

# MBRS540P

## Surface Mount Schottky Power Rectifier

The MBRS540PT3 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
- These are PB-Free Packages

### 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
- Cathode Polarity Band
- ESD Rating:
  - ◆ Machine Model, C (> 400 V)
  - ◆ Human Body Model, 3B (> 8000 V)
- Device Meets MSL 1 Requirements



**ON Semiconductor®**

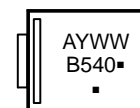
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**SCHOTTKY BARRIER  
RECTIFIER  
5.0 AMPERES, 40 VOLTS**



**SMC  
CASE 403AC**

### 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†              |
|-------------|------------------|------------------------|
| MBRS540PT3G | SMC<br>(Pb-Free) | 2,500 /<br>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.

# MBS540P

## 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, 20 KHz, $T_C = 80^\circ\text{C}$ )        | $I_{FRM}$                       | 10          | A                |
| Non-Repetitive Peak Surge Current<br>(Surge Applied at Rated Load Conditions Halfwave, Single Phase, 60 Hz) | $I_{FSM}$                       | 190         | A                |
| Storage Temperature Range   | Tstg                            | -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/ $\mu\text{s}$ |

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.

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

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

## ELECTRICAL CHARACTERISTICS

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

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

# MBS540P

## TYPICAL CHARACTERISTICS

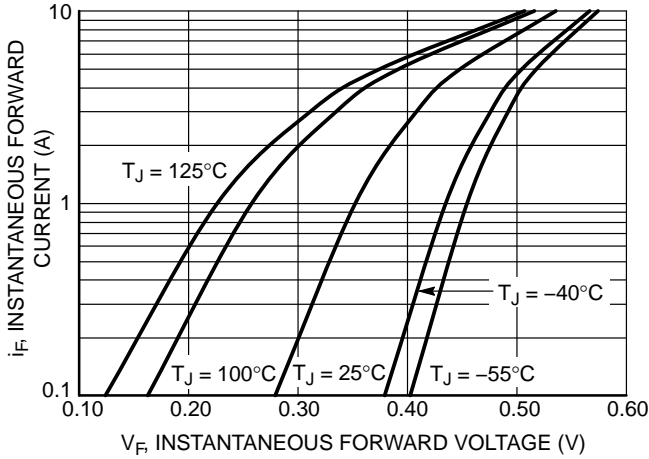


Figure 1. Typical Forward Voltage

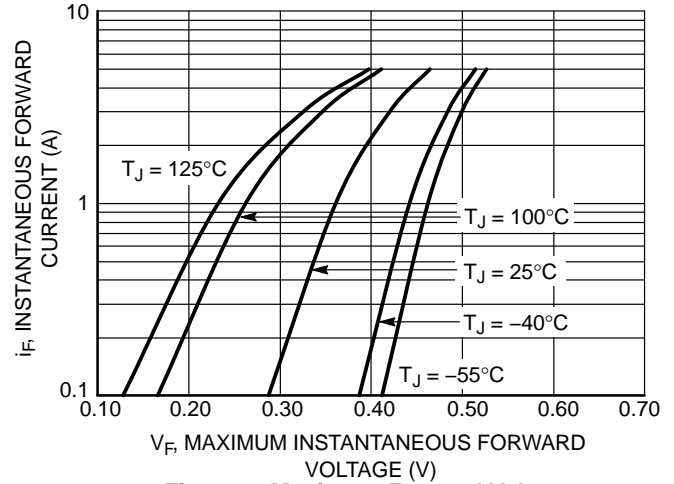


