

## Advance Information

# Surface Mount

# Schottky Power Rectifier

## SOD-123 Power Surface Mount Package

The Schottky Power Rectifier employs the Schottky Barrier principle with a barrier metal that produces optimal forward voltage drop–reverse current tradeoff. Ideally suited for low voltage, high frequency rectification, or as a free wheeling and polarity protection diodes in surface mount applications where compact size and weight are critical to the system. This package provides an alternative to the leadless 34 MELF style package. These state-of-the-art devices have the following features:

- Guardring for Stress Protection
- Very Low Forward Voltage
- Epoxy Meets UL94, VO at 1/8"
- Package Designed for Optimal Automated Board Assembly

### Mechanical Characteristics:

- Reel Options: 3,000 per 7 inch reel / 8 mm tape
- Reel Options: 10,000 per 13 inch reel / 8 mm tape
- Device Marking: B4
- Polarity Designator: Cathode Band
- Weight: 11.7 mg (approximately)
- Case: Epoxy Molded
- 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

### MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Peak Repetitive Reverse Voltage Working Peak Reverse Voltage DC Blocking Voltage	$V_{RRM}$ $V_{RWM}$ $V_R$	40	V
Average Rectified Forward Current (At Rated $V_R$ , $T_C = 115^\circ\text{C}$ )	$I_O$	0.5	A
Peak Repetitive Forward Current (At Rated $V_R$ , Square Wave, 20 kHz, $T_C = 115^\circ\text{C}$ )	$I_{FRM}$	1.0	A
Non-Repetitive Peak Surge Current (Surge applied at rated load conditions, halfwave, single phase, 60 Hz)	$I_{FSM}$	5.5	A
Storage / Operating Case Temperature	$T_{stg}, T_C$	-55 to 150	°C
Operating Junction Temperature	$T_J$	-55 to 150	°C
Voltage Rate of Change (Rated $V_R$ , $T_J = 25^\circ\text{C}$ )	$dv/dt$	1,000	V/ $\mu\text{s}$

### THERMAL CHARACTERISTICS

Thermal Resistance – Junction-to-Lead (2)	$R_{\theta JL}$	118	°C/W
Thermal Resistance – Junction-to-Ambient (3)	$R_{\theta JA}$	206	

### ELECTRICAL CHARACTERISTICS

Maximum Instantaneous Forward Voltage (1) ( $I_F = 0.5\text{ A}$ ) ( $I_F = 1\text{ A}$ )	$V_F$	$T_J = 25^\circ\text{C}$	$T_J = 100^\circ\text{C}$	V
		0.51 0.62	0.46 0.61	
Maximum Instantaneous Reverse Current ( $V_R = 40\text{ V}$ ) ( $V_R = 20\text{ V}$ )	$I_R$	$T_J = 25^\circ\text{C}$	$T_J = 100^\circ\text{C}$	$\mu\text{A}$
		20 10	5,000 13,000	

This document contains information on a new product. Specifications and information herein are subject to change without notice.

- (1) Pulse Test: Pulse Width  $\leq 250\text{ }\mu\text{s}$ , Duty Cycle  $\leq 2.0\%$ .
- (2) Mounted with minimum recommended pad size, PC Board FR4.
- (3) 1 inch square pad size (1 X 0.5 inch for each lead) on FR4 board.

