

# Single Non-Inverting Buffer with Schmitt Trigger

## NL17SZ17

The NL17SZ17 is a single Non-inverting Schmitt Trigger Buffer in tiny footprint packages.

### Features

- Designed for 1.65 V to 5.5 V  $V_{CC}$  Operation
- 3.7 ns  $t_{PD}$  at  $V_{CC} = 5$  V (typ)
- Input/Output Overvoltage Tolerant up to 5.5 V
- $I_{OFF}$  Supports Partial Power Down Protection
- Source/Sink 24 mA at 3.0 V
- Available in SC-88A, SC-74A, SOT-553, SOT-953 and UDFN6 Packages
- Chip Complexity < 100 FETs
- 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

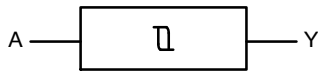
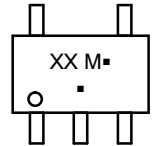


Figure 1. Logic Symbol

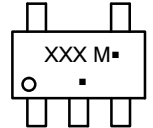
### MARKING DIAGRAMS



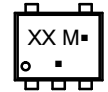
SC-88A  
DF SUFFIX  
CASE 419A



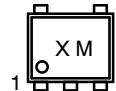
SC-74A  
DBV SUFFIX  
CASE 318BQ



SOT-553  
XV5 SUFFIX  
CASE 463B



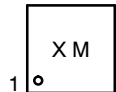
SOT-953  
P5 SUFFIX  
CASE 527AE



UDFN6  
1.45 x 1.0  
CASE 517AQ



UDFN6  
1.0 x 1.0  
CASE 517BX



XX = 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.

### ORDERING INFORMATION

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

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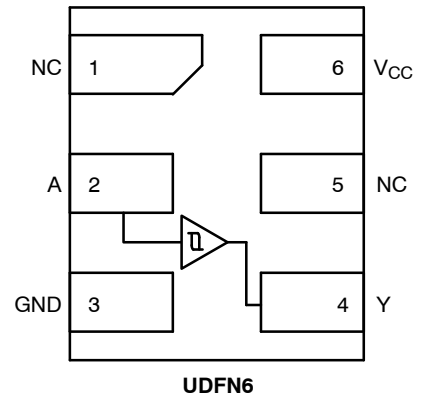
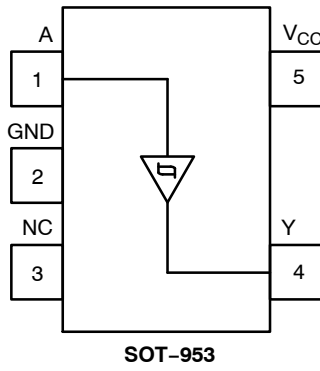
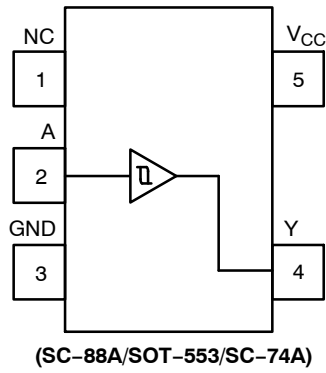


Figure 2. Pinout (Top View)

## PIN ASSIGNMENT (SC-88A/SOT-553/SC-74A)

| Pin | Function        |
|-----|-----------------|
| 1   | NC              |
| 2   | A               |
| 3   | GND             |
| 4   | Y               |
| 5   | V <sub>CC</sub> |

## PIN ASSIGNMENT (SOT-953)

| Pin | Function        |
|-----|-----------------|
| 1   | A               |
| 2   | GND             |
| 3   | NC              |
| 4   | Y               |
| 5   | V <sub>CC</sub> |

## PIN ASSIGNMENT (UDFN)

| Pin | Function        |
|-----|-----------------|
| 1   | NC              |
| 2   | A               |
| 3   | GND             |
| 4   | Y               |
| 5   | NC              |
| 6   | V <sub>CC</sub> |

## FUNCTION TABLE

| Input | Output |
|-------|--------|
| A     | Y      |
| L     | L      |
| H     | H      |

