

# MBRB1045G, MBRD1045G, SBRB1045G, SBRD81045T4G

Preferred Device

## SWITCHMODE Schottky Power Rectifier Surface Mount Power Package

This series of Power Rectifiers employs the Schottky Barrier principle in a large metal-to-silicon power diode. State-of-the-art geometry features epitaxial construction with oxide passivation and metal overlay contact. Ideally suited for use in low voltage, high frequency switching power supplies, free wheeling diodes, and polarity protection diodes.

### Features

- Guardring for Stress Protection
- Low Forward Voltage
- 175°C Operating Junction Temperature
- Epoxy Meets UL 94 V-0 @ 0.125 in
- Short Heat Sink Tab Manufactured – Not Sheared!
- AEC-Q101 Qualified and PPAP Capable
- SBRB and SBRD8 Prefixes for Automotive and Other Applications Requiring Unique Site and Control Change Requirements
- All Packages are Pb-Free\*

### Mechanical Characteristics:

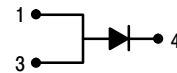
- Case: Epoxy, Molded, Epoxy Meets UL 94 V-0
- Weight: 1.7 grams for D<sup>2</sup>PAK (approximately)  
0.4 grams for DPAK (approximately)
- Finish: All External Surfaces Corrosion Resistant and Terminal Leads are Readily Solderable
- Lead and Mounting Surface Temperature for Soldering Purposes: 260°C Max. for 10 Seconds
- Device Meets MSL1 Requirements
- ESD Ratings:
  - ♦ Machine Model = C (> 400 V)
  - ♦ Human Body Model = 3B (> 8000 V)



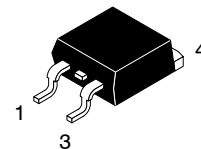
ON Semiconductor®

<http://onsemi.com>

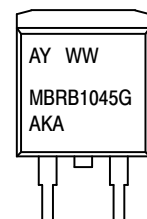
## SCHOTTKY BARRIER RECTIFIER 10 AMPERES, 45 VOLTS



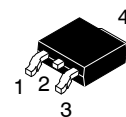
### MARKING DIAGRAM



D<sup>2</sup>PAK  
CASE 418B

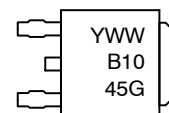


A = Assembly Location  
Y = Year  
WW = Work Week  
MBRB1045 = Device Code  
G = Pb-Free Package  
AKA = Diode Polarity



DPAK  
CASE 369C

### MARKING DIAGRAM



Y = Year  
WW = Work Week  
B1045 = Device Code  
G = Pb-Free Package

### ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 2 of this data sheet.

**Preferred** devices are recommended choices for future use and best overall value.

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

# MBRB1045G, MBRD1045G, SBRB1045G, SBRD81045T4G

## MAXIMUM RATINGS

| Rating                                                                                                     | Symbol                          | Value                                   | Unit             |
|------------------------------------------------------------------------------------------------------------|---------------------------------|-----------------------------------------|------------------|
| Peak Repetitive Reverse Voltage<br>Working Peak Reverse Voltage<br>DC Blocking Voltage                     | $V_{RRM}$<br>$V_{RWM}$<br>$V_R$ | 45                                      | V                |
| Average Rectified Forward Current (Rated $V_R$ ) $T_C = 135^\circ\text{C}$                                 | $I_{F(AV)}$                     | 10                                      | A                |
| Peak Repetitive Forward Current<br>(Rated $V_R$ , Square Wave, 20 kHz) $T_C = 135^\circ\text{C}$           | $I_{FRM}$                       | 20                                      | A                |
| Nonrepetitive Peak Surge Current<br>(Surge applied at rated load conditions halfwave, single phase, 60 Hz) | $I_{FSM}$                       | 150<br>(MBRB/SBRB)<br>70<br>(MBRD/SBRD) | A                |
| Operating Junction and Storage Temperature Range (Note 1)                                                  | $T_J, T_{stg}$                  | -65 to +175                             | $^\circ\text{C}$ |
| Voltage Rate of Change (Rated $V_R$ )                                                                      | $dv/dt$                         | 10000                                   | V/ $\mu\text{s}$ |

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. The heat generated must be less than the thermal conductivity from Junction-to-Ambient:  $dP_D/dT_J < 1/R_{\theta JA}$ .

