

MBRM110L

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:

- Ultra Low V_F
- 1st in Marketplace with a 10 V_R Schottky Rectifier
- Low Profile – Maximum Height of 1.1 mm
- Small Footprint – Footprint Area of 8.45 mm²
- Low Thermal Resistance with Direct Thermal Path of Die on Exposed Cathode Heat Sink
- ESD Protection: Human Body Model >4000 V (Class 3)
Machine Model >400 V (Class C)

Mechanical Characteristics:

- Powermite is JEDEC Registered as D0–216AA
- Case: Molded Epoxy
- Epoxy Meets UL 94V–O at 1/8"
- Weight: 62 mg (approximately)
- Lead and Mounting Surface Temperature for Soldering Purposes.
260°C Maximum for 10 Seconds

MAXIMUM RATINGS

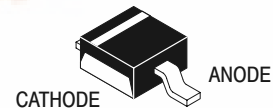
Please See the Table on the Following Page



ON Semiconductor™

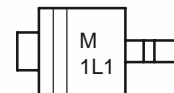
<http://onsemi.com>

SCHOTTKY BARRIER RECTIFIER 1.0 AMPERES 10 VOLTS



POWERMITE
CASE 457
PLASTIC

MARKING DIAGRAM



1L1 = Device Code
M = Date Code

ORDERING INFORMATION

| Device | Package | Shipping |
|------------|-----------|--------------------|
| MBRM110LT1 | POWERMITE | 3,000/Tape & Reel |
| MBRM110LT3 | POWERMITE | 12,000/Tape & Reel |

MBRM110L

MAXIMUM RATINGS

| Rating | Symbol | Value | Unit |
|---|---------------------------------|------------|------------------|
| Peak Repetitive Reverse Voltage Working Peak Reverse Voltage DC Blocking Voltage | V_{RRM} V_{RWM} V_R | 10 | V |
| Average Rectified Forward Current ($T_L = 115^\circ\text{C}$, $R_{\theta JL} = 35^\circ\text{C/W}$) | I_O | 1.0 | A |
| Non-Repetitive Peak Surge Current (Non-Repetitive peak surge current, halfwave, single phase, 60 Hz) | I_{FSM} | 50 | A |
| Storage Temperature | T_{stg} | -55 to 125 | $^\circ\text{C}$ |
| 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 | V/ μs |

THERMAL CHARACTERISTICS

| | | | |
|---|-------------|-----|--------------------|
| Thermal Resistance – Junction-to-Lead (Anode) (Note 1) | R_{tjl} | 35 | $^\circ\text{C/W}$ |
| Thermal Resistance – Junction-to-Tab (Cathode) (Note 1) | R_{tjtab} | 23 | |
| Thermal Resistance – Junction-to-Ambient (Note 1) | R_{tja} | 277 | |

ELECTRICAL CHARACTERISTICS

| | | | | |
|--|-------|--------------------------|---------------------------|----|
| Maximum Instantaneous Forward Voltage (Note 2) ($I_F = 0.1\text{ A}$) ($I_F = 1.0\text{ A}$) ($I_F = 2.0\text{ A}$) | V_F | $T_J = 25^\circ\text{C}$ | $T_J = 100^\circ\text{C}$ | V |
| | | 0.280 | 0.175 | |
| | | 0.365 | 0.275 | |
| | | 0.415 | 0.325 | |
| Maximum Instantaneous Reverse Current (Note 2) ($V_R = 5.0\text{ V}$) ($V_R = 10\text{ V}$) | I_R | $T_J = 25^\circ\text{C}$ | $T_J = 100^\circ\text{C}$ | mA |
| | | 0.2 | 30 | |
| | | 0.5 | 60 | |

1. Mounted with minimum recommended pad size, PC Board FR4, See Figures 8 and 9.
2. Pulse Test: Pulse Width $\leq 250\text{ }\mu\text{s}$, Duty Cycle $\leq 2\%$.

