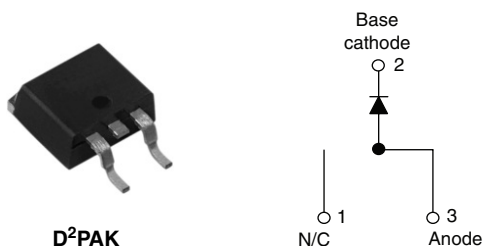


## Schottky Rectifier, 15 A



### FEATURES

- 150 °C  $T_J$  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

|             |            |
|-------------|------------|
| $I_{F(AV)}$ | 15 A       |
| $V_R$       | 35 to 45 V |

### MAJOR RATINGS AND CHARACTERISTICS

| SYMBOL      | CHARACTERISTICS             | VALUES      | UNITS |
|-------------|-----------------------------|-------------|-------|
| $I_{F(AV)}$ | Rectangular waveform        | 15          | A     |
| $V_{RRM}$   | Range                       | 35 to 45    | V     |
| $I_{FSM}$   | $t_p = 5 \mu s$ sine        | 990         | A     |
| $V_F$       | 15 Apk, $T_J = 125^\circ C$ | 0.50        | V     |
| $T_J$       | Range                       | - 55 to 150 | °C    |

### VOLTAGE RATINGS

| PARAMETER                            | SYMBOL    | 12TQ035S | 12TQ040S | 12TQ045S | UNITS |
|--------------------------------------|-----------|----------|----------|----------|-------|
| Maximum DC reverse voltage           | $V_R$     | 35       | 40       | 45       | V     |
| Maximum working peak reverse voltage | $V_{RWM}$ |          |          |          |       |

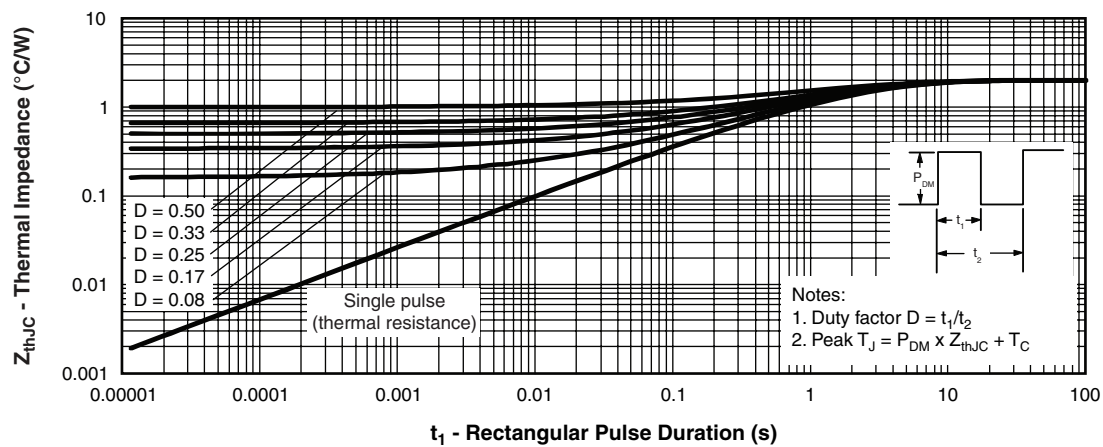
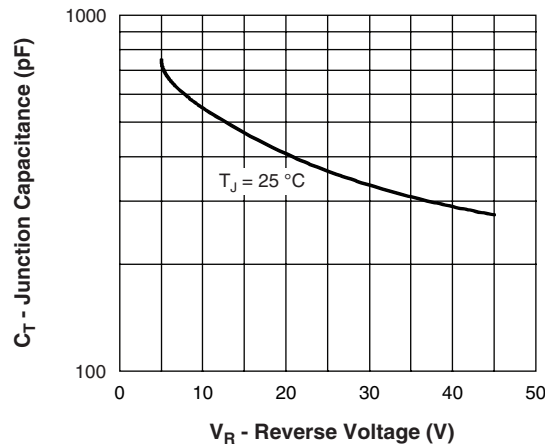
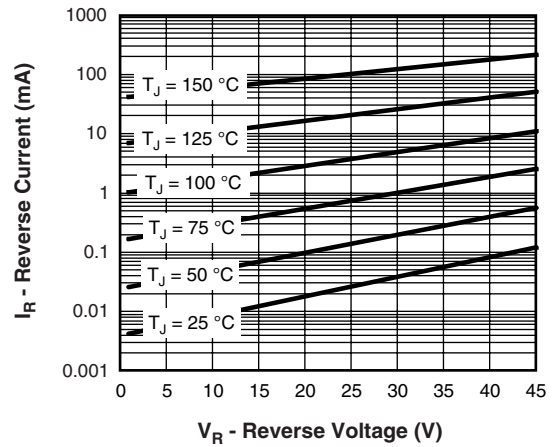
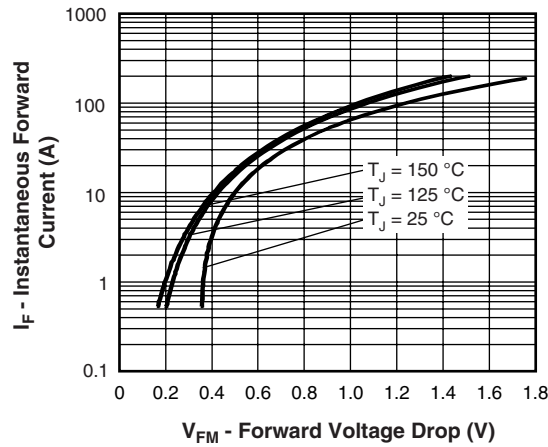
### ABSOLUTE MAXIMUM RATINGS