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## MAXIMUM RATINGS

| Symbol                              | Characteristics  | Value   | Unit                            |      |
|-------------------------------------|--|---|---------------------------------|------|
| V <sub>CC</sub>                     | DC Supply Voltage (NLV)  | -0.5 to +7.0<br>-0.5 to +6.5                                  | V                               |      |
| V <sub>IN</sub>                     | DC Input Voltage (NLV)   | -0.5 to +7.0<br>-0.5 to +6.5                                  | V                               |      |
| V <sub>OUT</sub>                    | DC Output Voltage (NLV)<br>Active-Mode (High or Low State)<br>Tri-State Mode (Note 1)<br>Power-Down Mode (V <sub>CC</sub> = 0 V)                       | -0.5 to V <sub>CC</sub> + 0.5<br>-0.5 to +7.0<br>-0.5 to +7.0 | V                               |      |
|                                     | DC Output Voltage (NL17SZ17P5T5G-L22088 Only)  | -0.5 to V <sub>CC</sub> + 0.5                                 |                                 |      |
|                                     | DC Output Voltage (NL17SZ17P5T5G-L22088 Only)<br>Active-Mode (High or Low State)<br>Tri-State Mode (Note 1)<br>Power-Down Mode (V <sub>CC</sub> = 0 V) | -0.5 to V <sub>CC</sub> + 0.5<br>-0.5 to +6.5<br>-0.5 to +6.5 |                                 |      |
| I <sub>IK</sub>                     | DC Input Diode Current<br>V <sub>IN</sub> < GND  | -50   | mA                              |      |
| I <sub>OK</sub>                     | DC Output Diode Current<br>V <sub>OUT</sub> < GND  | -50   | mA                              |      |
|                                     | DC Output Diode Current (NL17SZ17P5T5G-L22088 Only)  | ±50   |                                 |      |
| I <sub>OUT</sub>                    | DC Output Source/Sink Current  | ±50   | mA                              |      |
| I <sub>CC</sub> or I <sub>GND</sub> | DC Supply Current per Supply Pin or Ground 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 secs   | 260   | °C                              |      |
| T <sub>J</sub>                      | Junction Temperature Under Bias  | +150  | °C                              |      |
| θ <sub>JA</sub>                     | Thermal Resistance (Note 2)  | SC-88A<br>SC-74A<br>SOT-553<br>SOT-953<br>UDFN6               | 377<br>320<br>324<br>254<br>154 | °C/W |
| P <sub>D</sub>                      | Power Dissipation in Still Air   | SC-88A<br>SC-74A<br>SOT-553<br>SOT-953<br>UDFN6               | 332<br>390<br>386<br>491<br>812 | mW   |
| MSL                                 | Moisture Sensitivity   | Level 1   | -                               |      |
| F <sub>R</sub>                      | Flammability Rating<br>Oxygen Index: 28 to 34  | UL 94 V-0 @ 0.125 in  | -                               |      |
| V <sub>ESD</sub>                    | ESD Withstand Voltage (Note 3)<br>Human Body Model<br>Charged Device Model   | 2000<br>1000  | V                               |      |
| I <sub>Latchup</sub>                | Latchup Performance (Note 4)   | ±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-1 inch, 2 ounce copper trace no air flow per JESD51-7.
3. HBM tested to ANSI/ESDA/JEDEC JS-001-2017. CDM tested to EIA/JESD22-C101-F. JEDEC recommends that ESD qualification to EIA/JESD22-A115-A (Machine Model) be discontinued per JEDEC/JEP172A.
4. Tested to EIA/JESD78 Class II.

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## RECOMMENDED OPERATING CONDITIONS

| Symbol     | Characteristics                | Min  | Max              | Unit   |      |
|------------|--------------------------------|--|------------------|--|------|
| $V_{CC}$   | Positive DC Supply Voltage     | 1.65   | 5.5              | V  |      |
| $V_{IN}$   | DC Input Voltage               | 0  | 5.5              | V  |      |
| $V_{OUT}$  | DC Output Voltage              | Active-Mode (High or Low State)<br>Tri-State Mode (Note 1)<br>Power-Down Mode ( $V_{CC} = 0$ V)                    | 0<br>0<br>0      | $V_{CC}$<br>5.5<br>5.5                       | V    |
|            | DC Output Voltage              | (NL17SZ17P5T5G-L22088 Only)  | 0                | $V_{CC}$                                     |      |
| $T_A$      | Operating Temperature Range    | -55  | +125             | °C   |      |
| $t_r, t_f$ | Input Rise and Fall Time (NLV) | $V_{CC} = 3.0$ V to 3.6 V<br>$V_{CC} = 4.5$ V to 5.5 V   | 0<br>0           | No Limit<br>No Limit                         | ns/V |
|            | Input Rise and Fall Time       | $V_{CC} = 1.65$ V to 1.95 V<br>$V_{CC} = 2.3$ V to 2.7 V<br>$V_{CC} = 3.0$ V to 3.6 V<br>$V_{CC} = 4.5$ V to 5.5 V | 0<br>0<br>0<br>0 | No Limit<br>No Limit<br>No Limit<br>No Limit |      |

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.

