

*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	

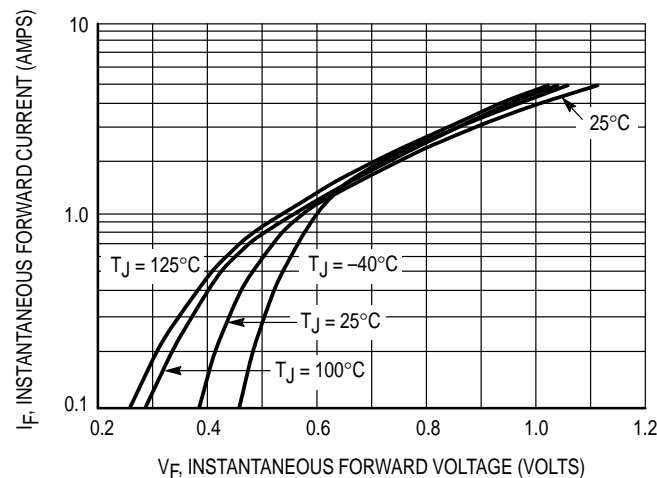
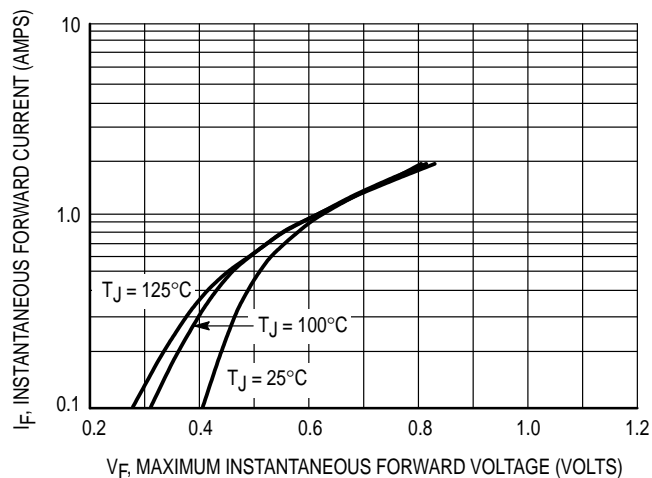
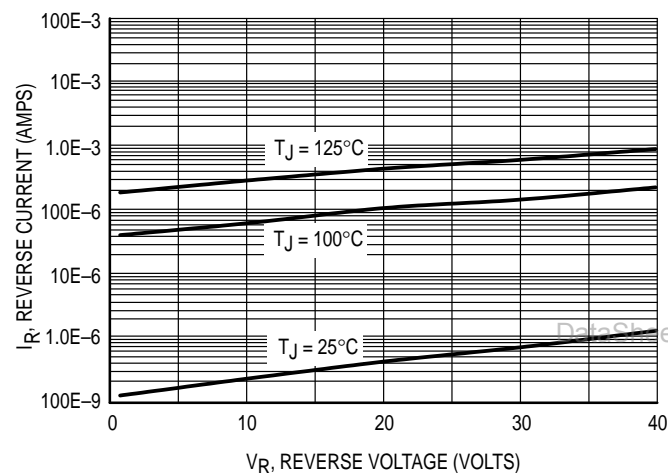
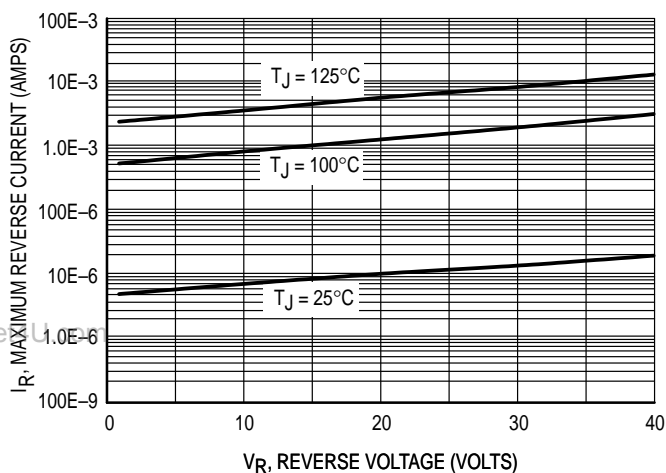
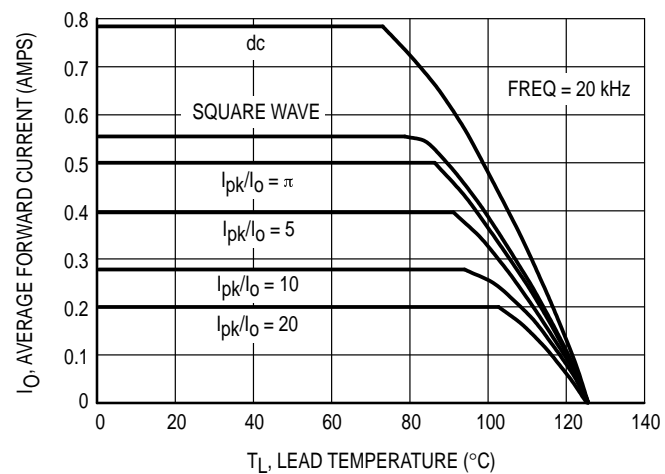
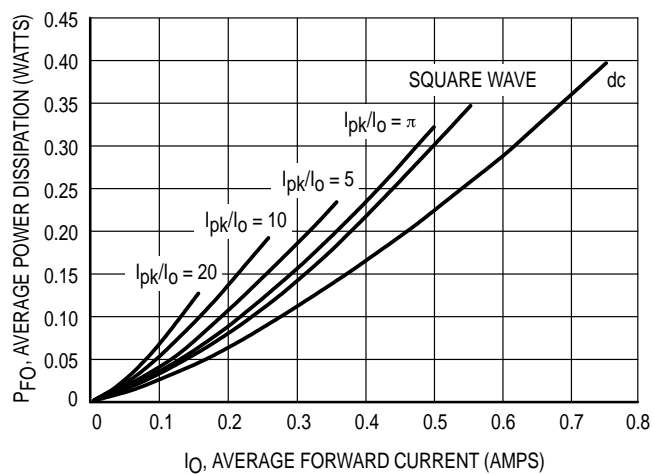
This document contains information on a new product. Specifications and information herein are subject to change without notice.

