

# 1-Bit Dual-Supply Level Translator

## NL3V1T244, NL3V1T240, NL3V1T34

The NL3V1T244 / NL3V1T240 / NL3V1T34 are 1-bit configurable dual-supply level translators with 3-state outputs. The A- and B-ports are designed to track two different power supply rails,  $V_{CCA}$  and  $V_{CCB}$  respectively. Both supply rails are configurable from 0.9 V to 3.6 V allowing universal voltage level translation between the A- to B- ports.

The NL3V1T244 / NL3V1T34 are 1-bit level translators that allows non-inverting translations from A to B ports. The NL3V1T240 is a 1-bit level translator that allows inverting translations from A to B ports.

The output enable pin ( $\overline{OE}$ ), when High, disables all the output ports by putting them in 3-state. The  $\overline{OE}$  pin is designed to track  $V_{CCA}$ . The NL3V1T34 does not have an  $\overline{OE}$  pin.

### Features

- Wide  $V_{CCA}$  and  $V_{CCB}$  Operating Range: 0.9 V to 3.6 V
- Balanced Output Drive:  $\pm 24$  mA @ 3.0 V
- High-Speed w/ Balanced Propagation Delay:  
2.8 ns max at 3.0 to 3.6 V
- Inputs Pins OVT to 3.6 V
- Non-preferential  $V_{CC}$  Sequencing
- Outputs at 3-State until Active  $V_{CC}$  is Reached
- Partial Power-Off Protection
- Outputs Switch to 3-State with either  $V_{CC}$  at GND
- Typical Max Data Rates:  
380 Mbps ( $\geq 1.8$ -V to 3.3-V Translation)  
200 Mbps ( $\geq 1.1$ -V to [1.8-V, 2.5-V, 3.3-V] Translation)  
150 Mbps ( $\geq 1.1$ -V to 1.5-V Translation)  
100 Mbps ( $\geq 1.1$ -V to 1.2-V Translation)
- Small Pb-Free Packaging:  
SC-88A, UDFN6
- -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

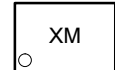
### Typical Applications

- Mobile Phones, PDAs, Other Portable Devices
- Automotive
- Industrial

### MARKING DIAGRAMS



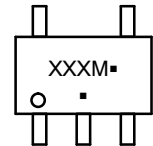
UDFN6  
MU SUFFIX  
CASE 517AA



UDFN6  
MU SUFFIX  
CASE 517AQ



SC-88A  
(SOT-353/SC-70)  
DF SUFFIX  
CASE 419A



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

(Note: Microdot may be in either location)

### ORDERING INFORMATION

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

## NL3V1T244, NL3V1T240, NL3V1T34

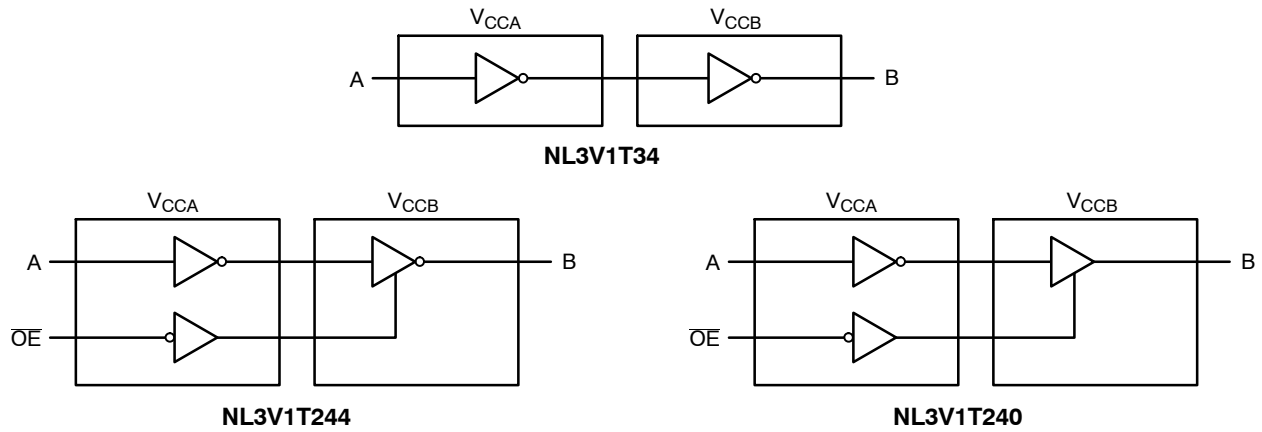


Figure 1. Logic Diagrams

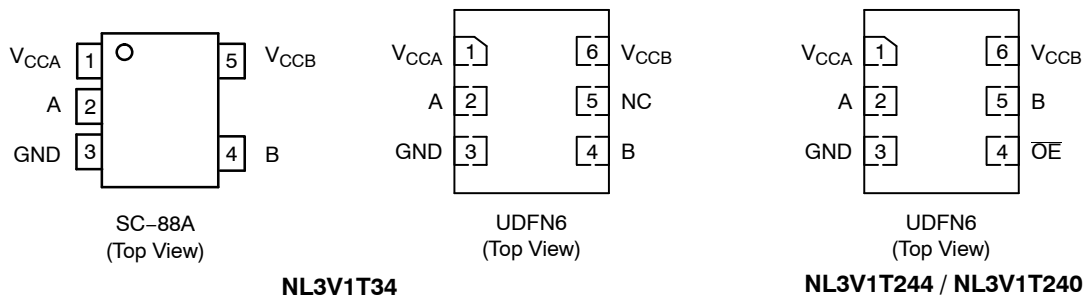


Figure 2. Pin Assignments (Top View)

