## NLAS2066

## Ultra-Small Dual Single Pole, Single Throw Analog Switch with Over Voltage Tolerance

The NLAS2066 is a Dual SPST (Single Pole, Single Throw) Analog Switch high performance version of the popular NLAS323. Packaged in the ultra-small US8 package. It is designed as a general analog/digital switch and can also be used to isolate USB ports.

## Features

- Same Pinout as the Popular NLAS323
- Excellent Performance - Maximum RDS ON $15 \Omega$ at 3.0 V
- Matching Between the Switches $\pm 1.5 \Omega$ at 3.0 V
- 1.65 V to 5.5 V Operating Range
- Lower Threshold Voltages for LVTTL/CMOS Levels
- Ultra-Low Charge Injection $\leq 4.8 \mathrm{pC}$ at 3.0 V
- Low Standby Power $-\mathrm{I}_{\mathrm{CC}}=1.0 \mathrm{nA}$ (max) @ $\mathrm{T}_{\mathrm{A}}=25^{\circ} \mathrm{C}$
- CMOS Level Compatibility
- OVT* (Pins 1, 3, 5, and 7) These Pins may be Subjected to 0 to +7.0 V , Regardless of Operating Voltage
- Allows a Short from USB Line without Damage to the Device
- These Devices are $\mathrm{Pb}-$ Free, Halogen Free/BFR Free and are RoHS Compliant


## Typical Applications

- USB Isolation
- Cell Phones
- PDAs
- MP3s Digital Still Cameras


## Important Information

- ESD Protection: Human Body Model; > 1500 V

Machine Model; > 200 V

- Latch-Up Maximum Rating: 200 mA

See detailed ordering and shipping information in the package dimensions section on page 8 of this data sheet.

## ON Semiconductor ${ }^{\circledR}$

www.onsemi.com

(Note: Microdot may be in either location)

PIN ASSIGNMENT

| Pin | Function | OVT |
| :---: | :---: | :---: |
| 1 | NO1 | Yes |
| 2 | COM1 | - |
| 3 | IN2 | Yes |
| 4 | GND | - |
| 5 | NO2 | Yes |
| 6 | COM2 | - |
| 7 | IN1 | Yes |
| 8 | V CC |  |

FUNCTION TABLE

| On/Off <br> Enable Input | State of <br> Analog Switch |
| :---: | :---: |
| L | Off |
| H | On |

ORDERING INFORMATION
-

Over Voltage Tolerance (OVT) enables pins to function outside (higher) of their operating voltages, with no damage to the devices or to signal integrity.

MAXIMUM RATINGS

| Symbol | Rating | Value | Unit |
| :---: | :---: | :---: | :---: |
| $\mathrm{V}_{\mathrm{CC}}$ | DC Supply Voltage | -0.5 to +7.0 | V |
| $\mathrm{V}_{1}$ | $\begin{array}{lr}\text { DC Input Voltage } & \text { Pins 1, 3, 5, } 7 \\ \text { Pins 2, } 6\end{array}$ | $\begin{aligned} & -0.5 \text { to }+7.0 \\ & -0.5 \text { to } \mathrm{V}_{\mathrm{CC}} \end{aligned}$ | V |
| $\mathrm{V}_{\mathrm{O}}$ | DC Output Voltage | -0.5 to +7.0 | V |
| $\mathrm{I}_{\mathrm{IK}}$ | DC Input Diode Current $\quad \mathrm{V}_{1}<$ GND | -50 | mA |
| lok | DC Output Diode Current $\quad \mathrm{V}_{\mathrm{O}}<\mathrm{GND}$ | -50 | mA |
| lo | DC Output Sink Current | $\pm 50$ | mA |
| $I_{\text {cc }}$ | DC Supply Current per Supply Pin | $\pm 100$ | mA |
| $\mathrm{I}_{\mathrm{GND}}$ | DC Ground Current per Ground Pin | $\pm 100$ | mA |
| $\mathrm{T}_{\text {STG }}$ | Storage Temperature Range | -65 to +150 | ${ }^{\circ} \mathrm{C}$ |
| $\mathrm{T}_{\mathrm{L}}$ | Lead Temperature, 1 mm from Case for 10 Seconds | 260 | ${ }^{\circ} \mathrm{C}$ |
| $\mathrm{T}_{J}$ | Junction Temperature under Bias | + 150 | ${ }^{\circ} \mathrm{C}$ |
| $\theta_{\text {JA }}$ | Thermal Resistance (Note 1) | 250 | ${ }^{\circ} \mathrm{C} / \mathrm{W}$ |
| $\mathrm{P}_{\mathrm{D}}$ | Power Dissipation in Still Air at $85^{\circ} \mathrm{C}$ | 250 | mW |
| MSL | Moisture Sensitivity | Level 1 | - |
| $\mathrm{F}_{\mathrm{R}}$ | Flammability Rating Oxygen Index: 28 to 34 | UL 94 V-0 @ 0.125 in | - |
| $\mathrm{V}_{\text {ESD }}$ | ESD Withstand Voltage Human Body Model (Note 2) <br> Machine Model (Note 3) <br> Charged Device Model (Note 4) | $\begin{gathered} >1500 \\ >200 \\ \text { N/A } \end{gathered}$ | V |

