

Advance Information

**Surface Mount
Schottky Power Rectifier**

POWERMITE® Power Surface Mount Package

The Schottky Powermite employs the Schottky Barrier principle with a barrier metal and epitaxial construction that produces optimal forward voltage drop–reverse current tradeoff. The advanced packaging techniques provide for a highly efficient micro miniature, space saving surface mount Rectifier. With its unique heatsink design, the Powermite has the same thermal performance as the SMA while being 50% smaller in footprint area, and delivering one of the lowest height profiles, < 1.1 mm in the industry. Because of its small size, it is ideal for use in portable and battery powered products such as cellular and cordless phones, chargers, notebook computers, printers, PDAs and PCMCIA cards. Typical applications are ac/dc and dc–dc converters, reverse battery protection, and “Oring” of multiple supply voltages and any other application where performance and size are critical.

Features:

- Low Profile — Maximum Height of 1.1 mm
- Small Footprint — Footprint Area of 8.45 mm²
- Low V_F Provides Higher Efficiency and Extends Battery Life
- Supplied in 12 mm Tape and Reel — 12,000 Units per Reel
- Low Thermal Resistance with Direct Thermal Path of Die on Exposed Cathode Heat Sink

Mechanical Characteristics:

- Powermite is JEDEC Registered as D0–216AA
- Case: Molded Epoxy
- Epoxy Meets UL94, VO at 1/8”
- Weight: 62 mg (approximately)
- Device Marking: BCD
- Lead and Mounting Surface Temperature for Soldering Purposes. 260°C Maximum 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	20	V
Average Rectified Forward Current (At Rated V_R , $T_C = 135^\circ\text{C}$)	I_O	1.0	A
Peak Repetitive Forward Current (At Rated V_R , Square Wave, 100 kHz, $T_C = 135^\circ\text{C}$)	I_{FRM}	2.0	A
Non–Repetitive Peak Surge Current (Non–Repetitive peak surge current, halfwave, single phase, 60 Hz)	I_{FSM}	50	A
Storage / Operating Case Temperature	T_{stg}, T_C	–55 to 150	°C
Operating Junction Temperature	T_J	–55 to 125	°C
Voltage Rate of Change (Rated V_R , $T_J = 25^\circ\text{C}$)	dv/dt	10,000	V/ μs

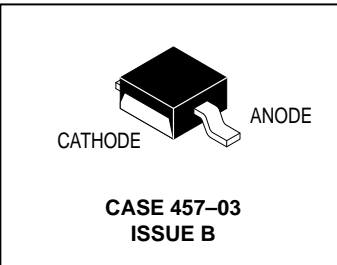
THERMAL CHARACTERISTICS

Thermal Resistance – Junction–to–Lead (Anode) (1)	R_{tjl}	35	°C/W
Thermal Resistance – Junction–to–Tab (Cathode) (1)	R_{tjtab}	15	
Thermal Resistance – Junction–to–Ambient (1)	R_{tja}	248	

(1) Pulse Test: Pulse Width $\leq 250 \mu\text{s}$, Duty Cycle $\leq 2\%$.

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

POWERMITE is a registered trademark of MicroSemi Corporation



(Replaces MBRM5817T3/D)

MBRM120LT3

ELECTRICAL CHARACTERISTICS

Maximum Instantaneous Forward Voltage (1), See Figure 2 ($I_F = 0.1$ A) ($I_F = 1.0$ A) ($I_F = 3.0$ A)	V_F	$T_J = 25^\circ\text{C}$	$T_J = 85^\circ\text{C}$	V
		0.34	0.26	
		0.45	0.415	
Maximum Instantaneous Reverse Current, See Figure 4 ($V_R = 20$ V) ($V_R = 10$ V)	I_R	$T_J = 25^\circ\text{C}$	$T_J = 85^\circ\text{C}$	mA
		0.40	25	
		0.10	18	

(1) Pulse Test: Pulse Width ≤ 250 μs , Duty Cycle $\leq 2\%$.

