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# NL17SZ08

## Single 2-Input AND Gate

The NL17SZ08 is a single 2-input AND Gate in three tiny footprint packages. The device performs much as LCX multi-gate products in speed and drive. They should be used wherever the need for higher speed and drive are needed.

### Features

- Tiny SOT-353, SOT-553 and SOT-953 Packages
- 2.7 ns  $T_{PD}$  at 5.0 V (typ)
- Source/Sink 24 mA at 3.0 V
- Overvoltage Tolerant Inputs
- Pin For Pin with NC7SZ08P5X, TC7SZ08FU and TC7SZ08AFE
- Chip Complexity: FETs = 20
- Designed for 1.65 V to 5.5 V  $V_{CC}$  Operation
- 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 are RoHS Compliant

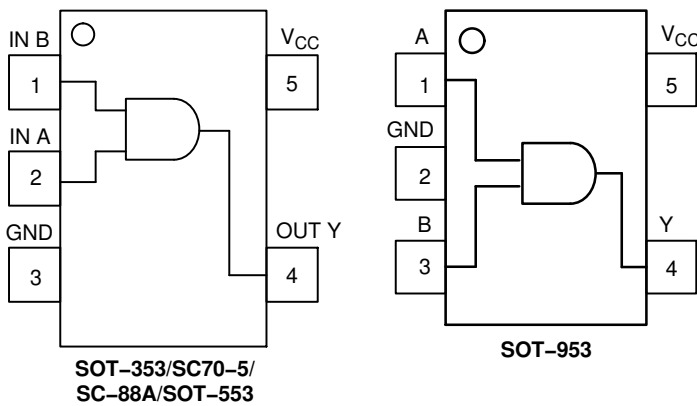


Figure 1. Pinout (Top View)

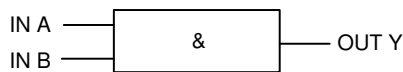
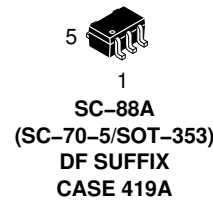


Figure 2. Logic Symbol

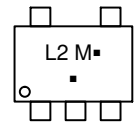


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### MARKING DIAGRAMS



L2 = Specific Device Marking  
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.



Y = Specific Device Code  
M = Month Code

### ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 4 of this data sheet.

# NL17SZ08

## PIN ASSIGNMENT (SOT-353/SC70-5/SC-88A/SOT-553)

Pin	Function
1	IN B
2	IN A
3	GND
4	OUT Y
5	V <sub>CC</sub>

## PIN ASSIGNMENT (SOT-953)

Pin	Function
1	IN A
2	GND
3	IN B
4	OUT Y
5	V <sub>CC</sub>

## FUNCTION TABLE

Input		Output Y = AB
A	B	Y
L	L	L
L	H	L
H	L	L
H	H	H

## MAXIMUM RATINGS

Symbol	Parameter	Value	Units	
V <sub>CC</sub>	DC Supply Voltage	-0.5 to +7.0	V	
V <sub>IN</sub>	DC Input Voltage	-0.5 to +7.0	V	
V <sub>OUT</sub>	DC Output Voltage (SOT-353/SC70-5/SC-88A/SOT-553 Packages)	-0.5 to +7.0	V	
V <sub>OUT</sub>	DC Output Voltage (SOT-953 Package)	-0.5 to V <sub>CC</sub> + 0.5	V	
I <sub>IK</sub>	DC Input Diode Current	-50	mA	
I <sub>OK</sub>	DC Output Diode Current (SOT-953 Package) V <sub>OUT</sub> < GND, V <sub>OUT</sub> > V <sub>CC</sub>	±50	mA	
I <sub>OK</sub>	DC Output Diode Current (SOT-353/SC70-5/SC-88A/SOT-553 Packages) V <sub>OUT</sub> < GND	-50	mA	
I <sub>OUT</sub>	DC Output Sink Current	±50	mA	
I <sub>CC</sub>	DC Supply Current per Supply Pin	±100	mA	
T <sub>STG</sub>	Storage Temperature Range	-65 to +150	°C	
T <sub>L</sub>	Lead Temperature, 1 mm from Case for 10 Seconds	260	°C	
T <sub>J</sub>	Junction Temperature Under Bias	+150	°C	
θ <sub>JA</sub>	Thermal Resistance	SOT-353 (Note 1) SOT-553	350 496	°C/W
P <sub>D</sub>	Power Dissipation in Still Air at 85°C	SOT-353 SOT-553	186 135	mW
MSL	Moisture Sensitivity	Level 1		
F <sub>R</sub>	Flammability Rating	Oxygen Index: 28 to 34	UL 94 V-0 @ 0.125 in	
ESD	ESD Classification	Human Body Model (Note 2) Machine Model (Note 3) Charged Device Model (Note 4)	2000 200 N/A	V
I <sub>LATCHUP</sub>	Latchup Performance Above V <sub>CC</sub> and Below GND at 125°C (Note 5)	±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 with no air flow.
2. Tested to EIA/JESD22-A114-A, rated to EIA/JESD22-A114-B.
3. Tested to EIA/JESD22-A115-A, rated to EIA/JESD22-A115-A.
4. Tested to JESD22-C101-A.
5. Tested to EIA/JESD78.



