



Is Now Part of



ON Semiconductor®

**To learn more about ON Semiconductor, please visit our website at
www.onsemi.com**

ON Semiconductor and the ON Semiconductor logo are trademarks of Semiconductor Components Industries, LLC dba ON Semiconductor or its subsidiaries in the United States and/or other countries. ON Semiconductor owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of ON Semiconductor's product/patent coverage may be accessed at www.onsemi.com/site/pdf/Patent-Marking.pdf. ON Semiconductor reserves the right to make changes without further notice to any products herein. ON Semiconductor makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does ON Semiconductor assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. Buyer is responsible for its products and applications using ON Semiconductor products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by ON Semiconductor. "Typical" parameters which may be provided in ON Semiconductor data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. ON Semiconductor does not convey any license under its patent rights nor the rights of others. ON Semiconductor products are not designed, intended, or authorized for use as a critical component in life support systems or any FDA Class 3 medical devices or medical devices with a same or similar classification in a foreign jurisdiction or any devices intended for implantation in the human body. Should Buyer purchase or use ON Semiconductor products for any such unintended or unauthorized application, Buyer shall indemnify and hold ON Semiconductor and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that ON Semiconductor was negligent regarding the design or manufacture of the part. ON Semiconductor is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

FSA203 — Multimedia High-Speed USB, Video, and Negative Swing Audio Switch with Video Amp/Filter

Features

- USB: 3.5Ω Typical On Resistance
- Video/Mic: 3Ω Typical On Resistance
- Audio: 3.5Ω Typical On Resistance
- USB: -3db Bandwidth at 0pF > 745MHz
- Video: -3db Bandwidth > 615MHz
- Video: 1.0db Flatness > 6MHz
- Low-Power Shutdown Mode: 1μA Maximum
- Power-Off Protection on Common D+/R, D-/L, Video/Microphone Ports
- Packaged in Pb-free 20-Lead DQFN

Applications

- Cell Phone, PDA, Digital Camera, and Notebook
- LCD Monitor, TV, and Set-Top Box

Description

The FSA203 is a multimedia device that includes a Double-Pole, Double Throw (DPDT) USB / audio multiplexer, a video/microphone switch, and a video amplifier / filter path. The DPDT path combines a low-distortion audio and a USB2.0 switch path.

This configuration enables audio and USB data to share a common connector port. The architecture is designed such that audio signals are allowed to swing below ground, enabling the use of a common USB and headphone connector for personal media players and similar portable peripheral devices.

The FSA203 includes a power-off feature to minimize current consumption when V_{av} or V_{bus} is not present. This power-off circuitry is available for the common D+/R, D-/L ports only.

Typical applications involve switching in portables and consumer applications, such as cell phones, digital cameras, and notebooks with hubs or controllers.

IMPORTANT NOTE:

For additional performance information, please contact analogswitch@fairchildsemi.com.

Ordering Information

Part Number	Top Mark	Package
FSA203BQX	203	20-Lead Depopulated very thin Quad Flat-pack No leads (DQFN) JEDEC MO-241, 2.5 x 4.5mm

Diagrams

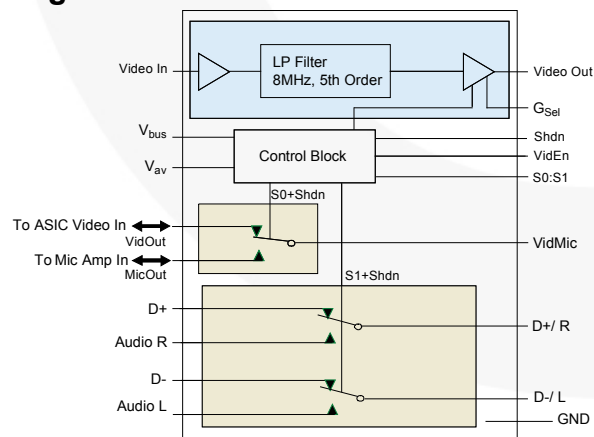


Figure 1. Functional Block Diagram

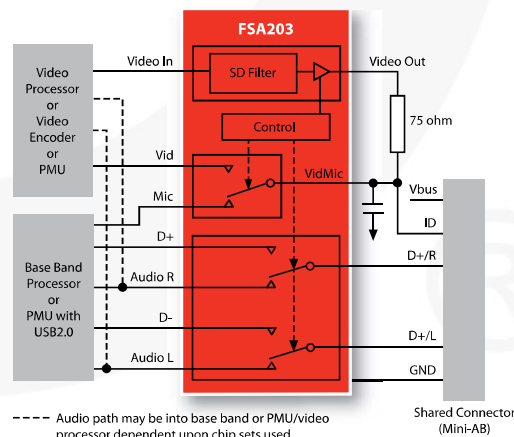


Figure 2. Typical Application Diagram

Pin Assignments

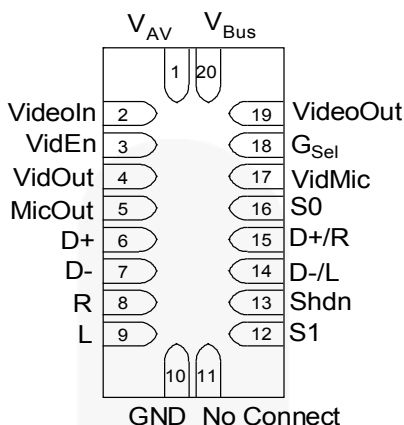


Figure 3. DQFN-20 (Top Through View)

Pin Descriptions

Pin #	Name	Description
1	V _{av}	Audio/Video Power Supply
2	Video In	Video Input Source
3	VidEn	Video Output Buffer Enable (Active High)
4	VidOut	Video Connection to ADC
5	MicOut	Microphone Pre-Amp Connection
6, 7	D+, D-	USB Data Bus Input sources
8, 9	R, L	Audio Right and Left Input sources
10	GND	Ground
11	NC	No Connect
12, 16	S1, S0	Switch Control Pins
13	Shdn	Shutdown Control Pin
14, 15	D-/L, D+/R	USB/Audio Common Connector Ports
17	VidMic	Video / Microphone Common Connector Port
18	G _{Sel}	Gain Select (0dB/6dB); G _{Sel} = High = 6dB
19	Video Out	Buffered/Filtered Video Out
20	V _{bus}	USB V _{bus} Supply

Truth Table

Shdn	VidEn	S0	S1	D+/R	D-/L	Vid/Mic	Video Out
LOW	LOW	LOW	LOW	D+	D-	VidOut	Off
LOW	LOW	LOW	HIGH	R	L	VidOut	Off
LOW	LOW	HIGH	LOW	D+	D-	MicOut	Off
LOW	LOW	HIGH	HIGH	R	L	MicOut	Off
LOW	HIGH	LOW	LOW	D+	D-	VidOut	On
LOW	HIGH	LOW	HIGH	R	L	VidOut	On
LOW	HIGH	HIGH	LOW	D+	D-	MicOut	On
LOW	HIGH	HIGH	HIGH	R	L	MicOut	On
HIGH	X	X	X	Hi-Z	Hi-Z	Hi-Z	Off

Absolute Maximum Ratings

Stresses exceeding the absolute maximum ratings may damage the device. The device may not function or be operable above the recommended operating conditions and stressing the parts to these levels is not recommended. In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only.

Symbol	Parameter		Min.	Max.	Unit
V_{AV} / V_{Bus}	Supply Voltage		-0.5	6.0	V
V_{SW}	Switch I/O Voltage ⁽¹⁾	D+, D-, D+/R, D-/L Pins	$V_{AV} - 5.5$	$V_{AV} - 0.3$	V
		R, L, VidOut, MicOut, VidMic Pins	$V_{AV} - 5.5$	$V_{AV} - 0.3$	V
$V_{VideoIn}$	Control Input Voltage		-0.5	6.0	V
$V_{VideoOut}$	Control Output Voltage		-0.5	6.0	V
V_{CNTRL}	Control Input Voltage ⁽¹⁾ S0: S1 VidEn, Shdn		-0.5	6.0	V
I_{Video}	Video Out Current			16	mA
I_{IK}	Input Clamp Diode Current		-50		mA
I_{SW}	Switch I/O Current (Continuous)	USB D+, D-		20	mA
		R, L, D+/R, D-/L		50	
		VidOut, MicOut, VidMic		50	
I_{SWPEAK}	Peak Switch Current (Pulsed at 1ms Duration, <10% Duty Cycle)	USB D+, D-		100	mA
		R, L, D+/R, D-/L		250	
		VidOut, MicOut, VidMic		250	
T_{STG}	Storage Temperature Range		-65	+150	°C
T_J	Maximum Junction Temperature			+150	°C
T_L	Lead Temperature (Soldering, 10 seconds)			+260	°C
ESD	Human Body Model (JEDEC: JESD22-A114)	I/O to GND		5.5	kV
		All other pins		6.5	
		V_{AV}/V_{Bus} to GND		12.0	
	Charged Discharge Model (JEDEC: JESD22-C101)			2.0	kV

Note:

- The input and output negative ratings may be exceeded if the input and output diode current ratings are observed.

