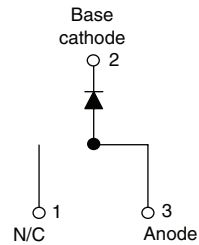


## Schottky Rectifier, 18 A


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


### FEATURES

- 175 °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 Q101 level

### DESCRIPTION

The 18TQ... Schottky rectifier series 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

|             |            |
|-------------|------------|
| $I_{F(AV)}$ | 18 A       |
| $V_R$       | 35 to 45 V |

### MAJOR RATINGS AND CHARACTERISTICS

| SYMBOL      | CHARACTERISTICS                            | VALUES      | UNITS            |
|-------------|--|-------------|------------------|
| $I_{F(AV)}$ | Rectangular waveform                       | 18          | A                |
| $V_{RRM}$   | Range                                      | 35 to 45    | V                |
| $I_{FSM}$   | $t_p = 5 \mu s$ sine                       | 1800        | A                |
| $V_F$       | 18 Apk, $T_J = 125 \text{ }^\circ\text{C}$ | 0.53        | V                |
| $T_J$       | Range                                      | - 55 to 175 | $^\circ\text{C}$ |

### VOLTAGE RATINGS

| PARAMETER                            | SYMBOL    | 18TQ035S | 18TQ040S | 18TQ045S | 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 $T_C = 149 \text{ }^\circ\text{C}$ , rectangular waveform  | 18  | 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   | Following any rated<br>load condition and with<br>rated $V_{RRM}$ applied | 1800  | A |
|  |             | 10 ms sine or 6 ms rect. pulse  |   |       |   |
| Non-repetitive avalanche energy                                      | $E_{AS}$    | $T_J = 25 \text{ }^\circ\text{C}$ , $I_{AS} = 3.6 \text{ A}$ , $L = 3.7 \text{ mH}$                                 | 24  | 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 | 3.6   | A     |   |

| ELECTRICAL SPECIFICATIONS                     |                |  |                                   |        |            |
|---|----------------|--|-----------------------------------|--------|------------|
| PARAMETER                                     | SYMBOL         | TEST CONDITIONS  |                                   | VALUES | UNITS      |
| Maximum forward voltage drop<br>See fig. 1    | $V_{FM}^{(1)}$ | 18 A   | $T_J = 25\text{ }^\circ\text{C}$  | 0.60   | V          |
|   |                | 36 A   |                                   | 0.72   |            |
|   |                | 18 A   | $T_J = 125\text{ }^\circ\text{C}$ | 0.53   |            |
|   |                | 36 A   |                                   | 0.67   |            |
| Maximum reverse leakage current<br>See fig. 2 | $I_{RM}^{(1)}$ | $T_J = 25\text{ }^\circ\text{C}$   | $V_R = \text{Rated } V_R$         | 2.5    | mA         |
|   |                | $T_J = 125\text{ }^\circ\text{C}$  |                                   | 25     |            |
| Maximum junction capacitance                  | $C_T$          | $V_R = 5 V_{DC}$ (test signal range 100 kHz to 1 MHz) $25\text{ }^\circ\text{C}$ |                                   | 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 175 | $^\circ\text{C}$       |
| 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 D <sup>2</sup> PAK        |  | 18TQ035S    |                        |
|  |                |                                      |  | 18TQ040S    |                        |
|  |                |                                      |  | 18TQ045S    |                        |

