

International
IR Rectifier

6TQ...
6TQ...S

SCHOTTKY RECTIFIER

6 Amp

$$I_{F(AV)} = 6\text{Amp}$$
$$V_R = 35 \text{ to } 45\text{V}$$

Major Ratings and Characteristics

Characteristics	6TQ	Units
$I_{F(AV)}$ Rectangular waveform	6	A
V_{RRM} range	35 to 45	V
I_{FSM} @tp=5µs sine	690	A
V_F @6Apk, $T_J = 125^\circ\text{C}$	0.53	V
T_J range	-55 to 175	°C

Description/Features

The 6TQ 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.

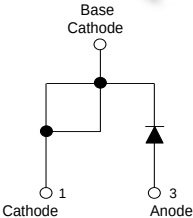
- 175° C T_J operation
- High purity, high temperature epoxy encapsulation for enhanced mechanical strength and moisture resistance
- Low forward voltage drop
- High frequency operation
- Guard ring for enhanced ruggedness and long term reliability

Case Styles

6TQ...



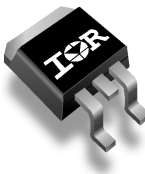
Base
Cathode



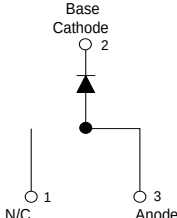
1 Cathode 3 Anode

TO-220

6TQ... S



Base
Cathode



1 N/C 3 Anode

D²PAK

6TQ... Series

Bulletin PD-20283 rev. A 05/02

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Voltage Ratings

Part number	6TQ035	6TQ040	6TQ045
V_R Max. DC Reverse Voltage (V)	35	40	45
V_{RWM} Max. Working Peak Reverse Voltage (V)			

Absolute Maximum Ratings

Parameters	6TQ	Units	Conditions
$I_{F(AV)}$ Max. Average Forward Current * See Fig. 5	6	A	50% duty cycle @ $T_C = 164^\circ\text{C}$, rectangular wave form
I_{FSM} Max. Peak One Cycle Non-Repetitive Surge Current * See Fig. 7	690	A	5 μs Sine or 3 μs Rect. pulse
	140		10ms Sine or 6ms Rect. pulse
E_{AS} Non-Repetitive Avalanche Energy	8	mJ	$T_J = 25^\circ\text{C}$, $I_{AS} = 1.20\text{Amps}$, $L = 11.10\text{mH}$
I_{AR} Repetitive Avalanche Current	1.20	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	6TQ	Units	Conditions
V_{FM} Max. Forward Voltage Drop (1) * See Fig. 1	0.60	V	@ 6A
	0.73	V	@ 12A
	0.53	V	@ 6A
	0.64	V	@ 12A
I_{RM} Max. Reverse Leakage Current (1) * See Fig. 2	0.8	mA	$T_J = 25^\circ\text{C}$
	7	mA	$T_J = 125^\circ\text{C}$
$V_{F(TO)}$ Threshold Voltage	0.35	V	$T_J = T_J \text{ max.}$
r_t Forward Slope Resistance	18.23	m Ω	
C_T Max. Junction Capacitance	400	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	10000	V/ μs	(Rated V_R)

(1) Pulse Width < 300 μs , Duty Cycle < 2%

Thermal-Mechanical Specifications

Parameters	6TQ	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	2.2	$^\circ\text{C/W}$	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)	

