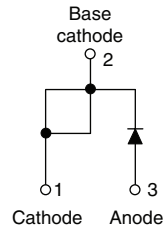


## High Performance Schottky Generation 5.0, 15 A


**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**

|                         |        |
|-------------------------|--------|
| $I_{F(AV)}$             | 15 A   |
| $V_R$                   | 100 V  |
| $V_F$ at 15 A at 125 °C | 0.67 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     |
| $V_F$     | 15 Apk, $T_J = 125$ °C (typical) | 0.63        |       |
| $T_J$     | Range                            | - 55 to 175 | °C    |

**VOLTAGE RATINGS**

| PARAMETER                  | SYMBOL | TEST CONDITIONS | 15TT100 | 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 $T_C = 144$ °C, rectangular waveform  | 15  | 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 |       | 920 |
|   |             | 10 ms sine or 6 ms rect. pulse   |   |       | 240 |
| Non-repetitive avalanche energy                     | $E_{AS}$    | $T_J = 25$ °C, $I_{AS} = 1.1$ A, $L = 60$ mH   | 36  | mJ    |     |
| Repetitive avalanche current                        | $I_{AR}$    | Limited by frequency of operation and time pulse duration so that $T_J < T_J$ max. $I_{AS}$ at $T_J$ max. as a function of time pulse See fig. 8 | $I_{AS}$ at $T_J$ max.  | A     |     |



| ELECTRICAL SPECIFICATIONS      |                |  |                                   |      |        |                  |
|--------------------------------|----------------|--|-----------------------------------|------|--------|------------------|
| PARAMETER                      | SYMBOL         | TEST CONDITIONS  |                                   | TYP. | MAX.   | UNITS            |
| Forward voltage drop           | $V_{FM}^{(1)}$ | 15 A   | $T_J = 25\text{ }^\circ\text{C}$  | -    | 0.81   | V                |
|                                |                | 30 A   |                                   | -    | 0.92   |                  |
|                                |                | 15 A   | $T_J = 125\text{ }^\circ\text{C}$ | -    | 0.67   |                  |
|                                |                | 30 A   |                                   | -    | 0.79   |                  |
| Reverse leakage current        | $I_{RM}^{(1)}$ | $T_J = 25\text{ }^\circ\text{C}$   | $V_R = \text{Rated } V_R$         | -    | 120    | $\mu\text{A}$    |
|                                |                | $T_J = 125\text{ }^\circ\text{C}$  |                                   | -    | 5      | mA               |
| Junction capacitance           | $C_T$          | $V_R = 5 V_{DC}$ (test signal range 100 kHz to 1 MHz) $25\text{ }^\circ\text{C}$ |                                   | 550  | -      | 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 | $T_J, T_{Stg}$ |                                      | - 55 to 175 | $^\circ\text{C}$       |
| Maximum thermal resistance, junction to case   | $R_{thJC}$     | DC operation                         | 2.5         | $^\circ\text{C/W}$     |
| 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                  | 15TT100     |                        |

