

# NSCT2907ALT1G

## General Purpose Transistors

### PNP Silicon

#### Features

- These are Pb-Free Devices

#### MAXIMUM RATINGS

| Rating                         | Symbol    | Value | Unit |
|--------------------------------|-----------|-------|------|
| Collector – Emitter Voltage    | $V_{CEO}$ | -60   | Vdc  |
| Collector – Base Voltage       | $V_{CBO}$ | -60   | Vdc  |
| Emitter – Base Voltage         | $V_{EBO}$ | -5.0  | Vdc  |
| Collector Current – Continuous | $I_C$     | -600  | mAdc |

#### THERMAL CHARACTERISTICS

| Characteristic                                                                                                        | Symbol          | Max         | Unit                       |
|-----------------------------------------------------------------------------------------------------------------------|-----------------|-------------|----------------------------|
| Total Device Dissipation FR-5 Board<br>(Note 1) @ $T_A = 25^\circ\text{C}$<br>Derate above $25^\circ\text{C}$         | $P_D$           | 225<br>1.8  | mW<br>mW/ $^\circ\text{C}$ |
| Thermal Resistance, Junction-to-Ambient                                                                               | $R_{\theta JA}$ | 556         | $^\circ\text{C/W}$         |
| Total Device Dissipation Alumina<br>Substrate, (Note 2) @ $T_A = 25^\circ\text{C}$<br>Derate above $25^\circ\text{C}$ | $P_D$           | 300<br>2.4  | mW<br>mW/ $^\circ\text{C}$ |
| Thermal Resistance, Junction-to-Ambient                                                                               | $R_{\theta JA}$ | 417         | $^\circ\text{C/W}$         |
| Junction and Storage Temperature                                                                                      | $T_J, T_{stg}$  | -55 to +150 | $^\circ\text{C}$           |

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

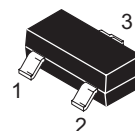
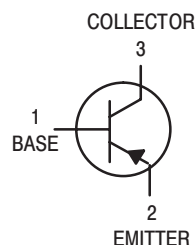
1. FR-5 =  $1.0 \times 0.75 \times 0.062$  in.

2. Alumina =  $0.4 \times 0.3 \times 0.024$  in. 99.5% alumina.



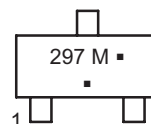
ON Semiconductor®

<http://onsemi.com>



SOT-23  
CASE 318  
STYLE 6

#### MARKING DIAGRAM



297 = Specific Device Code

M = Date Code\*

▪ = Pb-Free Package

(Note: Microdot may be in either location)

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

#### ORDERING INFORMATION

| Device        | Package             | Shipping†          |
|---------------|---------------------|--------------------|
| NSCT2907ALT1G | SOT-23<br>(Pb-Free) | 3000 Tape & Reel   |
| NSCT2907ALT3G | SOT-23<br>(Pb-Free) | 10,000 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.

**ELECTRICAL CHARACTERISTICS** ( $T_A = 25^\circ\text{C}$  unless otherwise noted)

| Characteristic | Symbol | Min | Max | Unit |
|----------------|--------|-----|-----|------|
|----------------|--------|-----|-----|------|