### FUNCTION TABLE

| INPUTS |   | OUTPUT   |           |           |
|--------|---|----------|-----------|-----------|
|        |   | NL3V1T34 | NL3V1T244 | NL3V1T240 |
| OE     | A | B        | B         | B         |
| L      | L | L        | L         | H         |
| L      | H | H        | H         | L         |
| H      | X | n/a      | 3-State   | 3-State   |

### PIN NAMES

| PINS | DESCRIPTION                                |
|------|--------------------------------------------|
| VCCA | A Port DC Supply                           |
| VCCB | B Port DC Supply                           |
| GND  | Ground                                     |
| A    | Input Port                                 |
| B    | Output Port                                |
| OE   | Output Enable (Not available for NL3V1T34) |

### Application Recommendations

During power-up and power-down, it is recommended that the  $\overline{\text{OE}}$  pin be connected to  $V_{CC}$  through pull-up resistors to ensure high impedance at the I/O ports.

# NL3V1T244, NL3V1T240, NL3V1T34

## MAXIMUM RATINGS

| Symbol             | Rating                                                            | Value                                    | Condition               | Unit |
|--------------------|-------------------------------------------------------------------|------------------------------------------|-------------------------|------|
| $V_{CCA}, V_{CCB}$ | DC Supply Voltage                                                 | -0.5 to +4.3                             |                         | V    |
| $V_I$              | DC Input Voltage                                                  | -0.5 to +4.3                             |                         | V    |
| $V_O$              | DC Output Voltage (Power Down Mode)                               | -0.5 to +4.3                             | $V_{CCA} = V_{CCB} = 0$ | V    |
|                    | (3-State Mode)                                                    | -0.5 to +4.3                             |                         |      |
|                    | (Active Mode)                                                     | -0.5 to $V_{CCB}+0.5$                    |                         |      |
| $I_{IK}$           | DC Input Diode Current                                            | -50                                      | $V_I < \text{GND}$      | mA   |
| $I_{OK}$           | DC Output Diode Current                                           | -50                                      | $V_O < \text{GND}$      | mA   |
| $I_O$              | DC Output Source/Sink Current                                     | $\pm 50$                                 |                         | mA   |
| $I_{CC}$           | DC Supply Current Per Supply Pin                                  | $\pm 100$                                |                         | mA   |
| $I_{GND}$          | DC Ground Current per Ground Pin                                  | $\pm 100$                                |                         | mA   |
| $T_{STG}$          | Storage Temperature Range                                         | -65 to +150                              |                         | °C   |
| $\theta_{JA}$      | Thermal Resistance (Note 1)                                       | SC-88A<br>UDFN6                          | 377<br>154              | °C/W |
| $P_D$              | Power Dissipation in Still Air                                    | SC-88A<br>UDFN6                          | 332<br>812              | mW   |
| MSL                | Moisture Sensitivity Level                                        |                                          | Level 1                 | –    |
| $F_R$              | Flammability Rating                                               | Oxygen Index: 28 to 34                   | UL 94 V-0 @ 0.125 in    | –    |
| $V_{ESD}$          | ESD Withstand Voltage (Note 2)                                    | Human Body Model<br>Charged Device Model | 2<br>1                  | kV   |
| $I_{LATCHUP}$      | Latchup Performance Above $V_{CC}$ and Below GND at 25°C (Note 3) |                                          | $\pm 100$               | 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. Measured with minimum pad spacing on an FR4 board, using 76 mm-by-114 mm, 2-ounce copper trace no air flow per JESD51-7.
2. HBM tested to ANSI/ESDA/JEDEC JS-001-2017. CDM tested to EIA/JESD22-C101-A. JEDEC recommends that ESD qualification to EIA/JESD22-A115A (Machine Model) be discontinued per JEDEC/JEP172A.
3. Tested to EIA/JESD78 Class II.

## RECOMMENDED OPERATING CONDITIONS

| Symbol                | Parameter                        | Min | Max       | Unit |
|-----------------------|----------------------------------|-----|-----------|------|
| $V_{CCA}, V_{CCB}$    | Positive DC Supply Voltage       | 0.9 | 3.6       | V    |
| $V_I$                 | Input Voltage                    | GND | 3.6       | V    |
| $V_{IO}$              | Output Voltage (Power Down Mode) | GND | 3.6       | V    |
|                       | (3-State Mode)                   | GND | 3.6       |      |
|                       | (Active Mode)                    | GND | $V_{CCB}$ |      |
| $T_A$                 | Operating Temperature Range      | -40 | +125      | °C   |
| $\Delta t / \Delta V$ | Input Transition Rise or Rate    | 0   | 5         | 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.

