

Bulletin PD-20239 rev. B 12/01

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

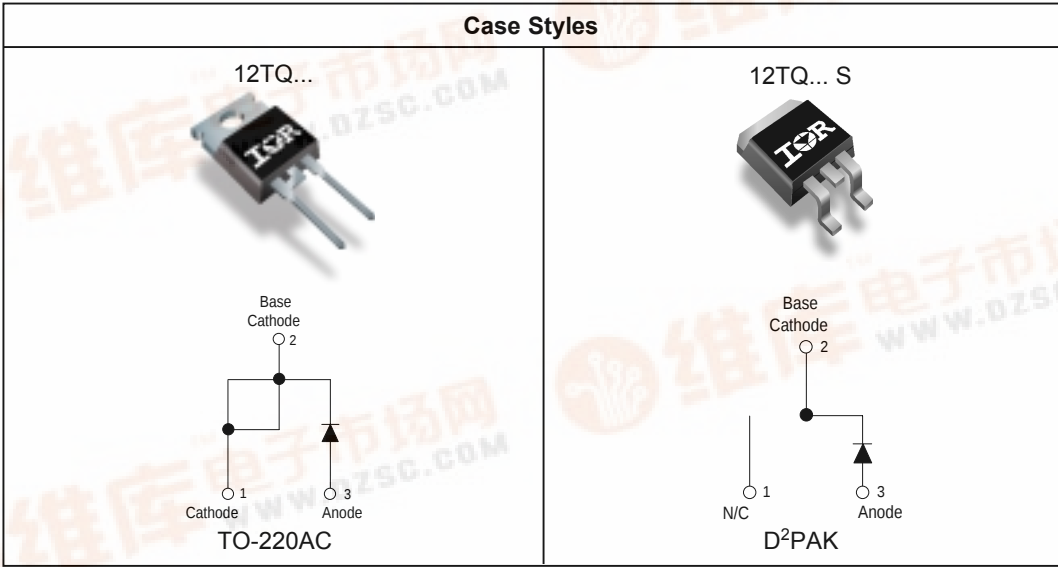
Characteristics	12TQ	Units
$I_{F(AV)}$ Rectangular waveform	15	A
V_{RRM} range	35 to 45	V
I_{FSM} @ $t_p = 5 \mu\text{s}$ sine	990	A
V_F @ 15A pk, $T_J = 125^\circ\text{C}$	0.50	V
T_J range	-55 to 150	$^\circ\text{C}$

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°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



12TQ... Series

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IRF Rectifier

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 μs Sine or 3 μs Rect. pulse
	250		10ms Sine or 6ms Rect. pulse
E_{AS} Non-Repetitive Avalanche Energy	16	mJ	$T_J = 25^\circ\text{C}$, $I_{AS} = 2.4$ Amps, $L = 5.5$ mH
I_{AR} Repetitive Avalanche Current	2.4	A	Current decaying linearly to zero in 1 μsec 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°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/ μs	

(1) Pulse Width < 300 μs , 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)	

