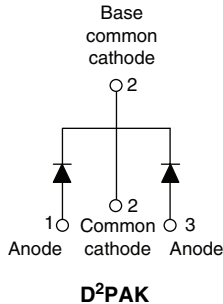
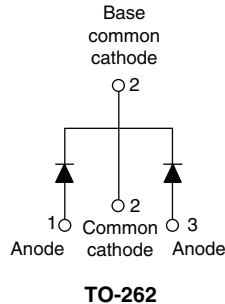
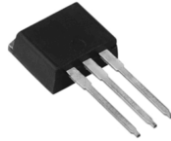


## Schottky Rectifier, 2 x 10 A

MBRB20..CTPbF



MBR20..CT-1PbF



### FEATURES

- 150 °C T<sub>J</sub> operation
- Center tap D<sup>2</sup>PAK and TO-262 packages
- 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
- Compliant to RoHS directive 2002/95/EC
- Halogen-free according to IEC 61249-2-21 definition
- AEC-Q101 qualified



**RoHS\***  
COMPLIANT  
HALOGEN  
**FREE**

### DESCRIPTION

This center tap 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, freewheeling diodes, and reverse battery protection.

### PRODUCT SUMMARY

|                    |                 |
|--------------------|-----------------|
| I <sub>F(AV)</sub> | 2 x 10 A        |
| V <sub>R</sub>     | 35 V/45 V       |
| I <sub>RM</sub>    | 15 mA at 125 °C |

### MAJOR RATINGS AND CHARACTERISTICS

| SYMBOL             | CHARACTERISTICS                   | VALUES      | UNITS |
|--------------------|-----------------------------------|-------------|-------|
| I <sub>F(AV)</sub> | Rectangular waveform (per device) | 20          | A     |
| I <sub>FRM</sub>   | T <sub>C</sub> = 135 °C (per leg) | 20          |       |
| V <sub>R</sub>     |                                   | 35/45       | V     |
| I <sub>FSM</sub>   | t <sub>p</sub> = 5 μs sine        | 1060        | A     |
| V <sub>F</sub>     | 10 Apk, T <sub>J</sub> = 125 °C   | 0.57        | V     |
| T <sub>J</sub>     | Range                             | - 65 to 150 | °C    |

### VOLTAGE RATINGS

| PARAMETER                            | SYMBOL           | MBRB2035CTPbF<br>MBR2035CT-1PbF | MBRB2045CTPbF<br>MBR2045CT-1PbF | UNITS |
|--------------------------------------|------------------|---------------------------------|---------------------------------|-------|
| Maximum DC reverse voltage           | V <sub>R</sub>   | 35                              | 45                              | V     |
| Maximum working peak reverse voltage | V <sub>RWM</sub> |                                 |                                 |       |

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

# MBRB20..CTPbF, MBR20..CT-1PbF



Vishay High Power Products Schottky Rectifier, 2 x 10 A

| ABSOLUTE MAXIMUM RATINGS                                 |             |                                                                                                                           |                                                                     |        |       |
|----------------------------------------------------------|-------------|---------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------|--------|-------|
| PARAMETER                                                | SYMBOL      | TEST CONDITIONS                                                                                                           |                                                                     | VALUES | UNITS |
| Maximum average forward current<br>per leg<br>per device | $I_{F(AV)}$ | $T_C = 135\text{ }^\circ\text{C}$ , rated $V_R$                                                                           |                                                                     | 10     | A     |
|                                                          |             |                                                                                                                           |                                                                     | 20     |       |
| Peak repetitive forward current per leg                  | $I_{FRM}$   | Rated $V_R$ , square wave, 20 kHz, $T_C = 135\text{ }^\circ\text{C}$                                                      |                                                                     | 20     |       |
| Non-repetitive peak surge current                        | $I_{FSM}$   | 5 $\mu\text{s}$ sine or 3 $\mu\text{s}$ rect. pulse                                                                       | Following any rated load condition and with rated $V_{RRM}$ applied | 1060   |       |
|                                                          |             | Surge applied at rated load conditions halfwave, single phase, 60 Hz                                                      |                                                                     | 150    |       |
| Non-repetitive avalanche energy per leg                  | $E_{AS}$    | $T_J = 25\text{ }^\circ\text{C}$ , $I_{AS} = 2\text{ A}$ , $L = 4\text{ mH}$                                              |                                                                     | 8      | mJ    |
| Repetitive avalanche current per leg                     | $I_{AR}$    | Current decaying linearly to zero in 1 $\mu\text{s}$<br>Frequency limited by $T_J$ maximum $V_A = 1.5 \times V_R$ typical |                                                                     | 2      | A     |

