

ON Semiconductor

Is Now



To learn more about onsemi™, please visit our website at
www.onsemi.com

onsemi and onsemi. and other names, marks, and brands are registered and/or common law trademarks of Semiconductor Components Industries, LLC dba "onsemi" or its affiliates and/or subsidiaries in the United States and/or other countries. onsemi owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of onsemi product/patent coverage may be accessed at www.onsemi.com/site/pdf/Patent-Marking.pdf. onsemi reserves the right to make changes at any time to any products or information herein, without notice. The information herein is provided "as-is" and onsemi makes no warranty, representation or guarantee regarding the accuracy of the information, product features, availability, functionality, or suitability of its products for any particular purpose, nor does onsemi 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 onsemi products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by onsemi. "Typical" parameters which may be provided in onsemi 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. onsemi does not convey any license under any of its intellectual property rights nor the rights of others. onsemi 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 onsemi products for any such unintended or unauthorized application, Buyer shall indemnify and hold onsemi 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 onsemi was negligent regarding the design or manufacture of the part. onsemi is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner. Other names and brands may be claimed as the property of others.



ON Semiconductor®

FSA2457 — Dual DPDT, 5Ω Analog Data Switch

Features

- Low On Capacitance for Data Path: 12pF Typical
- Low On Resistance for Data Path: 5Ω Typical
- Low Power Quiescent Consumption: 1μA Maximum
- Wide -3db Bandwidth: > 160MHz
- Packaged in Green 16-Lead UMLP (1.8 x 2.6mm)
- 4kV JEDEC: JESD22-A114 HBM
- 2kV JEDEC: JESD22-C101 CDM

Applications

- Cell Phone, PDA, Digital Camera, Portable GPS
- LCD Monitor, TV, Set-Top Box

Description

The FSA2457 is a bi-directional, low-power, dual double-pole double-throw (4PDT) analog switch targeted at dual 1-bit SIM/SD/MMC card and/or GPS signal multiplexing. It is optimized for switching the WLAN-SIM data and control signals at 52Mbps.

The FSA2457 is compatible with the requirements of 1-bit SIM/SD/MMC cards and is ideal for interfacing to GPS baseband processors. The FSA2457 features a low on capacitance (C_{ON}) of 12pF to ensure high-speed data transfer.

The FSA2457 contains special circuitry that minimizes current consumption even when the control voltage applied to the SEL pin is lower than the supply voltage (V_{CC}). This feature is especially valuable in ultra-portable applications, such as cell phones; allowing direct interface with the general-purpose I/Os of the baseband processor. Other applications include switching and connector sharing in portable cell phones, PDAs, digital cameras, printers, and portable GPS systems.

Ordering Information

Part Number	Top Mark	 Eco Status	Operating Temperature Range	Package
FSA2457UMX	GD	Green	-40 to +85°C	16-Lead, Quad, Ultrathin Molded Leadless Package (UMLP), 1.8 x 2.6mm

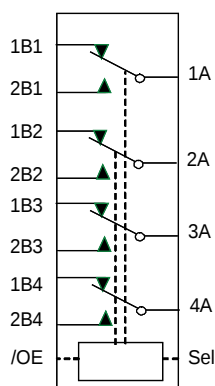


Figure 1. Analog Symbol

Pin Configuration

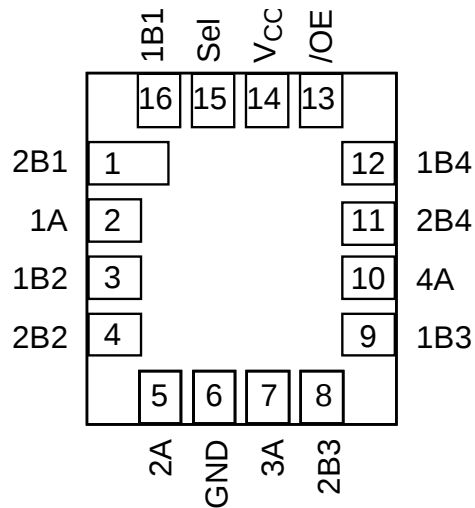


Figure 2. Pad Assignment UMLP16 (Top Through View)

Pin Definitions

Pin	Description
1Bn, 2Bn	Multiplexed Data Source Inputs
nA	Common Data Ports
Sel	Switch Select
/OE	Output Enable (Active LOW)

Truth Table

Sel	/OE	Function
Logic LOW	Logic LOW	1B1 = 1A, 1B2 = 2A, 1B3 = 3A, 1B4 = 4A
Logic HIGH	Logic LOW	2B1 = 1A, 2B2 = 2A, 2B3 = 3A, 2B4 = 4A
X	Logic HIGH	Data Ports Disconnected

