

# NLASB3157

## SPDT, 3 $\Omega$ $R_{ON}$ Switch

The NLASB3157 is an advanced CMOS analog switch fabricated with silicon gate CMOS technology. It achieves very low propagation delay and  $R_{DS_{ON}}$  resistances while maintaining CMOS low power dissipation. Analog and digital voltages that may vary across the full power-supply range (from  $V_{CC}$  to GND). This device is a drop in replacement for the NC7SB3157.

The select pin has overvoltage protection that allows voltages above  $V_{CC}$ , up to 7.0 V to be present on the pin without damage or disruption of operation of the part, regardless of the operating voltage.

### Features

- High Speed:  $t_{PD} = 1.0$  ns (Typ) at  $V_{CC} = 5.0$  V
- Low Power Dissipation:  $I_{CC} = 2.0$   $\mu$ A (Max) at  $T_A = 25^\circ$ C
- Standard CMOS Logic Levels
- High Bandwidth, Improved Linearity
- Switches Standard NTSC/PAL Video, Audio, SPDIF and HDTV
- May be used for Clock Switching, Data Multiplexing, etc.
- $R_{ON}$  Typical = 3  $\Omega$  @  $V_{CC} = 4.5$  V
- Break Before Make Circuitry, Prevents Inadvertent Shorts
- 2 Devices can Switch Balanced Signal Pairs, e.g. LVDS > 200 Mb/s
- Latchup Performance Exceeds 300 mA
- Pin for Pin Drop in for NC7SB3157
- Tiny SC88 and WDFN6 Packages
- ESD Performance:
  - ♦ Human Body Model; > 2000 V;
  - ♦ Machine Model; > 200 V
- NLVSB3157 Features Extended Automotive Temperature Range;  $-55^\circ$ C to  $+125^\circ$ C (See Appendix A)
- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant



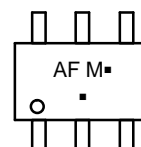
ON Semiconductor®

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### MARKING DIAGRAMS



SC-88  
DF SUFFIX  
CASE 419B



WDFN6  
MT SUFFIX  
CASE 506AS



AF, F = Specific Device Code  
M = Date Code\*  
▪ = Pb-Free Package

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

### FUNCTION TABLE

| Select Input | Function          |
|--------------|-------------------|
| L            | B0 Connected to A |
| H            | B1 Connected to A |

### ORDERING INFORMATION

| Device          | Package            | Shipping†          |
|-----------------|--------------------|--------------------|
| NLASB3157DFT2G  | SC-88<br>(Pb-Free) | 3000 / Tape & Reel |
| NLVASB3157DFT2G | SC-88<br>(Pb-Free) | 3000 / Tape & Reel |
| NLASB3157MTR2G  | WDFN6<br>(Pb-Free) | 3000 / Tape & Reel |

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

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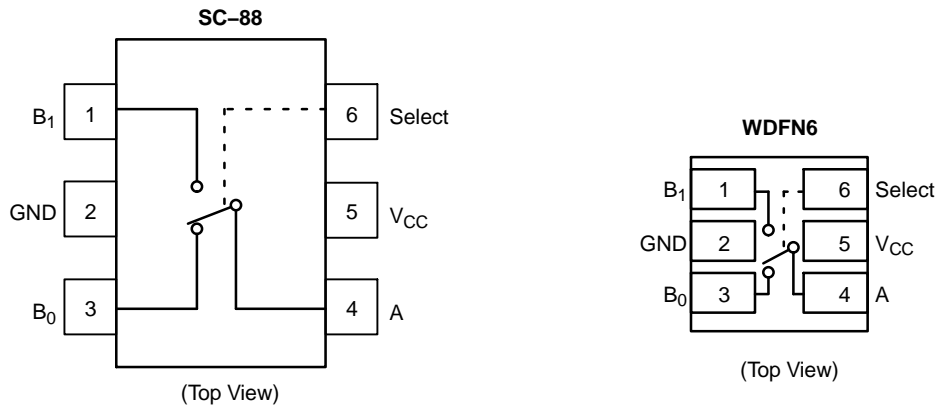


Figure 1. Pin Assignment & Logic Diagram

## MAXIMUM RATINGS

| Rating  | Symbol           | Value                  | Unit |
|---|------------------|------------------------|------|
| Supply Voltage                                    | $V_{CC}$         | -0.5 to +7.0           | V    |
| DC Switch Voltage (Note 1)                        | $V_{IS}$         | -0.5 to $V_{CC} + 0.5$ | V    |
| DC Input Voltage (Note 1)                         | $V_{IN}$         | -0.5 to + 7.0          | V    |
| DC Input Diode Current @ $V_{IN} < 0$ V           | $I_{IK}$         | -50                    | mA   |
| DC Input / Output Current                         | $I_{OUT}$        | 128                    | mA   |
| DC $V_{CC}$ or Ground Current                     | $I_{CC}/I_{GND}$ | +100                   | mA   |
| Storage Temperature Range                         | $T_{stg}$        | -65 to +150            | °C   |
| Junction Temperature Under Bias                   | $T_J$            | 150                    | °C   |
| Junction Lead Temperature (Soldering, 10 Seconds) | $T_L$            | 260                    | °C   |
| Power Dissipation @ +85°C                         | $P_D$            | 180                    | mW   |

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.

