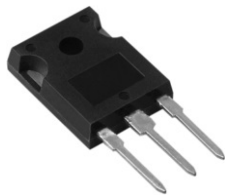
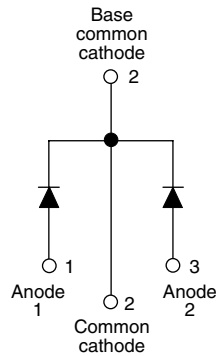


## Schottky Rectifier, 2 x 30 A


**TO-247AC**


### FEATURES

- 150 °C  $T_J$  operation
- Center tap TO-247 package
- Very low forward voltage drop
- High frequency operation
- High purity, high temperature epoxy encapsulation for enhanced mechanical strength and moisture resistance
- Guard ring for enhanced ruggedness and long term reliability
- Lead (Pb)-free ("PbF" suffix)
- Designed and qualified for industrial level


**RoHS\***  
COMPLIANT

### PRODUCT SUMMARY

|             |          |
|-------------|----------|
| $I_{F(AV)}$ | 2 x 30 A |
| $V_R$       | 45 V     |

### DESCRIPTION

The MBR6045WTPbF center tap Schottky rectifier has been optimized for very low forward voltage drop, with moderate leakage. The proprietary barrier technology allows for reliable operation up to 150 °C junction temperature. Typical applications are in switching power supplies, converters, freewheeling diodes, and reverse battery protection.

### MAJOR RATINGS AND CHARACTERISTICS

| SYMBOL      | CHARACTERISTICS                                      | VALUES      | UNITS            |
|-------------|--|-------------|------------------|
| $I_{F(AV)}$ | Rectangular waveform                                 | 60          | A                |
| $V_{RRM}$   |  | 45          | V                |
| $I_{FSM}$   | $t_p = 5 \mu s$ sine                                 | 2900        | A                |
| $V_F$       | 30 Apk, $T_J = 125 \text{ }^\circ\text{C}$ (per leg) | 0.55        | V                |
| $T_J$       |  | - 55 to 150 | $^\circ\text{C}$ |

### VOLTAGE RATINGS

| PARAMETER                            | SYMBOL    | MBR6045WTPbF | UNITS |
|--------------------------------------|-----------|--------------|-------|
| Maximum DC reverse voltage           | $V_R$     | 45           | V     |
| Maximum working peak reverse voltage | $V_{RWM}$ |              |       |

### ABSOLUTE MAXIMUM RATINGS

| PARAMETER   | SYMBOL      | TEST CONDITIONS   | VALUES | UNITS |
|---|-------------|---|--------|-------|
| Maximum average forward current<br>See fig. 5                             | $I_{F(AV)}$ | 50 % duty cycle at $T_C = 122 \text{ }^\circ\text{C}$ , rectangular waveform  | 30     | A     |
|   |             |   | 60     |       |
| Maximum peak one cycle non-repetitive surge current per leg<br>See fig. 7 | $I_{FSM}$   | 5 $\mu s$ sine or 3 $\mu s$ rect. pulse   | 2900   |       |
|   |             | 10 ms sine or 6 ms rect. pulse  | 360    |       |
| Non-repetitive avalanche energy per leg                                   | $E_{AS}$    | $T_J = 25 \text{ }^\circ\text{C}$ , $I_{AS} = 4 \text{ A}$ , $L = 3.4 \text{ mH}$                                   | 27     | mJ    |
| Repetitive avalanche current per leg                                      | $I_{AR}$    | Current decaying linearly to zero in 1 $\mu s$<br>Frequency limited by $T_J$ maximum $V_A = 1.5 \times V_R$ typical | 6      | A     |