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_{CC}	Supply Voltage		-0.5	+4.6	V
V_{CNTRL}	DC Input Voltage (Sel, /OE) ⁽¹⁾		-0.5	+4.6	V
V_{SW}	DC Switch I/O Voltage ⁽¹⁾ 1Bn, 2Bn, nA		-0.5	$V_{CC} + 0.5$	V
I_{IK}	DC Input Diode Current		-50		mA
I_{OUT}	DC Output Current – V_{SW}			128	mA
T_{STG}	Storage Temperature		-65	+150	°C
MSL	Moisture Sensitivity Level (JEDEC J-STD-020A)			1	Level
ESD	Human Body Model, JEDEC: JESD22-A114	All Pins		4	kV
		I/O to GND		8	
	Charged Device Model, JEDEC: JESD22-C101			2	

Note:

1. 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. ON Semiconductor does not recommend exceeding them or designing to Absolute Maximum Ratings.

Symbol	Parameter		Min.	Max.	Unit
V_{CC}	Supply Voltage		2.7	3.6	V
V_{CNTRL}	Control Input Voltage (Sel, /OE) ⁽²⁾		0	V_{CC}	V
V_{SW}	Switch I/O Voltage 1Bn, 2Bn, nA		-0.5	V_{CC}	V
I_{OUT}	DC Output Current 1Bn, 2Bn, nA			25	mA
T_A	Operating Temperature		-40	85	°C

Note:

2. The control input must be held HIGH or LOW; it must not float.

DC Electrical Characteristics

All typical values are at 25°C, 3.3V V_{CC} unless otherwise specified.

Symbol	Parameter	Conditions	V_{CC} (V)	$T_A = -40^{\circ}\text{C to } +85^{\circ}\text{C}$			Units
				Min.	Typ.	Max.	
V_{IK}	Clamp Diode Voltage	$I_{IN} = -18\text{mA}$	2.7			-1.2	V
V_{IH}	Input Voltage High		2.7 to 3.0	1.8			V
			3.3 to 3.6	2.0			
V_{IL}	Input Voltage Low		2.7 to 3.6			0.8	V
I_{IN}	Control Input Leakage (Sel)	$V_{SW} = 0 \text{ to } V_{CC}$	3.6	-1		1	μA
$I_{IC(off)}, I_{IO(off)}$	Off State Leakage	1Bn, 2Bn = 0V or V_{CC} Figure 4	3.6	-1		1	μA
R_{ON}	Data Path Switch On Resistance ⁽³⁾	$V_{SW} = 0, 2.0\text{V}, I_{ON} = -20\text{mA}$ Figure 3, Figure 12	2.7		5.0	7.0	Ω
ΔR_{ON}	Data Path Delta On Resistance ⁽⁴⁾	$V_{SW} = 0\text{V}, I_{ON} = -20\text{mA}$	2.7		0.3		Ω
I_{CC}	Quiescent Supply Current	$V_{CNTRL} = 0 \text{ or } V_{CC}, I_{OUT} = 0$	3.6			1.0	μA

Notes:

- Measured by the voltage drop between nB0, 1Bn and relative common port pins at the indicated current through the switch. On resistance is determined by the lower voltage on the relative ports.
- Guaranteed by characterization.

AC Electrical Characteristics

All typical value are for $V_{CC} = 3.3V$ at $25^{\circ}C$ unless otherwise specified.

Symbol	Parameter	Conditions	V_{CC} (V)	$T_A = -40^{\circ}C$ to $+85^{\circ}C$			Units
				Min.	Typ.	Max.	
t_{ON}	Turn-On Time Sel or /OE to Output (nA)	$R_L = 50\Omega$, $C_L = 30pF$ $V_{SW} = 1.5V$ Figure 5, Figure 6	2.7 to 3.6			7.0	ns
t_{OFF}	Turn-Off Time Sel or /OE to Output (nA)	$R_L = 50\Omega$, $C_L = 30pF$ $V_{SW} = 1.5V$ Figure 5, Figure 6	2.7 to 3.6			4.0	ns
O_{IRR}	Off Isolation ⁽⁵⁾ (nA)	$R_L = 50\Omega$, $f = 25MHz$, $C_L = 30pF$ Figure 9, Figure 13	2.7 to 3.6		-45		dB
Xtalk	Non-Adjacent Channel Crosstalk ⁽⁵⁾ (nA)	$R_L = 50\Omega$, $f = 25MHz$, $C_L = 30pF$ Figure 7	2.7 to 3.6		-54		dB
BW	-3db Bandwidth ⁽⁵⁾ (nA)	$R_L = 50\Omega$, $C_L = 30pF$ Figure 8, Figure 14	2.7 to 3.6		>160		MHz