MBRM110L

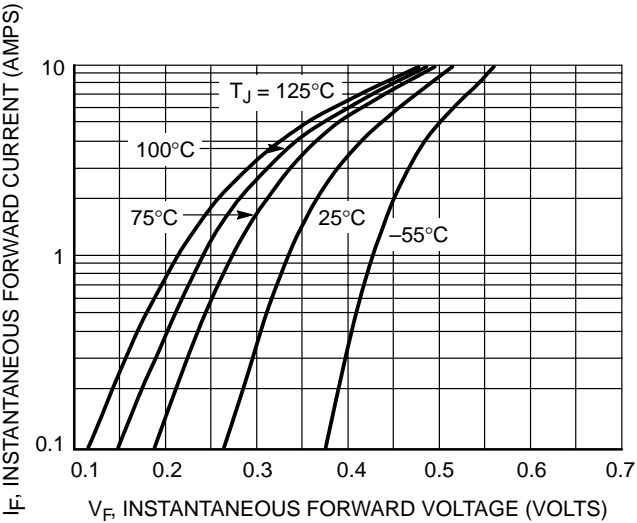


Figure 1. Typical Forward Voltage

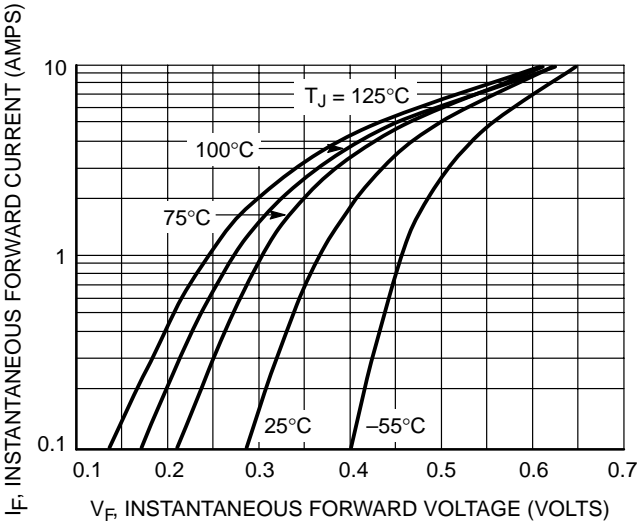


Figure 2. Maximum Forward Voltage

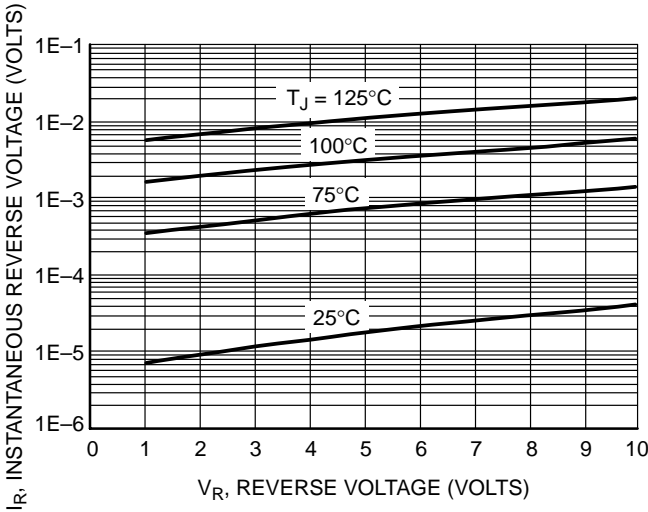


Figure 3. Typical Reverse Current

