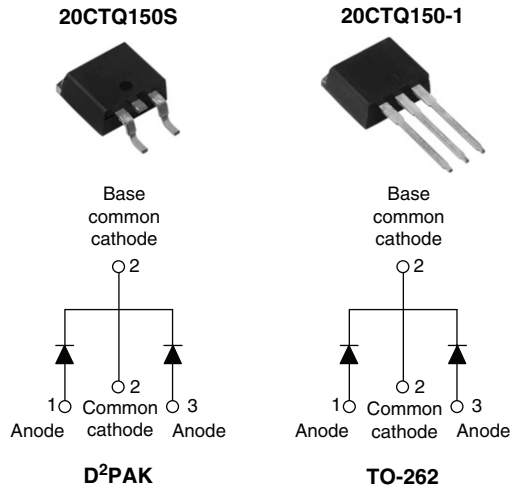


## Schottky Rectifier, 2 x 10 A



### FEATURES

- 175 °C  $T_J$  operation
- Center tap configuration
- 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 for industrial level

### DESCRIPTION

This center tap Schottky rectifier 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

|             |          |
|-------------|----------|
| $I_{F(AV)}$ | 2 x 10 A |
| $V_R$       | 150 V    |

### MAJOR RATINGS AND CHARACTERISTICS

| SYMBOL      | CHARACTERISTICS                                      | VALUES      | UNITS            |
|-------------|--|-------------|------------------|
| $I_{F(AV)}$ | Rectangular waveform                                 | 20          | A                |
| $V_{RRM}$   |  | 150         | V                |
| $I_{FSM}$   | $t_p = 5 \mu s$ sine                                 | 1030        | A                |
| $V_F$       | 10 Apk, $T_J = 125 \text{ }^\circ\text{C}$ (per leg) | 0.66        | V                |
| $T_J$       | Range  | - 55 to 175 | $^\circ\text{C}$ |

### VOLTAGE RATINGS

| PARAMETER                            | SYMBOL    | 20CTQ150S<br>20CTQ150-1 | UNITS |
|--------------------------------------|-----------|-------------------------|-------|
| Maximum DC reverse voltage           | $V_R$     | 150                     | 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 $T_C = 154 \text{ }^\circ\text{C}$ , rectangular waveform  | per leg   | 10    | A |
|   |             |   | per device  | 20    |   |
| Maximum peak one cycle non-repetitive surge current per leg<br>See fig. 7 | $I_{FSM}$   | 5 $\mu s$ sine or 3 $\mu s$ rect. pulse   | Following any rated load condition and with rated $V_{RRM}$ applied | 1030  |   |
|   |             | 10 ms sine or 6 ms rect. pulse  |   | 180   |   |
| Non-repetitive avalanche energy per leg                                   | $E_{AS}$    | $T_J = 25 \text{ }^\circ\text{C}$ , $I_{AS} = 0.7 \text{ A}$ , $L = 10 \text{ mH}$                                  | 2.45  | mJ    |   |
| Repetitive avalanche current per leg                                      | $I_{AR}$    | Current decaying linearly to zero in 1 $\mu s$<br>Frequency limited by $T_J$ maximum $V_A = 1.5 \times V_R$ typical | 0.7   | A     |   |

| ELECTRICAL SPECIFICATIONS                             |                |  |                                   |      |        |                  |
|---|----------------|--|-----------------------------------|------|--------|------------------|
| PARAMETER   | SYMBOL         | TEST CONDITIONS  |                                   | TYP. | MAX.   | UNITS            |
| Maximum forward voltage drop per leg<br>See fig. 1    | $V_{FM}^{(1)}$ | 10 A   | $T_J = 25\text{ }^\circ\text{C}$  | 0.80 | 0.88   | V                |
|   |                | 20 A   |                                   | 0.90 | 1.0    |                  |
|   |                | 10 A   | $T_J = 125\text{ }^\circ\text{C}$ | 0.63 | 0.66   |                  |
|   |                | 20 A   |                                   | 0.73 | 0.77   |                  |
| Maximum reverse leakage current per leg<br>See fig. 2 | $I_{RM}^{(1)}$ | $T_J = 25\text{ }^\circ\text{C}$                               | $V_R = \text{Rated } V_R$         | 3.0  | 25     | $\mu\text{A}$    |
|   |                | $T_J = 125\text{ }^\circ\text{C}$                              |                                   | 2.7  | 5.0    | mA               |
| Typical junction capacitance per leg                  | $C_T$          | $V_R = 5 V_{DC}$ (test signal range 100 kHz to 1 MHz) at 25 °C |                                   | -    | 280    | pF               |
| Typical series inductance per leg                     | $L_S$          | 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, _____ per leg<br>junction to case _____ per package | $R_{thJC}$     | DC operation  | 2.0         | $^\circ\text{C}/\text{W}$ |
|   |                |   | 1.0         |                           |
| Typical thermal resistance, case to heatsink                                    | $R_{thCS}$     | Mounting surface, smooth and greased<br>(Only for TO-262) | 0.50        |                           |
| Approximate weight  |                |   | 2           | g                         |
|   |                |   | 0.07        | oz.                       |
| Mounting torque   | minimum        |   | 6 (5)       | kgf · cm                  |
|   | maximum        |   | 12 (10)     | (lbf · in)                |
| Marking device  |                | Case style D <sup>2</sup> PAK                             | 20CTQ150S   |                           |
|   |                | Case style TO-262   | 20CTQ150-1  |                           |

