

# Buffer with Open Drain Output

## NL17SG07MU3TBG



UDFN6  
1.0 x 1.0  
CASE 517BX

The NL17SG07 is a buffer with open drain output in tiny footprint packages. The device is designed to operate for  $V_{CC} = 0.9\text{ V}$  to  $3.6\text{ V}$ .

### Features

- Designed for 0.9 V to 3.6 V  $V_{CC}$  Operation
- TPD = 1.8 ns (Typ) at  $V_{CC} = 3.0\text{ V}$ ,  $C_L = 15\text{ pF}$
- Inputs/Outputs Over-Voltage Tolerant up to 3.6 V
- $I_{OFF}$  Supports Partial Power Down Protection
- Available in UDFN Package
- NLV Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q100 Qualified and PPAP Capable
- These Devices are Pb-Free, Halogen-Free/BFR-Free and RoHS-Compliant

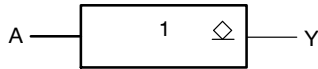


Figure 1. Logic Symbol

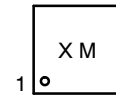
### PIN ASSIGNMENTS

Pin	UDFN
1	NC
2	A
3	GND
4	Y
5	NC
6	$V_{CC}$

### FUNCTION TABLE

Input	Output
A	Y
L	L
H	Z

### MARKING DIAGRAM

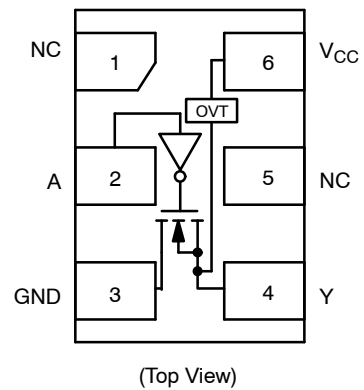


- X = Specific Device Code
- M = Date Code\*
- = Pb-Free Package

(Note: Microdot may be in either location)

\*Date Code orientation and/or position may vary depending upon manufacturing location.

### PINOUT DIAGRAM



(Top View)

### ORDERING INFORMATION

See detailed ordering, marking and shipping information in the package dimensions section on page 7 of this data sheet.

# NL17SG07MU3TBG

## MAXIMUM RATINGS

Symbol	Parameter	Value	Unit	
$V_{CC}$	DC Supply Voltage	-0.5 to +5.5	V	
$V_{IN}$	DC Input Voltage	-0.5 to +5.5	V	
$V_{OUT}$	DC Output Voltage	Active-Mode (High or Low State) Tri-State Mode (Note 1) Power-Down Mode ( $V_{CC} = 0$ V)	-0.5 to $V_{CC} + 0.5$ -0.5 to +5.5 -0.5 to +5.5	V
$I_{IK}$	DC Input Diode Current	$V_{IN} < GND$	-20	mA
$I_{OK}$	DC Output Diode Current	$V_{OUT} < GND$	-20	mA
$I_{OUT}$	DC Output Source/Sink Current		$\pm 20$	mA
$I_{CC}$ or $I_{GND}$	DC Supply Current Per Supply Pin or Ground Pin		$\pm 20$	mA
$T_{STG}$	Storage Temperature Range		-65 to +150	°C
$T_L$	Lead Temperature, 1 mm from Case for 10 Seconds		260	°C
$T_J$	Junction Temperature Under Bias		+150	°C
$\theta_{JA}$	Thermal Resistance (Note 2)		154	°C/W
$P_D$	Power Dissipation in Still Air		812	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 (Note 3)	Human Body Model Charged Device Model	2000 1000	V
$I_{LATCHUP}$	Latchup Performance (Note 4)		$\pm 100$	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. Applicable to devices with outputs that may be tri-stated.
2. Measured with minimum pad spacing on an FR4 board, using 10 mm – by – 1inch, 2 ounce copper trace no air flow per JESD51-7.
3. HBM tested to EIA / JESD22-A114-A. CDM tested to JESD22-C101-A. JEDEC recommends that ESD qualification to EIA/JESD22-A115A (Machine Model) be discontinued.
4. Tested to EIA/JESD78 Class II.

