

Power Management

Programmable Power

- Power Modules
- Universal PMICs

Power Conversion

- Power Modules
- Switching Regulators
- Switching Controllers
- LDOs
- DDR Termination
- Linear Regulators

System Controls

- Power Switches
- Voltage References
- Supervisors

LED Lighting

- AC Step Drivers
- Switching Regulators
- Linear Drivers



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Power Management Portfolio

Programmable Power

Modules	Triple PMICs	Quad PMICs		
XRP9710	XRP7713	XRP7704	XRP7724	XRP7720
XRP9711	XR77103	XRP7714	XR77128	XRP7725
		XRP7740		XR77129

Power Conversion

Power Modules	Switching Regulators			Switching Controllers	Linear			Linear Regulators	
	Step-Down PowerBlox	Step-Down	Step-Up	Step-Down	LDOs		DDR Termination		
XR79110	SP7650	SP6650	SP6641	SP6120	LP2950	SPX1117	SPX2941	XRP2997	SP78L05
XR79115	SP7651	SP6651	SP6660	SP6123	LP2951	SPX1521	SPX2945		
XR79120	SP7652	SP6652	SP6661	SP6128	SP6200	SPX1582	SPX29501		
XR79103	SP7662	SP6654	SP6648	SP6132	SP6201	SPX1583	SPX29502		
XR79106	SP7663	SP6669	SP34063	SP6133	SP6203	SPX1587	SPX2951		
XR79203	XRP7662	XRP6657		SP6134	SP6205	SPX2815	SPX2954		
XR79206	XR76108	XRP6658		SP6136	SP6213	SPX29150	SPX3819		
	XR76112	XRP6668		XRP6124	SP6214	SPX29151	SPX3940		
	XR76115	SP34063		XRP6141	SP6260	SPX29152	SPX5205		
	XR76116	XRP6670		XRP6142		SPX29300	XRP29302		
	XR76120	XRP7674		XR75100		SPX29301	XRP6272		
	XR76203	XRP7675				SPX29302	XRP6274		
	XR76205	XRP7659				SPX2940	XRP6275		
	XR76208					XR71211			

System Controls

Power Switches		Voltage References		Supervisors		
Single	Dual					
SP2525A	SP2526A	SPX1431	SPX2431	SP690	SP691	SP705
XRP2525	XRP2526	SPX385	SPX431	SP706	SP707	SP708
XRP2527	XRP2528	SPX432	XRP431L	SP791	SP809	SP810
XRP2523	XRP2524			SP813		
SP619						

LED Lighting

AC Step Drivers	Switching Regulators			Linear Drivers
	Step-Down	Step-Up/Down	Step-Up	
XR46050	XRP7613	SP6686	SP6699	AMC7140
XR46073		SP7685	iML8648	A703A
XR46110		XRP6840		XRP7618
XR46203				XRP7620
iML8683				
iML8684				
XR46010				

Programmable Power

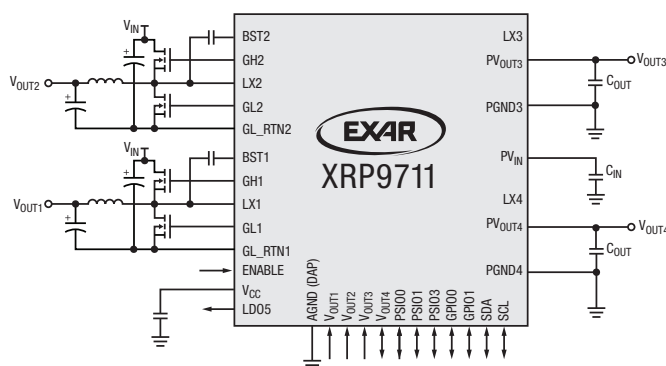
Exar's programmable power modules and universal PMICs offer advanced dynamic control and telemetry along with remote reconfigurability. Our PowerArchitect design and configuration software speeds development and significantly reduces overall time to market compared to legacy analog power solutions. An I²C interface and multiple GPIO pins ensure easy system integration. Configurable warning and fault levels, fault behavior and power up and down sequencing ensure that any load can be properly powered and protected. The power system design can be completed with confidence long before the final revision of the SOC or ASIC is available.

Applications

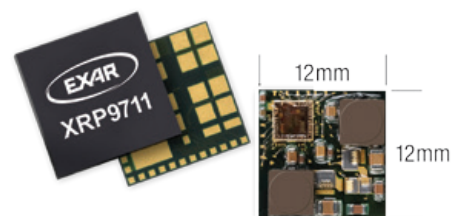
- FPGA, DSP and ASIC power systems
- Base stations
- x86 and ARM servers
- Networking
- Telecommunications
- Industrial and embedded systems

Power Modules

Part Number	Outputs	Output Current (A/Ch)	V _{IN} Range (V)		V _{OUT} Range (V)		Frequency (kHz)	Efficiency (%)	X-Y Dimension (mm)	Z Dimension (mm)	Features
			Min	Max	Min	Max					
XRP9710	2	6	3	22	0.6	5.5	500 to 750	92	12 x 12	2.75	▪ Dual 6A programmable power module with differential sensing ▪ I²C reconfigurability, telemetry and dynamic control ▪ Flash NVM ▪ 5 GPIOs
XRP9711	2 + 2	6	3	22	0.6	5.5	(500 to 750) + (124 to 1230)	92	12 x 12	2.75	▪ Dual 6A programmable power module with integrated dual switching controller for a total of 4 outputs ▪ I²C reconfigurability, telemetry and dynamic control ▪ Flash NVM ▪ 5 GPIOs



Dual 6A Programmable Power Module



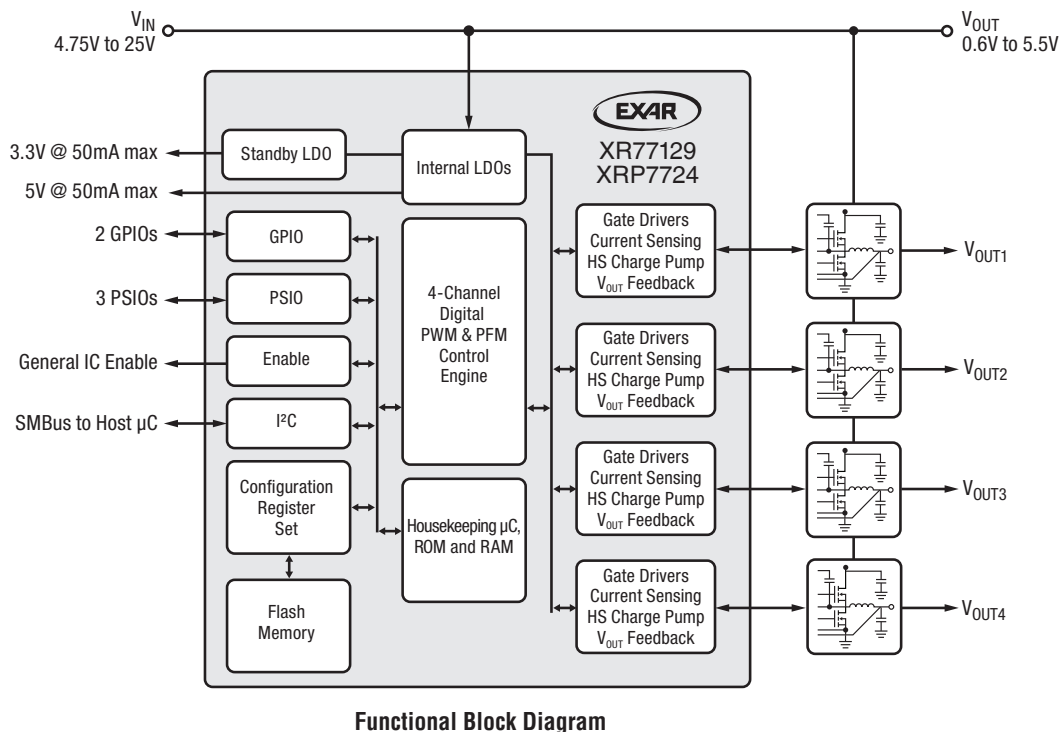
2 x 6A • 12mm x 12mm x 2.75mm

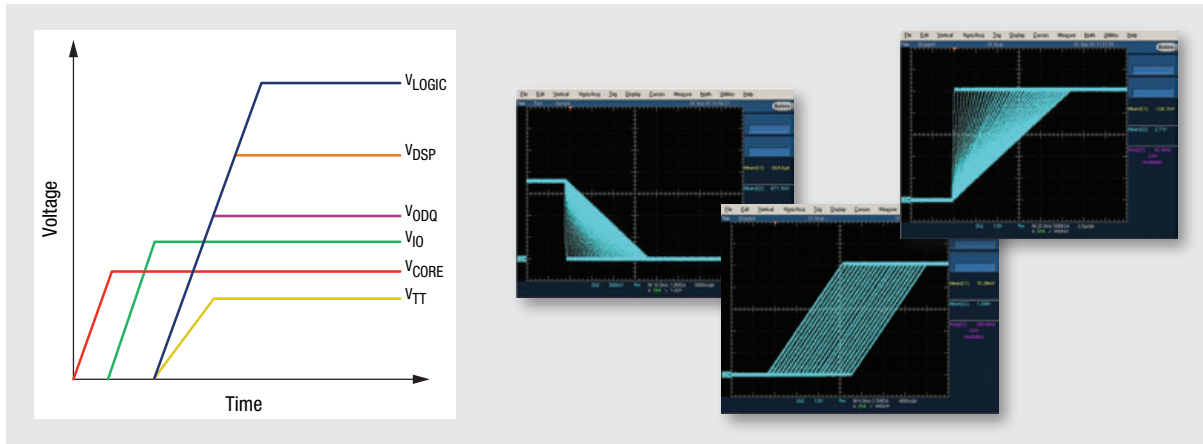
Low Profile Allows Mounting on Backside of Boards

