MBRM140E

Low Leakage 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 Leakage Current (I_R) Provides Higher Efficiency and Extends Battery Life
- Low Profile − Maximum Height of 1.1 mm
- Small Footprint − Footprint Area of 8.45 mm^2
- Low Thermal Resistance with Direct Thermal Path of Die on Exposed Cathode Heat Sink
- ESD Ratings: Machine Model, C
  Human Body Model, 3B
- Pb−Free Packages are Available

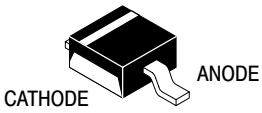
Mechanical Characteristics:

- Powermite® is JEDEC Registered as D0−216AA
- Case: Molded Epoxy
- Epoxy Meets UL 94 V−0 @ 0.125 in
- Weight: 62 mg (Approximately)
- Lead and Mounting Surface Temperature for Soldering Purposes: 260°C Maximum for 10 Seconds

ON Semiconductor®

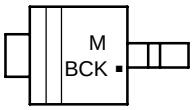
http://onsemi.com

SCHOTTKY BARRIER RECTIFIER 1.0 AMPERES, 40 VOLTS



POWERMITE
CASE 457
PLASTIC

MARKING DIAGRAM



M = Date Code
BCK = Device Code
▪ = Pb−Free Package

ORDERING INFORMATION

Device	Package	Shipping†
MBRM140ET1	POWERMITE	3000/Tape & Reel
MBRM140ET1G	POWERMITE (Pb−Free)	3000/Tape & Reel
MBRM140ET3	POWERMITE	12000/Tape & Reel
MBRM140ET3G	POWERMITE (Pb−Free)	12000/Tape & Reel

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

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 (Rated V_R, T_C = 110°C)	I_O	1.0	A
Peak Repetitive Forward Current (At Rated V_R, Square Wave, 100 kHz, T_C = 110°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 Temperature	T_{stg}	−55 to 150	°C
Operating Junction Temperature	T_J	−55 to 150	°C
Voltage Rate of Change (Rated V_R, T_J = 25°C)	dv/dt	10,000	V/μs

Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

THERMAL CHARACTERISTICS

Rating	Symbol	Value	Unit
Thermal Resistance, Junction−to−Lead (Anode) (Note 1)	R_{tjl}	35	°C/W
Thermal Resistance, Junction−to−Tab (Cathode) (Note 1)	R_{tjtab}	23	
Thermal Resistance, Junction−to−Ambient (Note 1)	R_{tja}	277	

1. Mounted with minimum recommended pad size, PC Board FR4, See Figures 6 and 7.

ELECTRICAL CHARACTERISTICS

Characteristic	Symbol	Typ	Max	Unit
Instantaneous Forward Voltage	V_F			V
(I_F = 0.1 A, T_C = 25°C)		0.42	0.45	
(I_F = 1.0 A, T_C = 25°C)		0.52	0.58	
(I_F = 0.1 A, T_C = 150°C)		0.24	0.26	
(I_F = 1.0 A, T_C = 150°C)		0.41	0.47	
Instantaneous Reverse Current (Rated V_R)	I_R			
T_C = 25°C		0.3	15	μA
T_C = 150°C		1.4	20	mA

