

SCHOTTKY RECTIFIER

7.5 Amp

$I_{F(AV)} = 7.5\text{Amp}$
 $V_R = 35 - 45\text{V}$

Major Ratings and Characteristics


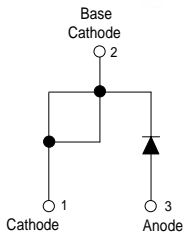

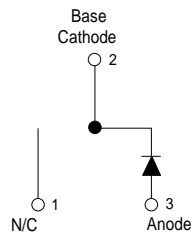
Characteristics	Values	Units
$I_{F(AV)}$ Rectangular waveform	7.5	A
V_{RRM} range	35 - 45	V
I_{FSM} @tp = 5 μ s sine	690	A
V_F @16 Apk, $T_J = 125^\circ\text{C}$	0.57	V
T_J range	-65 to 150	$^\circ\text{C}$

Description/ Features

The MBR7.. 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
- High purity, high temperature epoxy encapsulation for enhanced mechanical strength and moisture resistance
- Low forward voltage drop
- High frequency operation
- Guard ring for enhanced ruggedness and long term reliability

Case Styles

<p>MBR7..</p>  <p>Base Cathode ○ 2</p>  <p>○ 1 Cathode ○ 3 Anode</p> <p>TO-220AC</p>	<p>MBRB7..</p>  <p>Base Cathode ○ 2</p>  <p>○ 1 N/C ○ 3 Anode</p> <p>D²PAK</p>
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Voltage Ratings

Parameters	MBR.735	MBR.745
V_R Max. DC Reverse Voltage (V)	35	45
V_{RWM} Max. Working Peak Reverse Voltage (V)		

Absolute Maximum Ratings

Parameters	MBR..	Units	Conditions
$I_{F(AV)}$ Max. Average Forward Current	7.5	A	@ $T_C = 131^\circ\text{C}$ (Rated V_R)
I_{FSM} Non-Repetitive Peak Surge Current	690	A	5 μs Sine or 3 μs Rect. pulse Following any rated load condition and with rated V_{RRM} applied
	150		Surge applied at rated load condition halfwave single phase 60Hz
E_{AS} Non-Repetitive Avalanche Energy	7	mJ	$T_J = 25^\circ\text{C}$, $I_{AS} = 2$ Amps, $L = 3.5$ 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	MBR..	Units	Conditions
V_{FM} Max. Forward Voltage Drop (1)	0.84	V	@ 15A $T_J = 25^\circ\text{C}$
	0.57	V	@ 7.5A $T_J = 125^\circ\text{C}$
	0.72	V	@ 15A
I_{RM} Max. Instantaneous Reverse Current (1)	0.1	mA	$T_J = 25^\circ\text{C}$ Rated DC voltage
	15	mA	$T_J = 125^\circ\text{C}$
C_T Max. Junction Capacitance	400	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)	1000	V/ μs	

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

Thermal-Mechanical Specifications

Parameters	MBR..	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	3.0	$^\circ\text{C/W}$	DC operation
R_{thCS} Typical Thermal Resistance, Case to Heatsink	0.50	$^\circ\text{C/W}$	Mounting surface, smooth and greased
wt Approximate Weight	2 (0.07)	g (oz.)	
T Mounting Torque	Min. 6 (5)	Kg-cm (lbf-in)	
	Max. 12 (10)		
Marking Device	MBR745		Case Style TO-220
	MBRB745		Case Style D ² Pak