Universal PMICs

Part Number	Ch.	Gate Drive Resistance Up/Down (Ω)	Operating Voltage (V)		Min Output Voltage (V)	Quiescent Current (mA)	Programmable Frequency Range (MHz)	Package	Features
			Min	Max					
XR77103*	3	Integrated MOSFETs	4.5	14	0.8	1.5	0.3 to 2.2	TQFN-32	▪ Synchronous ▪ UVLO, OTP, soft-start ▪ Light load efficiency - PFM and PWM mode ▪ Overcurrent and output overvoltage protection ▪ I²C reconfigurable
XR77129	4	4/2	6	40	0.6	4	0.1 to 1.2	TQFN-44	▪ 40V digital PWM/PFM controller ▪ I²C reconfigurable ▪ Built-in 3.3V/5V LDO ▪ Integrated MOSFET drivers
XR77128	4	4/2 DrMOS output	4.75	25					▪ Updated fault management and GPIO functionality, with the ability to drive MOSFETs and DrMOS
XR7724	4	4/2	4.75	25	0.6	4	0.1 to 1.2	TQFN-44	▪ Digital PWM controller with DPFM mode ▪ I²C reconfigurable ▪ Built-in 3.3V/5V LDO ▪ Integrated MOSFET drivers ▪ Full protection
XR7725			4.75	25					▪ Intel® Node Manager compatible ▪ Programmable power system ▪ XRP7724 pin and function compatible
XR7720			4.75	18					▪ Configurable universal PMIC ▪ Fault, warning, conditional sequencing, GPIOs and PID compensation are all I²C reconfigurable in development, production units omit I²C ▪ Integrated MOSFET drivers
XR7713	3	6/3	4.75	25	0.9	9	0.3 to 1.5	TQFN-32	▪ Digital PWM controller ▪ Faults, warnings, sequencing, GPIOs and PID compensation are all I²C reconfigurable ▪ 3.3V or 5V selectable LDO ▪ Integrated MOSFET drivers
XR7714	4							TQFN-40	
XR7704	4	—/—	6.5	20	0.9	9	0.3 to 1.5	TQFN-40	
XR7740	4	3/1.8							

*Check with Exar for availability.

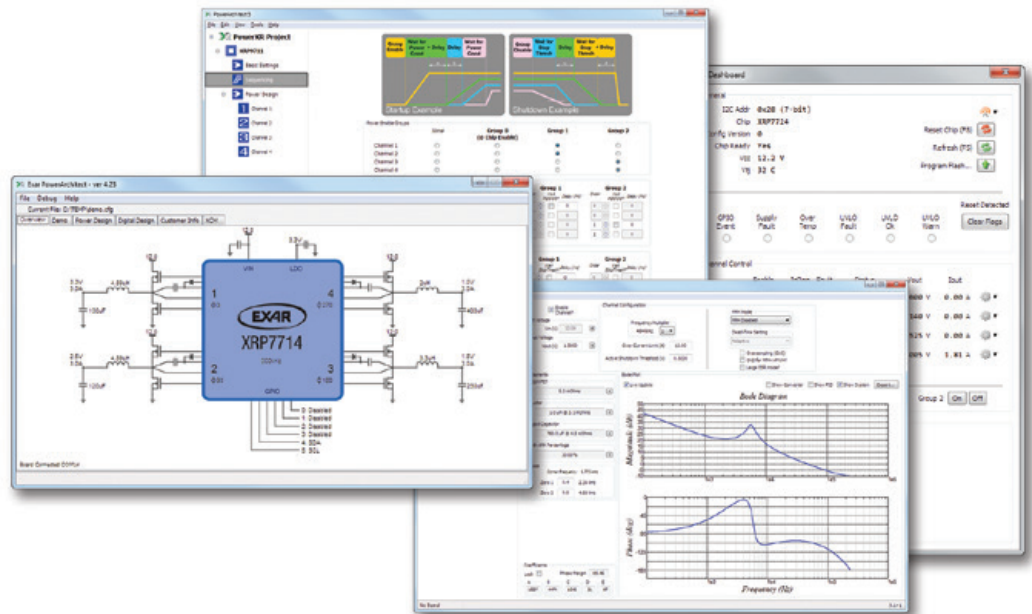




Control Power Up/Down Sequencing with Different Delays and Slopes

PowerArchitect – Configuration Software

Exar's PowerArchitect interactive design tool enables you to create a complete 4- to 6-channel optimized power supply design with complex sequencing and advanced power management features, all with a few clicks of the mouse. A free download of PowerArchitect is available at powerxr.exar.com



Evaluation Boards

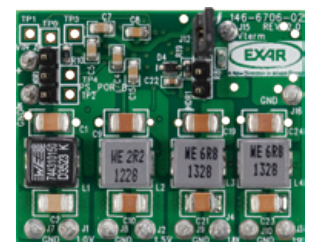
Evaluation boards for all programmable power management devices are available, along with their user manuals.



Complete Programmable Power Kits Available



XRP9710/11 with Arduino Interface

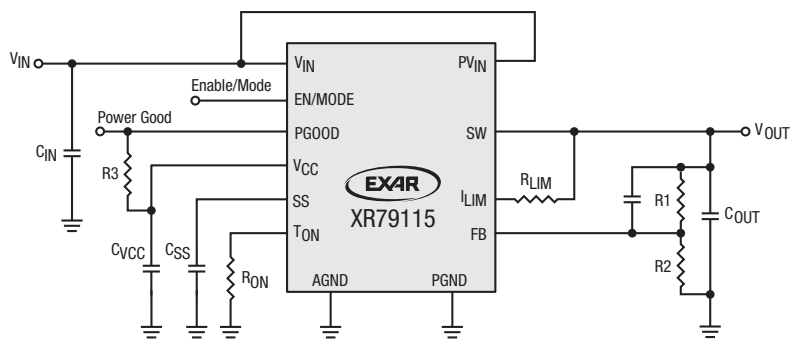


Zynq-7000 Power System Featuring XRP7714

Power Modules

This family of power modules addresses high-current single channel solutions for various end applications. These synchronous step-down power modules are complete system-in-package power management solutions with fully integrated power converters including MOSFETs, inductors and internal input and output capacitors. A patented emulated current mode constant on-time (COT) control provides exceptional full range 0.1% line regulation and 1% output accuracy over the full temperature range. This COT control loop enables operation with ceramic output capacitors, eliminating loop compensation components.

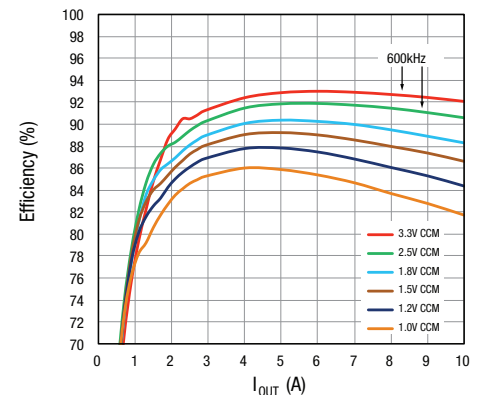
Available in a QFN package, our modules provide superior thermal performance and manufacturability, all in the smallest footprint. The QFN package makes visual inspection of solder joints possible and eases electrical debugging. At 85°C with no airflow, no thermal de-ratings are required for output voltages of 1.8V and below.



