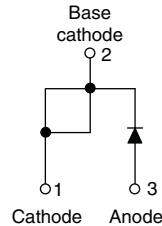


## Schottky Rectifier, 20 A



TO-220AC



### FEATURES

- 150 °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
- Designed and qualified for industrial level

### DESCRIPTION

The 20TQ... Schottky rectifier series has been optimized for very low forward voltage drop, with moderate leakage. The proprietary barrier technology allows for reliable operation up to 150 °C junction temperature. Typical applications are in switching power supplies, converters, freewheeling diodes, and reverse battery protection.

### PRODUCT SUMMARY

|             |            |
|-------------|------------|
| $I_{F(AV)}$ | 20 A       |
| $V_R$       | 35 to 45 V |

### MAJOR RATINGS AND CHARACTERISTICS

| SYMBOL      | CHARACTERISTICS                            | VALUES      | UNITS            |
|-------------|--|-------------|------------------|
| $I_{F(AV)}$ | Rectangular waveform                       | 20          | A                |
| $V_{RRM}$   | Range                                      | 35 to 45    | V                |
| $I_{FSM}$   | $t_p = 5 \mu s$ sine                       | 1800        | A                |
| $V_F$       | 20 Apk, $T_J = 125 \text{ }^\circ\text{C}$ | 0.51        | V                |
| $T_J$       | Range                                      | - 55 to 150 | $^\circ\text{C}$ |

### VOLTAGE RATINGS

| PARAMETER                            | SYMBOL    | 20TQ035 | 20TQ040 | 20TQ045 | UNITS |
|--------------------------------------|-----------|---------|---------|---------|-------|
| Maximum DC reverse voltage           | $V_R$     | 35      | 40      | 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 $T_C = 116 \text{ }^\circ\text{C}$ , rectangular waveform  | 20     | A     |
| Maximum peak one cycle<br>non-repetitive surge current<br>See fig. 7 | $I_{FSM}$   | 5 $\mu s$ sine or 3 $\mu s$ rect. pulse   | 1800   |       |
|  |             | 10 ms sine or 6 ms rect. pulse  | 400    |       |
| Non-repetitive avalanche energy                                      | $E_{AS}$    | $T_J = 25 \text{ }^\circ\text{C}$ , $I_{AS} = 4 \text{ A}$ , $L = 3.4 \text{ mH}$                                   | 27     | 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 | 4      | A     |

| ELECTRICAL SPECIFICATIONS                     |                |  |                                   |        |            |
|---|----------------|--|-----------------------------------|--------|------------|
| PARAMETER                                     | SYMBOL         | TEST CONDITIONS  |                                   | VALUES | UNITS      |
| Maximum forward voltage drop<br>See fig. 1    | $V_{FM}^{(1)}$ | 20 A   | $T_J = 25\text{ }^\circ\text{C}$  | 0.57   | V          |
|   |                | 40 A   |                                   | 0.73   |            |
|   |                | 20 A   | $T_J = 125\text{ }^\circ\text{C}$ | 0.51   |            |
|   |                | 40 A   |                                   | 0.67   |            |
| Maximum reverse leakage current<br>See fig. 2 | $I_{RM}^{(1)}$ | $T_J = 25\text{ }^\circ\text{C}$                                     | $V_R = \text{Rated } V_R$         | 2.7    | mA         |
|   |                | $T_J = 125\text{ }^\circ\text{C}$                                    |                                   | 105    |            |
| Maximum junction capacitance                  | $C_T$          | $V_R = 5\text{ }V_{DC}$ , (test signal range 100 kHz to 1 MHz) 25 °C |                                   | 1400   | 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 | $T_J, T_{Stg}$ |                                      |  | - 55 to 150 | $^\circ\text{C}$       |
| Maximum thermal resistance, junction to case   | $R_{thJC}$     | DC operation<br>See fig. 4           |  | 1.50        | $^\circ\text{C/W}$     |
| 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                  |  | 20TQ035     |                        |
|  |                |                                      |  | 20TQ040     |                        |
|  |                |                                      |  | 20TQ045     |                        |