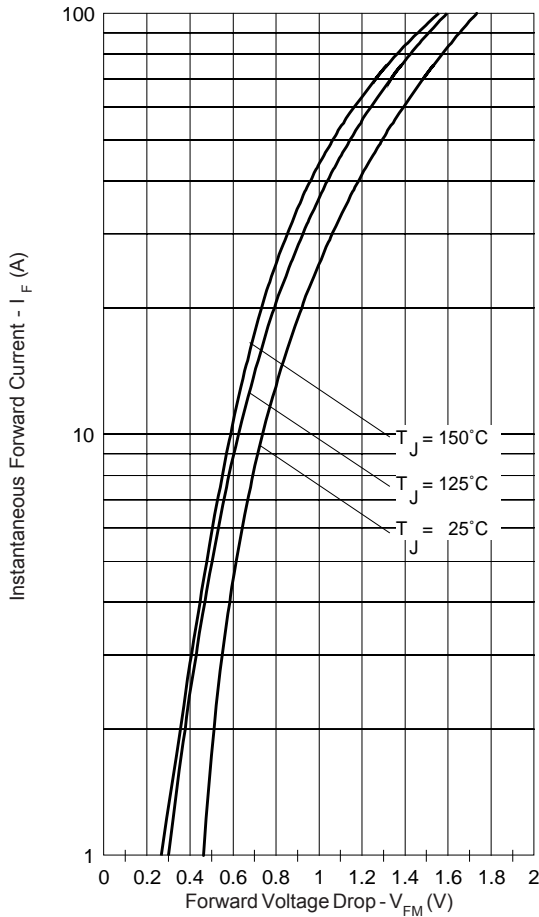


Fig. 1 - Max. Forward Voltage Drop Characteristics (Per Leg)

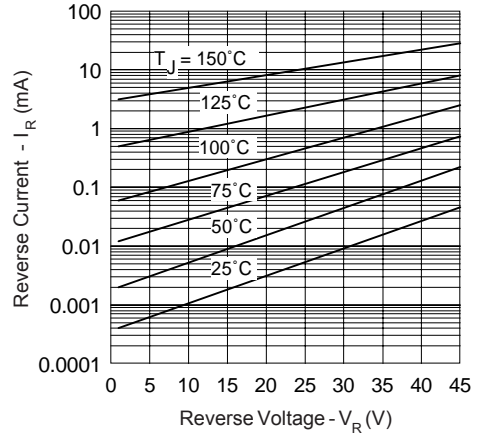


Fig. 2 - Typical Values Of Reverse Current Vs. Reverse Voltage (Per Leg)

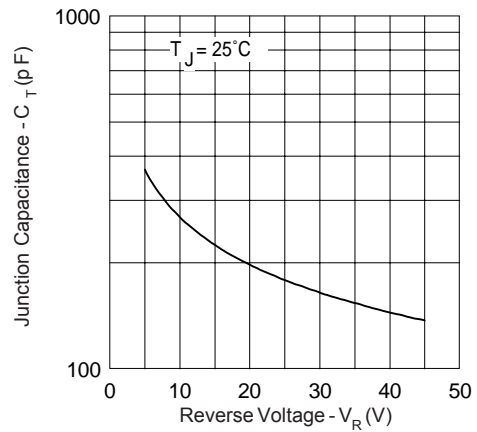


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage (Per Leg)

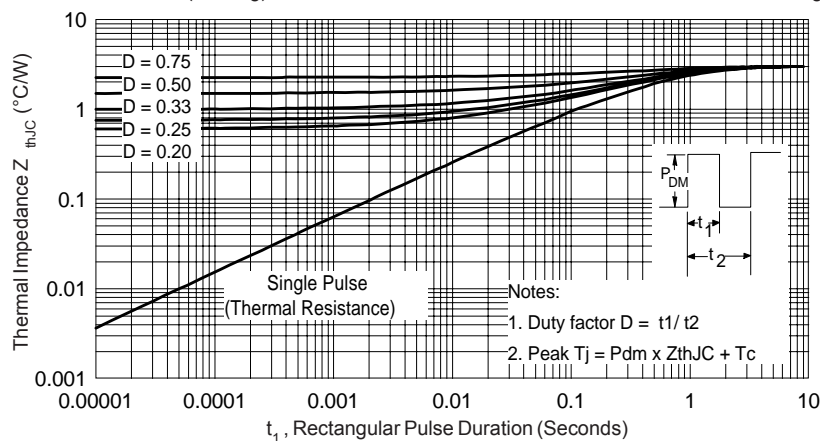


Fig. 4 - Max. Thermal Impedance Z_{thJC} Characteristics (Per Leg)