- (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.

Rev 2

**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**

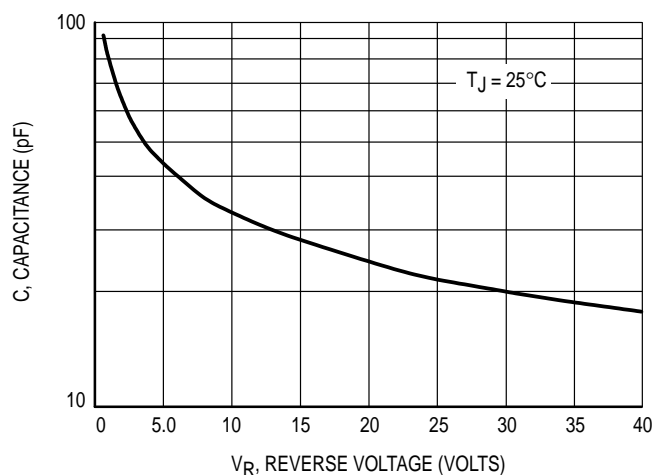


Figure 7. Capacitance

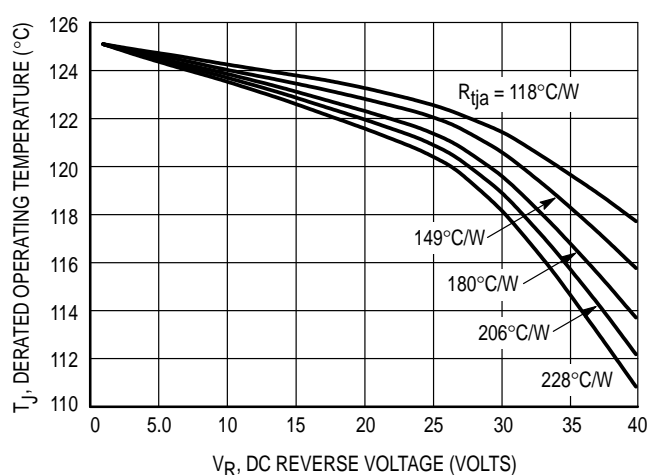


Figure 8. Typical Operating Temperature Derating\*

\* 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.

