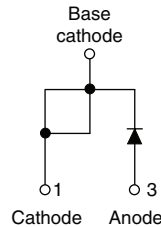


## High Performance Schottky Generation 5.0, 10 A


**TO-220AC**

**FEATURES**

- 175 °C high performance Schottky diode
- Very low forward voltage drop
- Extremely low reverse leakage
- Optimized  $V_F$  vs.  $I_F$  trade off for high efficiency
- Increased ruggedness for reverse avalanche capability
- RBSOA available
- Negligible switching losses
- Submicron trench technology
- Full lead (Pb)-free and RoHS compliant devices
- Designed and qualified for industrial level


**RoHS  
COMPLIANT**
**PRODUCT SUMMARY**

|                         |        |
|-------------------------|--------|
| $I_{F(AV)}$             | 10 A   |
| $V_R$                   | 100 V  |
| $V_F$ at 10 A at 125 °C | 0.68 V |

**APPLICATIONS**

- High efficiency SMPS
- Automotive
- High frequency switching
- Output rectification
- Reverse battery protection
- Freewheeling
- Dc-to-dc systems
- Increased power density systems

**MAJOR RATINGS AND CHARACTERISTICS**

| SYMBOL    | CHARACTERISTICS                  | VALUES      | UNITS |
|-----------|----------------------------------|-------------|-------|
| $V_{RRM}$ |                                  | 100         | V     |
| $V_F$     | 10 Apk, $T_J = 125$ °C (typical) | 0.62        |       |
| $T_J$     | Range                            | - 55 to 175 | °C    |

**VOLTAGE RATINGS**

| PARAMETER                  | SYMBOL | TEST CONDITIONS | MBR10T100 | UNITS |
|----------------------------|--------|-----------------|-----------|-------|
| Maximum DC reverse voltage | $V_R$  | $T_J = 25$ °C   | 100       | V     |

**ABSOLUTE MAXIMUM RATINGS**

| PARAMETER   | SYMBOL      | TEST CONDITIONS  | VALUES  | UNITS |
|---|-------------|--|---|-------|
| Maximum average forward current                     | $I_{F(AV)}$ | 50 % duty cycle at $T_C = 159$ °C, rectangular waveform  | 10  | A     |
| Maximum peak one cycle non-repetitive surge current | $I_{FSM}$   | 5 $\mu$ s sine or 3 $\mu$ s rect. pulse  | Following any rated load condition and with rated $V_{RRM}$ applied | 850   |
|   |             | 10 ms sine or 6 ms rect. pulse   |   | 200   |
| Non-repetitive avalanche energy                     | $E_{AS}$    | $T_J = 25$ °C, $I_{AS} = 3$ A, $L = 12$ mH   | 54  | mJ    |
| Repetitive avalanche current                        | $I_{AR}$    | Limited by frequency of operation and time pulse duration so that $T_J < T_{J \text{ max}}$ . $I_{AS}$ at $T_J \text{ max}$ . as a function of time pulse See fig. 8 | $I_{AS}$ at $T_J \text{ max}$ .                                     | A     |



| ELECTRICAL SPECIFICATIONS       |                |  |                                   |      |        |                  |
|---------------------------------|----------------|--|-----------------------------------|------|--------|------------------|
| PARAMETER                       | SYMBOL         | TEST CONDITIONS  |                                   | TYP. | MAX.   | UNITS            |
| Forward voltage drop per leg    | $V_{FM}^{(1)}$ | 10 A   | $T_J = 25\text{ }^\circ\text{C}$  | -    | 0.79   | V                |
|                                 |                | 20 A   |                                   | -    | 0.88   |                  |
|                                 |                | 10 A   | $T_J = 125\text{ }^\circ\text{C}$ | -    | 0.68   |                  |
|                                 |                | 20 A   |                                   | -    | 0.8    |                  |
| Reverse leakage current per leg | $I_{RM}^{(1)}$ | $T_J = 25\text{ }^\circ\text{C}$   | $V_R = \text{Rated } V_R$         | -    | 100    | $\mu\text{A}$    |
|                                 |                | $T_J = 125\text{ }^\circ\text{C}$  |                                   | -    | 4      | mA               |
| Junction capacitance per leg    | $C_T$          | $V_R = 5 V_{DC}$ (test signal range 100 kHz to 1 MHz) $25\text{ }^\circ\text{C}$ |                                   | 400  | -      | pF               |
| Series inductance per leg       | $L_S$          | Measured lead to lead 5 mm from package body                                     |                                   | 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 and storage temperature range | $T_J, T_{Stg}$ |                                      | - 55 to 175 | $^\circ\text{C}$       |
| Maximum thermal resistance, junction to case   | $R_{thJC}$     | DC operation                         | 2           | $^\circ\text{C/W}$     |
| Typical thermal resistance, case to heatsink   | $R_{thCS}$     | Mounting surface, smooth and greased | 0.5         |                        |
| Approximate weight                             |                |                                      | 2           | g                      |
|  |                |                                      | 0.07        | oz.                    |
| Mounting torque                                | minimum        |                                      | 6 (5)       | kgf · cm<br>(lbf · in) |
|  | maximum        |                                      | 12 (10)     |                        |
| Marking device                                 |                | Case style TO-220AC                  | MBR10T100   |                        |