**MBR0540T1**

**SCHOTTKY BARRIER  
RECTIFIER  
0.5 AMPERES  
40 VOLTS**



**CASE 425-04, Style 1  
SOD-123**



## MBR0540T1

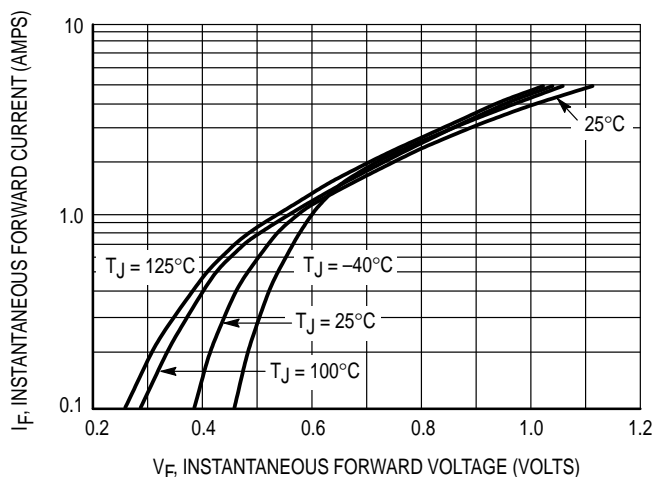


Figure 1. Typical Forward Voltage

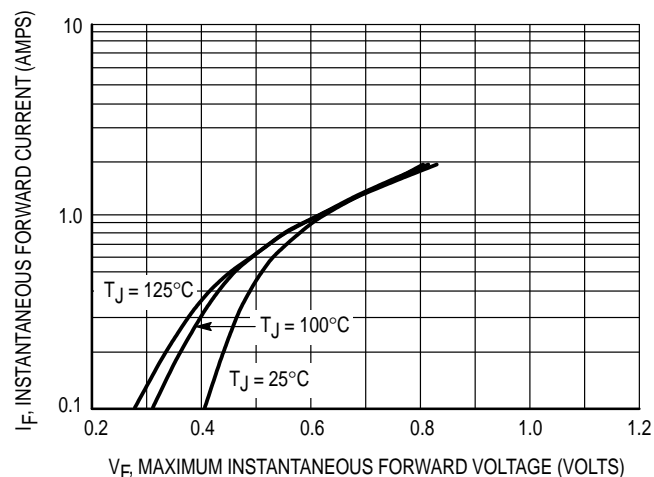


Figure 2. Maximum Forward Voltage

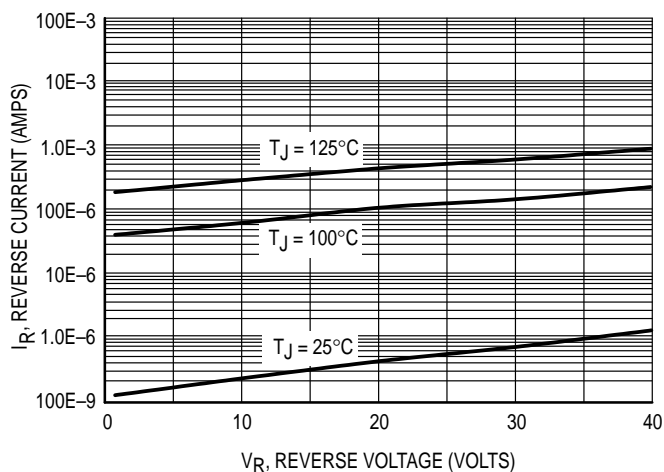


Figure 3. Typical Reverse Current

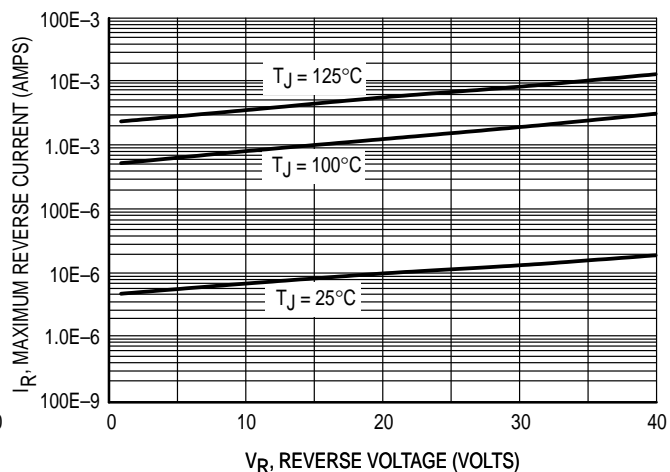


Figure 4. Maximum Reverse Current

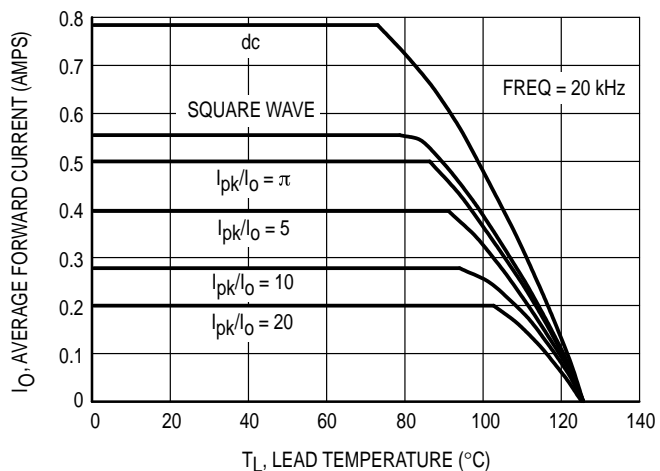