# NL3V1T244, NL3V1T240, NL3V1T34

## DC ELECTRICAL CHARACTERISTICS – INPUT VOLTAGES

| Symbol          | Parameter          | Test Conditions | Port                | V <sub>CCA</sub> (V) | V <sub>CCB</sub> (V) | –40 °C to +85 °C      |                      |                       | –40 °C to +125 °C     |                       | Unit |
|-----------------|--------------------|-----------------|---------------------|----------------------|----------------------|-----------------------|----------------------|-----------------------|-----------------------|-----------------------|------|
|                 |                    |                 |                     |                      |                      | Min                   | Typ (Note 4)         | Max                   | Min                   | Max                   |      |
| V <sub>IH</sub> | Input HIGH Voltage |                 | $\overline{OE}$ , A | 2.7 – 3.6            | 0.9 – 3.6            | 2.0                   | –                    | –                     | 2.0                   | –                     | V    |
|                 |                    |                 |                     | 2.3 – 2.7            |                      | 1.6                   | –                    | –                     | 1.6                   | –                     |      |
|                 |                    |                 |                     | 1.65–1.95            |                      | 0.65 V <sub>CCA</sub> | –                    | –                     | 0.65 V <sub>CCA</sub> | –                     |      |
|                 |                    |                 |                     | 1.1 – 1.6            |                      | 0.7 V <sub>CCA</sub>  | –                    | –                     | 0.7 V <sub>CCA</sub>  | –                     |      |
|                 |                    |                 |                     | 0.9                  |                      | –                     | 0.9 V <sub>CCA</sub> | –                     | –                     | –                     |      |
| V <sub>IL</sub> | Input LOW Voltage  |                 | $\overline{OE}$ , A | 2.7 – 3.6            | 0.9 – 3.6            | –                     | –                    | 0.8                   | –                     | 0.8                   | V    |
|                 |                    |                 |                     | 2.3 – 2.7            |                      | –                     | –                    | 0.7                   | –                     | 0.7                   |      |
|                 |                    |                 |                     | 1.65–1.95            |                      | –                     | –                    | 0.35 V <sub>CCA</sub> | –                     | 0.35 V <sub>CCA</sub> |      |
|                 |                    |                 |                     | 1.1 – 1.6            |                      | –                     | –                    | 0.3 V <sub>CCA</sub>  | –                     | 0.3 V <sub>CCA</sub>  |      |
|                 |                    |                 |                     | 0.9                  |                      | –                     | 0.1 V <sub>CCA</sub> | –                     | –                     | –                     |      |

4. All typical values are at T<sub>A</sub> = 25°C.

## DC ELECTRICAL CHARACTERISTICS – OUTPUT VOLTAGES

| Symbol          | Parameter               | Test Conditions                                       | V <sub>CCA</sub> (V) | V <sub>CCB</sub> (V) | –40 °C to +85 °C       |                        |      | –40 °C to +125 °C      |      | Unit |
|-----------------|-------------------------|-------------------------------------------------------|----------------------|----------------------|------------------------|------------------------|------|------------------------|------|------|
|                 |                         |                                                       |                      |                      | Min                    | Typ (Note 4)           | Max  | Min                    | Max  |      |
| V <sub>OH</sub> | Output HIGH Voltage     | V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub> : |                      |                      |                        |                        |      |                        |      | V    |
|                 |                         | I <sub>OH</sub> = –100 μA                             | 0.9                  | 0.9                  | –                      | V <sub>CCB</sub> – 0.1 | –    | –                      | –    |      |
|                 |                         |                                                       | 1.1 – 3.6            | 1.1 – 3.6            | V <sub>CCB</sub> – 0.1 | –                      | –    | V <sub>CCB</sub> – 0.1 | –    |      |
|                 |                         | I <sub>OH</sub> = –2 mA                               | 1.1                  | 1.1                  | 0.85                   | –                      | –    | 0.85                   | –    |      |
|                 |                         | I <sub>OH</sub> = –6 mA                               | 1.4                  | 1.4                  | 1.05                   | –                      | –    | 1.05                   | –    |      |
|                 |                         | I <sub>OH</sub> = –8 mA                               | 1.65                 | 1.65                 | 1.2                    | –                      | –    | 1.2                    | –    |      |
|                 |                         |                                                       | 2.3                  | 2.3                  | 1.8                    | –                      | –    | 1.8                    | –    |      |
|                 |                         | I <sub>OH</sub> = –12 mA                              | 2.7                  | 2.7                  | 2.2                    | –                      | –    | 2.2                    | –    |      |
|                 |                         |                                                       | 2.3                  | 2.3                  | 1.7                    | –                      | –    | 1.7                    | –    |      |
| V <sub>OL</sub> | Output LOW Voltage      | V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub> : |                      |                      |                        |                        |      |                        |      | V    |
|                 |                         | I <sub>OL</sub> = 100 μA                              | 0.9                  | 0.9                  | –                      | 0.1                    | –    | –                      | –    |      |
|                 |                         |                                                       | 1.1 – 3.6            | 1.1 – 3.6            | –                      | –                      | 0.1  | –                      | 0.1  |      |
|                 |                         | I <sub>OL</sub> = 2 mA                                | 1.1                  | 1.1                  | –                      | –                      | 0.25 | –                      | 0.25 |      |
|                 |                         | I <sub>OL</sub> = 6 mA                                | 1.4                  | 1.4                  | –                      | –                      | 0.35 | –                      | 0.35 |      |
|                 |                         | I <sub>OL</sub> = 8 mA                                | 1.65                 | 1.65                 | –                      | –                      | 0.3  | –                      | 0.3  |      |
|                 |                         | I <sub>OL</sub> = 12 mA                               | 2.3                  | 2.3                  | –                      | –                      | 0.4  | –                      | 0.4  |      |
|                 |                         |                                                       | 2.7                  | 2.7                  | –                      | –                      | 0.4  | –                      | 0.4  |      |
|                 |                         | I <sub>OL</sub> = 18 mA                               | 2.3                  | 2.3                  | –                      | –                      | 0.4  | –                      | 0.4  |      |
| 3.0             | 3.0                     |                                                       | –                    | –                    | 0.4                    | –                      | 0.4  |                        |      |      |
|                 | I <sub>OL</sub> = 24 mA | 3.0                                                   | 3.0                  | –                    | –                      | 0.55                   | –    | 0.55                   |      |      |

