



12TQ...  
12TQ...S

SCHOTTKY RECTIFIER

15 Amp

$I_{F(AV)} = 15\text{Amp}$   
 $V_R = 35 \text{ to } 45\text{V}$

**Major Ratings and Characteristics**


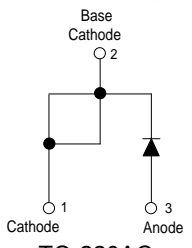
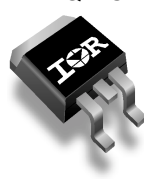
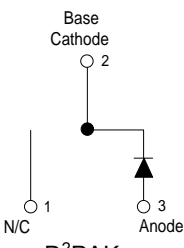
| Characteristics                           | 12TQ       | Units            |
|---|------------|------------------|
| $I_{F(AV)}$ Rectangular waveform          | 15         | A                |
| $V_{RRM}$ range                           | 35 to 45   | V                |
| $I_{FSM}$ @ $t_p = 5 \mu\text{s}$ sine    | 990        | A                |
| $V_F$ @ 15 Apk, $T_J = 125^\circ\text{C}$ | 0.50       | V                |
| $T_J$ range                               | -55 to 150 | $^\circ\text{C}$ |

**Description/ Features**

The 12TQ... 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, free-wheeling diodes, and reverse battery protection.

- 150° C  $T_J$  operation
- High purity, high temperature epoxy encapsulation for enhanced mechanical strength and moisture resistance
- Very low forward voltage drop
- High frequency operation
- Guard ring for enhanced ruggedness and long term reliability

**Case Styles**

|   |   |
|---|---|
| <p>12TQ...</p>  <p>Base<br/>Cathode<br/>2</p>  <p>1 Cathode<br/>3 Anode</p> <p>TO-220AC</p> | <p>12TQ... S</p>  <p>Base<br/>Cathode<br/>2</p>  <p>1 N/C<br/>3 Anode</p> <p>D<sup>2</sup>PAK</p> |
|---|---|

## Voltage Ratings

| Part number                                     | 12TQ035 | 12TQ040 | 12TQ045 |
|---|---------|---------|---------|
| $V_R$ Max. DC Reverse Voltage (V)               | 35      | 40      | 45      |
| $V_{RWM}$ Max. Working Peak Reverse Voltage (V) |         |         |         |

## Absolute Maximum Ratings

| Parameters  | 12TQ | Units | Conditions   |
|---|------|-------|--|
| $I_{F(AV)}$ Max. Average Forward Current<br>* See Fig. 5                | 15   | A     | 50% duty cycle @ $T_C = 120^\circ\text{C}$ , rectangular wave form   |
| $I_{FSM}$ Max. Peak One Cycle Non-Repetitive Surge Current * See Fig. 7 | 990  | A     | Following any rated load condition and with rated $V_{RWM}$ applied  |
|   | 250  |       |  |
| $E_{AS}$ Non-Repetitive Avalanche Energy                                | 16   | mJ    | $T_J = 25^\circ\text{C}$ , $I_{AS} = 2.4$ Amps, $L = 5.5$ mH   |
| $I_{AR}$ Repetitive Avalanche Current                                   | 2.4  | 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  | 12TQ  | Units            | Conditions  |
|---|-------|------------------|---|
| $V_{FM}$ Max. Forward Voltage Drop (1)<br>* See Fig. 1    | 0.56  | V                | @ 15A   |
|   | 0.71  | V                | @ 30A   |
|   | 0.50  | V                | @ 15A   |
|   | 0.64  | V                | @ 30A   |
| $I_{RM}$ Max. Reverse Leakage Current (1)<br>* See Fig. 2 | 1.75  | mA               | $T_J = 25^\circ\text{C}$  |
|   | 70    | mA               | $T_J = 125^\circ\text{C}$   |
| $C_T$ 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 $V_R$ )        | 10000 | V/ $\mu\text{s}$ |   |

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

## Thermal-Mechanical Specifications

| Parameters  | 12TQ       | Units                     | Conditions                           |
|---|------------|---------------------------|--------------------------------------|
| $T_J$ Max. Junction Temperature Range                   | -55 to 150 | $^\circ\text{C}$          |                                      |
| $T_{stg}$ Max. Storage Temperature Range                | -55 to 150 | $^\circ\text{C}$          |                                      |
| $R_{thJC}$ Max. Thermal Resistance Junction to Case     | 2.0        | $^\circ\text{C}/\text{W}$ | DC operation * See Fig. 4            |
| $R_{thCS}$ Typical Thermal Resistance, Case to Heatsink | 0.50       | $^\circ\text{C}/\text{W}$ | Mounting surface, smooth and greased |
| wt Approximate Weight                                   | 2 (0.07)   | g (oz.)                   |                                      |
| T Mounting Torque                                       | Min.       | 6 (5)                     | Kg-cm (lbf-in)                       |
|   | Max.       | 12 (10)                   |                                      |

