART)																					
IEBus		5 (UART)																					
Smart Card/SIM		5 (UART)																					
Synchronous Serial Communication Unit/Special Serial I/O		5 (UART)																					
CAN	Channels	1																					
	Message Box (Numbers)	16																					
IrDA		—																					
CRC Calculation Circuit		1 (CRC-CCITT ($X^{16} + X^{12} + X^5 + 1$))																					
X/Y Converter		Yes																					
I/O Ports	Input Only (Numbers)	1																					
	CMOS I/O (Numbers)	85	121	85	121	85	121	85	121	85	121	85	121	85	121	85	121	85	121	85	121	85	121
	N-Channel Open Drain Port (Numbers)	2																					
	High Current Drive Port	—																					
	Pull-Up Resistor	85	121	85	121	85	121	85	121	85	121	85	121	85	121	85	121	85	121	85	121	85	121
External Interrupts Pins		11																					
Debugging Function	On-Chip Debug	—								Yes													
	On-Board Flash Program	—								Yes													
Others	ROM Correction Function	Yes								—													
	Others	—																					
Operating Frequency/Supply Voltage		32MHz/4.2 to 5.5V																					
Operating Ambient Temperature (°C)		–40 to 85				–40 to 105		–40 to 85		–40 to 105		–40 to 85		–40 to 105		–40 to 85		–40 to 105		–40 to 85		–40 to 105	
Package*2		PLQP0100KB-A	PLQP0144KA-A	PLQP0100KB-A	PLQP0144KA-A	PLQP0100KB-A	PLQP0144KA-A	PLQP0100KB-A	PLQP0144KA-A	PLQP0100KB-A	PLQP0144KA-A	PLQP0100KB-A	PLQP0144KA-A	PLQP0100KB-A	PLQP0144KA-A	PLQP0100KB-A	PLQP0144KA-A	PLQP0100KB-A	PLQP0144KA-A	PLQP0100KB-A	PLQP0144KA-A	PLQP0100KB-A	PLQP0144KA-A
Part No.		M30840MCT-XXXGP	M30842MCT-XXXGP	M30843MGT-XXXGP	M30845MGT-XXXGP	M30843MGU-XXXGP	M30845MGU-XXXGP	M30843MWT-XXXGP	M30845MWT-XXXGP	M30843MWU-XXXGP	M30845MWU-XXXGP	M30843MHT-XXXGP	M30845MHT-XXXGP	M30843MHU-XXXGP	M30845MHU-XXXGP	M30843FHTGP	M30845FHTGP	M30843FHUGP	M30845FHUGP	M30843FJTGP	M30845FJTGP	M30843FJUGP	M30845FJUGP

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (M32C/80 Series)

Group		M32C/85 (M32C/85T)																											
Memory	ROM (Bytes)	256K				320K				320K + 4K				384K				384K + 4K				512K + 4K							
	RAM (Bytes)	20K				24K																							
	ROM Type*1	M								F				M				F											
	Data Flash/E2 Data Flash	—								4K (Data flash)				—				4K (Data flash)											
	Program Security	—								Yes (ID code check function, ROM code protect function)				—				Yes (ID code check function, ROM code protect function)											
CPU	CPU	M32C/80 Core																											
	Basic Instructions	108																											
	Minimum Instruction Execution Time (ns)	31.3 (@32MHz)																											
	Multiplier	16 × 16 → 32																											
	Multiply-Accumulate Instruction	16 × 16 + 48 → 48																											
	Barrel Shifter	Yes																											
DMA	DMAC (Channels)	4																											
	DTC/DMACⅡ	DMACⅡ (Starts by all peripheral interrupt factors)																											
External Bus Expansion	Address Space (Bytes)	—																											
	External Bus Interface	—																											
	Bus Structure	—																											
	DRAM Controller	—																											
Clock	Clock Generation Circuit	4 circuits (Main clock, Sub clock, PLL, On-chip oscillator)																											
	PLL	Yes																											
	Subclock	Yes																											
	RTC	—																											
	On-Chip Oscillator	Yes																											
	Oscillation Stop Detection	Yes																											
	Frequency Divider	1/n (n = 1, 2, 3, 4, 6, 8, 10, 12, 14, 16)																											
	Power Save	Wait/Stop																											
Power Supply Voltage Detection	Power-On Reset/POR	—																											
	Low Voltage Detection/LVD	—																											
A/D Converter	Resolution × Channels	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34
	Sample and Hold	Yes																											
	Multi-Channel Sample and Hold	—																											
D/A Converter	Resolution × Channels	8-bit × 2																											
Timer	8-bit	—																											
	16-bit	11 (Timer A, Timer B)																											
	Input Capture	8 (Intelligent I/O)																											
	Output Compare	8 (Intelligent I/O)																											
	PWM Output	13 (Timer A, Intelligent I/O)																											
	Real-Time Port	—																											
	Event Counter	11 (Timer A, Timer B)																											
	2-Phase Encoder Input	3 (Timer A) + 1 (Intelligent I/O)																											
	3-Phase Inverter Control	1 (shared with Timer A1, Timer A2, Timer A4, Timer B2, Dead time timer)																											
Watchdog Timer		1																											
Serial Interface	Clock Sync./Clock Async.	6 (UART, Intelligent I/O)																											
	Clock Sync. Only	1 (Intelligent I/O)																											
	Clock Async. Only	—																											
I²C-bus		5 (UART)																											
IEBus		5 (UART)																											
Smart Card/SIM		5 (UART)																											
Synchronous Serial Communication Unit/Special Serial I/O		5 (UART)																											
CAN	Channels	2																											
	Message Box (Numbers)	16 × 2																											
IrDA		—																											
CRC Calculation Circuit		1 (CRC-CCITT ($X^{16} + X^{12} + X^5 + 1$))																											
X/Y Converter		Yes																											
I/O Ports	Input Only (Numbers)	1																											
	CMOS I/O (Numbers)	85	121	85	121	85	121	85	121	85	121	85	121	85	121	85	121	85	121	85	121	85	121	85	121	85	121	85	121
	N-Channel Open Drain Port (Numbers)	2																											
	High Current Drive Port	—																											
	Pull-Up Resistor	85	121	85	121	85	121	85	121	85	121	85	121	85	121	85	121	85	121	85	121	85	121	85	121	85	121	85	121
External Interrupts Pins		11																											
Debugging Function	On-Chip Debug	—								Yes				—				Yes											
	On-Board Flash Program	—								Yes				—				Yes											
Others	ROM Correction Function	Yes								—				Yes				—											
	Others	—																											
Operating Frequency/Supply Voltage		32MHz/4.2 to 5.5V																											
Operating Ambient Temperature (°C)		–40 to 85		–40 to 105		–40 to 85		–40 to 105		–40 to 85		–40 to 105		–40 to 85		–40 to 105		–40 to 85		–40 to 105		–40 to 85		–40 to 105		–40 to 85		–40 to 105	
Package*2		PLQP0100KB-A	PLQP0144KA-A	PLQP0100KB-A	PLQP0144KA-A	PLQP0100KB-A	PLQP0144KA-A	PLQP0100KB-A	PLQP0144KA-A	PLQP0100KB-A	PLQP0144KA-A	PLQP0100KB-A	PLQP0144KA-A	PLQP0100KB-A	PLQP0144KA-A	PLQP0100KB-A	PLQP0144KA-A	PLQP0100KB-A	PLQP0144KA-A	PLQP0100KB-A	PLQP0144KA-A	PLQP0100KB-A	PLQP0144KA-A	PLQP0100KB-A	PLQP0144KA-A	PLQP0100KB-A	PLQP0144KA-A	PLQP0100KB-A	PLQP0144KA-A
Part No.		M30853MGT-XXXGP	M30855MGT-XXXGP	M30853MGU-XXXGP	M30855MGU-XXXGP	M30853MWT-XXXGP	M30855MWT-XXXGP	M30853MWU-XXXGP	M30855MWU-XXXGP	M30853FWTGP	M30855FWTGP	M30853FWUGP	M30855FWUGP	M30853MHT-XXXGP	M30855MHT-XXXGP	M30853MHU-XXXGP	M30855MHU-XXXGP	M30853FHTGP	M30855FHTGP	M30853FHUGP	M30855FHUGP	M30853FJTGP	M30855FJTGP	M30853FJUGP	M30855FJUGP				

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

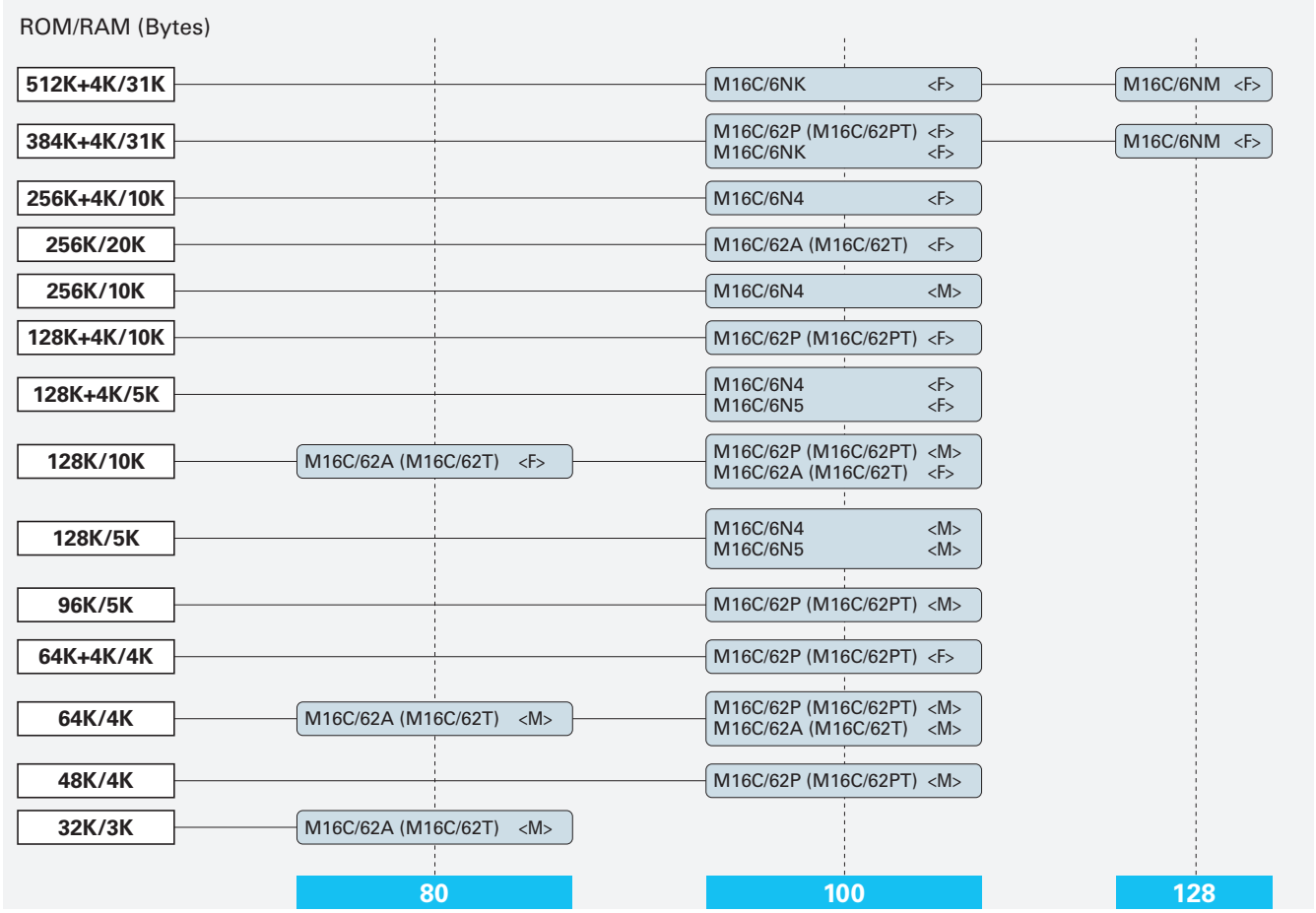
• Specifications (M32C/80 Series)

Group		M32C/88 (M32C/88T)											
Memory	ROM (Bytes)	320K + 4K				384K + 4K				512K + 4K			
	RAM (Bytes)	18K											
	ROM Type*1	F											
	Data Flash/E2 Data Flash	4K (Data flash)											
	Program Security	Yes (ID code check function, ROM code protect function)											
CPU	CPU	M32C/80 Core											
	Basic Instructions	108											
	Minimum Instruction Execution Time (ns)	31.3 (@32MHz)											
	Multiplier	16 × 16 → 32											
	Multiply-Accumulate Instruction	16 × 16 + 48 → 48											
	Barrel Shifter	Yes											
DMA	DMAC (Channels)	4											
	DTC/DMACⅡ	DMACⅡ (Starts by all peripheral interrupt factors)											
External Bus Expansion	Address Space (Bytes)	—											
	External Bus Interface	—											
	Bus Structure	—											
	DRAM Controller	—											
Clock	Clock Generation Circuit	4 circuits (Main clock, Sub clock, PLL, On-chip oscillator)											
	PLL	Yes											
	Subclock	Yes											
	RTC	—											
	On-Chip Oscillator	Yes											
	Oscillation Stop Detection	Yes											
	Frequency Divider	1/n (n = 1, 2, 3, 4, 6, 8, 10, 12, 14, 16)											
	Power Save	Wait/Stop											
Power Supply Voltage Detection	Power-On Reset/POR	—											
	Low Voltage Detection/LVD	—											
A/D Converter	Resolution × Channels	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34
	Sample and Hold	Yes											
	Multi-Channel Sample and Hold	—											
D/A Converter	Resolution × Channels	8-bit × 2											
Timer	8-bit	—											
	16-bit	11 (Timer A, Timer B)											
	Input Capture	8 (Intelligent I/O)											
	Output Compare	8 (Intelligent I/O)											
	PWM Output	13 (Timer A, Intelligent I/O)											
	Real-Time Port	—											
	Event Counter	11 (Timer A, Timer B)											
	2-Phase Encoder Input	3 (Timer A) + 2 (Intelligent I/O)											
	3-Phase Inverter Control	1 (shared with Timer A1, Timer A2, Timer A4, Timer B2, Dead time timer)											
Watchdog Timer		1											
Serial Interface	Clock Sync./Clock Async.	6 (UART, Intelligent I/O)											
	Clock Sync. Only	1 (Intelligent I/O)											
	Clock Async. Only	—											
I²C-bus		5 (UART)											
IEBus		5 (UART)											
Smart Card/SIM		5 (UART)											
Synchronous Serial Communication Unit/Special Serial I/O		5 (UART)											
CAN	Channels	3											
	Message Box (Numbers)	16 × 3											
IrDA		—											
CRC Calculation Circuit		1 (CRC-CCITT ($X^{16} + X^{12} + X^5 + 1$))											
X/Y Converter		Yes											
I/O Ports	Input Only (Numbers)	1											
	CMOS I/O (Numbers)	85	121	85	121	85	121	85	121	85	121	85	121
	N-Channel Open Drain Port (Numbers)	2											
	High Current Drive Port	—											
	Pull-Up Resistor	85	121	85	121	85	121	85	121	85	121	85	121
External Interrupts Pins		11											
Debugging Function	On-Chip Debug	Yes											
	On-Board Flash Program	Yes											
Others	ROM Correction Function	—											
	Others	—											
Operating Frequency/Supply Voltage		32MHz/4.2 to 5.5V											
Operating Ambient Temperature (˚C)		–40 to 85		–40 to 105		–40 to 85		–40 to 105		–40 to 85		–40 to 105	
Package*2		PLQP0100KB-A	PLQP0144KA-A	PLQP0100KB-A	PLQP0144KA-A	PLQP0100KB-A	PLQP0144KA-A	PLQP0100KB-A	PLQP0144KA-A	PLQP0100KB-A	PLQP0144KA-A	PLQP0100KB-A	PLQP0144KA-A
Part No.		M30880FWTGP	M30882FWTGP	M30880FWUGP	M30882FWUGP	M30880FHTGP	M30882FHTGP	M30880FHUGP	M30882FHUGP	M30880FJTGP	M30882FJTGP	M30880FJUGP	M30882FJUGP

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Memory Capacity (ROM/RAM) (M16C/60 Series)



Letters in brackets < > indicate memory variations.
F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

• Specifications (M16C/60 Series)

Group		M16C/62P (M16C/62PT)						
Memory	ROM (Bytes)	48K	64K	64K + 4K	96K	128K	128K + 4K	384K + 4K
	RAM (Bytes)	4K			5K	10K		31K
	ROM Type*1	M		F	M		F	
	Data Flash	—		4K (Data flash)	—		4K (Data flash)	
	Program Security	—		Yes (ID code check function, ROM code protect function)	—		Yes (ID code check function, ROM code protect function)	
CPU	CPU	M16C/60 Core						
	Basic Instructions	91						
	Minimum Instruction Execution Time (ns)	41.7 (@24MHz)						
	Multiplier	16 × 16 → 32						
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32						
	Barrel Shifter	—						
DMA	DMAC (Channels)	2						
	DTC/DMAC II	—						
External Bus Expansion	Address Space (Bytes)	—						
	External Bus Interface	—						
	Bus Structure	—						
	DRAM Controller	—						
Clock	Clock Generation Circuit	4 circuits (Main clock, PLL, Sub clock, On-chip oscillator)						
	PLL	Yes						
	Subclock	Yes						
	RTC	—						
	On-Chip Oscillator	Yes						
	Oscillation Stop Detection	Yes						
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)						
	Power Save	Wait/Stop						
Power Supply Voltage Detection	Power-On Reset/POR	—						
	Low Voltage Detection/LVD	—						
A/D Converter	Resolution × Channels	10-bit × 26						
	Sample and Hold	Yes						
	Multi-Channel Sample and Hold	—						
D/A Converter	Resolution × Channels	8-bit × 2						
Timer	8-bit	—						
	16-bit	11 (Timer A, Timer B)						
	Input Capture	—						
	Output Compare	—						
	PWM Output	5 (Timer A)						
	Real-Time Port	—						
	Event Counter	11 (Timer A, Timer B)						
	2-Phase Encoder Input	3 (Timer A)						
	3-Phase Inverter Control	1 (shared with Timer A4, Timer A1, Timer A2, Timer B2, Dead time timer)						
Watchdog Timer		1						
Serial Interface	Clock Sync./Clock Async.	3 (UART)						
	Clock Sync. Only	2 (Serial I/O)						
	Clock Async. Only	—						
I^2C-bus		3 (UART)						
IEBus		3 (UART)						
Smart Card/SIM		1 (UART)						
Synchronous Serial Communication Unit/Special Serial I/O		3 (UART)						
CAN	Channels	—						
	Message Box (Numbers)	—						
IrDA		—						
CRC Calculation Circuit		1 (CRC-CCITT ($X^{16} + X^{12} + X^5 + 1$))						
X/Y Converter		—						
I/O Ports	Input Only (Numbers)	1						
	CMOS I/O (Numbers)	85						
	N-Channel Open Drain Port (Numbers)	2						
	High Current Drive Port	—						
	Pull-Up Resistor	85						
External Interrupts Pins		11						
Debugging Function	On-Chip Debug	—		Yes	—		Yes	
	On-Board Flash Program	—		Yes	—		Yes	
Others	ROM Correction Function	Yes		—	Yes		—	
	Others	—						
Operating Frequency/Supply Voltage		24MHz/4.0 to 5.5V						
Operating Ambient Temperature (°C)		–40 to 85						
Package*2		PLQP0100KB-A					PRQP0100JB-A	PLQP0100KB-A
Part No.		M3062CM6T-XXXGP	M3062CM8T-XXXGP	M3062CF8TGP	M3062CMAT-XXXGP	M3062AMCT-XXXGP	M3062AFCTGP	M3062JFHTFP	M3062JFHTGP

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (M16C/60 Series)

Group		M16C/62A (M16C/62T)							
Memory	ROM (Bytes)	32K	64K		128K				256K
	RAM (Bytes)	3K	4K		5K		10K		20K
	ROM Type*1	M					F		
	Data Flash/E2 Data Flash	—							
	Program Security	—					Yes (ID code check function, ROM code protect function)		
CPU	CPU	M16C/60 Core							
	Basic Instructions	91							
	Minimum Instruction Execution Time (ns)	62.5 (@16MHz)							
	Multiplier	16 × 16 → 32							
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32							
	Barrel Shifter	—							
DMA	DMAC (Channels)	2							
	DTC/DMAC II	—							
External Bus Expansion	Address Space (Bytes)	—							
	External Bus Interface	—							
	Bus Structure	—							
	DRAM Controller	—							
Clock	Clock Generation Circuit	2 circuits (Main clock, Sub clock)							
	PLL	—							
	Subclock	Yes							
	RTC	—							
	On-Chip Oscillator	—							
	Oscillation Stop Detection	—							
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)							
	Power Save	Wait/Stop							
Power Supply Voltage Detection	Power-On Reset/POR	—							
	Low Voltage Detection/LVD	—							
A/D Converter	Resolution × Channels	10-bit × 26							
	Sample and Hold	Yes							
	Multi-Channel Sample and Hold	—							
D/A Converter	Resolution × Channels	8-bit × 2							
Timer	8-bit	—							
	16-bit	11 (Timer A, Timer B)							
	Input Capture	—							
	Output Compare	—							
	PWM Output	3 (Timer A)	5 (Timer A)	3 (Timer A)	5 (Timer A)	3 (Timer A)	5 (Timer A)	3 (Timer A)	5 (Timer A)
	Real-Time Port	—							
	Event Counter	11 (Timer A, Timer B)							
	2-Phase Encoder Input	2 (Timer A)	3 (Timer A)	2 (Timer A)	3 (Timer A)	2 (Timer A)	3 (Timer A)	2 (Timer A)	3 (Timer A)
	3-Phase Inverter Control	—	1 (shared with Timer A4, Timer A1, Timer A2, Timer B2, Dead time timer)	—	1 (shared with Timer A4, Timer A1, Timer A2, Timer B2, Dead time timer)	—	1 (shared with Timer A4, Timer A1, Timer A2, Timer B2, Dead time timer)	—	1 (shared with Timer A4, Timer A1, Timer A2, Timer B2, Dead time timer)
Watchdog Timer		1							
Serial Interface	Clock Sync./Clock Async.	2 (UART)	3 (UART)	2 (UART)	3 (UART)	2 (UART)	3 (UART)	2 (UART)	3 (UART)
	Clock Sync. Only	2 (Serial I/O)							
	Clock Async. Only	1 (UART)	—	1 (UART)	—	1 (UART)	—	1 (UART)	—
I²C-bus		1 (UART)							
IEBus		1 (UART)							
Smart Card/SIM		1 (UART)							
Synchronous Serial Communication Unit/Special Serial I/O		—							
CAN	Channels	—							
	Message Box (Numbers)	—							
IrDA		—							
CRC Calculation Circuit		1 (CRC-CCITT ($X^{16} + X^{12} + X^5 + 1$))							
X/Y Converter		—							
I/O Ports	Input Only (Numbers)	1							
	CMOS I/O (Numbers)	68	85	68	85	68	85	68	85
	N-Channel Open Drain Port (Numbers)	2							
	High Current Drive Port	—							
	Pull-Up Resistor	68	85	68	85	68	85	68	85
External Interrupts Pins		8	11	8	11	8	11	8	11
Debugging Function	On-Chip Debug	—					Yes		
	On-Board Flash Program	—					Yes		
Other Functions	ROM Correction Function	Yes					—		
	Others	—							
Operating Frequency/Supply Voltage		16MHz/4.2 to 5.5V					16MHz/4.2 to 5.5V		
Operating Ambient Temperature (°C)		−40 to 85	−40 to 125	−40 to 85	−40 to 125	−40 to 85	−40 to 125	−40 to 85	−40 to 125	−40 to 85	−40 to 105	−40 to 85	−40 to 105	−40 to 85	−40 to 105
Package*2		PRQP0080JA-A	PRQP0100JB-A	PRQP0080JA-A	PRQP0100JB-A	PRQP0080JA-A	PRQP0100JB-A	PRQP0080JA-A	PRQP0100JB-A	PRQP0100JB-A	PRQP0080JA-A	PLQP0100KB-A	PRQP0100JB-A
Part No.		M30623M4T-XXXGP	M30622M8T-XXXFP	M30622M8V-XXXFP	M30623M8T-XXXGP	M30623M8V-XXXGP	M30622MCT-XXXFP	M30622MCV-XXXFP	M30623MCT-XXXGP	M30623MCV-XXXGP	M30620FCTFP	M30620FCT-XXXFP	M30620FCUFP	M30621FCTGP	M30621FCUGP	M30624FGTGP	M30624FGT-XXXGP	M30624FGUFP	M30624FGU-XXXFP

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (M16C/60 Series)

Group		M16C/6N4				M16C/6N5	
Memory	ROM (Bytes)	128K	128K + 4K	256K	256K + 4K	128K	128K + 4K
	RAM (Bytes)	5K		10K		5K	
	ROM Type*1	M	F	M	F	M	F
	Data Flash	—	4K (Data flash)	—	4K (Data flash)	—	4K (Data flash)
	Program Security	—	Yes (ID code check function, ROM code protect function)	—	Yes (ID code check function, ROM code protect function)	—	Yes (ID code check function, ROM code protect function)
CPU	CPU	M16C/60 Core					
	Basic Instructions	91					
	Minimum Instruction Execution Time (ns)	50 (@20MHz)					
	Multiplier	16 × 16 → 32					
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32					
	Barrel Shifter	—					
DMA	DMAC (Channels)	2					
	DTC/DMAC II	—					
External Bus Expansion	Address Space (Bytes)	1M					
	External Bus Interface	Support for insertion of 1 to 3 wait states, Outputs 4 chip-select signals					
	Bus Structure	Selectable from Separate bus, Multiplex bus, Data bus width can be selected (8/16-bit), The number of output address buses can be selected (12/16/20)					
	DRAM Controller	—					
Clock	Clock Generation Circuit	4 circuits (Main clock, PLL, Sub clock, On-chip oscillator)					
	PLL	Yes					
	Subclock	Yes					
	RTC	—					
	On-Chip Oscillator	Yes					
	Oscillation Stop Detection	Yes					
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)					
	Power Save	Wait/Stop					
Power Supply Voltage Detection	Power-On Reset/POR	—					
	Low Voltage Detection/LVD	—					
A/D Converter	Resolution × Channels	10-bit × 26					
	Sample and Hold	Yes					
	Multi-Channel Sample and Hold	—					
D/A Converter	Resolution × Channels	8-bit × 2					
Timer	8-bit	—					
	16-bit	11 (Timer A, Timer B)					
	Input Capture	—					
	Output Compare	—					
	PWM Output	5 (Timer A)					
	Real-Time Port	—					
	Event Counter	11 (Timer A, Timer B)					
	2-Phase Encoder Input	3 (Timer A)					
	3-Phase Inverter Control	1 (shared with Timer A4, Timer A1, Timer A2, Timer B2, Dead time timer)					
Watchdog Timer		1					
Serial Interface	Clock Sync./Clock Async.	3 (UART)					
	Clock Sync. Only	1 (SI/O)					
	Clock Async. Only	—					
I²C-bus		3 (UART)					
IEBus		3 (UART)					
Smart Card/SIM		1 (UART)					
Synchronous Serial Communication Unit/Special Serial I/O		3 (UART)					
CAN	Channels	2				1	
	Message Box (Numbers)	16 + 16				16	
IrDA		—					
CRC Calculation Circuit		1 (CRC-CCITT ($X^{16} + X^{12} + X^5 + 1$))					
X/Y Converter		—					
I/O Ports	Input Only (Numbers)	1					
	CMOS I/O (Numbers)	85					
	N-Channel Open Drain Port (Numbers)	2					
	High Current Drive Port	—					
	Pull-Up Resistor	85					
External Interrupts Pins		11					
Debugging Function	On-Chip Debug	—	Yes	—	Yes	—	Yes
	On-Board Flash Program	—	Yes	—	Yes	—	Yes
Others	ROM Correction Function	Yes	—	Yes	—	Yes	—
	Others	—					
Operating Frequency/Supply Voltage		20MHz/4.2 to 5.5V					
Operating Ambient Temperature (°C)		–40 to 85	–40 to 125	-40 to 85	–40 to 125	–40 to 85	–40 to 125	–40 to 85	–40 to 125	-40 to 85	–40 to 125	-40 to 85	–40 to 125	–40 to 85
Package*2		PLQP0100KB-A	PRQP0100JB-A	PLQP0100KB-A	PRQP0100JB-A	PLQP0100KB-A	PRQP0100JB-A	PLQP0100KB-A	PRQP0100JB-A	PLQP0100KB-A	PRQP0100JB-A	PLQP0100KB-A	PRQP0100JB-A	PLQP0100KB-A	PRQP0100JB-A	PLQP0100KB-A	PRQP0100JB-A	PLQP0100KB-A	PRQP0100JB-A
Part No.		M306N4MCT-XXXGP	M306N4MCT-XXXFP	M306N4MCV-XXXGP	M306N4MCV-XXXFP	M306N4FCTGP	M306N4FCVFP	M306N4FCVGP	M306N4FCTFP	M306N4MGT-XXXGP	M306N4MGT-XXXFP	M306N4MGV-XXXFP	M306N4MGV-XXXGP	M306N4FGTFP	M306N4FGTGP	M306N4FGVFP	M306N4FGVGP	M306N5MCT-XXXGP	M306N5MCV-XXXGP	M306N5MCV-XXXFP	M306N5MCT-XXXFP	M306N5FCVFP	M306N5FCVGP	M306N5FCTGP	M306N5FCTFP

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

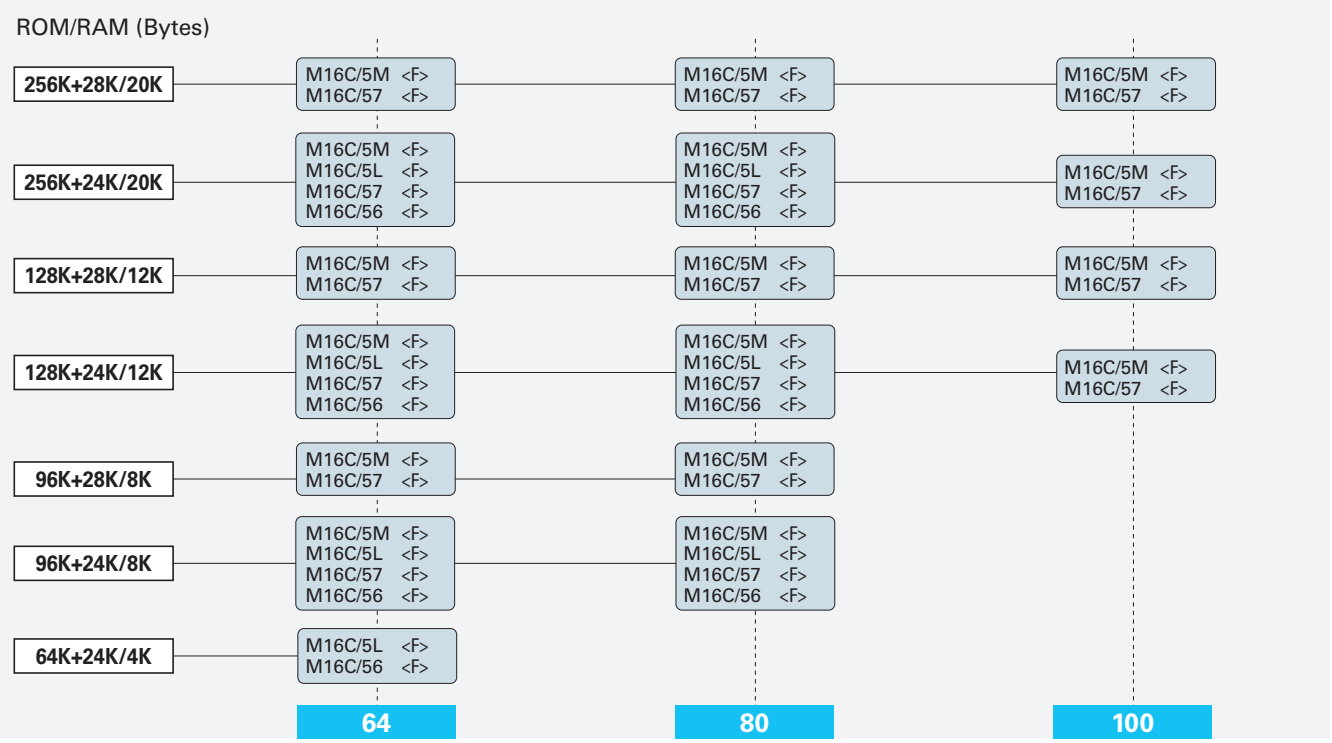
• Specifications (M16C/60 Series)

Group		M16C/6NK				M16C/6NM			
Memory	ROM (Bytes)	384K + 4K		512K + 4K		384K + 4K		512K + 4K	
	RAM (Bytes)	31K							
	ROM Type*1	F							
	Data Flash	4K (Data flash)							
	Program Security	Yes (ID code check function, ROM code protect function)							
CPU	CPU	M16C/60 Core							
	Basic Instructions	91							
	Minimum Instruction Execution Time (ns)	50 (@20MHz)							
	Multiplier	16 × 16 → 32							
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32							
	Barrel Shifter	—							
DMA	DMAC (Channels)	2							
	DTC/DMAC Ⅱ	—							
External Bus Expansion	Address Space (Bytes)	—							
	External Bus Interface	—							
	Bus Structure	—							
	DRAM Controller	—							
Clock	Clock Generation Circuit	4 circuits (Main clock, PLL, Sub clock, On-chip oscillator)							
	PLL	Yes							
	Subclock	Yes							
	RTC	—							
	On-Chip Oscillator	Yes							
	Oscillation Stop Detection	Yes							
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)							
	Power Save	Wait/Stop							
Power Supply Voltage Detection	Power-On Reset/POR	—							
	Low Voltage Detection/LVD	—							
A/D Converter	Resolution × Channels	10-bit × 26							
	Sample and Hold	Yes							
	Multi-Channel Sample and Hold	—							
D/A Converter	Resolution × Channels	8-bit × 2							
Timer	8-bit	—							
	16-bit	11 (Timer A, Timer B)							
	Input Capture	—							
	Output Compare	—							
	PWM Output	5 (Timer A)							
	Real-Time Port	—							
	Event Counter	11 (Timer A, Timer B)							
	2-Phase Encoder Input	3 (Timer A)							
	3-Phase Inverter Control	1 (shared with Timer A4, Timer A1, Timer A2, Timer B2, Dead time timer)							
Watchdog Timer		1							
Serial Interface	Clock Sync./Clock Async.	3 (UART)							
	Clock Sync. Only	2 (Serial I/O)				4 (Serial I/O)			
	Clock Async. Only	—							
I²C-bus		3 (UART)							
IEBus		3 (UART)							
Smart Card/SIM		1 (UART)							
Synchronous Serial Communication Unit/Special Serial I/O		3 (UART)							
CAN	Channels	2							
	Message Box (Numbers)	16 + 16							
IrDA		—							
CRC Calculation Circuit		1 (CRC-CCITT ($X^{16} + X^{12} + X^5 + 1$))							
X/Y Converter		—							
I/O Ports	Input Only (Numbers)	1							
	CMOS I/O (Numbers)	85				111			
	N-Channel Open Drain Port (Numbers)	2							
	High Current Drive Port	—							
	Pull-Up Resistor	85				111			
External Interrupts Pins		11				14			
Debugging Function	On-Chip Debug	Yes							
	On-Board Flash Program	Yes							
Others	ROM Correction Function	—							
	Others	—							
Operating Frequency/Supply Voltage		20MHz/4.2 to 5.5V							
Operating Ambient Temperature (°C)		–40 to 125	–40 to 85		–40 to 125	–40 to 85	–40 to 125	–40 to 85	–40 to 125
Package*2		PLQP0100KB-A				PLQP0128KB-A			
Part No.		M306NKFHVGP	M306NKFHTGP	M306NKFJTGP	M306NKFJVGP	M306NMFHTGP	M306NMFHVGP	M306NMFJTGP	M306NMFJVGP

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Memory Capacity (ROM/RAM) (M16C/50 Series)



Letters in brackets < > indicate memory variations.
F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

• Specifications (M16C/50 Series)

Group		M16C/56						
Memory	ROM (Bytes)	64K + 24K	96K + 24K		128K + 24K		256K + 24K	
	RAM (Bytes)	4K	8K		12K		20K	
	ROM Type*1	F						
	Data Flash/E2 Data Flash	8K (Data flash: program/erase 10k times)						
	Program Security	Yes (ID code check function, ROM code protect function)						
CPU	CPU	M16C/60 Core						
	Basic Instructions	91						
	Minimum Instruction Execution Time (ns)	31.25 (@32MHz)						
	Multiplier	16 × 16 → 32						
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32						
	Barrel Shifter	—						
DMA	DMAC (Channels)	4						
	DTC/DMAC Ⅱ	—						
External Bus Expansion	Address Space (Bytes)	—						
	External Bus Interface	—						
	Bus Structure	—						
	DRAM Controller	—						
Clock	Clock Generation Circuit	5 circuits (Main clock, PLL, Sub clock, High-speed on-chip oscillator, Low-speed on-chip oscillator)						
	PLL	Yes						
	Subclock	Yes (32.768kHz)						
	RTC	Yes						
	On-Chip Oscillator	2 circuits (High speed: 40MHz, Low speed: 125kHz)						
	Oscillation Stop Detection	Yes						
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)						
	Power Save	Wait/Stop						
Power Supply Voltage Detection	Power-On Reset/POR	Yes						
	Low Voltage Detection/LVD	Yes (Voltage detection 2)						
A/D Converter	Resolution × Channels	10-bit × 16	10-bit × 27	10-bit × 16	10-bit × 27	10-bit × 16	10-bit × 27	10-bit × 16
	Sample and Hold	Yes						
	Multi-Channel Sample and Hold	—						
D/A Converter	Resolution × Channels	—						
Timer	8-bit	—						
	16-bit	9 (Timer A, Timer B, Timer for task monitor)						
	Input Capture	8 (Timer S)						
	Output Compare	8 (Timer S)						
	PWM Output	13 (Timer A, Timer S)						
	Real-Time Port	—						
	Event Counter	8 (Timer A, Timer B)						
	2-Phase Encoder Input	3 (Timer A) + 1 (Timer S)						
	3-Phase Inverter Control	1 (shared with Timer A4, Timer A1, Timer A2, Timer B2, Dead time timer)						
Watchdog Timer		1 (with automatic starting function and clock source protection function, low-speed on-chip oscillator for watchdog timer)						
Serial Interface	Clock Sync./Clock Async.	4 (UART)	5 (UART)	4 (UART)	5 (UART)	4 (UART)	5 (UART)	4 (UART)
	Clock Sync. Only	—						
	Clock Async. Only	—						
I²C-bus		2 (Multi master I²C, UART)						
IEBus		1 (UART)						
Smart Card/SIM		1 (UART)						
Synchronous Serial Communication Unit/Special Serial I/O		1 (UART)						
CAN	Channels	—						
	Message Box (Numbers)	—						
IrDA		—						
CRC Calculation Circuit		1 (CRC-CCITT ($X^{16} + X^{12} + X^5 + 1$) /CRC-16 ($X^{16} + X^{15} + X^2 + 1$))						
X/Y Converter		—						
I/O Ports	Input Only (Numbers)	—						
	CMOS I/O (Numbers)	55	71	55	71	55	71	55
	N-Channel Open Drain Port (Numbers)	—						
	High Current Drive Port	—						
	Pull-Up Resistor	55	71	55	71	55	71	55
External Interrupts Pins		11						
Debugging Function	On-Chip Debug	Yes						
	On-Board Flash Program	Yes						
Other Functions	ROM Correction Function	—						
	Others	—						
Operating Frequency/Supply Voltage		32MHz/3.0 to 5.5V						
Operating Ambient Temperature (°C)		−40 to 85	−40 to 125	−40 to 85	−40 to 125	−40 to 85	−40 to 125	−40 to 85	−40 to 125	−40 to 85	−40 to 125	−40 to 85	−40 to 125	−40 to 85	−40 to 125
Package*2		PLQP0064KB-A	PLQP0080KB-A	PLQP0064KB-A	PLQP0080KB-A	PLQP0064KB-A	PLQP0080KB-A	PLQP0064KB-A	PLQP0080KB-A	PLQP0064KB-A
Part No.		R5F35630JFF	R5F35630KFF	R5F35623JFE	R5F35623KFE	R5F35633JFF	R5F35633KFF	R5F35626JFE	R5F35626KFE	R5F35636JFF	R5F35636KFF	R5F3562EJFE	R5F3562EKFE	R5F3563EJFF	R5F3563EKFF

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (M16C/50 Series)

Group		M16C/5L						
Memory	ROM (Bytes)	64K + 24K	96K + 24K		128K + 24K		256K + 24K	
	RAM (Bytes)	4K	8K		12K		20K	
	ROM Type*1	F						
	Data Flash/E2 Data Flash	8K (Data flash: program/erase 10k times)						
	Program Security	Yes (ID code check function, ROM code protect function)						
CPU	CPU	M16C/60 Core						
	Basic Instructions	91						
	Minimum Instruction Execution Time (ns)	31.25 (@32MHz)						
	Multiplier	16 × 16 → 32						
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32						
	Barrel Shifter	—						
DMA	DMAC (Channels)	4						
	DTC/DMAC II	—						
External Bus Expansion	Address Space (Bytes)	—						
	External Bus Interface	—						
	Bus Structure	—						
	DRAM Controller	—						
Clock	Clock Generation Circuit	5 circuits (Main clock, PLL, Sub clock, High-speed on-chip oscillator, Low-speed on-chip oscillator)						
	PLL	Yes						
	Subclock	Yes (32.768kHz)						
	RTC	Yes						
	On-Chip Oscillator	2 circuits (High speed: 40MHz, Low speed: 125kHz)						
	Oscillation Stop Detection	Yes						
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)						
	Power Save	Wait/Stop						
Power Supply Voltage Detection	Power-On Reset/POR	Yes						
	Low Voltage Detection/LVD	Yes (Voltage detection 2)						
A/D Converter	Resolution × Channels	10-bit × 16	10-bit × 27	10-bit × 16	10-bit × 27	10-bit × 16	10-bit × 27	10-bit × 16
	Sample and Hold	Yes						
	Multi-Channel Sample and Hold	—						
D/A Converter	Resolution × Channels	—						
Timer	8-bit	—						
	16-bit	9 (Timer A, Timer B, Timer for task monitor)						
	Input Capture	8 (Timer S)						
	Output Compare	8 (Timer S)						
	PWM Output	13 (Timer A, Timer S)						
	Real-Time Port	—						
	Event Counter	8 (Timer A, Timer B)						
	2-Phase Encoder Input	3 (Timer A) + 1 (Timer S)						
	3-Phase Inverter Control	1 (shared with Timer A4, Timer A1, Timer A2, Timer B2, Dead time timer)						
Watchdog Timer		1 (with automatic starting function and clock source protection function, low-speed on-chip oscillator for watchdog timer)						
Serial Interface	Clock Sync./Clock Async.	4 (UART)	5 (UART)	4 (UART)	5 (UART)	4 (UART)	5 (UART)	4 (UART)
	Clock Sync. Only	—						
	Clock Async. Only	—						
I^2C-bus		2 (Multi master I^2C, UART)						
IEBus		1 (UART)						
Smart Card/SIM		1 (UART)						
Synchronous Serial Communication Unit/Special Serial I/O		1 (UART)						
CAN	Channels	1						
	Message Box (Numbers)	32						
IrDA		—						
CRC Calculation Circuit		1 (CRC-CCITT ($X^{16} + X^{12} + X^5 + 1$) /CRC-16 ($X^{16} + X^{15} + X^2 + 1$))						
X/Y Converter		—						
I/O Ports	Input Only (Numbers)	—						
	CMOS I/O (Numbers)	55	71	55	71	55	71	55
	N-Channel Open Drain Port (Numbers)	—						
	High Current Drive Port	—						
	Pull-Up Resistor	55	71	55	71	55	71	55
External Interrupts Pins		11						
Debugging Function	On-Chip Debug	Yes						
	On-Board Flash Program	Yes						
Other Functions	ROM Correction Function	—						
	Others	—						
Operating Frequency/Supply Voltage		32MHz/3.0 to 5.5V						
Operating Ambient Temperature (°C)		–40 to 85	–40 to 125	–40 to 85	–40 to 125	–40 to 85	–40 to 125	–40 to 85	–40 to 125	–40 to 85	–40 to 125	–40 to 85	–40 to 125	–40 to 85	–40 to 125
Package*2		PLQP0064KB-A		PLQP0080KB-A		PLQP0064KB-A		PLQP0080KB-A		PLQP0064KB-A		PLQP0080KB-A		PLQP0064KB-A	
Part No.		R5F35L30JFF	R5F35L30KFF	R5F35L23JFE	R5F35L23KFE	R5F35L33JFF	R5F35L33KFF	R5F35L26JFE	R5F35L26KFE	R5F35L36JFF	R5F35L36KFF	R5F35L2EJFE	R5F35L2EKFE	R5F35L3EJFF	R5F35L3EKFF

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (M16C/50 Series)

Group		M16C/5M							
Memory	ROM (Bytes)	96K + 24K				96K + 28K			
	RAM (Bytes)	8K							
	ROM Type*1	F							
	Data Flash/E2 Data Flash	8K (Data flash)				8K (Data flash), 4K (E2 Data flash/erase 100k times)			
	Program Security	Yes (ID code check function, ROM code protect function)							
CPU	CPU	M16C/60 Core							
	Basic Instructions	91							
	Minimum Instruction Execution Time (ns)	31.25 (@32MHz)							
	Multiplier	16 × 16 → 32							
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32							
	Barrel Shifter	—							
DMA	DMAC (Channels)	4							
	DTC/DMAC Ⅱ	—							
External Bus Expansion	Address Space (Bytes)	—							
	External Bus Interface	—							
	Bus Structure	—							
	DRAM Controller	—							
Clock	Clock Generation Circuit	5 circuits (Main clock, PLL, Sub clock, High-speed on-chip oscillator, Low-speed on-chip oscillator)							
	PLL	Yes							
	Subclock	Yes (32.768kHz)							
	RTC	Yes							
	On-Chip Oscillator	2 circuits (High speed: 40MHz, Low speed: 125kHz)							
	Oscillation Stop Detection	Yes							
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)							
	Power Save	Wait/Stop							
Power Supply Voltage Detection	Power-On Reset/POR	Yes							
	Low Voltage Detection/LVD	Yes (Voltage detection 2)							
A/D Converter	Resolution × Channels	10-bit × 27	10-bit × 16	10-bit × 27	10-bit × 16	10-bit × 27	10-bit × 16	10-bit × 27	10-bit × 16
	Sample and Hold	Yes							
	Multi-Channel Sample and Hold	—							
D/A Converter	Resolution × Channels	8-bit × 1							
Timer	8-bit	—							
	16-bit	9 (Timer A, Timer B, Timer for task monitor)							
	Input Capture	8 (Timer S)							
	Output Compare	8 (Timer S)							
	PWM Output	13 (Timer A, Timer S)							
	Real-Time Port	—							
	Event Counter	8 (Timer A, Timer B)							
	2-Phase Encoder Input	3 (Timer A) + 1 (Timer S)							
	3-Phase Inverter Control	1 (shared with Timer A4, Timer A1, Timer A2, Timer B2, Dead time timer)							
Watchdog Timer		1 (with automatic starting function and clock source protection function, low-speed on-chip oscillator for watchdog timer)							
Serial Interface	Clock Sync./Clock Async.	5 (UART)	4 (UART)	5 (UART)	4 (UART)	5 (UART)	4 (UART)	5 (UART)	4 (UART)
	Clock Sync. Only	—							
	Clock Async. Only	—							
I²C-bus		2 (Multi master I²C, UART)							
IEBus		1 (UART)							
Smart Card/SIM		1 (UART)							
Synchronous Serial Communication Unit/Special Serial I/O		2 (1 (UART) + 1 (SBI))							
CAN	Channels	1		2		1		2	
	Message Box (Numbers)	32							
IrDA		—							
CRC Calculation Circuit		1 (CRC-CCITT ($X^{16} + X^{12} + X^5 + 1$) /CRC-16 ($X^{16} + X^{15} + X^2 + 1$))							
X/Y Converter		—							
I/O Ports	Input Only (Numbers)	—							
	CMOS I/O (Numbers)	70	54	70	54	70	54	70	54
	N-Channel Open Drain Port (Numbers)	1							
	High Current Drive Port	—							
	Pull-Up Resistor	70	54	70	54	70	54	70	54
External Interrupts Pins		11							
Debugging Function	On-Chip Debug	Yes							
	On-Board Flash Program	Yes							
Other Functions	ROM Correction Function	—							
	Others	LIN (1)							
Operating Frequency/Supply Voltage		32MHz/3.0 to 5.5V							
Operating Ambient Temperature (°C)		–40 to 85	–40 to 125	–40 to 85	–40 to 125	–40 to 85	–40 to 125	–40 to 85	–40 to 125	–40 to 85	–40 to 125	–40 to 85	–40 to 125	–40 to 85	–40 to 125	–40 to 85	–40 to 125
Package*2		PLQP0080KB-A		PLQP0064KB-A		PLQP0080KB-A		PLQP0064KB-A		PLQP0080KB-A		PLQP0064KB-A		PLQP0080KB-A		PLQP0064KB-A	
Part No.		R5F35M73JFE*	R5F35M73KFE*	R5F35M83JFF*	R5F35M83KFF*	R5F35ME3JFE*	R5F35ME3KFE*	R5F35MF3JFF*	R5F35MF3KFF*	R5F35M23JFE*	R5F35M23KFE*	R5F35M33JFF*	R5F35M33KFF*	R5F35MB3JFE*	R5F35MB3KFE*	R5F35MC3JFF*	R5F35MC3KFF*

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (M16C/50 Series)

Group		M16C/5M											
Memory	ROM (Bytes)	128K + 24K						128K + 28K					
	RAM (Bytes)	12K											
	ROM Type*1	F											
	Data Flash/E2 Data Flash	8K (Data flash)						8K (Data flash), 4K (E2 Data flash/erase 100k times)					
	Program Security	Yes (ID code check function, ROM code protect function)											
CPU	CPU	M16C/60 Core											
	Basic Instructions	91											
	Minimum Instruction Execution Time (ns)	31.25 (@32MHz)											
	Multiplier	16 × 16 → 32											
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32											
	Barrel Shifter	—											
DMA	DMAC (Channels)	4											
	DTC/DMAC II	—											
External Bus Expansion	Address Space (Bytes)	—											
	External Bus Interface	—											
	Bus Structure	—											
	DRAM Controller	—											
Clock	Clock Generation Circuit	5 circuits (Main clock, PLL, Sub clock, High-speed on-chip oscillator, Low-speed on-chip oscillator)											
	PLL	Yes											
	Subclock	Yes (32.768kHz)											
	RTC	Yes											
	On-Chip Oscillator	2 circuits (High speed: 40MHz, Low speed: 125kHz)											
	Oscillation Stop Detection	Yes											
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)											
	Power Save	Wait/Stop											
Power Supply Voltage Detection	Power-On Reset/POR	Yes											
	Low Voltage Detection/LVD	Yes (Voltage detection 2)											
A/D Converter	Resolution × Channels	10-bit × 26	10-bit × 27	10-bit × 16	10-bit × 26	10-bit × 27	10-bit × 16	10-bit × 26	10-bit × 27	10-bit × 16	10-bit × 26	10-bit × 27	10-bit × 16
	Sample and Hold	Yes											
	Multi-Channel Sample and Hold	—											
D/A Converter	Resolution × Channels	8-bit × 1											
Timer	8-bit	—											
	16-bit	12 (Timer A, Timer B, Timer for task monitor)	9 (Timer A, Timer B, Timer for task monitor)		12 (Timer A, Timer B, Timer for task monitor)	9 (Timer A, Timer B, Timer for task monitor)		12 (Timer A, Timer B, Timer for task monitor)	9 (Timer A, Timer B, Timer for task monitor)		12 (Timer A, Timer B, Timer for task monitor)	9 (Timer A, Timer B, Timer for task monitor)	
	Input Capture	8 (Timer S)											
	Output Compare	8 (Timer S)											
	PWM Output	13 (Timer A, Timer S)											
	Real-Time Port	—											
	Event Counter	11 (Timer A, Timer B)	8 (Timer A, Timer B)		11 (Timer A, Timer B)	8 (Timer A, Timer B)		11 (Timer A, Timer B)	8 (Timer A, Timer B)		11 (Timer A, Timer B)	8 (Timer A, Timer B)	
	2-Phase Encoder Input	3 (Timer A) + 1 (Timer S)											
	3-Phase Inverter Control	1 (shared with Timer A4, Timer A1, Timer A2, Timer B2, Dead time timer)											
Watchdog Timer		1 (with automatic starting function and clock source protection function, low-speed on-chip oscillator for watchdog timer)											
Serial Interface	Clock Sync./Clock Async.	5 (UART)		4 (UART)	5 (UART)		4 (UART)	5 (UART)		4 (UART)	5 (UART)		4 (UART)
	Clock Sync. Only	—											
	Clock Async. Only	—											
I^2C-bus		2 (Multi master I^2C, UART)											
IEBus		1 (UART)											
Smart Card/SIM		1 (UART)											
Synchronous Serial Communication Unit/Special Serial I/O		2 (1 (UART) + 1 (SBI))											
CAN	Channels	1			2			1			2		
	Message Box (Numbers)	32											
IrDA		—											
CRC Calculation Circuit		1 (CRC-CCITT ($X^{16} + X^{12} + X^5 + 1$) /CRC-16 ($X^{16} + X^{15} + X^2 + 1$))											
X/Y Converter		—											
I/O Ports	Input Only (Numbers)	—											
	CMOS I/O (Numbers)	87	70	54	87	70	54	87	70	54	87	70	54
	N-Channel Open Drain Port (Numbers)	1											
	High Current Drive Port	—											
	Pull-Up Resistor	87	70	54	87	70	54	87	70	54	87	70	54
External Interrupts Pins		13	11		13	11		13	11		13	11	
Debugging Function	On-Chip Debug	Yes											
	On-Board Flash Program	Yes											
Other Functions	ROM Correction Function	—											
	Others	LIN (1)											
Operating Frequency/Supply Voltage		32MHz/3.0 to 5.5V											
Operating Ambient Temperature (°C)		−40 to 85	−40 to 125	−40 to 85	−40 to 125	−40 to 85	−40 to 125	−40 to 85	−40 to 125	−40 to 85	−40 to 125	−40 to 85	−40 to 125	−40 to 85	−40 to 125	−40 to 85	−40 to 125	−40 to 85	−40 to 125	−40 to 85	−40 to 125	−40 to 85	−40 to 125
Package*2		PLQP0100KB-A		PLQP0080KB-A		PLQP0064KB-A		PLQP0100KB-A		PLQP0080KB-A		PLQP0064KB-A		PLQP0100KB-A		PLQP0080KB-A		PLQP0064KB-A		PLQP0100KB-A		PLQP0080KB-A		PLQP0064KB-A	
Part No.		R5F35M66JFB*	R5F35M66KFB*	R5F35M76JFE*	R5F35M76KFE*	R5F35M86JFF*	R5F35M86KFF*	R5F35MD6JFB*	R5F35MD6KFB*	R5F35ME6JFE*	R5F35ME6KFE*	R5F35MF6JFF*	R5F35MF6KFF*	R5F35M16JFB*	R5F35M16KFB*	R5F35M26JFE*	R5F35M26KFE*	R5F35M36JFF*	R5F35M36KFF*	R5F35MA6JFB*	R5F35MA6KFB*	R5F35MB6JFE*	R5F35MB6KFE*	R5F35MC6JFF*	R5F35MC6KFF*

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (M16C/50 Series)

Group		M16C/5M											
Memory	ROM (Bytes)	256K + 24K						256K + 28K					
	RAM (Bytes)	20K											
	ROM Type*1	F											
	Data Flash/E2 Data Flash	8K (Data flash)						8K (Data flash), 4K (E2 Data flash/erase 100k times)					
	Program Security	Yes (ID code check function, ROM code protect function)											
CPU	CPU	M16C/60 Core											
	Basic Instructions	91											
	Minimum Instruction Execution Time (ns)	31.25 (@32MHz)											
	Multiplier	16 × 16 → 32											
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32											
	Barrel Shifter	—											
DMA	DMAC (Channels)	4											
	DTC/DMAC II	—											
External Bus Expansion	Address Space (Bytes)	—											
	External Bus Interface	—											
	Bus Structure	—											
	DRAM Controller	—											
Clock	Clock Generation Circuit	5 circuits (Main clock, PLL, Sub clock, High-speed on-chip oscillator, Low-speed on-chip oscillator)											
	PLL	Yes											
	Subclock	Yes (32.768kHz)											
	RTC	Yes											
	On-Chip Oscillator	2 circuits (High speed: 40MHz, Low speed: 125kHz)											
	Oscillation Stop Detection	Yes											
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)											
	Power Save	Wait/Stop											
Power Supply Voltage Detection	Power-On Reset/POR	Yes											
	Low Voltage Detection/LVD	Yes (Voltage detection 2)											
A/D Converter	Resolution × Channels	10-bit × 26	10-bit × 27	10-bit × 16	10-bit × 26	10-bit × 27	10-bit × 16	10-bit × 26	10-bit × 27	10-bit × 16	10-bit × 26	10-bit × 27	10-bit × 16
	Sample and Hold	Yes											
	Multi-Channel Sample and Hold	—											
D/A Converter	Resolution × Channels	8-bit × 1											
Timer	8-bit	—											
	16-bit	12 (Timer A, Timer B, Timer for task monitor)	9 (Timer A, Timer B, Timer for task monitor)		12 (Timer A, Timer B, Timer for task monitor)	9 (Timer A, Timer B, Timer for task monitor)		12 (Timer A, Timer B, Timer for task monitor)	9 (Timer A, Timer B, Timer for task monitor)		12 (Timer A, Timer B, Timer for task monitor)	9 (Timer A, Timer B, Timer for task monitor)	
	Input Capture	8 (Timer S)											
	Output Compare	8 (Timer S)											
	PWM Output	13 (Timer A, Timer S)											
	Real-Time Port	—											
	Event Counter	11 (Timer A, Timer B)	8 (Timer A, Timer B)		11 (Timer A, Timer B)	8 (Timer A, Timer B)		11 (Timer A, Timer B)	8 (Timer A, Timer B)		11 (Timer A, Timer B)	8 (Timer A, Timer B)	
	2-Phase Encoder Input	3 (Timer A) + 1 (Timer S)											
	3-Phase Inverter Control	1 (shared with Timer A4, Timer A1, Timer A2, Timer B2, Dead time timer)											
Watchdog Timer		1 (with automatic starting function and clock source protection function, low-speed on-chip oscillator for watchdog timer)											
Serial Interface	Clock Sync./Clock Async.	5 (UART)		4 (UART)	5 (UART)		4 (UART)	5 (UART)		4 (UART)	5 (UART)		4 (UART)
	Clock Sync. Only	—											
	Clock Async. Only	—											
I^2C-bus		2 (Multi master I^2C, UART)											
IEBus		1 (UART)											
Smart Card/SIM		1 (UART)											
Synchronous Serial Communication Unit/Special Serial I/O		2 (1 (UART) + 1 (SBI))											
CAN	Channels	1			2			1			2		
	Message Box (Numbers)	32											
IrDA		—											
CRC Calculation Circuit		1 (CRC-CCITT ($X^{16} + X^{12} + X^5 + 1$) /CRC-16 ($X^{16} + X^{15} + X^2 + 1$))											
X/Y Converter		—											
I/O Ports	Input Only (Numbers)	—											
	CMOS I/O (Numbers)	87	70	54	87	70	54	87	70	54	87	70	54
	N-Channel Open Drain Port (Numbers)	1											
	High Current Drive Port	—											
	Pull-Up Resistor	87	70	54	87	70	54	87	70	54	87	70	54
External Interrupts Pins		13	11		13	11		13	11		13	11	
Debugging Function	On-Chip Debug	Yes											
	On-Board Flash Program	Yes											
Other Functions	ROM Correction Function	—											
	Others	LIN (1)											
Operating Frequency/Supply Voltage		32MHz/3.0 to 5.5V											
Operating Ambient Temperature (°C)		−40 to 85	−40 to 125	−40 to 85	−40 to 125	−40 to 85	−40 to 125	−40 to 85	−40 to 125	−40 to 85	−40 to 125	−40 to 85	−40 to 125	−40 to 85	−40 to 125	−40 to 85	−40 to 125	−40 to 85	−40 to 125	−40 to 85	−40 to 125	−40 to 85	−40 to 125
Package*2		PLQP0100KB-A		PLQP0080KB-A		PLQP0064KB-A		PLQP0100KB-A		PLQP0080KB-A		PLQP0064KB-A		PLQP0100KB-A		PLQP0080KB-A		PLQP0064KB-A		PLQP0100KB-A		PLQP0080KB-A		PLQP0064KB-A	
Part No.		R5F355M6EJFB*	R5F355M6EKFB*	R5F355M7EJFE*	R5F355M7EKFE*	R5F355M8EJFF*	R5F355M8EKFF*	R5F355MDEJFB*	R5F355MDEKFB*	R5F355MEEJFE*	R5F355MEEKFE*	R5F355MFEJFF*	R5F355MFEKFF*	R5F355M1EJFB*	R5F355M1EKFB*	R5F355M2EJFE*	R5F355M2EKFE*	R5F355M3EJFF*	R5F355M3EKFF*	R5F355MAEJFB*	R5F355MAEKFB★	R5F355MBEJFE*	R5F355MBEKFE*	R5F355MCEJFF*	R5F355MCEKFF*

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (M16C/50 Series)

Group		M16C/57									
Memory	ROM (Bytes)	96K + 24K		96K + 28K		128K + 24K		128K + 28K			
	RAM (Bytes)	8K				12K					
	ROM Type*1	F									
	Data Flash/E2 Data Flash	8K (Data flash)		8K (Data flash), 4K (E2 Data flash/erase 100k times)		8K (Data flash)		8K (Data flash), 4K (E2 Data flash/erase 100k times)			
	Program Security	Yes (ID code check function, ROM code protect function)									
CPU	CPU	M16C/60 Core									
	Basic Instructions	91									
	Minimum Instruction Execution Time (ns)	31.25 (@32MHz)									
	Multiplier	16 × 16 → 32									
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32									
	Barrel Shifter	—									
DMA	DMAC (Channels)	4									
	DTC/DMAC II	—									
External Bus Expansion	Address Space (Bytes)	—									
	External Bus Interface	—									
	Bus Structure	—									
	DRAM Controller	—									
Clock	Clock Generation Circuit	5 circuits (Main clock, PLL, Sub clock, High-speed on-chip oscillator, On-chip oscillator)									
	PLL	Yes									
	Subclock	Yes (32.768kHz)									
	RTC	Yes									
	On-Chip Oscillator	2 circuits (High speed: 40MHz, Low speed: 125kHz)									
	Oscillation Stop Detection	Yes									
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)									
	Power Save	Wait/Stop									
Power Supply Voltage Detection	Power-On Reset/POR	Yes									
	Low Voltage Detection/LVD	Yes (Voltage detection 2)									
A/D Converter	Resolution × Channels	10-bit × 27	10-bit × 16	10-bit × 27	10-bit × 16	10-bit × 26	10-bit × 27	10-bit × 16	10-bit × 26	10-bit × 27	10-bit × 16
	Sample and Hold	Yes									
	Multi-Channel Sample and Hold	—									
D/A Converter	Resolution × Channels	8-bit × 1									
Timer	8-bit	—									
	16-bit	9 (Timer A, Timer B, Timer for task monitor)				12 (Timer A, Timer B, Timer for task monitor)	9 (Timer A, Timer B, Timer for task monitor)		12 (Timer A, Timer B, Timer for task monitor)	9 (Timer A, Timer B, Timer for task monitor)	
	Input Capture	8 (Timer S)									
	Output Compare	8 (Timer S)									
	PWM Output	13 (Timer A, Timer S)									
	Real-Time Port	—									
	Event Counter	8 (Timer A, Timer B)				11 (Timer A, Timer B)	8 (Timer A, Timer B)		11 (Timer A, Timer B)	8 (Timer A, Timer B)	
	2-Phase Encoder Input	3 (Timer A) + 1 (Timer S)									
	3-Phase Inverter Control	1 (shared with Timer A4, Timer A1, Timer A2, Timer B2, Dead time timer)									
Watchdog Timer		1 (with automatic starting function and clock source protection function, low-speed on-chip oscillator for watchdog timer)									
Serial Interface	Clock Sync./Clock Async.	5 (UART)	4 (UART)	5 (UART)	4 (UART)	5 (UART)	4 (UART)	5 (UART)	4 (UART)		
	Clock Sync. Only	—									
	Clock Async. Only	—									
I²C-bus		2 (Multi master I²C, UART)									
IEBus		1 (UART)									
Smart Card/SIM		1 (UART)									
Synchronous Serial Communication Unit/Special Serial I/O		2 (UART, SSU)									
CAN	Channels	—									
	Message Box (Numbers)	—									
IrDA		—									
CRC Calculation Circuit		1 (CRC-CCITT ($X^{16} + X^{12} + X^5 + 1$) /CRC-16 ($X^{16} + X^{15} + X^2 + 1$))									
X/Y Converter		—									
I/O Ports	Input Only (Numbers)	—									
	CMOS I/O (Numbers)	70	54	70	54	87	70	54	87	70	54
	N-Channel Open Drain Port (Numbers)	1									
	High Current Drive Port	—									
	Pull-Up Resistor	70	54	70	54	87	70	54	87	70	54
External Interrupts Pins		11				13	11		13	11	
Debugging Function	On-Chip Debug	Yes									
	On-Board Flash Program	Yes									
Other Functions	ROM Correction Function	—									
	Others	LIN (1)									
Operating Frequency/Supply Voltage		32MHz/3.0 to 5.5V									
Operating Ambient Temperature (°C)		–40 to 85	–40 to 125	–40 to 85	–40 to 125	–40 to 85	–40 to 125	–40 to 85	–40 to 125	–40 to 85	–40 to 125	–40 to 85	–40 to 125	–40 to 85	–40 to 125	–40 to 85	–40 to 125	–40 to 85	–40 to 125
Package*2		PLQP0080KB-A		PLQP0064KB-A		PLQP0080KB-A		PLQP0064KB-A		PLQP0100KB-A		PLQP0080KB-A		PLQP0064KB-A		PLQP0100KB-A		PLQP0080KB-A		PLQP0064KB-A	
Part No.		R5F35773JFE*	R5F35773KFE*	R5F35783JFF*	R5F35783KFF*	R5F35723JFE*	R5F35723KFE*	R5F35733JFF*	R5F35733KFF*	R5F35766JFB*	R5F35766KFB*	R5F35776JFE*	R5F35776KFE*	R5F35786JFF*	R5F35786KFF*	R5F35716JFB*	R5F35716KFB*	R5F35726JFE*	R5F35726KFE*	R5F35736JFF*	R5F35736KFF*

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (M16C/50 Series)

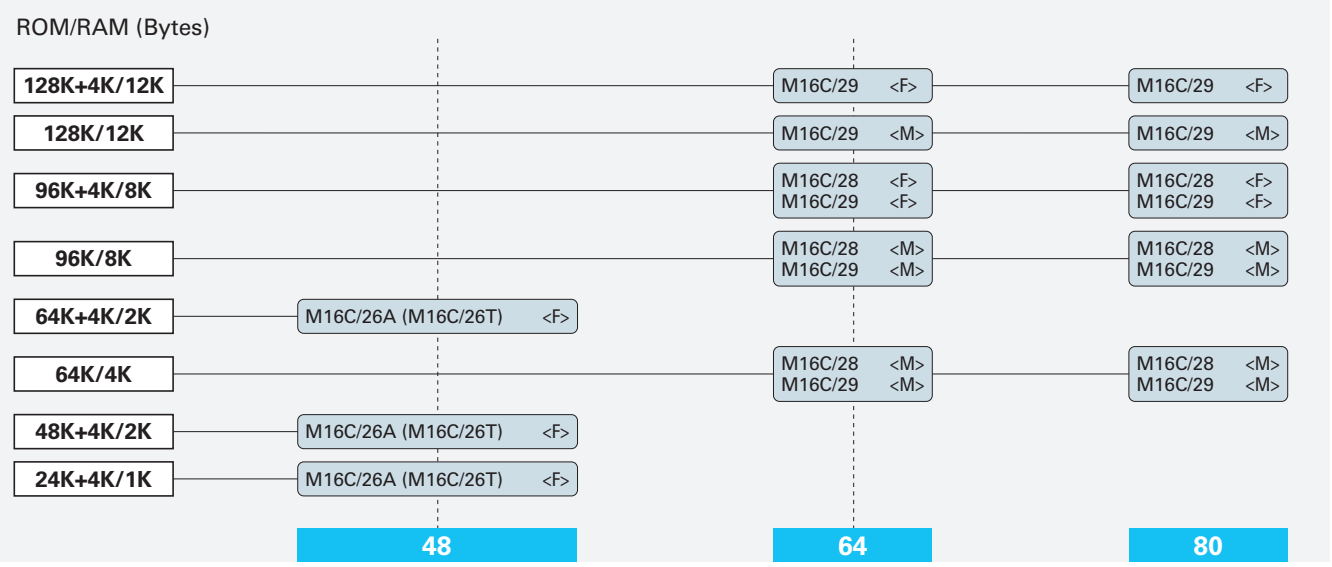
Group		M16C/57													
Memory	ROM (Bytes)	256K + 24K						256K + 28K							
	RAM (Bytes)	20K													
	ROM Type*1	F													
	Data Flash/E2 Data Flash	8K (Data flash)						8K (Data flash), 4K (E2 Data flash/erase 100k times)							
	Program Security	Yes (ID code check function, ROM code protect function)													
CPU	CPU	M16C/60 Core													
	Basic Instructions	91													
	Minimum Instruction Execution Time (ns)	31.25 (@32MHz)													
	Multiplier	16 × 16 → 32													
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32													
	Barrel Shifter	—													
DMA	DMAC (Channels)	4													
	DTC/DMAC Ⅱ	—													
External Bus Expansion	Address Space (Bytes)	—													
	External Bus Interface	—													
	Bus Structure	—													
	DRAM Controller	—													
Clock	Clock Generation Circuit	5 circuits (Main clock, PLL, Sub clock, High-speed on-chip oscillator, Low-speed on-chip oscillator)													
	PLL	Yes													
	Subclock	Yes (32.768kHz)													
	RTC	Yes													
	On-Chip Oscillator	2 circuits (High speed: 40MHz, Low speed: 125kHz)													
	Oscillation Stop Detection	Yes													
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)													
	Power Save	Wait/Stop													
Power Supply Voltage Detection	Power-On Reset/POR	Yes													
	Low Voltage Detection/LVD	Yes (Voltage detection 2)													
A/D Converter	Resolution × Channels	10-bit × 27		10-bit × 26		10-bit × 27		10-bit × 16		10-bit × 26		10-bit × 27		10-bit × 16	
	Sample and Hold	Yes													
	Multi-Channel Sample and Hold	—													
D/A Converter	Resolution × Channels	8-bit × 1													
Timer	8-bit	—													
	16-bit	9 (Timer A, Timer B, Timer for task monitor)		12 (Timer A, Timer B, Timer for task monitor)		9 (Timer A, Timer B, Timer for task monitor)				12 (Timer A, Timer B, Timer for task monitor)		9 (Timer A, Timer B, Timer for task monitor)			
	Input Capture	8 (Timer S)													
	Output Compare	8 (Timer S)													
	PWM Output	13 (Timer A, Timer S)													
	Real-Time Port	—													
	Event Counter	8 (Timer A, Timer B)		11 (Timer A, Timer B)		8 (Timer A, Timer B)				11 (Timer A, Timer B)		8 (Timer A, Timer B)			
	2-Phase Encoder Input	3 (Timer A) + 1 (Timer S)													
	3-Phase Inverter Control	1 (shared with Timer A4, Timer A1, Timer A2, Timer B2, Dead time timer)													
Watchdog Timer		1 (with automatic starting function and clock source protection function, low-speed on-chip oscillator for watchdog timer)													
Serial Interface	Clock Sync./Clock Async.	5 (UART)				4 (UART)				5 (UART)				4 (UART)	
	Clock Sync. Only	—													
	Clock Async. Only	—													
I²C-bus		2 (Multi master I²C, UART)													
IEBus		1 (UART)													
Smart Card/SIM		1 (UART)													
Synchronous Serial Communication Unit/Special Serial I/O		2 (UART, SSU)													
CAN	Channels	—													
	Message Box (Numbers)	—													
IrDA		—													
CRC Calculation Circuit		1 (CRC-CCITT ($X^{16} + X^{12} + X^5 + 1$) /CRC-16 ($X^{16} + X^{15} + X^2 + 1$))													
X/Y Converter		—													
I/O Ports	Input Only (Numbers)	—													
	CMOS I/O (Numbers)	70		87		70		54		87		70		54	
	N-Channel Open Drain Port (Numbers)	1													
	High Current Drive Port	—													
	Pull-Up Resistor	70		87		70		54		87		70		54	
External Interrupts Pins		11		13		11				13		11			
Debugging Function	On-Chip Debug	Yes													
	On-Board Flash Program	Yes													
Other Functions	ROM Correction Function	—													
	Others	LIN (1)													
Operating Frequency/Supply Voltage		32MHz/3.0 to 5.5V													
Operating Ambient Temperature (˚C)		–40 to 85		–40 to 125		–40 to 85		–40 to 125		–40 to 85		–40 to 125		–40 to 85	–40 to 125
Package*2		PLQP0080KB-A		PLQP0100KB-A		PLQP0080KB-A		PLQP0064KB-A		PLQP0100KB-A		PLQP0080KB-A		PLQP0064KB-A	
Part No.		R5F3577EJFE*	R5F3576EJFB*	R5F3576EKFB*	R5F3577EKFE*	R5F3578EJFF*	R5F3578EKFF*	R5F3571EJFB*	R5F3571EKFB*	R5F3572EJFE*	R5F3572EKFE*	R5F3573EJFF*	R5F3573EKFF*		

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Memory Capacity (ROM/RAM) (M16C/Tiny Series)



Letters in brackets < > indicate memory variations.
F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

• Specifications (M16C/Tiny Series)

Group		M16C/26A (M16C/26T)				M16C/28											
Memory	ROM (Bytes)	24K + 4K	48K + 4K	64K + 4K		64K		96K		96K + 4K							
	RAM (Bytes)	1K	2K			4K		8K									
	ROM Type*1	F				M				F							
	Data Flash/E2 Data Flash	4K (Data flash)				—				4K (Data flash)							
	Program Security	Yes (ID code check function, ROM code protect function)				—				Yes (ID code check function, ROM code protect function)							
CPU	CPU	M16C/60 Core															
	Basic Instructions	91															
	Minimum Instruction Execution Time (ns)	50 (@20MHz)			62.5 (@16MHz)	50 (@20MHz)		62.5 (@16MHz)		50 (@20MHz)		62.5 (@16MHz)		50 (@20MHz)		62.5 (@16MHz)	
	Multiplier	16 × 16 → 32															
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32															
	Barrel Shifter	—															
DMA	DMAC (Channels)	2															
	DTC/DMAC Ⅱ	—															
External Bus Expansion	Address Space (Bytes)	—															
	External Bus Interface	—															
	Bus Structure	—															
	DRAM Controller	—															
Clock	Clock Generation Circuit	4 circuits (Main clock, PLL, Sub clock, On-chip oscillator)															
	PLL	Yes															
	Subclock	Yes															
	RTC	—															
	On-Chip Oscillator	Yes															
	Oscillation Stop Detection	Yes															
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)															
	Power Save	Wait/Stop															
Power Supply Voltage Detection	Power-On Reset/POR	—															
	Low Voltage Detection/LVD	—															
A/D Converter	Resolution × Channels	10-bit × 12				10-bit × 27	10-bit × 16	10-bit × 27	10-bit × 16	10-bit × 27	10-bit × 16	10-bit × 27	10-bit × 16	10-bit × 27	10-bit × 16	10-bit × 27	10-bit × 16
	Sample and Hold	Yes															
	Multi-Channel Sample and Hold	—															
D/A Converter	Resolution × Channels	—															
Timer	8-bit	—															
	16-bit	8 (Timer A, Timer B)															
	Input Capture	—				8 (Timer S)											
	Output Compare	—				8 (Timer S)											
	PWM Output	5 (Timer A)				13 (Timer A, Timer S)											
	Real-Time Port	—															
	Event Counter	8 (Timer A, Timer B)															
	2-Phase Encoder Input	3 (Timer A)				3 (Timer A) + 1 (Timer S)											
	3-Phase Inverter Control	1 (shared with Timer A4, Timer A1, Timer A2, Timer B2, Dead time timer)															
Watchdog Timer		1															
Serial Interface	Clock Sync./Clock Async.	3 (UART)															
	Clock Sync. Only	—				2 (Serial I/O)	1 (Serial I/O)	2 (Serial I/O)	1 (Serial I/O)	2 (Serial I/O)	1 (Serial I/O)	2 (Serial I/O)	1 (Serial I/O)	2 (Serial I/O)	1 (Serial I/O)	2 (Serial I/O)	1 (Serial I/O)
	Clock Async. Only	—															
I²C-bus		1 (UART)				2 (Multi master I²C, UART)											
IEBus		1 (UART)															
Smart Card/SIM		1 (UART)															
Synchronous Serial Communication Unit/Special Serial I/O		1 (UART)															
CAN	Channels	—															
	Message Box (Numbers)	—															
IrDA		—															
CRC Calculation Circuit		1 (CRC-CCITT ($X^{16} + X^{12} + X^5 + 1$) /CRC-16 ($X^{16} + X^{15} + X^2 + 1$))															
X/Y Converter		—															
I/O Ports	Input Only (Numbers)	—															
	CMOS I/O (Numbers)	39				71	55	71	55	71	55	71	55	71	55	71	55
	N-Channel Open Drain Port (Numbers)	—															
	High Current Drive Port	—															
	Pull-Up Resistor	39				71	55	71	55	71	55	71	55	71	55	71	55
External Interrupts Pins		11															
Debugging Function	On-Chip Debug	Yes				—				Yes							
	On-Board Flash Program	Yes				—				Yes							
Others	ROM Correction Function	—				Yes (Address match × 2)				—							
	Others	—															
Operating Frequency/Supply Voltage		20MHz/3.0 to 5.5V			16MHz/4.2 to 5.5V	20MHz/3.0 to 5.5V		16MHz/4.2 to 5.5V		20MHz/3.0 to 5.5V		16MHz/4.2 to 5.5V		20MHz/3.0 to 5.5V		16MHz/4.2 to 5.5V	
Operating Ambient Temperature (°C)		–40 to 85			–40 to 125	–40 to 85		–40 to 125		–40 to 85		–40 to 125		–40 to 85		–40 to 125	
Package*2		PLQP0048KB-A				PLQP0080KB-A	PLQP0064KB-A	PLQP0080KB-A	PLQP0064KB-A	PLQP0080KB-A	PLQP0064KB-A	PLQP0080KB-A	PLQP0064KB-A	PLQP0080KB-A	PLQP0064KB-A	PLQP0080KB-A	PLQP0064KB-A
Part No.		M30260F3TGP	M30260F6TGP	M30260F8TGP	M30260F8VGP	M30280M8T-XXXHP	M30281M8T-XXXHP	M30280M8V-XXXHP	M30281M8V-XXXHP	M30280MAT-XXXHP	M30281MAT-XXXHP	M30280MAV-XXXHP	M30281MAV-XXXHP	M30280FATHP	M30281FATHP	M30280FAVHP	M30281FAVHP

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (M16C/Tiny Series)

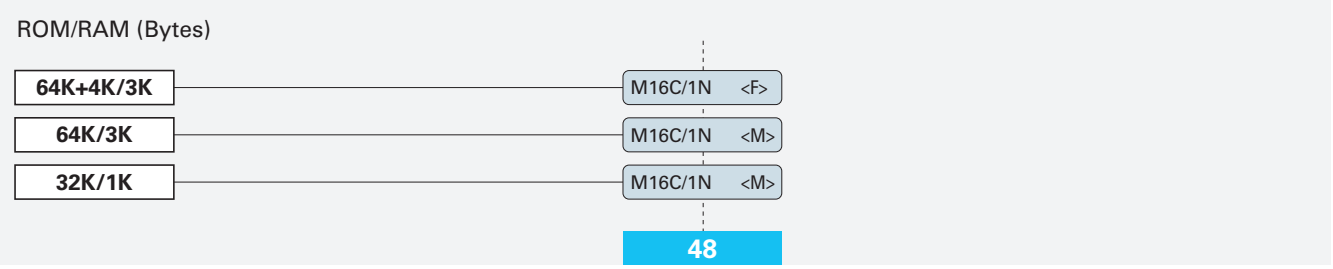
Group		M16C/29																			
Memory	ROM (Bytes)	64K		96K		96K + 4K		128K		128K + 4K											
	RAM (Bytes)	4K		8K				12K													
	ROM Type*1	M				F		M		F											
	Data Flash/E2 Data Flash	—				4K (Data flash)		—		4K (Data flash)											
	Program Security	—				Yes (ID code check function, ROM code protect function)		—		Yes (ID code check function, ROM code protect function)											
CPU	CPU	M16C/60 Core																			
	Basic Instructions	91																			
	Minimum Instruction Execution Time (ns)	50 (@20MHz)	62.5 (@16MHz)	50 (@20MHz)	62.5 (@16MHz)	50 (@20MHz)	62.5 (@16MHz)	50 (@20MHz)	62.5 (@16MHz)	50 (@20MHz)	62.5 (@16MHz)										
	Multiplier	16 × 16 → 32																			
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32																			
	Barrel Shifter	—																			
DMA	DMAC (Channels)	2																			
	DTC/DMAC II	—																			
External Bus Expansion	Address Space (Bytes)	—																			
	External Bus Interface	—																			
	Bus Structure	—																			
	DRAM Controller	—																			
Clock	Clock Generation Circuit	4 circuits (Main clock, PLL, Sub clock, On-chip oscillator)																			
	PLL	Yes																			
	Subclock	Yes																			
	RTC	—																			
	On-Chip Oscillator	Yes																			
	Oscillation Stop Detection	Yes																			
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)																			
	Power Save	Wait/Stop																			
Power Supply Voltage Detection	Power-On Reset/POR	—																			
	Low Voltage Detection/LVD	—																			
A/D Converter	Resolution × Channels	10-bit x 27	10-bit x 16	10-bit x 27	10-bit x 16	10-bit x 27	10-bit x 16	10-bit x 27	10-bit x 16	10-bit x 27	10-bit x 16	10-bit x 27	10-bit x 16	10-bit x 27	10-bit x 16	10-bit x 27	10-bit x 16	10-bit x 27	10-bit x 16	10-bit x 27	10-bit x 16
	Sample and Hold	Yes																			
	Multi-Channel Sample and Hold	—																			
D/A Converter	Resolution × Channels	—																			
Timer	8-bit	—																			
	16-bit	8 (Timer A, Timer B)																			
	Input Capture	8 (Timer S)																			
	Output Compare	8 (Timer S)																			
	PWM Output	13 (Timer A, Timer S)																			
	Real-Time Port	—																			
	Event Counter	8 (Timer A, Timer B)																			
	2-Phase Encoder Input	3 (Timer A) + 1 (Timer S)																			
	3-Phase Inverter Control	1 (shared with Timer A4, Timer A1, Timer A2, Timer B2, Dead time timer)																			
Watchdog Timer		1																			
Serial Interface	Clock Sync./Clock Async.	3 (UART)																			
	Clock Sync. Only	2 (Serial I/O)	1 (Serial I/O)	2 (Serial I/O)	1 (Serial I/O)	2 (Serial I/O)	1 (Serial I/O)	2 (Serial I/O)	1 (Serial I/O)	2 (Serial I/O)	1 (Serial I/O)	2 (Serial I/O)	1 (Serial I/O)	2 (Serial I/O)	1 (Serial I/O)	2 (Serial I/O)	1 (Serial I/O)	2 (Serial I/O)	1 (Serial I/O)	2 (Serial I/O)	1 (Serial I/O)
	Clock Async. Only	—																			
I^2C-bus		2 (Multi master I^2C, UART)																			
IEBus		1 (UART)																			
Smart Card/SIM		1 (UART)																			
Synchronous Serial Communication Unit/Special Serial I/O		1 (UART)																			
CAN	Channels	1																			
	Message Box (Numbers)	16																			
IrDA		—																			
CRC Calculation Circuit		1 (CRC-CCITT ($X^{16} + X^{12} + X^5 + 1$) /CRC-16 ($X^{16} + X^{15} + X^2 + 1$))																			
X/Y Converter		—																			
I/O Ports	Input Only (Numbers)	—																			
	CMOS I/O (Numbers)	71	55	71	55	71	55	71	55	71	55	71	55	71	55	71	55	71	55	71	55
	N-Channel Open Drain Port (Numbers)	—																			
	High Current Drive Port	—																			
	Pull-Up Resistor	71	55	71	55	71	55	71	55	71	55	71	55	71	55	71	55	71	55	71	55
External Interrupts Pins		11																			
Debugging Function	On-Chip Debug	—								Yes		—						Yes			
	On-Board Flash Program	—								Yes		—						Yes			
Others	ROM Correction Function	Yes (Address match × 2)								—		Yes (Address match × 2)						—			
	Others	—																			
Operating Frequency/Supply Voltage		20MHz/3.0 to 5.5V	16MHz/4.2 to 5.5V	20MHz/3.0 to 5.5V	16MHz/4.2 to 5.5V	20MHz/3.0 to 5.5V	16MHz/4.2 to 5.5V	20MHz/3.0 to 5.5V	16MHz/4.2 to 5.5V	20MHz/3.0 to 5.5V	16MHz/4.2 to 5.5V										
Operating Ambient Temperature (°C)		–40 to 85	–40 to 125	–40 to 85	–40 to 125	–40 to 85	–40 to 125	–40 to 85	–40 to 125	–40 to 85	–40 to 125										
Package*2		PLQP0080KB-A	PLQP0064KB-A	PLQP0080KB-A	PLQP0064KB-A	PLQP0080KB-A	PLQP0064KB-A	PLQP0080KB-A	PLQP0064KB-A	PLQP0080KB-A	PLQP0064KB-A	PLQP0080KB-A	PLQP0064KB-A	PLQP0080KB-A	PLQP0064KB-A	PLQP0080KB-A	PLQP0064KB-A	PLQP0080KB-A	PLQP0064KB-A	PLQP0080KB-A	PLQP0064KB-A
Part No.		M30290M8T-XXXHP	M30291M8T-XXXHP	M30290M8V-XXXHP	M30291M8V-XXXHP	M30290MAT-XXXHP	M30291MAT-XXXHP	M30290MAV-XXXHP	M30291MAV-XXXHP	M30290FATHP	M30291FATHP	M30290FAVHP	M30291FAVHP	M30290MCT-XXXHP	M30291MCT-XXXHP	M30290MCV-XXXHP	M30291MCV-XXXHP	M30290FCTHP	M30291FCTHP	M30290FCVHP	M30291FCVHP

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Memory Capacity (ROM/RAM) (M16C/10 Series)



Letters in brackets < > indicate memory variations.
F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

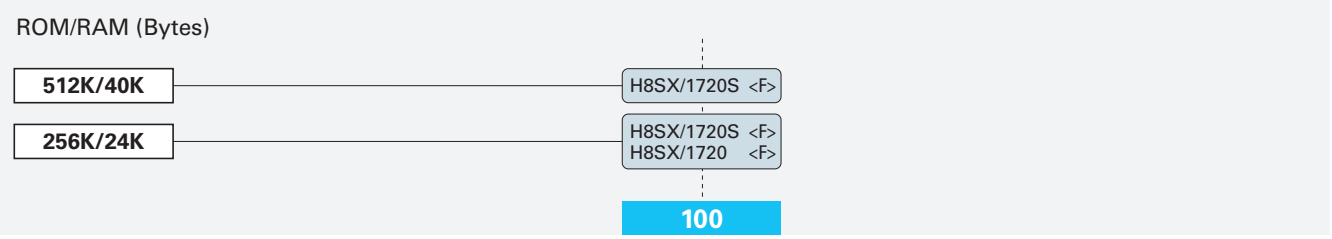
• Specifications (M16C/10 Series)

Group		M16C/1N					
Memory	ROM (Bytes)	32K	64K			64K + 4K	
	RAM (Bytes)	1K	3K				
	ROM Type*1	M				F	
	Data Flash	—				4K (Data flash)	
	Program Security	—				Yes (ID code check function, ROM code protect function)	
CPU	CPU	M16C/60 Core					
	Basic Instructions	91					
	Minimum Instruction Execution Time (ns)	62.5 (@16MHz)					
	Multiplier	16 × 16 → 32					
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32					
	Barrel Shifter	—					
DMA	DMAC (Channels)	—					
	DTC/DMAC II	—					
External Bus Expansion	Address Space (Bytes)	—					
	External Bus Interface	—					
	Bus Structure	—					
	DRAM Controller	—					
Clock	Clock Generation Circuit	3 circuits (Main clock, Sub clock, On-chip oscillator)					
	PLL	—					
	Subclock	Yes					
	RTC	—					
	On-Chip Oscillator	Yes					
	Oscillation Stop Detection	Yes					
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)					
	Power Save	Wait/Stop					
Power Supply Voltage Detection	Power-On Reset/POR	—					
	Low Voltage Detection/LVD	—					
A/D Converter	Resolution × Channels	10-bit × 14					
	Sample and Hold	Yes					
	Multi-Channel Sample and Hold	—					
D/A Converter	Resolution × Channels	8-bit × 1					
Timer	8-bit	4 (Timer 1, Timer X, Timer Y, Timer Z)					
	16-bit	1 (Timer C)					
	Input Capture	1 (Timer C)					
	Output Compare	—					
	PWM Output	2 (Timer Y, Timer Z)					
	Real-Time Port	—					
	Event Counter	1 (Timer X)					
	2-Phase Encoder Input	—					
	3-Phase Inverter Control	—					
Watchdog Timer		—					
Serial Interface	Clock Sync./Clock Async.	2 (UART)					
	Clock Sync. Only	—					
	Clock Async. Only	—					
I²C-bus		—					
IEBus		—					
Smart Card/SIM		—					
Synchronous Serial Communication Unit/Special Serial I/O		—					
CAN	Channels	1					
	Message Box (Numbers)	16					
IrDA		—					
CRC Calculation Circuit		—					
X/Y Converter		—					
I/O Ports	Input Only (Numbers)	—					
	CMOS I/O (Numbers)	37					
	N-Channel Open Drain Port (Numbers)	—					
	High Current Drive Port	8					
	Pull-Up Resistor	37					
External Interrupts Pins		8					
Debugging Function	On-Chip Debug	—				Yes	
	On-Board Flash Program	—				Yes	
Others	ROM Correction Function	Yes				—	
	Others	—					
Operating Frequency/Supply Voltage		16MHz/4.2 to 5.5V					
Operating Ambient Temperature (°C)		–40 to 125	–40 to 85	–40 to 125	–40 to 85	–40 to 125	–40 to 85
Package*2		PLQP0048KB-A					
Part No.		M301N2M4V-XXXFP	M301N2M4T-XXXFP	M301N2M8V-XXXFP	M301N2M8T-XXXFP	M301N2F8VFP	M301N2F8TFP

