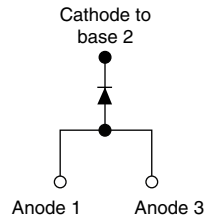


High Performance Schottky Generation 5.0, 20 A


TO-220AB

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

| | |
|-------------------------|--------|
| $I_{F(AV)}$ | 20 A |
| V_R | 100 V |
| V_F at 20 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 | 20 Apk, $T_J = 125$ °C (typical, per leg) | 0.65 | |
| T_J | Range | - 55 to 175 | °C |

VOLTAGE RATINGS

| PARAMETER | SYMBOL | TEST CONDITIONS | 21TT100 | 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 $T_C = 142$ °C, rectangular waveform | 20 | A |
| Maximum peak one cycle non-repetitive surge current at $T_J = 175$ °C | I_{FSM} | 5 μ s sine or 3 μ s rect. pulse | 660 | |
| | | 10 ms sine or 6 ms rect. pulse | 220 | |
| Non-repetitive avalanche energy | E_{AS} | $T_J = 25$ °C, $I_{AS} = 1.5$ A, $L = 60$ mH | 67.5 | 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 | $V_{FM}^{(1)}$ | 20 A | $T_J = 25\text{ }^\circ\text{C}$ | - | 0.80 | V |
| | | 40 A | | - | 0.95 | |
| | | 20 A | $T_J = 125\text{ }^\circ\text{C}$ | - | 0.68 | |
| | | 40 A | | - | 0.82 | |
| Reverse leakage current | $I_{RM}^{(1)}$ | $T_J = 25\text{ }^\circ\text{C}$ | $V_R = \text{Rated } V_R$ | - | 150 | μA |
| | | $T_J = 125\text{ }^\circ\text{C}$ | | - | 6 | mA |
| Junction capacitance | C_T | $V_R = 5\text{ }V_{DC}$ (test signal range 100 kHz to 1 MHz) $25\text{ }^\circ\text{C}$ | | 850 | - | pF |
| Series inductance | 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 | $^\circ\text{C}/\text{W}$ |
| 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) | |
| Marking device | | Case style TO-220AB | 21TT100 | |

