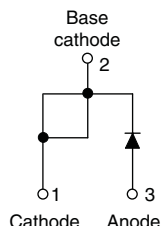


### Schottky Rectifier, 10 A



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

#### PRODUCT SUMMARY

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

#### 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.

#### 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 <sub>F(AV)</sub> | 50 % duty cycle at T <sub>C</sub> = 151 °C, rectangular waveform                                                                       |                                                                            | 10     | A     |
| Maximum peak one cycle non-repetitive surge current<br>See fig. 7 | I <sub>FSM</sub>   | 5 μs sine or 3 μs rect. pulse                                                                                                          | Following any rated load condition and with rated V <sub>RRM</sub> applied | 1050   |       |
|                                                                   |                    | 10 ms sine or 6 ms rect. pulse                                                                                                         |                                                                            | 280    |       |
| Non-repetitive avalanche energy                                   | E <sub>AS</sub>    | T <sub>J</sub> = 25 °C, I <sub>AS</sub> = 2 A, L = 6.5 mH                                                                              |                                                                            | 13     | mJ    |
| Repetitive avalanche current                                      | I <sub>AR</sub>    | Current decaying linearly to zero in 1 μs<br>Frequency limited by T <sub>J</sub> maximum V <sub>A</sub> = 1.5 x V <sub>R</sub> 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   |            | 0.61 |
|                                               |                | 20 A                                                                                      |                                     |        |            |      |
| 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                  | $C_T$          | $V_R = 5\text{ }V_{DC}$ (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/ $\mu$ s |      |

### Note

(1) Pulse width < 300  $\mu$ 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<br>See fig. 4           | 2.0         | °C/W                   |
| Typical thermal resistance, case to heatsink   |         | R <sub>thCS</sub>                 | 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                              |             |                        |

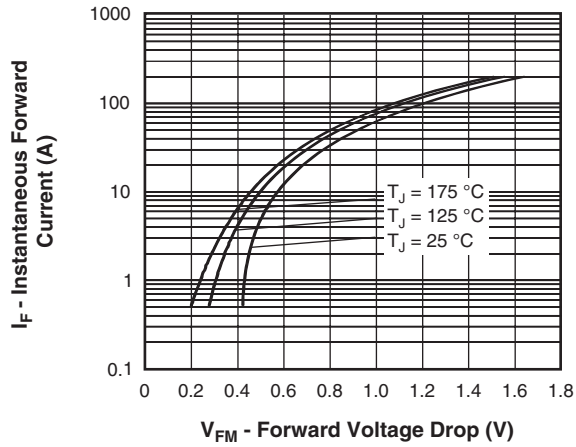


Fig. 1 - Maximum Forward Voltage Drop Characteristics

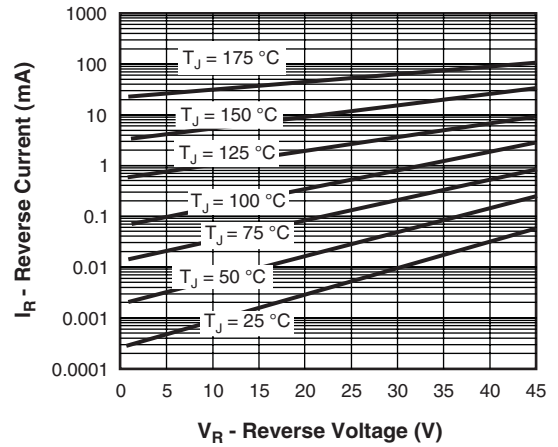


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

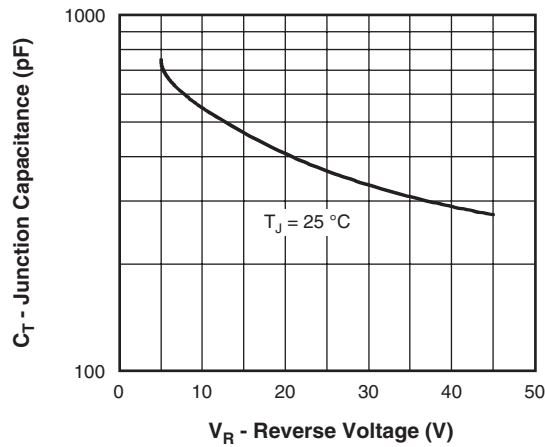
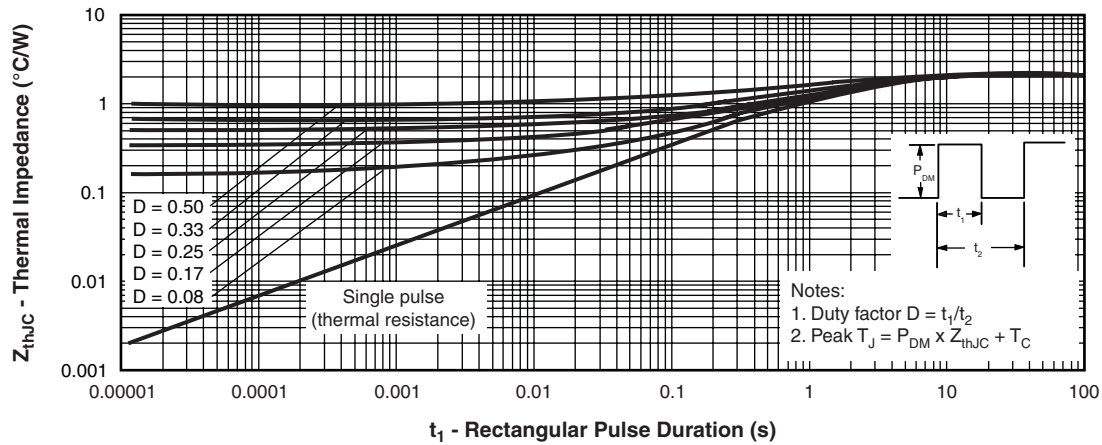