## THERMAL CHARACTERISTICS

| Characteristic                                                                                                                                                              | Symbol                                                                   | Value                   | Unit                      |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|-------------------------|---------------------------|
| Thermal Resistance,<br>(MBRB1045G)<br>Junction-to-Case (Note 2)<br>Junction-to-Ambient (Note 2)<br>(MBRD1045G)<br>Junction-to-Case (Note 2)<br>Junction-to-Ambient (Note 2) | $R_{\theta JC}$<br>$R_{\theta JA}$<br>$R_{\theta JC}$<br>$R_{\theta JA}$ | 1.0<br>50<br>2.43<br>68 | $^\circ\text{C}/\text{W}$ |

2. When mounted using minimum recommended pad size on FR-4 board.

## ELECTRICAL CHARACTERISTICS

| Characteristic                                                                                                                                                                                      | Symbol | Value                | Unit |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|----------------------|------|
| Maximum Instantaneous Forward Voltage (Note 3)<br>( $I_F = 10$ Amps, $T_J = 125^\circ\text{C}$ )<br>( $I_F = 20$ Amps, $T_J = 125^\circ\text{C}$ )<br>( $I_F = 20$ Amps, $T_J = 25^\circ\text{C}$ ) | $V_F$  | 0.57<br>0.72<br>0.84 | V    |
| Maximum Instantaneous Reverse Current (Note 3)<br>(Rated dc Voltage, $T_J = 125^\circ\text{C}$ )<br>(Rated dc Voltage, $T_J = 25^\circ\text{C}$ )                                                   | $I_R$  | 15<br>0.1            | mA   |

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

## ORDERING INFORMATION

| Device       | Package                         | Shipping <sup>†</sup>     |
|--------------|---------------------------------|---------------------------|
| MBRB1045G    | D <sup>2</sup> PAK<br>(Pb-Free) | 50 Units / Rail           |
| SBRB1045G    | D <sup>2</sup> PAK<br>(Pb-Free) | 50 Units / Rail           |
| MBRB1045T4G  | D <sup>2</sup> PAK<br>(Pb-Free) | 800 Units / Tape & Reel   |
| SBRB1045T4G  | D <sup>2</sup> PAK<br>(Pb-Free) | 800 Units / Tape & Reel   |
| MBRD1045G    | DPACK<br>(Pb-Free)              | 50 Units / Rail           |
| MBRD1045T4G  | DPACK<br>(Pb-Free)              | 2,500 Units / Tape & Reel |
| SBRD81045T4G | DPACK<br>(Pb-Free)              | 2,500 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.

