

# NLAS3257A

## Mux / Demux Analog Switch

The NLAS3257A Mux / Demux Analog Switch is an advanced high-speed single pole double throw (SPDT) analog switch in ultra-small footprint.

### Features

- High Speed:  $t_{PD} = 0.25 \text{ ns (Max) @ } V_{CC} = 4.5 \text{ V}$
- $R_{ON}: 7.5 \Omega, \text{ Typ @ } V_{CC} = 4.2 \text{ V}$
- $C_{ON}: 7.5 \text{ pF, Typ @ } V_{CC} = 3.3 \text{ V}$
- $V_{CC}$  Range: 1.65 V to 4.5 V
- Ultra-Small 1 x 1 mm Package
- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant

### Typical Applications

- Mobile Phones, PDAs, Camera

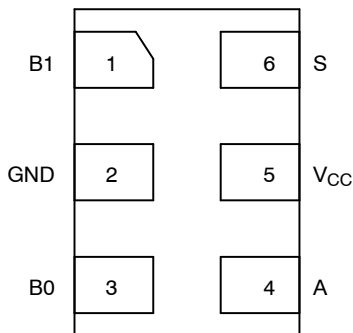


Figure 1. UDFN6 (Top View)

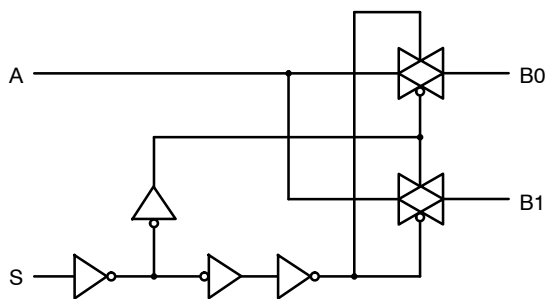


Figure 2. Logic Diagram

### Function Table

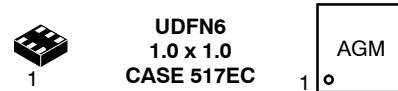
Input S	Function
L	A = B0
H	A = B1



ON Semiconductor®

[www.onsemi.com](http://www.onsemi.com)

### MARKING DIAGRAM



AG = Specific Device Code  
M = Date Code

### ORDERING INFORMATION

See detailed ordering and shipping information on page 6 of this data sheet.

# NLAS3257A

**Table 1. MAXIMUM RATINGS**

Symbol	Parameter	Value	Unit
$V_{CC}$	DC Supply Voltage	-0.5 to +5.5	V
$V_{IN}$	Control Input Voltage (S Pin)	-0.5 to +5.5	V
$V_{I/O}$	Switch Input / Output Voltage (A, B0, B1 Pins)	-0.5 to $V_{CC} + 0.5$	V
$I_{IK}$	Control Pin DC Input Diode Current (S Pin) $V_{IN} < GND$	-50	mA
$I_{OK}$	Switch I/O Port DC Diode Current (A, B0, B1 Pins) $V_{I/O} < GND$ or $V_{I/O} > V_{CC}$	$\pm 50$	mA
$I_O$	On-State Switch Current	$\pm 128$	mA
	Continuous Current Through $V_{CC}$ or GND	$\pm 150$	mA
$I_{CC}$	DC Supply Current per Supply Pin	$\pm 150$	mA
$I_{GND}$	DC Ground Current per Ground Pin	$\pm 150$	mA
$T_{STG}$	Storage Temperature Range	-65 to +150	$^{\circ}C$
$T_L$	Lead Temperature, 1 mm from Case for 10 Seconds	260	$^{\circ}C$
$T_J$	Junction Temperature Under Bias	150	$^{\circ}C$
$\theta_{JA}$	Thermal Resistance (Note 1)	466	$^{\circ}C/W$
$P_D$	Power Dissipation in Still Air at 85 $^{\circ}C$ (Note 1)	269	mW
MSL	Moisture Sensitivity	Level 1	
$F_R$	Flammability Rating Oxygen Index: 28 to 34	UL 94 V-0 @ 0.125 in	
$V_{ESD}$	ESD Withstand Voltage Human Body Model (Note 2) Machine Model (Note 3) Charged Device Model (Note 4)	>6000	V
		>200	
		>2000	
$I_{LATCHUP}$	Latchup Performance Above $V_{CC}$ and Below GND at 85 $^{\circ}C$ (Note 5)	$\pm 100$	mA