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Memory Capacity (ROM/RAM) (H8SX/1700 Series)



Letters in brackets < > indicate memory variations.
F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

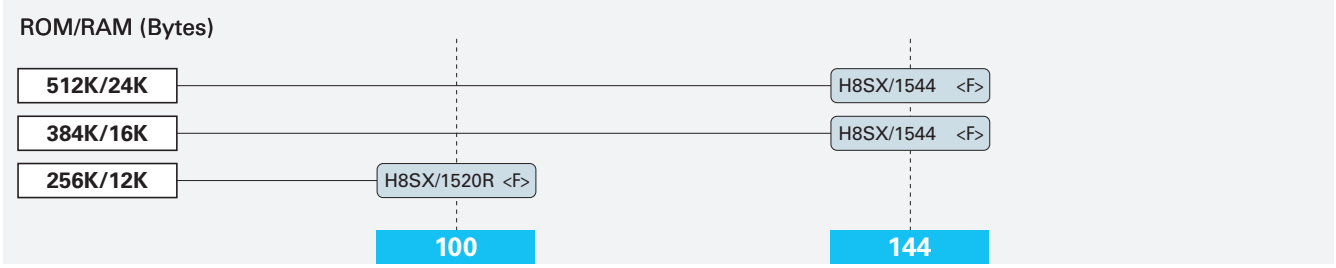
• Specifications (H8SX/1700 Series)

Group		H8SX/1720	H8SX/1720S	
Memory	ROM (Bytes)	256K		512K
	RAM (Bytes)	24K		40K
	ROM Type*1	F		
	Data Flash/E2 Data Flash	16K (Data flash)		32K (Data flash)
	Cache Memory	—		
	Program Security	Yes	Yes (Hardware Protect, Software Protect, Error Protect)	
CPU	CPU	H8SX Core		
	Basic Instructions	87		
	Minimum Instruction Execution Time (ns)	15.6 (@64MHz)	12.5 (@80MHz)	
	Multiplier	32 × 32 → 32		
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32		
DMA	DMAC (Channels)	4	—	
	DTC/DMAC II	DTC		
External Bus Expansion	Address Space (Bytes)	16M		
	Bus State Controller	—		
	Bus Structure	—		
	Endian Conversion	—		
Clock	Clock Generation Circuit	1 circuit (Main clock)		
	PLL	Yes		
	Subclock	—		
	Frequency Divider	1/n (n = 1, 2, 4, 8)		
	Power Save	Sleep/Full module clock stop/Software standby		
Power Supply Voltage Detection	Power-On Reset/POR	—		
	Low Voltage Detection/LVD	—		
A/D Converter	Resolution × Channels	10-bit × 16		
	Sample and Hold	Yes		
	Multi-Channel Sample and Hold	—		
D/A Converter	Resolution × Channels	—		
Timer	8-bit	—		
	16-bit	12 (TPU)		
	32-bit	2 (TPU)	—	
	Input Capture	6 (shared with TPU)		
	Output Compare	6 (shared with TPU)		
	PWM Output	6 (shared with TPU)		
	Programmable Pulse Generator	8		
	Event Counter	4 (shared with TPU)		
	2-Phase Encoder Input	2 (shared with TPU)	4 (shared with TPU)	
Watchdog Timer		1	8	
Serial Interface	Clock Sync./Clock Async.	2		
	Clock Sync. Only	—		
	Clock Async. Only	—		
I²C-bus		—		
Smart Card/SIM		—		
Synchronous Serial Communication Unit/Special Serial I/O		4	On-chip RSPI × 4ch	
CAN	Channels	2		
	Message Box (Numbers)	32		
USB Function		—		
IrDA		—		
I/O Ports	Input Only (Numbers)	17		
	CMOS I/O (Numbers)	61		
	N-Channel Open Drain Port (Numbers)	—		
	Pull-Up Resistor	—		
External Interrupts Pins		17 (NMI + 16 (8 level))	16 (NMI + 15 (8 level))	
Debugging Function	On-Chip Debug	Yes		
	On-Board Flash Program	Yes		
Operating Frequency/Supply Voltage		64MHz/4.5 to 5.5V	80MHz/4.5 to 5.5V	
Operating Ambient Temperature (˚C)		–40 to 85		
Package*2		PLQP0100KB-A		
Part No.		R5F61725J64FPV	R5F61725SJ80FPU	R5F61727SJ80FPU

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Memory Capacity (ROM/RAM) (H8SX/1500 Series)



Letters in brackets < > indicate memory variations.
F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

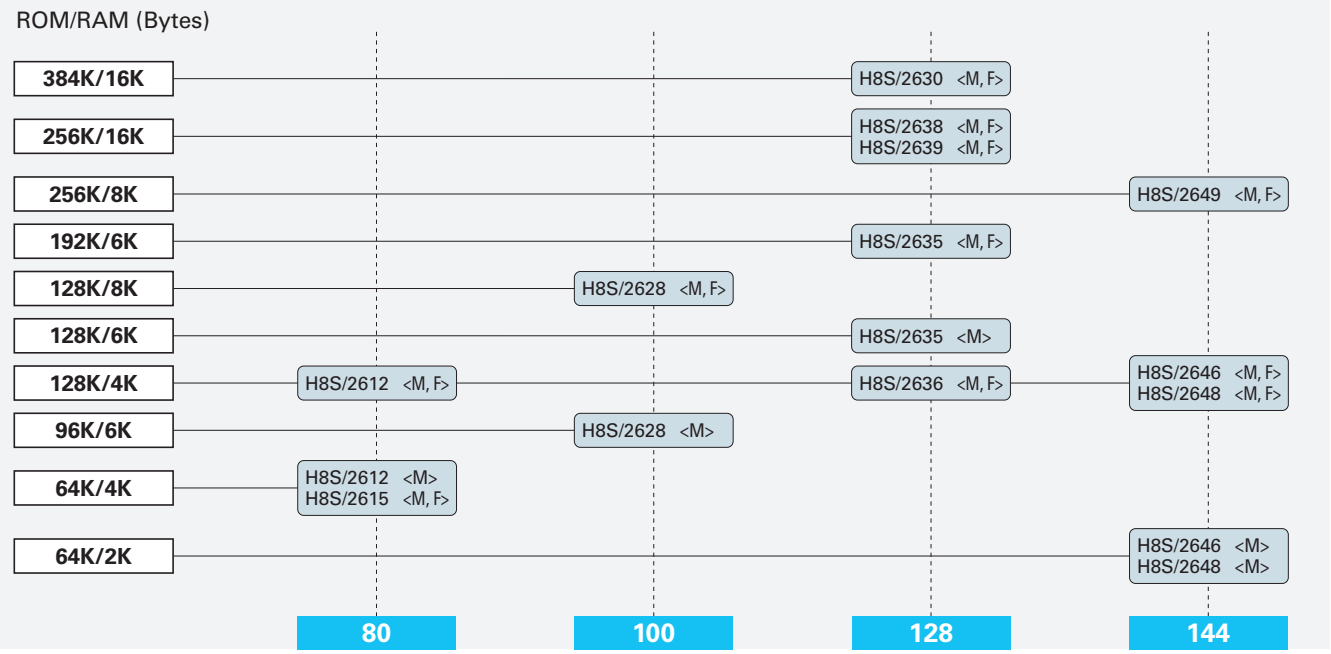
• Specifications (H8SX/1500 Series)

Group		H8SX/1520R	H8SX/1544		
Memory	ROM (Bytes)	256K	384K		512K
	RAM (Bytes)	12K	16K		24K
	ROM Type*1	F			
	Data Flash/E2 Data Flash	—			
	Cache Memory	—			
	Program Security	Yes (Hardware Protect, Software Protect, Error Protect)	Yes		
CPU	CPU	H8SX Core			
	Basic Instructions	87			
	Minimum Instruction Execution Time (ns)	21 (@48MHz)	25 (@40MHz)		
	Multiplier	16 × 16 → 32	16 × 16 → 32		
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32	16 × 16 + 32 → 32		
DMA	DMAC (Channels)	4			
	DTC/DMAC II	—			
External Bus Expansion	Address Space (Bytes)	16M			
	Bus State Controller	—	ROM/ SRAM		
	Bus Structure	—	Separate bus (8/16-bit)		
	Endian Conversion	—			
Clock	Clock Generation Circuit	1 circuit (Main clock)	2 circuits (Main clock, Sub clock)		
	PLL	Yes			
	Subclock	—	Yes (128 division)		
	Frequency Divider	1/n (n = 1, 2, 4, 8)			
	Power Save	Sleep/ Full module clock stop/ Software standby	Sleep/Full module clock stop/Software standby/Hardware standby		
Power Supply Voltage Detection	Power-On Reset/POR	—			
	Low Voltage Detection/LVD	—			
A/D Converter	Resolution × Channels	10-bit × 16			
	Sample and Hold	Yes			
	Multi-Channel Sample and Hold	—			
D/A Converter	Resolution × Channels	—	8-bit × 2		
Timer	8-bit	—			
	16-bit	12 (TPU)	6 (TPU)		
	32-bit	2 (TPU)			
	Input Capture	10 (shared with TPU)	6 (shared with TPU)		
	Output Compare	10 (shared with TPU)	6 (shared with TPU)		
	PWM Output	10 (shared with TPU)	6 (shared with TPU)		
	Programmable Pulse Generator	8 (shared with TPU + PPG)	—		
	Event Counter	4 (shared with TPU)			
	2-Phase Encoder Input	2 (shared with TPU)			
Watchdog Timer		1			
Serial Interface	Clock Sync./Clock Async.	2	4		
	Clock Sync. Only	—			
	Clock Async. Only	—			
I²C-bus		—	2		
Smart Card/SIM		2	3		
Synchronous Serial Communication Unit/Special Serial I/O		3	2		
CAN	Channels	1	2		
	Message Box (Numbers)	16	32		
USB Function		—			
IrDA		—			
I/O Ports	Input Only (Numbers)	17			
	CMOS I/O (Numbers)	65	95		
	N-Channel Open Drain Port (Numbers)	15	24		
	Pull-Up Resistor	32	56		
External Interrupts Pins		16 (NMI + 15 (8 level))	17 (NMI + 16 (8 level))		
Debugging Function	On-Chip Debug	Yes			
	On-Board Flash Program	Yes			
Operating Frequency/Supply Voltage		48MHz/4.5 to 5.5V	40MHz/4.5 to 5.5V		
Operating Ambient Temperature (°C)		–40 to 85	–40 to 105		–40 to 85
Package*2		PRQP0100KB-A	PLQP0144KA-A		
Part No.		R5F61527RJ48FPV	R5F61543J40FPV	R5F61543L40FPV	R5F61544L40FPV	R5F61544J40FPV

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Memory Capacity (ROM/RAM) (H8S/2600 Series)



Letters in brackets < > indicate memory variations.
F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

• Specifications (H8S/2600 Series)

Group		H8S/2612														H8S/2615								H8S/2628	
Memory	ROM (Bytes)	64K						128K								64K								128K	
	RAM (Bytes)	4K																						8K	
	ROM Type*1	M						F		M						F						M		F	M
	Program Security	—						Yes (H/W Protect, S/W Protect, Error Protect)		—						Yes (H/W Protect, S/W Protect, Error Protect)						—		Yes (H/W Protect, S/W Protect, Error Protect)	—
CPU	CPU	H8S/2600 Core																							
	Basic Instructions	69																							
	Minimum Instruction Execution Time (ns)	50 (@20MHz)		41.7 (@24MHz)				50 (@20MHz)				41.7 (@24MHz)													
	Multiplier	16 × 16 → 32																							
	Multiply-Accumulate Instruction	16 × 16 + 42 → 42																							
DMA	DMAC (Channels)	—																							
	EXDMAC	—																							
	DTC/DMAC II	DTC		—				DTC				—												DTC	
External Bus Expansion	Address Space (Bytes)	16M																							
	Bus State Controller	—																							
	Bus Structure	—																							
	SDRAM Controller	—																							
	DRAM Controller	—																							
	Host Interface	—																							
Clock	Clock Generation Circuit	1 circuit (Main clock)		2 circuits (Main clock, Sub clock)				1 circuit (Main clock)				2 circuits (Main clock, Sub clock)				1 circuit (Main clock)									
	PLL	Yes (× 1, × 2, × 4)																							
	Subclock	—		Yes (128 division)				—				Yes (128 division)												—	
	RTC	—		Yes (WDT for watch)				—				Yes (WDT for watch)												—	
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16, 32)		1/n (n = 1, 2, 4, 8, 16, 32, 128)				1/n (n = 1, 2, 4, 8, 16, 32)				1/n (n = 1, 2, 4, 8, 16, 32, 128)				1/n (n = 1, 2, 4, 8, 16, 32)									
	Power Save	Medium-speed/ Sleep/ Module stop/ Software standby/ Hardware standby		Normal operating/ Medium-speed/ Sleep/Module stop/ Watch/Sub active/ Sub sleep/ Software standby/ Hardware standby				Normal operating/ Medium-speed/ Sleep/ Module stop/ Software standby/ Hardware standby				Normal operating/ Medium-speed/ Sleep/Module stop/ Watch/Sub active/ Sub sleep/ Software standby/ Hardware standby				Medium-speed/Sleep/Module stop/ Watch/Sub active/Sub sleep/ Software standby/Hardware standby						Medium-speed/ Sleep/ Module stop/ Software standby/ Hardware standby	
A/D Converter	Resolution × Channels	10-bit × 12														10-bit × 16									
	Sample and Hold	Yes																							
D/A Converter	Resolution × Channels	—																							
Timer	8-bit	—																						4 (TMR)	
	16-bit	6 (TPU)																							
	32-bit	—																							
	Input Capture	6 (shared with TPU)																							
	Output Compare	6 (shared with TPU)																							
	PWM Output	7 (shared with 1 (MMT) + 6 (TPU))		6 (shared with TPU)				7 (1 (MMT) + 6 (TPU))		7 (shared with 1 (MMT) + 6 (TPU))		6 (shared with TPU)													
	Real-Time Port	—																							
	Programmable Pulse Generator	8 (shared with TPU + PPG)		—				8 (shared with TPU + PPG)				—												8 (shared with TPU + PPG)	
	Event Counter	4 (shared with TPU)																						2 (shared with TMR), 4 (shared with TPU)	
	2-Phase Encoder Input	2 (shared with TPU)																							
Watchdog Timer		1		2				1				2												1	
Serial Interface	Clock Sync./Clock Async.	3																						2	
I²C-bus		—																							
IEBus		—																							
Smart Card/SIM		3																						2	
Synchronous Serial Communication Unit/Special Serial I/O		—																						2	
CAN	Channels	1																							
	Message Box (Numbers)	16 × 1																							
Ethernet		—																							
USB Function		—																							
LPC/ISA		—																							
IrDA		—																							
LCD		—																							
CRC Calculation Circuit		—																							
I/O Ports	Input Only (Numbers)	12														16									
	CMOS Output Only (Numbers)	—																							
	CMOS I/O (Numbers)	44														40								60	
	High Voltage Port (Numbers)	—																							
	N-Channel Open Drain Port (Numbers)	20																						28	
	DTMF	—																							
	High Current Drive Port	—																							
	Pull-Up Resistor	28		—				28		—						28									
	NMOS Push-Pull	—																							
External Interrupts Pins		7 (NMI + IRQ (6))																							
Debugging Function	Boundary Scan/JTAG	—																							
	On-Chip Debug	Yes (PC break)		—				Yes (PC break)				—												Yes (PC break)	
	On-Board Flash Program	—						Yes		—						Yes						—		Yes	—
Other Functions	ROM Correction Function	—																							
	Others	MMT (× 1)		—				MMT (× 1)				—													
Operating Frequency/Supply Voltage		20MHz/4.5 to 5.5V		24MHz/4.5 to 5.5V				20MHz/4.5 to 5.5V				24MHz/4.5 to 5.5V				20MHz/4.5 to 5.5V	24MHz/4.5 to 5.5V	20MHz/4.5 to 5.5V			20MHz/4.5 to 5.5V 24MHz/4.5 to 5.5V			24MHz/4.5 to 5.5V	
Operating Ambient Temperature (°C)		–40 to 85	–40 to 105	–40 to 125	–40 to 105	–40 to 125	–40 to 85	–40 to 105	–40 to 125	–40 to 85	–40 to 125	–40 to 85	–40 to 105			–40 to 85		–40 to 105		–40 to 125		–40 to 105		–40 to 85	
Package*2		PRQP0080JD-A																						PRQP0100KB-A	
Part No.		HD6432611XXXFAJ	HD6432611XXXFAL	HD6432611XXXFAK	HD6432614XXXFAL	HD6432614XXXFAK	HD6432614XXXFAJ	HD64F2612FA20LV	HD64F2612FA20KV	HD64F2612FA20JV	HD6432612XXXFAK	HD6432612XXXFAJ	HD6432612XXXFAL	HD6432616XXXFAL	HD6432616XXXFAJ	HD6432616XXXFAK	HD64F2615FA20JV	HD64F2615FA24JV**	HD64F2615FA20L	HD64F2615FA20K	HD6432615XXXFAK	HD6432615XXXFAL	HD6432615XXXFAJ	HD64F2628FA24JV	HD6432628XXXFAJ

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8S/2600 Series)

Group		H8S/2630				H8S/2633	H8S/2636		
Memory	ROM (Bytes)	384K				192K	128K		
	RAM (Bytes)	16K				8K	4K		
	ROM Type*1	F		M			F	M	
	Program Security	Yes (H/W Protect, S/W Protect, Error Protect)		—			Yes (H/W Protect, S/W Protect, Error Protect)	—	
CPU	CPU	H8S/2600 Core							
	Basic Instructions	69							
	Minimum Instruction Execution Time (ns)	50 (@20MHz)				35.7 (@28MHz)	50 (@20MHz)		
	Multiplier	16 × 16 → 32							
	Multiply-Accumulate Instruction	16 × 16 + 42 → 42							
DMA	DMAC (Channels)	—							
	EXDMAC	—							
	DTC/DMAC Ⅱ	DTC				—	DTC		
External Bus Expansion	Address Space (Bytes)	16M							
	Bus State Controller	Direct connection to SRAM/ROM is supported				Direct connection to ROM/ Burst ROM/ SRAM/DRAM is supported	Direct connection to SRAM/ROM is supported		
	Bus Structure	Separate bus (8/16-bit)							
	SDRAM Controller	—							
	DRAM Controller	—				Yes	—		
	Host Interface	—							
Clock	Clock Generation Circuit	1 circuit (Main clock)	2 circuits (Main clock, sub clock)	1 circuit (Main clock)	2 circuits (Main clock, sub clock)	1 circuit (Main clock)	2 circuits (Main clock, sub clock)	1 circuit (Main clock)	2 circuits (Main clock, sub clock)
	PLL	Yes (× 1, × 2, × 4)							
	Subclock	—	Yes	—	Yes	—	Yes	—	Yes
	RTC	—	Yes (WDT for watch)	—	Yes (WDT for watch)	—	Yes (WDT for watch)	—	Yes (WDT for watch)
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16, 32)							
	Power Save	Medium-speed/ Sleep/ Module stop/ Software standby/ Hardware standby	Medium-speed/Sleep/ Module stop/ Watch/Sub active/Sub sleep/ Software standby/ Hardware standby	Medium-speed/ Sleep/ Module stop/ Software standby/ Hardware standby	Medium-speed/Sleep/ Module stop/ Watch/Sub active/Sub sleep/ Software standby/ Hardware standby	Medium-speed/Sleep/ Module stop/ Software standby/ Hardware standby	Medium-speed/ Sleep/Module stop/ Watch/Sub active/ Sub sleep/ Software standby/ Hardware standby	Medium-speed/ Sleep/ Module stop/ Software standby/ Hardware standby	Medium-speed/Sleep/ Module stop/ Watch/Sub active/Sub sleep/ Software standby/ Hardware standby
A/D Converter	Resolution × Channels	10-bit × 12				10-bit × 16	10-bit × 12		
	Sample and Hold	Yes							
D/A Converter	Resolution × Channels	8-bit × 2				—	8-bit × 2		
Timer	8-bit	—							
	16-bit	6 (TPU)							
	32-bit	—							
	Input Capture	6 (shared with TPU)							
	Output Compare	6 (shared with TPU)							
	PWM Output	8 (shared with 2 (PWM) + 6 (TPU))				6 (shared with TPU)	8 (shared with 2 (PWM) + 6 (TPU))		
	Real-Time Port	—							
	Programmable Pulse Generator	8 (shared with TPU + PPG)				—	8 (shared with TPU + PPG)		
	Event Counter	4 (shared with TPU)				2 (shared with TMR), 4 (shared with TPU)	4 (shared with TPU)		
	2-Phase Encoder Input	2 (shared with TPU)							
Watchdog Timer		2				1	2		
Serial Interface	Clock Sync./Clock Async.	3				5	3		
I²C-bus		—	2	—	2		—		
IEBus		—							
Smart Card/SIM		3				5	3		
Synchronous Serial Communication Unit/Special Serial I/O		—							
CAN	Channels	2				—	2		
	Message Box (Numbers)	16 × 2				—	16 × 2		
Ethernet		—							
USB Function		—							
LPC/ISA		—							
IrDA		—							
LCD		—							
CRC Calculation Circuit		—							
I/O Ports	Input Only (Numbers)	12				16	12		
	CMOS Output Only (Numbers)	—							
	CMOS I/O (Numbers)	72				73	72		
	High Voltage Port (Numbers)	—							
	N-Channel Open Drain Port (Numbers)	26				28	26		
	DTMF	—							
	High Current Drive Port	16				—	16		
	Pull-Up Resistor	36							
	NMOS Push-Pull	—	2	—	2		—		
External Interrupts Pins		7 (NMI + IRQ (6))				9 (NMI + IRQ (8))	7 (NMI + IRQ (6))		
Debugging Function	Boundary Scan/JTAG	—							
	On-Chip Debug	Yes (PC break)				—	Yes (PC break)		
	On-Board Flash Program	Yes		—			Yes	—	
Other Functions	ROM Correction Function	—							
	Others	10-bit PWM Timer (× 2)				—	10-bit PWM Timer (× 2)		
Operating Frequency/Supply Voltage		16MHz/ 4.5 to 5.5V	20MHz/4.5 to 5.5V	16MHz/4.5 to 5.5V	20MHz/4.5 to 5.5V	16MHz/4.5 to 5.5V	20MHz/4.5 to 5.5V	16MHz/ 4.5 to 5.5V	20MHz/ 4.5 to 5.5V / 28MHz/ 4.5 to 5.5V
Operating Ambient Temperature (˚C)		–40 to 105	–40 to 85	–40 to 105	–40 to 85	–40 to 105	–40 to 85	–40 to 105	–40 to 85
Package*2		PRQP0128KB-A							

Part No.	20MHz/ 4.5 to 5.5V	16MHz/ 4.5 to 5.5V	20MHz/ 4.5 to 5.5V	16MHz/ 4.5 to 5.5V	20MHz/ 4.5 to 5.5V	16MHz/4.5 to 5.5V	20MHz/4.5 to 5.5V	16MHz/4.5 to 5.5V	20MHz/4.5 to 5.5V	16MHz/ 4.5 to 5.5V	20MHz/ 4.5 to 5.5V	28MHz/ 4.5 to 5.5V	20MHz/ 4.5 to 5.5V	16MHz/ 4.5 to 5.5V	20MHz/ 4.5 to 5.5V	16MHz/ 4.5 to 5.5V	20MHz/ 4.5 to 5.5V	16MHz/4.5 to 5.5V	20MHz/ 4.5 to 5.5V
	HD64F2630F16LV	HD64F2630F20JV	HD64F2630UF20JV	HD64F2630UF16LV	HD64F2630WF16LV	HD64F2630WF20JV	HD6432630XXXFJ	HD6432630XXXFL	HD6432630UXXXFL	HD6432630UXXXFJ	HD6432630WXXXFJ	HD6432630WXXXFL	HD6432695XXXFL	HD6432695XXXFJ	HD64F2636F20JV	HD64F2636F16LV	HD64F2636UF20JV	HD64F2636UF16LV	HD6432636XXXFJ	HD6432636XXXFL	HD6432636UXXXFL	HD6432636UXXXFJ

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8S/2600 Series)

Group		H8S/2635			H8S/2638								H8S/2639							
Memory	ROM (Bytes)	128K	192K		256K															
	RAM (Bytes)	6K			16K															
	ROM Type*1	M	F	M	F				M				F				M			
	Program Security	—	Yes (H/W Protect, S/W Protect, Error Protect)	—	Yes (H/W Protect, S/W Protect, Error Protect)				—				Yes (H/W Protect, S/W Protect, Error Protect)				—			
CPU	CPU	H8S/2600 Core																		
	Basic Instructions	69																		
	Minimum Instruction Execution Time (ns)	50 (@20MHz)																		
	Multiplier	16 × 16 → 32																		
	Multiply-Accumulate Instruction	16 × 16 + 42 → 42																		
DMA	DMAC (Channels)	—																		
	EXDMAC	—																		
	DTC/DMAC II	—			DTC															
External Bus Expansion	Address Space (Bytes)	16M																		
	Bus State Controller	Direct connection to SRAM/ROM is supported																		
	Bus Structure	Separate bus (8/16-bit)																		
	SDRAM Controller	—																		
	DRAM Controller	—																		
	Host Interface	—																		
Clock	Clock Generation Circuit	1 circuit (Main clock)			2 circuits (Main clock, sub clock)				1 circuit (Main clock)		2 circuits (Main clock, sub clock)						1 circuit (Main clock)			
	PLL	Yes (× 1, × 2, × 4)																		
	Subclock	Yes (128 division)		—	Yes				—		Yes						Yes (128 division)			
	RTC	Yes (WDT for watch)		—	Yes (WDT for watch)				—		Yes (WDT for watch)									
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16, 32)																		
	Power Save	Medium-speed/Sleep/ Module stop/ Watch/Sub active/Sub sleep/ Software standby/ Hardware standby		Medium-speed/ Sleep/ Module stop/ Software standby/ Hardware standby	Medium-speed/ Sleep/Module stop/ Watch/Sub active/ Sub sleep/ Software standby/ Hardware standby				Medium-speed/ Sleep/ Module stop/ Software standby/ Hardware standby		Medium-speed/Sleep/Module stop/Watch/Sub active/Sub sleep/ Software standby/Hardware standby									
A/D Converter	Resolution × Channels	10-bit × 12																		
	Sample and Hold	Yes																		
D/A Converter	Resolution × Channels	—			8-bit × 2															
Timer	8-bit	—																		
	16-bit	6 (TPU)																		
	32-bit	—																		
	Input Capture	6 (shared with TPU)																		
	Output Compare	6 (shared with TPU)																		
	PWM Output	8 (shared with 2 (PWM) + 6 (TPU))																		
	Real-Time Port	—																		
	Programmable Pulse Generator	—			8 (shared with TPU + PPG)															
	Event Counter	4 (shared with TPU)																		
	2-Phase Encoder Input	2 (shared with TPU)																		
Watchdog Timer		2																		
Serial Interface	Clock Sync./Clock Async.	3																		
I²C-bus		—			2				—		2		—		2		—		2	
IEBus		—																		
Smart Card/SIM		3																		
Synchronous Serial Communication Unit/Special Serial I/O		—																		
CAN	Channels	1			2															
	Message Box (Numbers)	16 × 1			16 × 2															
Ethernet		—																		
USB Function		—																		
LPC/ISA		—																		
IrDA		—																		
LCD		—																		
CRC Calculation Circuit		—																		
I/O Ports	Input Only (Numbers)	12																		
	CMOS Output Only (Numbers)	—																		
	CMOS I/O (Numbers)	72																		
	High Voltage Port (Numbers)	—																		
	N-Channel Open Drain Port (Numbers)	26																		
	DTMF	—																		
	High Current Drive Port	16																		
	Pull-Up Resistor	36																		
	NMOS Push-Pull	—			2				—		2		—		2		—		2	
External Interrupts Pins		7 (NMI + IRQ (6))																		
Debugging Function	Boundary Scan/JTAG	—																		
	On-Chip Debug	—			Yes (PC break)															
	On-Board Flash Program	—	Yes	—	Yes				—				Yes				—			
Other Functions	ROM Correction Function	—																		
	Others	10-bit PWM Timer (× 2)																		
Operating Frequency/Supply Voltage		20MHz/4.5 to 5.5V			16MHz/4.5 to 5.5V	20MHz/4.5 to 5.5V	16MHz/4.5 to 5.5V	20MHz/4.5 to 5.5V	16MHz/4.5 to 5.5V	20MHz/4.5 to 5.5V	16MHz/4.5 to 5.5V	20MHz/4.5 to 5.5V	16MHz/4.5 to 5.5V	5MHz (PLL:20MHz)/4.5 to 5.5V	5MHz (PLL:16MHz)/4.5 to 5.5V	5MHz (PLL:20MHz)/4.5 to 5.5V	5MHz (PLL:16MHz)/4.5 to 5.5V	5MHz (PLL:20MHz)/4.5 to 5.5V	5MHz (PLL:16MHz)/4.5 to 5.5V	5MHz (PLL:20MHz)/4.5 to 5.5V
Operating Ambient Temperature (°C)		–40 to 105	–40 to 85	–40 to 105	–40 to 85	–40 to 105	–40 to 85	–40 to 105	–40 to 85	–40 to 105	–40 to 85	–40 to 105	–40 to 85	–40 to 105	–40 to 85	–40 to 105	–40 to 85	–40 to 105	–40 to 85	–40 to 105	–40 to 85
Package*2		PRQP0128KB-A																		
Part No.		HD6432634XXXFL	HD6432634XXXFJ	HD64F2635F20J	HD6432635XXXFL	HD6432635XXXFJ	HD64F2638F20JV	HD64F2638F16LV	HD64F2638UF16LV	HD64F2638UF20JV	HD64F2638WF16LV	HD64F2638WF20JV	HD6432638XXXFL	HD6432638XXXFJ	HD6432638UXXXFL	HD6432638UXXXFJ	HD6432638WXXXFJ	HD6432638WXXXFL	HD64F2639UF20JV	HD64F2639UF16LV	HD64F2639WF20JV	HD64F2639WF16LV	HD6432639UXXXFJ	HD6432639UXXXFL	HD6432639WXXXFL	HD6432639WXXXFJ

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8S/2600 Series)

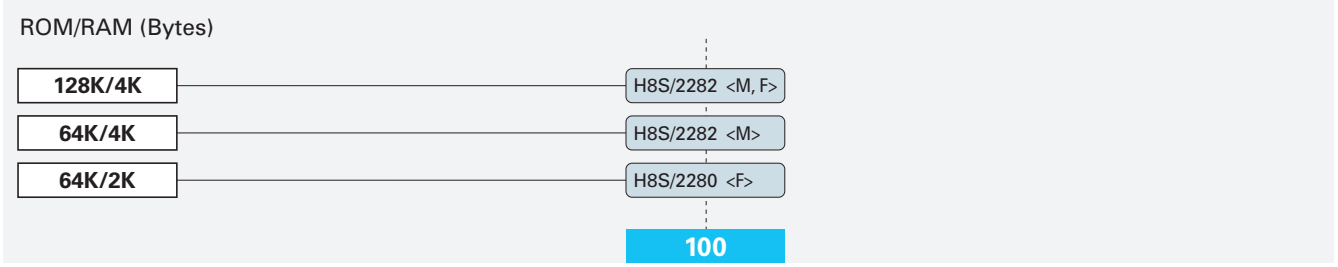
Group		H8S/2646				H8S/2648				H8S/2649			
Memory	ROM (Bytes)	64K	128K			64K	128K			256K			
	RAM (Bytes)	2K	4K			2K	4K			8K			
	ROM Type*1	M	F	M			F	M		F	M		
	Program Security	—	Yes (H/W Protect, S/W Protect, Error Protect)	—			Yes (H/W Protect, S/W Protect, Error Protect)	—		Yes (H/W Protect, S/W Protect, Error Protect)	—		
CPU	CPU	H8S/2600 Core											
	Basic Instructions	69											
	Minimum Instruction Execution Time (ns)	50 (@20MHz)											
	Multiplier	16 × 16 → 32											
	Multiply-Accumulate Instruction	16 × 16 + 42 → 42											
DMA	DMAC (Channels)	—											
	EXDMAC	—											
	DTC/DMAC II	DTC											
External Bus Expansion	Address Space (Bytes)	16M											
	Bus State Controller	Direct connection to SRAM/ROM is supported											
	Bus Structure	Separate bus (8/16-bit)											
	SDRAM Controller	—											
	DRAM Controller	—											
	Host Interface	—											
Clock	Clock Generation Circuit	2 circuits(Main clock, sub clock)											
	PLL	Yes (× 1, × 2, × 4)											
	Subclock	Yes											
	RTC	Yes (WDT for watch)											
	Frequency Divider	1/n (n = 1, 2, 4, 8 ,16, 32)											
	Power Save	Medium-speed/Sleep/Module stop/Watch/Sub active/Sub sleep/Software standby/Hardware standby											
A/D Converter	Resolution × Channels	10-bit × 12								10-bit × 16			
	Sample and Hold	Yes											
D/A Converter	Resolution × Channels	—											
Timer	8-bit	—											
	16-bit	6 (TPU)											
	32-bit	—											
	Input Capture	6 (shared with TPU)											
	Output Compare	6 (shared with TPU)											
	PWM Output	8 (shared with 2 (PWM) + 6 (TPU))											
	Real-Time Port	—											
	Programmable Pulse Generator	8 (shared with TPU + PPG)											
	Event Counter	4 (shared with TPU)											
	2-Phase Encoder Input	2 (shared with TPU)											
Watchdog Timer		2											
Serial Interface	Clock Sync./Clock Async.	2				3				4			
I²C-bus		—											
IEBus		—											
Smart Card/SIM		2				3				4			
Synchronous Serial Communication Unit/Special Serial I/O		—											
CAN	Channels	1											
	Message Box (Numbers)	16 × 1											
Ethernet		—											
USB Function		—											
LPC/ISA		—											
IrDA		—											
LCD		24seg × 4com				40seg × 4com							
CRC Calculation Circuit		—											
I/O Ports	Input Only (Numbers)	16											
	CMOS Output Only (Numbers)	—											
	CMOS I/O (Numbers)	92											
	High Voltage Port (Numbers)	—											
	N-Channel Open Drain Port (Numbers)	32											
	DTMF	—											
	High Current Drive Port	16											
	Pull-Up Resistor	40											
	NMOS Push-Pull	—											
External Interrupts Pins		7 (NMI + IRQ (6))											
Debugging Function	Boundary Scan/JTAG	—											
	On-Chip Debug	Yes (PC break)											
	On-Board Flash Program	—	Yes				Yes			Yes			
Other Functions	ROM Correction Function	—											
	Others	10-bit PWM Timer (× 2)											
Operating Frequency/Supply Voltage		20MHz/4.5 to 5.5V	16MHz/4.5 to 5.5V	20MHz/4.5 to 5.5V	16MHz/4.5 to 5.5V	20MHz/4.5 to 5.5V	16MHz/4.5 to 5.5V	16MHz/4.5 to 5.5V	20MHz/4.5 to 5.5V	16MHz/4.5 to 5.5V	20MHz/4.5 to 5.5V		
Operating Ambient Temperature (°C)		–40 to 85	–40 to 105	–40 to 85	–40 to 105	–40 to 85	–40 to 105		–40 to 85	–40 to 105	–40 to 85	–40 to 105	–40 to 85
Package*2		PRQP0144KA-A	PRQP0144KB-A	PRQP0144KA-A		PRQP0144KB-A	PRQP0144KA-A						
Part No.		HD6432645XXXFCJ	HD6432645XXXFCL	HD64F2646RFC16L	HD64F2646RFC20JV	HD6432646XXXFCL	HD6432646XXXFCJ	HD6432647XXXFCJ	HD6432647XXXFCL	HD64F2648RFC16LV	HD64F2648RFC20JV	HD6432648XXXFCJ	HD6432648XXXFCL

Part No.				
	HD64F2649FC20JV	HD64F2649FC20LV	HD6432649XXXFCL	HD6432649XXXFCJ

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★ : New product ★★ : Under development

• Memory Capacity (ROM/RAM) (H8S/2200 Series)



Letters in brackets < > indicate memory variations.
F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

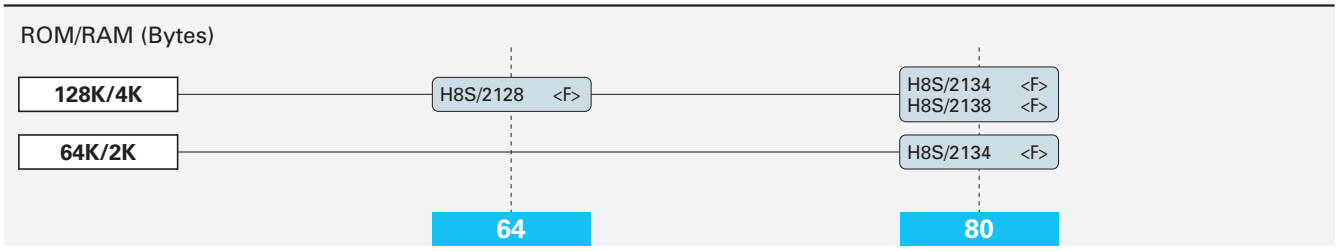
• Specifications (H8S/2200 Series)

Group		H8S/2280			H8S/2282					
Memory	ROM (Bytes)	64K			128K					
	RAM (Bytes)	2K			4K					
	ROM Type*1	F			M	F		M		
	Program Security	Yes (H/W Protect, S/W Protect, Error Protect)			—	Yes (H/W Protect, S/W Protect, Error Protect)		—		
CPU	CPU	H8S/2000 Core								
	Basic Instructions	65								
	Minimum Instruction Execution Time (ns)	50 (@20MHz)								
	Multiplier	—								
	Multiply-Accumulate Instruction	—								
DMA	DMAC (Channels)	—								
	EXDMAC	—								
	DTC/DMAC Ⅱ	—								
External Bus Expansion	Address Space (Bytes)	16M								
	Bus State Controller	—								
	Bus Structure	—								
	SDRAM Controller	—								
	DRAM Controller	—								
	Host Interface	—								
Clock	Clock Generation Circuit	1 circuit (Main clock)								
	PLL	Yes (× 1, × 2, × 4)								
	Subclock	Yes (128 division)								
	RTC	Yes (WDT for watch)								
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16, 32)								
	Power Save	Medium-speed/Sleep/Module stop/Watch/Sub active/Sub sleep/Software standby/Hardware standby								
A/D Converter	Resolution × Channels	10-bit × 8		10-bit × 6	10-bit × 8					
	Sample and Hold	Yes								
D/A Converter	Resolution × Channels	—								
Timer	8-bit	—								
	16-bit	3 (TPU)								
	32-bit	—								
	Input Capture	3 (shared with TPU)								
	Output Compare	3 (shared with TPU)								
	PWM Output	5 (shared with 2 (PWM), 3 (TPU))								
	Real-Time Port	—								
	Programmable Pulse Generator	—								
	Event Counter	3 (shared with TPU)								
	2-Phase Encoder Input	2 (shared with TPU)								
Watchdog Timer		2								
Serial Interface	Clock Sync./Clock Async.	2								
I²C-bus		—								
IEBus		—								
Smart Card/SIM		2								
Synchronous Serial Communication Unit/Special Serial I/O		—								
CAN	Channels	—			1					
	Message Box (Numbers)	—			16					
Ethernet		—								
USB Function		—								
LPC/ISA		—								
IrDA		—								
LCD		28seg × 4com		32seg × 4com	28seg × 4com					
CRC Calculation Circuit		—								
I/O Ports	Input Only (Numbers)	8								
	CMOS Output Only (Numbers)	—								
	CMOS I/O (Numbers)	66			64					
	High Voltage Port (Numbers)	—								
	N-Channel Open Drain Port (Numbers)	30								
	DTMF	—								
	High Current Drive Port	—								
	Pull-Up Resistor	—								
	NMOS Push-Pull	—								
External Interrupts Pins		7 (NMI + IRQ (6))								
Debugging Function	Boundary Scan/JTAG	—								
	On-Chip Debug	—								
	On-Board Flash Program	Yes			—	Yes		—		
Other Functions	ROM Correction Function	—								
	Others	10-bit PWM Timer (× 2)								
Operating Frequency/Supply Voltage		20MHz/4.5 to 5.5V								
Operating Ambient Temperature (°C)		–40 to 105	–40 to 85	–40 to 105	–40 to 85	–40 to 105		–40 to 85		–40 to 105
Package*2		PRQP0100JE-B								
Part No.		HD64F2280F20BLV	HD64F2280F20BJV	HD64F2280RF20BLV	HD64F2280RF20BJV	HD6432281XXXFJ	HD6432281XXXFL	HD64F2282F20LV	HD64F2282F20JV	HD6432282XXXFJ	HD6432282XXXFL

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*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Memory Capacity (ROM/RAM) (H8S/2100 Series)



Letters in brackets < > indicate memory variations.
F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

Pin count

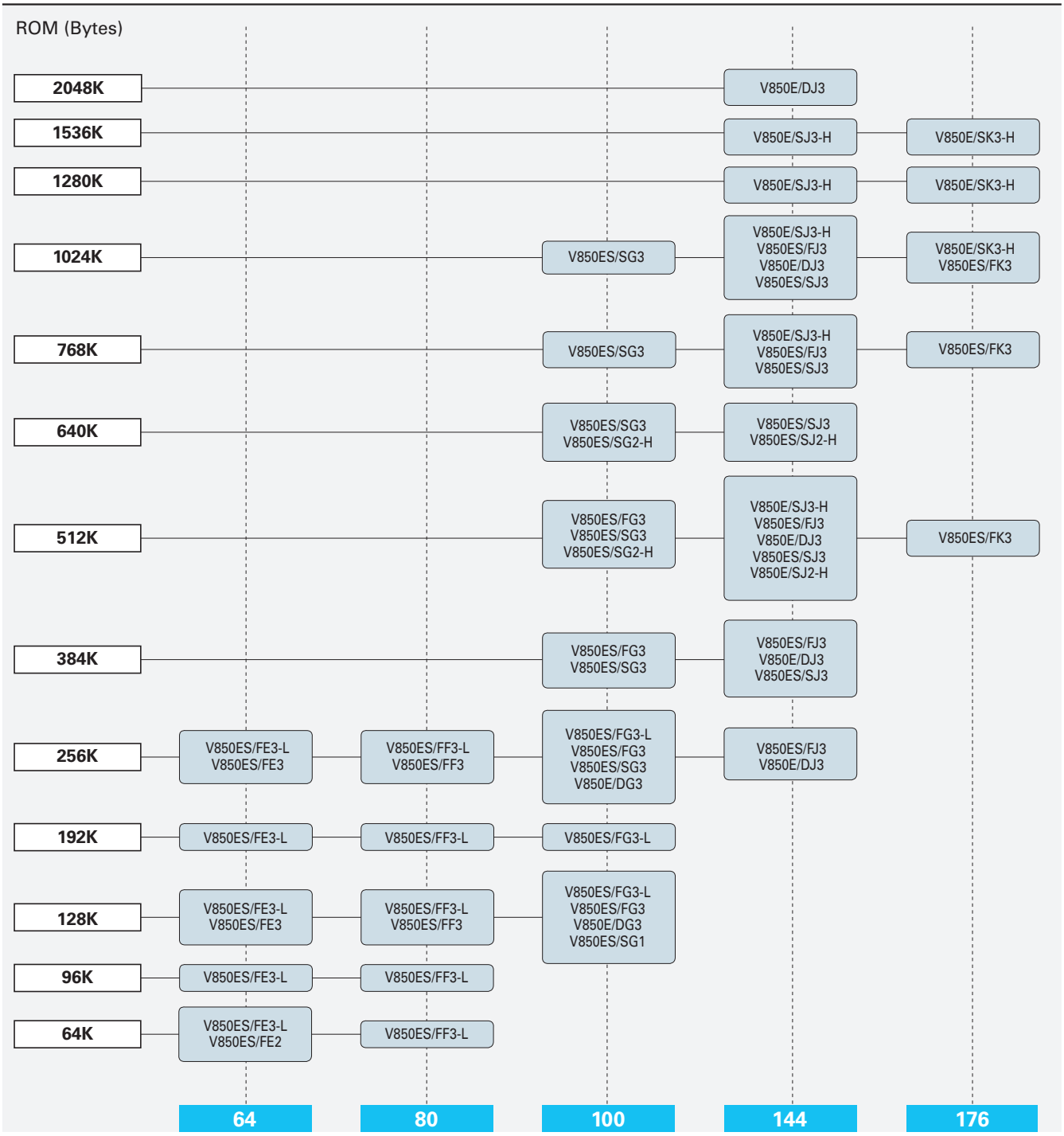
• Specifications (H8S/2100 Series)

Group		H8S/2128	H8S/2134		H8S/2138
Memory	ROM (Bytes)	128K	64K	128K	
	RAM (Bytes)	4K	2K	4K	
	ROM Type*1	F			
	Program Security	Yes			
CPU	CPU	H8S/2000 Core			
	Basic Instructions	65			
	Minimum Instruction Execution Time (ns)	100 (@10MHz), 50 (@20MHz)			
	Multiplier	—			
	Multiply-Accumulate Instruction	—			
DMA	DMAC (Channels)	—			
	EXDMAC	—			
	DTC/DMAC Ⅱ	DTC (85 channels)	—		DTC (85 channels)
External Bus Expansion	Address Space (Bytes)	16M			
	Bus State Controller	Direct connection to SRAM/ROM is supported			
	Bus Structure	Separate bus (8-bit)			
	SDRAM Controller	—			
	DRAM Controller	—			
	Host Interface	—			Yes (ISA)
Clock	Clock Generation Circuit	1 circuit (System clock)			
	PLL	—			
	Subclock	—			
	RTC	—			
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16, 32)			
	Power Save	Medium-speed/Sleep/Module stop/Watch/Sub active/Sub sleep/Software standby/Hardware standby			
A/D Converter	Resolution × Channels	10-bit × 8, 10-bit × 8 (expanded A/D input)			
	Sample and Hold	Yes			
D/A Converter	Resolution × Channels	—	8-bit × 2		
Timer	8-bit	4 (TMR0, TMR1, TMRX, TMRY)	3 (TMR0, TMR1, TMRY)		4 (TMR0, TMR1, TMRX, TMRY)
	16-bit	1 (FRT)			
	32-bit	—			
	Input Capture	5 (shared with FRT, TMR)	4 (shared with FRT)		5 (shared with FRT, TMR)
	Output Compare	5 (shared with FRT, TMR)			
	PWM Output	18 (PWMX × 2, PWM × 16)	2 (PWMX)		18 (PWMX × 2, PWM × 16)
	Real-Time Port	—			
	Programmable Pulse Generator	—			
	Event Counter	—			
	2-Phase Encoder Input	—			
Watchdog Timer		2			
Serial Interface	Clock Sync./Clock Async.	2	3		
I²C-bus		2	—		2
IEBus		—			
Smart Card/SIM		—			
Synchronous Serial Communication Unit/Special Serial I/O		—			
CAN	Channels	—			
	Message Box (Numbers)	—			
Ethernet		—			
USB Function		—			
LPC/ISA		—			Yes
IrDA		—	Yes		
LCD		—			
CRC Calculation Circuit		—			
I/O Ports	Input Only (Numbers)	9			
	CMOS Output Only (Numbers)	—			
	CMOS I/O (Numbers)	40	57		55
	High Voltage Port (Numbers)	—			
	N-Channel Open Drain Port (Numbers)	2	—		2
	DTMF	—			
	High Current Drive Port	24			
	Pull-Up Resistor	24			
	NMOS Push-Pull	2	—		2
External Interrupts Pins		4	9		
Debugging Function	Boundary Scan/JTAG	—			
	On-Chip Debug	—			
	On-Board Flash Program	Yes			
Other Functions	ROM Correction Function	—			
	Others	—			
Operating Frequency/Supply Voltage		20MHz/4.5 to 5.5V, 16MHz/4.0 to 5.5V			
Operating Ambient Temperature (˚C)		–40 to 85			
Package*2		PRQP0064GB-A	PRQP0080JB-A		
Part No.		**HD64F2128FA20JV**	**HD64F2132RFA20JV**	**HD64F2134FA20JV**	**HD64F2138FA20JV**

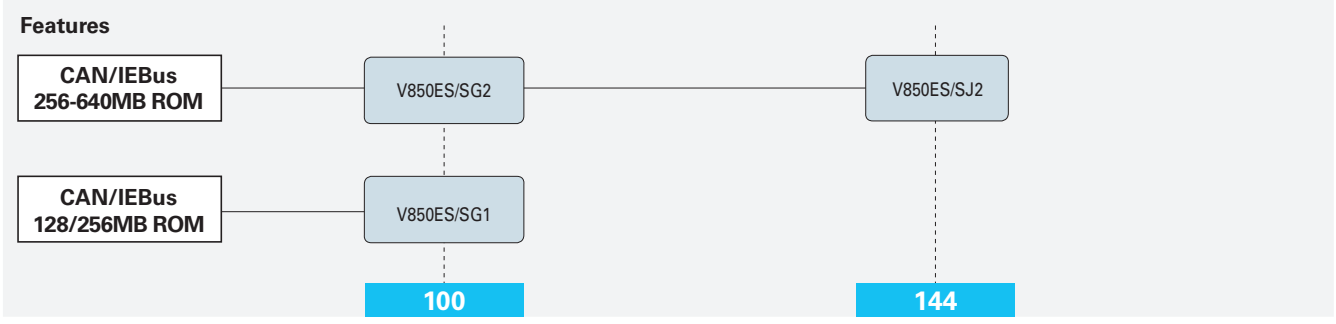
*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Memory Capacity (V850 MCUs)



Pin count



Pin count

• Specifications (V850E/SJ3-H (1/2))

Group		μPD70F3474A	μPD70F3475A	μPD70F3476A	μPD70F3477A	μPD70F3478A	μPD70F3479A
Memory	ROM Size (Bytes)	1.25M			1.5M		
	ROM Type	Flash					
	Single-Power-Supply Flash Memory	Yes					
	RAM Size (Bytes)	92K					
Clock	Maximum Operating Frequency (MHz)	48					
	On-Chip Oscillator (Hz)	220k					
	Subclock (32.768kHz)	Yes					
I/O	I/O Ports	128					
Bus	External Data/Address Bus	16/24					
Timer	16-bit Timer	13					
	8-bit Timer	—					
	Other Timers	Real-Time Counter					
	Watch Timer	1					
	Watchdog Timer	1					
	PWM Output	16 bits × 12					
Serial Interface	UART	2					
	UART Supporting LIN-bus	1					
	UART, CSI	—					
	UART Supporting LIN-bus, CSI	2					
	UART, I²C	—					
	UART Supporting LIN-bus, I²C	2					
	CSI	3					
	CSI, I²C	1					
	CSI with Automatic Transmission/Reception Function	1					
	I²C	2					
	IEBus	1	—		1	—	
	CAN	—		1	—		1
	CAN/IEBus	—	1		—	1	
OCD	On-Chip Debugger	Yes					
Peripheral Functions	LCD (Segments × Commons)	—					
	12-bit A/D Converter	—					
	10-bit A/D Converter	16					
	8-bit D/A Converter	2					
	Other Functions	LVI, CLM, DMA, ROMC, CRC					
Others	Power Supply Voltage (V)	2.85 to 3.6					
	Package (size: mm)	144-LQFP (20 × 20)					
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-V850MINIL (MINICUBE) QB-V850ESX3H (IECUBE)					
Package		P144GJ-50-GAE-2					
Part No.		μPD70F3474AGJA-GAE-G	μPD70F3475AGJA-GAE-G	μPD70F3476AGJA-GAE-G	μPD70F3477AGJA-GAE-G	μPD70F3478AGJA-GAE-G	μPD70F3479AGJA-GAE-G

Remark LVI: Low-voltage indicator
CLM: Clock monitor
ROMC: ROM correction

★ : New product ★★ : Under development

• Specifications (V850E/SJ3-H (2/2))

Group		μPD70F3931A	μPD70F3932A	μPD70F3933A	μPD70F3934A	μPD70F3935A	μPD70F3936A	μPD70F3937A	μPD70F3938A	μPD70F3939A
Memory	ROM Size (Bytes)	512K			768K			1M		
	ROM Type	Flash								
	Single-Power-Supply Flash Memory	Yes								
	RAM Size (Bytes)	60K			76K					
Clock	Maximum Operating Frequency (MHz)	48								
	On-Chip Oscillator (Hz)	220k								
	Subclock (32.768kHz)	Yes								
I/O	I/O Ports	128								
Bus	External Data/Address Bus	16/24								
Timer	16-bit Timer	13								
	8-bit Timer	—								
	Other Timers	Real-Time Counter								
	Watch Timer	1								
	Watchdog Timer	1								
	PWM Output	16 bits × 12								
Serial Interface	UART	2								
	UART Supporting LIN-bus	2			1					
	UART, CSI	—								
	UART Supporting LIN-bus, CSI	2								
	UART, I²C	—								
	UART Supporting LIN-bus, I²C	2								
	CSI	3			4					
	CSI, I²C	1								
	UART Supporting LIN-bus, CSI, I²C	—			1					
	I²C	1			2					
	IEBus	1	—		1	—		1	—	
	CAN	—		1	—		1	—		1
	CAN/IEBus	—	1		—	1		—	1	
OCD	On-Chip Debugger	Yes								
Peripheral Functions	LCD (Segments x Commons)	—								
	12-bit A/D Converter	—								
	10-bit A/D Converter	16								
	8-bit D/A Converter	2								
	Other Functions	LVI, CLM, DMA, ROMC, CRC								
Others	Power Supply Voltage (V)	2.85 to 3.6								
	Package (size: mm)	144-LQFP (20 × 20)								
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-V850MINIL (MINICUBE) QB-V850ESX3H (IECUBE)								
Package		P144GJ-50-GAE-2								
Part No.		μPD70F3931AGJA-GAE-G	μPD70F3932AGJA-GAE-G	μPD70F3933AGJA-GAE-G	μPD70F3934AGJA-GAE-G	μPD70F3935AGJA-GAE-G	μPD70F3936AGJA-GAE-G	μPD70F3937AGJA-GAE-G	μPD70F3938AGJA-GAE-G	μPD70F3939AGJA-GAE-G

Remark LVI: Low-voltage indicator
CLM: Clock monitor
ROMC: ROM correction

★ : New product ★★ : Under development

• Specifications (V850E/SK3-H (1/2))

Group		μPD70F3480A	μPD70F3481A	μPD70F3482A
Memory	ROM Size (Bytes)	1.5M		
	ROM Type	Flash		
	Single-Power-Supply Flash Memory	Yes		
	RAM Size (Bytes)	92K		
Clock	Maximum Operating Frequency (MHz)	48		
	On-Chip Oscillator (Hz)	220k		
	Subclock (32.768kHz)	Yes		
I/O	I/O Ports	156		
Bus	External Data/Address Bus	16/24		
Timer	16-bit Timer	13		
	8-bit Timer	—		
	Other Timers	Real-Time Counter		
	Watch Timer	1		
	Watchdog Timer	1		
	PWM Output	16 bits × 12		
Serial Interface	UART	2		
	UART Supporting LIN-bus	1		
	UART, CSI	—		
	UART Supporting LIN-bus, CSI	2		
	UART, I^2C	—		
	UART Supporting LIN-bus, I^2C	2		
	CSI	3		
	CSI, I^2C	1		
	CSI with Automatic Transmission/Reception Function	1		
	I^2C	2		
	IEBus	1	—	
	CAN	—		1
	CAN/IEBus	—	1	
OCD	On-Chip Debugger	Yes		
Peripheral Functions	LCD (Segments × Commons)	—		
	12-bit A/D Converter	—		
	10-bit A/D Converter	16		
	8-bit D/A Converter	2		
	Other Functions	LVI, CLM, DMA, ROMC, CRC		
Others	Power Supply Voltage (V)	2.85 to 3.6		
	Package (size: mm)	176-LQFP (24 × 24)		
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-V850MINIL (MINICUBE) QB-V850ESX3H (IECUBE)		
Package		P176GM-50-GAR		
Part No.		μPD70F3480AGMA-GAR-G	μPD70F3481AGMA-GAR-G	μPD70F3482AGMA-GAR-G

Remark LVI: Low-voltage indicator
CLM: Clock monitor
ROMC: ROM correction

★ : New product ★★ : Under development

• Specifications (V850E/SK3-H (2/2))

Group		μPD70F3486A	μPD70F3487A	μPD70F3488A	μPD70F3925A	μPD70F3926A	μPD70F3927A
Memory	ROM Size (Bytes)	1.25M			1M		
	ROM Type	Flash					
	Single-Power-Supply Flash Memory	Yes					
	RAM Size (Bytes)	92K			76K		
Clock	Maximum Operating Frequency (MHz)	48					
	On-Chip Oscillator (Hz)	220k					
	Subclock (32.768kHz)	Yes					
I/O	I/O Ports	156					
Bus	External Data/Address Bus	16/24					
Timer	16-bit Timer	13					
	8-bit Timer	—					
	Other Timers	Real-Time Counter					
	Watch Timer	1					
	Watchdog Timer	1					
	PWM Output	16 bits × 12					
Serial Interface	UART	2					
	UART Supporting LIN-bus	1					
	UART, CSI	—					
	UART Supporting LIN-bus, CSI	2					
	UART, I²C	—					
	UART Supporting LIN-bus, I²C	2					
	CSI	3					
	CSI, I²C	1					
	CSI with Automatic Transmission/Reception Function	1					
	I²C	2					
	IEBus	1	—		1	—	
	CAN	—		1	—		1
	CAN/IEBus	—	1		—	1	
OCD	On-Chip Debugger	Yes					
Peripheral Functions	LCD (Segments x Commons)	—					
	12-bit A/D Converter	—					
	10-bit A/D Converter	16					
	8-bit D/A Converter	2					
	Other Functions	LVI, CLM, DMA, ROMC, CRC					
Others	Power Supply Voltage (V)	2.85 to 3.6					
	Package (size: mm)	176-LQFP (24 × 24)					
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-V850MINIL (MINICUBE) QB-V850ESX3H (IECUBE)					
Package		P176GM-50-GAR					
Part No.		μPD70F3486AGMA-GAR-G	μPD70F3487AGMA-GAR-G	μPD70F3488AGMA-GAR-G	μPD70F3925AGMA-GAR-G	μPD70F3926AGMA-GAR-G	μPD70F3927AGMA-GAR-G

Remark LVI: Low-voltage indicator
CLM: Clock monitor
ROMC: ROM correction

★ : New product ★★ : Under development

• Specifications (V850ES/FE3, V850ES/FF3)

Group		V850ES/FE3		V850ES/FF3	
		μPD70F3370A	μPD70F3371	μPD70F3372	μPD70F3373
Memory	ROM Size (Bytes)	128K	256K	128K	256K
	ROM Type	Flash			
	Single-Power-Supply Flash Memory	Yes			
	RAM Size (Bytes)	8K	16K	8K	16K
Clock	Maximum Operating Frequency (MHz)	32			
	On-Chip Oscillator (Hz)	8M, 240k			
	Subclock (32.768kHz)	Yes			
I/O	I/O Ports	51		67	
Bus	External Data/Address Bus	—/—			
Timer	16-bit Timer	7			
	8-bit Timer	—			
	Other Timers	—			
	Watch Timer	1			
	Watchdog Timer	1			
	PWM Output	16 bits × 8 (6 phases, 16 bits × 1)			
Serial Interface	UART	—			
	UART Supporting LIN-bus	2			
	UART, CSI	—			
	UART Supporting LIN-bus, CSI	—			
	UART, I^2C	—			
	UART Supporting LIN-bus, I^2C	—			
	CSI	2			
	CSI, I^2C	—			
	CSI with Automatic Transmission/Reception Function	—			
	I^2C	1			
	IEBus	—			
	CAN	1			
	CAN/IEBus	—			
OCD	On-Chip Debugger	Yes			
Peripheral Functions	LCD (Segments x Commons)	—			
	12-bit A/D Converter	—			
	10-bit A/D Converter	10		12	
	8-bit D/A Converter	—			
	Other Functions	POC, LVI, CLM, DMA			
Others	Power Supply Voltage (V)	3.3 to 5.5			
	Package (size: mm)	64-LQFP (10 × 10)		80-LQFP (12 × 12))	
	In-Circuit Emulator Emulation Board	QB-V850MINIL (MINICUBE) QB-V850ESFX3 (IECUBE)			
Package		P64GB-50-GAH		P80GK-50-GAK	
Part No.		μPD70F3370AM1GBA-GAH-AX μPD70F3370AM2GBA-GAH-AX	μPD70F3371M1GBA-GAH-AX μPD70F3371M2GBA-GAH-AX	μPD70F3372M1GKA-GAK-AX μPD70F3372M2GKA-GAK-AX	μPD70F3373M1GKA-GAK-AX μPD70F3373M2GKA-GAK-AX

Remark POC: Power-on clear
LVI: Low-voltage indicator
CLM: Clock monitor

★ : New product ★★ : Under development

• Specifications (V850ES/FG3)

Group		μPD70F3374	μPD70F3375	μPD70F3376A	μPD70F3377A
Memory	ROM Size (Bytes)	128K	256K	384K	512K
	ROM Type	Flash			
	Single-Power-Supply Flash Memory	Yes			
	RAM Size (Bytes)	8K	16K	24K	32K
Clock	Maximum Operating Frequency (MHz)	32		40	
	On-Chip Oscillator (Hz)	8M, 240k			
	Subclock (32.768kHz)	Yes			
I/O	I/O Ports	84			
Bus	External Data/Address Bus	—/—			
Timer	16-bit Timer	8			
	8-bit Timer	—			
	Other Timers	—			
	Watch Timer	1			
	Watchdog Timer	1			
	PWM Output	16 bits × 11 (6 phases, 16 bits × 1)			
Serial Interface	UART	—			
	UART Supporting LIN-bus	3		5	
	UART, CSI	—			
	UART Supporting LIN-bus, CSI	—			
	UART, I^2C	—			
	UART Supporting LIN-bus, I^2C	—			
	CSI	2			
	CSI, I^2C	—			
	CSI with Automatic Transmission/Reception Function	—			
	I^2C	1			
	IEBus	—			
	CAN	2			
	CAN/IEBus	—			
OCD	On-Chip Debugger	Yes			
Peripheral Functions	LCD (Segments x Commons)	—			
	12-bit A/D Converter	—			
	10-bit A/D Converter	16			
	8-bit D/A Converter	—			
	Other Functions	POC, LVI, CLM, DMA			
Others	Power Supply Voltage (V)	3.3 to 5.5			
	Package (size: mm)	100-LQFP (14 × 14)			
	In-Circuit Emulator Emulation Board	QB-V850MINIL (MINICUBE) QB-V850ESFX3 (IECUBE)			
Package		P100GC-50-UEU-1			
Part No.		μPD70F3374M1GCA-UEU-AX μPD70F3374M2GCA-UEU-AX	μPD70F3375M1GCA-UEU-AX μPD70F3375M2GCA-UEU-AX	μPD70F3376AM1GCA-UEU-AX μPD70F3376AM2GCA-UEU-AX	μPD70F3377AM1GCA-UEU-AX μPD70F3377AM2GCA-UEU-AX

Remark POC: Power-on clear
LVI: Low-voltage indicator
CLM: Clock monitor

★ : New product ★★ : Under development

• Specifications (V850ES/FJ3)

Group		μPD70F3378	μPD70F3379	μPD70F3380	μPD70F3381	μPD70F3382
Memory	ROM Size (Bytes)	256K	384K	512K	768K	1M
	ROM Type	Flash				
	Single-Power-Supply Flash Memory	Yes				
	RAM Size (Bytes)	16K	24K	32K	40K	48K
Clock	Maximum Operating Frequency (MHz)	32	48			
	On-Chip Oscillator (Hz)	8M, 240k				
	Subclock (32.768kHz)	Yes				
I/O	I/O Ports	128				
Bus	External Data/Address Bus	—/—				
Timer	16-bit Timer	9				
	8-bit Timer	—				
	Other Timers	—				
	Watch Timer	1				
	Watchdog Timer	1				
	PWM Output	16 bits × 14 (6 phases, 16 bits × 1)				
Serial Interface	UART	—				
	UART Supporting LIN-bus	3	6			
	UART, CSI	—				
	UART Supporting LIN-bus, CSI	—				
	UART, I²C	—				
	UART Supporting LIN-bus, I²C	—				
	CSI	3				
	CSI, I²C	—				
	CSI with Automatic Transmission/Reception Function	—				
	I²C	1				
	IEBus	—				
	CAN	2	4			
	CAN/IEBus	—				
OCD	On-Chip Debugger	Yes				
Peripheral Functions	LCD (Segments × Commons)	—				
	12-bit A/D Converter	—				
	10-bit A/D Converter	24				
	8-bit D/A Converter	—				
	Other Functions	POC, LVI, CLM, DMA				
Others	Power Supply Voltage (V)	3.3 to 5.5				
	Package (size: mm)	144-LQFP (20 × 20)				
	In-Circuit Emulator Emulation Board	QB-V850MINIL (MINICUBE) QB-V850ESFX3 (IECUBE)				
Package		P144GJ-50-GAE-2				
Part No.		μPD70F3378M1GJA-GAE-AX μPD70F3378M2GJA-GAE-AX	μPD70F3379M1GJA-GAE-AX μPD70F3379M2GJA-GAE-AX	μPD70F3380M1GJA-GAE-AX μPD70F3380M2GJA-GAE-AX	μPD70F3381M1GJA-GAE-AX μPD70F3381M2GJA-GAE-AX	μPD70F3382M1GJA-GAE-AX μPD70F3382M2GJA-GAE-AX

Remark POC: Power-on clear
LVI: Low-voltage indicator
CLM: Clock monitor

★ : New product ★★ : Under development

• Specifications (V850ES/FK3)

Group		μPD70F3383	μPD70F3384	μPD70F3385
Memory	ROM Size (Bytes)	512K	768K	1M
	ROM Type	Flash		
	Single-Power-Supply Flash Memory	Yes		
	RAM Size (Bytes)	32K	48K	60K
Clock	Maximum Operating Frequency (MHz)	48		
	On-Chip Oscillator (Hz)	8M, 240k		
	Subclock (32.768kHz)	Yes		
I/O	I/O Ports	152		
Bus	External Data/Address Bus	—/—		
Timer	16-bit Timer	12		
	8-bit Timer	—		
	Other Timers	—		
	Watch Timer	1		
	Watchdog Timer	1		
	PWM Output	16 bits × 17 (6 phases, 16 bits × 1)		
Serial Interface	UART	—		
	UART Supporting LIN-bus	8		
	UART, CSI	—		
	UART Supporting LIN-bus, CSI	—		
	UART, I^2C	—		
	UART Supporting LIN-bus, I^2C	—		
	CSI	4		
	CSI, I^2C	—		
	CSI with Automatic Transmission/Reception Function	—		
	I^2C	1		
	IEBus	—		
	CAN	5		
	CAN/IEBus	—		
OCD	On-Chip Debugger	Yes		
Peripheral Functions	LCD (Segments x Commons)	—		
	12-bit A/D Converter	—		
	10-bit A/D Converter	24 + 16		
	8-bit D/A Converter	—		
	Other Functions	POC, LVI, CLM, DMA		
Others	Power Supply Voltage (V)	3.3 to 5.5		
	Package (size: mm)	176-LQFP (24 × 24)		
	In-Circuit Emulator Emulation Board	QB-V850MINIL (MINICUBE) QB-V850ESFX3 (IECUBE)		
Package		P176GM-50-GAR		
Part No.		μPD70F3383M1GMA-GAR-AX μPD70F3383M2GMA-GAR-AX	μPD70F3384M1GMA-GAR-AX μPD70F3384M2GMA-GAR-AX	μPD70F3385M1GMA-GAR-AX μPD70F3385M2GMA-GAR-AX

Remark POC: Power-on clear
LVI: Low-voltage indicator
CLM: Clock monitor

★ : New product ★★ : Under development

• Specifications (V850ES/FE3-L)

Group		μPD70F3610	μPD70F3611	μPD70F3612	μPD70F3613	μPD70F3614
Memory	ROM Size (Bytes)	64K	96K	128K	192K	256K
	ROM Type	Flash				
	Single-Power-Supply Flash Memory	Yes				
	RAM Size (Bytes)	6K		8K	12K	16K
Clock	Maximum Operating Frequency (MHz)	20				
	On-Chip Oscillator (Hz)	8M, 240k				
	Subclock (32.768kHz)	—				
I/O	I/O Ports	51				
Bus	External Data/Address Bus	—/—				
Timer	16-bit Timer	—				
	8-bit Timer	—				
	Other Timers	—				
	Watch Timer	1				
	Watchdog Timer	—				
	PWM Output	—				
Serial Interface	UART	—				
	UART Supporting LIN-bus	—				
	UART, CSI	—				
	UART Supporting LIN-bus, CSI	—				
	UART, I^2C	—				
	UART Supporting LIN-bus, I^2C	—				
	CSI	—				
	CSI, I^2C	—				
	CSI with Automatic Transmission/Reception Function	—				
	I^2C	—				
	IEBus	—				
	CAN	—				
	CAN/IEBus	—				
OCD	On-Chip Debugger	—				
Peripheral Functions	LCD (Segments × Commons)	—				
	12-bit A/D Converter	—				
	10-bit A/D Converter	10				
	8-bit D/A Converter	—				
	Other Functions	—				
Others	Power Supply Voltage (V)	3.3 to 5.5				
	Package (size: mm)	64-LQFP (10 × 10)				
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-V850MINIL (MINICUBE) QB-V850ESFX3 (IECUBE)				
Package		P64GB-50-GAH				
Part No.		μPD70F3610M1GBA-GAH-AX μPD70F3610M2GBA-GAH-AX	μPD70F3611M1GBA-GAH-AX μPD70F3611M2GBA-GAH-AX	μPD70F3612M1GBA-GAH-AX μPD70F3612M2GBA-GAH-AX	μPD70F3613M1GBA-GAH-AX μPD70F3613M2GBA-GAH-AX	μPD70F3614M1GBA-GAH-AX μPD70F3614M2GBA-GAH-AX

★ : New product ★★ : Under development

• Specifications (V850ES/FF3-L)

Group		μPD70F3615	μPD70F3616	μPD70F3617	μPD70F3618	μPD70F3619
Memory	ROM Size (Bytes)	64K	96K	128K	192K	256K
	ROM Type	Flash				
	Single-Power-Supply Flash Memory	Yes				
	RAM Size (Bytes)	6K		8K	12K	16K
Clock	Maximum Operating Frequency (MHz)	20				
	On-Chip Oscillator (Hz)	8M, 240k				
	Subclock (32.768kHz)	—				
I/O	I/O Ports	67				
Bus	External Data/Address Bus	—/—				
Timer	16-bit Timer	—				
	8-bit Timer	—				
	Other Timers	—				
	Watch Timer	1				
	Watchdog Timer	—				
	PWM Output	—				
Serial Interface	UART	—				
	UART Supporting LIN-bus	—				
	UART, CSI	—				
	UART Supporting LIN-bus, CSI	—				
	UART, I^2C	—				
	UART Supporting LIN-bus, I^2C	—				
	CSI	—				
	CSI, I^2C	—				
	CSI with Automatic Transmission/Reception Function	—				
	I^2C	—				
	IEBus	—				
	CAN	—				
	CAN/IEBus	—				
OCD	On-Chip Debugger	—				
Peripheral Functions	LCD (Segments x Commons)	—				
	12-bit A/D Converter	—				
	10-bit A/D Converter	12				
	8-bit D/A Converter	—				
	Other Functions	—				
Others	Power Supply Voltage (V)	3.3 to 5.5				
	Package (size: mm)	80-LQFP (12 × 12)				
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-V850MINIL (MINICUBE) QB-V850ESFX3 (IECUBE)				
Package		P80GK-50-GAK				
Part No.		μPD70F3615M1GKA-GAK-AX μPD70F3615M2GKA-GAK-AX	μPD70F3616M1GKA-GAK-AX μPD70F3616M2GKA-GAK-AX	μPD70F3617M1GKA-GAK-AX μPD70F3617M2GKA-GAK-AX	μPD70F3618M1GKA-GAK-AX μPD70F3618M2GKA-GAK-AX	μPD70F3619M1GKA-GAK-AX μPD70F3619M2GKA-GAK-AX

★ : New product ★★ : Under development

• Specifications (V850ES/FG3-L)

Group		μPD70F3620	μPD70F3621	μPD70F3622
Memory	ROM Size (Bytes)	128K	192K	256K
	ROM Type	Flash		
	Single-Power-Supply Flash Memory	Yes		
	RAM Size (Bytes)	8K	12K	16K
Clock	Maximum Operating Frequency (MHz)	20		
	On-Chip Oscillator (Hz)	8M, 240k		
	Subclock (32.768kHz)	—		
I/O	I/O Ports	84		
Bus	External Data/Address Bus	—/—		
Timer	16-bit Timer	—		
	8-bit Timer	—		
	Other Timers	—		
	Watch Timer	1		
	Watchdog Timer	—		
	PWM Output	—		
Serial Interface	UART	—		
	UART Supporting LIN-bus	—		
	UART, CSI	—		
	UART Supporting LIN-bus, CSI	—		
	UART, I²C	—		
	UART Supporting LIN-bus, I²C	—		
	CSI	—		
	CSI, I²C	—		
	CSI with Automatic Transmission/Reception Function	—		
	I²C	—		
	IEBus	—		
	CAN	—		
	CAN/IEBus	—		
OCD	On-Chip Debugger	—		
Peripheral Functions	LCD (Segments × Commons)	—		
	12-bit A/D Converter	—		
	10-bit A/D Converter	16		
	8-bit D/A Converter	—		
	Other Functions	—		
Others	Power Supply Voltage (V)	3.3 to 5.5		
	Package (size: mm)	100-LQFP (14 × 14)		
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-V850MINIL (MINICUBE) QB-V850ESFX3 (IECUBE)		
Package		P100GC-50-UEU-1		
Part No.		μPD70F3620M1GCA-UEU-AX μPD70F3620M2GCA-UEU-AX	μPD70F3621M1GCA-UEU-AX μPD70F3621M2GCA-UEU-AX	μPD70F3622M1GCA-UEU-AX μPD70F3622M2GCA-UEU-AX

★ : New product ★★ : Under development

• Specifications (V850E/DG3)

Group		μPD70F3416	μPD70F3417
Memory	ROM Size (Bytes)	128K	256K
	ROM Type	Flash	
	Single-Power-Supply Flash Memory	Yes	
	RAM Size (Bytes)	6K	12K
Clock	Maximum Operating Frequency (MHz)	16	
	On-Chip Oscillator (Hz)	240k	
	Subclock (32.768kHz)	Yes	
I/O	I/O Ports	80	
Bus	External Data/Address Bus	—/—	
Timer	16-bit Timer	7	
	8-bit Timer	—	
	Other Timers	—	
	Watch Timer	1	
	Watchdog Timer	1	
	PWM Output	16 bits × 9	
Serial Interface	UART	—	
	UART Supporting LIN-bus	2	
	UART, CSI	—	
	UART Supporting LIN-bus, CSI	—	
	UART, I^2C	—	
	UART Supporting LIN-bus, I^2C	—	
	CSI	1	
	CSI, I^2C	—	
	CSI with Automatic Transmission/Reception Function	—	
	I^2C	1	
	IEBus	—	
	CAN	1	
	CAN/IEBus	—	
OCD	On-Chip Debugger	Yes	
Peripheral Functions	LCD (Segments x Commons)	40 × 4	
	12-bit A/D Converter	—	
	10-bit A/D Converter	8	
	8-bit D/A Converter	—	
	Other Functions	Meter driver × 4, POC, CLM, ROMC, sound generator	
Others	Power Supply Voltage (V)	3.2 to 5.5	
	Package (size: mm)	100-LQFP (14 × 14)	
	In-Circuit Emulator Emulation Board	QB-V850MINIL (MINICUBE) QB-V850EDJ3 (IECUBE)	
Package		P100GC-50-UEU-1	
Part No.		μPD70F3416GC (A)-UEU-AX*	μPD70F3417GC (A)-UEU-AX*

Remark POC: Power-on clear
CLM: Clock monitor
ROMC: ROM correction

★ : New product ★★ : Under development

• Specifications (V850E/DJ3)

Group		μPD70F3421	μPD70F3422	μPD70F3423	μPD70F3424	μPD70F3425	μPD70F3426
Memory	ROM Size (Bytes)	256K	384K	512K		1M	2M
	ROM Type	Flash					
	Single-Power-Supply Flash Memory	Yes					
	RAM Size (Bytes)	12K	16K	20K	24K	32K	84K
Clock	Maximum Operating Frequency (MHz)	32				64	
	On-Chip Oscillator (Hz)	240k					
	Subclock (32.768kHz)	Yes					
I/O	I/O Ports	114					
Bus	External Data/Address Bus	—/—					
Timer	16-bit Timer	13				17	
	8-bit Timer	—					
	Other Timers	—					
	Watch Timer	1					
	Watchdog Timer	1					
	PWM Output	16 bits × 16					
Serial Interface	UART	—					
	UART Supporting LIN-bus	2					
	UART, CSI	—					
	UART Supporting LIN-bus, CSI	—					
	UART, I^2C	—					
	UART Supporting LIN-bus, I^2C	—					
	CSI	2				3	
	CSI, I^2C	—					
	CSI with Automatic Transmission/Reception Function	—					
	I^2C	2					
	IEBus	—					
	CAN	2					
	CAN/IEBus	—					
OCD	On-Chip Debugger	Yes					
Peripheral Functions	LCD (Segments × Commons)	40 × 4				—	
	12-bit A/D Converter	—					
	10-bit A/D Converter	12				16	
	8-bit D/A Converter	—					
	Other Functions	Meter driver × 6, POC, CLM, DMA, ROMC, voltage comparator, sound generator				Meter driver × 6, POC, CLM, DMA, ROMC, voltage comparator, sound generator, LCD bus interface	
Others	Power Supply Voltage (V)	3.2 to 5.5					
	Package (size: mm)	144-LQFP (20 × 20)					
	In-Circuit Emulator Emulation Board	QB-V850MINIL (MINICUBE) QB-V850EDJ3 (IECUBE)					
Package		P144GJ-50-GAE-2					
Part No.		μPD70F3421GJ (A)-GAE-AX	μPD70F3422GJ (A)-GAE-AX	μPD70F3423GJ (A)-GAE-AX	μPD70F3424GJ (A)-GAE-AX	μPD70F3425GJ (A)-GAE-AX	μPD70F3426GJ (A)-GAE-AX

Remark POC: Power-on clear
CLM: Clock monitor
ROMC: ROM correction

★ : New product ★★ : Under development

• Specifications (V850E/DL3)

Group		μPD70F3427
Memory	ROM Size (Bytes)	1M
	ROM Type	Flash
	Single-Power-Supply Flash Memory	Yes
	RAM Size (Bytes)	60K
Clock	Maximum Operating Frequency (MHz)	64
	On-Chip Oscillator (Hz)	240k
	Subclock (32.768kHz)	Yes
I/O	I/O Ports	117
Bus	External Data/Address Bus	32/24
Timer	16-bit Timer	17
	8-bit Timer	—
	Other Timers	—
	Watch Timer	1
	Watchdog Timer	1
	PWM Output	16 bits × 16
Serial Interface	UART	—
	UART Supporting LIN-bus	2
	UART, CSI	—
	UART Supporting LIN-bus, CSI	—
	UART, I^2C	—
	UART Supporting LIN-bus, I^2C	—
	CSI	3
	CSI, I^2C	—
	CSI with Automatic Transmission/Reception Function	—
	I^2C	2
	IEBus	—
	CAN	2
	CAN/IEBus	—
OCD	On-Chip Debugger	Yes
Peripheral Functions	LCD (Segments x Commons)	—
	12-bit A/D Converter	—
	10-bit A/D Converter	16
	8-bit D/A Converter	—
	Other Functions	Meter driver × 6, POC, CLM, DMA, ROMC, voltage comparator, sound generator, LCD bus interface
Others	Power Supply Voltage (V)	3.2 to 5.5
	Package (size: mm)	208-LQFP (28 × 28)
	In-Circuit Emulator Emulation Board	QB-V850MINIL (MINICUBE) QB-V850EDJ3 (IECUBE)
Package		P208GD-50-LML, MML, SML, WML-7
Part No.		μPD70F3427GD (A)-LML-AX

Remark POC: Power-on clear
CLM: Clock monitor
ROMC: ROM correction

★ : New product ★★ : Under development

• Specifications (V850ES/SG1)

Group		μPD703249Y	μPD703252Y	μPD703253Y
Memory	ROM Size (Bytes)	256K		128K
	ROM Type	Mask		
	Single-Power-Supply Flash Memory	—		
	RAM Size (Bytes)	12K		8K
Clock	Maximum Operating Frequency (MHz)	20		
	On-Chip Oscillator (Hz)	200k		
	Subclock (32.768kHz)	Yes		
I/O	I/O Ports	84		
Bus	External Data/Address Bus	16/22		
Timer	16-bit Timer	6		7
	8-bit Timer	—		
	Other Timers	—		
	Watch Timer	1		
	Watchdog Timer	1		
	PWM Output	16 bits × 5		16 bits × 6
Serial Interface	UART	2		
	UART Supporting LIN-bus	—		
	UART, CSI	—		
	UART Supporting LIN-bus, CSI	—		
	UART, I^2C	—		
	UART Supporting LIN-bus, I^2C	—		
	CSI	2		
	CSI, I^2C	1		
	CSI with Automatic Transmission/Reception Function	—		
	I^2C	1		
	IEBus	—	1	—
	CAN	—		1
	CAN/IEBus	—		
OCD	On-Chip Debugger	—		
Peripheral Functions	LCD (Segments × Commons)	—		
	12-bit A/D Converter	—		
	10-bit A/D Converter	12		
	8-bit D/A Converter	—		2
	Other Functions	CLM, ROMC		LVI (2.0V only), CLM, DMA, ROMC
Others	Power Supply Voltage (V)	2.85 to 3.6		
	Package (size: mm)	100-LQFP (14 × 14) 100-QFP (14 × 20)		100-LQFP (14 × 14)
	In-Circuit Emulator Emulation Board	QB-V850MINIL (MINICUBE) QB-V850ESSX2 (IECUBE)		
Package		S100GF-65-JBT-2 S100GC-50-8EU, 8EA-2		S100GC-50-8EU, 8EA-2
Part No.		μPD703249YGF-xxx-JBT-A μPD703249YGC-xxx-8EA-A	μPD703252YGF-xxx-JBT-A μPD703252YGC-xxx-8EA-A	μPD703253YGC-xxx-8EA-A

Remark LVI: Low-voltage indicator
CLM: Clock monitor
ROMC: ROM correction

★ : New product ★★ : Under development

• Specifications (V850ES/SG2-H (1/3))

Group		μPD703262HY	μPD703263HY	μPD70F3263HY
Memory	ROM Size (Bytes)	512K	640K	
	ROM Type	Mask		Flash
	Single-Power-Supply Flash Memory	—		Yes
	RAM Size (Bytes)	40K	48K	
Clock	Maximum Operating Frequency (MHz)	32		
	On-Chip Oscillator (Hz)	200k		
	Subclock (32.768kHz)	Yes		
I/O	I/O Ports	84		
Bus	External Data/Address Bus	16/22		
Timer	16-bit Timer	8		
	8-bit Timer	—		
	Other Timers	—		
	Watch Timer	1		
	Watchdog Timer	1		
	PWM Output	16 bits × 9		
Serial Interface	UART	—		
	UART Supporting LIN-bus	—		
	UART, CSI	—		
	UART Supporting LIN-bus, CSI	1		
	UART, I²C	—		
	UART Supporting LIN-bus, I²C	2		
	CSI	3		
	CSI, I²C	1		
	CSI with Automatic Transmission/Reception Function	—		
	I²C	—		
	IEBus	—		
	CAN	—		
	CAN/IEBus	—		
OCD	On-Chip Debugger	—		Yes
Peripheral Functions	LCD (Segments x Commons)	—		
	12-bit A/D Converter	—		
	10-bit A/D Converter	12		
	8-bit D/A Converter	2		
	Other Functions	CLM, DMA, ROMC, CRC		
Others	Power Supply Voltage (V)	3.0 to 3.6		
	Package (size: mm)	100-LQFP (14 × 14)		
	In-Circuit Emulator Emulation Board	QB-V850MINIL (MINICUBE) QB-V850ESSX2 (IECUBE)		
Package		S100GC-50-8EU, 8EA-2		
Part No.		μPD703262HYGC-xxx-8EA-A	μPD703263HYGC-xxx-8EA-A	μPD70F3263HYGC-8EA-A

Remark CLM: Clock monitor
ROMC: ROM correction

★ : New product ★★ : Under development

• Specifications (V850ES/SG2-H (2/3))

Group		μPD703272HY	μPD703273HY	μPD70F3273HY
Memory	ROM Size (Bytes)	512K	640K	
	ROM Type	Mask		Flash
	Single-Power-Supply Flash Memory	—		Yes
	RAM Size (Bytes)	40K	48K	
Clock	Maximum Operating Frequency (MHz)	32		
	On-Chip Oscillator (Hz)	200k		
	Subclock (32.768kHz)	Yes		
I/O	I/O Ports	84		
Bus	External Data/Address Bus	16/22		
Timer	16-bit Timer	8		
	8-bit Timer	—		
	Other Timers	—		
	Watch Timer	1		
	Watchdog Timer	1		
	PWM Output	16 bits × 9		
Serial Interface	UART	—		
	UART Supporting LIN-bus	—		
	UART, CSI	—		
	UART Supporting LIN-bus, CSI	1		
	UART, I²C	—		
	UART Supporting LIN-bus, I²C	2		
	CSI	3		
	CSI, I²C	1		
	CSI with Automatic Transmission/Reception Function	—		
	I²C	—		
	IEBus	1		
	CAN	—		
	CAN/IEBus	—		
OCD	On-Chip Debugger	—		Yes
Peripheral Functions	LCD (Segments × Commons)	—		
	12-bit A/D Converter	—		
	10-bit A/D Converter	12		
	8-bit D/A Converter	2		
	Other Functions	CLM, DMA, ROMC, CRC		
Others	Power Supply Voltage (V)	3.0 to 3.6		
	Package (size: mm)	100-LQFP (14 × 14)		
	In-Circuit Emulator Emulation Board	QB-V850MINIL (MINICUBE) QB-V850ESSX2 (IECUBE)		
Package		S100GC-50-8EU, 8EA-2		
Part No.		μPD703272HYGC-xxx-8EA-A	μPD703273HYGC-xxx-8EA-A	μPD70F3273HYGC-8EA-A

Remark CLM: Clock monitor
ROMC: ROM correction

★ : New product ★★ : Under development

• Specifications (V850ES/SG2-H (3/3))

Group		μPD703282HY	μPD703283HY	μPD70F3283HY
Memory	ROM Size (Bytes)	512K	640K	
	ROM Type	Mask		Flash
	Single-Power-Supply Flash Memory	—		Yes
	RAM Size (Bytes)	40K	48K	
Clock	Maximum Operating Frequency (MHz)	32		
	On-Chip Oscillator (Hz)	200k		
	Subclock (32.768kHz)	Yes		
I/O	I/O Ports	84		
Bus	External Data/Address Bus	16/22		
Timer	16-bit Timer	8		
	8-bit Timer	—		
	Other Timers	—		
	Watch Timer	1		
	Watchdog Timer	1		
	PWM Output	16 bits × 9		
Serial Interface	UART	—		
	UART Supporting LIN-bus	—		
	UART, CSI	—		
	UART Supporting LIN-bus, CSI	1		
	UART, I^2C	—		
	UART Supporting LIN-bus, I^2C	2		
	CSI	3		
	CSI, I^2C	1		
	CSI with Automatic Transmission/Reception Function	—		
	I^2C	—		
	IEBus	—		
	CAN	1		
	CAN/IEBus	—		
OCD	On-Chip Debugger	—		Yes
Peripheral Functions	LCD (Segments x Commons)	—		
	12-bit A/D Converter	—		
	10-bit A/D Converter	12		
	8-bit D/A Converter	2		
	Other Functions	CLM, DMA, ROMC, CRC		
Others	Power Supply Voltage (V)	3.0 to 3.6		
	Package (size: mm)	100-LQFP (14 × 14)		
	In-Circuit Emulator Emulation Board	QB-V850MINIL (MINICUBE) QB-V850ESSX2 (IECUBE)		
Package		S100GC-50-8EU, 8EA-2		
Part No.		μPD703282HYGC-xxx-8EA-A	μPD703283HYGC-xxx-8EA-A	μPD70F3283HYGC-8EA-A

Remark CLM: Clock monitor
ROMC: ROM correction

★ : New product ★★ : Under development

• Specifications (V850ES/SG3 (1/2))