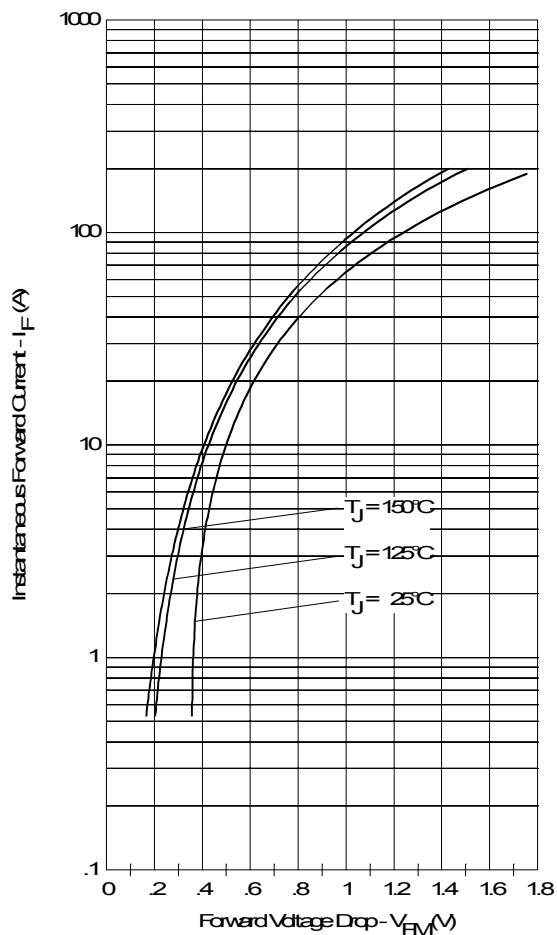


Fig. 1 - Maximum Forward Voltage Drop Characteristics

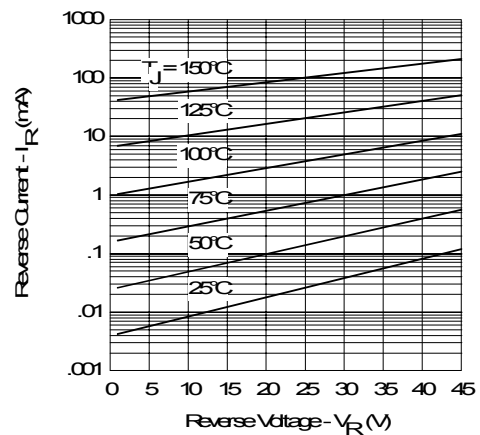


Fig. 2 - Typical Values of Reverse Current Vs. Reverse Voltage

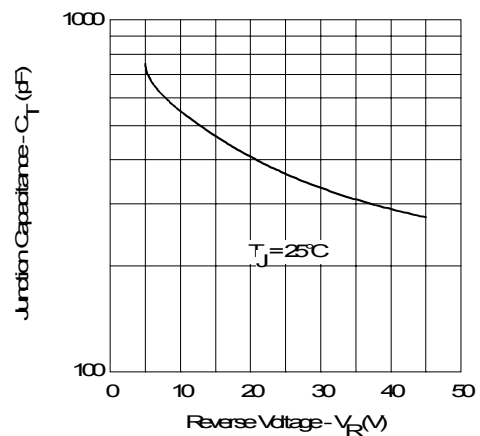


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage

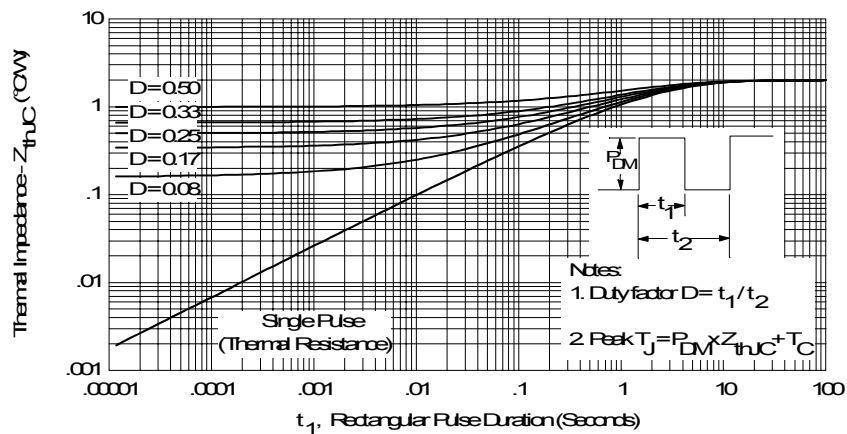


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