# MBRB1045G, MBRD1045G, SBRB1045G, SBRD81045T4G

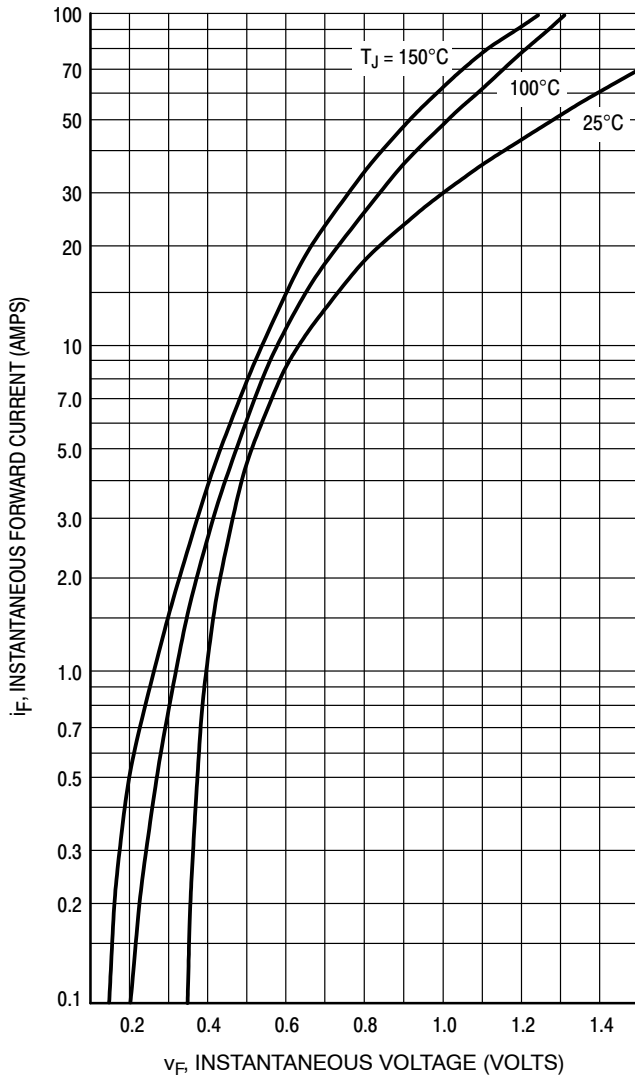


Figure 1. Maximum Forward Voltage

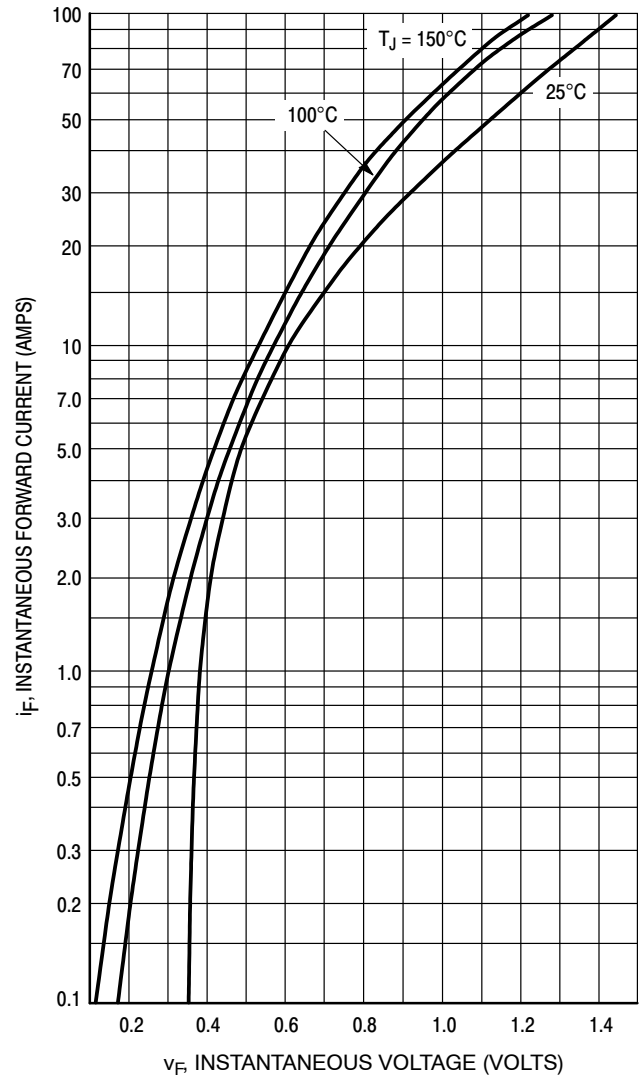


Figure 2. Typical Forward Voltage

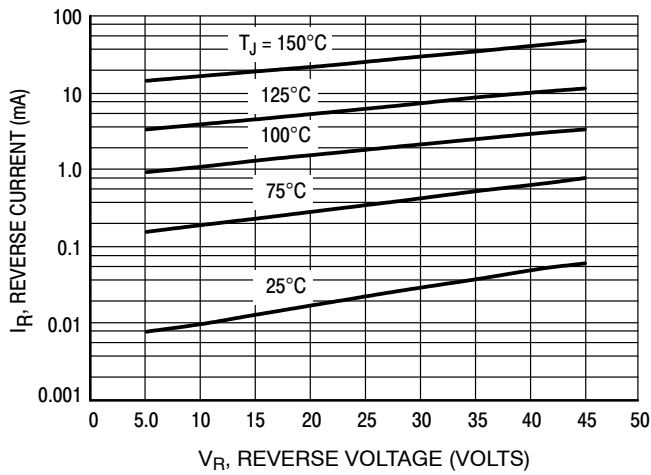


Figure 3. Maximum Reverse Current

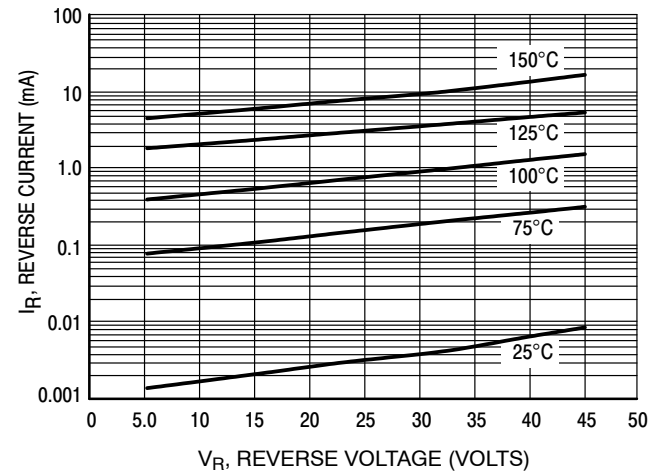


Figure 4. Typical Reverse Current