Group		μPD70F3333	μPD70F3334	μPD70F3340	μPD70F3341	μPD70F3342	μPD70F3343
Memory	ROM Size (Bytes)	256K	384K	512K	640K	768K	1M
	ROM Type	Flash					
	Single-Power-Supply Flash Memory	Yes					
	RAM Size (Bytes)	24K	32K	40K	48K	60K	
Clock	Maximum Operating Frequency (MHz)	32					
	On-Chip Oscillator (Hz)	220k					
	Subclock (32.768kHz)	Yes					
I/O	I/O Ports	84					
Bus	External Data/Address Bus	16/22					
Timer	16-bit Timer	8					
	8-bit Timer	—					
	Other Timers	—					
	Watch Timer	1					
	Watchdog Timer	1					
	PWM Output	16 bits × 9					
Serial Interface	UART	—					
	UART Supporting LIN-bus	—					
	UART, CSI	—					
	UART Supporting LIN-bus, CSI	1					
	UART, I^2C	—					
	UART Supporting LIN-bus, I^2C	2					
	CSI	3					
	CSI, I^2C	1					
	CSI with Automatic Transmission/Reception Function	—					
	I^2C	—					
	IEBus	1					
	CAN	—					
	CAN/IEBus	—					
OCD	On-Chip Debugger	Yes					
Peripheral Functions	LCD (Segments × Commons)	—					
	12-bit A/D Converter	—					
	10-bit A/D Converter	12					
	8-bit D/A Converter	2					
	Other Functions	LVI, CLM, DMA, ROMC, CRC					
Others	Power Supply Voltage (V)	2.85 to 3.6					
	Package (size: mm)	100-LQFP (14 × 14)					
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-V850MINIL (MINICUBE) QB-V850ESSX2 (IECUBE)					
Package		P100GC-50-UEU-1 S100GC-50-8EU, 8EA-2			P100GC-50-UEU-1		
Part No.		μPD70F3333GC (A)-UEU-AX μPD70F3333GC (A)-8EA-A	μPD70F3334GC (A)-UEU-AX μPD70F3334GC (A)-8EA-A	μPD70F3340GC (A)-UEU-AX μPD70F3340GC (A)-8EA-A	μPD70F3341GC (A)-UEU-AX	μPD70F3342GC (A)-UEU-AX	μPD70F3343GC (A)-UEU-AX

Remark LVI: Low-voltage indicator
CLM: Clock monitor
ROMC: ROM correction

★ : New product ★★ : Under development

• Specifications (V850ES/SG3 (2/2))

Group		μPD70F3335	μPD70F3336	μPD70F3350	μPD70F3351	μPD70F3352	μPD70F3353
Memory	ROM Size (Bytes)	256K	384K	512K	640K	768K	1M
	ROM Type	Flash					
	Single-Power-Supply Flash Memory	Yes					
	RAM Size (Bytes)	24K	32K	40K	48K	60K	
Clock	Maximum Operating Frequency (MHz)	32					
	On-Chip Oscillator (Hz)	220k					
	Subclock (32.768kHz)	Yes					
I/O	I/O Ports	84					
Bus	External Data/Address Bus	16/22					
Timer	16-bit Timer	8					
	8-bit Timer	—					
	Other Timers	—					
	Watch Timer	1					
	Watchdog Timer	1					
	PWM Output	16 bits × 9					
Serial Interface	UART	—					
	UART Supporting LIN-bus	—					
	UART, CSI	—					
	UART Supporting LIN-bus, CSI	1					
	UART, I²C	—					
	UART Supporting LIN-bus, I²C	2					
	CSI	3					
	CSI, I²C	1					
	CSI with Automatic Transmission/Reception Function	—					
	I²C	—					
	IEBus	—					
	CAN	—					
	CAN/IEBus	1					
OCD	On-Chip Debugger	Yes					
Peripheral Functions	LCD (Segments x Commons)	—					
	12-bit A/D Converter	—					
	10-bit A/D Converter	12					
	8-bit D/A Converter	2					
	Other Functions	LVI, CLM, DMA, ROMC, CRC					
Others	Power Supply Voltage (V)	2.85 to 3.6					
	Package (size: mm)	100-LQFP (14 × 14)					
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-V850MINIL (MINICUBE) QB-V850ESSX2 (IECUBE)					
Package		P100GC-50-UEU-1 S100GC-50-8EU, 8EA-2			P100GC-50-UEU-1		
Part No.		μPD70F3335GC (A)-UEU-AX μPD70F3335GC (A)-8EA-A	μPD70F3336GC (A)-UEU-AX μPD70F3336GC (A)-8EA-A	μPD70F3350GC (A)-UEU-AX μPD70F3350GC (A)-8EA-A	μPD70F3351GC (A)-UEU-AX	μPD70F3352GC (A)-UEU-AX	μPD70F3353GC (A)-UEU-AX

Remark LVI: Low-voltage indicator
CLM: Clock monitor
ROMC: ROM correction

★ : New product ★★ : Under development

• Specifications (V850ES/SJ2-H (1/3))

Group		μPD703265HY	μPD703266HY	μPD70F3266HY
Memory	ROM Size (Bytes)	512K	640K	
	ROM Type	Mask		Flash
	Single-Power-Supply Flash Memory	—		Yes
	RAM Size (Bytes)	40K	48K	
Clock	Maximum Operating Frequency (MHz)	32		
	On-Chip Oscillator (Hz)	200k		
	Subclock (32.768kHz)	Yes		
I/O	I/O Ports	128		
Bus	External Data/Address Bus	16/24		
Timer	16-bit Timer	11		
	8-bit Timer	—		
	Other Timers	—		
	Watch Timer	1		
	Watchdog Timer	1		
	PWM Output	16 bits × 12		
Serial Interface	UART	—		
	UART Supporting LIN-bus	1		
	UART, CSI	—		
	UART Supporting LIN-bus, CSI	1		
	UART, I²C	—		
	UART Supporting LIN-bus, I²C	2		
	CSI	4		
	CSI, I²C	1		
	CSI with Automatic Transmission/Reception Function	—		
	I²C	—		
	IEBus	—		
	CAN	—		
	CAN/IEBus	—		
OCD	On-Chip Debugger	—		Yes
Peripheral Functions	LCD (Segments × Commons)	—		
	12-bit A/D Converter	—		
	10-bit A/D Converter	16		
	8-bit D/A Converter	2		
	Other Functions	CLM, DMA, ROMC, CRC		
Others	Power Supply Voltage (V)	3.0 to 3.6		
	Package (size: mm)	144-LQFP (20 × 20)		
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-V850MINIL (MINICUBE) QB-V850ESSX2 (IECUBE)		
Package		S144GJ-50-UEN		
Part No.		μPD703265HYGJ-xxx-UEN-A	μPD703266HYGJ-xxx-UEN-A	μPD70F3266HYGJ-UEN-A

Remark CLM: Clock monitor
ROMC: ROM correction

★ : New product ★★ : Under development

• Specifications (V850ES/SJ2-H (2/3))

Group		μPD703275HY	μPD703276HY	μPD70F3276HY
Memory	ROM Size (Bytes)	512K	640K	
	ROM Type	Mask		Flash
	Single-Power-Supply Flash Memory	—		Yes
	RAM Size (Bytes)	40K	48K	
Clock	Maximum Operating Frequency (MHz)	32		
	On-Chip Oscillator (Hz)	200k		
	Subclock (32.768kHz)	Yes		
I/O	I/O Ports	128		
Bus	External Data/Address Bus	16/24		
Timer	16-bit Timer	11		
	8-bit Timer	—		
	Other Timers	—		
	Watch Timer	1		
	Watchdog Timer	1		
	PWM Output	16 bits × 12		
Serial Interface	UART	—		
	UART Supporting LIN-bus	1		
	UART, CSI	—		
	UART Supporting LIN-bus, CSI	1		
	UART, I²C	—		
	UART Supporting LIN-bus, I²C	2		
	CSI	4		
	CSI, I²C	1		
	CSI with Automatic Transmission/Reception Function	—		
	I²C	—		
	IEBus	1		
	CAN	—		
	CAN/IEBus	—		
OCD	On-Chip Debugger	—	Yes	
Peripheral Functions	LCD (Segments x Commons)	—		
	12-bit A/D Converter	—		
	10-bit A/D Converter	16		
	8-bit D/A Converter	2		
	Other Functions	CLM, DMA, ROMC, CRC		
Others	Power Supply Voltage (V)	3.0 to 3.6		
	Package (size: mm)	144-LQFP (20 × 20)		
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-V850MINIL (MINICUBE) QB-V850ESSX2 (IECUBE)		
Package		S144GJ-50-UEN		
Part No.		μPD703275HYGJ-xxx-UEN-A	μPD703276HYGJ-xxx-UEN-A	μPD70F3276HYGJ-UEN-A

Remark CLM: Clock monitor
ROMC: ROM correction

★ : New product ★★ : Under development

• Specifications (V850ES/SJ2-H (3/3))

Group		μPD703285HY	μPD703286HY	μPD70F3286HY	μPD703287HY	μPD703288HY	μPD70F3288HY
Memory	ROM Size (Bytes)	512K	640K		512K	640K	
	ROM Type	Mask		Flash	Mask		Flash
	Single-Power-Supply Flash Memory	—		Yes	—		Yes
	RAM Size (Bytes)	40K	48K		40K	48K	
Clock	Maximum Operating Frequency (MHz)	32					
	On-Chip Oscillator (Hz)	200k					
	Subclock (32.768kHz)	Yes					
I/O	I/O Ports	128					
Bus	External Data/Address Bus	16/24					
Timer	16-bit Timer	11					
	8-bit Timer	—					
	Other Timers	—					
	Watch Timer	1					
	Watchdog Timer	1					
	PWM Output	16 bits × 12					
Serial Interface	UART	—					
	UART Supporting LIN-bus	1					
	UART, CSI	—					
	UART Supporting LIN-bus, CSI	1					
	UART, I²C	—					
	UART Supporting LIN-bus, I²C	2					
	CSI	4					
	CSI, I²C	1					
	CSI with Automatic Transmission/Reception Function	—					
	I²C	—					
	IEBus	—					
	CAN	1			2		
	CAN/IEBus	—					
OCD	On-Chip Debugger	—		Yes	—		Yes
Peripheral Functions	LCD (Segments × Commons)	—					
	12-bit A/D Converter	—					
	10-bit A/D Converter	16					
	8-bit D/A Converter	2					
	Other Functions	CLM, DMA, ROMC, CRC					
Others	Power Supply Voltage (V)	3.0 to 3.6					
	Package (size: mm)	144-LQFP (20 × 20)					
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-V850MINIL (MINICUBE) QB-V850ESSX2 (IECUBE)					
Package		S144GJ-50-UEN					
Part No.		μPD703285HYGJ-xxx-UEN-A	μPD703286HYGJ-xxx-UEN-A	μPD70F3286HYGJ-UEN-A	μPD703287HYGJ-xxx-UEN-A	μPD703288HYGJ-xxx-UEN-A	μPD70F3288HYGJ-UEN-A

Remark CLM: Clock monitor
ROMC: ROM correction

★ : New product ★★ : Under development

• Specifications (V850ES/SJ3 (1/3))

Group		μPD70F3344	μPD70F3345	μPD70F3346	μPD70F3347	μPD70F3348
Memory	ROM Size (Bytes)	384K	512K	640K	768K	1M
	ROM Type	Flash				
	Single-Power-Supply Flash Memory	Yes				
	RAM Size (Bytes)	32K	40K	48K	60K	
Clock	Maximum Operating Frequency (MHz)	32				
	On-Chip Oscillator (Hz)	220k				
	Subclock (32.768kHz)	Yes				
I/O	I/O Ports	128				
Bus	External Data/Address Bus	16/24				
Timer	16-bit Timer	11				
	8-bit Timer	—				
	Other Timers	—				
	Watch Timer	1				
	Watchdog Timer	1				
	PWM Output	16 bits × 12				
Serial Interface	UART	—				
	UART Supporting LIN-bus	1				
	UART, CSI	—				
	UART Supporting LIN-bus, CSI	1				
	UART, I²C	—				
	UART Supporting LIN-bus, I²C	2				
	CSI	4				
	CSI, I²C	1				
	CSI with Automatic Transmission/Reception Function	—				
	I²C	—				
	IEBus	1				
	CAN	—				
	CAN/IEBus	—				
OCD	On-Chip Debugger	Yes				
Peripheral Functions	LCD (Segments x Commons)	—				
	12-bit A/D Converter	—				
	10-bit A/D Converter	16				
	8-bit D/A Converter	2				
	Other Functions	LVI, CLM, DMA, ROMC, CRC				
Others	Power Supply Voltage (V)	2.85 to 3.6				
	Package (size: mm)	144-LQFP (20 × 20)				
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-V850MINIL (MINICUBE) QB-V850ESSX2 (IECUBE)				
Package		P144GJ-50-GAE-1		P144GJ-50-GAE-1 S144GJ-50-UEN		
Part No.		μPD70F3344GJ (A)-GAE-AX	μPD70F3345GJ (A)-GAE-AX	μPD70F3346GJ (A)-GAE-AX μPD70F3346GJ (A)-UEN-A	μPD70F3347GJ (A)-GAE-AX μPD70F3347GJ (A)-UEN-A	μPD70F3348GJ (A)-GAE-AX μPD70F3348GJ (A)-UEN-A

Remark LVI: Low-voltage indicator
CLM: Clock monitor
ROMC: ROM correction

★ : New product ★★ : Under development

• Specifications (V850ES/SJ3 (2/3))

Group		μPD70F3354	μPD70F3355	μPD70F3356	μPD70F3357	μPD70F3358
Memory	ROM Size (Bytes)	384K	512K	640K	768K	1M
	ROM Type	Flash				
	Single-Power-Supply Flash Memory	Yes				
	RAM Size (Bytes)	32K	40K	48K	60K	
Clock	Maximum Operating Frequency (MHz)	32				
	On-Chip Oscillator (Hz)	220k				
	Subclock (32.768kHz)	Yes				
I/O	I/O Ports	128				
Bus	External Data/Address Bus	16/24				
Timer	16-bit Timer	11				
	8-bit Timer	—				
	Other Timers	—				
	Watch Timer	1				
	Watchdog Timer	1				
	PWM Output	16 bits × 12				
Serial Interface	UART	—				
	UART Supporting LIN-bus	1				
	UART, CSI	—				
	UART Supporting LIN-bus, CSI	1				
	UART, I²C	—				
	UART Supporting LIN-bus, I²C	2				
	CSI	4				
	CSI, I²C	1				
	CSI with Automatic Transmission/Reception Function	—				
	I²C	—				
	IEBus	—				
	CAN	—				
	CAN/IEBus	1				
OCD	On-Chip Debugger	Yes				
Peripheral Functions	LCD (Segments × Commons)	—				
	12-bit A/D Converter	—				
	10-bit A/D Converter	16				
	8-bit D/A Converter	2				
	Other Functions	LVI, CLM, DMA, ROMC, CRC				
Others	Power Supply Voltage (V)	2.85 to 3.6				
	Package (size: mm)	144-LQFP (20 × 20)				
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-V850MINIL (MINICUBE) QB-V850ESSX2 (IECUBE)				
Package		P144GJ-50-GAE-1		P144GJ-50-GAE-1 S144GJ-50-UEN		
Part No.		μPD70F3354GJ (A)-GAE-AX	μPD70F3355GJ (A)-GAE-AX	μPD70F3356GJ (A)-GAE-AX μPD70F3356GJ (A)-UEN-A	μPD70F3357GJ (A)-GAE-AX μPD70F3357GJ (A)-UEN-A	μPD70F3358GJ (A)-GAE-AX μPD70F3358GJ (A)-UEN-A

Remark LVI: Low-voltage indicator
CLM: Clock monitor
ROMC: ROM correction

★ : New product ★★ : Under development

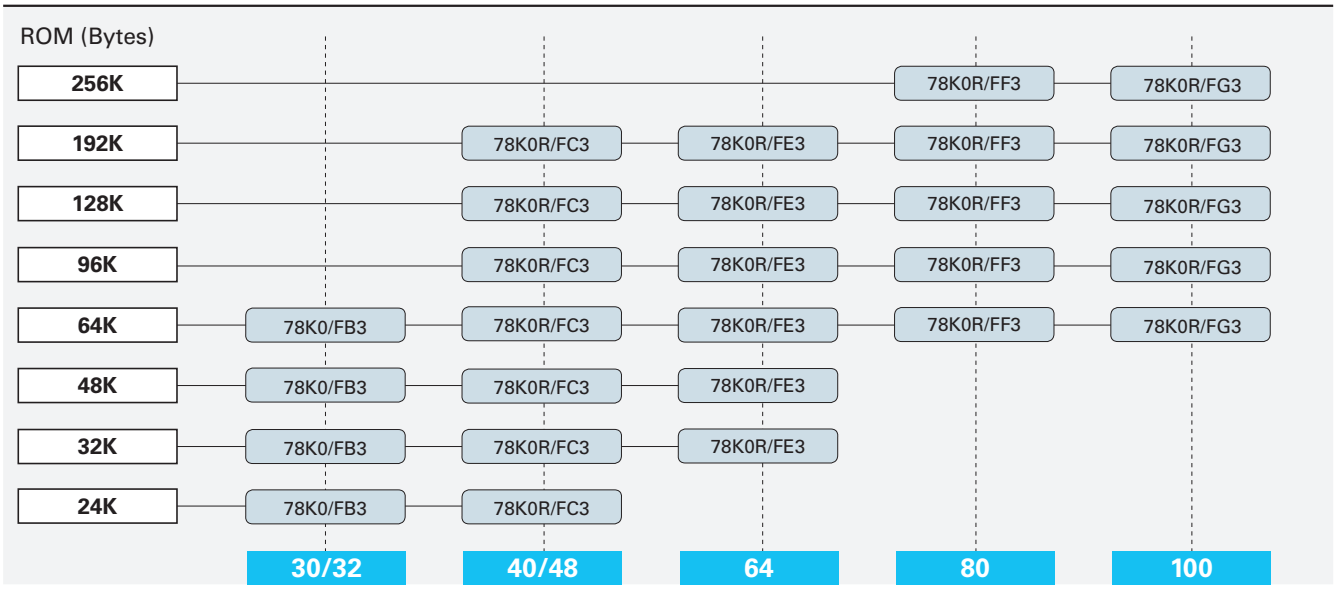
• Specifications (V850ES/SJ3 (3/3))

Group		μPD70F3364	μPD70F3365	μPD70F3366	μPD70F3367	μPD70F3368
Memory	ROM Size (Bytes)	384K	512K	640K	768K	1M
	ROM Type	Flash				
	Single-Power-Supply Flash Memory	Yes				
	RAM Size (Bytes)	32K	40K	48K	60K	
Clock	Maximum Operating Frequency (MHz)	32				
	On-Chip Oscillator (Hz)	220k				
	Subclock (32.768kHz)	Yes				
I/O	I/O Ports	128				
Bus	External Data/Address Bus	16/24				
Timer	16-bit Timer	11				
	8-bit Timer	—				
	Other Timers	—				
	Watch Timer	1				
	Watchdog Timer	1				
	PWM Output	16 bits × 12				
Serial Interface	UART	—				
	UART Supporting LIN-bus	1				
	UART, CSI	—				
	UART Supporting LIN-bus, CSI	1				
	UART, I²C	—				
	UART Supporting LIN-bus, I²C	2				
	CSI	4				
	CSI, I²C	1				
	CSI with Automatic Transmission/Reception Function	—				
	I²C	—				
	IEBus	—				
	CAN	1				
	CAN/IEBus	1				
OCD	On-Chip Debugger	Yes				
Peripheral Functions	LCD (Segments x Commons)	—				
	12-bit A/D Converter	—				
	10-bit A/D Converter	16				
	8-bit D/A Converter	2				
	Other Functions	LVI, CLM, DMA, ROMC, CRC				
Others	Power Supply Voltage (V)	2.85 to 3.6				
	Package (size: mm)	144-LQFP (20 × 20)				
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-V850MINIL (MINICUBE) QB-V850ESSX2 (IECUBE)				
Package		P144GJ-50-GAE-1		P144GJ-50-GAE-1 S144GJ-50-UEN		
Part No.		μPD70F3364GJ (A)-GAE-AX	μPD70F3365GJ (A)-GAE-AX	μPD70F3366GJ (A)-GAE-AX μPD70F3366GJ (A)-UEN-A	μPD70F3367GJ (A)-GAE-AX μPD70F3367GJ (A)-UEN-A	μPD70F3368GJ (A)-GAE-AX μPD70F3368GJ (A)-UEN-A

Remark LVI: Low-voltage indicator
CLM: Clock monitor
ROMC: ROM correction

★ : New product ★★ : Under development

• Memory Capacity (78K0R MCUs)



• Specifications (78K0R/FB3 (30 Pins))

Group		μPD78F1804	μPD78F1805	μPD78F1806	μPD78F1807
Memory	ROM Size (Bytes)	24K	32K	48K	64K
	ROM Type	Flash			
	Single-Power-Supply Flash Memory	Yes			
	RAM Size (Bytes)	1.5K	2K	3K	4K
Clock	Maximum Operating Frequency (MHz)	24			
	On-Chip Oscillator (Hz)	8M, 4M, 30k			
	Subclock (32.768kHz)	—			
I/O	I/O Ports	23			
Bus	External Data/Address Bus	—			
Timer	16-bit Timer	14			
	Real-Time Counter	—			
	Watchdog Timer	1			
	PWM Output	PWM: 16 bits × 5, multiplexed PWM: 16 bits × 7, multiplexed PWM: 16 bits × 4			
Serial Interface	CSI	2			
	CSI, Simplified I²C	—			
	CSI (2ch), Simplified I²C	—			
	UART, Simplified I²C	—			
	Simplified I²C	—			
	CAN	—			
	UART Supporting LIN-bus	2			
	I²C	—			
OCD	On-Chip Debugger	Yes			
Peripheral Functions	10-bit A/D Converter	8			
	8-bit D/A Converter	—			
	Multiplier/Divider (bits x bits, bits ÷ bits)	16 × 16 32 ÷ 32			
	Other Functions	POC, LVI, DMA, CLM, data flash: 16 KB			
Others	Power Supply Voltage (V)	2.7 to 5.5			
	Package (size: mm)	30-SSOP (7.62)			
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-78K0RFX3 (IECUBE)			
Package		P30MC-65-CAB			
Part No.		μPD78F1804MCA-CAB-G	μPD78F1805MCA-CAB-G	μPD78F1806MCA-CAB-G	μPD78F1807MCA-CAB-G

Remark POC: Power-on clear
LVI: Low-voltage indicator
CLM: Clock monitor

★ : New product ★★ : Under development

• Specifications (78K0R/FB3 (32 Pins))

Group		μPD78F1804	μPD78F1805	μPD78F1806	μPD78F1807
Memory	ROM Size (Bytes)	24K	32K	48K	64K
	ROM Type	Flash			
	Single-Power-Supply Flash Memory	Yes			
	RAM Size (Bytes)	1.5K	2K	3K	4K
Clock	Maximum Operating Frequency (MHz)	24			
	On-Chip Oscillator (Hz)	8M, 4M, 30k			
	Subclock (32.768kHz)	—			
I/O	I/O Ports	25			
Bus	External Data/Address Bus	—			
Timer	16-bit Timer	14			
	Real-Time Counter	—			
	Watchdog Timer	1			
	PWM Output	PWM: 16 bits × 5, multiplexed PWM: 16 bits × 7, multiplexed PWM: 16 bits × 4			
Serial Interface	CSI	2			
	CSI, Simplified I^2C	—			
	CSI (2ch), Simplified I^2C	—			
	UART, Simplified I^2C	—			
	Simplified I^2C	1			
	CAN	—			
	UART Supporting LIN-bus	2			
	I^2C	—			
OCD	On-Chip Debugger	Yes			
Peripheral Functions	10-bit A/D Converter	6			
	8-bit D/A Converter	—			
	Multiplier/Divider (bits × bits, bits ÷ bits)	16 × 16 32 ÷ 32			
	Other Functions	POC, LVI, DMA, CLM, data flash: 16 KB			
Others	Power Supply Voltage (V)	2.7 to 5.5			
	Package (size: mm)	32-WQFN (5 × 5)			
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-78K0RFX3 (IECUBE)			
Package		P32K8-50-3B4			
Part No.		μPD78F1804K8A-3B4-G	μPD78F1805K8A-3B4-G	μPD78F1806K8A-3B4-G	μPD78F1807K8A-3B4-G

Remark POC: Power-on clear
LVI: Low-voltage indicator
CLM: Clock monitor

★ : New product ★★ : Under development

• Specifications (78K0R/FC3 (40 Pins))

Group		μPD78F1808	μPD78F1809	μPD78F1810	μPD78F1811
Memory	ROM Size (Bytes)	24K	32K	48K	64K
	ROM Type	Flash			
	Single-Power-Supply Flash Memory	Yes			
	RAM Size (Bytes)	1.5K	2K	3K	4K
Clock	Maximum Operating Frequency (MHz)	24			
	On-Chip Oscillator (Hz)	8M, 4M, 30k			
	Subclock (32.768kHz)	—			
I/O	I/O Ports	33			
Bus	External Data/Address Bus	—			
Timer	16-bit Timer	17			
	Real-Time Counter	—			
	Watchdog Timer	1			
	PWM Output	PWM: 16 bits × 8, multiplexed PWM: 16 bits × 7, multiplexed PWM: 16 bits × 7			
Serial Interface	CSI	2			
	CSI, Simplified I^2C	—			
	CSI (2ch), Simplified I^2C	—			
	UART, Simplified I^2C	—			
	Simplified I^2C	1			
	CAN	—			
	UART Supporting LIN-bus	2			
	I^2C	—			
OCD	On-Chip Debugger	Yes			
Peripheral Functions	10-bit A/D Converter	8			
	8-bit D/A Converter	—			
	Multiplier/Divider (bits x bits, bits ÷ bits)	16 × 16 32 ÷ 32			
	Other Functions	POC, LVI, DMA, CLM, data flash: 16 KB			
Others	Power Supply Voltage (V)	2.7 to 5.5			
	Package (size: mm)	40-WQFN (6 × 6)			
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-78K0RFX3 (IECUBE)			
Package		P40K8-50-4B4			
Part No.		μPD78F1808K8A-4B4-G**	μPD78F1809K8A-4B4-G**	μPD78F1810K8A-4B4-G**	μPD78F1811K8A-4B4-G**

Remark POC: Power-on clear
LVI: Low-voltage indicator
CLM: Clock monitor

★ : New product ★★ : Under development

• Specifications (78K0R/FC3 (48 Pins) (1/2))

Group		μPD78F1812	μPD78F1813	μPD78F1814	μPD78F1815	μPD78F1816	μPD78F1817
Memory	ROM Size (Bytes)	24K	32K	48K	64K	96K	128K
	ROM Type	Flash					
	Single-Power-Supply Flash Memory	Yes					
	RAM Size (Bytes)	1.5K	2K	3K	4K	6K	8K
Clock	Maximum Operating Frequency (MHz)	24					
	On-Chip Oscillator (Hz)	8M, 4M, 30k					
	Subclock (32.768kHz)	—					
I/O	I/O Ports	41					
Bus	External Data/Address Bus	—					
Timer	16-bit Timer	17					
	Real-Time Counter	—					
	Watchdog Timer	1					
	PWM Output	PWM: 16 bits × 8, multiplexed PWM: 16 bits × 7, multiplexed PWM: 16 bits × 7					
Serial Interface	CSI	2					
	CSI, Simplified I^2C	—					
	CSI (2ch), Simplified I^2C	—					
	UART, Simplified I^2C	—					
	Simplified I^2C	1					
	CAN	—					
	UART Supporting LIN-bus	2					
	I^2C	—					
OCD	On-Chip Debugger	Yes					
Peripheral Functions	10-bit A/D Converter	11					
	8-bit D/A Converter	—					
	Multiplier/Divider (bits × bits, bits ÷ bits)	16 × 16 32 ÷ 32					
	Other Functions	POC, LVI, DMA, CLM, data flash: 16 KB					
Others	Power Supply Voltage (V)	2.7 to 5.5					
	Package (size: mm)	48-LQFP (7 × 7) 48-WQFN (7 × 7)					
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-78K0RFX3 (IECUBE)					
Package		P48GA-50-GAM P48K8-50-5B4					
Part No.		μPD78F1812GAA-GAM-G μPD78F1812K8A-5B4-G	μPD78F1813GAA-GAM-G μPD78F1813K8A-5B4-G	μPD78F1814GAA-GAM-G μPD78F1814K8A-5B4-G	μPD78F1815GAA-GAM-G μPD78F1815K8A-5B4-G	μPD78F1816GAA-GAM-G μPD78F1816K8A-5B4-G	μPD78F1817GAA-GAM-G μPD78F1817K8A-5B4-G

Remark POC: Power-on clear
LVI: Low-voltage indicator
CLM: Clock monitor

★ : New product ★★ : Under development

• Specifications (78K0R/FC3 (48 Pins) (2/2))

Group		μPD78F1826	μPD78F1827	μPD78F1828	μPD78F1829	μPD78F1830
Memory	ROM Size (Bytes)	64K	96K	128K	192K	256K
	ROM Type	Flash				
	Single-Power-Supply Flash Memory	Yes				
	RAM Size (Bytes)	4K	6K	8K	12K	16K
Clock	Maximum Operating Frequency (MHz)	24				
	On-Chip Oscillator (Hz)	8M, 4M, 30k				
	Subclock (32.768kHz)	—				
I/O	I/O Ports	41				
Bus	External Data/Address Bus	—				
Timer	16-bit Timer	17				
	Real-Time Counter	—				
	Watchdog Timer	1				
	PWM Output	PWM: 16 bits × 8, multiplexed PWM: 16 bits × 7, multiplexed PWM: 16 bits × 7				
Serial Interface	CSI	2				
	CSI, Simplified I^2C	—				
	CSI (2ch), Simplified I^2C	—				
	UART, Simplified I^2C	—				
	Simplified I^2C	1				
	CAN	1				
	UART Supporting LIN-bus	2				
	I^2C	—				
OCD	On-Chip Debugger	Yes				
Peripheral Functions	10-bit A/D Converter	11				
	8-bit D/A Converter	—				
	Multiplier/Divider (bits x bits, bits ÷ bits)	16 × 16 32 ÷ 32				
	Other Functions	POC, LVI, DMA, CLM, data flash: 16 KB				
Others	Power Supply Voltage (V)	2.7 to 5.5				
	Package (size: mm)	48-LQFP (7 × 7) 48-WQFN (7 × 7)				
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-78K0RFX3 (IECUBE)				
Package		P48GA-50-GAM P48K8-50-5B4				
Part No.		μPD78F1826GAA-GAM-G μPD78F1826K8A-5B4-G	μPD78F1827GAA-GAM-G μPD78F1827K8A-5B4-G	μPD78F1828GAA-GAM-G μPD78F1828K8A-5B4-G	μPD78F1829GAA-GAM-G μPD78F1829K8A-5B4-G	μPD78F1830GAA-GAM-G μPD78F1830K8A-5B4-G

Remark POC: Power-on clear
LVI: Low-voltage indicator
CLM: Clock monitor

★ : New product ★★ : Under development

• Specifications (78K0R/FE3 (1/2))

Group		μPD78F1818	μPD78F1819	μPD78F1820	μPD78F1821	μPD78F1822
Memory	ROM Size (Bytes)	32K	48K	64K	96K	128K
	ROM Type	Flash				
	Single-Power-Supply Flash Memory	Yes				
	RAM Size (Bytes)	2K	3K	4K	6K	8K
Clock	Maximum Operating Frequency (MHz)	24				
	On-Chip Oscillator (Hz)	8M, 4M, 30k				
	Subclock (32.768kHz)	—				
I/O	I/O Ports	55				
Bus	External Data/Address Bus	—				
Timer	16-bit Timer	21				
	Real-Time Counter	—				
	Watchdog Timer	1				
	PWM Output	PWM: 16 bits × 10, multiplexed PWM: 16 bits × 7, multiplexed PWM: 16 bits × 7, multiplexed PWM: 16 bits × 3				
Serial Interface	CSI	3				
	CSI, Simplified I^2C	—				
	CSI (2ch), Simplified I^2C	—				
	UART, Simplified I^2C	—			1	
	Simplified I^2C	1				
	CAN	—				
	UART Supporting LIN-bus	2				
	I^2C	—				
OCD	On-Chip Debugger	Yes				
Peripheral Functions	10-bit A/D Converter	15				
	8-bit D/A Converter	—				
	Multiplier/Divider (bits x bits, bits ÷ bits)	16 × 16 32 ÷ 32				
	Other Functions	POC, LVI, DMA, CLM, data flash: 16 KB				
Others	Power Supply Voltage (V)	2.7 to 5.5				
	Package (size: mm)	64-LQFP (10 × 10)				
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-78K0RFX3 (IECUBE)				
Package		P64GB-50-GAH				
Part No.		μPD78F1818GBA-GAH-G	μPD78F1819GBA-GAH-G	μPD78F1820GBA-GAH-G	μPD78F1821GBA-GAH-G	μPD78F1822GBA-GAH-G

Remark POC: Power-on clear
LVI: Low-voltage indicator
CLM: Clock monitor

★ : New product ★★ : Under development

• Specifications (78K0R/FE3 (2/2))

Group		μPD78F1831	μPD78F1832	μPD78F1833	μPD78F1834	μPD78F1835
Memory	ROM Size (Bytes)	64K	96K	128K	192K	256K
	ROM Type	Flash				
	Single-Power-Supply Flash Memory	Yes				
	RAM Size (Bytes)	4K	6K	8K	12K	16K
Clock	Maximum Operating Frequency (MHz)	24				
	On-Chip Oscillator (Hz)	8M, 4M, 30k				
	Subclock (32.768kHz)	—				
I/O	I/O Ports	55				
Bus	External Data/Address Bus	—				
Timer	16-bit Timer	21				
	Real-Time Counter	—				
	Watchdog Timer	1				
	PWM Output	PWM: 16 bits × 10, multiplexed PWM: 16 bits × 7, multiplexed PWM: 16 bits × 7, multiplexed PWM: 16 bits × 3				
Serial Interface	CSI	3				
	CSI, Simplified I^2C	—				
	CSI (2ch), Simplified I^2C	—				
	UART, Simplified I^2C	1				
	Simplified I^2C	1				
	CAN	1				
	UART Supporting LIN-bus	2				
	I^2C	—				
OCD	On-Chip Debugger	Yes				
Peripheral Functions	10-bit A/D Converter	15				
	8-bit D/A Converter	—				
	Multiplier/Divider (bits x bits, bits ÷ bits)	16 × 16 32 ÷ 32				
	Other Functions	POC, LVI, DMA, CLM, data flash: 16 KB				
Others	Power Supply Voltage (V)	2.7 to 5.5				
	Package (size: mm)	64-LQFP (10 × 10)				
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-78K0RFX3 (IECUBE)				
Package		P64GB-50-GAH				
Part No.		μPD78F1831GBA-GAH-G	μPD78F1832GBA-GAH-G	μPD78F1833GBA-GAH-G	μPD78F1834GBA-GAH-G	μPD78F1835GBA-GAH-G

Remark POC: Power-on clear
LVI: Low-voltage indicator
CLM: Clock monitor

★ : New product ★★ : Under development

• Specifications (78K0R/FF3)

Group		μPD78F1823	μPD78F1824	μPD78F1825	μPD78F1836	μPD78F1837	μPD78F1838	μPD78F1839	μPD78F1840
Memory	ROM Size (Bytes)	64K	96K	128K	64K	96K	128K	192K	256K
	ROM Type	Flash							
	Single-Power-Supply Flash Memory	Yes							
	RAM Size (Bytes)	4K	6K	8K	4K	6K	8K	12K	16K
Clock	Maximum Operating Frequency (MHz)	24							
	On-Chip Oscillator (Hz)	8M, 4M, 30k							
	Subclock (32.768kHz)	—							
I/O	I/O Ports	71							
Bus	External Data/Address Bus	—							
Timer	16-bit Timer	21							
	Real-Time Counter	—							
	Watchdog Timer	1							
	PWM Output	PWM: 16 bits × 10, multiplexed PWM: 16 bits × 7, multiplexed PWM: 16 bits × 7, multiplexed PWM: 16 bits × 3							
Serial Interface	CSI	3							
	CSI, Simplified I^2C	—							
	CSI (2ch), Simplified I^2C	—							
	UART, Simplified I^2C	1							
	Simplified I^2C	1							
	CAN	—			1				
	UART Supporting LIN-bus	2							
	I^2C	—							
OCD	On-Chip Debugger	Yes							
Peripheral Functions	10-bit A/D Converter	16							
	8-bit D/A Converter	—							
	Multiplier/Divider (bits x bits, bits ÷ bits)	16 × 16 32 ÷ 32							
	Other Functions	POC, LVI, DMA, CLM, data flash: 16 KB							
Others	Power Supply Voltage (V)	2.7 to 5.5							
	Package (size: mm)	80-LQFP (12 × 12)							
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-78K0RFX3 (IECUBE)							
Package		P80GK-50-GAK							
Part No.		μPD78F1823GKA-GAK-G	μPD78F1824GKA-GAK-G	μPD78F1825GKA-GAK-G	μPD78F1836GKA-GAK-G	μPD78F1837GKA-GAK-G	μPD78F1838GKA-GAK-G	μPD78F1839GKA-GAK-G	μPD78F1840GKA-GAK-G

Remark POC: Power-on clear
LVI: Low-voltage indicator
CLM: Clock monitor

★ : New product ★★ : Under development

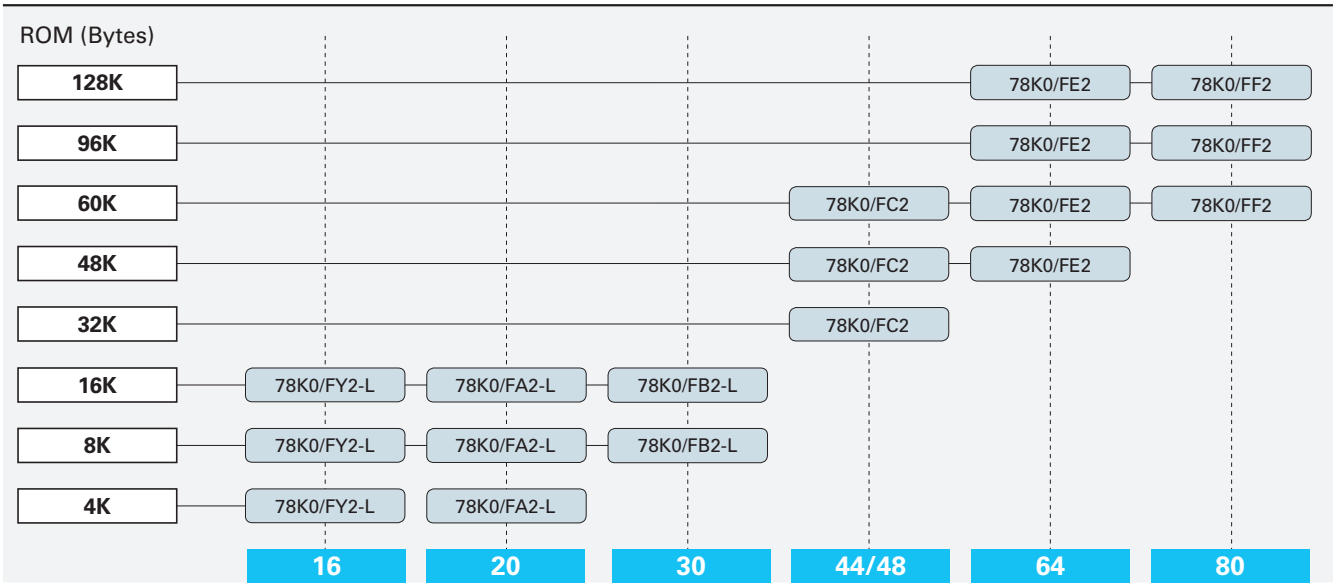
• Specifications (78K0R/FG3)

Group		μPD78F1841	μPD78F1842	μPD78F1843	μPD78F1844	μPD78F1845
Memory	ROM Size (Bytes)	64K	96K	128K	192K	256K
	ROM Type	Flash				
	Single-Power-Supply Flash Memory	Yes				
	RAM Size (Bytes)	4K	6K	8K	12K	16K
Clock	Maximum Operating Frequency (MHz)	24				
	On-Chip Oscillator (Hz)	8M, 4M, 30k				
	Subclock (32.768kHz)	—				
I/O	I/O Ports	89				
Bus	External Data/Address Bus	—				
Timer	16-bit Timer	25				
	Real-Time Counter	—				
	Watchdog Timer	1				
	PWM Output	PWM: 16 bits × 12, multiplexed PWM: 16 bits × 7, multiplexed PWM: 16 bits × 7, multiplexed PWM: 16 bits × 7				
Serial Interface	CSI	3				
	CSI, Simplified I²C	1				
	CSI (2ch), Simplified I²C	—				
	UART, Simplified I²C	1				
	Simplified I²C	—				
	CAN	1				
	UART Supporting LIN-bus	2				
	I²C	—				
OCD	On-Chip Debugger	Yes				
Peripheral Functions	10-bit A/D Converter	24				
	8-bit D/A Converter	—				
	Multiplier/Divider (bits x bits, bits ÷ bits)	16 × 16 32 ÷ 32				
	Other Functions	POC, LVI, DMA, CLM, data flash: 16 KB				
Others	Power Supply Voltage (V)	2.7 to 5.5				
	Package (size: mm)	100-LQFP (14 × 14)				
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-78K0RFX3 (IECUBE)				
Package		P100GC-50-UEU-1				
Part No.		μPD78F1841GCA-UEU-G	μPD78F1842GCA-UEU-G	μPD78F1843GCA-UEU-G	μPD78F1844GCA-UEU-G	μPD78F1845GCA-UEU-G

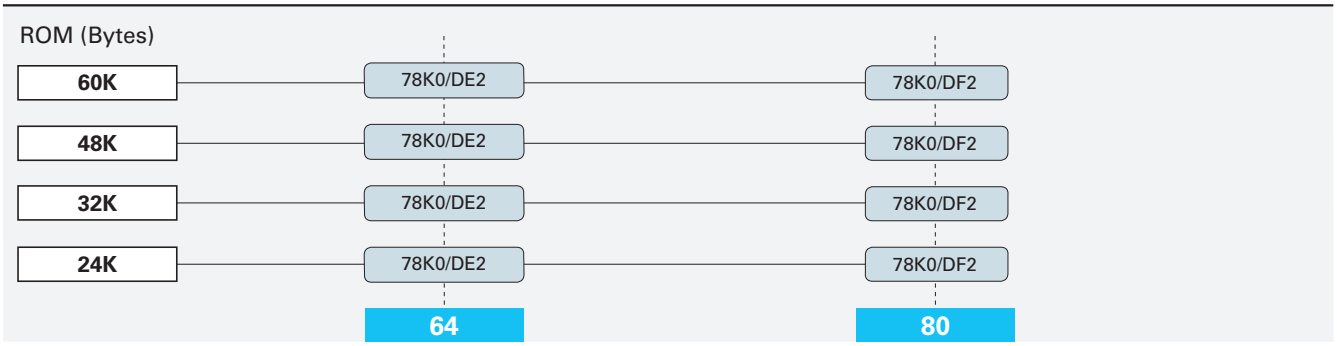
Remark POC: Power-on clear
LVI: Low-voltage indicator
CLM: Clock monitor

★ : New product ★★ : Under development

• Memory Capacity (78K0 MCUs)



• Memory Capacity (78K0 MCUs (for Dashboard Control))



• Specifications (78K0/FY2-L, 78K0/FA2-L)

Group		78K0/FY2-L			78K0/FA2-L		
		μPD78F0854	μPD78F0855	μPD78F0856	μPD78F0857	μPD78F0858	μPD78F0859
Memory	ROM Size (Bytes)	4K	8K	16K	4K	8K	16K
	ROM Type	Flash					
	Single-Power-Supply Flash Memory	Yes					
	RAM Size (Bytes)	384	512	768	384	512	768
Clock	Maximum Operating Frequency (MHz)	20					
	On-Chip Oscillator (Hz)	4M, 8M, 30k					
	Subclock (32.768kHz)	—					
I/O	I/O Ports	11			15		
Bus	External Data/Address Bus	—/—					
Timer	16-bit Timer	2					
	8-bit Timer	2					
	Other Timers	—					
	Watch Timer	—					
	Real-Time Counter	—					
	Watchdog Timer	1					
	PWM Output	16 bits × 1, 8 bits × 1			16 bits × 3, 8 bits × 1		
Serial Interface	UART	—					
	UART Supporting LIN-bus	1					
	UART, CSI	—					
	UART Supporting LIN-bus, CSI	—					
	CSI	—					
	CSI, I^2C	—					
	CSI with Automatic Transmission/Reception Function	—					
	I^2C	1					
	IEBus	—					
	CAN	—					
OCD	On-Chip Debugger	Yes					
Peripheral Functions	LCD (Segments x Commons)	—					
	16-bit ΔΣ A/D Converter	—					
	10-bit A/D Converter	4			6		
	8-bit A/D Converter	—					
	8-bit D/A Converter	—					
	Multiplier/Divider (bits x bits, bits ÷ bits)	8 × 8 16 × 16					
	Other Functions	Comparator, POC, LVI					
Others	Power Supply Voltage (V)	1.8 to 5.5 V					
	Package (size: mm)	16-SSOP (5.72)			20-SSOP (7.62)		
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-78K0FX2L (IECUBE)					
Package		P16MA-65-FAA			P20MC-65-CAA		
Part No.		μPD78F0854MAA-FAA-G μPD78F0854MAA2-FAA-G	μPD78F0855MAA-FAA-G μPD78F0855MAA2-FAA-G	μPD78F0856MAA-FAA-G μPD78F0856MAA2-FAA-G	μPD78F0857MCA-CAA-G μPD78F0857MCA2-CAA-G	μPD78F0858MCA-CAA-G μPD78F0858MCA2-CAA-G	μPD78F0859MCA-CAA-G μPD78F0859MCA2-CAA-G

Remark POC: Power-on clear
LVI: Low-voltage indicator

★ : New product ★★ : Under development

• Specifications (78K0/FB2-L)

Group		μPD78F0864	μPD78F0865
Memory	ROM Size (Bytes)	8K	16K
	ROM Type	Flash	
	Single-Power-Supply Flash Memory	Yes	
	RAM Size (Bytes)	512	768
Clock	Maximum Operating Frequency (MHz)	20	
	On-Chip Oscillator (Hz)	4M, 8M, 30k	
	Subclock (32.768kHz)	—	
I/O	I/O Ports	24	
Bus	External Data/Address Bus	—/—	
Timer	16-bit Timer	3	
	8-bit Timer	2	
	Other Timers	—	
	Watch Timer	—	
	Real-Time Counter	—	
	Watchdog Timer	1	
	PWM Output	16 bits × 5, 8 bits × 1	
Serial Interface	UART	—	
	UART Supporting LIN-bus	1	
	UART, CSI	—	
	UART Supporting LIN-bus, CSI	—	
	CSI	1	
	CSI, I^2C	—	
	CSI with Automatic Transmission/Reception Function	—	
	I^2C	1	
	IEBus	—	
	CAN	—	
OCD	On-Chip Debugger	Yes	
Peripheral Functions	LCD (Segments × Commons)	—	
	16-bit ΔΣ A/D Converter	—	
	10-bit A/D Converter	9	
	8-bit A/D Converter	—	
	8-bit D/A Converter	—	
	Multiplier/Divider (bits × bits, bits ÷ bits)	8 × 8 16 × 16	
	Other Functions	Comparator, POC, LVI	
Others	Power Supply Voltage (V)	1.8 to 5.5	
	Package (size: mm)	30-SSOP (7.62)	
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-78K0FX2L (IECUBE)	
Package		P30MC-65-CAB	
Part No.		μPD78F0864MCA-CAB-G μPD78F0864MCA2-CAB-G	μPD78F0865MCA-CAB-G μPD78F0865MCA2-CAB-G

Remark POC: Power-on clear
LVI: Low-voltage indicator

★ : New product ★★ : Under development

• Specifications (78K0/FC2)

Group		μPD78F0881 μPD78F0881A	μPD78F0882 μPD78F0882A	μPD78F0883 μPD78F0883A	μPD78F0884 μPD78F0884A	μPD78F0885 μPD78F0885A	μPD78F0886 μPD78F0886A
Memory	ROM Size (Bytes)	32K	48K	60K	32K	48K	60K
	ROM Type	Flash					
	Single-Power-Supply Flash Memory	Yes					
	RAM Size (Bytes)	2K	3K		2K	3K	
Clock	Maximum Operating Frequency (MHz)	20					
	On-Chip Oscillator (Hz)	8M, 240k					
	Subclock (32.768kHz)	Yes					
I/O	I/O Ports	37			41		
Bus	External Data/Address Bus	—/—					
Timer	16-bit Timer	2					
	8-bit Timer	4					
	Other Timers	—					
	Watch Timer	1					
	Real-Time Counter	—					
	Watchdog Timer	1					
	PWM Output	16 bits × 2, 8 bits × 4					
Serial Interface	UART	—					
	UART Supporting LIN-bus	1					
	UART, CSI	—					
	UART Supporting LIN-bus, CSI	1					
	CSI	—					
	CSI, I^2C	—					
	CSI with Automatic Transmission/Reception Function	—					
	I^2C	—					
	IEBus	—					
	CAN	1					
OCD	On-Chip Debugger	Yes					
Peripheral Functions	LCD (Segments x Commons)	—					
	16-bit ΔΣ A/D Converter	—					
	10-bit A/D Converter	8			9		
	8-bit A/D Converter	—					
	8-bit D/A Converter	—					
	Multiplier/Divider (bits x bits, bits ÷ bits)	16 × 16 32 ÷ 16					
	Other Functions	POC, LVI					
Others	Power Supply Voltage (V)	1.8 to 5.5					
	Package (size: mm)	44-LQFP (10 × 10)			48-LQFP (7 × 7)		
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-78K0FX2 (IECUBE)					
Package		P44GB-80-GAF			P48GA-50-GAM		
Part No.		μPD78F0881GB (A)-GAF-AX μPD78F0881AGBA-GAF-G	μPD78F0882GB (A)-GAF-AX μPD78F0882AGBA-GAF-G	μPD78F0883GB (A)-GAF-AX μPD78F0883AGBA-GAF-G	μPD78F0884GA (A)-GAM-AX μPD78F0884AGAA-GAM-G	μPD78F0885GA (A)-GAM-AX μPD78F0885AGAA-GAM-G	μPD78F0886GA (A)-GAM-AX μPD78F0886AGAA-GAM-G

Remark POC: Power-on clear
LVI: Low-voltage indicator

★ : New product ★★ : Under development

• Specifications (78K0/FE2, 78K0/FF2)

Group		78K0/FE2				78K0/FF2		
		μPD78F0887 μPD78F0887A	μPD78F0888 μPD78F0888A	μPD78F0889 μPD78F0889A	μPD78F0890 μPD78F0890A	μPD78F0891 μPD78F0891A	μPD78F0892 μPD78F0892A	μPD78F0893 μPD78F0893A
Memory	ROM Size (Bytes)	48K	60K	96K	128K	60K	96K	128K
	ROM Type	Flash						
	Single-Power-Supply Flash Memory	Yes						
	RAM Size (Bytes)	3K		5K	7K	3K	5K	7K
Clock	Maximum Operating Frequency (MHz)	20						
	On-Chip Oscillator (Hz)	8M, 240k						
	Subclock (32.768kHz)	Yes						
I/O	I/O Ports	55				71		
Bus	External Data/Address Bus	—/—						
Timer	16-bit Timer	4						
	8-bit Timer	4						
	Other Timers	—						
	Watch Timer	1						
	Real-Time Counter	—						
	Watchdog Timer	1						
	PWM Output	16 bits × 4, 8 bits × 4						
Serial Interface	UART	—						
	UART Supporting LIN-bus	1						
	UART, CSI	—						
	UART Supporting LIN-bus, CSI	1						
	CSI	1						
	CSI, I^2C	—						
	CSI with Automatic Transmission/ Reception Function	—						
	I^2C	—						
	IEBus	—						
	CAN	1						
OCD	On-Chip Debugger	Yes						
Peripheral Functions	LCD (Segments x Commons)	—						
	16-bit ΔΣ A/D Converter	—						
	10-bit A/D Converter	12				16		
	8-bit A/D Converter	—						
	8-bit D/A Converter	—						
	Multiplier/Divider (bits x bits, bits ÷ bits)	16 × 16 32 ÷ 16						
	Other Functions	POC, LVI						
Others	Power Supply Voltage (V)	1.8 to 5.5						
	Package (size: mm)	64-LQFP (12 × 12) 64-LQFP (10 × 10)				80-LQFP (14 × 14) 80-LQFP (12 × 12)		
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-78K0FX2 (IECUBE)						
Package		P64GK-65-GAJ P64GB-50-GAH				P80GC-65-GAD P80GK-50-GAK		
Part No.		μPD78F0887GK (A)-GAJ-AX μPD78F0887GB (A)-GAH-AX μPD78F0887AGKA-GAJ-G μPD78F0887AGBA-GAH-G	μPD78F0888GK (A)-GAJ-AX μPD78F0888GB (A)-GAH-AX μPD78F0888AGKA-GAJ-G μPD78F0888AGBA-GAH-G	μPD78F0889GK (A)-GAJ-AX μPD78F0889GB (A)-GAH-AX μPD78F0889AGKA-GAJ-G μPD78F0889AGBA-GAH-G	μPD78F0890GK (A)-GAJ-AX μPD78F0890GB (A)-GAH-AX μPD78F0890AGKA-GAJ-G μPD78F0890AGBA-GAH-G	μPD78F0891GC (A)-GAD-AX μPD78F0891GK (A)-GAK-AX μPD78F0891AGCA-GAD-G μPD78F0891AGKA-GAK-G	μPD78F0892GC (A)-GAD-AX μPD78F0892GK (A)-GAK-AX μPD78F0892AGCA-GAD-G μPD78F0892AGKA-GAK-G	μPD78F0893GC (A)-GAD-AX μPD78F0893GK (A)-GAK-AX μPD78F0893AGCA-GAD-G μPD78F0893AGKA-GAK-G

Remark POC: Power-on clear
LVI: Low-voltage indicator

★ : New product ★★ : Under development

• Specifications (78K0/DE2)

Group		μPD78F0836	μPD78F0837	μPD78F0844	μPD78F0845
Memory	ROM Size (Bytes)	24K	48K	32K	60K
	ROM Type	Flash			
	Single-Power-Supply Flash Memory	Yes			
	RAM Size (Bytes)	2K	3K	2K	3K
Clock	Maximum Operating Frequency (MHz)	20			
	On-Chip Oscillator (Hz)	8M, 240k			
	Subclock (32.768kHz)	Yes			
I/O	I/O Ports	47			
Bus	External Data/Address Bus	—/—			
Timer	16-bit Timer	5			
	8-bit Timer	2			
	Other Timers	—			
	Watch Timer	1			
	Real-Time Counter	—			
	Watchdog Timer	1			
	PWM Output	7			
Serial Interface	UART	—			
	UART Supporting LIN-bus	—			
	UART, CSI	—			
	UART Supporting LIN-bus, CSI	1			
	CSI	—			
	CSI, I^2C	—			
	CSI with Automatic Transmission/Reception Function	—			
	I^2C	1			
	IEBus	—			
	CAN	—		1	
OCD	On-Chip Debugger	Yes			
Peripheral Functions	LCD (Segments x Commons)	24 × 4			
	16-bit ΔΣ A/D Converter	—			
	10-bit A/D Converter	4			
	8-bit A/D Converter	—			
	8-bit D/A Converter	—			
	Multiplier/Divider (bits x bits, bits ÷ bits)	16 × 16 32 ÷ 16			
	Other Functions	Sound generator (1 CH), stepper motor C/D (2 CH)			
Others	Power Supply Voltage (V)	4.0 to 5.5 (when operating at 20 MHz) 2.7 to 5.5 (when operating at 10 MHz)			
	Package (size: mm)	64-LQFP (10 × 10)			
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-78K0DX2 (IECUBE)			
Package		P64GB-50-GAH			
Part No.		μPD78F0836GBA-GAH-G	μPD78F0837GBA-GAH-G	μPD78F0844GBA-GAH-G	μPD78F0845GBA-GAH-G

★ : New product ★★ : Under development

• Specifications (78K0/DF2 (without CAN))

Group		μPD78F0838	μPD78F0839	μPD78F0840	μPD78F0841	μPD78F0842	μPD78F0843
Memory	ROM Size (Bytes)	24K	48K	24K	48K	24K	48K
	ROM Type	Flash					
	Single-Power-Supply Flash Memory	Yes					
	RAM Size (Bytes)	2K	3K	2K	3K	2K	3K
Clock	Maximum Operating Frequency (MHz)	20					
	On-Chip Oscillator (Hz)	8M, 240k					
	Subclock (32.768kHz)	Yes					
I/O	I/O Ports	63					
Bus	External Data/Address Bus	—/—					
Timer	16-bit Timer	5					
	8-bit Timer	2					
	Other Timers	—					
	Watch Timer	1					
	Real-Time Counter	—					
	Watchdog Timer	1					
	PWM Output	7					
Serial Interface	UART	—					
	UART Supporting LIN-bus	1					
	UART, CSI	—					
	UART Supporting LIN-bus, CSI	1					
	CSI	1					
	CSI, I^2C	—					
	CSI with Automatic Transmission/Reception Function	—					
	I^2C	1					
	IEBus	—					
	CAN	—					
OCD	On-Chip Debugger	Yes					
Peripheral Functions	LCD (Segments x Commons)	40 × 4		32 × 4		28 × 4	
	16-bit ΔΣ A/D Converter	—					
	10-bit A/D Converter	8					
	8-bit A/D Converter	—					
	8-bit D/A Converter	—					
	Multiplier/Divider (bits x bits, bits ÷ bits)	16 × 16 32 ÷ 16					
	Other Functions	Sound generator (1 CH), stepper motor C/D (0 CH)		Sound generator (1 CH), stepper motor C/D (2 CH)		Sound generator (1 CH), stepper motor C/D (4 CH)	
Others	Power Supply Voltage (V)	4.0 to 5.5 (when operating at 20 MHz) 2.7 to 5.5 (when operating at 10 MHz)					
	Package (size: mm)	80-LQFP (12 × 12)					
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-78K0DX2 (IECUBE)					
Package		P80GK-50-GAK					
Part No.		μPD78F0838GKA-GAK-G	μPD78F0839GKA-GAK-G	μPD78F0840GKA-GAK-G	μPD78F0841GKA-GAK-G	μPD78F0842GKA-GAK-G	μPD78F0843GKA-GAK-G

★ : New product ★★ : Under development

• Specifications (78K0/DF2 (with CAN))

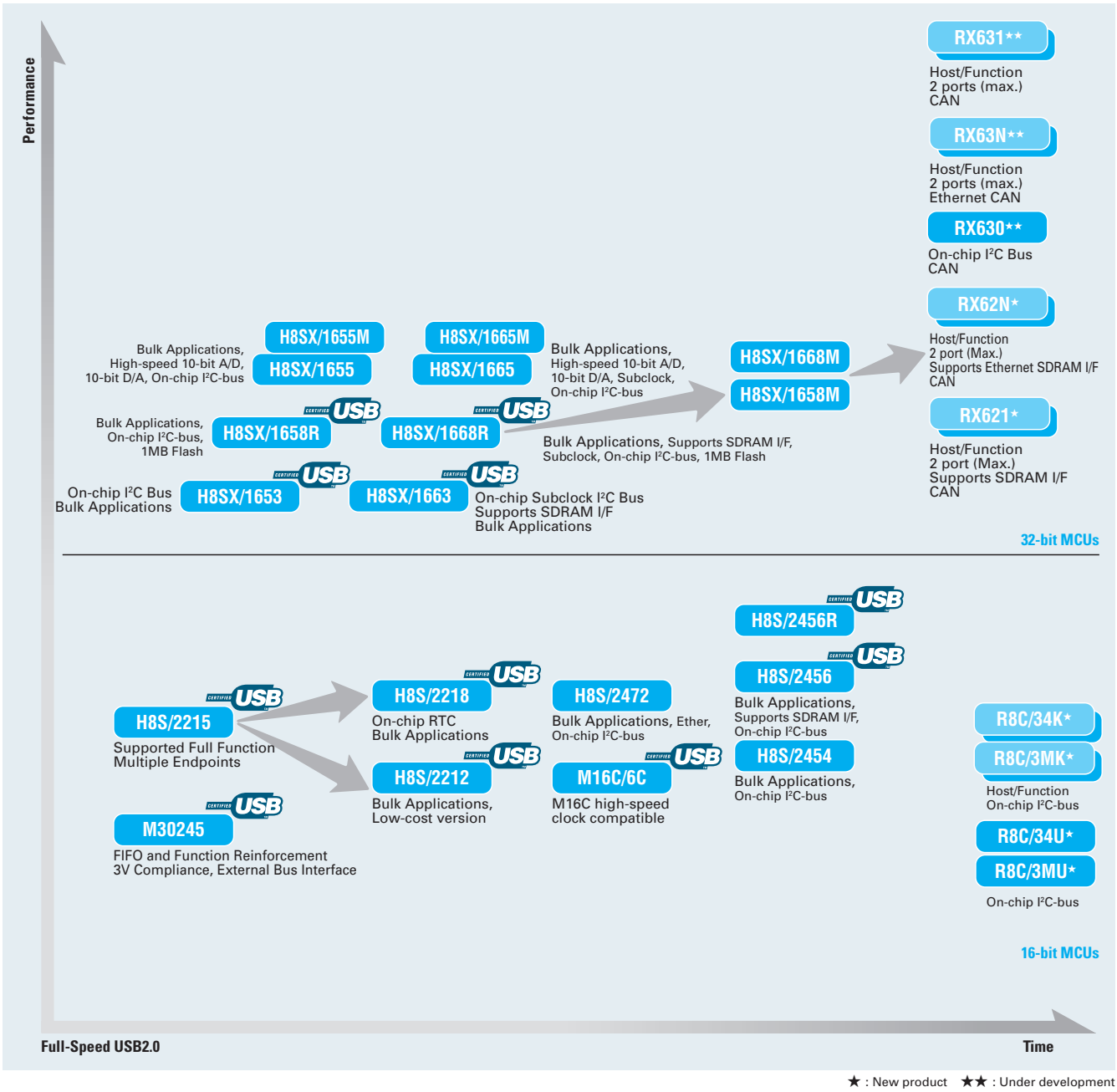
Group		μPD78F0846	μPD78F0847	μPD78F0848	μPD78F0849
Memory	ROM Size (Bytes)	32K	60K	32K	60K
	ROM Type	Flash			
	Single-Power-Supply Flash Memory	Yes			
	RAM Size (Bytes)	2K	3K	2K	3K
Clock	Maximum Operating Frequency (MHz)	20			
	On-Chip Oscillator (Hz)	8M, 240k			
	Subclock (32.768kHz)	Yes			
I/O	I/O Ports	63			
Bus	External Data/Address Bus	—/—			
Timer	16-bit Timer	5			
	8-bit Timer	2			
	Other Timers	—			
	Watch Timer	1			
	Real-Time Counter	—			
	Watchdog Timer	1			
	PWM Output	7			
Serial Interface	UART	—			
	UART Supporting LIN-bus	1			
	UART, CSI	—			
	UART Supporting LIN-bus, CSI	1			
	CSI	1			
	CSI, I^2C	—			
	CSI with Automatic Transmission/Reception Function	—			
	I^2C	1			
	IEBus	—			
	CAN	1			
OCD	On-Chip Debugger	Yes			
Peripheral Functions	LCD (Segments x Commons)	32 × 4		28 × 4	
	16-bit ΔΣ A/D Converter	—			
	10-bit A/D Converter	8			
	8-bit A/D Converter	—			
	8-bit D/A Converter	—			
	Multiplier/Divider (bits x bits, bits ÷ bits)	16 × 16 32 ÷ 16			
	Other Functions	Sound generator (1 CH), stepper motor C/D (2 CH)		Sound generator (1 CH), stepper motor C/D (4 CH)	
Others	Power Supply Voltage (V)	4.0 to 5.5 (when operating at 20 MHz) 2.7 to 5.5 (when operating at 10 MHz)			
	Package (size: mm)	80-LQFP (12 × 12)			
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-78K0DX2 (IECUBE)			
Package		P80GK-50-GAK			
Part No.		μPD78F0846GKA-GAK-G	μPD78F0847GKA-GAK-G	μPD78F0848GKA-GAK-G	μPD78F0849GKA-GAK-G

★ : New product ★★ : Under development

USB MCUs

This is a lineup of 8/16/32-bit microcontrollers compatible with Full-Speed applications, 8-bit microcontrollers compatible with Hub applications, 16/32-bit microcontrollers compatible with Hi-Speed applications, and 32-bit microcontrollers compatible with OHCI Host and Renesas original Host applications. These devices can be used extensively in many types of applications, such as in audio devices, electronic musical instruments, printers, scanners, modems, and other PC peripheral devices.

• USB MPUs and MCUs Roadmap (RX, M16C, H8SX, H8S, 740 Family)



★ : New product ★★ : Under development

USB MCUs

• Line up

RX Family (USB)

The RX family of USB MCU models attains a peak CPU operating performance of 100MHz. These USB MCU models incorporate functions conforming to Full-Speed USB2.0 specifications.
They are also equipped with a rich set of system fail-safe functions such as power-on reset (POR), low voltage detection (LVD).

RX631, RX63N, RX630, RX62N, RX621 Group

R8C Family (USB)

The R8C Family of 16-bit CISC MCUs features high ROM efficiency, superior noise characteristics, low power consumption, and excellent processing performance in actual applications.
These support functions conforming to Full-Speed USB2.0 specifications. The many on-chip peripheral functions, including a full complement of timer functions and serial communication functions, provide support for a wide variety of application fields.

R8C/3MU, R8C/3MK, R8C/34U, R8C/34K

H8SX Family (USB)

The H8SX family of USB MCU models attains a peak CPU operating performance of 50MHz. These USB MCU models incorporate a variety of peripheral features, such as DMAC, DTC, 8- and 16-bit timers, serial, and AD/DA converter functions, in addition to functions conforming to Full-Speed USB2.0 specifications. The USB MCU models incorporate especially powerful communications functions, such as serial (asynchronous, clock, and high-speed SCI), I^2C, and IrDA functions, which are ideal for the controllers of USB-connected peripheral devices.

H8SX/1653, H8SX/1658M, H8SX/1658R, H8SX/1663, H8SX/1655, H8SX/1665, H8SX/1665M, H8SX/1655M, H8SX/1668M, H8SX/1668R Group

H8S Family (USB)

The H8S family of USB MCU models incorporates a variety of peripheral features and USB functions conforming to Full-Speed USB2.0 specifications. These USB MCU models incorporate a power management function, which is ideal for the simultaneous supply of low power to equipment in use. Furthermore, a lineup of compact package products (BGA type) is available.

H8S/2212, H8S/2215, H8S/2218, H8S/2456R, H8S/2456, H8S/2454, H8S/2472 Group

M16C/60 Series (USB)

The M16C/60 Series of USB MCUs support a 1 MB address space. The maximum operating frequency is 32 MHz when using a PLL frequency synthesizer. Flash memory versions are available, and the on-chip flash memory can be rewritten using a single power supply.

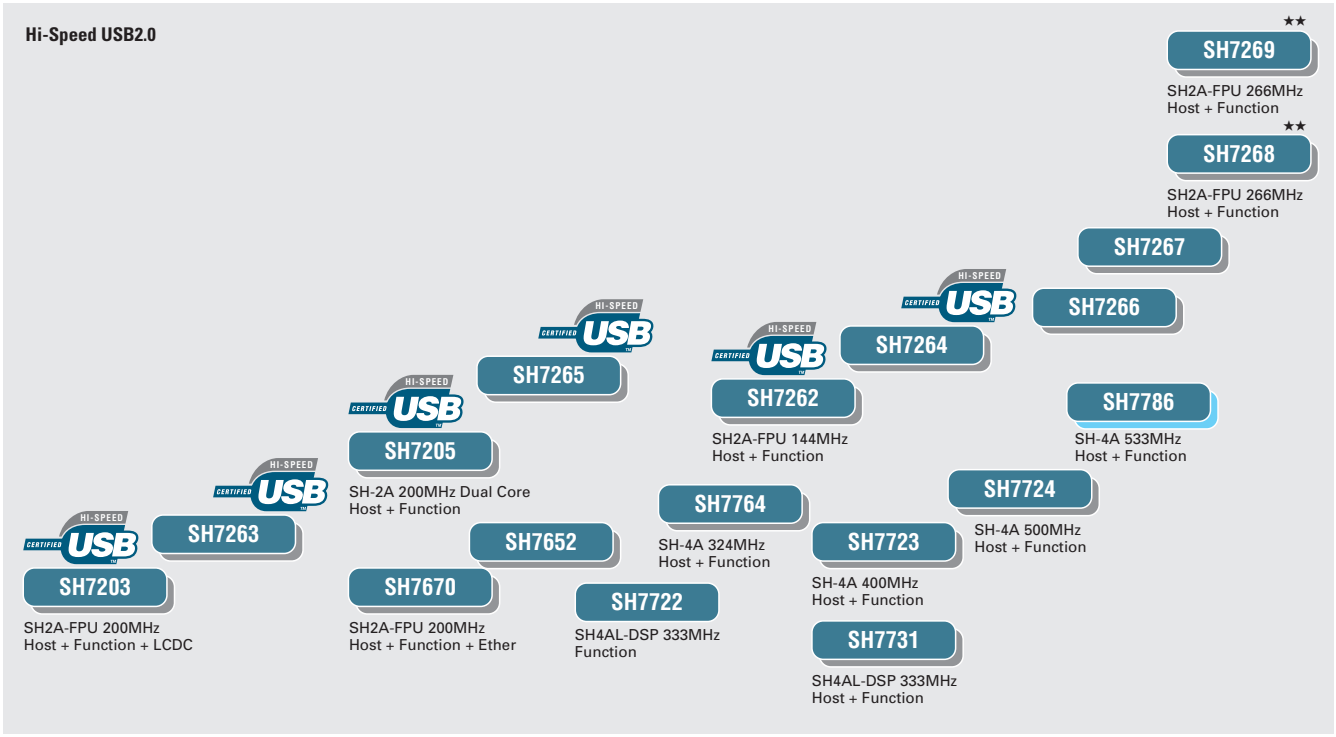
M16C/6C Group

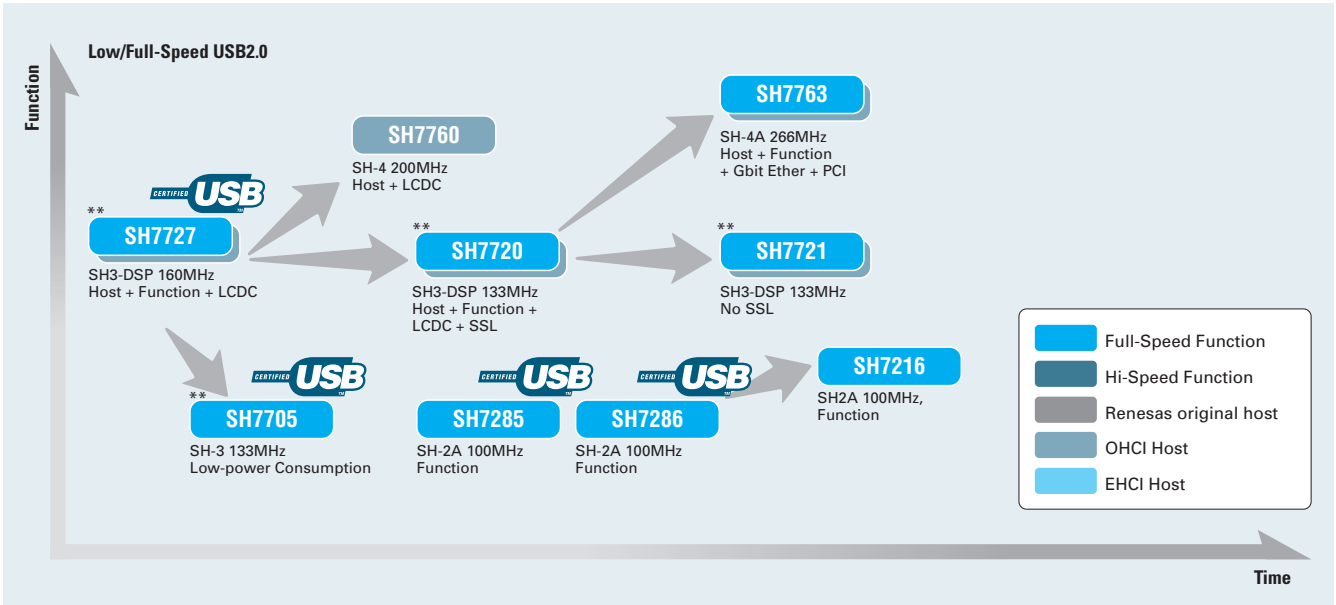
M16C/20 Series (USB)

The M16C/20 Series has 1M byte memory space. Standard on-chip peripherals, including 16-bit Multifunction Timers, UART/Clock Synchronous Serial I/Os, 10-bit A/D Converter, DMACs, Watchdog Timer, etc. USB MCUs with Full-Speed USB2.0 function are available.

M16C/24 (M30245) Group

• USB MPUs Roadmap (SuperH Family)





*SuperH™ is a trademark of Renesas Electronics Corp.

**Please refer to SH RISC engine Family regarding SH7705, SH7727, SH7720, SH7721.

★ : New product ★★ : Under development

• Specifications (SH-Ether Series)

Series		SH-Ether								
Group		SH7652	SH7670							
Memory	ROM (Bytes)	—								
	RAM (Bytes)	32K								
	ROM Type*1	L								
	Cache Memory	16K								
	Program Security	—								
CPU	CPU	SH2A-FPU Core								
	Basic Instructions	112								
	Minimum Instruction Execution Time (ns)	5 (@200MHz)	7.5 (@133MHz)	5 (@200MHz)	7.5 (@133MHz)	5 (@200MHz)	7.5 (@133MHz)	5 (@200MHz)	7.5 (@133MHz)	
	Dhrystone Performance	480MIPS (200MHz)	320MIPS (133MHz)	480MIPS (200MHz)	320MIPS (133MHz)	480MIPS (200MHz)	320MIPS (133MHz)	480MIPS (200MHz)	320MIPS (133MHz)	
	Multiplier	32 × 32 → 64								
	Multiply-Accumulate Instruction	32 × 32 + 64 → 64								
	Barrel Shifter	Yes								
	FPU	Yes								
	MMU	—								
DMA	DMAC (Channels)	8	8 (2 channels of them can receive an external request)							
	DTC/DMAC II	—								
External Bus Expansion	Address Space (Bytes)	320M								
	Bus State Controller	SRAM/SDRAM/Byte control SRAM/PCMCIA								
	Bus Structure	Separate bus (8/16/32-bit)								
	SDRAM Controller	Yes								
	DRAM Controller	—								
	PCI Controller	—								
	Endian Conversion	—								
	Host Interface	Yes								
Clock	Clock Generation Circuit	1 circuit								
	PLL	Yes								
	RTC	—								
	Oscillation Stop Detection	—								
	Frequency Divider	Yes								
	Power Save	Sleep/Software standby/Module standby								
Power Supply Voltage Detection	Power-On Reset/POR	—								
A/D Converter	Resolution × Channels	—								
	Sample and Hold	—								
	Multi-Channel Sample and Hold	—								
D/A Converter	Resolution × Channels	—								
Timer	8-bit	—								
	16-bit	2 (CMT)								
	32-bit	—								
	Input Capture	—								
	Output Compare	—								
	PWM Output	—								
	Event Counter	2 (shared with CMT)								
	2-Phase Encoder Input	—								
	3-Phase Inverter Control	—								
Watchdog Timer		1								
Serial Interface	Clock Sync./Clock Async.	3								
	Clock Sync. Only	—								
	Clock Async. Only	—								
I²C-bus		1								
Smart Card/SIM		—								
Synchronous Serial Communication Unit/Special Serial I/O		2 (SSI)	2 (SSI × 2)							
CAN	Channels	—								
	Message Box (Numbers)	—								
FlexRay		—								
Ethernet		1								
USB Host		1 (switchable to USB Function)								
USB Function		1 (switchable to USB HOST)								
IrDA		—								
LCD		—								
I/O Ports	Input Only (Numbers)	8								
	CMOS I/O (Numbers)	86								
	High Voltage Port (Numbers)	—								
	N-Channel Open Drain Port (Numbers)	—	2							
	High Current Drive Port	—								
	Pull-Up Resistor	—								
External Interrupts Pins		9 (NMI + 8)								
Debugging Function	Boundary Scan/JTAG	—	Yes							
	On-Chip Debug	Yes								
	On-Board Flash Program	—								
Other Functions	ROM Correction Function	—								
	Others	DTCP-IP, TSIF	—		SDHI		Encryption function		SDHI, Encryption function	
Operating Frequency/Supply Voltage		200MHz/1.2, 3.1 to 3.5 (bus)	—							
Operating Ambient Temperature (˚C)		–20 to 70	–40 to 85	–20 to 70	–40 to 85	–20 to 70	–40 to 85	–20 to 70	–40 to 85	
Package*2		—								
Part No.		R5S76520B200BG	R5S76700B200BG	R5S76700D133BG	R5S76710B200BG	R5S76710D133BG	R5S76720B200BG	R5S76720D133BG	R5S76730B200BG	R5S76730D133BG

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (SH7700 Series)

Series		SH7700													
Group		SH7706	SH7709S								SH7729R				
Memory	ROM (Bytes)	—													
	RAM (Bytes)	—									16K				
	ROM Type*1	L													
	Cache Memory	16K, 4-way set-associative													
	Program Security	—													
CPU	CPU	SH-3 Core									SH3-DSP Core				
	Basic Instructions	68									160				
	Minimum Instruction Execution Time (ns)	7.5 (@133MHz)	10 (@100MHz)	7.5 (@133MHz)	6 (@167MHz)	5 (@200MHz)					10 (@100MHz)	7.5 (@133MHz)	6 (@167MHz)	5 (@200MHz)	
	Dhrystone Performance	—													
	Multiplier	32 × 32 → 64													
	Multiply-Accumulate Instruction	32 × 32 + 64 → 64													
	Barrel Shifter	Yes													
	FPU	—													
	MMU	Yes													
DMA	DMAC (Channels)	4 (2 channels of them can receive an external request)													
	DTC/DMAC Ⅱ	—													
External Bus Expansion	Address Space (Bytes)	384M													
	Bus State Controller	SRAM/SDRAM/Burst ROM/PCMCIA													
	Bus Structure	Separate bus (8/16/32-bit)													
	SDRAM Controller	Yes													
	DRAM Controller	—													
	PCI Controller	—													
	Endian Conversion	Yes													
	Host Interface	—													
Clock	Clock Generation Circuit	1 circuit													
	PLL	Yes													
	RTC	Yes													
	Oscillation Stop Detection	—													
	Frequency Divider	Yes													
	Power Save	Sleep/Software standby/Module standby/Hardware standby													
Power Supply Voltage Detection	Power-On Reset/POR	—													
A/D Converter	Resolution × Channels	10-bit × 4	10-bit × 8												
	Sample and Hold	Yes													
	Multi-Channel Sample and Hold	Yes													
D/A Converter	Resolution × Channels	8-bit × 2													
Timer	8-bit	—													
	16-bit	1 (CMT)													
	32-bit	3 (TMU)													
	Input Capture	1 (shared with TMU)													
	Output Compare	—													
	PWM Output	—													
	Event Counter	—													
	2-Phase Encoder Input	—													
	3-Phase Inverter Control	—													
Watchdog Timer		1													
Serial Interface	Clock Sync./Clock Async.	1													
	Clock Sync. Only	—													
	Clock Async. Only	1	2												
I²C-bus		—													
Smart Card/SIM		1 (T = 0 (sub set))													
Synchronous Serial Communication Unit/Special Serial I/O		—													
CAN	Channels	—													
	Message Box (Numbers)	—													
FlexRay		—													
Ethernet		—													
USB Host		—													
USB Function		—													
IrDA		—	Yes (using serial I/F (1 ch))												
LCD		—													
I/O Ports	Input Only (Numbers)	—													
	CMOS I/O (Numbers)	72	96												
	High Voltage Port (Numbers)	—													
	N-Channel Open Drain Port (Numbers)	—													
	High Current Drive Port	—													
	Pull-Up Resistor	Yes													
External Interrupts Pins		7 (NMI + 6 (15 level))	23 (NMI + 22 (15 level))												
Debugging Function	Boundary Scan/JTAG	Yes													
	On-Chip Debug	Yes													
	On-Board Flash Program	—													
Other Functions	ROM Correction Function	—													
	Others	—									DSP function				
Operating Frequency/Supply Voltage		133MHz/ 1.9V, 3.3V	100MHz/ 1.7V, 3.3V		133MHz/ 1.8V, 3.3V		167MHz/ 1.9V, 3.3V		200MHz/ 2.0V, 3.3V		100MHz/ 1.7V, 3.3V		133MHz/ 1.8V, 3.3V		167MHz/ 1.9V, 3.3V		200MHz/ 2.0V, 3.3V
Operating Ambient Temperature (˚C)		–20 to 75													
Package*2		TTBG0208JA-A	PLQP0176KD-A	PLBG0240JA-A	PLQP0208KA-A	PLBG0240JA-A	PLQP0208KA-A	PLBG0240JA-A	PLQP0208KA-A	PRQP0208KE-B	PLBG0240JA-A	PLQP0208KA-A	PLBG0240JA-A	PLQP0208KA-A	PLBG0240JA-A	PLQP0208KA-A	PRQP0208KE-B
Part No.		HD6417706BP133	HD6417706F133	HD6417709SBP100B	HD6417709SF100B	HD6417709SBP133B	HD6417709SF133B	HD6417709SBP167B	HD6417709SF167B	HD6417709SHF200B	HD6417729RBP100B	HD6417729RF100B	HD6417729RBP133B	HD6417729RF133B	HD6417729RBP167B	HD6417729RF167B	HD6417729RHF200B

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (SH7750, SH7780 Series)

Series		SH7750	SH7780		
Group		SH7760	SH7722	SH7723	SH7724
Memory	ROM (Bytes)	—			
	RAM (Bytes)	—	148K	16K	
	ROM Type*1	L			
	Cache Memory	16K (instructions), 32K (data), 2-way set-associative	32K (instructions), 32K (data) 4-way set-associative	L1C: 32K (instructions), 32K (data) 4-way set-associative L2C: 256K (Mixed instruction and operand type)	
	Program Security	—			
CPU	CPU	SH-4 Core	SH4AL-DSP Core	SH-4A Core	
	Basic Instructions	94	170	103	
	Minimum Instruction Execution Time (ns)	2.5 (@200MHz)	1.5 (@333.4MHz)	1.25 (@400MHz)	1.00 (@500MHz)
	Dhrystone Performance	—	597MIPS (333.4MHz)	720MIPS (400MHz)	900MIPS (500MHz)
	Multiplier	32 × 32 → 64			
	Multiply-Accumulate Instruction	32 × 32 + 64 → 64			
	Barrel Shifter	Yes			
	FPU	Yes	—		
	MMU	Yes			
DMA	DMAC (Channels)	8 (4 channels of them can receive an external request)	6 (1 channel of them can receive an external request)	12 (2 channels of them can receive an external request)	
	DTC/DMAC II	—			
External Bus Expansion	Address Space (Bytes)	448M	384M		
	Bus State Controller	SRAM/SDRAM/MPX/ Burst ROM/Byte control SRAM/PCMCIA	SRAM/Burst ROM/NOR-Flash/PCMCIA		
	Bus Structure	Separate bus (8/16/32-bit) / Multiplex bus (32-bit)	Local bus (16/32-bit) SDRAM (16/32/64-bit)	Local bus (16/32-bit) DDR1-SDRAM (32-bit)	
	SDRAM Controller	Yes	Yes (SDRAM)	Yes (DDR1-SDRAM)	Yes (DDR2/MobileDDR-SDRAM)
	DRAM Controller	—			
	PCI Controller	—			
	Endian Conversion	Yes			
	Host Interface	Yes (Multi-function interface)	—		
Clock	Clock Generation Circuit	1 circuit			
	PLL	Yes			
	RTC	—	Yes		
	Oscillation Stop Detection	—			
	Frequency Divider	Yes			
	Power Save	Sleep/Standby/Module standby	Sleep/Software standby/Module standby/U-standby		Sleep/Software standby/ Module standby/R-standby/U-standby
Power Supply Voltage Detection	Power-On Reset/POR	—	Yes		
A/D Converter	Resolution × Channels	10-bit × 4	—	10-bit × 4	
	Sample and Hold	Yes	—		
	Multi-Channel Sample and Hold	Yes	—		
D/A Converter	Resolution × Channels	—			
Timer	8-bit	—			
	16-bit	4 (CMT)	4 (TPU)		
	32-bit	3 (TMU)	3 (TMU) 1 (CMT)	6 (TMU) 1 (CMT)	
	Input Capture	1 (shared with TMU)	—		
	Output Compare	1 (shared with CMT)	1 (shared with TPU)		
	PWM Output	—	1 (shared with TPU)		
	Event Counter	—			
	2-Phase Encoder Input	—			
	3-Phase Inverter Control	—			
Watchdog Timer		1			
Serial Interface	Clock Sync./Clock Async.	3	3 (SCIF × 3)	3 (SCIF × 3), 3 (SCIFA × 3)	
	Clock Sync. Only	—	1 (SIO)	—	
	Clock Async. Only	—			
I^2C-bus		2	1		
Smart Card/SIM		1 (T = 0 (sub set) /T = 1 (sub set))	Yes		
Synchronous Serial Communication Unit/Special Serial I/O		—	2 (SIOF × 2), 2 (SIU × 2)	2 (MSIOF × 2)	
CAN	Channels	2	—		
	Message Box (Numbers)	32	—		
FlexRay		—			
Ethernet		—			1
USB Host		1 (Full speed)	—	Yes	
USB Function		—	Yes		
IrDA		—	Yes		
LCD		Yes			
I/O Ports	Input Only (Numbers)	—	23	6	
	CMOS I/O (Numbers)	69 (Max.)	100	162	
	High Voltage Port (Numbers)	—			
	N-Channel Open Drain Port (Numbers)	—			
	High Current Drive Port	—			
	Pull-Up Resistor	Yes			
External Interrupts Pins		5 (NMI + 15 (15 level) or 4)	9 (NMI 1 + IRQ 8)		
Debugging Function	Boundary Scan/JTAG	Yes			
	On-Chip Debug	Yes			
	On-Board Flash Program	—			
Other Functions	ROM Correction Function	—			
	Others	Audio Codec interface × 2, Serial Sound Interface × 2, MultiMediaCard interface (Some pins for each module are multiplexed)	Video processing unit (VPU) Video I/O (VIO) JPEG Processing Unit (JPU) Video Output Unit (VOU) TS Interface (TSIF) Key scan interface (KEYSC) 2D Graphics Accelerator (2DG) SD card host interface (SDHI) NAND Flash Memory Control (FLCTL)	Video processing unit (VPU5F) Video I/O (VIO5) Video Output Unit (VOU) TS Interface (TSIF) Key scan interface (KEYSC) 2D Graphics Accelerator (2DG) SD card host interface (SDHI) NAND Flash Memory Control (FLCTL) ATAPI interface (ATAPI)	
Operating Frequency/Supply Voltage		200MHz/1.5V, 3.3V (I/O)	266MHz/1.2V (internal), 3.3V (I/O) 333MHz/1.3V (internal), 3.3V (I/O)	400MHz/1.2V (internal), 3.3V (I/O), 2.5V (DDR)	500MHz/1.2V (internal), 3.3V (I/O), 1.8V (DDR2)
Operating Ambient Temperature (°C)		–20 to 75 / –40 to 85	–20 to 70 / –40 to 85	–20 to 70 / –40 to 85	–20 to 70 / –40 to 85
Package*2		BP-256B	PLBG0417KB-A / PRBG0449GA-A		PVBG0441KB-A / PRBG0449GA-A
Part No.		HD6417760BL200A / HD6417760BL200AD	R8A77220AC266BA / R8A77220AC266BG	R8A77230C400BG / R8A77230D400BG	R8A77240B500BB / R8A77240D500BG

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (SH7780 Series)

