

International IR Rectifier

15TQ060SPbF

SCHOTTKY RECTIFIER

15 Amp

$$I_{F(AV)} = 15\text{Amp}$$

$$V_R = 60\text{V}$$

Major Ratings and Characteristics

Characteristics	Values	Units
$I_{F(AV)}$ Rectangular waveform	15	A
V_{RRM}	60	V
I_{FSM} @ $t_p = 5 \mu\text{s}$ sine	1000	A
V_F @15Apk, $T_J = 125^\circ\text{C}$	0.56	V
T_J range	-55 to 150	$^\circ\text{C}$

Description/ Features

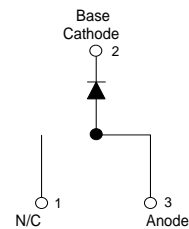
The 15TQ060PbF Schottky rectifier has been optimized for very low forward voltage drop, with moderate leakage. The proprietary barrier technology allows for reliable operation up to 150°C junction temperature. Typical applications are in switching power supplies, converters, free-wheeling diodes, and 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
- Lead-Free ("PbF" suffix)

Case Styles



D²PAK



Voltage Ratings

Part number	15TQ060SPbF
V_R Max. DC Reverse Voltage (V)	60
V_{RWM} Max. Working Peak Reverse Voltage (V)	

Absolute Maximum Ratings

Parameters	15TQ	Units	Conditions
$I_{F(AV)}$ Max. Average Forward Current * See Fig. 5	15	A	50% duty cycle @ $T_C = 104^\circ\text{C}$, rectangular wave form
I_{FSM} Max. Peak One Cycle Non-Repetitive Surge Current * See Fig. 7	1000	A	5 μs Sine or 3 μs Rect. pulse
	260		10ms Sine or 6ms Rect. pulse
E_{AS} Non-Repetitive Avalanche Energy	6	mJ	$T_J = 25^\circ\text{C}$, $I_{AS} = 1.50\text{Amps}$, $L = 11.5\text{mH}$
I_{AR} Repetitive Avalanche Current	1.50	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	15TQ	Units	Conditions
V_{FM} Max. Forward Voltage Drop (1) * See Fig. 1	0.62	V	@ 15A
	0.82	V	@ 30A
	0.56	V	@ 15A
	0.71	V	@ 30A
I_{RM} Max. Reverse Leakage Current (1) * See Fig. 2	0.80	mA	$T_J = 25^\circ\text{C}$
	45	mA	$T_J = 125^\circ\text{C}$
C_T Max. Junction Capacitance	720	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	15TQ	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	3.25	$^\circ\text{C/W}$	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)		
Case Style	TO-220AC		JEDEC
Marking Device	15TQ060S		Case style D ² Pak