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

1. Measured with minimum pad spacing on an FR4 board, using 10 mm-by-1 inch, 2 ounce copper trace no air flow.
2. Tested to EIA/ JESD22-A114-A
3. Tested to EIA/ JESD22-A115-A
4. Tested to JESD22-C101-A
5. Tested to EIA / JESD78.

**Table 2. RECOMMENDED OPERATING CONDITIONS**

Symbol	Parameter	Min	Max	Unit
$V_{CC}$	Positive DC Supply Voltage	1.65	4.5	V
$V_I$	Control Pin Input Voltage (S Pin)	0	4.5	V
$V_{I/O}$	Switch Input / Output Voltage (A, B0, B1 Pins)	0	$V_{CC}$	V
$T_A$	Operating Free-Air Temperature	-40	+85	$^{\circ}C$
$\Delta t / \Delta V$	Input Transition Rise or Fall Rate Control Input Switch I/O	0	20	ns/V
		0	DC	

Functional operation above the stresses listed in the Recommended Operating Ranges is not implied. Extended exposure to stresses beyond the Recommended Operating Ranges limits may affect device reliability.

# NLAS3257A

**Table 3. DC ELECTRICAL CHARACTERISTICS** (Typical: T = 25°C, V<sub>CC</sub> = 3.3 V)

Symbol	Parameter	Test Conditions	V <sub>CC</sub> (V)	T <sub>A</sub> = -40°C to +85°C			Unit
				Min	Typ	Max	
V <sub>IH</sub>	Control Input, High Voltage (S Pin)		2.7 3.3 4.2	0.95 1.0 1.25			V
V <sub>IL</sub>	Control Input, Low Voltage (S Pin)		2.7 3.3 4.2			0.3 0.4 0.5	V
I <sub>IN</sub>	Control Input, Leakage Current (S Pin)	0 ≤ V <sub>IN</sub> ≤ V <sub>CC</sub>	1.65 – 4.5		±0.5	±1.0	μA
I <sub>B0/B1_OFF</sub>	Off State Leakage Current (B0/B1 Pins)	V <sub>IN</sub> = V <sub>IL</sub> or V <sub>IH</sub> V <sub>B0</sub> and V <sub>B1</sub> = 0.3 V V <sub>A</sub> = 4 V	4.5		±20	±100	nA
I <sub>A_ON</sub>	On State Leakage Current (A Pin)	V <sub>IN</sub> = V <sub>IL</sub> or V <sub>IH</sub> V <sub>B0</sub> = 0.3 V or 4 V with V <sub>B1</sub> = Floating or V <sub>B1</sub> = 0.3 V or 4 V with V <sub>B0</sub> = Floating V <sub>A</sub> = 0.3 V or 4.0 V	4.5		±20	±100	nA
I <sub>Power_OFF</sub>	Power Off Leakage Current (S Pin)	V <sub>IN</sub> = 0 or 4.5 V	0			±100	nA
I <sub>CC</sub>	Quiescent Supply Current (V <sub>CC</sub> Pin)	V <sub>IN</sub> = V <sub>CC</sub> or GND, V <sub>IS</sub> = V <sub>CC</sub> or GND, I <sub>Load</sub> = 0 A	1.65 – 4.5		0.1	1.0	μA
ΔI <sub>CC</sub>	Additional Quiescent Supply Current (V <sub>CC</sub> Pin)	V <sub>IN</sub> = V <sub>CC</sub> or GND, V <sub>IS</sub> = V <sub>CC</sub> or GND, I <sub>Load</sub> = 0 A	3.3 4.2			2.0 3.0	mA