**Table 1. RECOMMENDED OPERATING CONDITIONS**

Symbol	Parameter	Min	Max	Unit	
$V_{CC}$	Positive DC Supply Voltage	0.9	3.6	V	
$V_{IN}$	Digital Input Voltage	0	3.6	V	
$V_{OUT}$	Output Voltage	Active Mode (High or Low State) Tri-State Mode (Note 1) Power Down Mode ( $V_{CC} = 0$ V)	0 0 0	$V_{CC}$ 3.6 3.6	V
$T_A$	Operating Free-Air Temperature	-55	+125	°C	
$t_r, t_f$	Input Transition Rise or Fall Rate	$V_{CC} = 3.3$ V $\pm$ 0.3 V	0	10	nS/V

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.

# NL17SG07MU3TBG

**Table 2. DC ELECTRICAL CHARACTERISTICS**

Symbol	Parameter	Conditions	V <sub>CC</sub> (V)	T <sub>A</sub> = 25 °C			T <sub>A</sub> = -55 °C to +125 °C		Unit
				Min	Typ	Max	Min	Max	
V <sub>IH</sub>	High-Level Input Voltage		0.9		V <sub>CC</sub>				V
			1.1 to 1.3	0.7 × V <sub>CC</sub>			0.7 × V <sub>CC</sub>		
			1.4 to 1.6	0.65 × V <sub>CC</sub>			0.65 × V <sub>CC</sub>		
			1.65 to 1.95	0.65 × V <sub>CC</sub>			0.65 × V <sub>CC</sub>		
			2.3 to 2.7	1.7			1.7		
			3.0 to 3.6	2.0			2.0		
V <sub>IL</sub>	Low-Level Input Voltage		0.9		GND				V
			1.1 to 1.3			0.3 × V <sub>CC</sub>		0.3 × V <sub>CC</sub>	
			1.4 to 1.6			0.35 × V <sub>CC</sub>		0.35 × V <sub>CC</sub>	
			1.65 to 1.95			0.35 × V <sub>CC</sub>		0.35 × V <sub>CC</sub>	
			2.3 to 2.7			0.7		0.7	
			3.0 to 3.6			0.8		0.8	
V <sub>OL</sub>	Low-Level Output Voltage	V <sub>IN</sub> = V <sub>IH</sub> or V <sub>IL</sub>							V
		I <sub>OL</sub> = 20 μA	0.9		0.1				
		I <sub>OL</sub> = 0.3 mA	1.1 to 1.3			0.25 × V <sub>CC</sub>		0.25 × V <sub>CC</sub>	
		I <sub>OL</sub> = 1.7 mA	1.4 to 1.6			0.25 × V <sub>CC</sub>		0.25 × V <sub>CC</sub>	
		I <sub>OL</sub> = 3.0 mA	1.65 to 1.95			0.45		0.45	
		I <sub>OL</sub> = 4.0 mA	2.3 to 2.7			0.4		0.4	
		I <sub>OL</sub> = 8.0 mA	2.7 to 3.6			0.4		0.4	
I <sub>IN</sub>	Input Leakage Current	V <sub>IN</sub> = 0 V to 3.6 V	0.9 to 3.6			±0.1		±1.0	μA
I <sub>OFF</sub>	Power Off Leakage Current	V <sub>IN</sub> = 0 V to 3.6 V; V <sub>OUT</sub> = 0 V to 3.6 V	0			1.0		10.0	μA
I <sub>CC</sub>	Quiescent Supply Current	V <sub>IN</sub> = V <sub>CC</sub> or GND	0.9 to 3.6			0.5		10.0	μA

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.