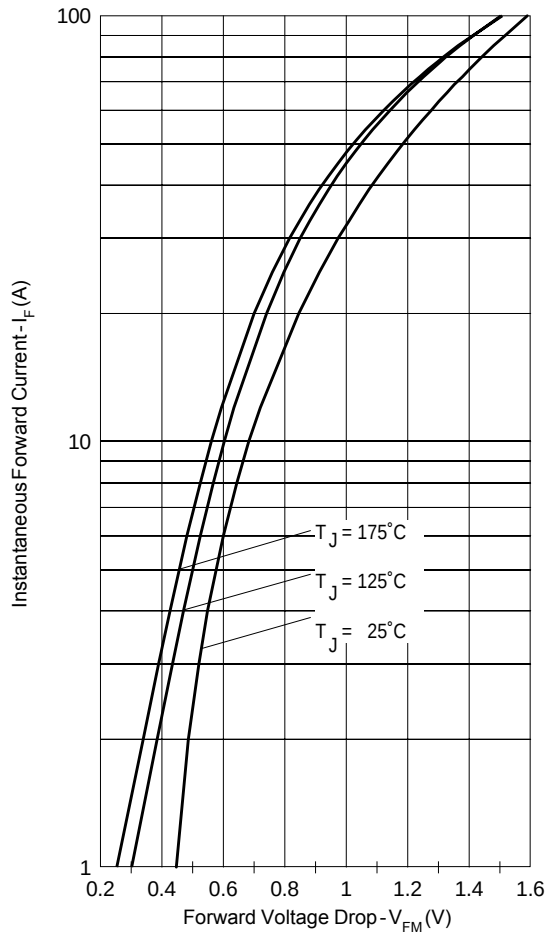


Fig. 1 - Maximum Forward Voltage Drop Characteristics

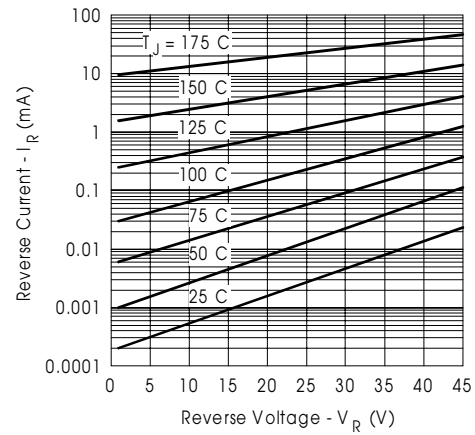


Fig. 2 - Typical Values of Reverse Current Vs. Reverse Voltage

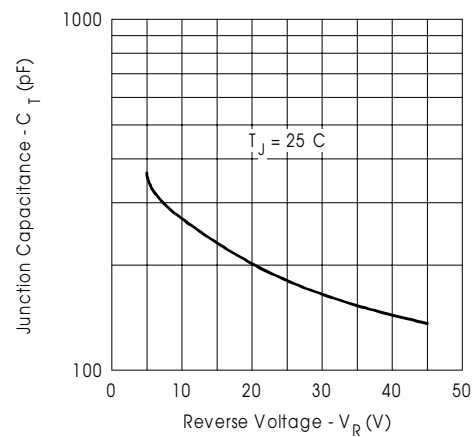


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage

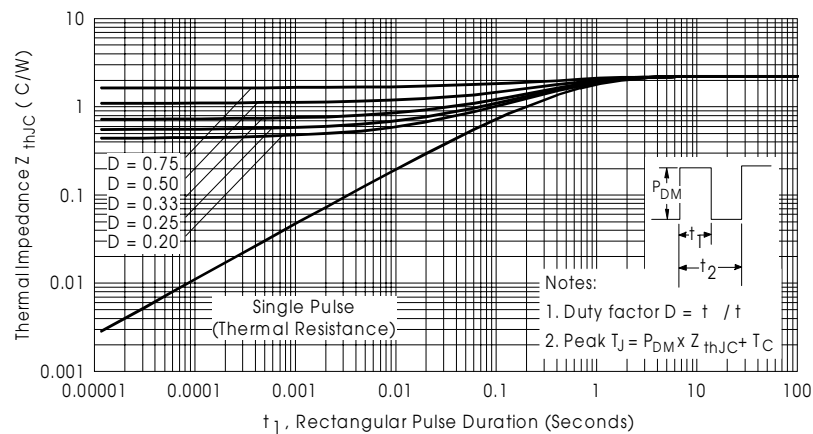


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

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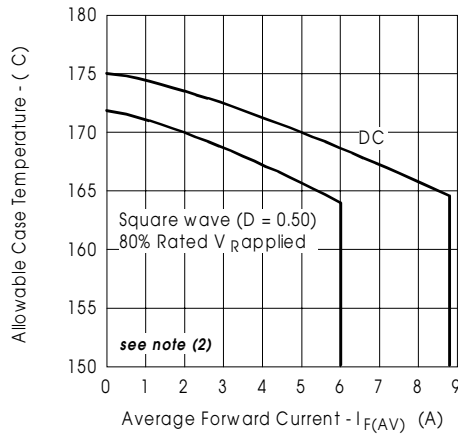


