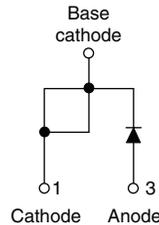


High Performance Schottky Generation 5.0, 10 A


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 |

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 |
|-------------|---|-------------|-------|
| $I_{F(AV)}$ | Rectangular waveform | 10 | A |
| V_{RRM} | | 100 | V |
| V_F | 10 Apk, $T_J = 125\text{ °C}$ (typical) | 0.62 | |
| T_J | Range | - 55 to 175 | °C |

VOLTAGE RATINGS

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

ABSOLUTE MAXIMUM RATINGS

| PARAMETER | SYMBOL | TEST CONDITIONS | VALUES | UNITS |
|---|-------------|--|--------------------------------|-------|
| Maximum average forward current | $I_{F(AV)}$ | 50 % duty cycle at $T_C = 159\text{ °C}$, rectangular waveform | 10 | A |
| Maximum peak one cycle non-repetitive surge current | I_{FSM} | 5 μ s sine or 3 μ s rect. pulse | 850 | A |
| | | 10 ms sine or 6 ms rect. pulse | 200 | |
| Non-repetitive avalanche energy | E_{AS} | $T_J = 25\text{ °C}$, $I_{AS} = 3\text{ A}$, $L = 12\text{ mH}$ | 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 | μA |
| | | $T_J = 125\text{ }^\circ\text{C}$ | | - | 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/ μs |

Note

(1) Pulse width < 300 μs , 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 (lbf · in) |
| | maximum | | 12 (10) | |
| Case style | | | TO-220AC | |
| Marking device | | | MBR10T100 | |