Note:

5. Guaranteed by characterization.

Capacitance

Symbol	Parameter	Conditions	$T_A = -40^{\circ}C$ to $+85^{\circ}C$			Units
			Min.	Typ.	Max.	
C_{IN}	Control Pin Input Capacitance	$V_{CC} = 0V$		1.8		pF
C_{ON}	On Capacitance ⁽⁶⁾ (nA)	$V_{CC} = 3.3V$, $f = 1MHz$ Figure 10		12.0		pF
C_{OFF}	Off Capacitance ⁽⁶⁾ (nA)	$V_{CC} = 3.3V$ Figure 9		6.0		pF

Note:

6. Guaranteed by characterization.

Test Diagrams

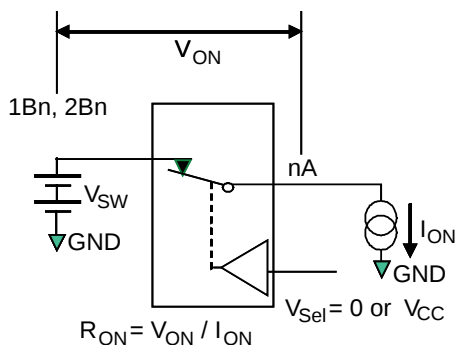


Figure 3. On Resistance

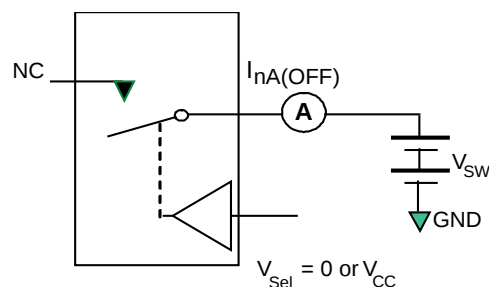
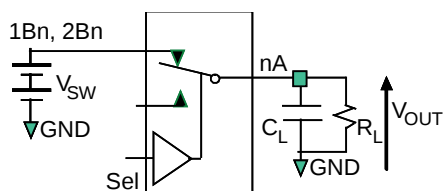


Figure 4. Off Leakage



R_L and C_L are functions of the application environment (see tables for specific values). C_L includes test fixture and stray capacitance.

Figure 5. AC Test Circuit Load

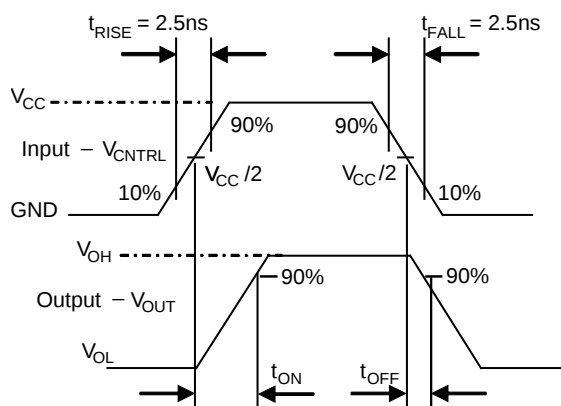


Figure 6. Turn-On / Turn-Off Waveforms

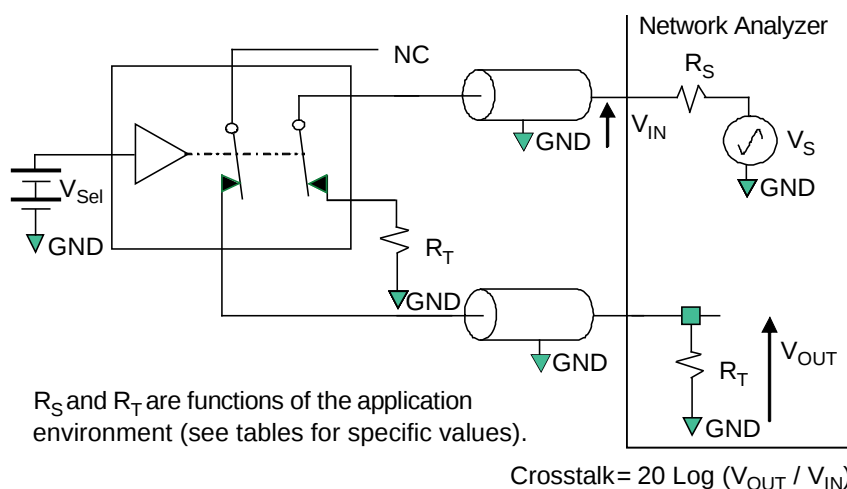


Figure 7. Non-Adjacent Channel-to-Channel Crosstalk

Test Diagrams (Continued)

