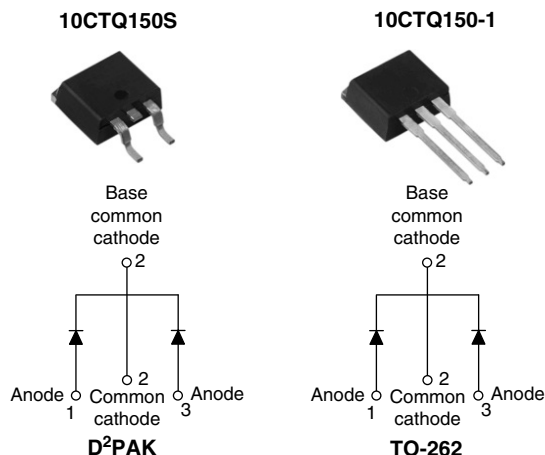


## Schottky Rectifier, 2 x 5 A



### FEATURES

- 175 °C T<sub>J</sub> 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 and qualified 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 <sub>F(AV)</sub> | 2 x 5 A |
| V <sub>R</sub>     | 150 V   |

### MAJOR RATINGS AND CHARACTERISTICS

| SYMBOL             | CHARACTERISTICS                          | VALUES      | UNITS |
|--------------------|------------------------------------------|-------------|-------|
| I <sub>F(AV)</sub> | Rectangular waveform                     | 10          | A     |
| V <sub>RRM</sub>   |                                          | 150         | V     |
| I <sub>FSM</sub>   | t <sub>p</sub> = 5 μs sine               | 620         | A     |
| V <sub>F</sub>     | 5 Apk, T <sub>J</sub> = 125 °C (per leg) | 0.73        | V     |
| T <sub>J</sub>     | Range                                    | - 55 to 175 | °C    |

### VOLTAGE RATINGS

| PARAMETER                            | SYMBOL           | 10CTQ150S<br>10CTQ150-1 | UNITS |
|--------------------------------------|------------------|-------------------------|-------|
| Maximum DC reverse voltage           | V <sub>R</sub>   | 150                     | V     |
| Maximum working peak reverse voltage | V <sub>RWM</sub> |                         |       |

### 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> = 155 °C, rectangular waveform                                                                       | 5      | A     |
|                                                                           |                    |                                                                                                                                        | 10     |       |
| Maximum peak one cycle non-repetitive surge current per leg<br>See fig. 7 | I <sub>FSM</sub>   | 5 μs sine or 3 μs rect. pulse                                                                                                          | 620    | A     |
|                                                                           |                    | 10 ms sine or 6 ms rect. pulse                                                                                                         |        |       |
| Non-repetitive avalanche energy per leg                                   | E <sub>AS</sub>    | T <sub>J</sub> = 25 °C, I <sub>AS</sub> = 0.30 A, L = 150 mH                                                                           | 6.75   | mJ    |
| Repetitive avalanche current per leg                                      | 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 | 0.30   | A     |

| ELECTRICAL SPECIFICATIONS                             |                |                                                                    |                                     |        |       |      |
|-------------------------------------------------------|----------------|--------------------------------------------------------------------|-------------------------------------|--------|-------|------|
| PARAMETER                                             | SYMBOL         | TEST CONDITIONS                                                    |                                     | VALUES | UNITS |      |
| Maximum forward voltage drop per leg<br>See fig. 1    | $V_{FM}^{(1)}$ | 5 A                                                                | $T_J = 25\text{ }^{\circ}\text{C}$  | 0.93   | V     |      |
|                                                       |                | 10 A                                                               |                                     | 1.10   |       |      |
|                                                       |                | 5 A                                                                | $T_J = 125\text{ }^{\circ}\text{C}$ | 0.73   |       | 0.86 |
|                                                       |                | 10 A                                                               |                                     |        |       |      |
| Maximum reverse leakage current per leg<br>See fig. 2 | $I_{RM}^{(1)}$ | $T_J = 25\text{ }^{\circ}\text{C}$                                 | $V_R = \text{Rated } V_R$           | 0.05   | mA    |      |
|                                                       |                | $T_J = 125\text{ }^{\circ}\text{C}$                                |                                     | 7      |       |      |
| Threshold voltage                                     | $V_{F(TO)}$    | $T_J = T_J \text{ maximum}$                                        |                                     | 0.468  | V     |      |
| Forward slope resistance                              | $r_t$          |                                                                    |                                     | 28     | mΩ    |      |
| Maximum junction capacitance per leg                  | $C_T$          | $V_R = 5\text{ }V_{DC}$ (test signal range 100 kHz to 1 MHz) 25 °C |                                     | 200    | 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/μs  |      |