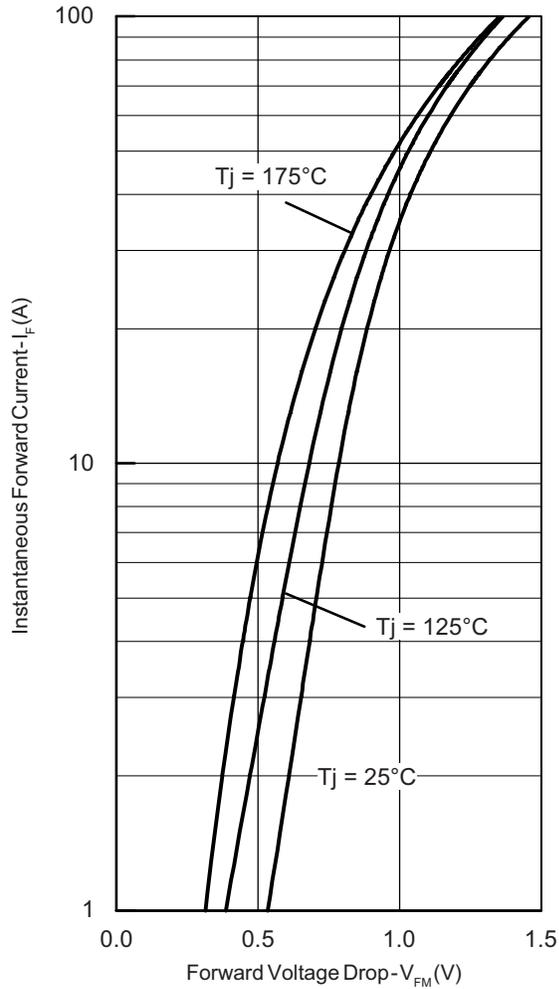


Fig. 1 - Maximum Forward Voltage Drop Characteristics

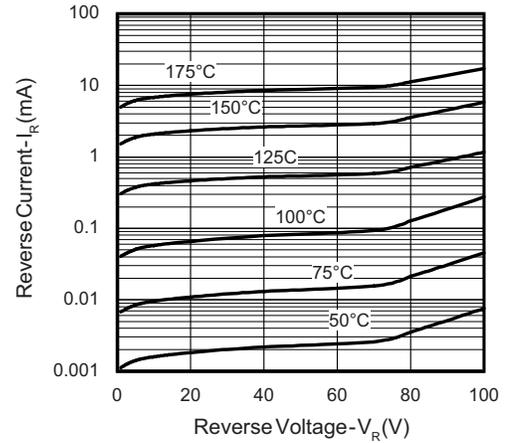


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

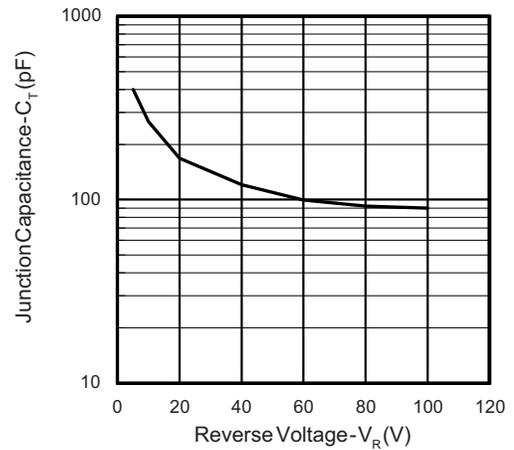
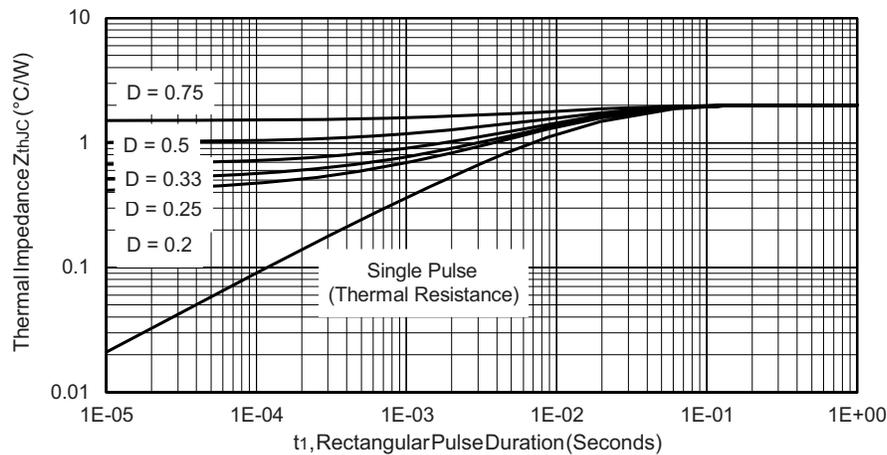