Recommended Operating Conditions

The Recommended Operating Conditions table defines the conditions for actual device operation. Recommended operating conditions are specified to ensure optimal performance to the datasheet specifications. Fairchild does not recommend exceeding them or designing to Absolute Maximum Ratings.

Symbol	Parameter	Min.	Max.	Unit
V_{AV}	Supply Voltage	3.0	3.6	V
V_{Bus}	Supply Voltage	4.25	5.5	V
$V_{VideoIn}$	Video Input Voltage	0	V_{AV}	V
$V_{VideoOut}$	Video Output Voltage	0	V_{AV}	V
V_{CNTRL}	Control Input Voltage	0	V_{AV}	V
V_{SW}	Switch I/O Voltage	$V_{AV} - 5.5$	$V_{AV} - 0.3$	
T_A	Operating Temperature	-40	85	°C

DC Electrical Characteristics

All typical values are at 25°C unless otherwise specified.

Symbol	Parameter	Conditions	V_{AV}/V_{Bus} (V)	$T_A = -40^{\circ}\text{C to } +85^{\circ}\text{C}$			Unit
				Min.	Typ.	Max.	
V_{IK}	Clamp Diode Voltage	$I_{IK} = -18\text{mA}$	$V_{AV} = 3.0\text{V}$ $V_{Bus} = 0\text{V}$			-1.2	V
V_{IH}	Control Input Voltage HIGH		$V_{AV} = 3.0$ to 3.6V $V_{Bus} = 5.5\text{V}$	1.3			V
V_{IL}	Control Input Voltage LOW		$V_{AV} = 3.0$ to 3.6V $V_{Bus} = 5.5\text{V}$			0.5	
I_{IN}	Control Input Current	$V_{CNTRL} = 0$ to 3.6V	$V_{AV} = 3.0$ to 3.6V $V_{Bus} = 5.5\text{V}$	-1		1	μA
I_{OFF}	Power Off Leakage Current (Common Port Only D+/R, D-/L, VidMic)	Common Ports (D+/R, D-/L); $V_{SW} = 0$ to 5.5V See Figure 15	$V_{AV} = 0\text{V}$ $V_{Bus} = 0\text{V}$			500	nA
$I_{OZ(OFF)}$	Off Leakage Current of Ports D+, D-, R, L, MicOut, VidOut)	Ports (D+/R, D-/L = 0.3V , $V_{AV} = 0.3\text{V}$, D+, D-, R, L = 0.3V , $V_{AV} = 0.3\text{V}$ or Floating) See Figure 15	$V_{AV} = 0\text{V}$ $V_{Bus} = 0\text{V}$			500	nA
$I_{NC(ON)}$	On-Leakage Current of Ports D+/R, D-/L or VidMic	Ports (D+/R, D-/L = 0.3V , $V_{AV} = 0.3\text{V}$, D+, D-, R, L = 0.3V , $V_{AV} = 0.3\text{V}$ or Floating) See Figure 16	$V_{AV} = 3.6\text{V}$ $V_{Bus} = 5.5\text{V}$	-100	50	100	nA
USB Switch Path							
	USB Analog Signal Range ⁽³⁾			0		3.6	V
R_{ONUSB}	Switch On Resistance ⁽²⁾	$V_{D+/D-} = 0\text{V}, 0.4\text{V}$, $I_{ON} = -8\text{mA}$ See Figure 5, Figure 14	$V_{AV} = 3.0\text{V}$ $V_{Bus} = 4.25\text{V}$		4	6	Ω
ΔR_{ONUSB}	Delta On Resistance ⁽³⁾	$V_{D+/D-} = 0\text{V}, 0.4\text{V}$, $I_{ON} = -8\text{mA}$	$V_{AV} = 3.0\text{V}$ $V_{Bus} = 4.25\text{V}$		0.35		Ω
$R_{FLAT(ON)USB}$	R_{ON} Flatness ⁽⁴⁾	$V_{D+/D-} = 0\text{V}, 0.4\text{V}$, $I_{ON} = -8\text{mA}$	$V_{AV} = 3.0\text{V}$ $V_{Bus} = 4.25\text{V}$	1.0		2.5	Ω
Audio R/L Switch Path							
	Audio Analog Signal Range ⁽³⁾			$V_{AV} - 5.5$		V_{AV}	V
$R_{ONAudio}$	Switch On Resistance ⁽²⁾	$V_{L/R} = 0\text{V}, 0.7\text{V}$; $V_{AV} = 0.7\text{V}$, V_{AV} ; $I_{ON} = -20\text{mA}$; $V_{Bus} = 0\text{V}$ See Figure 4, Figure 14	$V_{AV} = 3.0\text{V}$ $V_{Bus} = 0\text{V}$		3.5	5.5	Ω
$\Delta R_{ONAudio}$	Delta On Resistance ⁽³⁾	$V_{L/R} = 0\text{V}, 0.7\text{V}$; $I_{ON} = -20\text{mA}$	$V_{AV} = 3.0\text{V}$ $V_{Bus} = 0\text{V}$	0.10		0.35	Ω
$R_{FLAT(ON)Audio}$	R_{ON} Flatness ⁽⁴⁾	$V_{L/R} = 0\text{V}, 0.7\text{V}$; $I_{ON} = -20\text{mA}$	$V_{AV} = 3.0\text{V}$ $V_{Bus} = 0\text{V}$		0.5	2.5	Ω

Continued on the following page...

DC Electrical Characteristics (Continued)

All typical values are at 25°C unless otherwise specified.

Symbol	Parameter	Conditions	V _{AV} /V _{Bus} (V)	T _A = - 40°C to +85°C			Unit
				Min.	Typ.	Max.	
VidMic Switch Path							
	Audio Analog Signal Range ⁽³⁾			V _{AV} - 5.5		V _{AV}	V
R _{ONVidMic}	Video Switch On Resistance ⁽²⁾	V _{Vid/Mic} = 0V, 0.7V; I _{ON} = -13mA See Figure 6, Figure 14	V _{AV} = 3.0V V _{Bus} = 0V		3	6	Ω
Video Buffer Path							
V _{INV}	Video Input Voltage Range		V _{AV} = 3.0V V _{Bus} = 0V		1.2V _{pp}		V _{pp}
V _{OLS}	Output Level Shift	V _{Videoln} = 0V; R _S = 37.5Ω AC Coupled into 150Ω	V _{AV} = 3.0V V _{Bus} = 0V		250		mV
R _{OUTVID}	Video Output Impedance ⁽³⁾		V _{AV} = 3.6V V _{Bus} = 0V		2.5		kΩ
Power Supply							
I _{CC(AV)}	Quiescent Supply Current	V _{CNTRL} = 0V to V _{AV} I _{OUT} = 0	V _{AV} = 3.6V V _{Bus} = 0V		4.5	6.4	mA
I _{CC(VBus)}	Quiescent Supply Current	V _{CNTRL} = 0V to V _{AV} I _{OUT} = 0	V _{AV} = 3.0V V _{Bus} = 5.5V			20	μA
I _{SHDN}	Shutdown Current		V _{AV} = 3.6V V _{Bus} = 0V		.050	0.100	μA
I _{CCT}	Increase in I _{CC} per Control Voltage and V _{AV}	V _{CNTRL} = 1.8V	V _{AV} = 3.6V V _{Bus} = 0V			18	μA
		V _{CNTRL} = 2.6V	V _{AV} = 3.6V V _{Bus} = 0V			15	μA

Notes:

- R_{ON} measured by the voltage drop between 1Bn (2Bn) and 1A (2A) pins at identical current through the switch. R_{ON} is determined by the lower of the voltage on the two pins.
- Guaranteed by characterization, not production tested.
- Flatness is defined as the difference between the maximum and minimum values of on resistance over the specified range of conditions.