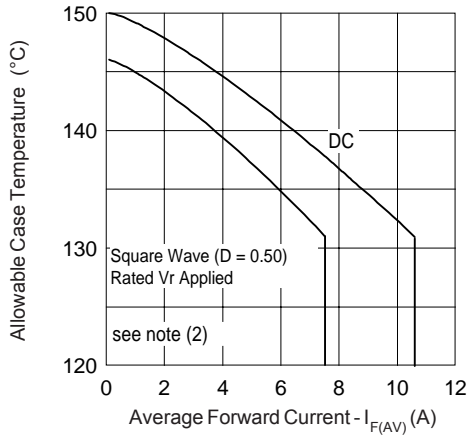


Fig. 5 - Max. Allowable Case Temperature Vs. Average Forward Current

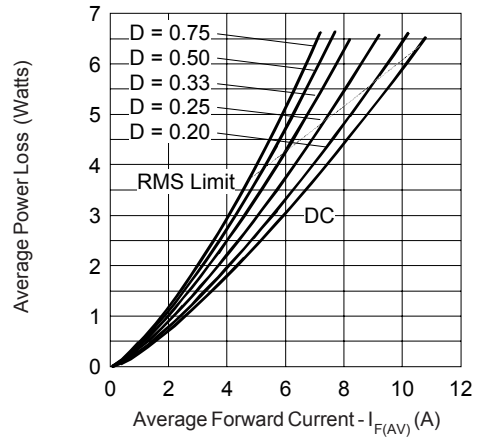


Fig. 6 - Forward Power Loss Characteristics

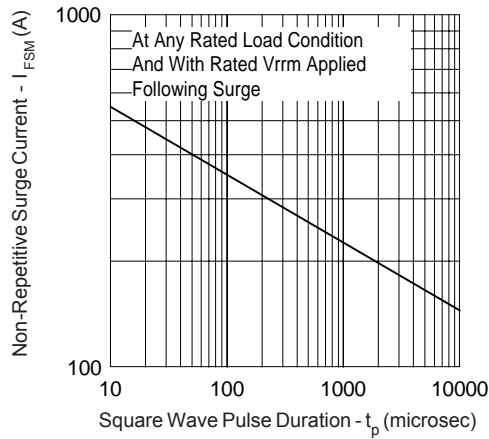
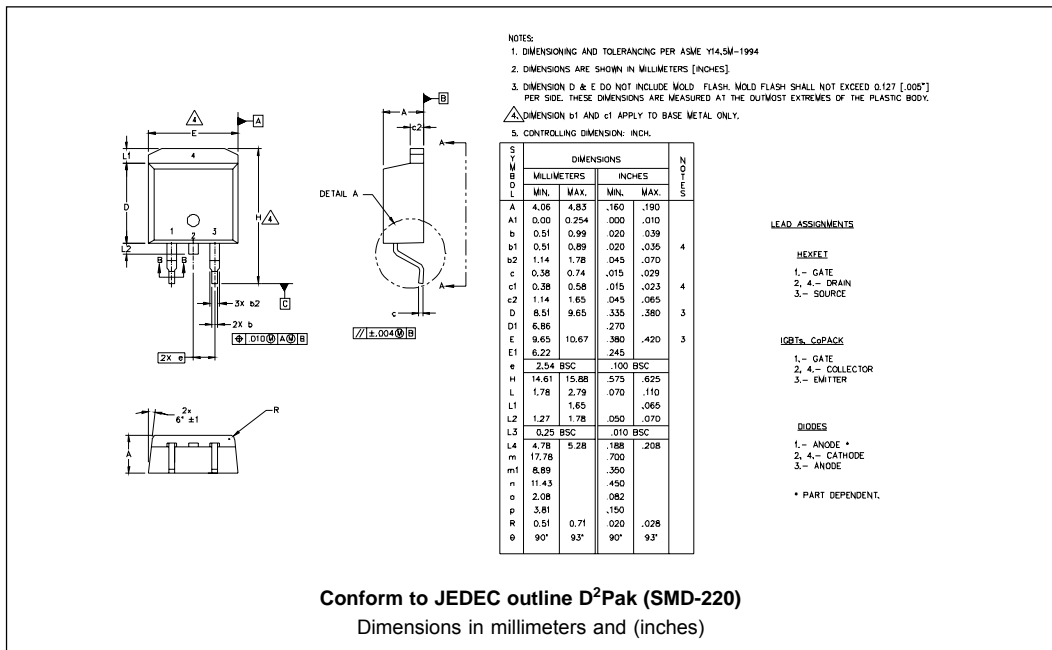
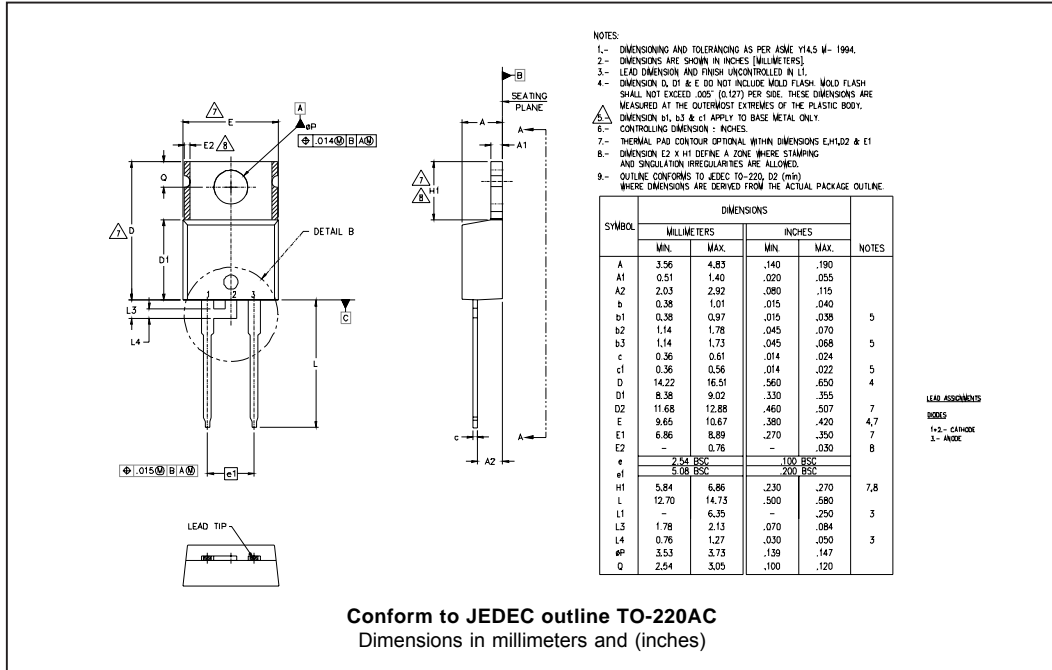


