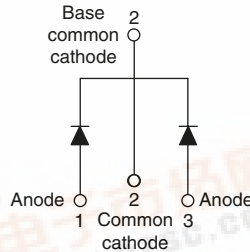


Schottky Rectifier, 2 x 20 A



TO-220AB



FEATURES

- 150 °C T_J operation
- Center tap TO-220, D²PAK 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
- Lead (Pb)-free ("PbF" suffix)
- Designed and qualified for industrial level



RoHS*
COMPLIANT

PRODUCT SUMMARY

| | |
|-------------|----------|
| $I_{F(AV)}$ | 2 x 20 A |
| V_R | 45 V |

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.

MAJOR RATINGS AND CHARACTERISTICS

| SYMBOL | CHARACTERISTICS | VALUES | UNITS |
|-------------|-----------------------------------|-------------|-------|
| $I_{F(AV)}$ | Rectangular waveform (per device) | 40 | A |
| V_{RRM} | | 45 | V |
| I_{FRM} | $T_C = 118\text{ °C}$ (per leg) | 40 | A |
| I_{FSM} | $t_p = 5\text{ }\mu\text{s}$ sine | 900 | A |
| V_F | 20 Apk, $T_J = 125\text{ °C}$ | 0.58 | V |
| T_J | Range | - 65 to 150 | °C |

VOLTAGE RATINGS

| PARAMETER | SYMBOL | MBR4045CTPbF | 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 | $I_{F(AV)}$ | $T_C = 118\text{ °C}$, rated V_R | 20 40 | A |
| Peak repetitive forward current per leg | I_{FRM} | Rated V_R , square wave, 20 kHz, $T_C = 118\text{ °C}$ | 40 | |
| Maximum peak one cycle non-repetitive surge current per leg | I_{FSM} | 5 μs sine or 3 μs rect. pulse | 900 | |
| | | 10 ms sine or 6 ms rect. pulse | 210 | |
| Non-repetitive avalanche energy per leg | E_{AS} | $T_J = 25\text{ °C}$, $I_{AS} = 3\text{ A}$, $L = 4.40\text{ mH}$ | 20 | mJ |
| Repetitive avalanche current per leg | I_{AR} | Current decaying linearly to zero in 1 μs Frequency limited by T_J maximum $V_A = 1.5 \times V_R$ typical | 3 | A |

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

| ELECTRICAL SPECIFICATIONS | | | | |
|---------------------------------------|----------------|---|-----------------------|------------|
| PARAMETER | SYMBOL | TEST CONDITIONS | VALUES | UNITS |
| Maximum forward voltage drop | $V_{FM}^{(1)}$ | 20 A | $T_J = 25\text{ °C}$ | 0.60 |
| | | 40 A | | 0.78 |
| | | 20 A | $T_J = 125\text{ °C}$ | 0.58 |
| | | 40 A | | 0.75 |
| Maximum instantaneous reverse current | $I_{RM}^{(1)}$ | $T_J = 25\text{ °C}$ | Rated DC voltage | 1 |
| | | $T_J = 100\text{ °C}$ | | 50 |
| | | $T_J = 125\text{ °C}$ | | 95 |
| Maximum junction capacitance | C_T | $V_R = 5\text{ V}_{DC}$, (test signal range 100 kHz to 1 MHz) 25 °C | 900 | 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/ μ s |

Note

⁽¹⁾ Pulse width < 300 μ s, duty cycle < 2 %

| THERMAL - MECHANICAL SPECIFICATIONS | | | | |
|--|-------------------|--|-------------|---------------------|
| PARAMETER | SYMBOL | TEST CONDITIONS | VALUES | UNITS |
| Maximum junction temperature range | T _J | | - 65 to 150 | °C |
| Maximum storage temperature range | T _{Stg} | | - 65 to 175 | |
| Maximum thermal resistance, junction to case per leg | R _{thJC} | DC operation | 1.5 | °C/W |
| Typical thermal resistance, case to heatsink | R _{thCS} | Mounting surface, smooth and greased (Only for TO-220) | 0.50 | |
| Maximum thermal resistance, junction to ambient | R _{thJA} | DC operation (For D ² PAK and TO-262) | 50 | |
| Approximate weight | | | 2 | g |
| | | | 0.07 | oz. |
| Mounting torque | minimum | Non-lubricated threads | 6 (5) | kgf · cm (lbf · in) |
| | maximum | | 12 (10) | |
| Marking device | | Case style TO-220AB | MBR4045CT | |