AC Electrical Characteristics

All typical value are for $V_{AV} = 3.3V$, $V_{BUS} = 5.0V$, and at $25^{\circ}C$ unless otherwise specified.

Symbol	Parameter	Conditions	V_{AV}/V_{BUS} (V)	$T_A = -40^{\circ}C$ to $+85^{\circ}C$			Unit
				Min.	Typ.	Max.	
$t_{ONAudio}$	Turn-On Time S1 or Shdn to Output	$V_{D+/R, D-/L} = 0.8V$ $R_L = 50\Omega$, $C_L = 5pF$ See Figure 17, Figure 18	$V_{AV} = 3.0V$ $V_{BUS} = 0V$		25	45	ns
$t_{OFFAudio}$	Turn-Off Time S1 or Shdn to Output	$V_{D+/R, D-/L} = 0.8V$ $R_L = 50\Omega$, $C_L = 5pF$ See Figure 17, Figure 18	$V_{AV} = 3.0V$ $V_{BUS} = 0V$		22	30	ns
t_{ONUSB}	Turn-On Time S1 or Shdn to Output	$V_{D+/R, D-/L} = 0.8V$ $R_L = 50\Omega$, $C_L = 5pF$ See Figure 17, Figure 18	$V_{AV} = 3.0V$ $V_{BUS} = 4.25V$		31	40	ns
t_{OFFUSB}	Turn-Off Time S1 or Shdn to Output	$V_{D+/R, D-/L} = 0.8V$ $R_L = 50\Omega$, $C_L = 5pF$ See Figure 17, Figure 18	$V_{AV} = 3.0V$ $V_{BUS} = 4.25V$		12	25	ns
t_{PDUSB}	USB Switch Propagation Delay ⁽⁵⁾	$R_L = 50\Omega$, $C_L = 5pF$ See Figure 19	$V_{AV} = 3.0V$ $V_{BUS} = 4.25V$		0.25		ns
O_{IRRUSB}	Off-Isolation – USB	$f = 1MHz$, $R_T = 50\Omega$, $C_L = 5pF$ See Figure 7, Figure 21	$V_{AV} = 3.0V$ $V_{BUS} = 4.25V$		-80		dB
O_{IRRA}	Off-Isolation – Audio	$f = 20kHz$, $R_T = 50\Omega$, $C_L = 5pF$ See Figure 8, Figure 21	$V_{AV} = 3.0V$ $V_{BUS} = 4.25V$		-100		dB
$Xtalk_{USB}$	Non-Adjacent Channel Crosstalk – USB	$f = 1MHz$, $R_L = 50\Omega$ See Figure 9, Figure 22	$V_{AV} = 3.0V$ $V_{BUS} = 4.25V$		-80		dB
$Xtalk_A$	Non-Adjacent Channel Crosstalk – Audio	$f = 20kHz$, $R_L = 50\Omega$ See Figure 10, Figure 22	$V_{AV} = 3.0V$ $V_{BUS} = 4.25V$		-80		dB
BW_{USB}	-3db Bandwidth - USB	$R_T = 50\Omega$, $C_L = 0pF$, Signal 0dBm See Figure 11, Figure 20	$V_{AV} = 3.0V$ $V_{BUS} = 4.25V$		780		MHz
		$R_T = 50\Omega$, $C_L = 5pF$, Signal 0dBm See Figure 11, Figure 20	$V_{AV} = 3.0V$ $V_{BUS} = 4.25V$		450		MHz
THD	Total Harmonic Distortion	$R_L = 32\Omega$	$V_{AV} = 3.0V$ $V_{BUS} = 0V$		0.01		%
$PSRR_{Audio}$	Power Supply Rejection Ratio	$V_{R,L} = 0.8V$; $R_T = 32\Omega$; $f=217Hz$ on V_{AV} at $600mV_{pp}$ See Figure 25	$V_{AV} = 3.0V$ $V_{BUS} = 0V$		40		dB

Continued on the following page...

AC Electrical Characteristics (Continued)All typical value are for $V_{AV} = 3.3V$, $V_{BUS} = 5.0V$, and at 25°C unless otherwise specified.

Symbol	Parameter	Conditions	V _{AV} /V _{Bus} (V)	T _A = - 40°C to +85°C			Unit
				Min.	Typ.	Max.	
VidMic Switch							
t _{ON}	Turn-On Time S1 or Shdn to Output	V _{VidMic} = 0.8V R _L = 75Ω, C _L = 5pF See Figure 17, Figure 18	V _{AV} = 3.0V V _{Bus} = 0V		35	50	ns
t _{OFF}	Turn-Off Time S1 or Shdn to Output	V _{VidMic} = 0.8V R _L = 75Ω, C _L = 5pF See Figure 17, Figure 18	V _{AV} = 3.0V V _{Bus} = 0V		15	35	ns
BW _{VidMic}	-3db Bandwidth	R _T = 50Ω, C _L = 0pF, Signal 0dBm See Figure 12, Figure 20	V _{AV} = 3.0V V _{Bus} = 0V		615		MHz
		R _T = 50Ω, C _L = 5pF, Signal 0dBm See Figure 12, Figure 20	V _{AV} = 3.0V V _{Bus} = 0V		400		MHz
Xtalk _{VidMic}	Non-Adjacent Channel Crosstalk – VidMic	f = 30MHz, R _L = 50Ω See Figure 22	V _{AV} = 3.0V V _{Bus} = 0V		-35		dB
Video Buffer Path							
t _{VidEn}	Turn-On Time VidEn or Shdn to VideoOut	V _{VideoIn} = 0.5V R _S = 37.5Ω	V _{AV} = 3.0V V _{Bus} = 0V		325		μs
t _{VidDis}	Turn-Off Time VidEn or Shdn to VideoOut	V _{VideoIn} = 0.5V R _S = 37.5Ω	V _{AV} = 3.0V V _{Bus} = 0V		20		ns
A _{V6dB}	Voltage Gain	R _S = 37.5Ω; AC Coupled into 150Ω	V _{AV} = 3.0 to 4.3V		6		dB
BW _{1dB}	-1db Bandwidth	See Figure 13, Figure 26	V _{AV} = 3.0V V _{Bus} = 5.0V		8		MHz
BW _{3dB}	-3db Bandwidth	See Figure 13, Figure 26	V _{AV} = 3.0V V _{Bus} = 5.0V		9		MHz
F _{SB}	Attenuation	R _S = 37.5Ω; AC Coupled into 150Ω; f=27MHz Referenced to 100kHz, VideoIn = 0dBm	V _{AV} = 3.0V V _{Bus} = 5.0V		-42		dB
PSRR _{video}	Power Supply Rejection Ratio	See Figure 25	V _{AV} = 3.3V V _{Bus} = 0V		-40		dB
OIRR _{VidOut}	Off-Isolation – Video Out	See Figure 27	V _{AV} = 3.0V V _{Bus} = 4.25V		-50		dB
dG	Differential Gain	R _S = 37.5Ω; AC Coupled into 150Ω See Figure 28	V _{AV} = 3.0V V _{Bus} = 0V		.5		%
dφ	Differential Phase	R _S = 37.5Ω; AC Coupled into 150Ω See Figure 28	V _{AV} = 3.0V V _{Bus} = 0V		.9		°
SNR	Signal-to-Noise Ratio	NTSC-7 Weighting, f=100kHz to 4.2MHz See Figure 28	V _{AV} = 3.0V V _{Bus} = 0V		75		dB

USB High-Speed-Related AC Electrical Characteristics

All typical value are for $V_{AV} = 3.0V$, $V_{BUS} = 4.25V$, and at $25^{\circ}C$ unless otherwise specified.

