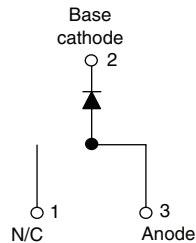


## Schottky Rectifier, 15 A


**D<sup>2</sup>PAK**


### FEATURES

- 150 °C T<sub>J</sub> operation
- Very 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 Q101 level

### DESCRIPTION

The 12TQ...S 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 <sub>F(AV)</sub> | 15 A       |
| V <sub>R</sub>     | 35 to 45 V |

### MAJOR RATINGS AND CHARACTERISTICS

| SYMBOL             | CHARACTERISTICS                 | VALUES      | UNITS |
|--------------------|---------------------------------|-------------|-------|
| I <sub>F(AV)</sub> | Rectangular waveform            | 15          | A     |
| V <sub>R(RM)</sub> | Range                           | 35 to 45    | V     |
| I <sub>FSM</sub>   | t <sub>p</sub> = 5 μs sine      | 990         | A     |
| V <sub>F</sub>     | 15 Apk, T <sub>J</sub> = 125 °C | 0.50        | V     |
| T <sub>J</sub>     | Range                           | - 55 to 150 | °C    |

### VOLTAGE RATINGS

| PARAMETER                            | SYMBOL             | 12TQ035S | 12TQ040S | 12TQ045S | UNITS |
|--------------------------------------|--------------------|----------|----------|----------|-------|
| Maximum DC reverse voltage           | V <sub>R</sub>     | 35       | 40       | 45       | V     |
| Maximum working peak reverse voltage | V <sub>R(WM)</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> = 120 °C, rectangular waveform                                                                       | 15     | A     |
| Maximum peak one cycle<br>non-repetitive surge current<br>See fig. 7 | I <sub>FSM</sub>   | 5 μs sine or 3 μs rect. pulse                                                                                                          | 990    | A     |
|                                                                      |                    | 10 ms sine or 6 ms rect. pulse                                                                                                         |        |       |
| Non-repetitive avalanche energy                                      | E <sub>AS</sub>    | T <sub>J</sub> = 25 °C, I <sub>AS</sub> = 2.4 A, L = 5.5 mH                                                                            | 16     | 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 | 2.4    | A     |



| ELECTRICAL SPECIFICATIONS                     |                |                                                                                  |                                   |        |            |
|-----------------------------------------------|----------------|----------------------------------------------------------------------------------|-----------------------------------|--------|------------|
| PARAMETER                                     | SYMBOL         | TEST CONDITIONS                                                                  |                                   | VALUES | UNITS      |
| Maximum forward voltage drop<br>See fig. 1    | $V_{FM}^{(1)}$ | 15 A                                                                             | $T_J = 25\text{ }^\circ\text{C}$  | 0.56   | V          |
|                                               |                | 30 A                                                                             |                                   | 0.71   |            |
|                                               |                | 15 A                                                                             | $T_J = 125\text{ }^\circ\text{C}$ | 0.50   |            |
|                                               |                | 30 A                                                                             |                                   | 0.64   |            |
| Maximum reverse leakage current<br>See fig. 2 | $I_{RM}^{(1)}$ | $T_J = 25\text{ }^\circ\text{C}$                                                 | $V_R = \text{Rated } V_R$         | 1.75   | mA         |
|                                               |                | $T_J = 125\text{ }^\circ\text{C}$                                                |                                   | 70     |            |
| 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/ $\mu$ 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           |  | 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 D <sup>2</sup> PAK        |  | 12TQ035S    |                        |
|                                                |                |                                      |  | 12TQ040S    |                        |
|                                                |                |                                      |  | 12TQ045S    |                        |

