

NSM80100MT1G

PNP Transistor with Dual Series Switching Diode

Features

- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant

Typical Applications

- LCD Control Board
- High Speed Switching
- High Voltage Switching

MAXIMUM RATINGS – PNP TRANSISTOR

| Rating | Symbol | Value | Unit |
|--------------------------------|-----------|-------|------|
| Collector–Emitter Voltage | V_{CEO} | -80 | Vdc |
| Collector–Base Voltage | V_{CBO} | -80 | Vdc |
| Emitter–Base Voltage | V_{EBO} | -4.0 | Vdc |
| Collector Current – Continuous | I_C | -500 | mAdc |

MAXIMUM RATINGS – SWITCHING DIODE

| Rating | Symbol | Value | Unit |
|--|----------------|-------------|------------------|
| Reverse Voltage | V_R | 100 | V |
| Forward Current | I_F | 200 | mA |
| Non-Repetitive Peak Forward Current (Square Wave, $T_J = 25^\circ\text{C}$ prior to surge) $t < 1 \text{ sec}$ $t = 1 \mu\text{sec}$ | I_{FSM} | 1.0 20 | A |
| Operating and Storage Junction Temperature Range | T_J, T_{stg} | -55 to +150 | $^\circ\text{C}$ |

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.

ESD RATINGS

| Rating | Class | Value |
|-------------------------|-----------|--|
| Electrostatic Discharge | HBM MM | 3A M4 4000 V ≤ Failure < 8000 V Failure > 400 V |

THERMAL CHARACTERISTICS

| Rating | Symbol | Max | Unit |
|---|-----------------|-------------|----------------------------|
| Total Device Dissipation FR-5 Board, (Note 1) @ $T_A = 25^\circ\text{C}$ Derate above 25°C | P_D | 400 | mW mW/ $^\circ\text{C}$ |
| Thermal Resistance from Junction-to-Ambient (Note 1) | $R_{\theta JA}$ | 313 | $^\circ\text{C}/\text{W}$ |
| Total Device Dissipation FR-5 Board (Note 2) $T_A = 25^\circ\text{C}$ Derate above 25°C | P_D | 270 | mW mW/ $^\circ\text{C}$ |
| Thermal Resistance, Junction-to-Ambient (Note 2) | $R_{\theta JA}$ | 463 | $^\circ\text{C}/\text{W}$ |
| Junction and Storage Temperature Range | T_J, T_{stg} | -55 to +150 | $^\circ\text{C}$ |

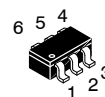
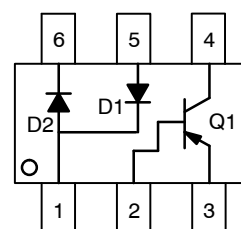
1. FR-5 = 650 mm² pad, 2.0 oz Cu.
2. FR-5 = 10 mm² pad, 2.0 oz Cu.



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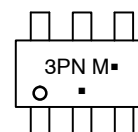
<http://onsemi.com>

PNP Transistor with Dual Series Switching Diode



SC-74
CASE 318F

MARKING DIAGRAM



3PN = Device Code
M = Date Code*
▪ = Pb-Free Package

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

ORDERING INFORMATION

| Device | Package | Shipping† |
|--------------|--------------------|-----------------------|
| NSM80100MT1G | SC-74 (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 Specification Brochure, BRD8011/D.

NSM80100MT1G

Q1: PNP TRANSISTOR

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

| Characteristic | Symbol | Min | Max | Unit |
|---|---------------|------|------|---------------|
| OFF CHARACTERISTICS | | | | |
| Collector – Emitter Breakdown Voltage (Note 3) ($I_C = -1.0\text{ mA}, I_B = 0$) | $V_{(BR)CEO}$ | -80 | - | V |
| Emitter – Base Breakdown Voltage ($I_E = -100\ \mu\text{A}, I_C = 0$) | $V_{(BR)EBO}$ | -4.0 | - | V |
| Collector Cutoff Current ($V_{CE} = -60\text{ V}, I_B = 0$) | I_{CES} | - | -0.1 | μA |
| Collector Cutoff Current ($V_{CB} = -80\text{ V}, I_E = 0$) | I_{CBO} | - | -0.1 | μA |