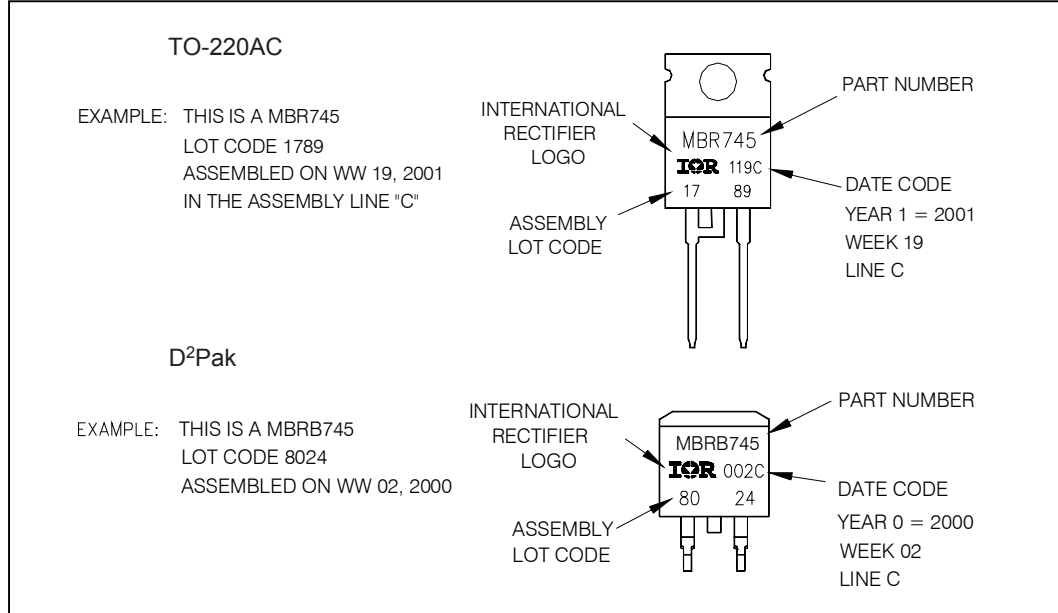
Fig. 7 - Max. Non-Repetitive Surge Current (Per Leg)