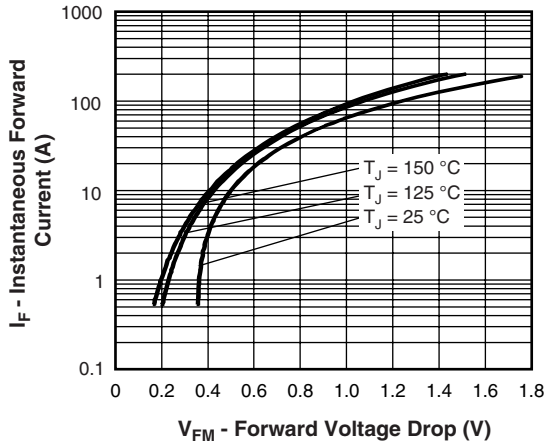


Fig. 1 - Maximum Forward Voltage Drop Characteristics

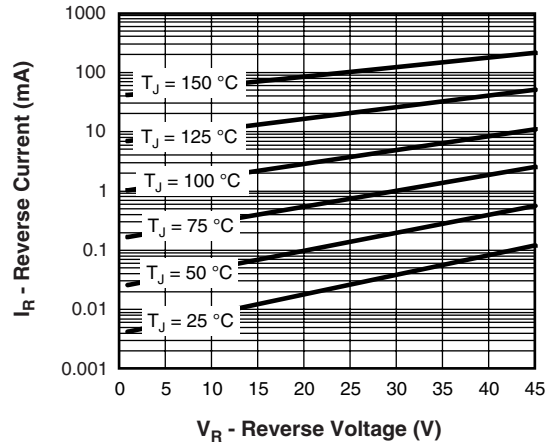


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

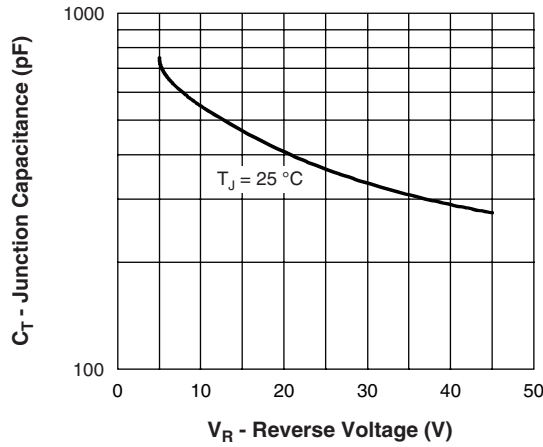


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

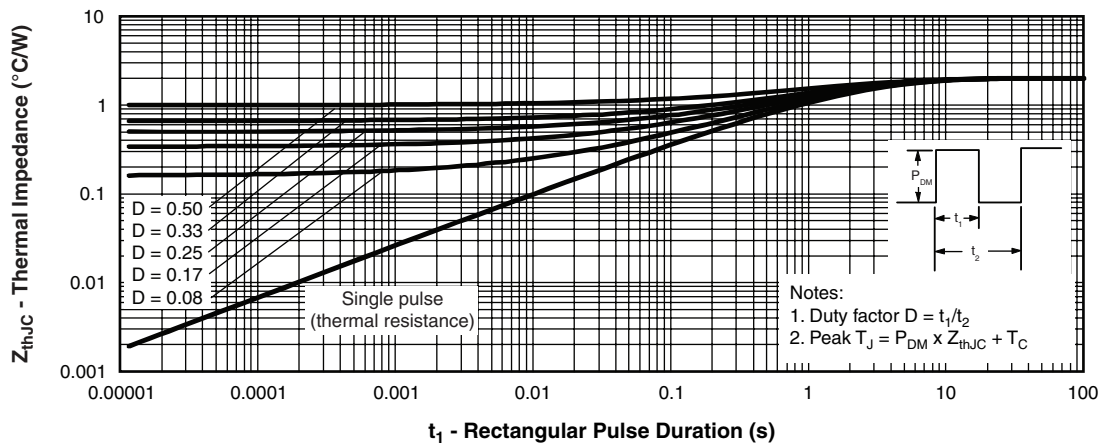


Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics

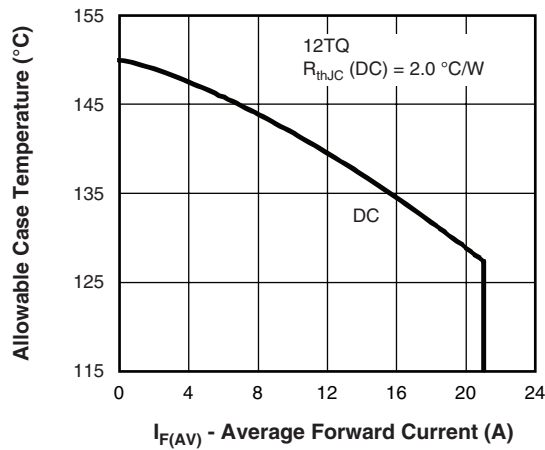


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

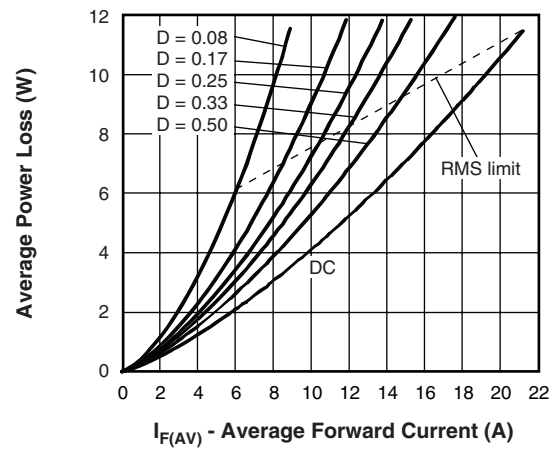


Fig. 6 - Forward Power Loss Characteristics

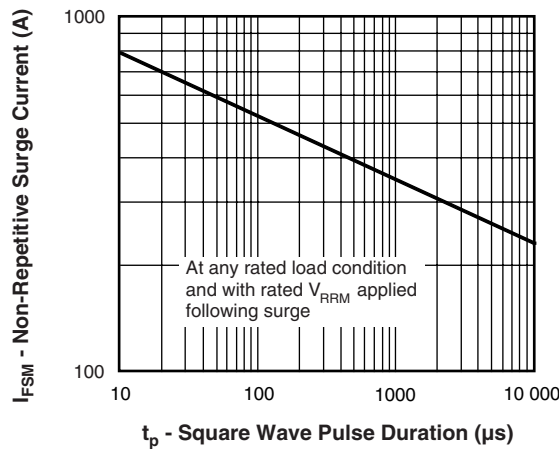


