

# Dual Schmitt-Trigger Inverter

## NL27WZ14

The NL27WZ14 is a high performance dual inverter with Schmitt-Trigger inputs operating from a 1.65 to 5.5 V supply.

### Features

- Designed for 1.65 V to 5.5 V  $V_{CC}$  Operation
- 3.2 ns  $t_{PD}$  at  $V_{CC} = 5$  V (Typ)
- Inputs/Outputs Overvoltage Tolerant up to 5.5 V
- $I_{OFF}$  Supports Partial Power Down Protection
- Sink 32 mA at 4.5 V
- Available in SC-88, SC-74 and UDFN6 Packages
- Chip Complexity < 100 FETs
- -Q Suffix 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

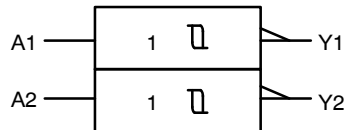
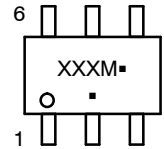


Figure 1. Logic Symbol

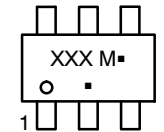


SC-88  
DF SUFFIX  
CASE 419B-02

### MARKING DIAGRAMS



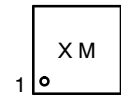
SC-74  
CASE 318F-05



UDFN6  
1.45x1.0, 0.5P  
CASE 517AQ



UDFN6  
1x1, 0.35P  
CASE 517BX



X, XXX = 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 and shipping information in the package dimensions section on page 7 of this data sheet.

# NL27WZ14

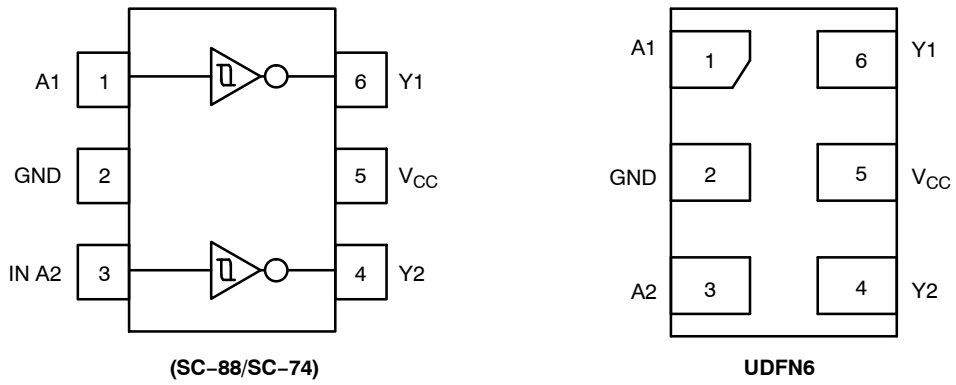


Figure 2. Pinout (Top View)

## PIN ASSIGNMENT

| Pin | Function        |
|-----|-----------------|
| 1   | A1              |
| 2   | GND             |
| 3   | A2              |
| 4   | Y2              |
| 5   | V <sub>CC</sub> |
| 6   | Y1              |

## FUNCTION TABLE

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

# NL27WZ14

## MAXIMUM RATINGS

| Symbol                | Characteristics  | Value  | Units         |
|-----------------------|--|--|---------------|
| $V_{CC}$              | DC Supply Voltage  | -0.5 to +6.5   | V             |
| $V_{IN}$              | DC Input Voltage   | -0.5 to +6.5   | V             |
| $V_{OUT}$             | DC Output Voltage<br>Active-Mode (High or Low State)<br>Tri-State Mode (Note 1)<br>Power-Down Mode ( $V_{CC} = 0$ V) | -0.5 to $V_{CC} + 0.5$<br>-0.5 to +6.5<br>-0.5 to +6.5 | V             |
| $I_{IK}$              | DC Input Diode Current, $V_{IN} < GND$   | -50  | mA            |
| $I_{OK}$              | DC Output Diode Current, $V_{OUT} < GND$   | -50  | mA            |
| $I_{OUT}$             | DC Output Source/Sink Current  | $\pm 50$   | mA            |
| $I_{CC}$ or $I_{GND}$ | DC Supply Current per Supply Pin or Ground Pin   | $\pm 100$  | mA            |
| $T_{STG}$             | Storage Temperature Range  | -65 to +150  | $^{\circ}C$   |
| $T_L$                 | Lead Temperature, 1 mm from Case for 10 secs   | 260  | $^{\circ}C$   |
| $T_J$                 | Junction Temperature under Bias  | +150   | $^{\circ}C$   |
| $\theta_{JA}$         | Thermal Resistance (Note 2)  | SC-88<br>SC-74<br>UDFN6                                | $^{\circ}C/W$ |
| $P_D$                 | Power Dissipation in Still Air   | SC-88<br>SC-74<br>UDFN6                                | mW            |
| MSL                   | Moisture Sensitivity   | Level 1  | -             |
| $F_R$                 | Flameability Rating  | Oxygen Index: 28 to 34<br>UL 94-V-0 @ 0.125 in         | -             |
| $V_{ESD}$             | ESD Withstand Voltage (Note 3)   | Human Body Model<br>Charged Device Model               | 2000<br>1000  |
| $I_{LATCHUP}$         | 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-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.