Fig. 5 - Maximum Allowable Case Temperature Vs. Average Forward Current

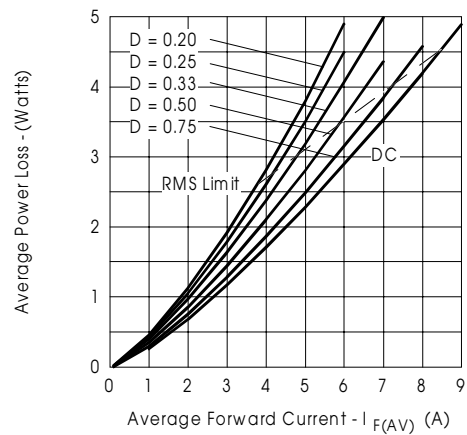


Fig. 6 - Forward Power Loss Characteristics

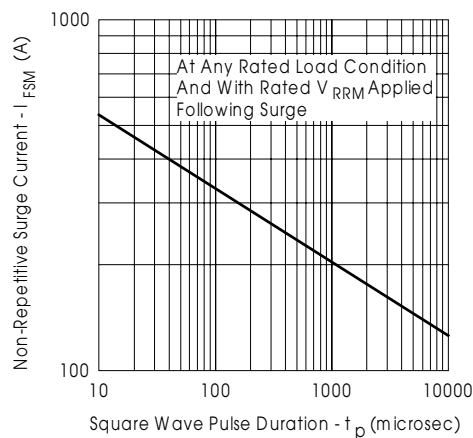


Fig. 7 - Maximum Non-Repetitive Surge Current

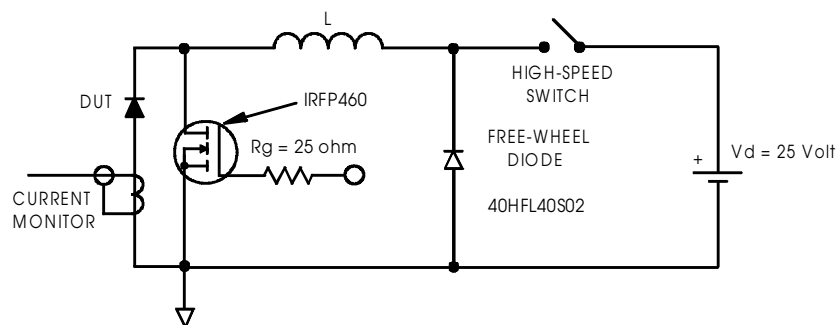


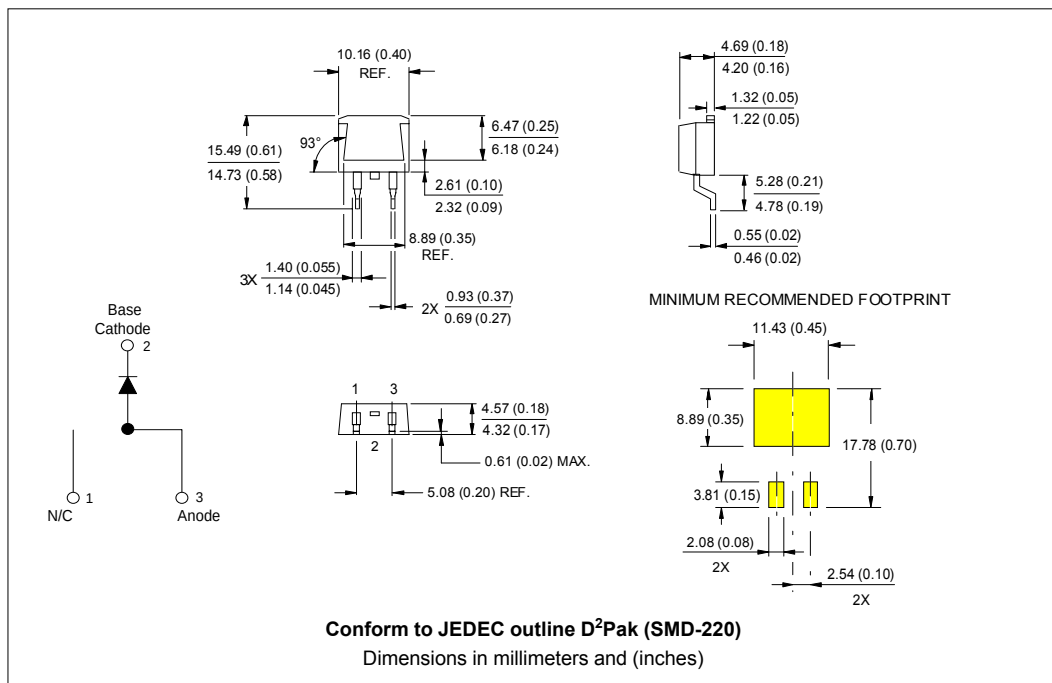
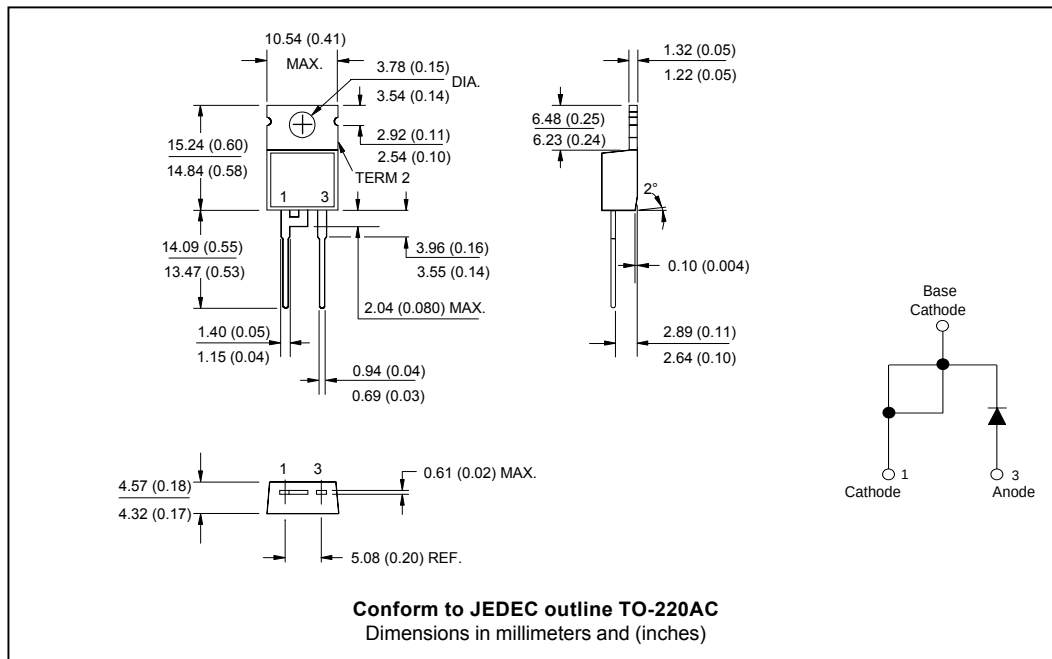
Fig. 8 - Unclamped Inductive Test Circuit

(2) Formula used: $T_C = T_J - (P_d + P_{d_{REV}}) \times R_{thJC}$;

P_d = Forward Power Loss = $I_{F(AV)} \times V_{FM} @ (I_{F(AV)} / D)$ (see Fig. 6);

$P_{d_{REV}}$ = Inverse Power Loss = $V_{R1} \times I_{R1} (1 - D)$; $I_{R1} @ V_{R1} = 80\% \text{ rated } V_R$

Outline Table



6TQ... Series

Bulletin PD-20283 rev. A 05/02

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Ordering Information Table

Device Code		6	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.

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