

MBRB1045, MBRD1045

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!
- Pb-Free Packages are Available

Mechanical Characteristics:

- Case: Epoxy, Molded, Epoxy Meets UL 94 V-0
- Weight: 1.7 grams for D²PAK (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)

MAXIMUM RATINGS

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

Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

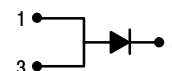
1. The heat generated must be less than the thermal conductivity from Junction-to-Ambient: $dP_D/dT_J < 1/R_{\theta JA}$.



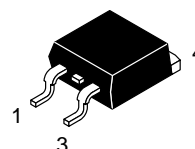
ON Semiconductor®

<http://onsemi.com>

SCHOTTKY BARRIER RECTIFIER 10 AMPERES, 45 VOLTS



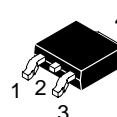
MARKING DIAGRAM



D²PAK
CASE 418B
PLASTIC

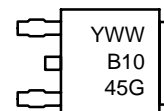


A = Assembly Location
Y = Year
WW = Work Week
MBRB1045 = Device Code
G = Pb-Free Package
AKA = Diode Polarity



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.

MBRB1045, MBRD1045

THERMAL CHARACTERISTICS

| Characteristic | Symbol | Value | Unit |
|---------------------------------------------------------------|-----------------|-------|------|
| Thermal Resistance, (MBRB1045) – Junction-to-Case (Note 2) | $R_{\theta JC}$ | 1.0 | °C/W |
| – Junction-to-Ambient (Note 2) | $R_{\theta JA}$ | 50 | |
| (MBRD1045) – Junction-to-Case (Note 2) | $R_{\theta JC}$ | 2.43 | |
| – Junction-to-Ambient (Note 2) | $R_{\theta JA}$ | 68 | |

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

ELECTRICAL CHARACTERISTICS

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

3. Pulse Test: Pulse Width = 300 μs , Duty Cycle $\leq 2.0\%$

ORDERING INFORMATION

| Device | Package | Shipping [†] |
|-------------|---------------------------------|--------------------------|
| MBRB1045 | D ² PAK | 50 Units / Rail |
| MBRB1045G | D ² PAK (Pb-Free) | 50 Units / Rail |
| MBRB1045T4 | D ² PAK | 800 Units / Tape & Reel |
| MBRB1045T4G | D ² PAK (Pb-Free) | 800 Units / Tape & Reel |
| MBRD1045T4G | DPAK (Pb-Free) | 2500 Units / 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.

