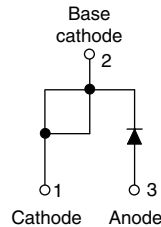


High Performance Schottky Generation 5.0, 18 A


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
- Compliant to RoHS directive 2002/95/EC
- Designed and qualified for industrial level


**RoHS
COMPLIANT**
PRODUCT SUMMARY

| | |
|-------------------------|--------|
| $I_{F(AV)}$ | 18 A |
| V_R | 45 V |
| V_F at 18 A at 125 °C | 0.51 V |

APPLICATIONS

- High efficiency SMPS
- Automotive
- High frequency switching
- Output rectification
- Reverse battery protection
- Freewheeling
- DC/DC systems
- Increased power density systems

MAJOR RATINGS AND CHARACTERISTICS

| SYMBOL | CHARACTERISTICS | VALUES | UNITS |
|-----------|---|-------------|-------|
| V_{RRM} | | 45 | V |
| V_F | 18 A _{pk} , $T_J = 125$ °C (typical) | 0.48 | |
| T_J | Range | - 55 to 175 | °C |

VOLTAGE RATINGS

| PARAMETER | SYMBOL | TEST CONDITIONS | 18TT045-F | UNITS |
|----------------------------|--------|-----------------|-----------|-------|
| Maximum DC reverse voltage | V_R | $T_J = 25$ °C | 45 | V |

ABSOLUTE MAXIMUM RATINGS

| PARAMETER | SYMBOL | TEST CONDITIONS | VALUES | UNITS |
|---|-------------|---|------------------------|-------|
| Maximum average forward current | $I_{F(AV)}$ | 50 % duty cycle at $T_C = 157$ °C, rectangular waveform | 18 | A |
| Maximum peak one cycle non-repetitive surge current | I_{FSM} | 5 μ s sine or 3 μ s rect. pulse | 1800 | |
| | | 10 ms sine or 6 ms rect. pulse | 390 | |
| Non-repetitive avalanche energy | E_{AS} | $T_J = 25$ °C, $I_{AS} = 5.5$ A, $L = 3.7$ mH | 56 | 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 | $V_{FM}^{(1)}$ | 18 A | $T_J = 25\text{ }^\circ\text{C}$ | 0.553 | 0.58 | V |
| | | 36 A | | 0.644 | 0.69 | |
| | | 18 A | $T_J = 125\text{ }^\circ\text{C}$ | 0.478 | 0.51 | |
| | | 36 A | | 0.608 | 0.65 | |
| Reverse leakage current | $I_{RM}^{(1)}$ | $T_J = 25\text{ }^\circ\text{C}$ | $V_R = \text{Rated } V_R$ | 2.4 | 150 | μA |
| | | $T_J = 125\text{ }^\circ\text{C}$ | | 2.6 | 12 | mA |
| Junction capacitance | C_T | $V_R = 5 V_{DC}$ (test signal range 100 kHz to 1 MHz), $25\text{ }^\circ\text{C}$ | | 1350 | - | 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 | 1.5 | $^\circ\text{C/W}$ |
| Typical thermal resistance, case to heatsink | R_{thCS} | Mounting surface, smooth and greased | 0.50 | |
| Approximate weight | | | 2 | g |
| | | | 0.07 | oz. |
| Mounting torque | minimum | | 6 (5) | kgf · cm (lbf · in) |
| | maximum | | 12 (10) | |
| Marking device | | Case style TO-220AC | 18TT045 | |

