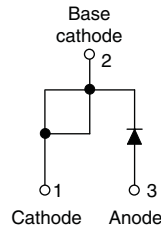


## Schottky Rectifier, 10 A



TO-220AC



### FEATURES

- 175 °C  $T_J$  operation
- Low forward voltage drop
- High frequency operation
- High purity, high temperature epoxy encapsulation for enhanced mechanical strength and moisture resistance
- Guard ring for enhanced ruggedness and long term reliability
- Lead (Pb)-free ("PbF" suffix)
- Designed and qualified for industrial level



RoHS\*  
COMPLIANT

### DESCRIPTION

The 10TQ...PbF Schottky rectifier series has been optimized for low reverse leakage at high temperature. The proprietary barrier technology allows for reliable operation up to 175 °C junction temperature. Typical applications are in switching power supplies, converters, freewheeling diodes, and reverse battery protection.

### PRODUCT SUMMARY

|             |         |
|-------------|---------|
| $I_{F(AV)}$ | 10 A    |
| $V_R$       | 35/45 V |

### MAJOR RATINGS AND CHARACTERISTICS

| SYMBOL      | CHARACTERISTICS             | VALUES      | UNITS |
|-------------|-----------------------------|-------------|-------|
| $I_{F(AV)}$ | Rectangular waveform        | 10          | A     |
| $V_{RRM}$   |                             | 35/45       | V     |
| $I_{FSM}$   | $t_p = 5 \mu s$ sine        | 1050        | A     |
| $V_F$       | 10 Apk, $T_J = 125^\circ C$ | 0.49        | V     |
| $T_J$       | Range                       | - 55 to 175 | °C    |

### VOLTAGE RATINGS

| PARAMETER                            | SYMBOL    | 10TQ035PbF | 10TQ045PbF | UNITS |
|--------------------------------------|-----------|------------|------------|-------|
| Maximum DC reverse voltage           | $V_R$     | 35         | 45         | V     |
| Maximum working peak reverse voltage | $V_{RWM}$ |            |            |       |

### ABSOLUTE MAXIMUM RATINGS

| PARAMETER   | SYMBOL      | TEST CONDITIONS   | VALUES | UNITS |
|---|-------------|---|--------|-------|
| Maximum average forward current<br>See fig. 5                     | $I_{F(AV)}$ | 50 % duty cycle at $T_C = 151^\circ C$ , rectangular waveform   | 10     | A     |
| Maximum peak one cycle non-repetitive surge current<br>See fig. 7 | $I_{FSM}$   | 5 $\mu s$ sine or 3 $\mu s$ rect. pulse   | 1050   |       |
|   |             | 10 ms sine or 6 ms rect. pulse  | 280    |       |
| Non-repetitive avalanche energy                                   | $E_{AS}$    | $T_J = 25^\circ C$ , $I_{AS} = 2 A$ , $L = 6.5 mH$  | 13     | mJ    |
| Repetitive avalanche current                                      | $I_{AR}$    | Current decaying linearly to zero in 1 $\mu s$<br>Frequency limited by $T_J$ maximum $V_A = 1.5 \times V_R$ typical | 2      | A     |

\* Pb containing terminations are not RoHS compliant, exemptions may apply

| ELECTRICAL SPECIFICATIONS                     |                |  |                                   |        |                  |
|---|----------------|--|-----------------------------------|--------|------------------|
| PARAMETER                                     | SYMBOL         | TEST CONDITIONS  |                                   | VALUES | UNITS            |
| Maximum forward voltage drop<br>See fig. 1    | $V_{FM}^{(1)}$ | 10 A   | $T_J = 25\text{ }^\circ\text{C}$  | 0.57   | V                |
|   |                | 20 A   |                                   | 0.67   |                  |
|   |                | 10 A   | $T_J = 125\text{ }^\circ\text{C}$ | 0.49   |                  |
|   |                | 20 A   |                                   | 0.61   |                  |
| Maximum reverse leakage current<br>See fig. 2 | $I_{RM}^{(1)}$ | $T_J = 25\text{ }^\circ\text{C}$   | $V_R = \text{Rated } V_R$         | 2      | mA               |
|   |                | $T_J = 125\text{ }^\circ\text{C}$  |                                   | 15     |                  |
| Maximum junction capacitance                  | $C_T$          | $V_R = 5 V_{DC}$ (test signal range 100 kHz to 1 MHz) $25\text{ }^\circ\text{C}$ |                                   | 900    | pF               |
| Typical 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<br>See fig. 4           |  | 2.0         | $^\circ\text{C/W}$     |
| 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<br>(lbf · in) |
|  | maximum        |                                      |  | 12 (10)     |                        |
| Marking device                                 |                | Case style TO-220AC                  |  | 10TQ035     |                        |
|  |                |                                      |  | 10TQ045     |                        |