ON CHARACTERISTICS (Note 3)

| | | | | |
|---|---------------|-----|-------|---|
| DC Current Gain ($I_C = -10\text{ mA}, V_{CE} = -1.0\text{ V}$) | h_{FE} | 120 | - | - |
| Collector – Emitter Saturation Voltage ($I_C = -100\text{ mA}, I_B = -10\text{ mA}$) | $V_{CE(sat)}$ | - | -0.25 | V |
| Base – Emitter Saturation Voltage ($I_C = -100\text{ mA}, V_{CE} = -1.0\text{ V}$) | $V_{BE(sat)}$ | - | -1.2 | V |

SMALL-SIGNAL CHARACTERISTICS

| | | | | |
|---|-------|-----|---|-----|
| Current – Gain – Bandwidth Product (Note 4) ($I_C = -100\text{ mA}, V_{CE} = -2.0\text{ V}, f = 100\text{ MHz}$) | f_T | 150 | - | MHz |
|---|-------|-----|---|-----|

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

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

D1, D2: SWITCHING DIODE ($T_A = 25^\circ\text{C}$ unless otherwise noted)

| Characteristic | Symbol | Min | Max | Unit |
|--|------------|------------------|----------------------------|---------------|
| OFF CHARACTERISTICS | | | | |
| Reverse Breakdown Voltage | $V_{(BR)}$ | 75 | - | V |
| Reverse Voltage Leakage Current ($V_R = 75\text{ V}$) ($V_R = 20\text{ V}, T_J = 150^\circ\text{C}$) ($V_R = 75\text{ V}, T_J = 150^\circ\text{C}$) | I_R | - - - | 1.0 30 100 | μA |
| Diode Capacitance ($V_R = 0\text{ V}, f = 1.0\text{ MHz}$) | C_D | - | 1.5 | pF |
| Forward Voltage ($I_F = 1.0\text{ mA}$) ($I_F = 10\text{ mA}$) ($I_F = 50\text{ mA}$) ($I_F = 150\text{ mA}$) | V_F | - - - - | 715 855 1000 1250 | mV |
| Reverse Recovery Time ($I_F = I_R = 10\text{ mA}, i_{R(REC)} = 1.0\text{ mA}, R_L = 100\ \Omega$) | t_{rr} | - | 4.0 | ns |
| Forward Recovery Voltage ($I_F = 10\text{ mA}, t_r = 20\text{ ns}$) | V_{FR} | - | 1.75 | V |

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.