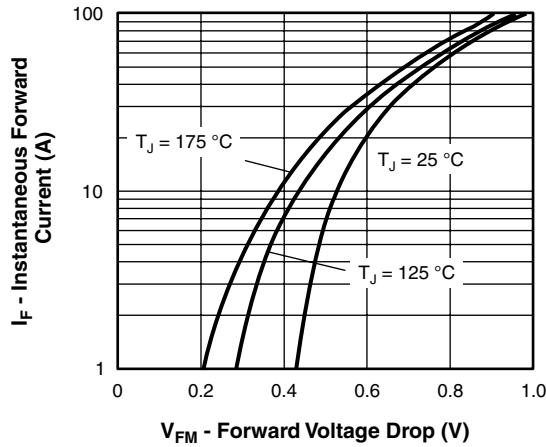


Fig. 1 - Maximum Forward Voltage Drop Characteristics

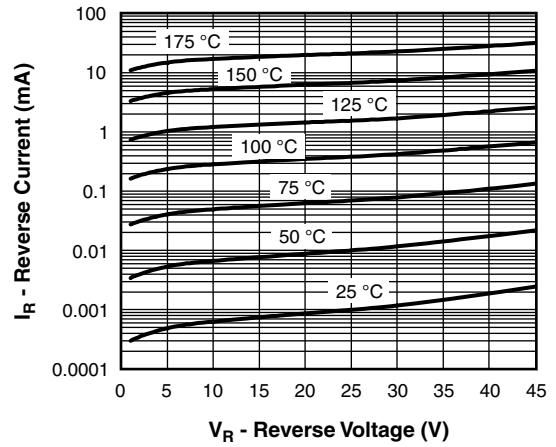


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

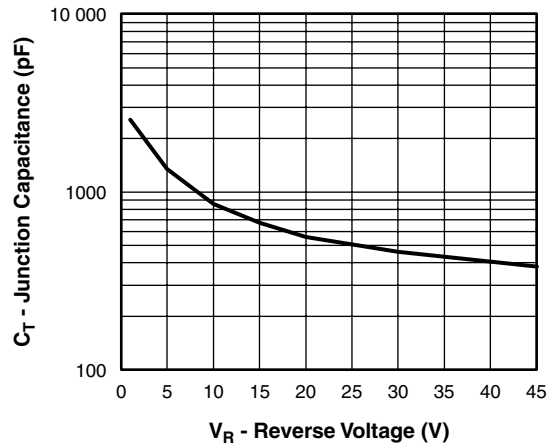
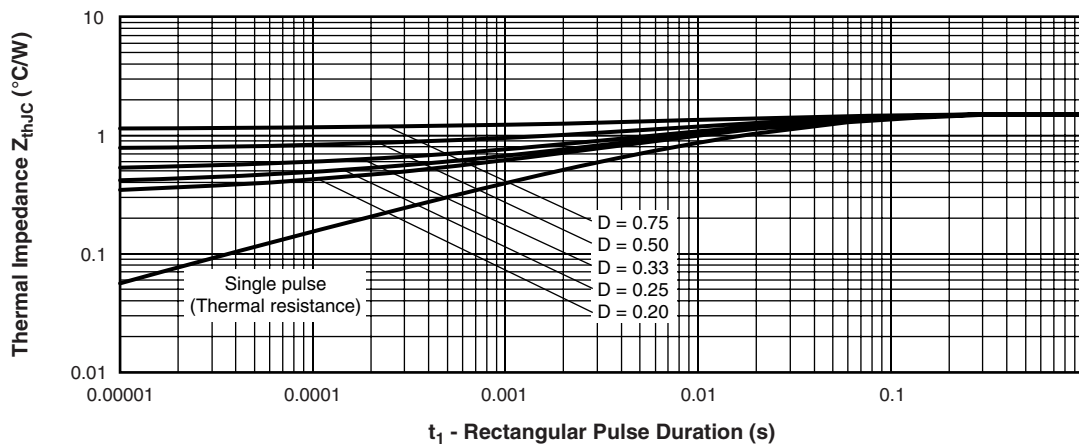


