

International  
**IR** Rectifier

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


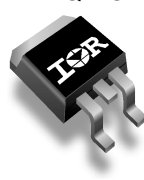
Characteristics	12TQ	Units
$I_{F(AV)}$ Rectangular waveform	15	A
$V_{RRM}$ range	35 to 45	V
$I_{FSM}$ @ $t_p = 5 \mu\text{s}$ sine	990	A
$V_F$ @ 15A pk, $T_J = 125^\circ\text{C}$	0.50	V
$T_J$ range	-55 to 150	$^\circ\text{C}$

#### 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  $150^\circ\text{C}$  junction temperature. Typical applications are in switching power supplies, converters, free-wheeling diodes, and reverse battery protection.

- $150^\circ\text{C}$   $T_J$  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

12TQ...	12TQ... S
 <p>Base Cathode</p> <p>2</p> <p>1 Cathode</p> <p>3 Anode</p> <p>TO-220AC</p>	 <p>Base Cathode</p> <p>2</p> <p>1 N/C</p> <p>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 * 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	5 $\mu\text{s}$ Sine or 3 $\mu\text{s}$ Rect. pulse
	250		10ms Sine or 6ms Rect. pulse
$E_{AS}$ Non-Repetitive Avalanche Energy	16	mJ	$T_J = 25^\circ\text{C}$ , $I_{AS} = 2.4\text{ Amps}$ , $L = 5.5\text{ mH}$
$I_{AR}$ Repetitive Avalanche Current	2.4	A	Current decaying linearly to zero in 1 $\mu\text{sec}$ 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) * 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) * 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	$^\circ\text{C/W}$	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 (lbf-in)	
	Max. 12 (10)		