**OFF CHARACTERISTICS**

|                                                                                                                                                |               |      |               |                 |
|------------------------------------------------------------------------------------------------------------------------------------------------|---------------|------|---------------|-----------------|
| Collector-Emitter Breakdown Voltage (Note 3) ( $I_C = -10\text{ mAdc}$ , $I_B = 0$ )                                                           | $V_{(BR)CEO}$ | -60  | -             | Vdc             |
| Collector-Base Breakdown Voltage ( $I_C = -10\text{ }\mu\text{Adc}$ , $I_E = 0$ )                                                              | $V_{(BR)CBO}$ | -60  | -             | Vdc             |
| Emitter-Base Breakdown Voltage ( $I_E = -10\text{ }\mu\text{Adc}$ , $I_C = 0$ )                                                                | $V_{(BR)EBO}$ | -5.0 | -             | Vdc             |
| Collector Cutoff Current ( $V_{CE} = -30\text{ Vdc}$ , $V_{EB(off)} = -0.5\text{ Vdc}$ )                                                       | $I_{CEX}$     | -    | -50           | nAdc            |
| Collector Cutoff Current<br>( $V_{CB} = -50\text{ Vdc}$ , $I_E = 0$ )<br>( $V_{CB} = -50\text{ Vdc}$ , $I_E = 0$ , $T_A = 125^\circ\text{C}$ ) | $I_{CBO}$     | -    | -0.010<br>-10 | $\mu\text{Adc}$ |
| Base Cutoff Current ( $V_{CE} = -30\text{ Vdc}$ , $V_{EB(off)} = -0.5\text{ Vdc}$ )                                                            | $I_{BL}$      | -    | -50           | nAdc            |

**ON CHARACTERISTICS**

|                                                                                                                                                                                                                                                                                                                                     |               |                               |                         |     |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|-------------------------------|-------------------------|-----|
| DC Current Gain<br>( $I_C = -0.1\text{ mAdc}$ , $V_{CE} = -10\text{ Vdc}$ )<br>( $I_C = -1.0\text{ mAdc}$ , $V_{CE} = -10\text{ Vdc}$ )<br>( $I_C = -10\text{ mAdc}$ , $V_{CE} = -10\text{ Vdc}$ )<br>( $I_C = -150\text{ mAdc}$ , $V_{CE} = -10\text{ Vdc}$ )<br>( $I_C = -500\text{ mAdc}$ , $V_{CE} = -10\text{ Vdc}$ ) (Note 3) | $h_{FE}$      | 75<br>100<br>100<br>100<br>50 | -<br>-<br>-<br>300<br>- | -   |
| Collector-Emitter Saturation Voltage (Note 3)<br>( $I_C = -150\text{ mAdc}$ , $I_B = -15\text{ mAdc}$ ) (Note 3)<br>( $I_C = -500\text{ mAdc}$ , $I_B = -50\text{ mAdc}$ )                                                                                                                                                          | $V_{CE(sat)}$ | -<br>-                        | -0.4<br>-1.6            | Vdc |
| Base-Emitter Saturation Voltage (Note 3)<br>( $I_C = -150\text{ mAdc}$ , $I_B = -15\text{ mAdc}$ )<br>( $I_C = -500\text{ mAdc}$ , $I_B = -50\text{ mAdc}$ )                                                                                                                                                                        | $V_{BE(sat)}$ | -<br>-                        | -1.3<br>-2.6            | Vdc |

**SMALL-SIGNAL CHARACTERISTICS**

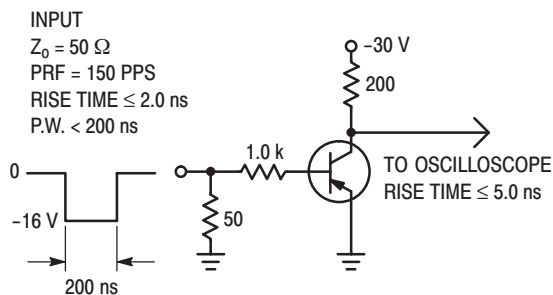
|                                                                                                                               |           |     |     |     |
|-------------------------------------------------------------------------------------------------------------------------------|-----------|-----|-----|-----|
| Current-Gain - Bandwidth Product (Notes 3, 4), ( $I_C = -50\text{ mAdc}$ , $V_{CE} = -20\text{ Vdc}$ , $f = 100\text{ MHz}$ ) | $f_T$     | 200 | -   | MHz |
| Output Capacitance ( $V_{CB} = -10\text{ Vdc}$ , $I_E = 0$ , $f = 1.0\text{ MHz}$ )                                           | $C_{obo}$ | -   | 8.0 | pF  |
| Input Capacitance ( $V_{EB} = -2.0\text{ Vdc}$ , $I_C = 0$ , $f = 1.0\text{ MHz}$ )                                           | $C_{ibo}$ | -   | 30  | pF  |