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

**Table 4. ON RESISTANCE** (Typical: T = 25°C)

Symbol	Parameter	Test Conditions	V <sub>CC</sub> (V)	T <sub>A</sub> = -40°C to +85°C			Unit
				Min	Typ	Max	
R <sub>ON</sub>	ON-Resistance	I <sub>ON</sub> = 8 mA, V <sub>IS</sub> = 0 V to V <sub>CC</sub>	2.7 3.3 4.2		9.3 8.7 7.5		Ω
R <sub>FLAT</sub>	ON-Resistance Flatness	I <sub>ON</sub> = 8 mA, V <sub>IS</sub> = 0 V to V <sub>CC</sub>	2.7 3.3 4.2		3.6 3.3 2.9		Ω
ΔR <sub>ON</sub>	Delta ON- Resistance	I <sub>ON</sub> = 8 mA, V <sub>IS</sub> = 0 V to V <sub>CC</sub>	2.7 3.3 4.2		0.8 0.7 0.5		Ω

# NLAS3257A

## AC ELECTRICAL CHARACTERISTICS

**Table 5. TIMING/FREQUENCY** (Typical: T = 25°C, V<sub>CC</sub> = 3.3 V, R<sub>L</sub> = 50 Ω, C<sub>L</sub> = 5 pF, f = 1 MHz)

Symbol	Parameter	Test Condition	V <sub>CC</sub> (V)	T <sub>A</sub> = -40°C to +85°C			Unit
				Min	Typ	Max	
t <sub>PD</sub>	Propagation Delay, A to Bn or Bn to A		1.65 – 4.5			0.25	ns
t <sub>ON</sub>	Turn-ON Time	(See Figures 4 and 5)	1.65 – 4.5			35	ns
t <sub>OFF</sub>	Turn-OFF Time	(See Figures 4 and 5)	1.65 – 4.5			25	ns
t <sub>BBM</sub>	Break-Before-Make Time	(See Figure 3)	1.65 – 4.5	2.0			ns
BW	-3 dB Bandwidth	C <sub>L</sub> = 5 pF	1.65 – 4.5		900		MHz

**Table 6. ISOLATION** (Typical: T = 25°C, V<sub>CC</sub> = 3.3 V, R<sub>L</sub> = 50 Ω, C<sub>L</sub> = 5 pF)

Symbol	Parameter	Test Condition	V <sub>CC</sub> (V)	T <sub>A</sub> = -40°C to +85°C			Unit
				Min	Typ	Max	
O <sub>IRR</sub>	OFF-Isolation	f = 240 MHz (See Figure 6)	1.65 – 4.5		-21		dB
X <sub>TALK</sub>	Non-Adjacent Channel Crosstalk	f = 240 MHz	1.65 – 4.5		-21		dB

**Table 7. CAPACITANCE** (Typical: T = 25°C, V<sub>CC</sub> = 3.3 V, f = 1 MHz)

Symbol	Parameter	Test Condition	T <sub>A</sub> = -40°C to +85°C			Unit
			Min	Typ	Max	
C <sub>IN</sub>	Control Input Capacitance	S pin			2.0	pF
C <sub>ON</sub>	ON Capacitance	Switch ON A to B0 A to B1			7.5	pF
C <sub>OFF</sub>	OFF Capacitance	Switch OFF B0 OFF B1 OFF			2.5	pF

