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

### Major Ratings and Characteristics

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Values</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>$I_{F(AV)}$ Rectangular waveform</td>
<td>7.5</td>
<td>A</td>
</tr>
<tr>
<td>$V_{RRM}$ range</td>
<td>35 - 45</td>
<td>V</td>
</tr>
<tr>
<td>$I_{FSM}$ @ $t = 5 \mu s$ sine</td>
<td>690</td>
<td>A</td>
</tr>
<tr>
<td>$V_F$ @ 16 Apk, $T_J = 125^\circ C$</td>
<td>0.57</td>
<td>V</td>
</tr>
<tr>
<td>$T_J$ range</td>
<td>-65 to 150</td>
<td>°C</td>
</tr>
</tbody>
</table>

### Casestyles

- **MBR7..**
  - TO-220AC
- **MBRB7..**
  - D²PAK

### Description/Features

- 7.5 Amp
- $I_{F(AV)} = 7.5$Amp
- $V_R = 35 - 45$V
## Voltage Ratings

<table>
<thead>
<tr>
<th>Parameters</th>
<th>MBR.735</th>
<th>MBR.745</th>
</tr>
</thead>
<tbody>
<tr>
<td>$V_{DR}$ Max. DC Reverse Voltage (V)</td>
<td>35</td>
<td>45</td>
</tr>
<tr>
<td>$V_{RWM}$ Max. Working Peak Reverse Voltage (V)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## Absolute Maximum Ratings

<table>
<thead>
<tr>
<th>Parameters</th>
<th>MBR.735</th>
<th>Units</th>
<th>Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>$I_{FAM}$ Max. Average Forward Current</td>
<td>7.5</td>
<td>A</td>
<td>@ $T_c = 131 \degree C$ (Rated $V_{RR}$)</td>
</tr>
<tr>
<td>$I_{FSM}$ Non-Repetitive Peak Surge Current</td>
<td>690</td>
<td>A</td>
<td>5μs Sine or 3μs Rect. pulse $V_{RMM}$ applied</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Surge applied at rated load condition halfwave single phase 60Hz</td>
</tr>
<tr>
<td>$E_{AS}$ Non-Repetitive Avalanche Energy</td>
<td>7</td>
<td>mJ</td>
<td>$T_J = 25 \degree C$, $I_{AS} = 2$ Amps, $L = 3.5$ mH</td>
</tr>
<tr>
<td>$I_{AR}$ Repetitive Avalanche Current</td>
<td>2</td>
<td>A</td>
<td>Current decaying linearly to zero in 1 μsec Frequency limited by $T_{j,max} V_A = 1.5 x V_{R}$ typical</td>
</tr>
</tbody>
</table>

## Electrical Specifications

<table>
<thead>
<tr>
<th>Parameters</th>
<th>MBR.735</th>
<th>Units</th>
<th>Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>$V_{FM}$ Max. Forward Voltage Drop</td>
<td>0.84</td>
<td>V</td>
<td>@ 15A $T_J = 25 \degree C$</td>
</tr>
<tr>
<td></td>
<td>0.57</td>
<td>V</td>
<td>@ 7.5A $T_J = 125 \degree C$</td>
</tr>
<tr>
<td></td>
<td>0.72</td>
<td>V</td>
<td>@ 15A</td>
</tr>
<tr>
<td>$I_{IRM}$ Max. Instantaneous Reverse Current</td>
<td>0.1</td>
<td>mA</td>
<td>$T_J = 25 \degree C$ Rated DC voltage</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>mA</td>
<td>$T_J = 125 \degree C$</td>
</tr>
<tr>
<td>$C_J$ Max. Junction Capacitance</td>
<td>400</td>
<td>pF</td>
<td>$V_{R} = 5 V_{RDC}$ (test signal range 100Khz to 1MHz) 25°C</td>
</tr>
<tr>
<td>$L_S$ Typical Series Inductance</td>
<td>8.0</td>
<td>nH</td>
<td>Measured from top of terminal to mounting plane</td>
</tr>
<tr>
<td>$dv/dt$ Max. Voltage Rate of Change (Rated $V_{R}$)</td>
<td>1000</td>
<td>V/μs</td>
<td></td>
</tr>
</tbody>
</table>