| ELECTRICAL SPECIFICATIONS             |                |                                                                                         |                                   |        |                  |
|---------------------------------------|----------------|-----------------------------------------------------------------------------------------|-----------------------------------|--------|------------------|
| PARAMETER                             | SYMBOL         | TEST CONDITIONS                                                                         |                                   | VALUES | UNITS            |
| Maximum forward voltage drop          | $V_{FM}^{(1)}$ | 20 A                                                                                    | $T_J = 25\text{ }^\circ\text{C}$  | 0.84   | V                |
|                                       |                | 10 A                                                                                    | $T_J = 125\text{ }^\circ\text{C}$ | 0.57   |                  |
|                                       |                | 20 A                                                                                    |                                   | 0.72   |                  |
| Maximum instantaneous reverse current | $I_{RM}^{(1)}$ | $T_J = 25\text{ }^\circ\text{C}$                                                        | Rated DC voltage                  | 0.1    | mA               |
|                                       |                | $T_J = 125\text{ }^\circ\text{C}$                                                       |                                   | 15     |                  |
| Threshold voltage                     | $V_{F(TO)}$    | $T_J = T_J$ maximum                                                                     |                                   | 0.354  | V                |
| Forward slope resistance              | $r_f$          |                                                                                         |                                   | 17.6   | m $\Omega$       |
| Maximum junction capacitance          | $C_T$          | $V_R = 5\text{ V}_{DC}$ (test signal range 100 kHz to 1 MHz) $25\text{ }^\circ\text{C}$ |                                   | 600    | pF               |
| Typical series inductance             | $L_S$          | Measured from top of terminal to mounting plane                                         |                                   | 8.0    | nH               |
| Maximum voltage rate of change        | dV/dt          | Rated $V_R$                                                                             |                                   | 10 000 | V/ $\mu\text{s}$ |

**Note**

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

| THERMAL - MECHANICAL SPECIFICATIONS                  |            |                                      |  |             |                        |
|------------------------------------------------------|------------|--------------------------------------|--|-------------|------------------------|
| PARAMETER                                            | SYMBOL     | TEST CONDITIONS                      |  | VALUES      | UNITS                  |
| Maximum junction temperature range                   | $T_J$      |                                      |  | - 65 to 150 | $^\circ\text{C}$       |
| Maximum storage temperature range                    | $T_{Stg}$  |                                      |  | - 65 to 175 |                        |
| Maximum thermal resistance, junction to case per leg | $R_{thJC}$ | DC operation                         |  | 2.0         | $^\circ\text{C/W}$     |
| Typical thermal resistance, case to heatsink         | $R_{thCS}$ | Mounting surface, smooth and greased |  | 0.50        |                        |
| Approximate weight                                   |            |                                      |  | 2           | g                      |
|                                                      |            |                                      |  | 0.07        | oz.                    |
| Mounting torque<br>minimum<br>maximum                |            | Non-lubricated threads               |  | 6 (5)       | kgf · cm<br>(lbf · in) |
|                                                      |            |                                      |  | 12 (10)     |                        |
| Marking device                                       |            | Case style D <sup>2</sup> PAK        |  | MBRB2045CT  |                        |
|                                                      |            | Case style TO-262                    |  | MBR2045CT-1 |                        |

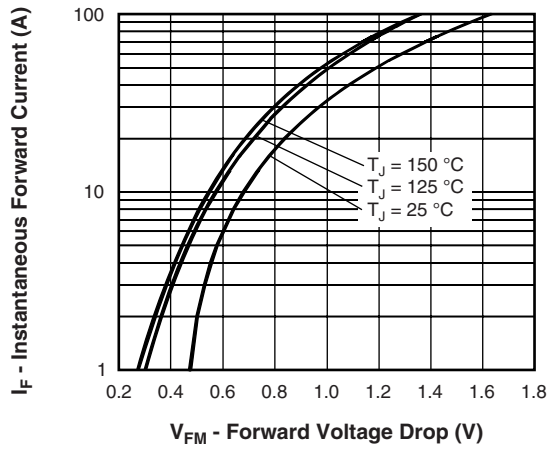


Fig. 1 - Maximum Forward Voltage Drop Characteristics (Per Leg)