MBRB1045, MBRD1045

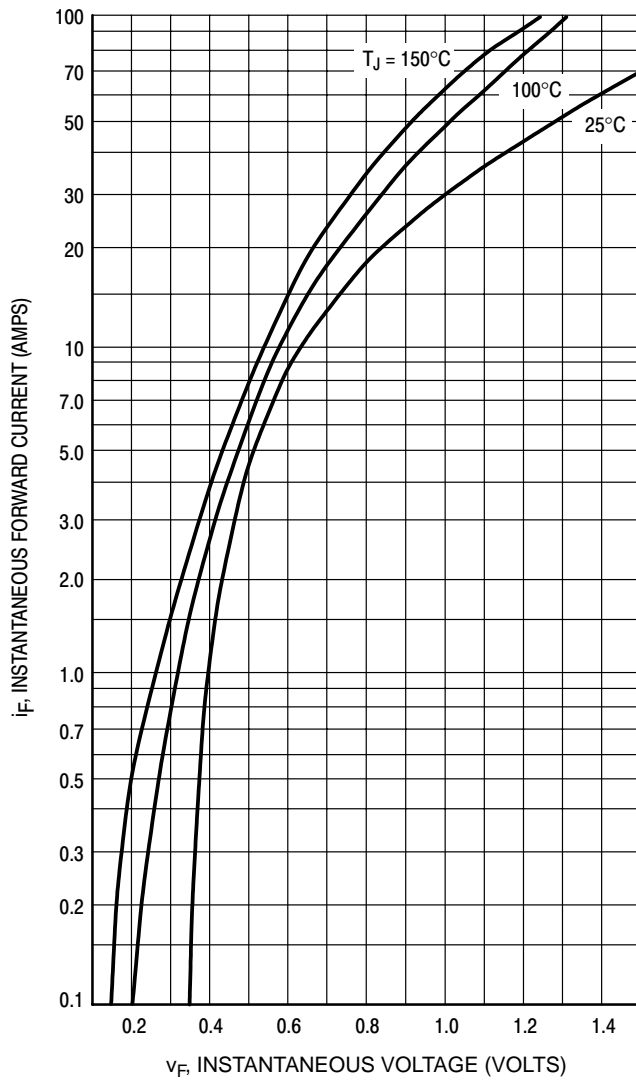


Figure 1. Maximum Forward Voltage

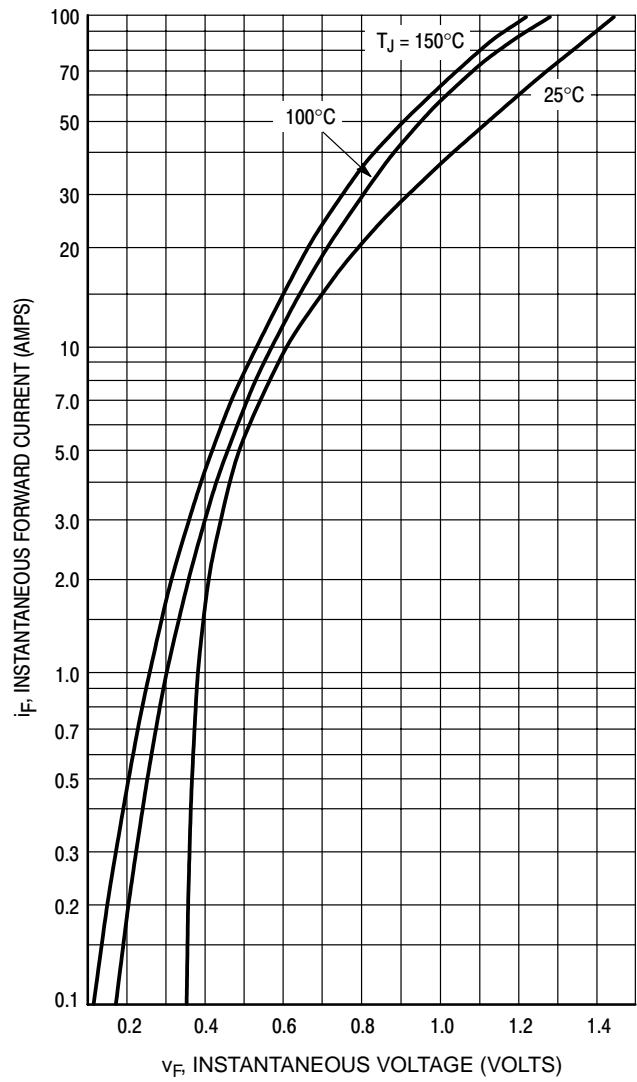


Figure 2. Typical Forward Voltage

MBRB1045, MBRD1045

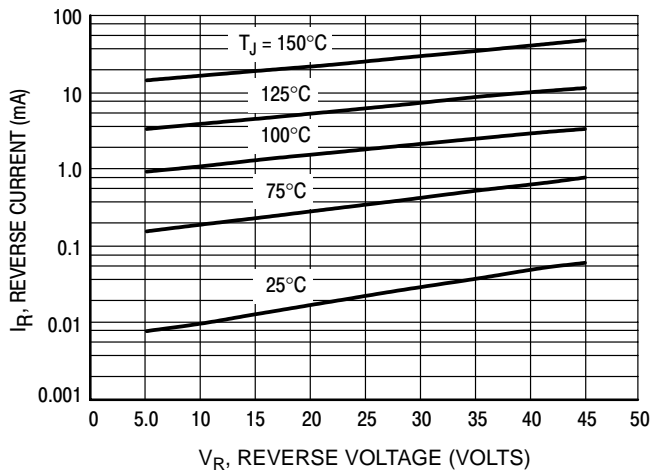