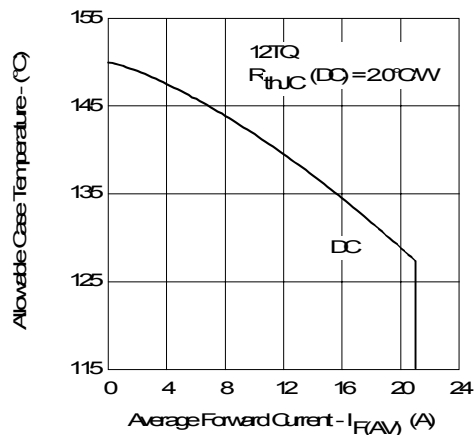


Fig. 5 - Maximum Allowable Case Temperature Vs. Average Forward Current

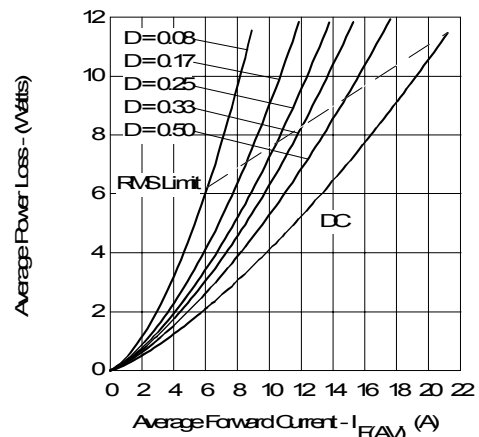


Fig. 6 - Forward Power Loss Characteristics

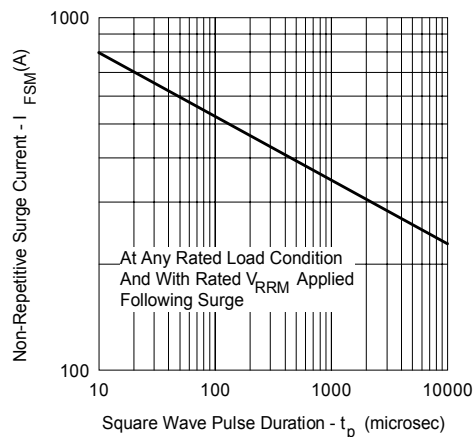


Fig. 7 - Maximum Non-Repetitive Surge Current

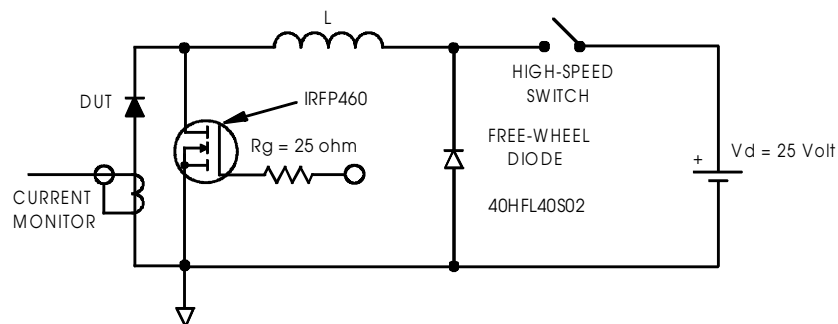
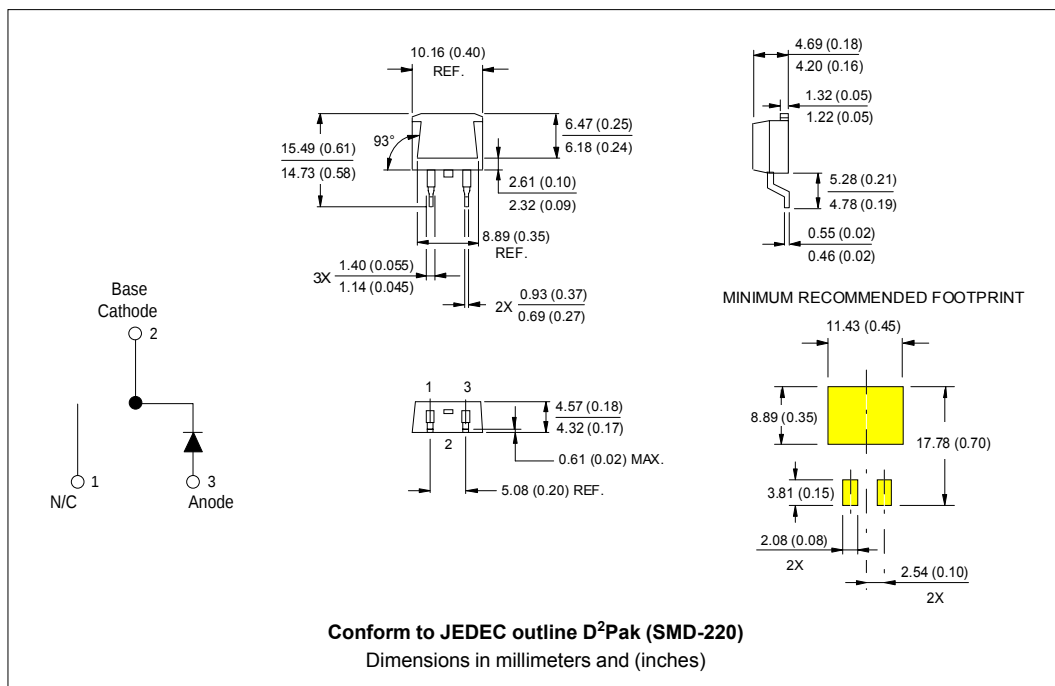
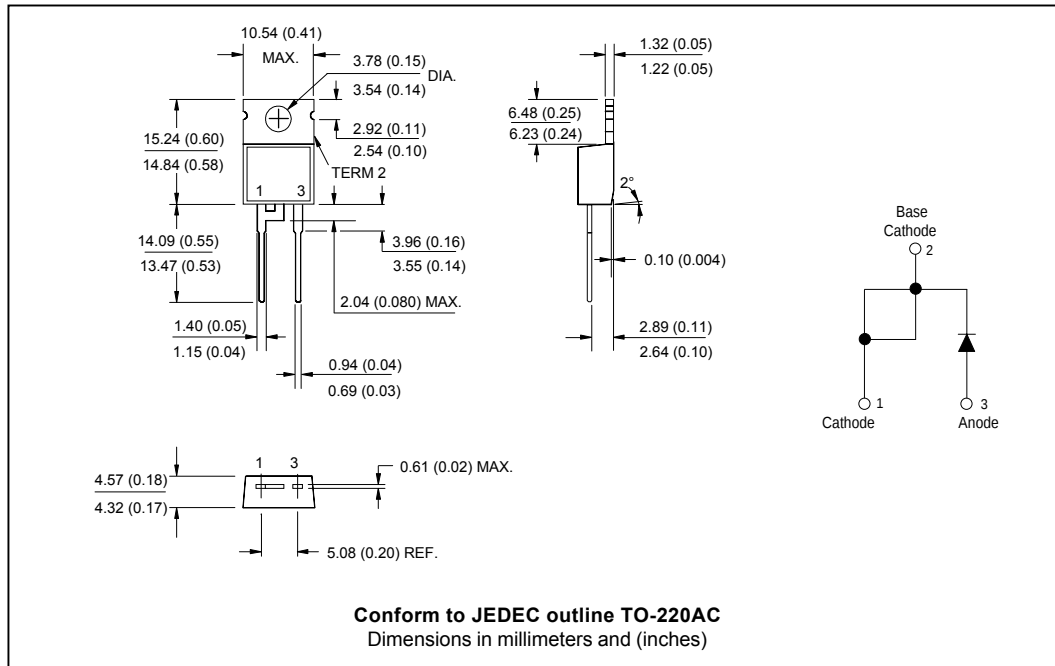