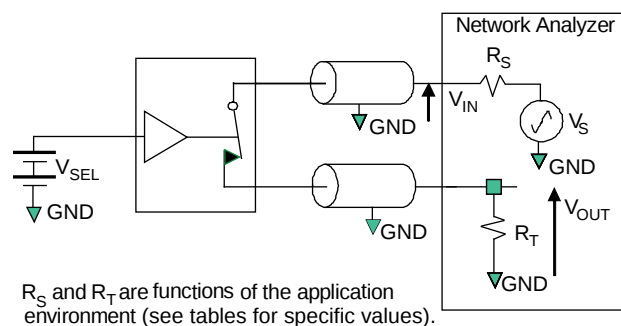


Figure 8. Bandwidth

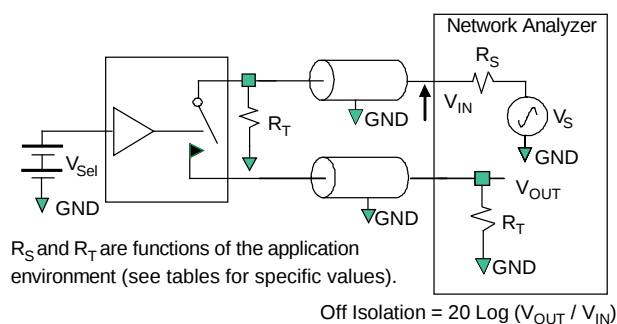


Figure 9. Channel Off Isolation

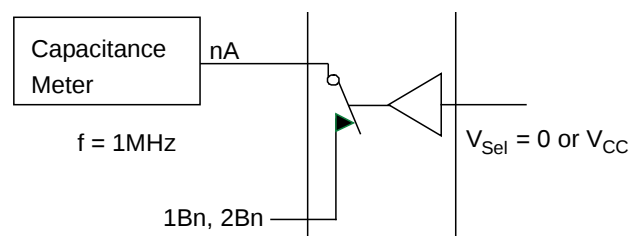


Figure 10. Channel On Capacitance

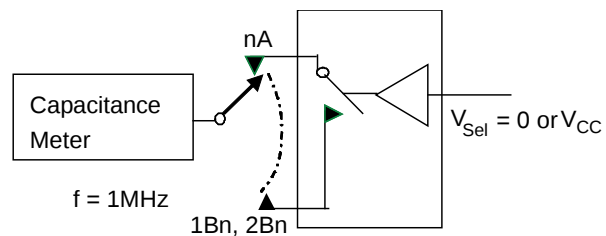


Figure 11. Channel Off Capacitance

Typical Performance Characteristics

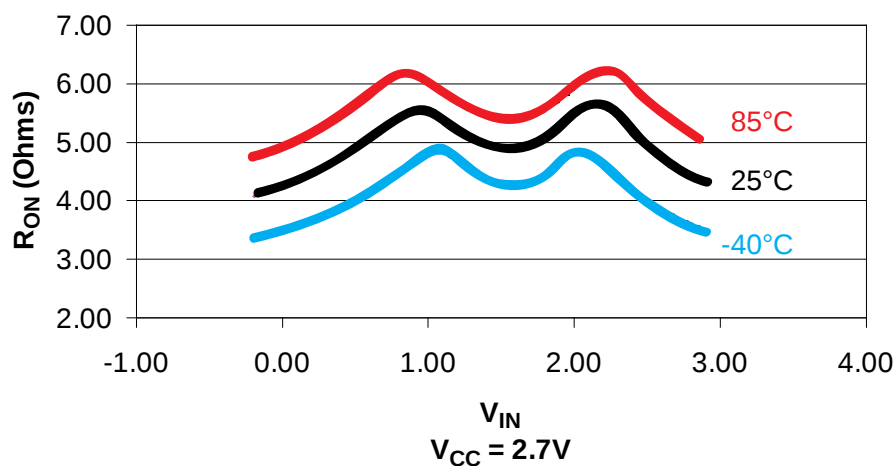


Figure 12. R_{ON}

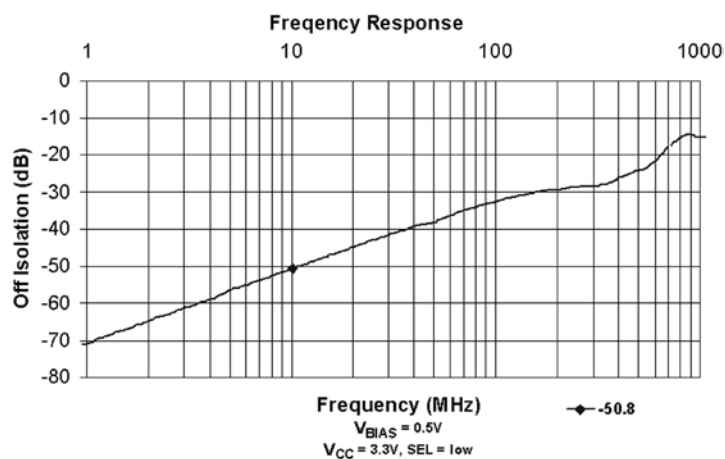


Figure 13. Off Isolation

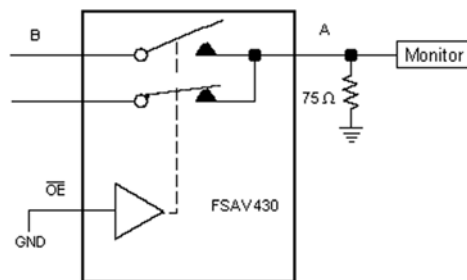
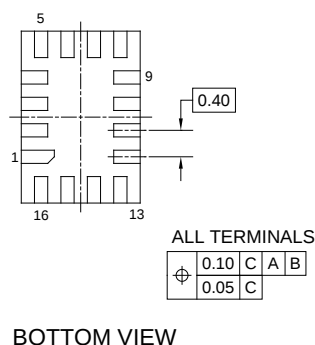
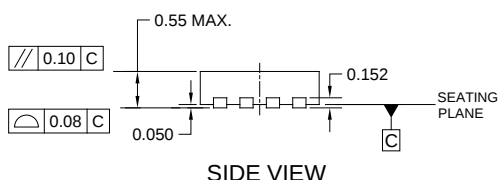
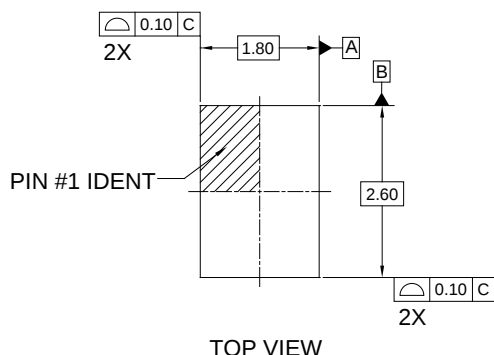


Figure 14. Bandwidth