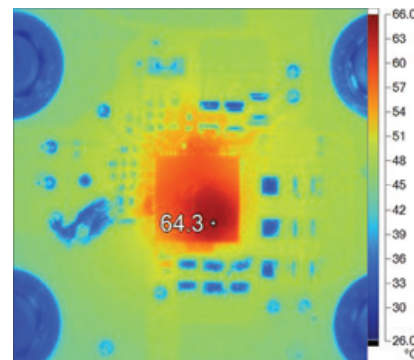
22V, 15A Power Module

Applications

- FPGA, DSP and ASIC power systems
- Base stations
- Repeaters
- Networking
- Telecommunications
- Industrial and embedded systems



$f = 500\text{kHz}$, $V_{IN} = 12\text{V}$
XR79110 Efficiency



1.8V 500kHz 0 LFM

XR79110 Thermal Image

Part Number	Ch.	Output Current (A)	V _{IN} Range (V)	V _{OUT} Range (V)	Frequency (kHz)	Efficiency (%)	X-Y Dimension (mm)	Z Dimension (mm)	Features
XR79203*	1	3	3 to 40	0.6 to 13.2	300 to 500	95	8 x 8	4	▪ QFN package ▪ Patented COT control ▪ UVLO, OTP, soft-start, adjustable hiccup current limit and short-circuit protection ▪ PG00D
XR79206*		6	3 to 40	0.6 to 13.2	300 to 500	95	10 x 10		
XR79103*		3	3 to 22	0.6 to 5.5	600 to 800	95	6 x 6		
XR79106*		6	3 to 22	0.6 to 5.5	600 to 800	95	8 x 8		
XR79110		10	3 to 22	0.6 to 5.5	400 to 600	96	10 x 10		
XR79115		15	3 to 22	0.6 to 5.5	400 to 600	96	12 x 12		
XR79120		20	3 to 22	0.6 to 5.5	400 to 600	93	12 x 14		

*Check with Exar for availability.

Step-Down PowerBlox

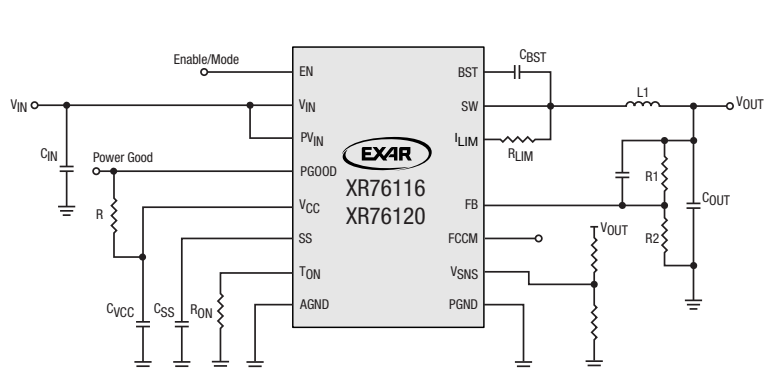
The PowerBlox family of synchronous and non-synchronous step-down regulators provides a fully integrated single-chip solution for point-of-load (POL) applications with high current output requirements. With high input voltage range and operating switching frequency options, the PowerBlox family fits in a wide range of applications and power architectures by enabling step-down DC/DC conversions from various intermediate power bus levels and providing a highly efficient and high performing solution in the most compact footprint.

Applications

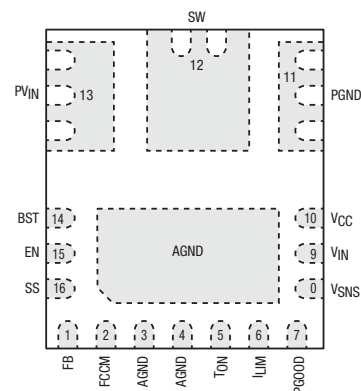
- Distributed power architectures
- Point-of-Load (POL) converters
- Point-of-Load (POL) modules
- FPGAs, DSPs and processor power supplies

Part Number	Output Current (A)	Frequency (kHz)	Operating Voltage (V)		Output Voltage	Output Voltage Range (V)		Accuracy (%)	Efficiency (%)	Package (mm)	Features
			Min	Max		Min	Max				
XR76203	3	100 to 800	3	40	Adj.	0.6	30	0.5	95	5 x 5 QFN	▪ Patented COT control ▪ UVLO, OTP, soft-start, hiccup, PGOOD ▪ Current limit and short protection
XR76205	5								96		
XR76208	8								96		
SP7650	3	300	2.5	28	Adj.	0.8	27	1	95	7 x 4 DFN	▪ Synchronous ▪ UVLO, OTP, soft-start ▪ Short-circuit protection/auto-restart
SP7652	6	600	2.5	28	Adj.	0.8	27	1	92	7 x 4 DFN	▪ Synchronous ▪ UVLO, OTP, soft-start ▪ Short-circuit protection/auto-restart
SP7663	6	600	3	22	Adj.	0.8	20.2	1	91	7 x 4 DFN	▪ Synchronous ▪ UVLO, OTP, soft-start, current limiting ▪ Short-circuit protection/auto-restart
SP7662/ XRP7662	12	300	3	22	Adj.	0.8	20.2	1	93	7 x 4 DFN	▪ Synchronous ▪ UVLO, OTP, soft-start, current limiting ▪ Short-circuit protection/auto-restart
XR76108	8	200 to 800	3	22	Adj.	0.6	18	0.5	96	5 x 5 QFN	▪ Patented COT control ▪ UVLO, OTP, soft-start, hiccup, PGOOD ▪ Current limit and short protection
XR76112	12									6 x 6 QFN	
XR76115	15										
XR76116*	15	200 to 800	4.5	22	Adj.	0.6	18	0.5	97	5 x 6 QFN	▪ Patented COT control ▪ UVLO, OTP, soft-start, hiccup, PGOOD ▪ Current limit and short protection
XR76120*	20	200 to 800	4.5	22	Adj.	0.6	18	0.5	97	5 x 6 QFN	
SP7651	3	900	2.5	20	Adj.	0.8	19	1	92	7 x 4 DFN	▪ Synchronous ▪ UVLO, OTP, soft-start ▪ Short-circuit protection/auto-restart

*Check with Exar for availability.



15A and 20A Step-Down Regulator



XR76120 Pin Assignment

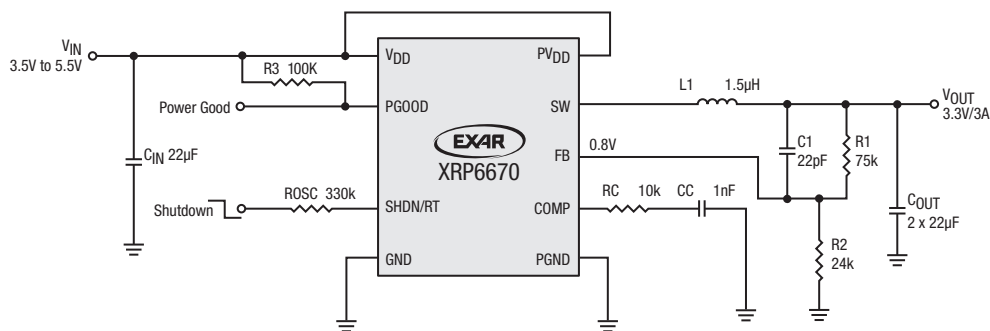
Step-Down Regulators

Step-down regulators, also known as buck regulators, are used to lower the input voltage to the desired output level with higher efficiency than an LDO. A step-down regulator integrates power FET ICs, providing a monolithic power converter.

Applications

- Distributed power architectures
- Point-of-Load (POL) converters
- Point-of-Load (POL) modules
- FPGAs, DPSs and processor power supplies

