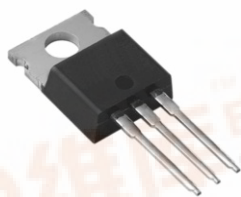
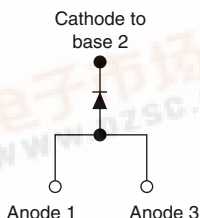


**21TT100**

Vishay High Power Products

## 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 $\mu$ s sine or 3 $\mu$ 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     |



# 21TT100

Vishay High Power Products High Performance  
Schottky Generation 5.0, 20 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    | $\mu\text{A}$    |
|                                |                | $T_J = 125\text{ }^{\circ}\text{C}$                                                       |                                     | -    | 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/ $\mu\text{s}$ |

## 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 <sub>J</sub> , T <sub>Stg</sub> |                                      | - 55 to 175 | °C                     |
| Maximum thermal resistance, junction to case   | R <sub>thJC</sub>                 | DC operation                         | 2           | °C/W                   |
| Typical thermal resistance, case to heatsink   | R <sub>thCS</sub>                 | 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-220AB                  | 21TT100     |                        |

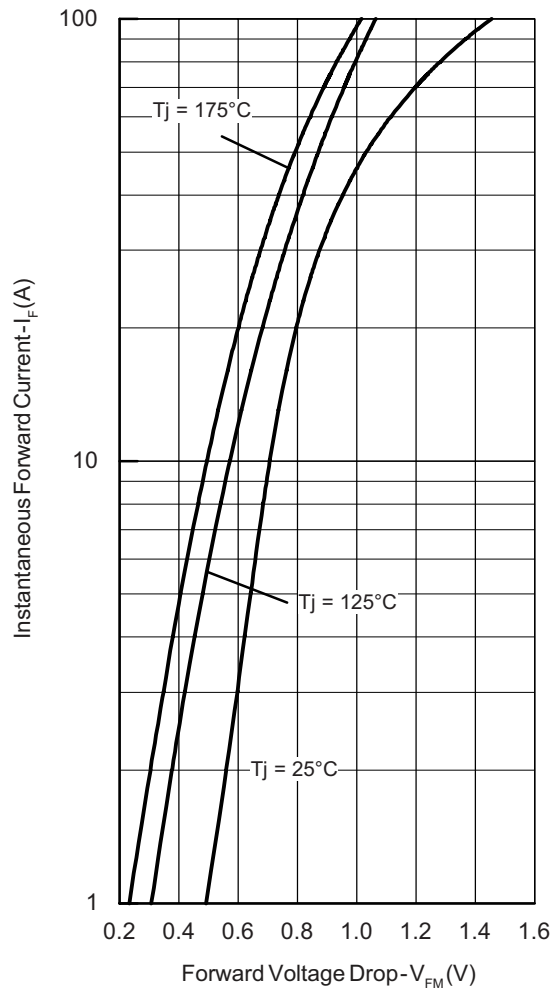


Fig. 1 - Maximum Forward Voltage Drop Characteristics