Figure 2. Maximum Forward Voltage

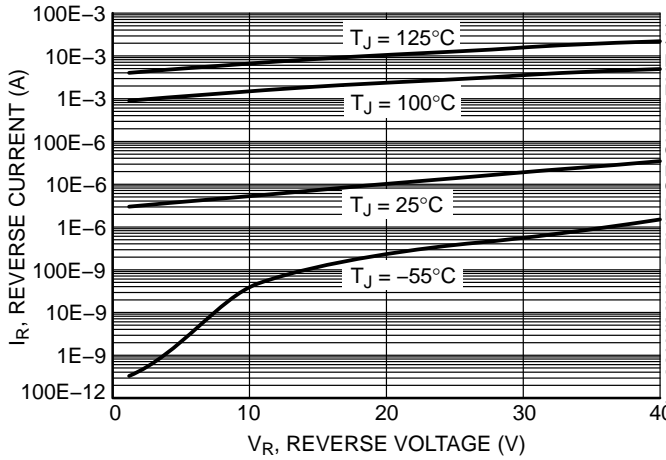


Figure 3. Typical Reverse Current

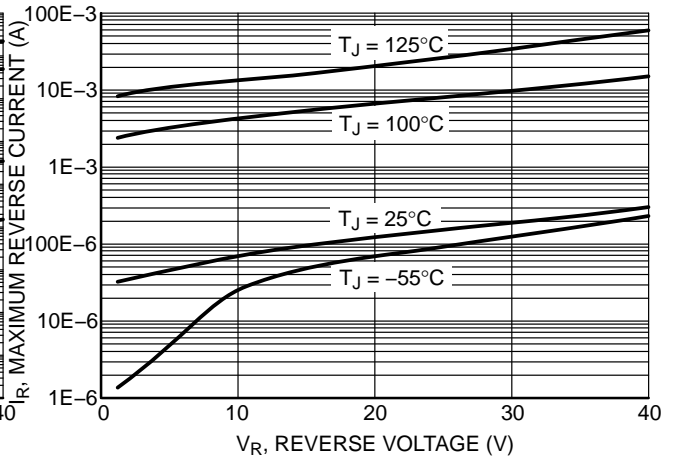


Figure 4. Maximum Reverse Current

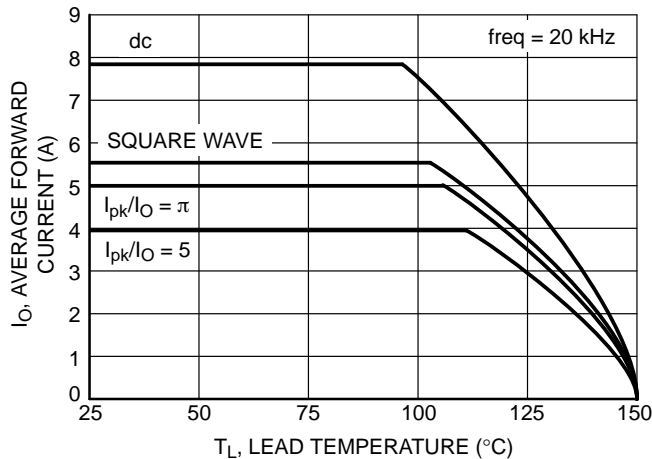


Figure 5. Current Derating

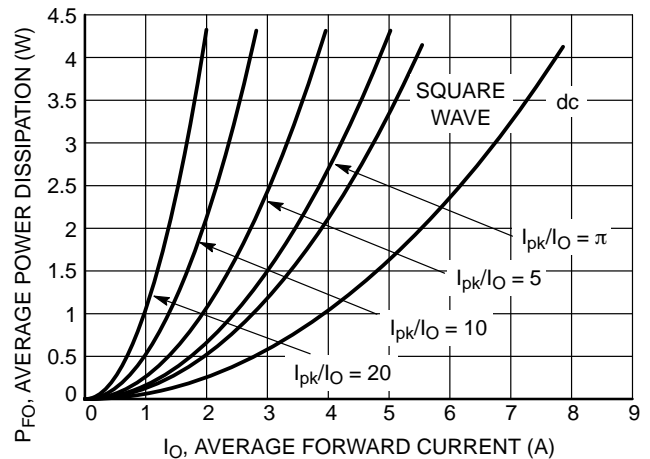


Figure 6. Forward Power Dissipation

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## TYPICAL CHARACTERISTICS

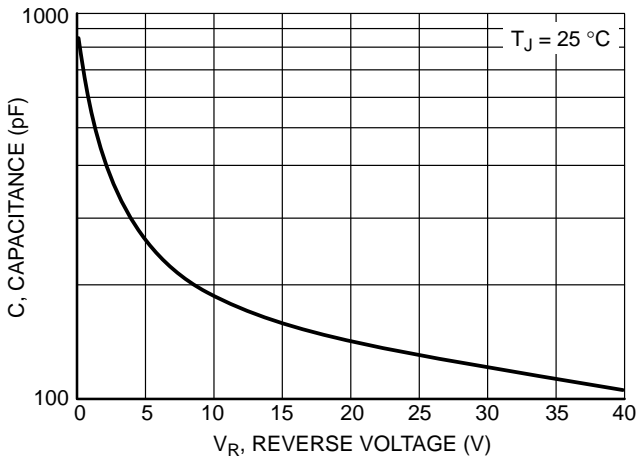


Figure 7. Capacitance

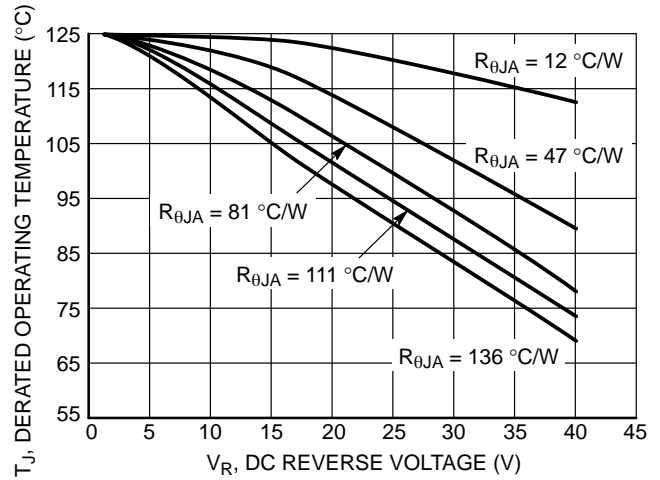


Figure 8. Typical Operating Temperature Derating

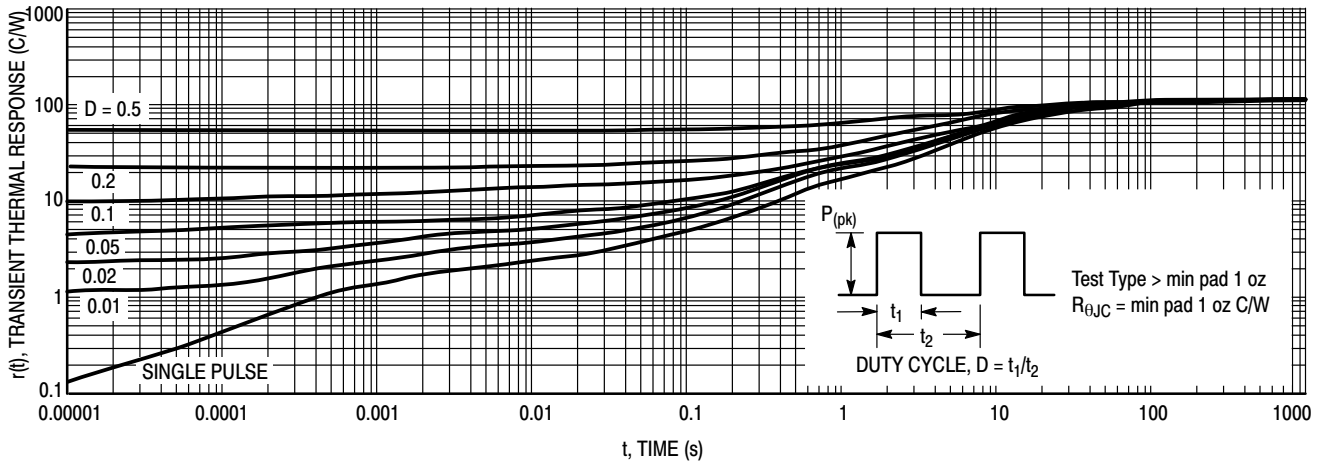


Figure 9. Thermal Response – MBR540PT3G, NRVBS540T3G on min pad

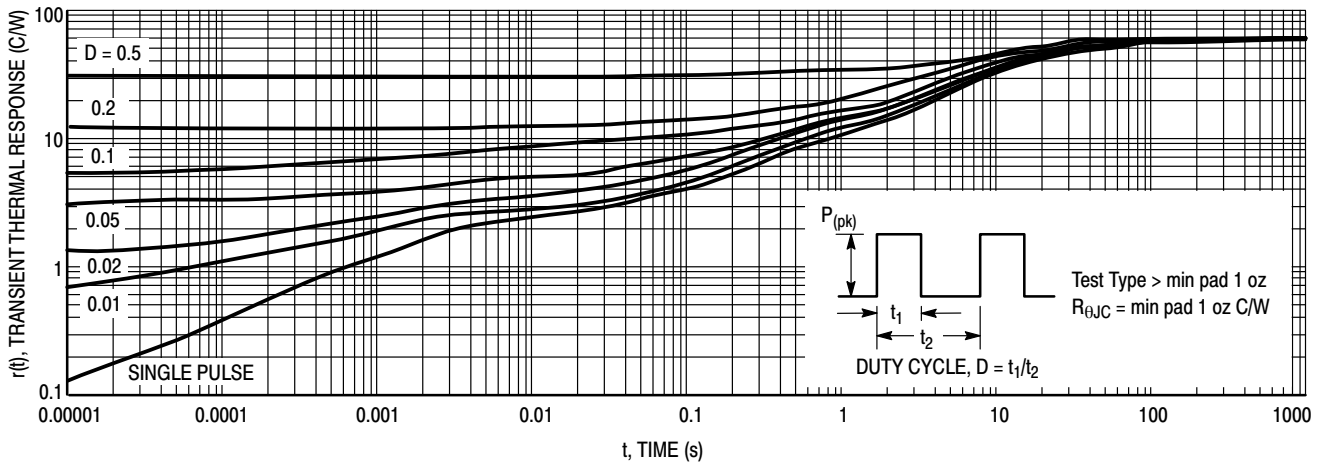
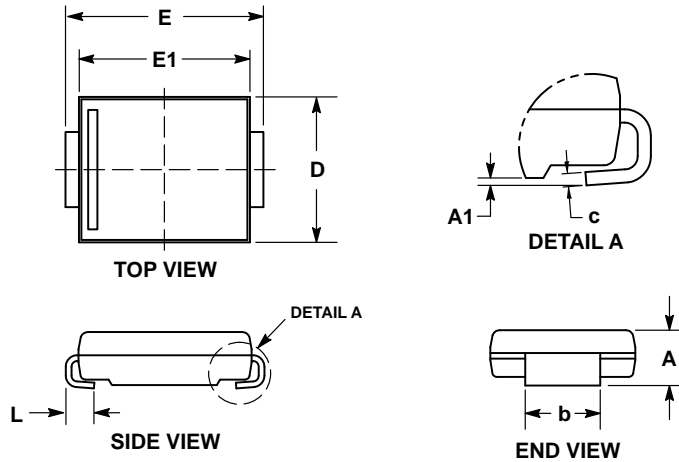


Figure 10. Thermal Response – MBR540PT3G, NRVBS540T3G on 1" pad

