# Surface Mount Schottky Power Rectifier

## SMB Power Surface Mount Package

# MBRS1540T3

These devices employ the Schottky Barrier principle in a metal−to−silicon power rectifier. Features epitaxial construction with oxide passivation and metal overlay contact. Ideally suited for low voltage, high frequency switching power supplies; free wheeling diodes and polarity protection diodes.

### Features

- Compact Package with J−Bend Leads Ideal for Automated Handling
- Highly Stable Oxide Passivated Junction
- Guard−Ring for Over−Voltage Protection
- Low Forward Voltage Drop
- These Devices are Pb−Free, Halogen Free/BFR Free and are RoHS Compliant

### Mechanical Characteristics

- Case: Molded Epoxy
- Epoxy Meets UL 94 V−0 @ 0.125 in
- Weight: 95 mg (Approximately)
- Cathode Polarity Band
- Lead and Mounting Surface Temperature for Soldering Purposes: 260°C Max. for 10 Seconds
- Finish: All External Surfaces Corrosion Resistant and Terminal Leads are Readily Solderable

### 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>$V_R$ | 40 | V |
| Average Rectified Forward Current (At Rated $V_R$, $T_C$ = 100°C) | $I_O$ | 1.5 | A |
| Peak Repetitive Forward Current (At Rated $V_R$, Square Wave, 100 kHz, $T_C$ = 105°C) | $I_{FRM}$ | 3.0 | A |
| Non−Repetitive Peak Surge Current (Surge Applied at Rated Load Conditions Halfwave, Single Phase, 60 Hz) | $I_{FSM}$ | 40 | A |
| Storage/Operating Case Temperature | $T_{stg}$, $T_C$ | −55 to +150 | °C |
| Operating Junction Temperature | $T_J$ | −55 to +125 | °C |
| Voltage Rate of Change (Rated $V_R$, $T_J$ = 25°C) | dv/dt | 10,000 | V/μs |

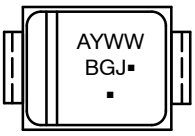
Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

## SCHOTTKY BARRIER RECTIFIER 1.5 AMPERES, 40 VOLTS



**SMB**
**CASE 403A**

### MARKING DIAGRAM




BGJ = Specific Device Code
A = Assembly Location
Y = Year
WW = Work Week
▪ = Pb−Free Package

(Note: Microdot may be in either location)

### ORDERING INFORMATION

| Device | Package | Shipping† |
|---|---|---|
| MBRS1540T3G | SMB (Pb−Free) | 2500/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.

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## THERMAL CHARACTERISTICS

| Characteristic | Symbol | Value | Unit |
|---|---|---|---|
| Thermal Resistance, Junction−to−Lead (Note 1) | $R_{\theta JL}$ | 24 | °C/W |
| Thermal Resistance, Junction−to−Ambient (Note 2) | $R_{\theta JA}$ | 80 | |

## ELECTRICAL CHARACTERISTICS

| | | | | |
|---|---|---|---|---|
| Maximum Instantaneous Forward Voltage (Note 3) | $v_F$ | **$T_J$ = 25°C** | **$T_J$ = 125°C** | V |
| ($i_F$ = 1.5 A) | | 0.46 | 0.39 | |
| see Figure 2 ($i_F$ = 3.0 A) | | 0.54 | 0.54 | |
| Maximum Instantaneous Reverse Current (Note 3) | $I_R$ | **$T_J$ = 25°C** | **$T_J$ = 100°C** | mA |
| ($V_R$ = 40 V) | | 0.8 | 5.7 | |
| see Figure 4 ($V_R$ = 20 V) | | 0.1 | 1.6 | |

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.

1. Mounted with minimum recommended pad size, PC Board FR4.
2. 1 inch square pad size (1 x 0.5 inch for each lead) on FR4 board.
3. Pulse Test: Pulse Width ≤ 250 μs, Duty Cycle ≤ 2.0%.



