Bulletin PD-21040 rev. A 06/06

International
IOR Rectifier

6TQ...SPbF

SCHOTTKY RECTIFIER 6 Amp

$I_{F(AV)}$ = 6Amp
V_R = 35/ 45V

Major Ratings and Characteristics

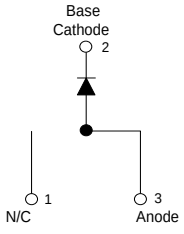
Characteristics	Values	Units
$I_{F(AV)}$ Rectangular waveform	6	A
V_{RRM} range	35 / 45	V
I_{FSM} @ tp = 5 µs sine	690	A
V_F @ 6 Apk, T_J = 125°C	0.53	V
T_J range	- 55 to 175	°C

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
- Lead-Free ("PbF" suffix)

Case Styles



D^2PAK

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° C, rectangular wave form	
I_{FSM}	Max. Peak One Cycle Non-Repetitive Surge Current * See Fig. 7	690	A	5µs Sine or 3µs Rect. pulse	Following any rated load condition and with rated V_{RRM} applied
		140		10ms Sine or 6ms Rect. pulse	
E_{AS}	Non-Repetitive Avalanche Energy	8	mJ	T_J = 25 °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	T_J = 25 °C
		0.73	V	@ 12A	
		0.53	V	@ 6A	T_J = 125 °C
		0.64	V	@ 12A	
I_{RM}	Max. Reverse Leakage Current (1) * See Fig. 2	0.8	mA	T_J = 25 °C	V_R = rated V_R
		7	mA	T_J = 125 °C	
$V_{F(TO)}$	Threshold Voltage	0.35	V	$T_J = T_J$ max.	
r_t	Forward Slope Resistance	18.23	mΩ		
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 < 300µs, Duty Cycle < 2%

Thermal-Mechanical Specifications

	Parameters		6TQ	Units	Conditions
T_J	Max. Junction Temperature Range		-55 to 175	°C	
T_{stg}	Max. Storage Temperature Range		-55 to 175	°C	
R_{thJC}	Max. Thermal Resistance Junction to Case		2.2	°C/W	DC operation * See Fig. 4
R_{thCS}	Typical Thermal Resistance, Case to Heatsink		0.50	°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)		
	Marking Device		6TQ...S		Case style D^{2}Pak