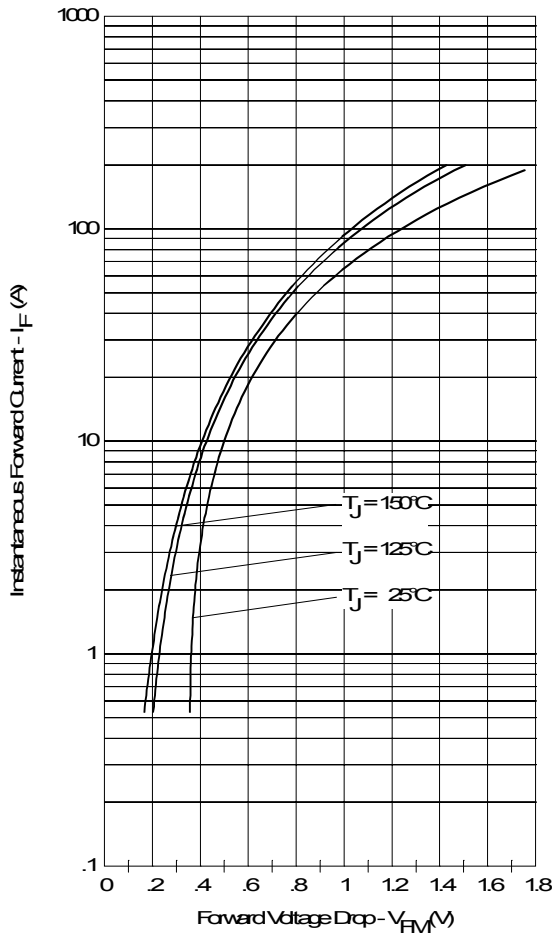


Fig. 1 - Maximum Forward Voltage Drop Characteristics

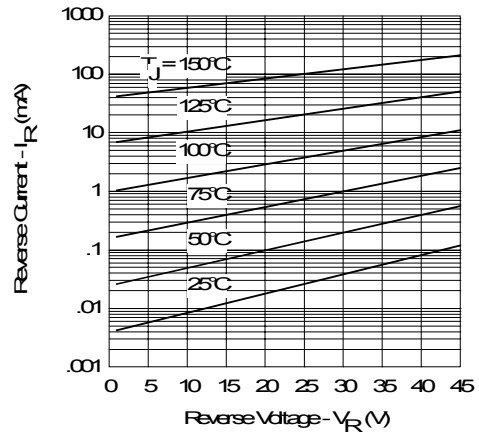


Fig. 2 - Typical Values of Reverse Current Vs. Reverse Voltage

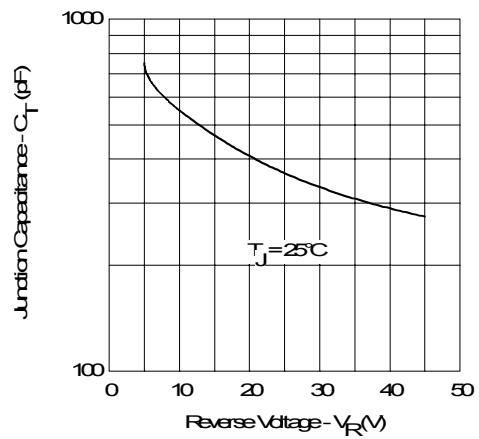


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage

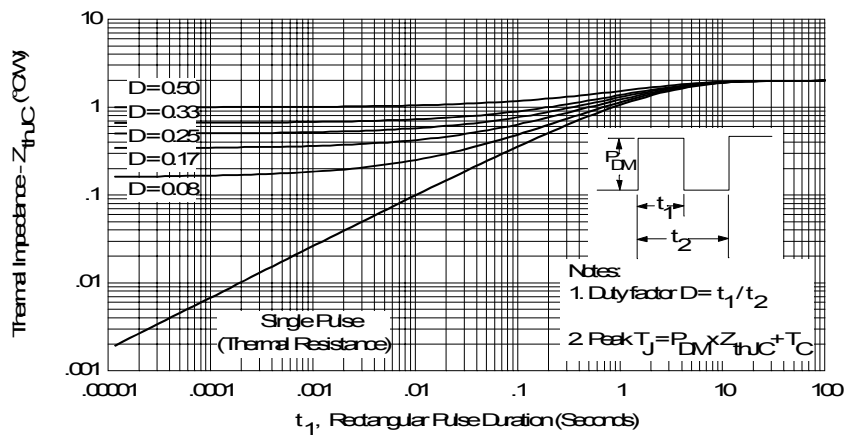


Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics

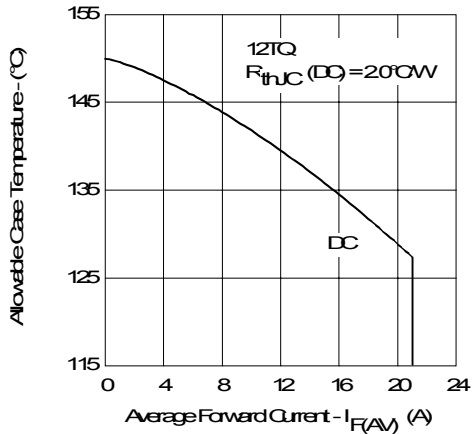


Fig. 5 - Maximum Allowable Case Temperature Vs. Average Forward Current

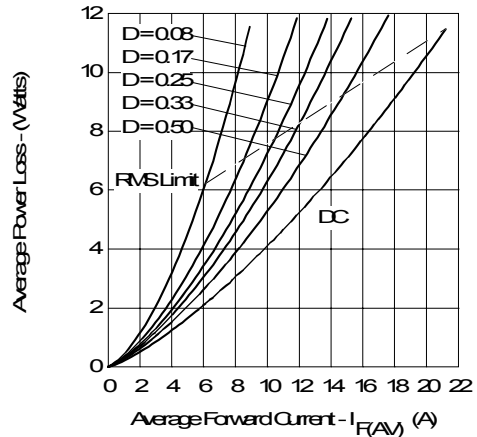