**SWITCHING CHARACTERISTICS**

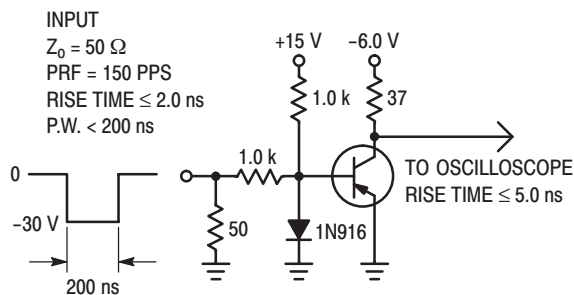
|               |                                                                                                |           |   |     |    |
|---------------|------------------------------------------------------------------------------------------------|-----------|---|-----|----|
| Turn-On Time  | $(V_{CC} = -30\text{ Vdc}$ , $I_C = -150\text{ mAdc}$ , $I_{B1} = -15\text{ mAdc}$ )           | $t_{on}$  | - | 45  | ns |
| Delay Time    |                                                                                                | $t_d$     | - | 10  |    |
| Rise Time     |                                                                                                | $t_r$     | - | 40  |    |
| Turn-Off Time | $(V_{CC} = -6.0\text{ Vdc}$ , $I_C = -150\text{ mAdc}$ , $I_{B1} = I_{B2} = -15\text{ mAdc}$ ) | $t_{off}$ | - | 100 |    |
| Storage Time  |                                                                                                | $t_s$     | - | 80  |    |
| Fall Time     |                                                                                                | $t_f$     | - | 30  |    |

3. Pulse Test: Pulse Width  $\leq 300\text{ }\mu\text{s}$ , Duty Cycle  $\leq 2.0\%$ .

4.  $f_T$  is defined as the frequency at which  $|h_{fe}|$  extrapolates to unity.