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TYPICAL CHARACTERISTICS

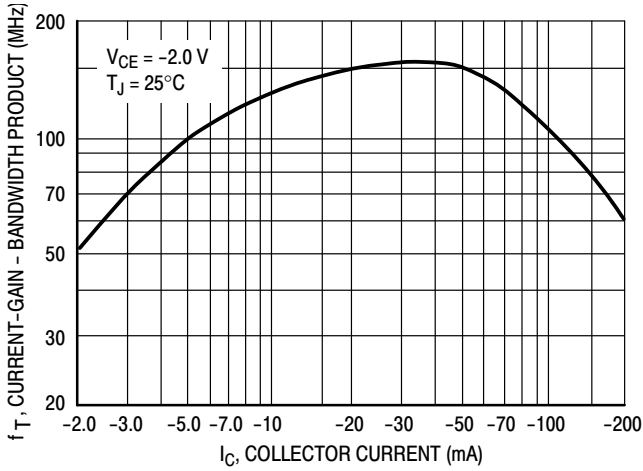


Figure 1. Current-Gain — Bandwidth Product

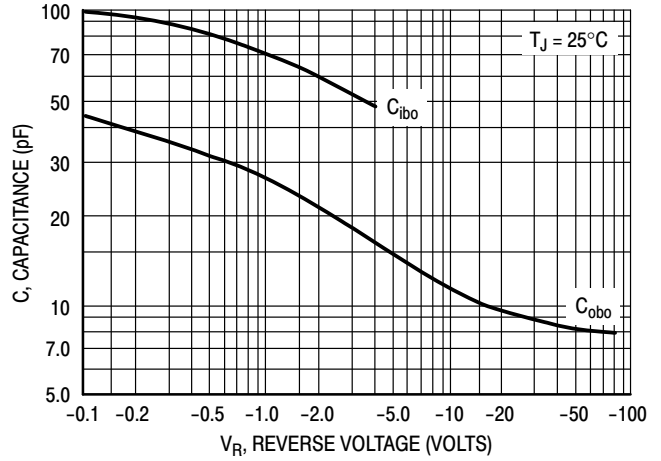


Figure 2. Capacitance

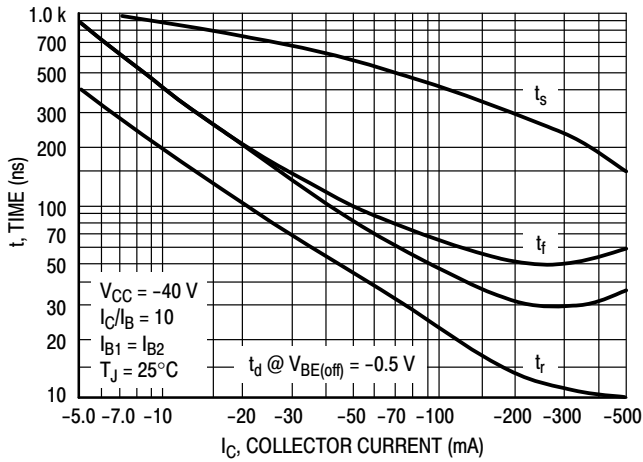


Figure 3. Switching Time

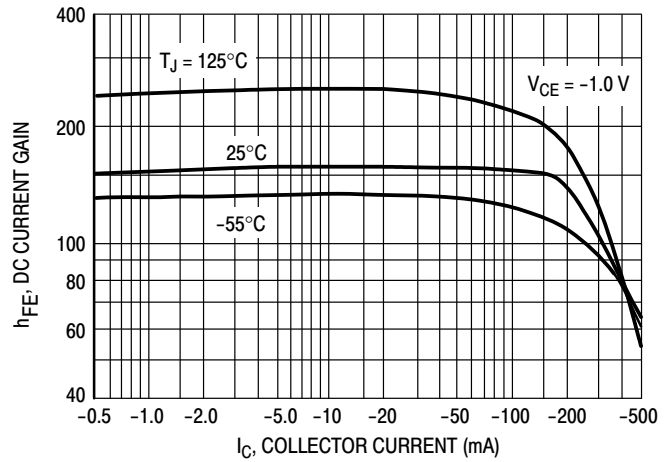


Figure 4. DC Current Gain

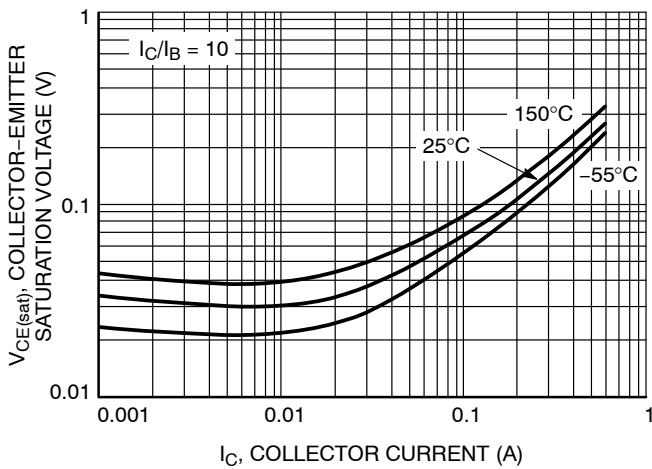


Figure 5. Collector Emitter Saturation Voltage vs. Collector Current