## RECOMMENDED OPERATING CONDITIONS

| Symbol     | Parameter  | 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<br>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           |
| $T_A$      | Operating Temperature Range  | -55              | +125   | $^{\circ}C$ |
| $t_r, t_f$ | Input Transition Rise or Fall Rate<br>$V_{CC} = 1.65$ 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 | ns          |

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.

# NL27WZ14

## DC ELECTRICAL CHARACTERISTICS

| Symbol           | Parameter   | Condition   | V <sub>CC</sub> (V) | T <sub>A</sub> = 25°C |                 |      | -40°C ≤ T <sub>A</sub> ≤ 85°C |      | -55°C ≤ T <sub>A</sub> ≤ 125°C |      | Unit |
|------------------|---|---|---------------------|-----------------------|-----------------|------|-------------------------------|------|--------------------------------|------|------|
|                  |   |   |                     | Min                   | Typ             | Max  | Min                           | Max  | Min                            | Max  |      |
| V <sub>T+</sub>  | Positive Input Threshold Voltage  |   | 1.65                | -                     | 1.0             | 1.4  | -                             | 1.4  | -                              | 1.4  | V    |
|                  |   |   | 2.3                 | -                     | 1.5             | 1.8  | -                             | 1.8  | -                              | 1.8  |      |
|                  |   |   | 2.7                 | -                     | 1.7             | 2.0  | -                             | 2.0  | -                              | 2.0  |      |
|                  |   |   | 3.0                 | -                     | 1.9             | 2.2  | -                             | 2.2  | -                              | 2.2  |      |
|                  |   |   | 4.5                 | -                     | 2.7             | 3.1  | -                             | 3.1  | -                              | 3.1  |      |
|                  |   |   | 5.5                 | -                     | 3.3             | 3.6  | -                             | 3.6  | -                              | 3.6  |      |
| V <sub>T-</sub>  | Negative Input Threshold Voltage  |   | 1.65                | 0.2                   | 0.5             | -    | 0.2                           | -    | 0.2                            | -    | V    |
|                  |   |   | 2.3                 | 0.4                   | 0.75            | -    | 0.4                           | -    | 0.4                            | -    |      |
|                  |   |   | 2.7                 | 0.5                   | 0.87            | -    | 0.5                           | -    | 0.5                            | -    |      |
|                  |   |   | 3.0                 | 0.6                   | 1.0             | -    | 0.6                           | -    | 0.6                            | -    |      |
|                  |   |   | 4.5                 | 1.0                   | 1.5             | -    | 1.0                           | -    | 1.0                            | -    |      |
|                  |   |   | 5.5                 | 1.2                   | 1.9             | -    | 1.2                           | -    | 1.2                            | -    |      |
| V <sub>H</sub>   | Input Hysteresis Voltage  |   | 1.65                | 0.1                   | 0.48            | 0.9  | 0.1                           | 0.9  | 0.1                            | 0.9  | V    |
|                  |   |   | 2.3                 | 0.25                  | 0.75            | 1.1  | 0.25                          | 1.1  | 0.25                           | 1.1  |      |
|                  |   |   | 2.7                 | 0.3                   | 0.83            | 1.15 | 0.3                           | 1.15 | 0.3                            | 1.15 |      |
|                  |   |   | 3.0                 | 0.4                   | 0.93            | 1.2  | 0.4                           | 1.2  | 0.4                            | 1.2  |      |