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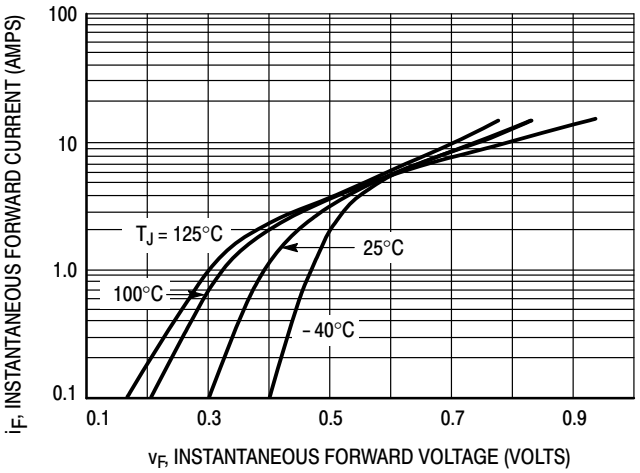



**Figure 1. Typical Forward Voltage**

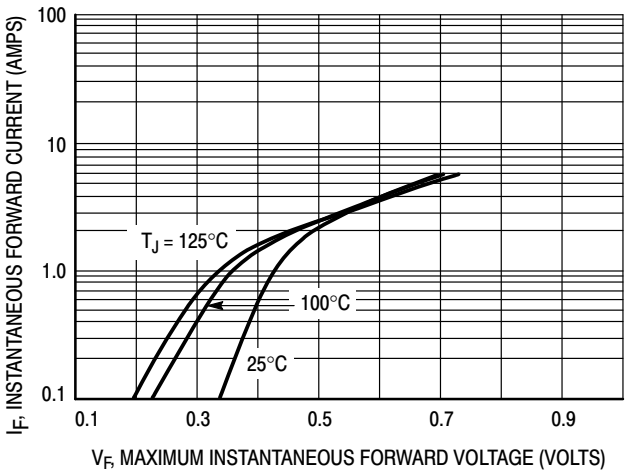



**Figure 2. Maximum Forward Voltage**

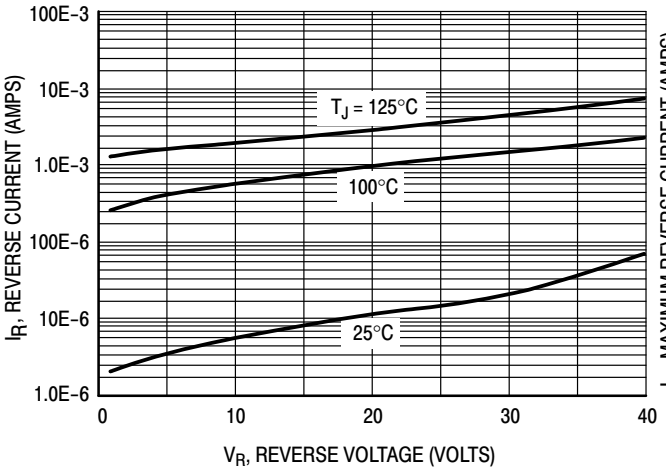



**Figure 3. Typical Reverse Current**

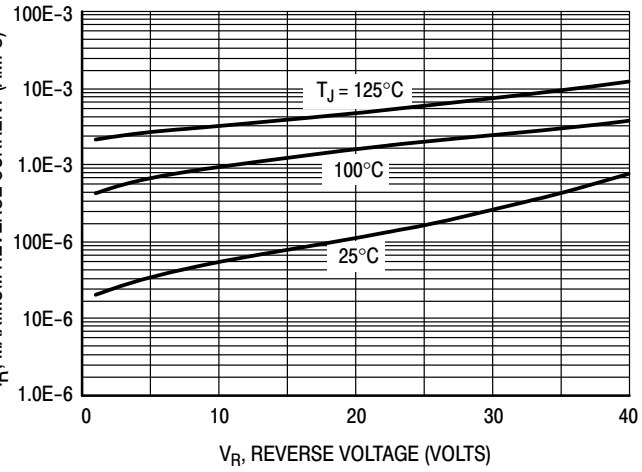



**Figure 4. Maximum Reverse Current**

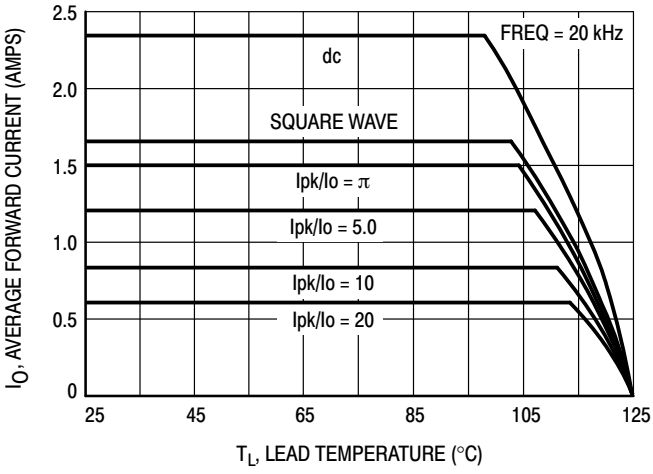



**Figure 5. Current Derating**

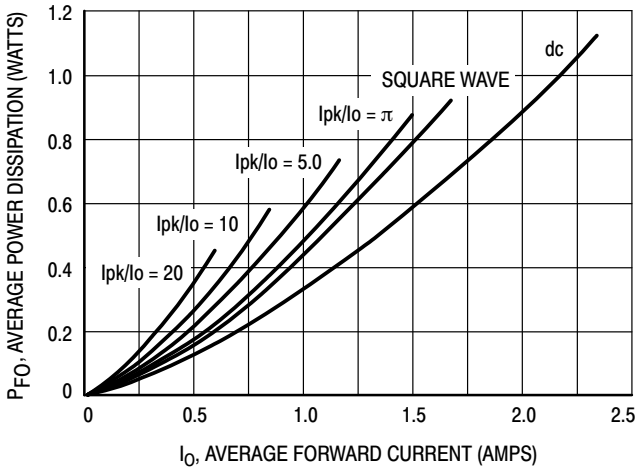



**Figure 6. Forward Power Dissipation**



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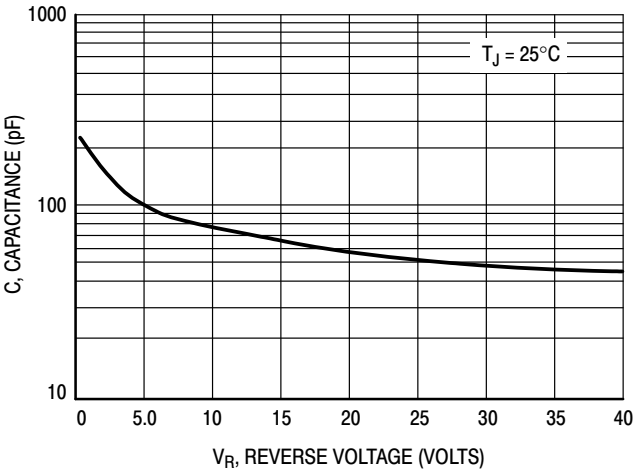



**Figure 7. Capacitance**

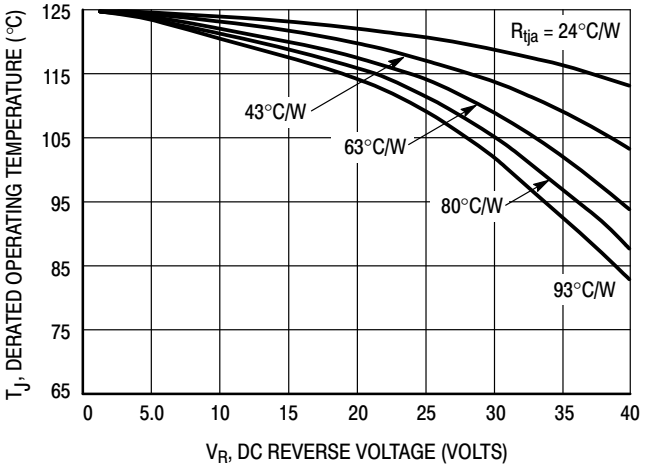



**Figure 8. Typical Operating Temperature Derating***

* Reverse power dissipation and the possibility of thermal runaway must be considered when operating this device under any reverse voltage conditions. Calculations of $T_J$ therefore must include forward and reverse power effects. The allowable operating $T_J$ may be calculated from the equation: $T_J = T_{Jmax} - r(t)(Pf + Pr)$ where

$r(t)$ = thermal impedance under given conditions,
Pf = forward power dissipation, and
Pr = reverse power dissipation

This graph displays the derated allowable $T_J$ due to reverse bias under DC conditions only and is calculated as $T_J = T_{Jmax} - r(t)Pr$, where $r(t)$ = Rthja. For other power applications further calculations must be performed.