## DC ELECTRICAL CHARACTERISTICS

| Symbol   | Parameter   | Condition | $V_{CC}$<br>(V) | $T_A = 25^\circ\text{C}$ |      |      | $-55^\circ\text{C} \leq T_A \leq 125^\circ\text{C}$ |      | Units |   |
|----------|---|-----------|-----------------|--------------------------|------|------|---|------|-------|---|
|          |   |           |                 | Min                      | Typ  | Max  | Min   | Max  |       |   |
| $V_{T+}$ | Positive Input Threshold Voltage (NLV and NL17SZ17P5T5G-L22088) |           | 1.65            | 0.6                      | 1.0  | 1.4  | 0.6   | 1.4  | V     |   |
|          |   |           | 2.3             | 1.0                      | 1.5  | 1.8  | 1.0   | 1.8  |       |   |
|          |   |           | 2.7             | 1.2                      | 1.7  | 2.0  | 1.2   | 2.0  |       |   |
|          |   |           | 3.0             | 1.3                      | 1.9  | 2.2  | 1.3   | 2.2  |       |   |
|          |   |           | 4.5             | 1.9                      | 2.7  | 3.1  | 1.9   | 3.1  |       |   |
|          |   |           | 5.5             | 2.2                      | 3.3  | 3.6  | 2.2   | 3.6  |       |   |
|          | Positive Input Threshold Voltage                                |           |                 | 1.65                     | -    | 1.0  | 1.4   | -    | 1.4   | V |
|          |   |           |                 | 2.3                      | -    | 1.5  | 1.8   | -    | 1.8   |   |
|          |   |           |                 | 2.7                      | -    | 1.7  | 2.0   | -    | 2.0   |   |
|          |   |           |                 | 3.0                      | -    | 1.9  | 2.2   | -    | 2.2   |   |
|          |   |           |                 | 4.5                      | -    | 2.7  | 3.1   | -    | 3.1   |   |
|          |   |           |                 | 5.5                      | -    | 3.3  | 3.6   | -    | 3.6   |   |
| $V_{T-}$ | Negative Input Threshold Voltage (NLV and NL17SZ17P5T5G-L22088) |           | 1.65            | 0.2                      | 0.5  | 0.8  | 0.2   | 0.8  | V     |   |
|          |   |           | 2.3             | 0.4                      | 0.75 | 1.15 | 0.4   | 1.15 |       |   |
|          |   |           | 2.7             | 0.5                      | 0.87 | 1.4  | 0.5   | 1.4  |       |   |
|          |   |           | 3.0             | 0.6                      | 1.0  | 1.5  | 0.6   | 1.5  |       |   |
|          |   |           | 4.5             | 1.0                      | 1.5  | 2.0  | 1.0   | 2.0  |       |   |
|          |   |           | 5.5             | 1.2                      | 1.9  | 2.3  | 1.2   | 2.3  |       |   |
|          | Negative Input Threshold Voltage                                |           |                 | 1.65                     | 0.2  | 0.5  | -   | 0.2  | -     | V |
|          |   |           |                 | 2.3                      | 0.4  | 0.75 | -   | 0.4  | -     |   |
|          |   |           |                 | 2.7                      | 0.5  | 0.87 | -   | 0.5  | -     |   |
|          |   |           |                 | 3.0                      | 0.6  | 1.0  | -   | 0.6  | -     |   |
|          |   |           |                 | 4.5                      | 1.0  | 1.5  | -   | 1.0  | -     |   |
|          |   |           |                 | 5.5                      | 1.2  | 1.9  | -   | 1.2  | -     |   |
| $V_H$    | Input Hysteresis Voltage  |           | 1.65            | 0.1                      | 0.48 | 0.9  | 0.1   | 0.9  | V     |   |
|          |   |           | 2.3             | 0.25                     | 0.75 | 1.1  | 0.25  | 1.1  |       |   |
|          |   |           | 2.7             | 0.3                      | 0.83 | 1.15 | 0.3   | 1.15 |       |   |
|          |   |           | 3.0             | 0.4                      | 0.93 | 1.2  | 0.4   | 1.2  |       |   |
|          |   |           | 4.5             | 0.6                      | 1.2  | 1.5  | 0.6   | 1.5  |       |   |
|          |   |           | 5.5             | 0.7                      | 1.4  | 1.7  | 0.7   | 1.7  |       |   |

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## DC ELECTRICAL CHARACTERISTICS (continued)