Part Number	Ch.	Output Current	Frequency Mode (MHz)	Operating Voltage (V)		Output Voltage	Output Voltage Range (V)		Quiescent Current (μA)	Efficiency (%)	Package	Features
				Min	Max		Min	Max				
SP6650	1	600mA	PFM	2.7	6.5	Adj.	1.3	6	70	95	MSOP-10	▪ Synchronous ▪ Enable pin ▪ Low battery detection ▪ UVLO, over temperature protection
SP6669	1	600mA	1.5	2.5	5.5	Adj.	0.6	5	200	95	SOT23-5	▪ Synchronous ▪ Enable pin ▪ Pulse skipping at light load ▪ Over temperature protection
SP6651	1	800mA	PFM	2.7	5.5	Adj.	1	5	20	98	MSOP-10 DFN-10	▪ Synchronous ▪ Enable pin ▪ Low battery detection ▪ Adjustable UVLO, over temperature protection
SP6654	1	800mA	PFM	2.7	5.5	Adj.	0.8	5	20	98	MSOP-10 DFN-10	▪ Synchronous ▪ Enable pin ▪ Power good indicator ▪ Adjustable UVLO, over temperature protection
SP6652	1	1A	1.4	2.7	5.5	Adj.	0.75	5	1mA	97	MSOP-10 DFN-10	▪ Synchronous ▪ Enable pin, soft-start ▪ External clock synchronization ▪ Overcurrent and over temperature protection
XRP6658	1	1A	1.5	2.5	5.5	Adj.	0.6	5	15	97	SOT23-5	▪ Synchronous ▪ Light load efficiency, PFM and PWM mode ▪ Enable pin ▪ UVLO and over temperature protection
SP34063	1	Adj. <1.5A	0.11	3	36	Adj.	1	27	4mA	80	NSOIC-8	▪ Can be implemented in buck, boost or inverting topologies
XRP6657	1	1.5A	1.3	2.5	5.5	Adj.	0.6	5	240	95	DFN-6	▪ Synchronous ▪ Enable pin ▪ Pulse skipping at light load ▪ Over temperature protection
XRP7659	1	1.5A	1.4	4.5	18	Adj.	0.81	15	800	92	SOT23-6	▪ Non synchronous ▪ Enable pin, soft-start ▪ Internal compensation ▪ Overcurrent, over temperature and UVLO protection
XRP7674	1	2A	0.3	4.5	18	Adj.	0.925	16	1.2mA	95	SOIC-8	▪ Synchronous ▪ UVLO, OTP, soft-start ▪ Light load efficiency, PFM and PWM mode ▪ Overcurrent and output overvoltage protection

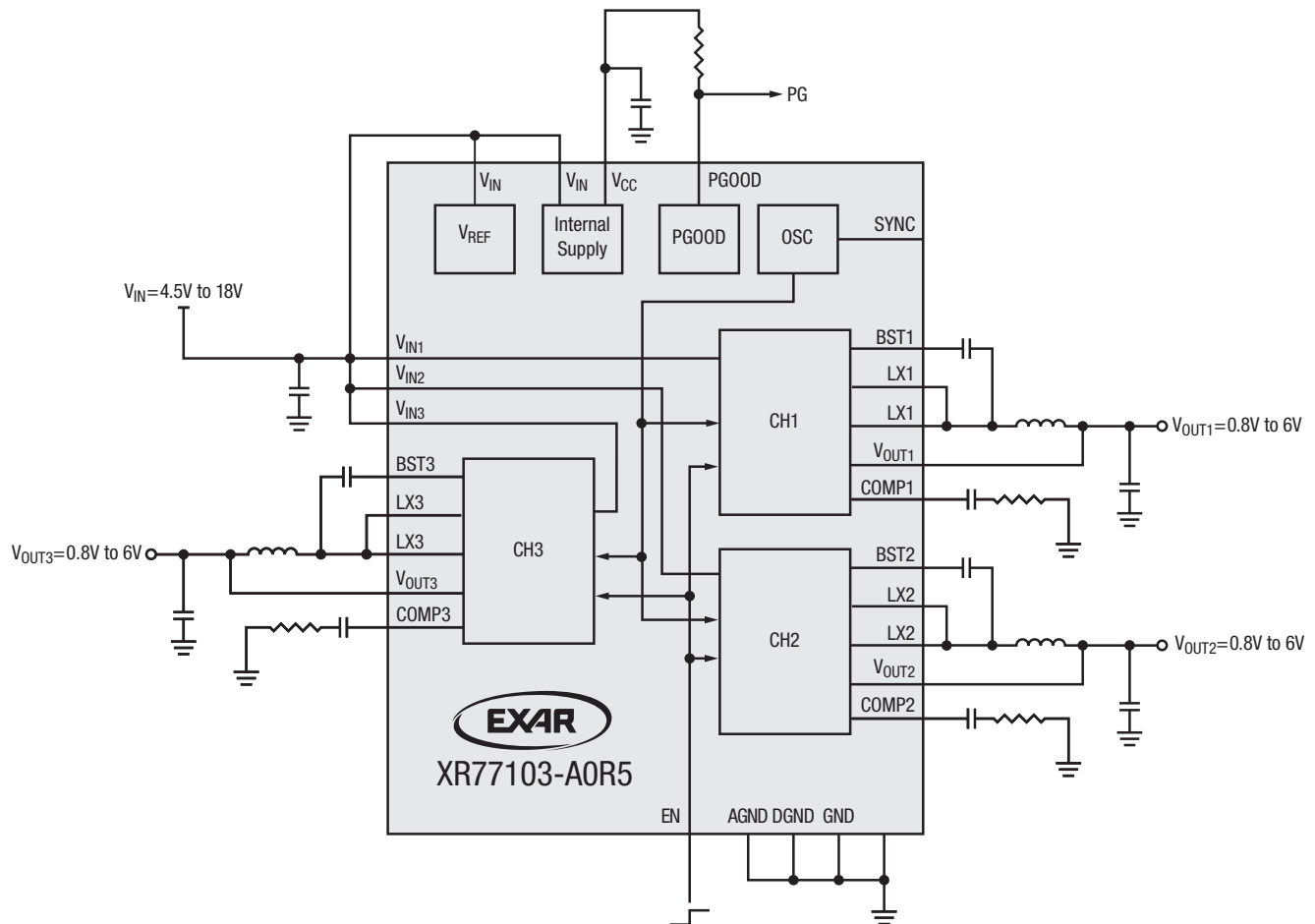


3A Synchronous Step-Down Regulator

Step-Down Regulators (Continued)

Part Number	Ch.	Output Current	Frequency Mode (MHz)	Operating Voltage (V)		Output Voltage	Output Voltage Range (V)		Quiescent Current (μ A)	Efficiency (%)	Package	Features
				Min	Max		Min	Max				
XRP6670	1	3A	Prog. 0.3 to 2.5	2.6	5.5	Adj.	0.8	5	460	95	DFN-10	- Synchronous, programmable frequency - Enable pin, power good flag - OTP, OCP and UVLO protection
XRP7675	1	3A	0.34	4.5	18	Adj.	0.925	16	1.2mA	95	HSOIC-8	- Synchronous - UVLO, OTP, soft-start - Light load efficiency, PFM and PWM mode - Overcurrent and output overvoltage protection
XRP6668	2	1A/1A	1.5	2.5	5.5	Adj.	0.6	5	30	97	NSOIC-8	- Synchronous - Light load efficiency, PFM and PWM mode - Individual enable pin - UVLO and over temperature protection
XR77103-A1R0*	3	1.5A	1	4.5	14	Adj.	0.8	6	2.8mA	93	TQFN-32	- Synchronous - UVLO, OTP, soft-start - Light load efficiency, PSM and PWM mode - Overcurrent and output overvoltage protection
XR77103-A0R5*	3	2A	0.5	4.5	14	Adj.	0.8	6	2.6mA	93	TQFN-32	- Synchronous - UVLO, OTP, soft-start - Light load efficiency, PSM and PWM mode - Overcurrent and output overvoltage protection

*Check with Exar for availability.



3-Output Synchronous Buck Regulator

Step-Up Regulators

Step-up regulators, also known as boost regulators, are used to step up an input voltage to the desired higher output level. They are typically used in portable equipment where the power supply is provided by a battery.

Applications

- Handheld and portable equipment
- Bias supplies

Part Number	Output Current	Operating Voltage (V)		Startup Voltage (V)	Output Voltage	Output Voltage Range (V)		Quiescent Current (μA)	Efficiency (%)	Package	Features
		Min	Max			Min	Max				
SP6641A	100mA	0.9	4.5	0.85	Fixed	3.3		10	87	SOT23-5	▪ Non synchronous ▪ Enable pin ▪ Current limiting
					Fixed	5					
SP6660	200mA	1.5	4.25	n/a	Inverter	-4.25	-1.5	400	94	SOIC-8	▪ Charge pump topology ▪ Selectable oscillator ▪ External oscillator input
					Doubler	3	8		96		
SP6661	200mA	1.5	5.3	n/a	Inverter	-5	-1.5	3mA	89	SOIC-8	▪ Charge pump topology ▪ Selectable oscillator ▪ External oscillator input
		2.5	5.3		Doubler	5	10		94	MSOP-8	
SP6648	400mA	0.7	4.5	0.85	Adj.	2.5	5.5	13	94	MSOP-10	▪ Synchronous ▪ Enable pin ▪ Programmable low battery detection ▪ Undervoltage lockout protection
SP6641B	500mA	0.9	4.5	0.85	Fixed	3.3		10	87	SOT23-5	▪ Non synchronous ▪ Enable pin ▪ Current limiting
					Fixed	5					
SP34063	Adj. <1.5A	3	36	n/a	Adj.	1	27	4mA	80	NSOIC-8	▪ Can be implemented in buck, boost or inverting topologies

Step-Down Controllers

Step-down controllers, also known as buck controllers, are the basic building blocks for high efficiency and high power point-of-loads. Step-down controllers allow maximum flexibility and customization for high performance conversions.