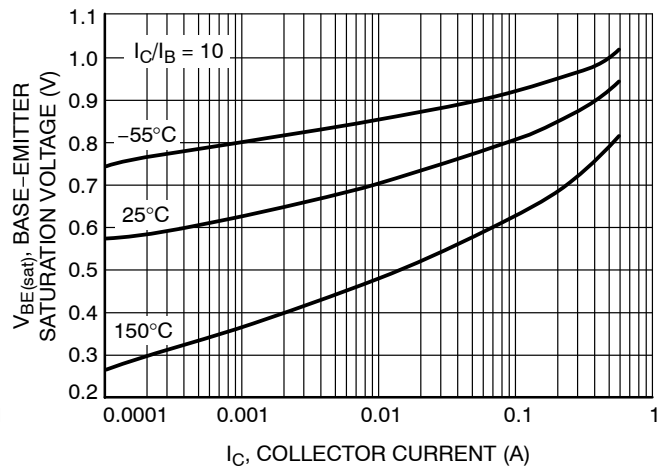


Figure 6. Base Emitter Saturation Voltage vs. Collector Current

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TYPICAL CHARACTERISTICS

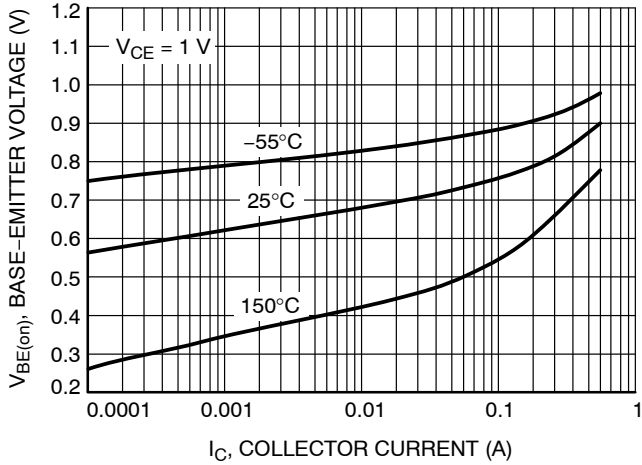


Figure 7. Base-Emitter Voltage vs. Collector Current

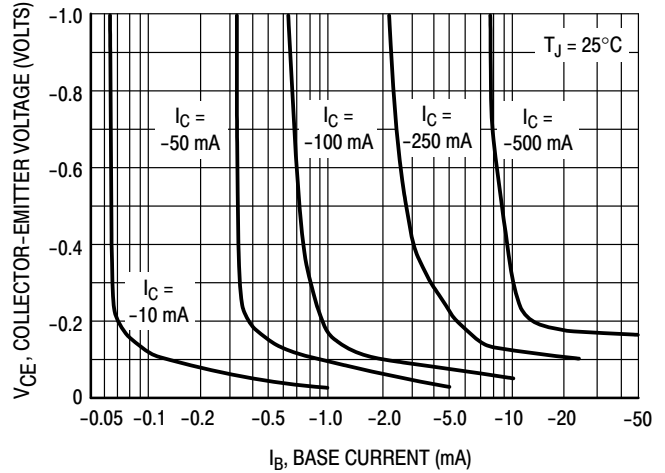


Figure 8. Collector Saturation Region

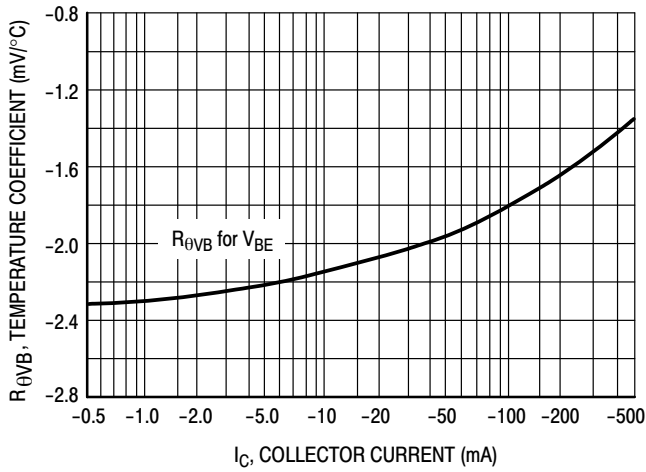


Figure 9. Base-Emitter Temperature Coefficient

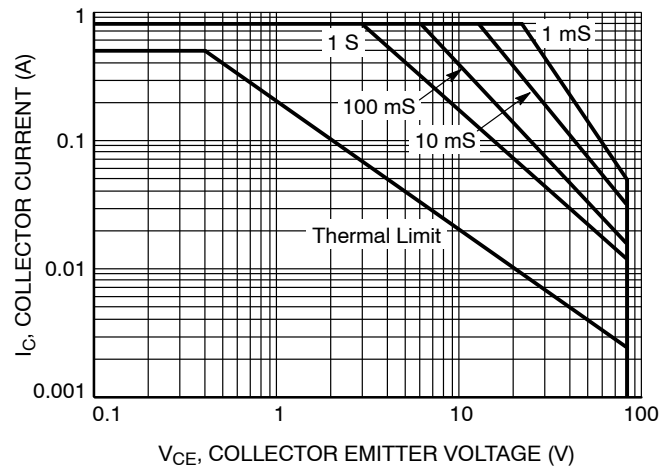