| Symbol           | Parameter   | Condition  | V <sub>CC</sub><br>(V) | T <sub>A</sub> = 25°C |                 |      | -55°C ≤ T <sub>A</sub> ≤ 125°C |      | Units |
|------------------|---|--|------------------------|-----------------------|-----------------|------|--------------------------------|------|-------|
|                  |   |  |                        | Min                   | Typ             | Max  | Min                            | Max  |       |
| V <sub>OH</sub>  | High-Level Output Voltage                             | V <sub>IN</sub> = V <sub>IH</sub> or V <sub>IL</sub> | 1.65 to 5.5            | V <sub>CC</sub> - 0.1 | V <sub>CC</sub> | -    | V <sub>CC</sub> - 0.1          | -    | V     |
|                  |   | I <sub>OH</sub> = -100 μA                            | 1.65                   | 1.29                  | 1.4             | -    | 1.29                           | -    |       |
|                  |   | I <sub>OH</sub> = -4 mA                              | 2.3                    | 1.9                   | 2.1             | -    | 1.9                            | -    |       |
|                  |   | I <sub>OH</sub> = -8 mA                              | 2.7                    | 2.2                   | 2.4             | -    | 2.2                            | -    |       |
|                  |   | I <sub>OH</sub> = -12 mA                             | 3.0                    | 2.4                   | 2.7             | -    | 2.4                            | -    |       |
|                  |   | I <sub>OH</sub> = -16 mA                             | 3.0                    | 2.3                   | 2.5             | -    | 2.3                            | -    |       |
|                  |   | I <sub>OH</sub> = -24 mA                             | 4.5                    | 3.8                   | 4.0             | -    | 3.8                            | -    |       |
| V <sub>OL</sub>  | Low-Level Output Voltage                              | V <sub>IN</sub> = V <sub>IH</sub> or V <sub>IL</sub> | 1.65 to 5.5            | -                     | -               | 0.1  | -                              | 0.1  | V     |
|                  |   | I <sub>OL</sub> = 100 μA                             | 1.65                   | -                     | 0.08            | 0.24 | -                              | 0.24 |       |
|                  |   | I <sub>OL</sub> = 4 mA                               | 2.3                    | -                     | 0.2             | 0.3  | -                              | 0.3  |       |
|                  |   | I <sub>OL</sub> = 8 mA                               | 2.7                    | -                     | 0.22            | 0.4  | -                              | 0.4  |       |
|                  |   | I <sub>OL</sub> = 12 mA                              | 3.0                    | -                     | 0.28            | 0.4  | -                              | 0.4  |       |
|                  |   | I <sub>OL</sub> = 16 mA                              | 3.0                    | -                     | 0.38            | 0.55 | -                              | 0.55 |       |
|                  |   | I <sub>OL</sub> = 24 mA                              | 4.5                    | -                     | 0.42            | 0.55 | -                              | 0.55 |       |
| I <sub>IN</sub>  | Input Leakage Current                                 | V <sub>IN</sub> = 5.5 V or GND                       | 1.65 to 5.5            | -                     | -               | ±0.1 | -                              | ±1.0 | μA    |
| I <sub>OFF</sub> | Power Off Leakage Current                             | V <sub>IN</sub> = 5.5 V or V <sub>OUT</sub> = 5.5 V  | 0                      | -                     | -               | 1.0  | -                              | 10   | μA    |
|                  | Power Off Leakage Current (NL17SZ17P5T5G-L22088 Only) | V <sub>IN</sub> = 5.5 V                              | 0                      | -                     | -               | 1.0  | -                              | 10   | μA    |
| I <sub>CC</sub>  | Quiescent Supply Current                              | V <sub>IN</sub> = V <sub>CC</sub> or GND             | 5.5                    | -                     | -               | 1.0  | -                              | 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.

## AC ELECTRICAL CHARACTERISTICS

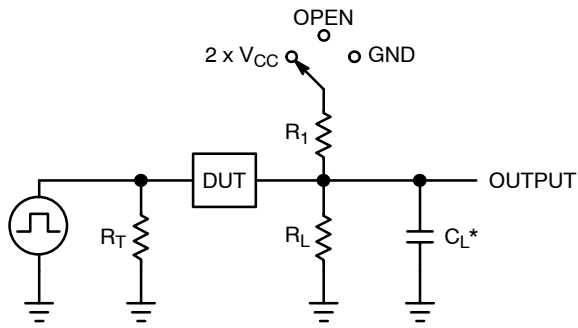
| Symbol                                 | Parameter                                   | Condition                                      | V <sub>CC</sub><br>(V) | T <sub>A</sub> = 25°C |     |     | -55°C ≤ T <sub>A</sub> ≤ 125°C |      | Units |
|--|---|--|------------------------|-----------------------|-----|-----|--------------------------------|------|-------|
|  |   |  |                        | Min                   | Typ | Max | Min                            | Max  |       |
| t <sub>PLH</sub> ,<br>t <sub>PHL</sub> | Propagation Delay, A to Y (Figures 3 and 4) | R <sub>L</sub> = 1 MΩ, C <sub>L</sub> = 15 pF  | 1.65 to 1.95           | -                     | 9.1 | 15  | -                              | 15.6 | ns    |
|  |   | R <sub>L</sub> = 1 MΩ, C <sub>L</sub> = 15 pF  | 2.3 to 2.7             | -                     | 5.0 | 9.0 | -                              | 9.5  |       |
|  |   | R <sub>L</sub> = 1 MΩ, C <sub>L</sub> = 15 pF  | 3.0 to 3.6             | -                     | 3.7 | 6.3 | -                              | 6.5  |       |
|  |   | R <sub>L</sub> = 500 Ω, C <sub>L</sub> = 50 pF |                        | -                     | 4.4 | 7.2 | -                              | 7.5  |       |
|  |   | R <sub>L</sub> = 1 MΩ, C <sub>L</sub> = 15 pF  | 4.5 to 5.5             | -                     | 3.1 | 5.2 | -                              | 5.5  |       |
|  |   | R <sub>L</sub> = 500 Ω, C <sub>L</sub> = 50 pF |                        | -                     | 3.7 | 5.9 | -                              | 6.2  |       |

## CAPACITIVE CHARACTERISTICS

| Symbol           | Parameter                              | Condition   | Typical | Units |
|------------------|--|---|---------|-------|
| C <sub>IN</sub>  | Input Capacitance                      | V <sub>CC</sub> = 5.5 V, V <sub>IN</sub> = 0 V or V <sub>CC</sub>         | 2.5     | pF    |
| C <sub>OUT</sub> | Output Capacitance                     | V <sub>CC</sub> = 5.5 V, V <sub>IN</sub> = 0 V or V <sub>CC</sub>         | 2.5     | pF    |
| C <sub>PD</sub>  | Power Dissipation Capacitance (Note 5) | 10 MHz, V <sub>CC</sub> = 3.3 V, V <sub>IN</sub> = 0 V or V <sub>CC</sub> | 9       | pF    |
|                  |  | 10 MHz, V <sub>CC</sub> = 5.5 V, V <sub>IN</sub> = 0 V or V <sub>CC</sub> | 11      |       |

5. 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<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>.