Symbol	Parameter	Conditions	V_{AV}/V_{BUS} (V)	$T_A = -40^{\circ}C$ to $+85^{\circ}C$			Unit
				Min.	Typ.	Max.	
$t_{SK(o)}$	Channel-to-Channel Skew ⁽⁵⁾	$t_R = t_F = 75ps$ (10-90%) at 240MHz; $C_L = 5pF$, $R_L = 50\Omega$	$V_{AV} = 3.0V$ $V_{BUS} = 4.25V$		50		ps
$t_{SK(P)}$	Skew of Opposite Transitions of the Same Output ⁽⁵⁾	$t_R = t_F = 75ps$ (10-90%) at 240MHz; $C_L = 5pF$, $R_L = 50\Omega$	$V_{AV} = 3.0V$ $V_{BUS} = 4.25V$		50		ps
t_J	Total Jitter ⁽⁵⁾	$t_R = t_F = 75ps$ (10-90%) at 480Mbps; $C_L = 5pF$, $R_L = 50\Omega$; (PRBS = $2^{15} - 1$)	$V_{AV} = 3.0V$ $V_{BUS} = 4.25V$		100		ps

Note:

5. Guaranteed by characterization, not production tested.

Capacitance

Symbol	Parameter	Conditions	V_{AV}/V_{BUS} (V)	$T_A = -40^{\circ}C$ to $+85^{\circ}C$	Unit
				Typical	
C_{IN} (CNTRL)	Control Pin Input Capacitance (S0, S1, /Shdn, VidEn)	$V_{BIAS} = 0V$	$V_{AV} = 3.0V$ $V_{BUS} = 4.25V$	2.75	pF
C_{ON} (D+/R, D-/L)	$C_{D+/R, D-/L}$ Source Port On Capacitance	$V_{BIAS} = 0.4V$; $f = 1MHz$, 240Mhz See Figure 24	$V_{AV} = 3.0V$ $V_{BUS} = 4.25V$ $S1 = 0V$ C_{ONUSB}	7.6	pF
		$V_{BIAS} = 0V$; $f = 1MHz$, 240Mhz See Figure 24	$V_{AV} = 3.0V$ $V_{BUS} = 4.25V$ $S1 = 3.0V$ $C_{ONAudio}$	9.7	
$C_{OFF(D+, D-)}$	USB Source Off Capacitance	$V_{BIAS} = 0.4V$; $f = 1MHz$, 240Mhz See Figure 23	$V_{AV} = 3.0V$ $V_{BUS} = 4.25V$ $S1 = 3.0V_o$	1.5	pF
$C_{OFF(R/L)}$	Audio Source Off Capacitance	$V_{BIAS} = 0V$; $f = 1MHz$ See Figure 23	$V_{AV} = 3.0V$ $V_{BUS} = 4.25V$ $S1 = 0V$	3.0	pF
$C_{ON(VidMic)}$	VidMic Source On Capacitance	$V_{BIAS} = 0V$; $f = 1MHz$ See Figure 24	$V_{AV} = 3.0V$ $V_{BUS} = 4.25V$	10 (15 Max.)	pF
$C_{OFF(MicOut)}$	MicOut Source Off Capacitance	$V_{BIAS} = 0V$; $f = 1MHz$ See Figure 23	$V_{AV} = 3.0V$ $V_{BUS} = 4.25V$	3.0	pF
$C_{OFF(VidOut)}$	VidOut Source Off Capacitance	$V_{BIAS} = 0V$; $f = 1MHz$ See Figure 23	$V_{AV} = 3.0V$ $V_{BUS} = 4.25V$	2.7	pF