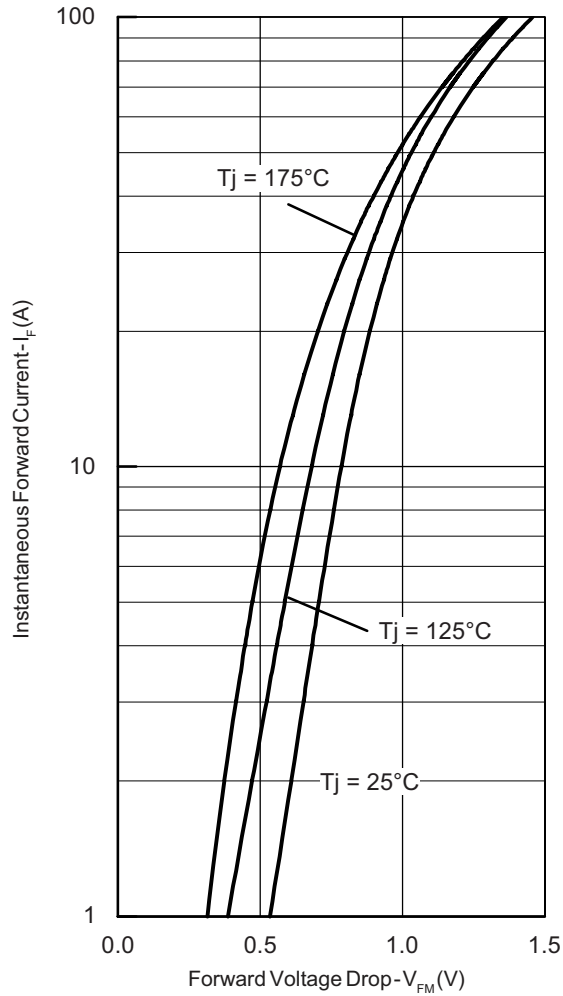


Fig. 1 - Maximum Forward Voltage Drop Characteristics

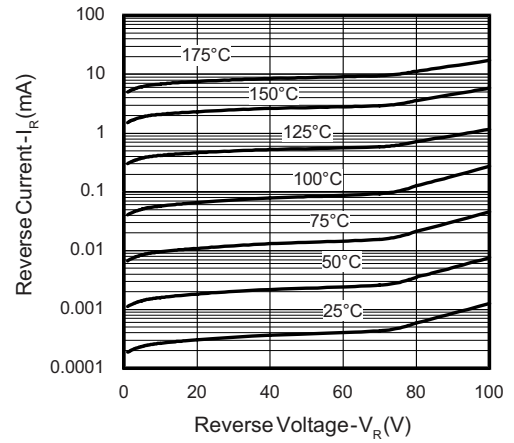


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

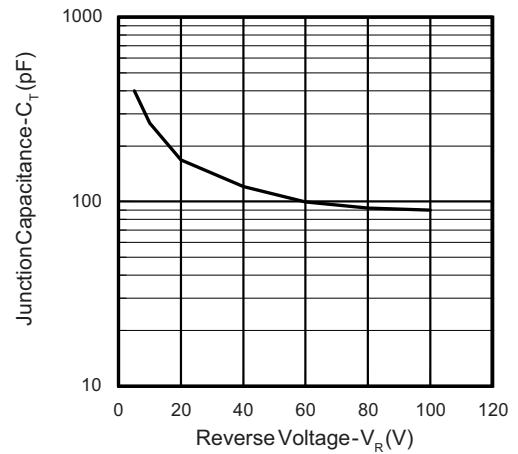
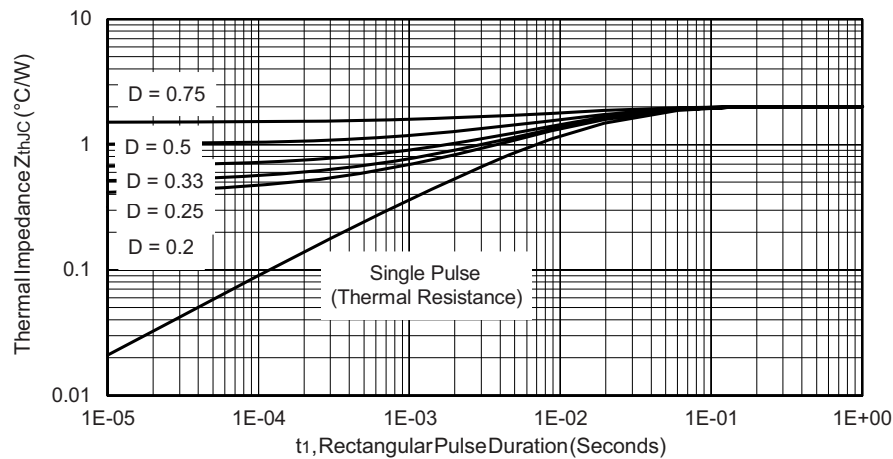


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage


 Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics

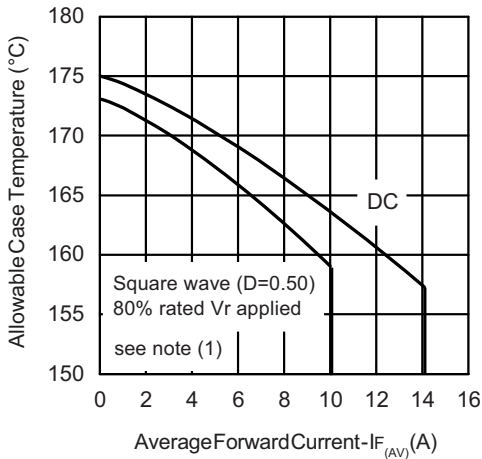


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

