

Advance Information

Surface Mount Schottky Power Rectifier

SMB Power Surface Mount Package

... employing 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.

- Compact Package with J-Bend Leads Ideal for Automated Handling
- Highly Stable Oxide Passivated Junction
- Guardring for Over-Voltage Protection
- Low Forward Voltage Drop

Mechanical Characteristics:

- Case: Molded Epoxy
- Epoxy Meets UL94, VO at 1/8"
- Weight: 95 mg (approximately)
- Polarity: Notch in Plastic Body Indicates Cathode Lead
- Lead and Mounting Surface Temperature for Soldering Purposes:
260°C Max. for 10 Seconds
- Available in 12 mm Tape, 2500 Units per 13" Reel, Add "T3" Suffix to Part Number
- Finish: All External Surfaces Corrosion Resistant and Terminal Leads are Readily Solderable
- Marking: B14L

MAXIMUM RATINGS

| Rating | Symbol | Value | Unit |
|--------------------------------------------------------------------------------------------------------------|---------------------------------|--------------|------------------------|
| Peak Repetitive Reverse Voltage Working Peak Reverse Voltage DC Blocking Voltage | V_{RRM} V_{RWM} V_R | 40 | Volts |
| Average Rectified Forward Current (At Rated V_R , $T_C = 110^\circ\text{C}$) | I_O | 1.0 | Amps |
| Peak Repetitive Forward Current (At Rated V_R , Square Wave, 100 kHz, $T_C = 110^\circ\text{C}$) | I_{FRM} | 2.0 | Amps |
| Non-Repetitive Peak Surge Current (Surge applied at rated load conditions, halfwave, single phase, 60 Hz) | I_{FSM} | 40 | Amps |
| 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 (Rated V_R , $T_J = 25^\circ\text{C}$) | dv/dt | 10,000 | $\text{V}/\mu\text{s}$ |

THERMAL CHARACTERISTICS

| | | | |
|----------------------------------------------|-----------------|----|---------------------------|
| Thermal Resistance — Junction-to-Lead (2) | $R_{\theta JL}$ | 24 | $^\circ\text{C}/\text{W}$ |
| Thermal Resistance — Junction-to-Ambient (2) | $R_{\theta JA}$ | 80 | |

ELECTRICAL CHARACTERISTICS

| | | | | |
|---------------------------------------------------------------|---------------------------------------------------------------------|--------------------------|---------------------------|-------|
| Maximum Instantaneous Forward Voltage (1) see Figure 2 | V_F ($I_F = 1.0 \text{ A}$) ($I_F = 2.0 \text{ A}$) | $T_J = 25^\circ\text{C}$ | $T_J = 125^\circ\text{C}$ | Volts |
| | | 0.5 0.6 | 0.425 0.58 | |
| Maximum Instantaneous Reverse Current see Figure 4 | I_R ($V_R = 40 \text{ V}$) ($V_R = 20 \text{ V}$) | $T_J = 25^\circ\text{C}$ | $T_J = 100^\circ\text{C}$ | mA |
| | | 0.4 0.02 | 10 5.0 | |

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

(1) Pulse Test: Pulse Width $\leq 250 \mu\text{s}$, Duty Cycle $\leq 2.0\%$.

(2) Mounted with minimum recommended pad size, PC Board FR4.