Figure 10. Safe Operating Area

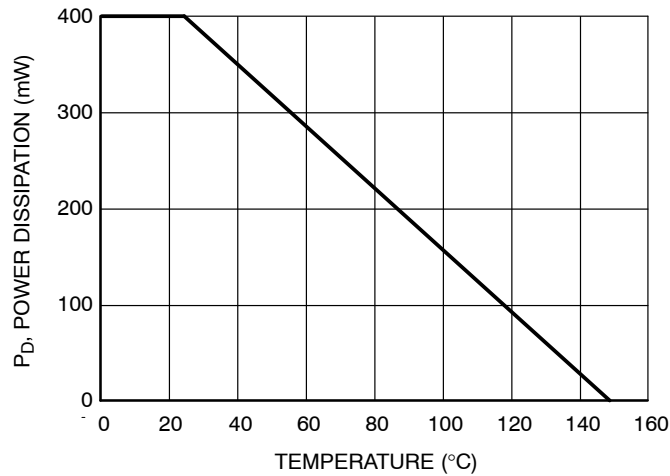


Figure 11. Operating Temperature Derating

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TYPICAL CHARACTERISTICS

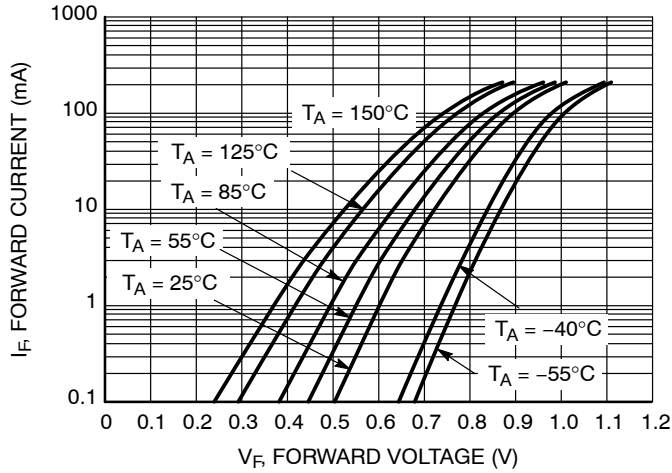


Figure 12. Forward Voltage

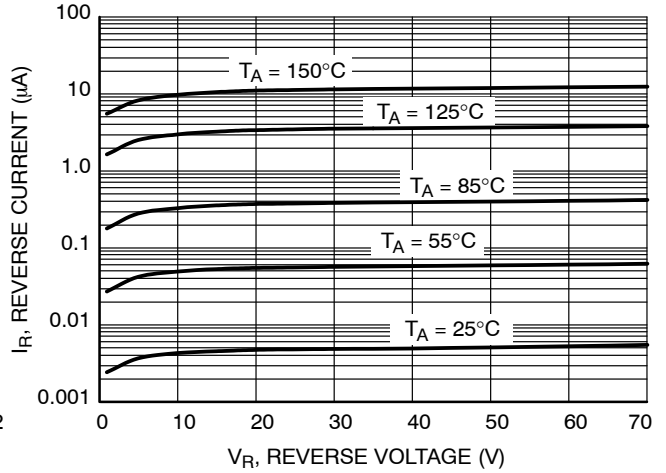


Figure 13. Leakage Current

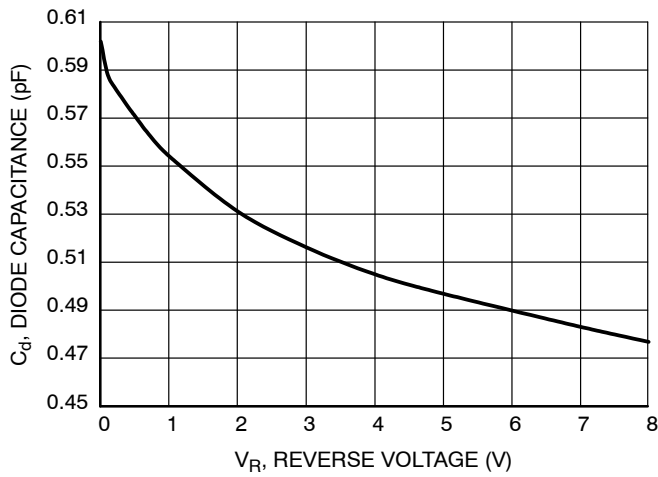


Figure 14. Capacitance

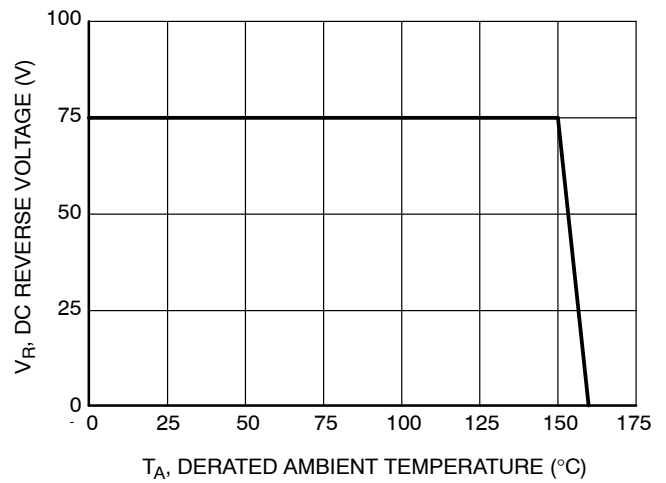
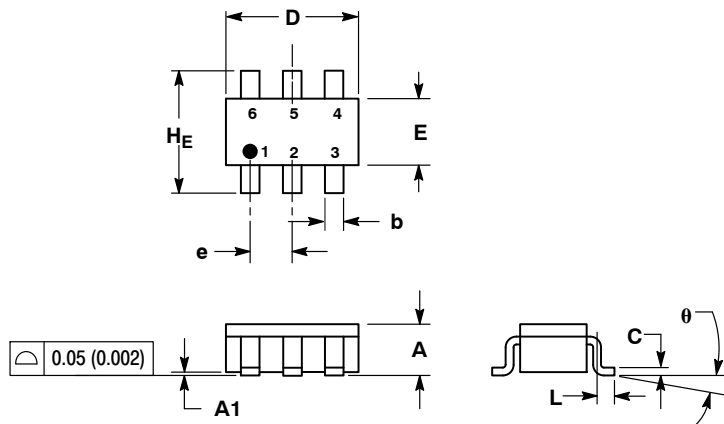


Figure 15. Diode Power Dissipation Curve

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PACKAGE DIMENSIONS

SC-74
CASE 318F-05
ISSUE N

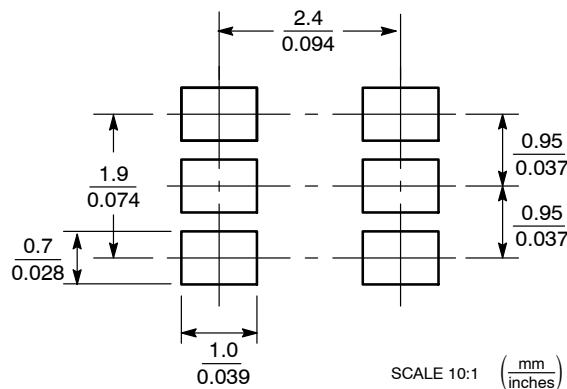


NOTES:

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. 318F-01, -02, -03 OBSOLETE. NEW STANDARD 318F-04.

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

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.

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