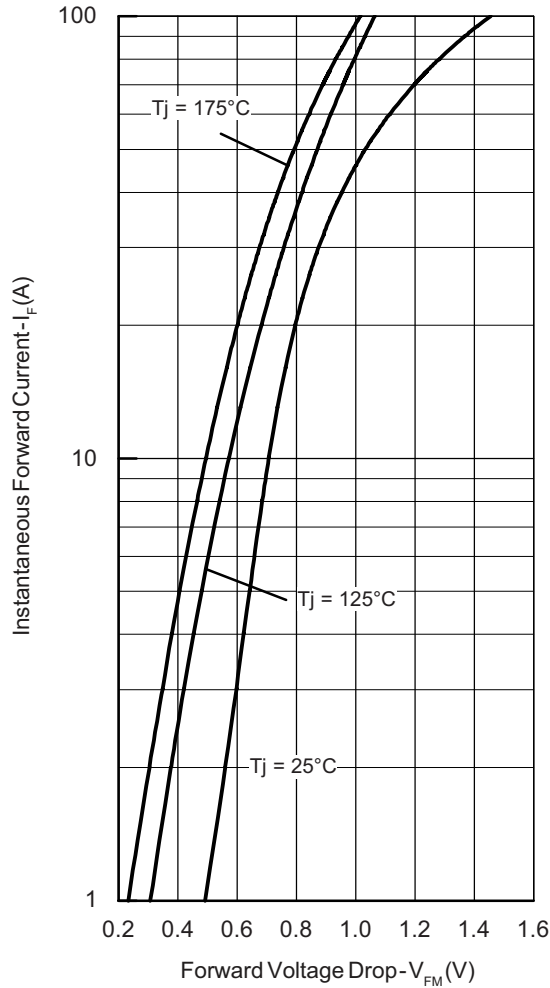


Fig. 1 - Maximum Forward Voltage Drop Characteristics

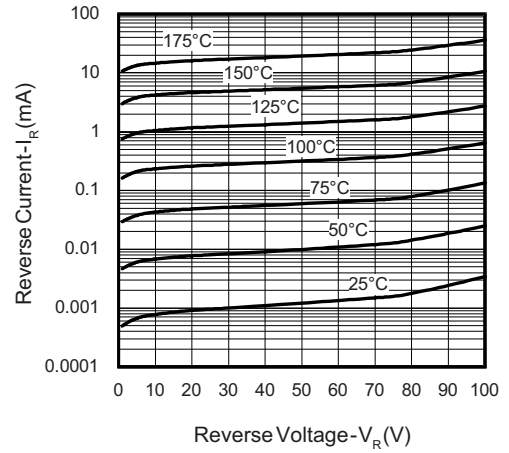


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

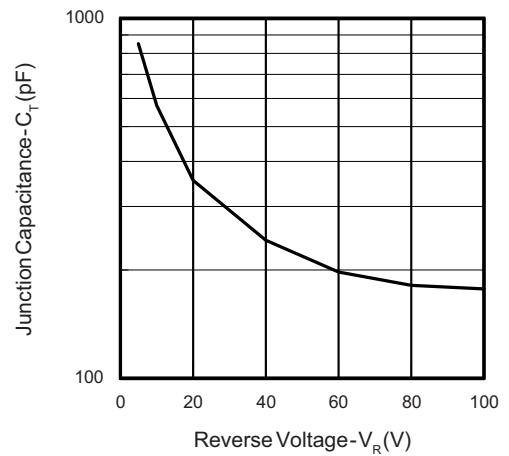


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

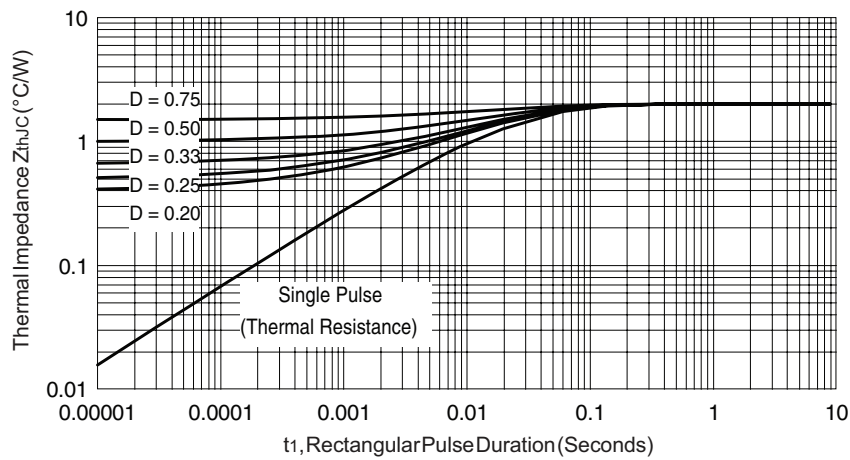


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

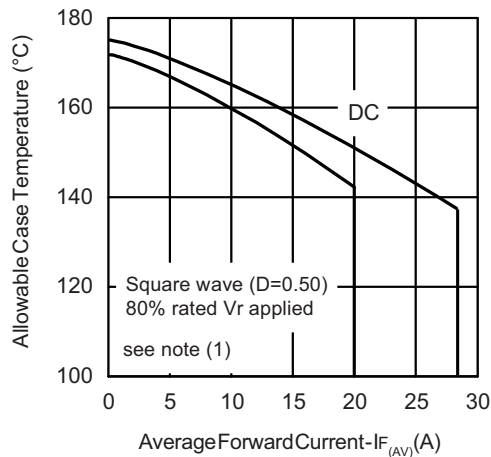


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

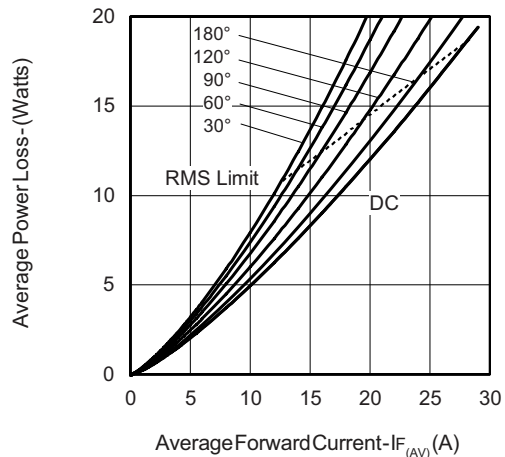


Fig. 6 - Forward Power Loss Characteristics

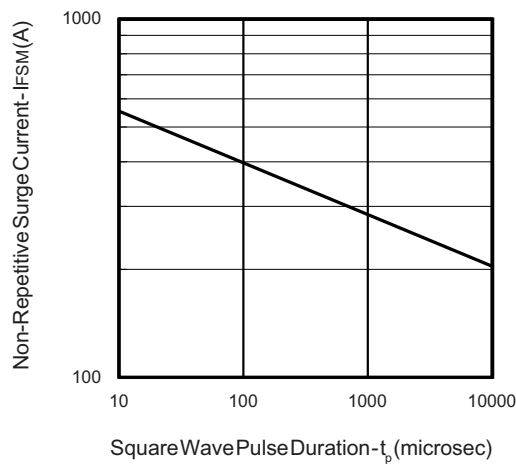


Fig. 7 - Maximum Non-Repetitive Surge Current

