Bulletin PD-2.317 rev. F 07/03

International
IOR Rectifier

MBR10.. Series
MBRB10.. Series

SCHOTTKY RECTIFIER

10 Amp

Major Ratings and Characteristics

Characteristics	Values	Units
$I_{F(AV)}$ Rectangular waveform	10	A
I_{FRM} @ T_C = 135°C	20	A
V_{RRM}	35/45	V
I_{FSM} @ tp = 5 μs sine	1060	A
V_F @ 10 Apk, T_J = 125°C	0.57	V
T_J range	- 65 to 150	°C

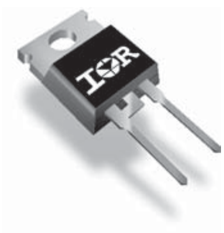
Description/ Features

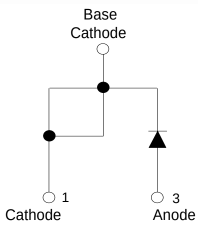
This Schottky rectifier has been optimized for low reverse leakage at high temperature. The proprietary barrier technology allows for reliable operation up to 150° C junction temperature. Typical applications are in switching power supplies, converters, free-wheeling diodes, and reverse battery protection.

- 150°C T_J operation
- TO-220 and D^2Pak packages
- Low forward voltage drop
- High purity, high temperature epoxy encapsulation for enhanced mechanical strength and moisture resistance
- High frequency operation
- Guard ring for enhanced ruggedness and long term reliability

Case Styles

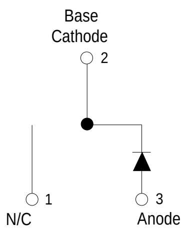
MBR10..





TO-220AC

MBRB10..



D^2PAK

Voltage Ratings

	Part number	MBR1035 / MBRB1035	MBR1045 / MBRB1045
V_R	Max. DC Reverse Voltage (V)	35	45
V_{RWM}	Max. Working Peak Reverse Voltage (V)		

Absolute Maximum Ratings

	Parameters	Values	Units	Conditions	
$I_{F(AV)}$	Max. Average Forward Current	10	A	@ T_C = 135° C (Rated V_R)	
I_{FRM}	Peak Repetitive Forward Current	20	A	Rated V_R, square wave, 20kHz T_C = 135° C	
I_{FSM}	Non Repetitive Peak Surge Current	1060	A	5µs Sine or 3µs Rect. pulse	Following any rated load condition and with rated V_{RRM} applied
		150		Surge applied at rated load conditions halfwave, single phase, 60Hz	
E_{AS}	Non-Repetitive Avalanche Energy	8	mJ	T_J = 25 °C, I_{AS} = 2 Amps, L = 4 mH	
I_{AR}	Repetitive Avalanche Current	2	A	Current decaying linearly to zero in 1 µsec Frequency limited by T_J max. V_A = 1.5 x V_R typical	

Electrical Specifications

	Parameters	Values	Units	Conditions	
V_{FM}	Max. Forward Voltage Drop	0.84	V	@ 20A	T_J = 25 °C
	(1)	0.57	V	@ 10A	T_J = 125 °C
		0.72	V	@ 20A	
I_{RM}	Max. Instantaneus Reverse Current	0.1	mA	T_J = 25 °C	Rated DC voltage
	(1)	15	mA	T_J = 125 °C	
$V_{F(TO)}$	Threshold Voltage	0.354	V	T_J = T_J max.	
r_t	Forward Slope Resistance	17.6	mΩ		
C_T	Max. Junction Capacitance	600	pF	V_R = 5V_{DC} (test signal range 100Khz to 1Mhz) 25°C	
L_S	Typical Series Inductance	8.0	nH	Measured from top of terminal to mounting plane	
dv/dt	Max. Voltage Rate of Change (Rated V_R)	10000	V/ µs		

