MBR150, MBR160

MBR160 is a Preferred Device

Axial Lead Rectifiers

The MBR150/160 series employs the Schottky Barrier principle in a large area metal−to−silicon power diode. State−of−the−art geometry features epitaxial construction with oxide passivation and metal overlap contact. Ideally suited for use as rectifiers in low−voltage, high−frequency inverters, free wheeling diodes, and polarity protection diodes.

Features

- Low Reverse Current
- Low Stored Charge, Majority Carrier Conduction
- Low Power Loss/High Efficiency
- Highly Stable Oxide Passivated Junction
- These are Pb−Free Devices*

Mechanical Characteristics:

- Case: Epoxy, Molded
- Weight: 0.4 Gram (Approximately)
- Finish: All External Surfaces Corrosion Resistant and Terminal Leads are Readily Solderable
- Lead Temperature for Soldering Purposes: 260°C Max. for 10 Seconds
- Polarity: Cathode Indicated by Polarity Band

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Peak Repetitive Reverse Voltage MBR150 / MBR160 Working Peak Reverse Voltage DC Blocking Voltage	V_{RRM} V_{RWM} V_R	50 60	V
RMS Reverse Voltage MBR150 / MBR160	$V_{R(RMS)}$	35 42	V
Average Rectified Forward Current (Note 1) ($V_{R(equiv)} \leq 0.2\ V_R$(dc), T_L = 90°C, $R_{\theta JA}$ = 80°C/W, P.C. Board Mounting, T_A = 55°C)	I_O	1.0	A
Nonrepetitive Peak Surge Current (Surge applied at rated load conditions, halfwave, single phase, 60 Hz, T_L = 70°C)	I_{FSM}	25 (for one cycle)	A
Operating and Storage Junction Temperature Range (Reverse Voltage Applied)	T_J, T_{stg}	− 65 to +150	°C

THERMAL CHARACTERISTICS (Notes 1 and 2)

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction−to−Ambient	$R_{\theta JA}$	80	°C/W

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

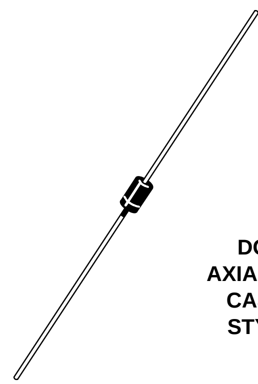
1. Lead Temperature reference is cathode lead 1/32″ from case.
2. Pulse Test: Pulse Width = 300 μs, Duty Cycle ≤ 2.0%.

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

ON Semiconductor®

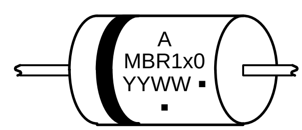
http://onsemi.com

SCHOTTKY BARRIER RECTIFIERS 1.0 AMPERE − 50 AND 60 VOLTS



DO−41
AXIAL LEAD
CASE 59
STYLE 1

MARKING DIAGRAM



A	=	Assembly Location
MBR1x0	=	Device Code x = 5 or 6
Y	=	Year
WW	=	Work Week
▪	=	Pb−Free Package

(Note: Microdot may be in either location)

ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 4 of this data sheet.

Preferred devices are recommended choices for future use and best overall value.

ELECTRICAL CHARACTERISTICS (T_L = 25°C unless otherwise noted) (Note 1)

Characteristic	Symbol	Max	Unit
Maximum Instantaneous Forward Voltage (Note 2) (i_F = 0.1 A) (i_F = 1.0 A) (i_F = 3.0 A)	v_F	 0.550 0.750 1.000	V
Maximum Instantaneous Reverse Current @ Rated dc Voltage (Note 2) (T_L = 25°C) (T_L = 100°C)	i_R	 0.5 5.0	mA

