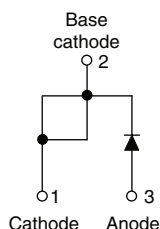


## Schottky Rectifier, 18 A


**TO-220AC**


### 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, $T_J = 125^\circ C$ | 0.53        | V          |
| $T_J$       | Range                       | - 55 to 175 | $^\circ C$ |

### VOLTAGE RATINGS

| PARAMETER                            | SYMBOL    | 18TQ035 | 18TQ040 | 18TQ045 | UNITS |
|--------------------------------------|-----------|---------|---------|---------|-------|
| Maximum DC reverse voltage           | $V_R$     | 35      | 40      | 45      | V     |
| Maximum working peak reverse voltage | $V_{RWM}$ |         |         |         |       |

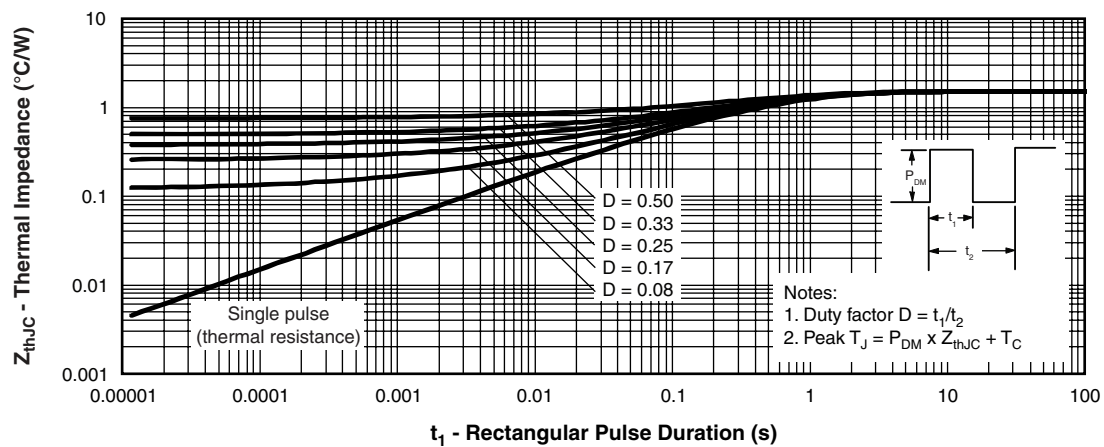
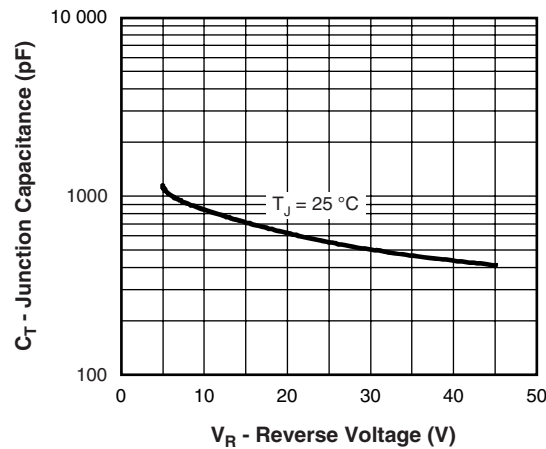
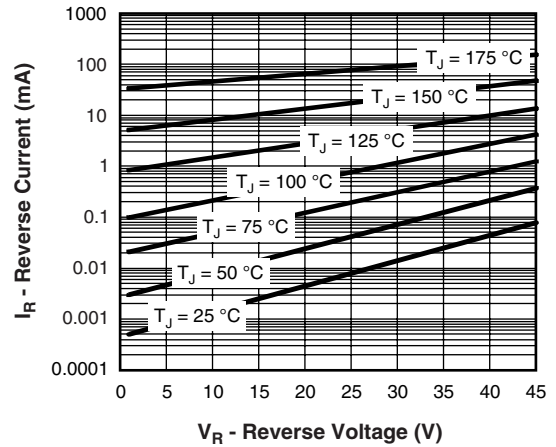
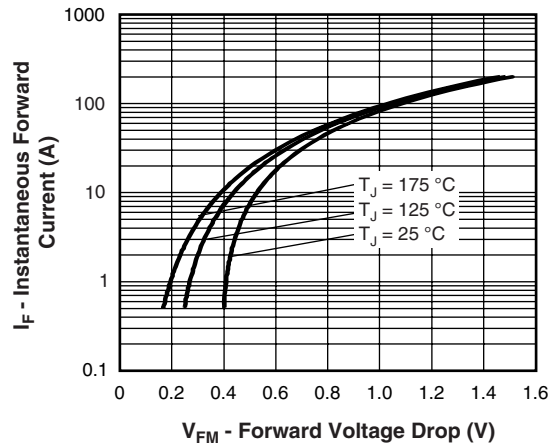
### ABSOLUTE MAXIMUM RATINGS

| 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 $\mu\text{s}$ sine or 3 $\mu\text{s}$ 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                                                                                            |                                                                           | 390    |       |
| 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 $\mu\text{s}$<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                  | $C_T$          | $V_R = 5\text{ V}_{DC}$ (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 <sub>J</sub> , T <sub>Stg</sub> |                                      | - 55 to 175 | °C                     |
| Maximum thermal resistance, junction to case   |         | R <sub>thJC</sub>                 | DC operation<br>See fig. 4           | 1.50        | °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 TO-220AC               | 18TQ035                              |             |                        |
|                                                |         |                                   | 18TQ040                              |             |                        |
|                                                |         |                                   | 18TQ045                              |             |                        |