# NL17SZ08

## AC ELECTRICAL CHARACTERISTICS $t_R = t_F = 3.0$ ns

Symbol	Parameter	Condition	V <sub>CC</sub> (V)	T <sub>A</sub> = 25°C			-55°C ≤ T <sub>A</sub> ≤ 125°C		Units
				Min	Typ	Max	Min	Max	
t <sub>PLH</sub> t <sub>PHL</sub>	Propagation Delay (Figure 3 and 4)	R <sub>L</sub> = 1 MΩ, C <sub>L</sub> = 15 pF	1.65	2.0	6.3	12	2.0	12.7	ns
		R <sub>L</sub> = 1 MΩ, C <sub>L</sub> = 15 pF	1.8	2.0	6.2	10	2.0	10.5	
		R <sub>L</sub> = 1 MΩ, C <sub>L</sub> = 15 pF	2.5 ± 0.2	0.8	3.4	7.0	0.8	7.5	
		R <sub>L</sub> = 1 MΩ, C <sub>L</sub> = 15 pF	3.3 ± 0.3	0.5	2.6	4.7	0.5	5.0	
		R <sub>L</sub> = 500 Ω, C <sub>L</sub> = 50 pF		1.5	3.3	5.2	1.5	5.5	
		R <sub>L</sub> = 1 MΩ, C <sub>L</sub> = 15 pF	5.0 ± 0.5	0.5	2.2	4.1	0.5	4.4	
		R <sub>L</sub> = 500 Ω, C <sub>L</sub> = 50 pF		0.8	2.7	4.5	0.8	4.8	

## CAPACITIVE CHARACTERISTICS

Symbol	Parameter	Condition	Typical	Units
C <sub>IN</sub>	Input Capacitance	V <sub>CC</sub> = 5.5 V, V <sub>I</sub> = 0 V or V <sub>CC</sub>	> 4.0	pF
C <sub>PD</sub>	Power Dissipation Capacitance (Note 6)	10 MHz, V <sub>CC</sub> = 3.3 V, V <sub>I</sub> = 0 V or V <sub>CC</sub>	25	pF
		10 MHz, V <sub>CC</sub> = 5.5 V, V <sub>I</sub> = 0 V or V <sub>CC</sub>	30	

6. C<sub>PD</sub> is defined as the value of the internal equivalent capacitance which is calculated from the 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<sub>PD</sub> is used to determine the no-load dynamic power consumption;  $P_D = C_{PD} \cdot V_{CC}^2 \cdot f_{in} + I_{CC} \cdot V_{CC}$ .