# NL17SG07MU3TBG

**Table 3. AC ELECTRICAL CHARACTERISTICS**

Symbol	Parameter	Test Condition	V <sub>CC</sub> (V)	T <sub>A</sub> = 25 °C			T <sub>A</sub> = -55 °C to +125 °C		Unit	
				Min	Typ	Max	Min	Max		
t <sub>pZL</sub>	Propagation Delay A to Y (Figures 3 and 4)	C <sub>L</sub> = 10 pF; R <sub>L</sub> = 100 kΩ R <sub>L</sub> = 5 kΩ R <sub>L</sub> = 5 kΩ R <sub>L</sub> = 5 kΩ R <sub>L</sub> = 5 kΩ R <sub>L</sub> = 5 kΩ							ns	
			0.9		31.6					
			1.1 to 1.3		8.2	12.7		13.0		
			1.4 to 1.6		4.3	5.7		7.3		
			1.65 to 1.95		3.4	4.5		5.9		
			2.3 to 2.7		2.2	3.3		4.5		
			3.0 to 3.6		1.7	2.9		3.7		
		C <sub>L</sub> = 15 pF; R <sub>L</sub> = 100 kΩ R <sub>L</sub> = 5 kΩ R <sub>L</sub> = 5 kΩ R <sub>L</sub> = 5 kΩ R <sub>L</sub> = 5 kΩ R <sub>L</sub> = 5 kΩ								
			0.9		32.5					
			1.1 to 1.3		8.5	13.0		13.5		
			1.4 to 1.6		4.5	6.0		7.9		
			1.65 to 1.95		3.6	4.5		6.2		
			2.3 to 2.7		2.3	3.4		4.6		
			3.0 to 3.6		1.8	3.0		3.7		
		C <sub>L</sub> = 30 pF; R <sub>L</sub> = 100 kΩ R <sub>L</sub> = 5 kΩ R <sub>L</sub> = 5 kΩ R <sub>L</sub> = 5 kΩ R <sub>L</sub> = 5 kΩ R <sub>L</sub> = 5 kΩ								
			0.9		35.2					
			1.1 to 1.3		9.3	14.0		14.2		
			1.4 to 1.6		5.1	6.2		8.5		
			1.65 to 1.95		4.0	4.9		6.4		
			2.3 to 2.7		2.6	3.6		4.7		
			3.0 to 3.6		2.1	3.1		3.9		
t <sub>pLZ</sub>	Propagation Delay, A to Y (Figures 3 and 4)	C <sub>L</sub> = 10 pF; R <sub>L</sub> = 100 kΩ R <sub>L</sub> = 5 kΩ R <sub>L</sub> = 5 kΩ R <sub>L</sub> = 5 kΩ R <sub>L</sub> = 5 kΩ R <sub>L</sub> = 5 kΩ							ns	
			0.9		14.9					
			1.1 to 1.3		7.2	10.9		11.5		
			1.4 to 1.6		5.1	7.2		8.3		
			1.65 to 1.95		4.8	7.0		7.8		
			2.3 to 2.7		4.2	6.5		7.3		
			3.0 to 3.6		3.8	6.2		6.8		
		C <sub>L</sub> = 15 pF; R <sub>L</sub> = 100 kΩ R <sub>L</sub> = 5 kΩ R <sub>L</sub> = 5 kΩ R <sub>L</sub> = 5 kΩ R <sub>L</sub> = 5 kΩ R <sub>L</sub> = 5 kΩ								
			0.9		16.2					
			1.1 to 1.3		8.5	13.4		14.0		
			1.4 to 1.6		6.4	10.0		10.8		
			1.65 to 1.95		6.1	9.5		10.5		
			2.3 to 2.7		5.5	7.8		10.0		
			3.0 to 3.6		5.2	7.2		9.3		
		C <sub>L</sub> = 30 pF; R <sub>L</sub> = 100 kΩ R <sub>L</sub> = 5 kΩ R <sub>L</sub> = 5 kΩ R <sub>L</sub> = 5 kΩ R <sub>L</sub> = 5 kΩ R <sub>L</sub> = 5 kΩ								
			0.9		20.1					
			1.1 to 1.3		12.4	18.4		20.0		
			1.4 to 1.6		10.2	15.0		16.0		
			1.65 to 1.95		9.9	14.5		15.8		
			2.3 to 2.7		9.4	13.5		15.4		
			3.0 to 3.6		9.0	13.2		14.3		

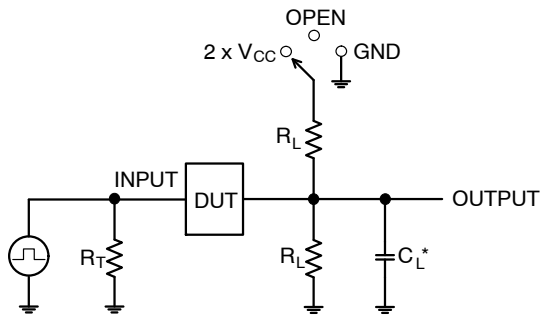
# NL17SG07MU3TBG

**Table 4. CAPACITIVE CHARACTERISTICS**

Symbol	Parameter	Test Condition	Typical (T <sub>A</sub> = 25 °C)	Unit
C <sub>IN</sub>	Input Capacitance	V <sub>CC</sub> = 0 V	3.0	pF
C <sub>OUT</sub>	Output Capacitance	V <sub>CC</sub> = 0 V	3.0	pF
C <sub>PD</sub>	Power Dissipation Capacitance (Note 5)	f = 10 MHz, V <sub>CC</sub> = 0.9 V to 3.6 V, V <sub>IN</sub> = 0 V or V <sub>CC</sub>	4.0	pF

