

Bulletin PD-20057 01/01

# International IR Rectifier

10TQ...  
10TQ...S

SCHOTTKY RECTIFIER

10 Amp

$I_{F(AV)} = 10\text{Amp}$   
 $V_R = 35 \text{ to } 45\text{V}$

## Major Ratings and Characteristics



| Characteristics                           | 10TQ       | Units            |
|---|------------|------------------|
| $I_{F(AV)}$ Rectangular waveform          | 10         | A                |
| $V_{RRM}$                                 | 35 to 45   | V                |
| $I_{FSM}$ @ $t_p = 5 \mu\text{s}$ sine    | 1050       | A                |
| $V_F$ @ 10 Apk, $T_J = 125^\circ\text{C}$ | 0.49       | V                |
| $T_J$ range                               | -55 to 175 | $^\circ\text{C}$ |

## Description/ Features

The 10TQ.. 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, free-wheeling diodes, and reverse battery protection.

- 175° C  $T_J$  operation
- High purity, high temperature epoxy encapsulation for enhanced mechanical strength and moisture resistance
- Low forward voltage drop
- High frequency operation
- Guard ring for enhanced ruggedness and long term reliability

## Case Styles

| 10TQ...   | 10TQ... S   |
|---|---|
|  <p>TO-220</p> |  <p>D²PAK</p> |

## Voltage Ratings

| Part number                                     | 10TQ035 | 10TQ040 | 10TQ045 |
|---|---------|---------|---------|
| $V_R$ Max. DC Reverse Voltage (V)               | 35      | 40      | 45      |
| $V_{RWM}$ Max. Working Peak Reverse Voltage (V) |         |         |         |

## Absolute Maximum Ratings

| Parameters  | 10TQ | Units | Conditions   |
|---|------|-------|--|
| $I_{F(AV)}$ Max. Average Forward Current<br>* See Fig. 5                | 10   | A     | 50% duty cycle @ $T_C = 151^\circ\text{C}$ , rectangular wave form   |
| $I_{FSM}$ Max. Peak One Cycle Non-Repetitive Surge Current * See Fig. 7 | 1050 | A     | Following any rated load condition and with rated $V_{RRM}$ applied  |
|   | 280  |       |  |
| $E_{AS}$ Non-Repetitive Avalanche Energy                                | 13   | mJ    | $T_J = 25^\circ\text{C}$ , $I_{AS} = 2\text{Amps}$ , $L = 6.5\text{mH}$  |
| $I_{AR}$ Repetitive Avalanche Current                                   | 2    | A     | Current decaying linearly to zero in 1 $\mu\text{sec}$<br>Frequency limited by $T_J$ max. $V_A = 1.5 \times V_R$ typical |

## Electrical Specifications

| Parameters  | 10TQ   | Units            | Conditions  |
|---|--------|------------------|---|
| $V_{FM}$ Max. Forward Voltage Drop (1)<br>* See Fig. 1    | 0.57   | V                | @ 10A<br>$T_J = 25^\circ\text{C}$                                       |
|   | 0.67   | V                | @ 20A   |
|   | 0.49   | V                | @ 10A<br>$T_J = 125^\circ\text{C}$                                      |
|   | 0.61   | V                | @ 20A   |
| $I_{RM}$ Max. Reverse Leakage Current (1)<br>* See Fig. 2 | 2      | mA               | $T_J = 25^\circ\text{C}$  |
|   | 15     | mA               | $T_J = 125^\circ\text{C}$<br>$V_R = \text{rated } V_R$                  |
| $C_T$ Max. Junction Capacitance                           | 900    | pF               | $V_R = 5V_{DC}$ , (test signal range 100Khz to 1Mhz) $25^\circ\text{C}$ |
| $L_S$ Typical Series Inductance                           | 8.0    | nH               | Measured lead to lead 5mm from package body                             |
| $dv/dt$ Max. Voltage Rate of Change (Rated $V_R$ )        | 10,000 | V/ $\mu\text{s}$ |   |