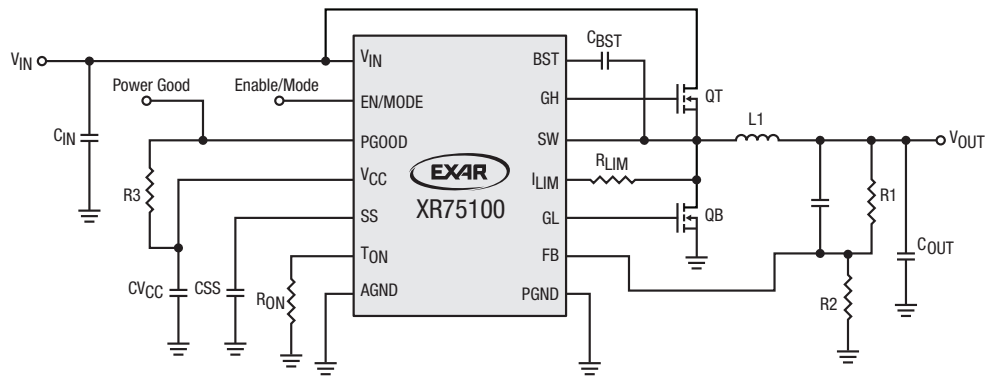
Applications

- Distributed power architectures
- Point-of-Load (POL) converters
- Point-of-Load (POL) modules
- Set-top boxes

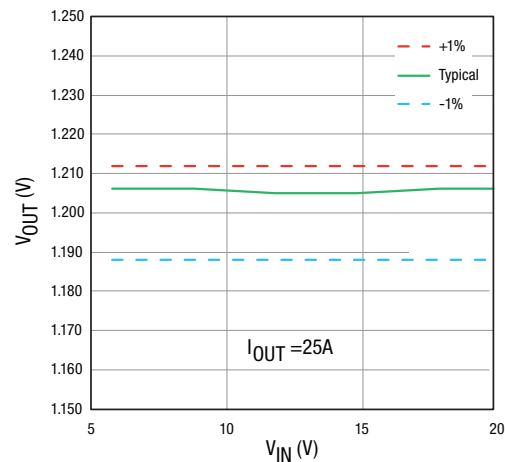
Part Number	Rec. Output Current (A)	Operating Voltage (V)		Min. Output Voltage (V)	Quiescent Current (μA)	Frequency (kHz)	Efficiency (%)	Package	Features
		Min	Max						
XR75100	<20	3	40	0.6	700	200 to 800	96	QFN-16	▪ Proprietary emulated current mode constant on-time architecture ▪ No external compensation ▪ Adjustable frequency ▪ Precision enable, soft-start, force PWM ▪ Adjustable temperature compensated current limit
XRP6124	<5	3	30	1.2	500	200 to 1000	92	SOT23-5	▪ Non synchronous, 500ns constant on-time ▪ Enable pin, soft-start ▪ UVLO and output short-circuit protection
SP6134H	<15	3	28	0.8	1.5mA	600	94	MSOP-10	▪ Synchronous voltage mode PWM ▪ Programmable soft-start ▪ UVLO, over temperature and output short-circuit protection
SP6132H	<20	3	28			300	95		
SP6136	<15	3	24	0.8	1.5mA	600	92	QFN-16	▪ Synchronous voltage mode PWM ▪ Enable pin, power good flag indicator ▪ Programmable soft-start, current limiting ▪ UVLO, over temperature and output short-circuit protection
SP6133	<30					300	95		

Step-Down Controllers (Continued)

Part Number	Rec. Output Current (A)	Operating Voltage (V)		Min. Output Voltage (V)	Quiescent Current (µA)	Frequency (kHz)	Efficiency (%)	Package	Features
		Min	Max						
XRP6141	<35	3	22	0.6	700	200 to 800	95	QFN-16	- Proprietary emulated current mode constant on-time architecture - No external compensation - Adjustable frequency - Precision enable, soft-start, force PWM - Adjustable temperature compensated current limit
SP6120	<10	3	5.5	1.3	950	250 to 550	95	TSSOP-16	- Synchronous voltage mode PWM - Enable pin, high side N or P FET capable - Programmable frequency - Soft-start, UVLO and overcurrent protection
SP6123A	<10	3	5.5	0.8	500	500	95	NSOIC-8	- Synchronous voltage mode PWM - Soft-start, on/off mode - UVLO and overcurrent protection
SP6123						300			
SP6128A	<10	3	5.5	0.8	500	300	95	TSSOP-14	- Synchronous voltage mode PWM - Soft-start, on/off mode - UVLO and overcurrent protection
XRP6142	<20	1	5.5	0.5	400	500 to 1000	96	QFN-16	- Constant on-time architecture 0.5µs, 1.0µs and 2.0µs options - No external compensation - DDR memory support



40V Synchronous Step-Down COT Controller



XR75100 Line Regulation

LDOs

Exar manufactures a broad line of low dropout linear regulators(LDO). The simplest and lowest cost technique for stepping down a DC voltage, LDOs offer a quiet, well-regulated DC voltage supply with excellent transient response.

Applications

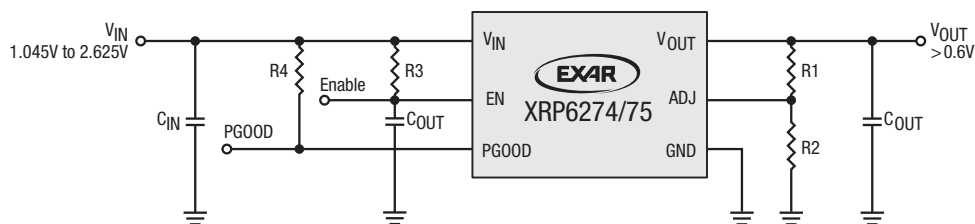
- Portable equipment
- Handheld devices
- Mobile phones and PDAs
- Medical and industrial instrumentation

Part Number	Output Current	Output Voltage (V)	Accuracy (%)	Typical Dropout Voltage (mV)	Operating Voltage (V)		Quiescent Current (μ A)	Package	Features
					Min	Max			
SP6200	100mA	3	2	160	2.5	7	28	SOT23-5	▪ Enable pin ▪ Power good indicator
SP6213	100mA	1.8, 2.5, 2.85, 3, 3.3	2.5	250	2.5	7	65	SC70-5	▪ Enable pin ▪ Current limiting and thermal protection
SP6214	100mA	1.8, 2.85, 3, 3.3	2.5	250	2.5	7	65	SC70-5	▪ Enable pin ▪ Current limiting and thermal protection
LP2950	100mA	3.3, 5	0.5, 1	380	2.4	30	150	TO92-3	▪ Current limiting and thermal protection
LP2951	100mA	Adj., 3.3, 5	0.5, 1	380	2.4	30	150	NSOIC-8	▪ Enable pin ▪ Output error flag indicator ▪ Current limiting and thermal protection
SPX2951	150mA	5	0.5, 1	300	2.4	30	150	NSOIC-8	▪ Enable pin ▪ Output error flag indicator ▪ Current limiting and thermal protection
SPX5205	150mA	Adj., 1.2, 1.8, 2.5, 3, 3.3, 5	1	210	2.5	16	70	SOT23-5	▪ Reverse battery protection ▪ Current limiting and thermal protection
SP6201	200mA	Adj., 1.5, 1.8, 2.5, 2.85, 3, 3.3, 5	2	320	2.5	7	28	SOT23-5	▪ Enable pin ▪ Power good indicator
		Adj., 1.8, 3.3						DFN-8	▪ Enable pin ▪ Power good indicator (fixed voltage version)
SP6260	200mA	1.2, 1.5, 1.8, 2.5, 3, 3.3	2	200	2	6	25	SOT23-5	▪ Low noise: 30μV_{RMS}, no bypass cap needed ▪ Enable pin ▪ Current limiting and thermal protection
SPX2954	250mA	5	0.5	310	2.4	30	150	NSOIC-8 SOT223-3	▪ Enable pin ▪ Output error flag indicator ▪ Current limiting and thermal protection
		3.3, 5	1					NSOIC-8 SOT223-3	
SP6203	300mA	Adj., 2.5, 2.8, 2.85, 3, 3.3	2	180	2.7	6	45	SOT23-5	▪ Low noise: 12μV_{RMS} (fixed voltage version) ▪ Enable pin ▪ Current limiting and thermal protection
		Adj., 1.8						DFN-8	
SPX1521	300mA	3.3, 5	1	300	4.1	20	150	SOT223-3	▪ Reverse battery protection ▪ Current limiting and thermal protection
SPX2945	400mA	3.3, 5	0.5, 1	420	4.1	30	100	SOT223-3	▪ Enable pin ▪ Output error flag indicator ▪ Current limiting and thermal protection
SP6205	500mA	Adj., 2.5, 2.8, 2.85, 3, 3.3	2	300	2.7	6	45	SOT23-5	▪ Low noise: 12μV_{RMS} (fixed voltage version) ▪ Enable pin ▪ Current limiting ▪ Over temperature protection
		Adj., 2.5						DFN-8	