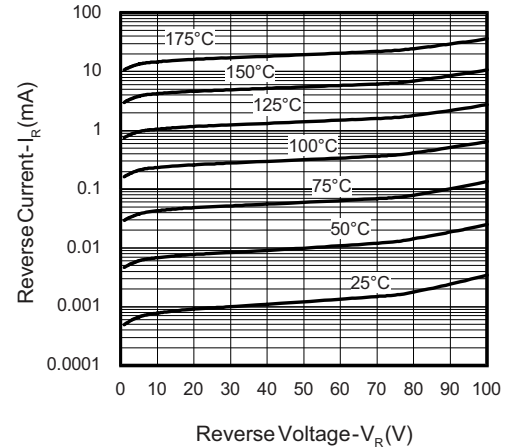


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

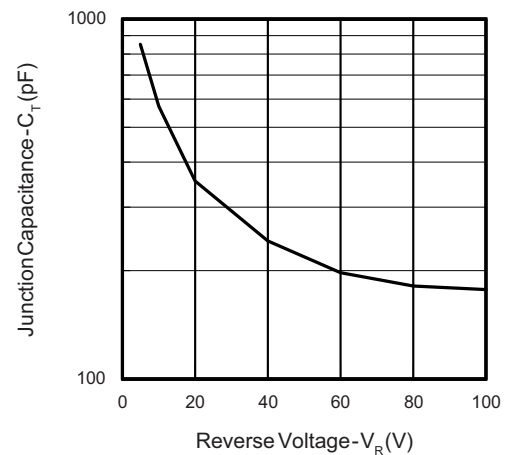


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

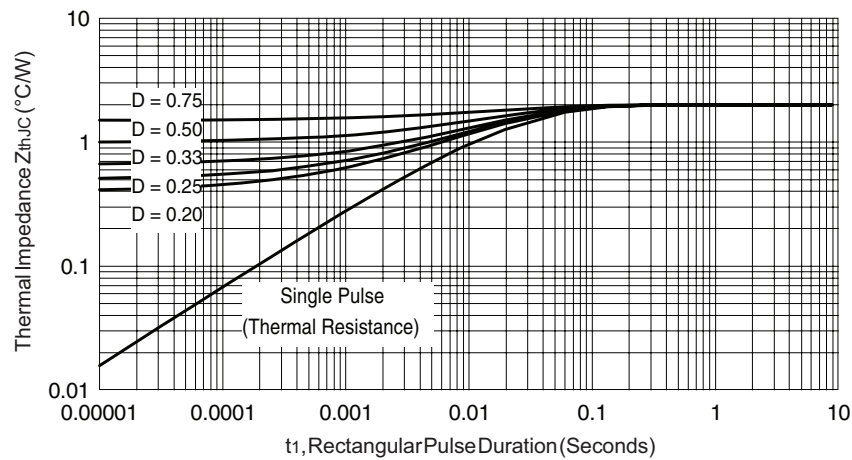


Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics

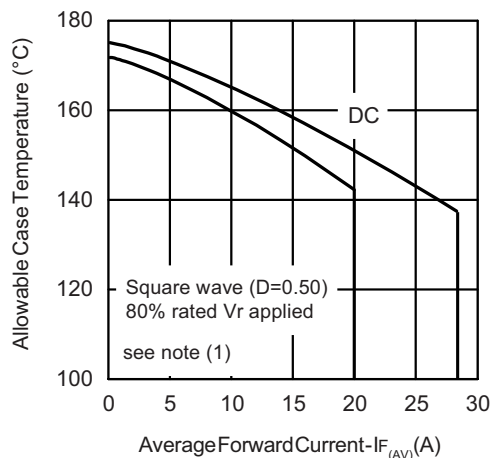


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

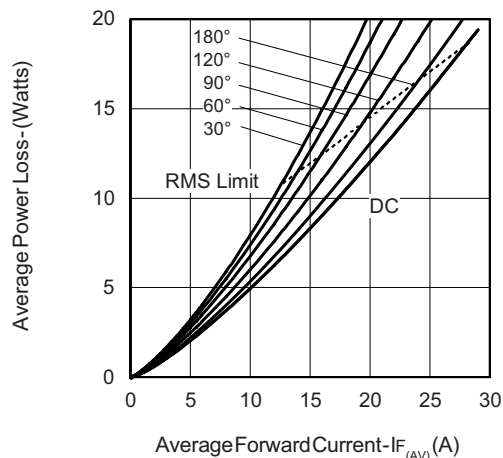


Fig. 6 - Forward Power Loss Characteristics

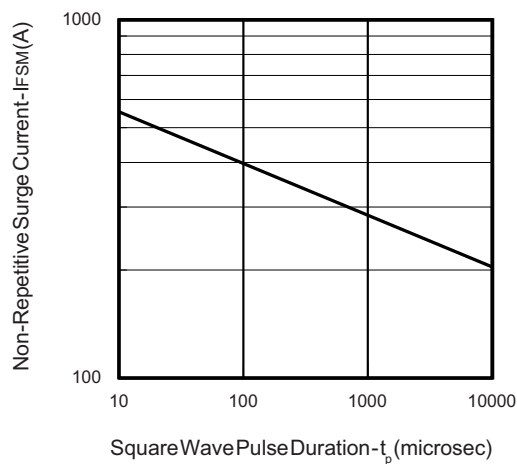


Fig. 7 - Maximum Non-Repetitive Surge Current

### Note

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

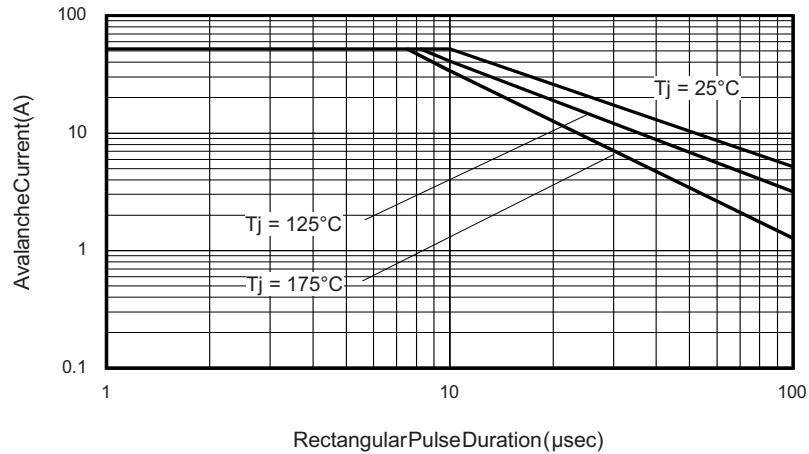


Fig. 8 - Reverse Bias Safe Operating Area (Avalanche Current vs. Rectangular Pulse Duration)

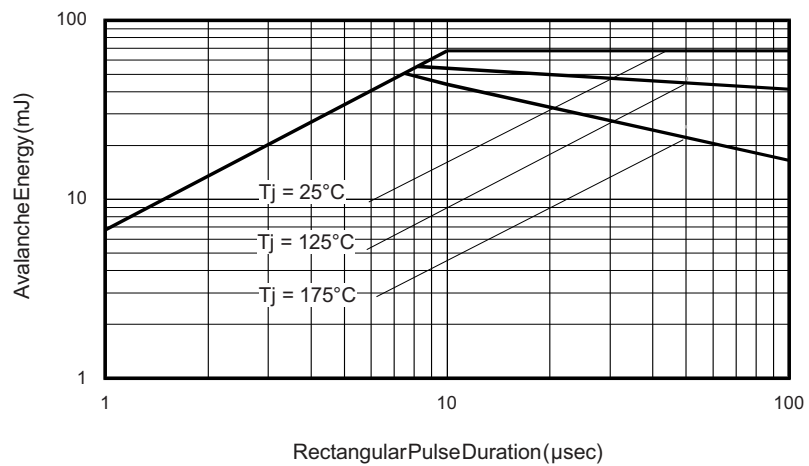


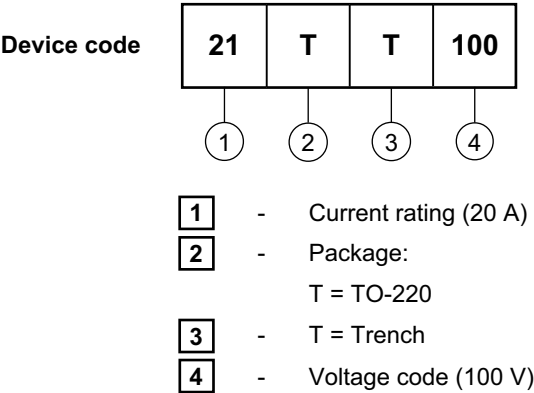
Fig. 9 - Reverse Bias Safe Operating Area (Avalanche Energy vs. Rectangular Pulse Duration)

# 21TT100



Vishay High Power Products      High Performance  
Schottky Generation 5.0, 20 A

## ORDERING INFORMATION TABLE



Tube standard pack quantity: 50 pieces

| LINKS TO RELATED DOCUMENTS |                                                                               |
|----------------------------|-------------------------------------------------------------------------------|
| Dimensions                 | <a href="http://www.vishay.com/doc?95222">http://www.vishay.com/doc?95222</a> |
| Part marking information   | <a href="http://www.vishay.com/doc?95225">http://www.vishay.com/doc?95225</a> |



### Disclaimer

All product specifications and data are subject to change without notice.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained herein or in any other disclosure relating to any product.

Vishay disclaims any and all liability arising out of the use or application of any product described herein or of any information provided herein to the maximum extent permitted by law. The product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein, which apply to these products.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay.

The products shown herein are not designed for use in medical, life-saving, or life-sustaining applications unless otherwise expressly indicated. Customers using or selling Vishay products not expressly indicated for use in such applications do so entirely at their own risk and agree to fully indemnify Vishay for any damages arising or resulting from such use or sale. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

Product names and markings noted herein may be trademarks of their respective owners.