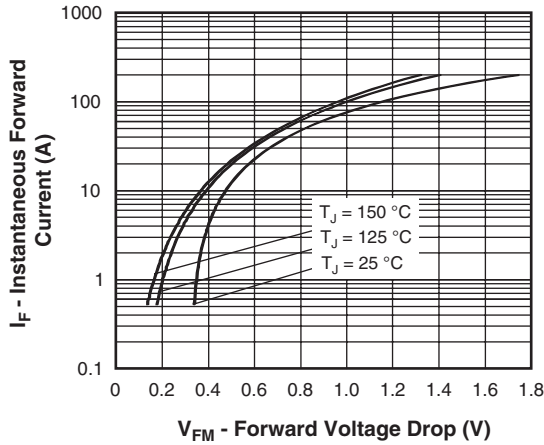


Fig. 1 - Maximum Forward Voltage Drop Characteristics

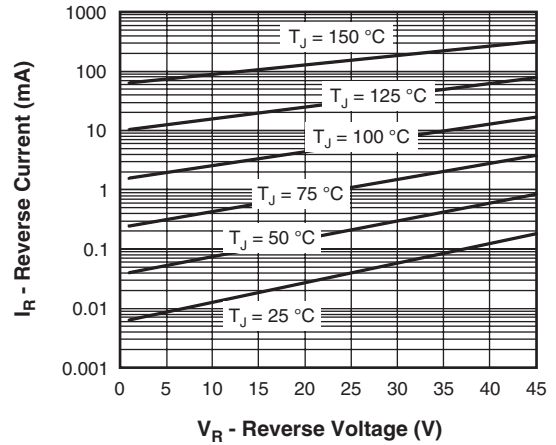


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

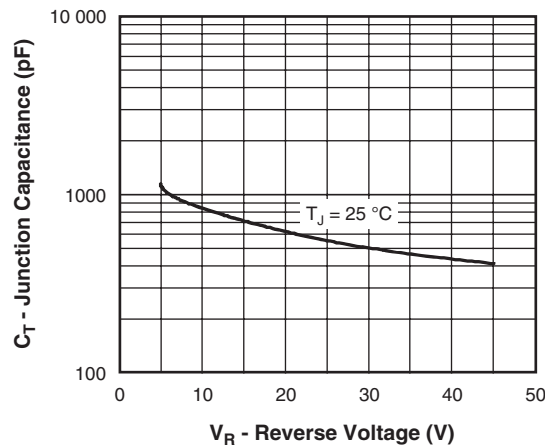


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

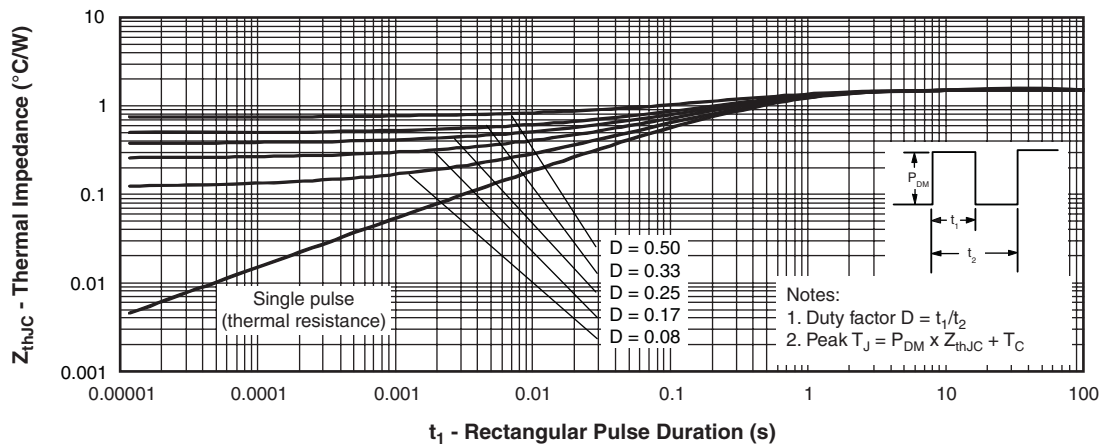


Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics

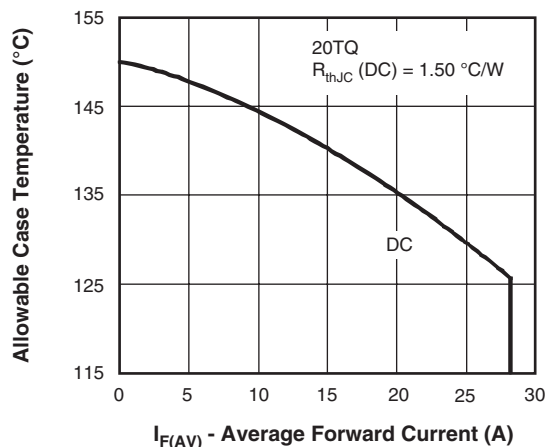