**Figure 1. Delay and Rise Time Test Circuit**



**Figure 2. Storage and Fall Time Test Circuit**

TYPICAL CHARACTERISTICS

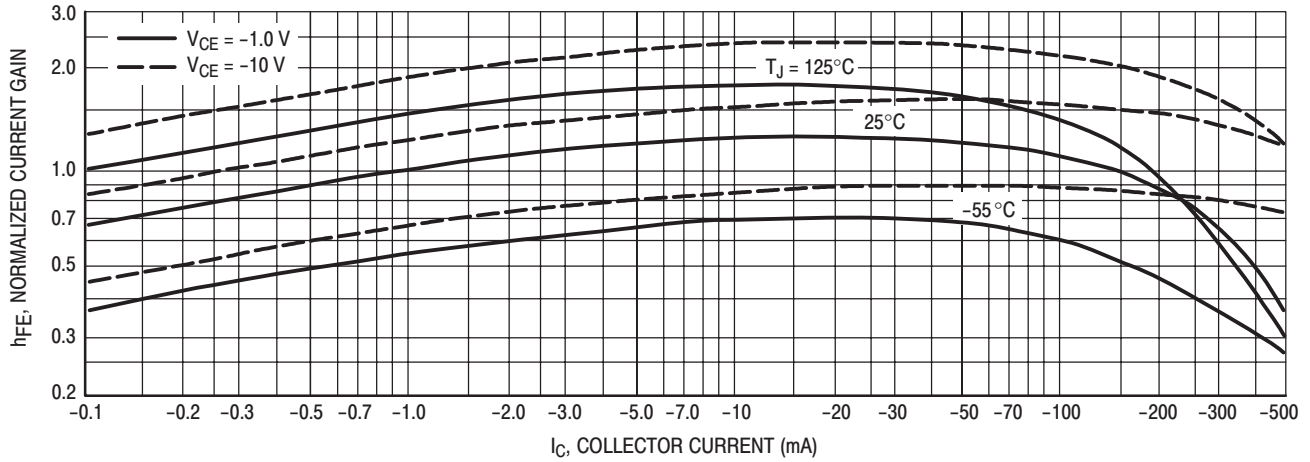


Figure 3. DC Current Gain

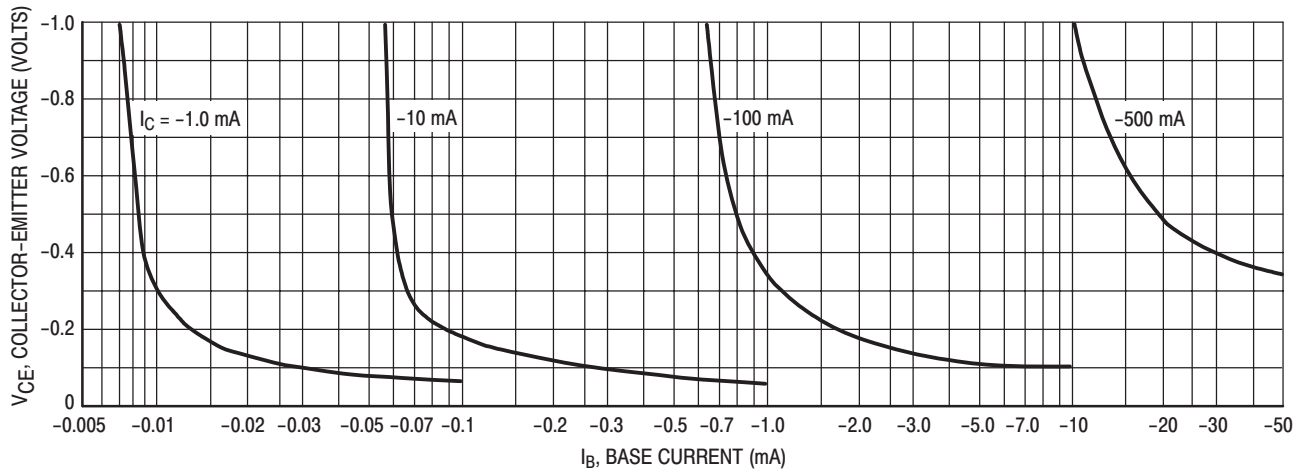


Figure 4. Collector Saturation Region

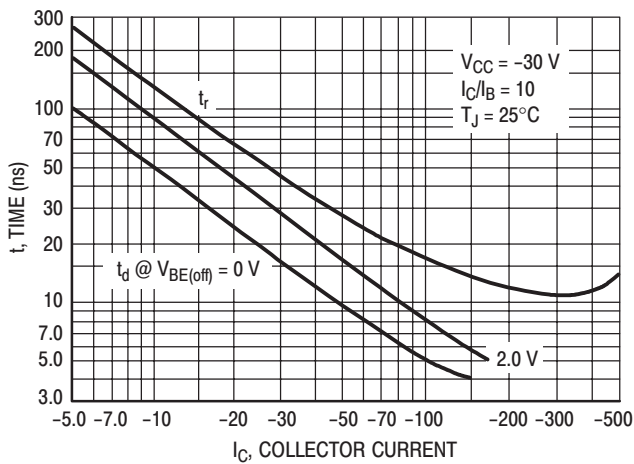