Typical Characteristics

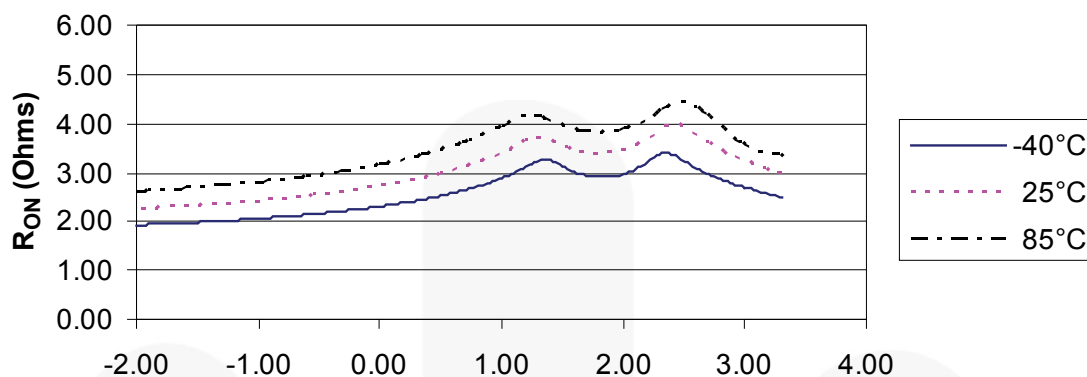


Figure 4. $R_{ONAUDIO}$, V_{IN} , $V_{AV} = 3.0V$, $V_{BUS} = 0V$

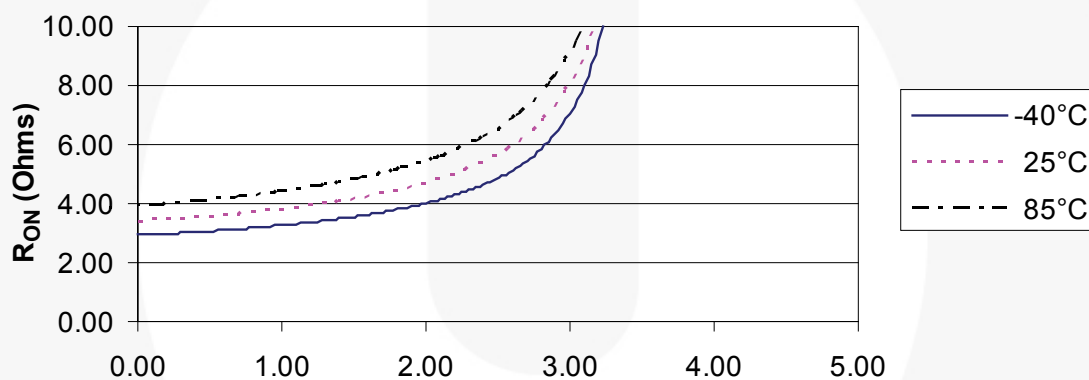


Figure 5. R_{ONUSB} , V_{IN} , $V_{AV} = 3.0V$, $V_{BUS} = 4.25V$

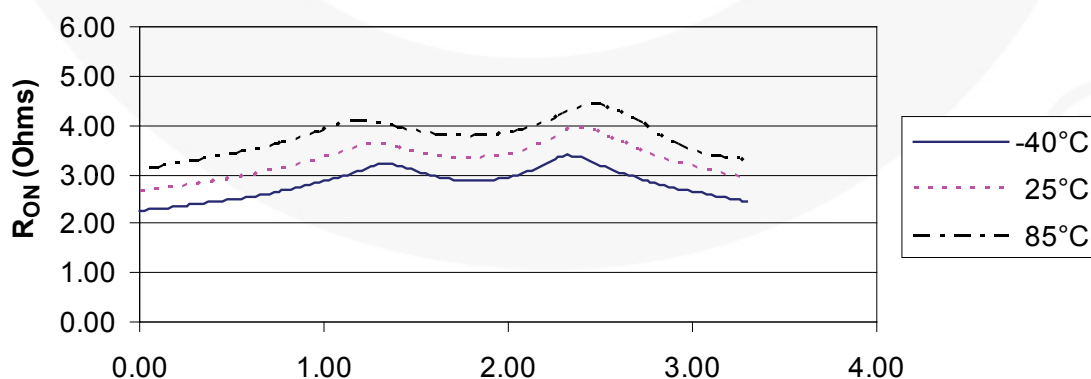
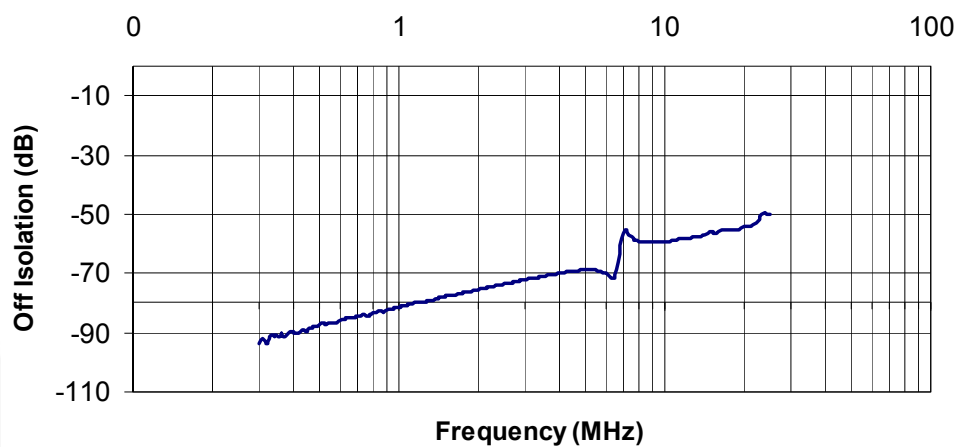
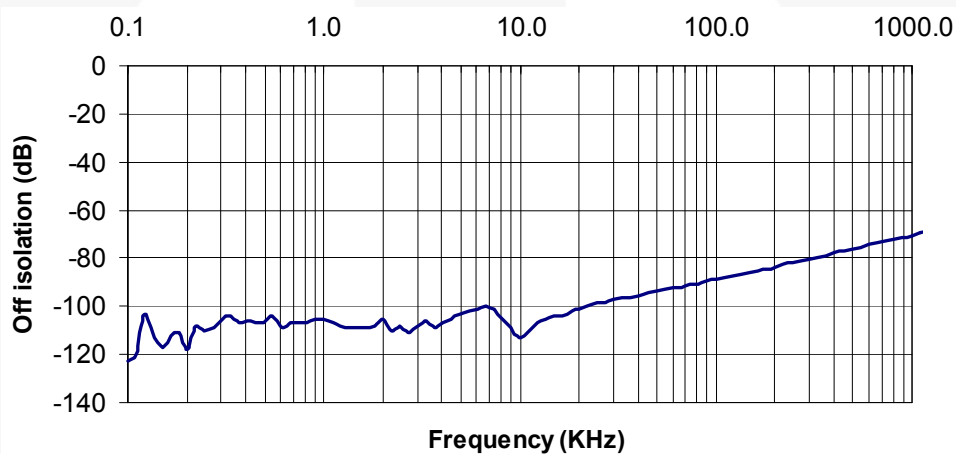
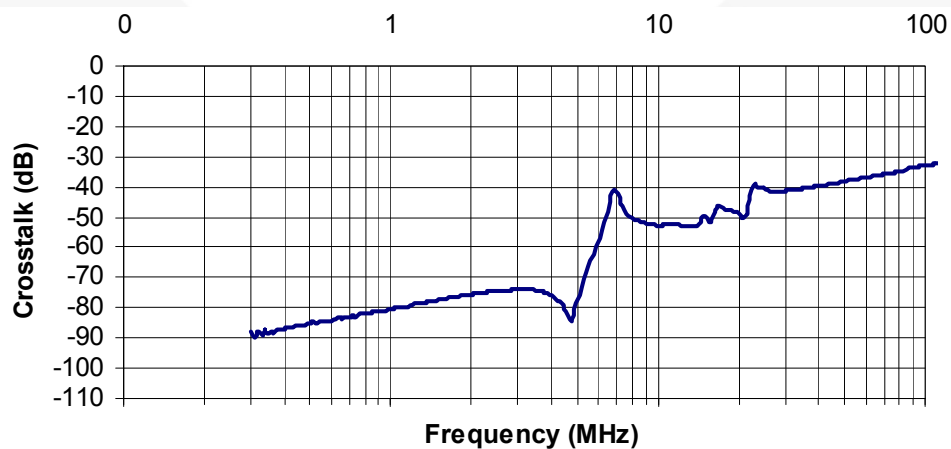


Figure 6. R_{ONVID} , V_{IN} , $V_{AV} = 3.0V$, $V_{BUS} = 0V$

Typical Characteristics (Continued)

Figure 7. Off Isolation USB (OIRRUSB), $V_{AV} = 3.0V$, $V_{BUS} = 4.25V$ Figure 8. Off Isolation Audio (OIRRA), $V_{AV} = 3.0V$, $V_{BUS} = 4.25V$ Figure 9. Non-Adjacent Crosstalk - USB, $V_{AV} = 3.0V$, $V_{BUS} = 4.25V$

Typical Characteristics (Continued)

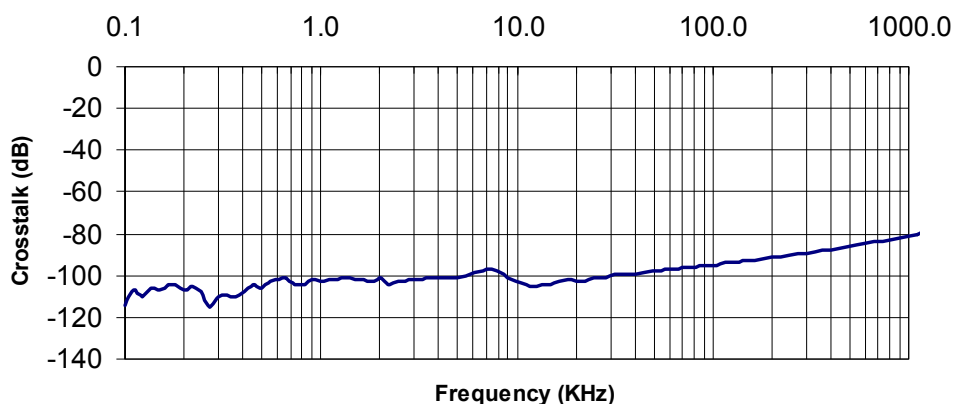


Figure 10. Non-Adjacent Crosstalk - Audio, $V_{AV} = 3.0V$, $V_{BUS} = 4.25V$

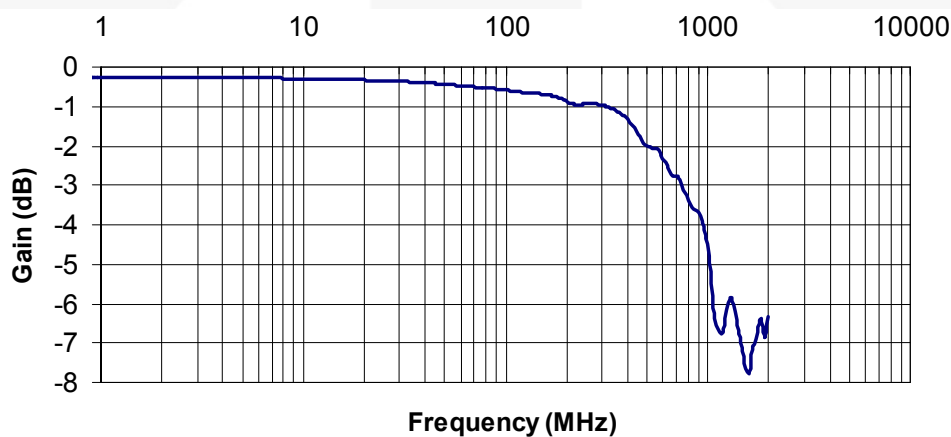


Figure 11. Bandwidth Gain vs. Frequency - USB, $C_L = 0pF$, $V_{AV} = 3.0V$, $V_{BUS} = 4.25V$