# MBRB1045G, MBRD1045G, SBRB1045G, SBRD81045T4G

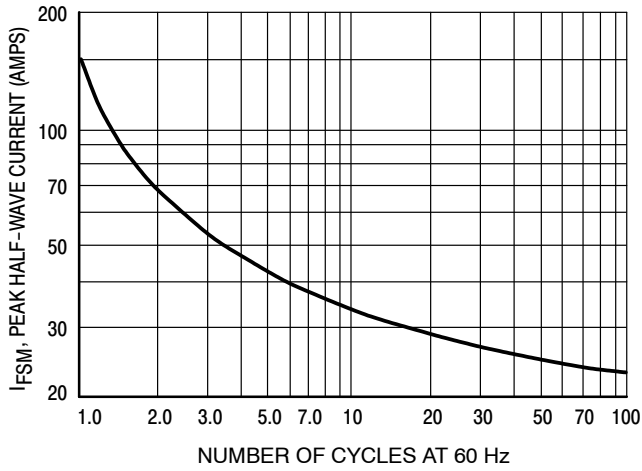


Figure 8. Maximum Surge Capability

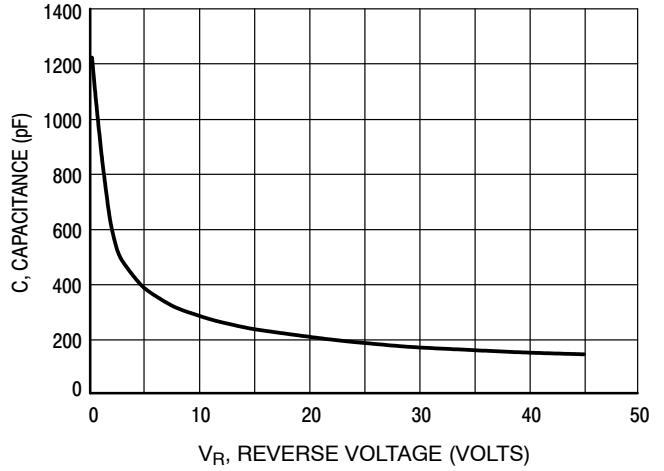


Figure 5. Typical Capacitance

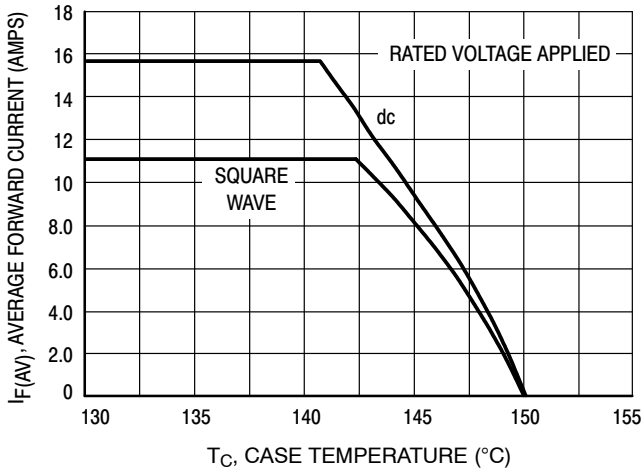


Figure 6. Current Derating, Case,  
 $R_{\theta JC} = 1.0\text{ }^{\circ}\text{C/W}$