Series		SH7780			
Group		**SH7731**	**SH7763**	**SH7764**	**SH7786**
Memory	ROM (Bytes)	—			
	RAM (Bytes)	148K	16K		(8K + 16K) × 2
	ROM Type*1	L			
	Cache Memory	32K (instructions), 32K (data), 4-way set-associative			(32K (instructions) + 32K (data)) × 2 + 256K (L2Cache)
	Program Security	—			
CPU	CPU	SH4AL-DSP Core	SH-4A Core		
	Basic Instructions	170	103		
	Minimum Instruction Execution Time (ns)	1.5 (@333MHz)	1.9 (@266MHz)	1.5 (@324MHz)	0.94 (@533MHz)
	Dhrystone Performance	—	478MIPS (266MHz), 1.8GFLOPS (266MHz)	583MIPS (324MHz)	—
	Multiplier	32 × 32 → 64			
	Multiply-Accumulate Instruction	32 × 32 + 64 → 64			
	Barrel Shifter	Yes			
	FPU	—	Yes		
	MMU	Yes			
DMA	DMAC (Channels)	6 (1 channel of them can receive an external request)	6 (4 channels of them can receive an external request)	6 (2 channels of them can receive an external request)	24 (max)
	DTC/DMAC II	—			
External Bus Expansion	Address Space (Bytes)	384M	Local: 448M, DDR: 256M, PCI: 512M + memory/I/O area	256M	Local: 448M (max) DDR3: 2G (max)
	Bus State Controller	SRAM/Burst ROM/Byte control SRAM/PCMCIA	SRAM/MPX/Burst ROM/ Byte control SRAM/PCMCIA	SRAM/SDRAM	SRAM/MPX/Burst ROM/Byte control SRAM/PCMCIA
	Bus Structure	Local bus (16/32-bit) SDRAM (16/32/64-bit)	Local bus (8/16/32-bit) /DDR (32-bit) /PCI (32-bit) / Multiplex bus (32-bit)	Separate bus (8/16/32-bit) SDRAM can connect to 64-bit bus	Local bus/DDR3/PCI-Express
	SDRAM Controller	Yes (SDRAM)	Yes (DDR-SDRAM)	Yes	Yes (DDR3-SDRAM)
	DRAM Controller	—			
	PCI Controller	—	Yes	—	Yes (PCI-Express)
	Endian Conversion	Yes			
	Host Interface	—			
Clock	Clock Generation Circuit	1 circuit			
	PLL	Yes			
	RTC	Yes		—	
	Oscillation Stop Detection	—			
	Frequency Divider	Yes			
	Power Save	Sleep/Software standby/ Module standby/U-standby	Sleep/Module standby	Sleep/Reflesh standby/Module standby	Sleep/ Module standby
Power Supply Voltage Detection	Power-On Reset/POR	—			
A/D Converter	Resolution × Channels	—	10-bit × 4	—	
	Sample and Hold	—	Yes	—	
	Multi-Channel Sample and Hold	—	Yes	—	
D/A Converter	Resolution × Channels	—	8-bit × 2	—	
Timer	8-bit	—			
	16-bit	4 (TPU)	4 (CMT)	—	
	32-bit	4 (TMU × 3, CMT × 1)	6 (TMU)		12 (TMU)
	Input Capture	—	2 (shared with TMU)	1 (shared with TMU)	
	Output Compare	1 (shared with TPU)	—		
	PWM Output	1 (shared with TPU)	—		
	Event Counter	—			
	2-Phase Encoder Input	—			
	3-Phase Inverter Control	—			
Watchdog Timer		1			
Serial Interface	Clock Sync./Clock Async.	3 (SCIF × 3)	3		6 (max)
	Clock Sync. Only	1 (SIO)	—		
	Clock Async. Only	—			
I²C-bus		1	2	1	2 (max)
Smart Card/SIM		1 (T = 0 mode/T = 1 mode)	Yes	—	
Synchronous Serial Communication Unit/Special Serial I/O		2 (SIOF × 2)	3 (serial IO × 3)	6 (SSI × 6)	—
CAN	Channels	—			
	Message Box (Numbers)	—			
FlexRay		—			
Ethernet		—	2 (Gbit)	1	1 (max)
USB Host		1 (High-Speed)	Yes (selectable USB Function)	1 (Host/Function selectable)	2 (max)
USB Function		High-Speed	Yes (selectable USB HOST)	1 (Host/Function selectable)	1 (max)
IrDA		Yes	—		
LCD		—	Yes		Display unit
I/O Ports	Input Only (Numbers)	23	4 (Max.)	—	
	CMOS I/O (Numbers)	100	107 (Max.)	77	60 (max)
	High Voltage Port (Numbers)	—			
	N-Channel Open Drain Port (Numbers)	—			
	High Current Drive Port	—			
	Pull-Up Resistor	103 (I/O 80, input 23)	Yes	77	—
External Interrupts Pins		9 (NMI 1 + IRQ 8)	9 (NMI + 15 (15 level) or 8)	3	9 (NMI + 15 (15 level) or 8) (max)
Debugging Function	Boundary Scan/JTAG	Yes			
	On-Chip Debug	Yes			
	On-Board Flash Program	Yes	—		
	ROM Correction Function	—			
Other Functions	Others	LCD controller (LCDC) Key scan interface (KEYSC) SD card host interface (SDHI)	Sec.accelerator, Audio Codec interface, Serial Sound Interface, MultiMediaCard interface, Stream Interface (Some pins for each module are multiplexed.) / Audio Codec interface, Serial Sound Interface, MultiMediaCard interface, Stream Interface (Some pins for each module are multiplexed.) / Sec.accelerator, SD Host interface, Audio Codec interface, Serial Sound Interface, MultiMediaCard interface, Stream Interface (Some pins for each module are multiplexed.)	—	HAC, SSI, NAND flash interface, SDIF, HSPI (Some pins for each module are multiplexed)
Operating Frequency/Supply Voltage		333MHz/1.3V (internal), 3.3V (I/O) 266MHz/1.2V (internal), 3.3V (I/O)	266MHz/1.25V (internal), 3.3V (I/O), 2.5V (DDR)	324MHz/1.2V (Internal) /3.3V (I/O)	533MHz1.25V (internal) 3.3V (I/O etc.)1.5V (DDR3 etc.)
Operating Ambient Temperature (°C)		–40 to 85	–20 to 75	–20 to 85 / –40 to 85 / –20 to 85 / –40 to 85	–20 to 85
Package*2		PRBG0449GA-A / PLBG0417KB-A	BP-449	PRBG0404GA-A	BGA593
Part No.		R8A77310D333BG / R8A77310C333BA	R8S77631AV266BGV / R8S77631AV266BGV / R8S77632AV266BGV	R8S77640N300BG / R8S77640D300BG / R8S77640P300BG / R8S77641N300BG / R8S77641D300BG / R8S77641P300BG	R8A77860HBG** / R8A77860NBG*

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (SH7200 Series)

Series		SH7200	
Group		SH7203	SH7205
Memory	ROM (Bytes)	—	
	RAM (Bytes)	80K	112K
	ROM Type*1	L	
	Cache Memory	16K	
	Program Security	—	
CPU	CPU	SH2A-FPU Core	
	Basic Instructions	112	
	Minimum Instruction Execution Time (ns)	5 (@200MHz)	
	Dhrystone Performance	480MIPS (200MHz)	
	Multiplier	32 × 32 → 64	
	Multiply-Accumulate Instruction	32 × 32 + 64 → 64	
	Barrel Shifter	Yes	
	FPU	Yes	
	MMU	—	
DMA	DMAC (Channels)	8 (4 channels of them can receive an external request)	14
	DTC/DMAC II	—	
External Bus Expansion	Address Space (Bytes)	4G	
	Bus State Controller	Yes	
	Bus Structure	—	
	SDRAM Controller	Yes	
	DRAM Controller	Yes	—
	PCI Controller	—	
	Endian Conversion	—	
	Host Interface	—	
Clock	Clock Generation Circuit	1 circuit (CPG)	
	PLL	Yes	
	RTC	Yes	
	Oscillation Stop Detection	Yes	—
	Frequency Divider	Yes	
	Power Save	Sleep/Software standby/Deep standby/Module standby	Dual processor/Single processor/Dual sleep/Software standby/Deep standby/Module standby
Power Supply Voltage Detection	Power-On Reset/POR	—	
A/D Converter	Resolution × Channels	10-bit × 8	
	Sample and Hold	Yes	
	Multi-Channel Sample and Hold	—	
D/A Converter	Resolution × Channels	8-bit × 2	
Timer	8-bit	—	
	16-bit	MTU × 5, CMT × 2	9 (MTU × 5, CMT × 4)
	32-bit	—	1 (MTU2)
	Input Capture	16 (shared with MTU2)	
	Output Compare	16 (shared with MTU2)	
	PWM Output	16 (shared with MTU2)	
	Event Counter	7 (shared with CMT, MTU2)	9 (shared with CMT, MTU2)
	2-Phase Encoder Input	—	2 (shared with MTU2)
	3-Phase Inverter Control	—	1 (shared with MTU2)
Watchdog Timer		1	2
Serial Interface	Clock Sync./Clock Async.	4	6
	Clock Sync. Only	—	
	Clock Async. Only	—	
I²C-bus		4	
Smart Card/SIM		—	
Synchronous Serial Communication Unit/Special Serial I/O		6 (SSU × 2, SSI × 4)	8 (SSU × 2, SSI × 6)
CAN	Channels	2	
	Message Box (Numbers)	32 × 2	
FlexRay		—	
Ethernet		—	
USB Host		1 (High-Speed)	2 (High-Speed)
USB Function		High-Speed	
IrDA		—	
LCD		Yes	—
I/O Ports	Input Only (Numbers)	16	11
	CMOS I/O (Numbers)	82	96
	High Voltage Port (Numbers)	—	
	N-Channel Open Drain Port (Numbers)	—	
	High Current Drive Port	—	
	Pull-Up Resistor	98 (I/O 82, input 16)	107 (I/O 96, input 11)
External Interrupts Pins		17 (NMI, IRQ × 8, PINT × 8)	
Debugging Function	Boundary Scan/JTAG	—	Yes
	On-Chip Debug	Yes	
	On-Board Flash Program	—	
Other Functions	ROM Correction Function	—	
	Others	FLCTL, LCDC supporting TFT	FLCTL, ATAPI, 2DG
Operating Frequency/Supply Voltage		200MHz/1.1 to 1.3V, 3.0 to 3.6V	
Operating Ambient Temperature (˚C)		–20 to 85	
Package*2		PRQP0240KC-A	PRBG0272GA-A
Part No.		R5S72030W200FP	R5S72050W200BG

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (SH7260 Series)

Series		SH7260			
Group		SH7263		SH7265	
Memory	ROM (Bytes)	—			
	RAM (Bytes)	80K		112K	
	ROM Type*1	L			
	Cache Memory	16K			
	Program Security	—			
CPU	CPU	SH2A-FPU Core			
	Basic Instructions	112			
	Minimum Instruction Execution Time (ns)	5 (@200MHz)			
	Dhrystone Performance	480MIPS (200MHz)			
	Multiplier	32 × 32 → 64			
	Multiply-Accumulate Instruction	32 × 32 + 64 → 64			
	Barrel Shifter	Yes			
	FPU	Yes			
	MMU	—			
DMA	DMAC (Channels)	8 (4 channels of them can receive an external request)		14	
	DTC/DMAC Ⅱ	—			
External Bus Expansion	Address Space (Bytes)	4G			
	Bus State Controller	Yes			
	Bus Structure	—			
	SDRAM Controller	Yes			
	DRAM Controller	Yes		—	
	PCI Controller	—			
	Endian Conversion	—			
	Host Interface	—			
Clock	Clock Generation Circuit	1 circuit (CPG)			
	PLL	Yes			
	RTC	Yes			
	Oscillation Stop Detection	Yes		—	
	Frequency Divider	Yes			
	Power Save	Sleep/Software standby/Deep standby/Module standby		Dual processor/Single processor/Dual sleep/Software standby/Deep standby/Module standby	
Power Supply Voltage Detection	Power-On Reset/POR	—			
A/D Converter	Resolution × Channels	10-bit × 8			
	Sample and Hold	Yes			
	Multi-Channel Sample and Hold	—			
D/A Converter	Resolution × Channels	8-bit × 2			
Timer	8-bit	—			
	16-bit	MTU × 5, CMT × 2		9 (MTU × 5, CMT × 4)	
	32-bit	—		1 (MTU2)	
	Input Capture	16 (shared with MTU2)			
	Output Compare	16 (shared with MTU2)			
	PWM Output	16 (shared with MTU2)			
	Event Counter	7 (shared with CMT, MTU2)		9 (shared with CMT, MTU2)	
	2-Phase Encoder Input	—		2 (shared with MTU2)	
	3-Phase Inverter Control	—		1 (shared with MTU2)	
Watchdog Timer		1		2	
Serial Interface	Clock Sync./Clock Async.	4		6	
	Clock Sync. Only	—			
	Clock Async. Only	—			
I²C-bus		4			
Smart Card/SIM		—			
Synchronous Serial Communication Unit/Special Serial I/O		6 (SSU × 2, SSI × 4)		8 (SSU × 2, SSI × 6)	
CAN	Channels	2			
	Message Box (Numbers)	32 × 2			
FlexRay		—			
Ethernet		—			
USB Host		1 (High-Speed)		2 (High-Speed)	
USB Function		High-Speed			
IrDA		—			
LCD		—			
I/O Ports	Input Only (Numbers)	16		11	
	CMOS I/O (Numbers)	82		96	
	High Voltage Port (Numbers)	—			
	N-Channel Open Drain Port (Numbers)	—			
	High Current Drive Port	—			
	Pull-Up Resistor	98 (I/O 82, input 16)		107 (I/O 96, input 11)	
External Interrupts Pins		17 (NMI, IRQ × 8, PINT × 8)			
Debugging Function	Boundary Scan/JTAG	—		Yes	
	On-Chip Debug	Yes			
	On-Board Flash Program	—			
Other Functions	ROM Correction Function	—			
	Others	CDROM, SRC, FLCTL, LCDC supporting TFT	CDROM, SRC, FLCTL, SDHI, LCDC supporting TFT	FLCTL, ATAPI, 2DG, AAC encoder	FLCTL, ATAPI, 2DG, AAC encoder, SDHI
Operating Frequency/Supply Voltage		200MHz/1.1 to 1.3V, 3.0 to 3.6V			
Operating Ambient Temperature (˚C)		–40 to 85			
Package*2		PRQP0240KC-A		PRBG0272GA-A	
Part No.		R5S72630P200FP	R5S72632P200FP	R5S72631P200FP	R5S72633P200FP
		R5S72650P200BG	R5S72652P200BG	R5S72651P200BG	R5S72653P200BG

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (SH7260 Series)

Series		SH7260																			
Group		SH7266				SH7267				SH7268				SH7269							
Memory	ROM (Bytes)	—																			
	RAM (Bytes)	1600K								2500K(SRAM) + 64K(high-speed)											
	ROM Type*1	L																			
	Cache Memory	16K								8K(instruction), 8K(data), 4-way set-associative											
	Program Security	—																			
CPU	CPU	SH2A-FPU Core																			
	Basic Instructions	112																			
	Minimum Instruction Execution Time (ns)	6.9(@144MHz)		6.94(@144MHz)		6.9(@144MHz)		6.94(@144MHz)		3.76(@266MHz)											
	Dhrystone Performance	345MIPS(144MHz)								638MIPS(266MHz)											
	Multiplier	32× 32 → 64																			
	Multiply-Accumulate Instruction	32× 32 + 64 → 64																			
	Barrel Shifter	Yes																			
	FPU	Yes																			
	MMU	—																			
DMA	DMAC (Channels)	16																			
	DTC/DMAC II	—																			
External Bus Expansion	Address Space (Bytes)	4G																			
	Bus State Controller	Yes																			
	Bus Structure	Separate bus(8/16bit)								Separate bus (8/16/32bit)											
	SDRAM Controller	Yes																			
	DRAM Controller	—																			
	PCI Controller	—																			
	Endian Conversion	—																			
	Host Interface	—																			
Clock	Clock Generation Circuit	1 circuit (CPG)																			
	PLL	Yes																			
	RTC	Yes																			
	Oscillation Stop Detection	—																			
	Frequency Divider	Yes																			
	Power Save	Sleep/software standby/deep standby/ module standby																			
Power Supply Voltage Detection	Power-On Reset/POR	—																			
A/D Converter	Resolution × Channels	10-bit × 6												10-bit × 8							
	Sample and Hold	Yes																			
	Multi-Channel Sample and Hold	—																			
D/A Converter	Resolution × Channels	—																			
Timer	8-bit	—																			
	16-bit	7(MTU2 × 5, CMT × 2)																			
	32-bit	—																			
	Input Capture	16 (shared with MTU2)																			
	Output Compare	16 (shared with MTU2)																			
	PWM Output	16 (shared with MTU2)								16 (shared with MTU2), 16 (shared with PWM)											
	Event Counter	7 (shared with CMT, MTU2)																			
	2-Phase Encoder Input	2 (shared with MTU2)																			
	3-Phase Inverter Control	1 (shared with MTU2)																			
Watchdog Timer		1																			
Serial Interface	Clock Sync./Clock Async.	5				8															
	Clock Sync. Only	—																			
	Clock Async. Only	—																			
I²C-bus		3								2				4							
Smart Card/SIM		—																			
Synchronous Serial Communication Unit/Special Serial I/O		4 (RSPI × 1, SSI × 3)				6 (RSPI × 2, SSI × 4)				9 (RSPI × 2, RQSPI × 2, SSI × 4, SPDIF × 1)				12 (RSPI × 2, RQSPI × 2, SSI × 6, SPDIF × 1, SIOF × 1)							
CAN	Channels	—		2		—		2		3											
	Message Box (Numbers)	—		32× 2		—		32× 2		32× 3											
FlexRay		—																			
Ethernet		—																			
USBHOST		1(High-Speed)																			
USBFunction		High-Speed																			
IrDA		—																			
LCD		—																			
I/O Ports	Input Only (Numbers)	6												8							
	CMOS I/O (Numbers)	68				92				101				133							
	High Voltage Port (Numbers)	—																			
	N-Channel Open Drain Port (Numbers)	6								4				8							
	High Current Drive Port	—																			
	Pull-Up Resistor	80 (I/O : 68, input : 6, open drain : 6)				104 (I/O : 92, input : 6, open drain : 6)				111(I/O : 101, input : 6, open drain : 4)				149(I/O : 133, input : 8, open drain : 8)							
External Interrupts Pins		9(NMI, IRQ× 8)				17 (NMI, IRQ × 8, PINT × 8)															
Debugging Function	Boundary Scan/JTAG	Yes																			
	On-Chip Debug	Yes																			
	On-Board Flash Program	—																			
Other Functions	ROM Correction Function	—																			
	Others	Video in, Display cntl., CDROM Decoder, SRC, FLCTL								2D Graphics Accelerator, Video Decoder, Video in, Display cntl., JPEG Decoder, CDROM Decoder, SRC, FLCTL, SD, MMC											
Operating Frequency/Supply Voltage		144MHz/1.15 to 1.35V (internal), 3.0 to 3.6V (peripheral)								266MHz/1.15 to 1.35V (internal), 3.0 to 3.6V (peripheral)											
Operating Ambient Temperature (˚C)		–40 to 85	–20 to 85	–40 to 85	–20 to 85	–40 to 85	–20 to 85	–40 to 85	–20 to 85	–40 to +85		–20 to +85		–40 to +85		–20 to +85		–40 to +85		–20 to +85	–40 to +85
Package*2		PLQP0144KA-A				PLQP0176KB-A				PLQP0208KB-A				PLQP0256LB-A				PRBG0272GA-A			
Part No.		R5S72660P144FP	R5S72660W144FP	R5S72661P144FP	R5S72661W144FP	R5S72670P144FP	R5S72670W144FP	R5S72671P144FP	R5S72671W144FP	R5S72680W266FP**	R5S72681P266FP**	R5S72680P266FP**	R5S72681W266FP**	R5S72691P266FP**	R5S72690P266FP**	R5S72691W266FP**	R5S72690W266FP**	R5S72691P266BG**	R5S72691W266BG**	R5S72690W266BG**	R5S72690P266BG**

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (SH7260 Series)

Series		SH7260														
Group		SH7262														
Memory	ROM (Bytes)	—														
	RAM (Bytes)	704K								1088K						
	ROM Type*1	L														
	Cache Memory	16K														
	Program Security	—														
CPU	CPU	SH2A-FPU Core														
	Basic Instructions	112														
	Minimum Instruction Execution Time (ns)	6.9 (@144MHz)	6.94 (@144MHz)							6.9 (@144MHz)	6.94 (@144MHz)					
	Dhrystone Performance	345MIPS (144MHz)														
	Multiplier	32 × 32 → 64														
	Multiply-Accumulate Instruction	32 × 32 + 64 → 64														
	Barrel Shifter	Yes														
	FPU	Yes														
	MMU	—														
DMA	DMAC (Channels)	16														
	DTC/DMAC Ⅱ	—														
External Bus Expansion	Address Space (Bytes)	4G														
	Bus State Controller	Yes														
	Bus Structure	Separate bus (8/16-bit)														
	SDRAM Controller	Yes														
	DRAM Controller	—														
	PCI Controller	—														
	Endian Conversion	—														
	Host Interface	—														
Clock	Clock Generation Circuit	1 circuit (CPG)														
	PLL	Yes														
	RTC	Yes														
	Oscillation Stop Detection	—														
	Frequency Divider	Yes														
	Power Save	Sleep/Software standby/Deep standby/Module standby														
Power Supply Voltage Detection	Power-On Reset/POR	—														
A/D Converter	Resolution × Channels	10-bit × 4														
	Sample and Hold	Yes														
	Multi-Channel Sample and Hold	—														
D/A Converter	Resolution × Channels	—														
Timer	8-bit	—														
	16-bit	7 (MTU2 × 5, CMT × 2)														
	32-bit	—														
	Input Capture	16 (shared with MTU2)														
	Output Compare	16 (shared with MTU2)														
	PWM Output	16 (shared with MTU2)														
	Event Counter	7 (shared with CMT, MTU2)														
	2-Phase Encoder Input	2 (shared with MTU2)														
	3-Phase Inverter Control	1 (shared with MTU2)														
Watchdog Timer		1														
Serial Interface	Clock Sync./Clock Async.	8														
	Clock Sync. Only	—														
	Clock Async. Only	—														
I²C-bus		3														
Smart Card/SIM		—														
Synchronous Serial Communication Unit/Special Serial I/O		6 (RSPI × 2, SSI × 4)														
CAN	Channels	—	2	—	2	—	2	—	2	—	2	—	2			
	Message Box (Numbers)	—	32 × 2	—	32 × 2	—	32 × 2	—	32 × 2	—	32 × 2	—	32 × 2			
FlexRay		—														
Ethernet		—														
USB Host		1 (High-Speed)														
USB Function		High-Speed														
IrDA		—														
LCD		—														
I/O Ports	Input Only (Numbers)	4														
	CMOS I/O (Numbers)	89														
	High Voltage Port (Numbers)	—														
	N-Channel Open Drain Port (Numbers)	6														
	High Current Drive Port	—														
	Pull-Up Resistor	99 (I/O 89, input 4, open drain 6)														
External Interrupts Pins		17 (NMI, IRQ × 8, PINT × 8)														
Debugging Function	Boundary Scan/JTAG	Yes														
	On-Chip Debug	Yes														
	On-Board Flash Program	—														
Other Functions	ROM Correction Function	—														
	Others	Video in, Display cntl., CDROM decoder, SRC, FLCTL														
Operating Frequency/Supply Voltage		144MHz/1.1 to 1.3V (internal), 3.0 to 3.6V (peripheral)														
Operating Ambient Temperature (°C)		–20 to 85	–40 to 85				–20 to 85				–40 to 85			–20 to 85		
Package*2		PLQP0176KB-A														
Part No.		R5S72624W144FPU	R5S72624P144FPU	R5S72625P144FPU	R5S72626P144FPU	R5S72627P144FPU	R5S72625W144FPU	R5S72626W144FPU	R5S72627W144FPU	R5S72620W144FPU	R5S72620P144FPU	R5S72621P144FPU	R5S72622P144FPU	R5S72623P144FPU	R5S72621W144FPU	R5S72622W144FPU	R5S72623W144FPU

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (SH7260 Series)

Series		SH7260															
Group		SH7264															
Memory	ROM (Bytes)	—															
	RAM (Bytes)	704K							1088K								
	ROM Type*1	L															
	Cache Memory	16K															
	Program Security	—															
CPU	CPU	SH2A-FPU Core															
	Basic Instructions	112															
	Minimum Instruction Execution Time (ns)	6.94 (@144MHz)															
	Dhrystone Performance	345MIPS (144MHz)															
	Multiplier	32 × 32 → 64															
	Multiply-Accumulate Instruction	32 × 32 + 64 → 64															
	Barrel Shifter	Yes															
	FPU	Yes															
	MMU	—															
DMA	DMAC (Channels)	16															
	DTC/DMAC II	—															
External Bus Expansion	Address Space (Bytes)	4G															
	Bus State Controller	Yes															
	Bus Structure	Separate bus (8/16-bit)															
	SDRAM Controller	Yes															
	DRAM Controller	—															
	PCI Controller	—															
	Endian Conversion	—															
	Host Interface	—															
Clock	Clock Generation Circuit	1 circuit (CPG)															
	PLL	Yes															
	RTC	Yes															
	Oscillation Stop Detection	—															
	Frequency Divider	Yes															
	Power Save	Sleep/Software standby/Deep standby/Module standby															
Power Supply Voltage Detection	Power-On Reset/POR	—															
A/D Converter	Resolution × Channels	10-bit × 8															
	Sample and Hold	Yes															
	Multi-Channel Sample and Hold	—															
D/A Converter	Resolution × Channels	—															
Timer	8-bit	—															
	16-bit	7 (MTU2 × 5, CMT × 2)															
	32-bit	—															
	Input Capture	16 (shared with MTU2)															
	Output Compare	16 (shared with MTU2)															
	PWM Output	16 (shared with MTU2)															
	Event Counter	7 (shared with CMT, MTU2)															
	2-Phase Encoder Input	2 (shared with MTU2)															
	3-Phase Inverter Control	1 (shared with MTU2)															
Watchdog Timer		1															
Serial Interface	Clock Sync./Clock Async.	8															
	Clock Sync. Only	—															
	Clock Async. Only	—															
I^2C-bus		3															
Smart Card/SIM		—															
Synchronous Serial Communication Unit/Special Serial I/O		6 (RSPI × 2, SSI × 4)															
CAN	Channels	—	2	—	2	—	2	—	2	—	2	—	2	—	2	—	2
	Message Box (Numbers)	—	32 × 2	—	32 × 2	—	32 × 2	—	32 × 2	—	32 × 2	—	32 × 2	—	32 × 2	—	32 × 2
FlexRay		—															
Ethernet		—															
USB Host		1 (High-Speed)															
USB Function		High-Speed															
IrDA		—															
LCD		—															
I/O Ports	Input Only (Numbers)	8															
	CMOS I/O (Numbers)	115															
	High Voltage Port (Numbers)	—															
	N-Channel Open Drain Port (Numbers)	6															
	High Current Drive Port	—															
	Pull-Up Resistor	129 (input 115, input 8, open drain 6)															
External Interrupts Pins		17 (NMI, IRQ × 8, PINT × 8)															
Debugging Function	Boundary Scan/JTAG	Yes															
	On-Chip Debug	Yes															
	On-Board Flash Program	—															
Other Functions	ROM Correction Function	—															
	Others	Video in, Display cntl., CDROM decoder, SRC, FLCTL															
Operating Frequency/Supply Voltage		144MHz/1.1 to 1.3V (internal), 3.0 to 3.6V (peripheral)															
Operating Ambient Temperature (˚C)		–20 to 85				–40 to 85								–20 to 85			
Package*2		PLQP0208KB-A															
Part No.		R5S72644W144FPU	R5S72645W144FPU	R5S72646W144FPU	R5S72647W144FPU	R5S72644P144FPU	R5S72645P144FPU	R5S72646P144FPU	R5S72647P144FPU	R5S72640P144FPU	R5S72641P144FPU	R5S72642P144FPU	R5S72643P144FPU	R5S72640W144FPU	R5S72641W144FPU	R5S72642W144FPU	R5S72643W144FPU

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (SH7216 Series)

Series		SH7216																									
Group		SH7216																									
Memory	ROM (Bytes)	512K																									
	RAM (Bytes)	64K																									
	ROM Type*1	F																									
	Cache Memory	—																									
	Program Security	Yes																									
CPU	CPU	SH2A Core												SH2A-FPU Core													
	Basic Instructions	91												112													
	Minimum Instruction Execution Time (ns)	5 (@200MHz)						10 (@100MHz)						5 (@200MHz)						10 (@100MHz)							
	Dhrystone Performance	400MIPS (Flash Memory, 200MHz)						200MIPS (Flash Memory, 100MHz)						400MIPS (Flash Memory, 200MHz)						200MIPS (Flash Memory, 100MHz)							
	Multiplier	32 × 32 → 64																									
	Multiply-Accumulate Instruction	32 × 32 + 64 → 64																									
	Barrel Shifter	Yes																									
	FPU	—												Yes													
	MMU	—																									
DMA	DMAC (Channels)	8 (4 channels of them can receive an external request)																									
	DTC/DMAC II	DTC																									
External Bus Expansion	Address Space (Bytes)	512M (64M × 8)																									
	Bus State Controller	Direct connection to ROM/SRAM/SDRAM/MPX-I/O and the others is supported																									
	Bus Structure	Separate bus (8/16/32-bit)																									
	SDRAM Controller	Yes																									
	DRAM Controller	—																									
	PCI Controller	—																									
	Endian Conversion	—																									
	Host Interface	—																									
Clock	Clock Generation Circuit	1 circuit																									
	PLL	Yes																									
	RTC	—																									
	Oscillation Stop Detection	Yes																									
	Frequency Divider	1/n (n = 1, 2, 4, 8)																									
	Power Save	Sleep/Software standby/Module standby																									
Power Supply Voltage Detection	Power-On Reset/POR	—																									
A/D Converter	Resolution × Channels	12-bit × 8																									
	Sample and Hold	Yes (2 circuits)																									
	Multi-Channel Sample and Hold	Yes (3 circuits)																									
D/A Converter	Resolution × Channels	—																									
Timer	8-bit	—																									
	16-bit	11 (MTU2 × 6, MTU2S × 3, CMT × 2)																									
	32-bit	—																									
	Input Capture	30 (shared with MTU2 × 19, MTU2S × 11)																									
	Output Compare	24 (shared with MTU2 × 16, MTU2S × 8)																									
	PWM Output	24 (shared with MTU2 × 16, MTU2S × 8)																									
	Event Counter	11 (shared with MTU2, MTU2S, CMT)																									
	2-Phase Encoder Input	2 (shared with MTU2)																									
	3-Phase Inverter Control	2 (shared with MTU2, MTU2S)																									
Watchdog Timer		1																									
Serial Interface	Clock Sync./Clock Async.	5 (SCI × 4, SCIF × 1)																									
	Clock Sync. Only	—																									
	Clock Async. Only	—																									
I²C-bus		1																									
Smart Card/SIM		—																									
Synchronous Serial Communication Unit/Special Serial I/O		1 (RSPI)																									
CAN	Channels	1 ch																									
	Message Box (Numbers)	16																									
FlexRay		—																									
Ethernet		1 ch		—		1 ch		—		1 ch		—		1 ch		—											
USB Host		—																									
USB Function		1 ch																									
IrDA		—																									
LCD		—																									
I/O Ports	Input Only (Numbers)	10																									
	CMOS I/O (Numbers)	100																									
	High Voltage Port (Numbers)	—																									
	N-Channel Open Drain Port (Numbers)	2 (I²C bus)																									
	High Current Drive Port	24 (MTU2 × 6, MTU2S × 18)																									
	Pull-Up Resistor	100																									
External Interrupts Pins		9 (NMI + IRQ × 8)																									
Debugging Function	Boundary Scan/JTAG	Yes																									
	On-Chip Debug	Yes (User Debug Interface/Advanced users debugger)																									
	On-Board Flash Program	Yes																									
Other Functions	ROM Correction Function	—																									
	Others	—																									
Operating Frequency/Supply Voltage		200MHz/3.0 to 3.6V						100MHz/3.0 to 3.6V						200MHz/3.0 to 3.6V						100MHz/3.0 to 3.6V							
Operating Ambient Temperature (˚C)		–40 to 85																									
Package*2		PLBG0176GA-A	PLQP0176LB-A	PLQP0176KB-A	PLBG0176GA-A	PLQP0176LB-A	PLQP0176KB-A	PLBG0176GA-A	PLQP0176LB-A	PLQP0176KB-A	PLBG0176GA-A	PLQP0176LB-A	PLQP0176KB-A	PLBG0176GA-A	PLQP0176LB-A	PLQP0176KB-A	PLBG0176GA-A	PLQP0176LB-A	PLQP0176KB-A	PLBG0176GA-A	PLQP0176LB-A	PLQP0176KB-A	PLBG0176GA-A	PLQP0176LB-A	PLQP0176KB-A		
Part No.		R5F72145ADBG	R5F72145ADFA	R5F72145ADFP	R5F72145BDBG	R5F72145BDFA	R5F72145BDFP	R5F72145GDBG	R5F72145GDFA	R5F72145GDFP	R5F72145HDBG	R5F72145HDFA	R5F72145HDFP	R5F72165ADBG	R5F72165ADFA	R5F72165ADFP	R5F72165BDBG	R5F72165BDFA	R5F72165BDFP	R5F72165GDBG	R5F72165GDFA	R5F72165GDFP	R5F72165HDBG	R5F72165HDFA	R5F72165HDFP		

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (SH7216 Series)

Series		SH7216							
Group		SH7216							
Memory	ROM (Bytes)	768K							
	RAM (Bytes)	96K							
	ROM Type*1	F							
	Cache Memory	—							
	Program Security	Yes							
CPU	CPU	SH2A Core				SH2A-FPU Core			
	Basic Instructions	91				112			
	Minimum Instruction Execution Time (ns)	5 (@200MHz)		10 (@100MHz)		5 (@200MHz)		10 (@100MHz)	
	Dhrystone Performance	400MIPS (Flash Memory, 200MHz)		200MIPS (Flash Memory, 100MHz)		400MIPS (Flash Memory, 200MHz)		200MIPS (Flash Memory, 100MHz)	
	Multiplier	32 × 32 → 64							
	Multiply-Accumulate Instruction	32 × 32 + 64 → 64							
	Barrel Shifter	Yes							
	FPU	—				Yes			
	MMU	—							
DMA	DMAC (Channels)	8 (4 channels of them can receive an external request)							
	DTC/DMAC II	DTC							
External Bus Expansion	Address Space (Bytes)	512M (64M × 8)							
	Bus State Controller	Direct connection to ROM/SRAM/SDRAM/MPX-I/O and the others is supported							
	Bus Structure	Separate bus (8/16/32-bit)							
	SDRAM Controller	Yes							
	DRAM Controller	—							
	PCI Controller	—							
	Endian Conversion	—							
	Host Interface	—							
Clock	Clock Generation Circuit	1 circuit							
	PLL	Yes							
	RTC	—							
	Oscillation Stop Detection	Yes							
	Frequency Divider	1/n (n = 1, 2, 4, 8)							
	Power Save	Sleep/Software standby/Module standby							
Power Supply Voltage Detection	Power-On Reset/POR	—							
A/D Converter	Resolution × Channels	12-bit × 8							
	Sample and Hold	Yes (2 circuits)							
	Multi-Channel Sample and Hold	Yes (3 circuits)							
D/A Converter	Resolution × Channels	—							
Timer	8-bit	—							
	16-bit	11 (MTU2 × 6, MTU2S × 3, CMT × 2)							
	32-bit	—							
	Input Capture	30 (shared with MTU2 × 19, MTU2S × 11)							
	Output Compare	24 (shared with MTU2 × 16, MTU2S × 8)							
	PWM Output	24 (shared with MTU2 × 16, MTU2S × 8)							
	Event Counter	11 (shared with MTU2, MTU2S, CMT)							
	2-Phase Encoder Input	2 (shared with MTU2)							
	3-Phase Inverter Control	2 (shared with MTU2, MTU2S)							
Watchdog Timer		1							
Serial Interface	Clock Sync./Clock Async.	5 (SCI × 4, SCIF × 1)							
	Clock Sync. Only	—							
	Clock Async. Only	—							
I²C-bus		1							
Smart Card/SIM		—							
Synchronous Serial Communication Unit/Special Serial I/O		1 (RSPI)							
CAN	Channels	1 ch							
	Message Box (Numbers)	16							
FlexRay		—							
Ethernet		1 ch	—	1 ch	—	1 ch	—	1 ch	—
USB Host		—							
USB Function		1 ch							
IrDA		—							
LCD		—							
I/O Ports	Input Only (Numbers)	10							
	CMOS I/O (Numbers)	100							
	High Voltage Port (Numbers)	—							
	N-Channel Open Drain Port (Numbers)	2 (I²C bus)							
	High Current Drive Port	24 (MTU2 × 6, MTU2S × 18)							
	Pull-Up Resistor	100							
External Interrupts Pins		9 (NMI + IRQ × 8)							
Debugging Function	Boundary Scan/JTAG	Yes							
	On-Chip Debug	Yes (User Debug Interface/Advanced users debugger)							
	On-Board Flash Program	Yes							
Other Functions	ROM Correction Function	—							
	Others	—							
Operating Frequency/Supply Voltage		200MHz/3.0 to 3.6V		100MHz/3.0 to 3.6V		200MHz/3.0 to 3.6V		100MHz/3.0 to 3.6V	
Operating Ambient Temperature (˚C)		–40 to 85							
Package*2		PLBG0176GA-A	PLQP0176LB-A	PLQP0176KB-A	PLBG0176GA-A	PLQP0176LB-A	PLQP0176KB-A	PLBG0176GA-A	PLQP0176LB-A
		PLQP0176KB-A	PLBG0176GA-A	PLQP0176LB-A	PLQP0176KB-A	PLBG0176GA-A	PLQP0176LB-A	PLQP0176KB-A	PLBG0176GA-A
		PLQP0176LB-A	PLQP0176KB-A	PLBG0176GA-A	PLQP0176LB-A	PLQP0176KB-A	PLBG0176GA-A	PLQP0176LB-A	PLQP0176KB-A
		PLBG0176GA-A	PLQP0176LB-A	PLQP0176KB-A	PLBG0176GA-A	PLQP0176LB-A	PLQP0176KB-A	PLBG0176GA-A	PLQP0176LB-A
		PLQP0176KB-A	PLBG0176GA-A	PLQP0176LB-A	PLQP0176KB-A	PLBG0176GA-A	PLQP0176LB-A	PLQP0176KB-A	
Part No.		R5F72146ADBG	R5F72146ADFA	R5F72146ADFP	R5F72146BDBG	R5F72146BDFA	R5F72146BDFP	R5F72146GDBG	R5F72146GDFA
		R5F72146GDFP	R5F72146HDBG	R5F72146HDFA	R5F72146HDFP	R5F72166ADBG	R5F72166ADFA	R5F72166ADFP	R5F72166BDBG
		R5F72166BDFA	R5F72166BDFP	R5F72166GDBG	R5F72166GDFA	R5F72166GDFP	R5F72166HDBG	R5F72166HDFA	R5F72166HDFP

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (SH7216 Series)

Series		SH7216							
Group		SH7216							
Memory	ROM (Bytes)	1M							
	RAM (Bytes)	128K							
	ROM Type*1	F							
	Cache Memory	—							
	Program Security	Yes							
CPU	CPU	SH2A Core				SH2A-FPU Core			
	Basic Instructions	91				112			
	Minimum Instruction Execution Time (ns)	5 (@200MHz)		10 (@100MHz)		5 (@200MHz)		10 (@100MHz)	
	Dhrystone Performance	400MIPS (Flash Memory, 200MHz)		200MIPS (Flash Memory, 100MHz)		400MIPS (Flash Memory, 200MHz)		200MIPS (Flash Memory, 100MHz)	
	Multiplier	32 × 32 → 64							
	Multiply-Accumulate Instruction	32 × 32 + 64 → 64							
	Barrel Shifter	Yes							
	FPU	—				Yes			
	MMU	—							
DMA	DMAC (Channels)	8 (4 channels of them can receive an external request)							
	DTC/DMAC II	DTC							
External Bus Expansion	Address Space (Bytes)	512M (64M × 8)							
	Bus State Controller	Direct connection to ROM/SRAM/SDRAM/MPX-I/O and the others is supported							
	Bus Structure	Separate bus (8/16/32-bit)							
	SDRAM Controller	Yes							
	DRAM Controller	—							
	PCI Controller	—							
	Endian Conversion	—							
	Host Interface	—							
Clock	Clock Generation Circuit	1 circuit							
	PLL	Yes							
	RTC	—							
	Oscillation Stop Detection	Yes							
	Frequency Divider	1/n (n = 1, 2, 4, 8)							
	Power Save	Sleep/Software standby/Module standby							
Power Supply Voltage Detection	Power-On Reset/POR	—							
A/D Converter	Resolution × Channels	12-bit × 8							
	Sample and Hold	Yes (2 circuits)							
	Multi-Channel Sample and Hold	Yes (3 circuits)							
D/A Converter	Resolution × Channels	—							
Timer	8-bit	—							
	16-bit	11 (MTU2 × 6, MTU2S × 3, CMT × 2)							
	32-bit	—							
	Input Capture	30 (shared with MTU2 × 19, MTU2S × 11)							
	Output Compare	24 (shared with MTU2 × 16, MTU2S × 8)							
	PWM Output	24 (shared with MTU2 × 16, MTU2S × 8)							
	Event Counter	11 (shared with MTU2, MTU2S, CMT)							
	2-Phase Encoder Input	2 (shared with MTU2)							
	3-Phase Inverter Control	2 (shared with MTU2, MTU2S)							
Watchdog Timer		1							
Serial Interface	Clock Sync./Clock Async.	5 (SCI × 4, SCIF × 1)							
	Clock Sync. Only	—							
	Clock Async. Only	—							
I²C-bus		1							
Smart Card/SIM		—							
Synchronous Serial Communication Unit/Special Serial I/O		1 (RSPI)							
CAN	Channels	1 ch							
	Message Box (Numbers)	16							
FlexRay		—							
Ethernet		1 ch	—	1 ch	—	1 ch	—	1 ch	—
USB Host		—							
USB Function		1 ch							
IrDA		—							
LCD		—							
I/O Ports	Input Only (Numbers)	10							
	CMOS I/O (Numbers)	100							
	High Voltage Port (Numbers)	—							
	N-Channel Open Drain Port (Numbers)	2 (I²C bus)							
	High Current Drive Port	24 (MTU2 × 6, MTU2S × 18)							
	Pull-Up Resistor	100							
External Interrupts Pins		9 (NMI + IRQ × 8)							
Debugging Function	Boundary Scan/JTAG	Yes							
	On-Chip Debug	Yes (User Debug Interface/Advanced users debugger)							
	On-Board Flash Program	Yes							
Other Functions	ROM Correction Function	—							
	Others	—							
Operating Frequency/Supply Voltage		200MHz/3.0 to 3.6V		100MHz/3.0 to 3.6V		200MHz/3.0 to 3.6V		100MHz/3.0 to 3.6V	
Operating Ambient Temperature (˚C)		–40 to 85							
Package*2		PLBG0176GA-A	PLQP0176LB-A	PLQP0176KB-A	PLBG0176GA-A	PLQP0176LB-A	PLQP0176KB-A	PLBG0176GA-A	PLQP0176LB-A
		PLQP0176KB-A	PLBG0176GA-A	PLQP0176LB-A	PLQP0176KB-A	PLBG0176GA-A	PLQP0176LB-A	PLQP0176KB-A	PLBG0176GA-A
		PLQP0176LB-A	PLQP0176KB-A	PLBG0176GA-A	PLQP0176LB-A	PLQP0176KB-A	PLBG0176GA-A	PLQP0176LB-A	PLQP0176KB-A
Part No.		R5F72147ADBG	R5F72147ADFA	R5F72147ADFP	R5F72147BDBG	R5F72147BDFA	R5F72147BDFP	R5F72147GDBG	R5F72147GDFA
		R5F72147GDFP	R5F72147HDBG	R5F72147HDFA	R5F72147HDFP	R5F72167ADBG	R5F72167ADFA	R5F72167ADFP	R5F72167BDBG
		R5F72167BDFA	R5F72167BDFP	R5F72167GDBG	R5F72167GDFA	R5F72167GDFP	R5F72167HDBG	R5F72167HDFA	R5F72167HDFP

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (SH7280 Series)

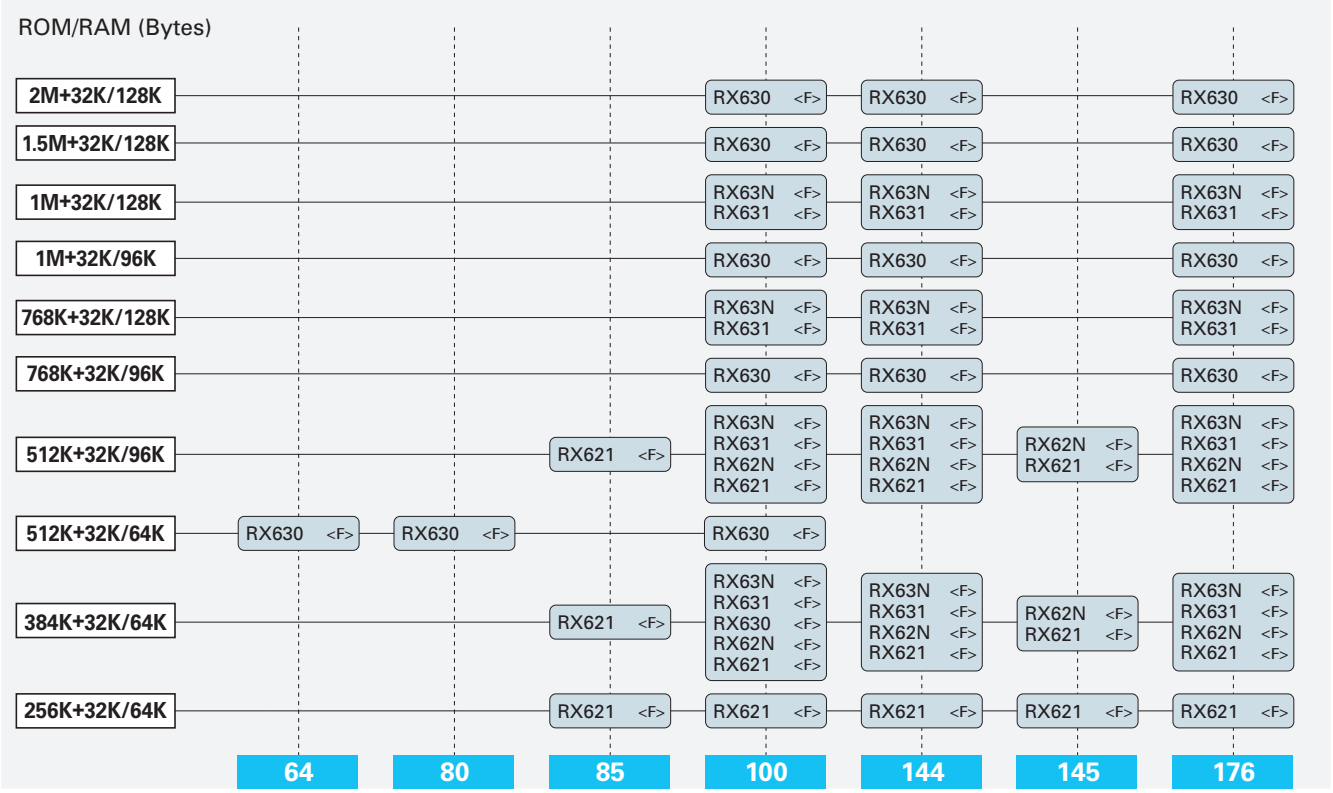
Series		SH7280													
Group		SH7285			SH7286										
Memory	ROM (Bytes)	512K	768K		512K		768K			1M					
	RAM (Bytes)	24K	32K		24K		32K								
	ROM Type*1	F													
	Cache Memory	—													
	Program Security	Yes													
CPU	CPU	SH-2A Core													
	Basic Instructions	91													
	Minimum Instruction Execution Time (ns)	10 (@100MHz)													
	Dhrystone Performance	200MIPS (100MHz)													
	Multiplier	32 × 32 → 64													
	Multiply-Accumulate Instruction	32 × 32 + 64 → 64													
	Barrel Shifter	Yes													
	FPU	—													
	MMU	—													
DMA	DMAC (Channels)	8 (2 channels of them can receive an external request)			8 (4 channels of them can receive an external request)										
	DTC/DMAC II	DTC													
External Bus Expansion	Address Space (Bytes)	512M (64M × 8)													
	Bus State Controller	Direct connection to ROM/SRAM/SDRAM/MPX-I/O and the others is supported													
	Bus Structure	Separate bus (8/16-bit) / Multiplex bus (8/16-bit)			Separate bus (8/16/32-bit) /Multiplex bus (8/16/32-bit)										
	SDRAM Controller	Yes													
	DRAM Controller	—													
	PCI Controller	—													
	Endian Conversion	Yes													
	Host Interface	—													
Clock	Clock Generation Circuit	1 circuit													
	PLL	Yes													
	RTC	—													
	Oscillation Stop Detection	Yes													
	Frequency Divider	1/n (n = 1, 2, 4, 8)													
	Power Save	Sleep/Software standby/Module standby													
Power Supply Voltage Detection	Power-On Reset/POR	—													
A/D Converter	Resolution x Channels (min. conversion time)	12-bit × 8 (1.0µs)			12-bit × 12 (1.0µs)										
	Sample and Hold	Yes (2 circuits)			Yes (3 circuits)										
	Multi-Channel Sample and Hold	Yes (3 circuits)													
D/A Converter	Resolution × Channels	—			8-bit × 2										
Timer	8-bit	—													
	16-bit	11 (MTU2 × 6, MTU2S × 3, CMT × 2)													
	32-bit	—													
	Input Capture	30 (shared with MTU2 × 19, MTU2S × 11)													
	Output Compare	24 (shared with MTU2 × 16, MTU2S × 8)													
	PWM Output	24 (shared with MTU2 × 16, MTU2S × 8)													
	Event Counter	11 (shared with MTU2, MTU2S, CMT)													
	2-Phase Encoder Input	2 (shared with MTU2)													
	3-Phase Inverter Control	2 (shared with MTU2, MTU2S)													
Watchdog Timer		1													
Serial Interface	Clock Sync./Clock Async.	5 (SCI × 4, SCIF × 1)													
	Clock Sync. Only	—													
	Clock Async. Only	—													
I²C-bus		1													
Smart Card/SIM		—													
Synchronous Serial Communication Unit/Special Serial I/O		1													
CAN	Channels	—			1 ch										
	Message Box (Numbers)	—			16										
FlexRay		—													
Ethernet		—													
USB Host		—													
USB Function		1 ch													
IrDA		—													
LCD		—													
I/O Ports	Input Only (Numbers)	10			14										
	CMOS I/O (Numbers)	89			99										
	High Voltage Port (Numbers)	—													
	N-Channel Open Drain Port (Numbers)	2 (I²C bus)													
	High Current Drive Port	12 (MTU2 × 6, MTU2S × 6)													
	Pull-Up Resistor	89			99										
External Interrupts Pins		9 (NMI + IRQ × 8)													
Debugging Function	Boundary Scan/JTAG	—													
	On-Chip Debug	Yes (User Debug Interface/Advanced users debugger)													
	On-Board Flash Program	Yes													
Other Functions	ROM Correction Function	—													
	Others	—													
Operating Frequency/Supply Voltage		100MHz/3.0 to 5.5V													
Operating Ambient Temperature (˚C)		–40 to 85	–20 to 85		–40 to 85			–20 to 85				–40 to 85				–20 to 85	
Package*2		PLQP0144KA-A			PLQP0176LB-A	PLQP0176KB-A		PLQP0176LB-A	PLQP0176KB-A	PLQP0176LB-A	PLQP0176KB-A	PLQP0176LB-A	PLQP0176KB-A	PLQP0176LB-A	PLQP0176KB-A	PLQP0176LB-A	PLQP0176KB-A
Part No.		R5F72855D100FP	R5F72855N100FP	R5F72856N100FP	R5F72856D100FP	R5F72865D100FA	R5F72865D100FP	R5F72865N100FA	R5F72865N100FP	R5F72866N100FA	R5F72866N100FP	R5F72866D100FA	R5F72866D100FP	R5F72867D100FA	R5F72867D100FP	R5F72867N100FA	R5F72867N100FP

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Memory Capacity (ROM/RAM) (RX600 Series)



Letters in brackets < > indicate memory variations.
F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

• Specifications (RX600 Series)

Group		RX621										
Memory	ROM (Bytes)	256K + 32K				384K + 32K			512K + 32K			
	RAM (Bytes)	64K							96K			
	ROM Type*1	F										
	Data Flash/E2 Data Flash	32K (Data flash)										
	Program Security	Yes (ID code protection, ROM code protection)										
CPU	CPU	RX CPU Core										
	Basic Instructions	90										
	Minimum Instruction Execution Time (ns)	10 (@100MHz)										
	Dhrystone Performance	165MIPS										
	Multiplier	32 × 32 → 64										
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32 32 × 32 + 80 → 80										
	Barrel Shifter	Yes										
	FPU	Yes										
DMA	DMAC (Channels)	4										
	EXDMAC	2	—	2	—	2	—	2	—	2	—	2
	DTC/DMAC Ⅱ	DTC										
External Bus Expansion	Address Space (Bytes)	4G										
	Bus State Controller	SRAM/ ROM/ Burst ROM/ Byte control SRAM/ SDRAM	SRAM/ ROM/ Burst ROM/ Byte control SRAM	SRAM/ROM/ Burst ROM/Byte control SRAM/ SDRAM	SRAM/ ROM/ Burst ROM/ Byte control SRAM	SRAM/ROM/ Burst ROM/Byte control SRAM/ SDRAM	SRAM/ ROM/ Burst ROM/ Byte control SRAM/ SDRAM	SRAM/ ROM/ Burst ROM/ Byte control SRAM/ SDRAM	SRAM/ROM/ Burst ROM/Byte control SRAM	SRAM/ROM/ Burst ROM/Byte control SRAM/ SDRAM	SRAM/ ROM/ Burst ROM/ Byte control SRAM	SRAM/ ROM/ Burst ROM/ Byte control SRAM/ SDRAM
	Bus Structure	Separate bus, selectable data bus width(8/16-bit)	Separate bus, selectable data bus width(8/16-bit)					Separate bus, selectable data bus width(8/16-bit)	Separate bus, selectable data bus width (8/16-bit)			Separate bus, selectable data bus width(8/16/32-bit)
	SDRAM Controller	Yes	—	Yes	—	Yes	—	Yes	—	Yes	—	Yes
	Endian Conversion	Yes (data)										
Clock	Clock Generation Circuit	3 circuits (Main clock, sub clock, low speed on-chip oscillator)										
	PLL	Yes										
	Subclock	Yes (32.768kHz)										
	RTC	Yes										
	On-Chip Oscillator	Yes (Low speed : 125kHz)										
	Oscillation Stop Detection	Yes										
	Frequency Divider	1/n (n = 1, 2, 4, 8)										
	Power Save	Sleep/Full module clock stop/software standby/deep software standby										
Power Supply Voltage Detection	Power-On Reset/POR	Yes										
	Low Voltage Detection/LVD	Yes (Low voltage detection)										
A/D Converter	Resolution × Channels	12-bit × 8 or 10-bit × 8										
	Sample and Hold	Yes										
	Multi-Channel Sample and Hold	Yes										
D/A Converter	Resolution × Channels	10-bit × 2	10-bit × 1	10-bit × 2	10-bit × 1	10-bit × 2	10-bit × 1	10-bit × 2	10-bit × 1	10-bit × 2	10-bit × 1	10-bit × 2
Timer	8-bit	4 (TMR)										
	16-bit	12 (MTU2), 4 (CMT)										
	32-bit	—										
	Input Capture	38 (MTU2)										
	Output Compare	4 (TMR), 32 (MTU2)										
	PWM Output	4 (TMR), 32 (MTU2)										
	Programmable Pulse Generator	32										
	Event Counter	Yes										
	2-Phase Encoder Input	Yes										
	3-Phase Inverter Control	Yes										
Watchdog Timer		2										
Serial Interface	Clock Sync./Clock Async.	6 (SCI)										
	Clock Sync. Only	2 (RSPI)										
	Clock Async. Only	—										
I²C-bus		2	1	2	1	2	1	2	1	2	1	2
Smart Card/SIM		6 (SCI)										
Synchronous Serial Communication Unit/Special Serial I/O		2 (RSPI)										
CAN	Channels	1										
	Message Box (Numbers)	32										
Ethernet		—										
USB Host		2	1					2	1			2
USB Function		2	1					2	1			2
CRC Calculation Circuit		1 ($X^8 + X^2 + X + 1$, $X^{16} + X^{15} + X^2 + 1$, $X^{16} + X^{12} + X^5 + 1$)										
I/O Ports	Input Only (Numbers)	2										
	CMOS I/O (Numbers)	126	58	103	72	103	72	126	58	103	72	126
	High Voltage Port (Numbers)	11 (input)	6 (input)	11 (input)	7 (input)	11 (input)	7 (input)	11 (input)	6 (input)	11 (input)	7 (input)	11 (input)
	N-Channel Open Drain Port (Numbers)	35	23	33	27	33	27	35	23	33	27	35
	High Current Drive Port	—										
	Pull-Up Resistor	56	28	44	40	44	40	56	28	44	40	56
External Interrupts Pins		17										
Debugging Function	Boundary Scan/JTAG	Yes/Yes			—/Yes	Yes/Yes	—/Yes	Yes/Yes			—/Yes	Yes/Yes
	On-Chip Debug	Yes										
	On-Board Flash Program	Yes										
Other Functions	Others	—										
Operating Frequency/Supply Voltage		100MHz/2.7 to 3.6V										
Operating Ambient Temperature (˚C)		–40 to 85										
Package*2		PLBG0176GA-A	PTLG0085JA-A	PTLG0145JB-A	PLQP0144KA-A	PLQP0100KB-A	PTLG0145JB-A	PLQP0144KA-A	PLQP0100KB-A	PLBG0176GA-A	PTLG0085JA-A	PTLG0145JB-A	PLQP0144KA-A	PLQP0100KB-A	PLBG0176GA-A
Part No.		R5F56216BDBG	R5F56216BDLD	R5F56216BDLE	R5F56216BDFB	R5F56216BDFP	R5F56217BDLE	R5F56217BDFB	R5F56217BDFP	R5F56217BDBG	R5F56217BDLD	R5F56218BDLD	R5F56218BDLE	R5F56218BDFB	R5F56218BDFP	R5F56218BDBG

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (RX600 Series)

Group		RX62N															
Memory	ROM (Bytes)	384K + 32K						512K + 32K									
	RAM (Bytes)	64K						96K									
	ROM Type*1	F															
	Data Flash/E2 Data Flash	32K (Data flash)															
	Program Security	Yes (ID code protection, ROM code protection)															
CPU	CPU	RX CPU Core															
	Basic Instructions	90															
	Minimum Instruction Execution Time (ns)	10 (@100MHz)															
	Dhrystone Performance	165MIPS															
	Multiplier	32 × 32 → 64															
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32 32 × 32 + 80 → 80															
	Barrel Shifter	Yes															
	FPU	Yes															
DMA	DMAC (Channels)	4															
	EXDMAC	2				—		2						—		2	
	DTC/DMAC Ⅱ	DTC															
External Bus Expansion	Address Space (Bytes)	4G															
	Bus State Controller	SRAM/ROM/Burst ROM/Byte control SRAM/SDRAM				SRAM/ROM/ Burst ROM/Byte control SRAM		SRAM/ROM/Burst ROM/Byte control SRAM/SDRAM						SRAM/ROM/ Burst ROM/Byte control SRAM		SRAM/ROM/ Burst ROM/Byte control SRAM/ SDRAM	
	Bus Structure	Separate bus, selectable data bus width (8/16-bit)						Separate bus, selectable data bus width (8/16-bit)								Separate bus, selectable data bus width (8/16/32-bit)	
	SDRAM Controller	Yes				—		Yes						—		Yes	
	Endian Conversion	Yes (data)															
Clock	Clock Generation Circuit	3 circuits (Main clock, sub clock, low speed on-chip oscillator)															
	PLL	Yes															
	Subclock	Yes (32.768kHz)															
	RTC	Yes															
	On-Chip Oscillator	Yes (Low speed : 125kHz)															
	Oscillation Stop Detection	Yes															
	Frequency Divider	1/n (n = 1, 2, 4, 8)															
	Power Save	Sleep/Full module clock stop/software standby/deep software standby															
Power Supply Voltage Detection	Power-On Reset/POR	Yes															
	Low Voltage Detection/LVD	Yes (Low voltage detection)															
A/D Converter	Resolution × Channels	12-bit × 8 or 10-bit × 8															
	Sample and Hold	Yes															
	Multi-Channel Sample and Hold	Yes															
D/A Converter	Resolution × Channels	10-bit × 2				10-bit × 1		10-bit × 2						10-bit × 1		10-bit × 2	
Timer	8-bit	4 (TMR)															
	16-bit	12 (MTU2), 4 (CMT)															
	32-bit	—															
	Input Capture	38 (MTU2)															
	Output Compare	4 (TMR), 32 (MTU2)															
	PWM Output	4 (TMR), 32 (MTU2)															
	Programmable Pulse Generator	32															
	Event Counter	Yes															
	2-Phase Encoder Input	Yes															
	3-Phase Inverter Control	Yes															
Watchdog Timer		2															
Serial Interface	Clock Sync./Clock Async.	6 (SCI)															
	Clock Sync. Only	2 (RSPI)															
	Clock Async. Only	—															
I²C-bus		2				1		2						1		2	
Smart Card/SIM		6 (SCI)															
Synchronous Serial Communication Unit/Special Serial I/O		2 (RSPI)															
CAN	Channels	1	—	1	—	1	—	1	—	1	—	1	—	1	—	1	—
	Message Box (Numbers)	32	—	32	—	32	—	32	—	32	—	32	—	32	—	32	—
Ethernet		1ch															
USB Host		1						2				1				2	
USB Function		1						2				1				2	
CRC Calculation Circuit		1 ($X^8 + X^2 + X + 1$, $X^{16} + X^{15} + X^2 + 1$, $X^{16} + X^{12} + X^5 + 1$)															
I/O Ports	Input Only (Numbers)	2															
	CMOS I/O (Numbers)	103				72		126		103				72		126	
	High Voltage Port (Numbers)	11 (input)				7 (input)		11 (input)						7 (input)		11 (input)	
	N-Channel Open Drain Port (Numbers)	33				27		35		33				27		35	
	High Current Drive Port	—															
	Pull-Up Resistor	44				40		56		44				40		56	
External Interrupts Pins		17															
Debugging Function	Boundary Scan/JTAG	Yes/Yes				—/Yes		Yes/Yes						—/Yes		Yes/Yes	
	On-Chip Debug	Yes															
	On-Board Flash Program	Yes															
Other Functions	Others	—															
Operating Frequency/Supply Voltage		100MHz/2.7 to 3.6V															
Operating Ambient Temperature (˚C)		–40 to 85															
Package*2		PTLG0145JB-A		PLQP0144KA-A		PLQP0100KB-A		PLBG0176GA-A		PTLG0145JB-A		PLQP0144KA-A		PLQP0100KB-A		PLBG0176GA-A	
Part No.		R5F562N7BDLE	R5F562N7ADLE	R5F562N7BDFB	R5F562N7ADFB	R5F562N7BDFP	R5F562N7ADFP	R5F562N7BDBG	R5F562N7ADBG	R5F562N8BDLE	R5F562N8ADLE	R5F562N8BDFB	R5F562N8ADFB	R5F562N8BDFP	R5F562N8ADFP	R5F562N8BDBG	R5F562N8ADBG

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (RX600 Series)

Group		RX630																	
Memory	ROM (Bytes)	384K + 32K				512K + 32K				768K + 32K									
	RAM (Bytes)	64K								96K									
	ROM Type*1	F																	
	Data Flash/E2 Data Flash	32K (E2 Data flash)																	
	Program Security	Yes (ID code protection, ROM code protection)																	
CPU	CPU	RX CPU Core																	
	Basic Instructions	90																	
	Minimum Instruction Execution Time (ns)	10 (@100MHz)																	
	Dhrystone Performance	165MIPS																	
	Multiplier	32 × 32 → 64																	
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32 32 × 32 + 80 → 80																	
	Barrel Shifter	Yes																	
	FPU	Yes																	
DMA	DMAC (Channels)	4																	
	EXDMAC	—																	
	DTC/DMAC Ⅱ	DTC																	
External Bus Expansion	Address Space (Bytes)	4G																	
	Bus State Controller	SRAM/ROM/ Byte control SRAM/ Page access supported		—		SRAM/ROM/ Byte control SRAM/ Page access supported		—		SRAM/ROM/Byte control SRAM/Page access supported									
	Bus Structure	Separate bus (8/16-bit), selectable multiplex bus width(8/16-bit)		—		Separate bus (8/16-bit), selectable multiplex bus width(8/16-bit)		—		Separate bus (8/16/32-bit), selectable multiplex bus width(8/16-bit)		Separate bus(8/16-bit), selectable multiplex bus width(8/16-bit)							
	SDRAM Controller	—																	
	Endian Conversion	Yes (data)																	
Clock	Clock Generation Circuit	4 circuits (Main clock, sub clock, low speed on-chip oscillator, high speed on-chip ocsillator)																	
	PLL	Yes																	
	Subclock	Yes																	
	RTC	Yes																	
	On-Chip Oscillator	Yes																	
	Oscillation Stop Detection	Yes																	
	Frequency Divider	1/n (n = 1, 2, 4)																	
	Power Save	Sleep/Full module clock stop/software standby/deep software standby																	
Power Supply Voltage Detection	Power-On Reset/POR	Yes																	
	Low Voltage Detection/LVD	Yes (Low voltage detection)																	
A/D Converter	Resolution × Channels	12-bit × 14 or 10-bit × 8		12-bit × 11 or 10-bit × 4		12-bit × 14 or 10-bit × 8		12-bit × 11 or 10-bit × 4		12-bit × 21 or 10-bit × 8						12-bit × 14 or 10-bit × 8	
	Sample and Hold	Yes																	
	Multi-Channel Sample and Hold	—																	
D/A Converter	Resolution × Channels	10-bit × 1								10-bit × 2						10-bit × 1	
Timer	8-bit	4(TMR)																	
	16-bit	6 (TPU), 6 (MTU2), 4 (CMT)								12 (TPU), 6 (MTU2), 4 (CMT)						6 (TPU), 6 (MTU2), 4 (CMT)	
	32-bit	—																	
	Input Capture	16 (TPU), 19 (MTU2)								32 (TPU), 19 (MTU2)						16 (TPU), 19 (MTU2)	
	Output Compare	16 (TPU), 16 (MTU2)								32 (TPU), 16 (MTU2)						16 (TPU), 16 (MTU2)	
	PWM Output	4 (TMR), 16 (MTU2)																	
	Programmable Pulse Generator	32 (PPG)																	
	Event Counter	20 (TPU, MTU2, TMR, CMT)								26 (TPU, MTU2, TMR, CMT)						20 (TPU, MTU2, TMR, CMT)	
	2-Phase Encoder Input	6 (TPU), 6 (MTU2)								12 (TPU), 6 (MTU2)						6 (TPU), 6 (MTU2)	
	3-Phase Inverter Control	6 (MTU2)																	
Watchdog Timer		2																	
Serial Interface	Clock Sync./Clock Async.	9 (SCI)								13 (SCI)						9 (SCI)	
	Clock Sync. Only	2 (RSPI)								3 (RSPI)						2 (RSPI)	
	Clock Async. Only	—																	
I²C-bus		2								4						2	
Smart Card/SIM		9								13						9	
Synchronous Serial Communication Unit/Special Serial I/O		2								3						2	
CAN	Channels	1	—	1	—	1	—	1	—	2	—	2	—			1	—
	Message Box (Numbers)	32	—	32	—	32	—	32	—	32	—	32	—			32	—
Ethernet		—																	
USB Host		—																	
USB Function		Yes																	
CRC Calculation Circuit		1 ($X^8 + X^2 + X + 1$, $X^{16} + X^{15} + X^2 + 1$, $X^{16} + X^{12} + X^5 + 1$)																	
I/O Ports	Input Only (Numbers)	2																	
	CMOS I/O (Numbers)	78		58		78		58		148		117				78			
	High Voltage Port (Numbers)	—																	
	N-Channel Open Drain Port (Numbers)	78		58		78		58		148		117				78			
	High Current Drive Port	—																	
	Pull-Up Resistor	78		58		78		58		148		117				78			
External Interrupts Pins		16																	
Debugging Function	Boundary Scan/JTAG	—																	
	On-Chip Debug	Yes																	
	On-Board Flash Program	Yes																	
Other Functions	Others	—																	
Operating Frequency/Supply Voltage		100MHz/2.7 to 3.6V																	
Operating Ambient Temperature (˚C)		–40 to 85																	
Package*2		PLQP0100KB-A		PLQP0080KB-A		PLQP0100KB-A		PLQP0080KB-A		PLQP0176KB-A		PLQP0144KA-A				PLQP0100KB-A			
Part No.		R5F56307DDFP**	R5F56307CDFP**	R5F56307DDFN**	R5F56307CDFN**	R5F56308DDFP**	R5F56308CDFP**	R5F56308DDFN**	R5F56308CDFN**	R5F5630ADDFC**	R5F5630ACDFC**	R5F5630ADDFB*	R5F5630ACDFB**			R5F5630ADDFP**	R5F5630ACDFP**		

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (RX600 Series)

Group		RX630																	
Memory	ROM (Bytes)	1M + 32K						1.5M + 32K						2M + 32K					
	RAM (Bytes)	96K						128K											
	ROM Type*1	F																	
	Data Flash/E2 Data Flash	32K (E2 Data flash)																	
	Program Security	Yes (ID code protection, ROM code protection)																	
CPU	CPU	RX CPU Core																	
	Basic Instructions	90																	
	Minimum Instruction Execution Time (ns)	10 (@100MHz)																	
	Dhrystone Performance	165MIPS																	
	Multiplier	32 × 32 → 64																	
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32 32 × 32 + 80 → 80																	
	Barrel Shifter	Yes																	
	FPU	Yes																	
DMA	DMAC (Channels)	4																	
	EXDMAC	—																	
	DTC/DMAC II	DTC																	
External Bus Expansion	Address Space (Bytes)	4G																	
	Bus State Controller	SRAM/ROM/Byte control SRAM/Page access supported																	
	Bus Structure	Separate bus (8/16/32-bit), selectable multiplex bus width (8/16-bit)		Separate bus (8/16-bit), selectable multiplex bus width (8/16-bit)				Separate bus (8/16/32-bit), selectable multiplex bus width (8/16-bit)		Separate bus (8/16-bit), selectable multiplex bus width (8/16-bit)				Separate bus (8/16/32-bit), selectable multiplex bus width (8/16-bit)		Separate bus (8/16-bit), selectable multiplex bus width (8/16-bit)			
	SDRAM Controller	—																	
	Endian Conversion	Yes (data)																	
Clock	Clock Generation Circuit	4 circuits (Main clock, sub clock, low speed on-chip oscillator, high speed on-chip ocsillator)																	
	PLL	Yes																	
	Subclock	Yes																	
	RTC	Yes																	
	On-Chip Oscillator	Yes																	
	Oscillation Stop Detection	Yes																	
	Frequency Divider	1/n (n = 1, 2, 4)																	
	Power Save	Sleep/Full module clock stop/software standby/deep software standby																	
Power Supply Voltage Detection	Power-On Reset/POR	Yes																	
	Low Voltage Detection/LVD	Yes (Low voltage detection)																	
A/D Converter	Resolution × Channels	12-bit × 21 or 10-bit × 8		12-bit × 14 or 10-bit × 8				12-bit × 21 or 10-bit × 8		12-bit × 14 or 10-bit × 8				12-bit × 21 or 10-bit × 8		12-bit × 14 or 10-bit × 8			
	Sample and Hold	Yes																	
	Multi-Channel Sample and Hold	—																	
D/A Converter	Resolution × Channels	10-bit × 2		10-bit × 1				10-bit × 2		10-bit × 1				10-bit × 2		10-bit × 1			
Timer	8-bit	4(TMR)																	
	16-bit	12 (TPU), 6 (MTU2), 4 (CMT)		6 (TPU), 6 (MTU2), 4 (CMT)				12 (TPU), 6 (MTU2), 4 (CMT)		6 (TPU), 6 (MTU2), 4 (CMT)				12 (TPU), 6 (MTU2), 4 (CMT)		6 (TPU), 6 (MTU2), 4 (CMT)			
	32-bit	—																	
	Input Capture	32 (TPU), 19 (MTU2)		16 (TPU), 19 (MTU2)				32 (TPU), 19 (MTU2)		16 (TPU), 19 (MTU2)				32 (TPU), 19 (MTU2)		16 (TPU), 19 (MTU2)			
	Output Compare	32 (TPU), 16 (MTU2)		16 (TPU), 16 (MTU2)				32 (TPU), 16 (MTU2)		16 (TPU), 16 (MTU2)				32 (TPU), 16 (MTU2)		16 (TPU), 16 (MTU2)			
	PWM Output	4 (TMR), 16 (MTU2)																	
	Programmable Pulse Generator	32 (PPG)																	
	Event Counter	26 (TPU, MTU2, TMR, CMT)		20 (TPU, MTU2, TMR, CMT)				26 (TPU, MTU2, TMR, CMT)		20 (TPU, MTU2, TMR, CMT)				26 (TPU, MTU2, TMR, CMT)		20 (TPU, MTU2, TMR, CMT)			
	2-Phase Encoder Input	12 (TPU), 6 (MTU2)		6 (TPU), 6 (MTU2)				12 (TPU), 6 (MTU2)		6 (TPU), 6 (MTU2)				12 (TPU), 6 (MTU2)		6 (TPU), 6 (MTU2)			
	3-Phase Inverter Control	6(MTU2)																	
Watchdog Timer		2																	
Serial Interface	Clock Sync./Clock Async.	13 (SCI)		9 (SCI)				13 (SCI)		9 (SCI)				13 (SCI)		9 (SCI)			
	Clock Sync. Only	3 (RSPI)		2 (RSPI)				3 (RSPI)		2 (RSPI)				3 (RSPI)		2 (RSPI)			
	Clock Async. Only	—																	
I²C-bus		4		2				4		2				4		2			
Smart Card/SIM		13		9				13		9				13		9			
Synchronous Serial Communication Unit/Special Serial I/O		3		2				3		2				3		2			
CAN	Channels	2	—	2	—	1	—	3	—	3	—	1	—	3	—	3	—	1	—
	Message Box (Numbers)	32	—	32	—	32	—	32	—	32	—	32	—	32	—	32	—	32	—
Ethernet		—																	
USB Host		—																	
USB Function		Yes																	
CRC Calculation Circuit		1 ($X^8 + X^2 + X + 1$, $X^{16} + X^{15} + X^2 + 1$, $X^{16} + X^{12} + X^5 + 1$)																	
I/O Ports	Input Only (Numbers)	2																	
	CMOS I/O (Numbers)	148		117		78		148		117		78		148		117		78	
	High Voltage Port (Numbers)	—																	
	N-Channel Open Drain Port (Numbers)	148		117		78		148		117		78		148		117		78	
	High Current Drive Port	—																	
	Pull-Up Resistor	148		117		78		148		117		78		148		117		78	
External Interrupts Pins		16																	
Debugging Function	Boundary Scan/JTAG	—																	
	On-Chip Debug	Yes																	
	On-Board Flash Program	Yes																	
Other Functions	Others	—																	
Operating Frequency/Supply Voltage		100MHz/2.7 to 3.6V																	
Operating Ambient Temperature (°C)		–40 to 85																	
Package*2		PLQP0176KB-A		PLQP0144KA-A		PLQP0100KB-A		PLQP0176KB-A		PLQP0144KA-A		PLQP0100KB-A		PLQP0176KB-A		PLQP0144KA-A		PLQP0100KB-A	
Part No.		R5F5630BDDFC**	R5F5630BCDFC**	R5F5630BDDFB**	R5F5630BCDFB**	R5F5630BDDFP**	R5F5630BCDFP**	R5F5630DDDFC**	R5F5630DCDFC**	R5F5630DDDFB**	R5F5630DCDFB**	R5F5630DDDFP**	R5F5630DCDFP**	R5F5630EDDFC**	R5F5630ECDFC**	R5F5630EDDFB**	R5F5630ECDFB**	R5F5630EDDFP**	R5F5630ECDFP**

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (RX600 Series)

Group		RX63N											
Memory	ROM (Bytes)	384K + 32K						512K + 32K					
	RAM (Bytes)	64K						96K					
	ROM Type*1	F											
	Data Flash/E2 Data Flash	32K (E2 Data flash)											
	Program Security	Yes (ID code protection, ROM code protection)											
CPU	CPU	RX CPU Core											
	Basic Instructions	90											
	Minimum Instruction Execution Time (ns)	10 (@100MHz)											
	Dhrystone Performance	165MIPS											
	Multiplier	32 × 32 → 64											
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32 32 × 32 + 80 → 80											
	Barrel Shifter	Yes											
	FPU	Yes											
DMA	DMAC (Channels)	4											
	EXDMAC	2											
	DTC/DMAC Ⅱ	DTC											
External Bus Expansion	Address Space (Bytes)	4G											
	Bus State Controller	SRAM/ROM/Byte control SRAM/Page access supported/SDRAM											
	Bus Structure	Separate bus (8/16/32-bit), selectable multiplex bus width (8/16-bit)		Separate bus (8/16-bit), selectable multiplex bus width (8/16-bit)				Separate bus (8/16/32-bit), selectable multiplex bus width (8/16-bit)		Separate bus (8/16-bit), selectable multiplex bus width (8/16-bit)			
	SDRAM Controller	Yes											
	Endian Conversion	Yes (data)											
Clock	Clock Generation Circuit	4 circuits (Main clock, sub clock, low speed on-chip oscillator, high speed on-chip ocsillator)											
	PLL	Yes											
	Subclock	Yes											
	RTC	Yes											
	On-Chip Oscillator	Yes											
	Oscillation Stop Detection	Yes											
	Frequency Divider	1/n (n = 1, 2, 4)											
	Power Save	Sleep/Full module clock stop/software standby/deep software standby											
Power Supply Voltage Detection	Power-On Reset/POR	Yes											
	Low Voltage Detection/LVD	Yes (Low voltage detection)											
A/D Converter	Resolution × Channels	12-bit × 21 or 10-bit × 8				12-bit × 14 or 10-bit × 8		12-bit × 21 or 10-bit × 8				12-bit × 14 or 10-bit × 8	
	Sample and Hold	Yes											
	Multi-Channel Sample and Hold	—											
D/A Converter	Resolution × Channels	10-bit × 2				10-bit × 1		10-bit × 2				10-bit × 1	
Timer	8-bit	4 (TMR)											
	16-bit	12 (TPU), 6 (MTU2), 4 (CMT)				6 (TPU), 6 (MTU2), 4 (CMT)		12 (TPU), 6 (MTU2), 4 (CMT)				6 (TPU), 6 (MTU2), 4 (CMT)	
	32-bit	—											
	Input Capture	32 (TPU), 19 (MTU2)				16 (TPU), 19 (MTU2)		32 (TPU), 19 (MTU2)				16 (TPU), 19 (MTU2)	
	Output Compare	32 (TPU), 16 (MTU2)				16 (TPU), 16 (MTU2)		32 (TPU), 16 (MTU2)				16 (TPU), 16 (MTU2)	
	PWM Output	4 (TMR), 16 (MTU2)											
	Programmable Pulse Generator	32 (PPG)											
	Event Counter	26 (TPU, MTU2, TMR, CMT)				20 (TPU, MTU2, TMR, CMT)		26 (TPU, MTU2, TMR, CMT)				20 (TPU, MTU2, TMR, CMT)	
	2-Phase Encoder Input	12 (TPU), 6 (MTU2)				6 (TPU), 6 (MTU2)		12 (TPU), 6 (MTU2)				6 (TPU), 6 (MTU2)	
	3-Phase Inverter Control	6(MTU2)											
Watchdog Timer		2											
Serial Interface	Clock Sync./Clock Async.	13 (SCI)				9 (SCI)		13 (SCI)				9 (SCI)	
	Clock Sync. Only	3 (RSPI)				2 (RSPI)		3 (RSPI)				2 (RSPI)	
	Clock Async. Only	—											
I²C-bus		4				2		4				2	
Smart Card/SIM		13				9		13				9	
Synchronous Serial Communication Unit/Special Serial I/O		3				2		3				2	
CAN	Channels	2	—	2	—	2	—	2	—	2	—	2	—
	Message Box (Numbers)	32	—	32	—	32	—	32	—	32	—	32	—
Ethernet		Yes											
USB Host		Yes											
USB Function		Yes											
CRC Calculation Circuit		1 ($X^8 + X^2 + X + 1$, $X^{16} + X^{15} + X^2 + 1$, $X^{16} + X^{12} + X^5 + 1$)											
I/O Ports	Input Only (Numbers)	2											
	CMOS I/O (Numbers)	133		111		78		133		111		78	
	High Voltage Port (Numbers)	—											
	N-Channel Open Drain Port (Numbers)	133		111		78		133		111		78	
	High Current Drive Port	—											
	Pull-Up Resistor	133		111		78		133		111		78	
External Interrupts Pins		16											
Debugging Function	Boundary Scan/JTAG	—											
	On-Chip Debug	Yes											
	On-Board Flash Program	Yes											
Other Functions	Others	—											
Operating Frequency/Supply Voltage		100MHz/2.7 to 3.6V											
Operating Ambient Temperature (˚C)		–40 to 85											
Package*2		PLQP0176KB-A		PLQP0144KA-A		PLQP0100KB-A		PLQP0176KB-A		PLQP0144KA-A		PLQP0100KB-A	
Part No.		R5F563N7DDBG**	R5F563N7CDBG**	R5F563N7DDFB**	R5F563N7CDFB**	R5F563N7DDLA**	R5F563N7CDLA**	R5F563N8DDBG**	R5F563N8CDBG**	R5F563N8DDFB**	R5F563N8CDFB**	R5F563N8DDLA**	R5F563N8CDLA**

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (RX600 Series)

Group		RX63N											
Memory	ROM (Bytes)	768K + 32K						1M + 32K					
	RAM (Bytes)	128K											
	ROM Type*1	F											
	Data Flash/E2 Data Flash	32K (E2 Data flash)											
	Program Security	Yes (ID code protection, ROM code protection)											
CPU	CPU	RX CPU Core											
	Basic Instructions	90											
	Minimum Instruction Execution Time (ns)	10 (@100MHz)											
	Dhrystone Performance	165MIPS											
	Multiplier	32 × 32 → 64											
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32 32 × 32 + 80 → 80											
	Barrel Shifter	Yes											
	FPU	Yes											
DMA	DMAC (Channels)	4											
	EXDMAC	2											
	DTC/DMAC Ⅱ	DTC											
External Bus Expansion	Address Space (Bytes)	4G											
	Bus State Controller	SRAM/ROM/Byte control SRAM/ Page access supported/SDRAM											
	Bus Structure	Separate bus (8/16/32-bit), selectable multiplex bus width (8/16-bit)		Separate bus (8/16-bit), selectable multiplex bus width (8/16-bit)				Separate bus (8/16/32-bit), selectable multiplex bus width (8/16-bit)		Separate bus (8/16-bit), selectable multiplex bus width (8/16-bit)			
	SDRAM Controller	Yes											
	Endian Conversion	Yes (data)											
Clock	Clock Generation Circuit	4 circuits (Main clock, sub clock, low speed on-chip oscillator, high speed on-chip ocsillator)											
	PLL	Yes											
	Subclock	Yes											
	RTC	Yes											
	On-Chip Oscillator	Yes											
	Oscillation Stop Detection	Yes											
	Frequency Divider	1/n (n = 1, 2, 4)											
	Power Save	Sleep/Full module clock stop/software standby/deep software standby											
Power Supply Voltage Detection	Power-On Reset/POR	Yes											
	Low Voltage Detection/LVD	Yes (Low voltage detection)											
A/D Converter	Resolution × Channels	12-bit × 21 or 10-bit × 8				12-bit × 14 or 10-bit × 8		12-bit × 21 or 10-bit × 8				12-bit × 14 or 10-bit × 8	
	Sample and Hold	Yes											
	Multi-Channel Sample and Hold	—											
D/A Converter	Resolution × Channels	10-bit × 2				10-bit × 1		10-bit × 2				10-bit × 1	
Timer	8-bit	4 (TMR)											
	16-bit	12 (TPU), 6 (MTU2), 4 (CMT)				6 (TPU), 6 (MTU2), 4 (CMT)		12 (TPU), 6 (MTU2), 4 (CMT)				6 (TPU), 6 (MTU2), 4 (CMT)	
	32-bit	—											
	Input Capture	32 (TPU), 19 (MTU2)				16 (TPU), 19 (MTU2)		32 (TPU), 19 (MTU2)				16 (TPU), 19 (MTU2)	
	Output Compare	32 (TPU), 16 (MTU2)				16 (TPU), 16 (MTU2)		32 (TPU), 16 (MTU2)				16 (TPU), 16 (MTU2)	
	PWM Output	4 (TMR), 16 (MTU2)											
	Programmable Pulse Generator	32 (PPG)											
	Event Counter	26 (TPU, MTU2, TMR, CMT)				20 (TPU, MTU2, TMR, CMT)		26 (TPU, MTU2, TMR, CMT)				20 (TPU, MTU2, TMR, CMT)	
	2-Phase Encoder Input	12 (TPU), 6 (MTU2)				6 (TPU), 6 (MTU2)		12 (TPU), 6 (MTU2)				6 (TPU), 6 (MTU2)	
	3-Phase Inverter Control	6 (MTU2)											
Watchdog Timer		2											
Serial Interface	Clock Sync./Clock Async.	13 (SCI)				9 (SCI)		13 (SCI)				9 (SCI)	
	Clock Sync. Only	3 (RSPI)				2 (RSPI)		3 (RSPI)				2 (RSPI)	
	Clock Async. Only	—											
I²C-bus		4				2		4				2	
Smart Card/SIM		13				9		13				9	
Synchronous Serial Communication Unit/Special Serial I/O		3				2		3				2	
CAN	Channels	2	—	2	—	2	—	2	—	2	—	2	—
	Message Box (Numbers)	32	—	32	—	32	—	32	—	32	—	32	—
Ethernet		Yes											
USB Host		Yes											
USB Function		Yes											
CRC Calculation Circuit		1 ($X^8 + X^2 + X + 1$, $X^{16} + X^{15} + X^2 + 1$, $X^{16} + X^{12} + X^5 + 1$)											
I/O Ports	Input Only (Numbers)	2											
	CMOS I/O (Numbers)	133		111		78		133		111		78	
	High Voltage Port (Numbers)	—											
	N-Channel Open Drain Port (Numbers)	133		111		78		133		111		78	
	High Current Drive Port	—											
	Pull-Up Resistor	133		111		78		133		111		78	
External Interrupts Pins		16											
Debugging Function	Boundary Scan/JTAG	—											
	On-Chip Debug	Yes											
	On-Board Flash Program	Yes											
Other Functions	Others	—											
Operating Frequency/Supply Voltage		100MHz/2.7 to 3.6V											
Operating Ambient Temperature (˚C)		–40 to 85											
Package*2		PLQP0176KB-A		PLQP0144KA-A		PLQP0100KB-A		PLQP0176KB-A		PLQP0144KA-A		PLQP0100KB-A	
Part No.		R5F563NADDBG**	R5F563NACDBG**	R5F563NADDFB**	R5F563NACDFB**	R5F563NADDLA**	R5F563NACDLA**	R5F563NBDDBG**	R5F563NBCDBG**	R5F563NBDDFB**	R5F563NBCDFB**	R5F563NBDDLA**	R5F563NBCDLA**

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (RX600 Series)

Group		RX631											
Memory	ROM (Bytes)	—	384K + 32K					512K + 32K					
	RAM (Bytes)	128K	64K					96K					
	ROM Type*1	L	F										
	Data Flash/E2 Data Flash	—	32K (E2 Data flash)										
	Program Security	Yes (ID code protection, ROM code protection)											
CPU	CPU	RX CPU core											
	Basic Instructions	90											
	Minimum Instruction Execution Time (ns)	10(@100MHz)											
	Dhrystone Performance	165MIPS											
	Multiplier	32 × 32 → 64											
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32 32 × 32 + 80 → 80											
	Barrel Shifter	Yes											
	FPU	Yes											
DMA	DMAC (Channels)	4											
	EXDMAC	2											
	DTC/DMAC Ⅱ	DTC											
External Bus Expansion	Address Space (Bytes)	4G											
	Bus State Controller	SRAM/ROM/Byte control SRAM/ Page access supported/SDRAM											
	Bus Structure	Separate bus (8/16-bit), selectable multiplex bus width (8/16-bit)	Separate bus (8/16/32-bit), selectable multiplex bus width (8/16-bit)		Separate bus (8/16-bit), selectable multiplex bus width (8/16-bit)			Separate bus (8/16/32-bit), selectable multiplex bus width (8/16-bit)		Separate bus (8/16-bit), selectable multiplex bus width (8/16-bit)			
	SDRAM Controller	Yes											
	Endian Conversion	Yes (data)											
Clock	Clock Generation Circuit	4 circuits (Main clock, sub clock, low speed on-chip oscillator, high speed on-chip ocsillator)											
	PLL	Yes											
	Subclock	Yes											
	RTC	Yes											
	On-Chip Oscillator	Yes											
	Oscillation Stop Detection	Yes											
	Frequency Divider	1/n (n = 1, 2, 4)											
	Power Save	Sleep/Full module clock stop/software standby/deep software standby											
Power Supply Voltage Detection	Power-On Reset/POR	Yes											
	Low Voltage Detection/LVD	Yes (Low voltage detection)											
A/D Converter	Resolution × Channels	12-bit × 21 or 10-bit × 8				12-bit × 14 or 10-bit × 8		12-bit × 21 or 10-bit × 8				12-bit × 14 or 10-bit × 8	
	Sample and Hold	Yes											
	Multi-Channel Sample and Hold	—											
D/A Converter	Resolution × Channels	10-bit × 2				10-bit × 1		10-bit × 2				10-bit × 1	
Timer	8-bit	4(TMR)											
	16-bit	12 (TPU), 6 (MTU2), 4 (CMT)				6 (TPU), 6 (MTU2), 4 (CMT)		12 (TPU), 6 (MTU2), 4 (CMT)				6 (TPU), 6 (MTU2), 4 (CMT)	
	32-bit	—											
	Input Capture	32 (TPU), 19 (MTU2)				16 (TPU), 19 (MTU2)		32 (TPU), 19 (MTU2)				16 (TPU), 19 (MTU2)	
	Output Compare	32 (TPU), 16 (MTU2)				16 (TPU), 16 (MTU2)		32 (TPU), 16 (MTU2)				16 (TPU), 16 (MTU2)	
	PWM Output	4(TMR), 16(MTU2)											
	Programmable Pulse Generator	32 (PPG)											
	Event Counter	26 (TPU, MTU2, TMR, CMT)				20 (TPU, MTU2, TMR, CMT)		26 (TPU, MTU2, TMR, CMT)				20 (TPU, MTU2, TMR, CMT)	
	2-Phase Encoder Input	12 (TPU), 6 (MTU2)				6 (TPU), 6 (MTU2)		12 (TPU), 6 (MTU2)				6 (TPU), 6 (MTU2)	
	3-Phase Inverter Control	6 (MTU2)											
Watchdog Timer		2											
Serial Interface	Clock Sync./Clock Async.	13 (SCI)				9 (SCI)		13 (SCI)				9 (SCI)	
	Clock Sync. Only	3 (RSPI)				2 (RSPI)		3 (RSPI)				2 (RSPI)	
	Clock Async. Only	—											
I²C-bus		4				2		4				2	
Smart Card/SIM		13				9		13				9	
Synchronous Serial Communication Unit/Special Serial I/O		3				2		3				2	
CAN	Channels	2	—	2	—	2	—	2	—	2	—	2	—
	Message Box (Numbers)	32	—	32	—	32	—	32	—	32	—	32	—
Ethernet		—											
USB Host		Yes											
USB Function		Yes											
CRC Calculation Circuit		1 ($X^8 + X^2 + X + 1$, $X^{16} + X^{15} + X^2 + 1$, $X^{16} + X^{12} + X^5 + 1$)											
I/O Ports	Input Only (Numbers)	2											
	CMOS I/O (Numbers)	133		111		78		133		111		78	
	High Voltage Port (Numbers)	—											
	N-Channel Open Drain Port (Numbers)	133		111		78		133		111		78	
	High Current Drive Port	—											
	Pull-Up Resistor	133		111		78		133		111		78	
External Interrupts Pins		16											
Debugging Function	Boundary Scan/JTAG	—											
	On-Chip Debug	Yes											
	On-Board Flash Program	Yes											
Other Functions	Others	—											
Operating Frequency/Supply Voltage		100MHz/2.7 to 3.6V											
Operating Ambient Temperature (˚C)		–40 to 85											
Package*2		PLBG0176GA-A	PLQP0176KB-A		PLQP0144KA-A		PLQP0100KB-A		PLQP0176KB-A		PLQP0144KA-A		PLQP0100KB-A	
Part No.		R5F56310DDFC**	R5F56317DDBG**	R5F56317CDBG**	R5F56317DDFB**	R5F56317CDFB**	R5F56317DDLA**	R5F56317CDLA**	R5F56318DDBG**	R5F56318CDBG**	R5F56318DDFB**	R5F56318CDFB**	R5F56318DDLA**	R5F56318CDLA**

