

# MBRS540T3

Preferred Device

## Surface Mount Schottky Power Rectifier

The MBRS540T3 employs the Schottky Barrier principle in a large area metal-to-silicon power diode. State-of-the-art geometry features epitaxial construction with oxide passivation and metal overlay contact. Ideally suited for low voltage, high frequency rectification, or as free wheeling and polarity protection diodes in surface mount applications where compact size and weight are critical to the system.

### Features

- Small Compact Surface Mountable Package with J-Bend Leads
- Rectangular Package for Automated Handling
- Highly Stable Oxide Passivated Junction
- Excellent Ability to Withstand Reverse Avalanche Energy Transients
- Guard-Ring for Stress Protection
- Pb-Free Package is Available

### Mechanical Characteristics

- Case: Epoxy, Molded, Epoxy Meets UL 94 V-0 @ 0.125 in
- Weight: 217 mg (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
- Polarity: Notch in Plastic Body Indicates Cathode Lead
- ESD Rating: Machine Model, C (> 400 V)  
Human Body Model, 3B (> 8000 V)
- Device Meets MSL 1 Requirements

### 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<br>(At Rated $V_R$ , $T_C = 105^\circ\text{C}$ )                             | $I_{F(AV)}$                     | 5           | A                |
| Peak Repetitive Forward Current<br>(At Rated $V_R$ , Square Wave,<br>20 KHz, $T_C = 80^\circ\text{C}$ )        | $I_{FRM}$                       | 10          | A                |
| Non-Repetitive Peak Surge Current<br>(Surge Applied at Rated Load Conditions<br>Halfwave, Single Phase, 60 Hz) | $I_{FSM}$                       | 190         | A                |
| Storage Temperature Range  | $T_{stg}$                       | -65 to +150 | $^\circ\text{C}$ |
| Operating Junction Temperature (Note 1)  | $T_J$                           | -65 to +150 | $^\circ\text{C}$ |
| Voltage Rate of Change (Rated $V_R$ )  | $dv/dt$                         | 10,000      | V/ $\mu\text{s}$ |

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.

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



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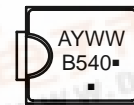
<http://onsemi.com>

## SCHOTTKY BARRIER RECTIFIER 5.0 AMPERES, 40 VOLTS



SMC  
CASE 403  
PLASTIC

### MARKING DIAGRAM



B540 = 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†        |
|------------|------------------|------------------|
| MBRS540T3  | SMC              | 2500/Tape & Reel |
| MBRS540T3G | SMC<br>(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.

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



# MBRS540T3

## THERMAL CHARACTERISTICS

| Characteristic                                      | Symbol          | Value | Unit          |
|---|-----------------|-------|---------------|
| Thermal Resistance,<br>Junction-to-Lead (Note 2)    | $R_{\theta JL}$ | 12    | $^{\circ}C/W$ |
| Thermal Resistance,<br>Junction-to-Ambient (Note 2) | $R_{\theta JA}$ | 111   |               |

## ELECTRICAL CHARACTERISTICS

|  |   |       |           |    |
|--|---|-------|-----------|----|
| Maximum Instantaneous Forward Voltage (Note 3) | ( $i_F = 5.0 \text{ A}$ , $T_C = 25^{\circ}C$ )                                       | $V_F$ | 0.50      | V  |
| Maximum Instantaneous Reverse Current (Note 3) | (Rated dc Voltage, $T_C = 25^{\circ}C$ )<br>(Rated dc Voltage, $T_C = 100^{\circ}C$ ) | $i_R$ | 0.3<br>15 | mA |