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

**Figure 3. Test Circuit**

| Test                | Switch Position   | $C_L$ , pF                   | $R_L$ , $\Omega$ | $R_1$ , $\Omega$ |
|---------------------|-------------------|------------------------------|------------------|------------------|
| $t_{PLH} / t_{PHL}$ | Open              | See AC Characteristics Table |                  |                  |
| $t_{PLZ} / t_{PZL}$ | $2 \times V_{CC}$ | 50                           | 500              | 500              |
| $t_{PHZ} / t_{PZH}$ | GND               | 50                           | 500              | 500              |

X = Don't Care



**Figure 4. Switching Waveforms**

| $V_{CC}$ , V | $V_{mi}$ , V | $V_{mo}$ , V          |   | $V_Y$ , V |
|--------------|--------------|-----------------------|---|-----------|
|              |              | $t_{PLH}$ , $t_{PHL}$ | $t_{PZL}$ , $t_{PLZ}$ , $t_{PZH}$ , $t_{PHZ}$ |           |
| 1.65 to 1.95 | $V_{CC}/2$   | $V_{CC}/2$            | $V_{CC}/2$                                    | 0.15      |
| 2.3 to 2.7   | $V_{CC}/2$   | $V_{CC}/2$            | $V_{CC}/2$                                    | 0.15      |
| 3.0 to 3.6   | $V_{CC}/2$   | $V_{CC}/2$            | $V_{CC}/2$                                    | 0.3       |
| 4.5 to 5.5   | $V_{CC}/2$   | $V_{CC}/2$            | $V_{CC}/2$                                    | 0.3       |

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## DEVICE ORDERING INFORMATION

| Device                             | Packages                | Specific Device Code   | Pin 1 Orientation (See below) | Shipping <sup>†</sup> |
|------------------------------------|-------------------------|------------------------|-------------------------------|-----------------------|
| NL17SZ17DFT2G                      | SC-88A                  | LX                     | Q4                            | 3000 / Tape & Reel    |
| NLV17SZ17DFT2G*                    | SC-88A                  | LX                     | Q4                            | 3000 / Tape & Reel    |
| NL17SZ17DFT2G-F22038**             | SC-88A                  | LX                     | Q4                            | 3000 / Tape & Reel    |
| NL17SZ17DBVT1G                     | SC-74A                  | AM                     | Q4                            | 3000 / Tape & Reel    |
| NL17SZ17XV5T2G                     | SOT-553                 | LX                     | Q4                            | 4000 / Tape & Reel    |
| NL17SZ17XV5T2G-L22087**            | SOT-553                 | LX                     | Q4                            | 4000 / Tape & Reel    |
| NL17SZ17P5T5G                      | SOT-953                 | J<br>(Rotated 180° CW) | Q2                            | 8000 / Tape & Reel    |
| NL17SZ17P5T5G-L22088               | SOT-953                 | J<br>(Rotated 180° CW) | Q2                            | 8000 / Tape & Reel    |
| NL17SZ17MU1TCG<br>(In Development) | UDFN6, 1.45 x 1.0, 0.5P | TBD                    | Q4                            | 3000 / Tape & Reel    |
| NL17SZ17MU3TCG<br>(In Development) | UDFN6, 1.0 x 1.0, 0.35P | TBD                    | Q4                            | 3000 / Tape & Reel    |

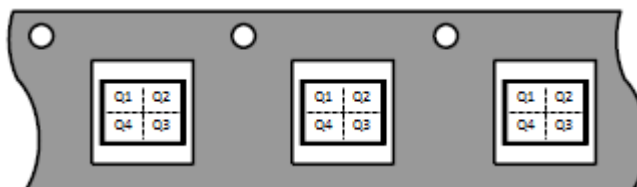
†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

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

\*\*Please refer to NLV specifications for this device.

