

International IOR Rectifier

6TQ...SPbF

SCHOTTKY RECTIFIER

6 Amp

$$I_{F(AV)} = 6\text{Amp}$$

$$V_R = 35/45\text{V}$$

Major Ratings and Characteristics

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

Description/ Features

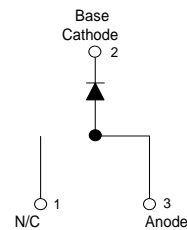
The 6TQ.. Schottky rectifier series has been optimized for low reverse leakage at high temperature. The proprietary barrier technology allows for reliable operation up to 175° C junction temperature. Typical applications are in switching power supplies, converters, free-wheeling diodes, and reverse battery 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
- Lead-Free ("PbF" suffix)

Case Styles



D²PAK



Voltage Ratings

Part number	6TQ035S	6TQ040S	6TQ045S
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	Following any rated load condition and with rated V_{RWM} applied
	140		
E_{AS} Non-Repetitive Avalanche Energy	8	mJ	$T_J = 25^\circ\text{C}$, $I_{AS} = 1.20$ Amps, $L = 11.10$ 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	$T_J = T_J$ max.
r_f 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	$^\circ\text{C}/\text{W}$	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)	
Marking Device	6TQ...S		Case style D ² Pak

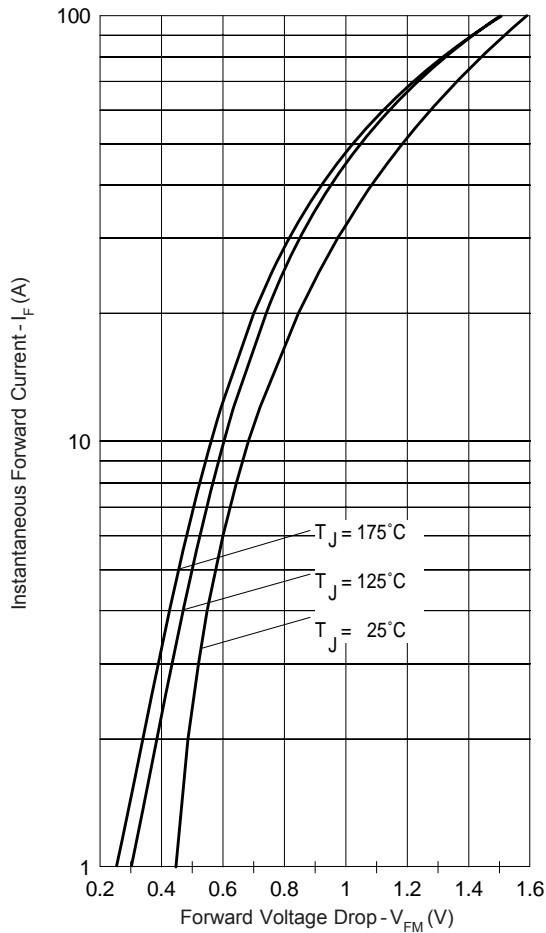


Fig. 1 - Maximum Forward Voltage Drop Characteristics