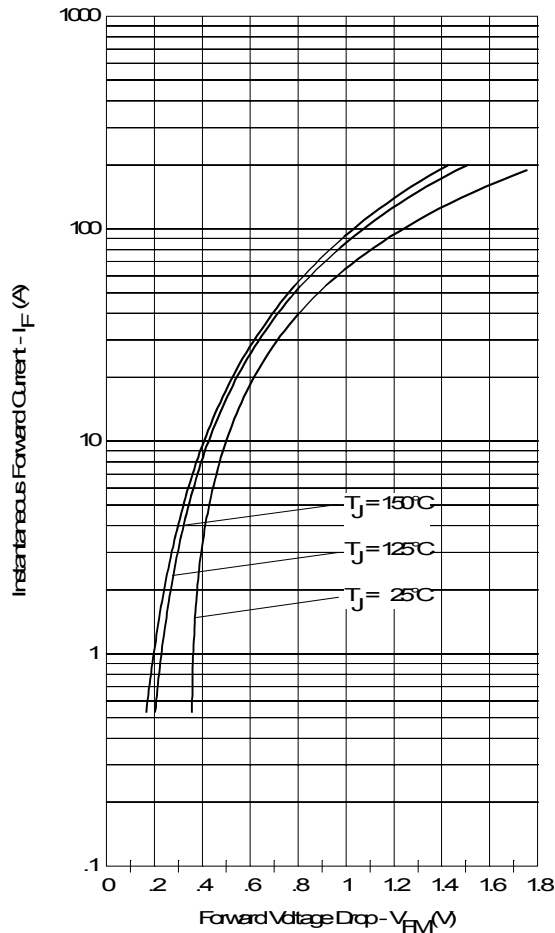


Fig. 1 - Maximum Forward Voltage Drop Characteristics

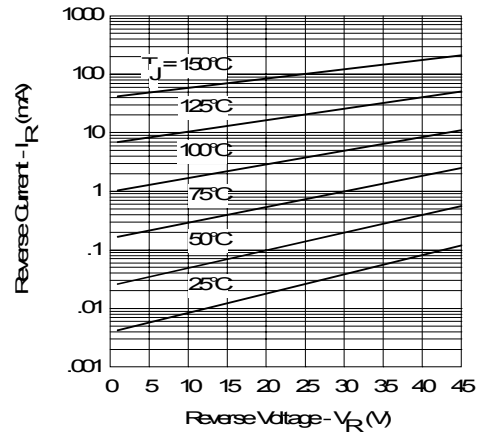


Fig. 2 - Typical Values of Reverse Current Vs. Reverse Voltage

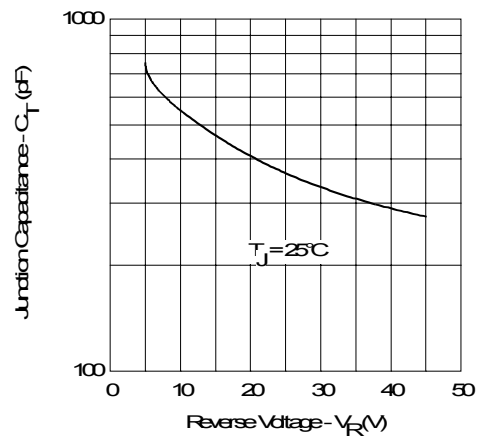


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage

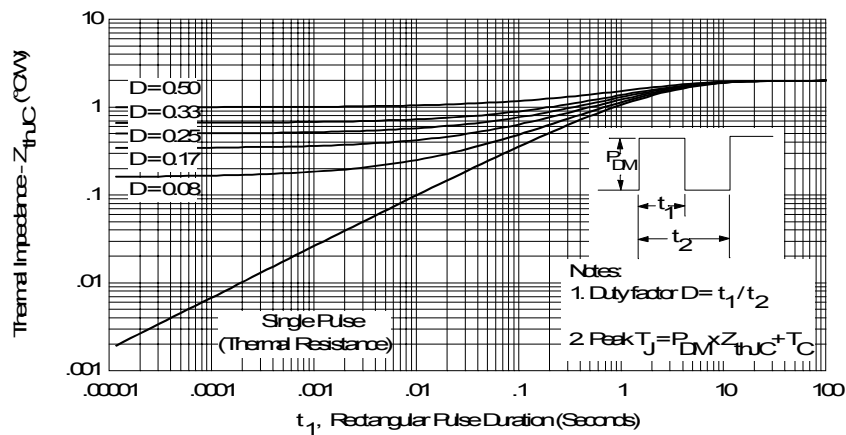


Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics

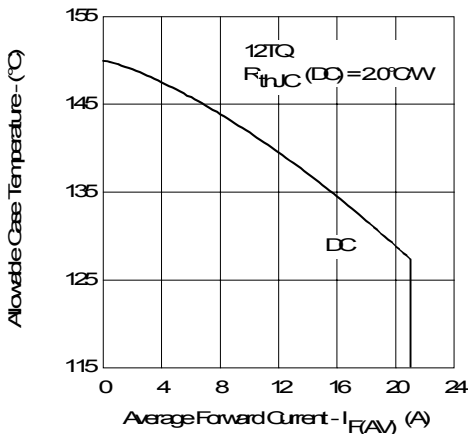


Fig. 5 - Maximum Allowable Case Temperature Vs. Average Forward Current

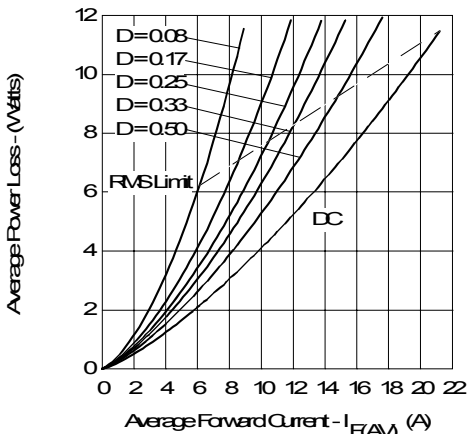


Fig. 6 - Forward Power Loss Characteristics

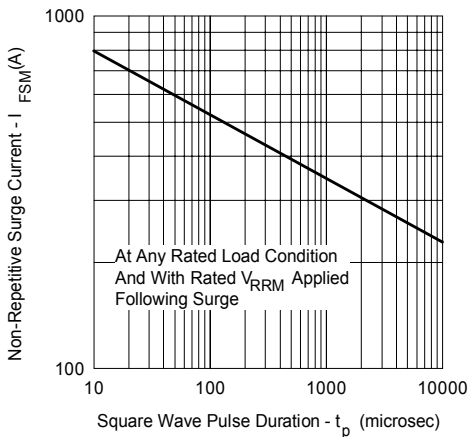


Fig. 7 - Maximum Non-Repetitive Surge Current

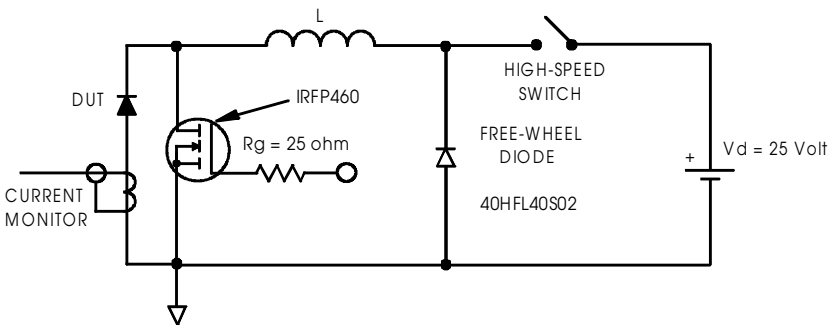
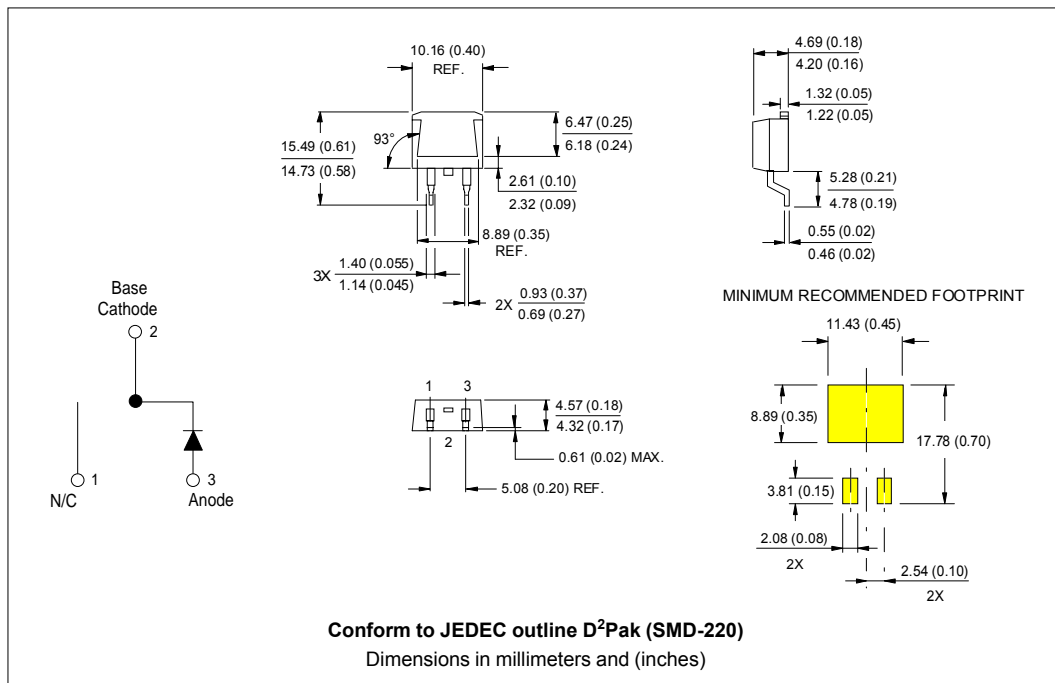
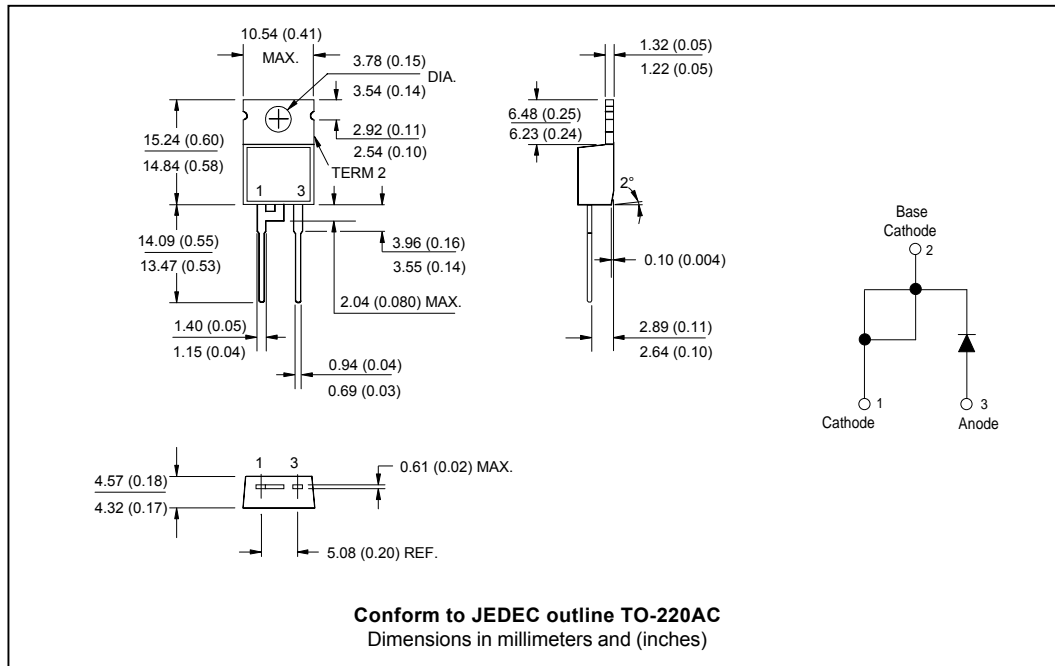