Figure 3. Maximum Reverse Current

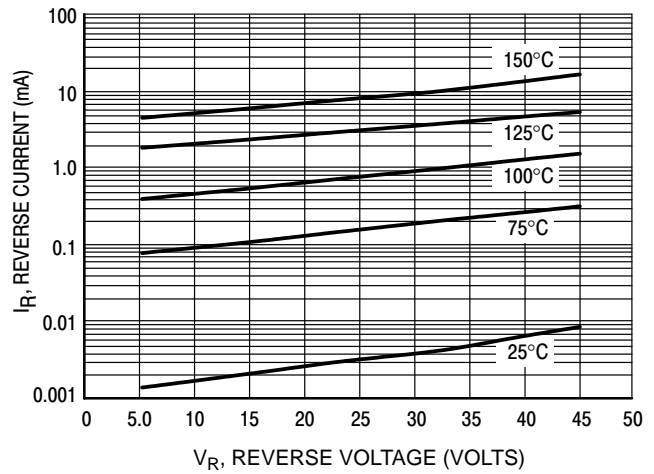


Figure 4. Typical Reverse Current

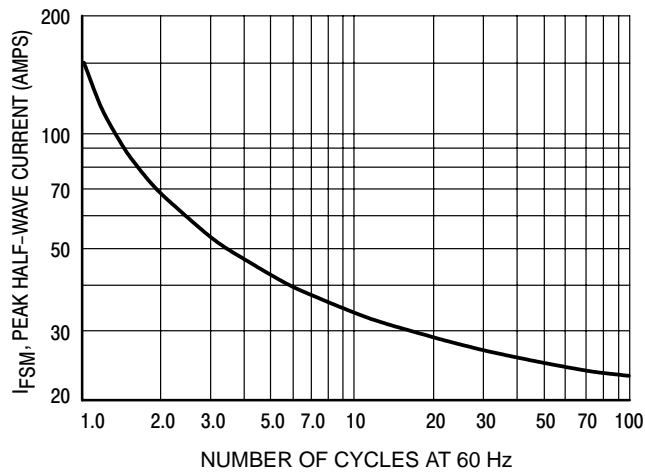


Figure 8. Maximum Surge Capability

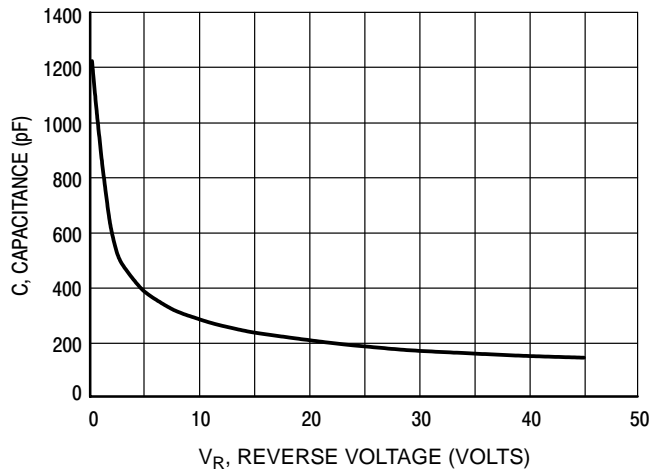