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

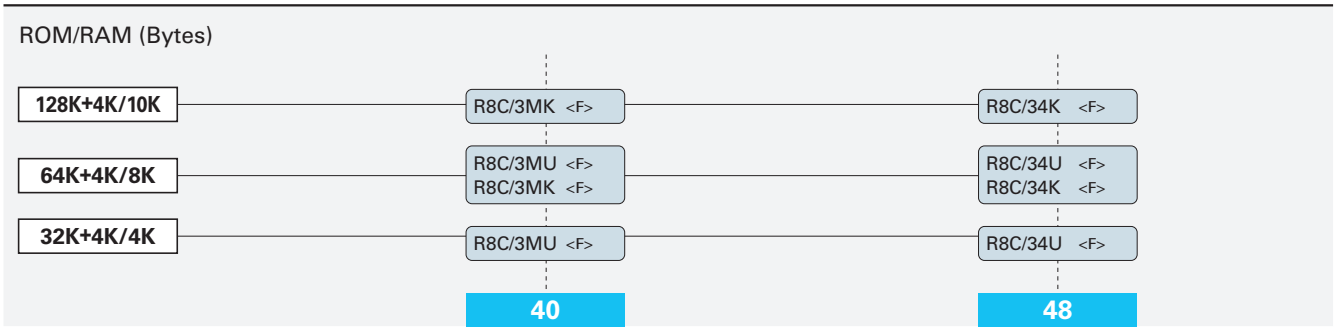
• Specifications (RX600 Series)

Group		RX631											
Memory	ROM (Bytes)	768K + 32K						1M + 32K					
	RAM (Bytes)	128K											
	ROM Type*1	F											
	Data Flash/E2 Data Flash	32K (E2 Data flash)											
	Program Security	Yes (ID code protection, ROM code protection)											
CPU	CPU	RX CPU Core											
	Basic Instructions	90											
	Minimum Instruction Execution Time (ns)	10 (@100MHz)											
	Dhrystone Performance	165MIPS											
	Multiplier	32 × 32 → 64											
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32 32 × 32 + 80 → 80											
	Barrel Shifter	Yes											
	FPU	Yes											
DMA	DMAC (Channels)	4											
	EXDMAC	2											
	DTC/DMAC Ⅱ	DTC											
External Bus Expansion	Address Space (Bytes)	4G											
	Bus State Controller	SRAM/ROM/Byte control SRAM/Page access supported/SDRAM											
	Bus Structure	Separate bus (8/16/32-bit), selectable multiplex bus width (8/16-bit)		Separate bus (8/16-bit), selectable multiplex bus width (8/16-bit)				Separate bus (8/16/32-bit), selectable multiplex bus width (8/16-bit)		Separate bus (8/16-bit), selectable multiplex bus width (8/16-bit)			
	SDRAM Controller	Yes											
	Endian Conversion	Yes (data)											
Clock	Clock Generation Circuit	4 circuits (Main clock, sub clock, low speed on-chip oscillator, high speed on-chip ocsillator)											
	PLL	Yes											
	Subclock	Yes											
	RTC	Yes											
	On-Chip Oscillator	Yes											
	Oscillation Stop Detection	Yes											
	Frequency Divider	1/n (n = 1, 2, 4)											
	Power Save	Sleep/Full module clock stop/software standby/deep software standby											
Power Supply Voltage Detection	Power-On Reset/POR	Yes											
	Low Voltage Detection/LVD	Yes (Low voltage detection)											
A/D Converter	Resolution × Channels	12-bit × 21 or 10-bit × 8				12-bit × 14 or 10-bit × 8		12-bit × 21 or 10-bit × 8				12-bit × 14 or 10-bit × 8	
	Sample and Hold	Yes											
	Multi-Channel Sample and Hold	—											
D/A Converter	Resolution × Channels	10-bit × 2				10-bit × 1		10-bit × 2				10-bit × 1	
Timer	8-bit	4 (TMR)											
	16-bit	12 (TPU), 6 (MTU2), 4 (CMT)				6 (TPU), 6 (MTU2), 4 (CMT)		12 (TPU), 6 (MTU2), 4 (CMT)				6 (TPU), 6 (MTU2), 4 (CMT)	
	32-bit	—											
	Input Capture	32 (TPU), 19 (MTU2)				16 (TPU), 19 (MTU2)		32 (TPU), 19 (MTU2)				16 (TPU), 19 (MTU2)	
	Output Compare	32 (TPU), 16 (MTU2)				16 (TPU), 16 (MTU2)		32 (TPU), 16 (MTU2)				16 (TPU), 16 (MTU2)	
	PWM Output	4(TMR), 16(MTU2)											
	Programmable Pulse Generator	32(PPG)											
	Event Counter	26 (TPU, MTU2, TMR, CMT)				20 (TPU, MTU2, TMR, CMT)		26 (TPU, MTU2, TMR, CMT)				20 (TPU, MTU2, TMR, CMT)	
	2-Phase Encoder Input	12 (TPU), 6 (MTU2)				6 (TPU), 6 (MTU2)		12 (TPU), 6 (MTU2)				6 (TPU), 6 (MTU2)	
	3-Phase Inverter Control	6 (MTU2)											
Watchdog Timer		2											
Serial Interface	Clock Sync./Clock Async.	13 (SCI)				9 (SCI)		13 (SCI)				9 (SCI)	
	Clock Sync. Only	3 (RSPI)				2 (RSPI)		3 (RSPI)				2 (RSPI)	
	Clock Async. Only	—											
I²C-bus		4				2		4				2	
Smart Card/SIM		13				9		13				9	
Synchronous Serial Communication Unit/Special Serial I/O		3				2		3				2	
CAN	Channels	2	—	2	—	2	—	2	—	2	—	2	—
	Message Box (Numbers)	32	—	32	—	32	—	32	—	32	—	32	—
Ethernet		—											
USB Host		Yes											
USB Function		Yes											
CRC Calculation Circuit		1 ($X^8 + X^2 + X + 1$, $X^{16} + X^{15} + X^2 + 1$, $X^{16} + X^{12} + X^5 + 1$)											
I/O Ports	Input Only (Numbers)	2											
	CMOS I/O (Numbers)	133		111		78		133		111		78	
	High Voltage Port (Numbers)	—											
	N-Channel Open Drain Port (Numbers)	133		111		78		133		111		78	
	High Current Drive Port	—											
	Pull-Up Resistor	133		111		78		133		111		78	
External Interrupts Pins		16											
Debugging Function	Boundary Scan/JTAG	—											
	On-Chip Debug	Yes											
	On-Board Flash Program	Yes											
Other Functions	Others	—											
Operating Frequency/Supply Voltage		100MHz/2.7 to 3.6V											
Operating Ambient Temperature (˚C)		–40 to 85											
Package*2		PLQP0176KB-A		PLQP0144KA-A		PLQP0100KB-A		PLQP0176KB-A		PLQP0144KA-A		PLQP0100KB-A	
Part No.		R5F5631ADDBG**	R5F5631ACDBG**	R5F5631ADDFB**	R5F5631ACDFB**	R5F5631ADDLA**	R5F5631ACDLA**	R5F5631BDDBG**	R5F5631BCDBG**	R5F5631BDDFB**	R5F5631BCDFB**	R5F5631BDDLA**	R5F5631BCDLA**

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Memory Capacity (ROM/RAM) (R8C/3X Series)



Letters in brackets < > indicate memory variations.
F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

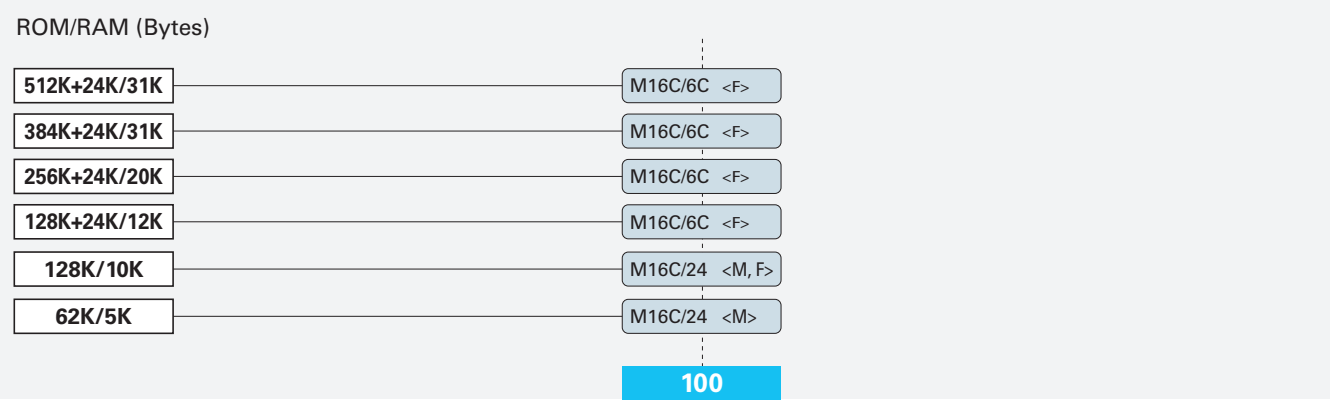
• Specifications (R8C/3X Series)

Group		R8C/34K				R8C/34U				R8C/3MK		R8C/3MU	
Memory	ROM (Bytes)	64K + 4K		128K + 4K		32K + 4K		64K + 4K		128K + 4K		32K + 4K	64K + 4K
	RAM (Bytes)	8K		10K		4K		8K		10K		4K	8K
	ROM Type*1	F											
	Data Flash/E2 Data Flash	4K (Data flash: program/erase 10k times)											
	Program Security	Yes (ID code check function, ROM code protect function)											
CPU	CPU	R8C Core											
	Basic Instructions	89											
	Minimum Instruction Execution Time (ns)	50 (@20MHz)											
	Multiplier	16 × 16 → 32											
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32											
DMA	DTC/DMAC Ⅱ	DTC (Activation sources: 31)											
Clock	Clock Generation Circuit	4 circuits (Main clock, High-speed on-chip oscillator, Low-speed on-chip oscillator, PLL)											
	PLL	yes											
	Subclock	—											
	RTC	—											
	On-Chip Oscillator	2 circuits (High precision and High speed: 40MHz, Low speed: 125kHz)											
	Oscillation Stop Detection	Yes											
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)											
	Power Save	Wait/Stop											
Power Supply Voltage Detection	Power-On Reset/POR	Yes											
	Low Voltage Detection/LVD	Yes (Voltage detection 3)											
A/D Converter	Resolution × Channels	10-bit × 12								10-bit × 10		—	
	Sample and Hold	Yes										—	
D/A Converter	Resolution × Channels	—											
Timer	8-bit	2 (Timer RA, Timer RB)											
	16-bit	2 (Timer RC, Timer RF)								1 (Timer RC)			
	Input Capture	5 (shared with Timer RC, Timer RF)								4 (shared with Timer RC)			
	Output Compare	5 (shared with Timer RC, Timer RF)								4 (shared with Timer RC)			
	PWM Output	4 (shared with Timer RB, Timer RC)											
	Real-Time Port	—											
	Event Counter	1 (shared with Timer RA)											
	2-Phase Encoder Input	—											
	3-Phase Inverter Control	—											
Watchdog Timer		1 (with automatic starting function and clock source protection function, low-speed on-chip oscillator for watchdog timer)											
Serial Interface	Clock Sync./Clock Async.	4 (UART 0 to UART 3)											
	Clock Sync. Only	—											
	Clock Async. Only	—											
I²C-bus		1 (shared with SSU) + 1 (UART 2 (simple I²C))											
Synchronous Serial Communication Unit/Special Serial I/O		1 (shared with I²C)											
CAN	Channels	—											
	Message Box (Numbers)	—											
USB Host		1 (selectable USB Function)				—				1 (selectable USB Function)		—	
USB Function		1 (selectable USB Host)				1				1 (selectable USB Host)		1	
LCD		—											
I/O Ports	Input Only (Numbers)	—											
	CMOS Output Only (Numbers)	—											
	CMOS I/O (Numbers)	36								30			
	N-Channel Open Drain Port (Numbers)	—											
	High Current Drive Port	36								30			
	Pull-Up Resistor	36								30			
External Interrupts Pins		9											
Debugging Function	On-Chip Debug	Yes											
	On-Board Flash Program	Yes											
Other Functions	ROM Correction Function	—											
	Others	Comparator B × 2											
Operating Frequency/Supply Voltage		16MHz/3.0V to 5.5V (When using USB) 20MHz/2.7 to 5.5V, 5MHz/1.8 to 5.5V											
Operating Ambient Temperature (°C)		–40 to 85	–20 to 85	–40 to 85	–20 to 85	–40 to 85	–20 to 85	–40 to 85	–20 to 85				
Package*2		PLQP0048KB-A								PWQN0040KB-A			
Part No.		R5F21348KDFP*	R5F21348KNFP*	R5F2134CKDFP*	R5F2134CKNFP*	R5F21346UDFP*	R5F21346UNFP*	R5F21348UDFP*	R5F21348UNFP*	R5F213M8KNNP*	R5F213MCKNNP*	R5F213M6UNNP*	R5F213M8UNNP*

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Memory Capacity (ROM/RAM) (M16C/60, M16C/20 Series)



Letters in brackets < > indicate memory variations.
F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

• Specifications (M16C/60, M16C/20 Series)

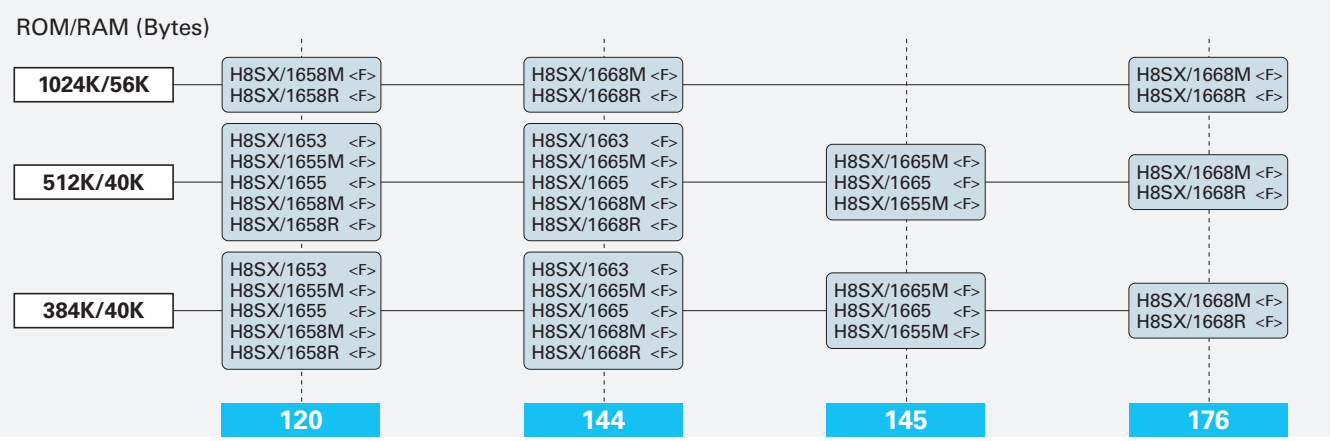
Group		M16C/6C				M16C/24	
Memory	ROM (Bytes)	128K + 24K	256K + 24K	384K + 24K	512K + 24K	64K	128K
	RAM (Bytes)	12K	20K	31K		5K	10K
	ROM Type*1	F				M	F
	Data Flash/E2 Data Flash	8K (Data flash: program/erase 10k times)				—	
	Program Security	Yes (ID code check function, ROM code protect function)				—	Yes (ID code check function, ROM code protect function)
CPU	CPU	M16C/60 Core					
	Basic Instructions	91					
	Minimum Instruction Execution Time (ns)	31.25 (@32MHz)				62.5 (@16MHz)	
	Multiplier	16 × 16 → 32					
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32					
	Barrel Shifter	—					
DMA	DMAC (Channels)	4					
	DTC/DMAC II	—					
External Bus Expansion	Address Space (Bytes)	1M					
	External Bus Interface	Support for insertion of 0 to 5 wait states, Outputs 4 chip-select signals				Support for insertion of 1 to 3 wait states, Outputs 4 chip-select signals	
	Bus Structure	Selectable from Separate bus, Multiplex bus, Data Bus Width is fixed (8-bit), The number of output address buses can be selected (12/16/20)				Data Bus Width can be selected (8/16-bit), The number of output address buses can be selected (16/20)	
	DRAM Controller	—					
Clock	Clock Generation Circuit	5 circuits (Main clock, PLL, Sub clock, High-speed on-chip oscillator, Low-speed on-chip oscillator)				3 circuits (Main clock, Sub-clock, On-chip oscillator)	
	PLL	Yes					
	Subclock	Yes (32.768kHz)				Yes	
	RTC	Yes				—	
	On-Chip Oscillator	2 circuits (High speed: 40MHz, Low speed: 125kHz)				Yes	
	Oscillation Stop Detection	Yes					
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)					
	Power Save	Wait/Stop				Normal operating (High-speed, Medium-speed, Low-speed, Low-power consumption) /Wait/Stop	
Power Supply Voltage Detection	Power-On Reset/POR	Yes				—	
	Low Voltage Detection/LVD	Yes (Voltage detection 3)				—	
A/D Converter	Resolution × Channels	10-bit × 26 (shared with 2 circuits)				10-bit × 8	
	Sample and Hold	Yes					
	Multi-Channel Sample and Hold	—					
D/A Converter	Resolution × Channels	8-bit × 2				—	
Timer	8-bit	—					
	16-bit	11 (Timer A, Timer B)				5 (Timer A0, Timer A1, Timer A2, Timer A3, Timer A4)	
	Input Capture	8 (Timer S)				—	
	Output Compare	8 (Timer S)				—	
	PWM Output	5 (Timer A)				5 (shared with Timer A0, Timer A1, Timer A2, Timer A3, Timer A4)	
	Real-Time Port	—					
	Event Counter	11 (Timer A, Timer B)				5 (shared with Timer A0, Timer A1, Timer A2, Timer A3, Timer A4)	
	2-Phase Encoder Input	3 (Timer A)				—	
	3-Phase Inverter Control	1 (shared with Timer A4, Timer A1, Timer A2, Timer B2, Dead time timer)				—	
Watchdog Timer		1					
Serial Interface	Clock Sync./Clock Async.	6 (UART)				4 (UART 0, UART 1, UART 2, UART 3)	
	Clock Sync. Only	—					
	Clock Async. Only	—					
I²C-bus		7 (Multi master I²C, UART)				4 (UART 0, UART 1, UART 2, UART 3)	
IEBus		6 (UART)				4 (UART 0, UART 1, UART 2, UART 3)	
Smart Card/SIM		1 (UART)				4 (UART 0, UART 1, UART 2, UART 3)	
Synchronous Serial Communication Unit/Special Serial I/O		6 (UART)				2 (UART 0, UART 1, Serial Sound Interface)	
CAN	Channels	—					
	Message Box (Numbers)	—					
USB Function		Yes (Full-speed)					
IrDA		—					
CRC Calculation Circuit		1 (CRC-CCITT ($X^{16} + X^{12} + X^5 + 1$) /CRC-16 ($X^{16} + X^{15} + X^2 + 1$))				2 (CRC-CCITT, CRC16)	
X/Y Converter		—					
I/O Ports	Input Only (Numbers)	—				1	
	CMOS I/O (Numbers)	85				80	
	N-Channel Open Drain Port (Numbers)	3				2	
	High Current Drive Port	—				8 (20mA)	
	Pull-Up Resistor	85				80 (Possible to Set Each of 4 Ports)	
External Interrupts Pins		13				12 (INT × 3, NMI × 1, Key Input × 8)	
Debugging Function	On-Chip Debug	Yes				—	
	On-Board Flash Program	Yes				—	
Other Functions	ROM Correction Function	—				Yes (Address match)	—
	Others	3V, 5V interface				Serial Sound Interface: 2, AND Flash Controller	
Operating Frequency/Supply Voltage		32MHz/3.0 to 5.5V				16MHz/3.0 to 3.6V	
Operating Ambient Temperature (°C)		–40 to 85	–20 to 85	–40 to 85	–20 to 85	–40 to 85	–20 to 85	–40 to 85	–20 to 85
Package*2		PRQP0100JD-B	PLQP0100KB-A	PRQP0100JD-B	PLQP0100KB-A	PRQP0100JD-B	PLQP0100KB-A	PRQP0100JD-B	PLQP0100KB-A	PRQP0100JD-B	PLQP0100KB-A	PRQP0100JD-B	PLQP0100KB-A	PRQP0100JD-B	PLQP0100KB-A
Part No.		R5F36CA6DFA	R5F36CA6DFB	R5F36CA6NFA	R5F36CA6NFB	R5F36CAEDFA	R5F36CAEDFB	R5F36CAENFA	R5F36CAENFB	R5F36CAKDFA	R5F36CAKDFB	R5F36CAKNFA	R5F36CAKNFB	R5F36CAMDFA	R5F36CAMDFB	R5F36CAMNFA	R5F36CAMNFB	M30245M8-XXXGP	M30245MC-XXXGP	M30245FCGP

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Memory Capacity (ROM/RAM) (H8SX/1600 Series)



Letters in brackets < > indicate memory variations.
F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

• Specifications (H8SX/1600 Series)

Group		H8SX/1653		H8SX/1655		H8SX/1658M			H8SX/1658R		
Memory	ROM (Bytes)	384K	512K	384K	512K	384K	512K	1024K	384K	512K	1024K
	RAM (Bytes)	40K						56K	40K		56K
	ROM Type*1	F									
	Data Flash/E2 Data Flash	—									
	Cache Memory	—									
	Program Security	Yes									
CPU	CPU	H8SX Core									
	Basic Instructions	87									
	Minimum Instruction Execution Time (ns)	20 (@50MHz)									
	Multiplier	16 × 16 → 32									
	Multiply-Accumulate Instruction	16 × 16 + 42 → 42									
DMA	DMAC (Channels)	4									
	DTC/DMAC II	DTC									
External Bus Expansion	Address Space (Bytes)	2M									
	Bus State Controller	ROM/Burst ROM/SRAM/Byte control SRAM/Address/Data Multiplexed I/O									
	Bus Structure	Separate bus (8/16-bit) /Multiplex bus (8/16-bit)									
	Endian Conversion	Yes									
Clock	Clock Generation Circuit	2 circuits (Main clock, USB)									
	PLL	Yes									
	Subclock	—									
	Frequency Divider	1/n (n = 1, 2, 4, 8)		1/n (n = 1/2, 1, 2, 4)							
	Power Save	Sleep/Full module clock stop/ Software standby/Hardware standby		Sleep/Full module clock stop/Software standby/Deep software standby/Hardware standby							
Power Supply Voltage Detection	Power-On Reset/POR	—				Yes			—		
	Low Voltage Detection/LVD	—				Yes			—		
A/D Converter	Resolution x Channels (min. conversion time)	10-bit × 8		10-bit × 8 (1.0µs)		10-bit × 8 (2.7µs)					
	Sample and Hold	Yes									
	Multi-Channel Sample and Hold	—		Yes (2 circuits)							
D/A Converter	Resolution × Channels	8-bit × 2		10-bit × 2		8-bit × 2					
Timer	8-bit	8 (TMR)									
	16-bit	6 (TPU)		12 (TPU)							
	32-bit	2 (TPU)		4 (TPU)							
	Input Capture	8 (shared with TPU)		24 (shared with TPU)							
	Output Compare	8 (shared with TPU)		24 (shared with TPU)							
	PWM Output	7 (shared with TPU)		22 (shared with TPU)							
	Programmable Pulse Generator	8 (shared with PPG and TPU)		24 (shared with PPG and TPU)							
	Event Counter	4 (shared with TPU)									
	2-Phase Encoder Input	2 (shared with TPU)									
Watchdog Timer		1									
Serial Interface	Clock Sync./Clock Async.	4									
	Clock Sync. Only	—									
	Clock Async. Only	2									
I²C-bus		2									
Smart Card/SIM		6									
Synchronous Serial Communication Unit/Special Serial I/O		—									
CAN	Channels	—									
	Message Box (Numbers)	—									
USB Function		Yes									
IrDA		Yes									
I/O Ports	Input Only (Numbers)	9									
	CMOS I/O (Numbers)	75									
	N-Channel Open Drain Port (Numbers)	—									
	Pull-Up Resistor	37		40							
External Interrupts Pins		13 (NMI × 1 + INT × 12)									
Debugging Function	On-Chip Debug	Yes									
	On-Board Flash Program	Yes									
Operating Frequency/Supply Voltage		50MHz/3.0 to 3.6V				50MHz/2.95 to 3.6V			50MHz/3.0 to 3.6V		
Operating Ambient Temperature (˚C)		-20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	-20 to 75
Package*2		PTQP0120LA-A		PLQP0120LA-A								
Part No.		R5F61653N50FTV	R5F61653W50FTV	R5F61654W50FTV	R5F61654N50FTV	R5F61652N50FPV	R5F61652D50FPV	R5F61655D50FPV	R5F61655N50FPV	R5F61653MN50FPV	R5F61653MD50FPV	R5F61654MD50FPV	R5F61654MN50FPV	R5F61658MN50FPV	R5F61658MD50FPV	R5F61653RD50FPV	R5F61653RN50FPV	R5F61654RN50FPV	R5F61654RD50FPV	R5F61658RD50FPV	R5F61658RN50FPV

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8SX/1600 Series)

Group		H8SX/1663			H8SX/1665						
Memory	ROM (Bytes)	384K	512K		384K	512K					
	RAM (Bytes)	40K									
	ROM Type*1	F									
	Data Flash/E2 Data Flash	—									
	Cache Memory	—									
	Program Security	Yes									
CPU	CPU	H8SX Core									
	Basic Instructions	87									
	Minimum Instruction Execution Time (ns)	20 (@50MHz)									
	Multiplier	16 × 16 → 32									
	Multiply-Accumulate Instruction	16 × 16 + 42 → 42									
DMA	DMAC (Channels)	4									
	DTC/DMAC Ⅱ	DTC									
External Bus Expansion	Address Space (Bytes)	16M									
	Bus State Controller	ROM/Burst ROM/SRAM/Byte control SRAM/Address/Data Multiplexed I/O/SDRAM									
	Bus Structure	Separate bus (8/16-bit) /Multiplex bus (8/16-bit)									
	Endian Conversion	Yes									
Clock	Clock Generation Circuit	2 circuits (Main clock, USB)									
	PLL	Yes									
	Subclock	Yes									
	Frequency Divider	1/n (n = 1, 2, 4, 8)			1/n (n = 1/2, 1, 2, 4)						
	Power Save	Sleep/Full module clock stop/ Software standby/Hardware standby			Sleep/Full module clock stop/Software standby/Deep software standby/ Hardware standby						
Power Supply Voltage Detection	Power-On Reset/POR	—									
	Low Voltage Detection/LVD	—									
A/D Converter	Resolution x Channels (min. conversion time)	10-bit × 8			10-bit × 8 (1.0µs)						
	Sample and Hold	Yes									
	Multi-Channel Sample and Hold	—			Yes (2 circuits)						
D/A Converter	Resolution × Channels	8-bit × 2			10-bit × 2						
Timer	8-bit	8 (TMR)									
	16-bit	6 (TPU)			12 (TPU)						
	32-bit	2 (TPU)			4 (TPU)						
	Input Capture	16 (shared with TPU)			32 (shared with TPU)						
	Output Compare	16 (shared with TPU)			32 (shared with TPU)						
	PWM Output	15 (shared with TPU)			30 (shared with TPU)						
	Programmable Pulse Generator	16 (shared with PPG and TPU)			32 (shared with PPG and TPU)						
	Event Counter	4 (shared with TPU)			8 (shared with TPU)						
	2-Phase Encoder Input	2 (shared with TPU)			4 (shared with TPU)						
Watchdog Timer		1									
Serial Interface	Clock Sync./Clock Async.	4									
	Clock Sync. Only	—									
	Clock Async. Only	2									
I^2C-bus		2									
Smart Card/SIM		6									
Synchronous Serial Communication Unit/Special Serial I/O		—									
CAN	Channels	—									
	Message Box (Numbers)	—									
USB Function		Yes									
IrDA		Yes									
I/O Ports	Input Only (Numbers)	9									
	CMOS I/O (Numbers)	92									
	N-Channel Open Drain Port (Numbers)	—									
	Pull-Up Resistor	40									
External Interrupts Pins		13 (NMI × 1 + INT × 12)									
Debugging Function	On-Chip Debug	Yes									
	On-Board Flash Program	Yes									
Operating Frequency/Supply Voltage		50MHz/3.0 to 3.6V									
Operating Ambient Temperature (˚C)		–20 to 75	–40 to 85	–20 to 75	–40 to 85						–20 to 75
Package*2		PLQP0144KA-A			PTLG0145JB-A	PLQP0144KA-A	PTLG0145JB-A	PLQP0144KA-A	PTLG0145JB-A	PLQP0144KA-A	
Part No.		R5F61663N50FPV	R5F61663W50FPV	R5F61664W50FPV	R5F61664N50FPV	R5F61662N50FPV	R5F61662N50LGV	R5F61662D50FPV	R5F61662D50LGV	R5F61665D50FPV	R5F61665D50LGV	R5F61665N50LGV	R5F61665N50FPV

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8SX/1600 Series)

Group		H8SX/1668M										H8SX/1668R									
Memory	ROM (Bytes)	384K		512K		1024K						384K		512K		1024K					
	RAM (Bytes)	40K				56K						40K				56K					
	ROM Type*1	F																			
	Data Flash/E2 Data Flash	—																			
	Cache Memory	—																			
	Program Security	Yes																			
CPU	CPU	H8SX Core																			
	Basic Instructions	87																			
	Minimum Instruction Execution Time (ns)	20 (@50MHz)																			
	Multiplier	16 × 16 → 32																			
	Multiply-Accumulate Instruction	16 × 16 + 42 → 42																			
DMA	DMAC (Channels)	4																			
	DTC/DMAC II	DTC																			
External Bus Expansion	Address Space (Bytes)	16M																			
	Bus State Controller	ROM/Burst ROM/SRAM/Byte control SRAM/Address/Data Multiplexed I/O/DRAM/SDRAM																			
	Bus Structure	Separate bus (8/16-bit) /Multiplex bus (8/16-bit)																			
	Endian Conversion	Yes																			
Clock	Clock Generation Circuit	2 circuits (Main clock, USB)																			
	PLL	Yes																			
	Subclock	Yes																			
	Frequency Divider	1/n (n = 1/2, 1, 2, 4)																			
	Power Save	Sleep/Full module clock stop/Software standby/Deep software standby/Hardware standby																			
Power Supply Voltage Detection	Power-On Reset/POR	Yes										—									
	Low Voltage Detection/LVD	Yes										—									
A/D Converter	Resolution × Channels	10-bit × 8																			
	Sample and Hold	Yes																			
	Multi-Channel Sample and Hold	Yes (2 circuits)																			
D/A Converter	Resolution × Channels	8-bit × 2																			
Timer	8-bit	8 (TMR)																			
	16-bit	12 (TPU)																			
	32-bit	4 (TPU)																			
	Input Capture	32 (shared with TPU)																			
	Output Compare	32 (shared with TPU)																			
	PWM Output	30 (shared with TPU)																			
	Programmable Pulse Generator	32 (shared with PPG and TPU)																			
	Event Counter	8 (shared with TPU)																			
	2-Phase Encoder Input	4 (shared with TPU)																			
Watchdog Timer		1																			
Serial Interface	Clock Sync./Clock Async.	4																			
	Clock Sync. Only	—																			
	Clock Async. Only	2																			
I²C-bus		2																			
Smart Card/SIM		6																			
Synchronous Serial Communication Unit/Special Serial I/O		—																			
CAN	Channels	—																			
	Message Box (Numbers)	—																			
USB Function		Yes																			
IrDA		Yes																			
I/O Ports	Input Only (Numbers)	9																			
	CMOS I/O (Numbers)	92																			
	N-Channel Open Drain Port (Numbers)	—																			
	Pull-Up Resistor	40																			
External Interrupts Pins		13 (NMI × 1 + INT × 12)																			
Debugging Function	On-Chip Debug	Yes																			
	On-Board Flash Program	Yes																			
Operating Frequency/Supply Voltage		50MHz/2.95 to 3.6V										50MHz/3.0 to 3.6V									
Operating Ambient Temperature (˚C)		–40 to 85		–20 to 75		–40 to 85		–20 to 75		–40 to 85		–20 to 75		–40 to 85		–20 to 75		–40 to 85		–20 to 75		–40 to 85		–20 to 75	
Package*2		PLBG0176GA-A	PLQP0144KA-A	PLBG0176GA-A	PLQP0144KA-A	PLBG0176GA-A	PLQP0144KA-A	PLBG0176GA-A	PLQP0144KA-A	PLBG0176GA-A	PLQP0144KA-A	PLBG0176GA-A	PLQP0144KA-A	PLBG0176GA-A	PLQP0144KA-A	PLBG0176GA-A	PLQP0144KA-A	PLBG0176GA-A	PLQP0144KA-A	PLBG0176GA-A	PLQP0144KA-A	PLBG0176GA-A	PLQP0144KA-A	PLBG0176GA-A	PLQP0144KA-A
Part No.		R5F61663MD50BGV	R5F61663MD50FPV	R5F61663MN50BGV	R5F61663MN50FPV	R5F61664MD50BGV	R5F61664MD50FPV	R5F61664MN50BGV	R5F61664MN50FPV	R5F61668MD50BGV	R5F61668MD50FPV	R5F61668MN50BGV	R5F61668MN50FPV	R5F61663RD50BGV	R5F61663RD50FPV	R5F61663RN50BGV	R5F61663RN50FPV	R5F61664RD50BGV	R5F61664RD50FPV	R5F61664RN50BGV	R5F61664RN50FPV	R5F61668RD50BGV	R5F61668RD50FPV	R5F61668RN50BGV	R5F61668RN50FPV

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8SX/1600 Series)

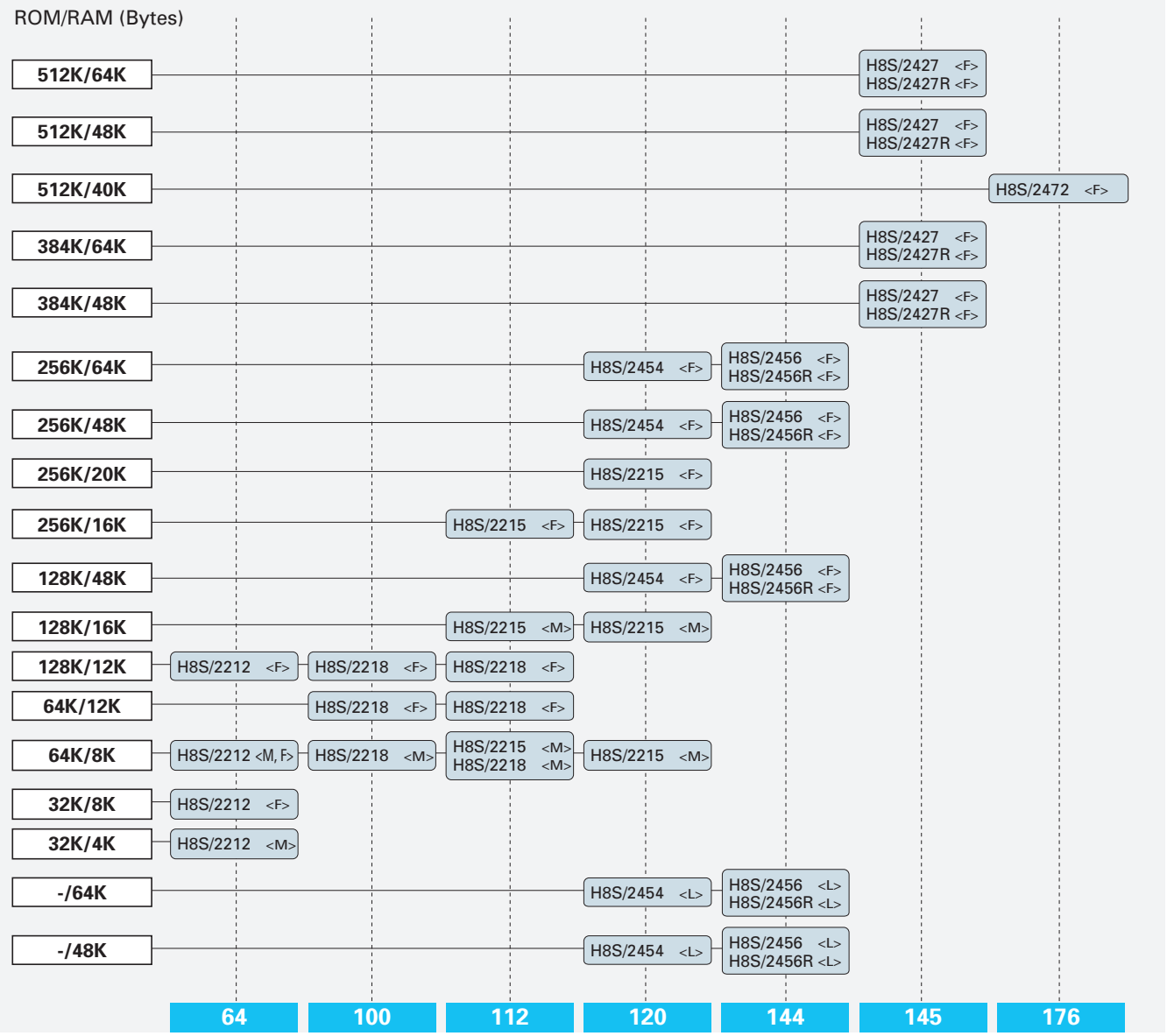
Group		H8SX/1655M				H8SX/1665M			
Memory	ROM (Bytes)	384K		512K		384K		512K	
	RAM (Bytes)	40K							
	ROM Type*1	F							
	Data Flash/E2 Data Flash	—							
	Cache Memory	—							
	Program Security	Yes							
CPU	CPU	H8SX Core							
	Basic Instructions	87							
	Minimum Instruction Execution Time (ns)	20 (@50MHz)							
	Multiplier	16 × 16 → 32							
	Multiply-Accumulate Instruction	16 × 16 + 42 → 42							
DMA	DMAC (Channels)	4							
	DTC/DMAC Ⅱ	DTC							
External Bus Expansion	Address Space (Bytes)	16M							
	Bus State Controller	ROM/Burst ROM/SRAM/Byte control SRAM/Address/Data Multiplexed I/O				ROM/Burst ROM/SRAM/Byte control SRAM/Address/Data Multiplexed I/O/SDRAM			
	Bus Structure	Separate bus (8/16-bit) /Multiplex bus (8/16-bit)							
	Endian Conversion	Yes							
Clock	Clock Generation Circuit	2 circuits (Main clock, USB)							
	PLL	Yes							
	Subclock	—				Yes			
	Frequency Divider	1/n (n = 1/2, 1, 2, 4)							
	Power Save	Sleep/Full module clock stop/Software standby/Deep software standby/Hardware standby							
Power Supply Voltage Detection	Power-On Reset/POR	Yes							
	Low Voltage Detection/LVD	Yes							
A/D Converter	Resolution × Channels	10-bit × 8							
	Sample and Hold	Yes							
	Multi-Channel Sample and Hold	Yes (2 circuits)							
D/A Converter	Resolution × Channels	10-bit × 2							
Timer	8-bit	8 (TMR)							
	16-bit	12 (TPU)							
	32-bit	4 (TPU)							
	Input Capture	24 (shared with TPU)				32 (shared with TPU)			
	Output Compare	24 (shared with TPU)				32 (shared with TPU)			
	PWM Output	22 (shared with TPU)				30 (shared with TPU)			
	Programmable Pulse Generator	24 (shared with PPG and TPU)				32 (shared with PPG and TPU)			
	Event Counter	4 (shared with TPU)				8 (shared with TPU)			
	2-Phase Encoder Input	2 (shared with TPU)				4 (shared with TPU)			
Watchdog Timer		1							
Serial Interface	Clock Sync./Clock Async.	4							
	Clock Sync. Only	—							
	Clock Async. Only	2							
I²C-bus		2							
Smart Card/SIM		6							
Synchronous Serial Communication Unit/Special Serial I/O		—							
CAN	Channels	—							
	Message Box (Numbers)	—							
USB Function		Yes							
IrDA		Yes							
I/O Ports	Input Only (Numbers)	9							
	CMOS I/O (Numbers)	75				92			
	N-Channel Open Drain Port (Numbers)	—							
	Pull-Up Resistor	40							
External Interrupts Pins		13 (NMI × 1 + INT × 12)							
Debugging Function	On-Chip Debug	Yes							
	On-Board Flash Program	Yes							
Operating Frequency/Supply Voltage		50MHz/2.95 to 3.6V							
Operating Ambient Temperature (°C)		–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75
Package*2		PLQP0120LA-A	PTLG0145JB-A	PLQP0120LA-A	PTLG0145JB-A	PLQP0120LA-A	PTLG0145JB-A	PLQP0120LA-A	PTLG0145JB-A
		PLQP0144KA-A	PTLG0145JB-A	PLQP0144KA-A	PTLG0145JB-A	PLQP0144KA-A	PTLG0145JB-A	PLQP0144KA-A	PTLG0145JB-A
Part No.		R5F61652MD50FPV	R5F61652MD50LGV	R5F61652MN50FPV	R5F61652MN50LGV	R5F61655MD50FPV	R5F61655MD50LGV	R5F61655MN50FPV	R5F61655MN50LGV
		R5F61662MD50FPV	R5F61662MD50LGV	R5F61662MN50FPV	R5F61662MN50LGV	R5F61665MD50FPV	R5F61665MD50LGV	R5F61665MN50FPV	R5F61665MN50LGV

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Memory Capacity (ROM/RAM) (H8S/2400, 2200 Series)



Letters in brackets < > indicate memory variations.
F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

• Specifications (H8S/2400 Series)

Group		H8S/2454																			
Memory	ROM (Bytes)	—								128K				256K							
	RAM (Bytes)	48K				64K				48K								64K			
	ROM Type*1	L								F											
	Program Security	—								Yes											
CPU	CPU	H8S/2600 Core																			
	Basic Instructions	69																			
	Minimum Instruction Execution Time (ns)	31 (@32MHz)																			
	Multiplier	16 × 16 → 32																			
	Multiply-Accumulate Instruction	16 × 16 + 42 → 42																			
DMA	DMAC (Channels)	4																			
	EXDMAC	—																			
	DTC/DMAC II	DTC																			
External Bus Expansion	Address Space (Bytes)	16M																			
	Bus State Controller	Direct connection to ROM/SRAM/DRAM is supported																			
	Bus Structure	Separate bus (8/16-bit)		Separate bus (8/16-bit), Multiplex bus		Separate bus (8/16-bit)		Separate bus (8/16-bit), Multiplex bus		Separate bus (8/16-bit)		Separate bus (8/16-bit), Multiplex bus		Separate bus (8/16-bit)		Separate bus (8/16-bit), Multiplex bus		Separate bus (8/16-bit)		Separate bus (8/16-bit), Multiplex bus	
	SDRAM Controller	—																			
	DRAM Controller	Yes																			
	Host Interface	—																			
Clock	Clock Generation Circuit	3 circuits (Main clock, PLL, PLL for USB)																			
	PLL	Yes																			
	Subclock	—																			
	RTC	—																			
	Frequency Divider	1/n (n = 1, 2)																			
	Power Save	Clock division/Sleep/Module stop/Full module clocks stop/Software standby/Hardware standby																			
A/D Converter	Resolution × Channels	10-bit × 10 (2 units)																			
	Sample and Hold	Yes																			
D/A Converter	Resolution × Channels	8-bit × 2																			
Timer	8-bit	2 (TMR)																			
	16-bit	12 (TPU)																			
	32-bit	—																			
	Input Capture	12 (shared with TPU)																			
	Output Compare	12 (shared with TPU)																			
	PWM Output	12 (shared with TPU)																			
	Real-Time Port	—																			
	Programmable Pulse Generator	16 (shared with DMAC, DTC, TMR, TPU)																			
	Event Counter	14 (shared with TMR, TPU)																			
	2-Phase Encoder Input	12 (shared with TPU)																			
Watchdog Timer		1																			
Serial Interface	Clock Sync./Clock Async.	5																			
I^2C-bus		4																			
IEBus		—																			
Smart Card/SIM		5																			
Synchronous Serial Communication Unit/Special Serial I/O		1 (Multiprocessor communication function)																			
CAN	Channels	—																			
	Message Box (Numbers)	—																			
Ethernet		—																			
USB Function		Yes																			
LPC/ISA		—																			
IrDA		Yes																			
LCD		—																			
CRC Calculation Circuit		—																			
I/O Ports	Input Only (Numbers)	11																			
	CMOS Output Only (Numbers)	—																			
	CMOS I/O (Numbers)	83																			
	High Voltage Port (Numbers)	—																			
	N-Channel Open Drain Port (Numbers)	91																			
	DTMF	—																			
	High Current Drive Port	—																			
	Pull-Up Resistor	40																			
	NMOS Push-Pull	—																			
External Interrupts Pins		9 (NMI, IRQ × 8)																			
Debugging Function	Boundary Scan/JTAG	—																			
	On-Chip Debug	Yes																			
	On-Board Flash Program	—								Yes											
Other Functions	ROM Correction Function	—																			
	Others	—																			
Operating Frequency/Supply Voltage		32MHz/3.0 to 3.6V																			
Operating Ambient Temperature (°C)		–40 to 85		–20 to 75		–40 to 85		–20 to 75		–40 to 85		–20 to 75		–40 to 85		–20 to 75		–40 to 85		–20 to 75	
Package*2		PLQP0120KA-A	PLQP0120LA-A	PLQP0120KA-A	PLQP0120LA-A	PLQP0120KA-A	PLQP0120LA-A	PLQP0120KA-A	PLQP0120LA-A	PLQP0120KA-A	PLQP0120LA-A	PLQP0120KA-A	PLQP0120LA-A	PLQP0120KA-A	PLQP0120LA-A	PLQP0120KA-A	PLQP0120LA-A	PLQP0120KA-A	PLQP0120LA-A	PLQP0120KA-A	PLQP0120LA-A
Part No.		R4S24541DVFAU	R4S24541DVFPV	R4S24541NVFAU	R4S24541NVFPV	R4S24542DVFAU	R4S24542DVFPV	R4S24542NVFAU	R4S24542NVFPV	R4F24545DVFAU	R4F24545DVFPV	R4F24545NVFAU	R4F24545NVFPV	R4F24548DVFAU	R4F24548DVFPV	R4F24548NVFAU	R4F24548NVFPV	R4F24549DVFAU	R4F24549DVFPV	R4F24549NVFAU	R4F24549NVFPV

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8S/2400 Series)

Group		H8S/2456																	
Memory	ROM (Bytes)	—						128K				256K							
	RAM (Bytes)	48K		64K				48K				64K							
	ROM Type*1	L						F											
	Program Security	—						Yes											
CPU	CPU	H8S/2600 Core																	
	Basic Instructions	69																	
	Minimum Instruction Execution Time (ns)	31 (@32MHz)																	
	Multiplier	16 × 16 → 32																	
	Multiply-Accumulate Instruction	16 × 16 + 42 → 42																	
DMA	DMAC (Channels)	4																	
	EXDMAC	2																	
	DTC/DMAC II	DTC																	
External Bus Expansion	Address Space (Bytes)	16M																	
	Bus State Controller	Direct connection to ROM/SRAM/DRAM is supported																	
	Bus Structure	Separate bus (8/16-bit), Multiplex bus																	
	SDRAM Controller	—																	
	DRAM Controller	Yes																	
	Host Interface	—																	
Clock	Clock Generation Circuit	3 circuits (Main clock, PLL, PLL for USB)																	
	PLL	Yes																	
	Subclock	—																	
	RTC	—																	
	Frequency Divider	1/n (n = 1, 2)																	
	Power Save	Clock division/Sleep/Module stop/Full module clocks stop/Software standby/Hardware standby																	
A/D Converter	Resolution × Channels	10-bit × 16 (2 units)																	
	Sample and Hold	Yes																	
D/A Converter	Resolution × Channels	8-bit × 2																	
Timer	8-bit	2 (TMR)																	
	16-bit	12 (TPU)																	
	32-bit	—																	
	Input Capture	12 (shared with TPU)																	
	Output Compare	12 (shared with TPU)																	
	PWM Output	12 (shared with TPU)																	
	Real-Time Port	—																	
	Programmable Pulse Generator	16 (shared with DMAC, DTC, TMR, TPU)																	
	Event Counter	14 (shared with TMR, TPU)																	
	2-Phase Encoder Input	12 (shared with TPU)																	
Watchdog Timer		1																	
Serial Interface	Clock Sync./Clock Async.	5																	
I²C-bus		4																	
IEBus		—																	
Smart Card/SIM		5																	
Synchronous Serial Communication Unit/Special Serial I/O		1 (Multiprocessor communication function)																	
CAN	Channels	—																	
	Message Box (Numbers)	—																	
Ethernet		—																	
USB Function		Yes																	
LPC/ISA		—																	
IrDA		Yes																	
LCD		—																	
CRC Calculation Circuit		—																	
I/O Ports	Input Only (Numbers)	18																	
	CMOS Output Only (Numbers)	—																	
	CMOS I/O (Numbers)	96																	
	High Voltage Port (Numbers)	—																	
	N-Channel Open Drain Port (Numbers)	91																	
	DTMF	—																	
	High Current Drive Port	—																	
	Pull-Up Resistor	40																	
	NMOS Push-Pull	—																	
External Interrupts Pins		17 (NMI, IRQ × 16)																	
Debugging Function	Boundary Scan/JTAG	—																	
	On-Chip Debug	Yes																	
	On-Board Flash Program	—						Yes											
Other Functions	ROM Correction Function	—																	
	Others	—																	
Operating Frequency/Supply Voltage		32MHz/3.0 to 3.6V																	
Operating Ambient Temperature (˚C)		–40 to 85		–20 to 75		–40 to 85		–20 to 75		–40 to 85		–20 to 75		–40 to 85		–20 to 75		–40 to 85		–20 to 75	
Package*2		PLQP0144KA-A	PTLG0145JB-A	PLQP0144KA-A	PTLG0145JB-A	PLQP0144KA-A	PTLG0145JB-A	PLQP0144KA-A	PTLG0145JB-A	PLQP0144KA-A	PTLG0145JB-A	PLQP0144KA-A	PTLG0145JB-A	PLQP0144KA-A	PTLG0145JB-A	PLQP0144KA-A	PTLG0145JB-A	PLQP0144KA-A	PTLG0145JB-A	PLQP0144KA-A	PTLG0145JB-A
Part No.		R4S24561DVFQV	R4S24561DVLPV	R4S24561NVFQV	R4S24561NVLPV	R4S24562DVFQV	R4S24562DVLPV	R4S24562NVFQV	R4S24562NVLPV	R4F24565DVFQV	R4F24565DVLPV	R4F24565NVFQV	R4F24565NVLPV	R4F24568DVFQV	R4F24568DVLPV	R4F24568NVFQV	R4F24568NVLPV	R4F24569DVFQV	R4F24569DVLPV	R4F24569NVFQV	R4F24569NVLPV

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8S/2400 Series)

Group		H8S/2456R																				H8S/2472
Memory	ROM (Bytes)	—								128K				256K								512K
	RAM (Bytes)	48K		64K						48K								64K				40K
	ROM Type*1	L								F												
	Program Security	—								Yes												Yes (H/W Protect, S/W Protect, Error Protect)
CPU	CPU	H8S/2600 Core																				
	Basic Instructions	69																				
	Minimum Instruction Execution Time (ns)	31 (@32MHz)																				29 (@34MHz)
	Multiplier	16 × 16 → 32																				16 × 16 → 32
	Multiply-Accumulate Instruction	16 × 16 + 42 → 42																				16 × 16 + 42 → 42
DMA	DMAC (Channels)	4																				—
	EXDMAC	2																				—
	DTC/DMAC II	DTC																				
External Bus Expansion	Address Space (Bytes)	16M																				
	Bus State Controller	Direct connection to ROM/SRAM/SDRAM/DRAM is supported																				Direct connection to SRAM/ROM is supported
	Bus Structure	Separate bus (8/16-bit), Multiplex bus																				Separate bus (8/16-bit)
	SDRAM Controller	Yes																				—
	DRAM Controller	Yes																				—
	Host Interface	—																				
Clock	Clock Generation Circuit	3 circuits (Main clock, PLL, PLL for USB)																				1 circuit (Main clock)
	PLL	Yes																				Yes (× 4)
	Subclock	—																				Yes
	RTC	—																				
	Frequency Divider	1/n (n = 1, 2)																				1/n (n = 1, 2, 4, 8, 16, 32)
	Power Save	Clock division/Sleep/Module stop/Full module clocks stop/Software standby/Hardware standby																				Normal operating/ Medium-speed/ Sleep/Module stop/ Software standby/ Hardware standby
A/D Converter	Resolution × Channels	10-bit × 16 (2 units)																				10-bit × 8
	Sample and Hold	Yes																				
D/A Converter	Resolution × Channels	8-bit × 2																				—
Timer	8-bit	2 (TMR)																				4 (TMR)
	16-bit	12 (TPU)																				1 (Free run)
	32-bit	—																				
	Input Capture	12 (shared with TPU)																				—
	Output Compare	12 (shared with TPU)																				—
	PWM Output	12 (shared with TPU)																				4 (PWM)
	Real-Time Port	—																				
	Programmable Pulse Generator	16 (shared with DMAC, DTC, TMR, TPU)																				—
	Event Counter	14 (shared with TMR, TPU)																				—
	2-Phase Encoder Input	12 (shared with TPU)																				—
Watchdog Timer		1																				2
Serial Interface	Clock Sync./Clock Async.	5																				3
I²C-bus		4																				6
IEBus		—																				
Smart Card/SIM		5																				2
Synchronous Serial Communication Unit/Special Serial I/O		1 (Multiprocessor communication function)																				1 (SSU)
CAN	Channels	—																				
	Message Box (Numbers)	—																				
Ethernet		—																				1
USB Function		Yes																				
LPC/ISA		—																				Yes (LPC)
IrDA		Yes																				—
LCD		—																				
CRC Calculation Circuit		—																				1 ($X^8 + X^2 + X^1 + 1$, $X^{16} + X^{15} + X^2 + 1$, $X^{16} + X^{12} + X^5 + 1$)
I/O Ports	Input Only (Numbers)	18																				9
	CMOS Output Only (Numbers)	—																				
	CMOS I/O (Numbers)	96																				110
	High Voltage Port (Numbers)	—																				
	N-Channel Open Drain Port (Numbers)	91																				—
	DTMF	—																				
	High Current Drive Port	—																				8
	Pull-Up Resistor	40																				54
	NMOS Push-Pull	—																				12
External Interrupts Pins		17 (NMI, IRQ × 16)																				33
Debugging Function	Boundary Scan/JTAG	—																				Yes
	On-Chip Debug	Yes																				
	On-Board Flash Program	—								Yes												
Other Functions	ROM Correction Function	—																				
	Others	—																				14-bit PWM Timer (× 4) PECI interface
Operating Frequency/Supply Voltage		32MHz/3.0 to 3.6V																				34MHz/3.0 to 3.6V
Operating Ambient Temperature (°C)		–40 to 85		–20 to 75		–40 to 85		–20 to 75		–40 to 85		–20 to 75		–40 to 85		–20 to 75		–40 to 85		–20 to 75		–40 to 85	–20 to 75
Package*2		PLQP0144KA-A	PTLG0145JB-A	PLQP0144KA-A	PTLG0145JB-A	PLQP0144KA-A	PTLG0145JB-A	PLQP0144KA-A	PTLG0145JB-A	PLQP0144KA-A	PTLG0145JB-A	PLQP0144KA-A	PTLG0145JB-A	PLQP0144KA-A	PTLG0145JB-A	PLQP0144KA-A	PTLG0145JB-A	PLQP0144KA-A	PTLG0145JB-A	PLQP0144KA-A	PTLG0145JB-A	PLBG0176GA-A	
Part No.		R4S24561DVRFQV	R4S24561DVRLPV	R4S24561NVRFQV	R4S24561NVRLPV	R4S24562DVRFQV	R4S24562DVRLPV	R4S24562NVRFQV	R4S24562NVRLPV	R4F24565DVRFQV	R4F24565DVRLPV	R4F24565NVRFQV	R4F24565NVRLPV	R4F24568DVRFQV	R4F24568DVRLPV	R4F24568NVRFQV	R4F24568NVRLPV	R4F24569DVRFQV	R4F24569DVRLPV	R4F24569NVRFQV	R4F24569NVRLPV	R4F2472VBR34DV	R4F2472VBR34V

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8S/2200 Series)

Group																											
Group		H8S/2212																									
Memory	ROM (Bytes)	32K										64K															
	RAM (Bytes)	4K						8K																			
	ROM Type*[1]	M						F				M				F											
	Program Security	Yes																									
CPU	CPU	H8S/2000 Core																									
	Basic Instructions	65																									
	Minimum Instruction Execution Time (ns)	42 (@24MHz)																									
	Multiplier	—																									
	Multiply-Accumulate Instruction	—																									
DMA	DMAC (Channels)	4																									
	EXDMAC	—																									
	DTC/DMAC II	—																									
External Bus Expansion	Address Space (Bytes)	16M																									
	Bus State Controller	—																									
	Bus Structure	—																									
	SDRAM Controller	—																									
	DRAM Controller	—																									
	Host Interface	—																									
Clock	Clock Generation Circuit	3 circuits (Main clock, Sub clock, USB clock)																									
	PLL	Yes (USB:× 2, × 3)																									
	Subclock	Yes																									
	RTC	Yes																									
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16, 32)																									
	Power Save	Normal operating/Medium-speed/Sleep/Module stop/Watch/Sub active/Sub sleep/Software standby/Hardware standby																									
A/D Converter	Resolution × Channels	10-bit × 6																									
	Sample and Hold	Yes																									
D/A Converter	Resolution × Channels	—																									
Timer	8-bit	—																									
	16-bit	3 (TPU)																									
	32-bit	—																									
	Input Capture	3 (shared with TPU)																									
	Output Compare	3 (shared with TPU)																									
	PWM Output	3 (shared with TPU)																									
	Real-Time Port	1 (RTC)																									
	Programmable Pulse Generator	—																									
	Event Counter	3 (shared with TPU)																									
	2-Phase Encoder Input	3 (shared with TPU)																									
Watchdog Timer		1																									
Serial Interface	Clock Sync./Clock Async.	2																									
I²C-bus		—																									
IEBus		—																									
Smart Card/SIM		1																									
Synchronous Serial Communication Unit/Special Serial I/O		—																									
CAN	Channels	—																									
	Message Box (Numbers)	—																									
Ethernet		—																									
USB Function		Yes																									
LPC/ISA		—																									
IrDA		—																									
LCD		—																									
CRC Calculation Circuit		—																									
I/O Ports	Input Only (Numbers)	21																									
	CMOS Output Only (Numbers)	3																									
	CMOS I/O (Numbers)	37																									
	High Voltage Port (Numbers)	—																									
	N-Channel Open Drain Port (Numbers)	4																									
	DTMF	—																									
	High Current Drive Port	—																									
	Pull-Up Resistor	11																									
	NMOS Push-Pull	—																									
External Interrupts Pins		7																									
Debugging Function	Boundary Scan/JTAG	—																									
	On-Chip Debug	—						Yes (E10A)				—				Yes (E10A)											
	On-Board Flash Program	—						Yes				—				Yes											
Other Functions	ROM Correction Function	—																									
	Others	SCIO for high-speed UART																									
Operating Frequency/Supply Voltage		24MHz/3.0 to 3.6V				When using USB: 24MHz/3.0 to 3.6V, When not using USB: 24MHz/3.0 to 3.6V, 16MHz/2.7 to 3.6V, 6MHz/2.4 to 3.6V		24MHz/3.0 to 3.6V				When using USB: 24MHz/3.0 to 3.6V, When not using USB: 24MHz/3.0 to 3.6V, 16MHz/2.7 to 3.6V, 6MHz/2.4 to 3.6V				24MHz/3.0 to 3.6V				When using USB: 24MHz/3.0 to 3.6V, When not using USB: 24MHz/3.0 to 3.6V, 16MHz/2.7 to 3.6V		When using USB: 24MHz/3.0 to 3.6V, When not using USB: 24MHz/3.0 to 3.6V, 16MHz/2.7 to 3.6V, 6MHz/2.4 to 3.6V		When using USB: 24MHz/3.0 to 3.6V, When not using USB: 24MHz/3.0 to 3.6V, 16MHz/2.7 to 3.6V		When using USB: 24MHz/3.0 to 3.6V, When not using USB: 24MHz/3.0 to 3.6V, 16MHz/2.7 to 3.6V, 6MHz/2.4 to 3.6V	
Operating Ambient Temperature (°C)		−20 to 75	−40 to 85	−20 to 75	−40 to 85	−20 to 75	−40 to 85	−20 to 75	−40 to 85	−20 to 75	−40 to 85	−20 to 75		−40 to 85		−20 to 75	−40 to 85	−20 to 75	−40 to 85	−20 to 75	−40 to 85	−20 to 75	−40 to 85	−20 to 75	−40 to 85	−20 to 75	−40 to 85
Package*[2]		PLQP0064KC-A		PVQN0064LB-A		PLQP0064KC-A				PVQN0064LB-A		PLQP0064KC-A	PVQN0064LB-A	PLQP0064KC-A	PVQN0064LB-A	PLQP0064KC-A		PVQN0064LB-A		PLQP0064KC-A		PVQN0064LB-A		PLQP0064KC-A		PVQN0064LB-A	
Part No.		HD6432210SXXXFPV	HD6432210SXXXFPWV	HD6432210SXXXNPV	HD6432210SXXXNPWV	HD6432210XXXFP	HD6432210XXXFPW	HD64F2210CUFP24	HD64F2210CUFP24W	HD64F2210CUNP24	HD64F2210CUNP24W	HD6432211XXXFP	HD6432211XXXNP	HD6432211XXXFPW	HD6432211XXXNPW	HD64F2211CUFP24	HD64F2211CUFP24W	HD64F2211CUNP24	HD64F2211CUNP24W	HD64F2211FP24V	HD64F2211FP24WV	HD64F2211NP24V	HD64F2211NP24W	HD64F2211UFP24V	HD64F2211UFP24WV	HD64F2211UNP24	HD64F2211UNP24W

*[1] F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*[2] Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8S/2200 Series)

Group		H8S/2212															
Memory	ROM (Bytes)	128K															
	RAM (Bytes)	12K															
	ROM Type*1	F															
	Program Security	Yes															
CPU	CPU	H8S/2000 Core															
	Basic Instructions	65															
	Minimum Instruction Execution Time (ns)	42 (@24MHz)															
	Multiplier	—															
	Multiply-Accumulate Instruction	—															
DMA	DMAC (Channels)	4															
	EXDMAC	—															
	DTC/DMAC II	—															
External Bus Expansion	Address Space (Bytes)	16M															
	Bus State Controller	—															
	Bus Structure	—															
	SDRAM Controller	—															
	DRAM Controller	—															
	Host Interface	—															
Clock	Clock Generation Circuit	3 circuits (Main clock, Sub clock, USB clock)															
	PLL	Yes (USB: × 2, × 3)															
	Subclock	Yes															
	RTC	Yes															
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16, 32)															
	Power Save	Normal operating/Medium-speed/Sleep/Module stop/Watch/Sub active/Sub sleep/Software standby/Hardware standby															
A/D Converter	Resolution × Channels	10-bit × 6															
	Sample and Hold	Yes															
D/A Converter	Resolution × Channels	—															
Timer	8-bit	—															
	16-bit	3 (TPU)															
	32-bit	—															
	Input Capture	3 (shared with TPU)															
	Output Compare	3 (shared with TPU)															
	PWM Output	3 (shared with TPU)															
	Real-Time Port	1 (RTC)															
	Programmable Pulse Generator	—															
	Event Counter	3 (shared with TPU)															
	2-Phase Encoder Input	3 (shared with TPU)															
Watchdog Timer		1															
Serial Interface	Clock Sync./Clock Async.	2															
I²C-bus		—															
IEBus		—															
Smart Card/SIM		1															
Synchronous Serial Communication Unit/Special Serial I/O		—															
CAN	Channels	—															
	Message Box (Numbers)	—															
Ethernet		—															
USB Function		Yes															
LPC/ISA		—															
IrDA		—															
LCD		—															
CRC Calculation Circuit		—															
I/O Ports	Input Only (Numbers)	21															
	CMOS Output Only (Numbers)	3															
	CMOS I/O (Numbers)	37															
	High Voltage Port (Numbers)	—															
	N-Channel Open Drain Port (Numbers)	4															
	DTMF	—															
	High Current Drive Port	—															
	Pull-Up Resistor	11															
	NMOS Push-Pull	—															
External Interrupts Pins		7															
Debugging Function	Boundary Scan/JTAG	—															
	On-Chip Debug	Yes (E10A)															
	On-Board Flash Program	Yes															
Other Functions	ROM Correction Function	—															
	Others	SCIO for high-speed UART															
Operating Frequency/Supply Voltage		24MHz/3.0 to 3.6V				When using USB: 24MHz/3.0 to 3.6V, When not using USB: 24MHz/3.0 to 3.6V, 16MHz/2.7 to 3.6V			When using USB: 24MHz/3.0 to 3.6V, When not using USB: 24MHz/3.0 to 3.6V, 16MHz/2.7 to 3.6V, 6MHz/2.4 to 3.6V			When using USB: 24MHz/3.0 to 3.6V, When not using USB: 24MHz/3.0 to 3.6V, 16MHz/2.7 to 3.6V			When using USB: 24MHz/3.0 to 3.6V, When not using USB: 24MHz/3.0 to 3.6V, 16MHz/2.7 to 3.6V, 6MHz/2.4 to 3.6V		
Operating Ambient Temperature (°C)		–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85			–20 to 75	–40 to 85			
Package*2		PLQP0064KC-A		PVQN0064LB-A		PLQP0064KC-A			PVQN0064LB-A			PLQP0064KC-A			PVQN0064LB-A		
Part No.		HD64F2212CUFP24W	HD64F2212CUFP24	HD64F2212CUNP24W	HD64F2212CUNP24	HD64F2212FP24WV	HD64F2212FP24V	HD64F2212FP24D	HD64F2212NP24	HD64F2212NP24W	HD64F2212NP24D	HD64F2212UFP24D	HD64F2212UFP24WV	HD64F2212UFP24V	HD64F2212UNP24V	HD64F2212UNP24D	HD64F2212UNP24W

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8S/2200 Series)

Group		H8S/2215															
Memory	ROM (Bytes)	64K		128K		256K											
	RAM (Bytes)	8K		16K													
	ROM Type*1	M				F											
	Program Security	Yes															
CPU	CPU	H8S/2000 Core															
	Basic Instructions	65															
	Minimum Instruction Execution Time (ns)	63 (@16MHz)															
	Multiplier	—															
	Multiply-Accumulate Instruction	—															
DMA	DMAC (Channels)	4															
	EXDMAC	—															
	DTC/DMAC II	DTC															
External Bus Expansion	Address Space (Bytes)	16M															
	Bus State Controller	Direct connection to SRAM/ROM is supported															
	Bus Structure	Separate bus (8/16-bit)															
	SDRAM Controller	—															
	DRAM Controller	—															
	Host Interface	—															
Clock	Clock Generation Circuit	2 circuits (Main clock, USB clock)															
	PLL	Yes (USB: × 3)															
	Subclock	—															
	RTC	—															
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16, 32)															
	Power Save	Normal operating/Medium-speed/Sleep/Module stop/Software standby/Hardware standby															
A/D Converter	Resolution × Channels	10-bit × 6															
	Sample and Hold	Yes															
D/A Converter	Resolution × Channels	8-bit × 2															
Timer	8-bit	2 (TMR)															
	16-bit	3 (TPU)															
	32-bit	—															
	Input Capture	3 (shared with TPU)															
	Output Compare	3 (shared with TPU)															
	PWM Output	3 (shared with TPU)															
	Real-Time Port	—															
	Programmable Pulse Generator	—															
	Event Counter	5 (shared with TMR, TPU)															
	2-Phase Encoder Input	3 (shared with TPU)															
Watchdog Timer		1															
Serial Interface	Clock Sync./Clock Async.	3															
I²C-bus		—															
IEBus		—															
Smart Card/SIM		1															
Synchronous Serial Communication Unit/Special Serial I/O		—															
CAN	Channels	—															
	Message Box (Numbers)	—															
Ethernet		—															
USB Function		Yes															
LPC/ISA		—															
IrDA		—															
LCD		—															
CRC Calculation Circuit		—															
I/O Ports	Input Only (Numbers)	21															
	CMOS Output Only (Numbers)	4															
	CMOS I/O (Numbers)	68															
	High Voltage Port (Numbers)	—															
	N-Channel Open Drain Port (Numbers)	11															
	DTMF	—															
	High Current Drive Port	—															
	Pull-Up Resistor	36															
	NMOS Push-Pull	—															
External Interrupts Pins		8															
Debugging Function	Boundary Scan/JTAG	Yes															
	On-Chip Debug	—															
	On-Board Flash Program	—								Yes							
Other Functions	ROM Correction Function	—															
	Others	SCIO for high-speed UART															
Operating Frequency/Supply Voltage		When using USB: 16MHz/3.0 to 3.6V, When not using USB: 16MHz/2.7 to 3.6V															
Operating Ambient Temperature (˚C)		–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85
Package*2		PLBG0112GA-A		PTQP0120LA-A		PLBG0112GA-A		PTQP0120LA-A		PLBG0112GA-A		PTQP0120LA-A		PLBG0112GA-A		PTQP0120LA-A	
Part No.		HD6432215CXXXBR	HD6432215CXXXBRW	HD6432215CXXXTE	HD6432215CXXXTEW	HD6432215BXXXBR	HD6432215BXXXBRW	HD6432215BXXXTE	HD6432215BXXXTEW	HD64F2215BR16V	HD64F2215BR16WV	HD64F2215TE16V	HD64F2215TE16WV	HD64F2215UBR16V	HD64F2215UBR16WV	HD64F2215UTE16V	HD64F2215UTE16WV

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8S/2200 Series)

Group		H8S/2215																													
Memory	ROM (Bytes)	256K																													
	RAM (Bytes)	20K																													
	ROM Type*1	F																													
	Program Security	Yes																													
CPU	CPU	H8S/2000 Core																													
	Basic Instructions	65																													
	Minimum Instruction Execution Time (ns)	42 (@24MHz)																													
	Multiplier	—																													
	Multiply-Accumulate Instruction	—																													
DMA	DMAC (Channels)	4																													
	EXDMAC	—																													
	DTC/DMAC II	DTC																													
External Bus Expansion	Address Space (Bytes)	16M																													
	Bus State Controller	Direct connection to SRAM/ROM is supported																													
	Bus Structure	Separate bus (8/16-bit)																													
	SDRAM Controller	—																													
	DRAM Controller	—																													
	Host Interface	—																													
Clock	Clock Generation Circuit	2 circuits (Main clock, USB clock)																													
	PLL	Yes (USB: × 2, × 3)																													
	Subclock	—																													
	RTC	—																													
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16, 32)																													
	Power Save	Normal operating/Medium-speed/Sleep/Module stop/Software standby/Hardware standby																													
A/D Converter	Resolution × Channels	10-bit × 6																													
	Sample and Hold	Yes																													
D/A Converter	Resolution × Channels	8-bit × 2																													
Timer	8-bit	2 (TMR)																													
	16-bit	3 (TPU)																													
	32-bit	—																													
	Input Capture	3 (shared with TPU)																													
	Output Compare	3 (shared with TPU)																													
	PWM Output	3 (shared with TPU)																													
	Real-Time Port	—																													
	Programmable Pulse Generator	—																													
	Event Counter	5 (shared with TMR, TPU)																													
	2-Phase Encoder Input	3 (shared with TPU)																													
Watchdog Timer		1																													
Serial Interface	Clock Sync./Clock Async.	3																													
I²C-bus		—																													
IEBus		—																													
Smart Card/SIM		1																													
Synchronous Serial Communication Unit/Special Serial I/O		—																													
CAN	Channels	—																													
	Message Box (Numbers)	—																													
Ethernet		—																													
USB Function		Yes																													
LPC/ISA		—																													
IrDA		—																													
LCD		—																													
CRC Calculation Circuit		—																													
I/O Ports	Input Only (Numbers)	21																													
	CMOS Output Only (Numbers)	4																													
	CMOS I/O (Numbers)	68																													
	High Voltage Port (Numbers)	—																													
	N-Channel Open Drain Port (Numbers)	11																													
	DTMF	—																													
	High Current Drive Port	—																													
	Pull-Up Resistor	36																													
	NMOS Push-Pull	—																													
External Interrupts Pins		8																													
Debugging Function	Boundary Scan/JTAG	Yes																													
	On-Chip Debug	Yes (E10A)																													
	On-Board Flash Program	Yes																													
Other Functions	ROM Correction Function	—																													
	Others	SCIO for high-speed UART																				SCIO for high-speed UART, USB seralock available									
Operating Frequency/Supply Voltage		24MHz/3.0 to 3.6V						When using USB: 24MHz/3.0 to 3.6V, When not using USB: 24MHz/2.7 to 3.6V										24MHz/3.0 to 3.6V									
Operating Ambient Temperature (°C)		–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85
Package*2		PLBG0112GA-A		PTQP0120LA-A		PLBG0112GA-A		PTQP0120LA-A		PLBG0112GA-A		PTQP0120LA-A		PLBG0112GA-A		PTQP0120LA-A		PLBG0112GA-A		PTQP0120LA-A		PLBG0112GA-A		PTQP0120LA-A			
Part No.		HD64F2215CUBR24	HD64F2215CUBR24W	HD64F2215CUTE24	HD64F2215CUTE24W	HD64F2215RBR24D	HD64F2215RBR24V	HD64F2215RBR24WV	HD64F2215RTE24D	HD64F2215RTE24V	HD64F2215RTE24WV	HD64F2215RUBR24D	HD64F2215RUBR24V	HD64F2215RUBR24WV	HD64F2215RUTE24D	HD64F2215RUTE24V	HD64F2215RUTE24WV	HD64F2215TBR24V	HD64F2215TBR24WV	HD64F2215TTE24V	HD64F2215TTE24WV	HD64F2215TUBR24V	HD64F2215TUBR24WV	HD64F2215TUTE24V	HD64F2215TUTE24WV		

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

USB MCUs

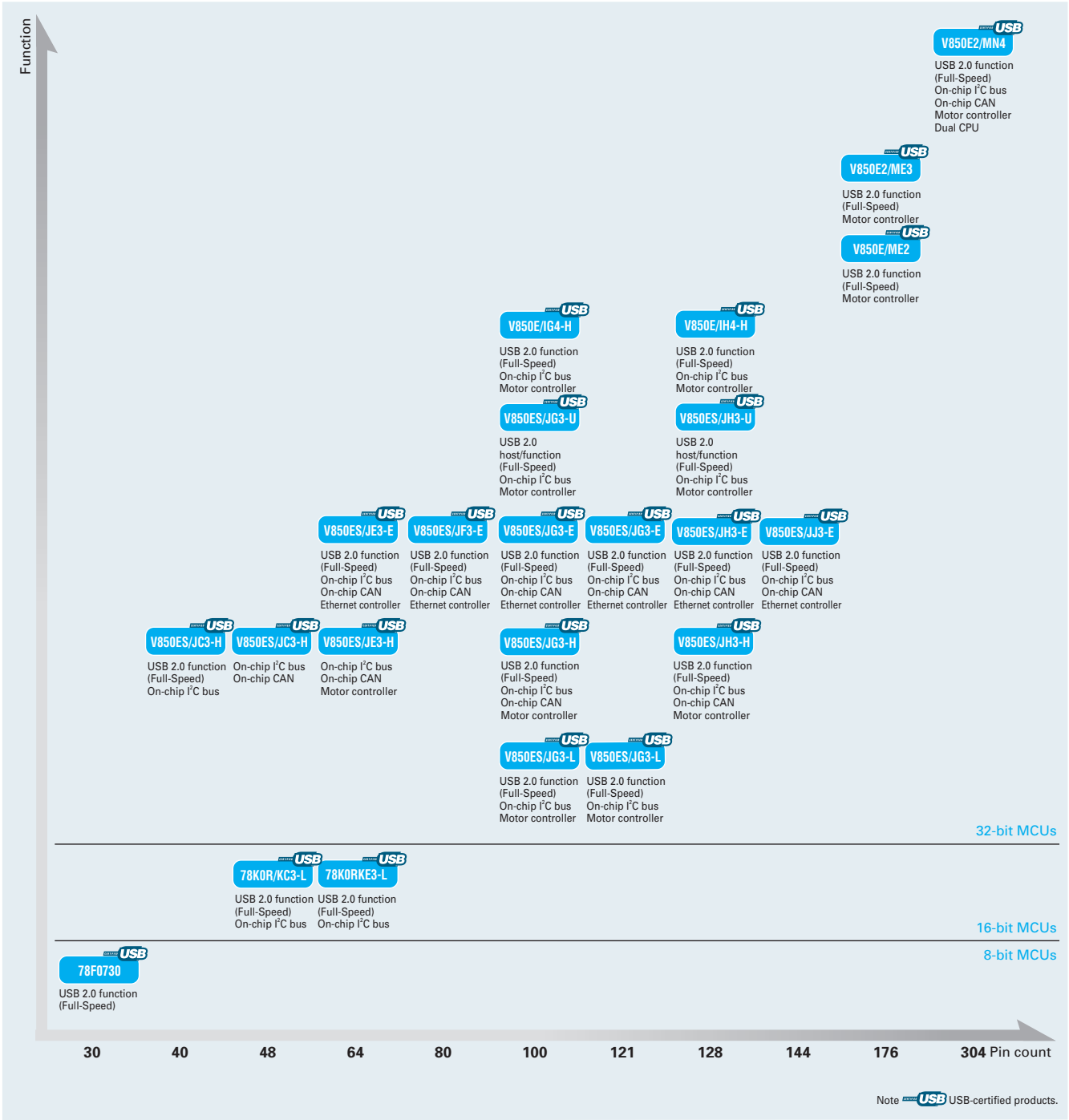
• Specifications (H8S/2200 Series)

Group		H8S/2218																							
Memory	ROM (Bytes)	64K								128K															
	RAM (Bytes)	8K				12K																			
	ROM Type*1	M				F																			
	Program Security	Yes																							
CPU	CPU	H8S/2000 Core																							
	Basic Instructions	65																							
	Minimum Instruction Execution Time (ns)	42 (@24MHz)																							
	Multiplier	—																							
	Multiply-Accumulate Instruction	—																							
DMA	DMAC (Channels)	6																							
	EXDMAC	—																							
	DTC/DMAC II	—																							
External Bus Expansion	Address Space (Bytes)	16M																							
	Bus State Controller	Direct connection to SRAM/ROM is supported																							
	Bus Structure	Separate bus (8/16-bit)																							
	SDRAM Controller	—																							
	DRAM Controller	—																							
	Host Interface	—																							
Clock	Clock Generation Circuit	3 circuits (Main clock, Sub clock, USB clock)																							
	PLL	Yes (USB: × 2, × 3)																							
	Subclock	Yes																							
	RTC	Yes																							
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16, 32)																							
	Power Save	Normal operating/Medium-speed/Sleep/Module stop/Watch/Sub active/Sub sleep/Software standby/Hardware standby																							
A/D Converter	Resolution × Channels	10-bit × 6																							
	Sample and Hold	Yes																							
D/A Converter	Resolution × Channels	—																							
Timer	8-bit	—																							
	16-bit	3 (TPU)																							
	32-bit	—																							
	Input Capture	3 (shared with TPU)																							
	Output Compare	3 (shared with TPU)																							
	PWM Output	3 (shared with TPU)																							
	Real-Time Port	1 (RTC)																							
	Programmable Pulse Generator	—																							
	Event Counter	3 (shared with TPU)																							
	2-Phase Encoder Input	3 (shared with TPU)																							
Watchdog Timer		1																							
Serial Interface	Clock Sync./Clock Async.	2																							
I²C-bus		—																							
IEBus		—																							
Smart Card/SIM		1																							
Synchronous Serial Communication Unit/Special Serial I/O		—																							
CAN	Channels	—																							
	Message Box (Numbers)	—																							
Ethernet		—																							
USB Function		Yes																							
LPC/ISA		—																							
IrDA		—																							
LCD		—																							
CRC Calculation Circuit		—																							
I/O Ports	Input Only (Numbers)	24																							
	CMOS Output Only (Numbers)	4																							
	CMOS I/O (Numbers)	69																							
	High Voltage Port (Numbers)	—																							
	N-Channel Open Drain Port (Numbers)	4																							
	DTMF	—																							
	High Current Drive Port	—																							
	Pull-Up Resistor	36																							
	NMOS Push-Pull	—																							
External Interrupts Pins		7																							
Debugging Function	Boundary Scan/JTAG	—				Yes																			
	On-Chip Debug	—				Yes (E10A)																			
	On-Board Flash Program	—				Yes																			
Other Functions	ROM Correction Function	—																							
	Others	SCIO for high-speed UART																							
Operating Frequency/Supply Voltage		When using USB: 24MHz/3.0 to 3.6V, When not using USB: 24MHz/3.0 to 3.6V, 16MHz/2.7 to 3.6V, 6MHz/2.4 to 3.6V				24MHz/3.0 to 3.6V				When using USB: 24MHz/3.0 to 3.6V, When not using USB: 24MHz/3.0 to 3.6V, 16MHz/2.7 to 3.6V			24MHz/3.0 to 3.6V				When using USB: 24MHz/3.0 to 3.6V, When not using USB: 24MHz/3.0 to 3.6V, 16MHz/2.7 to 3.6V								
Operating Ambient Temperature (°C)		–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85		–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85		–20 to 75	–40 to 85		–20 to 75	–40 to 85		–20 to 75	–40 to 85
Package*2		PLBG0112GA-A		PTQP0100LC-A		PLBG0112GA-A		PTQP0100LC-A		PLBG0112GA-A					PTQP0100LC-A					PLBG0112GA-A			PTQP0100LC-A		
Part No.		HD6432217XXXBR	HD6432217XXXBRW	HD6432217XXXTF	HD6432217XXXTFW	HD64F2217CUBR24	HD64F2217CUBR24W	HD64F2217CUTF24	HD64F2217CUTF24W	HD64F2218BR24D	HD64F2218BR24V	HD64F2218BR24WV	HD64F2218CUBR24	HD64F2218CUBR24W	HD64F2218CUTF24	HD64F2218CUTF24W	HD64F2218TF24D	HD64F2218TF24V	HD64F2218TF24WV	HD64F2218UBR24D	HD64F2218UBR24V	HD64F2218UBR24WV	HD64F2218UTF24D	HD64F2218UTF24V	HD64F2218UTF24WV

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• USB MCU Roadmap (V850, 78K MCUs)



• Lineup

V850 MCUs

With its on-chip USB 2.0 function (Full-Speed) controller, high performance of 98 MIPS, and large-capacity flash memory of up to 512 MB, the V850ES/Jx3-H enables both USB and advanced system control using only a single chip.
The V850ES/Jx3-U with an on-chip USB host (Full-Speed) controller is also available for applications to which a USB flash memory will be connected or to which peripherals will be connected via a USB interface.

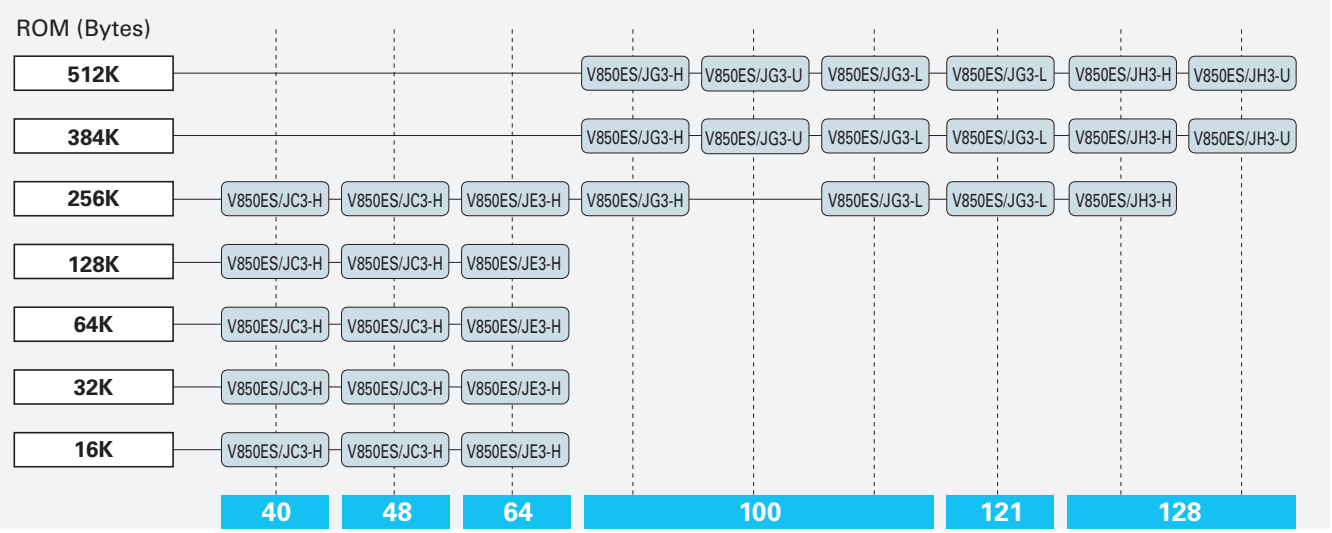
78K0R MCUs

These are 16-bit MCUs that provide a USB 2.0 function (Full-Speed) controller and support a large number of endpoints, allowing them to be used in a wide range of applications. These MCUs have received USB device (function) certification and can be used with confidence to develop USB device systems.

78K0 MCUs

These affordable 8-bit MCUs provide a feature to convert USB data to serial data, enabling your USB application to be connected to a computer at a low cost. The MCUs also provide a sample driver.