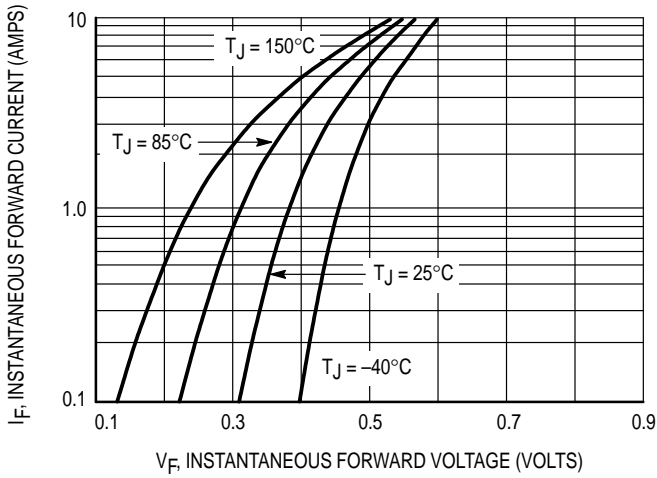


Figure 1. Typical Forward Voltage

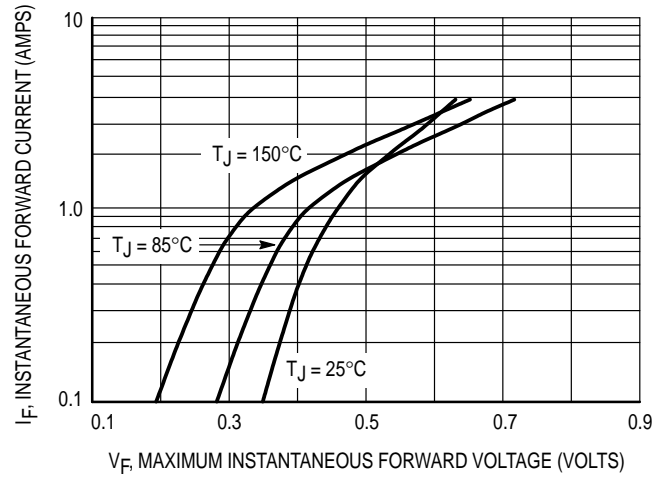


Figure 2. Maximum Forward Voltage

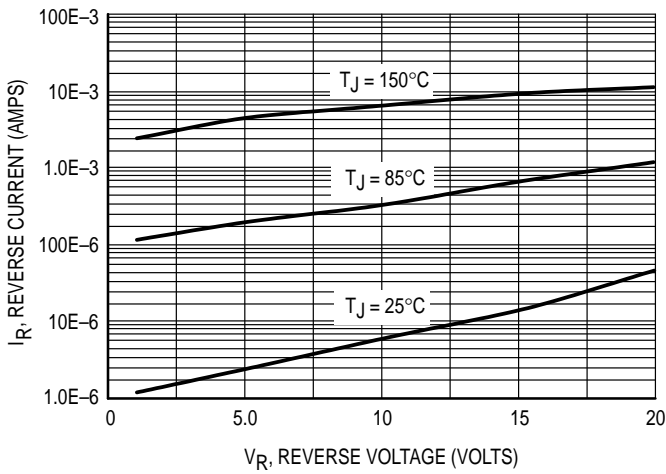


Figure 3. Typical Reverse Current

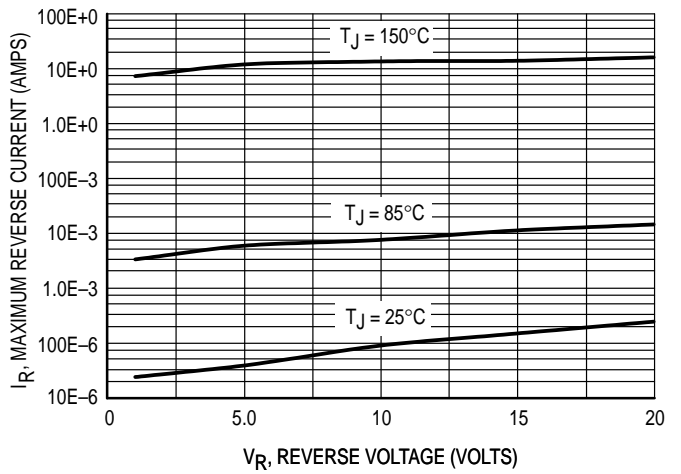


Figure 4. Maximum Reverse Current

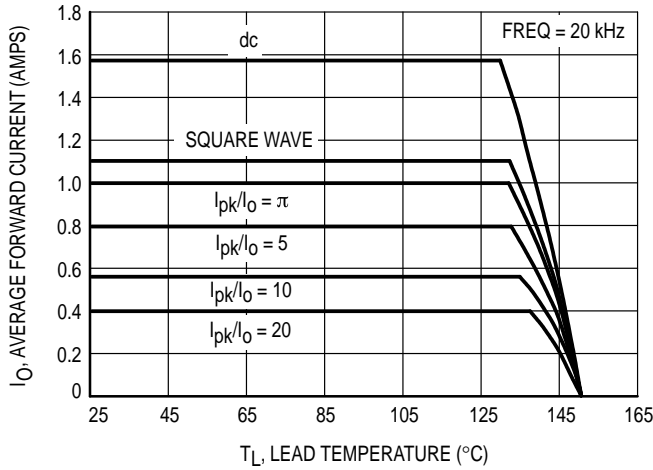