| PARAMETER                                                            | SYMBOL             | TEST CONDITIONS                                                                                                                        |                                                                                  | VALUES | UNITS |
|----------------------------------------------------------------------|--------------------|----------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|--------|-------|
| Maximum average forward current<br>See fig. 5                        | I <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                                                                                                          | Following any rated<br>load condition and with<br>rated V <sub>RRM</sub> applied | 990    | A     |
|                                                                      |                    | 10 ms sine or 6 ms rect. pulse                                                                                                         |                                                                                  | 250    |       |
| 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                  | $C_T$          | $V_R = 5\text{ }V_{DC}$ (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/μs  |

**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 150 | °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 D <sup>2</sup> PAK     | 12TQ035S                             |             |                        |
|                                                |         |                                   | 12TQ040S                             |             |                        |
|                                                |         |                                   | 12TQ045S                             |             |                        |



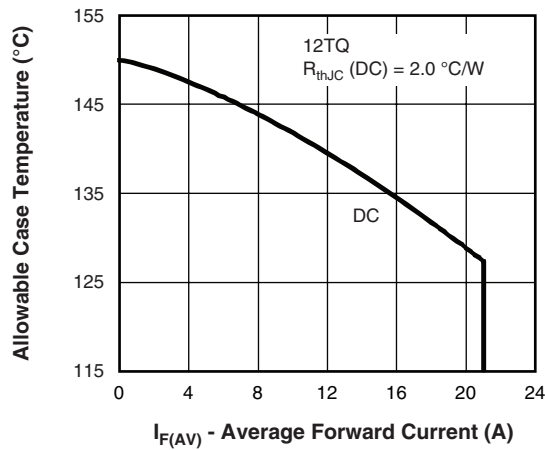


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

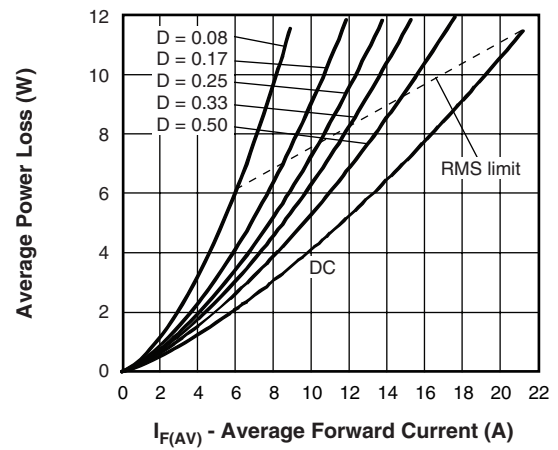


Fig. 6 - Forward Power Loss Characteristics

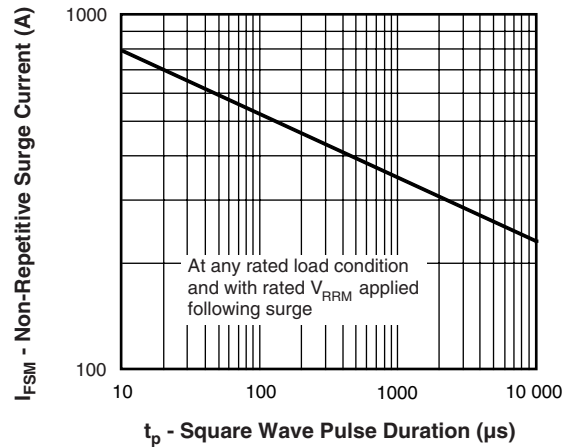


Fig. 7 - Maximum Non-Repetitive Surge Current

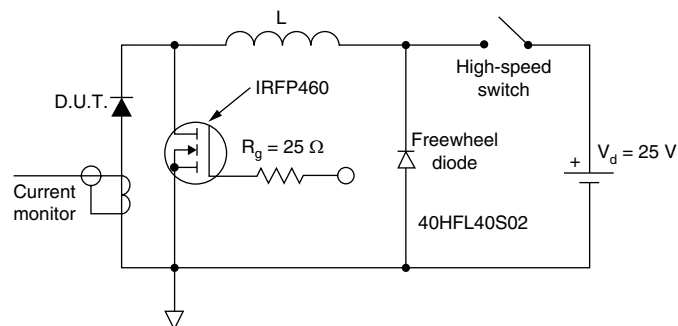


Fig. 8 - Unclamped Inductive Test Circuit

**ORDERING INFORMATION TABLE**

|             |    |   |                                        |     |   |     |   |
|-------------|----|---|----------------------------------------|-----|---|-----|---|
| Device code | 12 | T | Q                                      | 045 | S | TRL | - |
|             | ①  | ② | ③                                      | ④   | ⑤ | ⑥   | ⑦ |
|             | 1  | - | Current rating                         |     |   |     |   |
|             | 2  | - | Package:                               |     |   |     |   |
|             |    |   | T = TO-220                             |     |   |     |   |
|             | 3  | - | Schottky "Q" series                    |     |   |     |   |
|             | 4  | - | Voltage ratings                        |     |   |     |   |
|             | 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                 |     |   |     |   |

|            |
|------------|
| 035 = 35 V |
| 040 = 40 V |
| 045 = 45 V |

| 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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