(1) Pulse Width < 300 $\mu\text{s}$ , Duty Cycle < 2%

## Thermal-Mechanical Specifications

| Parameters  | 10TQ       | Units              | Conditions                           |
|---|------------|--------------------|--------------------------------------|
| $T_J$ Max. Junction Temperature Range                   | -55 to 175 | $^\circ\text{C}$   |                                      |
| $T_{stg}$ Max. Storage Temperature Range                | -55 to 175 | $^\circ\text{C}$   |                                      |
| $R_{thJC}$ Max. Thermal Resistance Junction to Case     | 2.0        | $^\circ\text{C/W}$ | DC operation * See Fig. 4            |
| $R_{thCS}$ Typical Thermal Resistance, Case to Heatsink | 0.50       | $^\circ\text{C/W}$ | Mounting surface, smooth and greased |
| wt Approximate Weight                                   | 2 (0.07)   | g (oz.)            |                                      |
| T Mounting Torque                                       | Min.       | 6 (5)              | Kg-cm<br>(lbf-in)                    |
|   | Max.       | 12 (10)            |                                      |

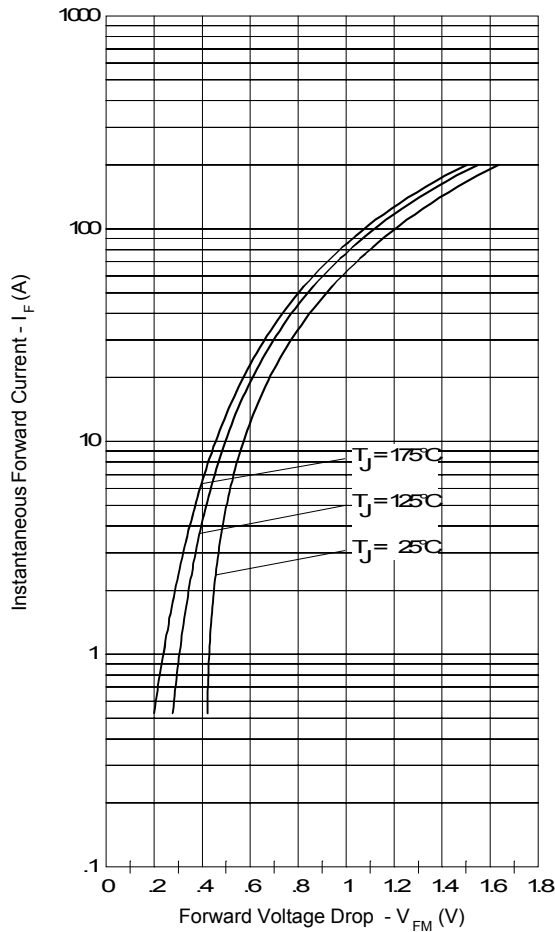


Fig. 1 - Maximum Forward Voltage Drop Characteristics

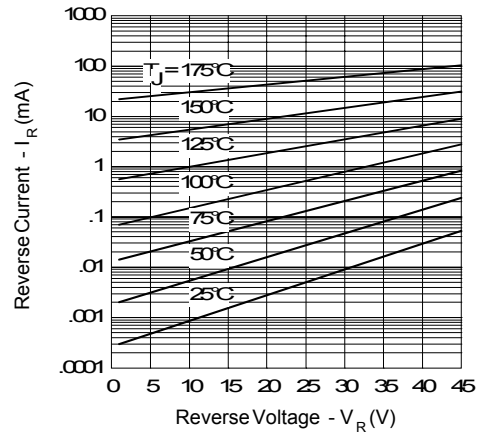


Fig. 2 - Typical Values of Reverse Current Vs. Reverse Voltage

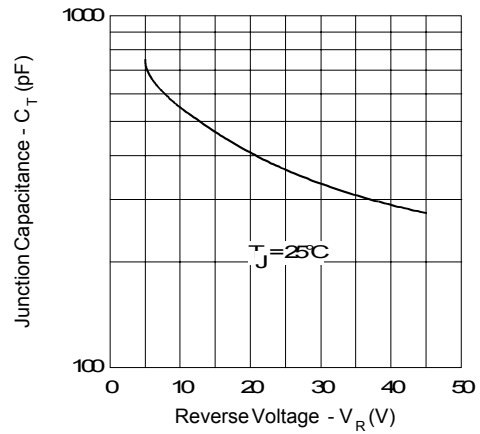