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

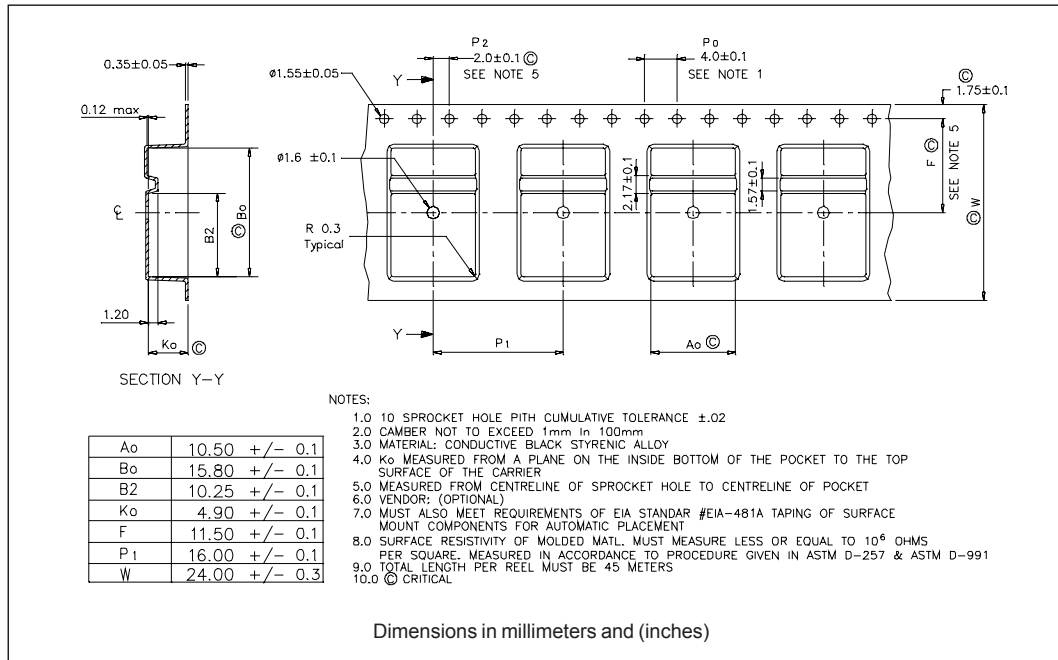
Outline Table



Part Marking Information



Tape & Reel Information



Ordering Information Table

Device Code													
	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="padding: 2px 10px;">MBR</td> <td style="padding: 2px 10px;">B</td> <td style="padding: 2px 10px;">7</td> <td style="padding: 2px 10px;">45</td> <td style="padding: 2px 10px;">TRL</td> <td style="padding: 2px 10px;">-</td> </tr> <tr> <td style="text-align: center;">①</td> <td style="text-align: center;">②</td> <td style="text-align: center;">③</td> <td style="text-align: center;">④</td> <td style="text-align: center;">⑤</td> <td style="text-align: center;">⑥</td> </tr> </table>	MBR	B	7	45	TRL	-	①	②	③	④	⑤	⑥
MBR	B	7	45	TRL	-								
①	②	③	④	⑤	⑥								
1	- Schottky MBR Series												
2	- Package Style: <ul style="list-style-type: none"> • none = TO-220 • B = D²PAK 												
3	- Current Rating (7.5A)												
4	- Voltage Ratings												
5	- <ul style="list-style-type: none"> • none = Tube • TRR = Tape & Reel (Right Oriented) • TRL = Tape & Reel (Left Oriented) 												
6	- <ul style="list-style-type: none"> • none = Standard Production • PbF = Lead-Free 												

35 = 35V
 45 = 45V

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MBR745
*****
* 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 paraladed VCG2T *
*****
.SUBCKT MBR745 ANO CAT
D1 ANO 1 DMOD (0.03191)
*Define diode model
.MODEL DMOD D(IS=9.72464638473799E-05A,N=1.30648926537753,BV=52V,
+ IBV=0.195508065728349A,RS= 0.000727548,CJO=1.94829876431799E-08,
+ VJ=2.27282978121533,XTI=2, EG=0.854458710837653)
*****
*Implementation of VCG2T
VX 1 2 DC 0V
R1 2 CAT TRES 1E-6
.MODEL TRES RES(R=1,TC1=27.6281424524011)
GP1 ANO CAT VALUE={-ABS(I(VX))*(EXP(((((-5.219758E-03/27.62814)*(V(2,CAT)*1E6)/(I(VX)+1E-6)-
1))+1)*7.000165E-02*ABS(V(ANO,CAT))))-1)}
*****
.ENDS MBR745

Thermal Model Subcircuit
.SUBCKT MBR745 5 1

CTHERM1 5 4 1.05E+00
CTHERM2 4 3 4.44E+00
CTHERM3 3 2 1.16E+01
CTHERM4 2 1 6.12E+01

R THERM1 5 4 1.33E+00
R THERM2 4 3 1.19E+00
R THERM1 3 2 3.81E-01
R THERM1 2 1 9.54E-02

.ENDS MBR745
    
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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.