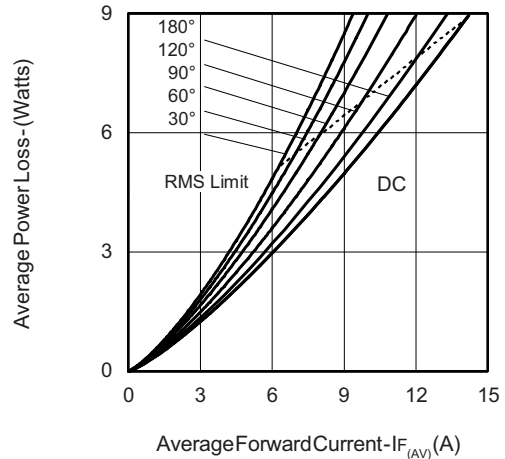


Fig. 6 - Forward Power Loss Characteristics

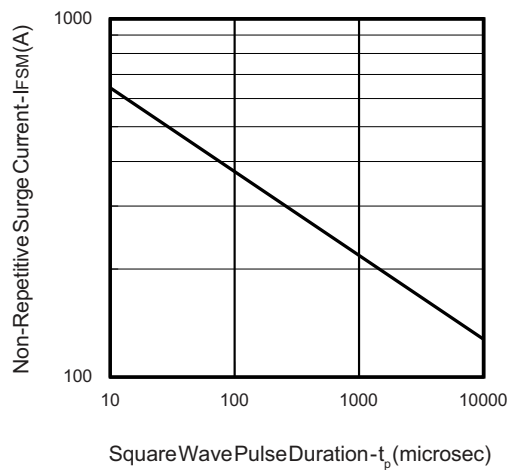


Fig. 7 - Maximum Non-Repetitive Surge Current

**Note**

- (1) Formula used:  $T_C = T_J - (P_d + P_{d_{REV}}) \times R_{thJC}$ ;  
 $P_d = \text{Forward power loss} = I_{F(AV)} \times V_{FM} \text{ at } (I_{F(AV)}/D)$  (see fig. 6);  
 $P_{d_{REV}} = \text{Inverse power loss} = V_{R1} \times I_R (1 - D)$ ;  $I_R$  at  $V_{R1} = 80\%$  rated  $V_R$