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage

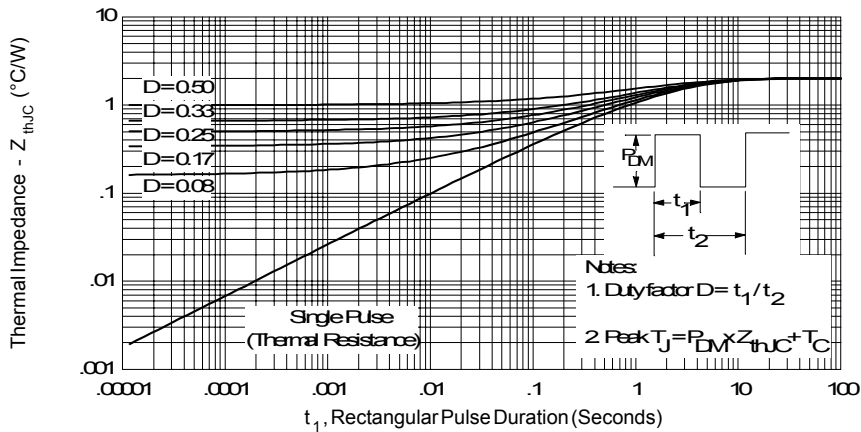


Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics

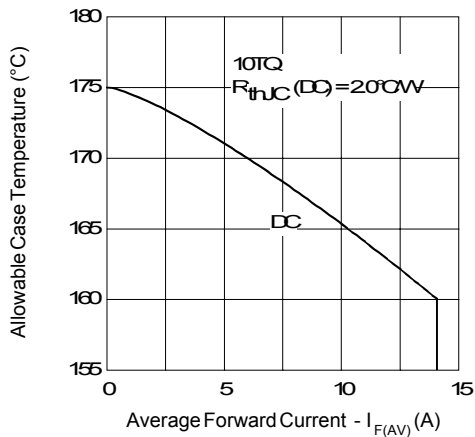


Fig. 5 - Maximum Allowable Case Temperature Vs. Average Forward Current

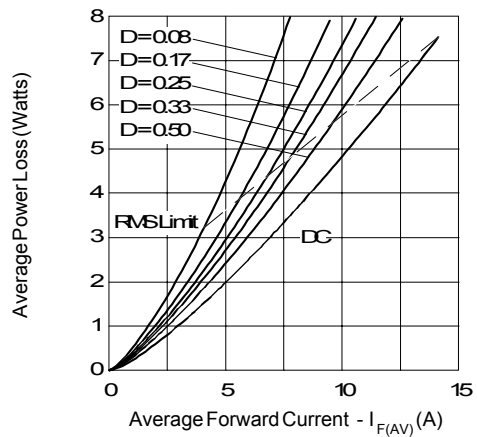


Fig. 6 - Forward Power Loss Characteristics

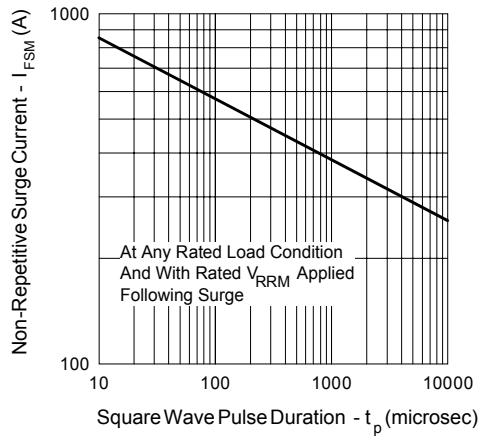


Fig. 7 - Maximum Non-Repetitive Surge Current

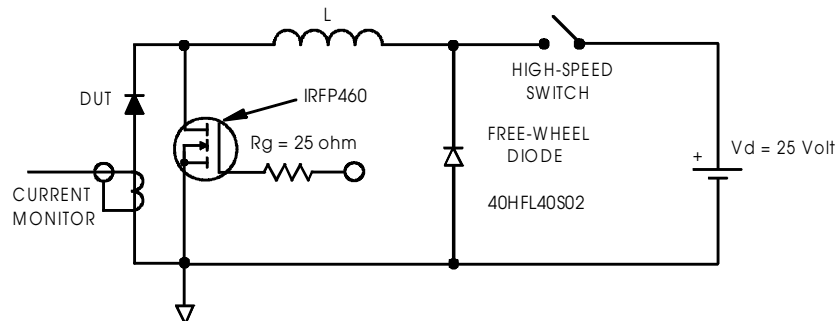
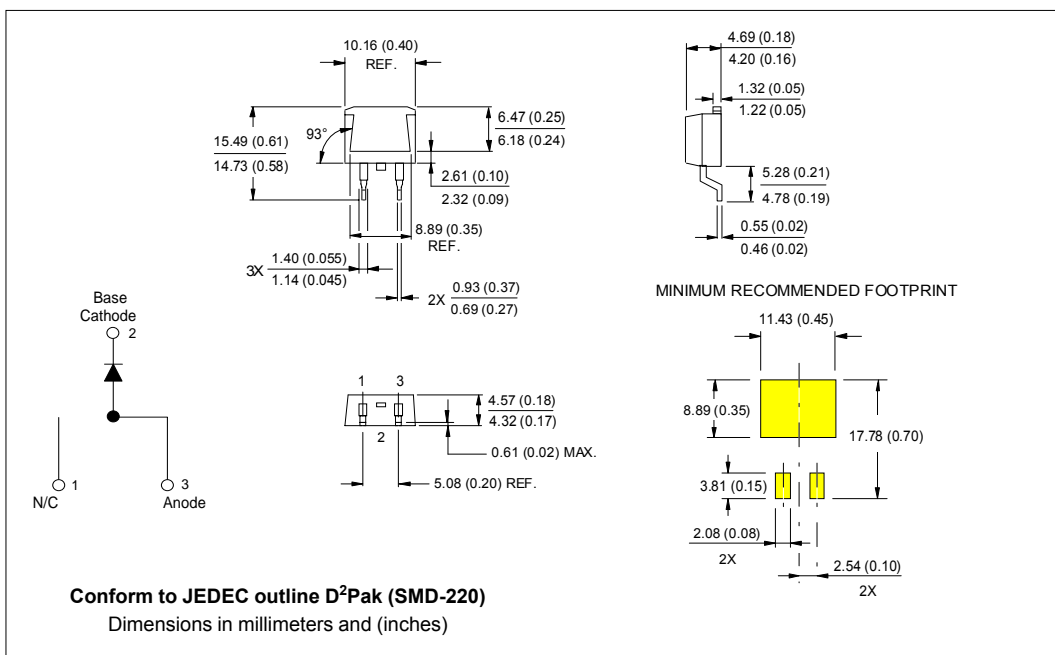
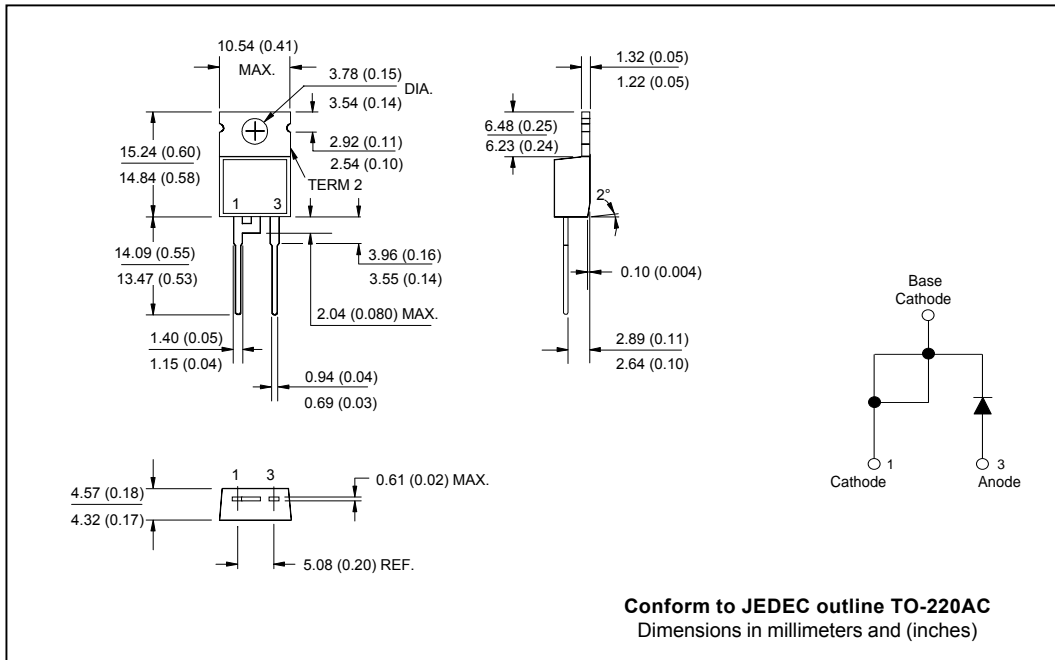


Fig. 8 - Unclamped Inductive Test Circuit

Outline Table



Ordering Information Table