Figure 5. Current Derating

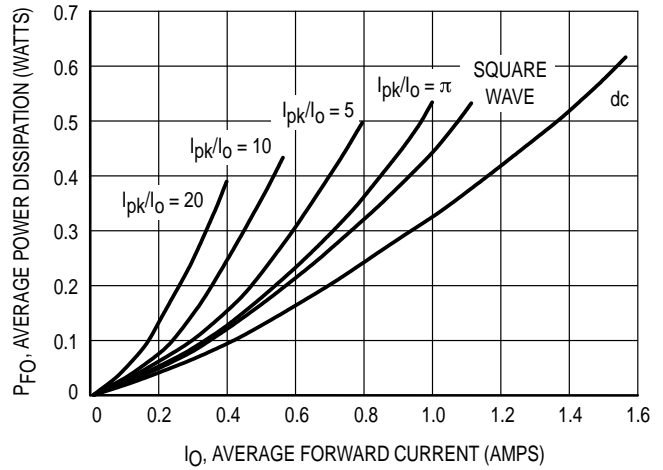


Figure 6. Forward Power Dissipation

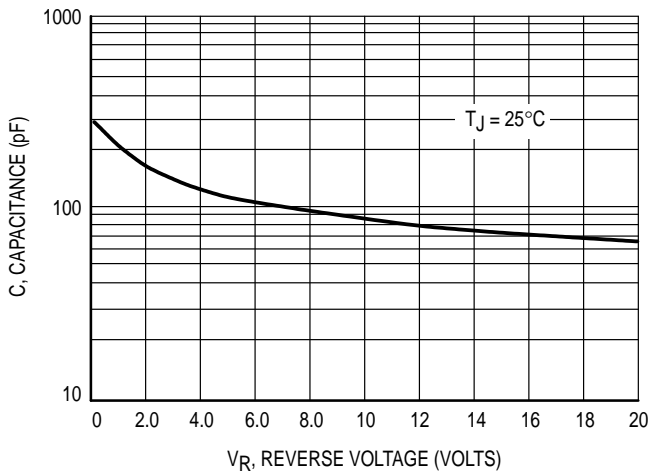


Figure 7. Capacitance

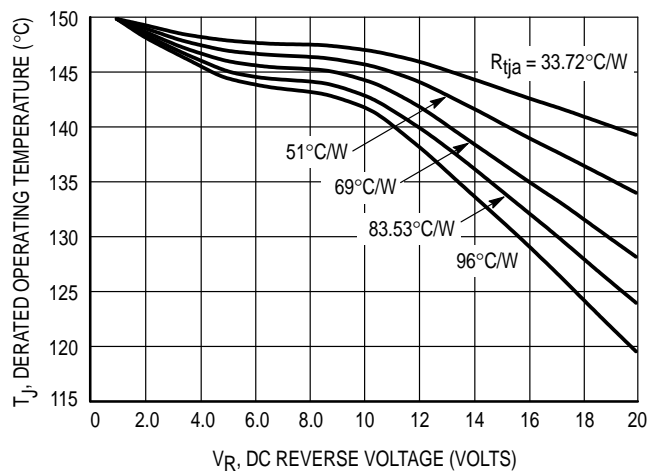


Figure 8. Typical Operating Temperature Derating*

* 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.