### Pin 1 Orientation in Tape and Reel

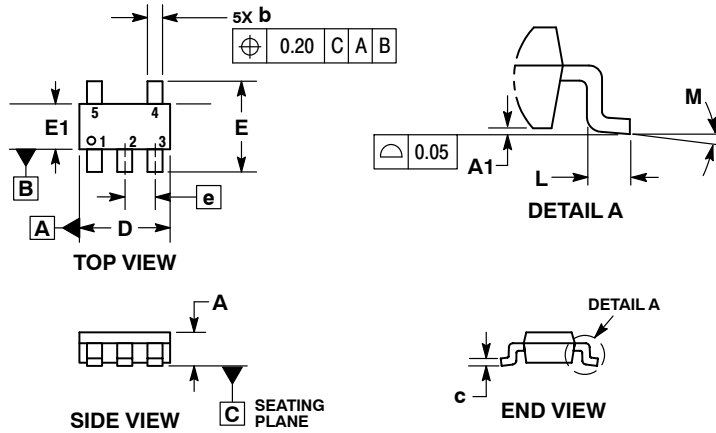
Direction of Feed



# NL17SZ17

## PACKAGE DIMENSIONS

**SC-74A**  
CASE 318BQ  
ISSUE B

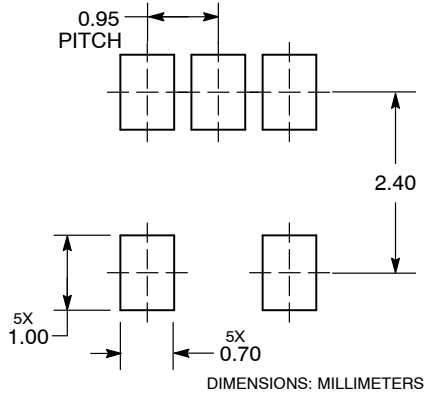


**NOTES:**

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
4. DIMENSIONS A AND B DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS. MOLD FLASH, PROTRUSIONS, OR GATE BURRS SHALL NOT EXCEED 0.15 PER SIDE.

| DIM | MILLIMETERS |      |
|-----|-------------|------|
|     | MIN         | MAX  |
| A   | 0.90        | 1.10 |
| A1  | 0.01        | 0.10 |
| b   | 0.25        | 0.50 |
| c   | 0.10        | 0.26 |
| D   | 2.85        | 3.15 |
| E   | 2.50        | 3.00 |
| E1  | 1.35        | 1.65 |
| e   | 0.95 BSC    |      |
| L   | 0.20        | 0.60 |
| M   | 0°          | 10°  |

**RECOMMENDED  
SOLDERING FOOTPRINT\***



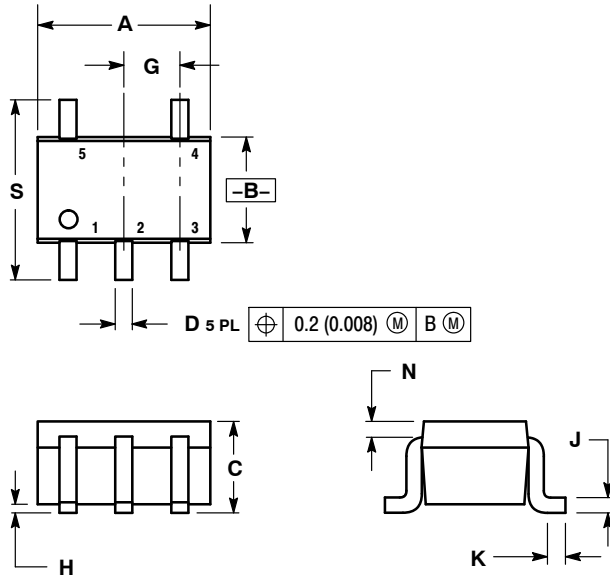
\*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.