Fig. 6 - Forward Power Loss Characteristics

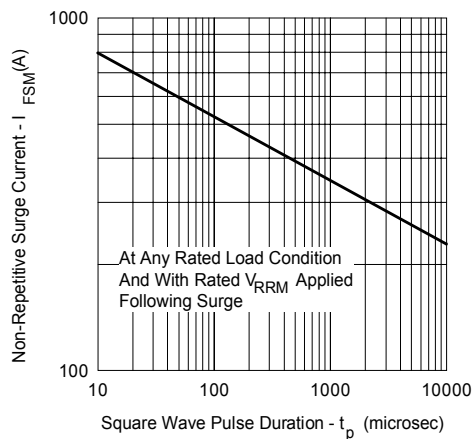


Fig. 7 - Maximum Non-Repetitive Surge Current

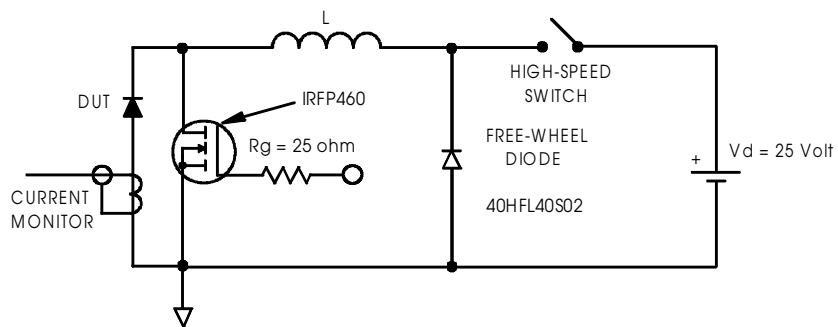
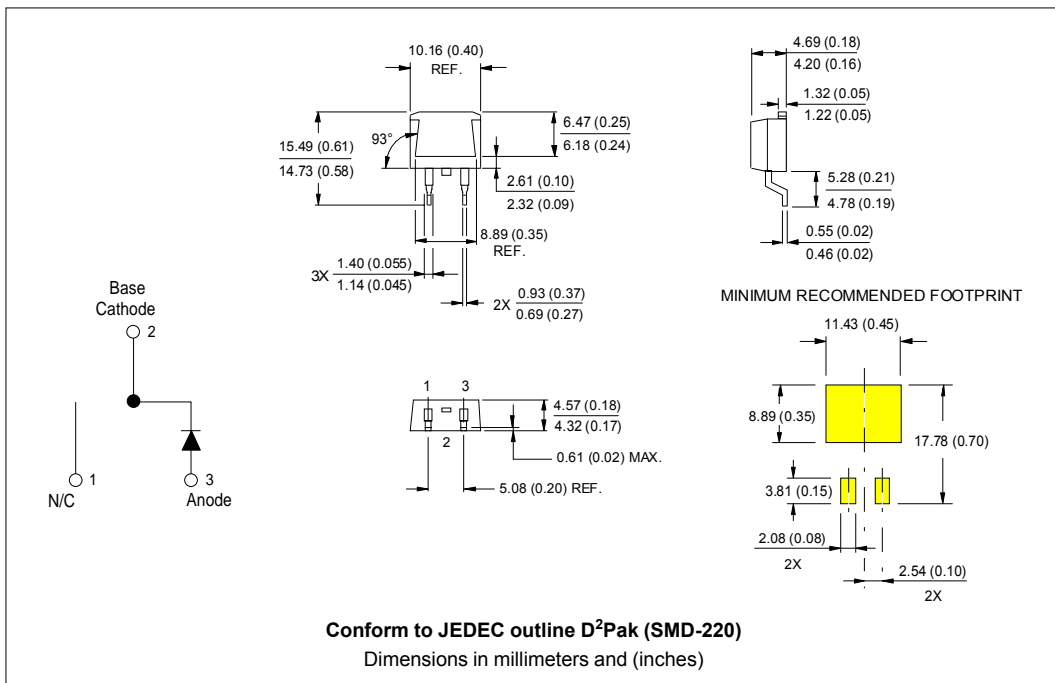
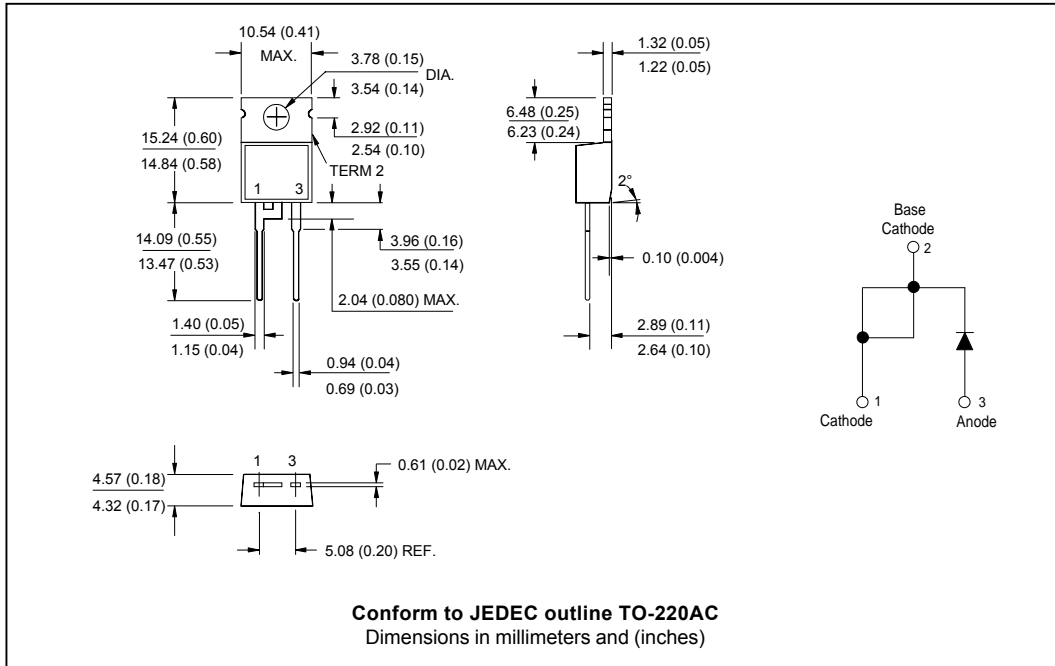
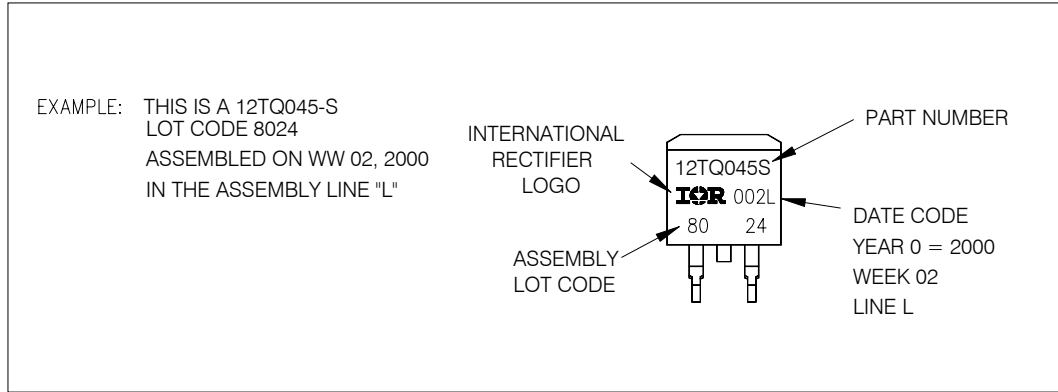