# NL3V1T244, NL3V1T240, NL3V1T34

## DC ELECTRICAL CHARACTERISTICS – LEAKAGE AND SUPPLY CURRENTS

| Symbol           | Parameter                 | Test Conditions                                                 | V <sub>CCA</sub> (V) | V <sub>CCB</sub> (V) | –40 °C to +85 °C |      | –40 °C to +125 °C |      | Unit |
|------------------|---------------------------|-----------------------------------------------------------------|----------------------|----------------------|------------------|------|-------------------|------|------|
|                  |                           |                                                                 |                      |                      | Min              | Max  | Min               | Max  |      |
| I <sub>I</sub>   | Input Leakage Current     | V <sub>I</sub> = 3.6 V or GND                                   | 0.9 – 3.6            | 0.9 – 3.6            | –                | ±1.0 | –                 | ±5.0 | μA   |
| I <sub>OZ</sub>  | 3-State Output Leakage    | OE = V <sub>IH</sub> ; V <sub>O</sub> = GND to 3.6 V            | 3.6                  | 3.6                  | –                | ±1.0 | –                 | ±5.0 | μA   |
| I <sub>OFF</sub> | Power-Off Leakage Current | V <sub>I</sub> or V <sub>O</sub> = 0 to 3.6 V                   | A                    | 0                    | 0.9 – 3.6        | –    | ±1.0              | –    | ±5.0 |
|                  |                           |                                                                 | B                    | 0.9 – 3.6            | 0                | –    | ±1.0              | –    | ±5.0 |
| I <sub>CCA</sub> | Quiescent Supply Current  | V <sub>I</sub> = V <sub>CCA</sub> or GND;<br>I <sub>O</sub> = 0 | 0.9 – 3.6            | 0.9 – 3.6            | –                | 5.0  | –                 | 10   | μA   |
|                  |                           |                                                                 | 0                    | 0.9 – 3.6            | –                | –1.0 | –                 | –5.0 |      |
|                  |                           |                                                                 | 0.9 – 3.6            | 0                    | –                | 5.0  | –                 | 10   |      |
| I <sub>CCB</sub> | Quiescent Supply Current  | V <sub>I</sub> = V <sub>CCA</sub> or GND;<br>I <sub>O</sub> = 0 | 0.9 – 3.6            | 0.9 – 3.6            | –                | 5.0  | –                 | 10   | μA   |
|                  |                           |                                                                 | 0                    | 0.9 – 3.6            | –                | 5.0  | –                 | 10   |      |
|                  |                           |                                                                 | 0.9 – 3.6            | 0                    | –                | –1.0 | –                 | –5.0 |      |

NOTE: Connect ground before applying supply voltage V<sub>CCA</sub> or V<sub>CCB</sub>. This device is designed with the feature that the power-up sequence of V<sub>CCA</sub> and V<sub>CCB</sub> will not damage the IC.