2. Pulse Test: Pulse Width ≤ 250 μs, Duty Cycle ≤ 2%.

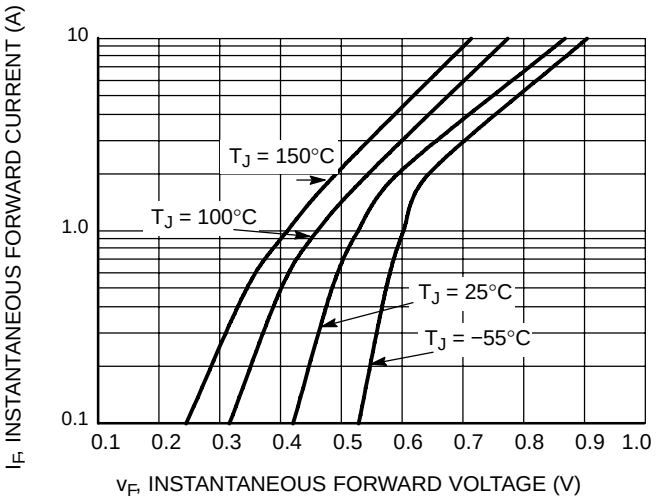


Figure 1. Typical Forward Voltage

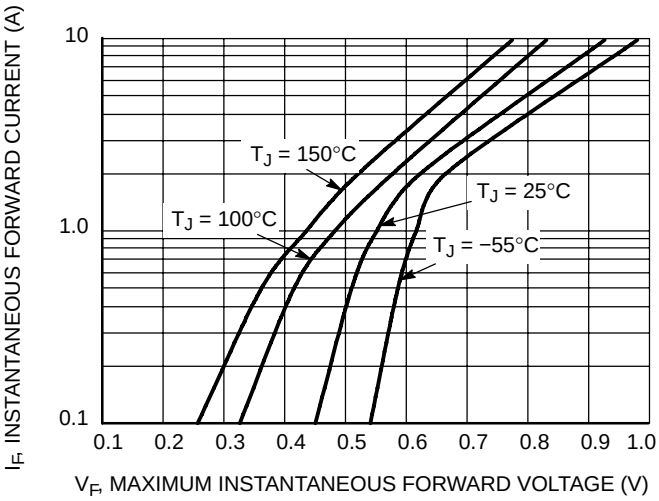


Figure 2. Maximum Forward Voltage

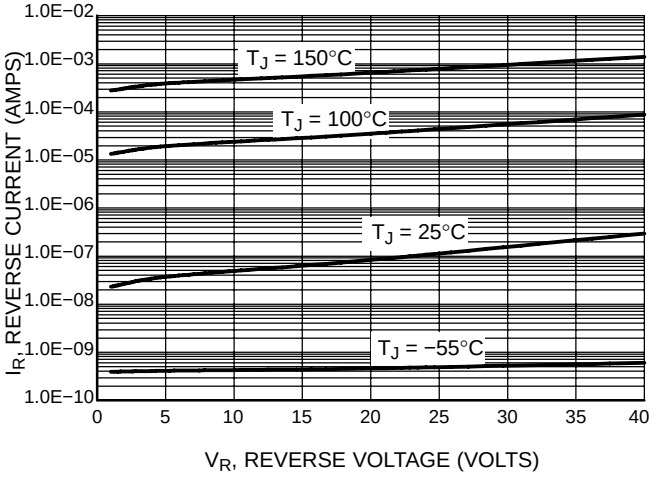


Figure 3. Typical Reverse Current

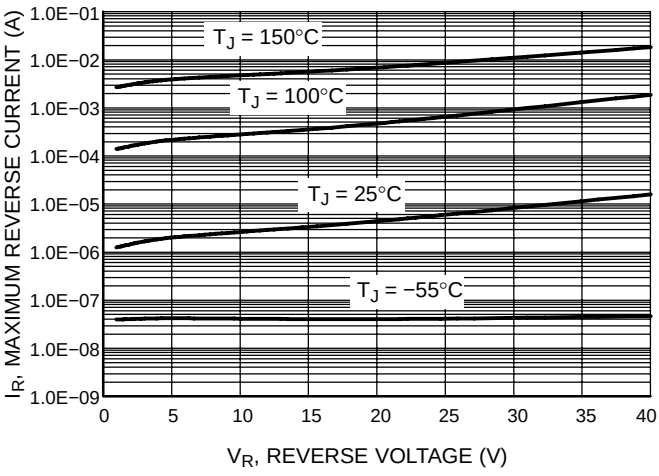


Figure 4. Maximum Reverse Current

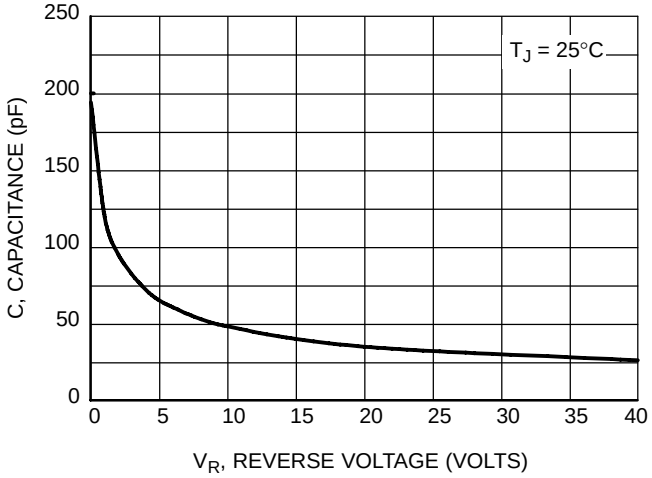


Figure 5. Capacitance