Note

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

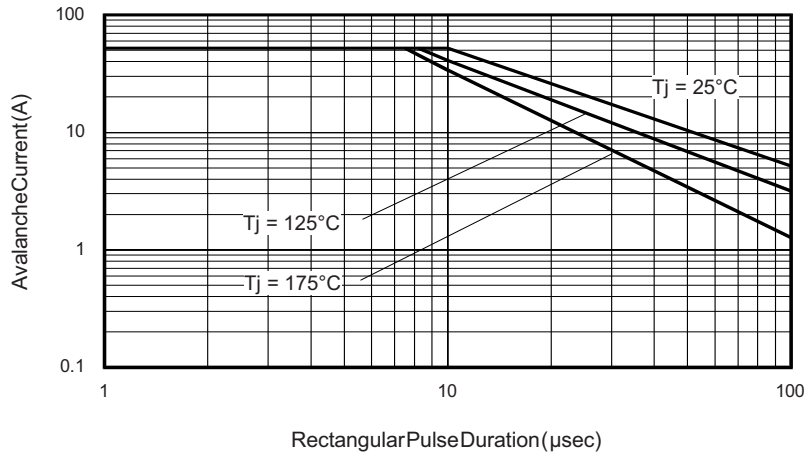


Fig. 8 - Reverse Bias Safe Operating Area (Avalanche Current vs. Rectangular Pulse Duration)

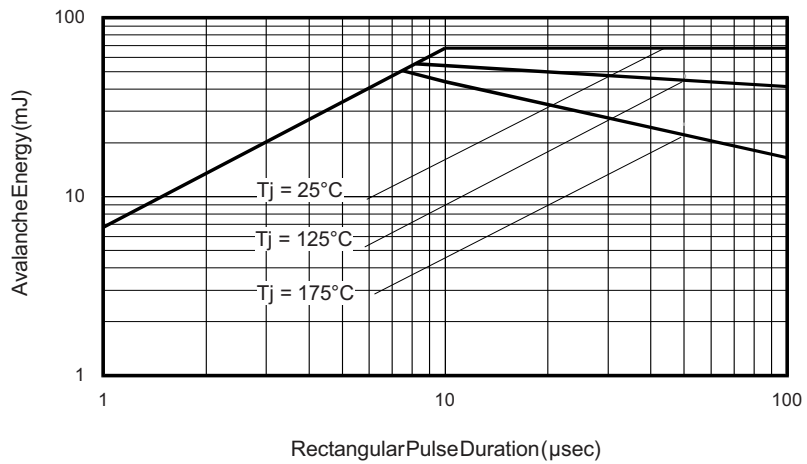
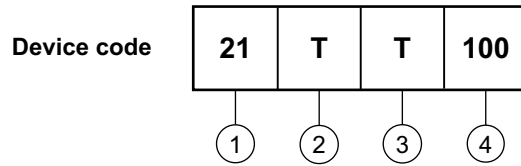


Fig. 9 - Reverse Bias Safe Operating Area (Avalanche Energy vs. Rectangular Pulse Duration)



ORDERING INFORMATION TABLE



- 1** - Current rating (20 A)
- 2** - Package:
T = TO-220
- 3** - T = Trench
- 4** - Voltage code (100 V)

Tube standard pack quantity: 50 pieces

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



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