- The input and output negative voltage ratings may be exceeded if the input and output diode current ratings are observed.

## RECOMMENDED OPERATING CONDITIONS (Note 2)

| Characteristic   | Symbol        | Min  | Max       | Unit |
|--|---------------|------|-----------|------|
| Supply Voltage Operating   | $V_{CC}$      | 1.65 | 5.5       | V    |
| Select Input Voltage   | $V_{IN}$      | 0    | 5.5       | V    |
| Switch Input Voltage   | $V_{IS}$      | 0    | $V_{CC}$  | V    |
| Output Voltage   | $V_{OUT}$     | 0    | $V_{CC}$  | V    |
| Operating Temperature  | $T_A$         | -55  | +125      | °C   |
| Input Rise and Fall Time<br>Control Input $V_{CC} = 2.3$ V–3.6 V<br>Control Input $V_{CC} = 4.5$ V–5.5 V | $t_r, t_f$    | 0    | 10<br>5.0 | ns/V |
| Thermal Resistance   | $\theta_{JA}$ | -    | 350       | °C/W |

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.

- Select input must be held HIGH or LOW, it must not float.

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## DC ELECTRICAL CHARACTERISTICS – NLASB3157

| Symbol             | Parameter   | Test Conditions  | V <sub>CC</sub><br>(V) | T <sub>A</sub> = +25°C |       |                 | T <sub>A</sub> = -40°C to +85°C             |   | Unit |
|--------------------|---|--|------------------------|------------------------|-------|-----------------|---|---|------|
|                    |   |  |                        | Min                    | Typ   | Max             | Min   | Max   |      |
| V <sub>IH</sub>    | HIGH Level Input Voltage  |  | 1.65–1.95<br>2.3–5.5   |                        |       |                 | 0.75 V <sub>CC</sub><br>0.7 V <sub>CC</sub> |   | V    |
| V <sub>IL</sub>    | LOW Level Input Voltage   |  | 1.65–1.95<br>2.3–5.5   |                        |       |                 |   | 0.25 V <sub>CC</sub><br>0.3 V <sub>CC</sub> | V    |
| I <sub>IN</sub>    | Input Leakage Current   | 0 ≤ V <sub>IN</sub> ≤ 5.5 V                                      | 0–5.5                  |                        | ±0.05 | ±0.1            |   | ±1  | μA   |
| I <sub>OFF</sub>   | OFF State Leakage Current                                       | 0 ≤ A, B ≤ V <sub>CC</sub>                                       | 1.65–5.5               |                        | ±0.05 | ±0.1            |   | ±1  | μA   |
| R <sub>ON</sub>    | Switch On Resistance (Note 3)                                   | V <sub>IN</sub> = 0 V, I <sub>O</sub> = 30 mA                    | 4.5                    |                        | 3.0   |                 |   | 7.0   | Ω    |
|                    |   | V <sub>IN</sub> = 2.4 V, I <sub>O</sub> = -30 mA                 |                        |                        | 5.0   |                 |   | 12  |      |
|                    |   | V <sub>IN</sub> = 4.5 V, I <sub>O</sub> = -30 mA                 |                        |                        | 7.0   |                 |   | 15  |      |
|                    |   | V <sub>IN</sub> = 0 V, I <sub>O</sub> = 24 mA                    | 3.0                    |                        | 4.0   |                 |   | 9.0   |      |
|                    |   | V <sub>IN</sub> = 3 V, I <sub>O</sub> = -24 mA                   |                        |                        | 10    |                 |   | 20  | Ω    |
|                    |   | V <sub>IN</sub> = 0 V, I <sub>O</sub> = 8 mA                     | 2.3                    |                        | 5.0   |                 |   | 12  | Ω    |
|                    |   | V <sub>IN</sub> = 2.3 V, I <sub>O</sub> = -8 mA                  |                        |                        | 13    |                 |   | 30  |      |
|                    |   | V <sub>IN</sub> = 0 V, I <sub>O</sub> = 4 mA                     | 1.65                   |                        | 6.5   |                 |   | 20  | Ω    |
|                    |   | V <sub>IN</sub> = 1.65 V, I <sub>O</sub> = -4 mA                 |                        |                        | 17    |                 |   | 50  |      |
| I <sub>CC</sub>    | Quiescent Supply Current<br>All Channels ON or OFF              | V <sub>IN</sub> = V <sub>CC</sub> or GND<br>I <sub>OUT</sub> = 0 | 5.5                    |                        |       | 1.0             |   | 10  | μA   |
|                    | Analog Signal Range   |  | V <sub>CC</sub>        | 0                      |       | V <sub>CC</sub> | 0   | V <sub>CC</sub>                             | V    |
| R <sub>RANGE</sub> | On Resistance Over Signal Range (Note 3) (Note 7)               | I <sub>A</sub> = -30 mA, 0 ≤ V <sub>Bn</sub> ≤ V <sub>CC</sub>   | 4.5                    |                        |       |                 |   | 25  | Ω    |
|                    |   | I <sub>A</sub> = -24 mA, 0 ≤ V <sub>Bn</sub> ≤ V <sub>CC</sub>   | 3.0                    |                        |       |                 |   | 50  |      |
|                    |   | I <sub>A</sub> = -8 mA, 0 ≤ V <sub>Bn</sub> ≤ V <sub>CC</sub>    | 2.3                    |                        |       |                 |   | 100   |      |
|                    |   | I <sub>A</sub> = -4 mA, 0 ≤ V <sub>Bn</sub> ≤ V <sub>CC</sub>    | 1.65                   |                        |       |                 |   | 300   |      |
| ΔR <sub>ON</sub>   | On Resistance Match Between Channels (Note 3) (Note 4) (Note 5) | I <sub>A</sub> = -30 mA, V <sub>Bn</sub> = 3.15                  | 4.5                    |                        | 0.15  |                 |   |   | Ω    |
|                    |   | I <sub>A</sub> = -24 mA, V <sub>Bn</sub> = 2.1                   | 3.0                    |                        | 0.2   |                 |   |   |      |
|                    |   | I <sub>A</sub> = -8 mA, V <sub>Bn</sub> = 1.6                    | 2.3                    |                        | 0.5   |                 |   |   |      |
|                    |   | I <sub>A</sub> = -4 mA, V <sub>Bn</sub> = 1.15                   | 1.65                   |                        | 0.5   |                 |   |   |      |
| R <sub>flat</sub>  | On Resistance Flatness (Note 3) (Note 4) (Note 6)               | I <sub>A</sub> = -30 mA, 0 ≤ V <sub>Bn</sub> ≤ V <sub>CC</sub>   | 5.0                    |                        | 6.0   |                 |   |   | Ω    |
|                    |   | I <sub>A</sub> = -24 mA, 0 ≤ V <sub>Bn</sub> ≤ V <sub>CC</sub>   | 3.3                    |                        | 12    |                 |   |   |      |
|                    |   | I <sub>A</sub> = -8 mA, 0 ≤ V <sub>Bn</sub> ≤ V <sub>CC</sub>    | 2.5                    |                        | 28    |                 |   |   |      |
|                    |   | I <sub>A</sub> = -4 mA, 0 ≤ V <sub>Bn</sub> ≤ V <sub>CC</sub>    | 1.8                    |                        | 125   |                 |   |   |      |

