

# SS22, SS24

## Surface Mount Schottky Power Rectifier SMB Power Surface Mount Package

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
- Guardring for Over-Voltage Protection
- Low Forward Voltage Drop
- Pb-Free Package is Available

### 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
- Available in 12 mm Tape, 2500 Units per 13 in Reel, Add "T3" Suffix to Part Number
- Finish: All External Surfaces Corrosion Resistant and Terminal Leads are Readily Solderable
- ESD Ratings: Machine Model = C  
Human Body Model = 3B



**ON Semiconductor®**

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**SCHOTTKY BARRIER  
RECTIFIER  
2 AMPERES  
20, 40 VOLTS**



**SMB  
CASE 403A  
PLASTIC**

### MARKING DIAGRAM



SS2x = Specific Device Code  
x = 2 or 4  
A = Assembly Location  
Y = Year  
WW = Work Week  
■ = Pb-Free Package

(Note: Microdot may be in either location)

### ORDERING INFORMATION

| Device  | Package          | Shipping <sup>†</sup> |
|---------|------------------|-----------------------|
| SS22T3  | SMB              | 2500/Tape & Reel      |
| SS24T3  | SMB              | 2500/Tape & Reel      |
| SS24T3G | SMB<br>(Pb-Free) | 2500/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.

## SS22, SS24

### MAXIMUM RATINGS

| Rating                                                                                                      | Symbol                          | Value       | Unit             |
|-------------------------------------------------------------------------------------------------------------|---------------------------------|-------------|------------------|
| Peak Repetitive Reverse Voltage<br>Working Peak Reverse Voltage<br>DC Blocking Voltage<br>SS22<br>SS24      | $V_{RRM}$<br>$V_{RWM}$<br>$V_R$ | 20<br>40    | V                |
| Average Rectified Forward Current<br>(At Rated $V_R$ , $T_L = 100^\circ\text{C}$ )                          | $I_O$                           | 2.0         | A                |
| Peak Repetitive Forward Current<br>(At Rated $V_R$ , Square Wave,<br>100 kHz, $T_C = 105^\circ\text{C}$ )   | $I_{FRM}$                       | 3.0         | A                |
| Non-Repetitive Peak Surge Current<br>(Surge Applied at Rated Load Conditions Halfwave, Single Phase, 60 Hz) | $I_{FSM}$                       | 75          | A                |
| Storage/Operating Case Temperature                                                                          | $T_{stg}, T_C$                  | -55 to +150 | $^\circ\text{C}$ |
| Operating Junction Temperature                                                                              | $T_J$                           | -55 to +125 | $^\circ\text{C}$ |
| Voltage Rate of Change<br>(Rated $V_R$ , $T_J = 25^\circ\text{C}$ )                                         | $dv/dt$                         | 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.

### THERMAL CHARACTERISTICS

| Characteristic                                      | Symbol          | Value | Unit                      |
|-----------------------------------------------------|-----------------|-------|---------------------------|
| Thermal Resistance,<br>Junction-to-Lead (Note 1)    | $R_{\theta JL}$ | 24    | $^\circ\text{C}/\text{W}$ |
| Thermal Resistance,<br>Junction-to-Ambient (Note 2) | $R_{\theta JA}$ | 80    |                           |

### ELECTRICAL CHARACTERISTICS

|                                                                                            |       |                          |                           |    |
|--------------------------------------------------------------------------------------------|-------|--------------------------|---------------------------|----|
| Maximum Instantaneous Forward Voltage (Note 3)<br>see Figure 2<br>( $I_F = 2.0\text{ A}$ ) | $V_F$ | $T_J = 25^\circ\text{C}$ | $T_J = 125^\circ\text{C}$ | V  |
|                                                                                            |       | 0.50                     | 0.46                      |    |
| Maximum Instantaneous Reverse Current (Note 3)<br>see Figure 4<br>( $V_R = 40\text{ V}$ )  | $I_R$ | $T_J = 25^\circ\text{C}$ | $T_J = 100^\circ\text{C}$ | mA |
|                                                                                            |       | 0.4                      | 5.7                       |    |

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  $\leq 250\text{ }\mu\text{s}$ , Duty Cycle  $\leq 2.0\%$ .