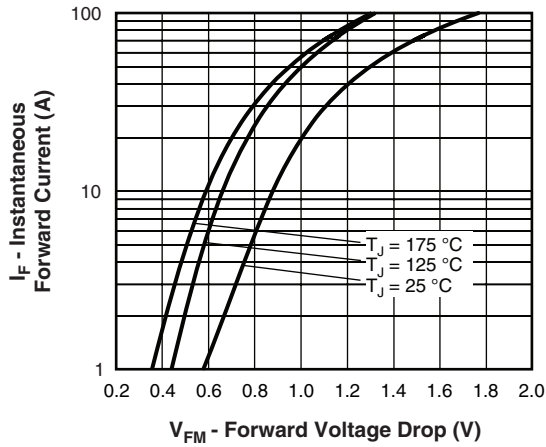


Fig. 1 - Maximum Forward Voltage Drop Characteristics (Per Leg)

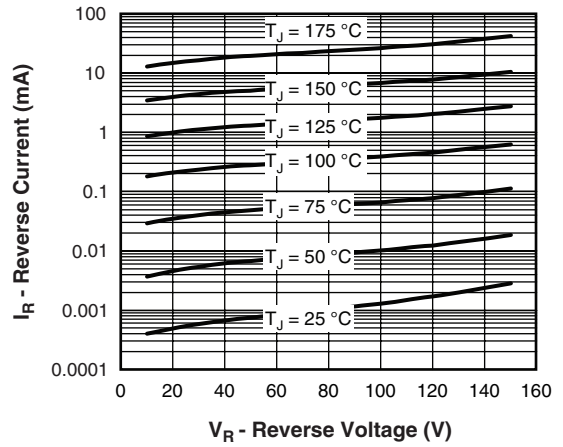


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage (Per Leg)

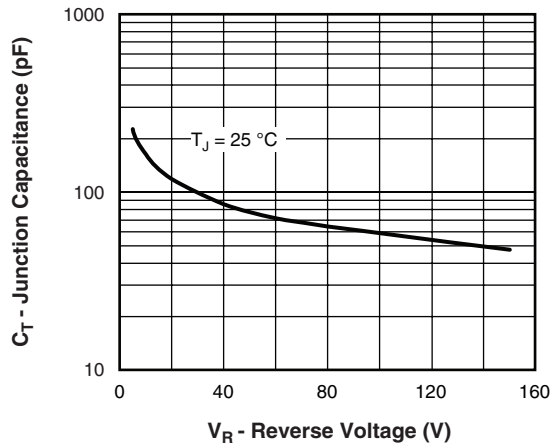


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Leg)

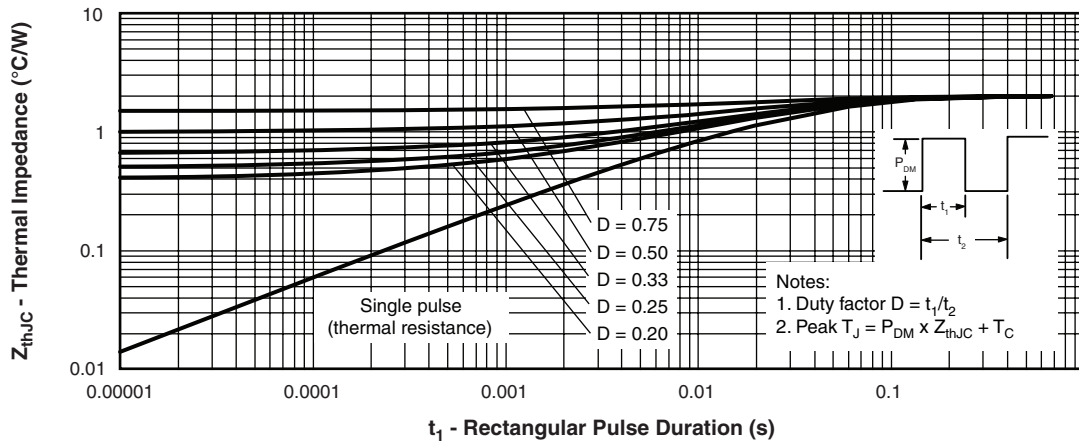


Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics (Per Leg)