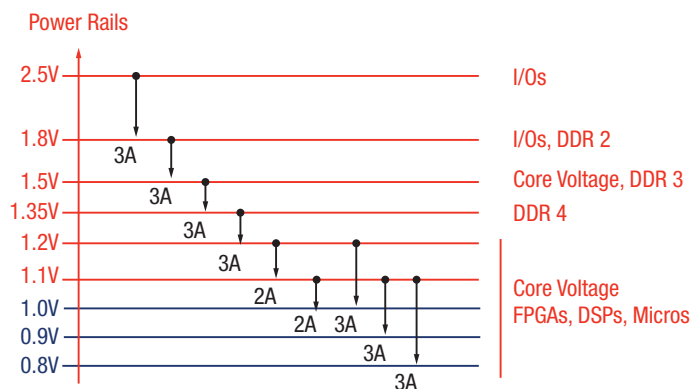
LDOs (Continued)

Part Number	Output Current	Output Voltage (V)	Accuracy (%)	Typical Dropout Voltage (mV)	Operating Voltage (V)		Quiescent Current (μA)	Package	Features
					Min	Max			
SPX3819	500mA	Adj., 1.2, 1.5, 1.8, 2.5, 3, 3.3, 5	1	340	2.5	16	90	SOT23-5	- Enable pin - Reverse battery protection - Current limiting and thermal protection
		Adj., 1.2, 1.8						DFN-8	
		Adj., 1.2, 1.5, 1.8, 2.5, 3.3, 5						NSOIC-8	
SPX1117	800mA	Adj., 1.5, 1.8, 2.5, 3.3, 5	1	1100	2.6	15	5mA	SOT223-3	Current limiting and thermal protection
		Adj., 3.3							
SPX2940	1A	5	3	280	3.2	16	12mA	T0263-3 T0220-3	- Reverse battery protection - Current limiting and thermal protection
SPX2941	1A	Adj.	3	280	3	16	12mA	T0263-5	- Enable pin - Reverse battery protection - Current limiting and thermal protection
SPX3940A	1A	1.8, 2.5, 3.3, 5	1	280	3.1	16	18mA	SOT223-3	- Reverse battery protection - Current limiting and thermal protection
1.8, 3.3, 5		T0263-3							
SPX3940		2.5, 3.3, 5	2					SOT223-3	
		3.3, 5						T0263-3	
SPX1583	1.5A	Adj.	2	400	1.8	5.5	5mA	T0263-5	- Enable pin - External sense pin - Current limiting and thermal protection
SPX2815	1.5A	Adj., 3.3	1, 2	1100	2.5	10	4mA	T0263-3	Current limiting and thermal protection
		Adj.						T0252-3	
SPX29150	1.5A	1.8, 2.5	1	390	2.5	16	12mA	T0263-3	- Reverse battery protection - Current limiting and thermal protection
SPX29151	1.5A	1.8, 2.5, 5	1	390	2.5	16	12mA	T0263-5	- Enable pin - Output error flag indicator - Current limiting and thermal protection
SPX29152	1.5A	Adj.	1	390	2.5	16	12mA	T0263-5 T0220-5	- Enable pin - Current limiting and thermal protection
XR71211	1.5A	Adj.	0.5	130	1.4	2.625	3.5mA	DFN-10	- Enable pin - Power good, soft-start - Current limiting and thermal protection
XRP6272	2A	Adj., 5	2	550	1.8	6	30	T0252-5 NSOIC-8	- Enable and power good functions - Current limiting and thermal protection
XRP6274	2A	Adj.	0.5	40	1.045	2.625	3.5mA	DFN-10	- Power good, precision enable, current and thermal protection - Reverse bias protection
SPX1582	3A	Adj., 2.5	2	400	1.8	5.5	5mA	T0263-5	- Enable pin - External sense pin - Current limiting and thermal protection
SPX1587	3A	Adj.	1	1100	2.8	10	4mA	T0252-3	- Current limiting - Over temperature protection
		Adj.						T0220-3	
		Adj., 2.5, 3.3						T0263-3	
		Adj., 1.5, 5	T0263-3						
		3.3, 5	T0220-3						
SPX29300	3A	1.8, 2.5, 3.3, 5	1	600	2.5	16	37mA	T0263-3	- Current limiting and thermal protection - Reverse battery protection
SPX29301	3A	3.3, 5	1	600	4	16	37mA	T0263-5	- Enable pin - Output error flag indicator - Current limiting and thermal protection

Part Number	Output Current	Output Voltage (V)	Accuracy (%)	Typical Dropout Voltage (mV)	Operating Voltage (V)		Quiescent Current (μ A)	Package	Features
					Min	Max			
SPX29302	3A	Adj.	1	600	2.8	16	37mA	TO263-5	- Enable pin - Current limiting and thermal protection - Reverse battery protection
XRP29302	3A	Adj.	1	600	2.25	16	40mA	TO220-5	- Enable pin - Current limiting and thermal protection - Reverse battery protection
XRP6275	3A	Adj.	0.5	80	1.045	2.625	3.5mA	DFN-10	- Power good, precision enable, current and thermal protection - Reverse bias protection
SPX29501	5A	3.3, 5	1	420	2.8	16	20mA	TO263-5	- Enable pin - Output error flag indicator - Current limiting and thermal protection - Reverse battery protection
SPX29502	5A	Adj.	1	420	2.8	16	20mA	TO263-5 TO220-5	- Enable pin - Current limiting and thermal protection - Reverse battery protection



2A and 3A Ultra LDO Voltage Regulators



XRP6274/75 Achievable Conversions

DDR Termination

Voltage regulators convert various input voltages and produce a constant regulated output voltage with current up to 2A.

Applications

- DDR I/II/III termination

Part Number	Output Current	Output Voltage	Accuracy (%)	Operating Voltage (V)		Quiescent Current (μA)	Package	Features
				Min	Max			
XRP2997	2A	Adjustable	1	1.1	5.5	2	NSOIC-8	▪ DDR I/II/III bus termination regulator ▪ Over temperature protection ▪ Overcurrent protection

Linear Regulators

Part Number	Output Current (mA)	Output Voltage (V)	Accuracy (%)	Operating Voltage (V)		Quiescent Current (mA)	Package	Features
				Min	Max			
SP78L05	100	5	5	7.5	18	1.5	NSOIC-8	▪ Over temperature protection ▪ Short-circuit protection

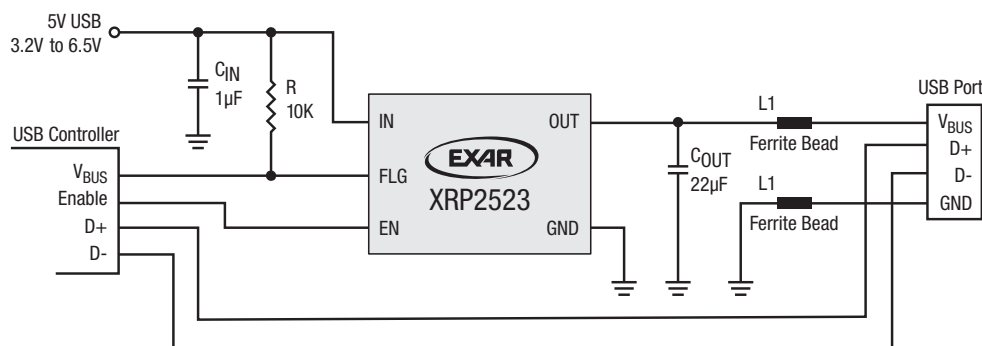
Power Switches

Power switches provide low loss, high efficiency power management, monitoring and fault handling capabilities for any power distribution network. Use of these compact devices results in safer, more stable and more reliable interconnecting systems.