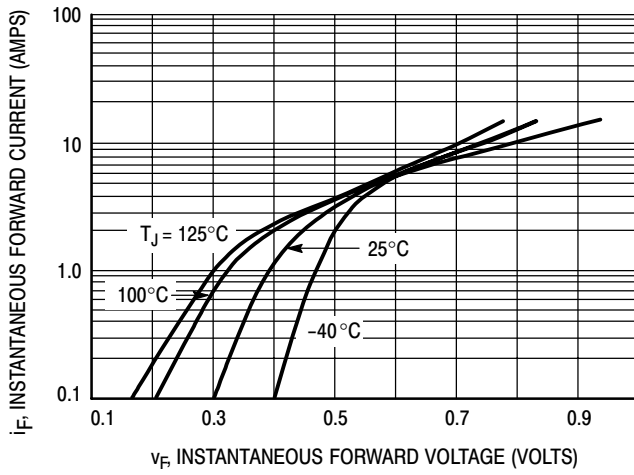


Figure 1. Typical Forward Voltage

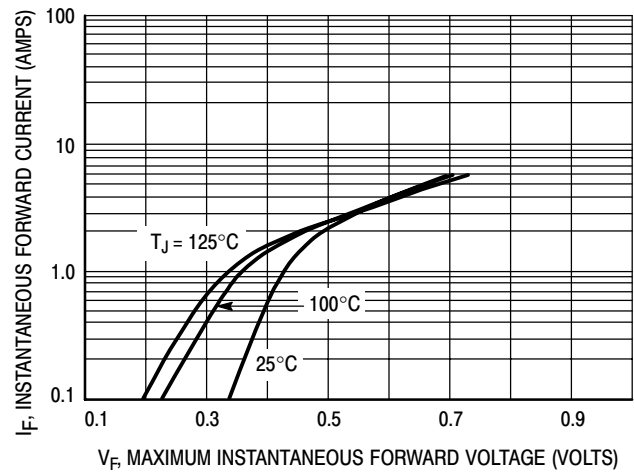


Figure 2. Maximum Forward Voltage

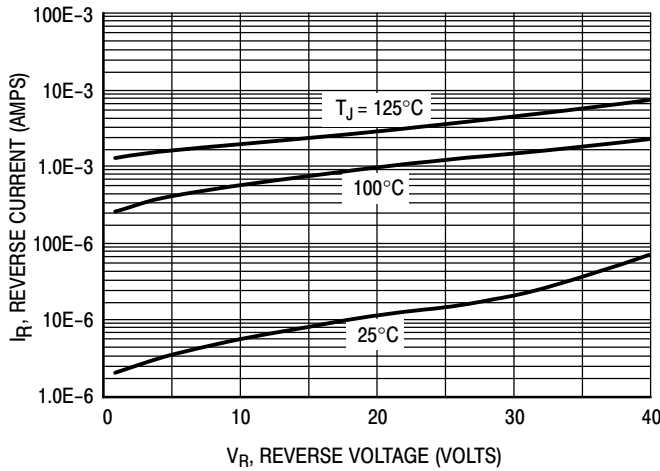


Figure 3. Typical Reverse Current

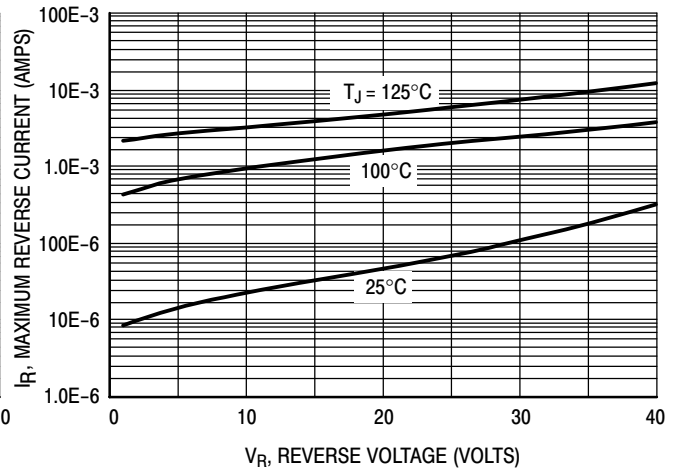


Figure 4. Maximum Reverse Current

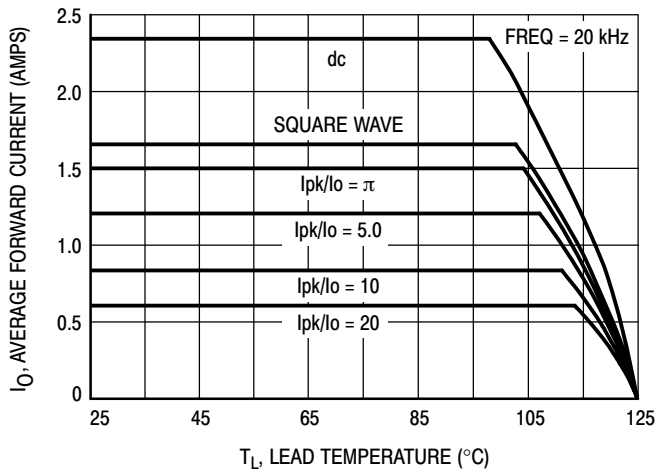


Figure 5. Current Derating

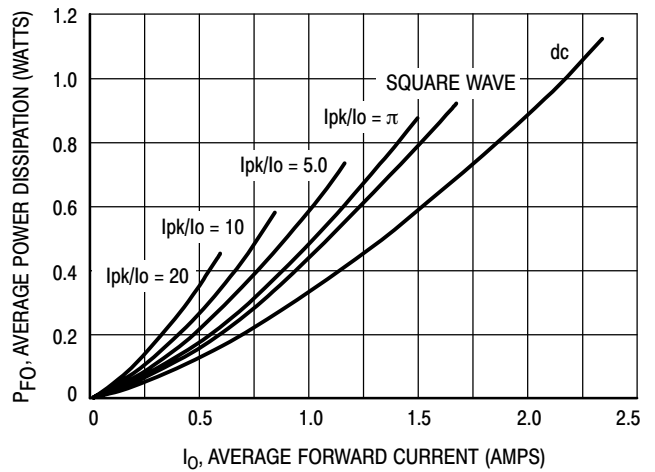


Figure 6. Forward Power Dissipation

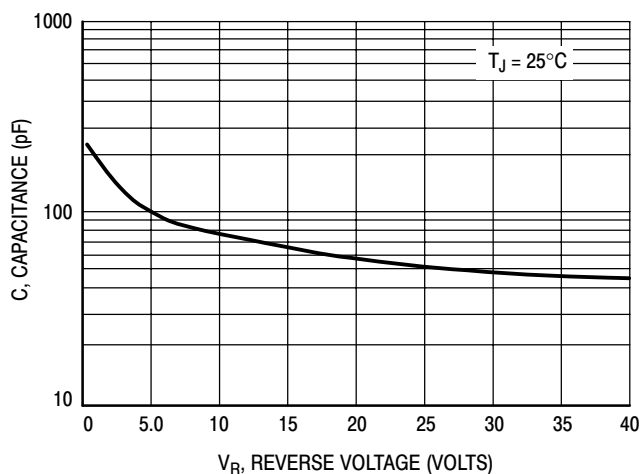