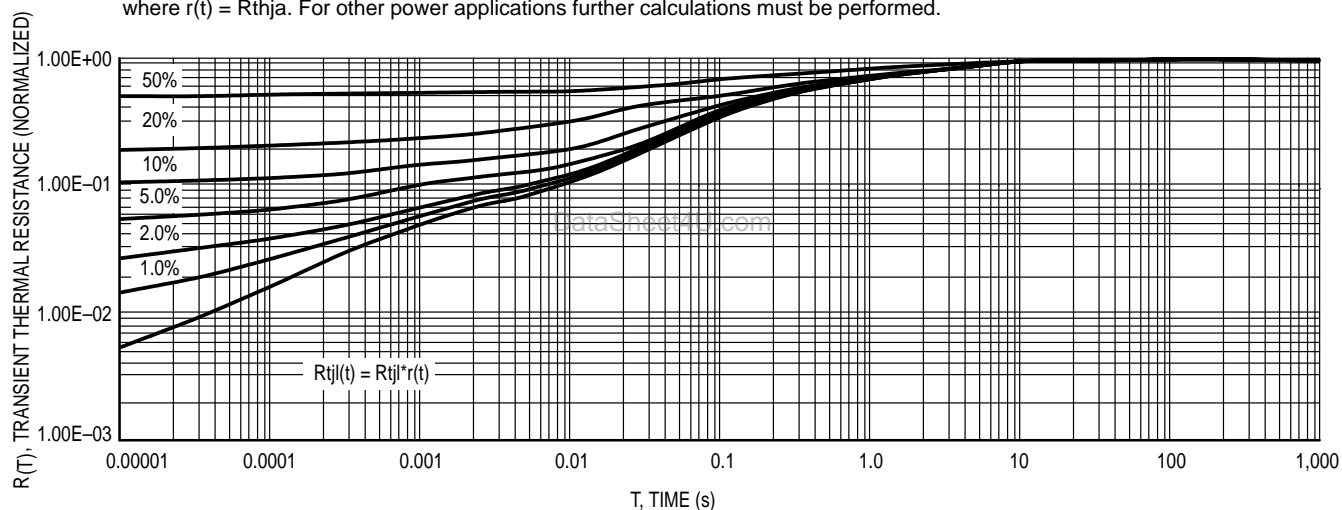


Figure 9. Thermal Response Junction to Lead

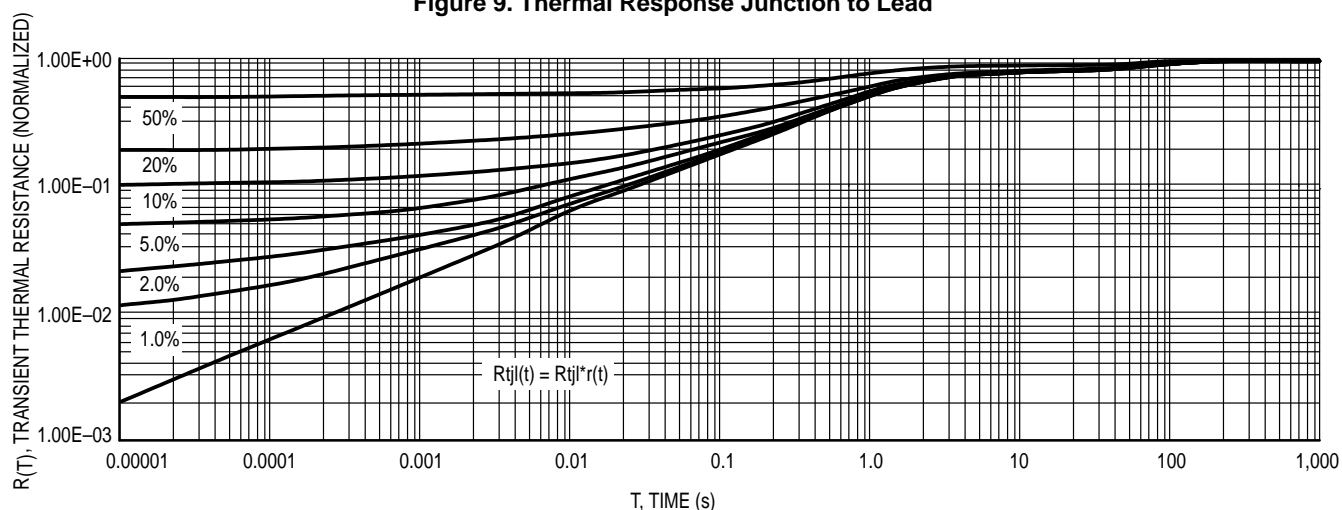
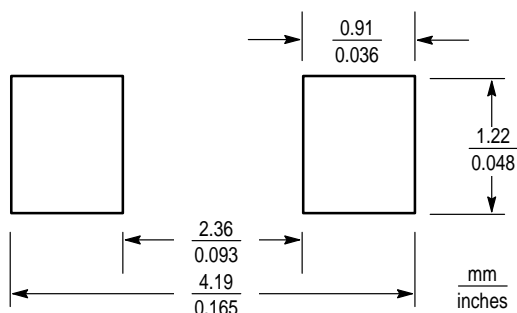


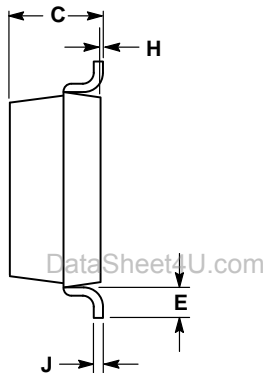
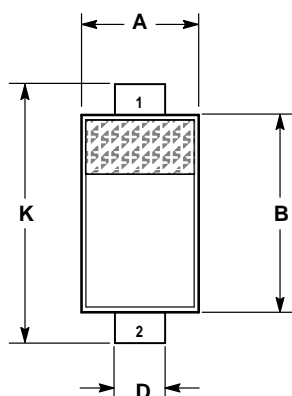
Figure 10. Thermal Response Junction to Ambient

## 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
- ANODE

CASE 425-04  
ISSUE C

Motorola reserves the right to make changes without further notice to any products herein. Motorola makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does Motorola assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation consequential or incidental damages. "Typical" parameters which may be provided in Motorola data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. Motorola does not convey any license under its patent rights nor the rights of others. Motorola products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the Motorola product could create a situation where personal injury or death may occur. Should Buyer purchase or use Motorola products for any such