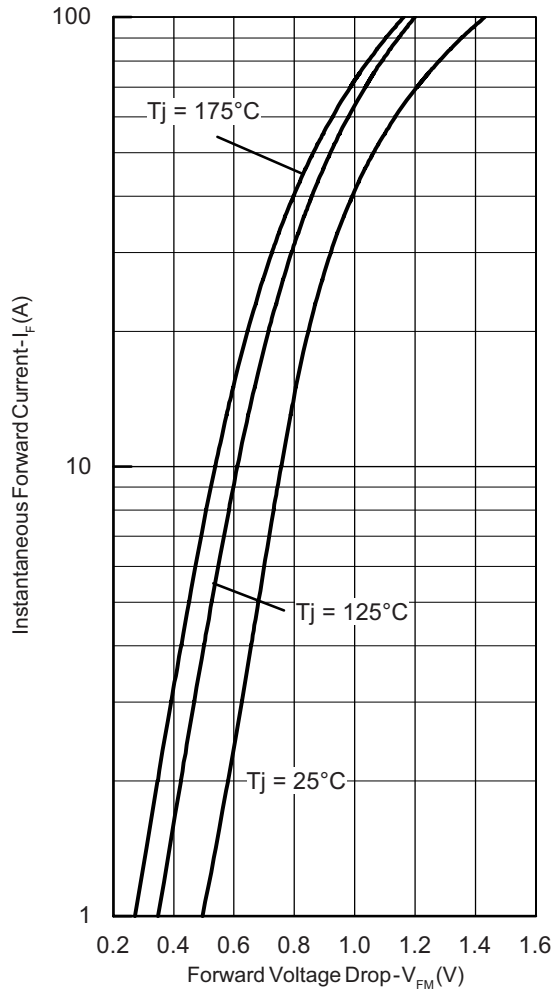


Fig. 1 - Maximum Forward Voltage Drop Characteristics

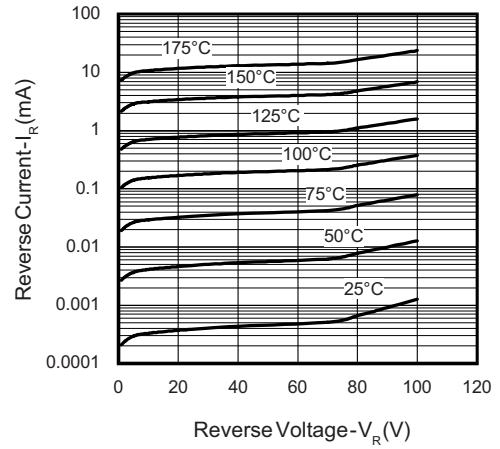


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

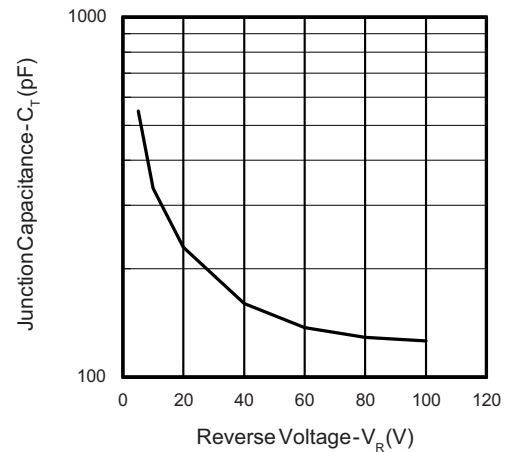


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

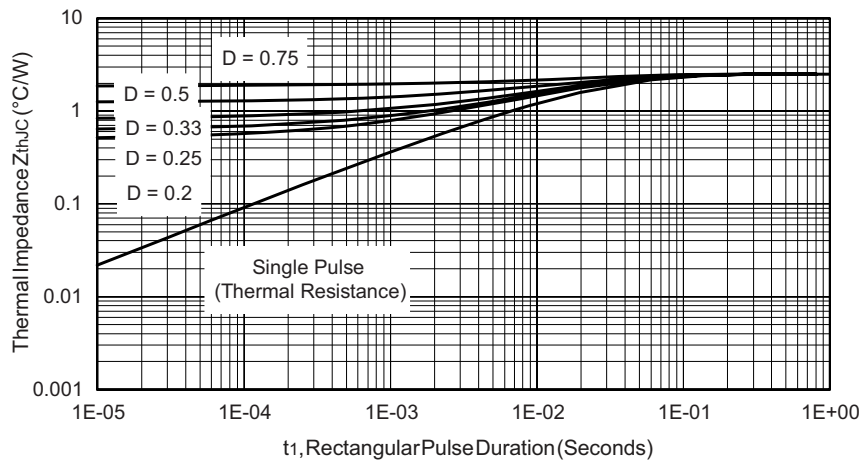


Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics

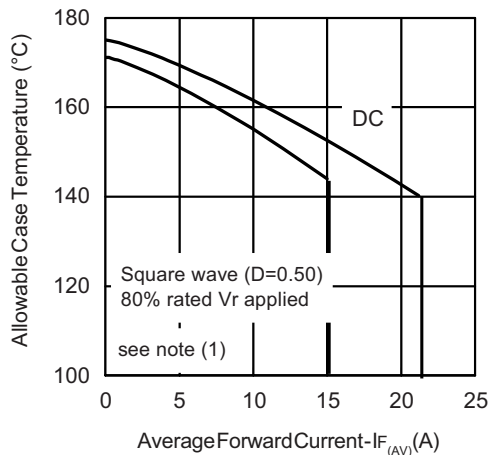


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

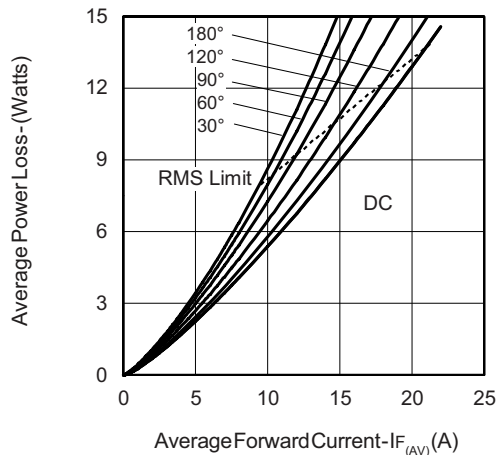