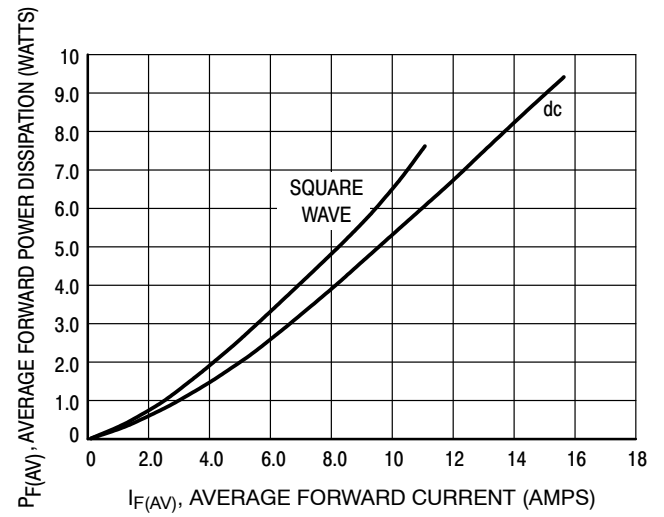
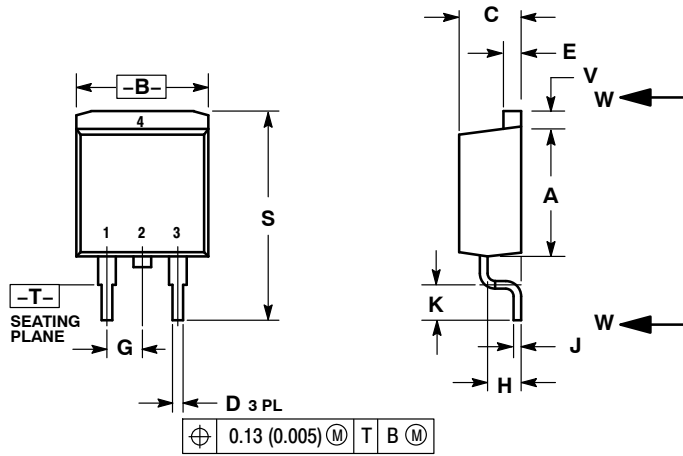


Figure 7. Forward Power Dissipation

# MBRB1045G, MBRD1045G, SBRB1045G, SBRD81045T4G

## PACKAGE DIMENSIONS

D<sup>2</sup>PAK 3  
CASE 418B-04  
ISSUE K

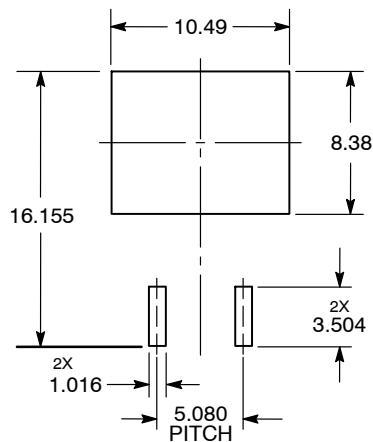


### NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. 418B-01 THRU 418B-03 OBSOLETE, NEW STANDARD 418B-04.

| DIM | INCHES    |       | MILLIMETERS |       |
|-----|-----------|-------|-------------|-------|
|     | MIN       | MAX   | MIN         | MAX   |
| A   | 0.340     | 0.380 | 8.64        | 9.65  |
| B   | 0.380     | 0.405 | 9.65        | 10.29 |
| C   | 0.160     | 0.190 | 4.06        | 4.83  |
| D   | 0.020     | 0.035 | 0.51        | 0.89  |
| E   | 0.045     | 0.055 | 1.14        | 1.40  |
| F   | 0.310     | 0.350 | 7.87        | 8.89  |
| G   | 0.100 BSC |       | 2.54 BSC    |       |
| H   | 0.080     | 0.110 | 2.03        | 2.79  |
| J   | 0.018     | 0.025 | 0.46        | 0.64  |
| K   | 0.090     | 0.110 | 2.29        | 2.79  |
| L   | 0.052     | 0.072 | 1.32        | 1.83  |
| M   | 0.280     | 0.320 | 7.11        | 8.13  |
| N   | 0.197 REF |       | 5.00 REF    |       |
| P   | 0.079 REF |       | 2.00 REF    |       |
| R   | 0.039 REF |       | 0.99 REF    |       |
| S   | 0.575     | 0.625 | 14.60       | 15.88 |
| V   | 0.045     | 0.055 | 1.14        | 1.40  |