**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 <sub>J</sub> , T <sub>Stg</sub> |                                      | - 55 to 175 | °C                     |
| Maximum thermal resistance, junction to case per leg           | R <sub>thJC</sub>                 | DC operation                         | 3.50        | °C/W                   |
| Maximum thermal resistance, junction to case per package       |                                   |                                      | 1.75        |                        |
| Typical thermal resistance, case to heatsink (only for TO-220) | 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 D <sup>2</sup> PAK        | 10CTQ150S   |                        |
|                                                                |                                   | Case style TO-262                    | 10CTQ150-1  |                        |

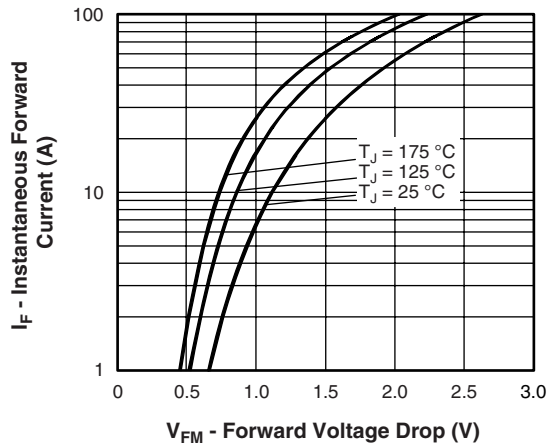


Fig. 1 - Maximum Forward Voltage Drop Characteristics (Per Leg)

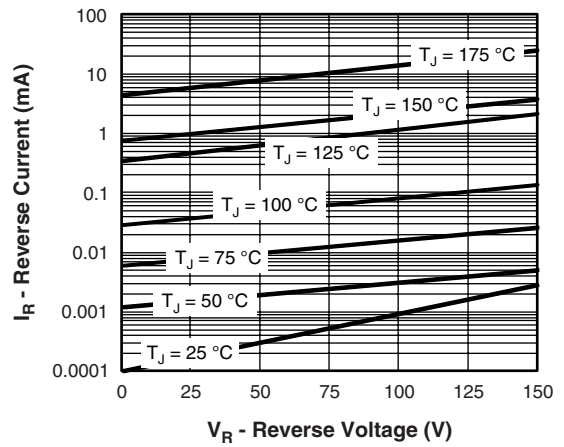


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage (Per Leg)

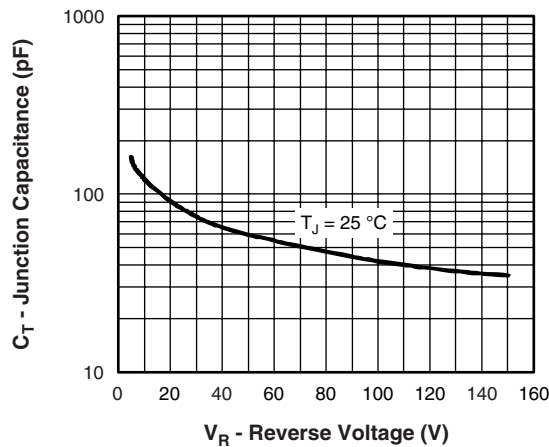


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Leg)

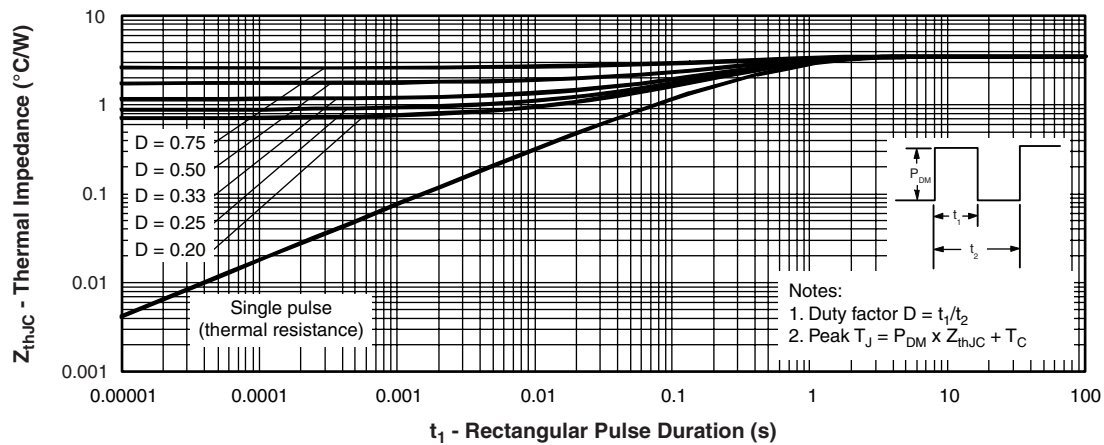


Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics (Per Leg)