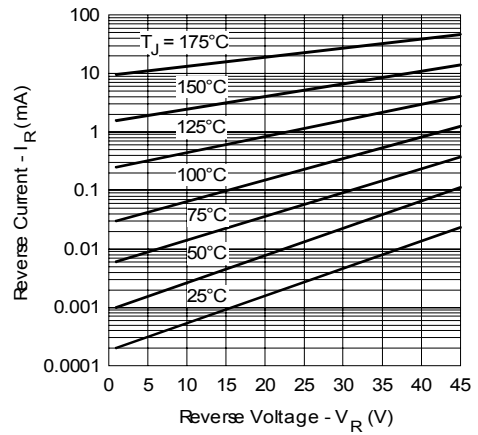


Fig. 2 - Typical Values of Reverse Current Vs. Reverse Voltage

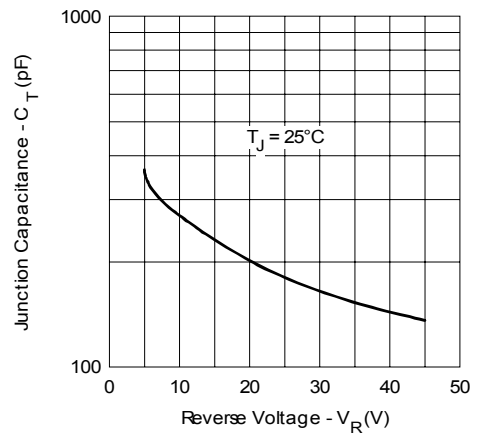


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage

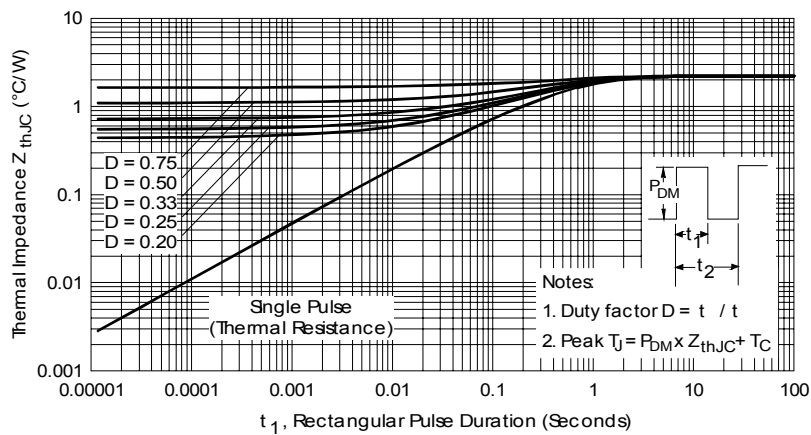


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

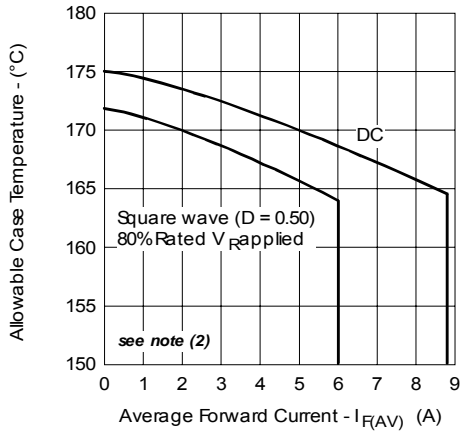


Fig. 5 - Maximum Allowable Case Temperature Vs. Average Forward Current

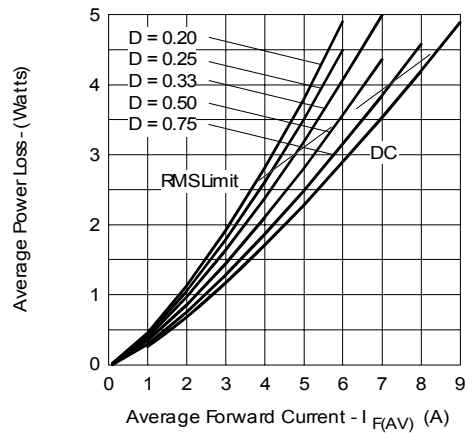


Fig. 6 - Forward Power Loss Characteristics

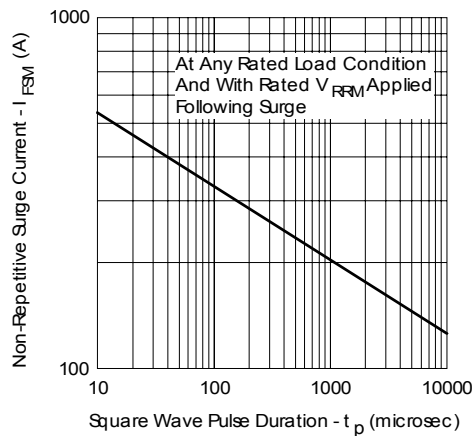


Fig. 7 - Maximum Non-Repetitive Surge Current

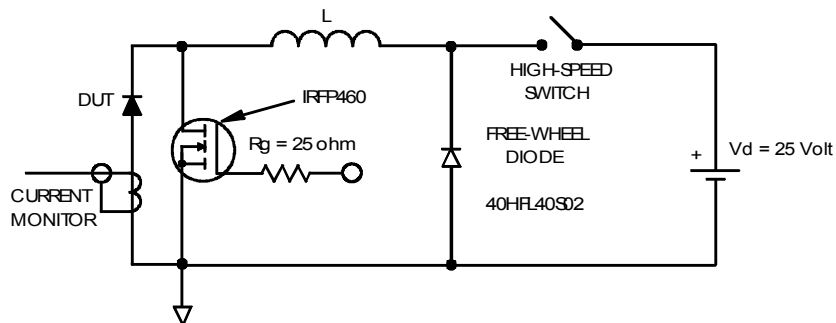


Fig. 8 - Unclamped Inductive Test Circuit

- (2) Formula used: $T_C = T_J - (Pd + Pd_{REV}) \times R_{thJC}$;
 $Pd = \text{Forward Power Loss} = I_{F(AV)} \times V_{FM} @ (I_{F(AV)} / D)$ (see Fig. 6);
 $Pd_{REV} = \text{Inverse Power Loss} = V_{R1} \times I_R (1 - D); I_R @ V_{R1} = 80\% \text{ rated } V_R$

Outline Table

NOTES:
 1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M-1994
 2. DIMENSIONS ARE SHOWN IN MILLIMETERS [INCHES].
 3. DIMENSION D & E DO NOT INCLUDE MOLD FLASH. MOLD FLASH SHALL NOT EXCEED 0.127 [0.005"] PER SIDE. THESE DIMENSIONS ARE MEASURED AT THE OUTMOST EXTREMES OF THE PLASTIC BODY.
 4. DIMENSION b1 AND c1 APPLY TO BASE METAL ONLY.
 5. CONTROLLING DIMENSION: INCH.