• Memory Capacity (V850 MCUs)



• Specifications (V850ES/JC3-H (40 Pins))

Group		μPD70F3809	μPD70F3810	μPD70F3811	μPD70F3812	μPD70F3813
Memory	ROM Size (Bytes)	16K	32K	64K	128K	256K
	ROM Type	Flash				
	Single-Power-Supply Flash Memory	Yes				
	RAM Size (Bytes)	8K	16K	24K	24K	24K
Clock	Maximum Operating Frequency (MHz)	48				
	On-Chip Oscillator (Hz)	220k				
	Subclock (32.768kHz)	Yes				
I/O	I/O Ports	25				
Timer	16-bit Timer	10				
	8-bit Timer	—				
	Other Timers	—				
	Watch Timer	—				
	Real-Time Counter	1				
	Watchdog Timer	1				
	PWM Output	16 bits × 12				
Serial Interface	UART	—				
	UART Supporting LIN-Bus	—				
	UART/CSI	—				
	UART Supporting LIN-Bus/CSI	2				
	UART/I²C	—				
	UART Supporting LIN-Bus/I²C	—				
	UART Supporting LIN-Bus/CSI/I²C	1				
	CSI	1				
	CSI/I²C	—				
	CSI with Automatic Transmission/ Reception Function	—				
	I²C	—				
	IEBus	—				
	CAN	—				
	CAN/IEBus	—				
	UART Supporting LIN-Bus/ I²C/CAN	—				
OCD	On-Chip Debugger	Yes				
Peripheral Functions	LCD (Segments x Commons)	—				
	12-bit A/D Converter	—				
	10-bit A/D Converter	5				
	8-bit D/A Converter	—				
	Other Functions	LVI, CLM, DMA, CRC, USB 2.0 function				
Others	Power Supply Voltage (V)	2.85 to 3.6				
	Package (size: mm)	40-WQFN (6 × 6)				
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-V850MINIL (MINICUBE) QB-V850ESJX3H (IECUBE)				
Package		P40K8-50-4B4				
Part No.		μPD70F3809K8-4B4-AX★★	μPD70F3810K8-4B4-AX★★	μPD70F3811K8-4B4-AX★★	μPD70F3812K8-4B4-AX★★	μPD70F3813K8-4B4-AX★★

Remark LVI: Low-voltage indicator
CLM: Clock monitor

★ : New product ★★ : Under development

• Specifications (V850ES/JC3-H (48 Pins))

Group		μPD70F3814	μPD70F3815	μPD70F3816	μPD70F3817	μPD70F3818	μPD70F3819
Memory	ROM Size (Bytes)	16K	32K	64K	128K	256K	
	ROM Type	Flash					
	Single-Power-Supply Flash Memory	Yes					
	RAM Size (Bytes)	8K	16K	24K	24K	24K	24K
Clock	Maximum Operating Frequency (MHz)	48					
	On-Chip Oscillator (Hz)	220k					
	Subclock (32.768kHz)	Yes					
I/O	I/O Ports	32					
Timer	16-bit Timer	10					
	8-bit Timer	—					
	Other Timers	—					
	Watch Timer	—					
	Real-Time Counter	1					
	Watchdog Timer	1					
	PWM Output	16 bits × 12					
Serial Interface	UART	—					
	UART Supporting LIN-Bus	—					
	UART/CSI	—					
	UART Supporting LIN-Bus/CSI	2					
	UART/I²C	—					
	UART Supporting LIN-Bus/I²C	1					—
	UART Supporting LIN-Bus/CSI/I²C	1					
	CSI	1					
	CSI/I²C	—					
	CSI with Automatic Transmission/ Reception Function	—					
	I²C	—					
	IEBus	—					
	CAN	—					
	CAN/IEBus	—					
	UART Supporting LIN-Bus/ I²C/CAN	—					1
OCD	On-Chip Debugger	Yes					
Peripheral Functions	LCD (Segments x Commons)	—					
	12-bit A/D Converter	—					
	10-bit A/D Converter	6					
	8-bit D/A Converter	1					
	Other Functions	LVI, CLM, DMA, CRC, USB 2.0 function					
Others	Power Supply Voltage (V)	2.85 to 3.6					
	Package (size: mm)	48-LQFP (7 × 7) 48-WQFN (7 × 7)					
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-V850MINIL (MINICUBE) QB-V850ESJX3H (IECUBE)					
Package		P48GA-50-GAM P48K8-50-5B4-1					
Part No.		μPD70F3814GA-GAM-AX** μPD70F3814K8-5B4-AX**	μPD70F3815GA-GAM-AX** μPD70F3815K8-5B4-AX**	μPD70F3816GA-GAM-AX** μPD70F3816K8-5B4-AX**	μPD70F3817GA-GAM-AX** μPD70F3817K8-5B4-AX**	μPD70F3818GA-GAM-AX** μPD70F3818K8-5B4-AX**	μPD70F3819GA-GAM-AX** μPD70F3819K8-5B4-AX**

Remark LVI: Low-voltage indicator
CLM: Clock monitor

★ : New product ★★ : Under development

• Specifications (V850ES/JE3-H)

Group		μPD70F3820	μPD70F3821	μPD70F3822	μPD70F3823	μPD70F3824	μPD70F3825
Memory	ROM Size (Bytes)	16K	32K	64K	128K	256K	
	ROM Type	Flash					
	Single-Power-Supply Flash Memory	Yes					
	RAM Size (Bytes)	8K	16K	24K	24K	24K	24K
Clock	Maximum Operating Frequency (MHz)	48					
	On-Chip Oscillator (Hz)	220k					
	Subclock (32.768kHz)	Yes					
I/O	I/O Ports	45					
Timer	16-bit Timer	10					
	8-bit Timer	—					
	Other Timers	—					
	Watch Timer	—					
	Real-Time Counter	1					
	Watchdog Timer	1					
	PWM Output	16 bits × 12 (6 phases, 16 bits × 1)					
Serial Interface	UART	—					
	UART Supporting LIN-Bus	—					
	UART/CSI	—					
	UART Supporting LIN-Bus/CSI	2					
	UART/I²C	—					
	UART Supporting LIN-Bus/I²C	1					—
	UART Supporting LIN-Bus/CSI/I²C	1					
	CSI	1					
	CSI/I²C	—					
	CSI with Automatic Transmission/ Reception Function	—					
	I²C	—					
	IEBus	—					
	CAN	—					
	CAN/IEBus	—					
	UART Supporting LIN-Bus/ I²C/CAN	—					1
OCD	On-Chip Debugger	Yes					
Peripheral Functions	LCD (Segments x Commons)	—					
	12-bit A/D Converter	—					
	10-bit A/D Converter	10					
	8-bit D/A Converter	1					
	Other Functions	LVI, CLM, DMA, CRC, USB 2.0 function					
Others	Power Supply Voltage (V)	2.85 to 3.6					
	Package (size: mm)	64-LQFP (10 × 10) 64-WQFN (9 × 9)				64-LQFP (10 × 10) 64-WQFN (9 × 9) 64-FBGA (6 × 6)	64-LQFP (10 × 10) 64-WQFN (9 × 9)
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-V850MINIL (MINICUBE) QB-V850ESJX3H (IECUBE)					
Package		P64GB-50-GAH P64K8-50-6B4				P64GB-50-GAH P64K8-50-6B4 P64F1-50-BA3	P64GB-50-GAH P64K8-50-6B4
Part No.		μPD70F3820GB-GAH-AX** μPD70F3820K8-6B4-AX**	μPD70F3821GB-GAH-AX** μPD70F3821K8-6B4-AX**	μPD70F3822GB-GAH-AX** μPD70F3822K8-6B4-AX**	μPD70F3823GB-GAH-AX** μPD70F3823K8-6B4-AX**	μPD70F3824GB-GAH-AX** μPD70F3824K8-6B4-AX** μPD70F3824F1-BA3-AX**	μPD70F3825GB-GAH-AX** μPD70F3825K8-6B4-AX**

Remark LVI: Low-voltage indicator
CLM: Clock monitor

★ : New product ★★ : Under development

• Specifications (V850ES/JG3-H, V850ES/JG3-U)

Group		V850ES/JG3-H				V850ES/JG3-U	
		μPD70F3760	μPD70F3761	μPD70F3762	μPD70F3770	μPD70F3763	μPD70F3764
Memory	ROM Size (Bytes)	256K	384K	512K	256K	384K	512K
	ROM Type	Flash					
	Single-Power-Supply Flash Memory	Yes					
	RAM Size (Bytes)	40K[Note]	48K[Note]	56K[Note]	40K[Note]	48K[Note]	56K[Note]
Clock	Maximum Operating Frequency (MHz)	48					
	On-Chip Oscillator (Hz)	220k					
	Subclock (32.768kHz)	Yes					
I/O	I/O Ports	77				75	
Bus	External Data/Address Bus	16/16					
Timer	16-bit Timer	13					
	8-bit Timer	—					
	Other Timers	Real-Time Counter					
	Watch Timer	—					
	Watchdog Timer	1					
	PWM Output	16 bits × 12 (6 phases, 16 bits × 1)					
Serial Interface	UART	—					
	UART Supporting LIN-Bus	—					
	UART/CSI	—					
	UART Supporting LIN-Bus/CSI	2					
	UART/I²C	—					
	UART Supporting LIN-Bus/I²C	2			1	2	
	UART Supporting LIN-Bus/CSI/I²C	1					
	CSI	2					
	CSI/I²C	—					
	CSI with Automatic Transmission/ Reception Function	—					
	I²C	—					
	IEBus	—					
	CAN	—					
	CAN/IEBus	—					
	UART Supporting LIN-Bus/ I²C/CAN	—			1	—	
OCD	On-Chip Debugger	Yes					
Peripheral Functions	LCD (Segments x Commons)	—					
	12-bit A/D Converter	—					
	10-bit A/D Converter	12					
	8-bit D/A Converter	2					
	Other Functions	LVI, CLM, DMA, CRC, USB 2.0 function				LVI, CLM, DMA, CRC, USB 2.0 host/function	
Others	Power Supply Voltage (V)	2.85 to 3.6					
	Package (size: mm)	100-LQFP (14 × 14)					
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-V850MINIL (MINICUBE) QB-V850ESJX3H (IECUBE)					
Package		P100GC-50-UEU-1					
Part No.		μPD70F3760GC-UEU-AX	μPD70F3761GC-UEU-AX	μPD70F3762GC-UEU-AX	μPD70F3770GC-UEU-AX	μPD70F3763GC-UEU-AX	μPD70F3764GC-UEU-AX

Note Contains an 8 KB area for data-use only.
Remark LVI: Low-voltage indicator
CLM: Clock monitor

★ : New product ★★ : Under development

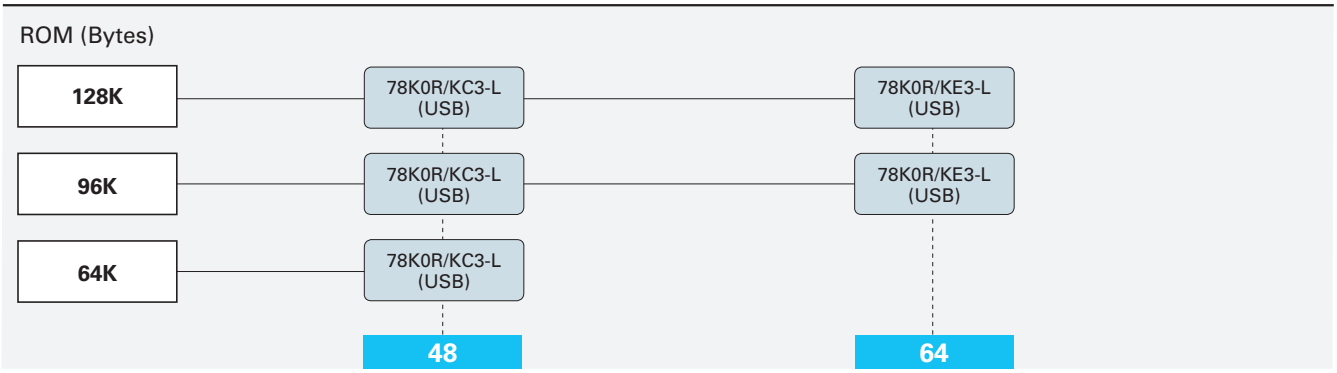
• Specifications (V850ES/JH3-H, V850ES/JH3-U)

Group		V850ES/JH3-H				V850ES/JH3-U	
		μPD70F3765	μPD70F3766	μPD70F3767	μPD70F3771	μPD70F3768	μPD70F3769
Memory	ROM Size (Bytes)	256K	384K	512K	256K	384K	512K
	ROM Type	Flash					
	Single-Power-Supply Flash Memory	Yes					
	RAM Size (Bytes)	40K[Note]	48K[Note]	56K[Note]	40K[Note]	48K[Note]	56K[Note]
Clock	Maximum Operating Frequency (MHz)	48					
	On-Chip Oscillator (Hz)	220k					
	Subclock (32.768kHz)	Yes					
I/O	I/O Ports	96					
Bus	External Data/Address Bus	16/24					
Timer	16-bit Timer	13					
	8-bit Timer	—					
	Other Timers	Real-Time Counter					
	Watch Timer	—					
	Watchdog Timer	1					
	PWM Output	16 bits × 12 (6 phases, 16 bits × 1)					
Serial Interface	UART	—					
	UART Supporting LIN-Bus	—					
	UART/CSI	—					
	UART Supporting LIN-Bus/CSI	2					
	UART/I²C	—					
	UART Supporting LIN-Bus/I²C	2			1	2	
	UART Supporting LIN-Bus/CSI/I²C	1					
	CSI	2					
	CSI/I²C	—					
	CSI with Automatic Transmission/ Reception Function	—					
	I²C	—					
	IEBus	—					
	CAN	—					
	CAN/IEBus	—					
	UART Supporting LIN-Bus/ I²C/CAN	—			1	—	
OCD	On-Chip Debugger	Yes					
Peripheral Functions	LCD (Segments x Commons)	—					
	12-bit A/D Converter	—					
	10-bit A/D Converter	12					
	8-bit D/A Converter	2					
	Other Functions	LVI, CLM, DMA, CRC, USB 2.0 function				LVI, CLM, DMA, CRC, USB 2.0 host/function	
Others	Power Supply Voltage (V)	2.85 to 3.6					
	Package (size: mm)	128-LQFP (14 × 20)					
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-V850MINIL (MINICUBE) QB-V850ESJX3H (IECUBE)					
Package		P128GF-50-GAT					
Part No.		μPD70F3765GF-GAT-AX	μPD70F3766GF-GAT-AX	μPD70F3767GF-GAT-AX	μPD70F3771GF-GAT-AX	μPD70F3768GF-GAT-AX	μPD70F3769GF-GAT-AX

Note Contains an 8 KB area for data-use only.
Remark LVI: Low-voltage indicator
CLM: Clock monitor

★ : New product ★★ : Under development

• Memory Capacity (78K0R MCUs)



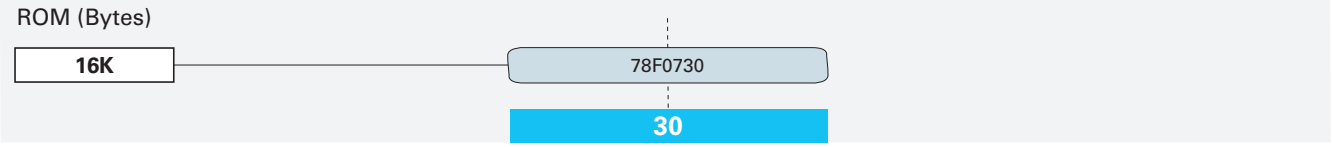
• Specifications (78K0R/KC3-L, 78K0R/KE3-L (with On-Chip USB controller))

Group		78K0R/KC3-L			78K0R/KE3-L	
		μPD78F1022	μPD78F1023	μPD78F1024	μPD78F1025	μPD78F1026
Memory	ROM Size (Bytes)	64K	96K	128K	96K	128K
	ROM Type	Flash				
	Single-Power-Supply Flash Memory	Yes				
	RAM Size (Bytes)	6K	8K			
Clock	Maximum Operating Frequency (MHz)	20				
	On-Chip Oscillator (Hz)	20M, 8M, 1M, 30k				
	Subclock (32.768kHz)	Yes				
I/O	I/O Ports	39			53	
Bus	External Data/Address Bus	—/—				
Timer	16-bit Timer	8				
	Real-Time Counter	1				
	Watchdog Timer	1				
	PWM Output	PWM: 16 bits × 2, multiplexed PWM: 16 bits × 3			PWM: 16 bits × 2, multiplexed PWM: 16 bits × 4	
Serial Interface	CSI/UART	1				
	CSI: 2ch/UART: 1ch	—				
	CSI/UART/Simplified I²C	1			2	
	CSI: 2ch/UART: 1ch/Simplified I²C: 2ch	—				
	CSI: 2ch/UART Supporting LIN-bus: 1ch	—				
	UART Supporting LIN-Bus	1				
	I²C	1				
OCD	On-Chip Debugger	Yes				
Peripheral Functions	10-bit A/D Converter	8				
	8-bit D/A Converter	—				
	Multiplier/Divider (bits × bits, bits ÷ bits)	16 × 16, 32 ÷ 32				
	Other Functions	USB function controller, POC, LVI, DMA				
Others	Power Supply Voltage (V)	3.0 to 3.6 V (1.8 to 3.6 V when USB not used)				
	Package (size: mm)	48-TQFP (7 × 7) 48-WQFN (7 × 7)			64-TQFP (7 × 7) 64-LQFP (10 × 10) 64-FBGA (5 × 5)	
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2)				
Package		P48GA-50-HAA P48K8-50-5B4-2			P64GA-40-HAB P64GB-50-GAH P64F1-50-AN9	
Part No.		μPD78F1022GA-HAA-AX μPD78F1022K8-5B4-AX	μPD78F1023GA-HAA-AX μPD78F1023K8-5B4-AX	μPD78F1024GA-HAA-AX μPD78F1024K8-5B4-AX	μPD78F1025GB-GAH-AX μPD78F1025GA-HAB-AX μPD78F1025F1-AN9-A	μPD78F1026GB-GAH-AX μPD78F1026GA-HAB-AX μPD78F1026F1-AN9-A

Remark POC: Power-on clear
LVI: Low-voltage indicator

★ : New product ★★ : Under development

• Memory Capacity (78K0 MCUs)



• Specifications (μPD78F0730)

Group		μPD78F0730
Memory	ROM Size (Bytes)	16K
	ROM Type	Flash
	Single-Power-Supply Flash Memory	Yes
	RAM Size (Bytes)	3K
Clock	Maximum Operating Frequency (MHz)	16
	On-Chip Oscillator (Hz)	16M, 6M, 240k
	Subclock (32.768kHz)	—
I/O	I/O Ports	20
Bus	External Data/Address Bus	—/—
Timer	16-bit Timer	1
	8-bit Timer	3
	Other Timers	—
	Watch Timer	—
	Real-Time Counter	—
	Watchdog Timer	1
	PWM Output	8 bits × 4
Serial Interface	UART	1
	UART Supporting LIN-Bus	—
	UART/CSI	—
	UART Supporting LIN-Bus/CSI	—
	CSI	1
	CSI/I²C	—
	CSI with Automatic Transmission/ Reception Function	—
	I²C	—
	IEBus	—
	CAN	—
OCD	On-Chip Debugger	Yes
Peripheral Functions	LCD (Segments x Commons)	—
	16 -bit ΔΣ A/D Converter	—
	10-bit A/D Converter	—
	8-bit A/D Converter	—
	8-bit D/A Converter	—
	Multiplier/Divider (bits x bits, bits ÷ bits)	—
	Other Functions	USB, POC, LVI
Others	Power Supply Voltage (V)	4.0 to 5.5
	Package (size: mm)	30-SSOP (7.62)
	In-Circuit Emulator Emulation Board	QB-780731 (IECUBE)
Package		P30MC-65-CAB
Part No.		μPD78F0730MC-CAB-AX

Remark POC: Power-on clear
LVI: Low-voltage indicator

★ : New product ★★ : Under development

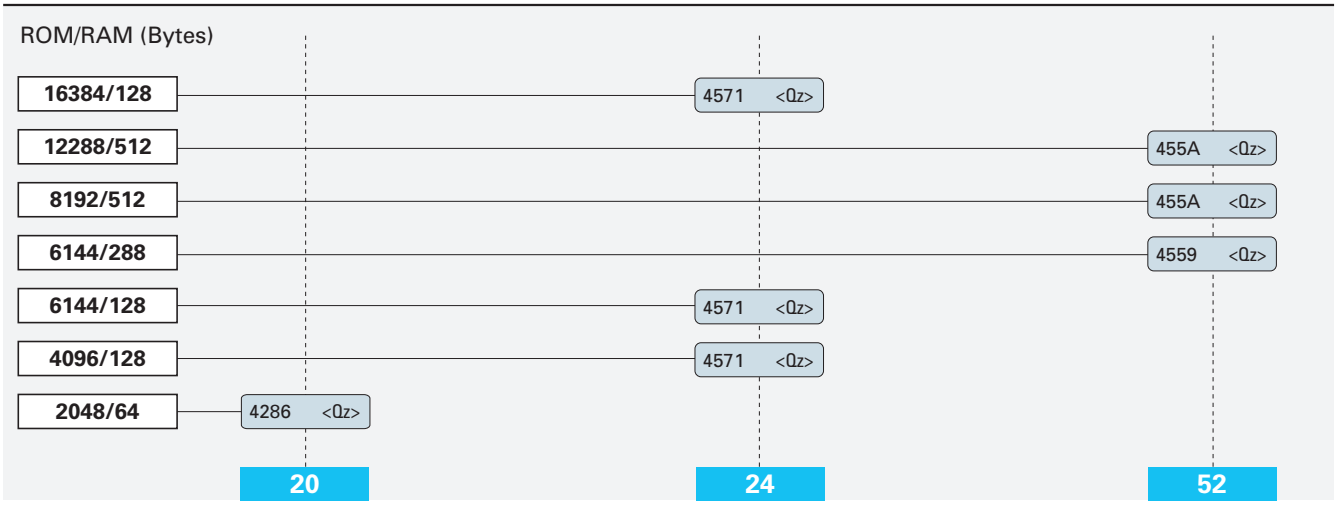
Remote Control MCUs

The 4-bit MCUs listed here are designed for use in remote control transmitters. They provide support for transfer code output using different configurations, multiple types of custom code output, and user-defined multiple-key input.

• Remote Control MCUs Roadmap

LCD	4559 — QzROM version, 52-pin version 455A — Large-capacity ROM, Reinforced I/O
Preset	4571 — Low-pin count version, QzROM version 179F12x / 179F11x — Large-capacity RAM, 8-bit MCU version, Flash memory
Single-function	4286 — High-speed operation, Wide range of operating ambient temperature

• Memory Capacity (ROM/RAM) (720/4500 Series)



Letters in brackets < > indicate memory variations.
F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

• Specifications (720/4500 Series)

Group		4286	4571			
Memory	ROM (Word × 10-bit)	2048	4096	6144		16384
	RAM (Word × 4-bit)	64	128			
	ROM Type*1	Qz				
	Program Security	Yes				
CPU	Basic Instructions	72	126			128
	Minimum Instruction Execution Time (ns)	2000 (@4MHz)	500 (@6MHz)			
Clock	Clock Generation Circuit	1 circuit (Ceramic resonator)				
	Subclock	—				
	On-Chip Oscillator	—				
	Frequency Divider	1/n (n = 1, 2, 4, 8)				
	Power Save	RAM backup				
Power Supply Voltage Detection	Power-On Reset/POR	Yes				
	Low Voltage Detection/LVD	Yes				
A/D Converter	Resolution × Channels	—				
Timer	8-bit	2 (Timer 1, Timer 2)	3 (Timer 1, Timer 2, Timer 3)			
	10-bit	—				
	16-bit	—				
	PWM Output	—	1 (shared with Timer 3)			
	Event Counter	—	1 (shared with Timer 1)			
Watchdog Timer		1				
LCD		—				
I/O Ports	Input Only (Numbers)	1				
	CMOS Output Only (Numbers)	1				
	CMOS I/O (Numbers)	—	6			
	N-Channel Open Drain Port (Numbers)	14 (P-Channel Open Drain Port)	17			
	High Current Drive Port	—				
	Pull-Up Resistor	—	10			
External Interrupts Pins		—	2			
Other Functions	Others	Carrier Wave Generation				
Operating Frequency/Supply Voltage		1.8 to 3.6V	1.8 to 5.5V			
Operating Ambient Temperature (˚C)		–40 to 85	–20 to 85			
Package*2		PLSP0020JB-A	PRSP0024GA-A			
Part No.		M34286G2-XXXGP	M34286G2GP	M34571G4-XXXFP	M34571G4FP	M34571G6-XXXFP	M34571G6FP	M34571GD-XXXFP	M34571GDFP

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

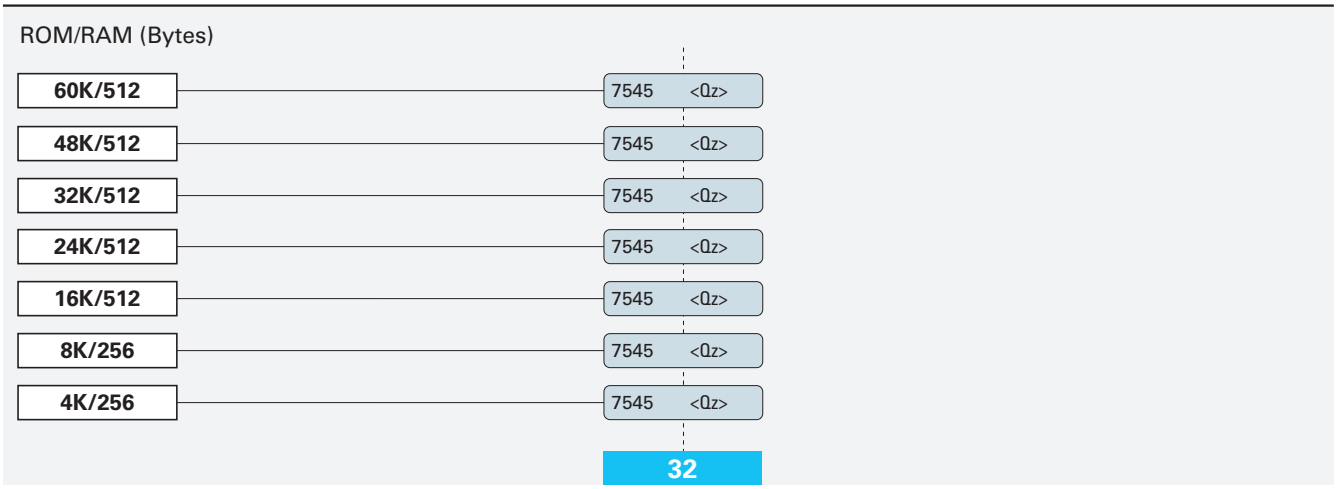
• Specifications (On-chip LCD: 4500 Series)

Group		4559	455A	
Memory	ROM (Word × 10-bit)	6144	8192	12288
	RAM (Word × 4-bit)	288	512	
	ROM Type*1	Qz		
	Program Security	Yes		
CPU	Basic Instructions	135	138	
	Minimum Instruction Execution Time (ns)	500 (@6MHz)		
Clock	Clock Generation Circuit	3 circuits (Ceramic resonator/On-chip oscillator, Sub clock)		
	Subclock	Yes		
	On-Chip Oscillator	Yes	Yes (2 circuits)	
	Frequency Divider	1/n (n = 1, 2, 4, 8)		
	Power Save	Clock operation/RAM backup		
Power Supply Voltage Detection	Power-On Reset/POR	Yes		
	Low Voltage Detection/LVD	Yes		
A/D Converter	Resolution × Channels	—		
Timer	8-bit	2 (Timer 1, Timer 2)		
	10-bit	—		
	16-bit	1 (Timer 3)		
	PWM Output	1 (shared with Timer 2)		
	Event Counter	1 (shared with Timer 1)		
Watchdog Timer		1		
LCD		32seg × 4com		
I/O Ports	Input Only (Numbers)	—		
	CMOS Output Only (Numbers)	1		
	CMOS I/O (Numbers)	22		
	N-Channel Open Drain Port (Numbers)	24		
	High Current Drive Port	8		
	Pull-Up Resistor	16	24	
External Interrupts Pins		1		
Other Functions	Others	Carrier Wave Generation		
Operating Frequency/Supply Voltage		1.8 to 5.5V		
Operating Ambient Temperature (˚C)		–20 to 85		
Package*2		PLQP0052JA-A		
Part No.		M34559G6FP / M34559G6-XXXFP	M3455AG8FP / M3455AG8-XXXFP	M3455AGCFP / M3455AGC-XXXFP

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Memory Capacity (ROM/RAM) (740 Series)



Letters in brackets < > indicate memory variations.
F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

• Specifications (General-Purpose Type (Low-Pin-Count Package): 740 Series)

Series		740						
Group		7545						
Memory	ROM (Bytes)	4K	8K	16K	24K	32K	48K	60K
	RAM (Bytes)	256		512				
	ROM Type*1	Qz						
	Data Flash/E2 Data Flash	—						
	Program Security	Yes (ROM code protect function)						
CPU	CPU	740 Core						
	Basic Instructions	71						
	Minimum Instruction Execution Time (ns)	2000 (@4MHz)						
DMA	DMAC (Channels)	—						
External Bus Expansion	Host Interface	—						
Clock	Clock Generation Circuit	1 circuit						
	PLL	—						
	Subclock	—						
	On-Chip Oscillator	—						
	Oscillation Stop Detection	—						
	Frequency Divider	1/n (n = 4)						
	Power Save	Wait/Stop						
Power Supply Voltage Detection	Power-On Reset/POR	Yes						
	Low Voltage Detection/LVD	Yes						
A/D Converter	Resolution × Channels	—						
D/A Converter	Resolution × Channels	—						
Timer	8-bit	3 (Timer 1, Timer 2, Timer 3)						
	16-bit	—						
	Input Capture	—						
	Output Compare	—						
	PWM Output	—						
	Real-Time Port	—						
	Event Counter	—						
Watchdog Timer		1						
Serial Interface	Clock Sync./Clock Async.	—						
	Clock Sync. Only	—						
	Clock Async. Only	—						
I²C-bus		—						
USB Function		—						
LPC/ISA		—						
LCD		—						
I/O Ports	Input Only (Numbers)	—						
	CMOS Output Only (Numbers)	—						
	CMOS I/O (Numbers)	25						
	High Voltage Port (Numbers)	—						
	N-Channel Open Drain Port (Numbers)	16						
	DTMF	—						
	High Current Drive Port	8						
	Pull-Up Resistor	8						
External Interrupts Pins		10 (INT × 2, Key Input × 8)						
Debugging Function	On-Board Flash Program	—						
Other Functions	ROM Correction Function	—						
	Others	Carrier Wave Generation Circuit						
Operating Frequency/Supply Voltage		1.8 to 3.6V						
Operating Ambient Temperature (°C)		–20 to 85						
Package*2		32-pin SSOP		PLQP0032GB-A	32-pin SSOP	PLQP0032GB-A	32-pin SSOP	PLQP0032GB-A	32-pin SSOP	PLQP0032GB-A	PLQP0032GB-A	PLQP0032GB-A
Part No.		M37545G1KP*	M37545G2KP*	M37545G4GP	M37545G4KP*	M37545G4-XXXGP	M37545GGGP	M37545G6KP*	M37545G6-XXXGP	M37545G8GP	M37545G8KP*	M37545G8-XXXGP	M37545GCGP*	M37545GC-XXXGP*	M37545GFGP*	M37545GF-XXXGP*

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Memory Capacity (179K MCUs)



• Specifications (μPD179F11x, μPD179F12x)

Group		μPD179F11x					μPD179F12x		
		μPD179F110	μPD179F111	μPD179F112	μPD179F113	μPD179F114	μPD179F122	μPD179F123	μPD179F124
Memory	ROM Size (Bytes)	4K	8K	16K	24K	32K	16K	24K	32K
	ROM Type	Flash							
	Single-Power-Supply Flash Memory	Yes							
	RAM Size (Bytes)	512		768	1K		768	1K	
Clock	Maximum Operating Frequency (MHz)	4							
	On-Chip Oscillator (Hz)	4M, 240k							
	Subclock (32.768kHz)	—							
I/O	I/O Ports	26					34		
Bus	External Data/Address Bus	—/—							
Timer	16-bit Timer	1							
	8-bit Timer	4							
	Other Timers	—							
	Watch Timer	—							
	Real-Time Counter	—							
	Watchdog Timer	1							
	PWM Output	16 bits × 1 8 bits × 4							
Serial Interface	UART	1							
	UART Supporting LIN-bus	—							
	UART, CSI	—							
	UART Supporting LIN-bus, CSI	—							
	CSI	—							
	CSI, I²C	—							
	CSI with Automatic Transmission/Reception Function	—							
	I²C	—							
	IEBus	—							
	CAN	—							
OCD	On-Chip Debugger	Yes							
Peripheral Functions	LCD (Segments x Commons)	—							
	16-bit ΔΣ A/D Converter	—							
	10-bit A/D Converter	—							
	8-bit A/D Converter	—							
	8-bit D/A Converter	—							
	Multiplier/Divider (bits x bits, bits ÷ bits)	—							
	Other Functions	POC, LVI, remote control signal output							
Others	Power Supply Voltage (VDD)	1.8 to 3.6							
	Package (size: mm)	30-SSOP (7.62)					38-SSOP (7.62)		
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-179F124 (IECUBE)							
Package		P30MC-65-CAB					P38MC-65-GAA		
Part No.		μPD179F110MC-CAB-AX	μPD179F111MC-CAB-AX	μPD179F112MC-CAB-AX	μPD179F113MC-CAB-AX	μPD179F114MC-CAB-AX	μPD179F122MC-GAA-AX	μPD179F123MC-GAA-AX	μPD179F124MC-GAA-AX

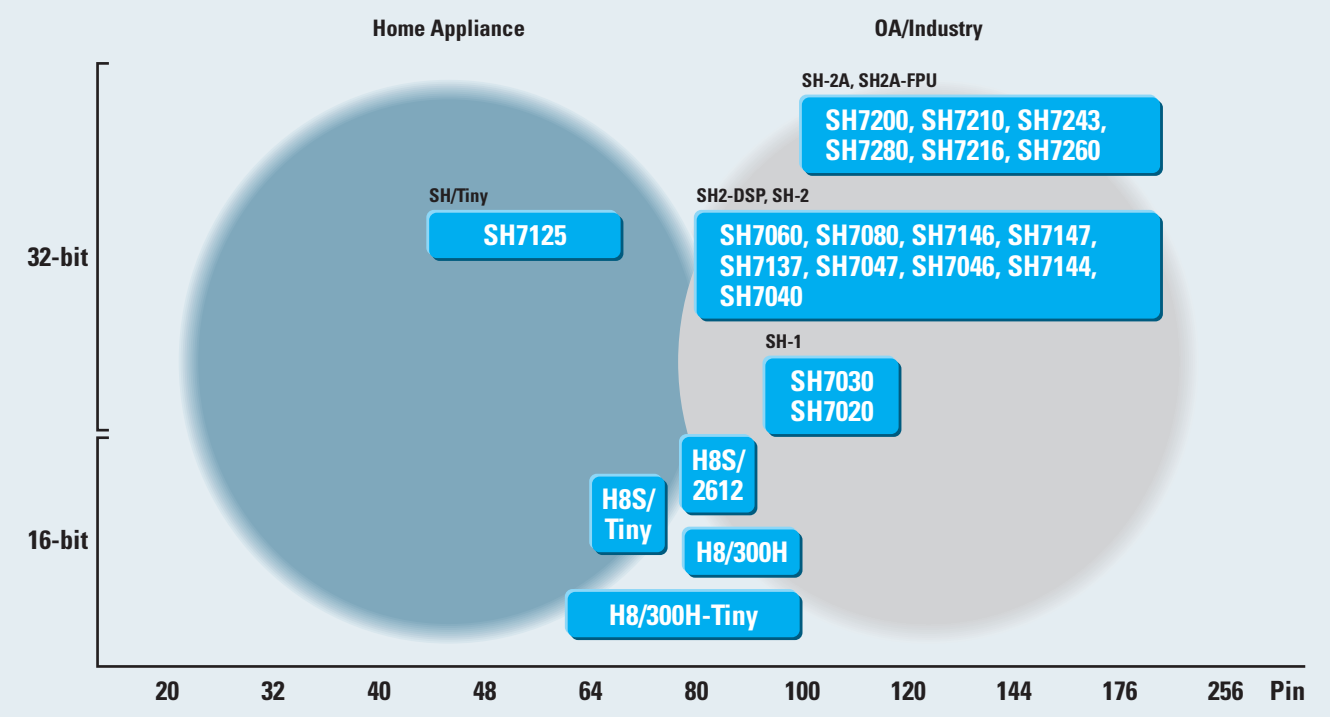
Remark POC: Power-on clear
LVI: Low-voltage indicator

★ : New product ★★ : Under development

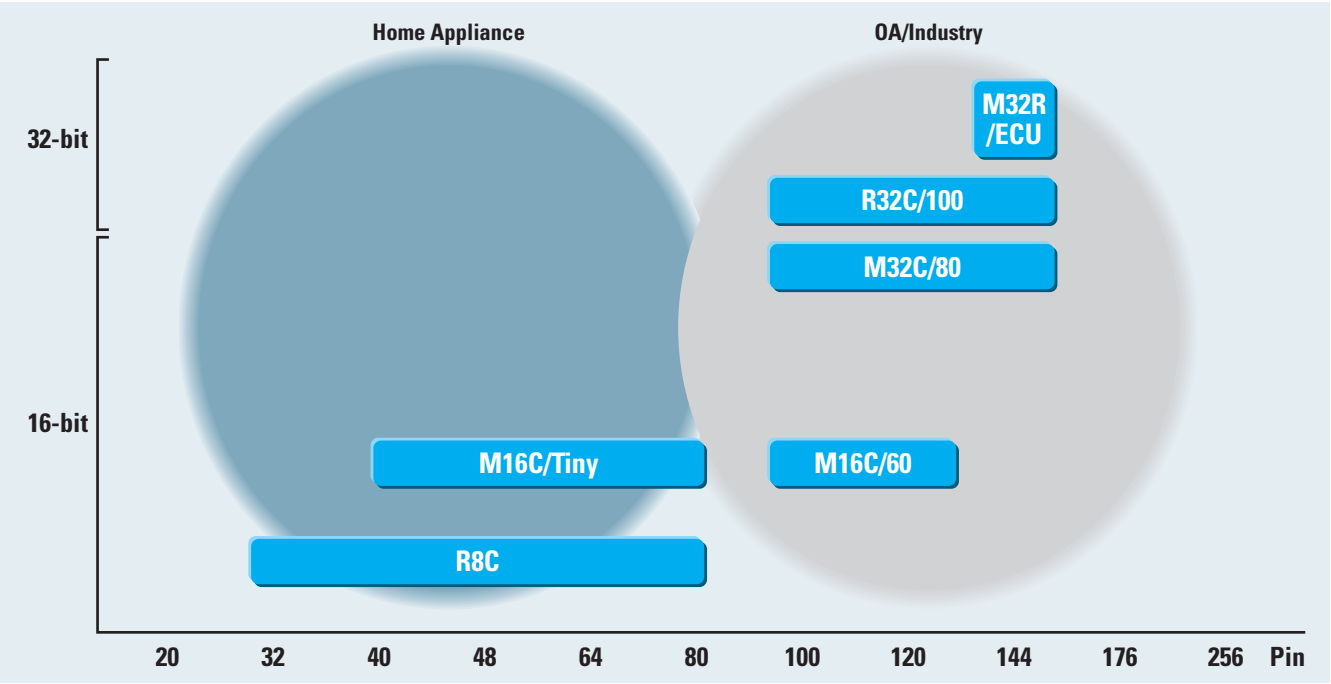
Inverter Controller MCUs

Electric motors power diverse products in industry (factory equipment, servo, etc.), office equipment (printers, scanners, etc.), and consumer goods (white goods, etc.). Efforts to conserve energy and meet tougher environmental regulations are boosting demand for inverter control systems. The MCUs listed on this page incorporate either one or two timers capable of producing three-phase PWM waveforms with no overlap between positive and negative-phases. This makes it easy to design products incorporating inverter control. These MPUs and MCUs are suitable for a broad range of motor control applications.

• Lineup of SuperH and H8 families for three-phase inverter control



• Lineup of M32R, M16C and R8C families for three-phase inverter control



• Lineup

Family	Series	Group	Page
SuperH	SH7216	SH7216	597, 596, 595, 38, 39, 40
	SH7200	SH7206	26
		SH7205	27, 590
		SH7203	27, 590
		SH7201	26
	SH7210	SH7211	43
	SH7280	SH7286	43, 598
		SH7285	43, 598
	SH7243	SH7243	44
	SH7239	SH7239*	41
		SH7237*	41
	SH7080	SH7086	47
		SH7085	47
		SH7084	47
		SH7083	46
	SH7060	SH7065	51
	SH7260	SH7267	29, 592
		SH7266	29, 592
		SH7265	28, 591
		SH7264	31, 594
		SH7262	30, 593
		SH7261	32
	SH7125	SH7125	50
		SH7124	49
	SH7144	SH7145	51
		SH7144	51
	SH7137	SH7137	45
		SH7136	45
		SH7132	45
		SH7131	45
	SH7046	SH7148	53
		SH7108	53
		SH7106	53
		SH7104	53
		SH7101	53
		SH7048	53
		SH7046	53
	SH7047	SH7109	52
		SH7107	52
		SH7105	52
		SH7049	52, 472
		SH7047	52, 472
	SH7146	SH7149	48
		SH7146	48
	SH7040	SH7045	55
		SH7044	55
		SH7043	55
		SH7042	54
		SH7041	54
	SH7030	SH7034B	58
		SH7034	57
		SH7032	57
	SH7020	SH7021	58
		SH7020	58
	SH7147	SH7147	45, 472
M32R	M32R/ECU	32196	474
		32195	474
		32192	474
		32186	473
		32185	473
RX	RX600	RX63N**	91, 92, 604, 605
		RX631**	89, 90, 606, 607
		RX630**	87, 88, 602, 603
		RX62T*	85, 86
		RX62N*	84, 601
		RX621*	83, 600
	RX200	RX210**	95
M16C	R32C/100	R32C/161	508
		R32C/160	507
		R32C/157	506
		R32C/156	505
		R32C/153	504
		R32C/152	503
		R32C/151	502
		R32C/145	501
		R32C/121	500
		R32C/120	499
		R32C/118A	234, 498
		R32C/118	230, 231, 497
		R32C/117A	233, 498
		R32C/117	228, 229, 496
		R32C/116A	232, 498
		R32C/116	226, 227, 495
		R32C/111	225
	M32C/80	M32C/8B	237
		M32C/8A	237
		M32C/88	512

Family	Series	Group	Page
M16C	M32C/80	M32C/87	240, 241
		M32C/85	239, 511
		M32C/84	238, 510
		M32C/83	237
		M32C/80	237
	M16C/60	M16C/6N	259, 260, 516, 517
		M16C/6C	611
		M16C/65	249, 250
		M16C/64A	247
		M16C/63	245, 246
		M16C/62P	252, 253, 254, 514
		M16C/62N	258
		M16C/62M	257
		M16C/62A	255, 256, 515
	16C/30	M16C/30P	264, 265
	M16C/Tiny	M16C/29	272, 528
		M16C/28	271, 527
		M16C/26A	270, 527
R8C	R8C/Lx	R8C/L3AC	157
		R8C/L38C	159
		R8C/L36C	161
		R8C/L35C	163
	R8C/3x	R8C/38Z	479
		R8C/38Y	479
		R8C/38X	479
		R8C/38W	479
		R8C/36Z	480
		R8C/36Y	480
		R8C/36X	480
		R8C/36W	480
		R8C/36C	132, 133
		R8C/34Z	482
		R8C/34Y	482
		R8C/34X	481
		R8C/34W	481
		R8C/34R**	487
		R8C/34P**	487
		R8C/34C	130
		R8C/33G**	488
		R8C/33H**	488
		R8C/32G**	489
		R8C/32H**	489
	R8C/2x	R8C/2L	136
		R8C/2K	136
		R8C/2D	139
		R8C/2C	139
		R8C/2B	140
		R8C/2A	140
		R8C/29	141, 478
		R8C/28	141, 478
		R8C/27	141, 478
		R8C/26	141, 478
		R8C/25	142
		R8C/24	142
		R8C/23	143, 477
		R8C/22	143, 477
		R8C/21	476
		R8C/20	476
H8S	H8S/2600	H8S/2612	300, 533
	H8S/Tiny	H8S/20335R**	380
		H8S/20323R**	380
		H8S/20235R**	379
		H8S/20235	377
		H8S/20223R**	378
		H8S/20223	376
		H8S/20215R**	379
		H8S/20215	377
		H8S/20203R**	378
		H8S/20203	376
		H8S/20115R**	379
		H8S/20115	377
		H8S/20103R**	378
		H8S/20103	376
H8	H8/300H Tiny	H8/3687	390, 391
		H8/36037	392, 393
		H8/36049	386
		H8/36057	394
		H8/36064	388
		H8/36077	388
		H8/36087	387
		H8/36109	386

★ : New product ★★ : Under development

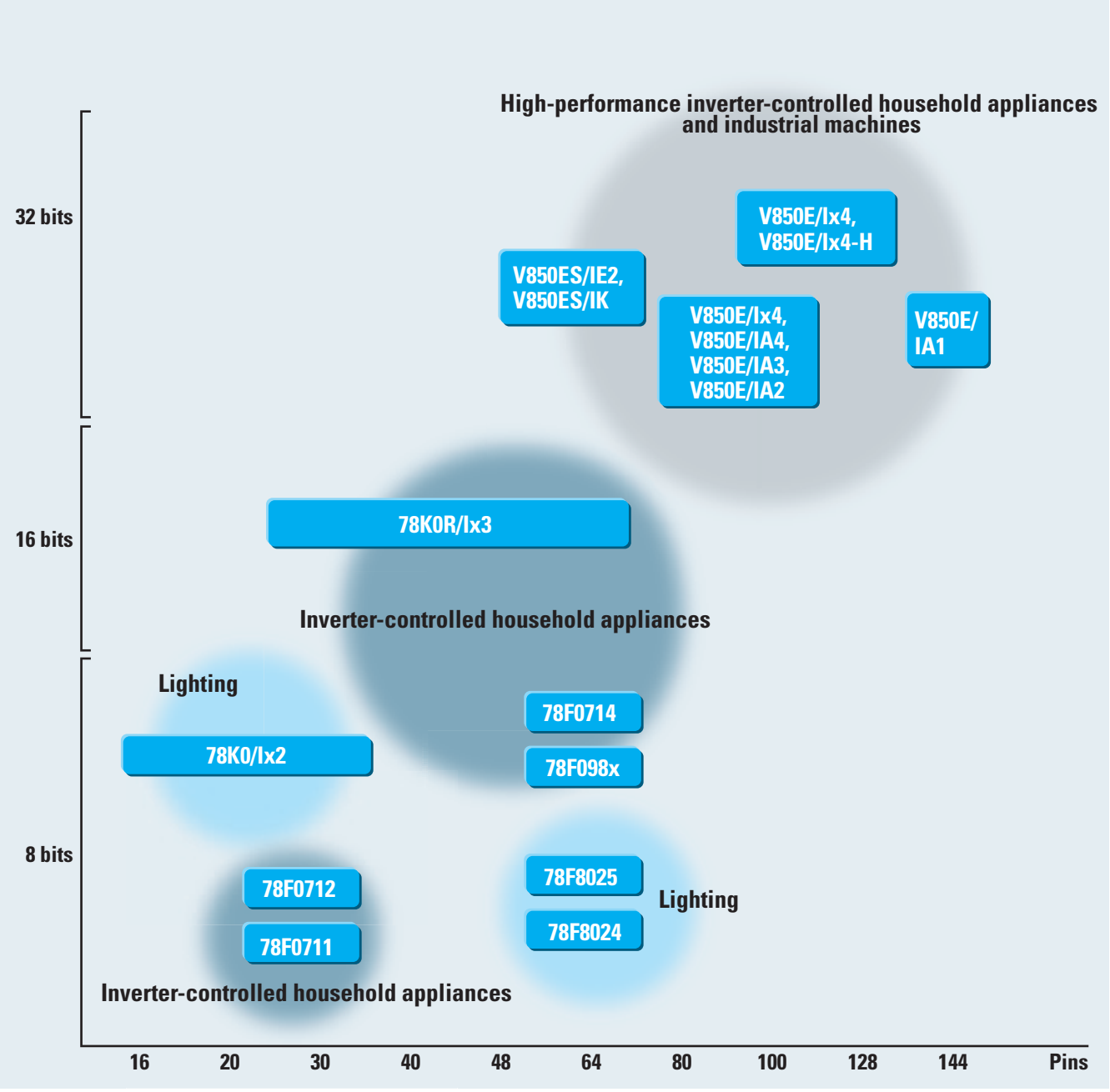
Features of V850 and 78K MCUs for Inverter Control

• V850
Our V850 inverter-control MCUs have a proven record among air conditioner developers as well as in a range of other markets, enabling more efficient control of BLDC motors. The lineup is extensive, including the V850E/Ix4, which incorporates a powerful CPU that can operate at up to 100 MHz as well as on-chip high precision analog functions for sensing current, and the V850E/Ix4-H, which provides a USB interface to enable connection to a computer.

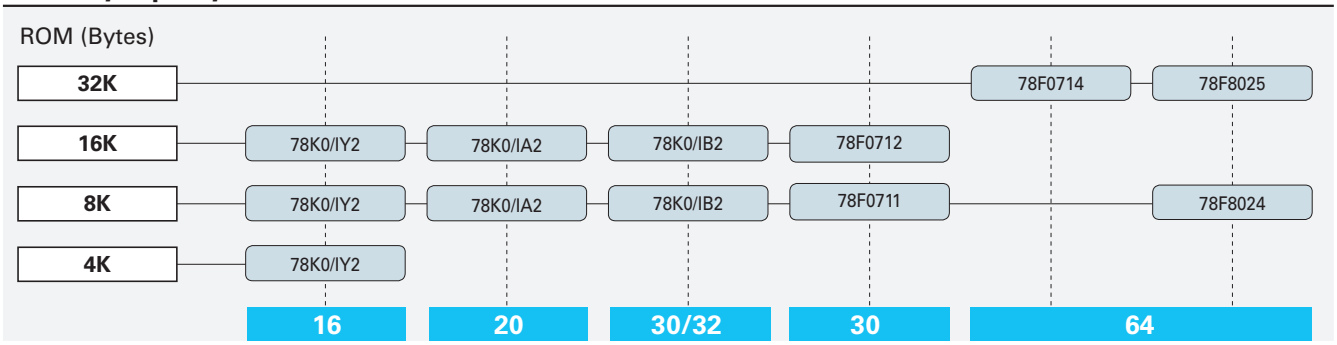
• 78K0R
The 78K0R inverter-control MCUs provide all the basic circuits for controlling an inverter on the chip as well as multifunction timers for precision inverter control.
These MCUs also incorporate the 78K0R core, which features the industry's best power-performance ratio, helping to reduce the power cost of your set.

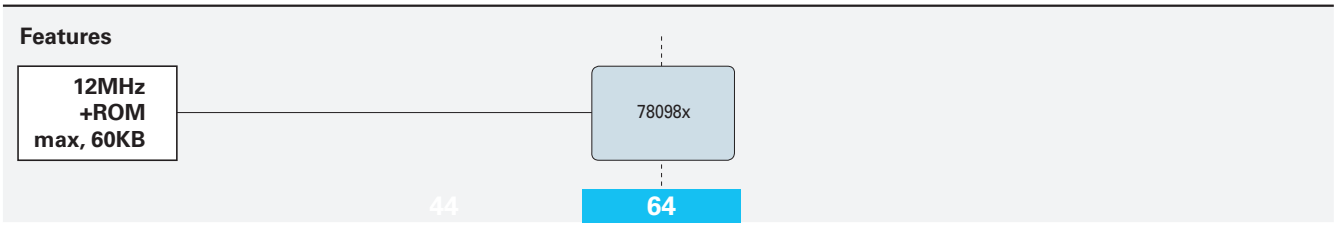
• 78K0
For motor inverter control, we recommend the 78F0711, 0712, and 0714.
The 78K0/Ix2, which features an on-chip operational amplifier and multifunction timers, is also available for applications such as lighting control (fluorescent or LED) and digital household appliance control.

• Lineup of V850 and 78K MCUs for Inverter Control



• Memory Capacity (78K0 MCUs)





Inverter Controller MCUs

• Specifications (78K0/IY2)

Group		μPD78F0740	μPD78F0741	μPD78F0742	μPD78F0750	μPD78F0751	μPD78F0752
Memory	ROM Size (Bytes)	4K	8K	16K	4K	8K	16K
	ROM Type	Flash					
	Single-Power-Supply Flash Memory	Yes					
	RAM Size (Bytes)	384	512	768	384	512	768
Clock	Maximum Operating Frequency (MHz)	10					
	On-Chip Oscillator (Hz)	4M, 8M, 30k					
	Subclock (32.768kHz)	—					
I/O	I/O Ports	12					
Bus	External Data/Address Bus	—/—					
Timer	16-bit Timer	3					
	8-bit Timer	2					
	Other Timers	—					
	Watch Timer	—					
	Real-Time Counter	—					
	Watchdog Timer	1					
	PWM Output	16 bits × 4, 8 bits × 1, (2 phases, 16 bits × 2 or 4 phases, 16 bits × 1)					
Serial Interface	UART	—					
	UART Supporting LIN-bus	—					
	UART, CSI	—					
	UART Supporting LIN-bus, CSI	—					
	CSI	—					
	CSI, I^2C	—					
	CSI with Automatic Transmission/Reception Function	—					
	I^2C	—					
	IEBus	—					
	CAN	—					
OCD	On-Chip Debugger	Yes					
Peripheral Functions	LCD (Segments × Commons)	—					
	16-bit ΔΣ A/D Converter	—					
	10-bit A/D Converter	5					
	8-bit A/D Converter	—					
	8-bit D/A Converter	—					
	Multiplier/Divider (bits × bits, bits ÷ bits)	8 × 8 16 × 16					
	Other Functions	POC, LVI			POC, LVI, operational amplifier		
Others	Power Supply Voltage (V)	2.7 to 5.5					
	Package (size: mm)	16-SSOP (5.72)					
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-78K0IX2 (IECUBE)					
Package		P16MA-65-FAA					
Part No.		μ78F0740MA-FAA-AX	μ78F0741MA-FAA-AX	μ78F0742MA-FAA-AX	μ78F0750MA-FAA-AX	μ78F0751MA-FAA-AX	μ78F0752MA-FAA-AX

Remark POC: Power-on clear
LVI: Low-voltage indicator

★ : New product ★★ : Under development

• Specifications (78K0/IA2)

Group		μPD78F0743	μPD78F0744	μPD78F0753	μPD78F0754
Memory	ROM Size (Bytes)	8K	16K	8K	16K
	ROM Type	Flash			
	Single-Power-Supply Flash Memory	Yes			
	RAM Size (Bytes)	512	768	512	768
Clock	Maximum Operating Frequency (MHz)	10			
	On-Chip Oscillator (Hz)	4M, 8M, 30k			
	Subclock (32.768kHz)	—			
I/O	I/O Ports	16			
Bus	External Data/Address Bus	—/—			
Timer	16-bit Timer	3			
	8-bit Timer	2			
	Other Timers	—			
	Watch Timer	—			
	Real-Time Counter	—			
	Watchdog Timer	1			
	PWM Output	16 bits × 4, 8 bits × 1, (2 phases, 16 bits × 2 or 4 phases, 16 bits × 1)			
Serial Interface	UART	—			
	UART Supporting LIN-bus	1[Note]			
	UART, CSI	—			
	UART Supporting LIN-bus, CSI	—			
	CSI	—			
	CSI, I^2C	—			
	CSI with Automatic Transmission/Reception Function	—			
	I^2C	1			
	IEBus	—			
	CAN	—			
OCD	On-Chip Debugger	Yes			
Peripheral Functions	LCD (Segments x Commons)	—			
	16-bit ΔΣ A/D Converter	—			
	10-bit A/D Converter	6			
	8-bit A/D Converter	—			
	8-bit D/A Converter	—			
	Multiplier/Divider (bits x bits, bits ÷ bits)	8 × 8 16 × 16			
	Other Functions	POC, LVI		POC, LVI, operational amplifier	
Others	Power Supply Voltage (V)	2.7 to 5.5			
	Package (size: mm)	20-SSOP (7.62) 20-SOP (7.62)			
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-78K0IX2 (IECUBE)			
Package		P20MC-65-CAA P20MC-127-GAB			
Part No.		μ78F0743MC-CAA-AX μ78F0743MC-GAB-AX	μ78F0744MC-CAA-AX μ78F0744MC-GAB-AX	μ78F0753MC-CAA-AX μ78F0753MC-GAB-AX	μ78F0754MC-CAA-AX μ78F0754MC-GAB-AX

Note Can communicate with a DALI slave.

★ : New product ★★ : Under development

Remark POC: Power-on clear
LVI: Low-voltage indicator

• Specifications (78K0/IB2 (30 Pins))

Group		μPD78F0745	μPD78F0746	μPD78F0755	μPD78F0756
Memory	ROM Size (Bytes)	8K	16K	8K	16K
	ROM Type	Flash			
	Single-Power-Supply Flash Memory	Yes			
	RAM Size (Bytes)	512	768	512	768
Clock	Maximum Operating Frequency (MHz)	10			
	On-Chip Oscillator (Hz)	4M, 8M, 30k			
	Subclock (32.768kHz)	—			
I/O	I/O Ports	25			
Bus	External Data/Address Bus	—/—			
Timer	16-bit Timer	3			
	8-bit Timer	2			
	Other Timers	—			
	Watch Timer	—			
	Real-Time Counter	—			
	Watchdog Timer	1			
	PWM Output	16 bits × 5, 8 bits × 1, (2 phases, 16 bits × 2 or 4 phases, 16 bits × 1)			
Serial Interface	UART	—			
	UART Supporting LIN-bus	1[Note]			
	UART, CSI	—			
	UART Supporting LIN-bus, CSI	—			
	CSI	1			
	CSI, I^2C	—			
	CSI with Automatic Transmission/Reception Function	—			
	I^2C	1			
	IEBus	—			
	CAN	—			
OCD	On-Chip Debugger	Yes			
Peripheral Functions	LCD (Segments × Commons)	—			
	16-bit ΔΣ A/D Converter	—			
	10-bit A/D Converter	9			
	8-bit A/D Converter	—			
	8-bit D/A Converter	—			
	Multiplier/Divider (bits × bits, bits ÷ bits)	8 × 8 16 × 16			
	Other Functions	POC, LVI		POC, LVI, operational amplifier	
Others	Power Supply Voltage (V)	2.7 to 5.5			
	Package (size: mm)	30-SSOP (7.62)			
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-78K0IX2 (IECUBE)			
Package		P30MC-65-CAB			
Part No.		μPD78F0745MC-CAB-AX	μPD78F0746MC-CAB-AX	μPD78F0755MC-CAB-AX	μPD78F0756MC-CAB-AX

Note Can communicate with a DALI slave.
Remark POC: Power-on clear
LVI: Low-voltage indicator

★ : New product ★★ : Under development

• Specifications (78K0/IB2 (32 Pins))

Group		μPD78F0745	μPD78F0746	μPD78F0755	μPD78F0756
Memory	ROM Size (Bytes)	8K	16K	8K	16K
	ROM Type	Flash			
	Single-Power-Supply Flash Memory	Yes			
	RAM Size (Bytes)	512	768	512	768
Clock	Maximum Operating Frequency (MHz)	10			
	On-Chip Oscillator (Hz)	4M, 8M, 30k			
	Subclock (32.768kHz)	—			
I/O	I/O Ports	23			
Bus	External Data/Address Bus	—/—			
Timer	16-bit Timer	3			
	8-bit Timer	2			
	Other Timers	—			
	Watch Timer	—			
	Real-Time Counter	—			
	Watchdog Timer	1			
	PWM Output	16 bits × 5, 8 bits × 1, (2 phases, 16 bits × 2 or 4 phases, 16 bits × 1)			
Serial Interface	UART	—			
	UART Supporting LIN-bus	1[Note]			
	UART, CSI	—			
	UART Supporting LIN-bus, CSI	—			
	CSI	1			
	CSI, I^2C	—			
	CSI with Automatic Transmission/Reception Function	—			
	I^2C	1			
	IEBus	—			
	CAN	—			
OCD	On-Chip Debugger	Yes			
Peripheral Functions	LCD (Segments x Commons)	—			
	16-bit ΔΣ A/D Converter	—			
	10-bit A/D Converter	9			
	8-bit A/D Converter	—			
	8-bit D/A Converter	—			
	Multiplier/Divider (bits x bits, bits ÷ bits)	8 × 8 16 × 16			
	Other Functions	POC, LVI		POC, LVI, operational amplifier	
Others	Power Supply Voltage (V)	2.7 to 5.5			
	Package (size: mm)	32-WQFN (5 × 5)			
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-78K0IX2 (IECUBE)			
Package		P32K8-50-3B4-1			
Part No.		μPD78F0745K8-3B4-AX	μPD78F0746K8-3B4-AX	μPD78F0755K8-3B4-AX	μPD78F0756K8-3B4-AX

Note Can communicate with a DALI slave.
Remark POC: Power-on clear
LVI: Low-voltage indicator

★ : New product ★★ : Under development

• Specifications (μPD78F8025)

Group		μPD78F8024	μPD78F8025
Memory	ROM Size (Bytes)	8K	32K
	ROM Type	Flash	
	Single-Power-Supply Flash Memory	Yes	
	RAM Size (Bytes)	512	1K
Clock	Maximum Operating Frequency (MHz)	20	
	On-Chip Oscillator (Hz)	8M, 240k	
	Subclock (32.768kHz)	—	
I/O	I/O Ports	23	
Bus	External Data/Address Bus	—/—	
Timer	16-bit Timer	1	
	8-bit Timer	4	
	Other Timers	—	
	Watch Timer	—	
	Real-Time Counter	—	
	Watchdog Timer	1	
	PWM Output	4 phases, 8 bits × 1	
Serial Interface	UART	—	
	UART Supporting LIN-bus	1	
	UART, CSI	1	
	UART Supporting LIN-bus, CSI	—	
	CSI	—	
	CSI, I^2C	—	
	CSI with Automatic Transmission/Reception Function	—	
	I^2C	1	
	IEBus	—	
	CAN	—	
OCD	On-Chip Debugger	—	
Peripheral Functions	LCD (Segments × Commons)	—	
	16-bit ΔΣ A/D Converter	—	
	10-bit A/D Converter	4	
	8-bit A/D Converter	—	
	8-bit D/A Converter	—	
	Multiplier/Divider (bits × bits, bits ÷ bits)	—	
	Other Functions	POC, LVI	
Others	Power Supply Voltage (V)	1.8 to 5.5	
	Package (size: mm)	64-LQFP (12 × 12)	
	In-Circuit Emulator Emulation Board	QB-78K0KX2 (IECUBE)	
Package		P64GK-65-GAJ	
Part No.		μPD78F8024GK-GAJ-AX	μPD78F8025GK-GAJ-AX

Remark POC: Power-on clear
LVI: Low-voltage indicator

★ : New product ★★ : Under development

• Specifications (μPD78F071x)

Group		μPD78F0711	μPD78F0712	μPD78F0714
Memory	ROM Size (Bytes)	8K	16K	32K
	ROM Type	Flash		
	Single-Power-Supply Flash Memory	Yes		
	RAM Size (Bytes)	768		1K
Clock	Maximum Operating Frequency (MHz)	20		
	On-Chip Oscillator (Hz)	8M, 240k		240k
	Subclock (32.768kHz)	—		
I/O	I/O Ports	15		48
Bus	External Data/Address Bus	—/—		
Timer	16-bit Timer	1		2
	8-bit Timer	2		3
	Other Timers	10 bits × 1		
	Watch Timer	—		
	Real-Time Counter	—		
	Watchdog Timer	1		
	PWM Output	16 bits × 1, 8 bits × 1, 6 phases, 10 bits × 1		16 bits × 2, 8 bits × 3, 6 phases, 10 bits × 1
Serial Interface	UART	1		
	UART Supporting LIN-bus	—		
	UART, CSI	—		
	UART Supporting LIN-bus, CSI	—		
	CSI	—		1
	CSI, I²C	—		
	CSI with Automatic Transmission/Reception Function	—		
	I²C	—		
	IEBus	—		
	CAN	—		
OCD	On-Chip Debugger	Yes		
Peripheral Functions	LCD (Segments x Commons)	—		
	16-bit ΔΣ A/D Converter	—		
	10-bit A/D Converter	4		8
	8-bit A/D Converter	—		
	8-bit D/A Converter	—		
	Multiplier/Divider (bits x bits, bits ÷ bits)	16 × 16 32 ÷ 16		
	Other Functions	POC, LVI		
Others	Power Supply Voltage (V)	4.0 to 5.5		
	Package (size: mm)	30-SSOP (7.62)		64-TQFP (12 × 12)
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-780714 (IECUBE)		
Package		S30MC-65-5A4-2		P64GK-65-9ET-3
Part No.		μPD78F0711MC-5A4-A	μPD78F0712MC-5A4-A	μPD78F0714GK-9ET-A

Remark POC: Power-on clear
LVI: Low-voltage indicator

★ : New product ★★ : Under development

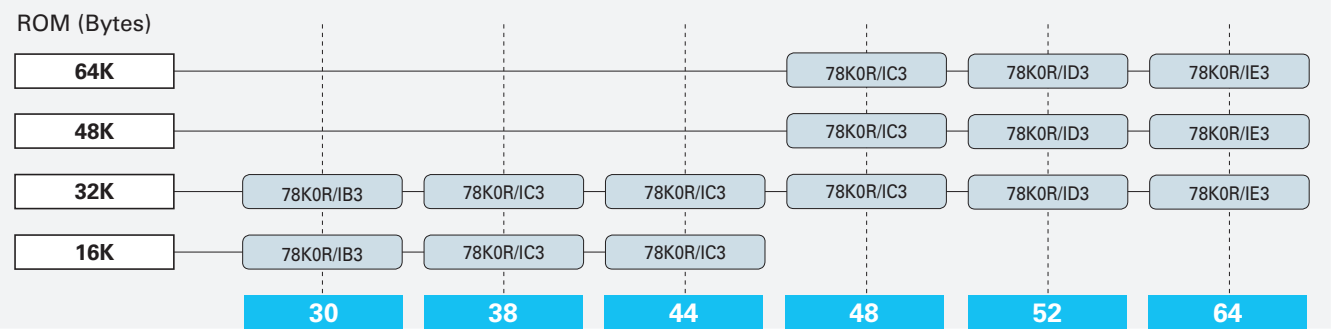
Inverter Controller MCUs

• Specifications (μPD78098x)

Group		μPD780982	μPD780983	μPD780984	μPD780986	μPD780988	μPD78F0988A
Memory	ROM Size (Bytes)	16K	24K	32K	48K	60K	
	ROM Type	Mask					Flash
	Single-Power-Supply Flash Memory	—					
	RAM Size (Bytes)	1K			2K		
Clock	Maximum Operating Frequency (MHz)	12					
	On-Chip Oscillator (Hz)	—					
	Subclock (32.768kHz)	—					
I/O	I/O Ports	47					
Bus	External Data/Address Bus	8/8					
Timer	16-bit Timer	2					
	8-bit Timer	3					
	Other Timers	10 bits × 1					
	Watch Timer	—					
	Real-Time Counter	—					
	Watchdog Timer	1					
	PWM Output	16 bits × 2, 8 bits × 3, 6 phases, 10 bits × 1					
Serial Interface	UART	2					
	UART Supporting LIN-bus	—					
	UART, CSI	—					
	UART Supporting LIN-bus, CSI	—					
	CSI	1					
	CSI, I^2C	—					
	CSI with Automatic Transmission/Reception Function	—					
	I^2C	—					
	IEBus	—					
	CAN	—					
OCD	On-Chip Debugger	—					
Peripheral Functions	LCD (Segments × Commons)	—					
	16-bit ΔΣ A/D Converter	—					
	10-bit A/D Converter	8					
	8-bit A/D Converter	—					
	8-bit D/A Converter	—					
	Multiplier/Divider (bits × bits, bits ÷ bits)	—					
	Other Functions	—					
Others	Power Supply Voltage (V)	3.0 to 5.5					
	Package (size: mm)	64-LQFP, 64-QFP (14 × 14) 64-SDIP (19.05)					
	In-Circuit Emulator Emulation Board	IE-78K0-NS/-A, IE-780988-NS-EM4 + IE-78K0-NS-P01					
Package		P64C-70-750A, C-4 P64GC-80-8BS					
Part No.		μPD780982CW-xxx-A μPD780982GC-xxx-8BS-A	μPD780983CW-xxx-A μPD780983GC-xxx-8BS-A	μPD780984CW-xxx-A μPD780984GC-xxx-8BS-A	μPD780986CW-xxx-A μPD780986GC-xxx-8BS-A	μPD780988CW-xxx-A μPD780988GC-xxx-8BS-A	μPD78F0988ACW-A μPD78F0988AGC-AB8-A μPD78F0988AGC-8BS-A

★ : New product ★★ : Under development

• Memory Capacity (78K0R MCUs)



Pin count

• Specifications (78K0R/IB3)

Group		μPD78F1201	μPD78F1203
Memory	ROM Size (Bytes)	16K	32K
	ROM Type	Flash	
	Single-Power-Supply Flash Memory	Yes	
	RAM Size (Bytes)	1K	1.5K
Clock	Maximum Operating Frequency (MHz)	20	
	On-Chip Oscillator (Hz)	40M, 8M, 30k	
	Subclock (32.768kHz)	Yes	
I/O	I/O Ports	23	
Bus	External Data/Address Bus	—/—	
Timer	16-bit Timer	12	
	Real-Time Counter	—	
	Watchdog Timer	1	
	PWM Output	PWM: 16 bits × 4, multiplexed PWM: 16 bits × 7, (6 phases, 16 bits × 1)	
Serial Interface	CSI, UART	—	
	CSI: 2ch, UART: 1ch	—	
	CSI, UART, Simplified I^2C	1	
	CSI: 2ch, UART: 1ch, Simplified I^2C, 2ch	—	
	CSI: 2ch, UART Supporting LIN-bus: 1ch	—	
	UART Supporting LIN-bus	1	
	I^2C	—	
OCD	On-Chip Debugger	Yes	
Peripheral Functions	10-bit A/D Converter	6	
	8-bit D/A Converter	—	
	Multiplier/Divider (bits × bits, bits ÷ bits)	16 × 16 32 ÷ 32	
	Other Functions	POC, LVI, DMA, comparator × 2, programmable gain amplifier	
Others	Power Supply Voltage (V)	2.7 to 5.5	
	Package (size: mm)	30-SSOP (7.62)	
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-78K0RIX3 (IECUBE)	
Package		P30MC-65-CAB	
Part No.		μPD78F1201MC-CAB-AX	μPD78F1203MC-CAB-AX

Remark POC: Power-on clear
LVI: Low-voltage indicator

★ : New product ★★ : Under development

• Specifications (78K0R/IC3 (38 Pins), 78K0R/IC3 (44 Pins))

Group		78K0R/IC3 (38 Pins)		78K0R/IC3 (44 Pins)	
		μPD78F1211	μPD78F1213	μPD78F1211	μPD78F1213
Memory	ROM Size (Bytes)	16K	32K	16K	32K
	ROM Type	Flash			
	Single-Power-Supply Flash Memory	Yes			
	RAM Size (Bytes)	1K	1.5K	1K	1.5K
Clock	Maximum Operating Frequency (MHz)	20			
	On-Chip Oscillator (Hz)	40M, 8M, 30k			
	Subclock (32.768kHz)	Yes			
I/O	I/O Ports	31		37	
Bus	External Data/Address Bus	—/—			
Timer	16-bit Timer	12			
	Real-Time Counter	1			
	Watchdog Timer	1			
	PWM Output	PWM: 16 bits × 5, multiplexed PWM: 16 bits × 9, (6 phases, 16 bits × 1)			
Serial Interface	CSI, UART	—			
	CSI: 2ch, UART: 1ch	—			
	CSI, UART, Simplified I²C	1			
	CSI: 2ch, UART: 1ch, Simplified I²C, 2ch	—			
	CSI: 2ch, UART Supporting LIN-bus: 1ch	—		1	
	UART Supporting LIN-bus	1		—	
	I²C	—			
OCD	On-Chip Debugger	Yes			
Peripheral Functions	10-bit A/D Converter	8		10	
	8-bit D/A Converter	—			
	Multiplier/Divider (bits x bits, bits ÷ bits)	16 × 16 32 ÷ 32			
	Other Functions	POC, LVI, DMA, comparator × 2, programmable gain amplifier			
Others	Power Supply Voltage (V)	2.7 to 5.5			
	Package (size: mm)	38-SSOP (7.62)		44-LQFP (10 × 10)	
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-78K0RIX3 (IECUBE)			
Package		P38MC-65-GAA		P44GB-80-GAF	
Part No.		μPD78F1211MC-GAA-AX	μPD78F1213MC-GAA-AX	μPD78F1211GB-GAF-AX	μPD78F1213GB-GAF-AX

Remark POC: Power-on clear
LVI: Low-voltage indicator

★ : New product ★★ : Under development

• Specifications (78K0R/IC3 (48 Pins))

Group		μPD78F1213	μPD78F1214	μPD78F1215
Memory	ROM Size (Bytes)	32K	48K	64K
	ROM Type	Flash		
	Single-Power-Supply Flash Memory	Yes		
	RAM Size (Bytes)	1.5K	2K	3K
Clock	Maximum Operating Frequency (MHz)	20		
	On-Chip Oscillator (Hz)	40M, 8M, 30k		
	Subclock (32.768kHz)	Yes		
I/O	I/O Ports	41		
Bus	External Data/Address Bus	—/—		
Timer	16-bit Timer	12		
	Real-Time Counter	1		
	Watchdog Timer	1		
	PWM Output	PWM: 16 bits × 5, multiplexed PWM: 16 bits × 9, (6 phases, 16 bits × 1)		
Serial Interface	CSI, UART	—		
	CSI: 2ch, UART: 1ch	—		
	CSI, UART, Simplified I^2C	1		
	CSI: 2ch, UART: 1ch, Simplified I^2C, 2ch	—		
	CSI: 2ch, UART Supporting LIN-bus: 1ch	1		
	UART Supporting LIN-bus	—		
	I^2C	1		
OCD	On-Chip Debugger	Yes		
Peripheral Functions	10-bit A/D Converter	11		
	8-bit D/A Converter	—		
	Multiplier/Divider (bits × bits, bits ÷ bits)	16 × 16 32 ÷ 32		
	Other Functions	POC, LVI, DMA, comparator × 2, programmable gain amplifier		
Others	Power Supply Voltage (V)	2.7 to 5.5		
	Package (size: mm)	48-TQFP (7 × 7)		
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-78K0RIX3 (IECUBE)		
Package		P48GA-50-HAA		
Part No.		μPD78F1213GA-HAA-AX	μPD78F1214GA-HAA-AX	μPD78F1215GA-HAA-AX

Remark POC: Power-on clear
LVI: Low-voltage indicator

★ : New product ★★ : Under development

Inverter Controller MCUs

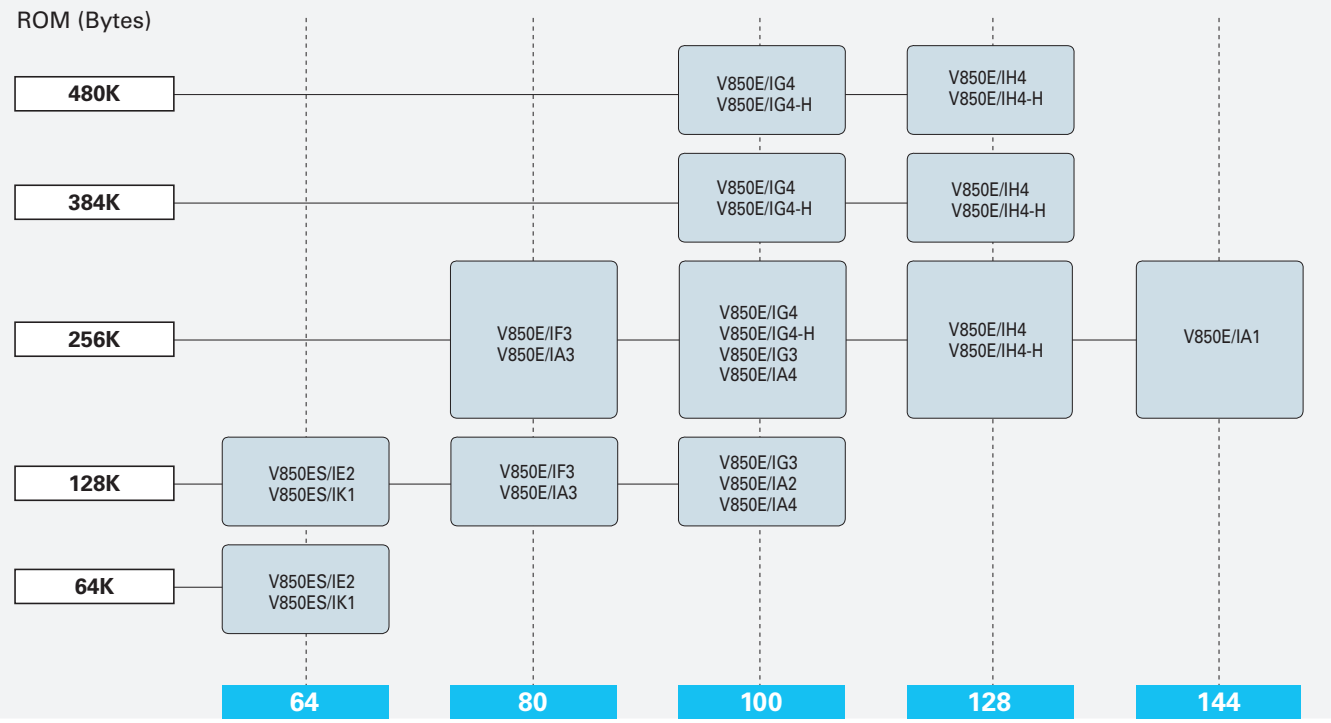
• Specifications (78K0R/ID3, 78K0R/IE3)

Group		78K0R/ID3			78K0R/IE3		
		μPD78F1223	μPD78F1224	μPD78F1225	μPD78F1233	μPD78F1234	μPD78F1235
Memory	ROM Size (Bytes)	32K	48K	64K	32K	48K	64K
	ROM Type	Flash					
	Single-Power-Supply Flash Memory	Yes					
	RAM Size (Bytes)	1.5K	2K	3K	1.5K	2K	3K
Clock	Maximum Operating Frequency (MHz)	20					
	On-Chip Oscillator (Hz)	40M, 8M, 30k					
	Subclock (32.768kHz)	Yes					
I/O	I/O Ports	45			55		
Bus	External Data/Address Bus	—/—					
Timer	16-bit Timer	12					
	Real-Time Counter	1					
	Watchdog Timer	1					
	PWM Output	PWM: 16 bits × 5, multiplexed PWM: 16 bits × 9, (6 phases, 16 bits × 1)			PWM: 16 bits × 5, multiplexed PWM: 16 bits × 11, (6 phases, 16 bits × 1)		
Serial Interface	CSI, UART	—					
	CSI: 2ch, UART: 1ch	—					
	CSI, UART, Simplified I^2C	1					
	CSI: 2ch, UART: 1ch, Simplified I^2C, 2ch	—					
	CSI: 2ch, UART Supporting LIN-bus: 1ch	1					
	UART Supporting LIN-bus	—					
	I^2C	1					
OCD	On-Chip Debugger	Yes					
Peripheral Functions	10-bit A/D Converter	11			12		
	8-bit D/A Converter	—					
	Multiplier/Divider (bits x bits, bits ÷ bits)	16 × 16 32 ÷ 32					
	Other Functions	POC, LVI, DMA, comparator × 2, programmable gain amplifier					
Others	Power Supply Voltage (V)	2.7 to 5.5					
	Package (size: mm)	52-LQFP (10 × 10)			64-LQFP (10 × 10) 64-LQFP (12 × 12)		
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-78K0RIX3 (IECUBE)					
Package		P52GB-65-GAG			P64GB-50-GAH P64GK-65-GAJ		
Part No.		μPD78F1223GB-GAG-AX	μPD78F1224GB-GAG-AX	μPD78F1225GB-GAG-AX	μPD78F1233GB-GAH-AX μPD78F1233GK-GAJ-AX	μPD78F1234GB-GAH-AX μPD78F1234GK-GAJ-AX	μPD78F1235GB-GAH-AX μPD78F1235GK-GAJ-AX

Remark POC: Power-on clear
LVI: Low-voltage indicator

★ : New product ★★ : Under development

• Memory Capacity (V850 MCUs)



• Specifications (V850E/IG4, V850E/IG4-H)

Group		V850E/IG4			V850E/IG4-H		
		μPD70F3913	μPD70F3914	μPD70F3915	μPD70F3919	μPD70F3920	μPD70F3921
Memory	ROM Size (Bytes)	256K	384K	480K	256K	384K	480K
	ROM Type	Flash					
	Single-Power-Supply Flash Memory	—					
	RAM Size (Bytes)	24K					
Clock	Maximum Operating Frequency (MHz)	100					
	On-Chip Oscillator (Hz)	—					
	Subclock (32.768kHz)	—					
I/O	I/O Ports	67			63		
Bus	External Data/Address Bus	—/—			16/16		
Timer	16-bit Timer	13					
	8-bit Timer	—					
	Other Timers	—					
	Watch Timer	—					
	Watchdog Timer	1					
	PWM Output	16 bits × 12 (6 phases, 16 bits × 2)					
Serial Interface	UART	—					
	UART Supporting LIN-bus	—					
	UART, CSI	3					
	UART Supporting LIN-bus, CSI	—					
	UART, I^2C	1					
	UART Supporting LIN-bus, I^2C	—					
	UART Supporting LIN-bus, CSI, I^2C	—					
	CSI	—					
	CSI, I^2C	—					
	CSI with Automatic Transmission/Reception Function	—					
	I^2C	—					
	IEBus	—					
	CAN	—					
	CAN/IEBus	—					
	USB	—			1		
OCD	On-Chip Debugger	Yes					
Peripheral Functions	LCD (Segments x Commons)	—					
	12-bit A/D Converter	7 (4 ch × 1 unit, 3 ch × 1 unit) Of which 6 channels incorporate comparators for the input amplifier and overcurrent detection.					
	10-bit A/D Converter	12					
	8-bit D/A Converter	—					
	Other Functions	POC, LVI, CLM					
Others	Power Supply Voltage (V)	1.5V/5V			1.5V/3.3V/5V		
	Package (size: mm)	100-LQFP (14 × 14) 100-LQFP (14 × 20)			100-LQFP (14 × 14)		
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2)					
Package		P100GC-50-UEU-1 P100GF-65-GAS			P100GC-50-UEU-1		
Part No.		μPD70F3913GC-UEU-AX μPD70F3913GF-GAS-AX	μPD70F3914GC-UEU-AX μPD70F3914GF-GAS-AX	μPD70F3915GC-UEU-AX μPD70F3915GF-GAS-AX	μPD70F3919GC-UEU-AX	μPD70F3920GC-UEU-AX	μPD70F3921GC-UEU-AX

Remark POC: Power-on clear
LVI: Low-voltage indicator
CLM: Clock monitor

★ : New product ★★ : Under development

• Specifications (V850E/IH4, V850E/IH4-H)

Group		V850E/IH4			V850E/IH4-H		
		μPD70F3916	μPD70F3917	μPD70F3918	μPD70F3922	μPD70F3923	μPD70F3924
Memory	ROM Size (Bytes)	256K	384K	480K	256K	384K	480K
	ROM Type	Flash					
	Single-Power-Supply Flash Memory	—					
	RAM Size (Bytes)	24K					
Clock	Maximum Operating Frequency (MHz)	100					
	On-Chip Oscillator (Hz)	—					
	Subclock (32.768kHz)	—					
I/O	I/O Ports	80					
Bus	External Data/Address Bus	—/—			16/16		
Timer	16-bit Timer	13					
	8-bit Timer	—					
	Other Timers	—					
	Watch Timer	—					
	Watchdog Timer	1					
	PWM Output	16 bits × 12 (6 phases, 16 bits × 2)					
Serial Interface	UART	—					
	UART Supporting LIN-bus	—					
	UART, CSI	3					
	UART Supporting LIN-bus, CSI	—					
	UART, I²C	1					
	UART Supporting LIN-bus, I²C	—					
	UART Supporting LIN-bus, CSI, I²C	—					
	CSI	3					
	CSI, I²C	—					
	CSI with Automatic Transmission/Reception Function	—					
	I²C	—			1		
	IEBus	—					
	CAN	—					
	CAN/IEBus	—					
	USB	—			1		
OCD	On-Chip Debugger	Yes					
Peripheral Functions	LCD (Segments x Commons)	—					
	12-bit A/D Converter	8 (4 ch × 2 units) Of which 6 channels incorporate comparators for the input amplifier and overcurrent detection.					
	10-bit A/D Converter	12					
	8-bit D/A Converter	—					
	Other Functions	POC, LVI, CLM					
Others	Power Supply Voltage (V)	1.5V/5.0V			1.5V/3.3V/5.0V		
	Package (size: mm)	128-LQFP (14 × 20)					
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2)					
Package		P128GF-50-GAT					
Part No.		μPD70F3916GF-GAT-AX	μPD70F3917GF-GAT-AX	μPD70F3918GF-GAT-AX	μPD70F3922GF-GAT-AX	μPD70F3923GF-GAT-AX	μPD70F3924GF-GAT-AX

Remark POC: Power-on clear
LVI: Low-voltage indicator
CLM: Clock monitor

★ : New product ★★ : Under development

• Specifications (V850ES/IE2, V850E/IF3, V850E/IG3)

Group		V850ES/IE2		V850E/IF3		V850E/IG3	
		μPD70F3713	μPD70F3714	μPD70F3451	μPD70F3452	μPD70F3453	μPD70F3454
Memory	ROM Size (Bytes)	64K	128K	128K	256K	128K	256K
	ROM Type	Flash					
	Single-Power-Supply Flash Memory	Yes					
	RAM Size (Bytes)	6K		8K	12K	8K	12K
Clock	Maximum Operating Frequency (MHz)	20		64			
	On-Chip Oscillator (Hz)	—					
	Subclock (32.768kHz)	—					
I/O	I/O Ports	39		48		64	
Bus	External Data/Address Bus	—/—					16/16[Note]
Timer	16-bit Timer	7		13			
	8-bit Timer	—					
	Other Timers	—					
	Watch Timer	—					
	Watchdog Timer	1					
	PWM Output	16 bits × 6 (6 phases, 16 bits × 1)		16 bits × 9 (6 phases, 16 bits × 2)		16 bits × 11 (6 phases, 16 bits × 2)	
Serial Interface	UART	1		—			
	UART Supporting LIN-bus	—					
	UART, CSI	—		3			
	UART Supporting LIN-bus, CSI	—					
	UART, I²C	—		1			
	UART Supporting LIN-bus, I²C	—					
	UART Supporting LIN-bus, CSI, I²C	—					
	CSI	2		—			
	CSI, I²C	—					
	CSI with Automatic Transmission/Reception Function	—					
	I²C	—					
	IEBus	—					
	CAN	—					
	CAN/IEBus	—					
	UART Supporting LIN-bus, I²C, CAN	—					
OCD	On-Chip Debugger	Yes					
Peripheral Functions	LCD (Segments × Commons)	—					
	12-bit A/D Converter	—		5 + 5			
	10-bit A/D Converter	4 + 4		4		8	
	8-bit D/A Converter	—					
	Other Functions	POC, LVI		POC, LVI, DMA operational amplifier, comparator			
Others	Power Supply Voltage (V)	3.5 to 5.5					
	Package (size: mm)	64-LQFP (14 × 14)		80-LQFP (14 × 14)		100-LQFP (14 × 14) 100-LQFP (14 × 20) 161-FBGA (10 × 10)	
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-V850ESIX2 (IECUBE)		QB-MINI2 (MINICUBE2) QB-V850EIX3 (IECUBE)		QB-MINI2 (MINICUBE2) QB-V850MINIL (MINICUBE) QB-V850EIX3 (IECUBE)	
Package		P64GC-80-8BS		P80GC-65-UBT		S100GC-50-8EU, 8EA-2 P100GF-65-GAS P161F1-65-DA1	
Part No.		μPD70F3713GC-8BS-A	μPD70F3714GC-8BS-A	μPD70F3451GC-UBT-A	μPD70F3452GC-UBT-A	μPD70F3453GC-8EA-A μPD70F3453GF-GAS-AX	μPD70F3454GC-8EA-A μPD70F3454GF-GAS-AX μPD70F3454F1-DA9-A

Note Only available in the 14 × 14 mm package version of the μPD70F3454.

★ : New product ★★ : Under development

Remark POC: Power-on clear
LVI: Low-voltage indicator

• Specifications (V850E/IA1, V850E/IA2)

Group		V850E/IA1		V850E/IA2	
		μPD703116	μPD70F3116	μPD703114	μPD70F3114
Memory	ROM Size (Bytes)	256K		128K	
	ROM Type	Mask	Flash	Mask	Flash
	Single-Power-Supply Flash Memory	—			
	RAM Size (Bytes)	10K		6K	
Clock	Maximum Operating Frequency (MHz)	50		40	
	On-Chip Oscillator (Hz)	—			
	Subclock (32.768kHz)	—			
I/O	I/O Ports	83		53	
Bus	External Data/Address Bus	16/24		16/22	
Timer	16-bit Timer	8		7	
	8-bit Timer	—			
	Other Timers	—			
	Watch Timer	—			
	Watchdog Timer	—			
	PWM Output	16 bits × 11 (6 phases, 16 bits × 2)		16 bits × 11 (6 phases, 16 bits × 2)	
Serial Interface	UART	3		1	
	UART Supporting LIN-bus	—			
	UART, CSI	—		1	
	UART Supporting LIN-bus, CSI	—			
	UART, I²C	—			
	UART Supporting LIN-bus, I²C	—			
	UART Supporting LIN-bus, CSI, I²C	—			
	CSI	2		1	
	CSI, I²C	—			
	CSI with Automatic Transmission/Reception Function	—			
	I²C	—			
	IEBus	—			
	CAN	1		—	
	CAN/IEBus	—			
	UART Supporting LIN-bus, I²C, CAN	—			
OCD	On-Chip Debugger	—			
Peripheral Functions	LCD (Segments x Commons)	—			
	12-bit A/D Converter	—			
	10-bit A/D Converter	16		14	
	8-bit D/A Converter	—			
	Other Functions	DMA	DMA, non-break debugging	DMA	
Others	Power Supply Voltage (V)	3.0 to 3.6 4.5 to 5.5			
	Package (size: mm)	144-LQFP (20 × 20)		100-LQFP (14 × 14), 100-QFP (14 × 20)	
	In-Circuit Emulator Emulation Board	IE-V850E-MC+ IE-703116-MC-EM1		IE-V850E-MC+ IE-703114-MC-EM1	
Package		S144GJ-50-UEN		S100GC-50-8EU, 8EA-2 P100GF-65-3BA1-4	
Part No.		μPD703116GJ-xxx-UEN-A	μPD70F3116GJ-UEN-A	μPD703114GC-xxx-8EU-A μPD703114GF-xxx-3BA-A	μPD70F3114GC-8EU-A μPD70F3114GF-3BA-A

★ : New product ★★ : Under development

Inverter Controller MCUs

• Specifications (V850E/IA3, V850E/IA4)

Group		V850E/IA3		V850E/IA4		
		μPD703183	μPD70F3184	μPD703185	μPD703186	μPD70F3186
Memory	ROM Size (Bytes)	128K	256K	128K	256K	
	ROM Type	Mask	Flash	Mask		Flash
	Single-Power-Supply Flash Memory	—	Yes	—		Yes
	RAM Size (Bytes)	6K	12K	6K	12K	
Clock	Maximum Operating Frequency (MHz)	64				
	On-Chip Oscillator (Hz)	—				
	Subclock (32.768kHz)	—				
I/O	I/O Ports	50		64		
Bus	External Data/Address Bus	—/—				
Timer	16-bit Timer	8		9		
	8-bit Timer	—				
	Other Timers	—				
	Watch Timer	—				
	Watchdog Timer	1				
	PWM Output	16 bits × 5 (6 phases, 16 bits × 1)		16 bits × 6 (6 phases, 16 bits × 2)		
Serial Interface	UART	1				
	UART Supporting LIN-bus	—				
	UART, CSI	1				
	UART Supporting LIN-bus, CSI	—				
	UART, I²C	—				
	UART Supporting LIN-bus, I²C	—				
	UART Supporting LIN-bus, CSI, I²C	—				
	CSI	1				
	CSI, I²C	—				
	CSI with Automatic Transmission/Reception Function	—				
	I²C	—				
	IEBus	—				
	CAN	1		—		
	CAN/IEBus	—				
	UART Supporting LIN-bus, I²C, CAN	—				
OCD	On-Chip Debugger	—				Yes
Peripheral Functions	LCD (Segments × Commons)	—				
	12-bit A/D Converter	—				
	10-bit A/D Converter	12		16		
	8-bit D/A Converter	—				
	Other Functions	DMA, ROMC, operational amplifier, comparator				
Others	Power Supply Voltage (V)	2.3 to 2.7 4.0 to 5.5				
	Package (size: mm)	80-QFP (14 × 14)		100-LQFP (14 × 14), 100-QFP (14 × 20)		
	In-Circuit Emulator Emulation Board	QB-V850EIA4 (IECUBE)		QB-V850MINIL (MINICUBE) QB-V850EIA4 (IECUBE)		
Package		P80GC-65-8BT-1		S100GC-50-8EU, 8EA-2 P100GF-65-3BA1-4		
Part No.		μPD703183GC-xxx-8BT-A	μPD70F3184GC-8BT-A	μPD703185GC-xxx-8EU-A μPD703185GF-xxx-3BA-A	μPD703186GC-xxx-8EU-A μPD703186GF-xxx-3BA-A	μPD70F3186GC-8EU-A μPD70F3186GF-3BA-A

★ : New product ★★ : Under development

• Specifications (V850ES/IK1)

Group		μPD703327	μPD703329	μPD70F3329
Memory	ROM Size (Bytes)	64K	128K	
	ROM Type	Mask		Flash
	Single-Power-Supply Flash Memory	—		Yes
	RAM Size (Bytes)	4K	6K	
Clock	Maximum Operating Frequency (MHz)	32		
	On-Chip Oscillator (Hz)	—		
	Subclock (32.768kHz)	—		
I/O	I/O Ports	39		
Bus	External Data/Address Bus	—/—		
Timer	16-bit Timer	7		
	8-bit Timer	—		
	Other Timers	—		
	Watch Timer	—		
	Watchdog Timer	1		
	PWM Output	16 bits × 6 (6 phases, 16 bits × 1)		
Serial Interface	UART	1		
	UART Supporting LIN-bus	—		
	UART, CSI	—		
	UART Supporting LIN-bus, CSI	—		
	UART, I²C	—		
	UART Supporting LIN-bus, I²C	—		
	UART Supporting LIN-bus, CSI, I²C	—		
	CSI	2		
	CSI, I²C	—		
	CSI with Automatic Transmission/Reception Function	—		
	I²C	—		
	IEBus	—		
	CAN	—		
	CAN/IEBus	—		
	UART Supporting LIN-bus, I²C, CAN	—		
OCD	On-Chip Debugger	—		
Peripheral Functions	LCD (Segments x Commons)	—		
	12-bit A/D Converter	—		
	10-bit A/D Converter	8		
	8-bit D/A Converter	—		
	Other Functions	POC, LVI, ROMC		
Others	Power Supply Voltage (V)	3.5 to 5.5		
	Package (size: mm)	64-LQFP (14 × 14)		
	In-Circuit Emulator Emulation Board	QB-V850EIA4 (IECUBE)		
Package		P64GC-80-8BS		
Part No.		μPD703327GC-xxx-8BS-A	μPD703329GC-xxx-8BS-A	μPD70F3329GC-8BS-A

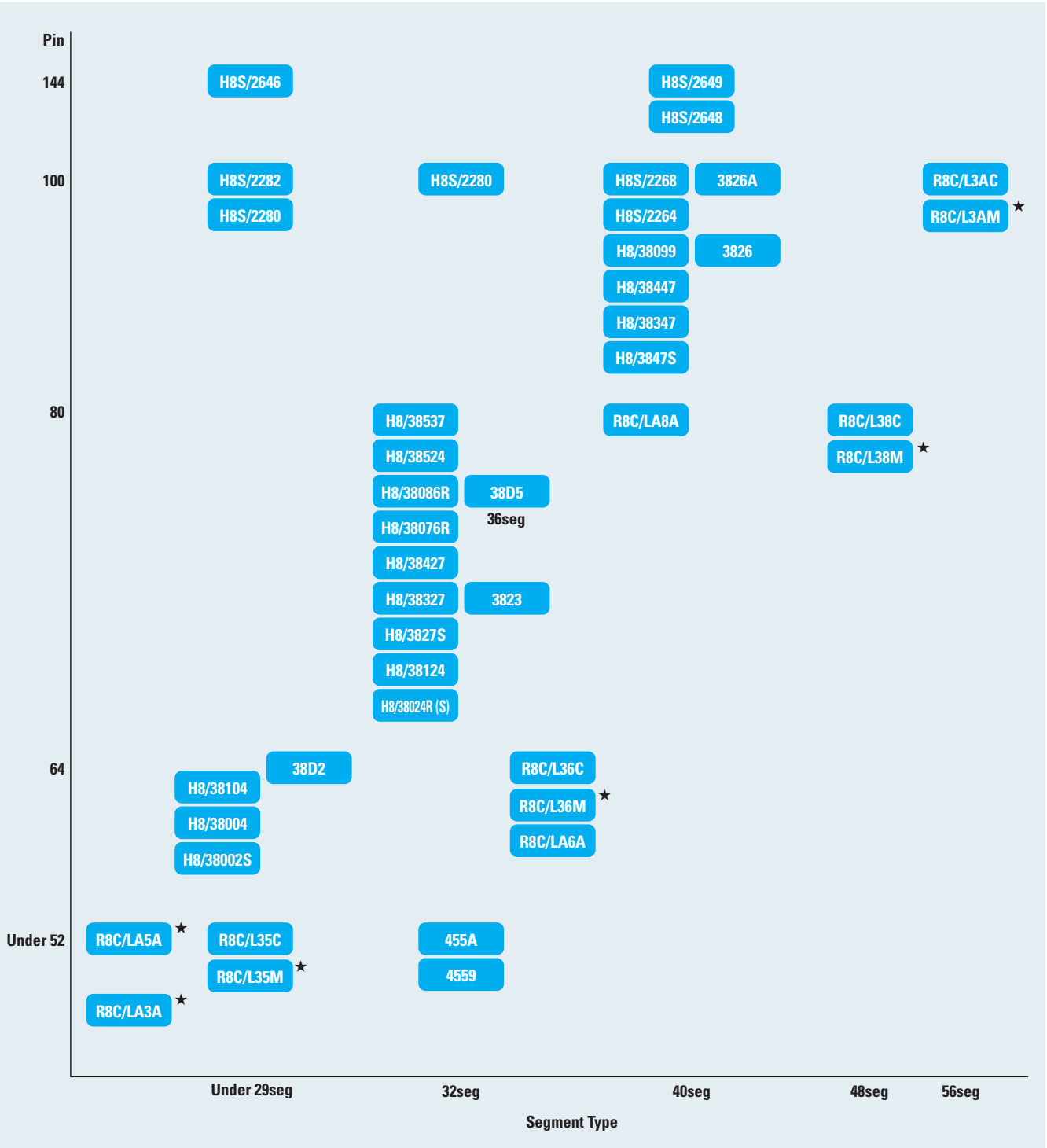
Remark POC: Power-on clear
LVI: Low-voltage indicator
ROMC: ROM correction

★ : New product ★★ : Under development

MCUs with LCD Controllers and Drivers

A variety of standard MCUs incorporating LCD controllers and drivers are available.