Figure 5. Current Derating

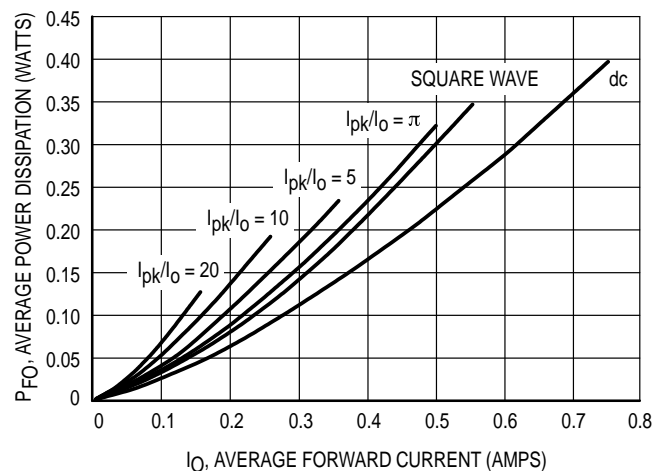


Figure 6. Forward Power Dissipation

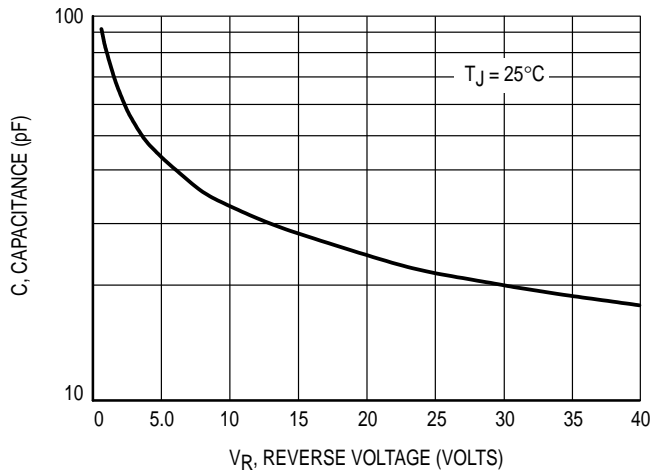


Figure 7. Capacitance

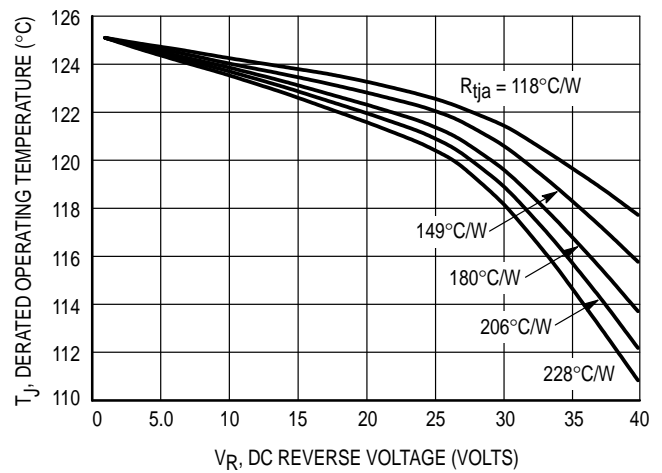


Figure 8. Typical Operating Temperature Derating\*

\* 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  $T_J = T_{Jmax} - r(t)P_r$ , where  $r(t) = R_{thJA}$ . For other power applications further calculations must be performed.