5. C<sub>PD</sub> is defined as the value of the internal equivalent capacitance which is calculated from the dynamic operating current consumption without load. Average operating current can be obtained by the equation I<sub>CC(OPR)</sub> = C<sub>PD</sub> × V<sub>CC</sub> × f<sub>in</sub> + I<sub>CC</sub>. C<sub>PD</sub> is used to determine the no-load dynamic power consumption: P<sub>D</sub> = C<sub>PD</sub> × V<sub>CC</sub><sup>2</sup> × f<sub>in</sub> + I<sub>CC</sub> × V<sub>CC</sub>.

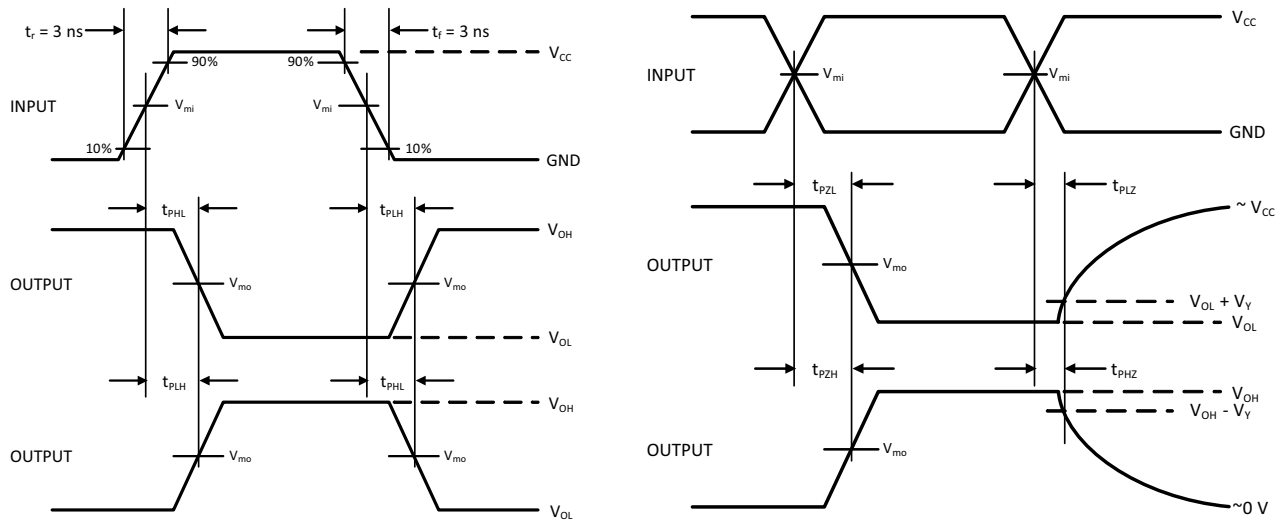
# NL17SG07MU3TBG



$C_L$  includes probe and jig capacitance  
 $R_T$  is  $Z_{OUT}$  of pulse generator (typically 50  $\Omega$ )  
 $f = 1$  MHz

**Figure 2. Test Circuit**

Test	Switch Position
$t_{PLH} / t_{PHL}$	Open
$t_{PLZ} / t_{PZL}$	$2 \times V_{CC}$
$t_{PHZ} / t_{PZH}$	GND



**Figure 3. Switching Waveforms**

$V_{CC}, V$	$V_{mi}, V$	$V_{mo}, V$	$V_Y, V$
0.9	$V_{CC}/2$	$V_{CC}/2$	0.1
1.1 to 1.3	$V_{CC}/2$	$V_{CC}/2$	0.1
1.4 to 1.6	$V_{CC}/2$	$V_{CC}/2$	0.1
1.65 to 1.95	$V_{CC}/2$	$V_{CC}/2$	0.15
2.3 to 2.7	$V_{CC}/2$	$V_{CC}/2$	0.15
3.0 to 3.6	1.5	1.5	0.3

# NL17SG07MU3TBG

## ORDERING INFORMATION

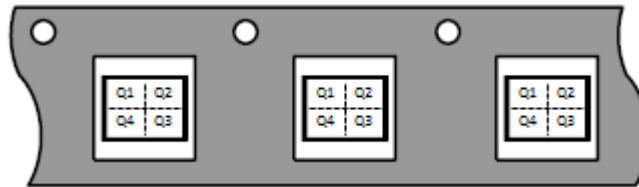
Device	Package	Marking	Pin 1 Orientation (See below)	Shipping <sup>†</sup>
NL17SG07EMU3TBG	UDFN6, 1.0 x 1.0, 0.35P	J (Rotated 180°)	Q2	3000 / Tape & Reel

† 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](#).