|                  |   |   | 4.5                 | 0.6                   | 1.2             | 1.5  | 0.6                           | 1.5  | 0.6                            | 1.5  |      |
|                  |   |   | 5.5                 | 0.7                   | 1.4             | 1.7  | 0.7                           | 1.7  | 0.7                            | 1.7  |      |
| V <sub>OH</sub>  | High-Level Output Voltage<br>V <sub>IN</sub> = V <sub>IH</sub> or V <sub>IL</sub> | I <sub>OH</sub> = -100 μA                           | 1.65 to 5.5         | V <sub>CC</sub> - 0.1 | V <sub>CC</sub> | -    | V <sub>CC</sub> - 0.1         | -    | V <sub>CC</sub> - 0.1          | -    | V    |
|                  |   | I <sub>OH</sub> = -4 mA                             | 1.65                | 1.29                  | 1.52            | -    | 1.29                          | -    | 1.29                           | -    |      |
|                  |   | I <sub>OH</sub> = -8 mA                             | 2.3                 | 1.9                   | 2.1             | -    | 1.9                           | -    | 1.9                            | -    |      |
|                  |   | I <sub>OH</sub> = -12 mA                            | 2.7                 | 2.2                   | 2.4             | -    | 2.2                           | -    | 2.2                            | -    |      |
|                  |   | I <sub>OH</sub> = -16 mA                            | 3.0                 | 2.4                   | 2.7             | -    | 2.4                           | -    | 2.4                            | -    |      |
|                  |   | I <sub>OH</sub> = -24 mA                            | 3.0                 | 2.3                   | 2.5             | -    | 2.3                           | -    | 2.3                            | -    |      |
|                  |   | I <sub>OH</sub> = -32 mA                            | 4.5                 | 3.8                   | 4               | -    | 3.8                           | -    | 3.8                            | -    |      |
| V <sub>OL</sub>  | Low-Level Output Voltage<br>V <sub>IN</sub> = V <sub>IH</sub> or V <sub>IL</sub>  | I <sub>OL</sub> = 100 μA                            | 1.65 to 5.5         | -                     | -               | 0.1  | -                             | 0.1  | -                              | 0.1  | V    |
|                  |   | I <sub>OL</sub> = 4 mA                              | 1.65                | -                     | 0.08            | 0.24 | -                             | 0.24 | -                              | 0.24 |      |
|                  |   | I <sub>OL</sub> = 8 mA                              | 2.3                 | -                     | 0.2             | 0.3  | -                             | 0.3  | -                              | 0.3  |      |
|                  |   | I <sub>OL</sub> = 12 mA                             | 2.7                 | -                     | 0.22            | 0.4  | -                             | 0.4  | -                              | 0.4  |      |
|                  |   | I <sub>OL</sub> = 16 mA                             | 3.0                 | -                     | 0.28            | 0.4  | -                             | 0.4  | -                              | 0.4  |      |
|                  |   | I <sub>OL</sub> = 24 mA                             | 3.0                 | -                     | 0.38            | 0.55 | -                             | 0.55 | -                              | 0.55 |      |
|                  |   | I <sub>OL</sub> = 32 mA                             | 4.5                 | -                     | 0.42            | 0.55 | -                             | 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 | -                              | ±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    | -                             | 10   | -                              | 10   | μA   |
| I <sub>CC</sub>  | Quiescent Supply Current  | V <sub>IN</sub> = 5.5 V or GND                      | 5.5                 | -                     | -               | 1    | -                             | 10   | -                              | 10   | μA   |