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

1. Measured with minimum pad spacing on an FR4 board, using 10 mm -by-1 inch, 2-ounce copper trace with no air flow
2. Tested to EIA/JESD22-A114-A
3. Tested to EIA/JESD22-A115-A
4. Tested to JESD22-C101-A

## RECOMMENDED OPERATING CONDITIONS

| Symbol | Characteristics |  | Min | Max | Unit |
| :---: | :---: | :---: | :---: | :---: | :---: |
| $\mathrm{V}_{\text {CC }}$ | Positive DC Supply Voltage |  | 1.65 | 5.5 | V |
| $\mathrm{V}_{\text {IN }}$ | Digital Input Voltage (INx) |  | GND | 5.5 | V |
| $\mathrm{V}_{10}$ | Static or Dynamic Voltage Across an Off Switch |  | GND | $\mathrm{V}_{\text {CC }}$ | V |
| $V_{\text {IS }}$ | Analog Input Voltage | $\begin{array}{r} \mathrm{NO} \\ \mathrm{COM} \end{array}$ | $\begin{aligned} & \text { GND } \\ & \text { GND } \end{aligned}$ | $\begin{gathered} 5.5 \\ \mathrm{~V}_{\mathrm{CC}} \end{gathered}$ | V |
| $\mathrm{T}_{\mathrm{A}}$ | Operating Temperature Range, All Package Types |  | -55 | +125 | ${ }^{\circ} \mathrm{C}$ |
| $\mathrm{tr}_{\mathrm{r}}, \mathrm{t}_{\mathrm{f}}$ | Input Rise or Fall Time (Enable Input) | $\begin{aligned} & \mathrm{V}_{\mathrm{CC}}=3.3 \mathrm{~V} \pm 0.3 \mathrm{~V} \\ & \mathrm{~V}_{\mathrm{CC}}=5.0 \mathrm{~V} \pm 0.5 \mathrm{~V} \end{aligned}$ | $\begin{aligned} & \hline 0 \\ & 0 \end{aligned}$ | $\begin{aligned} & 100 \\ & 20 \end{aligned}$ | $\mathrm{ns} / \mathrm{V}$ |

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.

## NLAS2066

DEVICE JUNCTION TEMPERATURE VS. TIME TO $0.1 \%$ BOND FAILURES

| Junction <br> Temperature ${ }^{\circ} \mathbf{C}$ | Time, Hours | Time, Years |
| :---: | :---: | :---: |
| 80 | $1,032,200$ | 117.8 |
| 90 | 419,300 | 47.9 |
| 100 | 178,700 | 20.4 |
| 110 | 79,600 | 9.4 |
| 120 | 37,000 | 4.2 |
| 130 | 17,800 | 2.0 |
| 140 | 8,900 | 1.0 |



Figure 1. Failure Rate vs. Time Junction Temperature

DC CHARACTERISTICS - Digital Section (Voltages Referenced to GND)