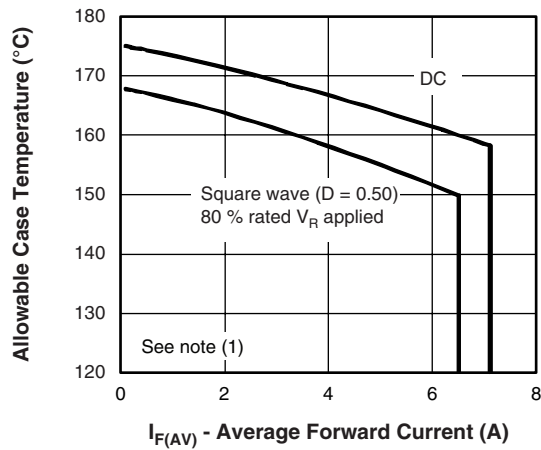


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current (Per Leg)

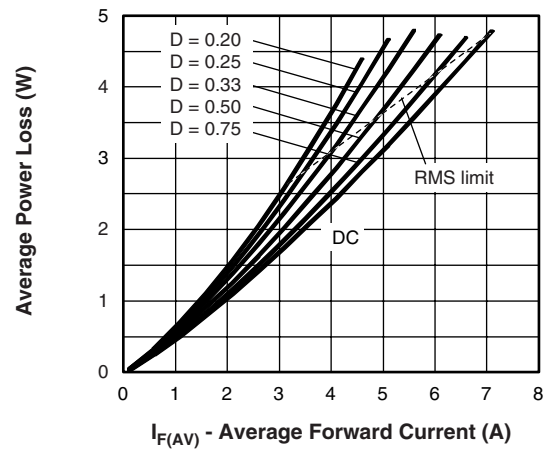


Fig. 6 - Forward Power Loss Characteristics (Per Leg)

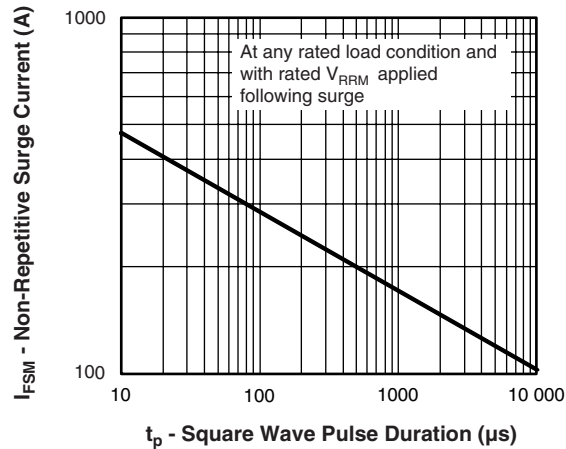


Fig. 7 - Maximum Non-Repetitive Surge Current (Per Leg)

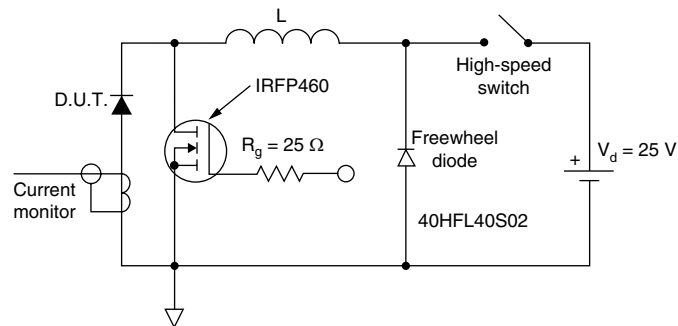


Fig. 8 - Unclamped Inductive Test Circuit

## Note

- (1) Formula used:  $T_C = T_J - (P_d + P_{dREV}) \times R_{thJC}$ ;  
 $P_d$  = Forward power loss =  $I_{F(AV)} \times V_{FM}$  at  $(I_{F(AV)}/D)$  (see fig. 6);  
 $P_{dREV}$  = Inverse power loss =  $V_{R1} \times I_R (1 - D)$ ;  $I_R$  at  $V_{R1} = 10$  V

**ORDERING INFORMATION TABLE**

|             |                                                                      |   |   |   |     |   |     |   |
|-------------|----------------------------------------------------------------------|---|---|---|-----|---|-----|---|
| Device code | 10                                                                   | C | T | Q | 150 | S | TRL | - |
|             | ①                                                                    | ② | ③ | ④ | ⑤   | ⑥ | ⑦   | ⑧ |
| ①           | - Current rating (10 A)                                              |   |   |   |     |   |     |   |
| ②           | - Circuit configuration                                              |   |   |   |     |   |     |   |
|             | C = Common cathode                                                   |   |   |   |     |   |     |   |
| ③           | - T = TO-220                                                         |   |   |   |     |   |     |   |
| ④           | - Schottky "Q" series                                                |   |   |   |     |   |     |   |
| ⑤           | - Voltage rating (150 = 150 V)                                       |   |   |   |     |   |     |   |
| ⑥           | - • S = D <sup>2</sup> PAK                                           |   |   |   |     |   |     |   |
|             | • -1 = TO-262                                                        |   |   |   |     |   |     |   |
| 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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