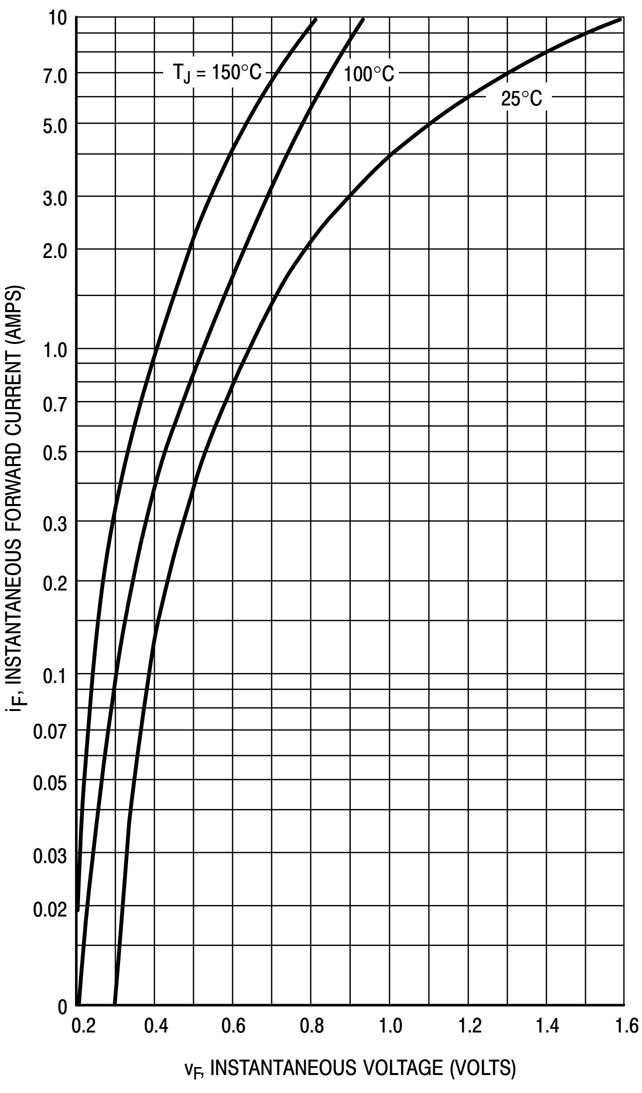


Figure 1. Typical Forward Voltage

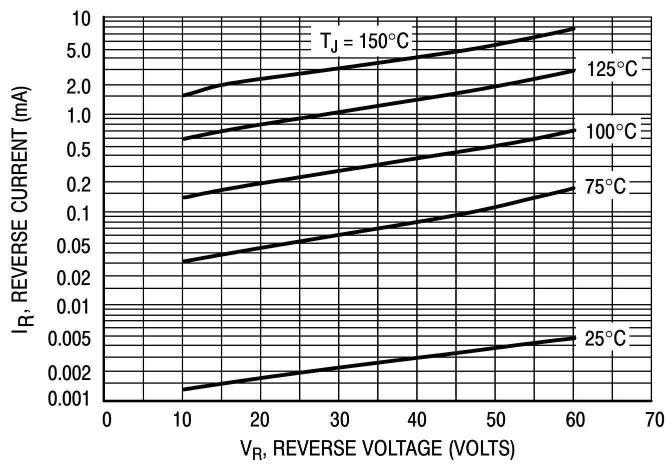


Figure 2. Typical Reverse Current*

*The curves shown are typical for the highest voltage device in the voltage grouping. Typical reverse current for lower voltage selections can be estimated from these same curves if V_R is sufficiently below rated V_R.