| Symbol | Parameter | Condition | $\mathrm{V}_{\mathrm{Cc}}$ | Guaranteed Max Limit |  |  | Unit |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  | $25^{\circ} \mathrm{C}$ | -40 to $85^{\circ} \mathrm{C}$ | -55 to $<125^{\circ} \mathrm{C}$ |  |
| $\mathrm{V}_{\mathrm{IH}}$ | Minimum HighLevel Input Voltage, Enable Inputs |  | $\begin{aligned} & 2.3 \pm 10 \% \\ & 2.7 \pm 10 \% \\ & 3.0 \pm 10 \% \\ & 5.0 \pm 10 \% \end{aligned}$ | $\mathrm{V}_{\mathrm{CC}} \times 0.55$ <br> $V_{C C} \times 0.55$ <br> $V_{C C} \times 0.55$ <br> $\mathrm{V}_{\mathrm{CC}} \times 0.55$ | $\mathrm{V}_{\mathrm{CC}} \times 0.55$ <br> $\mathrm{V}_{\text {CC }} \times 0.55$ <br> $\mathrm{V}_{\text {CC }} \times 0.55$ <br> $\mathrm{V}_{\mathrm{CC}} \times 0.55$ | $V_{C C} \times 0.55$ <br> $V_{\text {CC }} \times 0.55$ <br> $\mathrm{V}_{\text {CC }} \times 0.55$ <br> $\mathrm{V}_{\text {CC }} \times 0.55$ | V |
| VIL | Maximum LowLevel Input Voltage, Enable Inputs |  | $\begin{aligned} & 2.3 \pm 10 \% \\ & 2.7 \pm 10 \% \\ & 3.0 \pm 10 \% \\ & 5.0 \pm 10 \% \end{aligned}$ | $\mathrm{V}_{\mathrm{CC}} \times 0.30$ <br> $V_{C C} \times 0.30$ <br> $V_{C C} \times 0.30$ <br> $V_{C C} \times 0.30$ | $\mathrm{V}_{\mathrm{CC}} \times 0.30$ <br> $V_{C C} \times 0.30$ <br> $V_{\text {CC }} \times 0.30$ <br> $V_{C C} \times 0.30$ | $V_{C C} \times 0.30$ <br> $V_{\text {CC }} \times 0.30$ <br> $V_{\text {CC }} \times 0.30$ <br> $\mathrm{V}_{\mathrm{CC}} \times 0.30$ | V |
| $\mathrm{I}_{\mathrm{IN}}$ | Maximum Input Leakage Current, Enable Inputs | $\mathrm{V}_{\mathrm{IN}}=5.5 \mathrm{~V}$ or GND | 0 V to 5.5 V | $\pm 0.1$ | $\pm 1.0$ | $\pm 1.0$ | $\mu \mathrm{A}$ |
| $\mathrm{I}_{\mathrm{CC}}$ | Maximum Quiescent Supply Current (per package) | Enable and $\mathrm{V}_{\mathrm{IS}}=\mathrm{V}_{\mathrm{CC}}$ or GND | 5.5 | 1.0 | 1.0 | 2.0 | $\mu \mathrm{A}$ |

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.