\* NLV Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q100 Qualified and PPAP Capable

### PIN 1 ORIENTATION IN TAPE AND REEL

Direction of Feed



# NL17SG07MU3TBG

## REVISION HISTORY

Revision	Description of Changes	Date
2	Max Values of $V_{CC}$ , $V_{IN}$ and $V_{OUT}$ updated (from +4.3 V to +5.5 V) in the Maximum Ratings table, NL17SG07MU3TBG device removed from the Ordering Information table.	4/8/2026

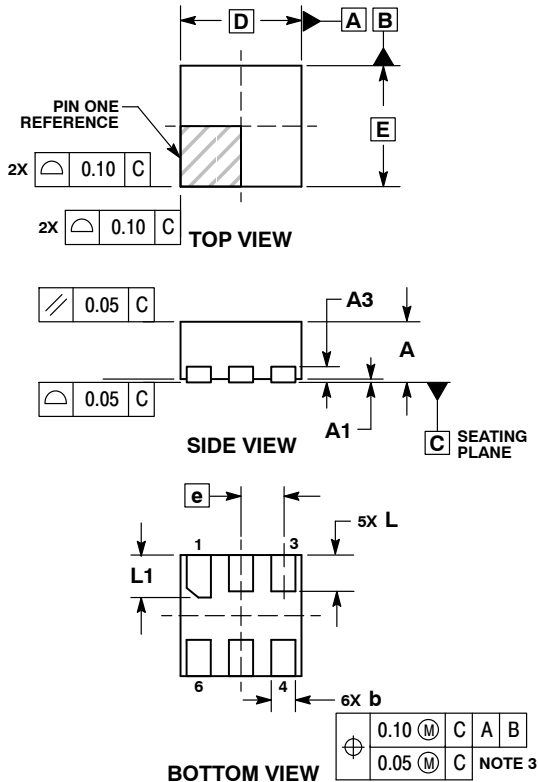
This document has undergone updates prior to the inclusion of this revision history table. The changes tracked here only reflect updates made on the noted approval dates.



UDFN6, 1x1, 0.35P  
CASE 517BX  
ISSUE O

SCALE 4:1

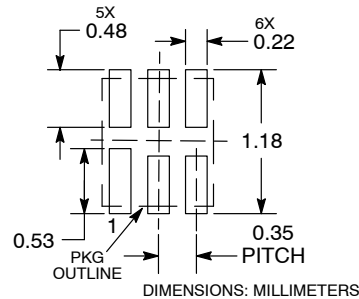
DATE 18 MAY 2011



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

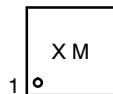
MILLIMETERS		
DIM	MIN	MAX
A	0.45	0.55
A1	0.00	0.05
A3	0.13	REF
b	0.12	0.22
D	1.00	BSC
E	1.00	BSC
e	0.35	BSC
L	0.25	0.35
L1	0.30	0.40

RECOMMENDED  
SOLDERING FOOTPRINT\*



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

GENERIC  
MARKING DIAGRAM\*



X = 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.

DOCUMENT NUMBER:	98AON56787E	Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red.
DESCRIPTION:	UDFN6, 1x1, 0.35P	PAGE 1 OF 1

onsemi and onsemi are trademarks of Semiconductor Components Industries, LLC dba onsemi or its subsidiaries in the United States and/or other countries. onsemi reserves the right to make changes without further notice to any products herein. onsemi makes no warranty, representation or guarantee regarding the 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. onsemi 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.

## ADDITIONAL INFORMATION

### TECHNICAL PUBLICATIONS:

Technical Library: [www.onsemi.com/design/resources/technical-documentation](http://www.onsemi.com/design/resources/technical-documentation)  
onsemi Website: [www.onsemi.com](http://www.onsemi.com)

### ONLINE SUPPORT: [www.onsemi.com/support](http://www.onsemi.com/support)

For additional information, please contact your local Sales Representative at [www.onsemi.com/support/sales](http://www.onsemi.com/support/sales)