# NL27WZ14

## AC ELECTRICAL CHARACTERISTICS

| Symbol                                 | Parameter                                   | Condition                | V <sub>CC</sub> (V)       | T <sub>A</sub> = 25°C |     |     | -40°C ≤ T <sub>A</sub> ≤ 85°C |      | -55°C ≤ T <sub>A</sub> ≤ 125°C |      | Unit |
|--|---|--------------------------|---------------------------|-----------------------|-----|-----|-------------------------------|------|--------------------------------|------|------|
|  |   |                          |                           | Min                   | Typ | Max | Min                           | Max  | Min                            | Max  |      |
| t <sub>PLH</sub> ,<br>t <sub>PHL</sub> | Propagation Delay, A to Y (Figures 3 and 4) | RL = 1 MΩ,<br>CL = 15 pF | 1.65 to 1.95              | -                     | 7.1 | 13  | -                             | 14.5 | -                              | 15.5 | ns   |
|  |   |                          | 2.3 to 2.7                | -                     | 4.3 | 7.4 | -                             | 8.1  | -                              | 9.1  |      |
|  |   | RL = 1 MΩ,<br>CL = 15 pF | 3.0 to 3.6                | -                     | 3.3 | 5   | -                             | 5.5  | -                              | 6.5  |      |
|  |   |                          | 4.5 to 5.5                | -                     | 2.7 | 4.1 | -                             | 4.5  | -                              | 5.5  |      |
|  |   |                          | RL = 500 Ω,<br>CL = 50 pF | 3.0 to 3.6            | -   | 4   | 6                             | -    | 6.6                            | -    |      |
|  |   | 4.5 to 5.5               |                           | -                     | 3.2 | 4.9 | -                             | 5.4  | -                              | 6.4  |      |

## CAPACITIVE CHARACTERISTICS

| Symbol           | Parameter                              | Condition  | Typical    | Unit |
|------------------|--|--|------------|------|
| C <sub>IN</sub>  | Input Capacitance                      | V <sub>CC</sub> = 5.5 V, V <sub>I</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>I</sub> = 0 V or V <sub>CC</sub>   | 4.0        | 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><br>10 MHz, V <sub>CC</sub> = 5.0 V, V <sub>IN</sub> = 0 V or V <sub>CC</sub> | 11<br>12.5 | pF   |

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

# NL27WZ14



$C_L$  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 |                  |                  |
| $t_{PLZ} / t_{PZL}$ | $2 \times V_{CC}$ | -                            | -                | -                |
|                     |                   | See AC Characteristics Table |                  |                  |
| $t_{PHZ} / t_{PZH}$ | GND               | -                            | -                | -                |
|                     |                   | See AC Characteristics Table |                  |                  |

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       |

# NL27WZ14

## ORDERING INFORMATION

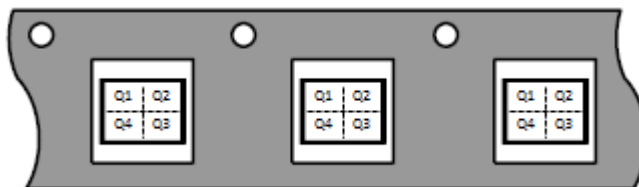
| Device           | Package                 | Specific Device Code | Pin1 Orientation<br>(See below) | Shipping <sup>†</sup> |
|------------------|-------------------------|----------------------|---------------------------------|-----------------------|
| NL27WZ14DFT2G    | SC-88                   | MA                   | Q4                              | 3000 / Tape & Reel    |
| NL27WZ14DFT4G    | SC-88                   | MA                   | Q4                              | 10000 / Tape & Reel   |
| NL27WZ14DFT2G-Q* | SC-88                   | MA                   | Q4                              | 3000 / Tape & Reel    |
| NL27WZ14DBVT1G   | SC-74                   | MA                   | Q4                              | 3000 / Tape & Reel    |
| NL27WZ14MU1TCG   | UDFN6, 1.45 x 1.0, 0.5P | P (Rotated 90° CW)   | Q4                              | 3000 / Tape & Reel    |
| NL27WZ14MU3TCG   | UDFN6, 1.0 x 1.0, 0.35P | 3 (Rotated 90° CW)   | Q4                              | 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.