\* Pb containing terminations are not RoHS compliant, exemptions may apply

| ELECTRICAL SPECIFICATIONS                             |                |  |                                   |        |            |
|---|----------------|--|-----------------------------------|--------|------------|
| PARAMETER   | SYMBOL         | TEST CONDITIONS  |                                   | VALUES | UNITS      |
| Maximum forward voltage drop per leg<br>See fig. 1    | $V_{FM}^{(1)}$ | 30 A   | $T_J = 25\text{ }^\circ\text{C}$  | 0.62   | V          |
|   |                | 60 A   |                                   | 0.75   |            |
|   |                | 30 A   | $T_J = 125\text{ }^\circ\text{C}$ | 0.55   |            |
| Maximum reverse leakage current per leg<br>See fig. 2 | $I_{RM}^{(1)}$ | $T_J = 25\text{ }^\circ\text{C}$   | $V_R = \text{Rated } V_R$         | 1      | mA         |
|   |                | $T_J = 125\text{ }^\circ\text{C}$  |                                   | 150    |            |
| Threshold voltage                                     | $V_{F(TO)}$    | $T_J = T_J \text{ maximum}$  |                                   | 0.27   | V          |
| Forward slope resistance                              | $r_f$          |  |                                   | 7.3    | m $\Omega$ |
| Maximum junction capacitance per leg                  | $C_T$          | $V_R = 5 V_{DC}$ (test signal range 100 kHz to 1 MHz) $25\text{ }^\circ\text{C}$ |                                   | 1400   | pF         |
| Typical series inductance per leg                     | $L_S$          | Measured lead to lead 5 mm from package body                                     |                                   | 7.5    | nH         |
| Maximum voltage rate of change                        | dV/dt          | Rated $V_R$  |                                   | 10 000 | V/ $\mu$ s |

**Note**

(1) Pulse width < 300  $\mu$ s, duty cycle < 2 %

| THERMAL - MECHANICAL SPECIFICATIONS                      |                |                                      |  |             |                        |
|--|----------------|--------------------------------------|--|-------------|------------------------|
| PARAMETER  | SYMBOL         | TEST CONDITIONS                      |  | VALUES      | UNITS                  |
| Maximum junction and storage temperature range           | $T_J, T_{Stg}$ |                                      |  | - 55 to 150 | $^\circ\text{C}$       |
| Maximum thermal resistance, junction to case per leg     | $R_{thJC}$     | DC operation<br>See fig. 4           |  | 1.0         | $^\circ\text{C/W}$     |
| Maximum thermal resistance, junction to case per package |                | DC operation                         |  | 0.5         |                        |
| Typical thermal resistance, case to heatsink             | $R_{thCS}$     | Mounting surface, smooth and greased |  | 0.24        |                        |
| Approximate weight                                       |                |                                      |  | 6           | g                      |
|  |                |                                      |  | 0.21        | oz.                    |
| Mounting torque  | minimum        |                                      |  | 6 (5)       | kgf · cm<br>(lbf · in) |
|  | maximum        |                                      |  | 12 (10)     |                        |
| Marking device   |                | Case style TO-247AC (JEDEC)          |  | MBR6045WT   |                        |

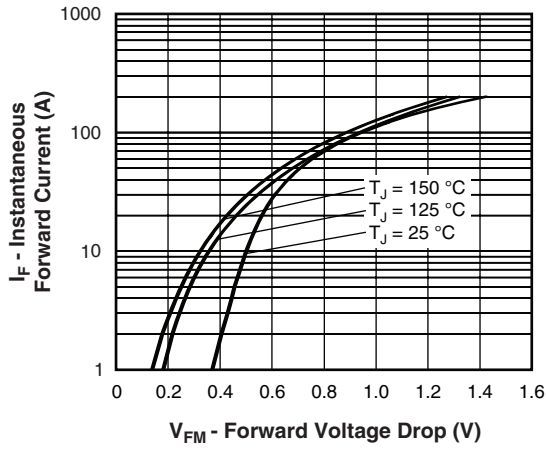


Fig. 1 - Maximum Forward Voltage Drop Characteristics (Per Leg)