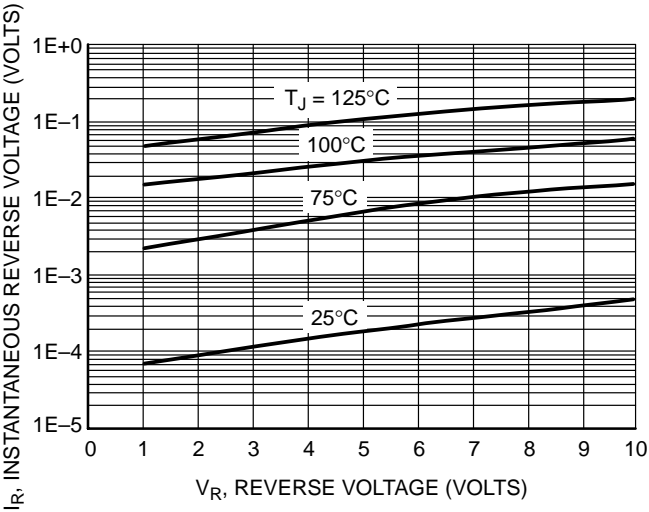


Figure 4. Maximum Reverse Current

MBRM110L

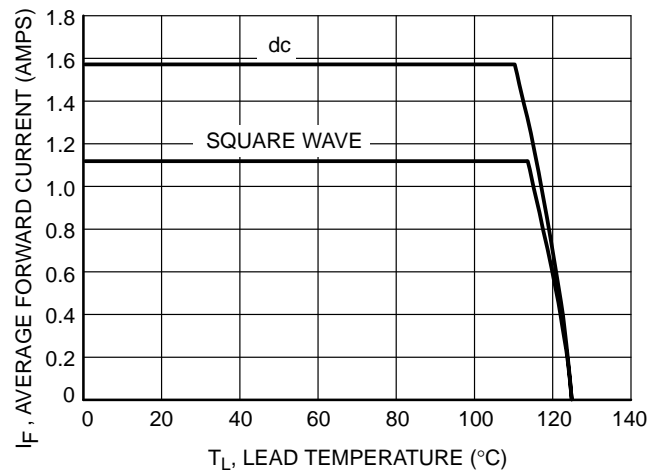


Figure 5. Current Derating – Junction to Lead

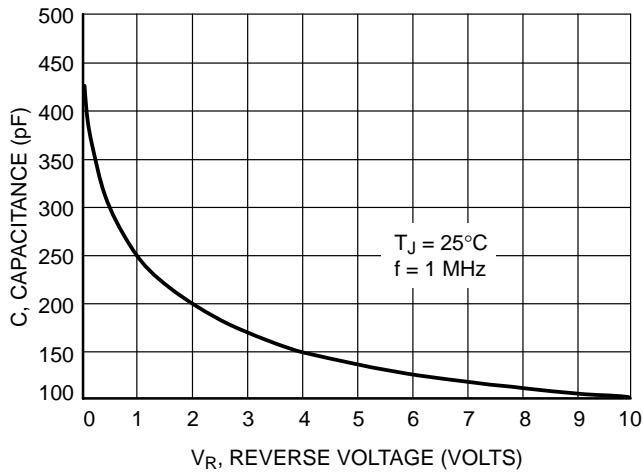


Figure 6. Typical Capacitance