# NL17SZ17

## PACKAGE DIMENSIONS

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

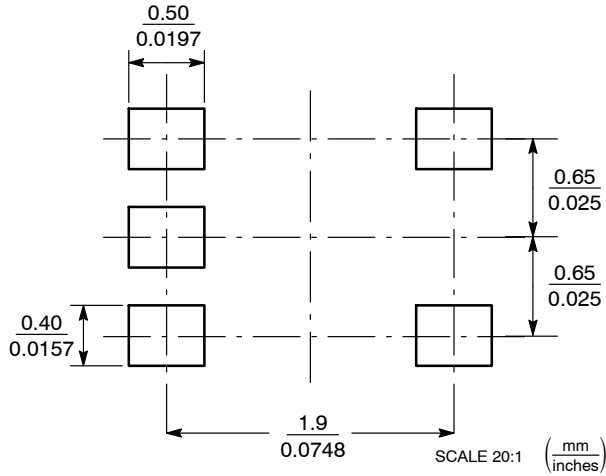


**NOTES:**

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



**STYLE 1:**

- PIN 1. BASE
- 2. EMITTER
- 3. BASE
- 4. COLLECTOR
- 5. COLLECTOR

**STYLE 2:**

- PIN 1. ANODE
- 2. EMITTER
- 3. BASE
- 4. COLLECTOR
- 5. CATHODE

**STYLE 3:**

- PIN 1. ANODE 1
- 2. N/C
- 3. ANODE 2
- 4. CATHODE 2
- 5. CATHODE 1

**STYLE 4:**

- PIN 1. SOURCE 1
- 2. DRAIN 1/2
- 3. SOURCE 1
- 4. GATE 1
- 5. GATE 2

**STYLE 5:**

- PIN 1. CATHODE
- 2. COMMON ANODE
- 3. CATHODE 2
- 4. CATHODE 3
- 5. CATHODE 4

**STYLE 6:**

- PIN 1. EMITTER 2
- 2. BASE 2
- 3. EMITTER 1
- 4. COLLECTOR
- 5. COLLECTOR 2/BASE 1

**STYLE 7:**

- PIN 1. BASE
- 2. EMITTER
- 3. BASE
- 4. COLLECTOR
- 5. COLLECTOR

**STYLE 8:**

- PIN 1. CATHODE
- 2. COLLECTOR
- 3. N/C
- 4. BASE
- 5. EMITTER

**STYLE 9:**

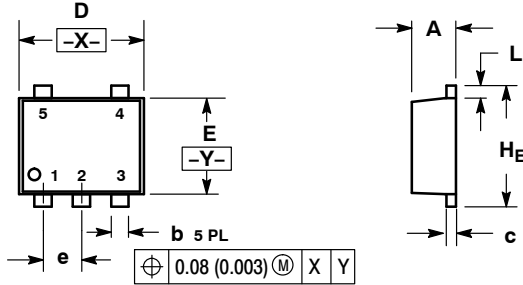
- PIN 1. ANODE
- 2. CATHODE
- 3. ANODE
- 4. ANODE
- 5. ANODE

Note: Please refer to datasheet for style callout. If style type is not called out in the datasheet refer to the device datasheet pinout or pin assignment.

# NL17SZ17

## PACKAGE DIMENSIONS

### SOT-553, 5 LEAD CASE 463B ISSUE C

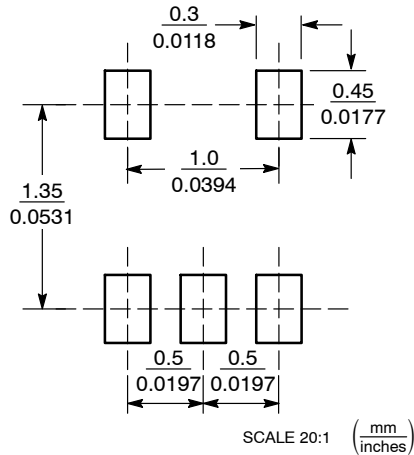


**NOTES:**

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\*



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

**STYLE 1:**

- PIN 1. BASE
- 2. EMITTER
- 3. BASE
- 4. COLLECTOR
- 5. COLLECTOR

**STYLE 2:**

- PIN 1. CATHODE
- 2. COMMON ANODE
- 3. CATHODE 2
- 4. CATHODE 3
- 5. CATHODE 4

**STYLE 3:**

- PIN 1. ANODE 1
- 2. N/C
- 3. ANODE 2
- 4. CATHODE 2
- 5. CATHODE 1

**STYLE 4:**

- PIN 1. SOURCE 1
- 2. DRAIN 1/2
- 3. SOURCE 1
- 4. GATE 1
- 5. GATE 2

**STYLE 5:**

- PIN 1. ANODE
- 2. EMITTER
- 3. BASE
- 4. COLLECTOR
- 5. CATHODE

**STYLE 6:**

- PIN 1. EMITTER 2
- 2. BASE 2
- 3. EMITTER 1
- 4. COLLECTOR 1
- 5. COLLECTOR 2/BASE 1

**STYLE 7:**

- PIN 1. BASE
- 2. EMITTER
- 3. BASE
- 4. COLLECTOR
- 5. COLLECTOR

**STYLE 8:**

- PIN 1. CATHODE
- 2. COLLECTOR
- 3. N/C
- 4. BASE
- 5. EMITTER

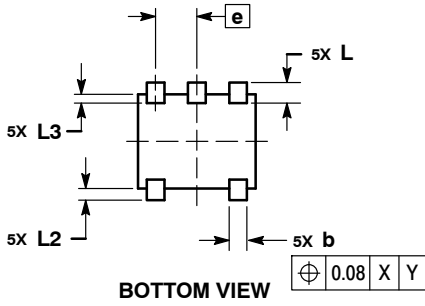
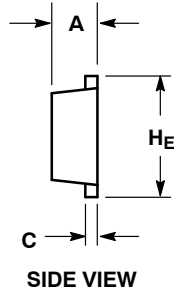
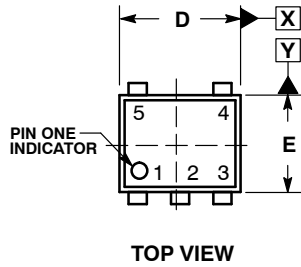
**STYLE 9:**

- PIN 1. ANODE
- 2. CATHODE
- 3. ANODE
- 4. ANODE
- 5. ANODE

# NL17SZ17

## PACKAGE DIMENSIONS

SOT-953  
CASE 527AE  
ISSUE E

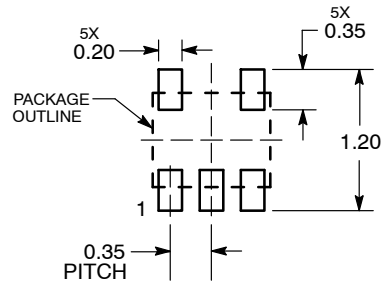


**NOTES:**

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  |      |      |
| H <sub>E</sub> | 0.95      | 1.00 | 1.05 |
| L              | 0.175 REF |      |      |
| L2             | 0.05      | 0.10 | 0.15 |
| L3             | ---       | ---  | 0.15 |