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage


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

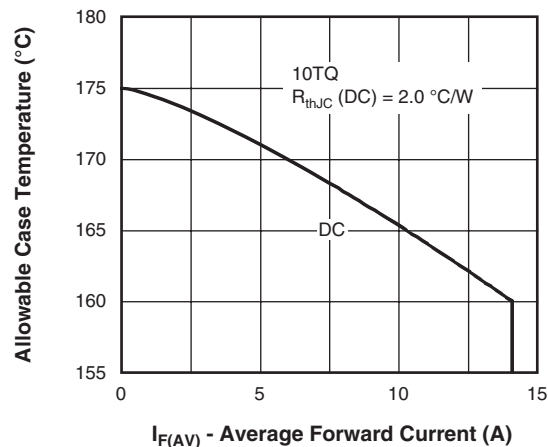


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

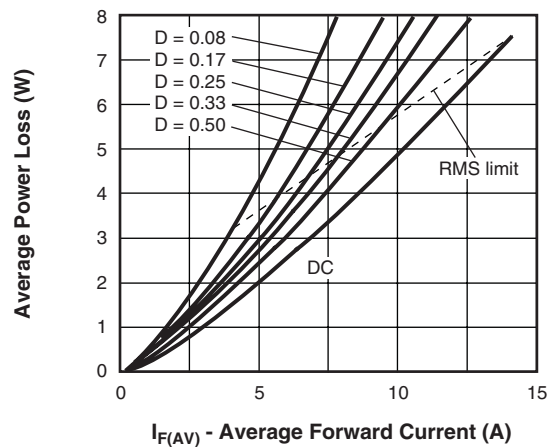


Fig. 6 - Forward Power Loss Characteristics

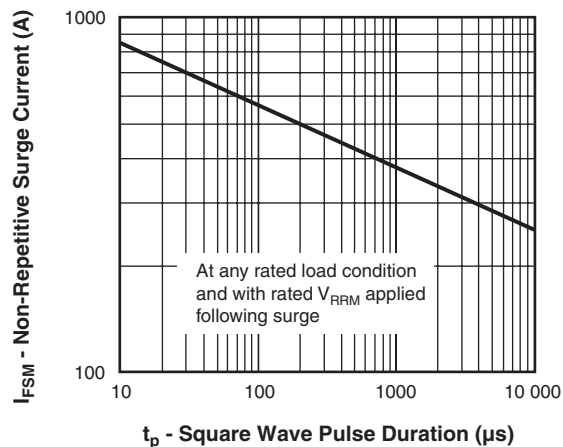


Fig. 7 - Maximum Non-Repetitive Surge Current

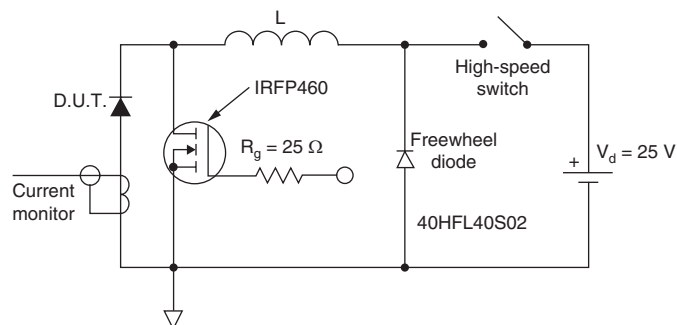


Fig. 8 - Unclamped Inductive Test Circuit



### ORDERING INFORMATION TABLE

|             |    |   |                                                        |                          |     |
|-------------|----|---|--------------------------------------------------------|--------------------------|-----|
| Device code | 10 | T | Q                                                      | 045                      | PbF |
|             | 1  | 2 | 3                                                      | 4                        | 5   |
|             | 1  | - | Current rating (10 = 10 A)                             |                          |     |
|             | 2  | - | Package:                                               |                          |     |
|             |    |   | T = TO-220                                             |                          |     |
|             | 3  | - | Schottky "Q" series                                    |                          |     |
|             | 4  | - | Voltage ratings                                        | 035 = 35 V<br>045 = 45 V |     |
|             | 5  | - | • None = Standard production<br>• PbF = Lead (Pb)-free |                          |     |

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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