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.

- Measured by the voltage drop between A and B pins at the indicated current through the switch. On Resistance is determined by the lower of the voltages on the two (A or B Ports).
- Parameter is characterized but not tested in production.
- ΔR<sub>ON</sub> = R<sub>ON</sub> max – R<sub>ON</sub> min measured at identical V<sub>CC</sub>, temperature and voltage levels.
- Flatness is defined as the difference between the maximum and minimum value of On Resistance over the specified range of conditions.
- Guaranteed by Design.

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## AC ELECTRICAL CHARACTERISTICS – NLASB3157

| Symbol                               | Parameter  | Test Conditions  | V <sub>CC</sub><br>(V)                     | T <sub>A</sub> = +25°C |            |                           | T <sub>A</sub> = -40°C to +85°C |                         | Unit | Figure Number   |
|--------------------------------------|--|--|--|------------------------|------------|---------------------------|---------------------------------|-------------------------|------|-----------------|
|                                      |  |  |  | Min                    | Typ        | Max                       | Min                             | Max                     |      |                 |
| t <sub>PHL</sub><br>t <sub>PLH</sub> | Propagation Delay<br>Bus to Bus (Note 9)                     | V <sub>I</sub> = OPEN  | 1.65–1.95<br>2.3–2.7<br>3.0–3.6<br>4.5–5.5 |                        |            |                           |                                 | 1.2<br>0.8<br>0.3       | ns   | Figures<br>2, 3 |
| t <sub>PZL</sub><br>t <sub>PZH</sub> | Output Enable Time<br>Turn On Time<br>(A to B <sub>n</sub> ) | V <sub>I</sub> = 2 × V <sub>CC</sub> for t <sub>PZL</sub><br>V <sub>I</sub> = 0 V for t <sub>PZH</sub> | 1.65–1.95<br>2.3–2.7<br>3.0–3.6<br>4.5–5.5 |                        |            | 23<br>13<br>6.9<br>5.2    | 7.0<br>3.5<br>2.5<br>1.7        | 24<br>14<br>7.6<br>5.7  | ns   | Figures<br>2, 3 |
| t <sub>PLZ</sub><br>t <sub>PHZ</sub> | Output Disable Time<br>Turn Off Time<br>(A Port to B Port)   | V <sub>I</sub> = 2 × V <sub>CC</sub> for t <sub>PLZ</sub><br>V <sub>I</sub> = 0 V for t <sub>PHZ</sub> | 1.65–1.95<br>2.3–2.7<br>3.0–3.6<br>4.5–5.5 |                        |            | 12.5<br>7.0<br>5.0<br>3.5 | 3.0<br>2.0<br>1.5<br>0.8        | 13<br>7.5<br>5.3<br>3.8 | ns   | Figures<br>2, 3 |
| t <sub>B-M</sub>                     | Break Before Make<br>Time (Note 8)                           |  | 1.65–1.95<br>2.3–2.7<br>3.0–3.6<br>4.5–5.5 |                        |            |                           | 0.5<br>0.5<br>0.5<br>0.5        |                         | ns   | Figure 4        |
| Q                                    | Charge Injection<br>(Note 8)                                 | C <sub>L</sub> = 0.1 nF, V <sub>GEN</sub> = 0 V<br>R <sub>GEN</sub> = 0 Ω                              | 5.0<br>3.3                                 |                        | 7.0<br>3.0 |                           |                                 |                         | pC   | Figure 5        |
| OIRR                                 | Off Isolation (Note 10)                                      | R <sub>L</sub> = 50 Ω<br>f = 10 MHz  | 1.65–5.5                                   |                        | -57        |                           |                                 |                         | dB   | Figure 6        |
| Xtalk                                | Crosstalk  | R <sub>L</sub> = 50 Ω<br>f = 10 MHz  | 1.65–5.5                                   |                        | -54        |                           |                                 |                         | dB   | Figure 7        |
| BW                                   | -3 dB Bandwidth  | R <sub>L</sub> = 50 Ω  | 1.65–5.5                                   |                        | 250        |                           |                                 |                         | MHz  | Figure 10       |
| THD                                  | Total Harmonic<br>Distortion (Note 8)                        | R <sub>L</sub> = 600 Ω<br>0.5 V <sub>P-P</sub><br>f = 600 Hz to 20 kHz                                 | 5.0  |                        | 0.011      |                           |                                 |                         | %    |                 |