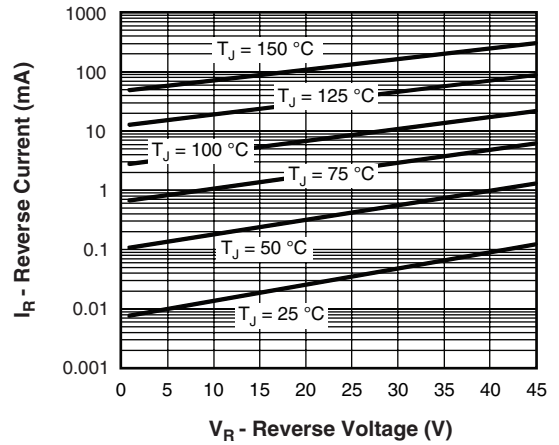


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage (Per Leg)

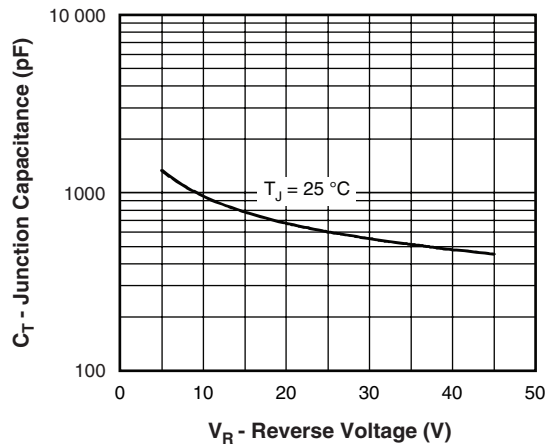


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Leg)

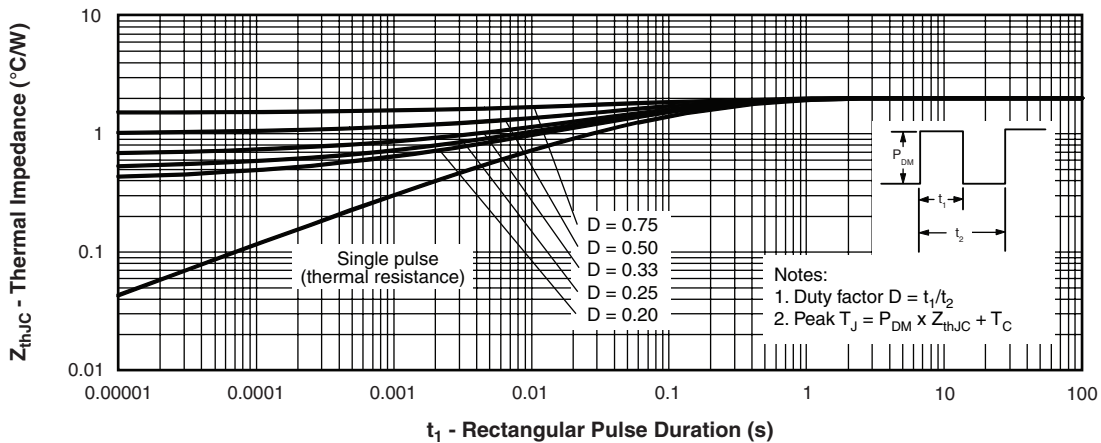


Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics (Per Leg)

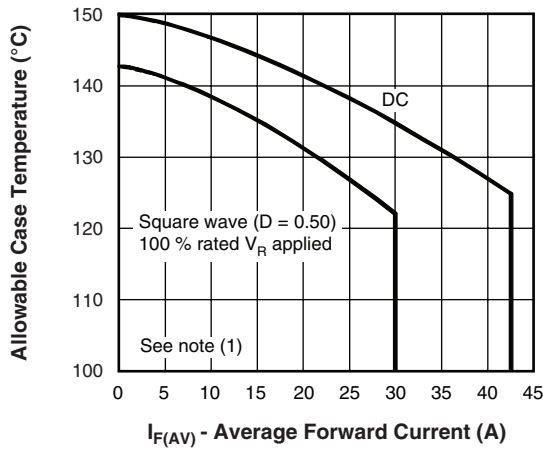


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current (Per Leg)