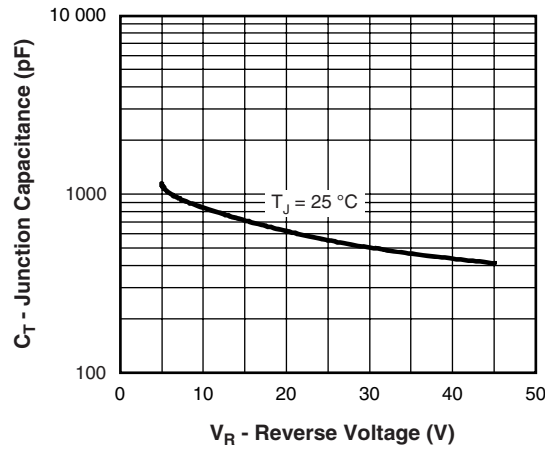
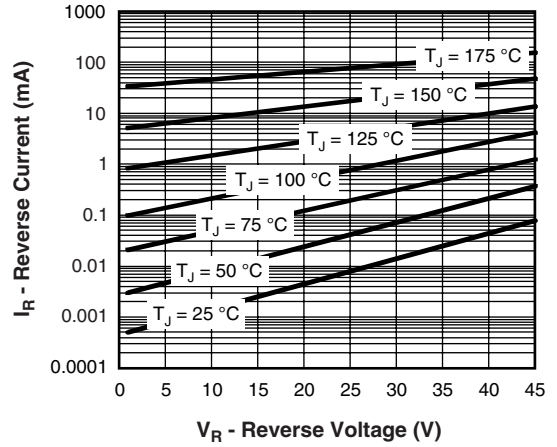
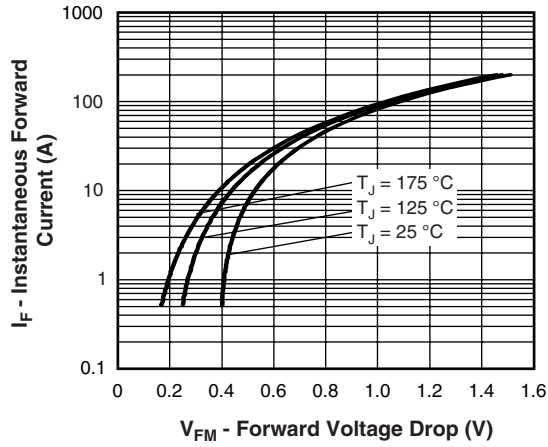
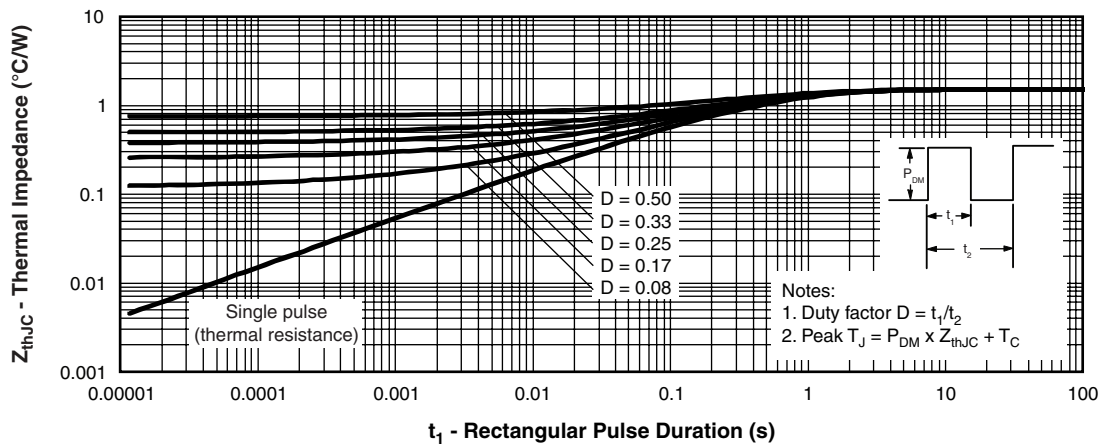