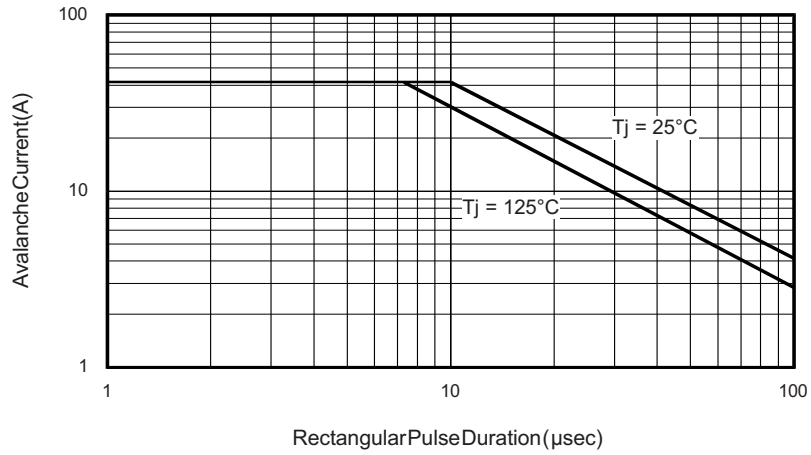


Fig. 8 - Reverse Bias Safe Operating Area (Avalanche Current vs. Rectangular Pulse Duration)

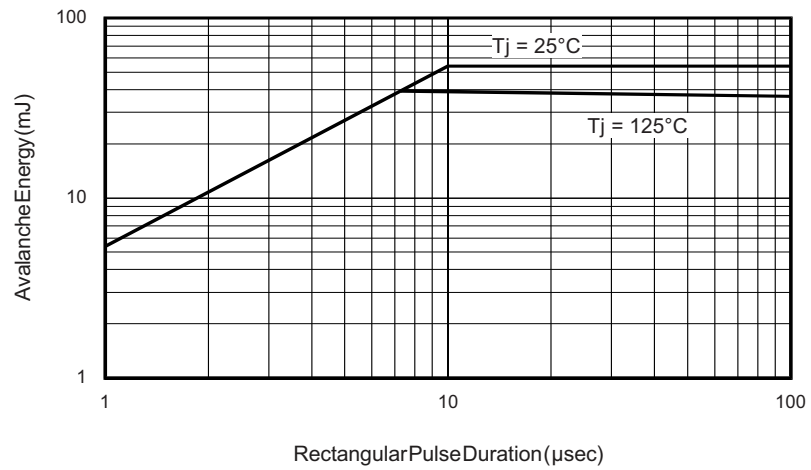


Fig. 9 - Reverse Bias Safe Operating Area (Avalanche Energy vs. Rectangular Pulse Duration)

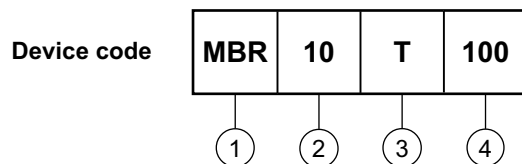
# MBR10T100

Vishay High Power Products

High Performance  
Schottky Generation 5.0, 10 A



## ORDERING INFORMATION TABLE



- 1** - MBR series
- 2** - Current rating (10 = 10 A)
- 3** - T = Trench
- 4** - Voltage rating (100 = 100 V)

Tube standard pack quantity: 50 pieces

| LINKS TO RELATED DOCUMENTS |   |
|----------------------------|---|
| Dimensions                 | <a href="http://www.vishay.com/doc?95221">http://www.vishay.com/doc?95221</a> |
| Part marking information   | <a href="http://www.vishay.com/doc?95224">http://www.vishay.com/doc?95224</a> |



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