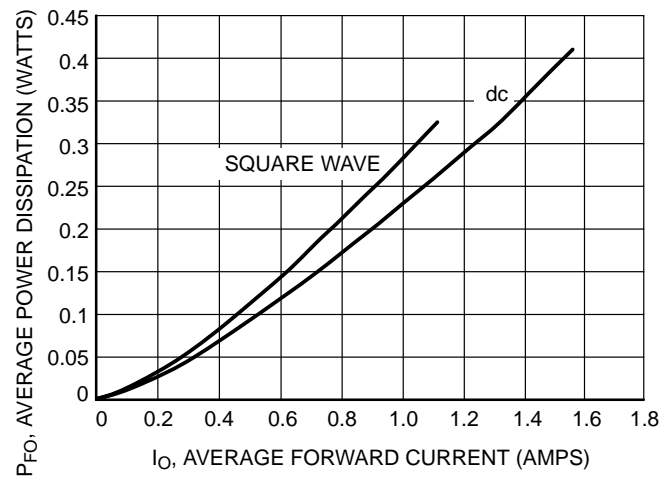


Figure 7. Forward Power Dissipation

MBRM110L

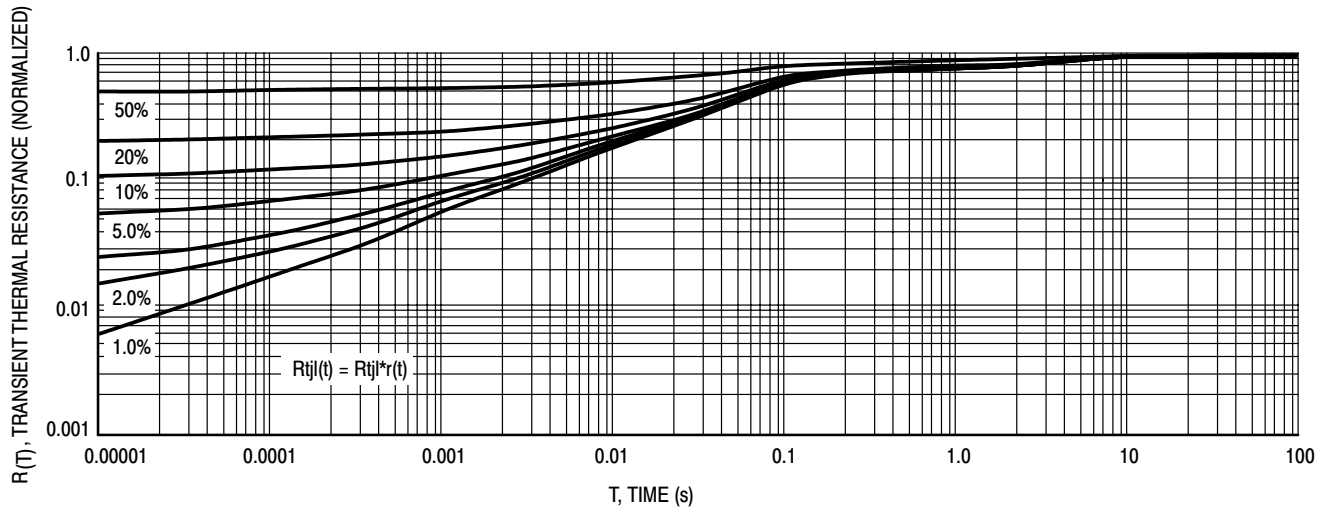


Figure 8. Thermal Response Junction to Lead

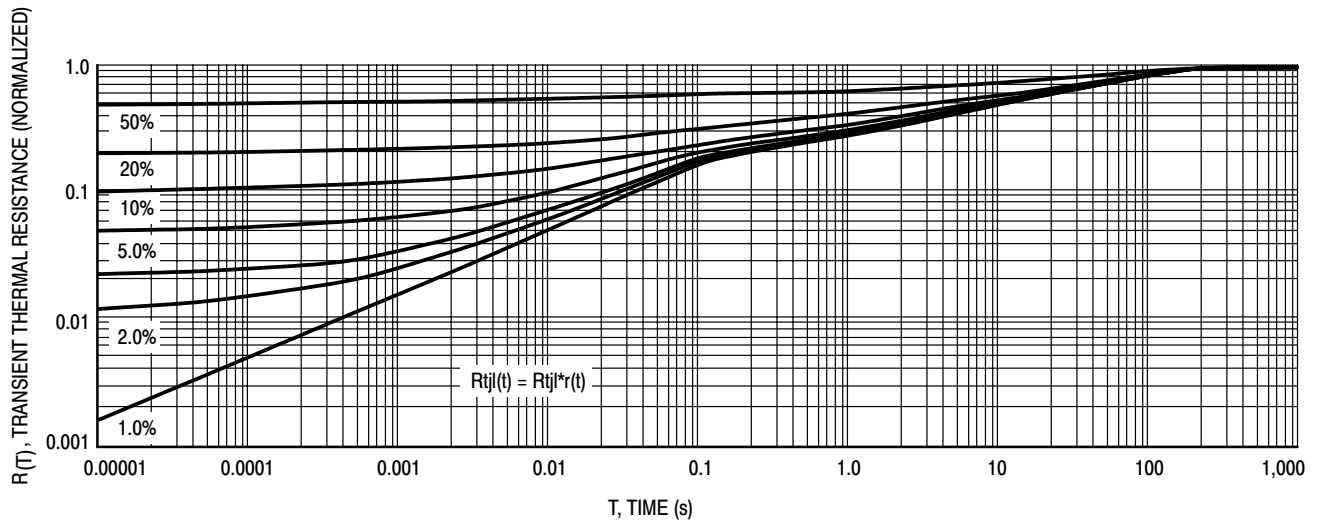
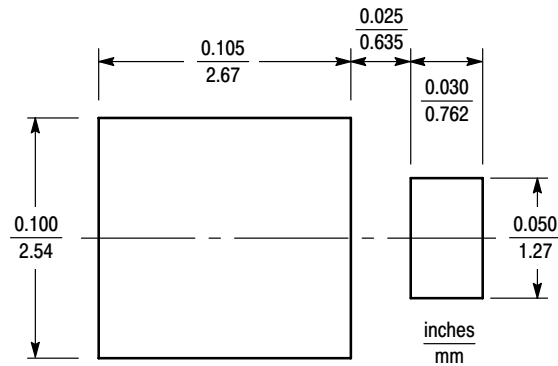