SYMBOL	DIMENSIONS				NOTES
	MILLIMETERS		INCHES		
	MIN.	MAX.	MIN.	MAX.	
A	4.06	4.83	.160	.190	
A1	0.00	0.254	.000	.010	
b	0.51	0.99	.020	.039	
b1	0.51	0.89	.020	.035	4
b2	1.14	1.78	.045	.070	
c	0.38	0.74	.015	.029	
c1	0.38	0.58	.015	.023	4
c2	1.14	1.65	.045	.065	
D	8.51	9.65	.335	.380	3
D1	6.86		.270		
E	9.65	10.67	.380	.420	3
E1	6.22		.245		
e	2.54 BSC		.100 BSC		
H	14.61	15.88	.575	.625	
L	1.78	2.79	.070	.110	
L1		1.65		.065	
L2	1.27	1.78	.050	.070	
L3	0.25 BSC		.010 BSC		
L4	4.78	5.28	.188	.208	
m	17.78		.700		
m1	8.89		.350		
n	11.43		.450		
o	2.08		.082		
p	3.81		.150		
R	0.51	0.71	.020	.028	
θ	90°	93°	90°	93°	

LEAD ASSIGNMENTS
HEXFET
 1.- GATE
 2, 4.- DRAIN
 3.- SOURCE
IGBTs, CoPACK
 1.- GATE
 2, 4.- COLLECTOR
 3.- EMITTER
DIODES
 1.- ANODE *
 2, 4.- CATHODE
 3.- ANODE
 * PART DEPENDENT.

Conform to JEDEC outline D²Pak (SMD-220)
 Dimensions in millimeters and (inches)

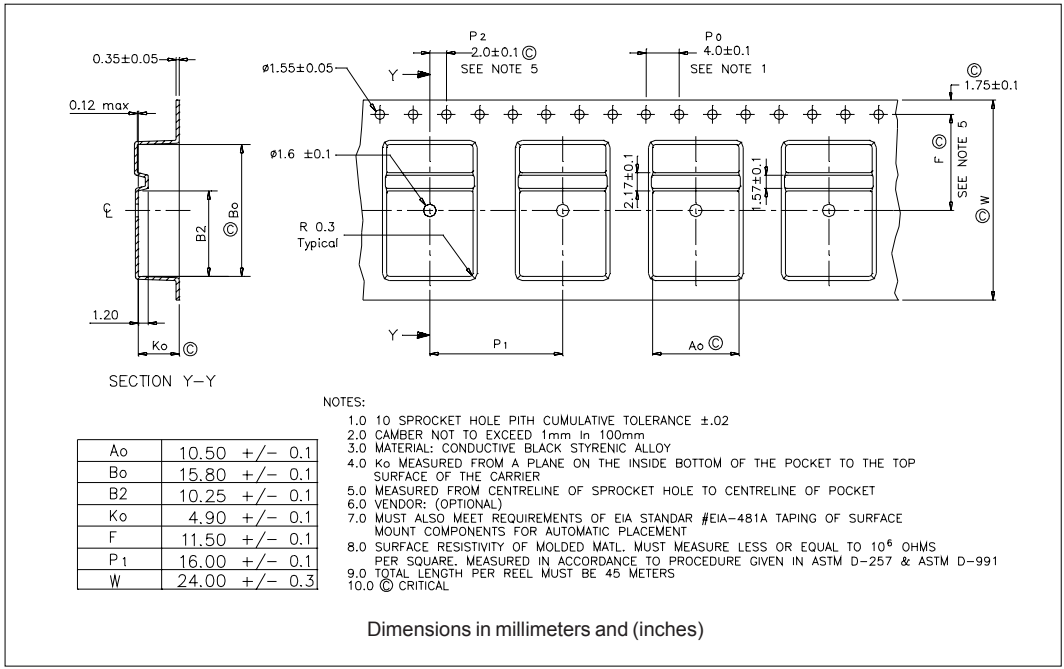
Part Marking Information

EXAMPLE: THIS IS A 6TQ045S
 LOT CODE 8024
 ASSEMBLED ON WW 02, 2000

Note: "P" in assembly line position indicates "Lead-Free"

INTERNATIONAL RECTIFIER LOGO
 ASSEMBLY LOT CODE
 PART NUMBER
 DATE CODE
 YEAR 0 = 2000
 WEEK 02
 P = LEAD-FREE

Tape & Reel Information



Ordering Information Table

Device Code

6	T	Q	045	S	TRL	PbF
1	2	3	4	5	6	7

- 1** - Current Rating (6A)
- 2** - Circuit Configuration
T = TO-220
- 3** - Schottky "Q" Series
- 4** - Voltage Ratings
- 5** - • S = D²Pak
- 6** - • none = Tube (50 pieces)
• TRL = Tape & Reel (Left Oriented)
• TRR = Tape & Reel (Right Oriented)
- 7** - • none = Standard Production
• PbF = Lead-Free

035 = 35V
040 = 40V
045 = 45V

Data and specifications subject to change without notice.
This product has been designed and qualified for Industrial Level and Lead-Free.
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
Visit us at www.irf.com for sales contact information. 06/06