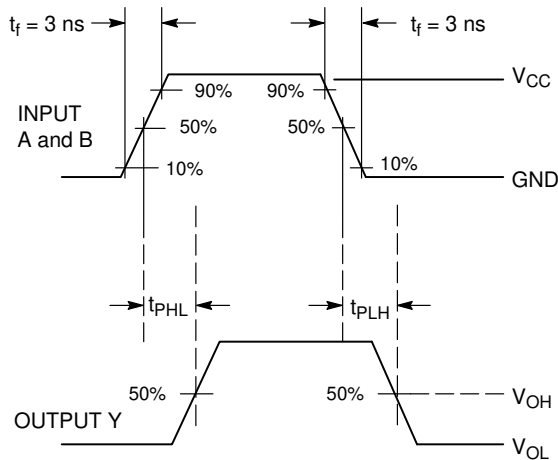
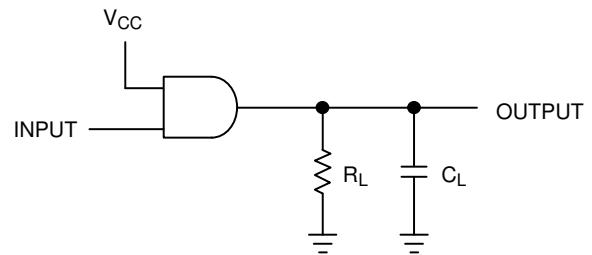


Figure 3. Switching Waveform



A 1-MHz square input wave is recommended for propagation delay tests.

Figure 4. Test Circuit

## DEVICE ORDERING INFORMATION

Device Order Number	Package Type	Tape and Reel Size†
NL17SZ08DFT2G	SC-88A/SC-70-5/SOT-353 (Pb-Free)	3000 / Tape & Reel
NLV17SZ08DFT2G*	SC-88A/SC-70-5/SOT-353 (Pb-Free)	3000 / Tape & Reel
NL17SZ08XV5T2G	SOT-553 (Pb-Free)	4000 / Tape & Reel
NL17SZ08P5T5G	SOT-953 (Pb-Free)	8000 / Tape & Reel

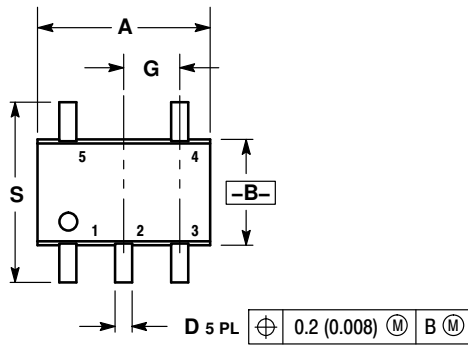
†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

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

# NL17SZ08

## PACKAGE DIMENSIONS

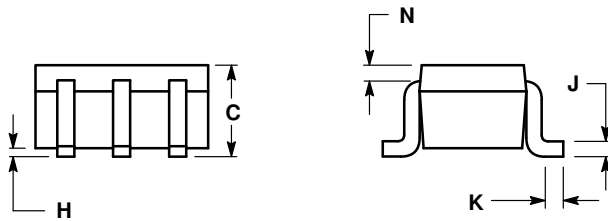
SC-88A (SC-70-5/SOT-353)  
CASE 419A-02  
ISSUE L



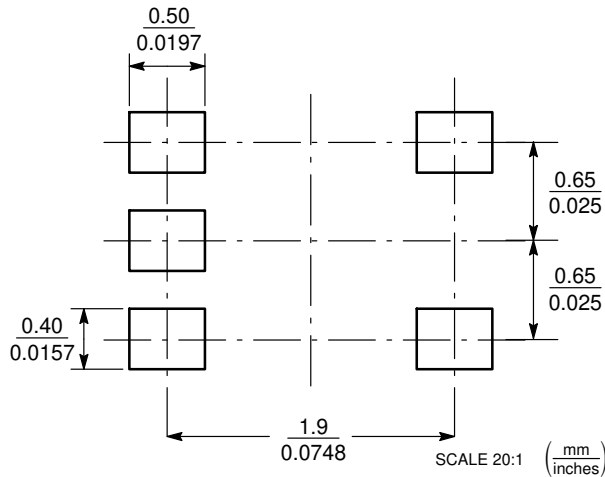
NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. 419A-01 OBSOLETE. NEW STANDARD 419A-02.
4. DIMENSIONS A AND B DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.071	0.087	1.80	2.20
B	0.045	0.053	1.15	1.35
C	0.031	0.043	0.80	1.10
D	0.004	0.012	0.10	0.30
G	0.026 BSC		0.65 BSC	
H	---	0.004	---	0.10
J	0.004	0.010	0.10	0.25
K	0.004	0.012	0.10	0.30
N	0.008 REF		0.20 REF	
S	0.079	0.087	2.00	2.20