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage


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

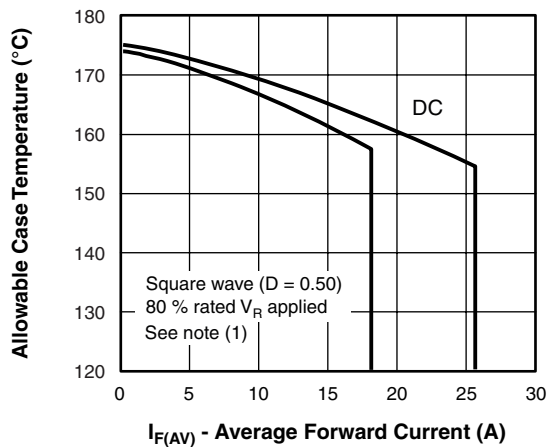


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

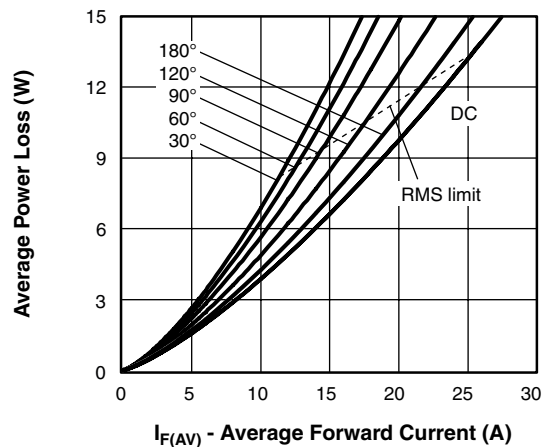


Fig. 6 - Forward Power Loss Characteristics

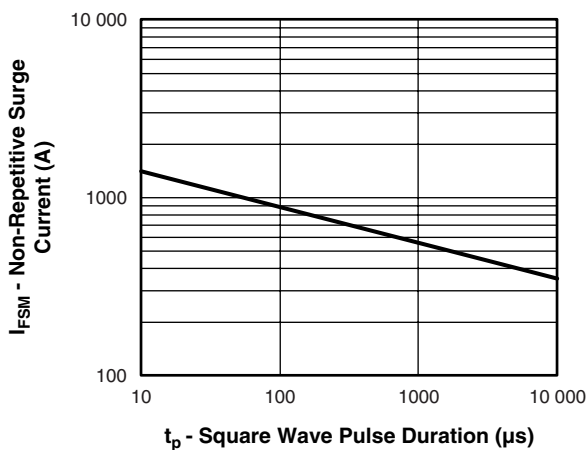


Fig. 7 - Maximum Non-Repetitive Surge Current

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 Schottky Vishay High Power Products
Generation 5.0, 18 A

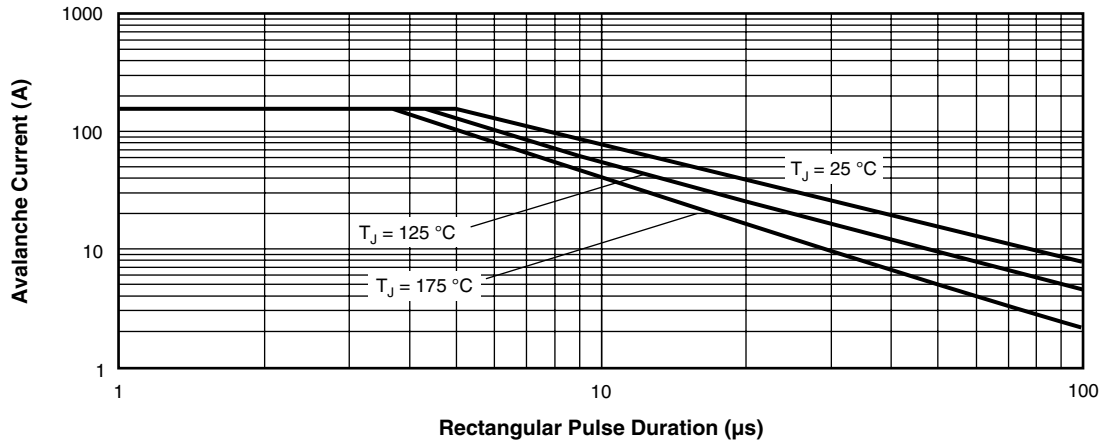


Fig. 8 - Reverse Bias Safe Operating Area (Avalanche Current vs. Rectangular Pulse Duration)

