



Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of "Quality Parts,Customers Priority,Honest Operation,and Considerate Service",our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!



Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832

Email & Skype: info@chipsmall.com Web: www.chipsmall.com

Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China



NL7SZ58

Configurable Multifunction Gate

The NL7SZ58 is an advanced high-speed CMOS multifunction gate. The device allows the user to choose logic functions AND, OR, NAND, NOR, XOR, INVERT and BUFFER. The device has Schmitt-trigger inputs, thereby enhancing noise immunity.

The NL7SZ58 input and output structures provide protection when voltages up to 7.0 V are applied, regardless of the supply voltage.

Features

- High Speed: $t_{PD} = 3.4 \text{ ns (Typ) @ } V_{CC} = 5.0 \text{ V}$
- Low Power Dissipation: $I_{CC} = 1 \mu\text{A (Maximum) at } T_A = 25^\circ\text{C}$
- Power Down Protection Provided on inputs
- Balanced Propagation Delays
- Overvoltage Tolerant (OVT) Input and Output Pins
- Ultra-Small Package
- NLV Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable
- This is a Pb-Free Device



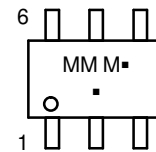
ON Semiconductor®

<http://onsemi.com>



1
SC-88 (SOT-363)
CASE 419B

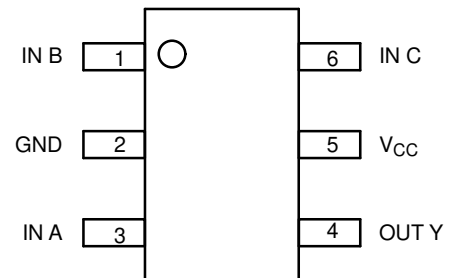
MARKING DIAGRAM



MM = Specific Device Code
M = Date Code
▪ = Pb-Free Package

(Note: Microdot may be in either location)

PIN ASSIGNMENTS



(Top View)

ORDERING INFORMATION

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

NL7SZ58

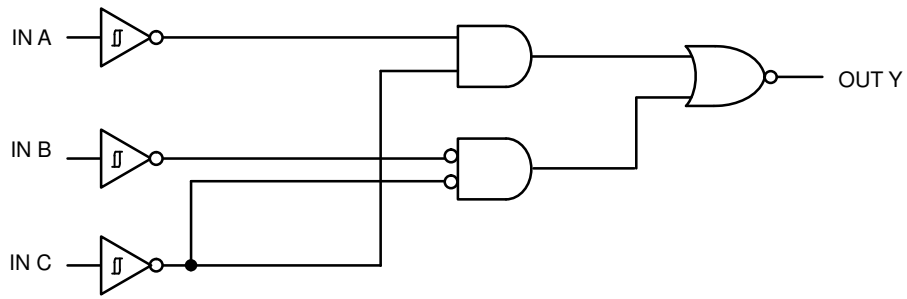


Figure 1. Function Diagram

PIN ASSIGNMENT

1	IN B
2	GND
3	IN A
4	OUT Y
5	V _{CC}
6	IN C

FUNCTION TABLE*

Input			Output
A	B	C	Y
L	L	L	L
L	L	H	H
L	H	L	L
L	H	H	L
H	L	L	H
H	L	H	H
H	H	L	H
H	H	H	L

*To select a logic function, please refer to "Logic Configurations section".

NL7SZ58

LOGIC CONFIGURATIONS

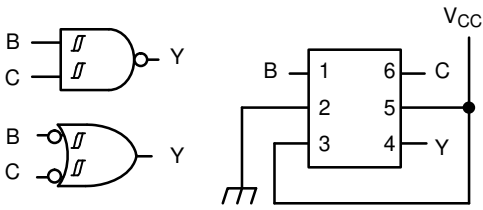


Figure 2. 2-Input NAND (When A = "H")

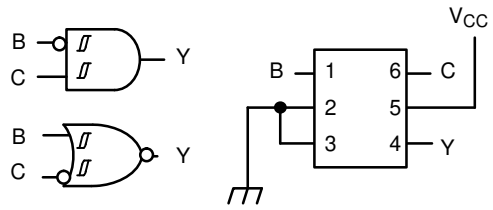


Figure 3. 2-Input AND with Input B Inverted (When A = "L")