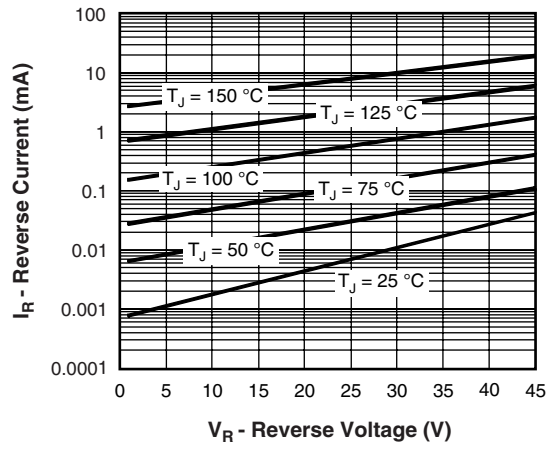


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage (Per Leg)

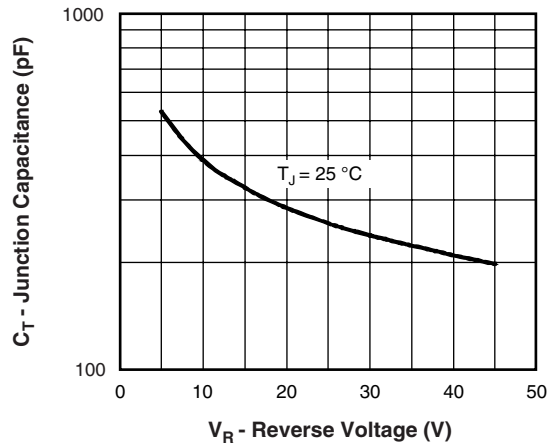


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Leg)

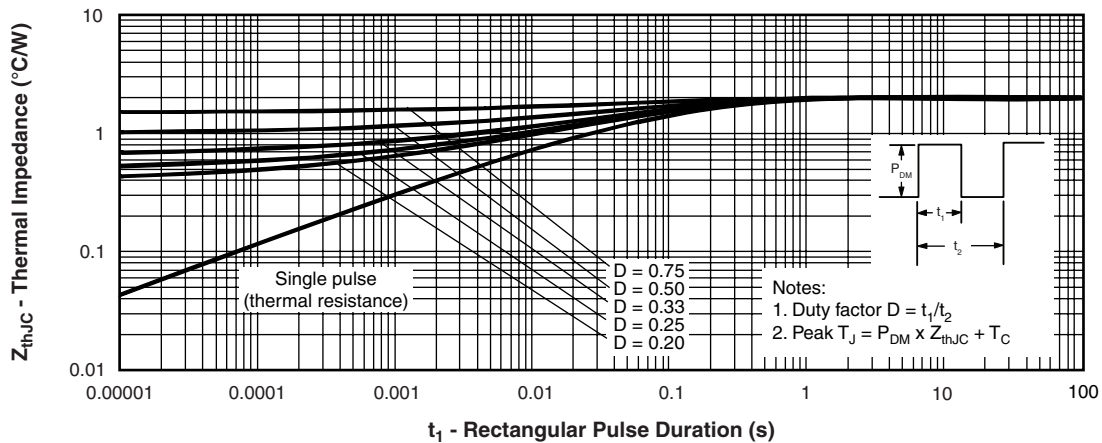


Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics (Per Leg)

# MBRB20..CTPbF, MBR20..CT-1PbF



Vishay High Power Products Schottky Rectifier, 2 x 10 A

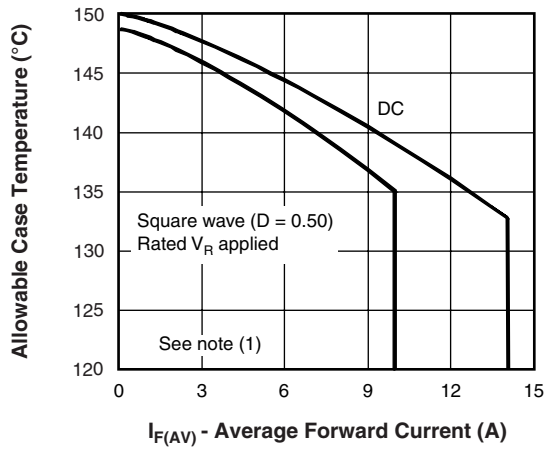


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current (Per Leg)