(1) Pulse Width < 300µs, Duty Cycle <2%

Thermal-Mechanical Specifications

	Parameters		Values	Units	Conditions
T_J	Max. Junction Temperature Range		-65 to 150	°C	
T_{stg}	Max. Storage Temperature Range		-65 to 175	°C	
R_{thJC}	Max. Thermal Resistance Junction to Case		2.0	°C/W	DC operation
R_{thCS}	Typical Thermal Resistance Case to Heatsink		0.50	°C/W	Mounting surface, smooth and greased Only for TO-220
wt	Approximate Weight		2 (0.07)	g (oz.)	
T	Mounting Torque	Min.	6 (5)	Kg-cm (lbf-in)	
		Max.	12 (10)		

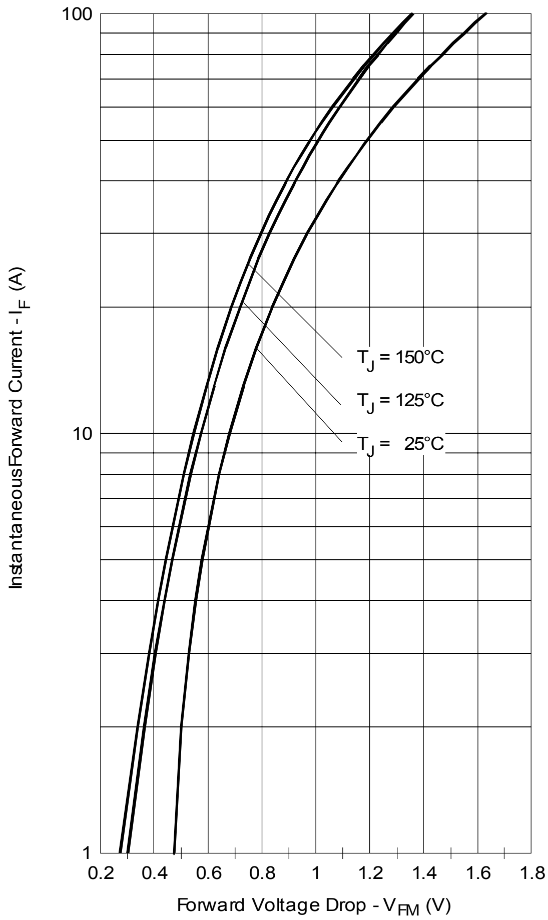


Fig. 1 - Max. Forward Voltage Drop Characteristics