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

## Thermal-Mechanical Specifications

<table>
<thead>
<tr>
<th>Parameters</th>
<th>MBR.735</th>
<th>Units</th>
<th>Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>$T_J$ Max. Junction Temperature Range</td>
<td>-65 to 150</td>
<td>°C</td>
<td></td>
</tr>
<tr>
<td>$T_{stg}$ Max. Storage Temperature Range</td>
<td>-65 to 175</td>
<td>°C</td>
<td></td>
</tr>
<tr>
<td>$R_{JUC}$ Max. Thermal Resistance Junction to Case</td>
<td>3.0</td>
<td>°C/W</td>
<td>DC operation</td>
</tr>
<tr>
<td>$R_{JCS}$ Typical Thermal Resistance, Case to HeatSink</td>
<td>0.5</td>
<td>°C/W</td>
<td>Mounting surface, smooth and greased</td>
</tr>
<tr>
<td>$w$ Approximate Weight</td>
<td>2 (0.07)</td>
<td>g (oz.)</td>
<td></td>
</tr>
<tr>
<td>$T$ Mounting Torque</td>
<td>6 (5)</td>
<td>Kg-cm (lbf-in)</td>
<td>Min.</td>
</tr>
<tr>
<td></td>
<td>12 (10)</td>
<td>Kg-cm (lbf-in)</td>
<td>Max.</td>
</tr>
<tr>
<td>Marking Device</td>
<td>MBR745</td>
<td>Case Style TO-220</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MBR8745</td>
<td>Case Style D²Pak</td>
<td></td>
</tr>
</tbody>
</table>

www.irf.com
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:

\[ T_C = T_J - (P_d + P_{d,REV}) \times R_{th,JC} \]

\[ P_d = \text{Forward Power Loss} = I_{AV} \times V_{FM} \times \left( \frac{I_{AV}}{D} \right) \text{ (see Fig. 6)} \]

\[ P_{d,REV} = \text{Inverse Power Loss} = V_{RRM} \times I_R (1 - D) \text{; } I_R \text{ @ } V_{RRM} = \text{rated } V_R \]
Outline Table

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

Conform to JEDEC outline D²Pak (SMD-220)
Dimensions in millimeters and (inches)
Part Marking Information

TO-220AC

EXAMPLE: THIS IS A MBR745
LOT CODE 1789
ASSEMBLED ON WW 19, 2001
IN THE ASSEMBLY LINE "C"

INTERNATIONAL RECTIFIER
LOGO

PART NUMBER

DATE CODE
YEAR 1 = 2001
WEEK 19
LINE C

ASSEMBLY
LOT CODE

MBR745
17 89

RECTIFIER
EXAMPLE:

IN THE ASSEMBLY LINE "C"

ASSEMBLED ON WW 19, 2001
LOT CODE 1789

INTERNATIONAL RECTIFIER
LOGO

PART NUMBER

DATE CODE
YEAR 1 = 2001
WEEK 19
LINE C

ASSEMBLY
LOT CODE

MBR745
17 89

RECTIFIER

D^2Pak

EXAMPLE: THIS IS A MBR745
LOT CODE 8024
ASSEMBLED ON WW 02, 2000

INTERNATIONAL RECTIFIER
LOGO

PART NUMBER

DATE CODE
YEAR 0 = 2000
WEEK 02
LINE C

ASSEMBLY
LOT CODE

MBR745
17 89

RECTIFIER

Tape & Reel Information

Dimensions in millimeters and (inches)
### Ordering Information Table

<table>
<thead>
<tr>
<th>Device Code</th>
<th>MBR</th>
<th>B</th>
<th>7</th>
<th>45</th>
<th>TRL</th>
<th>-</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. Schottky MBR Series
2. Package Style:
   - none = TO-220
   - B = D²PAk
3. Current Rating (7.5A)
4. Voltage Ratings
   - none = Tube
   - TRR = Tape & Reel (Right Oriented)
   - TRL = Tape & Reel (Left Oriented)
5. - none = Standard Production
   - PbF = Lead-Free

### Device Codes

- 35 = 35V
- 45 = 45V

*www.irf.com*
* 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 paralleled VCG2T

.SUBCKT MBR745 ANO CAT
D1 ANO 1 DMOD (0.03191)
.MODEL DMOD D(IS=9.72464638473799E-05A,N=1.30648926537753,BV=52V,
+ IBV=0.195508065728349A,RS= 0.000727548,CJO=1.94829878431799E-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
CTERM1 5 4 1.05E+00
CTERM2 4 3 4.44E+00
CTERM3 3 2 1.16E+01
CTERM4 2 1 6.12E+01
RTERM1 5 4 1.33E+00
RTERM2 4 3 1.19E+00
RTERM3 3 2 3.81E-01
RTERM1 2 1 9.54E-02

.ENDS MBR745

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.

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