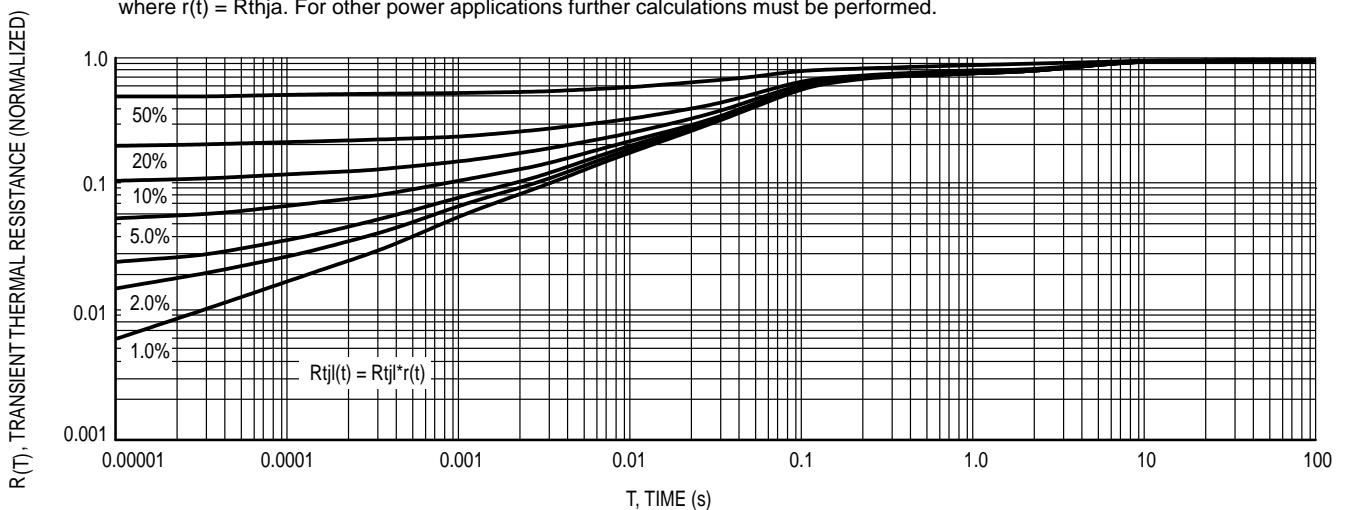


Figure 9. Thermal Response Junction to Lead

MBRM120LT3

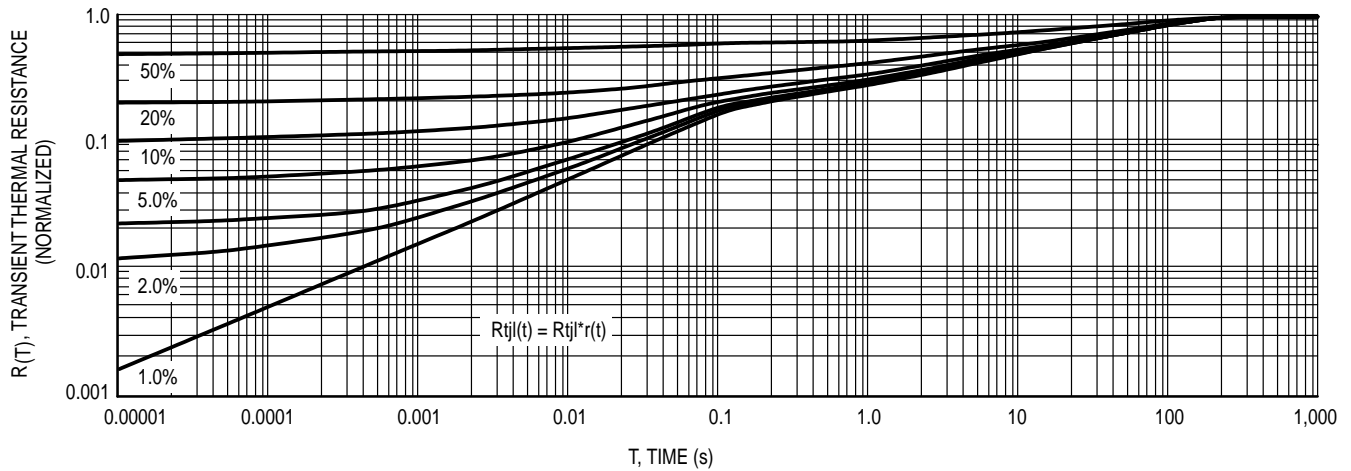