DC ELECTRICAL CHARACTERISTICS - Analog Section

| Symbol | Parameter | Condition | $\mathrm{V}_{\mathrm{cc}}$ | Guaranteed Max Limit |  |  | Unit |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  | $25^{\circ} \mathrm{C}$ | -40 to $85^{\circ} \mathrm{C}$ | -55 to $<125^{\circ} \mathrm{C}$ |  |
| RON | Maximum On Resistance | $V_{I N}=V_{I H}$ $I_{S}=8 \mathrm{~mA}$ <br> $V_{I S}=V_{C C}$ to $G N D$ $I_{S}=8 \mathrm{~mA}$ <br>  $I_{\mathrm{S}}=24 \mathrm{~mA}$ <br>  $I_{\mathrm{S}}=32 \mathrm{~mA}$ <br> (Figures 2 and 3) | $\begin{array}{\|l\|} \hline 2.3 \\ 2.7 \\ 3.0 \\ 4.5 \end{array}$ | $\begin{gathered} 50 \\ 20 \\ 15 \\ 7 \end{gathered}$ | $\begin{aligned} & 54 \\ & 24 \\ & 19 \\ & 11 \end{aligned}$ | $\begin{aligned} & 54 \\ & 24 \\ & 19 \\ & 11 \end{aligned}$ | $\Omega$ |
| R $\mathrm{FLAT}^{\text {(ON }}$ ) | On Resistance Flatness | $V_{I N}=V_{I H}$ $I_{S}=8 \mathrm{~mA}$ <br> $V_{I S}=0$ to $V_{C C}$ $I_{S}=8 \mathrm{~mA}$ <br>  $I_{\mathrm{S}}=24 \mathrm{~mA}$ <br>  $I_{\mathrm{S}}=32 \mathrm{~mA}$ <br> (Figure 5) | $\begin{array}{\|l} \hline 2.3 \\ 2.7 \\ 3.0 \\ 4.5 \end{array}$ | $\begin{gathered} \hline 60 \\ 24 \\ 13.5 \\ 3.0 \end{gathered}$ | $\begin{gathered} \hline 60 \\ 24 \\ 13.5 \\ 3.0 \end{gathered}$ | $\begin{gathered} 60 \\ 24 \\ 13.5 \\ 3.0 \end{gathered}$ | $\Omega$ |
| $\Delta \mathrm{R}_{\mathrm{ON}}$ | On Resistance Match Between Channels | $\begin{aligned} & \hline \mathrm{V}_{\text {S }}=1.4 \mathrm{~V} \\ & \mathrm{~V}_{\text {IS }}=1.6 \mathrm{~V} \\ & \mathrm{~V}_{\text {IS }}=1.8 \mathrm{~V} \\ & \mathrm{~V}_{\text {IS }}=2.7 \mathrm{~V} \end{aligned}$ <br> (Figures 4, 5 and 6) | $\begin{array}{\|l\|} \hline 2.3 \\ 2.7 \\ 3.0 \\ 4.5 \end{array}$ | $\begin{aligned} & 1.3 \\ & 1.4 \\ & 1.5 \\ & 2.0 \end{aligned}$ | $\begin{aligned} & 1.3 \\ & 1.4 \\ & 1.5 \\ & 2.0 \end{aligned}$ | $\begin{aligned} & 1.3 \\ & 1.4 \\ & 1.5 \\ & 2.0 \end{aligned}$ | $\Omega$ |
| $\mathrm{I}_{\text {NO(OFF) }}$ | Off Leakage Current | $\begin{aligned} & \mathrm{V}_{\mathrm{IN}}=\mathrm{V}_{\mathrm{IL}} \\ & \mathrm{~V}_{\mathrm{NO}}=1.0 \mathrm{~V}, \mathrm{~V}_{\mathrm{COM}}=4.5 \mathrm{~V} \\ & \text { or } \\ & \mathrm{V}_{\mathrm{COM}}=1.0 \mathrm{~V} \text { and } \mathrm{V}_{\mathrm{NO}} 4.5 \mathrm{~V} \end{aligned}$ | 5.5 | 1.0 | 10 | 100 | nA |
| ICOM(OFF) | Off Leakage Current | $\begin{aligned} & \hline \mathrm{V}_{\mathrm{IN}}=\mathrm{V}_{\mathrm{IL}} \\ & \mathrm{~V}_{\mathrm{NO}}=4.5 \mathrm{~V} \text { or } 1.0 \mathrm{~V} \\ & \mathrm{~V}_{\mathrm{COM}}=1.0 \mathrm{~V} \text { or } 4.5 \mathrm{~V} \\ & \hline \end{aligned}$ | 5.5 | 1.0 | 10 | 100 | nA |

AC ELECTRICAL CHARACTERISTICS (Input $t_{r}=t_{f}=3.0 \mathrm{~ns}$ )

| Symbol | Parameter | Condition | $\mathrm{V}_{\mathrm{cc}}$ <br> (V) | Guaranteed Max Limit |  |  |  |  |  |  |  |  | Unit |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  | $25^{\circ} \mathrm{C}$ |  |  | -40 to $85^{\circ} \mathrm{C}$ |  |  | -55 to $<125^{\circ} \mathrm{C}$ |  |  |  |
|  |  |  |  | Min | Typ | Max | Min | Typ | Max | Min | Typ | Max |  |
| ton | Turn-On Time | $\mathrm{R}_{\mathrm{L}}=300 \Omega, \mathrm{C}_{\mathrm{L}}=35 \mathrm{pF}$ <br> (Figures 7, 14 and 15) | $\begin{array}{\|l\|} \hline 2.3 \\ 2.7 \\ 3.0 \\ 4.5 \end{array}$ |  | 8 4 3 2 | 9 5 4 3 |  |  | $\begin{gathered} \hline 10 \\ 7 \\ 6 \\ 5 \end{gathered}$ |  |  | $\begin{gathered} \hline 10 \\ 7 \\ 6 \\ 5 \end{gathered}$ | ns |
| toff | Turn-Off Time | $\mathrm{R}_{\mathrm{L}}=300 \Omega, \mathrm{C}_{\mathrm{L}}=35 \mathrm{pF}$ <br> (Figures 7, 14 and 15) | $\begin{aligned} & 2.3 \\ & 2.7 \\ & 3.0 \\ & 4.5 \end{aligned}$ |  | 8 6 5 4 | 10 <br> 8 <br> 7 <br> 6 |  |  | 11 9 8 7 |  |  | 11 9 8 7 | ns |


|  |  | Typical @ $25^{\circ} \mathrm{C}, \mathrm{V}_{\mathrm{CC}}=5.0 \mathrm{~V}$ | Unit |
| :---: | :---: | :---: | :---: |
| $\mathrm{C}_{\text {IN }}$ | Maximum Input Capacitance, Select Input | 3.0 | pF |
| $\mathrm{C}_{\mathrm{NO}}$ or $\mathrm{C}_{\mathrm{NC}}$ | Analog I/O (Switch Off) | 10 |  |
| $\mathrm{C}_{\text {COM (OFF) }}$ | Common I/O (Switch Off) | 10 |  |
| CCOM(ON) | Feedthrough (Switch Off) | 10 |  |