Figure 7. Capacitance

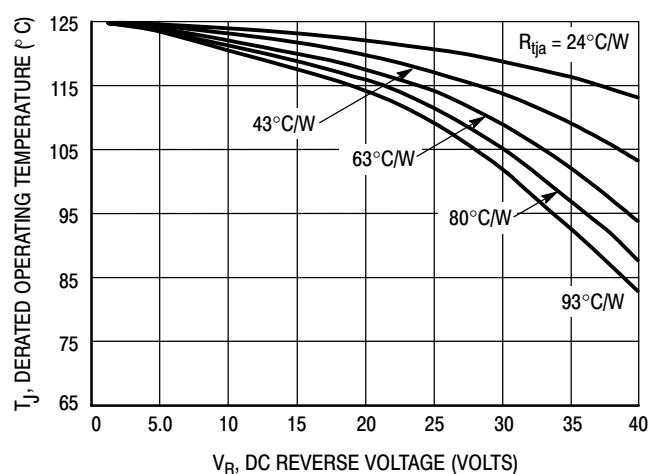


Figure 8. Typical Operating Temperature Derating\*

\* 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:

$$T_J = T_{Jmax} - r(t)(P_f + P_r) \text{ where}$$

$r(t)$  = thermal impedance under given conditions,  
 $P_f$  = forward power dissipation, and  
 $P_r$  = 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  $r(t) = R_{thJA}$ . For other power applications further calculations must be performed.