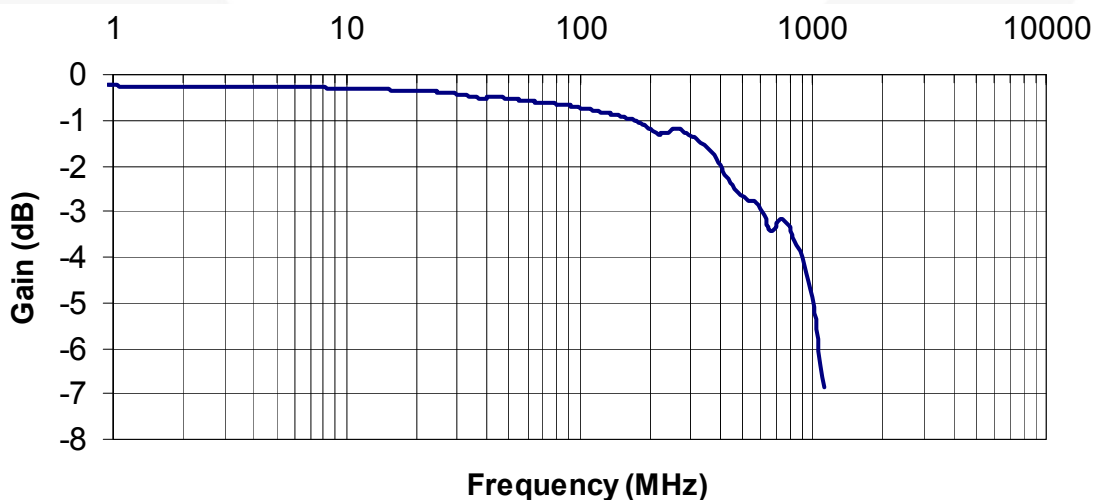


Figure 12. Bandwidth Gain vs. Frequency – VidMic, $C_L = 0pF$, $V_{AV} = 3.0V$, $V_{BUS} = 0V$

Typical Characteristics (Continued)

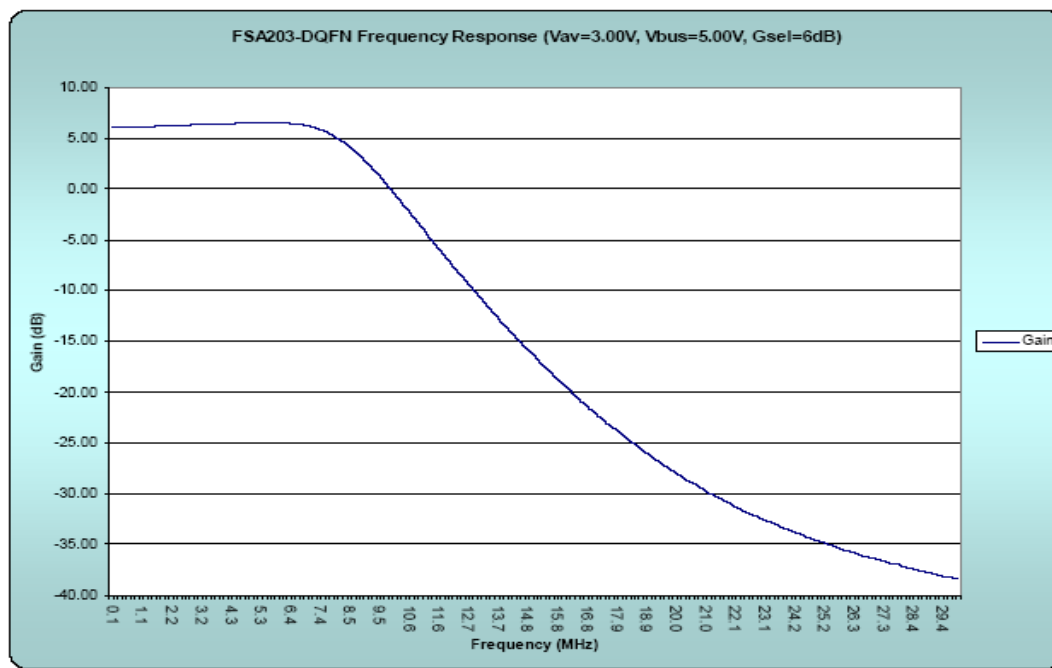


Figure 13. Video Buffer Frequency Response

Test Diagrams

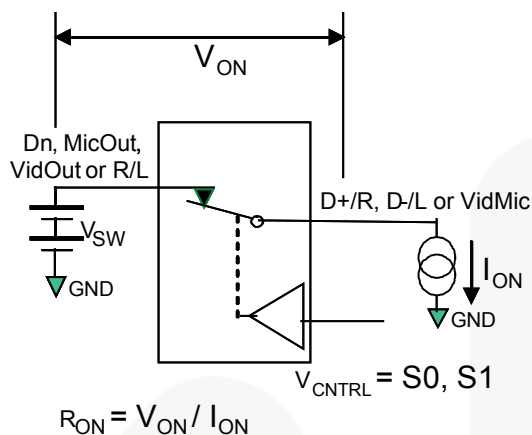


Figure 14. On Resistance

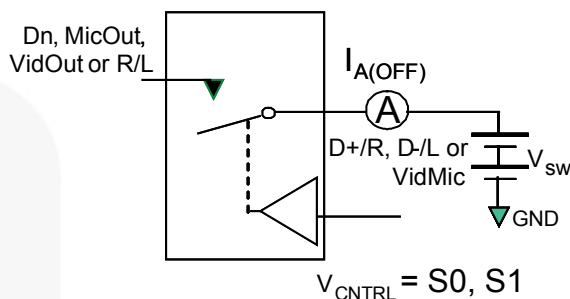


Figure 15. Off Leakage

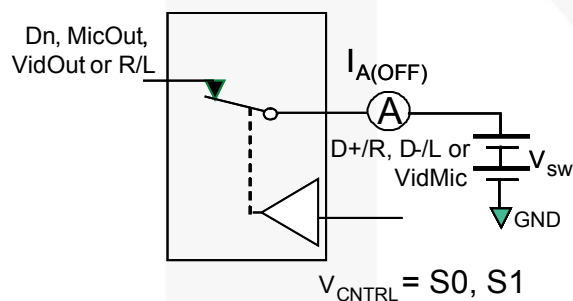
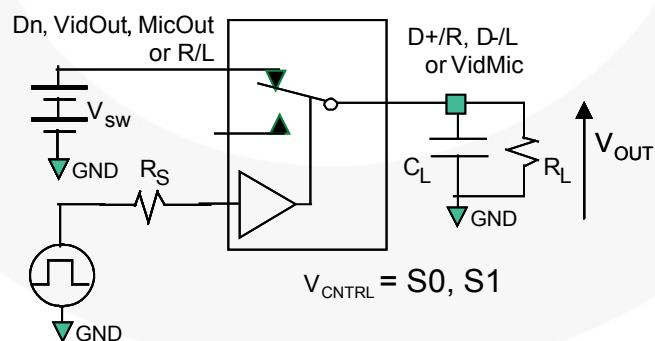


Figure 16. On Leakage



R_L , R_S , and C_L are functions of the application environment (see AC Tables for specific values)
 C_L includes test fixture and stray capacitance

Figure 17. AC Test Circuit Load

Test Diagrams (Continued)