Fig. 8 - Unclamped Inductive Test Circuit

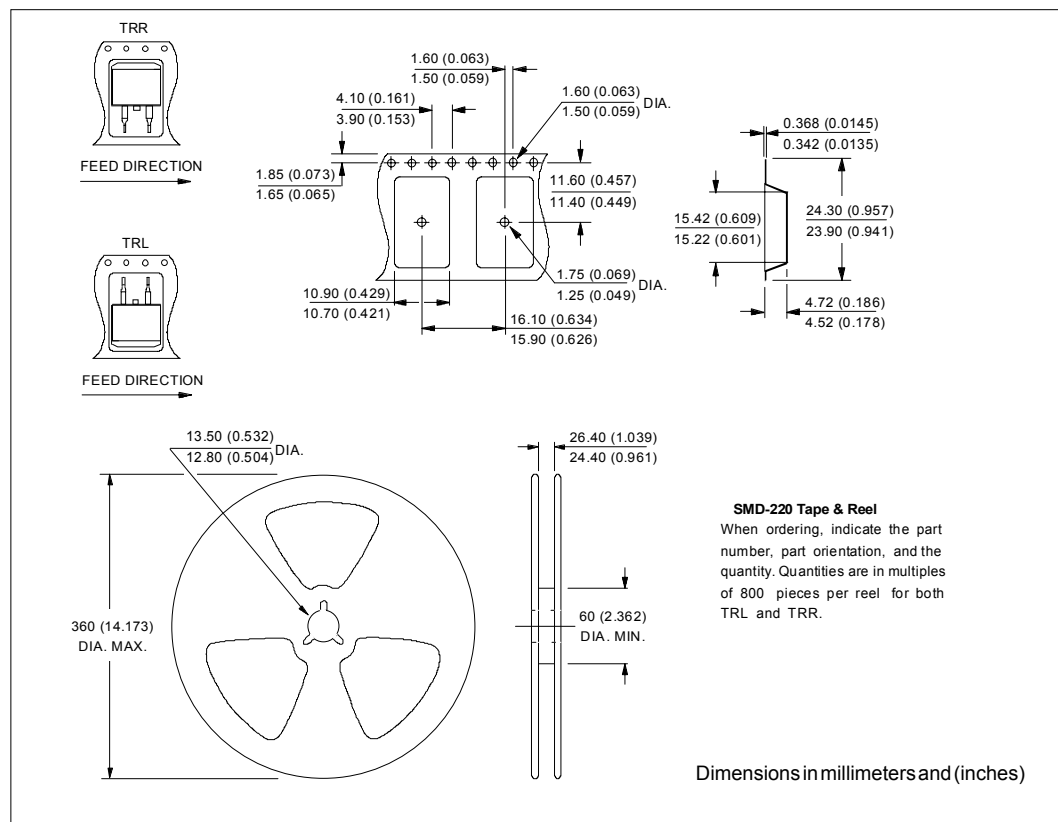
Outline Table



Marking Information



Tape & Reel Information



Ordering Information Table

**Device Code**

|    |   |   |     |   |
|----|---|---|-----|---|
| 12 | T | Q | 045 | S |
| ①  | ② | ③ | ④   | ⑤ |

|          |                          |           |
|----------|--------------------------|-----------|
| <b>1</b> | - Essential Part Number  |           |
| <b>2</b> | - T = TO-220             |           |
| <b>3</b> | - Q = Schottky Q Series  |           |
| <b>4</b> | - Voltage Rating         | 035 = 35V |
| <b>5</b> | - S = D <sup>2</sup> Pak | 040 = 40V |
|          |                          | 045 = 45V |

Data and specifications subject to change without notice.  
 This product has been designed and qualified for Industrial Level.  
 Qualification Standards can be found on IR's Web site.