## CAPACITANCE – NLASB3157 (Note 11)

| Symbol              | Parameter                                 | Test Conditions         | Typ  | Max | Unit | Figure Number |
|---------------------|---|-------------------------|------|-----|------|---------------|
| C <sub>IN</sub>     | Select Pin Input Capacitance              | V <sub>CC</sub> = 0 V   | 2.3  |     | pF   |               |
| C <sub>IO-B</sub>   | B Port Off Capacitance                    | V <sub>CC</sub> = 5.0 V | 6.5  |     | pF   | Figure 8      |
| C <sub>IOA-ON</sub> | A Port Capacitance when Switch is Enabled | V <sub>CC</sub> = 5.0 V | 18.5 |     | pF   | Figure 9      |

8. Guaranteed by Design.

9. This parameter is guaranteed by design but not tested. The bus switch contributes no propagation delay other than the RC delay of the On Resistance of the switch and the 50 pF load capacitance, when driven by an ideal voltage source (zero output impedance).

10. Off Isolation = 20 log<sub>10</sub> [V<sub>A</sub>/V<sub>Bn</sub>].

11. T<sub>A</sub> = +25°C, f = 1 MHz, Capacitance is characterized but not tested in production.

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## APPENDIX A

### DC ELECTRICAL EXTENDED AUTOMOTIVE TEMPERATURE RANGE CHARACTERISTICS – NLVASB3157

| Symbol             | Parameter  | Test Conditions  | V <sub>CC</sub><br>(V) | T <sub>A</sub> = +25°C |       |                 | T <sub>A</sub> = -55°C to +125°C            |   | Unit |
|--------------------|--|--|------------------------|------------------------|-------|-----------------|---|---|------|
|                    |  |  |                        | Min                    | Typ   | Max             | Min   | Max   |      |
| V <sub>IH</sub>    | HIGH Level Input Voltage                               |  | 1.65–1.95<br>2.3–5.5   |                        |       |                 | 0.75 V <sub>CC</sub><br>0.7 V <sub>CC</sub> |   | V    |
| V <sub>IL</sub>    | LOW Level Input Voltage                                |  | 1.65–1.95<br>2.3–5.5   |                        |       |                 |   | 0.25 V <sub>CC</sub><br>0.3 V <sub>CC</sub> | V    |
| I <sub>IN</sub>    | Input Leakage Current                                  | 0 ≤ V <sub>IN</sub> ≤ 5.5 V  | 0–5.5                  |                        | ±0.05 | ±0.1            |   | ±1  | μA   |
| I <sub>OFF</sub>   | OFF State Leakage Current                              | 0 ≤ A, B ≤ V <sub>CC</sub>   | 1.65–5.5               |                        | ±0.05 | ±0.1            |   | ±1  | μA   |
| R <sub>ON</sub>    | Switch On Resistance<br>(Note 12)                      | V <sub>IN</sub> = 0 V, I <sub>O</sub> = 30 mA                        | 4.5                    |                        | 3.0   |                 |   | 8.5   | Ω    |
|                    |  | V <sub>IN</sub> = 2.4 V, I <sub>O</sub> = -30 mA                     |                        |                        | 5.0   |                 | 13.0  |   |      |
|                    |  | V <sub>IN</sub> = 4.5 V, I <sub>O</sub> = -30 mA                     |                        |                        | 7.0   |                 | 15.0  |   |      |
|                    |  | V <sub>IN</sub> = 0 V, I <sub>O</sub> = 24 mA                        | 3.0                    |                        | 4.0   |                 | 11  |   |      |
|                    |  | V <sub>IN</sub> = 3 V, I <sub>O</sub> = -24 mA                       |                        |                        | 10    |                 | 20  |   |      |
|                    |  | V <sub>IN</sub> = 0 V, I <sub>O</sub> = 8 mA                         | 2.3                    |                        | 5.0   |                 | 12  |   |      |
|                    |  | V <sub>IN</sub> = 2.3 V, I <sub>O</sub> = -8 mA                      |                        |                        | 13    |                 | 30  |   |      |
|                    |  | V <sub>IN</sub> = 0 V, I <sub>O</sub> = 4 mA                         | 1.65                   |                        | 6.5   |                 | 20  |   |      |
|                    |  | V <sub>IN</sub> = 1.65 V, I <sub>O</sub> = -4 mA                     |                        |                        | 17    |                 | 50  |   |      |
| I <sub>CC</sub>    | Quiescent Supply Current<br>All Channels ON or OFF     | V <sub>IN</sub> = V <sub>CC</sub> or GND<br><br>I <sub>OUT</sub> = 0 | 5.5                    |                        |       | 1.0             |   | 10  | μA   |
|                    | Analog Signal Range                                    |  | V <sub>CC</sub>        | 0                      |       | V <sub>CC</sub> | 0   | V <sub>CC</sub>                             | V    |
| R <sub>RANGE</sub> | On Resistance Over Signal Range<br>(Note 12) (Note 14) | I <sub>A</sub> = -30 mA, 0 ≤ V <sub>Bn</sub> ≤ V <sub>CC</sub>       | 4.5                    |                        |       |                 |   | 25  | Ω    |
|                    |  | I <sub>A</sub> = -24 mA, 0 ≤ V <sub>Bn</sub> ≤ V <sub>CC</sub>       |                        |                        |       |                 | 50  |   |      |
|                    |  | I <sub>A</sub> = -8 mA, 0 ≤ V <sub>Bn</sub> ≤ V <sub>CC</sub>        | 3.0                    |                        |       |                 | 100   |   |      |
|                    |  | I <sub>A</sub> = -4 mA, 0 ≤ V <sub>Bn</sub> ≤ V <sub>CC</sub>        | 2.3                    |                        |       |                 | 300   |   |      |
|                    |  | I <sub>A</sub> = -4 mA, 0 ≤ V <sub>Bn</sub> ≤ V <sub>CC</sub>        | 1.65                   |                        |       |                 |   |   |      |