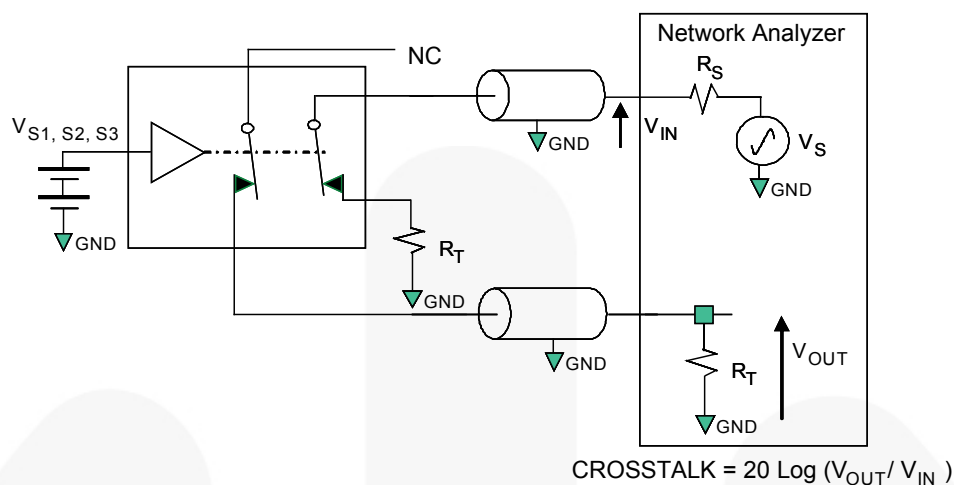


Figure 22. Non-Adjacent Channel-to-Channel Crosstalk

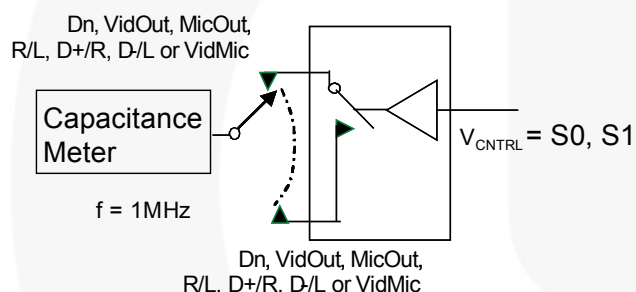


Figure 23. Channel Off Capacitance

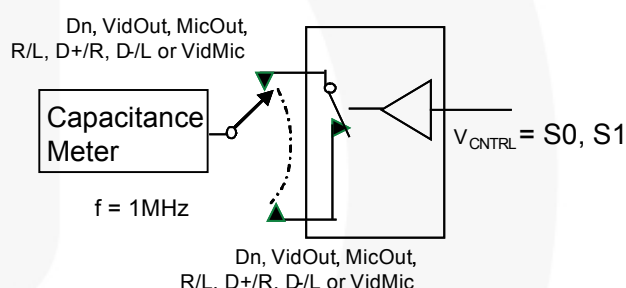


Figure 24. Channel On Capacitance

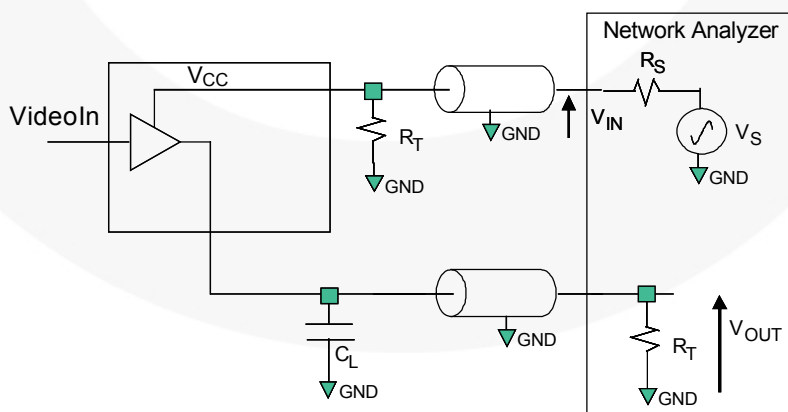
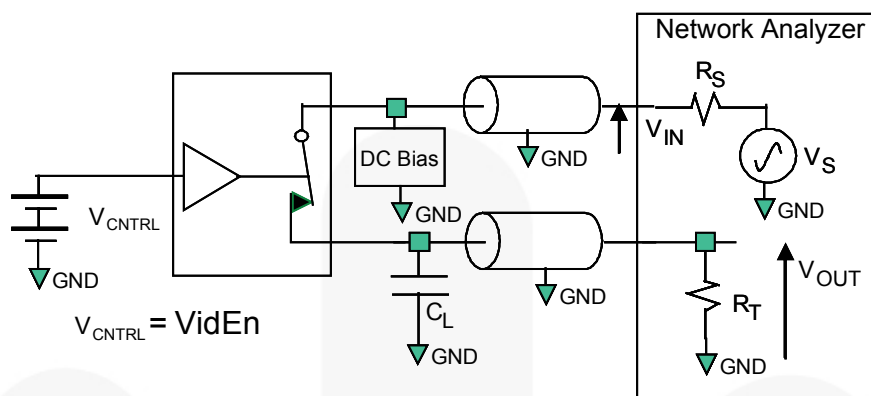


Figure 25. PSRR

Test Diagrams (Continued)



R_S and R_T are functions of the application environment (see AC Tables for specific values)

Figure 26. Video Amplifier Bandwidth

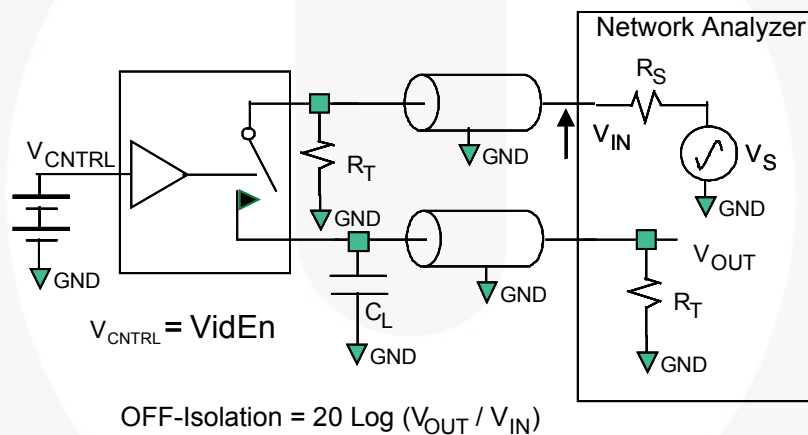


Figure 27. Video Amplifier Off Isolation

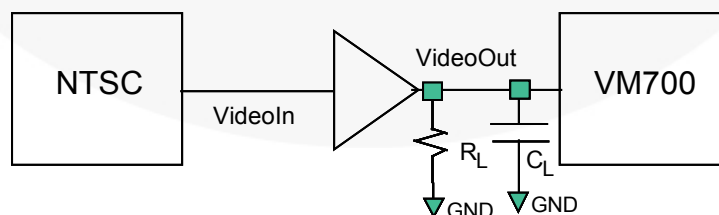
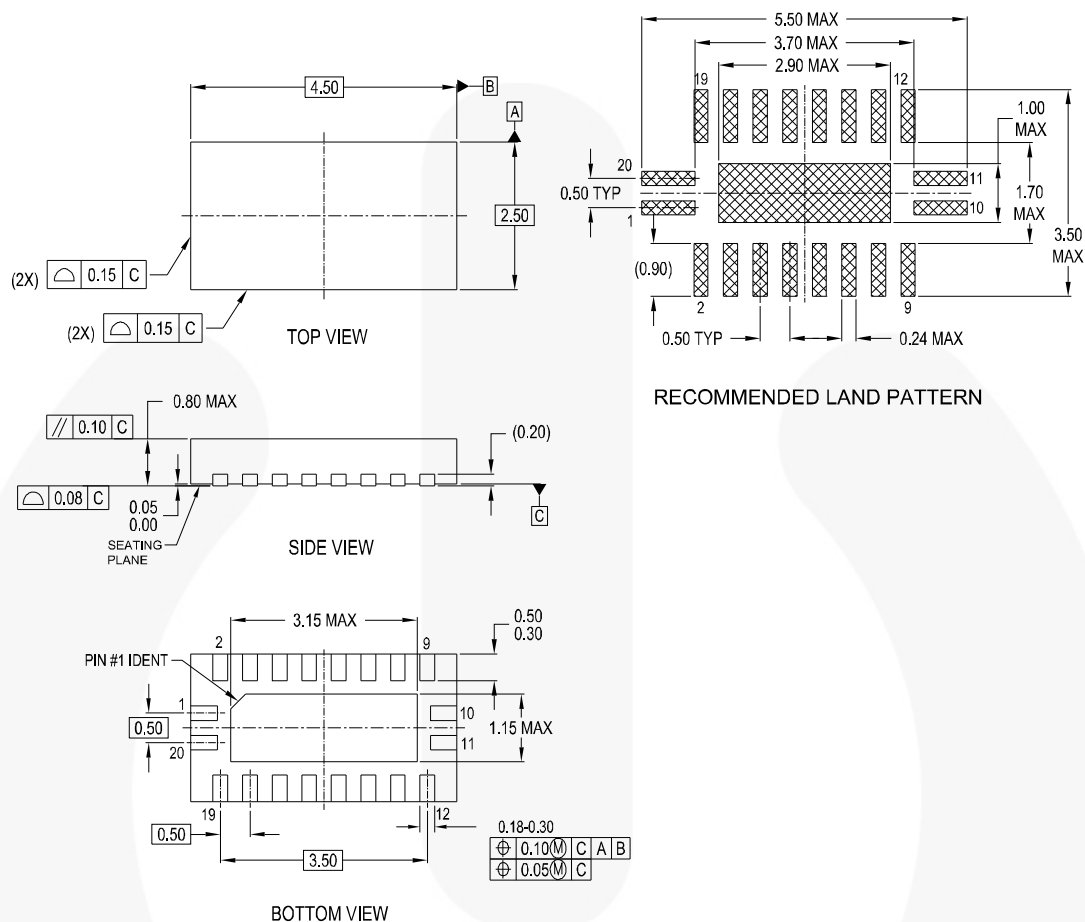


Figure 28. Video Amplifier Differential Phase, Gain & SNR

Physical Dimensions



NOTES:

- A. CONFORMS TO JEDEC REGISTRATION MO-241, VARIATION AC
- B. DIMENSIONS ARE IN MILLIMETERS.
- C. DIMENSIONS AND TOLERANCES PER ASME Y14.5M, 1994

MLP020BrevA

Figure 29. 20-Lead Depopulated very thin Quad Flat-pack No leads (DQFN)

Package drawings are provided as a service to customers considering Fairchild components. Drawings may change in any manner without notice. Please note the revision and/or date on the drawing and contact a Fairchild Semiconductor representative to verify or obtain the most recent revision. Package specifications do not expand the terms of Fairchild's worldwide terms and conditions, specifically the warranty therein, which covers Fairchild products.