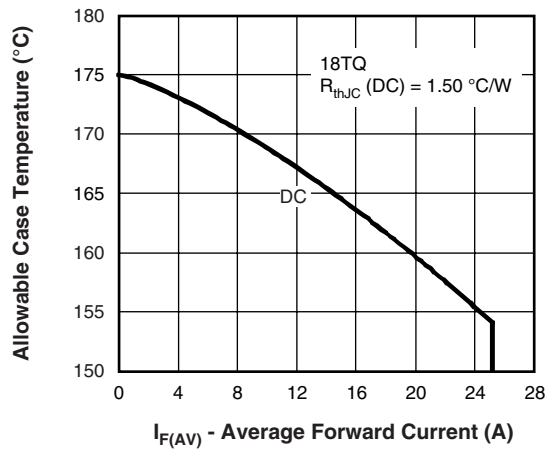


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

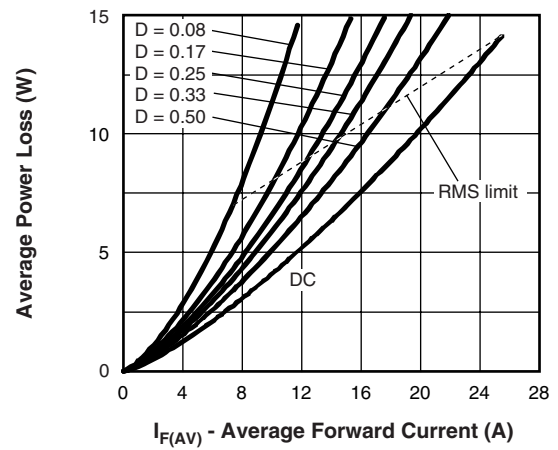


Fig. 6 - Forward Power Loss Characteristics

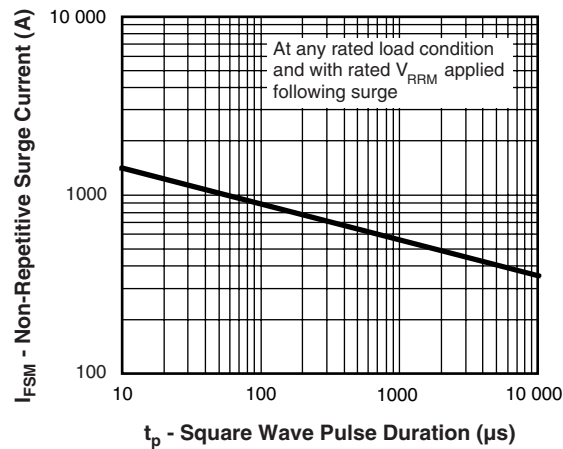


Fig. 7 - Maximum Non-Repetitive Surge Current

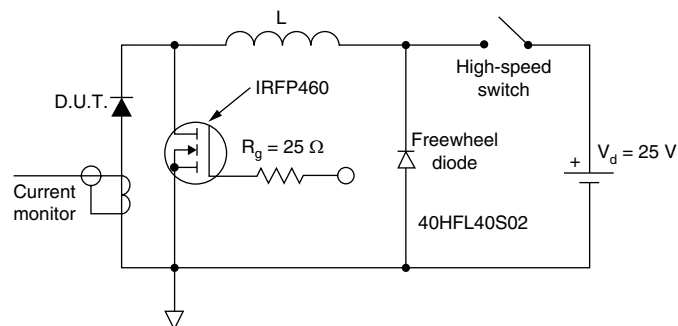


Fig. 8 - Unclamped Inductive Test Circuit

**ORDERING INFORMATION TABLE**

| Device code | 18 | T | Q | 045 | PbF |
|-------------|----|---|---|-----|-----|
|             | 1  | 2 | 3 | 4   | 5   |
|             | 1  | - | - | -   | -   |
|             | 2  | - | - | -   | -   |
|             | 3  | - | - | -   | -   |
|             | 4  | - | - | -   | -   |
|             | 5  | - | - | -   | -   |

1 - Current rating (18 = 18 A)

2 - Package:  
T = TO-220

3 - Schottky "Q" series

4 - Voltage ratings

5 -  
• None = Standard production  
• PbF = Lead (Pb)-free

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

Tube standard pack quantity: 50 pieces

| 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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