12. Measured by the voltage drop between A and B pins at the indicated current through the switch. On Resistance is determined by the lower of the voltages on the two (A or B Ports).

13. Flatness is defined as the difference between the maximum and minimum value of On Resistance over the specified range of conditions.

14. Guaranteed by Design.

\* For ΔR<sub>ON</sub>, R<sub>FLAT</sub>, Q, OIRR, Xtalk, BW, THD, and CIN see -40°C to 85°C section.

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## APPENDIX A

### AC ELECTRICAL EXTENDED AUTOMOTIVE TEMPERATURE RANGE CHARACTERISTICS – NLVASB3157

| Symbol                               | Parameter  | Test Conditions  | V <sub>CC</sub><br>(V)                     | T <sub>A</sub> = +25°C |     |                           | T <sub>A</sub> = -55°C to +125°C |                         | Unit | Figure Number   |
|--------------------------------------|--|--|--|------------------------|-----|---------------------------|----------------------------------|-------------------------|------|-----------------|
|                                      |  |  |  | Min                    | Typ | Max                       | Min                              | Max                     |      |                 |
| t <sub>PHL</sub><br>t <sub>PLH</sub> | Propagation Delay<br>Bus to Bus (Note 16)                    | V <sub>I</sub> = OPEN  | 1.65–1.95<br>2.3–2.7<br>3.0–3.6<br>4.5–5.5 |                        |     |                           |                                  | 1.2<br>0.8<br>0.3       | ns   | Figures<br>2, 3 |
| t <sub>PZL</sub><br>t <sub>PZH</sub> | Output Enable Time<br>Turn On Time<br>(A to B <sub>n</sub> ) | V <sub>I</sub> = 2 × V <sub>CC</sub> for t <sub>PZL</sub><br>V <sub>I</sub> = 0 V for t <sub>PZH</sub> | 1.65–1.95<br>2.3–2.7<br>3.0–3.6<br>4.5–5.5 |                        |     | 23<br>13<br>6.9<br>5.2    | 7.0<br>3.5<br>2.5<br>1.7         | 24<br>14<br>9.0<br>7.0  | ns   | Figures<br>2, 3 |
| t <sub>PLZ</sub><br>t <sub>PHZ</sub> | Output Disable Time<br>Turn Off Time<br>(A Port to B Port)   | V <sub>I</sub> = 2 × V <sub>CC</sub> for t <sub>PLZ</sub><br>V <sub>I</sub> = 0 V for t <sub>PHZ</sub> | 1.65–1.95<br>2.3–2.7<br>3.0–3.6<br>4.5–5.5 |                        |     | 12.5<br>7.0<br>5.0<br>3.5 | 3.0<br>2.0<br>1.5<br>0.8         | 13<br>7.5<br>6.5<br>5.0 | ns   | Figures<br>2, 3 |
| t <sub>B-M</sub>                     | Break Before Make<br>Time (Note 15)                          |  | 1.65–1.95<br>2.3–2.7<br>3.0–3.6<br>4.5–5.5 |                        |     |                           | 0.5<br>0.5<br>0.5<br>0.5         |                         | ns   | Figure 4        |

15. Guaranteed by Design.

16. This parameter is guaranteed by design but not tested. The bus switch contributes no propagation delay other than the RC delay of the On Resistance of the switch and the 50 pF load capacitance, when driven by an ideal voltage source (zero output impedance).