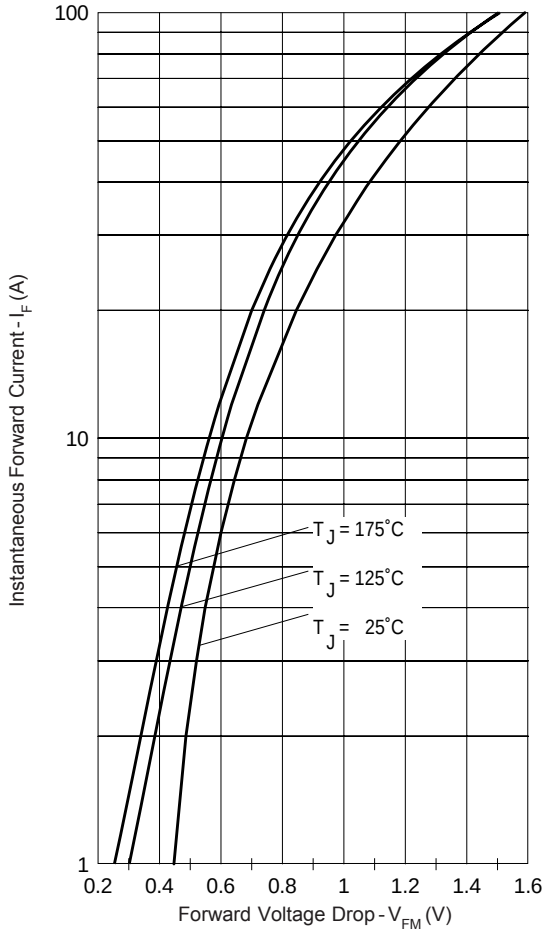


Fig. 1 - Maximum Forward Voltage Drop Characteristics

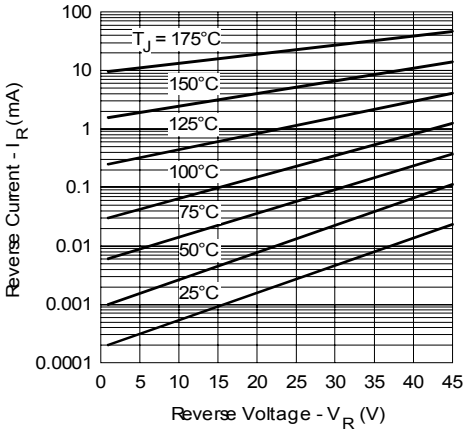


Fig. 2 - Typical Values of Reverse Current Vs. Reverse Voltage

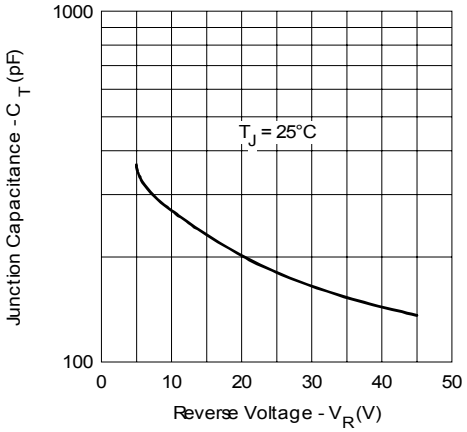


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage

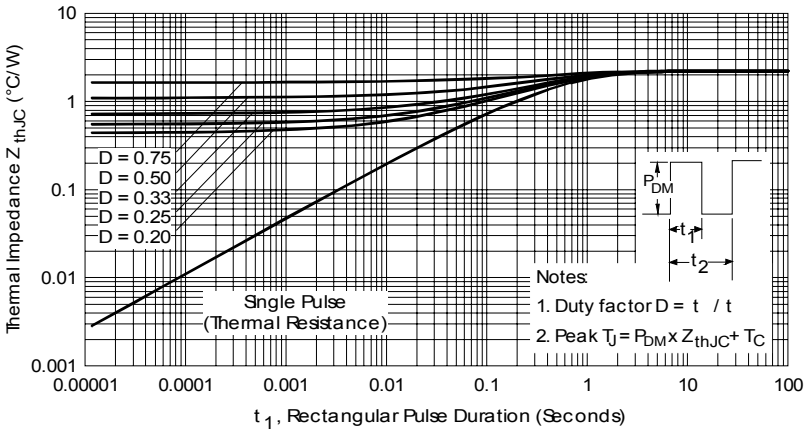


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

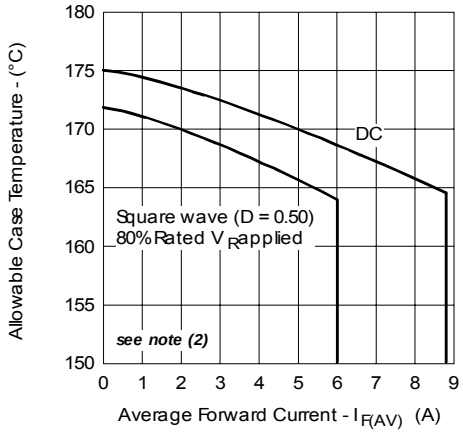


Fig. 5 - Maximum Allowable Case Temperature Vs. Average Forward Current

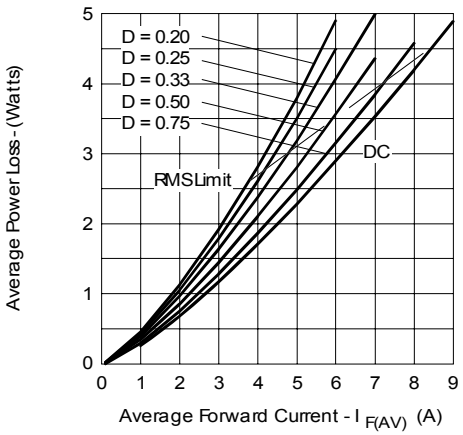


Fig. 6 - Forward Power Loss Characteristics

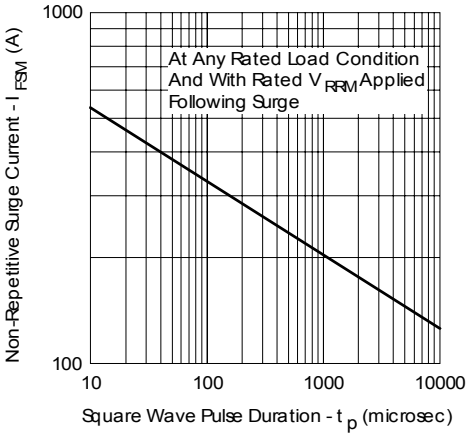


Fig. 7 - Maximum Non-Repetitive Surge Current

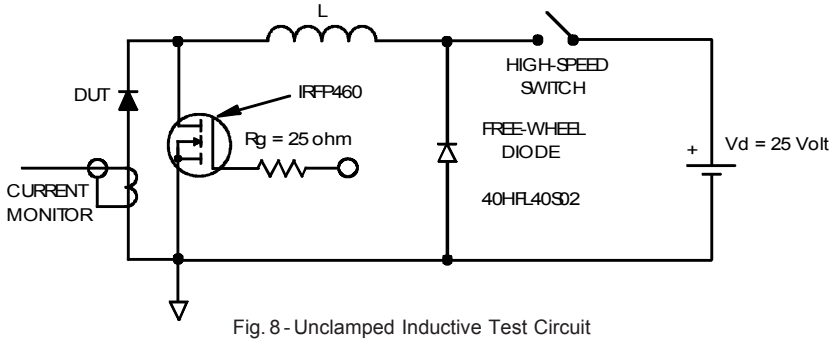
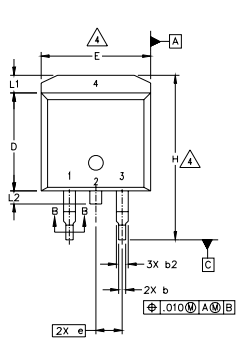


Fig. 8 - Unclamped Inductive Test Circuit

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

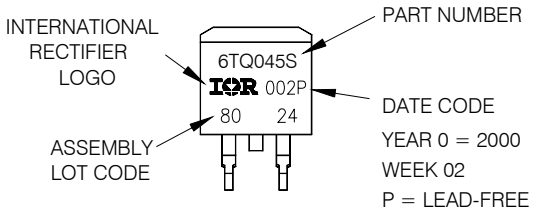
* PART DEPENDENT.

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

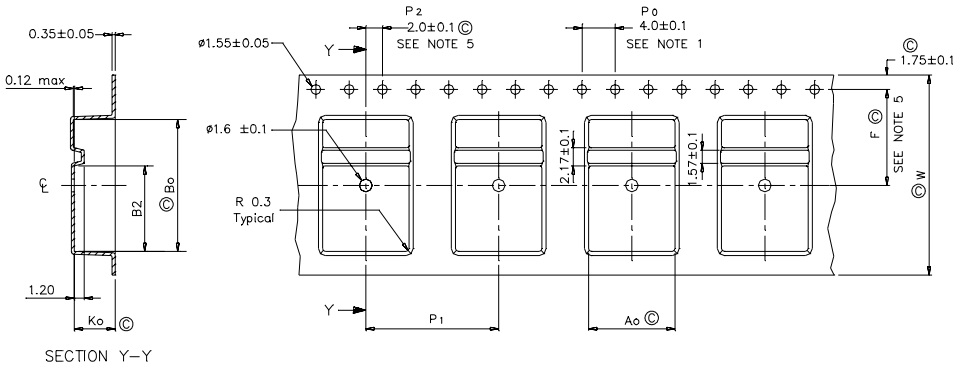
Part Marking Information

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

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



Tape & Reel Information



Ao	10.50 +/– 0.1