Figure 5. Turn-On Time

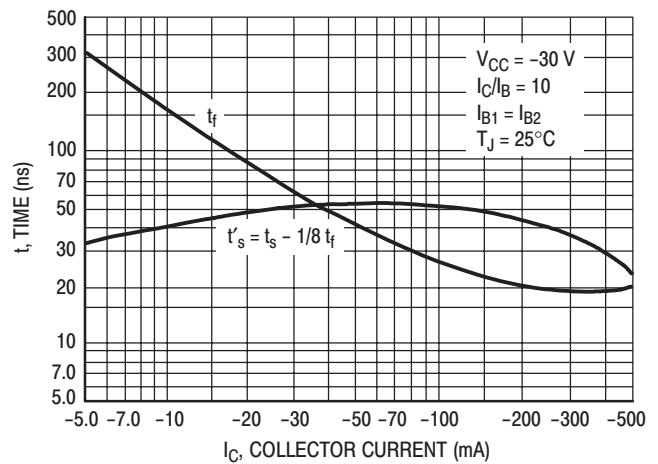
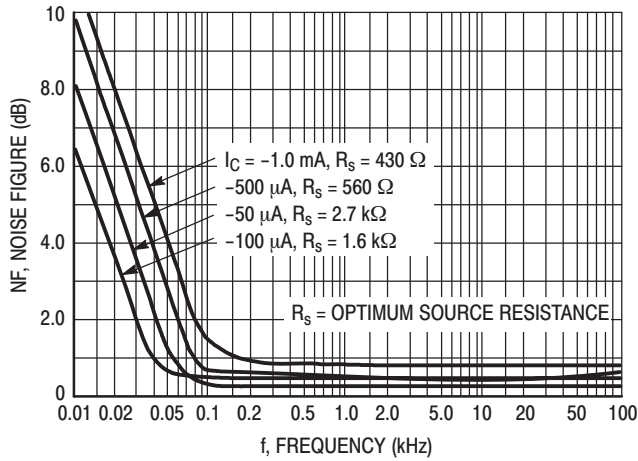


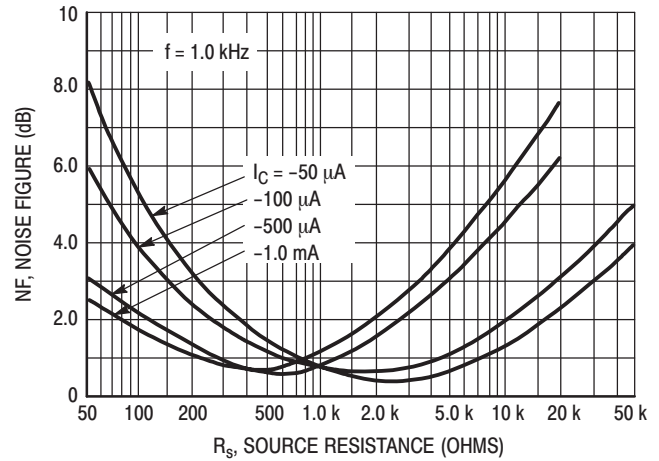
Figure 6. Turn-Off Time

**TYPICAL SMALL-SIGNAL Characteristics**  
**NOISE FIGURE**

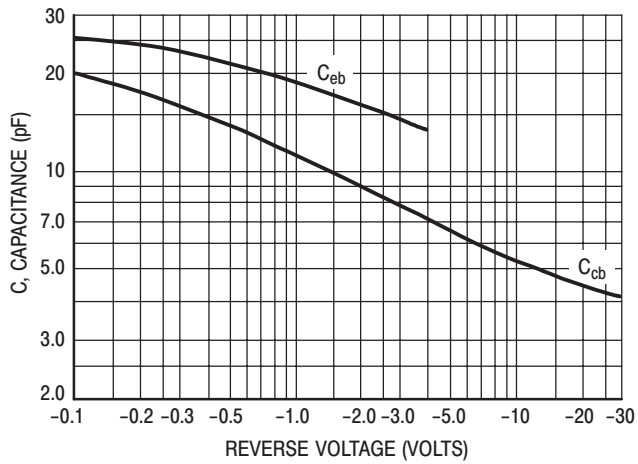
$V_{CE} = 10 \text{ Vdc}$ ,  $T_A = 25^\circ\text{C}$