Applications

- USB V_{BUS} power management
- Set-top boxes
- USB peripherals
- Battery charger circuits

Part Number	Channel(s)	Output Current	Current Limit	Operating Voltage (V)		Quiescent Current (μA)	Package	Features
				Min	Max			
SP2525A	1	500mA	850mA	3	5.5	75	NSOIC-8	▪ Active high or low enable pin(s) ▪ USB 2.0 compliant ▪ Current limiting ▪ Fault flag indicator(s) ▪ Over temperature protection ▪ Undervoltage lock out protection
SP2526A	2	500mA	850mA	3	5.5	110	NSOIC-8	▪ Active high enable pin ▪ Current limiting ▪ Short-circuit protection ▪ Over temperature protection
SP619	1	600mA	800mA	2.5	5.5	350	SOT23-6	▪ Active high or low enable pin(s) ▪ USB 3.0 compliant ▪ Current limiting ▪ Blanking fault flag indicator(s) ▪ Over temperature/reverse current protection ▪ Undervoltage lock out protection
XRP2525	1	900mA	1.15A	1.8	5.5	65	NSOIC-8	▪ Active high or low enable pin(s) ▪ USB 3.0 compliant ▪ Current limiting ▪ Blanking fault flag indicator(s) ▪ Over temperature/reverse current protection ▪ Undervoltage lock out protection
XRP2526	2	900mA	1.15A	1.8	5.5	65	NSOIC-8	▪ Active high or low enable pin(s) ▪ USB 3.0 compliant ▪ Current limiting ▪ Blanking fault flag indicator(s) ▪ Over temperature/reverse current protection ▪ Undervoltage lock out protection
XRP2527	1	900mA	Adj.	1.8	5.5	65	TDFN-8	▪ Active high enable and soft-start ▪ USB 3.0 compliant ▪ Current limiting ▪ Blanking fault flag indicator(s) ▪ Over temperature/reverse current protection ▪ Undervoltage lock out protection
XRP2528	2	900mA	Adj.	1.8	5.5	65	TDFN-10	▪ Active high enable and soft-start ▪ USB 3.0 compliant ▪ Current limiting ▪ Blanking fault flag indicator(s) ▪ Over temperature/reverse current protection ▪ Undervoltage lock out protection
XRP2523	1	1.5A	1.6A	3.2	6.5	40	SOT23-5	▪ Active high enable and soft-start ▪ USB 3.0 compliant ▪ Current limiting ▪ Blanking fault flag indicator(s) ▪ Over temperature/reverse current protection ▪ Undervoltage lock out protection
XRP2524	2	1A	1.5A	2.7	6.5	80	NSOIC-8	▪ Active high enable and soft-start ▪ USB 3.0 compliant ▪ Current limiting ▪ Blanking fault flag indicator(s) ▪ Over temperature/reverse current protection ▪ Undervoltage lock out protection



1.5A USB Power Distribution Switch

Voltage References

Voltage references provide a precise and stable output voltage over a wide range of conditions such as input voltage fluctuations and/or operating temperature change. These devices guarantee system accuracy and performance.

Applications

- Power supplies
- Mother boards
- Medical and industrial instrumentation

Part Number	V _{REF} (V)	Accuracy (%)	Operating Current (mA)	Max Operating Voltage (V)	I _{REF} (μA)	Operating Temperature Range (°C)	Temperature Coefficient (ppm/°C)	Package	Features
SPX385	1.235	1	0.01 to 20	–	–	-40 to 85	80	NSOIC-8	▪ Shunt reference ▪ Replacement for LM285/385
	2.5							SOT23-3	
	5	2						TO92-3	
SPX431A	2.5	0.5	1 to 150	36	0.7	-40 to 125	30	SOT89-3 TO92-3	▪ V_{REF} adjustable up to 36V ▪ Replaces TL431 and AS431
SPX431L	2.5	0.5	1 to 100	20	0.7	0 to 105	30	TO92-3	▪ V_{REF} adjustable up to 20V ▪ Replaces TL431 and AS431
		1						SOT89-3 TO92-3	
SPX432	1.24	0.5	1 to 80	15	3	0 to 105	50	SOT23-3	▪ V_{REF} adjustable to 15V ▪ Replaces TLV431 and AS432
		1						SOT23-3 TO92-3	
SPX1431	2.5	0.4	1 to 150	36	0.7	-55 to 125	30	SOT89-3 NSOIC-8	▪ V_{REF} adjustable up to 36V ▪ Replaces TL1431
SPX2431	2.5	0.5, 1	1 to 100	20	0.7	0 to 105	30	SOT23-3	▪ V_{REF} adjustable up to 20V ▪ Replaces TL2431 and AS2431
XRP431L	1.24	0.5	0.1 to 100	18	0.15	-40 to 125	20	SOT23-5	▪ V_{REF} adjustable up to 18V

Supervisors

Supervisory circuits ensure safe operating conditions for microprocessor and memory-based systems. By monitoring one or more system supplies, supervisory circuits provide basic protection such as power-on reset as well as fault monitoring during power-up, power down and undervoltage (brownout) conditions. Additional functions typically include a watchdog timer, a manual reset and battery backup supply switching.

Applications

- Mother boards
- Telecom and datacom equipment
- Medical and industrial instrumentation

Part Number	Channel(s)	Reset Threshold (V)	Reset Accuracy	Reset Active	Operating Voltage(V)		Quiescent Current (µA)	Package	Features
					Min	Max			
SP690A	1	4.65	125mV	Low	1	5.5	35	NSOIC-8 PDIP-8	▪ Watchdog timer ▪ Back-up battery switchover ▪ Power fail, low battery indicator
SP690S	1	2.925	75mV	Low	1	5.5	25	NSOIC-8	▪ Watchdog timer ▪ Back-up battery switchover ▪ Power fail, low battery indicator
SP690T	1	3.075	75mV	Low	1	5.5	25	NSOIC-8	▪ Watchdog timer ▪ Back-up battery switchover ▪ Power fail, low battery indicator
SP691	1	4.65	125mV	Low/High	1	5.5	35	NSOIC-16 WSOIC-16	▪ Programmable watchdog timer ▪ Back-up battery switchover ▪ Power fail, low battery indicator ▪ Chip enable gating
SP705	1	4.65	150mV	Low	1.1	5.5	40	NSOIC-8 MSOP-8	▪ Watchdog timer ▪ Power fail, low battery indicator ▪ Manual reset
SP706	1	4.40	150mV	Low	1.1	5.5	40	NSOIC-8 MSOP-8	▪ Watchdog timer ▪ Power fail, low battery indicator ▪ Manual reset
SP706R	1	2.63	80mV	Low	1.1	5.5	25	NSOIC-8 MSOP-8	▪ Watchdog timer ▪ Power fail, low battery indicator ▪ Manual reset
SP706S	1	2.93	80mV	Low	1.1	5.5	25	NSOIC-8 MSOP-8	▪ Watchdog timer ▪ Power fail, low battery indicator ▪ Manual reset
SP706T	1	3.08	80mV	Low	1.1	5.5	25	NSOIC-8 MSOP-8	▪ Watchdog timer ▪ Power fail, low battery indicator ▪ Manual reset
SP707	1	4.65	150mV	Low/High	1.1	5.5	40	NSOIC-8 MSOP-8	▪ Power fail, low battery indicator ▪ Manual reset
SP708	1	4.40	150mV	Low/High	1.1	5.5	40	NSOIC-8	▪ Power fail, low battery indicator ▪ Manual reset
SP708R	1	2.63	80mV	Low/High	1.1	5.5	25	NSOIC-8	▪ Power fail, low battery indicator ▪ Manual reset
SP708S	1	2.93	80mV	Low/High	1.1	5.5	25	NSOIC-8 MSOP-8	▪ Power fail, low battery indicator ▪ Manual reset
SP708T	1	3.08	80mV	Low/High	1.1	5.5	25	NSOIC-8	▪ Power fail, low battery indicator ▪ Manual reset
SP791	1	4.65	150mV	High	1	5.5	40	NSOIC-16	▪ Programmable watchdog timer ▪ Back-up battery switchover ▪ Power fail, low battery indicator ▪ Chip enable gating ▪ Manual reset
SP809	1	2.3, 2.6, 2.9 3.1, 4.6	1.50%	Low	0.9	6	1	SOT23-3	▪ 140ms reset pulse width ▪ Push-pull output
SP809N	1	2.3, 2.9 3.1, 4.6	1.50%	Low	0.9	6	1	SOT23-3	▪ 140ms reset pulse width ▪ Open drain output
SP810	1	2.6, 4.4	1.50%	High	0.9	6	1	SOT23-3	▪ 140ms reset pulse width
SP813	1	4.65	150mV	High	1.1	5.5	40	NSOIC-8 PDIP-8	▪ Watchdog timer ▪ Manual reset

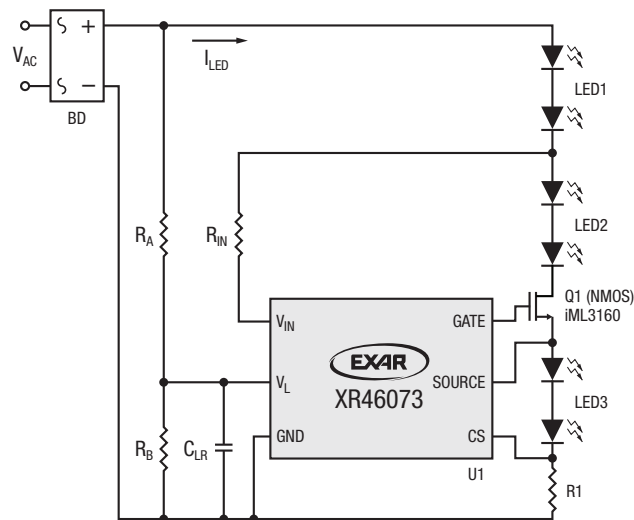
AC Step Drivers

Exar is the world leader in AC step driver solutions for LED bulbs, tubes, troffers, downlights and decorative LED applications. Our patented distributed architecture eliminates the need for magnetics, MOVs and electrolytic capacitors providing robust, cost effective and extremely small solutions with low flicker, high power factor and low THD.