MBRS140LT3

**SCHOTTKY BARRIER
RECTIFIER
1.0 AMPERES
40 VOLTS**



**CASE 403A-03
SMB**

MBRS140LT3

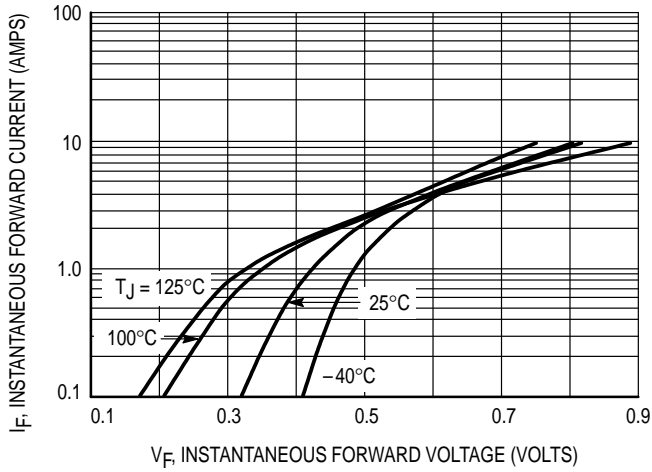


Figure 1. Typical Forward Voltage

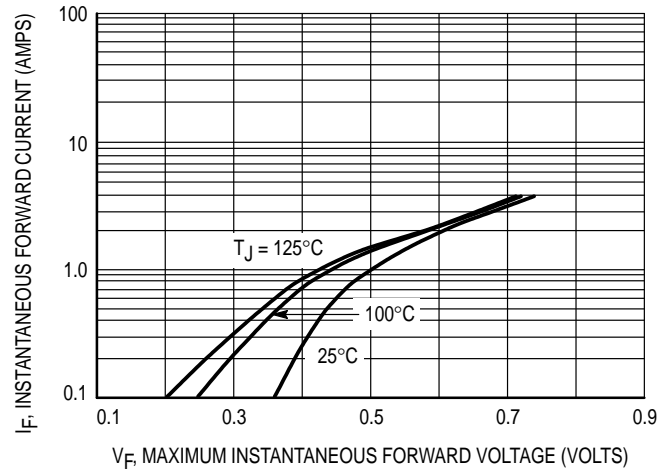


Figure 2. Maximum Forward Voltage

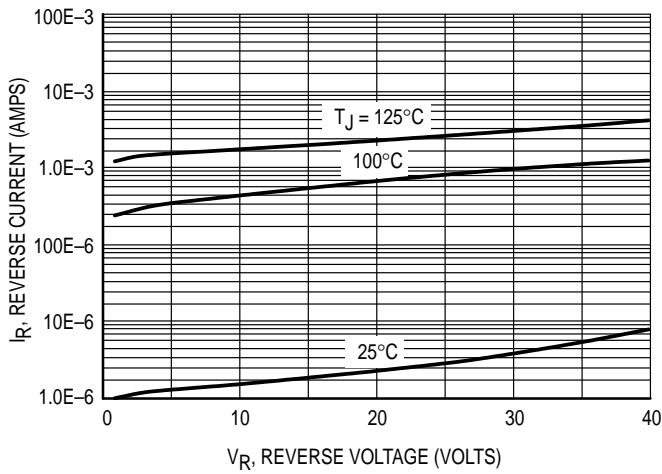


Figure 3. Typical Reverse Current

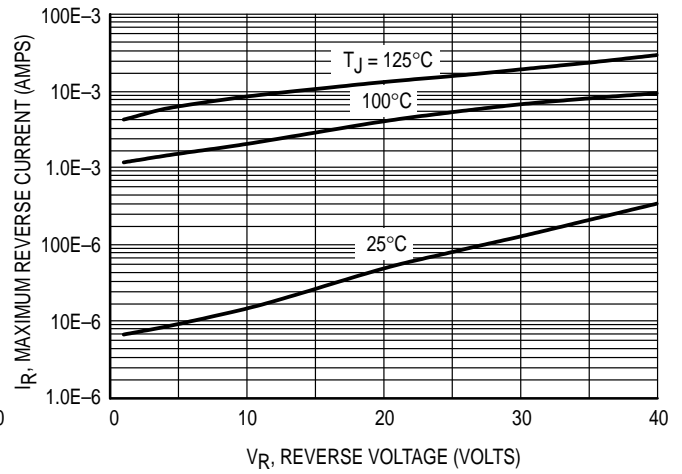


Figure 4. Maximum Reverse Current

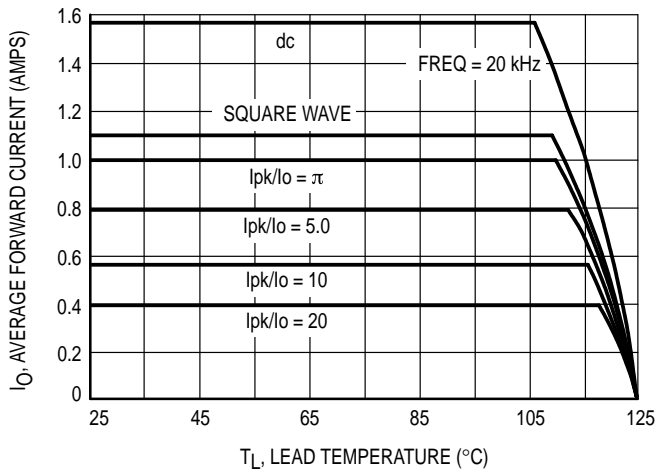