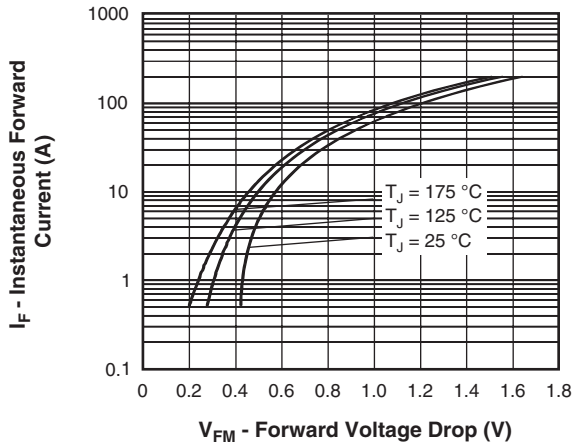


Fig. 1 - Maximum Forward Voltage Drop Characteristics

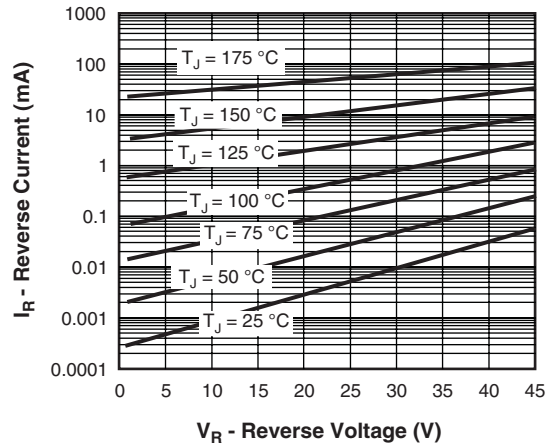


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

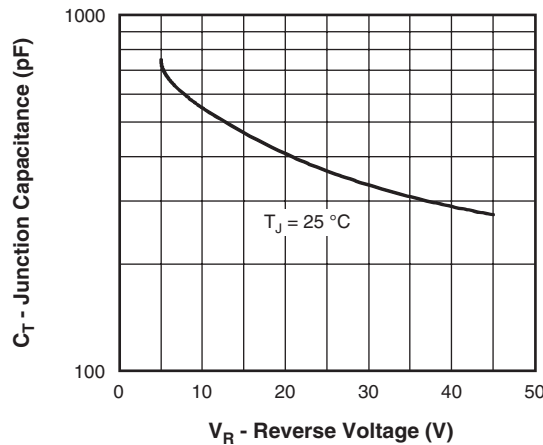


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

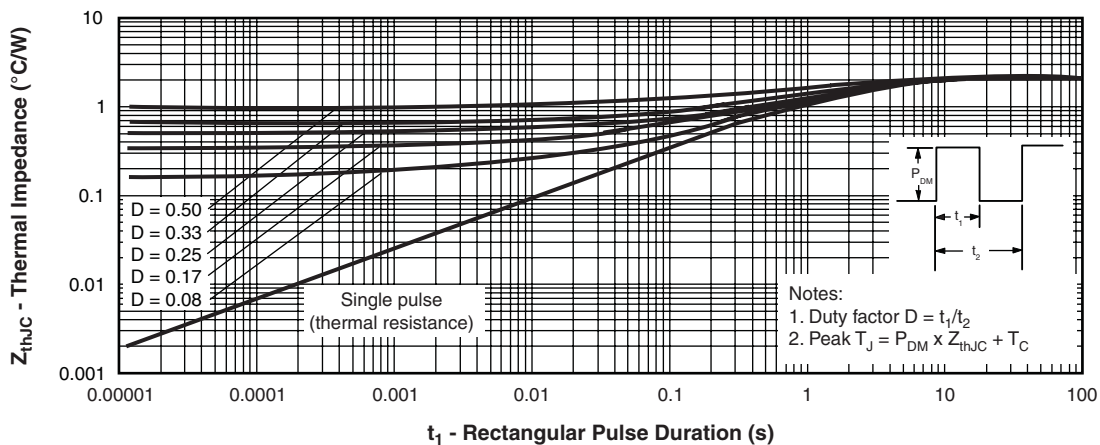


Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics

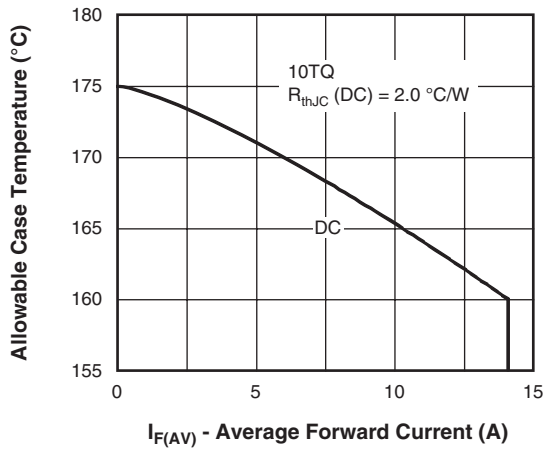