**SOLDERING FOOTPRINT\***



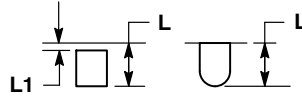
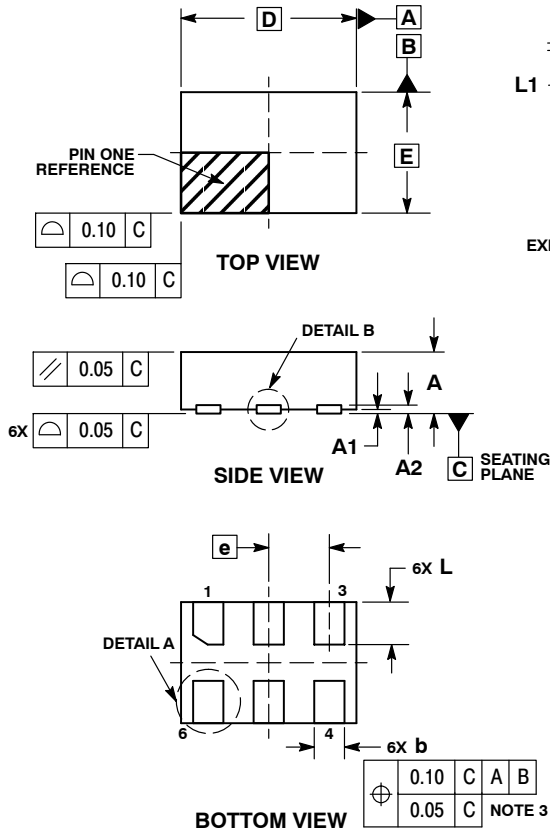
DIMENSIONS: MILLIMETERS

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

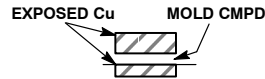
# NL17SZ17

## PACKAGE DIMENSIONS

UDFN6, 1.45x1.0, 0.5P  
CASE 517AQ  
ISSUE O



**DETAIL A**  
OPTIONAL CONSTRUCTIONS



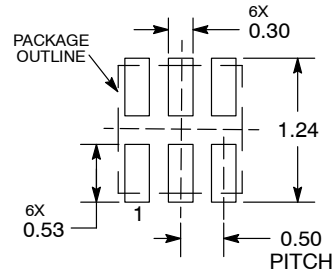
**DETAIL B**  
OPTIONAL CONSTRUCTIONS

**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 0.30 mm FROM THE TERMINAL TIP.

| MILLIMETERS |      |      |
|-------------|------|------|
| DIM         | MIN  | MAX  |
| A           | 0.45 | 0.55 |
| A1          | 0.00 | 0.05 |
| A2          | 0.07 | REF  |
| b           | 0.20 | 0.30 |
| D           | 1.45 | BSC  |
| E           | 1.00 | BSC  |
| e           | 0.50 | BSC  |
| L           | 0.30 | 0.40 |
| L1          | ---  | 0.15 |

### MOUNTING FOOTPRINT



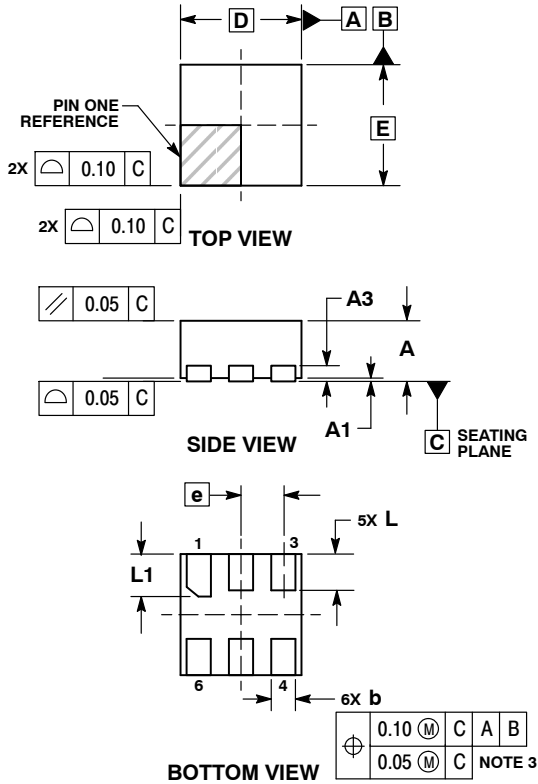
DIMENSIONS: MILLIMETERS

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

# NL17SZ17

## PACKAGE DIMENSIONS

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

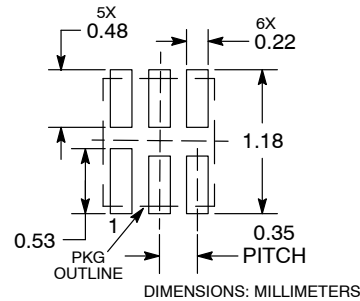


**NOTES:**

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.

| DIM | MILLIMETERS |      |
|-----|-------------|------|
|     | 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 ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

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