\* For  $\Delta R_{ON}$ ,  $R_{FLAT}$ ,  $Q$ ,  $OIRR$ ,  $Xtalk$ ,  $BW$ ,  $THD$ , and  $CIN$  see  $-40^{\circ}\text{C}$  to  $85^{\circ}\text{C}$  section.

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## AC LOADING AND WAVEFORMS

NOTE: Input driven by 50 Ω source terminated in 50 Ω  
 NOTE:  $C_L$  includes load and stray capacitance  
 NOTE: Input PRR = 1.0 MHz;  $t_W = 500$  ns

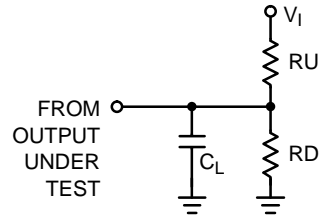


Figure 2. AC Test Circuit

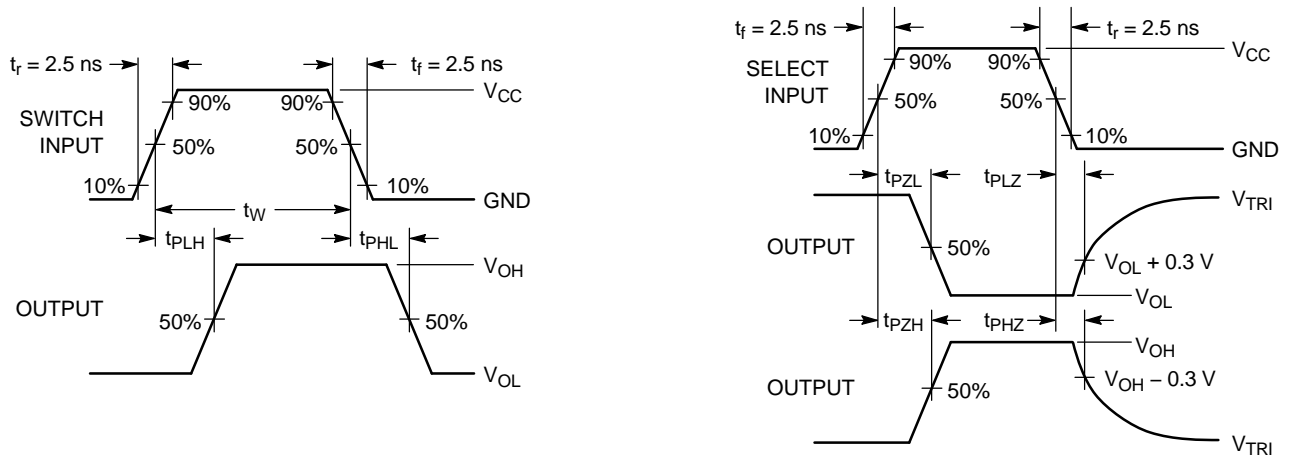


Figure 3. AC Waveforms

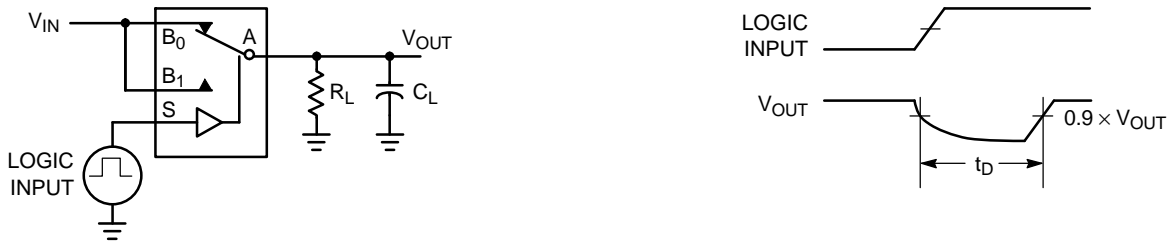


Figure 4. Break Before Make Interval Timing

AC LOADING AND WAVEFORMS

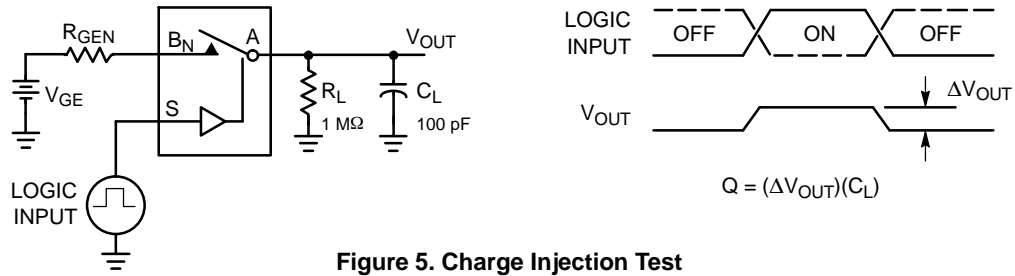


Figure 5. Charge Injection Test

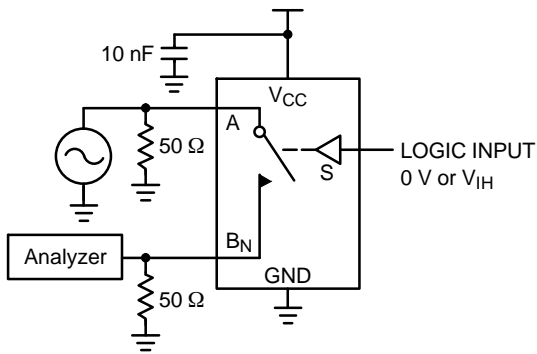


Figure 6. Off Isolation

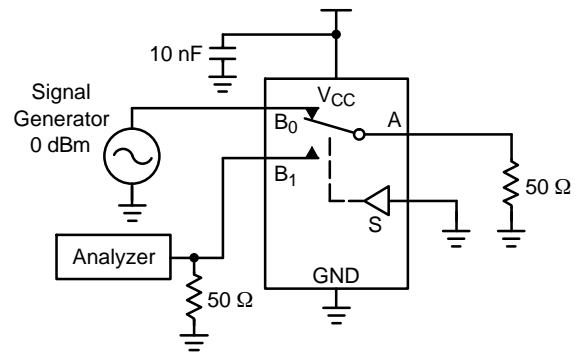