ADDITIONAL APPLICATIONS CHARACTERISTICS (Voltage Reference to GND Unless Noted)

| Symbol | Parameter | Condition | $\begin{aligned} & \mathrm{V}_{\mathrm{Cc}} \\ & (\mathrm{~V}) \end{aligned}$ | Typical $25^{\circ} \mathrm{C}$ | Unit |
| :---: | :---: | :---: | :---: | :---: | :---: |
| BW | Maximum On-Channel - 3.0 dB Bandwidth or Minimum Frequency Response | $\mathrm{V}_{\mathrm{IS}}=0 \mathrm{dBm}$ <br> (Figure 8 and 9 ) | $\begin{aligned} & 2.3 \\ & 2.7 \\ & 3.0 \\ & 4.5 \end{aligned}$ | $\begin{aligned} & 102 \\ & 175 \\ & 180 \\ & 186 \end{aligned}$ | MHz |
| $\mathrm{V}_{\text {ONL }}$ | Maximum Feed-Through On Loss | $\mathrm{V}_{\mathrm{IS}}=0 \mathrm{dBm} @ 10 \mathrm{kHz}$ <br> (Figure 8 and 9) | $\begin{aligned} & 2.3 \\ & 2.7 \\ & 3.0 \\ & 4.5 \end{aligned}$ | $\begin{aligned} & -2.2 \\ & -0.9 \\ & -0.8 \\ & -0.4 \end{aligned}$ | dB |
| $\mathrm{V}_{\text {ISO }}$ | Off-Channel Isolation | $\begin{gathered} f=100 \mathrm{kHz} \\ \mathrm{~V}_{\mathrm{IS}}=1.0 \mathrm{~V} \mathrm{RMS} \\ \text { (Figure } 10 \text { and } 11 \text { ) } \end{gathered}$ | $\begin{aligned} & \hline 2.3 \\ & 2.7 \\ & 3.0 \\ & 4.5 \end{aligned}$ | $\begin{aligned} & \hline-73 \\ & -74 \\ & -74 \\ & -75 \end{aligned}$ | dB |
| Q | Charge Injection <br> Enable Input to Common I/O | $\mathrm{V}_{I S}=\mathrm{V}_{\mathrm{CC}} \text { to } \mathrm{GND}, \mathrm{~F}_{\text {IS }}=20 \mathrm{kHz}$ | $\begin{aligned} & 3.0 \\ & 5.5 \end{aligned}$ | $\begin{aligned} & 4.8 \\ & 7.4 \end{aligned}$ | pC |
| THD | Total Harmonic Distortion TDH + Noise | $\begin{gathered} \mathrm{F}_{\mathrm{IS}}=10 \mathrm{~Hz} \text { to } 100 \mathrm{kHz}, \\ \mathrm{R}_{\mathrm{L}}=\text { Rgen }=600 \Omega, \mathrm{C}_{\mathrm{L}}=50 \mathrm{pF} \\ \text { (Figure 13) } \end{gathered}$ | $\begin{aligned} & 3.0 \\ & 5.5 \end{aligned}$ | $\begin{aligned} & 0.19 \\ & 0.06 \end{aligned}$ | \% |



Figure 2. $\mathrm{R}_{\mathrm{ON}} \mathrm{vs} . \mathrm{V}_{\mathrm{COM}}$ and $\mathrm{V}_{\mathrm{CC}}\left(@ 25^{\circ} \mathrm{C}\right)$


Figure 4. $R_{\mathrm{ON}}$ vs. $\mathrm{V}_{\mathrm{COM}}$ and Temperature, $\mathrm{V}_{\mathrm{cc}}=2.5 \mathrm{~V}$


Figure 6. RON vs. $\mathrm{V}_{\text {COM }}$ and Temperature, $\mathrm{V}_{\mathrm{CC}}=4.5 \mathrm{~V}$


