

International
IR Rectifier

MBR10.. Series
MBRB10.. Series

SCHOTTKY RECTIFIER

10 Amp

$$I_{F(AV)} = 10\text{Amp}$$

$$V_R = 35 - 45\text{V}$$

Major Ratings and Characteristics

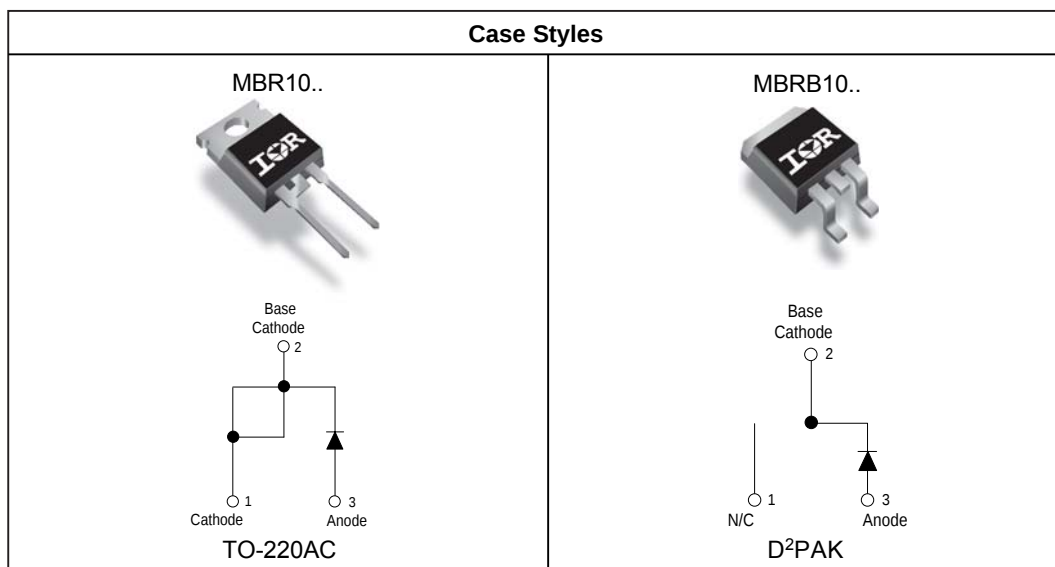
Characteristics	Values	Units
$I_{F(AV)}$ Rectangular waveform	10	A
V_{RRM} range	35-45	V
I_{FSM} @ $t_p = 5\mu\text{s}$ sine	1060	A
V_F @10Apk, $T_J = 125^\circ\text{C}$	0.57	V
T_J range	-55 to 150	$^\circ\text{C}$

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 D²Pak 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



Voltage Ratings

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

Electrical Specifications

Parameters	Values	Units	Conditions
V_{FM} Max. Forward Voltage Drop (1)	0.84	V	@ 20A $T_J = 25^\circ\text{C}$
	0.57	V	@ 10A $T_J = 125^\circ\text{C}$
	0.72	V	@ 20A $T_J = 125^\circ\text{C}$
I_{RM} Max. Instantaneous Reverse Current (1)	0.1	mA	$T_J = 25^\circ\text{C}$ Rated DC voltage
	15	mA	$T_J = 125^\circ\text{C}$
$V_{F(TO)}$ Threshold Voltage	0.354	V	$T_J = T_J \text{ max.}$
r_t Forward Slope Resistance	17.6	m Ω	
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	10000	V/ μs	(Rated V_R)

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

Thermal-Mechanical Specifications

Parameters	Values	Units	Conditions
T_J Max. Junction Temperature Range	-65 to 150	$^\circ\text{C}$	
T_{stg} Max. Storage Temperature Range	-65 to 175	$^\circ\text{C}$	
R_{thJC} Max. Thermal Resistance Junction to Case	2.0	$^\circ\text{C/W}$	DC operation
R_{thCS} Typical Thermal Resistance Case to Heatsink	0.50	$^\circ\text{C/W}$	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)		
Marking Device	MBR1045		Case Style TO-220
	MBRB1045		Case Style D ² Pak