\*-Q Suffix 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



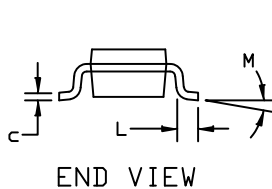
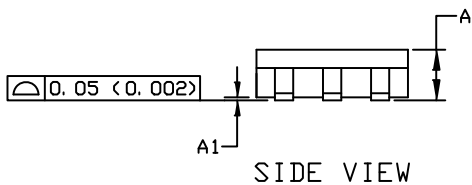
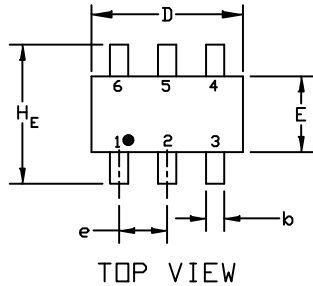
# MECHANICAL CASE OUTLINE PACKAGE DIMENSIONS



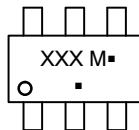
SCALE 2:1

SC-74  
CASE 318F  
ISSUE P

DATE 07 OCT 2021



### GENERIC MARKING DIAGRAM\*



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

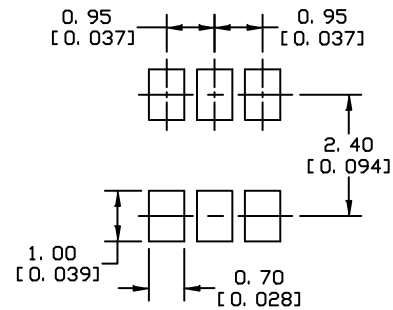
(Note: Microdot may be in either location)

\*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.

### NOTES:

- DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994
- CONTROLLING DIMENSION: INCHES
- MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF THE BASE MATERIAL.

| DIM | MILLIMETERS |      |      | INCHES |       |       |
|-----|-------------|------|------|--------|-------|-------|
|     | MIN.        | NOM. | MAX. | MIN.   | NOM.  | MAX.  |
| A   | 0.90        | 1.00 | 1.10 | 0.035  | 0.039 | 0.043 |
| A1  | 0.01        | 0.06 | 0.10 | 0.001  | 0.002 | 0.004 |
| b   | 0.25        | 0.37 | 0.50 | 0.010  | 0.015 | 0.020 |
| c   | 0.10        | 0.18 | 0.26 | 0.004  | 0.007 | 0.010 |
| D   | 2.90        | 3.00 | 3.10 | 0.114  | 0.118 | 0.122 |
| E   | 1.30        | 1.50 | 1.70 | 0.051  | 0.059 | 0.067 |
| e   | 0.85        | 0.95 | 1.05 | 0.034  | 0.037 | 0.041 |
| HE  | 2.50        | 2.75 | 3.00 | 0.099  | 0.108 | 0.118 |
| L   | 0.20        | 0.40 | 0.60 | 0.008  | 0.016 | 0.024 |
| M   | 0*          | ---  | 10*  | 0*     | ---   | 10*   |



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

### SOLDERING FOOTPRINT

#### STYLE 1:

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

#### STYLE 2:

- PIN 1. NO CONNECTION
- 2. COLLECTOR
- 3. EMITTER
- 4. NO CONNECTION
- 5. COLLECTOR
- 6. BASE

#### STYLE 3:

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

#### STYLE 4:

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

#### STYLE 5:

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

#### STYLE 6:

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

#### STYLE 7:

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

#### STYLE 8:

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

#### STYLE 9:

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

#### STYLE 10:

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

#### STYLE 11:

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

|                         |                    |   |
|-------------------------|--------------------|---|
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# MECHANICAL CASE OUTLINE PACKAGE DIMENSIONS

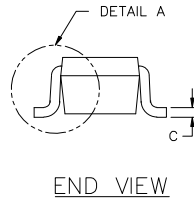
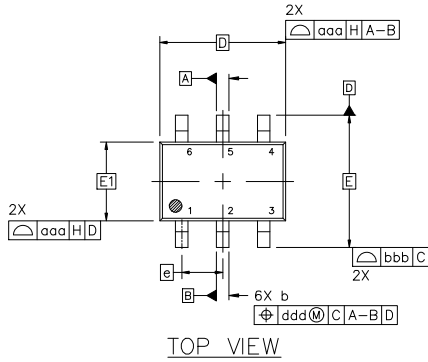


**SC-88 2.00x1.25x0.90, 0.65P**  
CASE 419B-02  
ISSUE Z

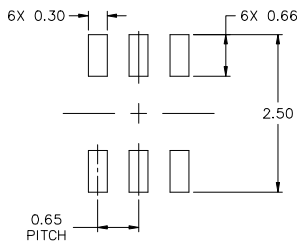
DATE 18 APR 2024

NOTES:

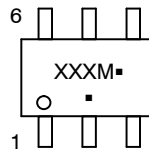
1. DIMENSIONING AND TOLERANCING CONFORM TO ASME Y14.5-2018.
2. ALL DIMENSION ARE IN MILLIMETERS.
3. DIMENSIONS D AND E1 DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS. MOLD FLASH, PROTRUSIONS, OR GATE BURRS SHALL NOT EXCEED 0.20 PER END.
4. DIMENSIONS D AND E1 AT THE OUTERMOST EXTREMES OF THE 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 |      |      |
|-----|-------------|------|------|
|     | MIN.        | NOM. | MAX. |
| A   | ---         | ---  | 1.10 |
| A1  | 0.00        | ---  | 0.10 |
| A2  | 0.70        | 0.90 | 1.00 |
| b   | 0.15        | 0.20 | 0.25 |
| c   | 0.08        | 0.15 | 0.22 |
| D   | 2.00 BSC    |      |      |
| E   | 2.10 BSC    |      |      |
| E1  | 1.25 BSC    |      |      |
| e   | 0.65 BSC    |      |      |
| L   | 0.26        | 0.36 | 0.46 |
| L2  | 0.15 BSC    |      |      |
| aaa | 0.15        |      |      |
| bbb | 0.30        |      |      |
| ccc | 0.10        |      |      |
| ddd | 0.10        |      |      |



**GENERIC MARKING DIAGRAM\***



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

(Note: Microdot may be in either location)  
 \*Date Code orientation and/or position may vary depending upon manufacturing location.  
 \*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.

FOR ADDITIONAL INFORMATION ON OUR Pb-FREE STRATEGY AND SOLDERING DETAILS, PLEASE DOWNLOAD THE ONSEMI SOLDERING AND MOUNTING TECHNIQUES REFERENCE MANUAL, SOLDERRM/D.

**STYLES ON PAGE 2**

|                         |                                    |  |
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**SC-88 2.00x1.25x0.90, 0.65P**  
**CASE 419B-02**  
**ISSUE Z**