Figure 5. Current Derating

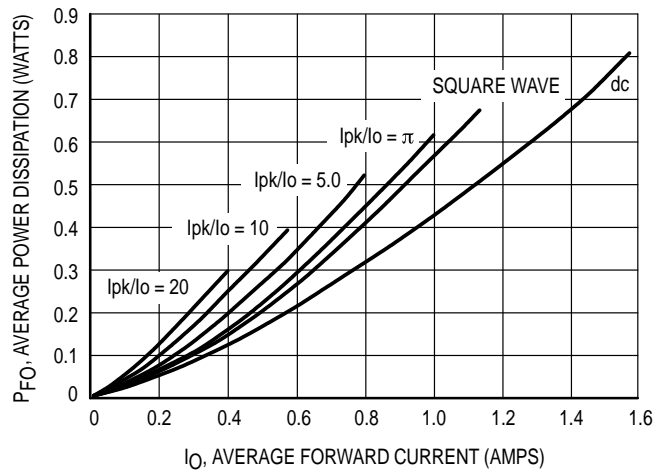


Figure 6. Forward Power Dissipation

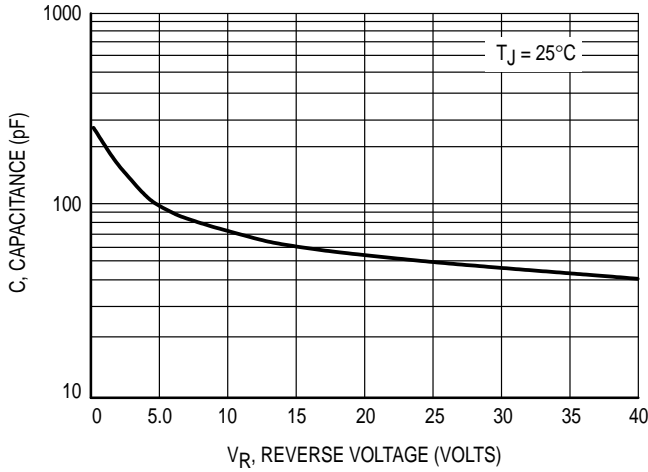


Figure 7. Capacitance

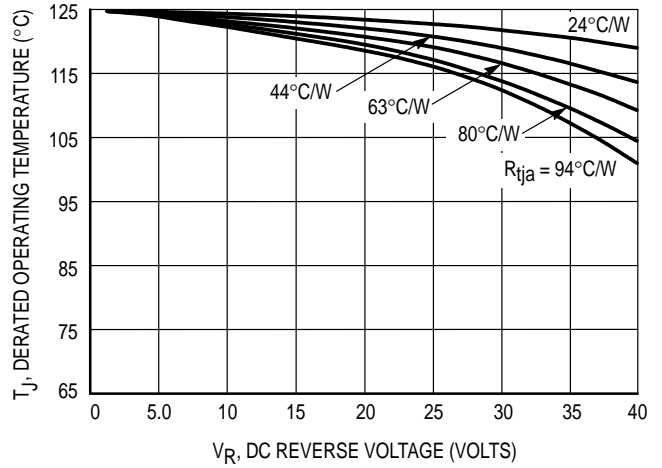


Figure 8. Typical Operating Temperature Derating*

* 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:

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

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.