## AC ELECTRICAL CHARACTERISTICS (Notes 5 and 6)

| Symbol                                 | Parameter                 | V <sub>CCA</sub> (V) | T <sub>A</sub> = −40 °C to +85 °C |     |     |      |      | T <sub>A</sub> = −40 °C to +125 °C |      |      |      |      | Unit |
|----------------------------------------|---------------------------|----------------------|-----------------------------------|-----|-----|------|------|------------------------------------|------|------|------|------|------|
|                                        |                           |                      | V <sub>CCB</sub> (V)              |     |     |      |      | V <sub>CCB</sub> (V)               |      |      |      |      |      |
|                                        |                           |                      | 3.3                               | 2.5 | 1.8 | 1.5  | 1.2  | 3.3                                | 2.5  | 1.8  | 1.5  | 1.2  |      |
|                                        |                           |                      | Max                               | Max | Max | Max  | Max  | Max                                | Max  | Max  | Max  | Max  |      |
| t <sub>PLH</sub> ,<br>t <sub>PHL</sub> | Propagation Delay, A to B | 3.3                  | 2.9                               | 3.3 | 4.5 | 5.6  | 9.3  | 3.3                                | 3.8  | 5.0  | 6.2  | 9.5  | nS   |
|                                        |                           | 2.5                  | 3.6                               | 3.7 | 4.6 | 5.7  | 9.4  | 4.0                                | 4.0  | 5.1  | 6.3  | 9.6  |      |
|                                        |                           | 1.8                  | 3.9                               | 4.0 | 4.9 | 6.0  | 9.6  | 4.3                                | 4.3  | 5.4  | 6.6  | 9.8  |      |
|                                        |                           | 1.5                  | 4.2                               | 4.3 | 5.2 | 6.3  | 9.8  | 4.7                                | 4.7  | 5.8  | 7.0  | 10.0 |      |
|                                        |                           | 1.2                  | 5.1                               | 5.2 | 6.2 | 7.1  | 11.0 | 5.7                                | 5.8  | 6.9  | 7.9  | 11.2 |      |
| t <sub>pZH</sub> ,<br>t <sub>pZL</sub> | Output Enable, OE to B    | 3.3                  | 3.8                               | 4.7 | 6.8 | 8.7  | 11.3 | 4.2                                | 5.2  | 7.5  | 9.6  | 12.4 | nS   |
|                                        |                           | 2.5                  | 4.0                               | 4.8 | 7.0 | 8.8  | 11.3 | 4.4                                | 5.3  | 7.7  | 9.7  | 12.4 |      |
|                                        |                           | 1.8                  | 4.6                               | 5.3 | 7.4 | 9.2  | 11.7 | 5.1                                | 5.9  | 8.2  | 10.2 | 12.9 |      |
|                                        |                           | 1.5                  | 5.6                               | 5.8 | 7.7 | 9.6  | 12.1 | 6.2                                | 6.4  | 8.5  | 10.6 | 13.3 |      |
|                                        |                           | 1.2                  | 7.7                               | 7.9 | 8.9 | 10.0 | 13.5 | 8.5                                | 8.7  | 9.8  | 11.0 | 14.7 |      |
| t <sub>pHZ</sub> ,<br>t <sub>pLZ</sub> | Output Disable, OE to B   | 3.3                  | 6.2                               | 6.4 | 8.1 | 9.3  | 10.2 | 6.9                                | 7.1  | 9.0  | 10.3 | 11.3 | nS   |
|                                        |                           | 2.5                  | 5.2                               | 6.2 | 8.2 | 8.8  | 10.4 | 5.8                                | 6.9  | 9.1  | 10.4 | 11.5 |      |
|                                        |                           | 1.8                  | 6.9                               | 6.9 | 8.7 | 9.9  | 10.9 | 7.6                                | 7.6  | 9.6  | 10.9 | 12.0 |      |
|                                        |                           | 1.5                  | 7.6                               | 7.4 | 9.1 | 10.3 | 11.3 | 8.2                                | 8.4  | 10.1 | 11.4 | 12.5 |      |
|                                        |                           | 1.2                  | 8.1                               | 8.1 | 9.5 | 9.6  | 12.4 | 9.0                                | 10.1 | 10.5 | 10.6 | 13.7 |      |

5. Propagation delays defined per Figure 3.

6. These parameters are guaranteed by characterization and are not production tested.

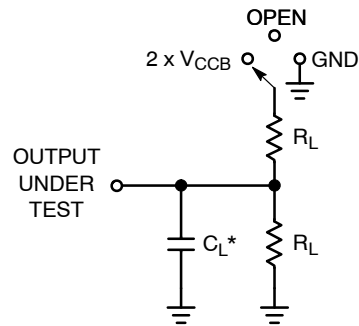
## CAPACITANCE

| Symbol                      | Parameter                     | Test Conditions                                                                                    | Typ (Note 4) | Unit |
|-----------------------------|-------------------------------|----------------------------------------------------------------------------------------------------|--------------|------|
| C <sub>IN</sub>             | Control Pin Input Capacitance | V <sub>CCA</sub> = V <sub>CCB</sub> = 3.3 V, V <sub>I</sub> = 0 V or V <sub>CCA</sub>              | 2.5          | pF   |
| C <sub>I/O</sub>            | I/O Pin Input Capacitance     | V <sub>CCA</sub> = V <sub>CCB</sub> = 3.3 V, V <sub>I</sub> = 0 V or V <sub>CCA</sub>              | 5.0          | pF   |
| C <sub>PD</sub><br>(Note 7) | Power Dissipation Capacitance | V <sub>CCA</sub> = V <sub>CCB</sub> = 3.3 V, V <sub>I</sub> = 0 V or V <sub>CCA</sub> , f = 10 MHz | 12           | pF   |

7. C<sub>PD</sub> is defined as the value of the IC's equivalent capacitance from which the operating current can be calculated from:

$$I_{CC(\text{operating})} \approx C_{PD} \times V_{CC} \times f_{IN} \times N_{SW} \text{ where } I_{CC} = I_{CCA} + I_{CCB} \text{ and } N_{SW} = \text{total number of outputs switching.}$$