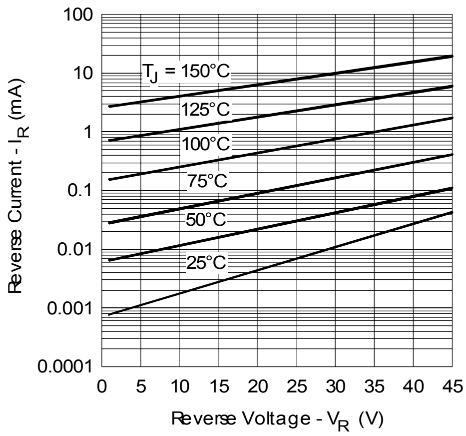


Fig. 2 - Typical Values Of Reverse Current Vs. Reverse Voltage

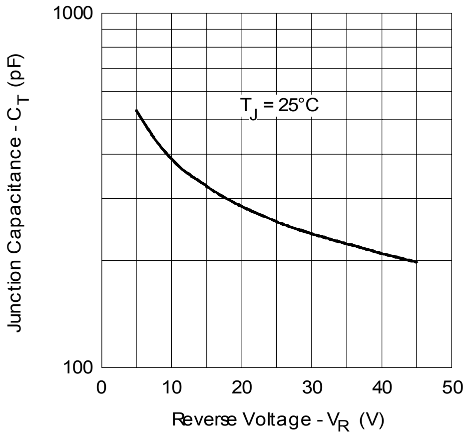


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage

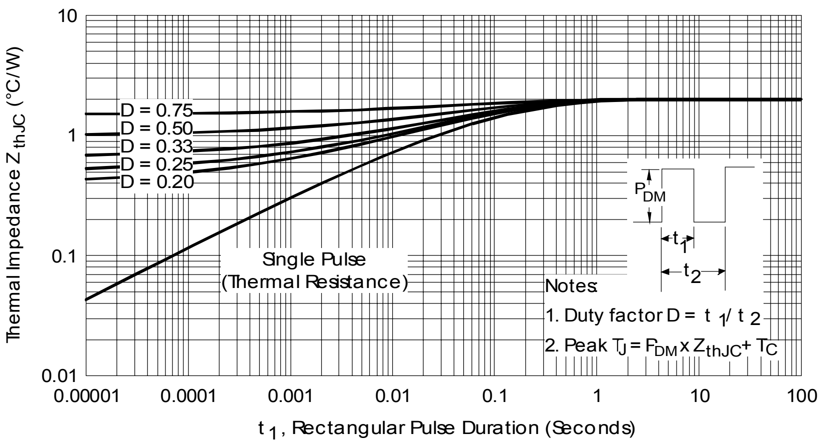


Fig. 4 - Max. Thermal Impedance Z_{thJC} Characteristics

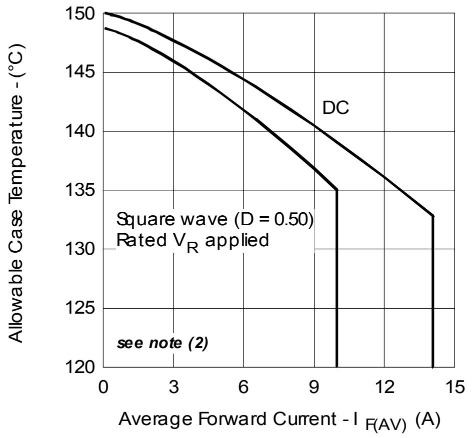


Fig. 5 - Max. Allowable Case Temperature
Vs. Average Forward Current

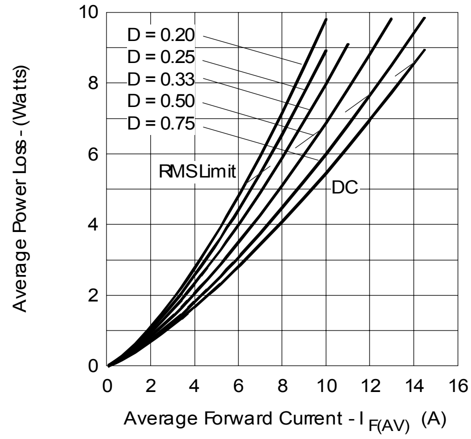


Fig. 6 - Forward Power Loss Characteristics

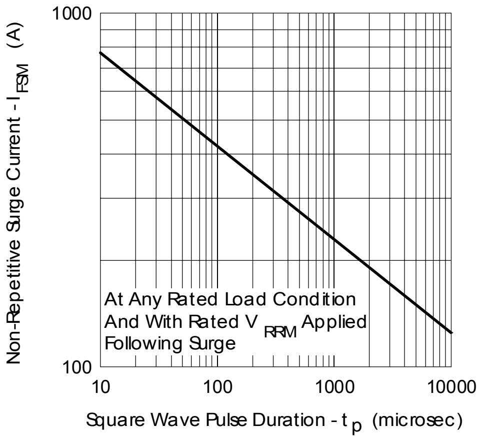
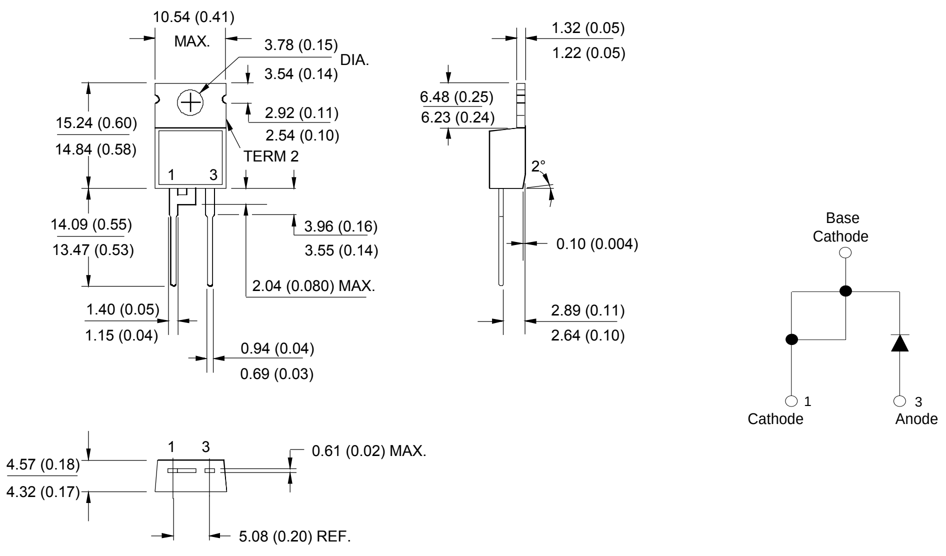