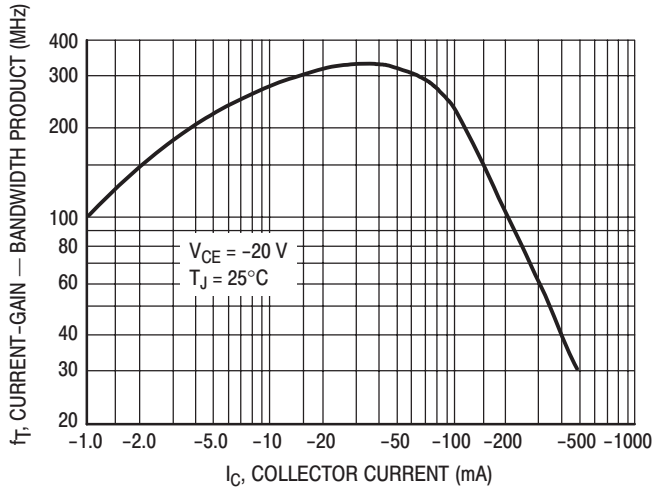
**Figure 7. Frequency Effects**



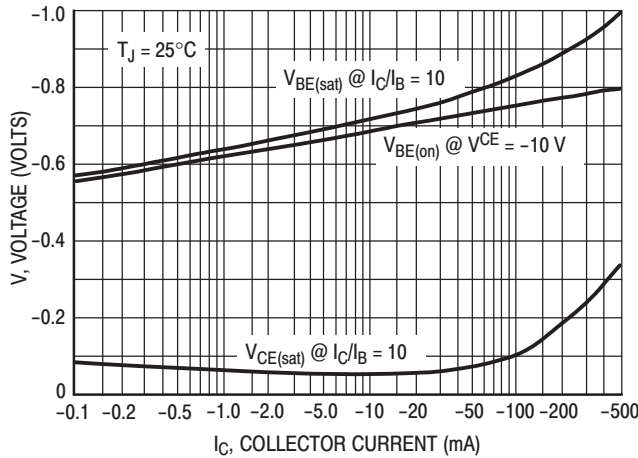
**Figure 8. Source Resistance Effects**



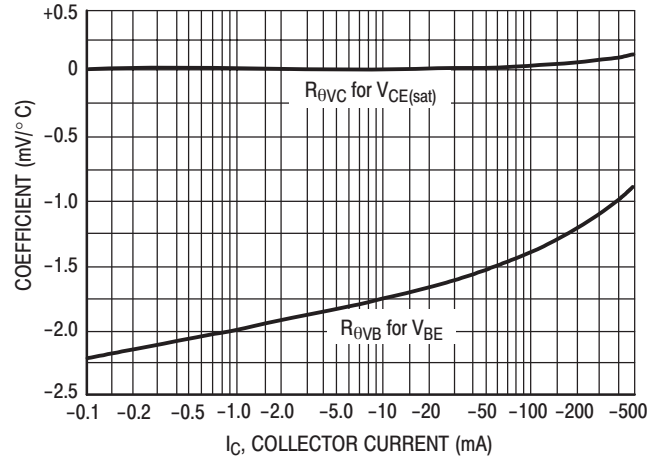
**Figure 9. Capacitances**



**Figure 10. Current-Gain - Bandwidth Product**



**Figure 11. "On" Voltage**

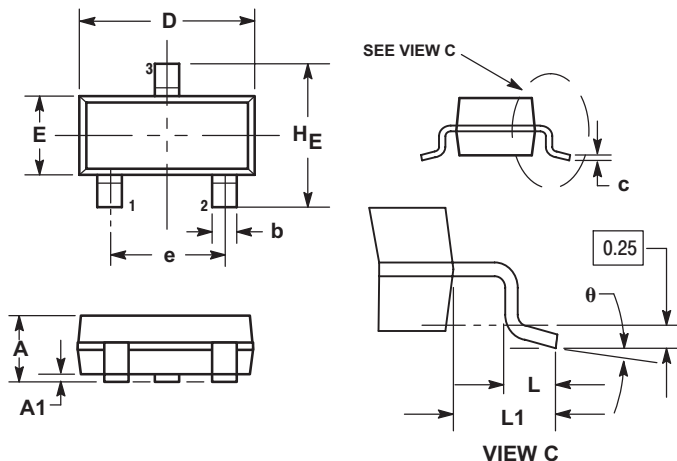


**Figure 12. Temperature Coefficients**

# NSCT2907ALT1G

## PACKAGE DIMENSIONS

SOT-23 (TO-236)  
CASE 318-08  
ISSUE AN



### NOTES:

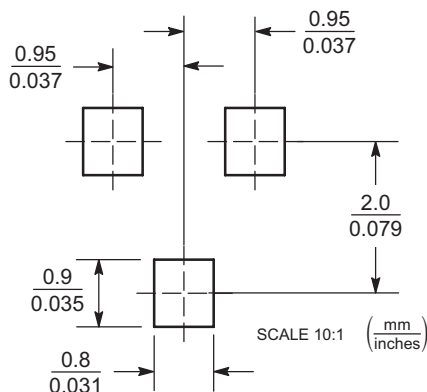
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
4. 318-01 THRU -07 AND -09 OBSOLETE, NEW STANDARD 318-08.

| DIM | MILLIMETERS |      |      | INCHES |       |       |
|-----|-------------|------|------|--------|-------|-------|
|     | MIN         | NOM  | MAX  | MIN    | NOM   | MAX   |
| A   | 0.89        | 1.00 | 1.11 | 0.035  | 0.040 | 0.044 |
| A1  | 0.01        | 0.06 | 0.10 | 0.001  | 0.002 | 0.004 |
| b   | 0.37        | 0.44 | 0.50 | 0.015  | 0.018 | 0.020 |
| c   | 0.09        | 0.13 | 0.18 | 0.003  | 0.005 | 0.007 |
| D   | 2.80        | 2.90 | 3.04 | 0.110  | 0.114 | 0.120 |
| E   | 1.20        | 1.30 | 1.40 | 0.047  | 0.051 | 0.055 |
| e   | 1.78        | 1.90 | 2.04 | 0.070  | 0.075 | 0.081 |
| L   | 0.10        | 0.20 | 0.30 | 0.004  | 0.008 | 0.012 |
| L1  | 0.35        | 0.54 | 0.69 | 0.014  | 0.021 | 0.029 |
| H_E | 2.10        | 2.40 | 2.64 | 0.083  | 0.094 | 0.104 |

### STYLE 6:

1. BASE
2. EMITTER
3. COLLECTOR