# NLAS3257A

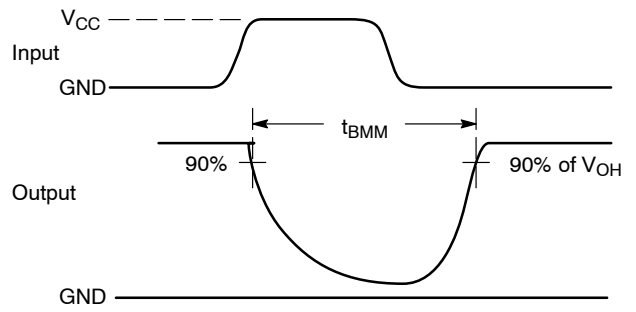
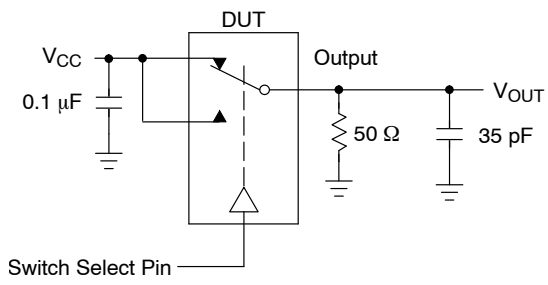


Figure 3.  $t_{BMM}$  (Time Break-Before-Make)

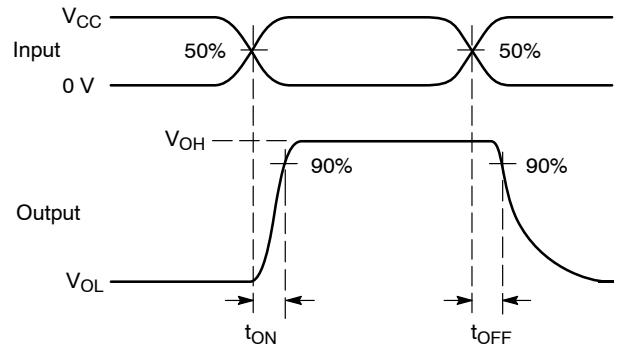
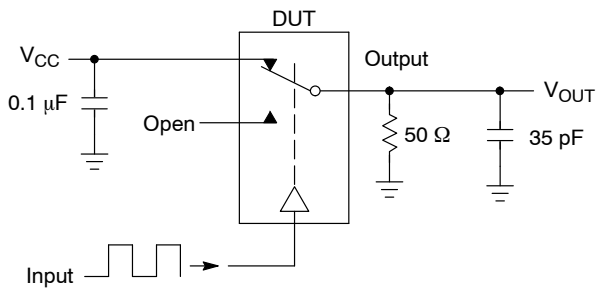


Figure 4.  $t_{ON}/t_{OFF}$

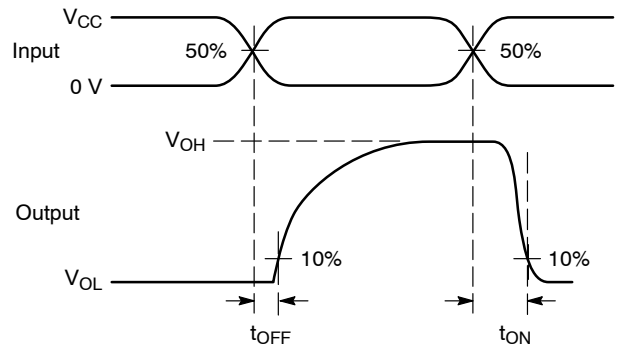
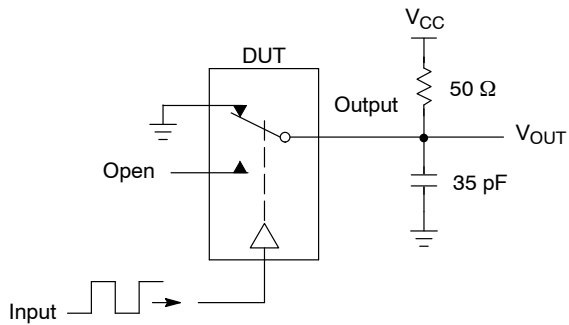
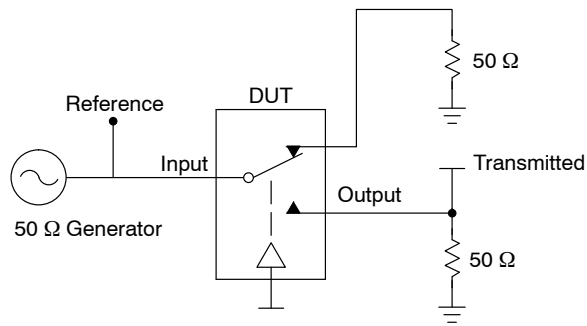