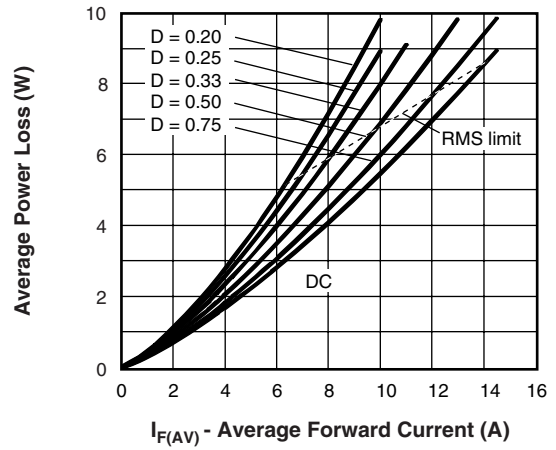


Fig. 6 - Forward Power Loss Characteristics (Per Leg)

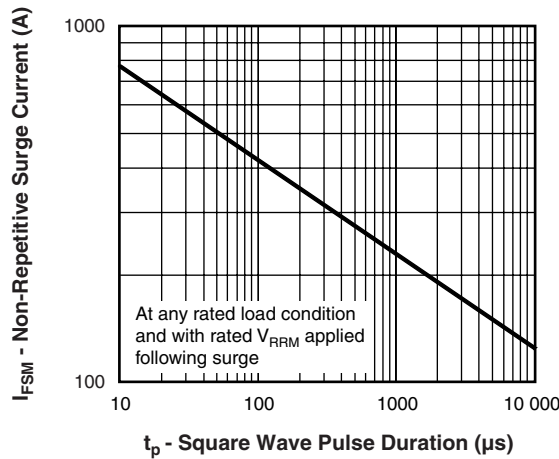


Fig. 7 - Maximum Non-Repetitive Surge Current (Per Leg)

**Note**

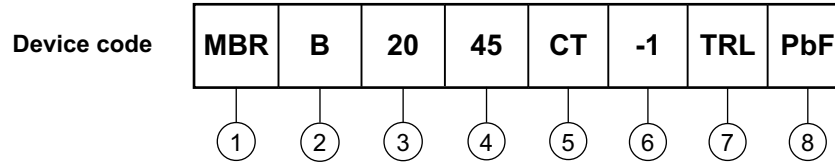
- (1) Formula used:  $T_C = T_J - (P_d + P_{d_{REV}}) \times R_{thJC}$ ;  
 $P_d$  = Forward power loss =  $I_{F(AV)} \times V_{FM}$  at  $(I_{F(AV)}/D)$  (see fig. 6);  
 $P_{d_{REV}}$  = Inverse power loss =  $V_{R1} \times I_R (1 - D)$ ;  $I_R$  at  $V_{R1}$  = Rated  $V_R$



# MBRB20..CTPbF, MBR20..CT-1PbF

Schottky Rectifier, 2 x 10 A Vishay High Power Products

## ORDERING INFORMATION TABLE



- 1** - Essential part number
- 2** -
  - B = D<sup>2</sup>PAK      **6** None
  - None = TO-262    **6** = -1
- 3** - Current rating (20 = 20 A)
- 4** - Voltage ratings
 

|           |
|-----------|
| 35 = 35 V |
| 45 = 45 V |
- 5** - CT = Essential part number
- 6** -
  - None = D<sup>2</sup>PAK    **2** = B
  - -1 = TO-262    **2** None
- 7** -
  - None = Tube (50 pieces)
  - TRL = Tape and reel (left oriented - for D<sup>2</sup>PAK only)
  - TRR = Tape and reel (right oriented - for D<sup>2</sup>PAK only)
- 8** -
  - None = Standard production
  - PbF = Lead (Pb)-free (for TO-262 and D<sup>2</sup>PAK tube)
  - P = Lead (Pb)-free (for D<sup>2</sup>PAK TRR and TRL)

| LINKS TO RELATED DOCUMENTS |                                                                        |
|----------------------------|------------------------------------------------------------------------|
| Dimensions                 | <a href="http://www.vishay.com/doc?95014">www.vishay.com/doc?95014</a> |
| Part marking information   | <a href="http://www.vishay.com/doc?95008">www.vishay.com/doc?95008</a> |
| Packaging information      | <a href="http://www.vishay.com/doc?95032">www.vishay.com/doc?95032</a> |



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