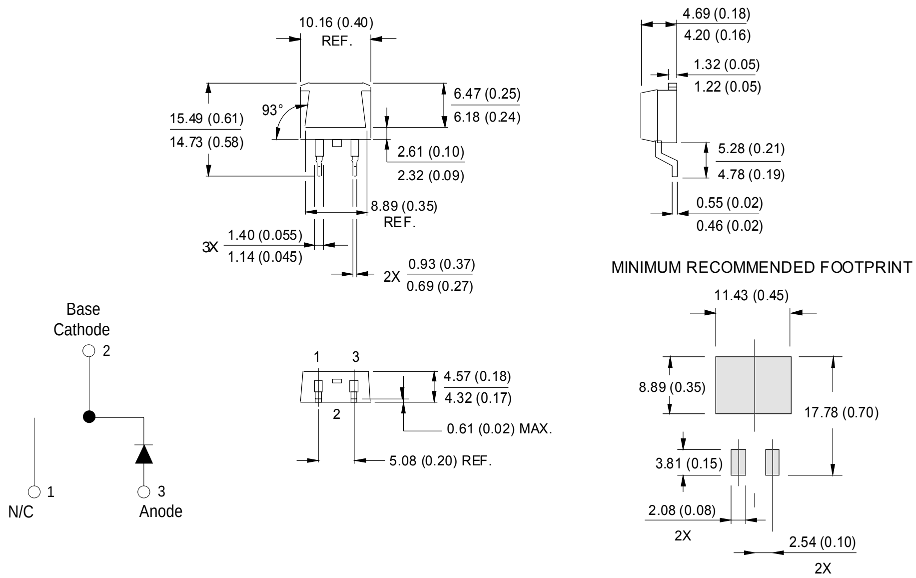
Fig. 7 - Max. Non-Repetitive Surge Current

(2) Formula used: $T_C = T_J - (Pd + Pd_{REV}) \times R_{thJC}$;
Pd = Forward Power Loss = $I_{F(AV)} \times V_{FM}$ @ $(I_{F(AV)} / D)$ (see Fig. 6);
Pd_{REV} = Inverse Power Loss = $V_{R1} \times I_R (1 - D)$; I_R @ V_{R1} = rated V_R