Figure 5.  $t_{ON}/t_{OFF}$

# NLAS3257A



Channel switch control/s test socket is normalized. Off isolation is measured across an off channel. On loss is the bandwidth of an On switch.  $V_{ISO}$ , Bandwidth and  $V_{ONL}$  are independent of the input signal direction.

$$V_{ISO} = \text{Off Channel Isolation} = 20 \text{ Log} \left( \frac{V_{OUT}}{V_{IN}} \right) \text{ for } V_{IN} \text{ at } 100 \text{ kHz}$$

$$V_{ONL} = \text{On Channel Loss} = 20 \text{ Log} \left( \frac{V_{OUT}}{V_{IN}} \right) \text{ for } V_{IN} \text{ at } 100 \text{ kHz to } 50 \text{ MHz}$$

Bandwidth (BW) = the frequency 3 dB below  $V_{ONL}$

$V_{CT}$  = Use  $V_{ISO}$  setup and test to all other switch analog input/outputs terminated with 50 Ω

**Figure 6. Off Channel Isolation/On Channel Loss (BW)/Crosstalk (On Channel to Off Channel)/ $V_{ONL}$**

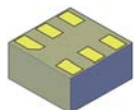
## DEVICE ORDERING INFORMATION

Device	Package	Shipping <sup>†</sup>
NLAS3257AMU3TCG	UDFN6 – 1.0 x 1.0, 0.35P (Pb-Free)	3000 / Tape & Reel