Fig. 8 - Unclamped Inductive Test Circuit

## Outline Table

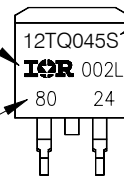


## Marking Information

EXAMPLE: THIS IS A 12TQ045-S  
 LOT CODE 8024  
 ASSEMBLED ON WW 02, 2000  
 IN THE ASSEMBLY LINE "L"

INTERNATIONAL  
 RECTIFIER  
 LOGO

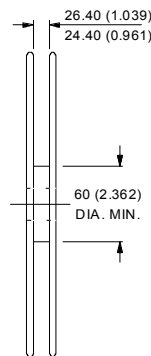
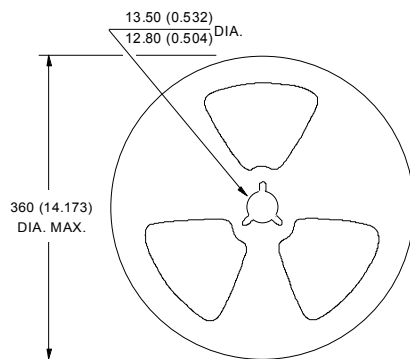
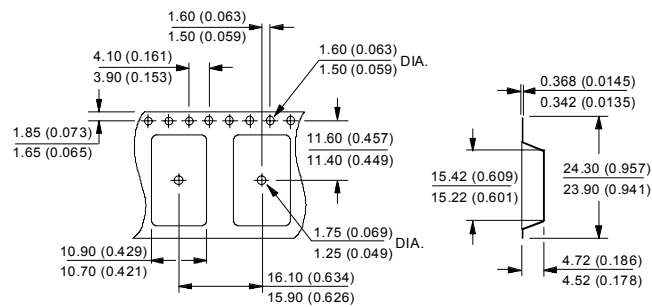
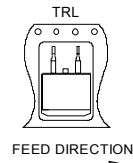
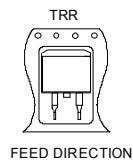
ASSEMBLY  
 LOT CODE



PART NUMBER

DATE CODE  
 YEAR 0 = 2000  
 WEEK 02  
 LINE L

## Tape &amp; Reel Information

**SMD-220 Tape & Reel**

When ordering, indicate the part number, part orientation, and the quantity. Quantities are in multiples of 800 pieces per reel for both TRL and TRR.

Dimensions in millimeters and (inches)

## 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		
<b>5</b>	-	S = D <sup>2</sup> Pak		
				035 = 35V
				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.

International  
**IOR** Rectifier

**IR WORLD HEADQUARTERS:** 233 Kansas St., El Segundo, California 90245, USA Tel: (310) 252-7105  
TAC Fax: (310) 252-7309  
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