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage


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

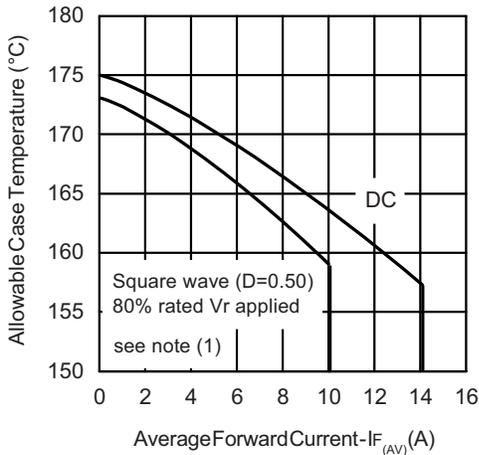


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

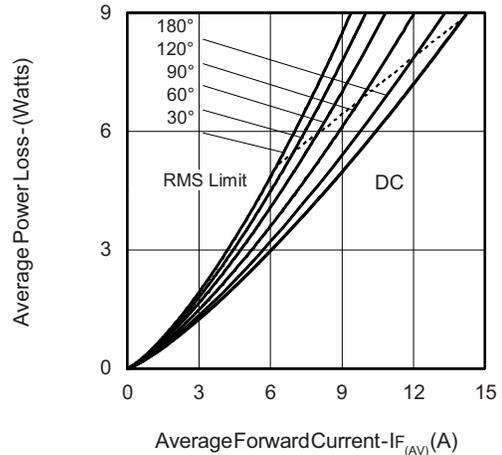


Fig. 6 - Forward Power Loss Characteristics

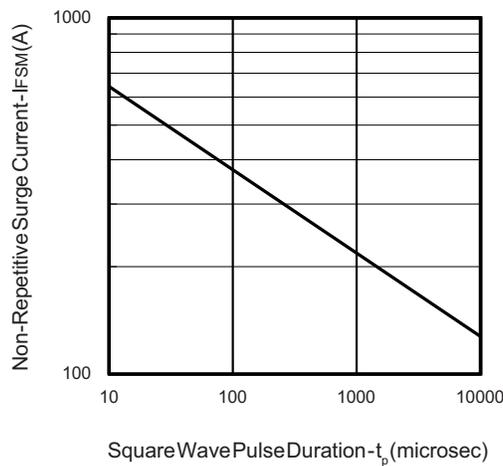


Fig. 7 - Maximum Non-Repetitive Surge Current

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

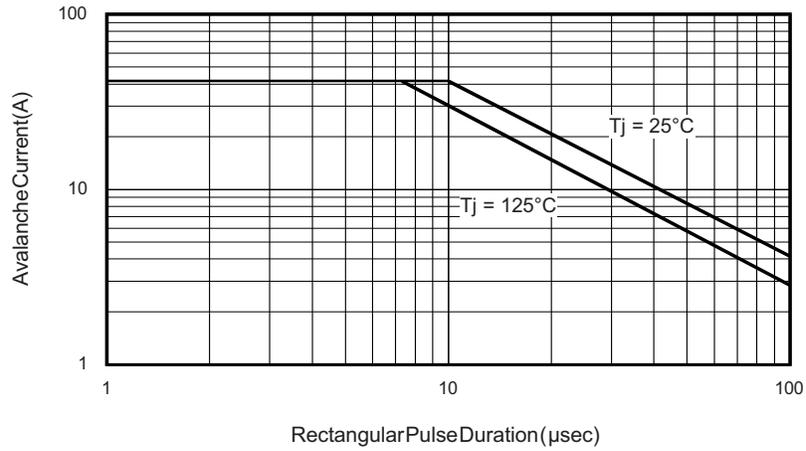


Fig. 8 - Reverse Bias Safe Operating Area (Avalanche Current vs. Rectangular Pulse Duration)

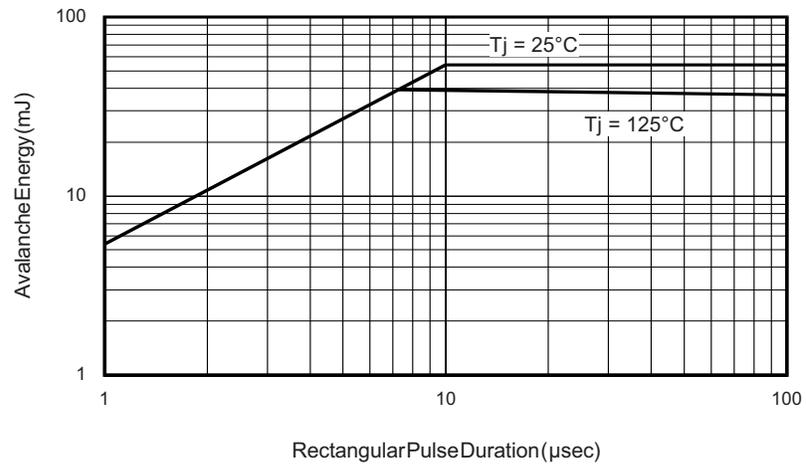


Fig. 9 - Reverse Bias Safe Operating Area (Avalanche Energy vs. Rectangular Pulse Duration)

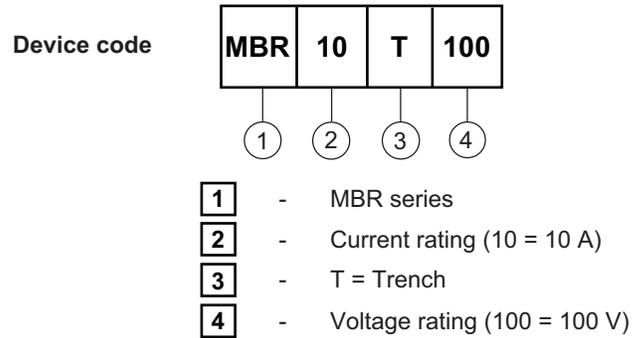
MBR10T100

Vishay High Power Products

High Performance
Schottky Generation 5.0, 10 A



ORDERING INFORMATION TABLE



Tube standard pack quantity: 50 pieces

| LINKS TO RELATED DOCUMENTS | |
|----------------------------|---|
| Dimensions | http://www.vishay.com/doc?95221 |
| Part marking information | http://www.vishay.com/doc?95224 |



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