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

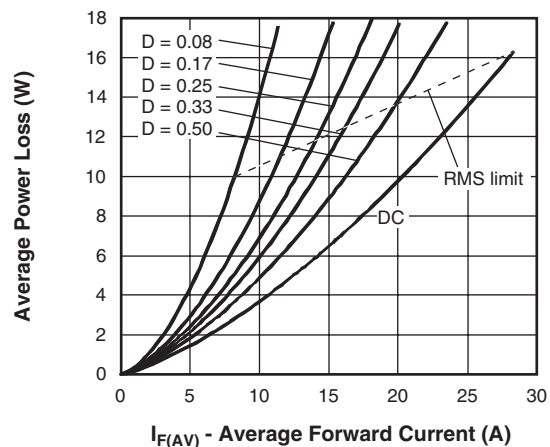


Fig. 6 - Forward Power Loss Characteristics

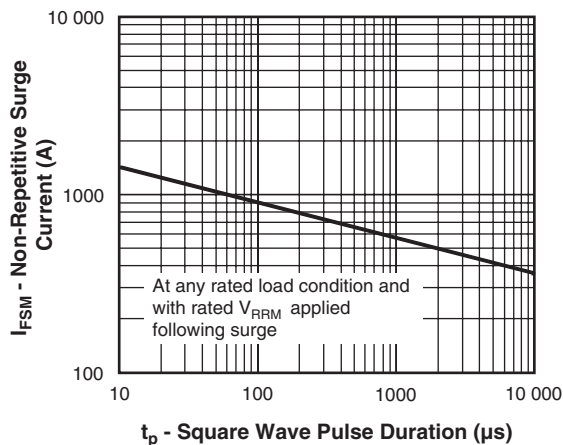


Fig. 7 - Maximum Non-Repetitive Surge Current

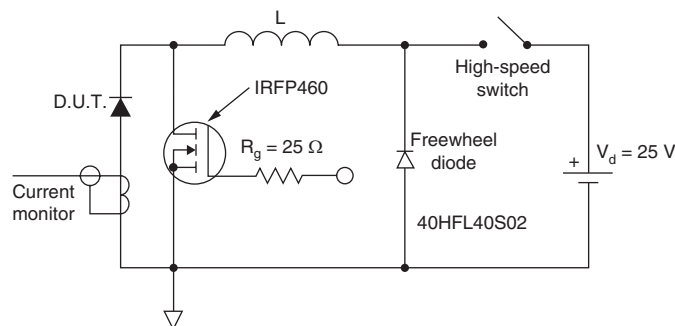
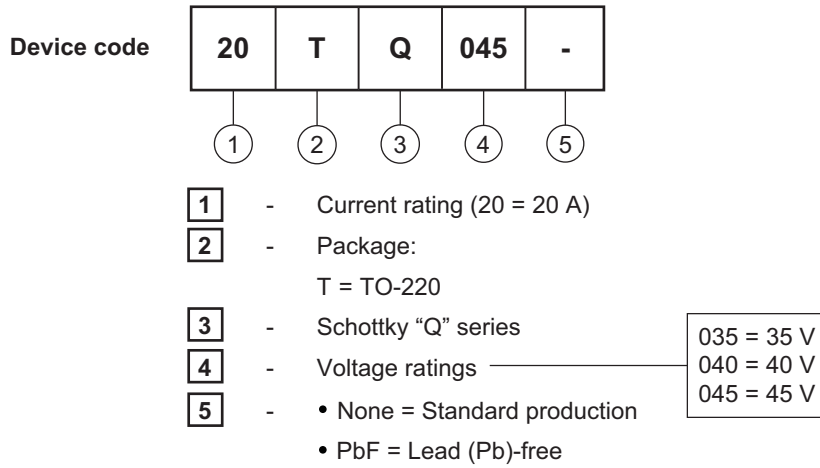


Fig. 8 - Unclamped Inductive Test Circuit



**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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