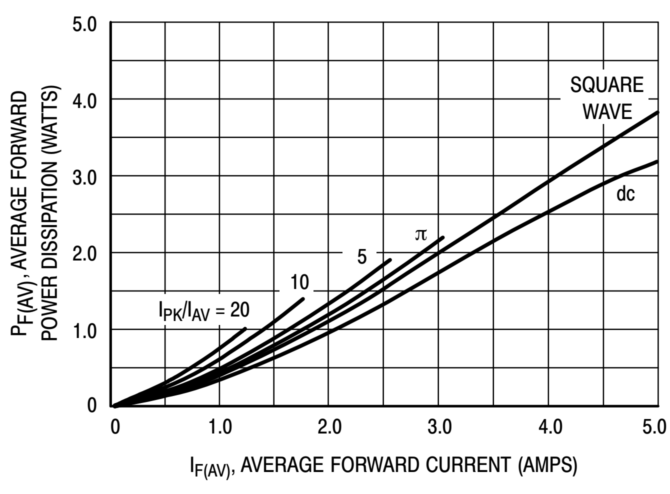


Figure 3. Forward Power Dissipation

THERMAL CHARACTERISTICS

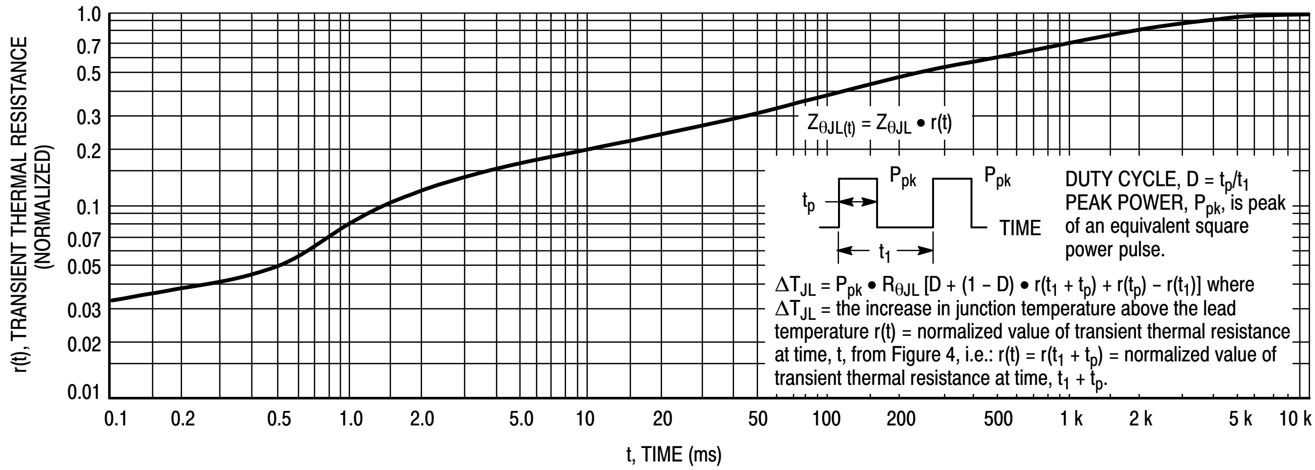


Figure 4. Thermal Response

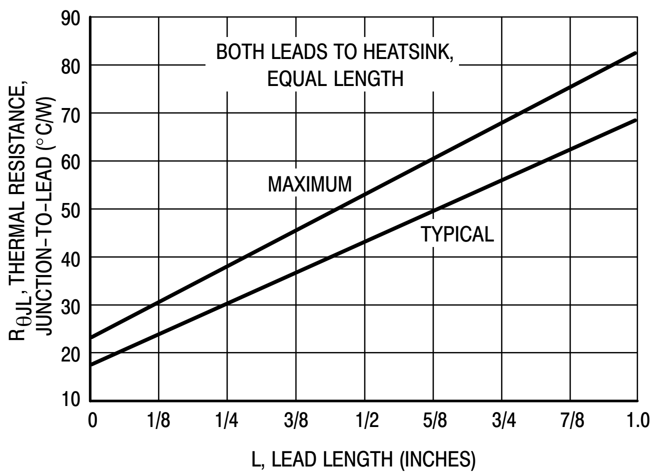


Figure 5. Steady−State Thermal Resistance

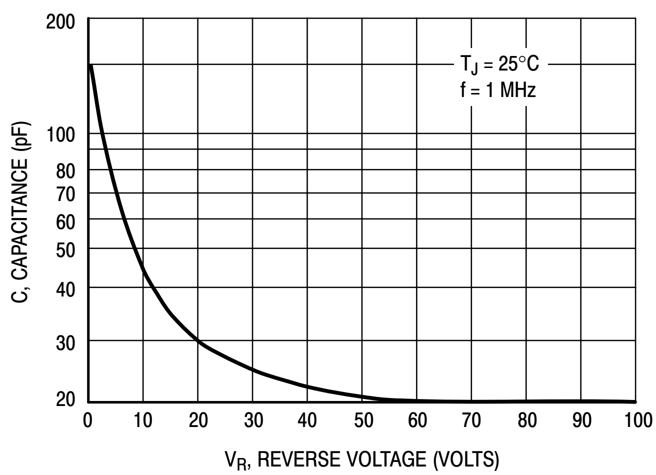


Figure 6. Typical Capacitance

NOTE 1. — MOUNTING DATA:

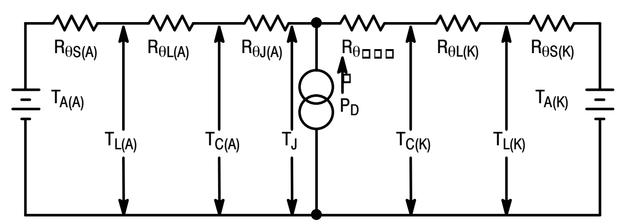
Data shown for thermal resistance junction−to−ambient ($R_{\theta JA}$) for the mounting shown is to be used as a typical guideline values for preliminary engineering or in case the tie point temperature cannot be measured.

Typical Values for $R_{\theta JA}$ in Still Air

Mounting Method	Lead Length, L (in)				$R_{\theta JA}$
	1/8	1/4	1/2	3/4	
1	52	65	72	85	°C/W
2	67	80	87	100	°C/W
3	—	50			°C/W

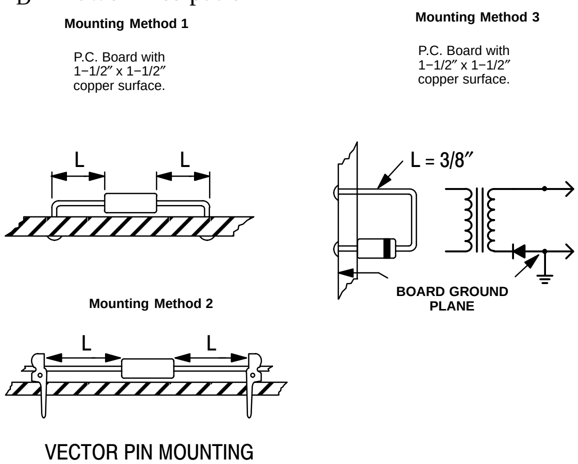
NOTE 2. — THERMAL CIRCUIT MODEL:

(For heat conduction through the leads)



Use of the above model permits junction to lead thermal resistance for any mounting configuration to be found. For a given total lead length, lowest values occur when one side of the rectifier is brought as close as possible to the heatsink. Terms in the model signify:

T_A = Ambient Temperature T_C = Case Temperature
T_L = Lead Temperature T_J = Junction Temperature
$R_{\theta S}$ = Thermal Resistance, Heatsink−to−Ambient