2. Rating applies when surface mounted on the minimum pad size recommended.

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

## TYPICAL CHARACTERISTICS

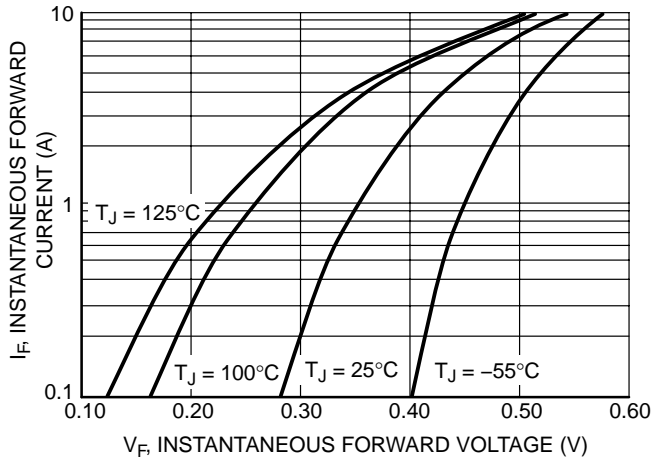


Figure 1. Typical Forward Voltage

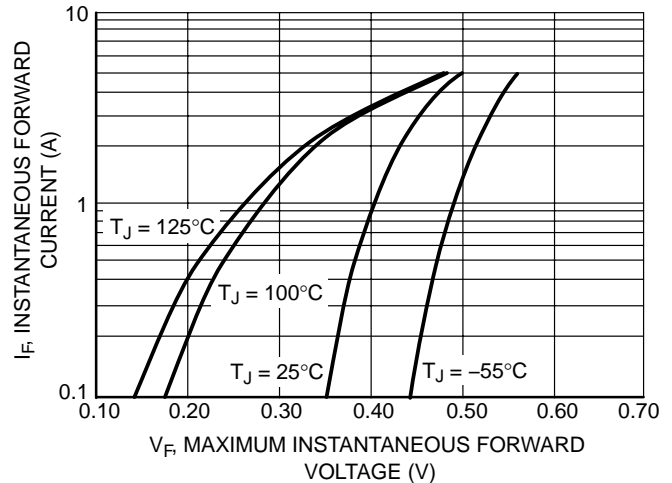


Figure 2. Maximum Forward Voltage

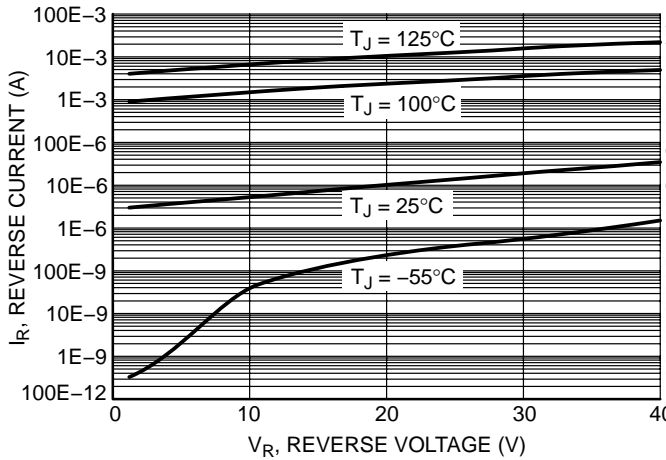


Figure 3. Typical Reverse Current

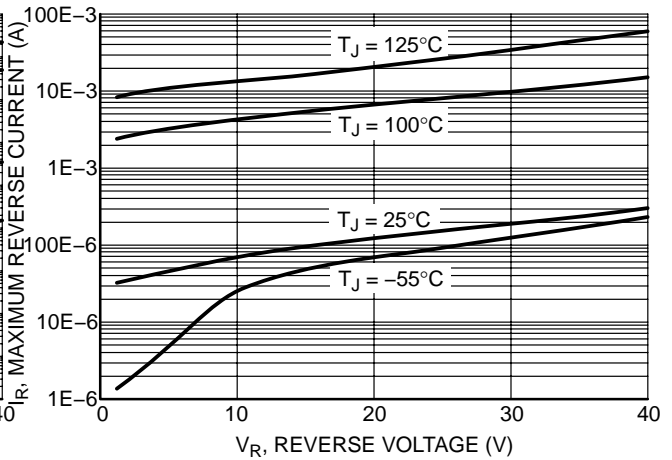


Figure 4. Maximum Reverse Current