• MCUs with LCD Controllers and Drivers Roadmap



★ : New product ★★ : Under development

Segment Type (On-chip controller/driver)

Series	R8C/Lx						
Group	R8C/LA3A*	R8C/L35C	R8C/L35M*	R8C/LA5A*	R8C/L36C	R8C/L36M*	R8C/LA6A
Display Size	8seg × 4com	24seg × 4com			32seg × 4com, 28seg × 8com		
No. of Pins	32-pin	52-pin			64-pin		
ROM Assortment*	F						
Other Functions	On-chip Data flash	On-chip voltage pull-up circuit		On-chip Data flash	On-chip voltage pull-up circuit		On-chip Data flash
Detailed Specifications Page	156	163	163	156	161	162	155

Series	R8C/Lx				
Group	R8C/L38C	R8C/L38M*	R8C/LA8A	R8C/L3AC	R8C/L3AM*
Display Size	48seg × 4com, 44seg × 8com, 40seg × 4com			56seg × 4com, 52seg × 8com, 56seg × 8com	
No. of Pins	80-pin			100-pin	
ROM Assortment*	F				
Other Functions	On-chip voltage pull-up circuit		On-chip Data flash	On-chip voltage pull-up circuit	
Detailed Specifications Page	159	160	154	157	158

Series	H8S/2600			H8S/2200			H8S Super Low Power	H8/300H Super Low Power				
Group	H8S/2646	H8S/2648	H8S/2649	H8S/2280	H8S/2282	H8S/2268	H8S/2264	H8/38099	H8/38076R	H8/38086R	H8/38524	H8/38537
Display Size	24seg × 4com	40seg × 4com		28seg × 4com, 32seg × 4com	28seg × 4com	40seg × 4com		32seg × 4com				
No. of Pins	144-pin			100-pin				80-pin				
ROM Assortment*	F, M			F	F, M	F	M	F, M				
Other Functions	—					On-chip voltage pull-up circuit	—	On-chip voltage pull-up circuit		⊿ΣA/D	—	
Detailed Specifications Page	304, 536	304, 536	536	361, 537	361, 537	360	382	410	411, 412	415, 416	421, 422	423, 424

Series	H8/300L Super Low Power											
Group	H8/38447	H8/38347	H8/3847S	H8/38427	H8/38327	H8/3827S	H8/38124	H8/38024R	H8/38024S	H8/38104	H8/38004	H8/38002S
Display Size	40seg × 4com			32seg × 4com						25seg × 4com		
No. of Pins	100-pin			80-pin						64-pin		
ROM Assortment*	F, M		M	F, M		M	F, M	F	M	F, M		M
Other Functions	—											
Detailed Specifications Page	445, 446	443, 444	442	440, 441	438, 439	437	435, 436	433	433, 434	431, 432	429, 430	428

Series	38000		
Group	38D2	3823	38D5
Display Size	24seg × 4com	32seg × 4com	32seg×8com, 36seg × 4com
No. of Pins	64-pin	80-pin	
ROM Assortment*	Qz, F	Qz	Qz, F
Other Functions	LED direct connection drive ports	—	On-chip voltage pull-up circuit
Detailed Specifications Page	463, 464	462	465

Series	4500	
Group	4559	455A
Display Size	32seg × 4com	
No. of Pins	52-pin	
ROM Assortment*	Qz	
Other Functions	On-chip voltage drop detection circuit	
Detailed Specifications Page	636	636

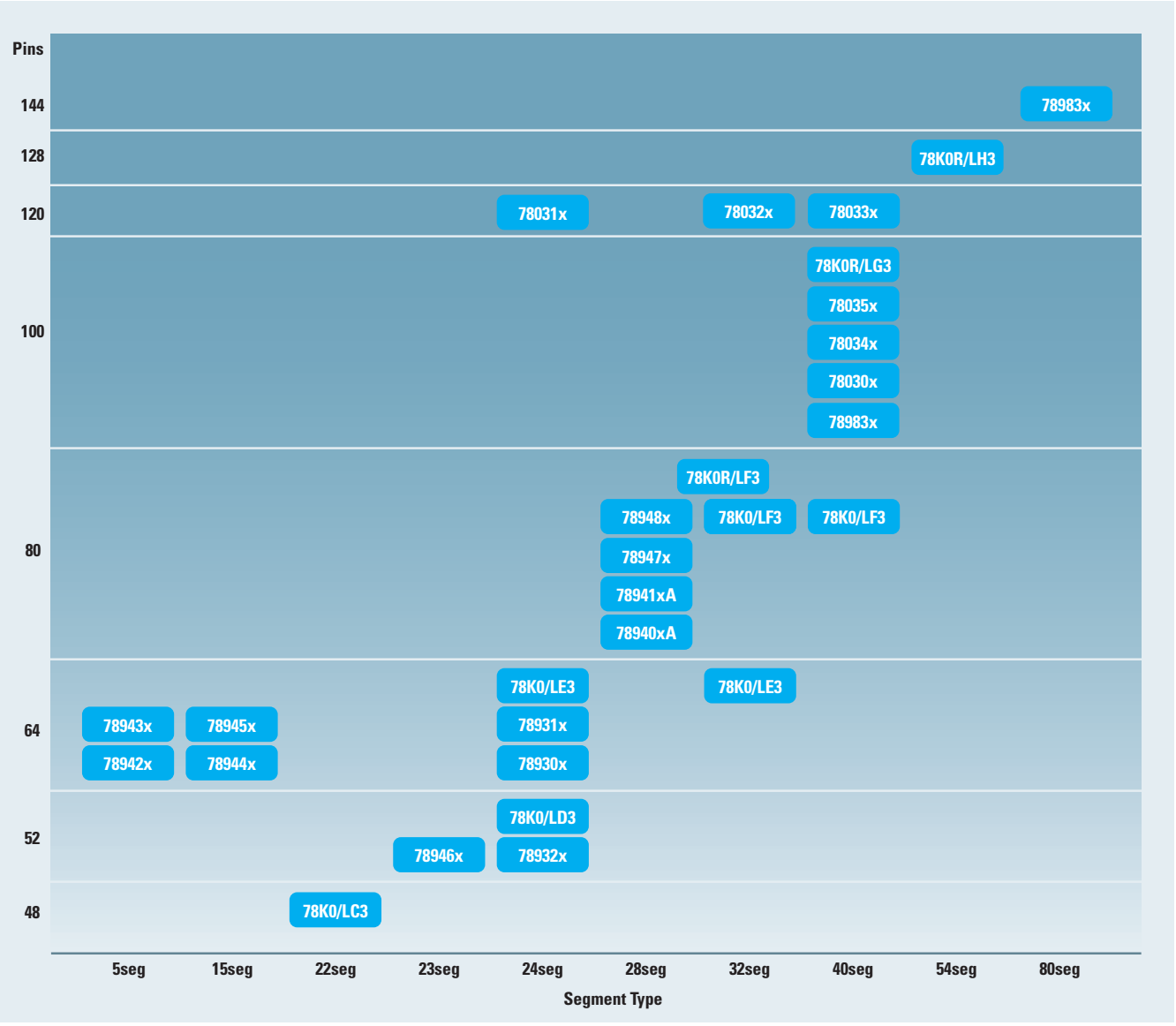
* F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

★ : New product ★★ : Under development

Please refer to the specifications in this catalog or hardware manuals on details regarding the MCUs described below.
SH7780 Series: SH7786 SH7785 SH7764 SH7763 SH7724 SH7723 SH7722 Group
SH7750 Series: SH7760 Group
SH7700 Series: SH7727 SH7721 SH7720 Group
SH7260 Series: SH7267 SH7266 SH7264 SH7263 SH7262 Group
SH7200 Series: SH7203 Group

MCUs with LCD Controllers and Drivers

• Roadmap of MCUs with On-Chip LCD Controller/Driver (78K MCUs)



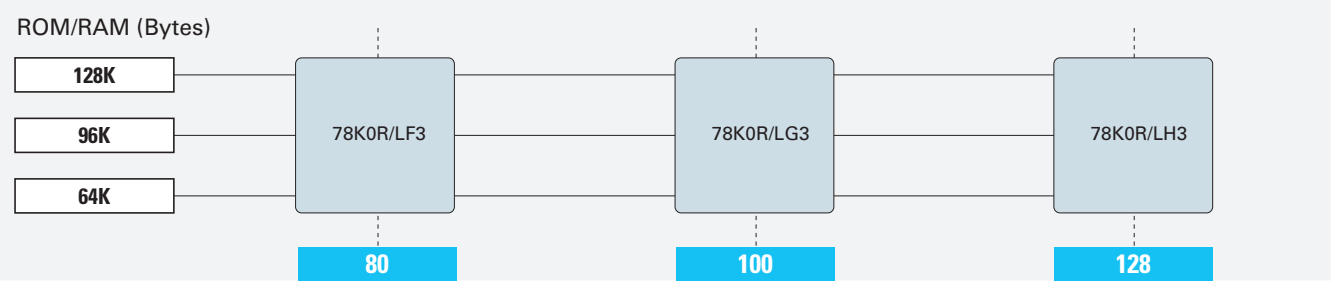
• Features of 16bit 78K0R MCUs with On-Chip LCD Controller/Driver

Renesas Electronics offers the 78K0R/Lx3 series of MCUs ideal for healthcare and measurement applications. These MCUs have on-chip 12-bit A/D and D/A converters providing high precision analog capability and also include an LCD controller that can drive up to 400 LCD segments. Also, because the 78K0R/Lx3 uses the capacitive division method to display images on an LCD, the power consumption rating is very low.

• Features of 8bit 78K0 MCUs with On-Chip LCD Controller/Driver

78K0/Lx3 MCUs are low-power All Flash microcontrollers with an on-chip LCD controller that can drive up to 288 LCD segments, making them ideal for systems that implement liquid crystal displays, such as household electronics devices. The 78K0/Lx3 series also provides products that feature a 16-bit ΔΣ A/D converter enabling high precision analog measurement.

• Memory Capacity (78K0R)



• Specifications (78K0R/LF3)

Group		μPD78F1500A	μPD78F1501A	μPD78F1502A	μPD78F1510A	μPD78F1512A
Memory	ROM Size (Bytes)	64K	96K	128K	64K	128K
	ROM Type	Flash				
	Single-Power-Supply Flash Memory	Yes				
	RAM Size (Bytes)	4K	6K	7K	4K	7K
Clock	Maximum Operating Frequency (MHz)	20				
	On-Chip Oscillator (Hz)	20M, 8M, 1M, 30k				
	Subclock (32.768kHz)	Yes				
I/O	I/O Ports	51				
Bus	External Data/Address Bus	—				
Timer	16-bit Timer	12				
	Real-Time Counter	1				
	Watchdog Timer	1				
	PWM Output	PWM: 16 bits × 3, multiplexed PWM: 16 bits × 5				
Serial Interface	CSI, UART	—				
	CSI (2ch), UART	—				
	CSI, UART, Simplified I²C	2				
	UART Supporting LIN-bus, CSI	—				
	UART Supporting LIN-bus	1				
	I²C	—				
OCD	On-Chip Debugger	Yes				
Peripheral Functions	LCD (Segments x Commons)	31 × 4 or 27 × 8				
	12-bit A/D Converter	8			—	
	10-bit A/D Converter	—			8	
	12-bit D/A Converter	2			—	
	Multiplier/Divider (bits × bits, bits ÷ bits)	16 × 16 32 ÷ 32				
	Other Functions	POC, LVI, DMA, operational amplifier × 2			POC, LVI, DMA	
Others	Power Supply Voltage (V)	1.8 to 5.5				
	Package (size: mm)	80-LQFP (14 × 14) 80-LQFP (12 × 12)				
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-78K0RLX3 (IECUBE)				
Package		P80GC-65-GAD P80GK-50-GAK				
Part No.		μPD78F1500AGC-GAD-AX μPD78F1500AGK-GAK-AX	μPD78F1501AGC-GAD-AX μPD78F1501AGK-GAK-AX	μPD78F1502AGC-GAD-AX μPD78F1502AGK-GAK-AX	μPD78F1510AGC-GAD-AX μPD78F1510AGK-GAK-AX	μPD78F1512AGC-GAD-AX μPD78F1512AGK-GAK-AX

Remark POC: Power-on clear
LVI: Low-voltage indicator

★ : New product ★★ : Under development

• Specifications (78K0R/LG3)

Group		μPD78F1503A	μPD78F1504A	μPD78F1505A	μPD78F1513A	μPD78F1515A
Memory	ROM Size (Bytes)	64K	96K	128K	64K	128K
	ROM Type	Flash				
	Single-Power-Supply Flash Memory	Yes				
	RAM Size (Bytes)	4K	6K	7K	4K	7K
Clock	Maximum Operating Frequency (MHz)	20				
	On-Chip Oscillator (Hz)	20M, 8M, 1M, 30k				
	Subclock (32.768kHz)	Yes				
I/O	I/O Ports	67				
Bus	External Data/Address Bus	—				
Timer	16-bit Timer	12				
	Real-Time Counter	1				
	Watchdog Timer	1				
	PWM Output	PWM: 16 bits × 4, multiplexed PWM: 16 bits × 7				
Serial Interface	CSI, UART	1				
	CSI (2ch), UART	—				
	CSI, UART, Simplified I²C	2				
	UART Supporting LIN-bus, CSI	—				
	UART Supporting LIN-bus	1				
	I²C	1				
OCD	On-Chip Debugger	Yes				
Peripheral Functions	LCD (Segments × Commons)	40 × 4 or 36 × 8				
	12-bit A/D Converter	12			—	
	10-bit A/D Converter	—			12	
	12-bit D/A Converter	2			—	
	Multiplier/Divider (bits × bits, bits ÷ bits)	16 × 16 32 ÷ 32				
	Other Functions	POC, LVI, DMA, operational amplifier × 3			POC, LVI, DMA	
Others	Power Supply Voltage (V)	1.8 to 5.5				
	Package (size: mm)	100-LQFP (14 × 14)			100-LQFP (14 × 14)	
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-78K0RLX3 (IECUBE)				
Package		P100GC-50-UEU-1			P100GC-50-UEU-1	
Part No.		μPD78F1503AGC-UEU-AX	μPD78F1504AGC-UEU-AX	μPD78F1505AGC-UEU-AX	μPD78F1513AGC-UEU-AX	μPD78F1515AGC-UEU-AX

Remark POC: Power-on clear
LVI: Low-voltage indicator

★ : New product ★★ : Under development

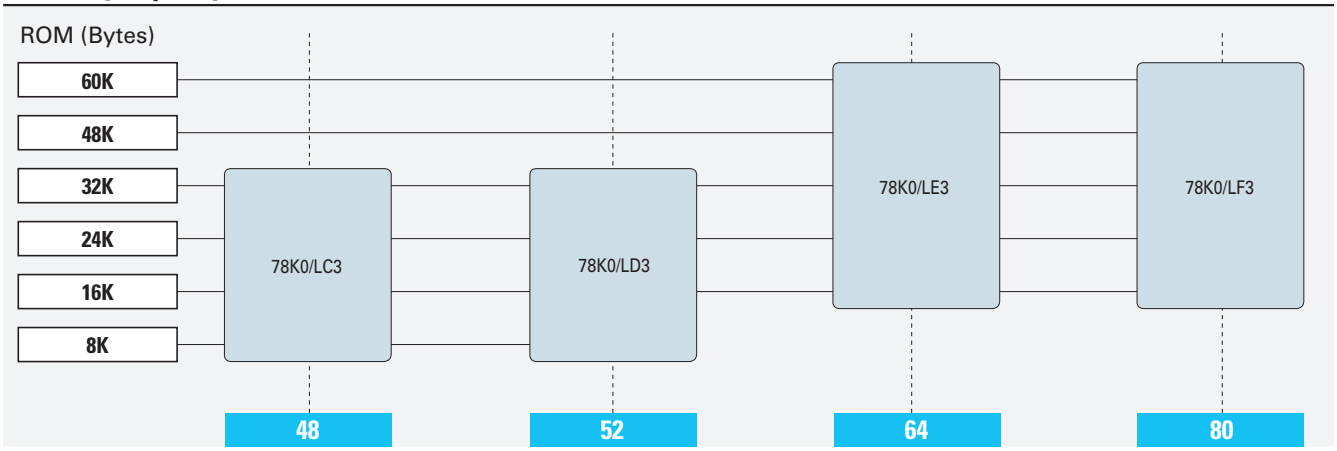
• Specifications (78K0R/LH3)

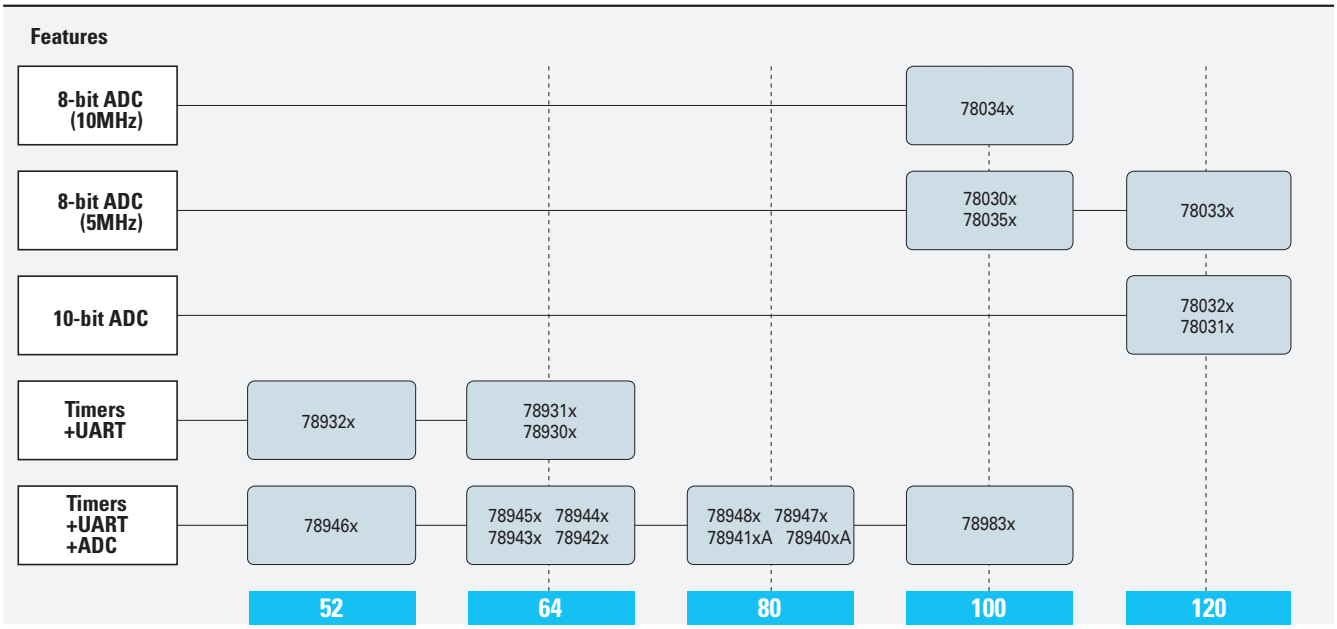
Group		μPD78F1506A	μPD78F1507A	μPD78F1508A	μPD78F1516A	μPD78F1518A
Memory	ROM Size (Bytes)	64K	96K	128K	64K	128K
	ROM Type	Flash				
	Single-Power-Supply Flash Memory	Yes				
	RAM Size (Bytes)	4K	6K	7K	4K	7K
Clock	Maximum Operating Frequency (MHz)	20				
	On-Chip Oscillator (Hz)	20M, 8M, 1M, 30k				
	Subclock (32.768kHz)	Yes				
I/O	I/O Ports	83				
Bus	External Data/Address Bus	—				
Timer	16-bit Timer	12				
	Real-Time Counter	1				
	Watchdog Timer	1				
	PWM Output	PWM: 16 bits × 6, multiplexed PWM: 16 bits × 7, multiplexed PWM: 16 bits × 3				
Serial Interface	CSI, UART	—				
	CSI (2ch), UART	1				
	CSI, UART, Simplified I²C	2				
	UART Supporting LIN-bus, CSI	—				
	UART Supporting LIN-bus	1				
	I²C	1				
OCD	On-Chip Debugger	Yes				
Peripheral Functions	LCD (Segments x Commons)	54 × 4 or 50 × 8				
	12-bit A/D Converter	12			—	
	10-bit A/D Converter	—			12	
	12-bit D/A Converter	2			—	
	Multiplier/Divider (bits x bits, bits ÷ bits)	16 × 16 32 ÷ 32				
	Other Functions	POC, LVI, DMA, operational amplifier × 3			POC, LVI, DMA	
Others	Power Supply Voltage (V)	1.8 to 5.5				
	Package (size: mm)	128-LQFP (14 × 20)				
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-78K0RLX3 (IECUBE)				
Package		P128GF-50-GAT				
Part No.		μPD78F1506AGF-GAT-AX	μPD78F1507AGF-GAT-AX	μPD78F1508AGF-GAT-AX	μPD78F1516AGF-GAT-AX	μPD78F1518AGF-GAT-AX

Remark POC: Power-on clear
LVI: Low-voltage indicator

★ : New product ★★ : Under development

• Memory Capacity (78K0, 78K0S)





• Specifications (78K0/LC3)

Group		μPD78F0400	μPD78F0401	μPD78F0402	μPD78F0403	μPD78F0410	μPD78F0411	μPD78F0412	μPD78F0413
Memory	ROM Size (Bytes)	8K	16K	24K	32K	8K	16K	24K	32K
	ROM Type	Flash							
	Single-Power-Supply Flash Memory	Yes							
	RAM Size (Bytes)	512	768	1K		512	768	1K	
Clock	Maximum Operating Frequency (MHz)	10							
	On-Chip Oscillator (Hz)	8M, 240k							
	Subclock (32.768kHz)	Yes							
I/O	I/O Ports	30							
Bus	External Data/Address Bus	—/—							
Timer	16-bit Timer	1							
	8-bit Timer	6							
	Other Timers	—							
	Watch Timer	—							
	Real-Time Counter	1							
	Watchdog Timer	1							
	PWM Output	16 bits × 1, 8 bits × 2							
Serial Interface	UART	1							
	UART Supporting LIN-bus	1							
	UART, CSI	—							
	UART Supporting LIN-bus, CSI	—							
	CSI	—							
	CSI, I²C	—							
	CSI with Automatic Transmission/Reception Function	—							
	I²C	—							
	IEBus	—							
	CAN	—							
OCD	On-Chip Debugger	Yes							
Peripheral Functions	LCD (Segments x Commons)	18 × 8 or 22 × 4							
	16-bit ΔΣ A/D Converter	—							
	10-bit A/D Converter	—				6			
	8-bit A/D Converter	—							
	8-bit D/A Converter	—							
	Multiplier/Divider (bits x bits, bits ÷ bits)	—							
	Other Functions	POC, LVI, Manchester code generator							
Others	Power Supply Voltage (V)	1.8 to 5.5							
	Package (size: mm)	48-LQFP (7 × 7)							
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-78K0LX3 (IECUBE)							
Package		P48GA-50-GAM							
Part No.		μPD78F0400GA-GAM-AX	μPD78F0401GA-GAM-AX	μPD78F0402GA-GAM-AX	μPD78F0403GA-GAM-AX	μPD78F0410GA-GAM-AX	μPD78F0411GA-GAM-AX	μPD78F0412GA-GAM-AX	μPD78F0413GA-GAM-AX

Remark POC: Power-on clear
LVI: Low-voltage indicator

★ : New product ★★ : Under development

• Specifications (78K0/LD3)

Group		μPD78F0420	μPD78F0421	μPD78F0422	μPD78F0423	μPD78F0430	μPD78F0431	μPD78F0432	μPD78F0433
Memory	ROM Size (Bytes)	8K	16K	24K	32K	8K	16K	24K	32K
	ROM Type	Flash							
	Single-Power-Supply Flash Memory	Yes							
	RAM Size (Bytes)	512	768	1K		512	768	1K	
Clock	Maximum Operating Frequency (MHz)	10							
	On-Chip Oscillator (Hz)	8M, 240k							
	Subclock (32.768kHz)	Yes							
I/O	I/O Ports	34							
Bus	External Data/Address Bus	—/—							
Timer	16-bit Timer	1							
	8-bit Timer	6							
	Other Timers	—							
	Watch Timer	—							
	Real-Time Counter	1							
	Watchdog Timer	1							
	PWM Output	16 bits × 1, 8 bits × 2							
Serial Interface	UART	—							
	UART Supporting LIN-bus	1							
	UART, CSI	1							
	UART Supporting LIN-bus, CSI	—							
	CSI	—							
	CSI, I^2C	—							
	CSI with Automatic Transmission/Reception Function	—							
	I^2C	—							
	IEBus	—							
	CAN	—							
OCD	On-Chip Debugger	Yes							
Peripheral Functions	LCD (Segments x Commons)	20 × 8 or 24 × 4							
	16-bit ΔΣ A/D Converter	—							
	10-bit A/D Converter	—				6			
	8-bit A/D Converter	—							
	8-bit D/A Converter	—							
	Multiplier/Divider (bits x bits, bits ÷ bits)	—							
	Other Functions	POC, LVI, Manchester code generator, remote control receiver							
Others	Power Supply Voltage (V)	1.8 to 5.5							
	Package (size: mm)	52-LQFP (10 × 10)							
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-78K0LX3 (IECUBE)							
Package		P52GB-65-GAG							
Part No.		μPD78F0420GB-GAG-AX	μPD78F0421GB-GAG-AX	μPD78F0422GB-GAG-AX	μPD78F0423GB-GAG-AX	μPD78F0430GB-GAG-AX	μPD78F0431GB-GAG-AX	μPD78F0432GB-GAG-AX	μPD78F0433GB-GAG-AX

Remark POC: Power-on clear
LVI: Low-voltage indicator

★ : New product ★★ : Under development

• Specifications (78K0/LE3 (1/3))

Group		μPD78F0441	μPD78F0442	μPD78F0443	μPD78F0444	μPD78F0445
Memory	ROM Size (Bytes)	16K	24K	32K	48K	60K
	ROM Type	Flash				
	Single-Power-Supply Flash Memory	Yes				
	RAM Size (Bytes)	768	1K		2K	
Clock	Maximum Operating Frequency (MHz)	10				
	On-Chip Oscillator (Hz)	8M, 240k				
	Subclock (32.768kHz)	Yes				
I/O	I/O Ports	46				
Bus	External Data/Address Bus	—/—				
Timer	16-bit Timer	1				
	8-bit Timer	6				
	Other Timers	—				
	Watch Timer	—				
	Real-Time Counter	1				
	Watchdog Timer	1				
	PWM Output	16 bits × 1, 8 bits × 4				
Serial Interface	UART	—				
	UART Supporting LIN-bus	1				
	UART, CSI	1				
	UART Supporting LIN-bus, CSI	—				
	CSI	—				
	CSI, I²C	—				
	CSI with Automatic Transmission/Reception Function	—				
	I²C	—				
	IEBus	—				
	CAN	—				
OCD	On-Chip Debugger	Yes				
Peripheral Functions	LCD (Segments x Commons)	28 × 8 or 32 × 4				
	16-bit ΔΣ A/D Converter	—				
	10-bit A/D Converter	—				
	8-bit A/D Converter	—				
	8-bit D/A Converter	—				
	Multiplier/Divider (bits x bits, bits ÷ bits)	—				
	Other Functions	POC, LVI, Manchester code generator, remote control receiver				
Others	Power Supply Voltage (V)	1.8 to 5.5				
	Package (size: mm)	64-LQFP (10 × 10) 64-LQFP (12 × 12) 64-TQFP (7 × 7)				
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-78K0LX3 (IECUBE)				
Package		P64GB-50-GAH P64GK-65-GAJ P64GA-40-HAB				
Part No.		μPD78F0441GB-GAH-AX μPD78F0441GK-GAJ-AX μPD78F0441GA-HAB-AX*	μPD78F0442GB-GAH-AX μPD78F0442GK-GAJ-AX μPD78F0442GA-HAB-AX*	μPD78F0443GB-GAH-AX μPD78F0443GK-GAJ-AX μPD78F0443GA-HAB-AX*	μPD78F0444GB-GAH-AX μPD78F0444GK-GAJ-AX μPD78F0444GA-HAB-AX*	μPD78F0445GB-GAH-AX μPD78F0445GK-GAJ-AX μPD78F0445GA-HAB-AX*

Remark POC: Power-on clear
LVI: Low-voltage indicator

★ : New product ★★ : Under development

• Specifications (78K0/LE3 (2/3))

Group		μPD78F0451	μPD78F0452	μPD78F0453	μPD78F0454	μPD78F0455
Memory	ROM Size (Bytes)	16K	24K	32K	48K	60K
	ROM Type	Flash				
	Single-Power-Supply Flash Memory	Yes				
	RAM Size (Bytes)	768	1K		2K	
Clock	Maximum Operating Frequency (MHz)	10				
	On-Chip Oscillator (Hz)	8M, 240k				
	Subclock (32.768kHz)	Yes				
I/O	I/O Ports	46				
Bus	External Data/Address Bus	—/—				
Timer	16-bit Timer	1				
	8-bit Timer	6				
	Other Timers	—				
	Watch Timer	—				
	Real-Time Counter	1				
	Watchdog Timer	1				
	PWM Output	16 bits × 1, 8 bits × 4				
Serial Interface	UART	—				
	UART Supporting LIN-bus	1				
	UART, CSI	1				
	UART Supporting LIN-bus, CSI	—				
	CSI	—				
	CSI, I^2C	—				
	CSI with Automatic Transmission/Reception Function	—				
	I^2C	—				
	IEBus	—				
	CAN	—				
OCD	On-Chip Debugger	Yes				
Peripheral Functions	LCD (Segments x Commons)	28 × 8 or 32 × 4				
	16-bit ΔΣ A/D Converter	—				
	10-bit A/D Converter	8				
	8-bit A/D Converter	—				
	8-bit D/A Converter	—				
	Multiplier/Divider (bits x bits, bits ÷ bits)	—				
	Other Functions	POC, LVI, Manchester code generator, remote control receiver				
Others	Power Supply Voltage (V)	1.8 to 5.5				
	Package (size: mm)	64-LQFP (10 × 10) 64-LQFP (12 × 12) 64-TQFP (7 × 7)				
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-78K0LX3 (IECUBE)				
Package		P64GB-50-GAH P64GK-65-GAJ P64GA-40-HAB				
Part No.		μPD78F0451GB-GAH-AX μPD78F0451GK-GAJ-AX μPD78F0451GA-HAB-AX	μPD78F0452GB-GAH-AX μPD78F0452GK-GAJ-AX μPD78F0452GA-HAB-AX	μPD78F0453GB-GAH-AX μPD78F0453GK-GAJ-AX μPD78F0453GA-HAB-AX	μPD78F0454GB-GAH-AX μPD78F0454GK-GAJ-AX μPD78F0454GA-HAB-AX	μPD78F0455GB-GAH-AX μPD78F0455GK-GAJ-AX μPD78F0455GA-HAB-AX

Remark POC: Power-on clear
LVI: Low-voltage indicator

★ : New product ★★ : Under development

• Specifications (78K0/LE3 (3/3))

Group		μPD78F0461	μPD78F0462	μPD78F0463	μPD78F0464	μPD78F0465
Memory	ROM Size (Bytes)	16K	24K	32K	48K	60K
	ROM Type	Flash				
	Single-Power-Supply Flash Memory	Yes				
	RAM Size (Bytes)	768	1K		2K	
Clock	Maximum Operating Frequency (MHz)	10				
	On-Chip Oscillator (Hz)	8M, 240k				
	Subclock (32.768kHz)	Yes				
I/O	I/O Ports	46				
Bus	External Data/Address Bus	—/—				
Timer	16-bit Timer	1				
	8-bit Timer	6				
	Other Timers	—				
	Watch Timer	—				
	Real-Time Counter	1				
	Watchdog Timer	1				
	PWM Output	16 bits × 1, 8 bits × 4				
Serial Interface	UART	—				
	UART Supporting LIN-bus	1				
	UART, CSI	1				
	UART Supporting LIN-bus, CSI	—				
	CSI	—				
	CSI, I^2C	—				
	CSI with Automatic Transmission/Reception Function	—				
	I^2C	—				
	IEBus	—				
	CAN	—				
OCD	On-Chip Debugger	Yes				
Peripheral Functions	LCD (Segments x Commons)	20 × 8 or 24 × 4				
	16-bit ΔΣ A/D Converter	3				
	10-bit A/D Converter	8				
	8-bit A/D Converter	—				
	8-bit D/A Converter	—				
	Multiplier/Divider (bits x bits, bits ÷ bits)	—				
	Other Functions	POC, LVI, Manchester code generator, remote control receiver				
Others	Power Supply Voltage (V)	1.8 to 5.5				
	Package (size: mm)	64-LQFP (10 × 10) 64-LQFP (12 × 12)				
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-78K0LX3 (IECUBE)				
Package		P64GB-50-GAH P64GK-65-GAJ				
Part No.		μPD78F0461GB-GAH-AX μPD78F0461GK-GAJ-AX	μPD78F0462GB-GAH-AX μPD78F0462GK-GAJ-AX	μPD78F0463GB-GAH-AX μPD78F0463GK-GAJ-AX	μPD78F0464GB-GAH-AX μPD78F0464GK-GAJ-AX	μPD78F0465GB-GAH-AX μPD78F0465GK-GAJ-AX

Remark POC: Power-on clear
LVI: Low-voltage indicator

★ : New product ★★ : Under development

• Specifications (78K0/LF3 (1/3))

Group		μPD78F0471	μPD78F0472	μPD78F0473	μPD78F0474	μPD78F0475
Memory	ROM Size (Bytes)	16K	24K	32K	48K	60K
	ROM Type	Flash				
	Single-Power-Supply Flash Memory	Yes				
	RAM Size (Bytes)	768	1K		2K	
Clock	Maximum Operating Frequency (MHz)	10				
	On-Chip Oscillator (Hz)	8M, 240k				
	Subclock (32.768kHz)	Yes				
I/O	I/O Ports	62				
Bus	External Data/Address Bus	—/—				
Timer	16-bit Timer	1				
	8-bit Timer	6				
	Other Timers	—				
	Watch Timer	—				
	Real-Time Counter	1				
	Watchdog Timer	1				
	PWM Output	16 bits × 1, 8 bits × 4				
Serial Interface	UART	—				
	UART Supporting LIN-bus	1				
	UART, CSI	1				
	UART Supporting LIN-bus, CSI	—				
	CSI	—				
	CSI, I^2C	—				
	CSI with Automatic Transmission/Reception Function	1				
	I^2C	—				
	IEBus	—				
	CAN	—				
OCD	On-Chip Debugger	Yes				
Peripheral Functions	LCD (Segments x Commons)	36 × 8 or 40 × 4				
	16-bit ΔΣ A/D Converter	—				
	10-bit A/D Converter	—				
	8-bit A/D Converter	—				
	8-bit D/A Converter	—				
	Multiplier/Divider (bits x bits, bits ÷ bits)	—				
	Other Functions	POC, LVI, Manchester code generator, remote control receiver				
Others	Power Supply Voltage (V)	1.8 to 5.5				
	Package (size: mm)	80-LQFP (14 × 14) 80-LQFP (12 × 12)				
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-78K0LX3 (IECUBE)				
Package		P80GC-65-GAD P80GK-50-GAK				
Part No.		μPD78F0471GC-GAD-AX μPD78F0471GK-GAK-AX	μPD78F0472GC-GAD-AX μPD78F0472GK-GAK-AX	μPD78F0473GC-GAD-AX μPD78F0473GK-GAK-AX	μPD78F0474GC-GAD-AX μPD78F0474GK-GAK-AX	μPD78F0475GC-GAD-AX μPD78F0475GK-GAK-AX

Remark POC: Power-on clear
LVI: Low-voltage indicator

★ : New product ★★ : Under development

• Specifications (78K0/LF3 (2/3))

Group		μPD78F0481	μPD78F0482	μPD78F0483	μPD78F0484	μPD78F0485
Memory	ROM Size (Bytes)	16K	24K	32K	48K	60K
	ROM Type	Flash				
	Single-Power-Supply Flash Memory	Yes				
	RAM Size (Bytes)	768	1K		2K	
Clock	Maximum Operating Frequency (MHz)	10				
	On-Chip Oscillator (Hz)	8M, 240k				
	Subclock (32.768kHz)	Yes				
I/O	I/O Ports	62				
Bus	External Data/Address Bus	—/—				
Timer	16-bit Timer	1				
	8-bit Timer	6				
	Other Timers	—				
	Watch Timer	—				
	Real-Time Counter	1				
	Watchdog Timer	1				
	PWM Output	16 bits × 1, 8 bits × 4				
Serial Interface	UART	—				
	UART Supporting LIN-bus	1				
	UART, CSI	1				
	UART Supporting LIN-bus, CSI	—				
	CSI	—				
	CSI, I²C	—				
	CSI with Automatic Transmission/Reception Function	1				
	I²C	—				
	IEBus	—				
	CAN	—				
OCD	On-Chip Debugger	Yes				
Peripheral Functions	LCD (Segments x Commons)	36 × 8 or 40 × 4				
	16-bit ΔΣ A/D Converter	—				
	10-bit A/D Converter	8				
	8-bit A/D Converter	—				
	8-bit D/A Converter	—				
	Multiplier/Divider (bits x bits, bits ÷ bits)	—				
	Other Functions	POC, LVI, Manchester code generator, remote control receiver				
Others	Power Supply Voltage (V)	1.8 to 5.5				
	Package (size: mm)	80-LQFP (14 × 14) 80-LQFP (12 × 12)				
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-78K0LX3 (IECUBE)				
Package		P80GC-65-GAD P80GK-50-GAK				
Part No.		μPD78F0481GC-GAD-AX μPD78F0481GK-GAK-AX	μPD78F0482GC-GAD-AX μPD78F0482GK-GAK-AX	μPD78F0483GC-GAD-AX μPD78F0483GK-GAK-AX	μPD78F0484GC-GAD-AX μPD78F0484GK-GAK-AX	μPD78F0485GC-GAD-AX μPD78F0485GK-GAK-AX

Remark POC: Power-on clear
LVI: Low-voltage indicator

★ : New product ★★ : Under development

• Specifications (78K0/LF3 (3/3))

Group		μPD78F0491	μPD78F0492	μPD78F0493	μPD78F0494	μPD78F0495
Memory	ROM Size (Bytes)	16K	24K	32K	48K	60K
	ROM Type	Flash				
	Single-Power-Supply Flash Memory	Yes				
	RAM Size (Bytes)	768	1K		2K	
Clock	Maximum Operating Frequency (MHz)	10				
	On-Chip Oscillator (Hz)	8M, 240k				
	Subclock (32.768kHz)	Yes				
I/O	I/O Ports	62				
Bus	External Data/Address Bus	—/—				
Timer	16-bit Timer	1				
	8-bit Timer	6				
	Other Timers	—				
	Watch Timer	—				
	Real-Time Counter	1				
	Watchdog Timer	1				
	PWM Output	16 bits × 1, 8 bits × 4				
Serial Interface	UART	—				
	UART Supporting LIN-bus	1				
	UART, CSI	1				
	UART Supporting LIN-bus, CSI	—				
	CSI	—				
	CSI, I^2C	—				
	CSI with Automatic Transmission/Reception Function	1				
	I^2C	—				
	IEBus	—				
	CAN	—				
OCD	On-Chip Debugger	Yes				
Peripheral Functions	LCD (Segments x Commons)	28 × 8 or 32 × 4				
	16-bit ΔΣ A/D Converter	3				
	10-bit A/D Converter	8				
	8-bit A/D Converter	—				
	8-bit D/A Converter	—				
	Multiplier/Divider (bits x bits, bits ÷ bits)	—				
	Other Functions	POC, LVI, Manchester code generator, remote control receiver				
Others	Power Supply Voltage (V)	1.8 to 5.5				
	Package (size: mm)	80-LQFP (14 × 14) 80-LQFP (12 × 12)				
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-78K0LX3 (IECUBE)				
Package		P80GC-65-GAD P80GK-50-GAK				
Part No.		μPD78F0491GC-GAD-AX μPD78F0491GK-GAK-AX	μPD78F0492GC-GAD-AX μPD78F0492GK-GAK-AX	μPD78F0493GC-GAD-AX μPD78F0493GK-GAK-AX	μPD78F0494GC-GAD-AX μPD78F0494GK-GAK-AX	μPD78F0495GC-GAD-AX μPD78F0495GK-GAK-AX

Remark POC: Power-on clear
LVI: Low-voltage indicator

★ : New product ★★ : Under development

• Specifications (μPD78030x)

Group		μPD780306 (/Y)	μPD780308 (/Y)	μPD78P0308 (/Y)
Memory	ROM Size (Bytes)	48K	60K	
	ROM Type	Mask		OTPROM
	Single-Power-Supply Flash Memory	—		
	RAM Size (Bytes)	2K		
Clock	Maximum Operating Frequency (MHz)	5		
	On-Chip Oscillator (Hz)	—		
	Subclock (32.768kHz)	Yes		
I/O	I/O Ports	57		
Bus	External Data/Address Bus	—/—		
Timer	16-bit Timer	1		
	8-bit Timer	2		
	Other Timers	—		
	Watch Timer	1		
	Real-Time Counter	—		
	Watchdog Timer	1		
	PWM Output	14 bits × 1		
Serial Interface	UART	—		
	UART Supporting LIN-bus	—		
	UART, CSI	1		
	UART Supporting LIN-bus, CSI	—		
	CSI	2 (1)		
	CSI, I²C	0 (1)		
	CSI with Automatic Transmission/Reception Function	—		
	I²C	—		
	IEBus	—		
	CAN	—		
OCD	On-Chip Debugger	—		
Peripheral Functions	LCD (Segments x Commons)	40 × 4		
	16-bit ΔΣ A/D Converter	—		
	10-bit A/D Converter	—		
	8-bit A/D Converter	8		
	8-bit D/A Converter	—		
	Multiplier/Divider (bits × bits, bits ÷ bits)	—		
	Other Functions	—		
Others	Power Supply Voltage (V)	2.0 to 5.5		
	Package (size: mm)	100-LQFP (14 × 14)		
	In-Circuit Emulator Emulation Board	IE-78K0-NS/-A, IE-780308-NS-EM1		
Package		S100GC-50-8EU, 8EA-2		
Part No.		μPD780306 (/Y)GC-xxx-8EU-A	μPD780308 (/Y)GC-xxx-8EU-A	μPD78P0308 (/Y)GC-8EU-A

★ : New product ★★ : Under development

MCUs with LCD Controllers and Drivers

• Specifications (μPD78031x, μPD78032x, μPD78033x)

Group		μPD78031x		μPD78032x		μPD78033x		
		μPD780316	μPD780318	μPD780326	μPD780328	μPD780336	μPD780338	μPD78F0338
Memory	ROM Size (Bytes)	48K	60K	48K	60K	48K	60K	
	ROM Type	Mask						Flash
	Single-Power-Supply Flash Memory	—						
	RAM Size (Bytes)	2.5K						
Clock	Maximum Operating Frequency (MHz)	10						
	On-Chip Oscillator (Hz)	—						
	Subclock (32.768kHz)	Yes						
I/O	I/O Ports	70		62		54		70
Bus	External Data/Address Bus	—/—						
Timer	16-bit Timer	2						
	8-bit Timer	3						
	Other Timers	—						
	Watch Timer	—						
	Real-Time Counter	—						
	Watchdog Timer	1						
	PWM Output	16 bits × 1, 8 bits × 3						
Serial Interface	UART	—						
	UART Supporting LIN-bus	—						
	UART, CSI	1						
	UART Supporting LIN-bus, CSI	—						
	CSI	1						
	CSI, I²C	—						
	CSI with Automatic Transmission/Reception Function	—						
	I²C	—						
	IEBus	—						
	CAN	—						
OCD	On-Chip Debugger	—						
Peripheral Functions	LCD (Segments × Commons)	24 × 4		32 × 4		40 × 4		
	16-bit ΔΣ A/D Converter	—						
	10-bit A/D Converter	10						
	8-bit A/D Converter	—						
	8-bit D/A Converter	1						
	Multiplier/Divider (bits × bits, bits ÷ bits)	—						
	Other Functions	ROMC						
Others	Power Supply Voltage (V)	1.8 to 5.5						
	Package (size: mm)	120-TQFP (14 × 14)						
	In-Circuit Emulator Emulation Board	IE-78K0-NS/-A, IE-780338-NS-EM1						
Package		S120GC-40-9EB-1						
Part No.		μPD780316GC-xxx-9EB-A	μPD780318GC-xxx-9EB-A	μPD780326GC-xxx-9EB-A	μPD780328GC-xxx-9EB-A	μPD780336GC-xxx-9EB-A	μPD780338GC-xxx-9EB-A	μPD78F0338GC-9EB-A

Remark ROMC: ROM correction

★ : New product ★★ : Under development

• Specifications (μPD78034x, μPD78035x)

Group		μPD78034x		μPD78035x		
		μPD780343 (/Y)	μPD780344 (/Y)	μPD780353 (/Y)	μPD780354 (/Y)	μPD78F0354A (/Y)
Memory	ROM Size (Bytes)	24K	32K	48K	60K	
	ROM Type	Mask				Flash
	Single-Power-Supply Flash Memory	—				
	RAM Size (Bytes)	1K				1.5K
Clock	Maximum Operating Frequency (MHz)	10				
	On-Chip Oscillator (Hz)	—				
	Subclock (32.768kHz)	Yes				
I/O	I/O Ports	66				
Bus	External Data/Address Bus	—/—				
Timer	16-bit Timer	1				
	8-bit Timer	4				
	Other Timers	—				
	Watch Timer	1				
	Real-Time Counter	—				
	Watchdog Timer	1				
	PWM Output	16 bits × 1, 8 bits × 3				
Serial Interface	UART	1				
	UART Supporting LIN-bus	—				
	UART, CSI	—				
	UART Supporting LIN-bus, CSI	—				
	CSI	2				
	CSI, I²C	—				
	CSI with Automatic Transmission/Reception Function	—				
	I²C	0 (1)				
	IEBus	—				
	CAN	—				
OCD	On-Chip Debugger	—				
Peripheral Functions	LCD (Segments x Commons)	40 × 4				
	16-bit ΔΣ A/D Converter	—				
	10-bit A/D Converter	—		8		
	8-bit A/D Converter	8		—		
	8-bit D/A Converter	—				
	Multiplier/Divider (bits x bits, bits ÷ bits)	—				
	Other Functions	ROMC				
Others	Power Supply Voltage (V)	1.8 to 5.5				
	Package (size: mm)	100-LQFP (14 × 14)	100-LQFP (14 × 14) 113-FBGA (10 × 10) note1	100-LQFP (14 × 14)		100-LQFP (14 × 14) 113-FBGA (10 × 10) note2
	In-Circuit Emulator Emulation Board	IE-78K0-NS/-A, IE-780354-NS-EM1				
Package		S100GC-50-8EU, 8EA-2	S100GC-50-8EU, 8EA-2 P113F1-80-DA3	S100GC-50-8EU, 8EA-2		S100GC-50-8EU, 8EA-2 P113F1-80-DA3
Part No.		μPD780343 (/Y)GC-xxx-8EU-A	μPD780344 (/Y)GC-xxx-8EU-A μPD780344F1-xxx-DA3-A	μPD780353 (/Y)GC-xxx-8EU-A	μPD780354 (/Y)GC-xxx-8EU-A	μPD78F0354A (/Y)GC-8EU-A μPD78F0354YF1-DA3-A

note1: μPD780344 only
note2: μPD78F0354Y only
Remark ROMC: ROM correction

★ : New product ★★ : Under development

• Specifications (μPD78930x, μPD78931x)

Group		μPD78930x			μPD78931x		
		μPD789304	μPD789306	μPD78F9306	μPD789314	μPD789316	μPD78F9316
Memory	ROM Size (Bytes)	8K	16K		8K	16K	
	ROM Type	Mask		Flash	Mask		Flash
	Single-Power-Supply Flash Memory	—					
	RAM Size (Bytes)	512					
Clock	Maximum Operating Frequency (MHz)	5			4 (RC)		
	On-Chip Oscillator (Hz)	—					
	Subclock (32.768kHz)	Yes					
I/O	I/O Ports	23					
Bus	External Data/Address Bus	—/—					
Timer	16-bit Timer	1					
	8-bit Timer	2					
	Other Timers	—					
	Watch Timer	1					
	Real-Time Counter	—					
	Watchdog Timer	1					
	PWM Output	8 bits × 1					
Serial Interface	UART	—					
	UART Supporting LIN-bus	—					
	UART, CSI	1					
	UART Supporting LIN-bus, CSI	—					
	CSI	1					
	CSI, I²C	—					
	CSI with Automatic Transmission/Reception Function	—					
	I²C	—					
	IEBus	—					
	CAN	—					
OCD	On-Chip Debugger	—					
Peripheral Functions	LCD (Segments x Commons)	24 × 4					
	16-bit ΔΣ A/D Converter	—					
	10-bit A/D Converter	—					
	8-bit A/D Converter	—					
	8-bit D/A Converter	—					
	Multiplier/Divider (bits x bits, bits ÷ bits)	—					
	Other Functions	—					
Others	Power Supply Voltage (V)	1.8 to 5.5					
	Package (size: mm)	64-TQFP (12 × 12) 64-LQFP (14 × 14)					
	In-Circuit Emulator Emulation Board	IE-78K0S-NS/-A, IE-789306-NS-EM1					
Package		P64GK-65-9ET-3 P64GC-80-8BS					
Part No.		μPD789304GK-xxx-9ET-A μPD789304GC-xxx-8BS-A	μPD789306GK-xxx-9ET-A μPD789306GC-xxx-8BS-A	μPD78F9306GK-9ET-A μPD78F9306GC-8BS-A	μPD789314GK-xxx-9ET-A μPD789314GC-xxx-8BS-A	μPD789316GK-xxx-9ET-A μPD789316GC-xxx-8BS-A	μPD78F9316GK-9ET-A μPD78F9316GC-8BS-A

★ : New product ★★ : Under development

• Specifications (μPD78932x)

Group		μPD789322	μPD789324	μPD789326	μPD78F9328
Memory	ROM Size (Bytes)	4K	8K	16K	32K
	ROM Type	Mask			Flash
	Single-Power-Supply Flash Memory	—			
	RAM Size (Bytes)	256		512	
Clock	Maximum Operating Frequency (MHz)	5			
	On-Chip Oscillator (Hz)	—			
	Subclock (32.768kHz)	Yes			
I/O	I/O Ports	21			
Bus	External Data/Address Bus	—/—			
Timer	16-bit Timer	—			
	8-bit Timer	2			
	Other Timers	—			
	Watch Timer	1			
	Real-Time Counter	—			
	Watchdog Timer	1			
	PWM Output	8 bits × 1			
Serial Interface	UART	—			
	UART Supporting LIN-bus	—			
	UART, CSI	—			
	UART Supporting LIN-bus, CSI	—			
	CSI	1			
	CSI, I²C	—			
	CSI with Automatic Transmission/Reception Function	—			
	I²C	—			
	IEBus	—			
	CAN	—			
OCD	On-Chip Debugger	—			
Peripheral Functions	LCD (Segments x Commons)	24 × 4			
	16-bit ΔΣ A/D Converter	—			
	10-bit A/D Converter	—			
	8-bit A/D Converter	—			
	8-bit D/A Converter	—			
	Multiplier/Divider (bits x bits, bits ÷ bits)	—			
	Other Functions	POC			
Others	Power Supply Voltage (V)	1.8 to 5.5			
	Package (size: mm)	52-LQFP (10 × 10)			
	In-Circuit Emulator Emulation Board	IE-78K0S-NS/-A, IE-789468-NS-EM1			
Package		S52GB-65-8ET-2			
Part No.		μPD789322GB-xxx-8ET-A	μPD789324GB-xxx-8ET-A	μPD789326GB-xxx-8ET-A	μPD78F9328GB-8ET-A

★ : New product ★★ : Under development

• Specifications (μPD78940xA, μPD78941xA)

Group		μPD78940xA			μPD78941xA		
		μPD789405A	μPD789406A	μPD789407A	μPD789415A	μPD789416A	μPD789417A
Memory	ROM Size (Bytes)	12K	16K	24K	12K	16K	24K
	ROM Type	Mask					
	Single-Power-Supply Flash Memory	—					
	RAM Size (Bytes)	512					
Clock	Maximum Operating Frequency (MHz)	5					
	On-Chip Oscillator (Hz)	—					
	Subclock (32.768kHz)	Yes					
I/O	I/O Ports	43					
Bus	External Data/Address Bus	—/—					
Timer	16-bit Timer	1					
	8-bit Timer	3					
	Other Timers	—					
	Watch Timer	1					
	Real-Time Counter	—					
	Watchdog Timer	1					
	PWM Output	—					
Serial Interface	UART	—					
	UART Supporting LIN-bus	—					
	UART, CSI	1					
	UART Supporting LIN-bus, CSI	—					
	CSI	—					
	CSI, I²C	—					
	CSI with Automatic Transmission/Reception Function	—					
	I²C	—					
	IEBus	—					
	CAN	—					
OCD	On-Chip Debugger	—					
Peripheral Functions	LCD (Segments × Commons)	28 × 4					
	16-bit ΔΣ A/D Converter	—					
	10-bit A/D Converter	—			7		
	8-bit A/D Converter	7			—		
	8-bit D/A Converter	—					
	Multiplier/Divider (bits × bits, bits ÷ bits)	—					
	Other Functions	—					
Others	Power Supply Voltage (V)	1.8 to 5.5					
	Package (size: mm)	80-TQFP (12 × 12) 80-QFP (14 × 14)					
	In-Circuit Emulator Emulation Board	IE-78K0S-NS/-A, IE-789418-NS-EM1					
Package		P80GC-65-8BT-1 P80GK-50-9EU-1					
Part No.		μPD789405AGC-×××-8BT-A μPD789405AGK-×××-9EU-A	μPD789406AGC-×××-8BT-A μPD789406AGK-×××-9EU-A	μPD789407AGC-×××-8BT-A μPD789407AGK-×××-9EU-A	μPD789415AGC-×××-8BT-A μPD789415AGK-×××-9EU-A	μPD789416AGC-×××-8BT-A μPD789416AGK-×××-9EU-A	μPD789417AGC-×××-8BT-A μPD789417AGK-×××-9EU-A

★ : New product ★★ : Under development

• Specifications (μPD78942x, μPD78943x)

Group		μPD78942x		μPD78943x	
		μPD789425	μPD789426	μPD789435	μPD789436
Memory	ROM Size (Bytes)	12K	16K	12K	16K
	ROM Type	Mask			
	Single-Power-Supply Flash Memory	—			
	RAM Size (Bytes)	512			
Clock	Maximum Operating Frequency (MHz)	5			
	On-Chip Oscillator (Hz)	—			
	Subclock (32.768kHz)	Yes			
I/O	I/O Ports	40			
Bus	External Data/Address Bus	—/—			
Timer	16-bit Timer	1			
	8-bit Timer	2			
	Other Timers	—			
	Watch Timer	1			
	Real-Time Counter	—			
	Watchdog Timer	1			
	PWM Output	8 bits × 2			
Serial Interface	UART	—			
	UART Supporting LIN-bus	—			
	UART, CSI	1			
	UART Supporting LIN-bus, CSI	—			
	CSI	—			
	CSI, I²C	—			
	CSI with Automatic Transmission/Reception Function	—			
	I²C	—			
	IEBus	—			
	CAN	—			
OCD	On-Chip Debugger	—			
Peripheral Functions	LCD (Segments x Commons)	5 × 4			
	16-bit ΔΣ A/D Converter	—			
	10-bit A/D Converter	—		6	
	8-bit A/D Converter	6		—	
	8-bit D/A Converter	—			
	Multiplier/Divider (bits x bits, bits ÷ bits)	—			
	Other Functions	—			
Others	Power Supply Voltage (V)	1.8 to 5.5			
	Package (size: mm)	64-TQFP (12 × 12) 64-LQFP (10 × 10)			
	In-Circuit Emulator Emulation Board	IE-78K0S-NS/-A, IE-789456-NS-EM1			
Package		P64GK-65-9ET-3 S64GB-50-8EU-2			
Part No.		μPD789425GK-×××-9ET-A μPD789425GB-×××-8EU-A	μPD789426GK-×××-9ET-A μPD789426GB-×××-8EU-A	μPD789435GK-×××-9ET-A μPD789435GB-×××-8EU-A	μPD789436GK-×××-9ET-A μPD789436GB-×××-8EU-A

★ : New product ★★ : Under development

• Specifications (μPD78944x, μPD78945x)

Group		μPD78944x		μPD78945x	
		μPD789445	μPD789446	μPD789455	μPD789456
Memory	ROM Size (Bytes)	12K	16K	12K	16K
	ROM Type	Mask			
	Single-Power-Supply Flash Memory	—			
	RAM Size (Bytes)	512			
Clock	Maximum Operating Frequency (MHz)	5			
	On-Chip Oscillator (Hz)	—			
	Subclock (32.768kHz)	Yes			
I/O	I/O Ports	30			
Bus	External Data/Address Bus	—/—			
Timer	16-bit Timer	1			
	8-bit Timer	2			
	Other Timers	—			
	Watch Timer	1			
	Real-Time Counter	—			
	Watchdog Timer	1			
	PWM Output	8 bits × 2			
Serial Interface	UART	—			
	UART Supporting LIN-bus	—			
	UART, CSI	1			
	UART Supporting LIN-bus, CSI	—			
	CSI	—			
	CSI, I²C	—			
	CSI with Automatic Transmission/Reception Function	—			
	I²C	—			
	IEBus	—			
	CAN	—			
OCD	On-Chip Debugger	—			
Peripheral Functions	LCD (Segments x Commons)	15 × 4			
	16-bit ΔΣ A/D Converter	—			
	10-bit A/D Converter	—		6	
	8-bit A/D Converter	6		—	
	8-bit D/A Converter	—			
	Multiplier/Divider (bits x bits, bits ÷ bits)	—			
	Other Functions	—			
Others	Power Supply Voltage (V)	1.8 to 5.5			
	Package (size: mm)	64-TQFP (12 × 12) 64-LQFP (10 × 10)			
	In-Circuit Emulator Emulation Board	IE-78K0S-NS/-A, IE-789456-NS-EM1			
Package		P64GK-65-9ET-3 S64GB-50-8EU-2			
Part No.		μPD789445GK-×××-9ET-A μPD789445GB-×××-8EU-A	μPD789446GK-×××-9ET-A μPD789446GB-×××-8EU-A	μPD789455GK-×××-9ET-A μPD789455GB-×××-8EU-A	μPD789456GK-×××-9ET-A μPD789456GB-×××-8EU-A

★ : New product ★★ : Under development

• Specifications (μPD78946x)

Group		μPD789462	μPD789464	μPD789466	μPD789467
Memory	ROM Size (Bytes)	4K	8K	16K	24K
	ROM Type	Mask			
	Single-Power-Supply Flash Memory	—			
	RAM Size (Bytes)	256		512	
Clock	Maximum Operating Frequency (MHz)	5			
	On-Chip Oscillator (Hz)	—			
	Subclock (32.768kHz)	Yes			
I/O	I/O Ports	18			
Bus	External Data/Address Bus	—/—			
Timer	16-bit Timer	—			
	8-bit Timer	2			
	Other Timers	—			
	Watch Timer	1			
	Real-Time Counter	—			
	Watchdog Timer	1			
	PWM Output	8 bits × 1			
Serial Interface	UART	—			
	UART Supporting LIN-bus	—			
	UART, CSI	—			
	UART Supporting LIN-bus, CSI	—			
	CSI	—			
	CSI, I²C	—			
	CSI with Automatic Transmission/Reception Function	—			
	I²C	—			
	IEBus	—			
	CAN	—			
OCD	On-Chip Debugger	—			
Peripheral Functions	LCD (Segments x Commons)	23 × 4			
	16-bit ΔΣ A/D Converter	—			
	10-bit A/D Converter	—			
	8-bit A/D Converter	1			
	8-bit D/A Converter	—			
	Multiplier/Divider (bits × bits, bits ÷ bits)	—			
	Other Functions	POC			
Others	Power Supply Voltage (V)	1.8 to 5.5			
	Package (size: mm)	52-LQFP (10 × 10)			
	In-Circuit Emulator Emulation Board	IE-78K0S-NS/-A, IE-789468-NS-EM1			
Package		S52GB-65-8ET-2			
Part No.		μPD789462GB-xxx-8ET-A	μPD789464GB-xxx-8ET-A	μPD789466GB-xxx-8ET-A	μPD789467GB-xxx-8ET-A

Remark POC: Power-on clear

★ : New product ★★ : Under development

• Specifications (μPD78947x)

Group		μPD789477	μPD789478	μPD789479
Memory	ROM Size (Bytes)	24K	32K	48K
	ROM Type	Mask		
	Single-Power-Supply Flash Memory	—		
	RAM Size (Bytes)	768	1K	1.5K
Clock	Maximum Operating Frequency (MHz)	5		
	On-Chip Oscillator (Hz)	—		
	Subclock (32.768kHz)	Yes		
I/O	I/O Ports	45		
Bus	External Data/Address Bus	—/—		
Timer	16-bit Timer	1		
	8-bit Timer	3		
	Other Timers	—		
	Watch Timer	1		
	Real-Time Counter	—		
	Watchdog Timer	1		
	PWM Output	8 bits × 3		
Serial Interface	UART	—		
	UART Supporting LIN-bus	—		
	UART, CSI	1		
	UART Supporting LIN-bus, CSI	—		
	CSI	—		
	CSI, I²C	—		
	CSI with Automatic Transmission/Reception Function	1		
	I²C	—		
	IEBus	—		
	CAN	—		
OCD	On-Chip Debugger	—		
Peripheral Functions	LCD (Segments x Commons)	28 × 4		
	16-bit ΔΣ A/D Converter	—		
	10-bit A/D Converter	—		
	8-bit A/D Converter	8		
	8-bit D/A Converter	—		
	Multiplier/Divider (bits x bits, bits ÷ bits)	8 × 8		
	Other Functions	Remote control receiver		
Others	Power Supply Voltage (V)	1.8 to 5.5		
	Package (size: mm)	80-TQFP (12 × 12) 80-QFP (14 × 14)		
	In-Circuit Emulator Emulation Board	IE-78K0S-NS/-A, IE-789488-NS-EM1		
Package		P80GC-65-8BT-1 P80GK-50-9EU-1		
Part No.		μPD789477GC-xxx-8BT-A μPD789477GK-xxx-9EU-A	μPD789478GC-xxx-8BT-A μPD789478GK-xxx-9EU-A	μPD789479GC-xxx-8BT-A μPD789479GK-xxx-9EU-A

★ : New product ★★ : Under development

• Specifications (μPD78948x)

Group		μPD789488	μPD789489
Memory	ROM Size (Bytes)	32K	48K
	ROM Type	Mask	
	Single-Power-Supply Flash Memory	—	
	RAM Size (Bytes)	1K	1.5K
Clock	Maximum Operating Frequency (MHz)	5	
	On-Chip Oscillator (Hz)	—	
	Subclock (32.768kHz)	Yes	
I/O	I/O Ports	45	
Bus	External Data/Address Bus	—/—	
Timer	16-bit Timer	1	
	8-bit Timer	3	
	Other Timers	—	
	Watch Timer	1	
	Real-Time Counter	—	
	Watchdog Timer	1	
	PWM Output	8 bits × 3	
Serial Interface	UART	—	
	UART Supporting LIN-bus	—	
	UART, CSI	1	
	UART Supporting LIN-bus, CSI	—	
	CSI	—	
	CSI, I²C	—	
	CSI with Automatic Transmission/Reception Function	1	
	I²C	—	
	IEBus	—	
	CAN	—	
OCD	On-Chip Debugger	—	
Peripheral Functions	LCD (Segments x Commons)	28 × 4	
	16-bit ΔΣ A/D Converter	—	
	10-bit A/D Converter	8	
	8-bit A/D Converter	—	
	8-bit D/A Converter	—	
	Multiplier/Divider (bits × bits, bits ÷ bits)	8 × 8	
	Other Functions	Internal LCD step-up circuit	Internal LCD step-up circuit and remote control receiver
Others	Power Supply Voltage (V)	1.8 to 5.5	
	Package (size: mm)	80-TQFP (12 × 12) 80-QFP (14 × 14)	
	In-Circuit Emulator Emulation Board	IE-78K0S-NS/-A, IE-789488-NS-EM1	
Package		P80GC-65-8BT-1 P80GK-50-9EU-1	
Part No.		μPD789488GC-×××-8BT-A μPD789488GK-×××-9EU-A	μPD789489GC-×××-8BT-A μPD789489GK-×××-9EU-A

★ : New product ★★ : Under development

• Specifications (μPD78983x)

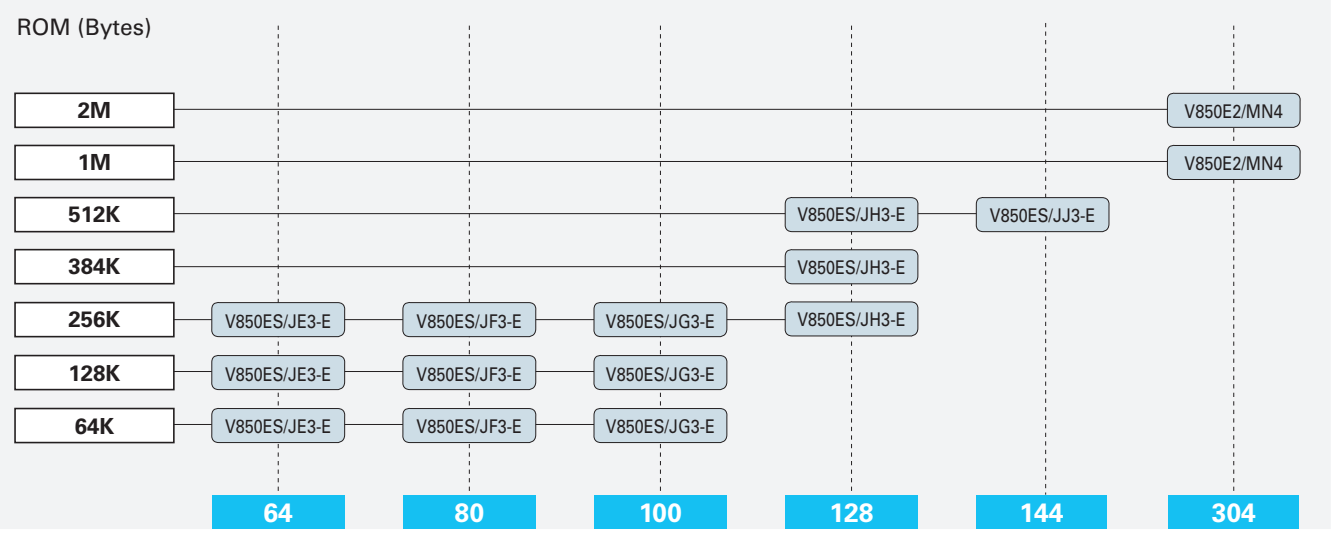
Group		μPD78983x		μPD789835B				
		μPD789830	μPD78F9831	μPD789832B	μPD789833B	μPD789834B	μPD789835B	μPD78F9835
Memory	ROM Size (Bytes)	24K	48K	24K	32K	48K	60K	
	ROM Type	Mask	Flash	Mask				Flash
	Single-Power-Supply Flash Memory	—						
	RAM Size (Bytes)	1K	2K	2240		3264		
Clock	Maximum Operating Frequency (MHz)	3.58		5				
	On-Chip Oscillator (Hz)	—						
	Subclock (32.768kHz)	Yes						
I/O	I/O Ports	30	38	37				
Bus	External Data/Address Bus	—/—						
Timer	16-bit Timer	1		—				
	8-bit Timer	1		6				
	Other Timers	—						
	Watch Timer	1						
	Real-Time Counter	—						
	Watchdog Timer	1						
	PWM Output	—		8 bits × 1				
Serial Interface	UART	1		—				
	UART Supporting LIN-bus	—						
	UART, CSI	—		1				
	UART Supporting LIN-bus, CSI	—						
	CSI	—						
	CSI, I²C	—						
	CSI with Automatic Transmission/Reception Function	—						
	I²C	—						
	IEBus	—						
	CAN	—						
OCD	On-Chip Debugger	—	Yes	—				
Peripheral Functions	LCD (Segments x Commons)	40 × 16		48 × 48				
	16-bit ΔΣ A/D Converter	—						
	10-bit A/D Converter	—						
	8-bit A/D Converter	—		3				
	8-bit D/A Converter	—						
	Multiplier/Divider (bits x bits, bits ÷ bits)	—		8 × 8				
	Other Functions	—		SWAP, sound generator				
Others	Power Supply Voltage (V)	2.7 to 5.5		1.8 to 3.6				3.0 to 3.6
	Package (size: mm)	88-pin bare chip	100-LQFP (14 × 14)	144-LQFP (20 × 20)				
	In-Circuit Emulator Emulation Board	IE-78K0S-NS/-A, IE-789831-NS-EM1		IE-78K0S-NS/-A IE-789835-NS-EM1				
Package		—	S100GC-50-8EU, 8EA-2	S144GJ-50-UEN				
Part No.		μPD789830P-xxx μPD789830W-xxx	μPD78F9831GC-8EU-A	μPD789832BGJ-xxx-UEN-A	μPD789833BGJ-xxx-UEN-A	μPD789834BGJ-xxx-UEN-A	μPD789835BGJ-xxx-UEN-A	μPD78F9835GJ-UEN-A

★ : New product ★★ : Under development

Ethernet MCUs

The Ethernet MCUs from Renesas Electronics are single-chip microcontrollers that feature an on-chip Ethernet MAC (10/100Base), enabling compact network connection. The large-capacity on-chip RAM (capacities up to 124 KB are available) also provide support for network data transfers.

• Memory Capacity (Ethernet MCUs)



• Specifications (V850ES/JE3-E)

Group		μPD70F3826	μPD70F3827	μPD70F3828	μPD70F3829
Memory	ROM Size (Bytes)	64K	128K	256K	
	ROM Type	Flash			
	Single-Power-Supply Flash Memory	Yes			
	RAM Size (Bytes)	32K	48K	64K	
Clock	Maximum Operating Frequency (MHz)	50			
	On-Chip Oscillator (Hz)	220k			
	Subclock (32.768kHz)	Yes			
I/O	I/O Ports	29			
Timer	16-bit Timer	10			
	8-bit Timer	—			
	Other Timers	—			
	Watch Timer	—			
	Real-Time Counter	1			
	Watchdog Timer	1			
	PWM Output	16 bits × 6			
Serial Interface	CSI, UART	1			
	CSI, UART, I²C	1			
	CSI with FIFO, UART	—			
	CSI with FIFO, UART, I²C	—			
	CSI with FIFO, UART	—			
	CSI	1			
	UART, I²C, CAN[Note]	1			
OCD	On-Chip Debugger	Yes			
Peripheral Functions	LCD (Segments x Commons)	—			
	12-bit A/D Converter	—			
	10-bit A/D Converter	8			
	8-bit D/A Converter	—			
	Other Functions	LVI, real-time output, key return function, USB 2.0 function, etc.			
Others	Power Supply Voltage (V)	2.85 to 3.6			
	Package (size: mm)	64-LQFP (10 × 10) 64-WQFN (9 × 9)			
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-V850ESJX3E (IECUBE)			
Package		P64GB-50-GAH P64K8-50-6B4			
Part No.		μPD70F3826GB-GAH-AX** μPD70F3826K8-6B4-AX**	μPD70F3827GB-GAH-AX** μPD70F3827K8-6B4-AX**	μPD70F3828GB-GAH-AX** μPD70F3828K8-6B4-AX**	μPD70F3829GB-GAH-AX** μPD70F3829K8-6B4-AX**

Note μPD70F3829 only.
Remark LVI: Low-voltage indicator

★ : New product ★★ : Under development

• Specifications (V850ES/JF3-E)

Group		μPD70F3830	μPD70F3831	μPD70F3832	μPD70F3833
Memory	ROM Size (Bytes)	64K	128K	256K	
	ROM Type	Flash			
	Single-Power-Supply Flash Memory	Yes			
	RAM Size (Bytes)	32K	48K	64K	
Clock	Maximum Operating Frequency (MHz)	50			
	On-Chip Oscillator (Hz)	220k			
	Subclock (32.768kHz)	Yes			
I/O	I/O Ports	41			
Timer	16-bit Timer	10			
	8-bit Timer	—			
	Other Timers	—			
	Watch Timer	—			
	Real-Time Counter	1			
	Watchdog Timer	1			
	PWM Output	16 bits × 13 (6 phases, 16 bits × 1)			
Serial Interface	CSI, UART	1			
	CSI, UART, I²C	2			
	CSI with FIFO, UART	—			
	CSI with FIFO, UART, I²C	—			
	CSI with FIFO, UART	—			
	CSI	2			
	UART, I²C, CAN[Note]	1			
OCD	On-Chip Debugger	Yes			
Peripheral Functions	LCD (Segments x Commons)	—			
	12-bit A/D Converter	—			
	10-bit A/D Converter	8			
	8-bit D/A Converter	—			
	Other Functions	LVI, real-time output, motor control timer, key return function, USB 2.0 function, etc.			
Others	Power Supply Voltage (V)	2.85 to 3.6			
	Package (size: mm)	80-LQFP (12 × 12)			
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-V850ESJX3E (IECUBE)			
Package		P80GK-50-GAK			
Part No.		μPD70F3830GK-GAK-AX**	μPD70F3831GK-GAK-AX**	μPD70F3832GK-GAK-AX**	μPD70F3833GK-GAK-AX**

Note μPD70F3833 only.
Remark LVI: Low-voltage indicator

★ : New product ★★ : Under development

• Specifications (V850ES/JG3-E)

Group		μPD70F3834	μPD70F3835	μPD70F3836	μPD70F3837
Memory	ROM Size (Bytes)	64K	128K	256K	
	ROM Type	Flash			
	Single-Power-Supply Flash Memory	Yes			
	RAM Size (Bytes)	32K	48K	64K	
Clock	Maximum Operating Frequency (MHz)	50			
	On-Chip Oscillator (Hz)	220k			
	Subclock (32.768kHz)	Yes			
I/O	I/O Ports	64			
Timer	16-bit Timer	10			
	8-bit Timer	—			
	Other Timers	—			
	Watch Timer	—			
	Real-Time Counter	1			
	Watchdog Timer	1			
	PWM Output	16 bits × 14 (6 phases, 16 bits × 1)			
Serial Interface	CSI, UART	1			
	CSI, UART, I²C	2			
	CSI with FIFO, UART	—			
	CSI with FIFO, UART, I²C	—			
	CSI with FIFO, UART	—			
	CSI	2			
	UART, I²C, CAN[Note]	1			
OCD	On-Chip Debugger	Yes			
Peripheral Functions	LCD (Segments x Commons)	—			
	12-bit A/D Converter	—			
	10-bit A/D Converter	10			
	8-bit D/A Converter	—			
	Other Functions	LVI, real-time output, motor control timer, key return function, USB 2.0 function, etc.			
Others	Power Supply Voltage (V)	2.85 to 3.6			
	Package (size: mm)	100-LQFP (14 × 14) 113-FBGA (8 × 8) (under development)			
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-V850ESJX3E (IECUBE)			
Package		P100GC-50-UEU-1 P113F1-65-CAH			
Part No.		μPD70F3834GC-UEU-AX** μPD70F3834F1-CAH-A	μPD70F3835GC-UEU-AX** μPD70F3835F1-CAH-A	μPD70F3836GC-UEU-AX** μPD70F3836F1-CAH-A	μPD70F3837GC-UEU-AX** μPD70F3837F1-CAH-A

Note μPD70F3837 only.
Remark LVI: Low-voltage indicator

★ : New product ★★ : Under development

• Specifications (V850ES/JH3-E)

Group		μPD70F3778	μPD70F3779	μPD70F3780	μPD70F3781	μPD70F3782	μPD70F3783
Memory	ROM Size (Bytes)	256K	384K	512K	384K	512K	512K
	ROM Type	Flash					
	Single-Power-Supply Flash Memory	Yes					
	RAM Size (Bytes)	76K			124K		
Clock	Maximum Operating Frequency (MHz)	50					
	On-Chip Oscillator (Hz)	220k					
	Subclock (32.768kHz)	Yes					
I/O	I/O Ports	84					
Bus	External Data/Address Bus	16/22					
Timer	16-bit Timer	13					
	8-bit Timer	—					
	Other Timers	—					
	Watch Timer	1					
	Watchdog Timer	1					
	PWM Output	16 bits × 6 (6 phases, 16 bits × 1)					
Serial Interface	CSI, UART	1					
	CSI, UART, I²C	2					
	CSI with FIFO, UART	1					
	CSI with FIFO[Note 1], UART, I²C	1					
	CSI with FIFO, UART	2					
	CSI with FIFO[Note 1]	1					
	UART, I²C, CAN[Note 2]	1					
OCD	On-Chip Debugger	Yes					
Peripheral Functions	LCD (Segments x Commons)	—					
	12-bit A/D Converter	—					
	10-bit A/D Converter	10					
	8-bit D/A Converter	—					
	Other Functions	LVI, real-time output motor control timer, key return function, etc.					
Others	Power Supply Voltage (V)	2.85 to 3.6					
	Package (size: mm)	128-LQFP (14 × 20mm)					
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-V850ESJX3E (IECUBE)					
Package		P128GF-50-GAT					
Part No.		μPD70F3778GF-GAT-AX	μPD70F3779GF-GAT-AX	μPD70F3780GF-GAT-AX	μPD70F3781GF-GAT-AX	μPD70F3782GF-GAT-AX	μPD70F3783GF-GAT-AX

Note 1. FIFO buffers used for the same channel are assigned to two different pins.
2. μPD70F3783 only.

Remark LVI: Low-voltage indicator

★ : New product ★★ : Under development

• Specifications (V850ES/JJ3-E)

Group		μPD70F3784	μPD70F3785	μPD70F3786
Memory	ROM Size (Bytes)	512K	512K	512K
	ROM Type	Flash		
	Single-Power-Supply Flash Memory	Yes		
	RAM Size (Bytes)	76K	124K	124K
Clock	Maximum Operating Frequency (MHz)	50		
	On-Chip Oscillator (Hz)	220k		
	Subclock (32.768kHz)	Yes		
I/O	I/O Ports	100		
Bus	External Data/Address Bus	16/24		
Timer	16-bit Timer	13		
	8-bit Timer	—		
	Other Timers	—		
	Watch Timer	1		
	Watchdog Timer	1		
	PWM Output	16 bits × 6 (6 phases, 16 bits × 1)		
Serial Interface	CSI, UART	3		
	CSI, UART, I²C	2		
	CSI with FIFO, UART	1		
	CSI with FIFO[Note 1], UART, I²C	1		
	CSI with FIFO, UART	2		
	CSI with FIFO[Note 1]	1		
	I²C	1		
	UART, I²C, CAN[Note 2]	1		
OCD	On-Chip Debugger	Yes		
Peripheral Functions	LCD (Segments x Commons)	—		
	12-bit A/D Converter	—		
	10-bit A/D Converter	12		
	8-bit D/A Converter	—		
	Other Functions	LVI, real-time output motor control timer, key return function		
Others	Power Supply Voltage (V)	2.9 to 3.6		
	Package (size: mm)	144-LQFP (20 × 20)		
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-V850ESJX3E (IECUBE)		
Package		P144GJ-50-GAE-2		
Part No.		μPD70F3784GJ-GAE-AX	μPD70F3785GJ-GAE-AX	μPD70F3786GJ-GAE-AX

Note 1. FIFO buffers used for the same channel are assigned to two different pins.
2. μPD70F3786 only.

Remark LVI: Low-voltage indicator

★ : New product ★★ : Under development

MCUs for Digital AV

Our lineup of digital AV MCUs provide an on-chip HDMI-CEC system that slashes conventional standby power consumption by 99.8%. The MCUs also feature improved operability and faster response speeds.
Consumer Electronics Control (CEC) is part of the recently developed High-Definition Multimedia Interface (HDMI) standard used to transfer high-definition, high-sound-quality data. The CEC bus interacts with and controls connected units, and has become a popular feature of systems used in the increasing number of digital AV devices available today.