Figure 5. Typical Capacitance

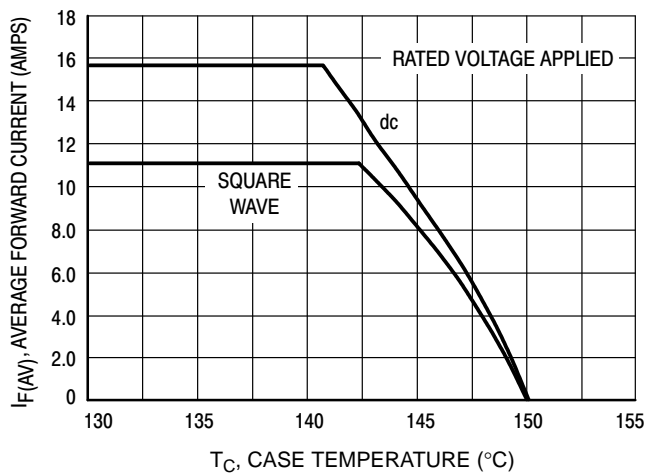


Figure 6. Current Derating, Case,
 $R_{\theta JC} = 1.0^\circ\text{C/W}$

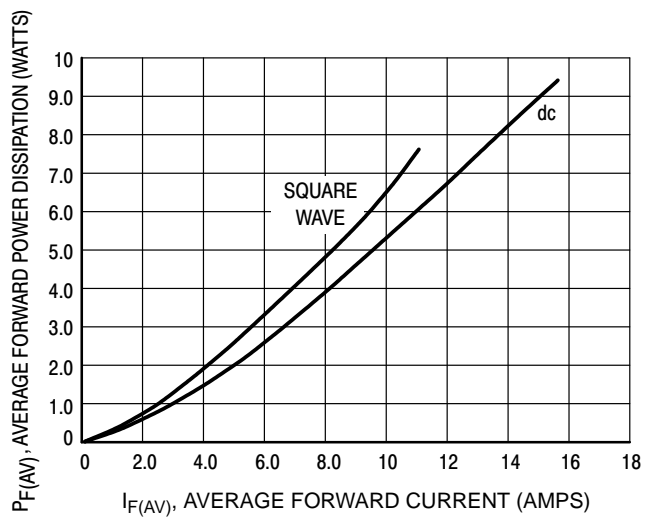
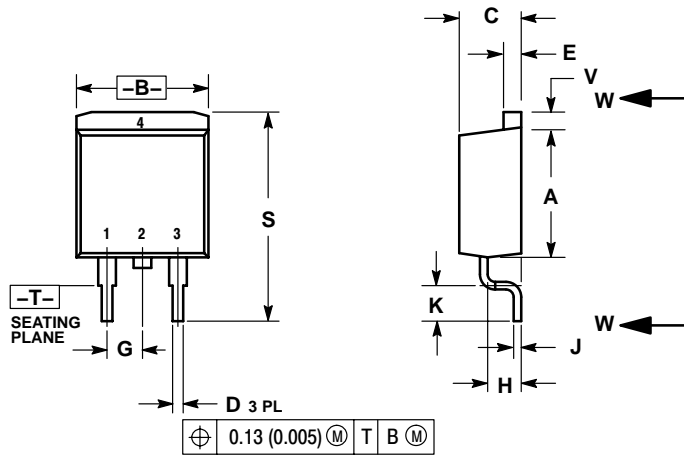