Always visit Fairchild Semiconductor's online packaging area for the most recent package drawings:

<http://www.fairchildsemi.com/packaging/>.



TRADEMARKS

The following includes registered and unregistered trademarks and service marks, owned by Fairchild Semiconductor and/or its global subsidiaries, and is not intended to be an exhaustive list of all such trademarks.

AccuPower™
Auto-SPM™
AX-CAP™
BitSiC®
Build it Now™
CorePLUS™
CorePOWER™
CROSSVOLT™
CTL™
Current Transfer Logic™
DEUXPEED®
Dual Cool™
EcoSPARK®
EfficientMax™
ESBC™
F®
Fairchild®
Fairchild Semiconductor®
FACT Quiet Series™
FACT®
FAST®
FastvCore™
FETBench™
FlashWriter®

FPS™
F-PFS™
FRFET®
Global Power Resource™
Green FPS™
Green FPS™ e-Series™
Gmax™
GTO™
IntelliMAX™
ISOPLANAR™
MegaBuck™
MICROCOUPLER™
MicroFET™
MicroPak™
MicroPak2™
MillerDrive™
MotionMax™
Motion-SPM™
mWSaver™
OptoHit™
OPTOLOGIC®
OPTOPLANAR®
PDP SPM™

Power-SPM™
PowerTrench®
PowerXS™
Programmable Active Droop™
QFET®
QS™
Quiet Series™
RapidConfigure™
S™
Saving our world, 1mW/W/kW at a time™
SignalWise™
SmartMax™
SMART START™
SPM®
STEALTH™
SuperFET®
SuperSOT™.3
SuperSOT™.8
SuperSOT™.8
SupreMOS®
SyncFET™
Sync-Lock™
SYSTEM GENERAL®

The Power Franchise®
The Right Technology for Your Success™
The power franchise
TinyBoost™
TinyBuck™
TinyCalc™
TinyLogic®
TINYOPTO™
TinyPower™
TinyPWM™
TinyWire™
TransiC®
TriFault Detect™
TRUECURRENT®
µSerDes™
SerDes®
UHC®
Ultra FRFET™
UniFET™
VCX™
VisualMax™
XS™

* Trademarks of System General Corporation, used under license by Fairchild Semiconductor.

DISCLAIMER

FAIRCHILD SEMICONDUCTOR RESERVES THE RIGHT TO MAKE CHANGES WITHOUT FURTHER NOTICE TO ANY PRODUCTS HEREIN TO IMPROVE RELIABILITY, FUNCTION, OR DESIGN. FAIRCHILD DOES NOT ASSUME ANY LIABILITY ARISING OUT OF THE APPLICATION OR USE OF ANY PRODUCT OR CIRCUIT DESCRIBED HEREIN, NEITHER DOES IT CONVEY ANY LICENSE UNDER ITS PATENT RIGHTS, NOR THE RIGHTS OF OTHERS. THESE SPECIFICATIONS DO NOT EXPAND THE TERMS OF FAIRCHILD'S WORLDWIDE TERMS AND CONDITIONS, SPECIFICALLY THE WARRANTY THEREIN, WHICH COVERS THESE PRODUCTS.

LIFE SUPPORT POLICY

FAIRCHILD'S PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS WRITTEN APPROVAL OF FAIRCHILD SEMICONDUCTOR CORPORATION.

As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body or (b) support or sustain life, and (c) whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury of the user.
2. A critical component in any component of a life support, device, or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

ANTI-COUNTERFEITING POLICY

Fairchild Semiconductor Corporation's Anti-Counterfeiting Policy. Fairchild's Anti-Counterfeiting Policy is also stated on our external website, www.fairchildsemi.com, under Sales Support.

Counterfeiting of semiconductor parts is a growing problem in the industry. All manufacturers of semiconductor products are experiencing counterfeiting of their parts. Customers who inadvertently purchase counterfeit parts experience many problems such as loss of brand reputation, substandard performance, failed applications, and increased cost of production and manufacturing delays. Fairchild is taking strong measures to protect ourselves and our customers from the proliferation of counterfeit parts. Fairchild strongly encourages customers to purchase Fairchild parts either directly from Fairchild or from Authorized Fairchild Distributors who are listed by country on our web page cited above. Products customers buy either from Fairchild directly or from Authorized Fairchild Distributors are genuine parts, have full traceability, meet Fairchild's quality standards for handling and storage and provide access to Fairchild's full range of up-to-date technical and product information. Fairchild and our Authorized Distributors will stand behind all warranties and will appropriately address any warranty issues that may arise. Fairchild will not provide any warranty coverage or other assistance for parts bought from Unauthorized Sources. Fairchild is committed to combat this global problem and encourage our customers to do their part in stopping this practice by buying direct or from authorized distributors.

PRODUCT STATUS DEFINITIONS

Definition of Terms

Datasheet Identification	Product Status	Definition
Advance Information	Formative / In Design	Datasheet contains the design specifications for product development. Specifications may change in any manner without notice.
Preliminary	First Production	Datasheet contains preliminary data; supplementary data will be published at a later date. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve design.
No Identification Needed	Full Production	Datasheet contains final specifications. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve the design.
Obsolete	Not In Production	Datasheet contains specifications on a product that is discontinued by Fairchild Semiconductor. The datasheet is for reference information only.

Rev. I54

ON Semiconductor and  are trademarks of Semiconductor Components Industries, LLC dba ON Semiconductor or its subsidiaries in the United States and/or other countries. ON Semiconductor owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of ON Semiconductor's product/patent coverage may be accessed at www.onsemi.com/site/pdf/Patent-Marking.pdf. ON Semiconductor reserves the right to make changes without further notice to any products herein. ON Semiconductor makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does ON Semiconductor assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. Buyer is responsible for its products and applications using ON Semiconductor products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by ON Semiconductor. "Typical" parameters which may be provided in ON Semiconductor data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. ON Semiconductor does not convey any license under its patent rights nor the rights of others. ON Semiconductor products are not designed, intended, or authorized for use as a critical component in life support systems or any FDA Class 3 medical devices or medical devices with a same or similar classification in a foreign jurisdiction or any devices intended for implantation in the human body. Should Buyer purchase or use ON Semiconductor products for any such unintended or unauthorized application, Buyer shall indemnify and hold ON Semiconductor and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that ON Semiconductor was negligent regarding the design or manufacture of the part. ON Semiconductor is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:

Literature Distribution Center for ON Semiconductor
19521 E. 32nd Pkwy, Aurora, Colorado 80011 USA
Phone: 303-675-2175 or 800-344-3860 Toll Free USA/Canada
Fax: 303-675-2176 or 800-344-3867 Toll Free USA/Canada
Email: orderlit@onsemi.com

N. American Technical Support: 800-282-9855 Toll Free
USA/Canada
Europe, Middle East and Africa Technical Support:
Phone: 421 33 790 2910
Japan Customer Focus Center
Phone: 81-3-5817-1050

ON Semiconductor Website: www.onsemi.com

Order Literature: <http://www.onsemi.com/orderlit>

For additional information, please contact your local Sales Representative