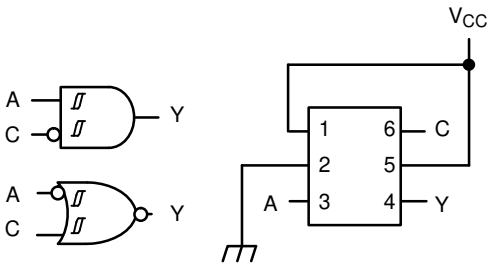


Figure 4. 2-Input AND with Input C Inverted (When B = "H")

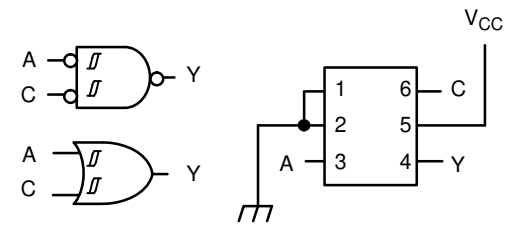


Figure 5. 2-Input OR (When B = "L")

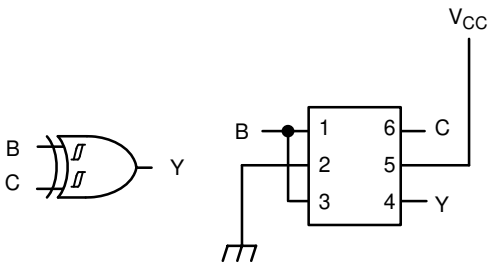


Figure 6. 2-Input XOR (When A = B)

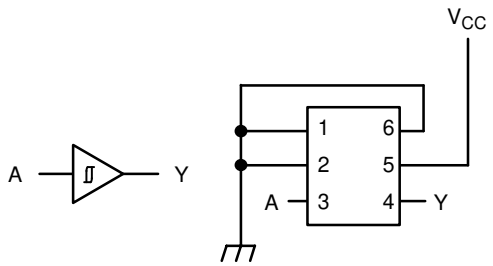


Figure 7. Buffer (When B = C = "L")

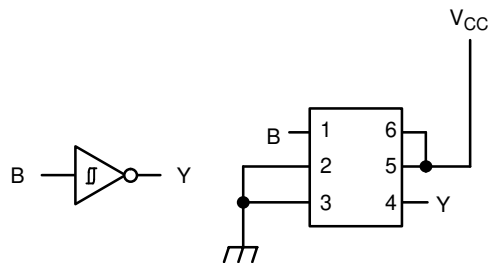


Figure 8. Inverter (When A = "L" and C = "H")

NL7SZ58

MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V _{CC}	DC Supply Voltage	-0.5 to +7.0	V
V _{IN}	DC Input Voltage	-0.5 to +7.0	V
V _{OUT}	DC Output Voltage	-0.5 to +7.0	V
I _{IK}	DC Input Diode Current V _{IN} < GND	-50	mA
I _{OK}	DC Output Diode Current V _{OUT} < GND	-50	mA
I _O	DC Output Source/Sink Current	± 50	mA
I _{CC}	DC Supply Current Per Supply Pin	± 100	mA
I _{GND}	DC Ground Current per Ground Pin	± 100	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
θ _{JA}	Thermal Resistance (Note 1) SC-88	350	°C/W
P _D	Power Dissipation in Still Air at 85°C SC-88	200	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 Mode (Note 2) Machine Model (Note 3) Charged Device Model (Note 4)	>2000 >200 N/A	V
I _{LATCHUP}	Latchup Performance Above V _{CC} and Below GND at 125°C (Note 5)	± 500	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.

RECOMMENDED OPERATING CONDITIONS

Symbol	Parameter	Min	Max	Unit
V _{CC}	Positive DC Supply Voltage	1.65	5.5	V
V _{IN}	Digital Input Voltage	0	5.5	V
V _{OUT}	Output Voltage	0	5.5	V
T _A	Operating Free-Air Temperature	-55	+125	°C
Δt/ΔV	Input Transition Rise or Fall Rate V _{CC} = 2.5 V ± 0.2 V V _{CC} = 3.3 V ± 0.3 V V _{CC} = 5.0 V ± 0.5 V	0 0 0	No Limit No Limit No Limit	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.