Outline Table

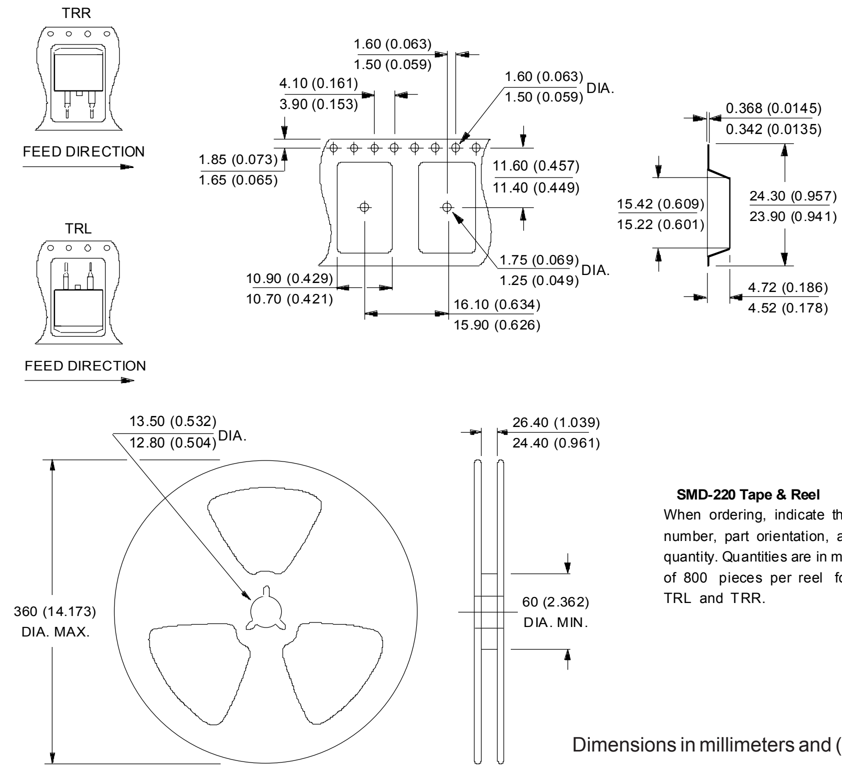


Conform to JEDEC outline TO-220AC
Dimensions in millimeters and (inches)



Conform to JEDEC outline D^{2}Pak (SMD-220)
Dimensions in millimeters and (inches)

Tape & Reel Information



SMD-220 Tape & Reel
When ordering, indicate the part number, part orientation, and the quantity. Quantities are in multiples of 800 pieces per reel for both TRL and TRR.

Dimensions in millimeters and (inches)

Ordering Information Table

Device Code

MBR	B	10	45
1	2	3	4

1 - Essential Part Number
2 - B = Surface Mount
None = TO-220
3 - Current Rating
4 - Voltage code: Code = V_{RRM}

35	= 35V
45	= 45V

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MBR1045
********************************************
*     This model has been developed by                    *
*    Wizard SPICE MODEL GENERATOR (1999)     *
*         (International Rectifier Corporation)              *
*     Contains Proprietary Information                    *
********************************************
* SPICE Model Diode is composed by a       *
* simple diode plus paralled VCG2T        *
********************************************
.SUBCKT MBR1045 ANO CAT
D1 ANO 1 DMOD (0.04688)
*Define diode model
.MODEL DMOD D(IS=2.14849701885607E-04A,N=1.50833541375759,BV=52V,
+ IBV=0.431942180477539A,RS= 0.000618816,CJO=1.90645706123736E-08,
+ VJ=2.31227489200037,XTI=2, EG=0.684712841282824)
********************************************
*Implementation of VCG2T
VX 1 2 DC 0V
R1 2 CAT TRES 1E-6
.MODEL TRES RES(R=1,TC1=-29.9118224426661)
GP1 ANO CAT VALUE={-ABS(I(VX))*(EXP((((-6.195028E-06/-29.91182)*((V(2,CAT)*1E6)/(I(VX)+1E-6)-
1))+1)*4.475503E-02*ABS(V(ANO,CAT)))-1)}
********************************************
.ENDS MBR1045

Thermal Model Subcircuit
.SUBCKT MBR1045  5 1

CTHERM1    5    4    1.40E+00
CTHERM2    4    3    1.46E+01
CTHERM3    3    2    9.30E+01
CTHERM4    2    1    1.69E+03

RTHERM1    5    4    5.79E-01
RTHERM2    4    3    7.72E-01
RTHERM1    3    2    4.45E-01
RTHERM1    2    1    1.93E-01


.ENDS MBR1045
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International Rectifier

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