## SOLDERING FOOTPRINT\*



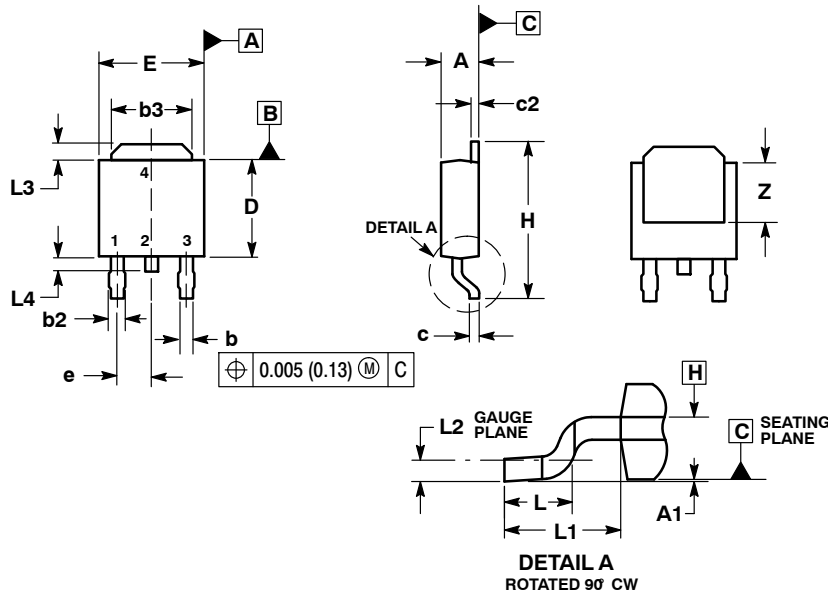
DIMENSIONS: MILLIMETERS

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

# MBRB1045G, MBRD1045G, SBRB1045G, SBRD81045T4G

## PACKAGE DIMENSIONS

### DPAK (SINGLE GAUGE) CASE 369C-01 ISSUE D

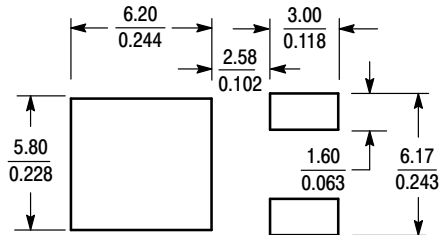


#### NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: INCHES.
3. THERMAL PAD CONTOUR OPTIONAL WITHIN DIMENSIONS b3, L3 and Z.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR BURRS. MOLD FLASH, PROTRUSIONS, OR GATE BURRS SHALL NOT EXCEED 0.006 INCHES PER SIDE.
5. DIMENSIONS D AND E ARE DETERMINED AT THE OUTERMOST EXTREMES OF THE PLASTIC BODY.
6. DATUMS A AND B ARE DETERMINED AT DATUM PLANE H.

| DIM | INCHES |       | MILLIMETERS |       |
|-----|--------|-------|-------------|-------|
|     | MIN    | MAX   | MIN         | MAX   |
| A   | 0.086  | 0.094 | 2.18        | 2.38  |
| A1  | 0.000  | 0.005 | 0.00        | 0.13  |
| b   | 0.025  | 0.035 | 0.63        | 0.89  |
| b2  | 0.030  | 0.045 | 0.76        | 1.14  |
| b3  | 0.180  | 0.215 | 4.57        | 5.46  |
| c   | 0.018  | 0.024 | 0.46        | 0.61  |
| c2  | 0.018  | 0.024 | 0.46        | 0.61  |
| D   | 0.235  | 0.245 | 5.97        | 6.22  |
| E   | 0.250  | 0.265 | 6.35        | 6.73  |
| e   | 0.090  | BSC   | 2.29        | BSC   |
| H   | 0.370  | 0.410 | 9.40        | 10.41 |
| L   | 0.055  | 0.070 | 1.40        | 1.78  |
| L1  | 0.108  | REF   | 2.74        | REF   |
| L2  | 0.020  | BSC   | 0.51        | BSC   |
| L3  | 0.035  | 0.050 | 0.89        | 1.27  |
| L4  | ---    | 0.040 | ---         | 1.01  |
| Z   | 0.155  | ---   | 3.93        | ---   |

### SOLDERING FOOTPRINT\*



SCALE 3:1 (mm/inches)

\*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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