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage


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

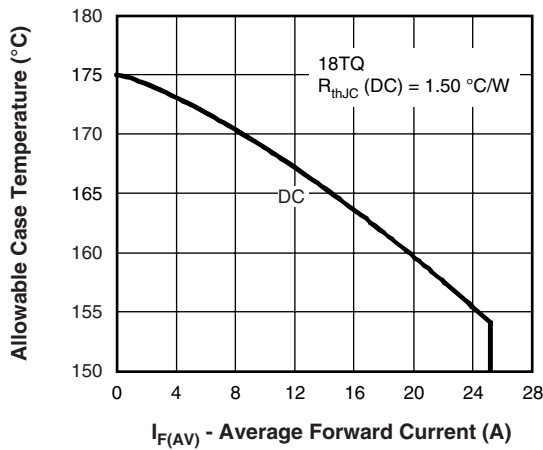


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

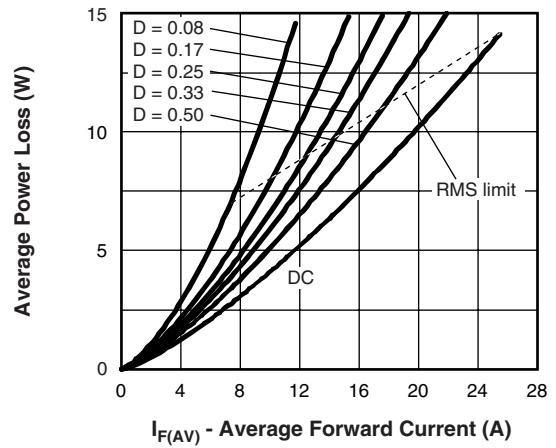


Fig. 6 - Forward Power Loss Characteristics

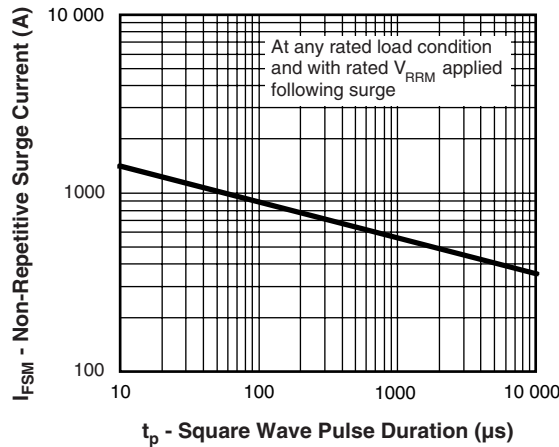


Fig. 7 - Maximum Non-Repetitive Surge Current

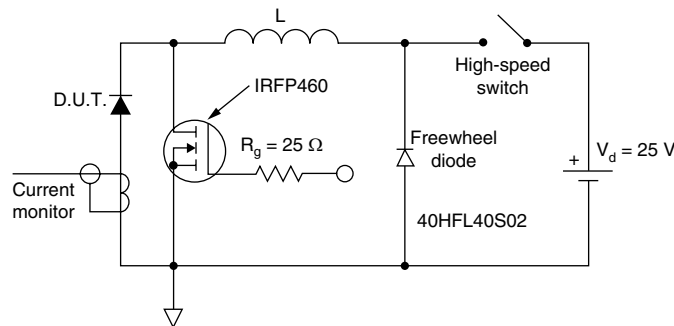
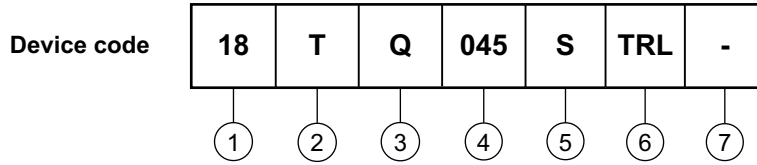


Fig. 8 - Unclamped Inductive Test Circuit



**ORDERING INFORMATION TABLE**



- 1** - Current rating (18 A)
- 2** - Circuit configuration  
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> |
| SPICE model                | <a href="http://www.vishay.com/doc?95280">http://www.vishay.com/doc?95280</a> |



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