Fig. 6 - Forward Power Loss Characteristics

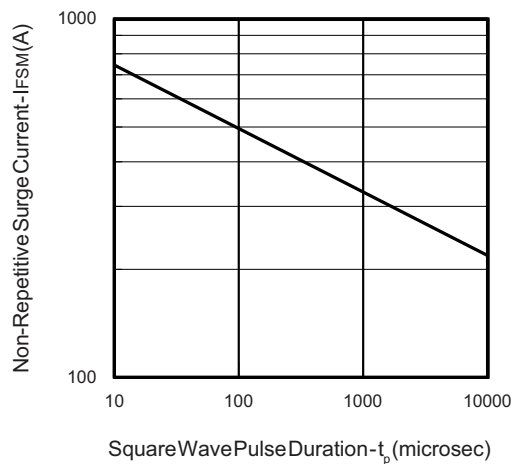


Fig. 7 - Maximum Non-Repetitive Surge Current

**Note**

- (1) Formula used:  $T_C = T_J - (P_d + P_{d_{REV}}) \times R_{thJC}$ ;
- $P_d$  = 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  $V_{R1} = 80\%$  rated  $V_R$



High Performance Vishay High Power Products  
Schottky Generation 5.0, 15 A

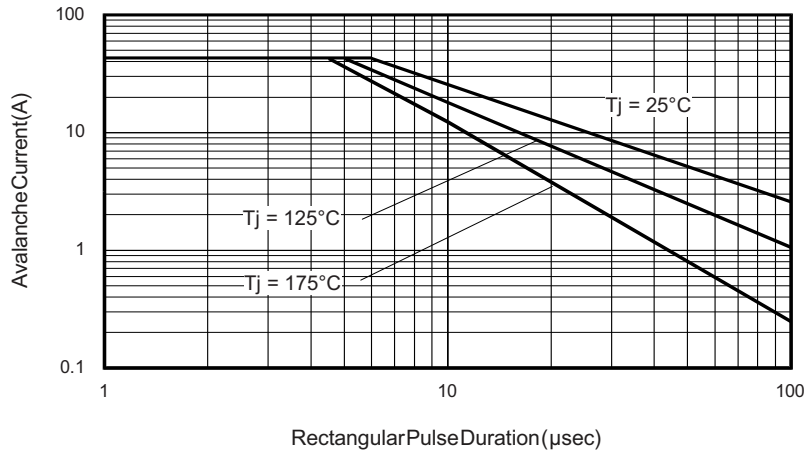


Fig. 8 - Reverse Bias Safe Operating Area (Avalanche Current vs. Rectangular Pulse Duration)