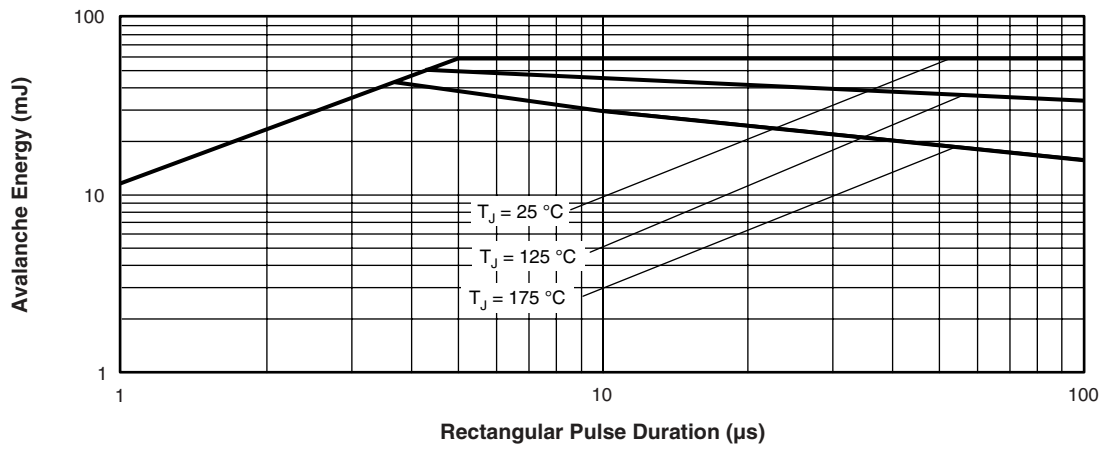


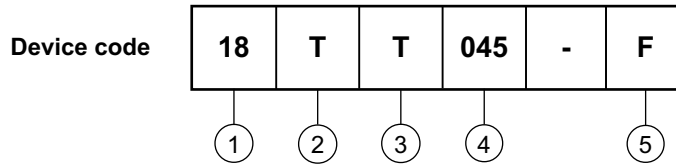
Fig. 9 - Reverse Bias Safe Operating Area (Avalanche Energy vs. Rectangular Pulse Duration)

18TT045-F



Vishay High Power Products High Performance Schottky
Generation 5.0, 18 A

ORDERING INFORMATION TABLE



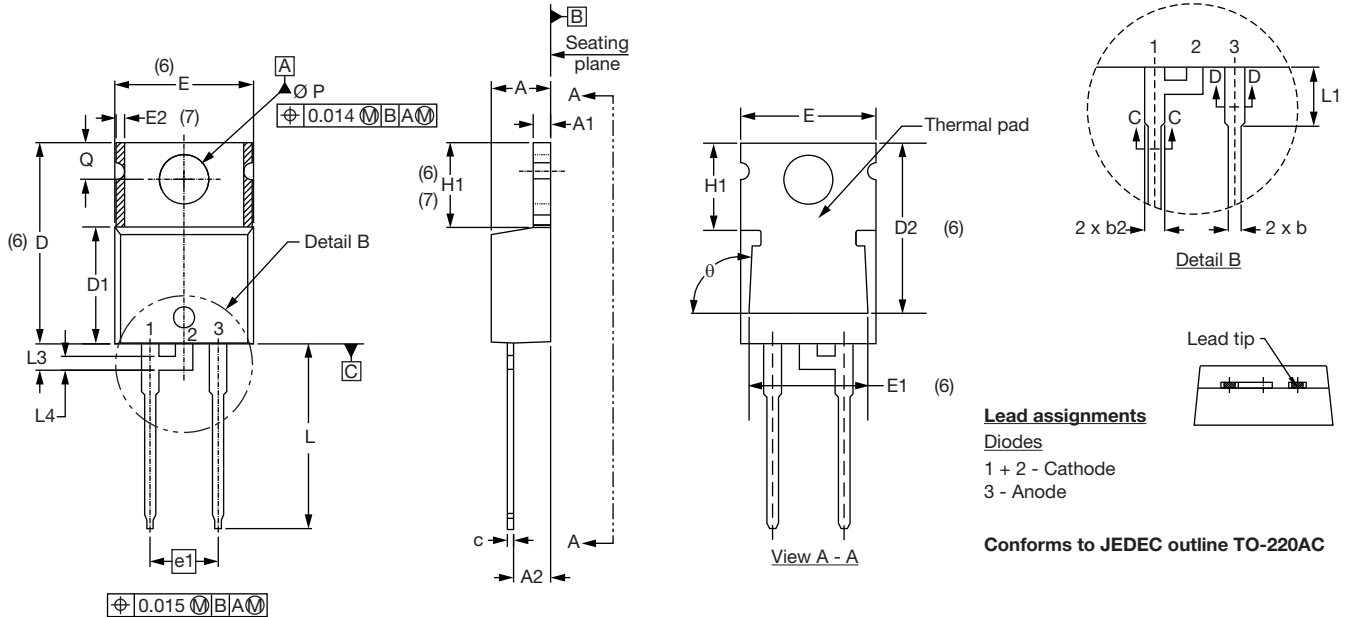
- 1** - Current rating (18 A)
- 2** - Package:
T = TO-220
- 3** - T = Trench
- 4** - Voltage code (045 = 45 A)
- 5** - F = RoHS compliant and totally lead (Pb)-free

Tube standard pack quantity: 50 pieces

| LINKS TO RELATED DOCUMENTS | |
|----------------------------|--|
| Dimensions | www.vishay.com/doc?95221 |
| Part marking information | www.vishay.com/doc?95068 |

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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