NL7SZ58

DC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Conditions	V _{CC} (V)	T _A = 25°C			T _A ≤ +85°C		T _A = -55°C to +125°C		Unit
				Min	Typ	Max	Min	Max	Min	Max	
V _{T+}	Positive Threshold Voltage		1.65	0.79		1.16		1.16		1.16	V
			2.3	1.11		1.56		1.56		1.56	
			3.0	1.5		1.87		1.87		1.87	
			4.5	2.16		2.74		2.74		2.74	
			5.5	2.61		3.33		3.33		3.33	
V _{T-}	Negative Threshold Voltage		1.65	0.35		0.62	0.35		0.35		V
			2.3	0.58		0.87	0.58		0.58		
			3.0	0.84		1.19	0.84		0.84		
			4.5	1.41		1.9	1.41		1.41		
			5.5	1.78		2.29	1.78		1.78		
V _H	Hysteresis Voltage		1.65	0.30		0.62	0.30	0.62	0.30	0.62	V
			2.3	0.40		0.8	0.40	0.8	0.40	0.8	
			3.0	0.53		0.87	0.53	0.87	0.53	0.87	
			4.5	0.71		1.04	0.71	1.04	0.71	1.04	
			5.5	0.8		1.2	0.8	1.2	0.8	1.2	
V _{OH}	Minimum High-Level Output Voltage	V _{IN} ≤ V _{T-MIN} I _{OH} = -50 μA	1.65 – 5.5	V _{CC} – 0.1			V _{CC} – 0.1		V _{CC} – 0.1		V
		V _{IN} ≤ V _{T-MIN} I _{OH} = -4 mA	1.65	1.2			1.2		1.2		
		I _{OH} = -8 mA	2.3	1.9			1.9		1.9		
		I _{OH} = -16 mA	3.0	2.4			2.4		2.4		
		I _{OH} = -24 mA	3.0	2.3			2.3		2.3		
		I _{OH} = -32 mA	4.5	3.8			3.8		3.8		
V _{OL}	Maximum Low-Level Output Voltage	V _{IN} ≥ V _{T+MAX} I _{OL} = 50 μA	1.65 – 5.5			0.1		0.1		0.1	V
		V _{IN} ≥ V _{T+MAX} I _{OL} = 4 mA	1.65			0.45		0.45		0.45	
		I _{OL} = 8 mA	2.3			0.3		0.3		0.3	
		I _{OL} = 16 mA	3.0			0.4		0.4		0.4	
		I _{OL} = 24 mA	3.0			0.55		0.55		0.55	
		I _{OL} = 32 mA	4.5			0.55		0.55		0.55	
I _{IN}	Input Leakage Current	0 ≤ V _{IN} ≤ 5.5 V	0 to 5.5			±0.1		±1.0		±1.0	μA
I _{CC}	Quiescent Supply Current	0 ≤ V _{IN} ≤ V _{CC}	5.5			1.0		10		10	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.

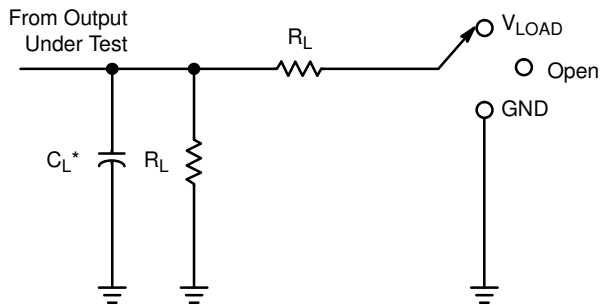
NL7SZ58

AC ELECTRICAL CHARACTERISTICS (Input $t_r = t_f = 3.0$ ns)

Symbol	Parameter	V_{CC} (V)	Test Condition	$T_A = 25^\circ\text{C}$			$T_A \leq +85^\circ\text{C}$		$T_A = -55^\circ\text{C}$ to $+125^\circ\text{C}$		Unit
				Min	Typ	Max	Min	Max	Min	Max	
t_{PLH} , t_{PHL}	Propagation Delay, Any Input to Output Y (See Test Circuit)	1.65 – 1.95		3.2	9.0	14.4	3.2	14.4	3.2	14.4	ns
		2.3 – 2.7		2.0	5.3	8.3	2.0	8.3	2.0	8.3	
		3.0 – 3.6		1.5	4.0	6.3	1.5	6.3	1.5	6.3	
		4.5 – 5.5		1.1	3.4	5.1	1.1	5.1	1.1	5.1	
C_{IN}	Input Capacitance				3.5						pF
C_{PD}	Power Dissipation Capacitance (Note 6)	5.0	$f = 10$ MHz		22						pF

6. C_{PD} 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 $I_{CC(OPR)} = C_{PD} \cdot V_{CC} \cdot f_{in} + I_{CC}$. C_{PD} is used to determine the no-load dynamic power consumption: $P_D = C_{PD} \cdot V_{CC}^2 \cdot f_{in} + I_{CC} \cdot V_{CC}$.