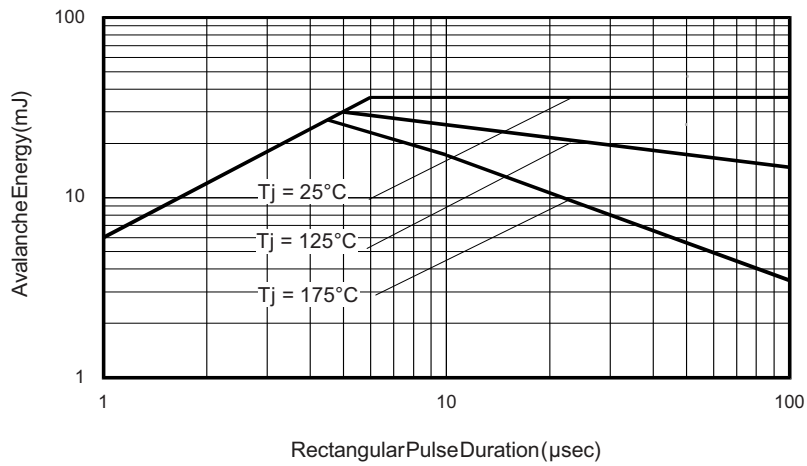
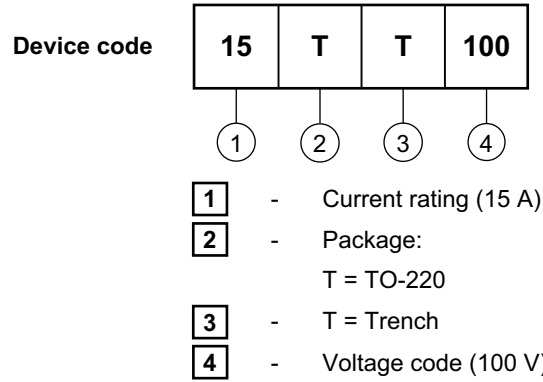


Fig. 9 - Reverse Bias Safe Operating Area (Avalanche Energy vs. Rectangular Pulse Duration)