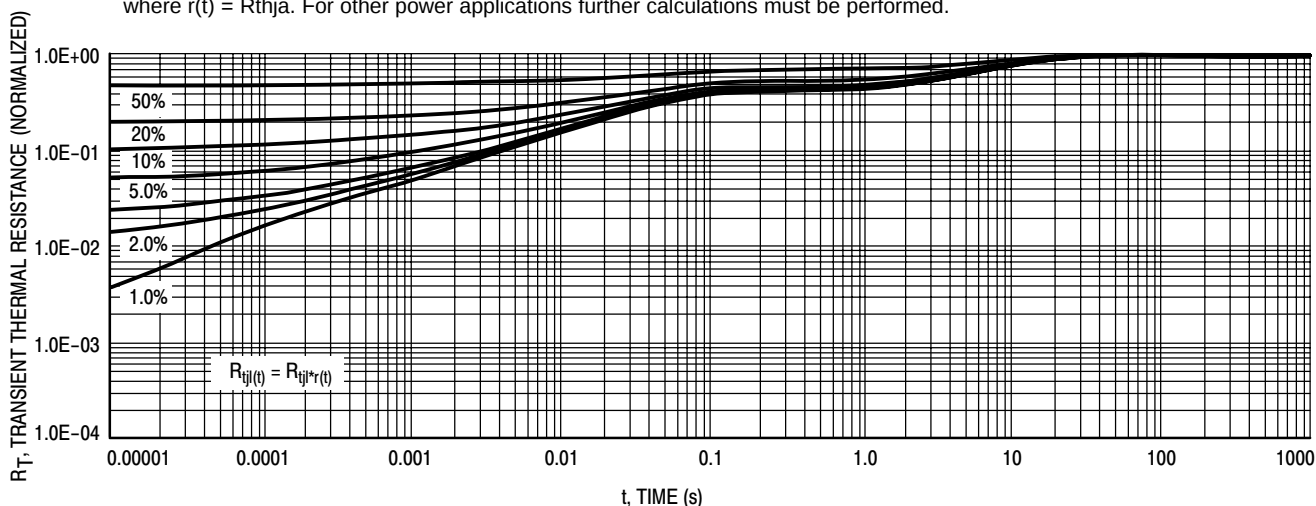


Figure 9. Thermal Response — Junction to Case

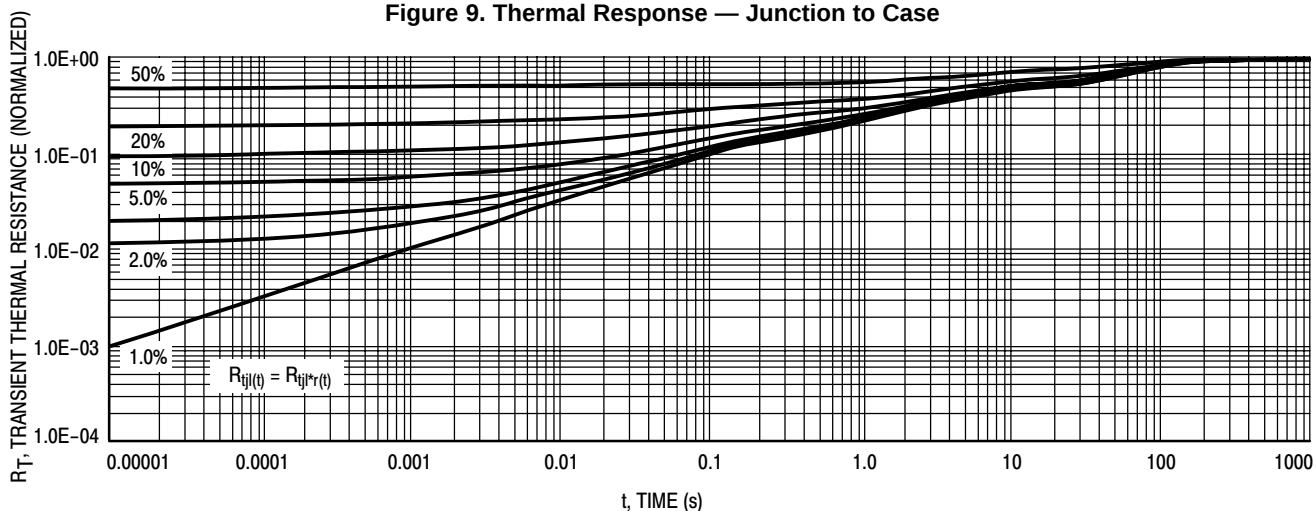
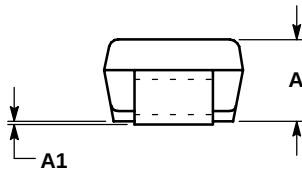
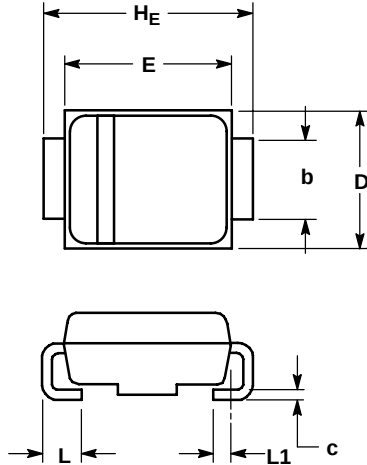


Figure 10. Thermal Response — Junction to Ambient

# SS22, SS24

## PACKAGE DIMENSIONS

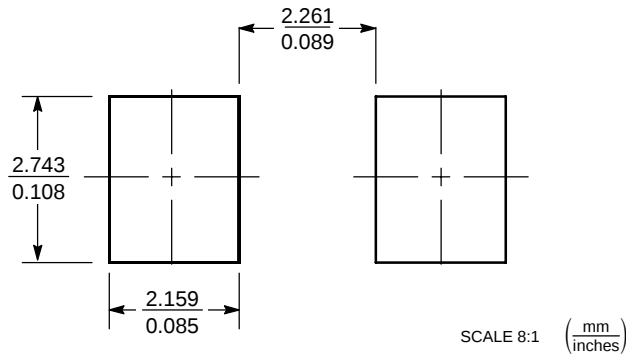
### SMB CASE 403A-03 ISSUE E



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

| 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   | 1.96        | 2.03 | 2.11 | 0.077     | 0.080 | 0.083 |
| c   | 0.15        | 0.23 | 0.30 | 0.006     | 0.009 | 0.012 |
| D   | 3.30        | 3.56 | 3.81 | 0.130     | 0.140 | 0.150 |
| E   | 4.06        | 4.32 | 4.57 | 0.160     | 0.170 | 0.180 |
| HE  | 5.21        | 5.44 | 5.59 | 0.205     | 0.214 | 0.220 |
| 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, SOLDERM/D.

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