unintended or unauthorized application, Buyer shall indemnify and hold Motorola and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that Motorola was negligent regarding the design or manufacture of the part. Motorola and  are registered trademarks of Motorola, Inc. Motorola, Inc. is an Equal Opportunity/Affirmative Action Employer.

Mfax is a trademark of Motorola, Inc.

## How to reach us:

**USA/EUROPE/Locations Not Listed:** Motorola Literature Distribution;  
P.O. Box 5405, Denver, Colorado 80217. 1-303-675-2140 or 1-800-441-2447

**JAPAN:** Nippon Motorola Ltd.: SPD, Strategic Planning Office, 4-32-1,  
Nishi-Gotanda, Shinagawa-ku, Tokyo 141, Japan. 81-3-5487-8488

**Customer Focus Center: 1-800-521-6274**

**Mfax™:** RMFAX0@email.sps.mot.com – TOUCHTONE 1-602-244-6609  
Motorola Fax Back System – US & Canada ONLY 1-800-774-1848  
– http://sps.motorola.com/mfax/

**ASIA/PACIFIC:** Motorola Semiconductors H.K. Ltd.; 8B Tai Ping Industrial Park,  
51 Ting Kok Road, Tai Po, N.T., Hong Kong. 852-26629298

**HOME PAGE:** <http://motorola.com/sps/>



**MOTOROLA**