## ORDERING INFORMATION TABLE

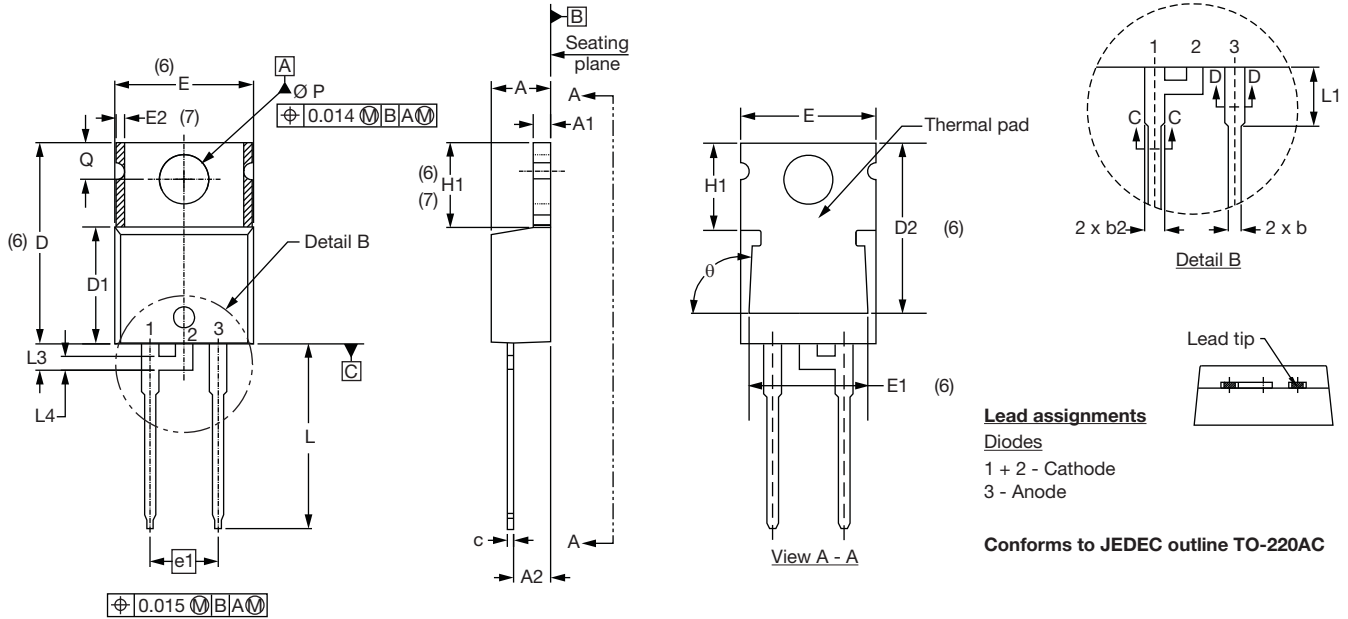


Tube standard pack quantity: 50 pieces

| 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> |

## TO-220AC

**DIMENSIONS** in millimeters and inches



| SYMBOL | MILLIMETERS |       | INCHES |       | NOTES | SYMBOL | MILLIMETERS |       | INCHES     |       | NOTES |
|--------|-------------|-------|--------|-------|-------|--------|-------------|-------|------------|-------|-------|
|        | MIN.        | MAX.  | MIN.   | MAX.  |       |        | MIN.        | MAX.  | MIN.       | MAX.  |       |
| A      | 4.25        | 4.65  | 0.167  | 0.183 |       | E1     | 6.86        | 8.89  | 0.270      | 0.350 | 6     |
| A1     | 1.14        | 1.40  | 0.045  | 0.055 |       | E2     | -           | 0.76  | -          | 0.030 | 7     |
| A2     | 2.56        | 2.92  | 0.101  | 0.115 |       | e      | 2.41        | 2.67  | 0.095      | 0.105 |       |
| b      | 0.69        | 1.01  | 0.027  | 0.040 |       | e1     | 4.88        | 5.28  | 0.192      | 0.208 |       |
| b1     | 0.38        | 0.97  | 0.015  | 0.038 | 4     | H1     | 6.09        | 6.48  | 0.240      | 0.255 | 6, 7  |
| b2     | 1.20        | 1.73  | 0.047  | 0.068 |       | L      | 13.52       | 14.02 | 0.532      | 0.552 |       |
| b3     | 1.14        | 1.73  | 0.045  | 0.068 | 4     | L1     | 3.32        | 3.82  | 0.131      | 0.150 | 2     |
| c      | 0.36        | 0.61  | 0.014  | 0.024 |       | L3     | 1.78        | 2.13  | 0.070      | 0.084 |       |
| c1     | 0.36        | 0.56  | 0.014  | 0.022 | 4     | L4     | 0.76        | 1.27  | 0.030      | 0.050 | 2     |
| D      | 14.85       | 15.25 | 0.585  | 0.600 | 3     | Ø P    | 3.54        | 3.73  | 0.139      | 0.147 |       |
| D1     | 8.38        | 9.02  | 0.330  | 0.355 |       | Q      | 2.60        | 3.00  | 0.102      | 0.118 |       |
| D2     | 11.68       | 12.88 | 0.460  | 0.507 | 6     | θ      | 90° to 93°  |       | 90° to 93° |       |       |
| E      | 10.11       | 10.51 | 0.398  | 0.414 | 3, 6  |        |             |       |            |       |       |

**Notes**

- (1) Dimensioning and tolerancing as per ASME Y14.5M-1994
- (2) Lead dimension and finish uncontrolled in L1
- (3) Dimension D, D1 and E do not include mold flash. Mold flash shall not exceed 0.127 mm (0.005") per side. These dimensions are measured at the outermost extremes of the plastic body
- (4) Dimension b1, b3 and c1 apply to base metal only
- (5) Controlling dimension: inches
- (6) Thermal pad contour optional within dimensions E, H1, D2 and E1
- (7) Dimension E2 x H1 define a zone where stamping and singulation irregularities are allowed
- (8) Outline conforms to JEDEC TO-220, D2 (minimum) where dimensions are derived from the actual package outline



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