# MBS540P

## PACKAGE DIMENSIONS

### SMC 2-LEAD CASE 403AC ISSUE O

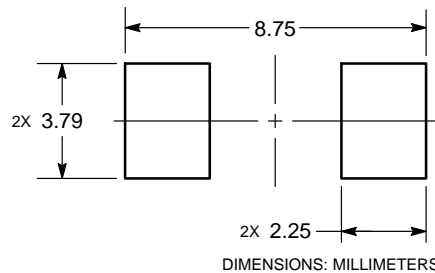


#### NOTES:


1. DIMENSIONING AND TOLERANCING PER ANME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. DIMENSIONS D AND E1 DO NOT INCLUDE MOLD FLASH. MOLD FLASH SHALL NOT EXCEED 0.13 PER SIDE.
4. DIMENSIONS D AND E1 TO BE DETERMINED AT DATUM H.
5. DIMENSION b SHALL BE MEASURED WITHIN THE AREA DETERMINED BY DIMENSION L.

| DIM | MILLIMETERS |      |
|-----|-------------|------|
|     | MIN         | MAX  |
| A   | 1.95        | 2.65 |
| A1  | 0.05        | 0.20 |
| b   | 2.90        | 3.20 |
| c   | 0.15        | 0.41 |
| D   | 5.55        | 6.25 |
| E   | 7.75        | 8.15 |
| E1  | 6.60        | 7.15 |
| L   | 0.75        | 1.60 |

#### RECOMMENDED 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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