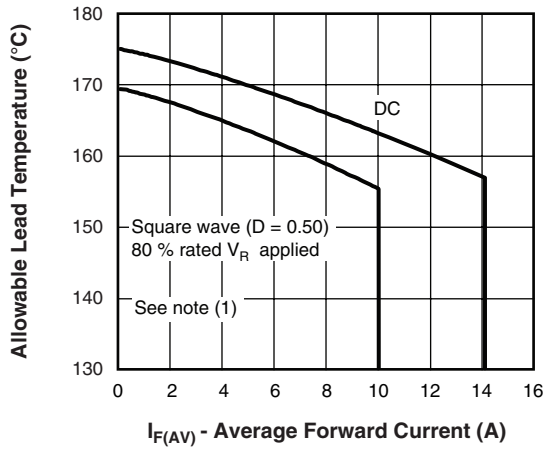


Fig. 5 - Maximum Average Forward Current vs. Allowable Lead Temperature

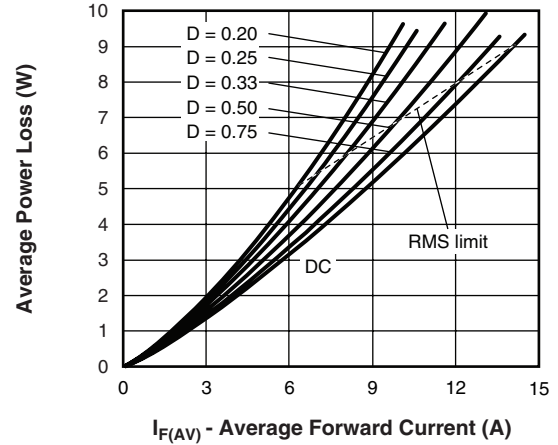


Fig. 6 - Maximum Average Forward Dissipation vs. Average Forward Current

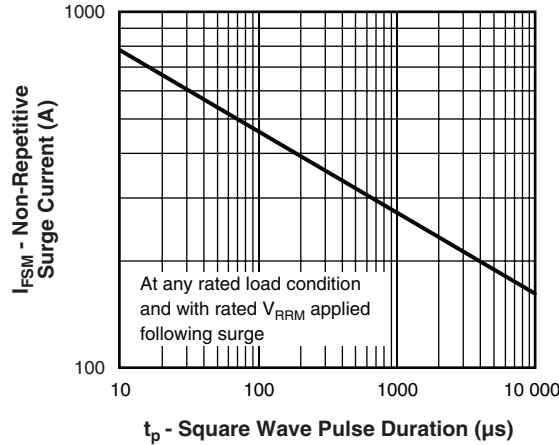


Fig. 7 - Maximum Peak Surge Forward Current vs. Pulse Duration

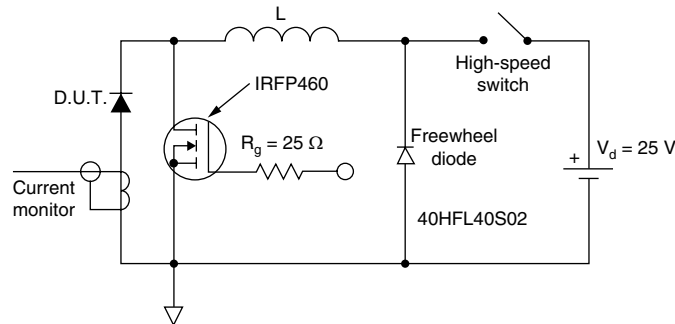


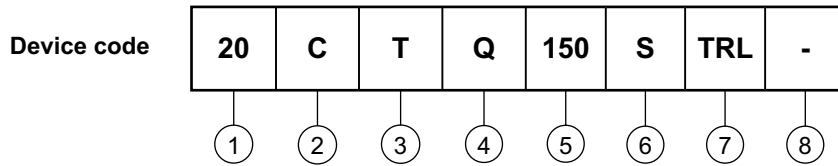
Fig. 8 - Unclamped Inductive Test Circuit

**Note**

- (1) Formula used:  $T_C = T_J - (P_d + P_{dREV}) \times R_{thJC}$ ;  
 $P_d = \text{Forward power loss} = I_{F(AV)} \times V_{FM} \text{ at } (I_{F(AV)}/D)$  (see fig. 6);  
 $P_{dREV} = \text{Inverse power loss} = V_{R1} \times I_R (1 - D)$ ;  $I_R$  at  $V_{R1} = 80\%$  rated  $V_R$



### ORDERING INFORMATION TABLE



- 1** - Current rating (20 = 20 A)
- 2** - C = Common cathode
- 3** - T = TO-220
- 4** - Q = Schottky "Q" series
- 5** - Voltage rating (150 = 150 V)
- 6** -
  - -1 = TO-262
  - S = D<sup>2</sup>PAK
- 7** -
  - None = Tube (50 pieces)
  - TRL = Tape and reel (left oriented - for D<sup>2</sup>PAK only)
  - TRR = Tape and reel (right oriented - for D<sup>2</sup>PAK only)
- 8** -
  - None = Standard production
  - PbF = Lead (Pb)-free

| LINKS TO RELATED DOCUMENTS |   |
|----------------------------|---|
| Dimensions                 | <a href="http://www.vishay.com/doc?95014">http://www.vishay.com/doc?95014</a> |
| Part marking information   | <a href="http://www.vishay.com/doc?95008">http://www.vishay.com/doc?95008</a> |
| Packaging information      | <a href="http://www.vishay.com/doc?95032">http://www.vishay.com/doc?95032</a> |



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