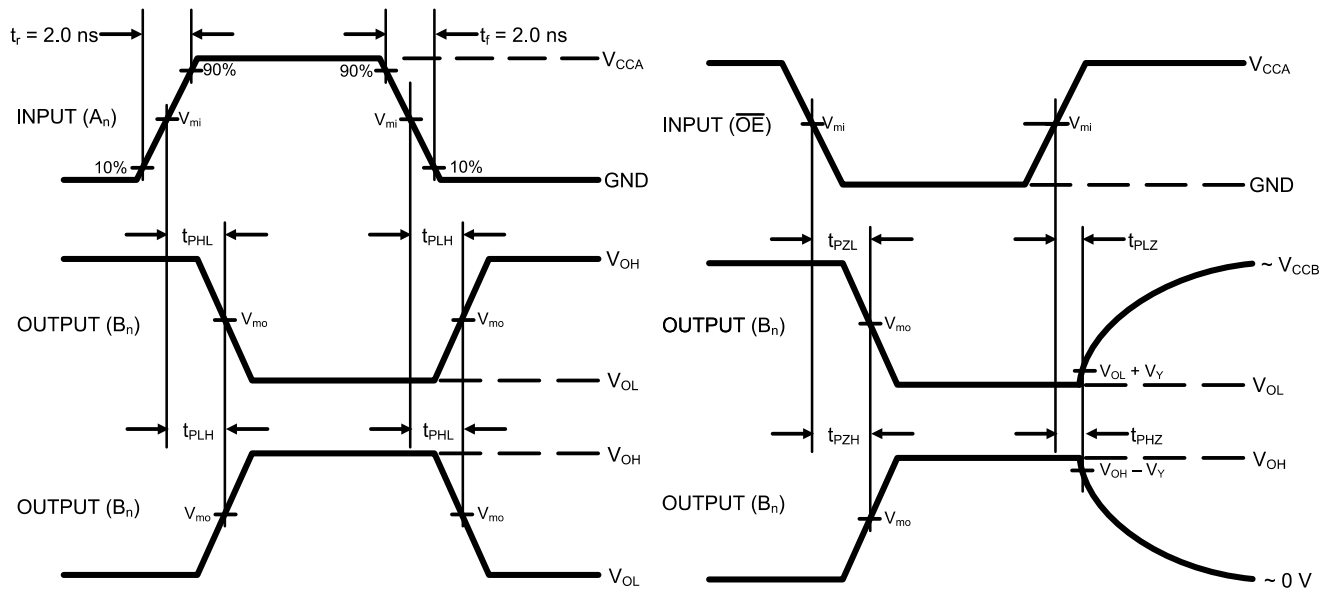
# NL3V1T244, NL3V1T240, NL3V1T34



\*C<sub>L</sub> Includes probe and jig capacitance

**Figure 3. AC Test Circuit**

| Test                                                                                                                                     | Switch               | C <sub>L</sub> | R <sub>L</sub> |
|------------------------------------------------------------------------------------------------------------------------------------------|----------------------|----------------|----------------|
| t <sub>PLH</sub> , t <sub>PHL</sub>                                                                                                      | OPEN                 | 15 pF          | 2 kΩ           |
| t <sub>PLZ</sub> , t <sub>PZL</sub>                                                                                                      | 2 x V <sub>CCB</sub> |                |                |
| t <sub>PHZ</sub> , t <sub>PZH</sub>                                                                                                      | GND                  |                |                |
| C <sub>L</sub> includes probe and jig capacitance<br>Pulse generator Z <sub>O</sub> = 50 Ω<br>Input f = 1.0 MHz; t <sub>W</sub> = 500 ns |                      |                |                |



**Figure 4. AC Waveforms**

| Symbol          | V <sub>CC</sub>     |                     |                     |                     |                     |
|-----------------|---------------------|---------------------|---------------------|---------------------|---------------------|
|                 | 3.0 V – 3.6 V       | 2.3 V – 2.7 V       | 1.65 V – 1.95 V     | 1.4 V – 1.6 V       | 1.1 V – 1.3 V       |
| V <sub>mi</sub> | V <sub>CCA</sub> /2 | V <sub>CCA</sub> /2 | V <sub>CCA</sub> /2 | V <sub>CCA</sub> /2 | V <sub>CCA</sub> /2 |
| V <sub>mo</sub> | V <sub>CCB</sub> /2 | V <sub>CCB</sub> /2 | V <sub>CCB</sub> /2 | V <sub>CCB</sub> /2 | V <sub>CCB</sub> /2 |
| V <sub>Y</sub>  | 0.3 V               | 0.15 V              | 0.15 V              | 0.1 V               | 0.1 V               |

# NL3V1T244, NL3V1T240, NL3V1T34

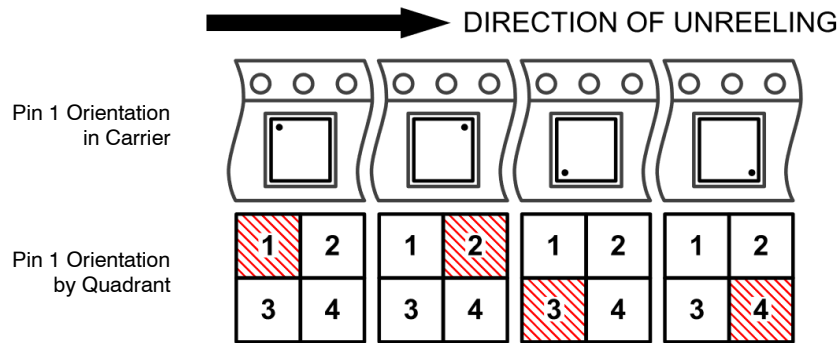
## ORDERING INFORMATION

| Device             | Marking | Package             | Pin 1 Quadrant | Shipping <sup>†</sup>    |
|--------------------|---------|---------------------|----------------|--------------------------|
| NL3V1T34DFT2G      | AFR     | SC-88A              | 3              | 3000 Units / Tape & Reel |
| NL3V1T34DFT2G-Q*   | AFR     | SC-88A              | 3              | 3000 Units / Tape & Reel |
| NL3V1T34MU1TAG     | AD      | UDFN6, 1.45x1, 0.5P | 1              | 3000 Units / Tape & Reel |
| NL3V1T34MU1TCG     | AD      | UDFN6, 1.45x1, 0.5P | 3              | 3000 Units / Tape & Reel |
| NL3V1T34MU2TBG     | EQ      | UDFN6, 1.2x1, 0.4P  | 2              | 3000 Units / Tape & Reel |
| NL3V1T244MU2TBG    | AQ      | UDFN6, 1.2x1, 0.4P  | 2              | 3000 Units / Tape & Reel |
| NL3V1T244MU2TBG-Q* | AQ      | UDFN6, 1.2x1, 0.4P  | 2              | 3000 Units / Tape & Reel |
| NL3V1T240MU2TBG    | A3      | UDFN6, 1.2x1, 0.4P  | 2              | 3000 Units / 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