Figure 7. Crosstalk

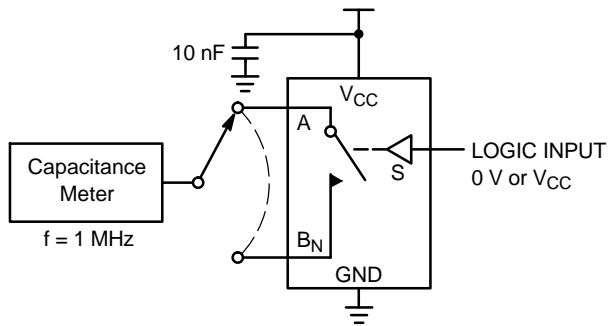


Figure 8. Channel Off Capacitance

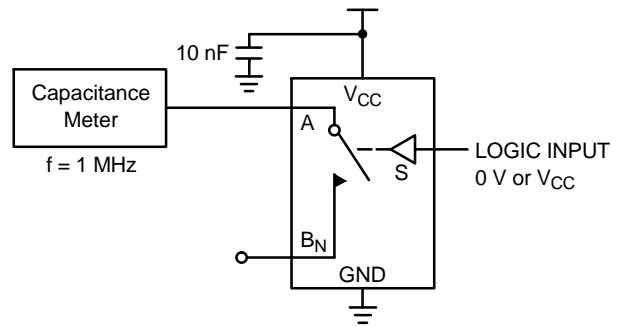


Figure 9. Channel On Capacitance

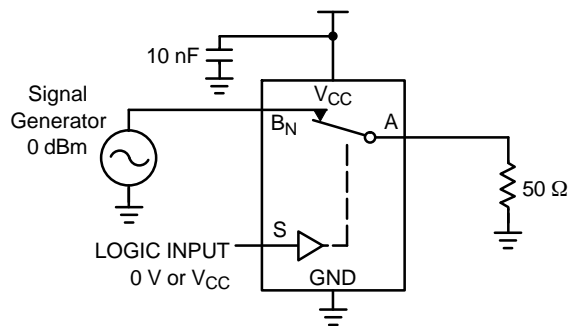


Figure 10. Bandwidth



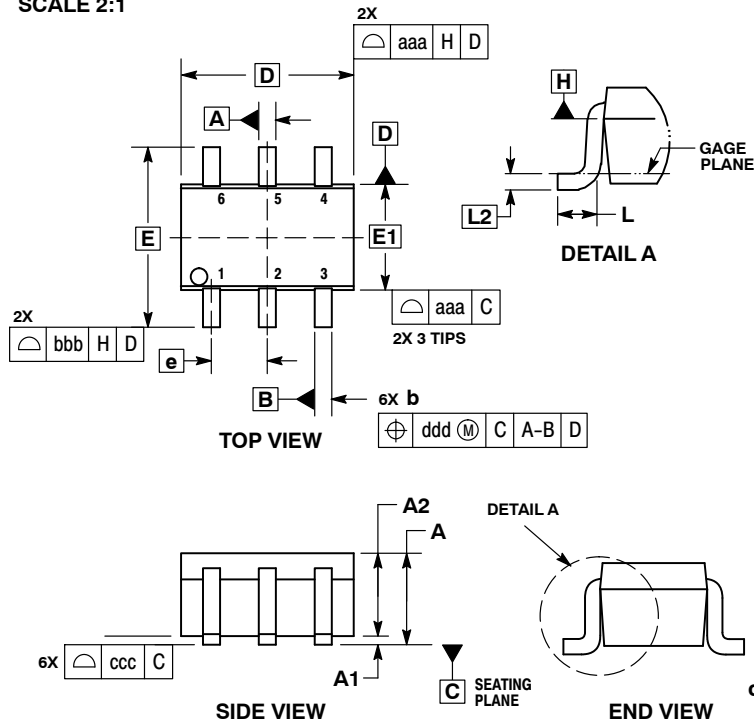
# MECHANICAL CASE OUTLINE PACKAGE DIMENSIONS



1  
SCALE 2:1

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

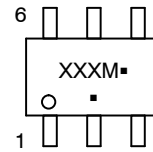
DATE 11 DEC 2012



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

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

### GENERIC MARKING DIAGRAM\*



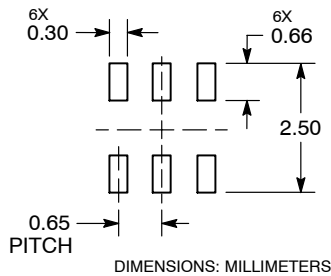
- XXX = Specific Device Code
- M = Date Code\*
- = Pb-Free Package

(Note: Microdot may be in either location)

\*Date Code orientation and/or position may vary depending upon manufacturing location.