## 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.

ON Semiconductor and  are registered trademarks of Semiconductor Components Industries, LLC (SCILLC). SCILLC reserves the right to make changes without further notice to any products herein. SCILLC makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does SCILLC assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. "Typical" parameters which may be provided in SCILLC data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. SCILLC does not convey any license under its patent rights nor the rights of others. SCILLC products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the SCILLC product could create a situation where personal injury or death may occur. Should Buyer purchase or use SCILLC products for any such unintended or unauthorized application, Buyer shall indemnify and hold SCILLC and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that SCILLC was negligent regarding the design or manufacture of the part. SCILLC is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

## PUBLICATION ORDERING INFORMATION

### LITERATURE FULFILLMENT:

Literature Distribution Center for ON Semiconductor  
P.O. Box 61312, Phoenix, Arizona 85082-1312 USA  
Phone: 480-829-7710 or 800-344-3860 Toll Free USA/Canada  
Fax: 480-829-7709 or 800-344-3867 Toll Free USA/Canada  
Email: [orderlit@onsemi.com](mailto:orderlit@onsemi.com)

N. American Technical Support: 800-282-9855 Toll Free  
USA/Canada

Japan: ON Semiconductor, Japan Customer Focus Center  
2-9-1 Kamimeguro, Meguro-ku, Tokyo, Japan 153-0051  
Phone: 81-3-5773-3850

ON Semiconductor Website: <http://onsemi.com>

Order Literature: <http://www.onsemi.com/litorder>

For additional information, please contact your local Sales Representative.