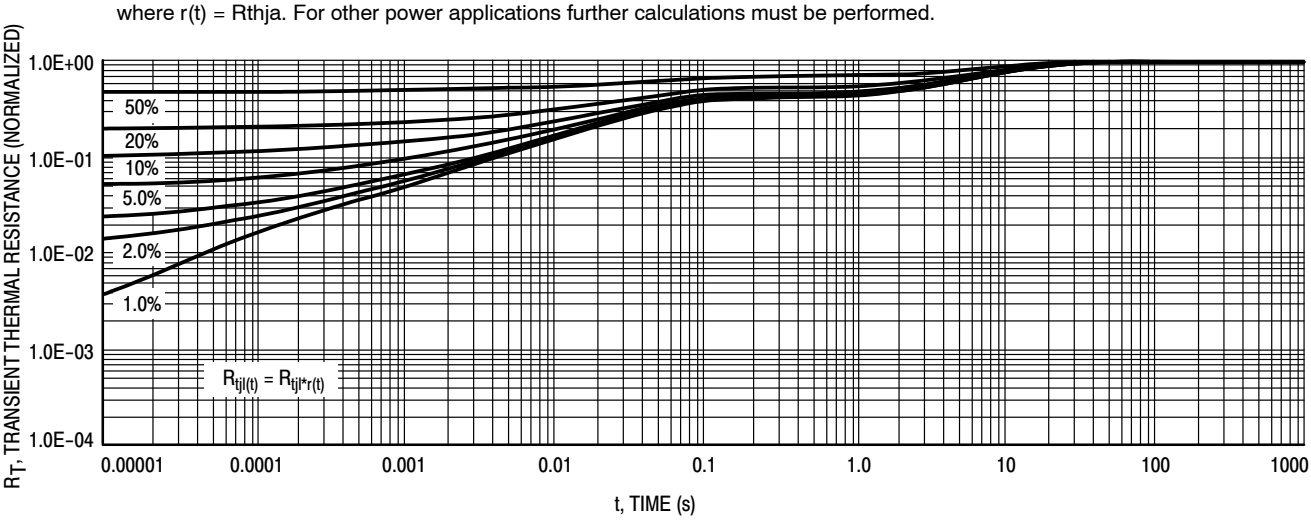



**Figure 9. Thermal Response — Junction to Case**

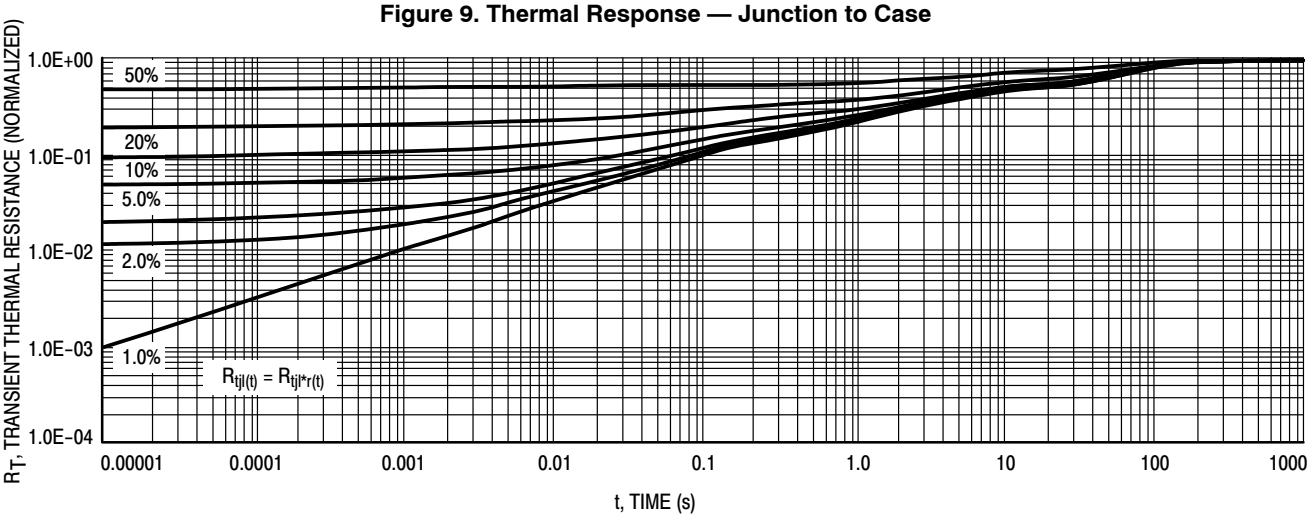



**Figure 10. Thermal Response — Junction to Ambient**



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**SMB**
CASE 403A−03
ISSUE J