Fig. 7 - Maximum Non-Repetitive Surge Current

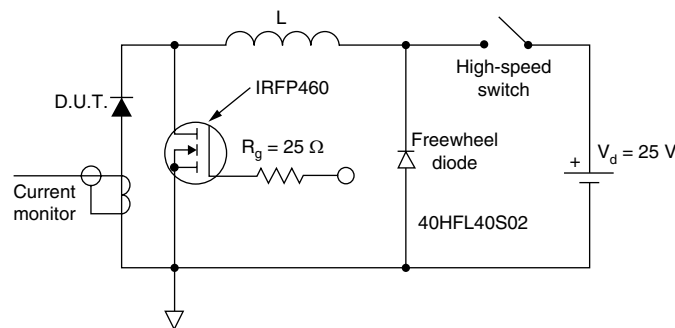
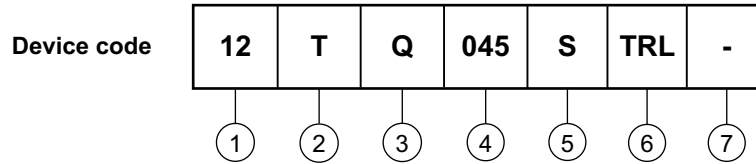


Fig. 8 - Unclamped Inductive Test Circuit



**ORDERING INFORMATION TABLE**



- 1** - Current rating
- 2** - Package:  
T = TO-220
- 3** - Schottky "Q" series
- 4** - Voltage ratings 

|            |
|------------|
| 035 = 35 V |
| 040 = 40 V |
| 045 = 45 V |
- 5** - • S = D<sup>2</sup>PAK
- 6** - • None = Tube (50 pieces)  
• TRL = Tape and reel (left oriented)  
• TRR = Tape and reel (right oriented)
- 7** - • 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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