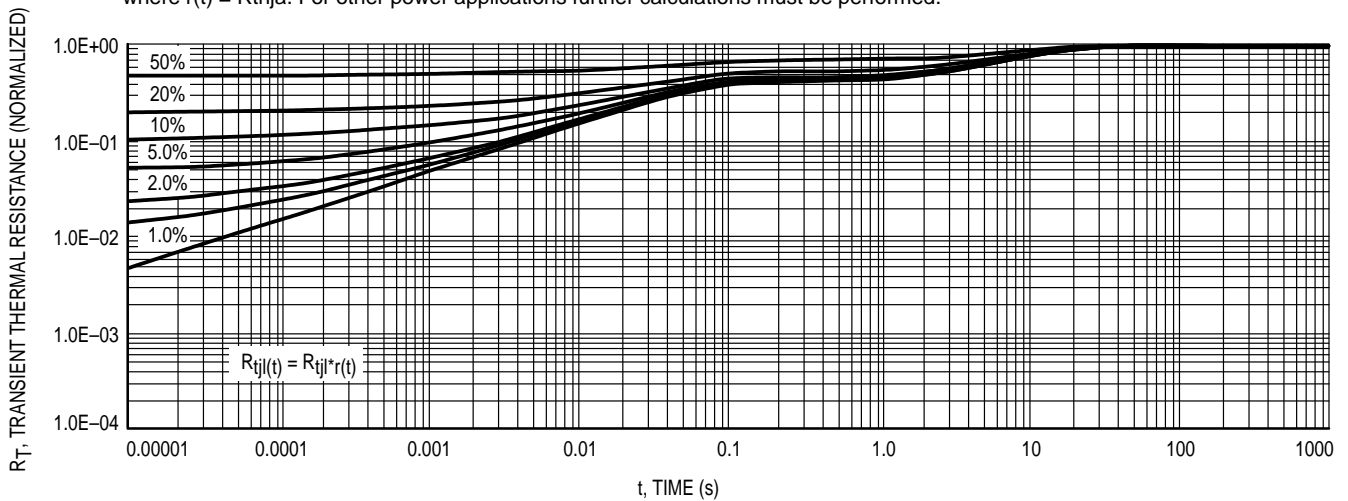


Figure 9. Thermal Response — Junction to Lead

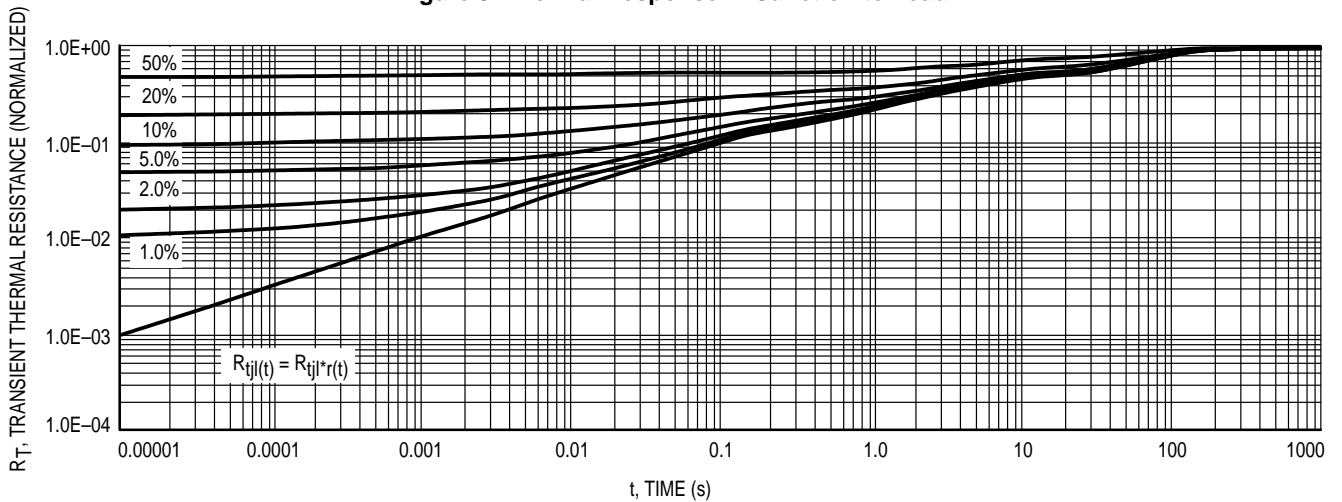
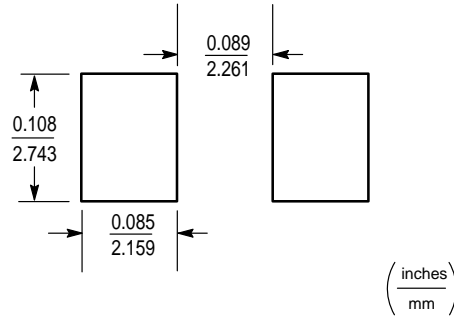


Figure 10. Thermal Response — Junction to Ambient

MBRS140LT3



SMB

PACKAGE DIMENSIONS

NOTES:

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

| DIM | INCHES | | MILLIMETERS | |
|-----|-----------|--------|-------------|-------|
| | MIN | MAX | MIN | MAX |
| A | 0.160 | 0.180 | 4.06 | 4.57 |
| B | 0.130 | 0.150 | 3.30 | 3.81 |
| C | 0.075 | 0.095 | 1.90 | 2.41 |
| D | 0.077 | 0.083 | 1.96 | 2.11 |
| H | 0.0020 | 0.0060 | 0.051 | 0.152 |
| J | 0.006 | 0.012 | 0.15 | 0.30 |
| K | 0.030 | 0.050 | 0.76 | 1.27 |
| P | 0.020 REF | | 0.51 REF | |
| S | 0.205 | 0.220 | 5.21 | 5.59 |

**CASE 403A-03
ISSUE B**

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. 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

Mfax™: RMFAX0@email.sps.mot.com – TOUCHTONE 602-244-6609
– US & Canada ONLY 1-800-774-1848

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

INTERNET: <http://motorola.com/sps>