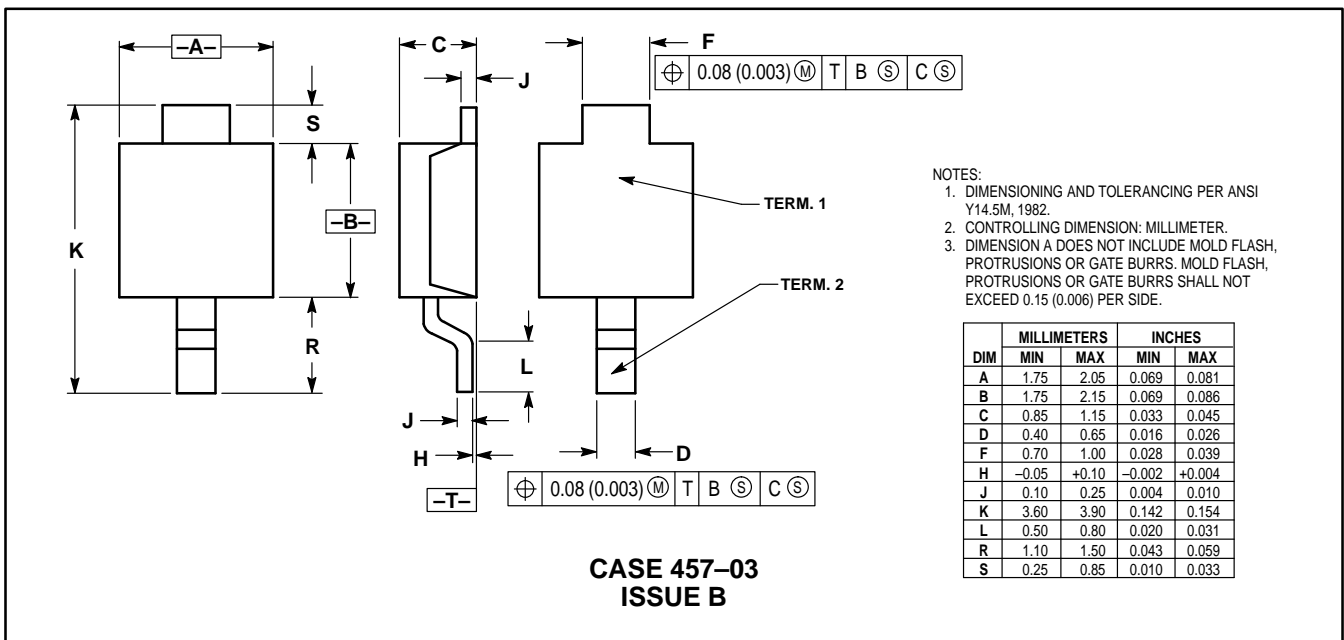


Figure 10. Thermal Response Junction to Ambient

PACKAGE DIMENSIONS



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/>