Applications

- A19 bulbs
- BR and PAR downlights
- Tubes, linear lights

Part Number	Steps	Max Voltage (V)	I _{OUT} Max (mA)	Improved Line Regulation	Dimmable	Application	Package	Features
XR46050	2	78	180	N	Y	Bulb, downlight	DFN-6	▪ 2-step integrated driver ▪ Smallest footprint solution ▪ Built in OTP/OVP
XR46073	2	78	180	Y	Y	Bulb, downlight	DFN-6	▪ 2-step integrated driver ▪ Improved line regulation ▪ Built in OTP/OVP
XR46110	1	78	180	Y	Y	Tube, downlight	DFN-6	▪ 1-step driver ▪ Improved line regulation ▪ Built in OTP/OVP
XR46203	2	78	180	Y	Y	Downlight	DFN-8	▪ 2-step integrated driver ▪ Better thermal performance ▪ Built in OTP/OVP
iML8683	1	80	130	N	N	Bulb, tube, downlight	DFN-6, SOT89-5	▪ 1-step driver ▪ For use in non-dimmable applications
iML8684	1	80	130	N	Y	Bulb, tube, downlight	DFN-6, SOT89-5	▪ 1-step driver ▪ For use in dimmable applications
XR46010	1	80	60	—	Y	Dimming controller	SOT23-3	▪ For use in TRIAC dimmable applications



Two-Step LED Current Controller

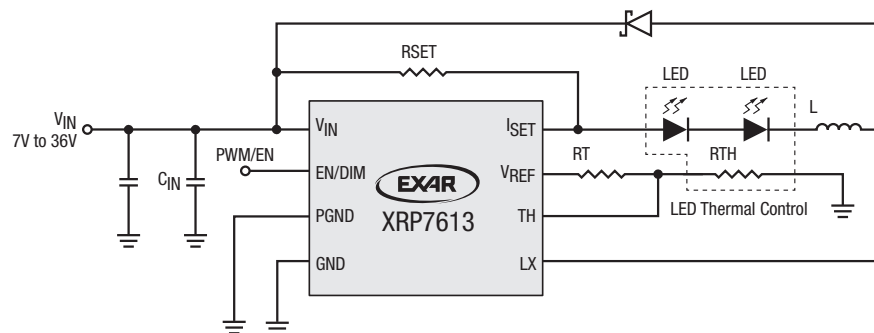
Switching Regulators

Efficiency, performance, size and reliability are rapidly imposing LEDs as the lighting solution of choice in space-constrained portable electronic equipment as well as in architectural and accent lighting fixtures. Exar's LED lighting products offer compact and efficient solutions for line and battery-operated devices and are capable of driving multiple LEDs in various series or parallel topologies.

Applications

- General lighting and display
- Medical and industrial instrumentation
- Keypad and signage backlighting

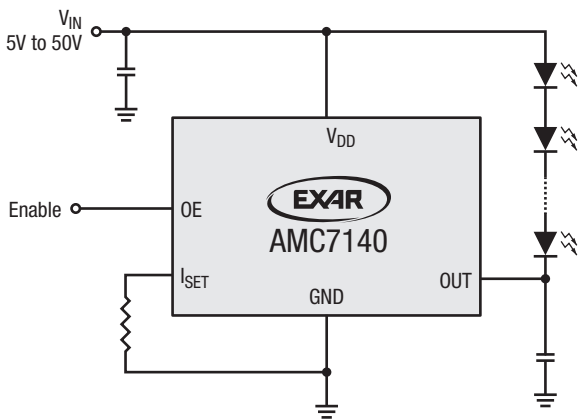
Part Number	Ch.	Max Current/Ch.	LEDs/Ch.	Operating Voltage (V)		Ref. Voltage (mV)	Freq. (MHz)	Max Output Voltage (V)	Quiescent Current (μA)	Efficiency (%)	Package	Application	Features
				Min	Max								
XRP7613	1	1.2A	8	7	36	100	<1	36	35	95	SOIC-8	High-powered LED	▪ Hysteretic PFM control ▪ Enable and soft-start functions ▪ Analog and PWM dimming ▪ Dynamic LED current thermal control
SP7685	1	1.2A	1	2.7	5.5	50	2.4	5.5	500	94	DFN-10	Flash	▪ Charge pump topology ▪ Enable pin, flash/torch mode ▪ Adjustable flash current, soft-start ▪ Flash timeout protection ▪ Overvoltage, overcurrent and temperature protection
SP6686	1	400mA	1	2.7	5.5	50	2.4	5.5	500	94	DFN-10	Flash	▪ Charge pump topology ▪ Enable pin, flash/torch mode ▪ Adjustable flash current, soft-start ▪ Overvoltage, overcurrent and temperature protection
SP6699	1	20mA	6	2.5	16	200	1.2	27	3.2	84	SOT23-6	Backlight	▪ Integrated Schottky diode ▪ Enable pin, PWM dimming ▪ Soft-start
XRP6840	2	2.15A	1	2.7	5.5	I ² C Controlled	2.4	5.5	1		TQFN-20	Flash	▪ Uses SuperCap technology ▪ Charge pump topology ▪ Enable pin, flash/torch mode ▪ I²C programmable ▪ Overvoltage, overcurrent and temperature protection
	3	1.45A	1										
iML8648	4	30	12	4.2	24	600	<2	39	1	85	QFN-16	Backlight	▪ 1:1000 PWM dimming range ▪ 100Hz to 25kHz PWM dimming frequency ▪ Power-on inrush current protection ▪ OCP/OVP/OTP functions ▪ LED short-circuit protection ▪ Schottky diode open protection



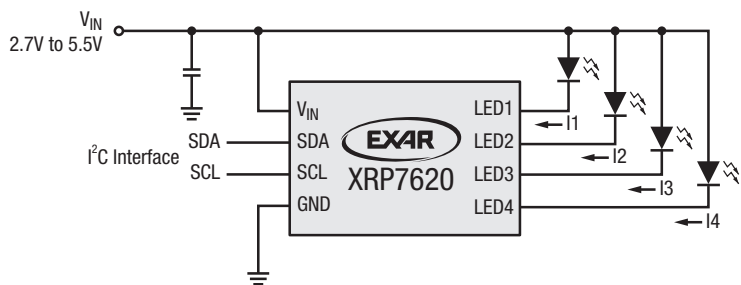
1.2A 36V Step-Down LED Driver

Linear Drivers

Part Number	Ch.	Max Current/Ch. (mA)	LEDs/Ch.	Operating Voltage (V)		Dropout Voltage (mV)	Ch./Ch. Accuracy (%)	Control Interface	Package	Application	Features
				Min	Max						
AMC7140	1	700	20	5	50	500	N/A	TTL	TO252-5	General	3μs fast response output stage enable control 0.5V output dropout voltage at 700mA 5V to 50V wide supply voltage range
A703A	2	150	20	6	50	500	3	TTL	SOP-8	General	2μs output current rising/falling time 0.5V output dropout voltage at 150mA 6V to 50V wide supply voltage range
XRP7620	4	31.5	1	2.5	5.5	100	3	I ² C	DFN-8	General	- RGBW/RGBA color mixing applications - Independent channel current programming - Over temperature protection
XRP7618	8	100	7	4.2	30	450	1.5	TTL	TSSOP-20	General	- Enable pin, PWM dimming - Programmable LED current - Smart Talk power optimization - UVLO, OTP, open LED and overcurrent protection



700mA High Voltage Adjustable Current Regulator



4-Channel Adjustable LED Driver

Exar Corporation designs, develops and markets high performance integrated circuits and system solutions for the industrial and embedded systems communications, high-end consumer and infrastructure markets. Exar's broad product portfolio includes analog, display, LED lighting, mixed-signal, power management, connectivity, data management and video processing solutions. Exar has locations worldwide providing real-time customer support.

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