### SOLDER FOOTPRINT\*

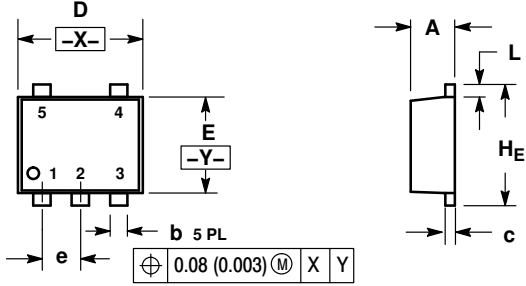


\*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

# NL17SZ08

## PACKAGE DIMENSIONS

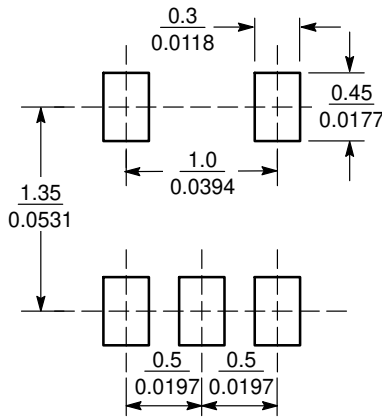
SOT-553, 5 LEAD  
 XV5 SUFFIX  
 CASE 463B  
 ISSUE C



- NOTES:  
 1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.  
 2. CONTROLLING DIMENSION: MILLIMETERS  
 3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.

DIM	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.50	0.55	0.60	0.020	0.022	0.024
b	0.17	0.22	0.27	0.007	0.009	0.011
c	0.08	0.13	0.18	0.003	0.005	0.007
D	1.55	1.60	1.65	0.061	0.063	0.065
E	1.15	1.20	1.25	0.045	0.047	0.049
e	0.50 BSC			0.020 BSC		
L	0.10	0.20	0.30	0.004	0.008	0.012
HE	1.55	1.60	1.65	0.061	0.063	0.065

### RECOMMENDED SOLDERING FOOTPRINT\*



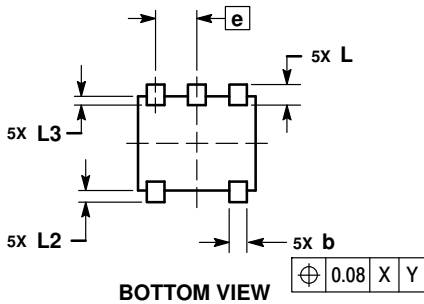
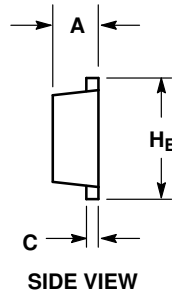
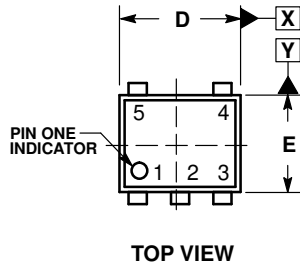
SCALE 20:1 (mm/inches)

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

# NL17SZ08

## PACKAGE DIMENSIONS

**SOT-953**  
CASE 527AE  
ISSUE E

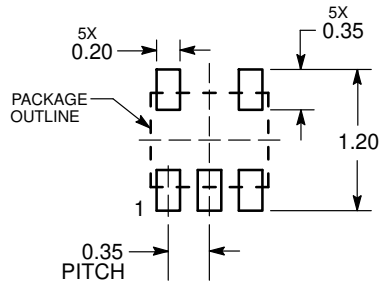


**NOTES:**

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF THE BASE MATERIAL.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS.

MILLIMETERS			
DIM	MIN	NOM	MAX
A	0.34	0.37	0.40
b	0.10	0.15	0.20
C	0.07	0.12	0.17
D	0.95	1.00	1.05
E	0.75	0.80	0.85
e	0.35 BSC		
He	0.95	1.00	1.05
L	0.175 REF		
L2	0.05	0.10	0.15
L3	---	---	0.15

**SOLDERING FOOTPRINT\***



DIMENSIONS: MILLIMETERS

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