## NL3V1T244, NL3V1T240, NL3V1T34

### REVISION HISTORY

| Revision | Description of Changes            | Date      |
|----------|-----------------------------------|-----------|
| 0        | Initial document version release. | 8/20/2025 |

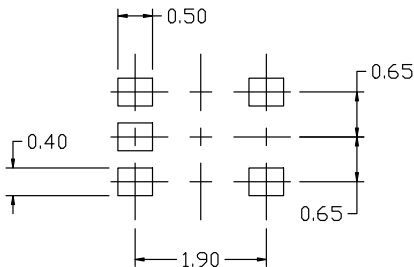
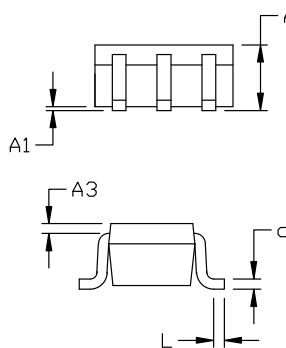
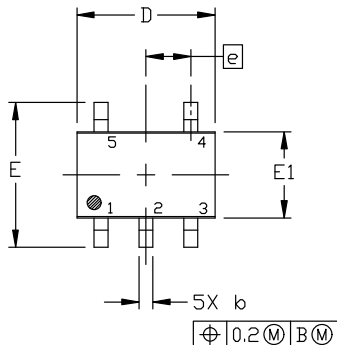




SCALE 2:1

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

DATE 11 APR 2023

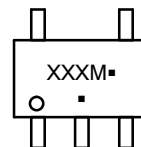

**RECOMMENDED  
MOUNTING FOOTPRINT**

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

**NOTES:**

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETERS
3. 419A-01 OBSOLETE. NEW STANDARD 419A-02
4. DIMENSIONS D AND E1 DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS. MOLD FLASH, PROTRUSIONS, OR GATE BURRS SHALL NOT EXCEED 0.1016MM PER SIDE.

| DIM | MILLIMETERS |      |      |
|-----|-------------|------|------|
|     | MIN.        | NOM. | MAX. |
| A   | 0.80        | 0.95 | 1.10 |
| A1  | ---         | ---  | 0.10 |
| A3  | 0.20 REF    |      |      |
| b   | 0.10        | 0.20 | 0.30 |
| c   | 0.10        | ---  | 0.25 |
| D   | 1.80        | 2.00 | 2.20 |
| E   | 2.00        | 2.10 | 2.20 |
| E1  | 1.15        | 1.25 | 1.35 |
| e   | 0.65 BSC    |      |      |
| L   | 0.10        | 0.15 | 0.30 |

**GENERIC MARKING  
DIAGRAM\***


\*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.

XXX = Specific Device Code

M = Date Code

▪ = Pb-Free Package

(Note: Microdot may be in either location)

**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

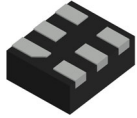
**STYLE 9:**

- 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.

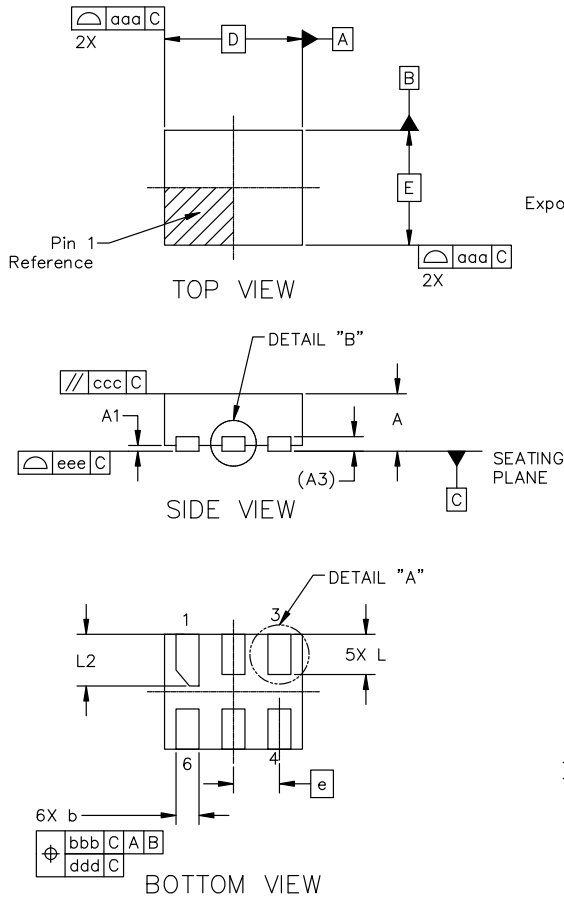
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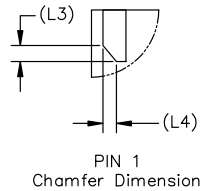
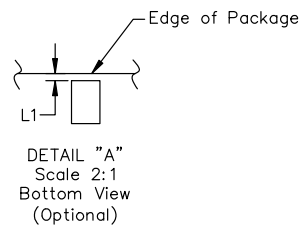
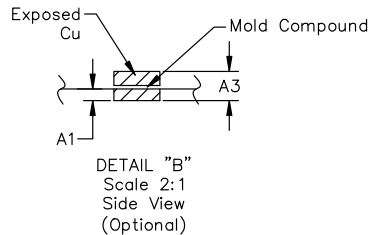
**UDFN6, 1.20x1.00x0.50, 0.40P**  
**CASE 517AA**  
**ISSUE E**