DATE 18 APR 2024

|   |   |  |  |  |  |
|---|---|--|--|--|--|
| <b>STYLE 1:</b><br>PIN 1. EMITTER 2<br>2. BASE 2<br>3. COLLECTOR 1<br>4. EMITTER 1<br>5. BASE 1<br>6. COLLECTOR 2 | <b>STYLE 2:</b><br>CANCELLED  | <b>STYLE 3:</b><br>CANCELLED   | <b>STYLE 4:</b><br>PIN 1. CATHODE<br>2. CATHODE<br>3. COLLECTOR<br>4. EMITTER<br>5. BASE<br>6. ANODE               | <b>STYLE 5:</b><br>PIN 1. ANODE<br>2. ANODE<br>3. COLLECTOR<br>4. EMITTER<br>5. BASE<br>6. CATHODE                 | <b>STYLE 6:</b><br>PIN 1. ANODE 2<br>2. N/C<br>3. CATHODE 1<br>4. ANODE 1<br>5. N/C<br>6. CATHODE 2          |
| <b>STYLE 7:</b><br>PIN 1. SOURCE 2<br>2. DRAIN 2<br>3. GATE 1<br>4. SOURCE 1<br>5. DRAIN 1<br>6. GATE 2           | <b>STYLE 8:</b><br>CANCELLED  | <b>STYLE 9:</b><br>PIN 1. EMITTER 2<br>2. EMITTER 1<br>3. COLLECTOR 1<br>4. BASE 1<br>5. BASE 2<br>6. COLLECTOR 2  | <b>STYLE 10:</b><br>PIN 1. SOURCE 2<br>2. SOURCE 1<br>3. GATE 1<br>4. DRAIN 1<br>5. DRAIN 2<br>6. GATE 2           | <b>STYLE 11:</b><br>PIN 1. CATHODE 2<br>2. CATHODE 2<br>3. ANODE 1<br>4. CATHODE 1<br>5. CATHODE 1<br>6. ANODE 2   | <b>STYLE 12:</b><br>PIN 1. ANODE 2<br>2. ANODE 2<br>3. CATHODE 1<br>4. ANODE 1<br>5. ANODE 1<br>6. CATHODE 2 |
| <b>STYLE 13:</b><br>PIN 1. ANODE<br>2. N/C<br>3. COLLECTOR<br>4. EMITTER<br>5. BASE<br>6. CATHODE                 | <b>STYLE 14:</b><br>PIN 1. VREF<br>2. GND<br>3. GND<br>4. IOUT<br>5. VEN<br>6. VCC                            | <b>STYLE 15:</b><br>PIN 1. ANODE 1<br>2. ANODE 2<br>3. ANODE 3<br>4. CATHODE 3<br>5. CATHODE 2<br>6. CATHODE 1     | <b>STYLE 16:</b><br>PIN 1. BASE 1<br>2. EMITTER 2<br>3. COLLECTOR 2<br>4. BASE 2<br>5. EMITTER 1<br>6. COLLECTOR 1 | <b>STYLE 17:</b><br>PIN 1. BASE 1<br>2. EMITTER 1<br>3. COLLECTOR 2<br>4. BASE 2<br>5. EMITTER 2<br>6. COLLECTOR 1 | <b>STYLE 18:</b><br>PIN 1. VIN1<br>2. VCC<br>3. VOUT2<br>4. VIN2<br>5. GND<br>6. VOUT1                       |
| <b>STYLE 19:</b><br>PIN 1. IOUT<br>2. GND<br>3. GND<br>4. V CC<br>5. V EN<br>6. V REF                             | <b>STYLE 20:</b><br>PIN 1. COLLECTOR<br>2. COLLECTOR<br>3. BASE<br>4. EMITTER<br>5. COLLECTOR<br>6. COLLECTOR | <b>STYLE 21:</b><br>PIN 1. ANODE 1<br>2. N/C<br>3. ANODE 2<br>4. CATHODE 2<br>5. N/C<br>6. CATHODE 1               | <b>STYLE 22:</b><br>PIN 1. D1 (i)<br>2. GND<br>3. D2 (i)<br>4. D2 (c)<br>5. VBUS<br>6. D1 (c)                      | <b>STYLE 23:</b><br>PIN 1. Vn<br>2. CH1<br>3. Vp<br>4. N/C<br>5. CH2<br>6. N/C                                     | <b>STYLE 24:</b><br>PIN 1. CATHODE<br>2. ANODE<br>3. CATHODE<br>4. CATHODE<br>5. CATHODE<br>6. CATHODE       |
| <b>STYLE 25:</b><br>PIN 1. BASE 1<br>2. CATHODE<br>3. COLLECTOR 2<br>4. BASE 2<br>5. EMITTER<br>6. COLLECTOR 1    | <b>STYLE 26:</b><br>PIN 1. SOURCE 1<br>2. GATE 1<br>3. DRAIN 2<br>4. SOURCE 2<br>5. GATE 2<br>6. DRAIN 1      | <b>STYLE 27:</b><br>PIN 1. BASE 2<br>2. BASE 1<br>3. COLLECTOR 1<br>4. EMITTER 1<br>5. EMITTER 2<br>6. COLLECTOR 2 | <b>STYLE 28:</b><br>PIN 1. DRAIN<br>2. DRAIN<br>3. GATE<br>4. SOURCE<br>5. DRAIN<br>6. DRAIN                       | <b>STYLE 29:</b><br>PIN 1. ANODE<br>2. ANODE<br>3. COLLECTOR<br>4. EMITTER<br>5. BASE/ANODE<br>6. CATHODE          | <b>STYLE 30:</b><br>PIN 1. SOURCE 1<br>2. DRAIN 2<br>3. DRAIN 2<br>4. SOURCE 2<br>5. GATE 1<br>6. DRAIN 1    |

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.

|                         |                                    |  |
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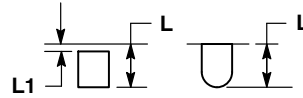
# MECHANICAL CASE OUTLINE PACKAGE DIMENSIONS



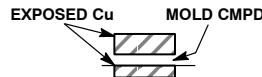
SCALE 4:1

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

DATE 15 MAY 2008



**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.

**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.

|                         |                              |  |
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# MECHANICAL CASE OUTLINE PACKAGE DIMENSIONS



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 ON Semiconductor 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.

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