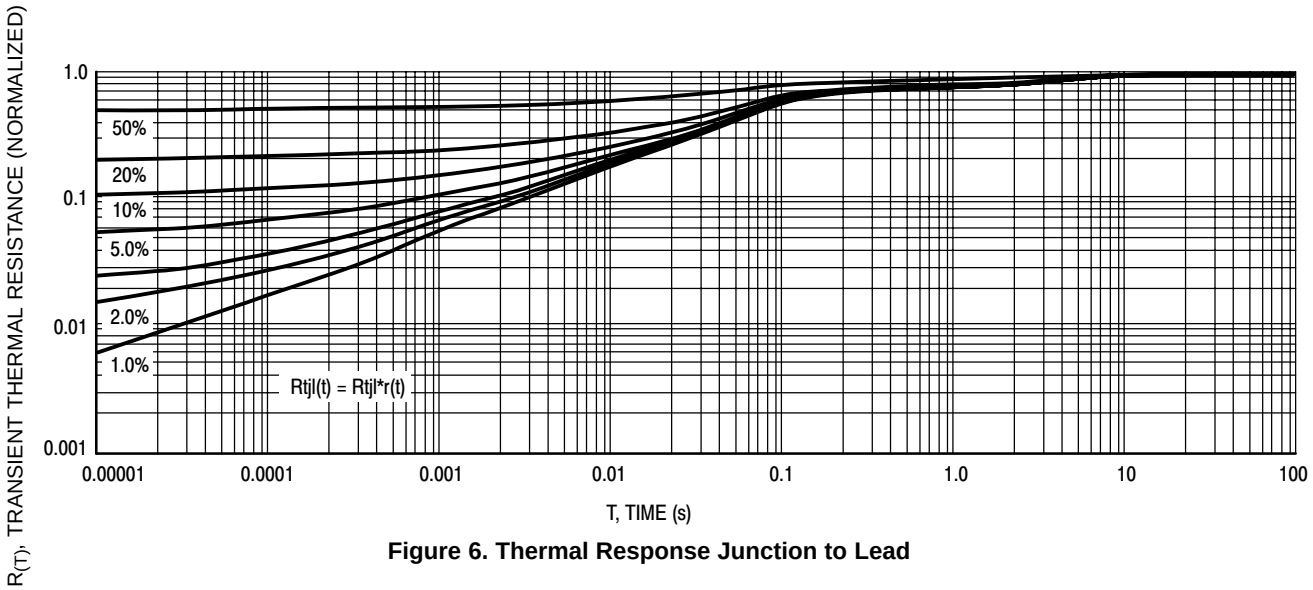


Figure 6. Thermal Response Junction to Lead

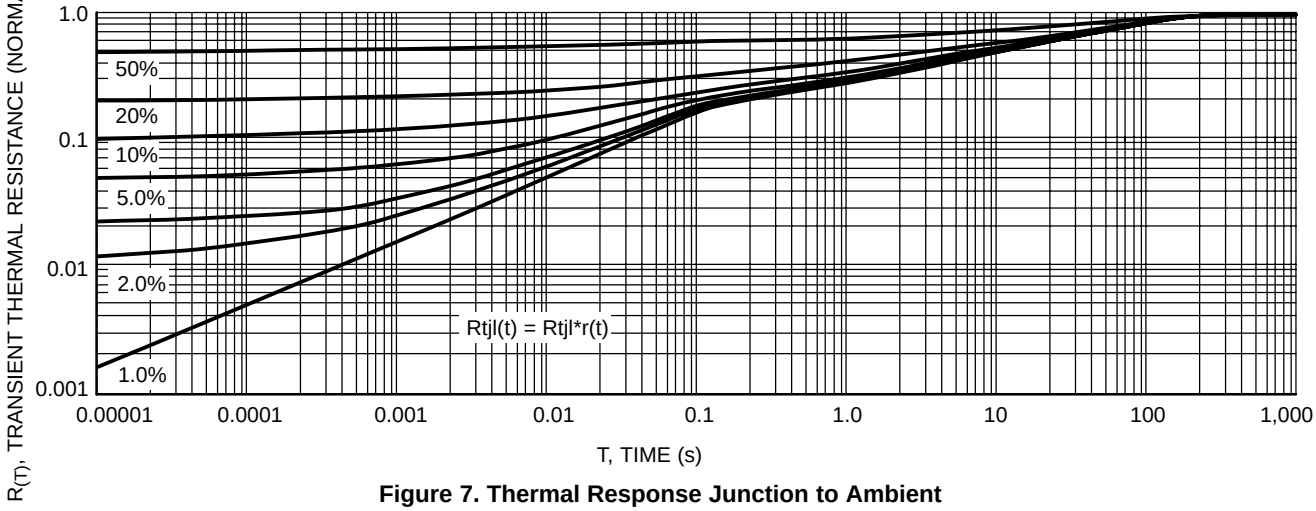
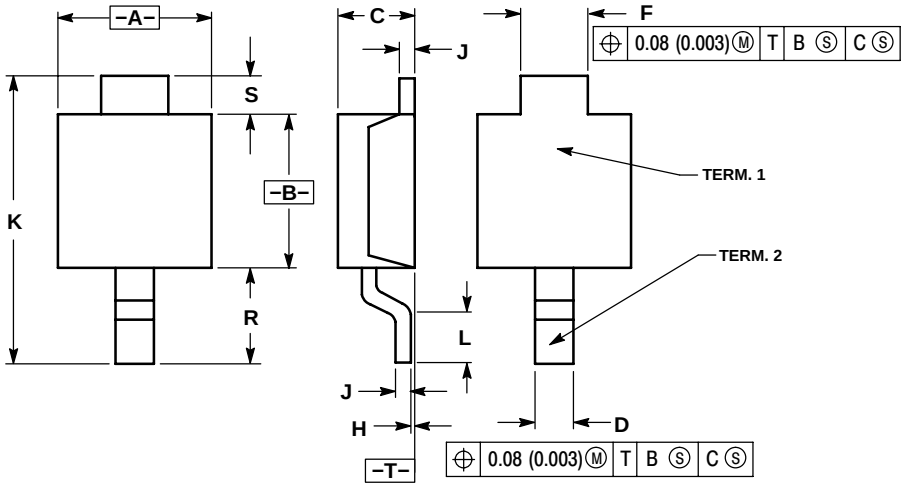


Figure 7. Thermal Response Junction to Ambient

PACKAGE DIMENSIONS

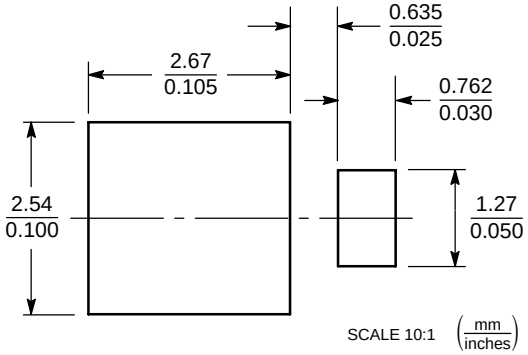
POWERMITE
CASE 457−04
ISSUE D



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.

	MILLIMETERS		INCHES	
DIM	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	

SOLDERING FOOTPRINT*



*For additional information on our Pb−Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

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PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:
Literature Distribution Center for ON Semiconductor
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Phone: 480−829−7710 or 800−344−3860 Toll Free USA/Canada
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