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## TYPICAL CHARACTERISTICS

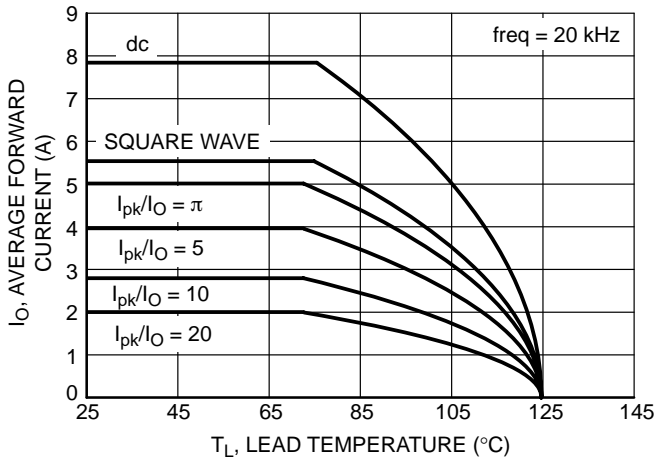


Figure 5. Current Derating

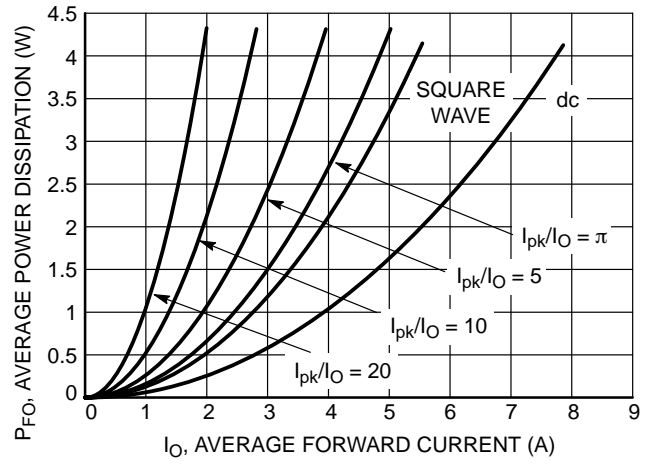


Figure 6. Forward Power Dissipation

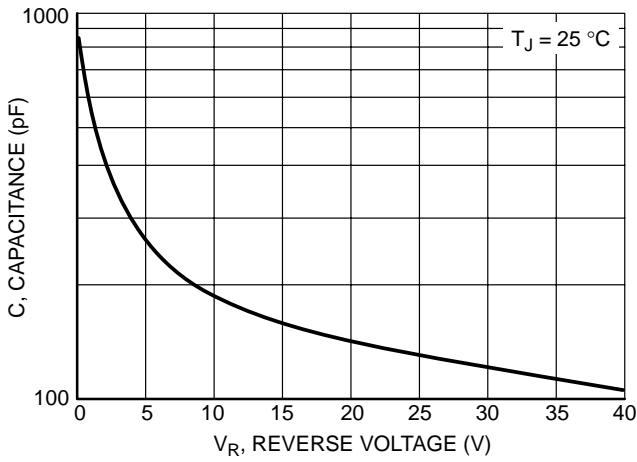


Figure 7. Capacitance

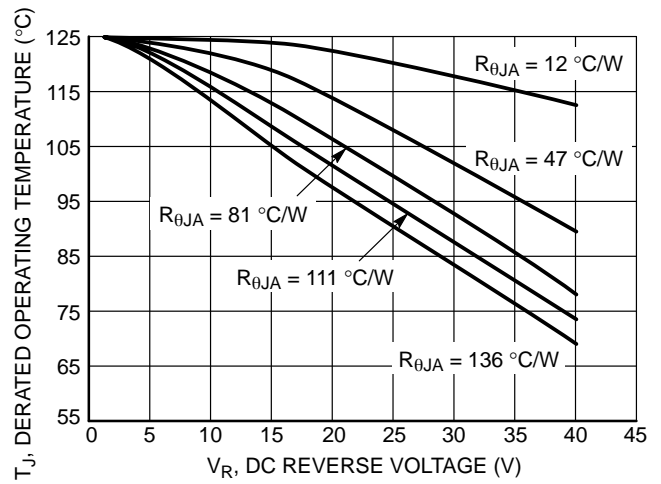


Figure 8. Typical Operating Temperature Derating

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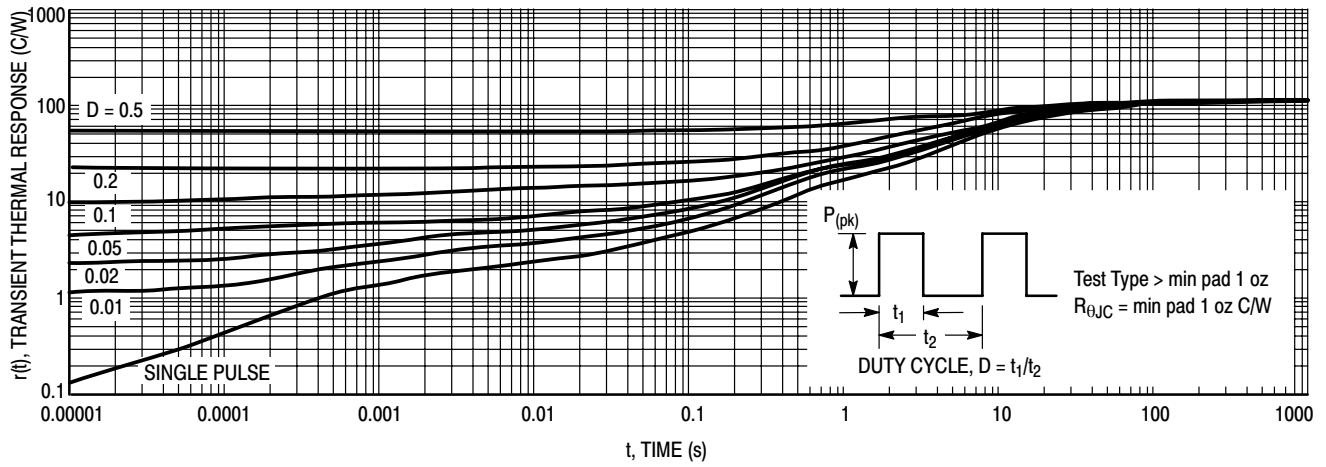