$R_{\theta L}$ = Thermal Resistance, Lead−to−Heatsink
$R_{\theta J}$ = Thermal Resistance, Junction−to−Case
P_D = Power Dissipation



(Subscripts A and K refer to anode and cathode sides, respectively.) Values for thermal resistance components are: $R_{\theta L}$ = 100°C/W/in typically and 120°C/W/in maximum. $R_{\theta J}$ = 36°C/W typically and 46°C/W maximum.

NOTE 3. — HIGH FREQUENCY OPERATION:

Since current flow in a Schottky rectifier is the result of majority carrier conduction, it is not subject to junction diode forward and reverse recovery transients due to minority carrier injection and stored charge. Satisfactory circuit analysis work may be performed by using a model consisting of an ideal diode in parallel with a variable capacitance. (See Figure 6)

Rectification efficiency measurements show that operation will be satisfactory up to several megahertz. For example, relative waveform rectification efficiency is approximately 70 percent at 2 MHz, e.g., the ratio of dc power to RMS power in the load is 0.28 at this frequency, whereas perfect rectification would yield 0.406 for sine wave inputs. However, in contrast to ordinary junction diodes, the loss in waveform efficiency is not indicative of power loss: it is simply a result of reverse current flow through the diode capacitance, which lowers the dc output voltage.