Figure 3. R Ron $^{\text {vs. }} \mathrm{V}_{\text {Com }}$ and Temperature, $\mathrm{V}_{\mathrm{CC}}=2.0 \mathrm{~V}$


Figure 5. $\mathrm{R}_{\mathrm{ON}}$ vs. $\mathrm{V}_{\mathrm{COM}}$ and Temperature,

$$
V_{c \mathrm{CC}}=3.0 \mathrm{~V}
$$



Figure 7. Switching Time vs. Supply Voltage, $\mathrm{T}=25^{\circ} \mathrm{C}$


Figure 8. ON Channel Bandwidth and Phase Shift Over Frequency


Figure 10. Off Isolation and Crosstalk


Figure 12. Charge Injection vs. $\mathrm{V}_{\text {com }}$


Figure 9. ON Channel Bandwidth and Phase Shift Over Frequency


Figure 11. Off Isolation and Crosstalk


Figure 13. THD vs. Frequency

## TIMING INFORMATION



Figure 14. $\mathrm{t}_{\mathrm{ON}} / \mathrm{t}_{\mathrm{OFF}}$


Figure 15. $\mathrm{t}_{\mathrm{ON}} / \mathrm{t}_{\mathrm{OFF}}$

| $\mathbf{V}_{\mathbf{C C}}$ | $\mathbf{V M I}$ |
| :---: | :---: |
| 2.0 V | 1.0 V |
| 3.0 V | 1.5 V |
| 4.5 V | 1.5 V |

DEVICE ORDERING INFORMATION

| Device Order Number | Package | Shipping $^{\dagger}$ |
| :--- | :---: | :---: |
| NLAS2066USG | US8 <br> (Pb-Free) | $3,000 /$ Tape \& Reel |
| NLAS2066UST3G | US8 <br> (Pb-Free) | $10,000 /$ Tape \& Reel |

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## PACKAGE DIMENSIONS

US8
US SUFFIX
CASE 493-02
ISSUE D


1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETERS
3. DIMENSION A DOES NOT INCLUDE MOLD

FLASH, PROTRUSION OR GATE BURR. MOLD FLASH. PROTRUSION AND GATE BURR SHALL FLASH. PROTRUSION AND GATE BURR SHA
4. DIMENSION B DOES NOT INCLUDE INTERLEAD

DIMENSION B DOES NOT INCLUDE INTERLEAD
FLASH OR PROTRUSION. INTERLEAD FLASH FLASH OR PROTRUSION. INTERLEAD FLASH
AND PROTRUSION SHALL NOT EXCEED 0.14 MM (0.0055") PER SIDE.
5. LEAD FINISH IS SOLDER PLATING WITH THICKNESS OF 0.0076-0.0203MM (0.003-0.008").
6. ALL TOLERANCE UNLESS OTHERWISE SPECIFIED $\pm 0.0508 \mathrm{MM}$ ( 0.0002 ").

| DIM | MILLIMETERS |  | INCHES |  |
| :---: | :---: | :---: | :---: | :---: |
|  | MIN | MAX | MIN | MAX |
| A | 1.90 | 2.10 | 0.075 | 0.083 |
| B | 2.20 | 2.40 | 0.087 | 0.094 |
| C | 0.60 | 0.90 | 0.024 | 0.035 |
| D | 0.17 | 0.25 | 0.007 | 0.010 |
| F | 0.20 | 0.35 | 0.008 | 0.014 |
| G | 0.50 BSC |  | 0.020 BSC |  |
| H | 0.40 REF |  | 0.016 REF |  |
| J | 0.10 | 0.18 | 0.004 | 0.007 |
| K | 0.00 | 0.10 | 0.000 | 0.004 |
| L | 3.00 | 3.20 | 0.118 | 0.128 |
| M | $0^{\circ}$ | $6^{\circ}$ | $0^{\circ}$ | $6^{\circ}$ |
| N | $0^{\circ}$ | $10^{\circ}$ | $0^{\circ}$ | $10^{\circ}$ |
| P | 0.23 | 0.34 | 0.010 | 0.013 |
| R | 0.23 | 0.33 | 0.009 | 0.013 |
| S | 0.37 | 0.47 | 0.015 | 0.019 |
| U | 0.60 | 0.80 | 0.024 | 0.031 |
| V | 0.12 BSC |  | 0.005 BSC |  |

DETAIL E
RECOMMENDED
SOLDERING FOOTPRINT*

 details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

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[^0]:    $\dagger$ 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.