DATE 09 MAY 2025



**NOTES:**

1. DIMENSIONING AND TOLERANCING AS PER ASME Y14.5M, 2018.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. DIMENSION b APPLIES TO PLATED TERMINAL AND IS MEASURED BETWEEN 0.25 AND 0.30mm FROM TERMINAL.
4. COPLANARITY APPLIES TO THE EXPOSED PAD AS WELL AS THE TERMINALS.



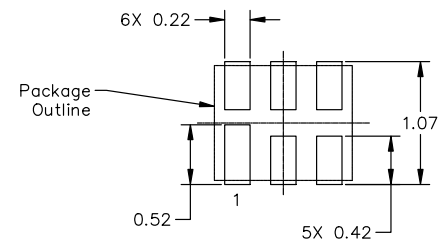
| MILLIMETERS               |           |      |      |
|---------------------------|-----------|------|------|
| DIM                       | MIN       | NOM  | MAX  |
| A                         | 0.45      | 0.50 | 0.55 |
| A1                        | 0.00      | ---  | 0.05 |
| A3                        | 0.127 REF |      |      |
| b                         | 0.15      | 0.20 | 0.25 |
| D                         | 1.20 BSC  |      |      |
| E                         | 1.00 BSC  |      |      |
| e                         | 0.40 BSC  |      |      |
| L                         | 0.30      | 0.35 | 0.40 |
| L1                        | 0.00      | ---  | 0.15 |
| L2                        | 0.40      | 0.45 | 0.50 |
| L3                        | 0.14 REF  |      |      |
| L4                        | 0.116 REF |      |      |
| TOLERANCE FORM & POSITION |           |      |      |
| aaa                       | 0.10      |      |      |
| bbb                       | 0.10      |      |      |
| ccc                       | 0.10      |      |      |
| ddd                       | 0.05      |      |      |
| eee                       | 0.08      |      |      |

**GENERIC MARKING DIAGRAM\***



XX = 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.



**RECOMMENDED MOUNTING FOOTPRINT**

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

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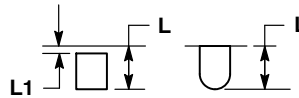
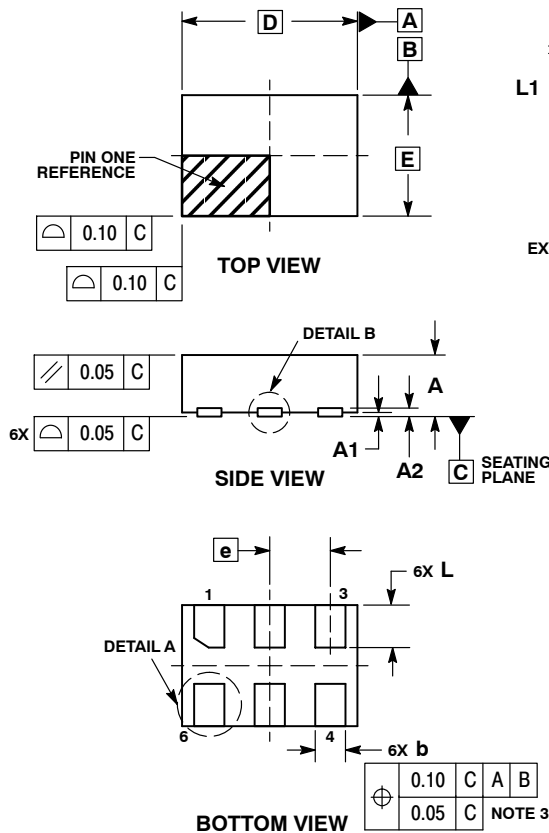
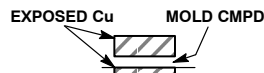
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SCALE 4:1

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

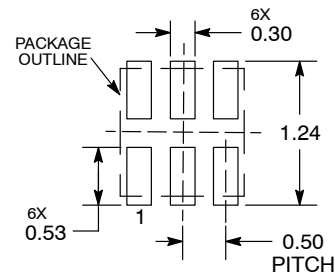
DATE 15 MAY 2008


**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 **onsemi** Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

**GENERIC**  
**MARKING DIAGRAM\***

X = Specific Device  
Code

M = Date Code

\*This information is generic. Please refer to device data sheet for actual part marking.  
Pb-Free indicator, "G" or microdot "▪", may or may not be present.

|                         |                              |                                                                                                                                                                                     |
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