ORDERING INFORMATION

Device	Package	Shipping†
MBR150	Axial Lead*	1000 Units / Bag
MBR150G	Axial Lead*	1000 Units / Bag
MBR150RL	Axial Lead*	5000 / Tape & Reel
MBR150RLG	Axial Lead*	5000 / Tape & Reel
MBR160	Axial Lead*	1000 Units / Bag
MBR160G	Axial Lead*	1000 Units / Bag
MBR160RL	Axial Lead*	5000 / Tape & Reel
MBR160RLG	Axial Lead*	5000 / Tape & Reel

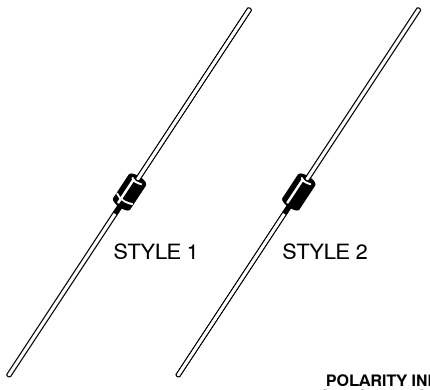
†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

*This package is inherently Pb−Free.

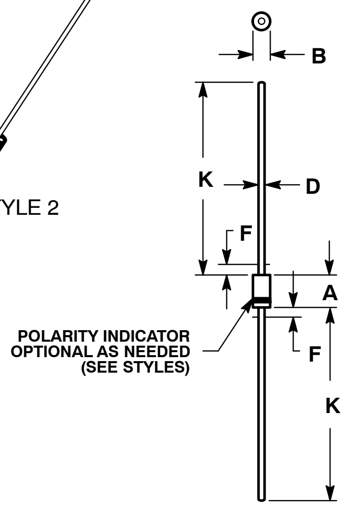
ON Semiconductor®

AXIAL LEAD
CASE 59−10
ISSUE U

DATE 15 FEB 2005



SCALE 1:1



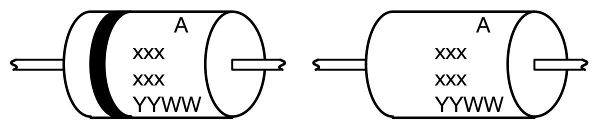
NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. ALL RULES AND NOTES ASSOCIATED WITH JEDEC DO−41 OUTLINE SHALL APPLY
4. POLARITY DENOTED BY CATHODE BAND.
5. LEAD DIAMETER NOT CONTROLLED WITHIN F DIMENSION.

	INCHES		MILLIMETERS	
DIM	MIN	MAX	MIN	MAX
A	0.161	0.205	4.10	5.20
B	0.079	0.106	2.00	2.70
D	0.028	0.034	0.71	0.86
F	−−−	0.050	−−−	1.27
K	1.000	−−−	25.40	−−−

STYLE 1:
PIN 1. CATHODE (POLARITY BAND)
2. ANODE

STYLE 2:
NO POLARITY

GENERIC MARKING DIAGRAM*



STYLE 1 STYLE 2

xxx = Specific Device Code
A = Assembly Location
YY = Year
WW = Work Week

*This information is generic. Please refer to device data sheet for actual part marking. Pb−Free indicator, “G” or microdot “ ▪”, may or may not be present.

DOCUMENT NUMBER:	98ASB42045B	Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped “CONTROLLED COPY” in red.
DESCRIPTION:	AXIAL LEAD	PAGE 1 OF 1

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:
Email Requests to: orderlit@onsemi.com

onsemi Website: www.onsemi.com

TECHNICAL SUPPORT
North American Technical Support:
Voice Mail: 1 800−282−9855 Toll Free USA/Canada
Phone: 011 421 33 790 2910

Europe, Middle East and Africa Technical Support:
Phone: 00421 33 790 2910
For additional information, please contact your local Sales Representative