<sup>†</sup>For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

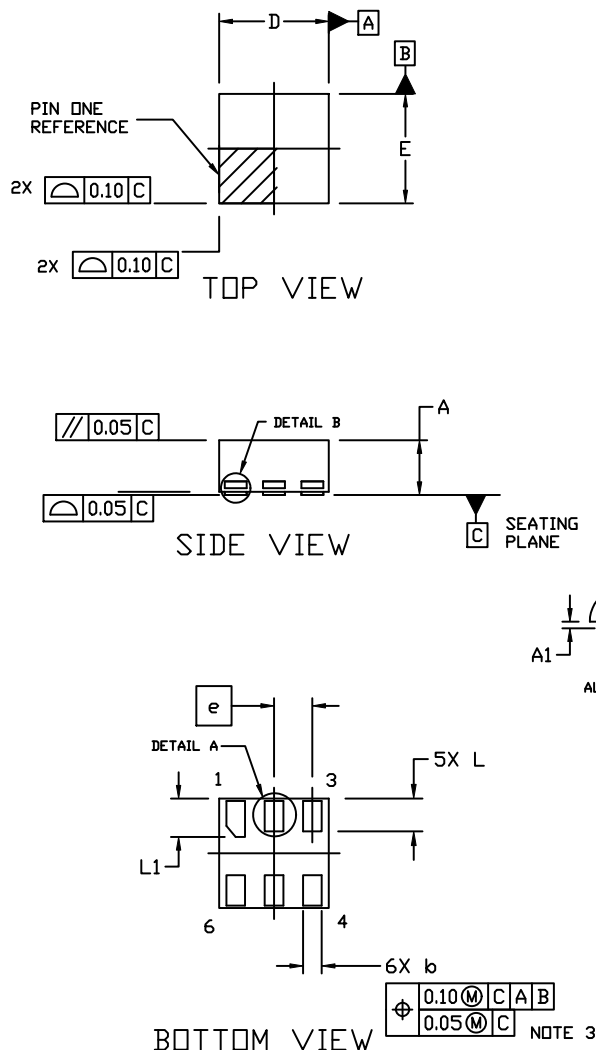
# MECHANICAL CASE OUTLINE PACKAGE DIMENSIONS

ON Semiconductor®



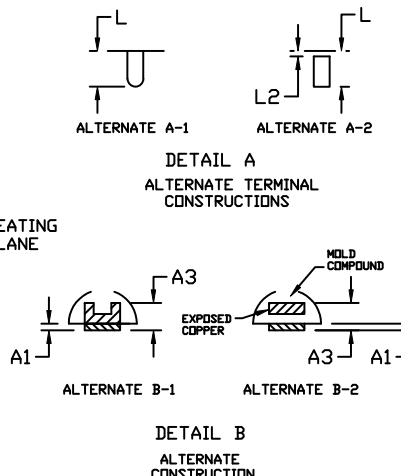
**UDFN6 1x1, 0.35P**  
CASE 517EC  
ISSUE O

DATE 09 NOV 2018

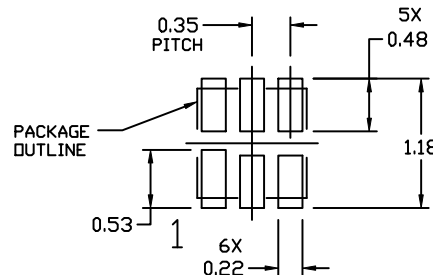


**NOTES:**

1. DIMENSIONING AND TOLERANCING PER. ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS
3. DIMENSION b APPLIES TO THE PLATED TERMINALS AND IS MEASURED BETWEEN 0.15 AND 0.20 FROM THE TERMINAL TIPS.
4. PACKAGE DIMENSIONS EXCLUSIVE OF BURRS AND MOLD FLASH.



DIM	MILLIMETERS		
	MIN.	NOM.	MAX.
A	0.45	0.50	0.55
A1	0.00	0.025	0.05
A3	0.13 REF		
b	0.12	0.17	0.22
D	0.90	1.00	1.10
E	0.90	1.00	1.10
e	0.35 BSC		
L	0.25	0.30	0.35
L1	0.30	0.35	0.40
L2	---	---	0.10



**RECOMMENDED MOUNTING FOOTPRINT\***  
\* For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

**GENERIC MARKING DIAGRAM\***



XX = Specific Device Code  
M = Date Code

\*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "•", may or may not be present. Some products may not follow the Generic Marking.

<b>DOCUMENT NUMBER:</b>	<b>98AON00214H</b>	Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red.
<b>DESCRIPTION:</b>	<b>UDFN6 1x1, 0.35P</b>	<b>PAGE 1 OF 1</b>

ON Semiconductor and ON are trademarks of Semiconductor Components Industries, LLC dba ON Semiconductor or its subsidiaries in the United States and/or other countries. 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. ON Semiconductor does not convey any license under its patent rights nor the rights of others.

**onsemi**, **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**'s product/patent coverage may be accessed at [www.onsemi.com/site/pdf/Patent-Marking.pdf](http://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.

## PUBLICATION ORDERING INFORMATION

### LITERATURE FULFILLMENT:

Email Requests to: [orderlit@onsemi.com](mailto:orderlit@onsemi.com)

**onsemi Website:** [www.onsemi.com](http://www.onsemi.com)

### TECHNICAL SUPPORT

**North American Technical Support:**

Voice Mail: 1 800-282-9855 Toll Free USA/Canada

Phone: 011 421 33 790 2910

**Europe, Middle East and Africa Technical Support:**

Phone: 00421 33 790 2910

For additional information, please contact your local Sales Representative