TEST CIRCUIT AND VOLTAGE WAVEFORMS



Test	S1
t_{PLH}/t_{PHL}	Open
t_{PLZ}/t_{PZL}	V_{LOAD}
t_{PHZ}/t_{PZH}	GND

* C_L includes probes and jig capacitance.

Figure 9. Load Circuit

V_{CC}	Inputs		V_M	V_{LOAD}	C_L	R_L	V_A
	V_I	t_r/t_f					
$1.8\text{ V} \pm 0.15\text{ V}$	V_{CC}	≤ 2 ns	$V_{CC}/2$	$2 \times V_{CC}$	30 pF	1 k Ω	0.15 V
$2.5\text{ V} \pm 0.2\text{ V}$	V_{CC}	≤ 2 ns	$V_{CC}/2$	$2 \times V_{CC}$	30 pF	500 Ω	0.15 V
$3.3\text{ V} \pm 0.3\text{ V}$	3 V	≤ 2.5 ns	1.5 V	6 V	50 pF	500 Ω	0.3 V
$5.5\text{ V} \pm 0.5\text{ V}$	V_{CC}	≤ 2.5 ns	$V_{CC}/2$	$2 \times V_{CC}$	50 pF	500 Ω	0.3 V

NL7SZ58

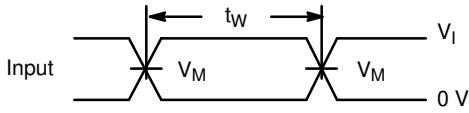


Figure 10. Voltage Waveforms Pulse Duration

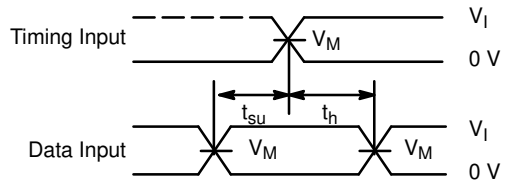


Figure 11. Voltage Waveforms Setup and Hold Times

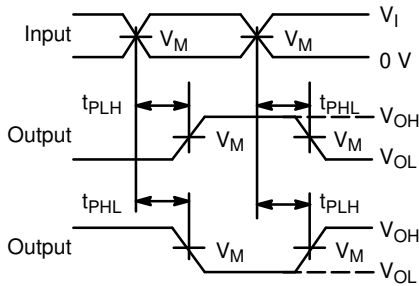


Figure 12. Voltage Waveforms Propagation Delay Times Inverting and Noninverting Outputs

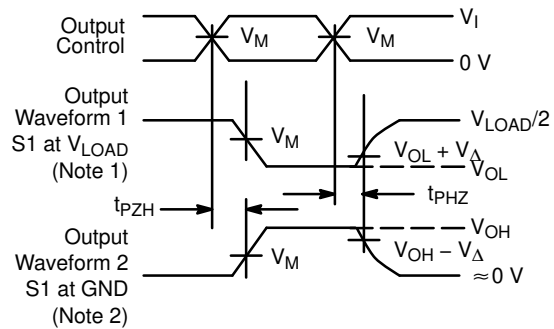


Figure 13. Voltage Waveforms Enable and Disable Times Low- and High-Level Enabling

1. Waveform 1 is for an output with internal conditions such that the output is low, except when disabled by the output control.
2. Waveform 2 is for an output with internal conditions such that the output is high, except when disabled by the output control
3. All input pulses are supplied by generators having the following characteristics: $PRR \leq 10 \text{ MHz}$, $Z_O = 50 \Omega$.
4. The outputs are measured one at a time, with one transition per measurement.
5. All parameters are waveforms are not applicable to all devices.