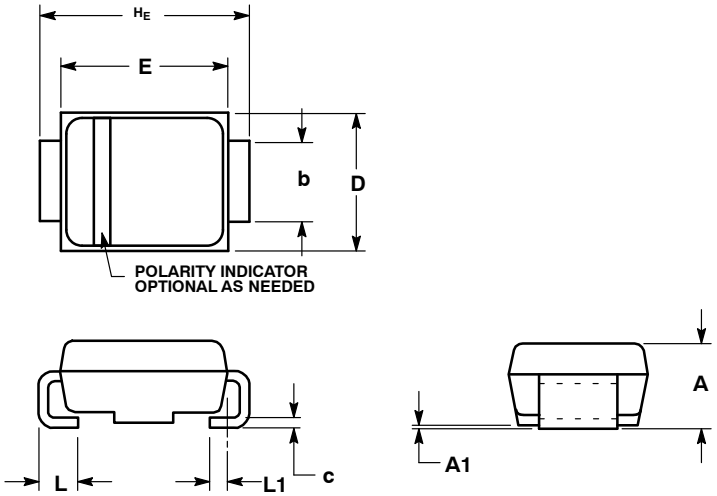
DATE 19 JUL 2012



**SCALE 1:1**
**Polarity Band**



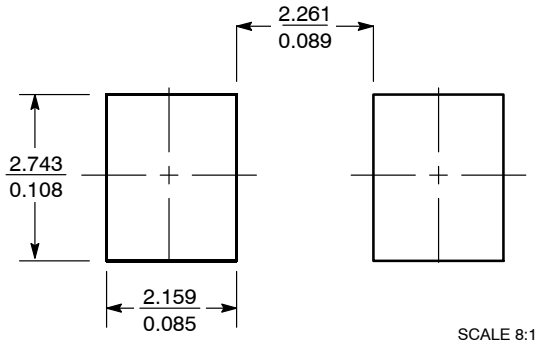
**SCALE 1:1**
**Non−Polarity Band**




NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. DIMENSION b SHALL BE MEASURED WITHIN DIMENSION L1.

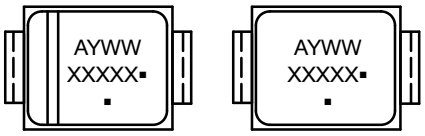
| | MILLIMETERS | | | INCHES | | |
|---|---|---|---|---|---|---|
| DIM | MIN | NOM | MAX | MIN | NOM | MAX |
| A | 1.95 | 2.30 | 2.47 | 0.077 | 0.091 | 0.097 |
| A1 | 0.05 | 0.10 | 0.20 | 0.002 | 0.004 | 0.008 |
| b | 1.96 | 2.03 | 2.20 | 0.077 | 0.080 | 0.087 |
| c | 0.15 | 0.23 | 0.31 | 0.006 | 0.009 | 0.012 |
| D | 3.30 | 3.56 | 3.95 | 0.130 | 0.140 | 0.156 |
| E | 4.06 | 4.32 | 4.60 | 0.160 | 0.170 | 0.181 |
| $H_E$ | 5.21 | 5.44 | 5.60 | 0.205 | 0.214 | 0.220 |
| L | 0.76 | 1.02 | 1.60 | 0.030 | 0.040 | 0.063 |
| L1 | 0.51 REF | | | 0.020 REF | | |

## SOLDERING FOOTPRINT*




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

## GENERIC MARKING DIAGRAM*




**Polarity Band** **Non−Polarity Band**

XXXXX = Specific Device Code
A = Assembly Location
Y = Year
WW = Work Week
▪ = Pb−Free Package

(Note: Microdot may be in either location)

*This information is generic. Please refer to device data sheet for actual part marking. Pb−Free indicator, “G” or microdot “▪”, may or may not be present. Some products may not follow the Generic Marking.

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