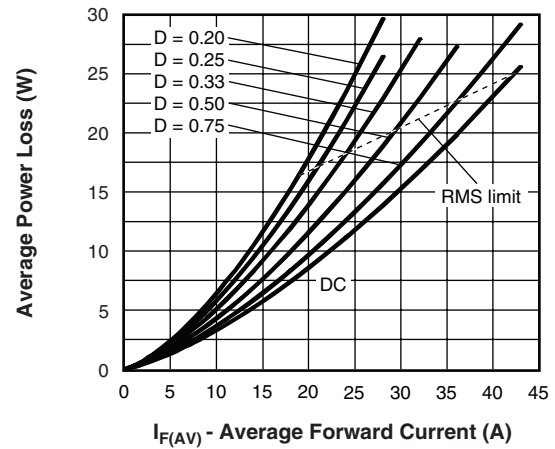


Fig. 6 - Forward Power Loss Characteristics (Per Leg)

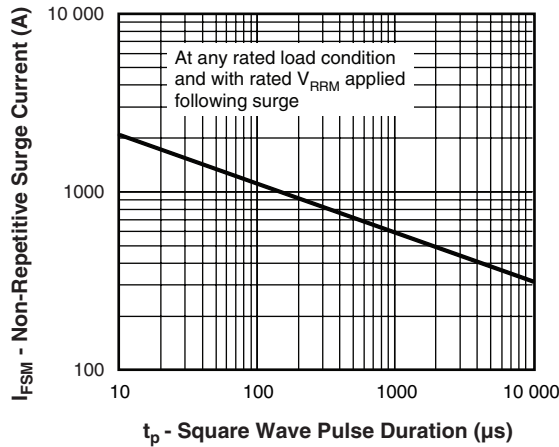


Fig. 7 - Maximum Non-Repetitive Surge Current (Per Leg)



Fig. 8 - Unclamped Inductive Test Circuit

**Note**

- (1) Formula used:  $T_C = T_J - (P_d + P_{d_{REV}}) \times R_{thJC}$ ;  
 $P_d$  = Forward power loss =  $I_{F(AV)} \times V_{FM}$  at  $(I_{F(AV)}/D)$  (see fig. 6);  
 $P_{d_{REV}}$  = Inverse power loss =  $V_{R1} \times I_R (1 - D)$ ;  $I_R$  at  $V_{R1} = 100\%$  rated  $V_R$



**ORDERING INFORMATION TABLE**

|             |            |   |           |           |            |
|-------------|------------|---|-----------|-----------|------------|
| Device code | <b>MBR</b> | <b>60</b>   | <b>45</b> | <b>WT</b> | <b>PbF</b> |
|             | ①          | ②   | ③         | ④         | ⑤          |
| <b>1</b>    | -          | Schottky MBR series   |           |           |            |
| <b>2</b>    | -          | Current rating (60 = 60 A)  |           |           |            |
| <b>3</b>    | -          | Voltage rating (45 = 45 V)  |           |           |            |
| <b>4</b>    | -          | Circuit configuration:<br>Center tap (dual) TO-247  |           |           |            |
| <b>5</b>    | -          | <ul style="list-style-type: none"><li>• None = Standard production</li><li>• PbF = Lead (Pb)-free</li></ul> |           |           |            |

| LINKS TO RELATED DOCUMENTS |   |
|----------------------------|---|
| Dimensions                 | <a href="http://www.vishay.com/doc?95223">http://www.vishay.com/doc?95223</a> |
| Part marking information   | <a href="http://www.vishay.com/doc?95226">http://www.vishay.com/doc?95226</a> |



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