ORDERING INFORMATION

Device	Package	Shipping†
NL7SZ58DFT2G	SC-88 (Pb-Free)	3000 / Tape & Reel
NLV7SZ58DFT2G*	SC-88 (Pb-Free)	3000 / Tape & Reel

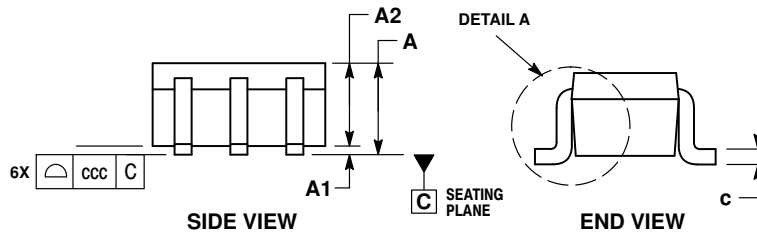
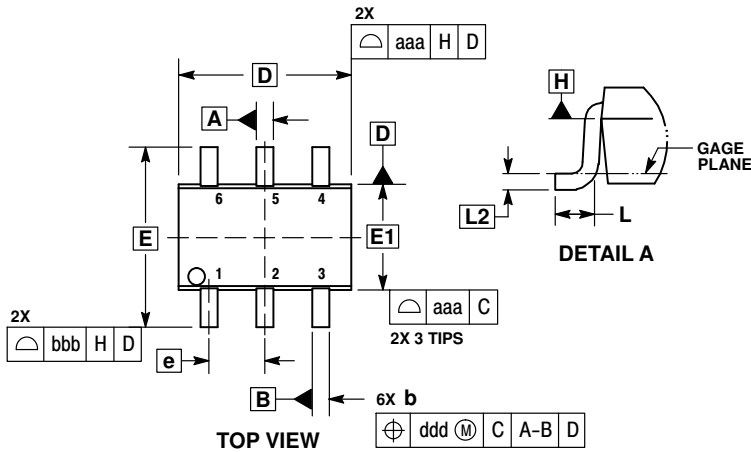
†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

*NLV Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable.

NL7SZ58

PACKAGE DIMENSIONS

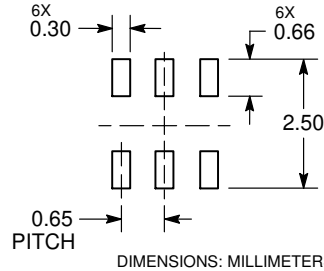
SC-88/SC70-6/SOT-363
CASE 419B-02
ISSUE Y



- NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
 2. CONTROLLING DIMENSION: MILLIMETERS.
 3. DIMENSIONS D AND E1 DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS. MOLD FLASH, PROTRUSIONS, OR GATE BURRS SHALL NOT EXCEED 0.20 PER END.
 4. DIMENSIONS D AND E1 AT THE OUTERMOST EXTREMES OF THE PLASTIC BODY AND DATUM H.
 5. DATUMS A AND B ARE DETERMINED AT DATUM H.
 6. DIMENSIONS b AND c APPLY TO THE FLAT SECTION OF THE LEAD BETWEEN 0.08 AND 0.15 FROM THE TIP.
 7. DIMENSION b DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.08 TOTAL IN EXCESS OF DIMENSION b AT MAXIMUM MATERIAL CONDITION. THE DAMBAR CANNOT BE LOCATED ON THE LOWER RADIUS OF THE FOOT.

DIM	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	---	---	1.10	---	---	0.043
A1	0.00	---	0.10	0.000	---	0.004
A2	0.70	0.90	1.00	0.027	0.035	0.039
b	0.15	0.20	0.25	0.006	0.008	0.010
C	0.08	0.15	0.22	0.003	0.006	0.009
D	1.80	2.00	2.20	0.070	0.078	0.086
E	2.00	2.10	2.20	0.078	0.082	0.086
E1	1.15	1.25	1.35	0.045	0.049	0.053
e	0.65 BSC			0.026 BSC		
L	0.26	0.36	0.46	0.010	0.014	0.018
L2	0.15 BSC			0.006 BSC		
aaa	0.15			0.006		
bbb	0.30			0.012		
ccc	0.10			0.004		
ddd	0.10			0.004		

RECOMMENDED SOLDERING 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.

ON Semiconductor and are registered trademarks of Semiconductor Components Industries, LLC (SCILLC). SCILLC owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of SCILLC's product/patent coverage may be accessed at www.onsemi.com/site/pdf/Patent-Marking.pdf. SCILLC reserves the right to make changes without further notice to any products herein. SCILLC makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does SCILLC 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. "Typical" parameters which may be provided in SCILLC 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. SCILLC does not convey any license under its patent rights nor the rights of others. SCILLC products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the SCILLC product could create a situation where personal injury or death may occur. Should Buyer purchase or use SCILLC products for any such unintended or unauthorized application, Buyer shall indemnify and hold SCILLC 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 SCILLC was negligent regarding the design or manufacture of the part. SCILLC 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
P.O. Box 5163, Denver, Colorado 80217 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