Fig. 8 - Unclamped Inductive Test Circuit

Outline Table



12TQ... Series

Bulletin PD-20239 rev. B 12/01

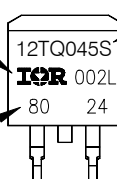
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Marking Information

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

INTERNATIONAL
RECTIFIER
LOGO

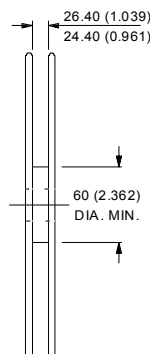
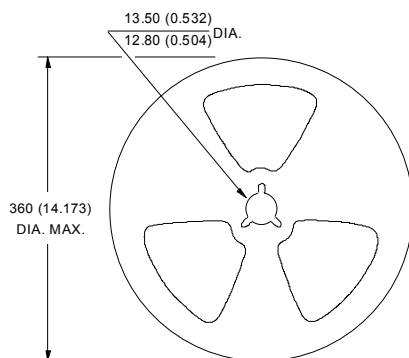
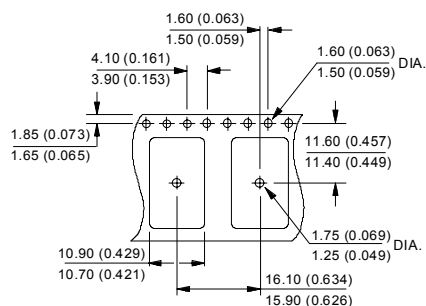
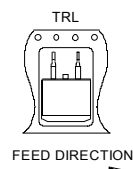
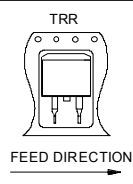
ASSEMBLY
LOT CODE



PART NUMBER

DATE CODE
YEAR 0 = 2000
WEEK 02
LINE L

Tape & 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
1	-	Essential Part Number		
2	-	T = TO-220		
3	-	Q = Schottky Q Series		
4	-	Voltage Rating		
5	-	S = D ² 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
IR Rectifier

IR WORLD HEADQUARTERS: 233 Kansas St., El Segundo, California 90245, USA Tel: (310) 252-7105
TAC Fax: (310) 252-7309
Visit us at www.irf.com for sales contact information. 12/01