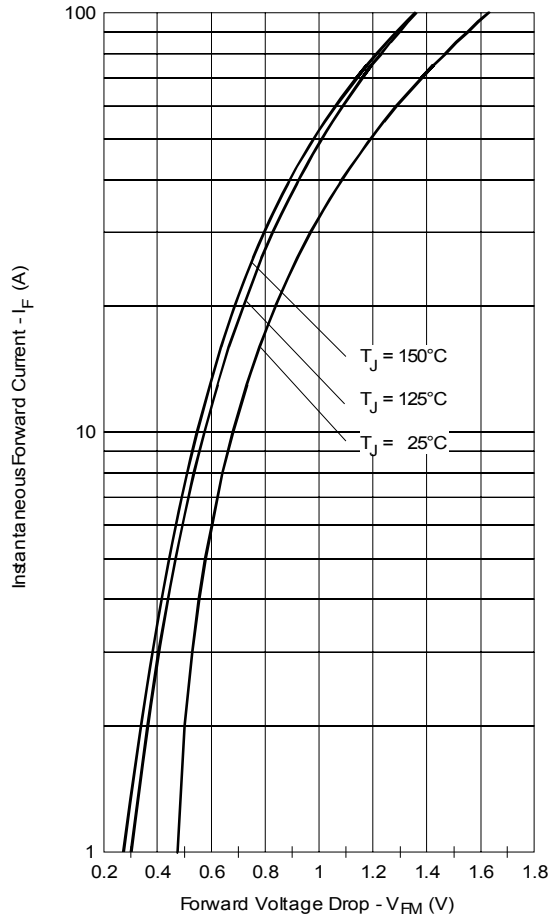


Fig. 1 - Max. Forward Voltage Drop Characteristics

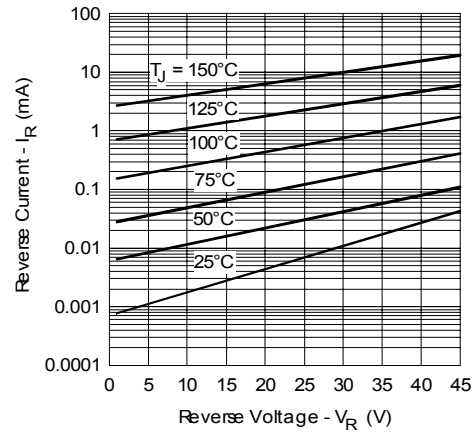


Fig. 2 - Typical Values Of Reverse Current Vs. Reverse Voltage

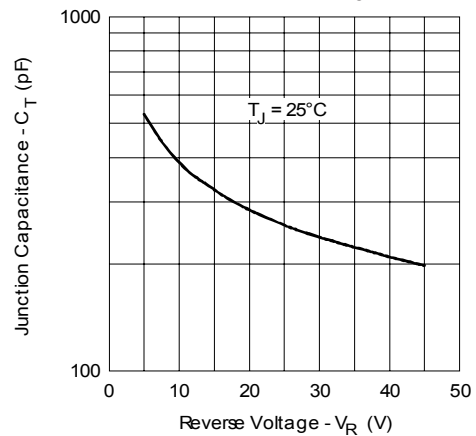


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage

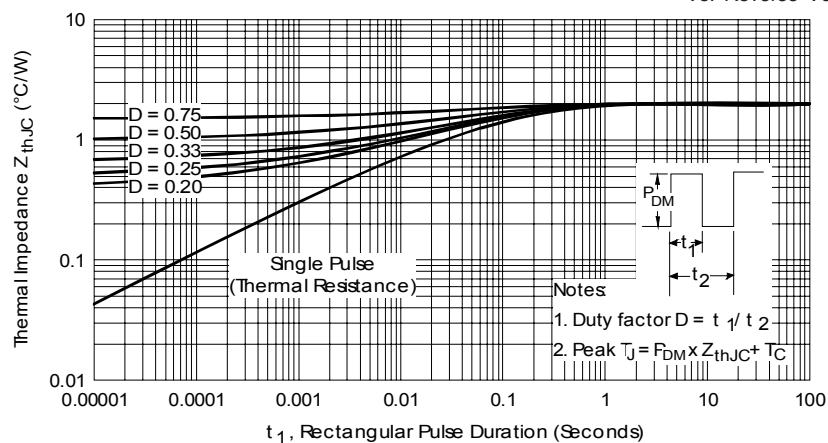


Fig. 4 - Max. Thermal Impedance Z_{thJC} Characteristics

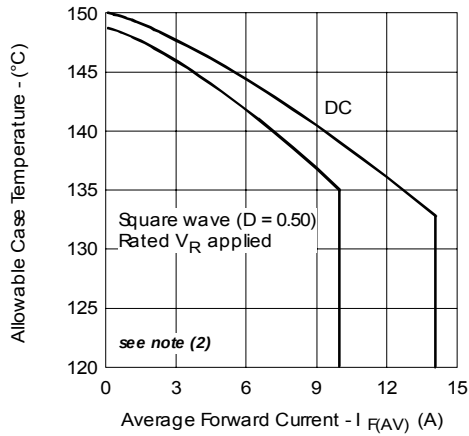


Fig. 5 - Max. Allowable Case Temperature Vs. Average Forward Current

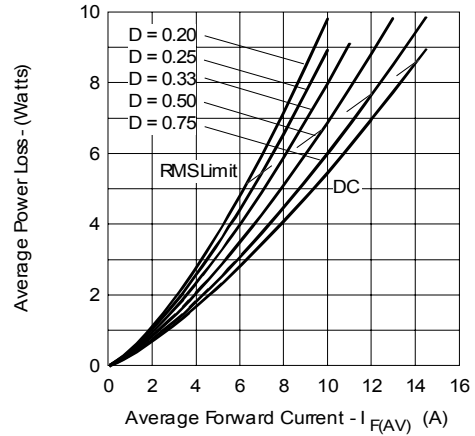


Fig. 6 - Forward Power Loss Characteristics

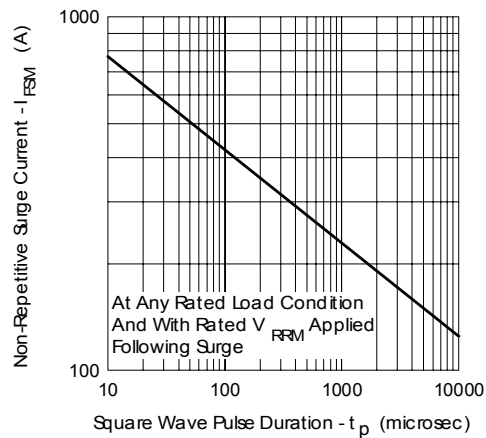