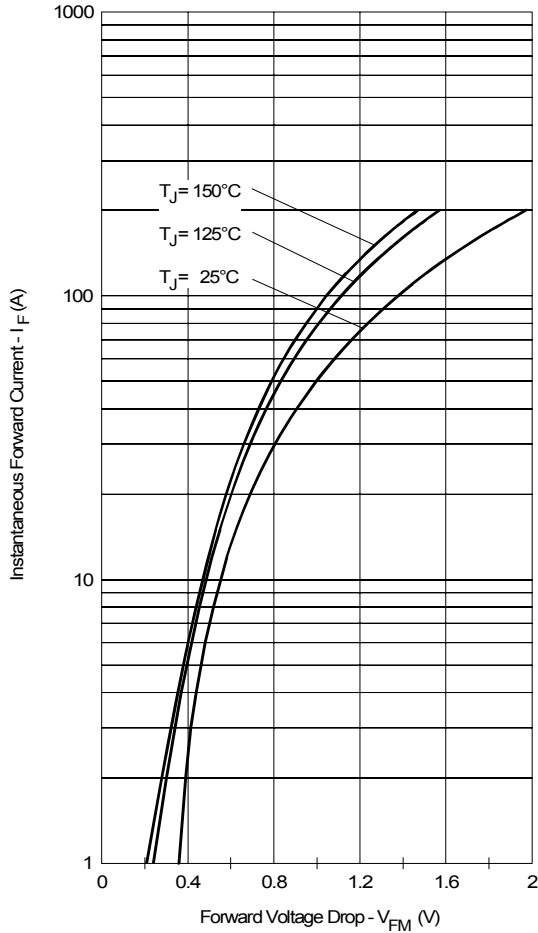


Fig. 1 - Maximum Forward Voltage Drop Characteristics

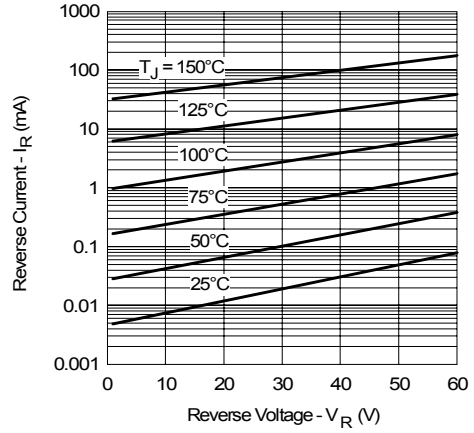


Fig. 2 - Typical Values of Reverse Current Vs. Reverse Voltage

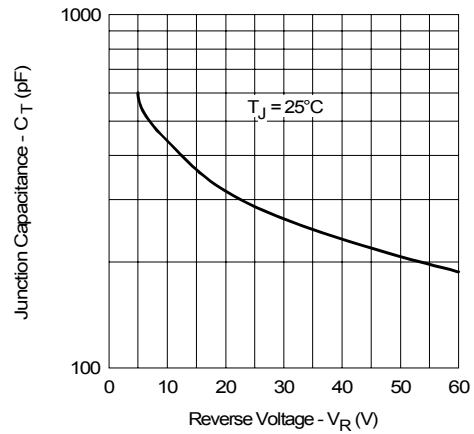


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage

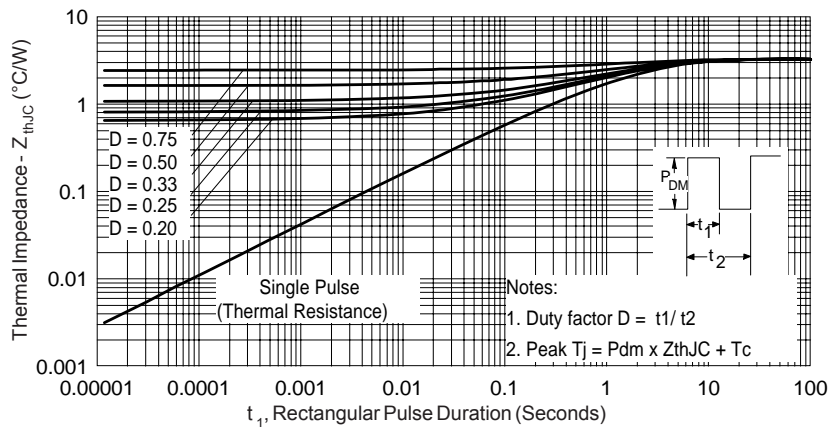


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

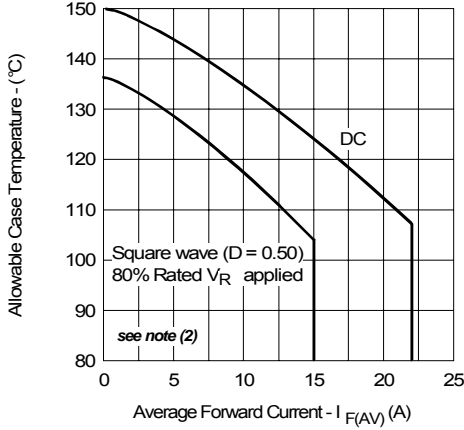


Fig. 5 - Maximum Allowable Case Temperature Vs. Average Forward Current

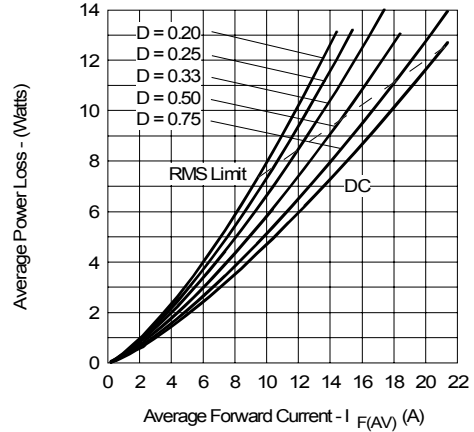


Fig. 6 - Forward Power Loss Characteristics

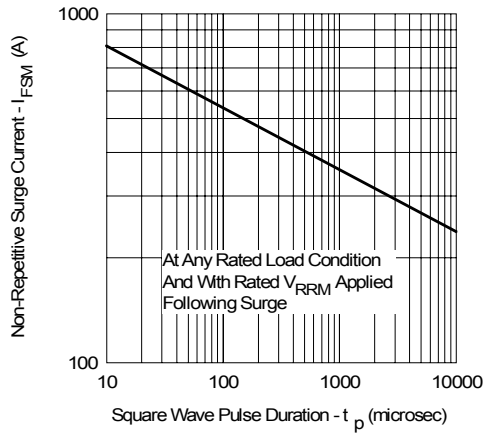


Fig. 7 - Maximum Non-Repetitive Surge Current

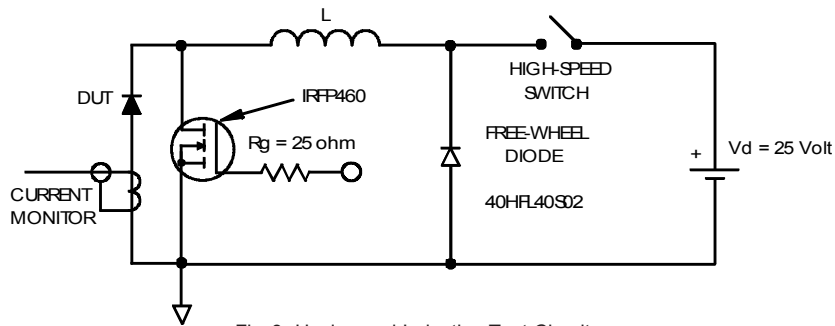


Fig. 8 - Unclamped Inductive Test Circuit

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