Physical Dimensions



NOTES:

- A. THIS PACKAGE IS NOT CURRENTLY REGISTERED WITH ANY STANDARDS COMMITTEE
- B. DIMENSIONS ARE IN MILLIMETERS.
- C. DIMENSIONS AND TOLERANCES PER ASME Y14.5M, 1994
- D. TERMINAL SHAPE MAY VARY ACCORDING TO PACKAGE SUPPLIER, SEE TERMINAL SHAPE VARIANTS
- E. LAND PATTERN IS A MINIMAL TOE DESIGN
- F. DRAWING FILE NAME : UMLP16AREV3

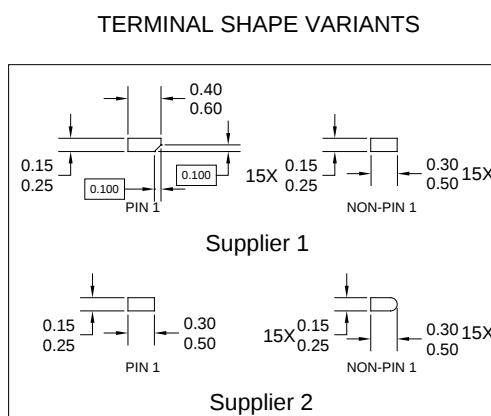
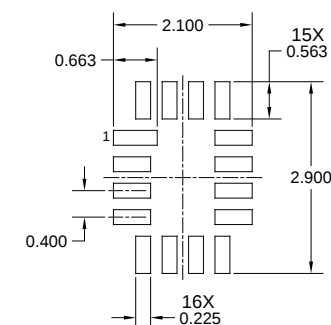


Figure 15. 16-Lead Ultrathin Molded Leadless Package (UMLP)

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

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.

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