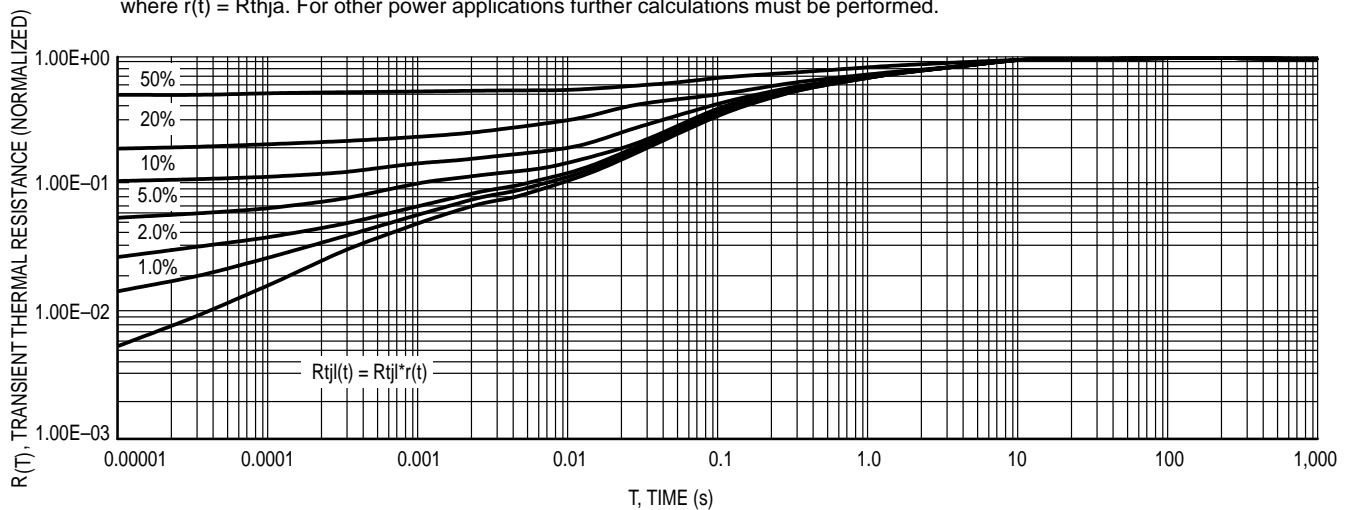


Figure 9. Thermal Response Junction to Lead

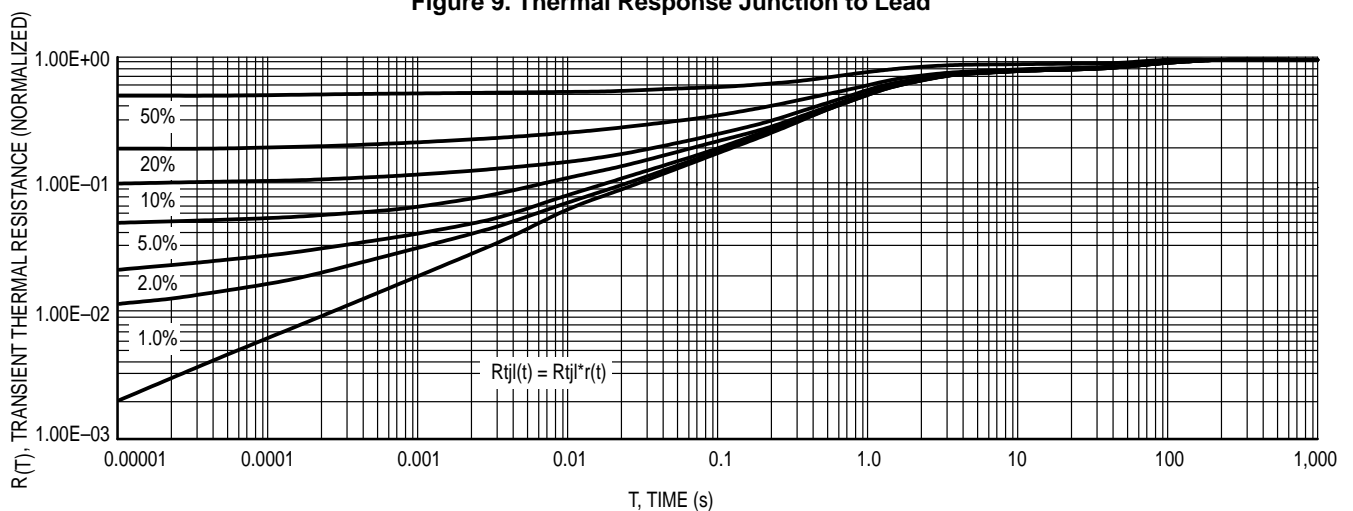
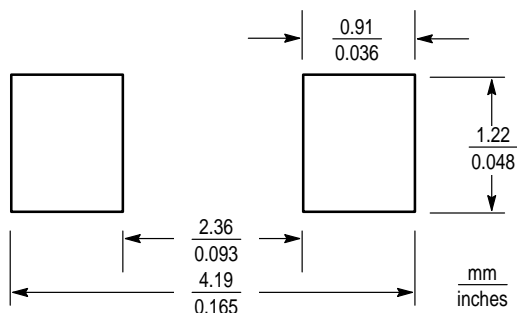


Figure 10. Thermal Response Junction to Ambient

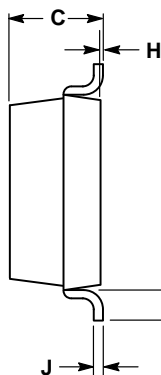
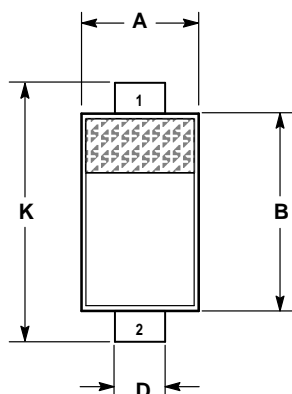
# MBR0540T1

## RECOMMENDED FOOTPRINT FOR SOD-123



SOD-123

## PACKAGE DIMENSIONS




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

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.055	0.071	1.40	1.80
B	0.100	0.112	2.55	2.85
C	0.037	0.053	0.95	1.35
D	0.020	0.028	0.50	0.70
E	0.004	—	0.25	—
H	0.000	0.004	0.00	0.10
J	—	0.006	—	0.15
K	0.140	0.152	3.55	3.85

STYLE 1:  
PIN 1. CATHODE  
2. ANODE

## CASE 425-04 ISSUE C

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