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

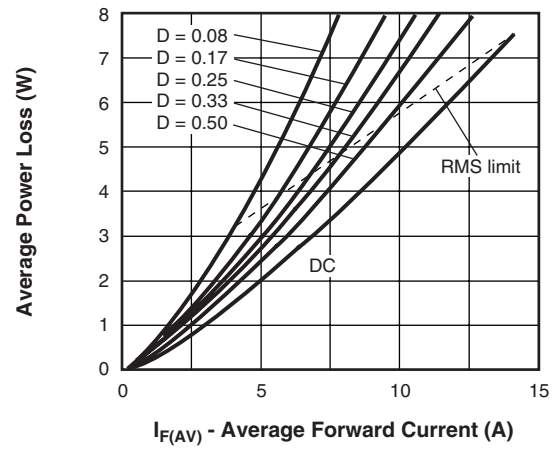


Fig. 6 - Forward Power Loss Characteristics

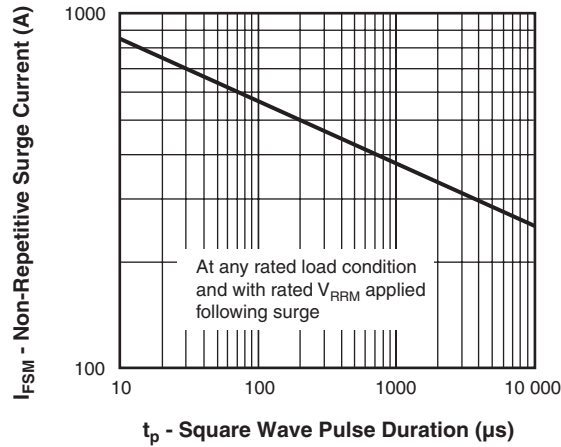


Fig. 7 - Maximum Non-Repetitive Surge Current

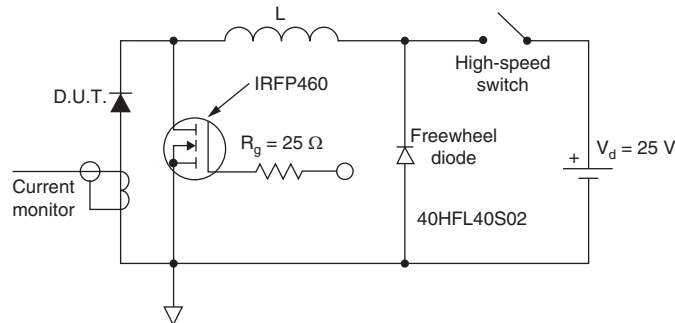
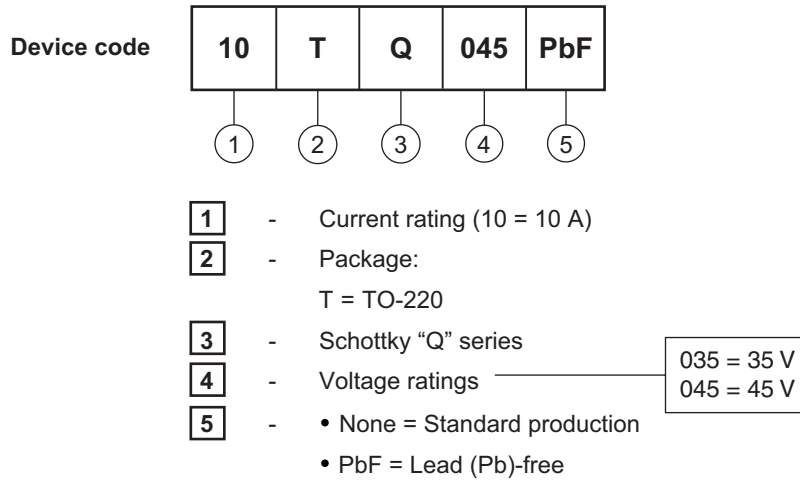


Fig. 8 - Unclamped Inductive Test Circuit



### 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> |



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