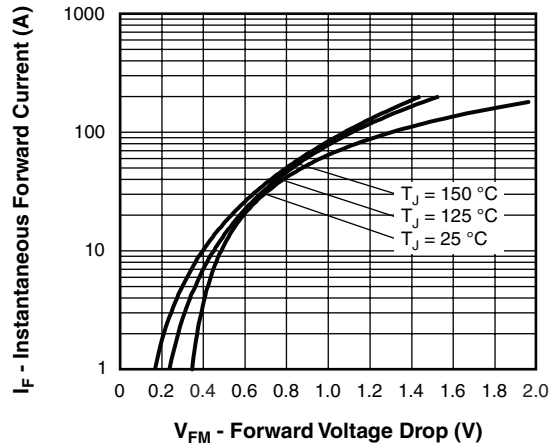


Fig. 1 - Maximum Forward Voltage Drop Characteristics (Per Leg)

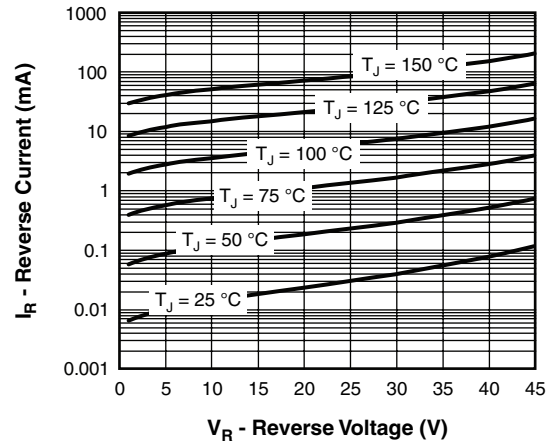


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage (Per Leg)

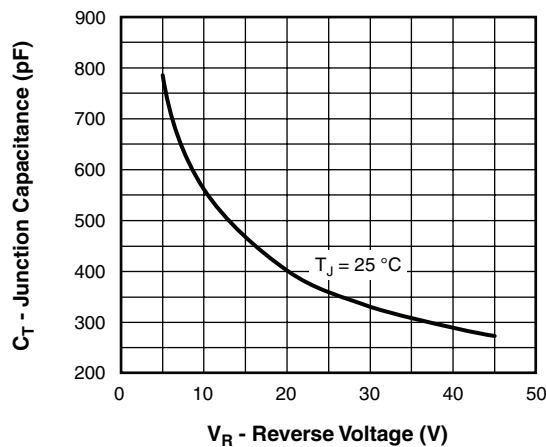


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Leg)

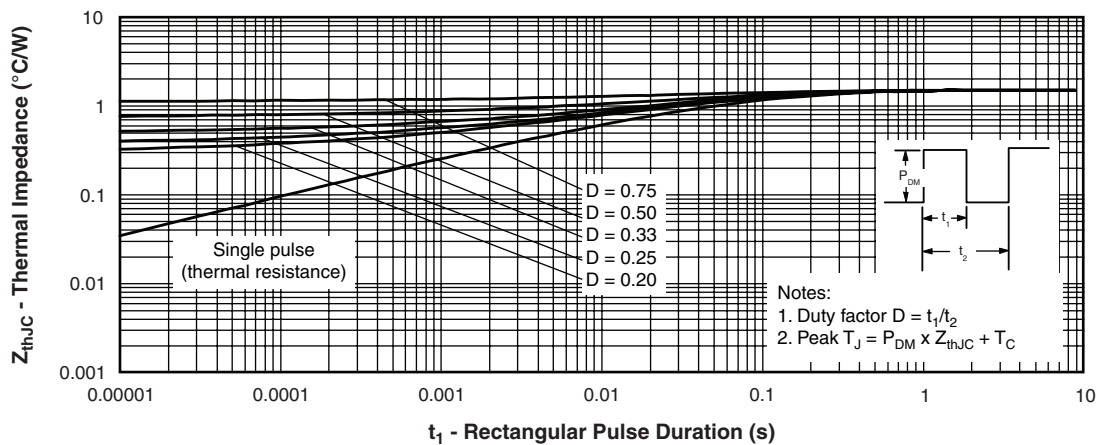


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics (Per Leg)