\*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 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.

### STYLES ON PAGE 2

|                         |                             |  |
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| <b>DESCRIPTION:</b>     | <b>SC-88/SC70-6/SOT-363</b> | <b>PAGE 1 OF 2</b>   |

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

DATE 11 DEC 2012

|   |   |  |  |  |  |
|---|---|--|--|--|--|
| <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

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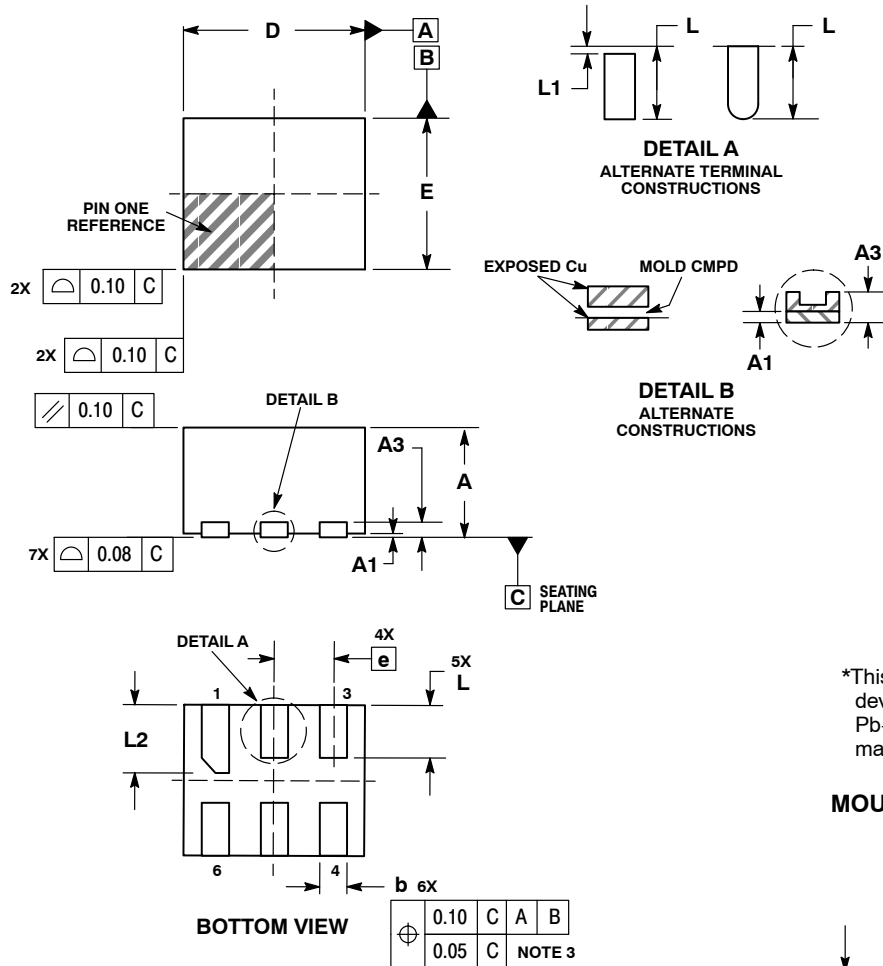


WDFN6 1.2x1.0, 0.4P  
CASE 506AS  
ISSUE D

DATE 27 AUG 2013



SCALE 4:1



**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 0.25 AND 0.30mm FROM TERMINAL.
4. COPLANARITY APPLIES TO THE EXPOSED PAD AS WELL AS THE TERMINALS.

| DIM | MILLIMETERS |      |
|-----|-------------|------|
|     | MIN         | MAX  |
| A   | 0.70        | 0.80 |
| A1  | 0.00        | 0.05 |
| A3  | 0.20 REF    |      |
| b   | 0.15        | 0.25 |
| D   | 1.20 BSC    |      |
| E   | 1.00 BSC    |      |
| e   | 0.40 BSC    |      |
| L   | 0.30        | 0.40 |
| L1  | 0.00        | 0.15 |
| L2  | 0.40        | 0.50 |

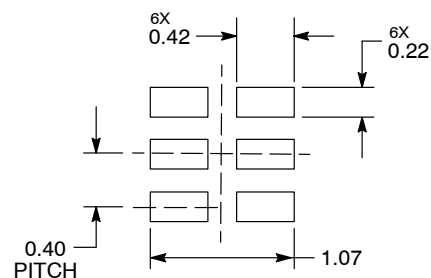
**GENERIC MARKING DIAGRAM\***



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.

**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.

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

|                         |                                |  |
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