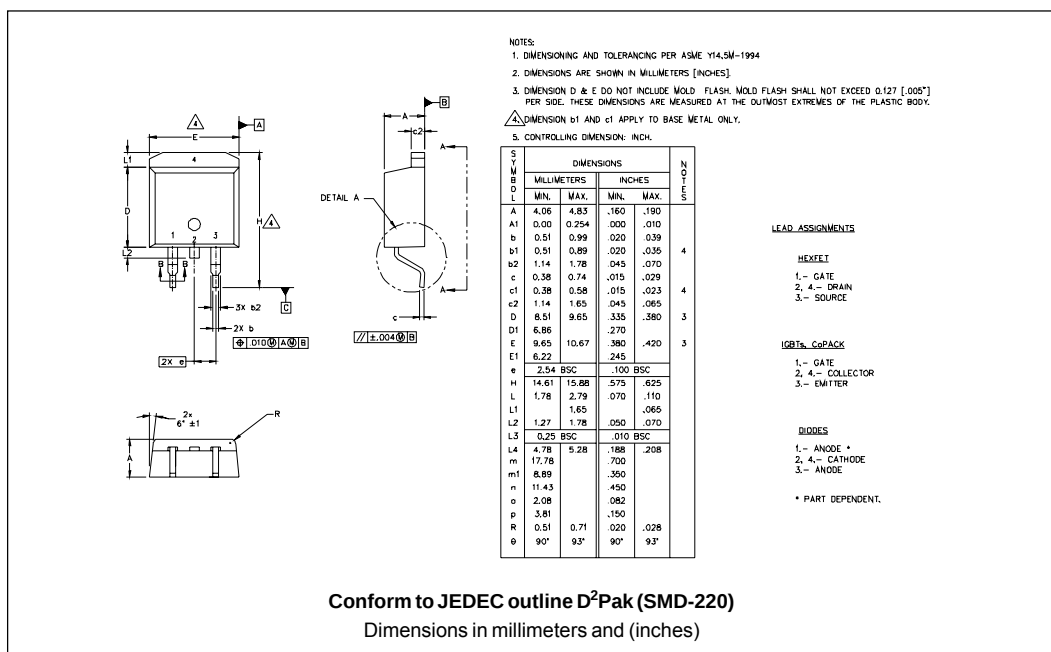
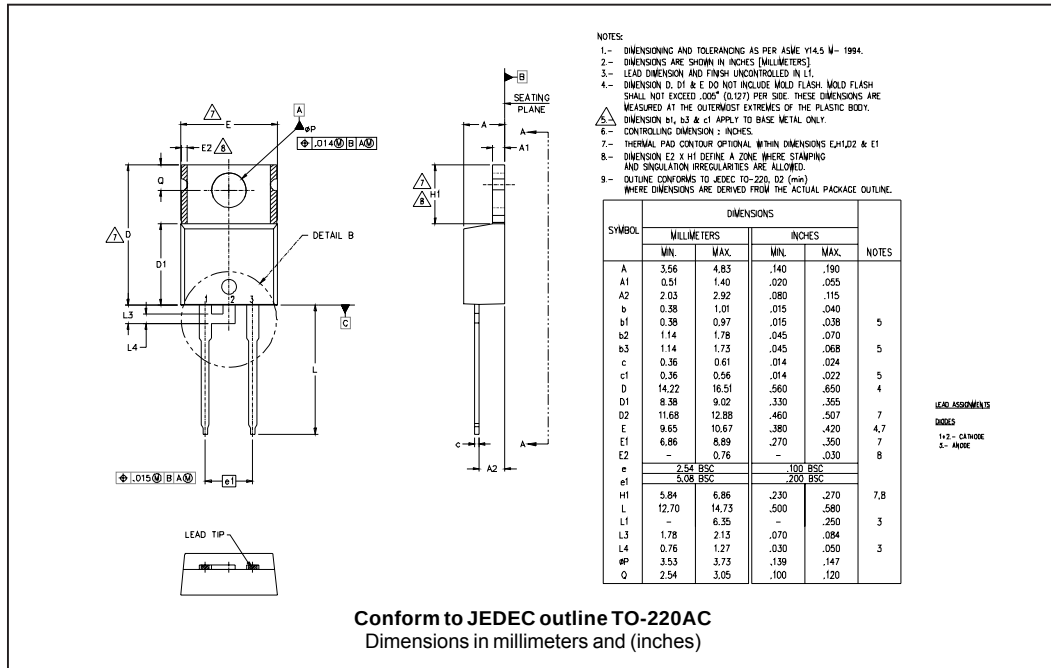
Fig. 7 - Max. Non-Repetitive Surge Current

(2) Formula used: $T_C = T_J - (P_d + P_{d_{REV}}) \times R_{thJC}$;

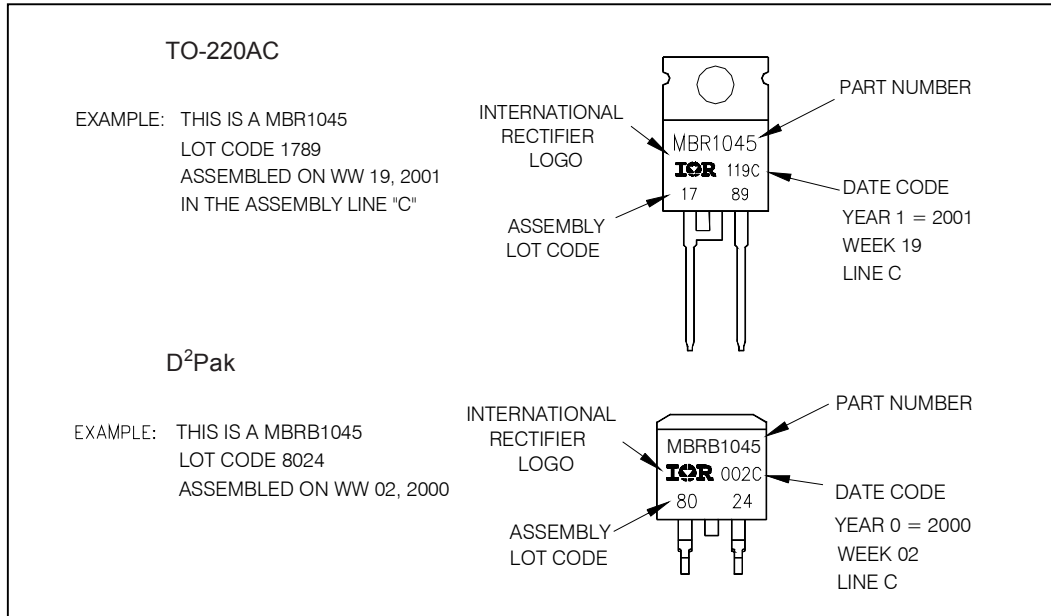
P_d = Forward Power Loss = $I_{F(AV)} \times V_{FM} @ (I_{F(AV)} / D)$ (see Fig. 6);