Figure 9. Thermal Response – MBR540T3 on min pad

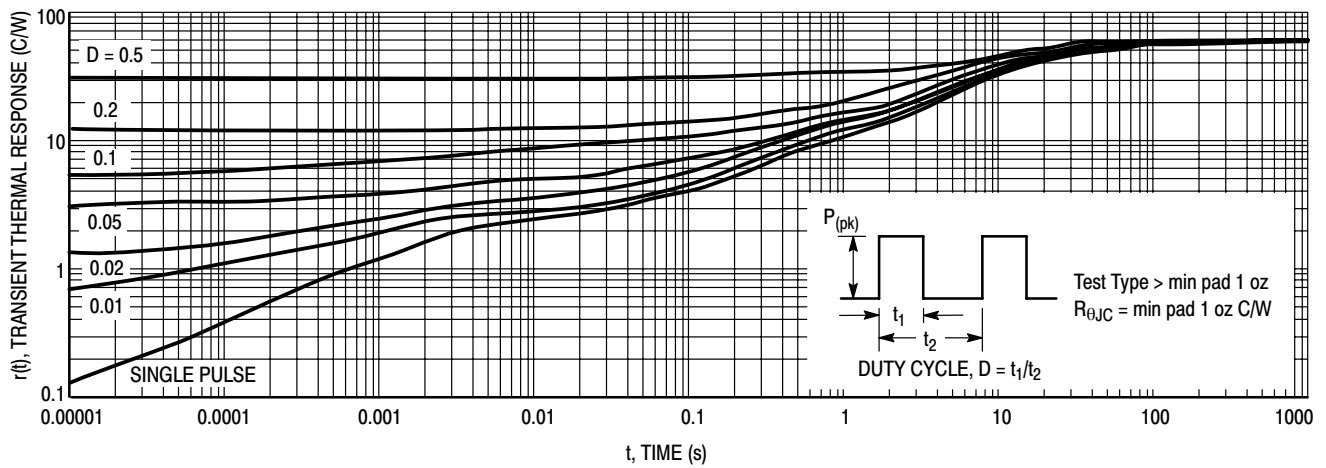
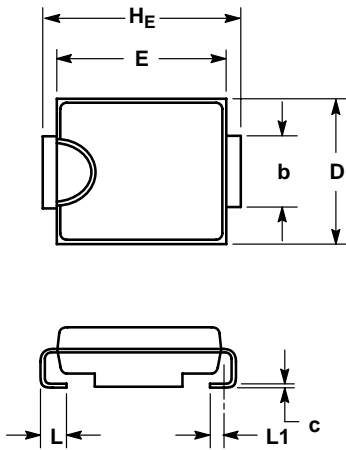


Figure 10. Thermal Response – MBR540T3 on 1" pad

# MBRS540T3

## PACKAGE DIMENSIONS

SMC  
CASE 403-03  
ISSUE E

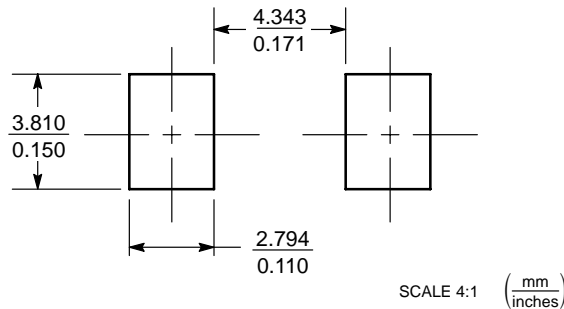


NOTES:


1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. D DIMENSION SHALL BE MEASURED WITHIN DIMENSION P.
4. 403-01 THRU -02 OBSOLETE, NEW STANDARD 403-03.

| DIM | MILLIMETERS |      |      | INCHES    |       |       |
|-----|-------------|------|------|-----------|-------|-------|
|     | MIN         | NOM  | MAX  | MIN       | NOM   | MAX   |
| A   | 1.90        | 2.13 | 2.41 | 0.075     | 0.084 | 0.095 |
| A1  | 0.05        | 0.10 | 0.15 | 0.002     | 0.004 | 0.006 |
| b   | 2.92        | 3.00 | 3.07 | 0.115     | 0.118 | 0.121 |
| c   | 0.15        | 0.23 | 0.30 | 0.006     | 0.009 | 0.012 |
| D   | 5.59        | 5.84 | 6.10 | 0.220     | 0.230 | 0.240 |
| E   | 6.60        | 6.86 | 7.11 | 0.260     | 0.270 | 0.280 |
| HE  | 7.75        | 7.94 | 8.13 | 0.305     | 0.313 | 0.320 |
| L   | 0.76        | 1.02 | 1.27 | 0.030     | 0.040 | 0.050 |
| L1  | 0.51 REF    |      |      | 0.020 REF |       |       |

### 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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