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

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

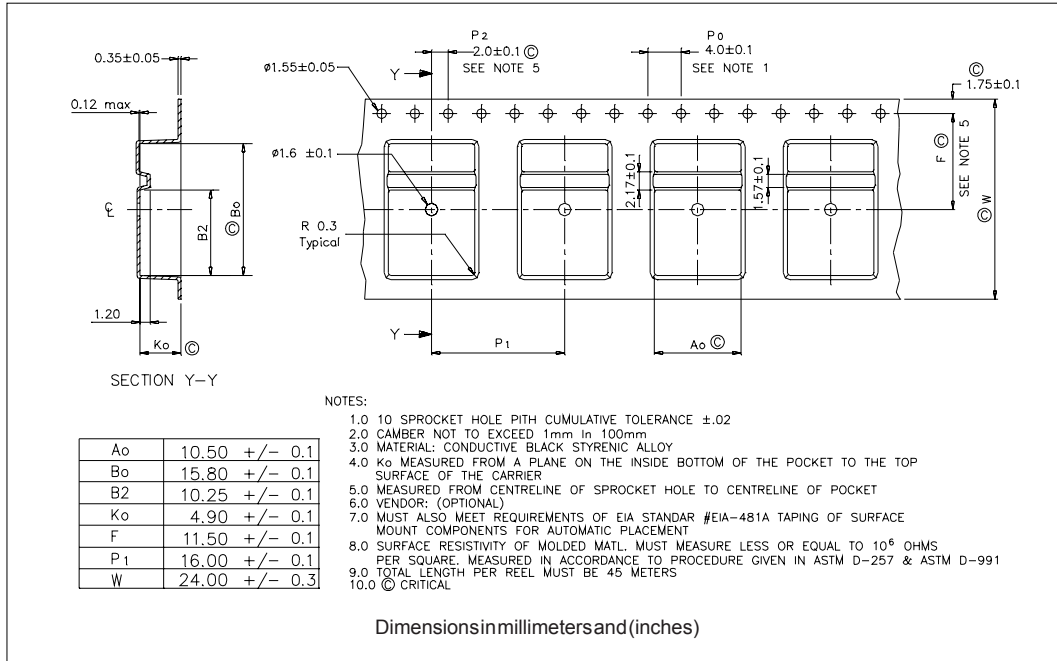
Part Marking Information

EXAMPLE: THIS IS A 15TQ060S
 LOT CODE 8024
 ASSEMBLED ON WW 02, 2001

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

INTERNATIONAL RECTIFIER LOGO
 ASSEMBLY LOT CODE
 PART NUMBER
 DATE CODE
 YEAR 1 = 2001
 WEEK 02
 P = LEAD-FREE

Tape & Reel Information



Ordering Information Table

Device Code

15	T	Q	060	S	TRL	PbF
1	2	3	4	5	6	7

- 1** - Current Rating (15A)
- 2** - Circuit Configuration
T = TO-220
- 3** - Schottky "Q" Series
- 4** - Voltage Rating (060 = 60V)
- 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

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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