$P_{d_{REV}}$ = Inverse Power Loss = $V_{R1} \times I_R (1 - D)$; $I_R @ V_{R1}$ = rated V_R

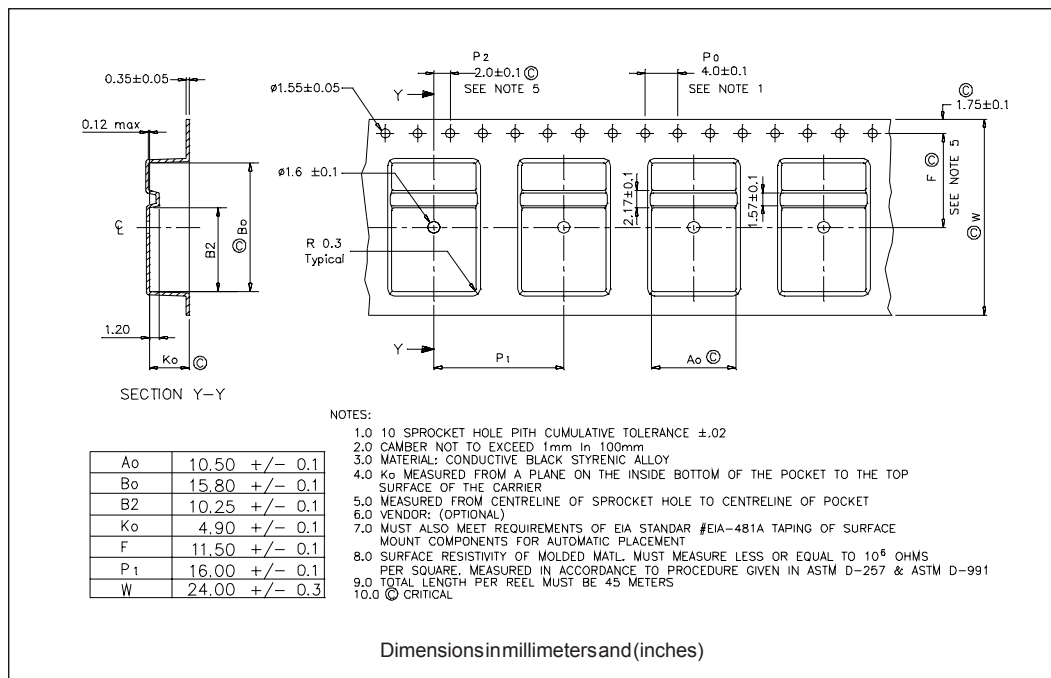
Outline Table



Part Marking Information



Tape & Reel Information



Ordering Information Table

Device Code					
	MBR	B	10	45	TRL -
	①	②	③	④	⑤ ⑥
1	-	Schottky MBR Series			
2	-	Package Style:			
		• none = TO-220			
		• B = D ² PAk			
3	-	Current Rating (10 = 10A)			
4	-	Voltage Ratings			
5	-	• none = Tube			
		• TRR = Tape & Reel (Right Oriented)			
		• TRL = Tape & Reel (Left Oriented)			
6	-	• none = Standard Production			
		• PbF = Lead-Free			

35 = 35V
 45 = 45V

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 paralalled VCG2T *

.SUBCKT MBR1045 ANO CAT

D1 ANO1 DMOD(0.04688)

*Define diode model

.MODEL DMODD(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

VX1 2 DC 0V

R1 2 CAT TRES 1E-6

.MODEL TRESRES(R=1,TC1=-29.9118224426661)

GP1 ANOCAT 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

Data and specifications subject to change without notice.
This product has been designed and qualified for Industrial Level.
Qualification Standards can be found on IR's Web site.

International
IR Rectifier

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