Bo	15.80 +/– 0.1
B2	10.25 +/– 0.1
Ko	4.90 +/– 0.1
F	11.50 +/– 0.1
P1	16.00 +/– 0.1
W	24.00 +/– 0.3

NOTES:
1.0 10 SPROCKET HOLE PITH CUMULATIVE TOLERANCE ±.02
2.0 CAMBER NOT TO EXCEED 1mm In 100mm
3.0 MATERIAL: CONDUCTIVE BLACK STYRENIC ALLOY
4.0 Ko MEASURED FROM A PLANE ON THE INSIDE BOTTOM OF THE POCKET TO THE TOP SURFACE OF THE CARRIER
5.0 MEASURED FROM CENTRELINE OF SPROCKET HOLE TO CENTRELINE OF POCKET
6.0 VENDOR: (OPTIONAL)
7.0 MUST ALSO MEET REQUIREMENTS OF EIA STANDAR #EIA-481A TAPING OF SURFACE MOUNT COMPONENTS FOR AUTOMATIC PLACEMENT
8.0 SURFACE RESISTIVITY OF MOLDED MATL. MUST MEASURE LESS OR EQUAL TO 10^6 OHMS PER SQUARE. MEASURED IN ACCORDANCE TO PROCEDURE GIVEN IN ASTM D-257 & ASTM D-991
9.0 TOTAL LENGTH PER REEL MUST BE 45 METERS
10.0 Ⓒ CRITICAL

Dimensions in millimeters and (inches)

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

5 - • S = D^2Pak

6 - • none = Tube (50 pieces)
• TRL = Tape & Reel (Left Oriented)
• TRR = Tape & Reel (Right Oriented)

7 - • none = Standard Production
• PbF = Lead-Free

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

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06/06

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