• Memory Capacity (78K0 MCUs)



Pin count

• Specifications (78K0/KC2-C)

Group		μPD78F0760	μPD78F0761	μPD78F0762
Memory	ROM Size (Bytes)	32K	48K	60K
	ROM Type	Flash		
	Single-Power-Supply Flash Memory	Yes		
	RAM Size (Bytes)	1K	2K	3K
Clock	Maximum Operating Frequency (MHz)	20		
	On-Chip Oscillator (Hz)	8M, 240k		
	Subclock (32.768kHz)	Yes		
I/O	I/O Ports	41		
Bus	External Data/Address Bus	—/—		
Timer	16-bit Timer	3		
	8-bit Timer	4		
	Other Timers	—		
	Watch Timer	—		
	Real-Time Counter	1		
	Watchdog Timer	1		
	PWM Output	16 bits × 1, 8 bits × 4		
Serial Interface	UART	—		
	UART Supporting LIN-Bus	1		
	UART, CSI	1		
	UART Supporting LIN-Bus, CSI	—		
	CSI	1		
	CSI, I^2C	—		
	CSI with Automatic Transmission/ Reception Function	—		
	I^2C	3		
	IEBus	—		
	CAN	—		
OCD	On-Chip Debugger	Yes		
Peripheral Functions	LCD (Segments x Commons)	—		
	16-bit ΔΣ A/D Converter	—		
	12-bit A/D Converter	—		
	10-bit A/D Converter	8		
	8-bit A/D Converter	—		
	8-bit D/A Converter	—		
	Multiplier/Divider (bits x bits, bits ÷ bits)	16 × 16 32 ÷ 16		
	Other Functions	POC, LVI, clock output, CEC transmitter/receiver, remote control receiver		
Others	Power Supply Voltage (V)	1.8 to 5.5		
	Package (size: mm)	48-LQFP (7 × 7)		
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-78K0KX2C (IECUBE)		
Package		P48GA-50-GAM		
Part No.		μPD78F0760GA-GAM-AX	μPD78F0761GA-GAM-AX	μPD78F0762GA-GAM-AX

Remark POC: Power-on clear
LVI: Low-voltage indicator

★ : New product ★★ : Under development

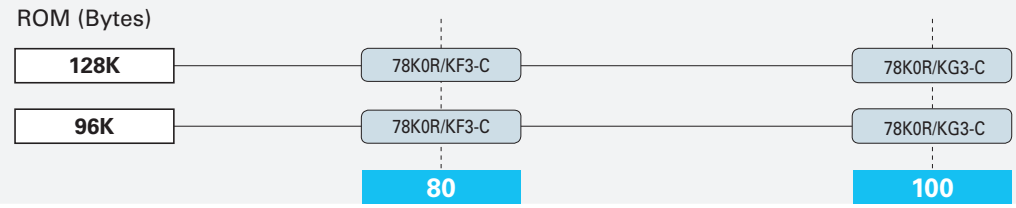
• Specifications (78K0/KE2-C)

Group		μPD78F0763	μPD78F0764	μPD78F0765
Memory	ROM Size (Bytes)	32K	48K	60K
	ROM Type	Flash		
	Single-Power-Supply Flash Memory	Yes		
	RAM Size (Bytes)	1K	2K	3K
Clock	Maximum Operating Frequency (MHz)	20		
	On-Chip Oscillator (Hz)	8M, 240k		
	Subclock (32.768kHz)	Yes		
I/O	I/O Ports	55		
Bus	External Data/Address Bus	—/—		
Timer	16-bit Timer	3		
	8-bit Timer	4		
	Other Timers	—		
	Watch Timer	—		
	Real-Time Counter	1		
	Watchdog Timer	1		
	PWM Output	16 bits × 3, 8 bits × 4		
Serial Interface	UART	1		
	UART Supporting LIN-Bus	1		
	UART, CSI	1		
	UART Supporting LIN-Bus, CSI	—		
	CSI	1		
	CSI, I²C	—		
	CSI with Automatic Transmission/ Reception Function	—		
	I²C	3		
	IEBus	—		
	CAN	—		
OCD	On-Chip Debugger	Yes		
Peripheral Functions	LCD (Segments x Commons)	—		
	16-bit ΔΣ A/D Converter	—		
	12-bit A/D Converter	—		
	10-bit A/D Converter	8		
	8-bit A/D Converter	—		
	8-bit D/A Converter	—		
	Multiplier/Divider (bits x bits, bits ÷ bits)	16 × 16 32 ÷ 16		
	Other Functions	POC, LVI, clock output, buzzer output, CEC transmitter/receiver, remote control receiver		
Others	Power Supply Voltage (V)	1.8 to 5.5		
	Package (size: mm)	64-LQFP (10 × 10)		
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-78K0KX2C (IECUBE)		
Package		P64GB-50-GAH		
Part No.		μPD78F0763GB-GAH-AX	μPD78F0764GB-GAH-AX	μPD78F0765GB-GAH-AX

Remark POC: Power-on clear
LVI: Low-voltage indicator

★ : New product ★★ : Under development

• Memory Capacity (78K0R MCUs)



• Specifications (78K0R/KF3-C, 78K0R/KG3-C)

Group		78K0R/KF3-C		78K0R/KG3-C	
		μPD78F1846A	μPD78F1847A	μPD78F1848A	μPD78F1849A
Memory	ROM Size (Bytes)	96K	128K	96K	128K
	ROM Type	Flash			
	Single-Power-Supply Flash Memory	Yes			
	RAM Size (Bytes)	6K	8K	6K	8K
Clock	Maximum Operating Frequency (MHz)	20			
	On-Chip Oscillator (Hz)	20M, 8M, 30k			
	Subclock (32.768kHz)	Yes			
I/O	I/O Ports	71		89	
Bus	External Data/Address Bus	—/—			
Timer	16-bit Timer	11			
	Real-Time Counter	1			
	Watchdog Timer	1			
	PWM Output	PWM: 16 bits × 5, multiplexed PWM: 16 bits × 7, multiplexed PWM: 16 bits × 2			
Serial Interface	CSI, UART	—			
	CSI: 2 ch, UART: 1 ch	1			
	CSI, UART, Simplified I²C	2			
	CSI: 2 ch, UART: 1 ch, Simplified I²C: 2 ch	—			
	CSI: 2 ch, UART Supporting LIN-bus: 1 ch	—			
	UART Supporting LIN-bus	—			
	I²C	1			
OCD	On-Chip Debugger	Yes			
Peripheral Functions	10-bit A/D Converter	12		16	
	8-bit D/A Converter	—			
	Multiplier/Divider (bits × bits, bits ÷ bits)	16 × 16 32 ÷ 32			
	Other Functions	POC, LVI, DMA, CEC transmitter/receiver, remote control receiver			
Others	Power Supply Voltage (V)	2.7 to 5.5			
	Package (size: mm)	80-LQFP (12 × 12)		100-LQFP (14 × 14)	
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-78K0RKX3C (IECUBE)			
Package		P80GK-50-GAK		P100GC-50-UEU-1	
Part No.		μPD78F1846AGK-GAK-AX	μPD78F1847AGK-GAK-AX	μPD78F1848AGC-UEU-AX	μPD78F1849AGC-UEU-AX

Remark POC: Power-on clear
LVI: Low-voltage indicator

★ : New product ★★ : Under development

MCUs for Notebook PCs/PC Servers

MCUs for Notebook PCs

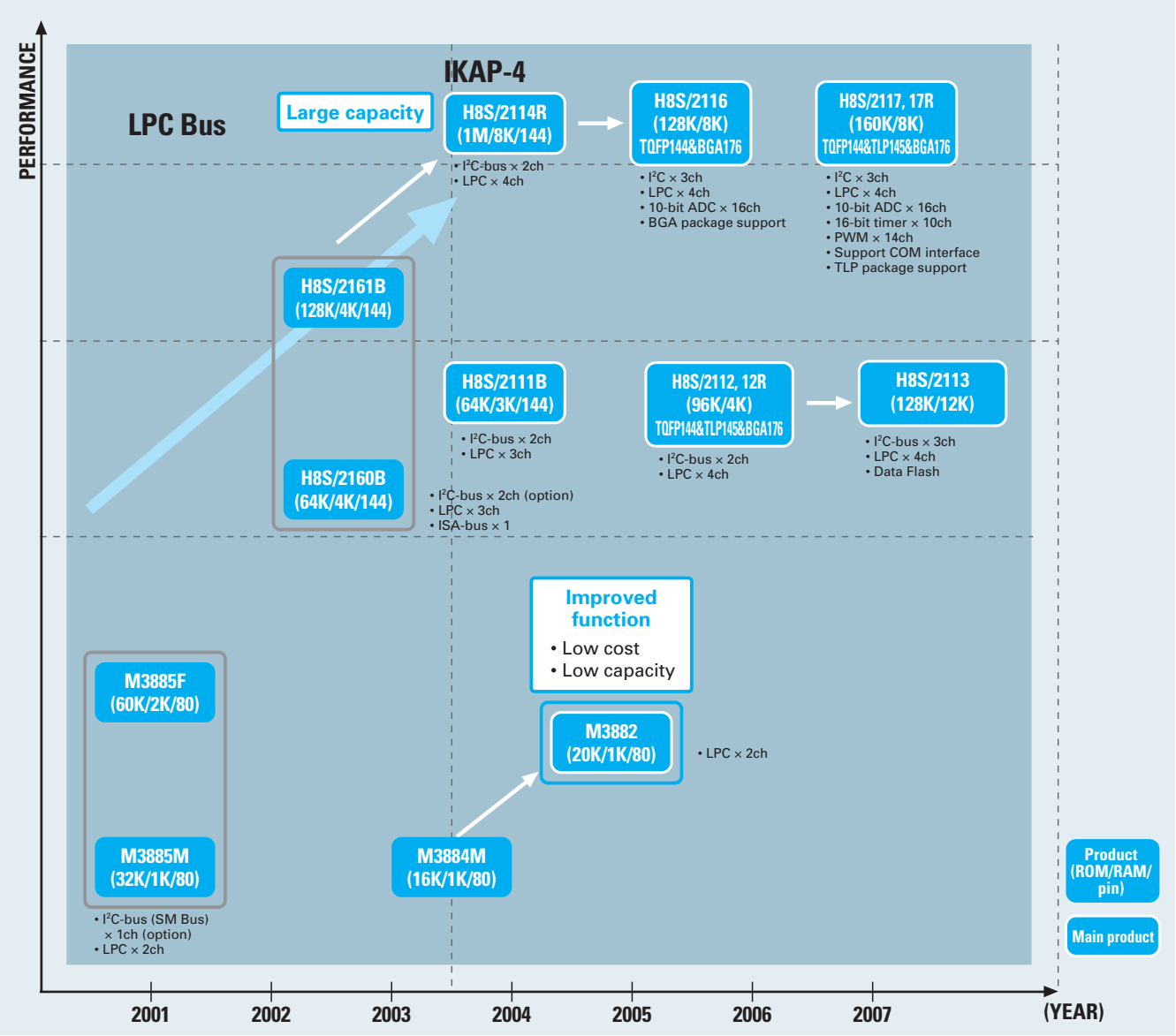
Notebook PCs are hugely popular computing choices for business people and consumers. Renesas serves this vibrant market by delivering MCUs for applications such as power supply control and keyboard control. These notebook PC MCUs are compatible with Intel's LPC and Philips's I²C-bus standards. These MCUs are used for the keyboard control of notebook PCs as well as embedded control, such as power management and temperature management control.
Furthermore, H8S/2100 series MCUs can be ideally used for built-in products that need versatile peripheral functions including GPIO (through 144 pins) and I²C functions.

MCUs for PC Servers

The PC market requires not only high performance and high functions but also high safety and reliability from products. In recent years, there has been an increasing need for remote management realized by Internet servers of rack-mounted type. Conventional servers in the high-end class usually perform such remote management, where the conditions of servers are monitored remotely and controlled as the occasion arises. High functions and high efficiency are demanded from server management systems as well.

Applications • Notebook PCs • PDAs • PC servers • General purposes as well

• Roadmap (MCUs for Notebook PCs)

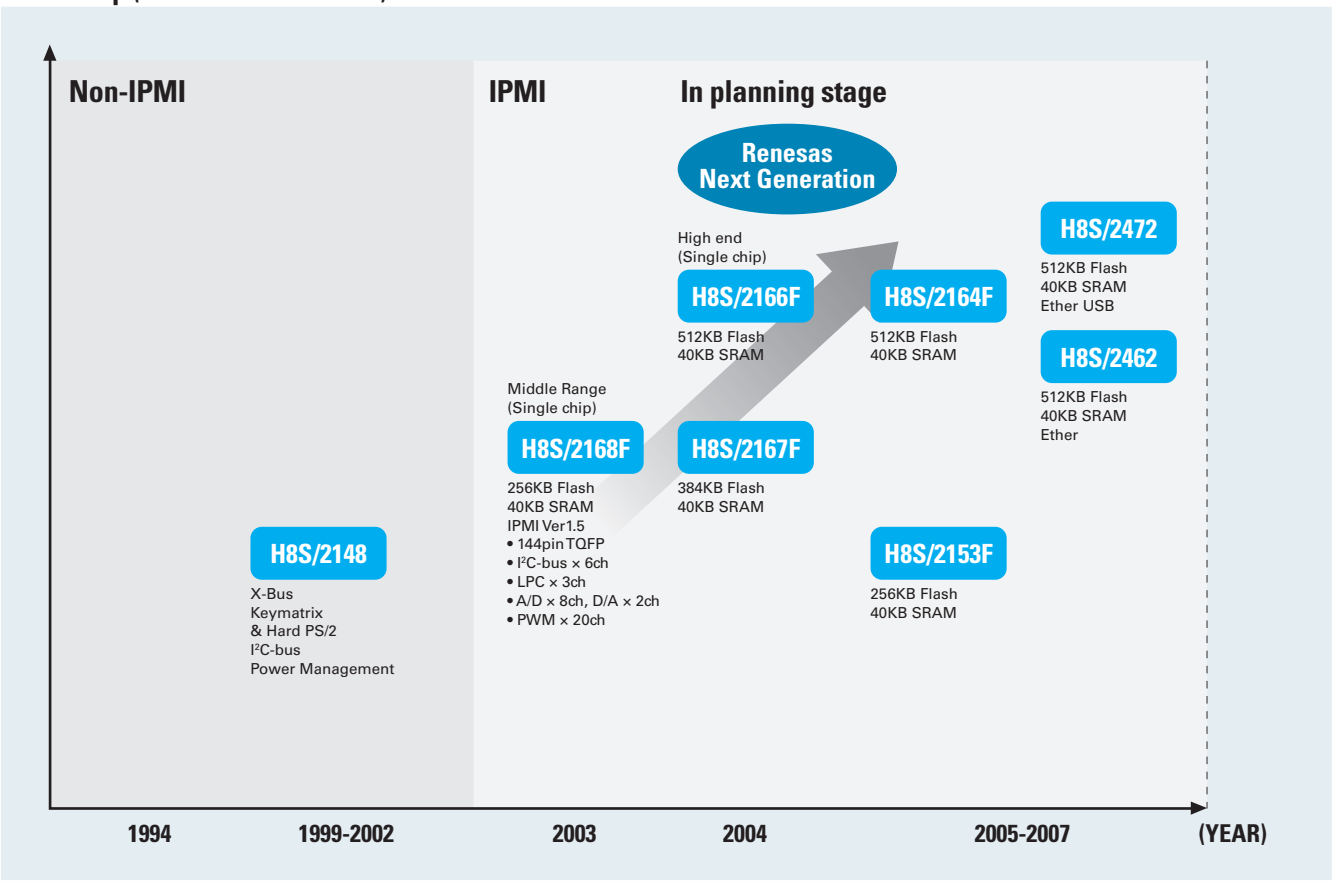


- Phoenix-made exclusive firmware MultiKey™/M306KL, MultiKey™/M3886L, MultiKey™/M3885L, and MultiKey™/H8S-2111L
  Keyboard control firmware incorporating versatile functions, such as power management, HOTKEY, SMBus communications, and ACPI functions.

- All brand names and registered trademarks belong to their respective holders.

- SMBus (System Management Bus) is a serial bus for electric power control advocated by 13 companies including Intel Corporation and Renesas Technology.
- PS/2™ is a registered trademark of IBM Corporation of the US.
- The ISA Bus (Industrial Standard Architecture Bus) is a registered trademark of IBM Corporation of the US. This is an internal/external bus advocated by IBM and adopted by PC or AT compatible PCs.
- LPC (Low Pin Count) is an internal bus advocated by Intel for PC or AT compatible PCs.

• **Roadmap (MCUs for PC Servers)**



• The IPMI (Intelligent Platform Management Interface) is a standard interface established by Intel, Dell, Hewlett-Packard, and NEC to monitor the hardware in servers.

38000 Series (MCUs for Notebook PCs)

Ideal for the keyboard control of notebook PCs.

3882, 3885, 3886 Group

H8S/2100 Series (MCUs for Notebook PCs/PC Servers)

The H8S/2100 Series incorporates the peripheral functions of the H8/300 Series besides a PC interface, the standardization of which is making progress, and a variety of low-power consumption modes.

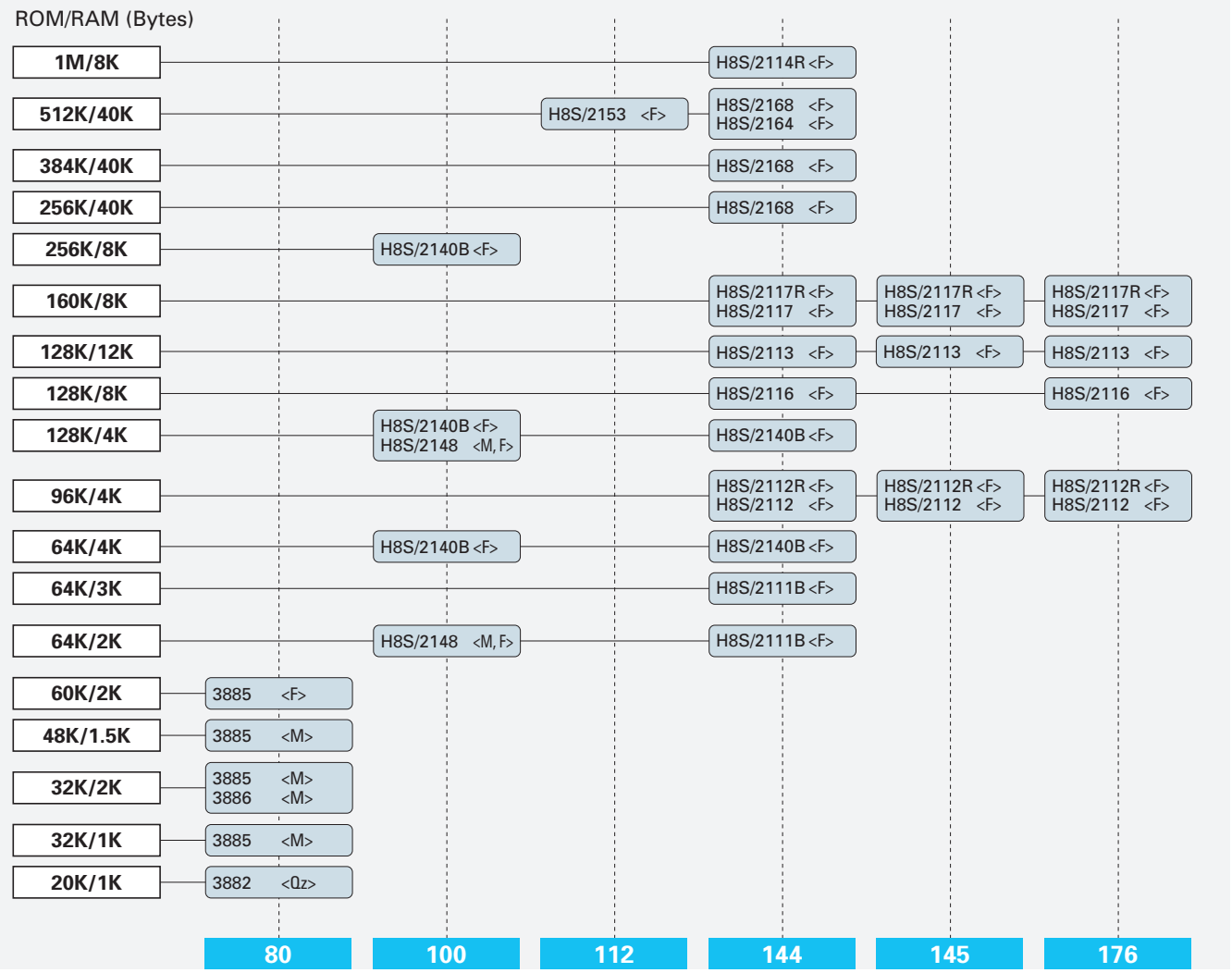
H8S/2111B, H8S/2112, H8S/2112R, H8S/2113, H8S/2114, H8S/2116, H8S/2117, H8S/2117R, H8S/2140B, H8S/2148, H8S/2168, H8S/2164, H8S/2153 Group

H8S/2400 Series (MCU for PC Servers)

H8S/2472 and H8S/2462 groups in H8S/2400 series incorporate PC interface and Ethernet controllers

* Refer to "USB MCUs" for the H8S/2472 group and "H8S/2400 Series" for the H8S/2462 group

• Memory Capacity (ROM/RAM) (H8S/2100 Series, 38000 Series)



Letters in brackets < > indicate memory variations.
F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

• Specifications (H8S/2100 Series)

Group		H8S/2111B	H8S/2112	H8S/2112R	H8S/2113	H8S/2114R	H8S/2116
Memory	ROM (Bytes)	64K	96K		128K	1M	128K
	RAM (Bytes)	2K / 3K	4K		12K		8K
	ROM Type*1	F					
	Program Security	—					
CPU	CPU	H8S/2000 Core					
	Basic Instructions	65					
	Minimum Instruction Execution Time (ns)	100 (@10MHz)	50 (@20MHz)		32 (@20MHz)	100 (@10MHz), 50 (@20MHz)	50 (@20MHz)
	Multiplier	—					
	Multiply-Accumulate Instruction	—					
DMA	DMAC (Channels)	—					
	EXDMAC	—					
	DTC/DMAC Ⅱ	—				DTC (85 channels)	—
External Bus Expansion	Address Space (Bytes)	16M					
	Bus State Controller	—					
	Bus Structure	—					
	SDRAM Controller	—					
	DRAM Controller	—					
	Host Interface	Yes (LPC)					
Clock	Clock Generation Circuit	1 circuit (System clock)					
	PLL	—					
	Subclock	—					
	RTC	—					
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16, 32)	1/n (n = 1)			1/n (n = 1, 2, 4, 8, 16, 32)	1/n (n = 1)
	Power Save	Medium-speed/ Sub active/ Sleep/Sub sleep/ Watch/ Software standby/ Hardware standby/ Module stop	Medium-speed/Sleep/Watch/ Software standby/ Module stop			Medium-speed/ Sub active/ Sleep/Sub sleep/ Watch/ Software standby/ Hardware standby/ Module stop	Sub active/Sleep/ Sub sleep/Watch/ Software standby/ Hardware standby/ Module stop
A/D Converter	Resolution × Channels	10-bit × 8	10-bit × 12			10-bit × 8	10-bit × 16
	Sample and Hold	Yes					
D/A Converter	Resolution × Channels	—					
Timer	8-bit	6 (TMR0, TMR1, TMRX, TMRY, TMRA, TMRB)	4 (TMR0, TMR1, TMRX, TMRY)				
	16-bit	1 (FRT)	6 (TCM 3ch; TPU 3ch)			4 (FRT, TPU × 3)	3 (TPU)
	32-bit	—					
	Input Capture	6 (shared with FRT)	12 (shared with TPU, TCM)			12 (shared with FRT, TPU)	8 (shared with TPU)
	Output Compare	8 (shared with FRT, TMR)	12 (shared with TPU, TMR)			16 (shared with FRT, TMR, TPU)	12 (shared with TPU, TMR)
	PWM Output	8 (PWM)	12 (PWM × 12)			10 (PWMX × 2, PWM × 8)	10 (PWMX × 2, PWM × 8)
	Real-Time Port	—					
	Programmable Pulse Generator	—					
	Event Counter	—					
	2-Phase Encoder Input	—	Yes				
Watchdog Timer		2					
Serial Interface	Clock Sync./Clock Async.	1					2
I²C-bus		2			3		2
IEBus		—					
Smart Card/SIM		—	1				
Synchronous Serial Communication Unit/Special Serial I/O		—			1		—
CAN	Channels	—					
	Message Box (Numbers)	—					
Ethernet		—					
USBFunction		—					
LPC/ISA		Yes					
IrDA		—	Yes				
LCD		—					
CRC Calculation Circuit		—					
I/O Ports	Input Only (Numbers)	9	13		8		13
	CMOS Output Only (Numbers)	—					
	CMOS I/O (Numbers)	101	112		130 / 114	106	112
	High Voltage Port (Numbers)	—					
	N-Channel Open Drain Port (Numbers)	—					
	DTMF	—					
	High Current Drive Port	14	40				14
	Pull-Up Resistor	80	78		88		78
	NMOS Push-Pull	12	20				
External Interrupts Pins		9	17				
Debugging Function	Boundary Scan/JTAG	—				Yes	—
	On-Chip Debug	—	Yes				
	On-Board Flash Program	Yes					
Other Functions	ROM Correction Function	—					
	Others	PS/2 Interface / —	PS/2 Interface	PS2, CIR, FSI Interface	PS/2 Interface		
Operating Frequency/Supply Voltage		10MHz/3.0 to 3.6V	25MHz/3.0 to 3.6V		20MHz/3.0 to 3.6V		
Operating Ambient Temperature (˚C)		–20 to 75					
Package*2		PTQP0144LC-A	PLBG0176GA-A	PTLG0145JB-A	PTQP0144LC-A	PLBG0176GA-A	PTLG0145JB-A	PTQP0144LC-A	PLBG0176GA-A	PTLG0145JB-A	PTQP0144LC-A	PLBG0176GA-A	PTQP0144LC-A
Part No.		HD64F2111BVTE10BV / HD64F2111BVTE10CV	R4F2112VBG25HV	R4F2112VLP25HV	R4F2112VTE25HV	R4F2112RVBG25HV	R4F2112RVLP25HV	R4F2112RVTE25HV	R4F2113NBG*	R4F2113NLP*	R4F2113NFT*	R4F2114RVTE20V	R4F2116VBG20HV	R4F2116VTE20V

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

MCUs for Notebook PCs/PC Servers

• Specifications (H8S/2100 Series)

Group		H8S/2117		H8S/2117R		H8S/2153	H8S/2164	H8S/2168		
Memory	ROM (Bytes)	160K				512K		256K	384K	512K
	RAM (Bytes)	8K				40K				
	ROM Type*1	F								
	Program Security	—				Yes				
CPU	CPU	H8S/2600 Core						H8S/2000 Core		
	Basic Instructions	65				69		65		
	Minimum Instruction Execution Time (ns)	50 (@20MHz)				40 (@25MHz)	29 (@34MHz)	30 (@33MHz)		
	Multiplier	16 × 16 → 32						—		
	Multiply-Accumulate Instruction	—				16 × 16 + 42 → 42		—		
DMA	DMAC (Channels)	—								
	EXDMAC	—								
	DTC/DMAC II	—				DTC (85 channels)				
External Bus Expansion	Address Space (Bytes)	16M								
	Bus State Controller	—					Direct connection to SRAM/ROM is supported			
	Bus Structure	—					Separate bus (8/16-bit)/Multiplex bus (8/16-bit)			
	SDRAM Controller	—								
	DRAM Controller	—								
	Host Interface	Yes (LPC)								
Clock	Clock Generation Circuit	1 circuit (System clock)								
	PLL	—				Yes				
	Subclock	—								
	RTC	—								
	Frequency Divider	1/n (n = 1)				1/n (n = 1, 2, 4, 8, 16, 32)				
	Power Save	Medium-speed/Sleep/Watch/Software standby/Module stop				Medium-speed/Sub active/Sleep/Sub sleep/Watch/Software standby/ Hardware standby/Module stop				
A/D Converter	Resolution × Channels	10-bit × 16				10-bit × 8				
	Sample and Hold	Yes								
D/A Converter	Resolution × Channels	—						8-bit × 2		
Timer	8-bit	4 (TMR0, TMR1, TMRX, TMRY)								
	16-bit	10 (TCM 4ch; TDP 3ch; TPU 3ch)				1 (FRT)				
	32-bit	—								
	Input Capture	15 (shared with TPU, TCM, TDP)				—		5 (shared with FRT, TMR)		
	Output Compare	12 (shared with TPU, TMR)				—		6 (shared with FRT, TMR)		
	PWM Output	14 (PMWX × 2, PWM × 12)				4 (shared with PWMX)		20 (shared with PWM, PWMX)		
	Real-Time Port	—								
	Programmable Pulse Generator	—								
	Event Counter	—				8 (shared with EVC)	16 (shared with EVC)			
	2-Phase Encoder Input	Yes				—				
Watchdog Timer		2								
Serial Interface	Clock Sync./Clock Async.	2					3			
I²C-bus		3				4	6			
IEBus		—								
Smart Card/SIM		1								
Synchronous Serial Communication Unit/Special Serial I/O		—								
CAN	Channels	—								
	Message Box (Numbers)	—								
Ethernet		—								
USBFunction		—								
LPC/ISA		Yes								
IrDA		Yes				—		Yes		
LCD		—								
CRC Calculation Circuit		—				1 ($X^8 + X^2 + X + 1$, $X^{16} + X^{15} + X^2 + 1$, $X^{16} + X^{12} + X^5 + 1$)				
I/O Ports	Input Only (Numbers)	13				9				
	CMOS Output Only (Numbers)	—								
	CMOS I/O (Numbers)	128	112	128	112	53	95	90		
	High Voltage Port (Numbers)	—								
	N-Channel Open Drain Port (Numbers)	—								
	DTMF	—								
	High Current Drive Port	40				—				
	Pull-Up Resistor	78				40	46			
	NMOS Push-Pull	28	20	28	20	12		16		
External Interrupts Pins		17								
Debugging Function	Boundary Scan/JTAG	—				Yes				
	On-Chip Debug	Yes								
	On-Board Flash Program	Yes								
Other Functions	ROM Correction Function	—								
	Others	PS/2 Interface				—				
Operating Frequency/Supply Voltage		20MHz/3.0 to 3.6V				25MHz/3.0 to 3.6V	34MHz/3.0 to 3.6V	33MHz/3.0 to 3.6V		
Operating Ambient Temperature (˚C)		–20 to 75				–40 to 85	–20 to 75	–40 to 85	–20 to 75	
Package*2		PLBG0176GA-A	PTLG0145JB-A	PTQP0144LC-A	PLBG0176GA-A	PTLG0145JB-A	PTQP0144LC-A	PLBG0112GA-A		PTQP0144LC-A
Part No.		R4F2117VBG20HV	R4F2117VLP20HV	R4F2117VTE20HV	R4F2117RVBG20HV	R4F2117RVLP20HV	R4F2117RVTE20HV	R4F2153VBR25KDV	R4F2153VBR25V	R4F2164VTE34DV / R4F2164VTE34V
		HD64F2168VTE33V	HD64F2167VTE33V	HD64F2166VTE33V						

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8S/2100 Series)

Group		H8S/2140B													
Memory	ROM (Bytes)	64K		128K								256K			
	RAM (Bytes)	4K										8K			
	ROM Type*1	F													
	Program Security	Yes													
CPU	CPU	H8S/2000 Core													
	Basic Instructions	65													
	Minimum Instruction Execution Time (ns)	100 (@10MHz)		100 (@10MHz), 50 (@20MHz)							100 (@10MHz)	100 (@10MHz), 50 (@20MHz)			
	Multiplier	—													
	Multiply-Accumulate Instruction	—													
DMA	DMAC (Channels)	—													
	EXDMAC	—													
	DTC/DMAC Ⅱ	DTC (85 channels)													
External Bus Expansion	Address Space (Bytes)	16M													
	Bus State Controller	Direct connection to SRAM/ROM is supported													
	Bus Structure	Separate bus (8/16-bit)													
	SDRAM Controller	—													
	DRAM Controller	—													
	Host Interface	Yes (LPC/ISA)													
Clock	Clock Generation Circuit	1 circuit (System clock)													
	PLL	—													
	Subclock	—													
	RTC	—													
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16, 32)													
	Power Save	Medium-speed/Sub active/Sleep/Sub sleep/Watch/Software standby/Hardware standby/Module stop													
A/D Converter	Resolution × Channels	10-bit × 8, 10-bit × 16 (expanded A/D input)													
	Sample and Hold	Yes													
D/A Converter	Resolution × Channels	8-bit × 2													
Timer	8-bit	4 (TMR0, TMR1, TMRX, TMRY)													
	16-bit	1 (FRT)													
	32-bit	—													
	Input Capture	4 (shared with FRT)	4 (shared with FRT and 8-bit timer)	5 (shared with FRT, TMR)							4 (shared with FRT and 8bit timer)	5 (shared with FRT, TMR)			
	Output Compare	5 (shared with FRT)	5 (shared with FRT and 8-bit timer)	5 (shared with FRT)							5 (shared with FRT and 8-bit timer)	5 (shared with FRT)			
	PWM Output	18 (PWMX × 2, PWM × 16)													
	Real-Time Port	—													
	Programmable Pulse Generator	—													
	Event Counter	—													
	2-Phase Encoder Input	—													
Watchdog Timer		2													
Serial Interface	Clock Sync./Clock Async.	3													
I²C-bus		2													
IEBus		—													
Smart Card/SIM		—													
Synchronous Serial Communication Unit/Special Serial I/O		—													
CAN	Channels	—													
	Message Box (Numbers)	—													
Ethernet		—													
USBFunction		—													
LPC/ISA		Yes													
IrDA		Yes													
LCD		—													
CRC Calculation Circuit		—													
I/O Ports	Input Only (Numbers)	9													
	CMOS Output Only (Numbers)	—													
	CMOS I/O (Numbers)	69	109	69							109	69			
	High Voltage Port (Numbers)	—													
	N-Channel Open Drain Port (Numbers)	—													
	DTMF	—													
	High Current Drive Port	10													
	Pull-Up Resistor	32	64	48							64	48			
	NMOS Push-Pull	4													
External Interrupts Pins		9													
Debugging Function	Boundary Scan/JTAG	—													
	On-Chip Debug	—													
	On-Board Flash Program	Yes													
Other Functions	ROM Correction Function	—													
	Others	PS/2 Interface													
Operating Frequency/Supply Voltage		10MHz/2.7 to 3.6V		20MHz/4.5 to 5.5V, 16MHz/4.0 to 5.5V						10MHz/2.7 to 3.6V		20MHz/4.5 to 5.5V, 16MHz/4.0 to 5.5V			10MHz/2.7 to 3.6V
Operating Ambient Temperature (°C)		–20 to 75		–40 to 85	–20 to 75	–40 to 85		–20 to 75				–40 to 85		–20 to 75	
Package*2		PTQP0100KA-A	PTQP0144LC-A	PRQP0100KA-A		PTQP0100KA-A		PRQP0100KA-A	PTQP0144LC-A			PRQP0100KA-A		PTQP0100KA-A	PRQP0100KA-A	PTQP0100KA-A
Part No.		HD64F2140BVTE10V	HD64F2160BVTE10V	HD64F2148BFA20IV	HD64F2148BFA20V	HD64F2148BTE20IV	HD64F2148BTE20V	HD64F2148BVFA10V	HD64F2161BVTE10V			HD64F2145BFA20IV	HD64F2145BFA20V	HD64F2145BTE20V	HD64F2145BVFA10V	HD64F2145BVTE10V

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

MCUs for Notebook PCs/PC Servers

• Specifications (H8S/2100 Series)

Group		H8S/2148															
Memory	ROM (Bytes)	64K															
	RAM (Bytes)	2K															
	ROM Type*1	F	M														
	Program Security	Yes	—														
CPU	CPU	H8S/2000 Core															
	Basic Instructions	65															
	Minimum Instruction Execution Time (ns)	100 (@10MHz), 50 (@20MHz)															
	Multiplier	—															
	Multiply-Accumulate Instruction	—															
DMA	DMAC (Channels)	—															
	EXDMAC	—															
	DTC/DMAC Ⅱ	DTC (85 channels)															
External Bus Expansion	Address Space (Bytes)	16M															
	Bus State Controller	Direct connection to SRAM/ROM is supported															
	Bus Structure	Separate bus (8/16-bit)															
	SDRAM Controller	—															
	DRAM Controller	—															
	Host Interface	Yes (ISA)															
Clock	Clock Generation Circuit	1 circuit (System clock)															
	PLL	—															
	Subclock	—															
	RTC	—															
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16, 32)															
	Power Save	Medium-speed/Sub active/Sleep/Sub sleep/Watch/Software standby/Hardware standby/Module stop															
A/D Converter	Resolution × Channels	10-bit × 8, 10-bit × 16 (expanded A/D input)															
	Sample and Hold	Yes															
D/A Converter	Resolution × Channels	8-bit × 2															
Timer	8-bit	4 (TMR0, TMR1, TMRX, TMRY)															
	16-bit	1 (FRT)															
	32-bit	—															
	Input Capture	5 (shared with FRT, TMR)															
	Output Compare	5 (shared with FRT, TMR)															
	PWM Output	18 (PWMX × 2, PWM × 16)															
	Real-Time Port	—															
	Programmable Pulse Generator	—															
	Event Counter	—															
	2-Phase Encoder Input	—															
Watchdog Timer		2															
Serial Interface	Clock Sync./Clock Async.	3															
I²C-bus		2		—		2		—									
IEBus		—															
Smart Card/SIM		—															
Synchronous Serial Communication Unit/Special Serial I/O		—															
CAN	Channels	—															
	Message Box (Numbers)	—															
Ethernet		—															
USBFunction		—															
LPC/ISA		Yes															
IrDA		Yes															
LCD		—															
CRC Calculation Circuit		—															
I/O Ports	Input Only (Numbers)	9															
	CMOS Output Only (Numbers)	—															
	CMOS I/O (Numbers)	71															
	High Voltage Port (Numbers)	—															
	N-Channel Open Drain Port (Numbers)	2															
	DTMF	—															
	High Current Drive Port	24															
	Pull-Up Resistor	48															
	NMOS Push-Pull	2															
External Interrupts Pins		9															
Debugging Function	Boundary Scan/JTAG	—															
	On-Chip Debug	—															
	On-Board Flash Program	Yes	—														
Other Functions	ROM Correction Function	—															
	Others	PS/2 Interface															
Operating Frequency/Supply Voltage		20MHz/ 4.5 to 5.5V	10MHz/2.7 to 3.6V							20MHz/4.5 to 5.5V, 16MHz/4.0 to 5.5V							
Operating Ambient Temperature (˚C)		–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85
Package*2		PRQP0100KA-A		PTQP0100KA-A		PRQP0100KA-A		PTQP0100KA-A		PRQP0100KA-A		PTQP0100KA-A		PRQP0100KA-A		PTQP0100KA-A	
Part No.		HD64F2147AFA20	HD64F2147ATE20V	HD6432147SVWXXXFA	HD6432147SVWXXXFAI	HD6432147SVWXXXTE	HD6432147SVWXXXTEI	HD6432147SVXXXFA	HD6432147SVXXXFAI	HD6432147SVXXXTE	HD6432147SVXXXTEI	HD6432147SWXXXFA	HD6432147SWXXXFAI	HD6432147SWXXXTE	HD6432147SWXXXTEI	HD6432147SXXXFA	HD6432147SXXXFAI	HD6432147SXXXTE	HD6432147SXXXTEI

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (H8S/2100 Series)

Group		H8S/2148											
Memory	ROM (Bytes)	128K											
	RAM (Bytes)	4K											
	ROM Type*1	F											
	Program Security	Yes											
CPU	CPU	H8S/2000 Core											
	Basic Instructions	65											
	Minimum Instruction Execution Time (ns)	100 (@10MHz), 50 (@20MHz)											
	Multiplier	—											
	Multiply-Accumulate Instruction	—											
DMA	DMAC (Channels)	—											
	EXDMAC	—											
	DTC/DMAC II	DTC (85 channels)											
External Bus Expansion	Address Space (Bytes)	16M											
	Bus State Controller	Direct connection to SRAM/ROM is supported											
	Bus Structure	Separate bus (8/16-bit)											
	SDRAM Controller	—											
	DRAM Controller	—											
	Host Interface	Yes (ISA)											
Clock	Clock Generation Circuit	1 circuit (System clock)											
	PLL	—											
	Subclock	—											
	RTC	—											
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16, 32)											
	Power Save	Medium-speed/Sub active/Sleep/Sub sleep/Watch/Software standby/Hardware standby/Module stop											
A/D Converter	Resolution × Channels	10-bit × 8, 10-bit × 16 (expanded A/D input)											
	Sample and Hold	Yes											
D/A Converter	Resolution × Channels	8-bit × 2											
Timer	8-bit	4 (TMR0, TMR1, TMRX, TMRY)											
	16-bit	1 (FRT)											
	32-bit	—											
	Input Capture	5 (shared with FRT, TMR)											
	Output Compare	5 (shared with FRT, TMR)											
	PWM Output	18 (PWMX × 2, PWM × 16)											
	Real-Time Port	—											
	Programmable Pulse Generator	—											
	Event Counter	—											
	2-Phase Encoder Input	—											
Watchdog Timer		2											
Serial Interface	Clock Sync./Clock Async.	3											
I²C-bus		2											
IEBus		—											
Smart Card/SIM		—											
Synchronous Serial Communication Unit/Special Serial I/O		—											
CAN	Channels	—											
	Message Box (Numbers)	—											
Ethernet		—											
USBFunction		—											
LPC/ISA		Yes											
IrDA		Yes											
LCD		—											
CRC Calculation Circuit		—											
I/O Ports	Input Only (Numbers)	9											
	CMOS Output Only (Numbers)	—											
	CMOS I/O (Numbers)	71											
	High Voltage Port (Numbers)	—											
	N-Channel Open Drain Port (Numbers)	2											
	DTMF	—											
	High Current Drive Port	24											
	Pull-Up Resistor	48											
	NMOS Push-Pull	2											
External Interrupts Pins		9											
Debugging Function	Boundary Scan/JTAG	—											
	On-Chip Debug	—											
	On-Board Flash Program	Yes											
Other Functions	ROM Correction Function	—											
	Others	PS/2 Interface											
Operating Frequency/Supply Voltage		20MHz/ 4.5 to 5.5V, 16MHz/ 4.0 to 5.5V	10MHz/ 2.7 to 3.6V	20MHz/4.5 to 5.5V, 16MHz/4.0 to 5.5V	10MHz/ 2.7 to 3.6V	20MHz/ 4.5 to 5.5V, 16MHz/ 4.0 to 5.5V	10MHz/ 2.7 to 3.6V	10MHz/ 3.0 to 5.5V	20MHz/4.5 to 5.5V, 16MHz/4.0 to 5.5V				10MHz/ 3.0 to 5.5V
Operating Ambient Temperature (°C)		–20 to 75				–40 to 85		–20 to 75	–40 to 85	–20 to 75	–40 to 85		–20 to 75
Package*2		PRQP0100KA-A		PTQP0100KA-A		PLQP0064KB-A	PTQP0100KA-A	PLQP0064KB-A	PRQP0100KA-A		PTQP0100KA-A		
Part No.		HD64F2148AFA20V	HD64F2148AVFA10V	HD64F2148ATE20V	HD64F2148AVTE10V	HD64F2148ATE20IV	HD64F2148AVTE10IV	HD64F2148VFA10V	HD64F2148FA20V	HD64F2148FA20JV	HD64F2148TE20V	HD64F2148TE20IV	HD64F2148VTE10V

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version
*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

MCUs for Notebook PCs/PC Servers

• Specifications (H8S/2100 Series)

Group		H8S/2148															
Memory	ROM (Bytes)	128K															
	RAM (Bytes)	4K															
	ROM Type*1	M															
	Program Security	—															
CPU	CPU	H8S/2000 Core															
	Basic Instructions	65															
	Minimum Instruction Execution Time (ns)	100 (@10MHz), 50 (@20MHz)															
	Multiplier	—															
	Multiply-Accumulate Instruction	—															
DMA	DMAC (Channels)	—															
	EXDMAC	—															
	DTC/DMAC II	DTC (85 channels)															
External Bus Expansion	Address Space (Bytes)	16M															
	Bus State Controller	Direct connection to SRAM/ROM is supported															
	Bus Structure	Separate bus (8/16-bit)															
	SDRAM Controller	—															
	DRAM Controller	—															
	Host Interface	Yes (ISA)															
Clock	Clock Generation Circuit	1 circuit (System clock)															
	PLL	—															
	Subclock	—															
	RTC	—															
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16, 32)															
	Power Save	Medium-speed/Sub active/Sleep/Sub sleep/Watch/Software standby/Hardware standby/Module stop															
A/D Converter	Resolution × Channels	10-bit × 8, 10-bit × 16 (expanded A/D input)															
	Sample and Hold	Yes															
D/A Converter	Resolution × Channels	8-bit × 2															
Timer	8-bit	4 (TMR0, TMR1, TMRX, TMRY)															
	16-bit	1 (FRT)															
	32-bit	—															
	Input Capture	5 (shared with FRT, TMR)															
	Output Compare	5 (shared with FRT, TMR)															
	PWM Output	18 (PWMX × 2, PWM × 16)															
	Real-Time Port	—															
	Programmable Pulse Generator	—															
	Event Counter	—															
	2-Phase Encoder Input	—															
Watchdog Timer		2															
Serial Interface	Clock Sync./Clock Async.	3															
I²C-bus		2		—		2		—									
IEBus		—															
Smart Card/SIM		—															
Synchronous Serial Communication Unit/Special Serial I/O		—															
CAN	Channels	—															
	Message Box (Numbers)	—															
Ethernet		—															
USBFunction		—															
LPC/ISA		Yes															
IrDA		Yes															
LCD		—															
CRC Calculation Circuit		—															
I/O Ports	Input Only (Numbers)	9															
	CMOS Output Only (Numbers)	—															
	CMOS I/O (Numbers)	71															
	High Voltage Port (Numbers)	—															
	N-Channel Open Drain Port (Numbers)	2															
	DTMF	—															
	High Current Drive Port	24															
	Pull-Up Resistor	48															
	NMOS Push-Pull	2															
External Interrupts Pins		9															
Debugging Function	Boundary Scan/JTAG	—															
	On-Chip Debug	—															
	On-Board Flash Program	—															
Other Functions	ROM Correction Function	—															
	Others	PS/2 Interface															
Operating Frequency/Supply Voltage		10MHz/2.7 to 3.6V								20MHz/4.5 to 5.5V, 16MHz/4.0 to 5.5V							
Operating Ambient Temperature (˚C)		–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85	–20 to 75	–40 to 85
Package*2		PRQP0100KA-A		PTQP0100KA-A	PLQP0064KB-A	PRQP0100KA-A		PLQP0064KB-A		PRQP0100KA-A		PTQP0100KA-A	PLQP0064KB-A	PRQP0100KA-A		PTQP0100KA-A	
Part No.		HD6432148SVWXXXFA	HD6432148SVWXXXFAI	HD6432148SVWXXXTE	HD6432148SVWXXXTEI	HD6432148SVXXXFA	HD6432148SVXXXFAI	HD6432148SVXXXTE	HD6432148SVXXXTEI	HD6432148SWXXXFA	HD6432148SWXXXFAI	HD6432148SWXXXTE	HD6432148SWXXXTEI	HD6432148SXXXFA	HD6432148SXXXFAI	HD6432148SXXXTE	HD6432148SXXXTEI

*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

• Specifications (38000 Series)

Series		38000							
Group		3882		3885					3886
Memory	ROM (Bytes)	20K		32K		48K	60K		32K
	RAM (Bytes)	1K			2K	1.5K	2K		2K
	ROM Type*1	Qz		M			F		M
	Data Flash	—							
	Program Security	—							
CPU	CPU	740 Core							
	Basic Instructions	71							
	Minimum Instruction Execution Time (ns)	500 (@8MHz)							400 (@10MHz)
DMA	DMAC (Channels)	—							
External Bus Expansion	Host Interface	—							
Clock	Clock Generation Circuit	1 circuit (Main clock)		2 circuits (Main clock, Sub clock)					
	PLL	—							
	Subclock	—		Yes					
	On-Chip Oscillator	—							
	Oscillation Stop Detection	—							
	Frequency Divider	Main clock: 1/n (n = 2, 8)		Main clock: 1/n (n = 2, 8), Sub clock: 1/n (n = 2)					
	Power Save	Wait/Stop							
Power Supply Voltage Detection	Power-On Reset/POR	—							
	Low Voltage Detection/LVD	—							
A/D Converter	Resolution × Channels	—		10-bit × 8					
D/A Converter	Resolution × Channels	—		8-bit × 2					
Timer	8-bit	4 (Timer X, Timer Y, Timer 1, Timer 2)							
	16-bit	—							
	Input Capture	—							
	Output Compare	—							
	PWM Output	—							1
	Real-Time Port	—							
	Event Counter	2 (shared with Timer X, Timer Y)							
Watchdog Timer		1							
Serial Interface	Clock Sync./Clock Async.	—		1 (Serial I/O 1)					
	Clock Sync. Only	—							1 (Serial I/O 2)
	Clock Async. Only	—							
I²C-bus		—		1 (option)					
USB Function		—							
LPC/ISA		Yes (LPC × 2)							Yes (ISA × 2)
LCD		—							
I/O Ports	Input Only (Numbers)	—							
	CMOS Output Only (Numbers)	—							
	CMOS I/O (Numbers)	72							64
	High Voltage Port (Numbers)	—							
	N-Channel Open Drain Port (Numbers)	34							28
	DTMF	—							
	High Current Drive Port	4							
	Pull-Up Resistor	8							
External Interrupts Pins		17	10	13					15 (INT × 5, CNTR × 2, Key Input × 8)
Debugging Function	On-Board Flash Program	—							
Other Functions	ROM Correction Function	—							
	Others	—		Comparator × 8					
Operating Frequency/Supply Voltage		8MHz/3.0 to 3.6V							2.7 to 5.5V
Operating Ambient Temperature (˚C)		–20 to 85							
Package*2		PLQP0080KB-A							
Part No.		M38827G5-XXXHP	M38827G5HP	M38857M8-XXXHP	M38859M8-XXXHP	M38858MC-XXXHP	M38859FFHP		M38869M8A-XXXHP

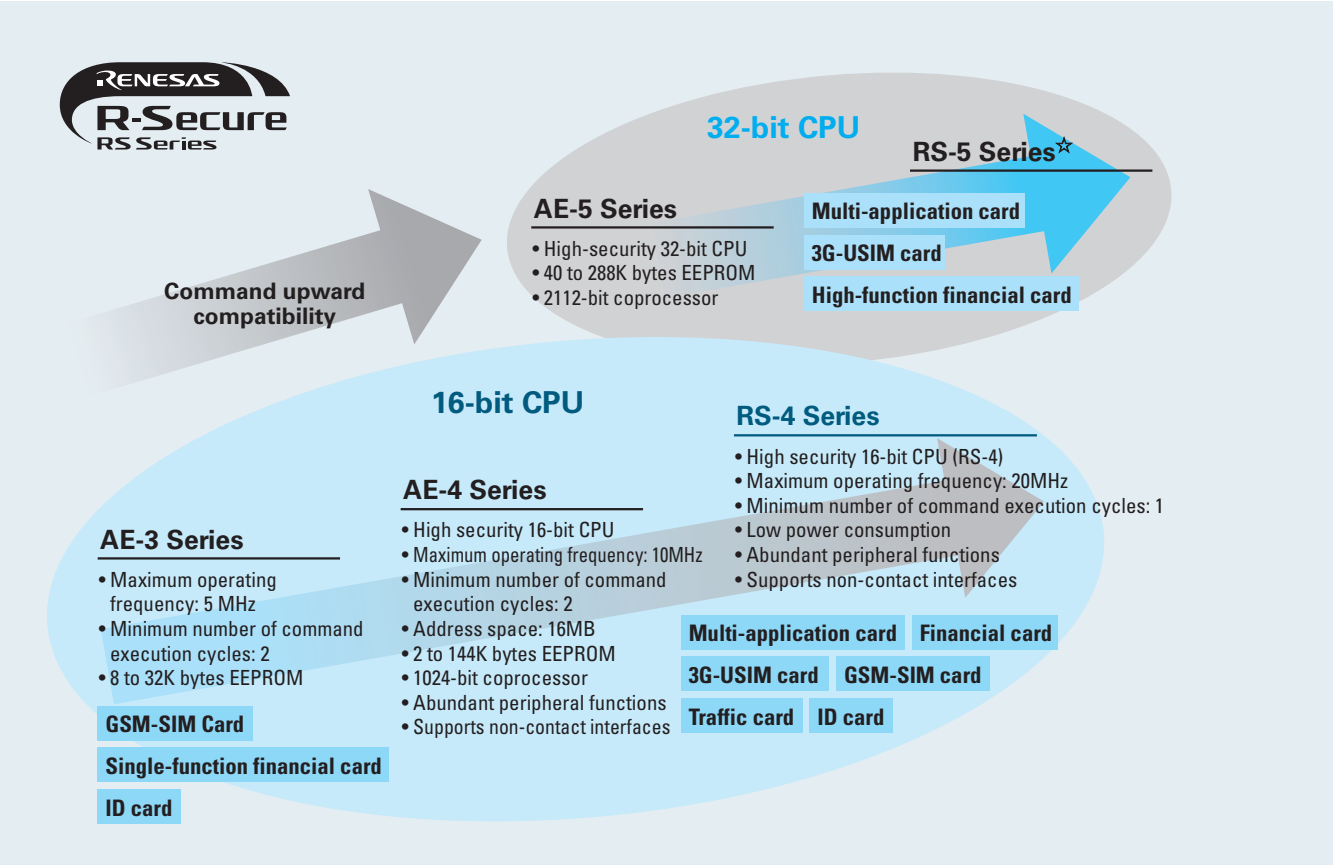
*1 F : Flash memory version, L : ROM-less version, M : Mask ROM version, O : One time PROM version, Qz : QzROM version

*2 Please refer to "Package Code and Size Table" in the end of this catalog for the previous code

★ : New product ★★ : Under development

With the remarkable development of the information industry, the degree of information security required is becoming higher than ever before. In order to maintain information security in a variety of fields, the number of IT products incorporating security functions is growing. IC cards play a core role in realizing the required degree of information security, and are adopted in a variety of fields. For example, they are used as GSM-SIM and W-CDMA-USIM cards for cellular phones, credit cards and ATM cards, and electronic tickets and electronic toll collection (ETC) cards. RS-series IC card microcontrollers adopt a CPU with unique security-oriented architecture, code coprocessor, and highly reliable non-volatile EEPROM. Renesas is offering a lineup of upward-compatible CPUs, prioritizing customers' software resources, and implementing wide-ranging product expansion to support contact and non-contact interfaces.

• Roadmap



☆ : In planning stage

• Specifications

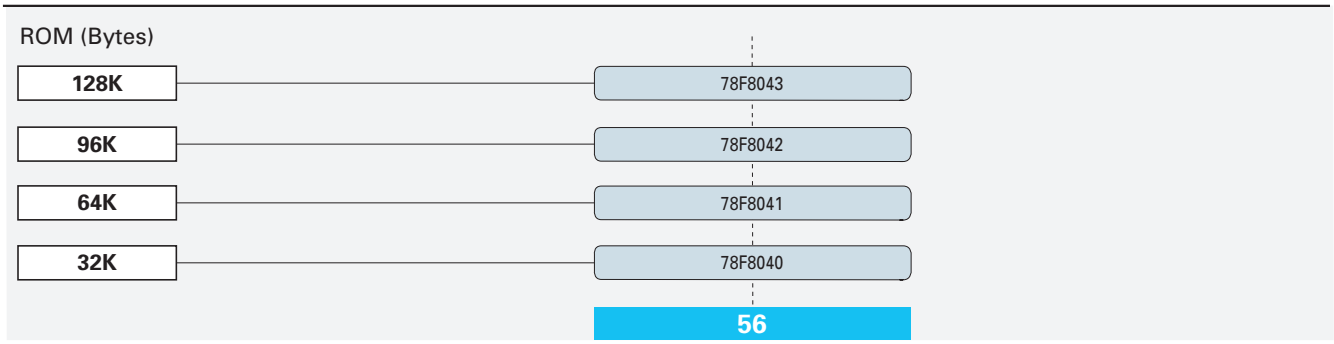
Series		AE-4 (16 bits)		RS-4 (16 bits)						AE-5 (32 bits)			
Model		AE41R	AE470G	RS44C	RS45C	RS44X	RS45X	RS46X	RS47X	AE55C1	AE56U	AE57C1	AE58C
Memory	EEPROM (Bytes)	2K	144K	18K	36K	18K	36K	72K	144K	40K	72K	144K	288K
	ROM (Bytes)	36K	288K	192K	224K	288K	288K	352K	352K	240K	224K	480K	480K
	RAM (Bytes)	1.5K	8K	6K	8K	8.5K	8.5K	8.5K	8.5K	8K	8K	14K	18K
Modular Multiplication Coprocessor		—	—	○	○	○	○	○	○	○	○	○	○
DES Coprocessor		○	○	○	○	○	○	○	○	○	○	○	○
AES Coprocessor		—	—	—	—	○	○	○	○	—	—	○	○
Random Number Generator		○	○	○	○	○	○	○	○	○	○	○	○
FMU[Note 1]		—	—	—	—	—	—	—	—	○	○	○	○
Watchdog Timer		—	—	○	○	○	○	○	○	○	○	○	○
Interval Timers		1	2	3	3	3	3	3	3	2	2	2	2
UART		—	○	○	○	○	○	○	○	○ + DMA	○ + DMA	○ + DMA	○ + DMA
I/O		—	1	2	2	2	2	2	2	2	17	2	2
Non-Contact Interface		Type-B	—	—	—	Type A/B FeliCa[Note 2]	Type A/B FeliCa[Note 2]	Type A/B FeliCa[Note 2]	Type A/B FeliCa[Note 2]	—	—	—	—
USB		—	—	—	—	—	—	—	—	—	Full	—	—
PLL		—	○	○	○	○	○	○	○	○	○	○	○

Note[1] FMU: Firewall Management Unit (monitors illegal memory accesses)
Note[2] FeliCa is a noncontact smartcard technology developed by Sony Inc. FeliCa is the registered trademark of Sony Inc.

IO-Link MCUs

The IO-Link MCUs from Renesas Electronics are 16-bit microcontrollers that can be incorporated in slave units that communicate using the IO-Link specification. This specification was designed for the sensors and actuators used in industrial systems, so customers can feel confident in using our IO-Link MCUs to build sophisticated sensor networks.
These MCUs also come with software stacks, improving development efficiency.

• Memory Capacity



• Specifications (μPD78F8043)

Group		μPD78F8040	μPD78F0841	μPD78F0842	μPD78F0843
Memory	ROM Size (Bytes)	32K	64K	96K	128K
	ROM Type	Flash			
	Single-Power-Supply Flash Memory	Yes			
	RAM Size (Bytes)	4K	4K	6K	7K
Clock	Maximum Operating Frequency (MHz)	20			
	On-Chip Oscillator (Hz)	1M, 8M, 20M, 30k			
	Subclock (32.768kHz)	—			
I/O	I/O Ports	26			
Bus	External Data/Address Bus	—/—			
Timer	16-bit Timer	12			
	Real-Time Counter	—			
	Watchdog Timer	1			
	PWM Output	PWM: 16 bits × 6, multiplexed PWM: 16 bits × 4, multiplexed PWM: 16 bits × 2			
Serial Interface	IO-Link (using UART)	1			
	CSI, UART	—			
	CSI: 2ch, UART: 1ch	—			
	CSI, UART, Simplified I²C	1			
	CSI: 2ch, UART: 1ch, Simplified I²C: 2ch	—			
	CSI: 2ch, UART Supporting LIN-bus: 1ch	—			
	UART Supporting LIN-bus	1			
	I²C	1			
OCD	On-Chip Debugger	Yes			
Peripheral Functions	10-bit A/D Converter	6			
	8-bit D/A Converter	—			
	Multiplier/Divider (bits × bits, bits ÷ bits)	16 × 16 32 ÷ 32			
	Other Functions	POC, LVI, DMA, IO-Link transceiver			
Others	Power Supply Voltage (V)	3.0 to 5.5			
	Package (size: mm)	56-WQFN (8 × 8) 56-FBGA (4 × 7)			
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-78K0RKX3C (IECUBE)			
Package		P56K8-50-9B4 P56F1-50-AD1			
Part No.		μPD78F8040K8-9B4-AX μPD78F8040F1-AD1-AX**	μPD78F8041K8-9B4-AX μPD78F8041F1-AD1-AX**	μPD78F8042K8-9B4-AX μPD78F8042F1-AD1-AX**	μPD78F8043K8-9B4-AX μPD78F8043F1-AD1-AX**

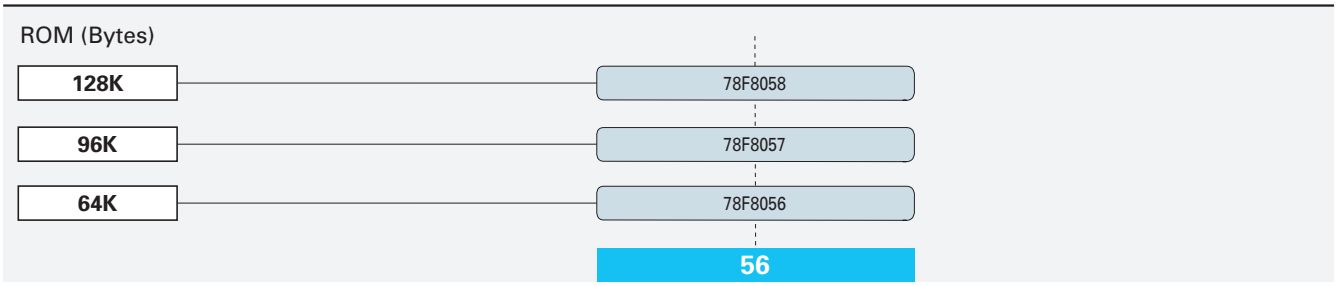
Remark POC: Power-on clear
LVI: Low-voltage indicator

★ : New product ★★ : Under development

RF MCUs

Our RF MCUs are 16-bit 78K0R microcontrollers with a 2.4 GHz RF transceiver integrated into a single package. Because an RF transceiver does not need to be attached externally, using one of our RF MCUs will reduce system components, helping you create a more compact set.
RF MCUs from Renesas Electronics are ideal for ZigBee® RF4CE-compliant wireless remote control and other communications applications.

• Memory Capacity



• Specifications (μPD78F8058)

Group		μPD78F8056	μPD78F0857	μPD78F0858
Memory	ROM Size (Bytes)	64K	96K	128K
	ROM Type	Flash		
	Single-Power-Supply Flash Memory	Yes		
	RAM Size (Bytes)	8K	8K	8K
Clock	Maximum Operating Frequency (MHz)	20		
	On-Chip Oscillator (Hz)	1M, 8M, 20M, 30k		
	Subclock (32.768kHz)	Yes		
I/O	I/O Ports	18		
Bus	External Data/Address Bus	—/—		
Timer	16-bit Timer	12		
	Real-Time Counter	1		
	Watchdog Timer	1		
	PWM Output	PWM: 16 bits × 2, multiplexed PWM: 16 bits × 2		
Serial Interface	RF Transceiver (Using CSI)	1		
	CSI, UART	—		
	CSI: 2ch, UART: 1ch	—		
	CSI, UART, Simplified I²C	1		
	CSI: 2ch, UART: 1ch, Simplified I²C: 2ch	—		
	CSI: 2ch, UART Supporting LIN-bus: 1ch	—		
	UART Supporting LIN-bus	1		
	UART	1 (transmission only)		
	I²C	—		
OCD	On-Chip Debugger	Yes		
Peripheral Functions	10-bit A/D Converter	—		
	8-bit D/A Converter	—		
	Multiplier/Divider (bits × bits, bits ÷ bits)	16 × 16 32 ÷ 32		
	Other Functions	POC, LVI, DMA, RF transceiver		
Others	Power Supply Voltage (V)	1.8 to 3.6		
	Package (size: mm)	56-WQFN (8 × 8)		
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2)		
Package		P56K8-50-9B4		
Part No.		μPD78F8056K8-9B4-AX**	μPD78F8057K8-9B4-AX**	μPD78F8058K8-9B4-AX**

Remark POC: Power-on clear
LVI: Low-voltage indicator

★ : New product ★★ : Under development

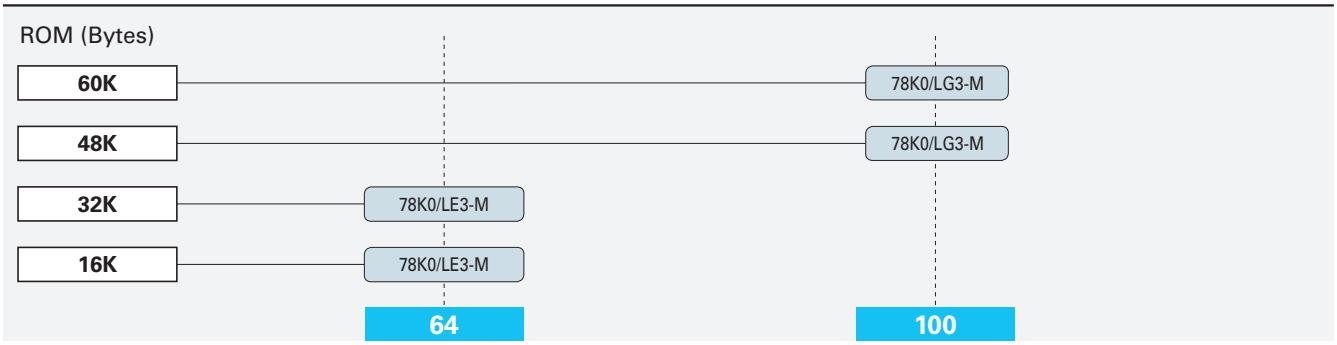
MCUs for Meter Control

Smart meters, which are electronic power meters with a wide range of features that enable support for applications such as smart grids, are now taking the place of conventional mechanical meters.
The 78K0/Lx3-M series from Renesas Electronics are 8-bit MCUs that provide all the features required for developing an electronic power meter.

• Features of MCUs for Meter Control

- All features required for power meters integrated in a single package.
- Power metrology implemented by hardware.

• Memory Capacity (78K0 MCUs)



• Specifications (78K0/LE3-M)

Group		μPD78F8052	μPD78F8053
Memory	ROM Size (Bytes)	16K	32K
	ROM Type	Flash	
	Single-Power-Supply Flash Memory	Yes	
	RAM Size (Bytes)	768	1K
Clock	Maximum Operating Frequency (MHz)	10	
	On-Chip Oscillator (Hz)	8M, 240k	
	Subclock (32.768kHz)	Yes	
I/O	I/O Ports	32	
Bus	External Data/Address Bus	—/—	
Timer	16-bit Timer	1	
	8-bit Timer	6	
	Other Timers	—	
	Watch Timer	—	
	Real-Time Counter	1	
	Watchdog Timer	1	
	PWM Output	8 bits × 1	
Serial Interface	UART	—	
	UART Supporting LIN-bus	1	
	UART, CSI	1	
	UART Supporting LIN-bus, CSI	—	
	CSI	—	
	CSI, I²C	—	
	CSI with Automatic Transmission/ Reception Function	—	
	I²C	—	
	IEBus	—	
	CAN	—	
OCD	On-Chip Debugger	Yes	
Peripheral Functions	LCD (Segments x Commons)	24 × 4	
	24-bit ΔΣ A/D Converter	3	
	16-bit ΔΣ A/D Converter	—	
	10-bit A/D Converter	1	
	8-bit A/D Converter	—	
	8-bit D/A Converter	—	
	Multiplier/Divider (bits x bits, bits ÷ bits)	—	
	Other Functions	POC, LVI, buzzer output, remote control transmitter, power calculator, power quality measurement, digital frequency converter	
Others	Power Supply Voltage (V)	1.8 to 3.6	
	Package (size: mm)	64-LQFP (10 × 10)	
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-78K0LX3M (IECUBE)	
Package		P64GB-50-GAH	
Part No.		μPD78F8052GB-GAH-AX**	μPD78F8053GB-GAH-AX**

Remark POC: Power-on clear
LVI: Low-voltage indicator

★ : New product ★★ : Under development

• Specifications (78K0/LG3-M)

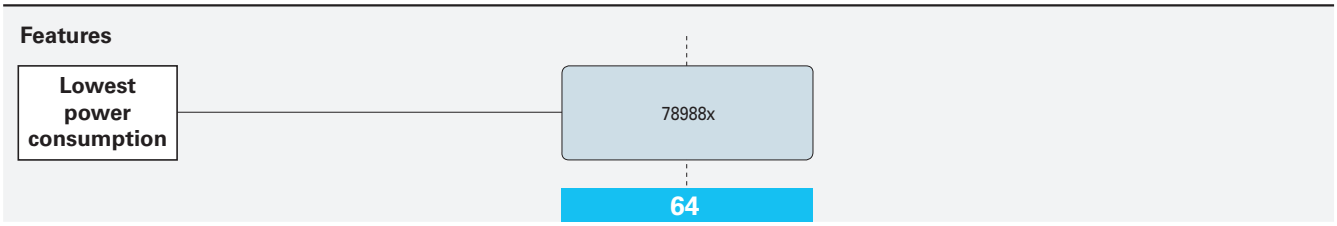
Group		μPD78F8054	μPD78F8055
Memory	ROM Size (Bytes)	48K	60K
	ROM Type	Flash	
	Single-Power-Supply Flash Memory	Yes	
	RAM Size (Bytes)	2K	
Clock	Maximum Operating Frequency (MHz)	10	
	On-Chip Oscillator (Hz)	8M, 240k	
	Subclock (32.768kHz)	Yes	
I/O	I/O Ports	65	
Bus	External Data/Address Bus	—/—	
Timer	16-bit Timer	1	
	8-bit Timer	6	
	Other Timers	—	
	Watch Timer	—	
	Real-Time Counter	1	
	Watchdog Timer	1	
	PWM Output	8 bits × 4	
Serial Interface	UART	—	
	UART Supporting LIN-bus	1	
	UART, CSI	1	
	UART Supporting LIN-bus, CSI	—	
	CSI	—	
	CSI, I^2C	—	
	CSI with Automatic Transmission/ Reception Function	—	
	I^2C	—	
	IEBus	—	
	CAN	—	
OCD	On-Chip Debugger	Yes	
Peripheral Functions	LCD (Segments x Commons)	40 × 4	
	24-bit ΔΣ A/D Converter	4	
	16-bit ΔΣ A/D Converter	—	
	10-bit A/D Converter	8	
	8-bit A/D Converter	—	
	8-bit D/A Converter	—	
	Multiplier/Divider (bits x bits, bits ÷ bits)	—	
	Other Functions	POC, LVI, buzzer output, remote control transmitter, power calculator, power quality measurement, digital frequency converter	
Others	Power Supply Voltage (V)	1.8 to 3.6	
	Package (size: mm)	100-LQFP (14 × 14)	
	In-Circuit Emulator Emulation Board	QB-MINI2 (MINICUBE2) QB-78K0LX3M (IECUBE)	
Package		P100GC-50-UEU-1	
Part No.		μPD78F8054GC-UEU-AX**	μPD78F8055GC-UEU-AX**

Remark POC: Power-on clear
LVI: Low-voltage indicator

★ : New product ★★ : Under development

MCUs for Meter Control

• Memory Capacity (78K0S MCUs)



• Specifications (μPD78988x)

Group		μPD789881	μPD78F9882
Memory	ROM Size (Bytes)	16K	32K
	ROM Type	Mask	Flash
	Single-Power-Supply Flash Memory	—	
	RAM Size (Bytes)	512	
Clock	Maximum Operating Frequency (MHz)	0.5	
	On-Chip Oscillator (Hz)	500k	
	Subclock (32.768kHz)	Yes	
I/O	I/O Ports	28	
Bus	External Data/Address Bus	—/—	
Timer	16-bit Timer	1	
	8-bit Timer	3	
	Other Timers	—	
	Watch Timer	—	
	Real-Time Counter	—	
	Watchdog Timer	1	
	PWM Output	8 bits × 2	
Serial Interface	UART	1	
	UART Supporting LIN-bus	—	
	UART, CSI	—	
	UART Supporting LIN-bus, CSI	—	
	CSI	—	
	CSI, I²C	—	
	CSI with Automatic Transmission/ Reception Function	—	
	I²C	—	
	IEBus	—	
	CAN	—	
OCD	On-Chip Debugger	—	
Peripheral Functions	LCD (Segments × Commons)	26 × 4	
	16-bit ΔΣ A/D Converter	—	
	10-bit A/D Converter	—	
	8-bit A/D Converter	—	
	8-bit D/A Converter	—	
	Multiplier/Divider (bits × bits, bits ÷ bits)	8 × 8	
	Other Functions	Low Power Consumption	
Others	Power Supply Voltage (V)	2.7 to 3.6	3.0 to 3.6
	Package (size: mm)	64-LQFP (10 × 10)	
	In-Circuit Emulator Emulation Board	IE-78K0S-NS/-A, IE-789882-NS-EM1	
Package		S64GB-50-8EU-2	
Part No.		μPD789881GB-×××-8EU-A	μPD78F9882GB-8EU-A

★ : New product ★★ : Under development

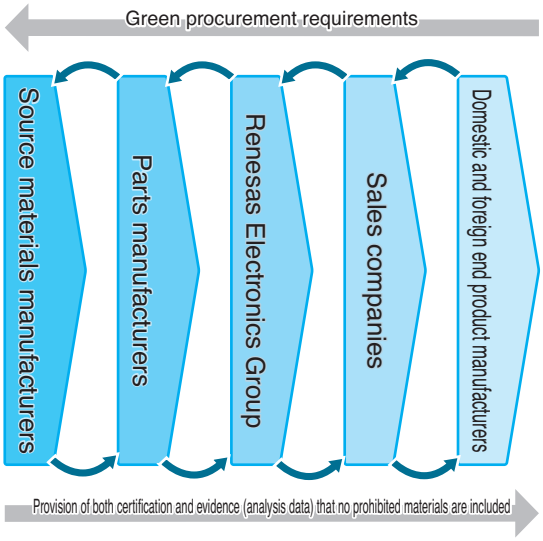
Renesas Electronics is working actively to improve product environmental quality in all aspects of its business operations, including product design and development, materials procurement, manufacturing, shipment, and waste disposal.

Renesas Product Environmental Efforts

Design

- **Development of environmentally compliant products through product environmental assessment**
  Making products more energy efficient (more compact, higher integration, reduced power, and extended service life)
  Reducing environmental burdens due to chemicals (management of chemical content of products)
- **Compliance with domestic and international product environment regulations**
  EU RoHS directive, Chinese RoHS, ELV directive, and REACH regulations

Management of Product Chemical Content Throughout the Whole Supply Chain



Procurement

- **Thoroughgoing green procurement activities** (Green procurement guidelines)
- **Investigation and confirmation of chemical content of procured parts and materials**

Manufacturing

- **Prevention of inclusion or contamination by prohibited chemicals in products** (process management)
- **Reduction of CO_2 emissions** (reduction of PFC emissions and energy used), **reduction of environmental burden due to chemicals used in manufacturing, and reduction of chemical waste**

Shipping

- **Reduction of volume of packing materials used** (increasing reuse of plastic packing materials)
- **Reduction of energy consumption in transport** (improving overall efficiency of distribution)

Compliance with customer requirements
Transmission of information such as chemical content of products

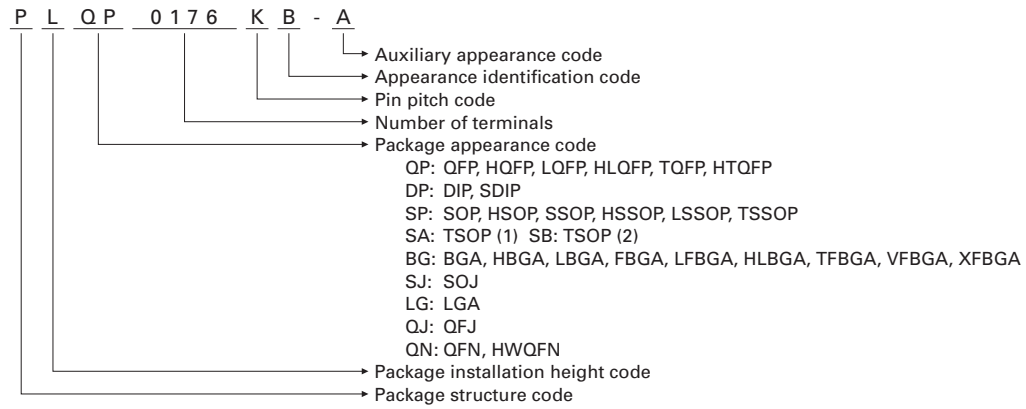
RoHS : Restriction of the use of certain Hazardous Substances in electrical and electronic equipment
WEEE : Waste Electrical and Electronic Equipment
ELV : End of Life Vehicles
REACH : Registration, Evaluation, Authorisation and Restriction of Chemicals

Package Code and Size Table

Package Name	Renesas Code	Previous Code	Terminal Count	Package Dimensions mm (mil)	Terminal Pitch mm	Mounting Height (Max.)mm
SDIP	PRDP0032BB-A	DP-32S	32	8.9 × 28 (400)	1.778	5.08
	PRDP0064BB-A	DP-64S	64	17 × 57.6 (750)	1.78	5.08
	PRDP0020BA-A	20P4B	20	6.3 × 19 (300)	1.778	4.50
	PRDP0032BA-A	32P4B	32	8.9 × 28 (400)	1.778	5.08
	PRDP0042BA-A	42P4B	42	13 × 36.72 (600)	1.778	5.50
	PRDP0064BA-A	64P4B	64	17 × 56.4 (750)	1.778	5.08
SOP	PRSP0032DC-A	FP-32D	32	11.3 × 20.45 (525)	1.27	3.00
	PRSP0020DA-A	20P2N-A	20	5.3 × 12.6 (300)	1.27	2.10
SSOP	PRSP0024GA-A	24P2Q-A	24	5.3 × 10.1	0.80	2.10
	PRSP0036GA-B	36P2R-D	36	8.4 × 15	0.80	2.35
	PRSP0042GA-B	42P2R-E	42	8.4 × 17.5	0.80	2.40
LSSOP	PLSP0020JB-A	20P2F-A	20	4.4 × 6.5	0.65	1.45
	PLSP0024JB-A	24P2F-A	24	5.6 × 7.8	0.65	1.45
TSSOP	PTSP0014JA-B	TTP-14DV	14	4.4 × 5	0.65	1.10
QFP	PRQP0048JA-A	48P6S-A	48	7 × 10	0.65	2.15
	PRQP0064GB-A	FP-64A	64	14 × 14	0.80	3.05
	PRQP0064GC-A	FP-64H/FP-64HV	64	14 × 14	0.80	3.05
	PRQP0080JB-A	FP-80A/FP-80AV	80	14 × 14	0.65	3.05
	PRQP0080GD-B	FP-80B	80	14 × 20	0.80	3.10
	PRQP0080JD-A	FP-80Q	80	14 × 14	0.65	3.05
	PRQP0100JD-B	100P6F-A	100	14 × 20	0.65	3.05
	PRQP0100JE-B	FP-100A	100	14 × 20	0.65	3.10
	PRQP0100KA-A	FP-100B	100	14 × 14	0.50	3.05
	PRQP0100KB-A	FP-100M	100	14 × 14	0.50	3.05
	PRQP0112JA-A	FP-112	112	20 × 20	0.65	3.05
	PRQP0112JB-A	FP-112B/112BV	112	20 × 20	0.65	3.05
	PRQP0128KB-A	FP-128B	128	14 × 20	0.50	3.15
	PRQP0144KA-A	FP-144G	144	20 × 20	0.50	3.05
	PRQP0144KB-A	FP-144J	144	20 × 20	0.50	3.05
	PRQP0064GA-A	64P6N-A	64	14 × 14	0.80	3.05
	PRQP0080JA-A	80P6S-A	80	14 × 14	0.65	3.05
	PRQP0080GB-A	80P6N-A	80	14 × 20	0.80	3.05
	PRQP0100JB-A	100P6S-A	100	14 × 20	0.65	3.05
	PRQP0240KC-A	FP-240/FP-240V	240	32 × 32	0.50	3.95
HQFP	PRQP0208KE-B	FP-208E	208	28 × 28	0.50	3.56
	PRQP0240KC-B	FP-240B	240	32 × 32	0.50	3.95
	PRQP0256LA-B	FP-256G	256	28 × 28	0.40	3.95
LQFP	PLQP0032GC-A	FP-32A	32	7 × 7	0.80	1.70
	PLQP0048KC-A	FP-48B	48	7 × 7	0.50	1.70
	PLQP0048JA-A	FP-48F	48	10 × 10	0.65	1.70

* The number of pins in one pin now or column of the pin matrix of the package (including latent pins)

Package code



Package Code and Size Table

Package Name	Renesas Code	Previous Code	Terminal Count	Package Dimensions mm (mil)	Terminal Pitch mm	Mounting Height (Max.)mm
LQFP	PLQP0064KC-A	FP-64E	64	10 × 10	0.50	1.70
	PLQP0064KB-A	FP-64K/64P6Q-A	64	10 × 10	0.50	1.70
	PLQP0080JA-A	FP-80W/WV	80	14 × 14	0.65	1.70
	PLQP0100KB-A	FP-100U/FP-100UV/100P6Q-A	100	14 × 14	0.50	1.70
	PLQP0112JA-A	FP-112E/EV	112	20 × 20	0.65	1.70
	PLQP0176KC-A	FP-176	176	24 × 24	0.50	1.70
	PLQP0176KD-A	FP-176C	176	24 × 24	0.50	1.70
	PLQP0144KB-A	FP-144F	144	20 × 20	0.50	1.70
	PLQP0144KC-A	FP-144H	144	20 × 20	0.50	1.70
	PLQP0120LA-A	FP-120B	120	14 × 14	0.40	1.70
	PLQP0144KA-A	FP-144L/144P6Q-A	144	20 × 20	0.50	1.70
	PLQP0208KA-A	FP-208C	208	28 × 28	0.50	1.70
	PLQP0208KB-A	–	208	28 × 28	0.50	0.17
	PLQP0032GB-A	32P6U-A	32	7 × 7	0.80	1.70
	PLQP0048KB-A	48P6Q-A	48	7 × 7	0.50	1.70
	PLQP0052JA-A	52P6A-A	52	10 × 10	0.65	1.70
	PLQP0064GA-A	64P6U-A	64	14 × 14	0.80	1.70
	PLQP0080KB-A	80P6Q-A	80	12 × 12	0.50	1.70
	PLQP0128KB-A	128P6Q-A	128	14 × 20	0.50	1.70
	PLQP0176KB-A	FP-176E/EV/176P6Q-A	176	24 × 24	0.50	1.70
	PLQP0176LB-A	FP-176A/FP-176AV	176	20 × 20	0.40	1.70
	PLQP0256LB-A	–	256	28 × 28	0.40	1.70
TQFP	PTQP0064LB-A	–	64	7 × 7	0.40	1.20
	PTQP0080KC-A	TFP-80C/TFP-80CV	80	12 × 12	0.50	1.20
	PTQP0100KA-A	TFP-100B	100	14 × 14	0.50	1.20
	PTQP0100LC-A	TFP-100G	100	12 × 12	0.40	1.20
	PTQP0120LA-A	TFP-120/TFP-120V	120	14 × 14	0.40	1.20
	PTQP0144LC-A	TFP-144/TFP-144V	144	16 × 16	0.40	1.20
	PTQP0100LB-A	100PFB-A	100	12 × 12	0.40	1.20
VQFN	PVQN0032KA-A	TNP-32	32	5 × 6	0.50	0.95
	PVQN0048KA-A	TNP-48	48	7 × 7	0.50	1.00
	PVQN0052LE-A	–	52	7 × 7	0.40	0.95
	PVQN0064LB-A	TNP-64B/64BV	64	8 × 8	0.40	0.95
QFN (LCC)	–	44PJX-A	44	7.0	0.5	1.00
HWQFN	PWQN0024KC-A	24PJS-A	24	4 × 4	0.50	0.80
	PWQN0028KA-B	28PJW-B	28	5 × 5	0.50	0.80
	PWQN0036KA-A	36PJW-A	36	6 × 6	0.50	0.80
	PWQN0040KB-A	40PJS-A	40	6 × 6	0.50	0.8
BGA	PRBG0272FA-A	BP-272/BP-272V	272	21 × 21	1.00	2.10
	PRBG0256DE-A	BP-256	256	27 × 27	1.27	2.50
	PRBG0256DE-B	BP-256A	256	27 × 27	1.27	2.50
FBGA	PRBG0272GA-A	–	272	17 × 17	0.80	1.90
	PRBG0292GA-A	–	292	17 × 17	0.80	2.00
	PRBG0292GB-A	–	292	17 × 17	0.80	1.90
	PRBG0404GA-A	–	404	19 × 19	0.80	1.90
	PRBG0436GA-A	436F7S	436	19 × 19	0.80	2.60
	PRBG0449GA-A	–	449	21 × 21	0.80	1.90
LFBGA	PLBG0112GA-A	BP-112/BP-112V	112	10 × 10	0.80	1.40
	PLBG0176GA-A	BP-176/BP-176V	176	13 × 13	0.8	1.40
	PLBG0240JA-A	BP-240A	240	13 × 13	0.65	1.40
	PLBG0256KA-A	BP-256C	256	11 × 11	0.50	1.40
	PLBG0256KA-B	–	256	11 × 11	0.50	1.40
	PLBG0256GA-A	BP-256H	256	17 × 17	0.80	1.40
	PLBG0264GA-A	BP-264/264V	264	15 × 15	0.80	1.40
	PLBG0336GA-A	BP-336/336V	336	17 × 17	0.80	1.40
	PLBG0417KB-A	–	417	13 × 13	0.50	1.55
TFBGA	TTBG0112GA-A	TBP-112A	112	10 × 10	0.80	1.20
	TTBG0208JA-A	TBP-208A	208	12 × 12	0.65	1.20
TFLGA	PTLG0064JA-A	64F0G	64	6 × 6	0.65	1.05
	PTLG0085JB-A	85F0G	85	7 × 7	0.65	1.05
	PTLG0085JA-A	TLP-85V	85	7 × 7	0.65	1.20
	PTLG0100KA-A	100F0M	100	5.5 × 5.5	0.50	1.05
	PTLG0113JA-A	TLP-113V	113	8 × 8	0.65	1.20
	PTLG0145JB-A	TLP-145V	145	9 × 9	0.65	1.20

* The number of pins in one pin now or column of the pin matrix of the package (including latent pins)

Note For the latest information on packages, refer to the URL below.
http://www.renesas.com/en/package

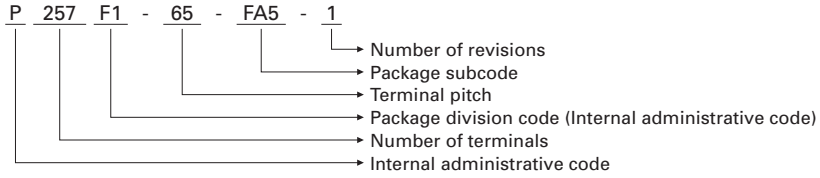
Package Name	Package Code	Terminal Count	Package Dimensions mm (mil)	Terminal Pitch mm	Mounting Height (Max.) mm
SDIP	P16CS-70-CAB	16	7.62mm (300)	1.78	2.8
	P20CS-70-CAC	20	7.62mm (300)	1.78	2.8
	P32CS-70-CAA	32	7.62mm (300)	1.78	2.8
SOP	P20MC-127-GAB	20	19.1 × 11.8	1.27	1.7
SSOP	P10MA-65-CAC	10	4.4 × 3.6	0.65	1.45
	P16MA-65-FAA	16	4.4 × 5.0	0.65	1.725
	P16GM-65-225B-5	16	4.4 × 5.2	0.65	1.44
	P20MC-65-CAA	20	6.1 × 6.5	0.65	1.2
	S20MC-65-5A4-2	20	7.62mm (300)	0.65	1.2
	P30MC-65-CAB	30	7.62mm (300)	0.65	1.2
	S30MC-65-5A4-2	30	7.62mm (300)	0.65	1.2
	P38MC-65-GAA	38	6.1 × 12.3	0.65	2.00
QFP	P80GC-65-8BT-1	80	14 × 14	0.65	1.50
	P100GF-65-3BA1-4	100	14 × 20	0.65	2.7
	S176GM-50-3EU	176	24 × 24	0.5	3.0
	S176GM-50-JEU	176	24 × 24	0.5	3.0
	S176GM-50-KEU-3	176	24 × 24	0.5	3.0
LQFP	P48GA-50-GAM	48	7 × 7	0.5	1.60
	P44GB-80-GAF	44	10 × 10	0.8	1.60
	S44GB-80-8ES-2	44	10 × 10	0.8	1.6
	P52GB-65-GAG	52	10 × 10	0.65	1.60
	P52GB-65-UET-1	52	10 × 10	0.65	1.4
	S52GB-65-8ET-2	52	10 × 10	0.65	1.6
	P64C-70-750A	64	19.05mm (750)	1.78	4.31
	P64GB-50-GAH	64	10 × 10	0.5	1.60
	P64GB-50-UEU-1	64	10 × 10	0.5	1.4
	S64GB-50-8EU-2	64	10 × 10	0.5	1.6
	P64GK-65-GAJ	64	12 × 12	0.65	1.60
	P64GC-80-8BS	64	14 × 14	0.8	1.7
	P64GC-80-GAL	64	14 × 14	0.8	1.70
	P80GK-50-GAK	80	12 × 12	0.5	1.60
	P80GC-65-GAD	80	14 × 14	0.65	1.70
	P80GC-65-UBT	80	14 × 14	0.65	1.4
	P100GC-50-UEU	100	14 × 14	0.5	1.6
	P100GC-50-UEU-1	100	14 × 14	0.5	0.5
	S100GC-50-8EA-2	100	14 × 14	0.5	1.60
	S100GC-50-8EU	100	14 × 14	0.5	1.60
	S100GF-65-JBT-2	100	14 × 14	0.65	2.7
	P100GF-65-GAS	100	14 × 20	0.65	1.6
	P128GF-50-GAT	128	14 × 20	0.5	1.6
	P144GJ-50-GAE-1	144	20 × 20	0.5	1.6
	P144GJ-50-GAE-2	144	20 × 20	0.5	1.6
	S144GJ-50-UEN	144	20 × 20	0.5	1.4
	P176GM-50-GAR	176	24 × 24	0.5	1.60
	S176GM-50-UEU-1	176	24 × 24	0.5	1.4
	P208GD-50-LML	208	28 × 28	0.5	3.2
	P208GD-50-MML	208	28 × 28	0.5	3.2
	P208GD-50-SML	208	28 × 28	0.5	3.2
	P208GD-50-WML-7	208	28 × 28	0.5	3.2
TQFP	P48GA-50-HAA	48	7 × 7	0.5	1.20
	P64GA-40-HAB	64	7 × 7	0.4	1.20
	P64GK-65-9ET-3	64	12 × 12	0.65	1.1
	S80GK-50-9EU-1	80	12 × 12	0.5	1.2
	S120GC-40-9EB-1	120	14 × 14	0.4	1.2
WQFN	P32K8-50-3B4	32	5 × 5	0.5	0.8
	P32K8-50-3B4-1	32	5 × 5	0.5	0.8
	P40K8-50-4B4	40	6 × 6	0.5	0.80
	P40K8-50-4B4-1	40	6 × 6	0.5	0.80
	P48K8-50-5B4	48	7 × 7	0.5	0.80
	P48K8-50-5B4-1	48	7 × 7	0.5	0.80
	P48K8-50-5B4-2	48	7 × 7	0.5	0.80
	P56K8-50-9B4	56	8 × 8	0.5	0.80
	P64K8-50-6B4	64	9 × 9	0.5	T.B.D.

Package Code and Size Table

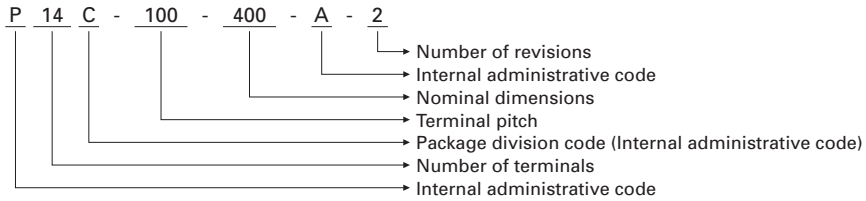
Package Name	Package Code	Terminal Count	Package Dimensions mm (mil)	Terminal Pitch mm	Mounting Height (Max.) mm
FBGA	P64F1-40-AA2	64	4 × 4	0.4	0.69
	P64F1-50-AN1	64	5 × 5	0.5	1.00
	P64F1-50-AN9	64	5 × 5	0.50	1.23
	P64F1-65-BA4	64	6 × 6	0.65	1.51
	P100F1-50-BAK	100	6 × 6	0.5	0.69
	P121F1-65-CAH	121	8 × 8	0.65	1.31
	P161F1-80-EN4-1	161	13 × 13	0.8	1.58
	P304F1-80-HN6	304	19 × 19	0.8	1.11
WLBGA	P16FH-50-2A2-1	16	2 × 2.3	0.5	0.52
LGA	P25FC-50-2N2	25	3 × 3	0.5	0.76
FLGA	P36FC-50-AA3-2	36	4 × 4	0.5	0.8
	P64FC-50-AA1-1	64	5 × 5	0.50	0.98

Package code

1. QFN, QFP, BGA Type



2. SOP, DIP Type



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♦Site Map



1. Eco-Friendly Renesas
2. MCU software library
3. My Renesas
4. Online magazine Renesas Edge
5. Applications

1 Eco-Friendly Renesas

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Toward a Green Society

Green Systems

Green Devices

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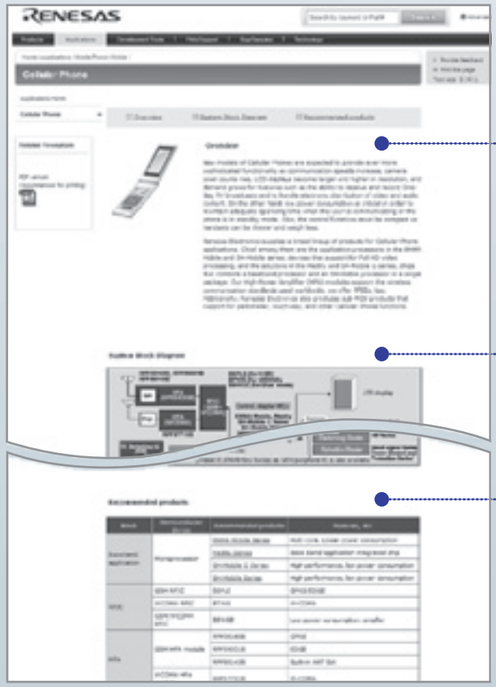


5 Applications

We propose solutions specific to your needs based on our complete lineup of products and know-how. In addition to information about recommended products, other useful information such as that related to sample code and evaluation boards is also provided.



● Applications page (mobile phones)



- Overview
- System block diagram
- Recommended Renesas devices

Renesas Electronics Corporation

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