Figure 7. Forward Power Dissipation

MBRB1045, MBRD1045

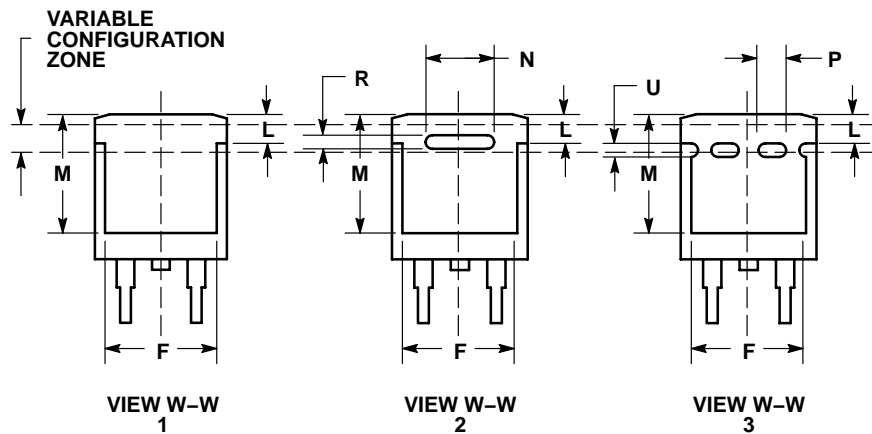
PACKAGE DIMENSIONS

D²PAK 3 CASE 418B-04 ISSUE J

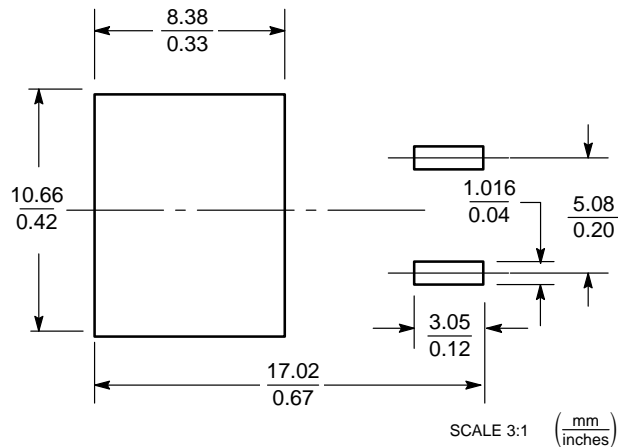


- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
 2. CONTROLLING DIMENSION: INCH.
 3. 418B-01 THRU 418B-03 OBSOLETE, NEW STANDARD 418B-04.

| 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*

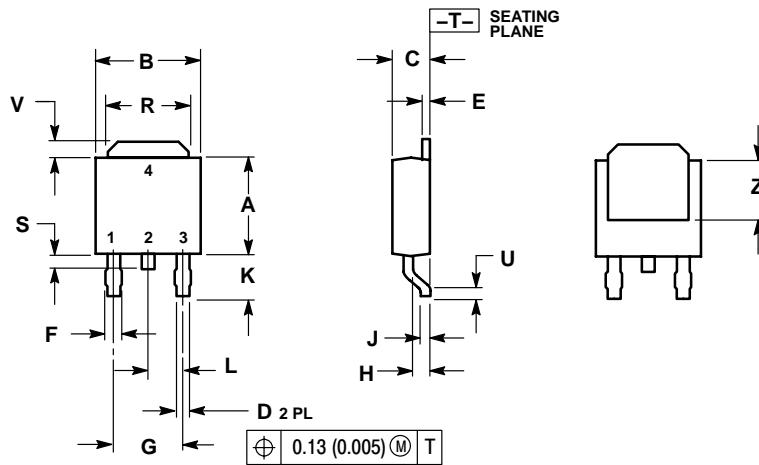


*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

MBRB1045, MBRD1045

PACKAGE DIMENSIONS

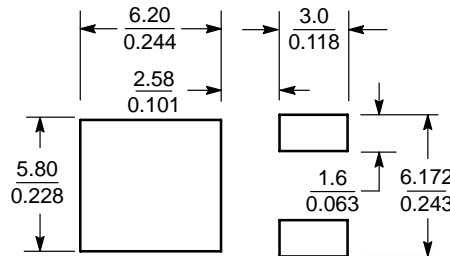
DPAK (SINGLE GUAGE) CASE 369C ISSUE O



- NOTES:
1. DIMENSIONING AND TOLERANCING
PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.

| DIM | INCHES | | MILLIMETERS | |
|-----|-----------|-------|-------------|------|
| | MIN | MAX | MIN | MAX |
| A | 0.235 | 0.245 | 5.97 | 6.22 |
| B | 0.250 | 0.265 | 6.35 | 6.73 |
| C | 0.086 | 0.094 | 2.19 | 2.38 |
| D | 0.027 | 0.035 | 0.69 | 0.88 |
| E | 0.018 | 0.023 | 0.46 | 0.58 |
| F | 0.037 | 0.045 | 0.94 | 1.14 |
| G | 0.180 BSC | | 4.58 BSC | |
| H | 0.034 | 0.040 | 0.87 | 1.01 |
| J | 0.018 | 0.023 | 0.46 | 0.58 |
| K | 0.102 | 0.114 | 2.60 | 2.89 |
| L | 0.090 BSC | | 2.29 BSC | |
| R | 0.180 | 0.215 | 4.57 | 5.45 |
| S | 0.025 | 0.040 | 0.63 | 1.01 |
| U | 0.020 | --- | 0.51 | --- |
| V | 0.035 | 0.050 | 0.89 | 1.27 |
| 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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