Figure 9. Thermal Response Junction to Ambient

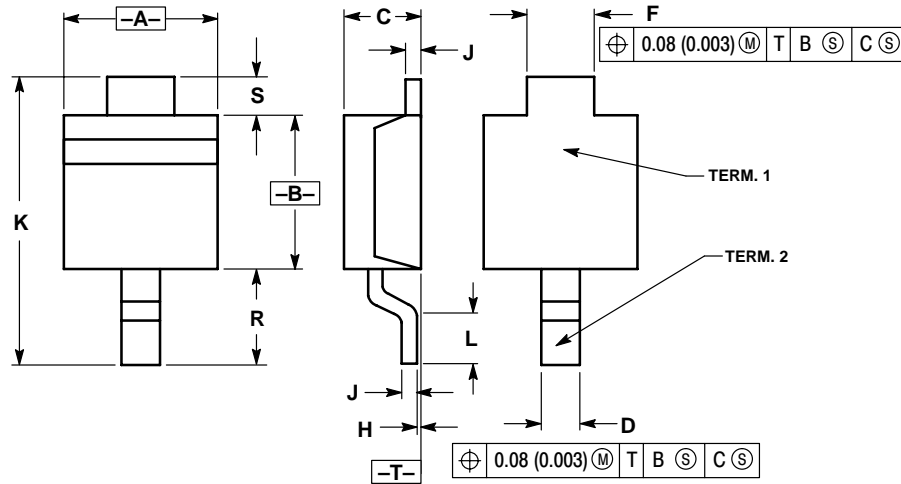


Minimum Recommended Footprint

MBRM110L

PACKAGE DIMENSIONS

POWERMITE PLASTIC PACKAGE CASE 457-04 ISSUE D



NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSION A DOES NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS. MOLD FLASH, PROTRUSIONS OR GATE BURRS SHALL NOT EXCEED 0.15 (0.006) PER SIDE.


| DIM | MILLIMETERS | | INCHES | |
|-----|-------------|-------|-----------|--------|
| | MIN | MAX | MIN | MAX |
| A | 1.75 | 2.05 | 0.069 | 0.081 |
| B | 1.75 | 2.18 | 0.069 | 0.086 |
| C | 0.85 | 1.15 | 0.033 | 0.045 |
| D | 0.40 | 0.69 | 0.016 | 0.027 |
| F | 0.70 | 1.00 | 0.028 | 0.039 |
| H | -0.05 | +0.10 | -0.002 | +0.004 |
| J | 0.10 | 0.25 | 0.004 | 0.010 |
| K | 3.60 | 3.90 | 0.142 | 0.154 |
| L | 0.50 | 0.80 | 0.020 | 0.031 |
| R | 1.20 | 1.50 | 0.047 | 0.059 |
| S | 0.50 REF | | 0.019 REF | |

MBRM110L

Notes

MBRM110L

POWERMITE is a registered trademark of and used under a license from MicroSemi Corporation

ON Semiconductor and  are trademarks of Semiconductor Components Industries, LLC (SCILLC). SCILLC reserves the right to make changes without further notice to any products herein. SCILLC makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does SCILLC 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 special, consequential or incidental damages. "Typical" parameters which may be provided in SCILLC 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. SCILLC does not convey any license under its patent rights nor the rights of others. SCILLC 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 SCILLC product could create a situation where personal injury or death may occur. Should Buyer purchase or use SCILLC products for any such unintended or unauthorized application, Buyer shall indemnify and hold SCILLC 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 SCILLC was negligent regarding the design or manufacture of the part. SCILLC is an Equal Opportunity/Affirmative Action Employer.

PUBLICATION ORDERING INFORMATION

Literature Fulfillment:

Literature Distribution Center for ON Semiconductor
P.O. Box 5163, Denver, Colorado 80217 USA
Phone: 303-675-2175 or 800-344-3860 Toll Free USA/Canada
Fax: 303-675-2176 or 800-344-3867 Toll Free USA/Canada
Email: ONlit@hibbertco.com

N. American Technical Support: 800-282-9855 Toll Free USA/Canada

JAPAN: ON Semiconductor, Japan Customer Focus Center
4-32-1 Nishi-Gotanda, Shinagawa-ku, Tokyo, Japan 141-0031
Phone: 81-3-5740-2700
Email: r14525@onsemi.com

ON Semiconductor Website: <http://onsemi.com>

For additional information, please contact your local Sales Representative.