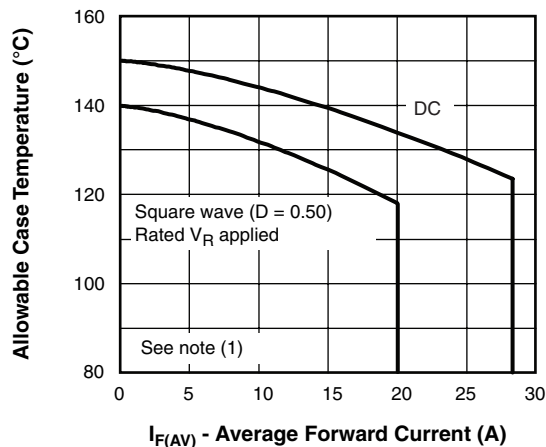


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

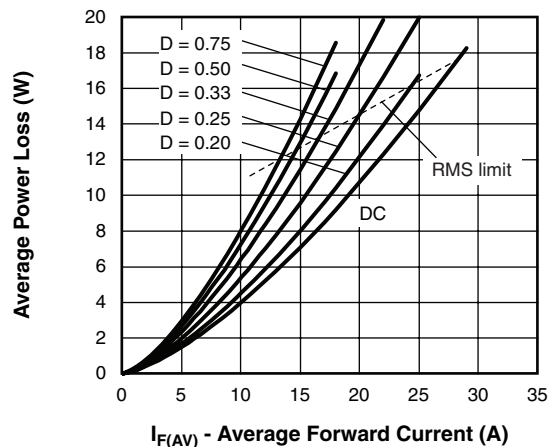


Fig. 6 - Forward Power Loss Characteristics

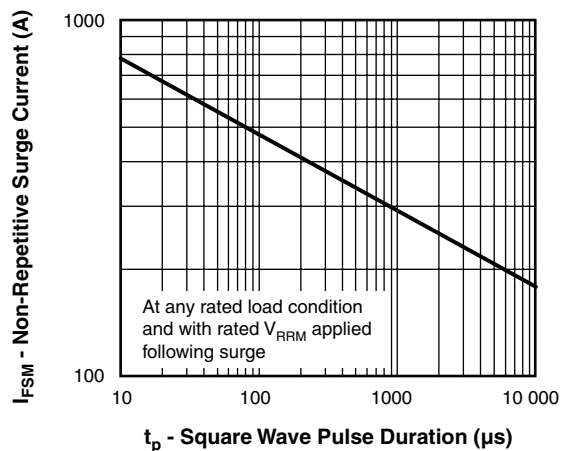


Fig. 7 - Maximum Non-Repetitive Surge Current (Per Leg)

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

ORDERING INFORMATION TABLE

| | | | | | |
|-------------|------------|-----------|-----------|-----------|------------|
| Device code | MBR | 40 | 45 | CT | PbF |
| | ① | ② | ③ | ④ | ⑤ |

- | | | |
|---|---|--|
| 1 | - | Schottky MBR series |
| 2 | - | Current rating (40 = 40 A) |
| 3 | - | Voltage rating (45 = 45 V) |
| 4 | - | CT = Essential part number |
| 5 | - | <ul style="list-style-type: none"> • None = Standard production • PbF = Lead (Pb)-free |

| LINKS TO RELATED DOCUMENTS | |
|----------------------------|---|
| Dimensions | http://www.vishay.com/doc?95222 |
| Part marking information | http://www.vishay.com/doc?95225 |
| SPICE model | http://www.vishay.com/doc?95296 |

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