

International
IR Rectifier

30CTQ...SPbF
30CTQ...-1PbF

SCHOTTKY RECTIFIER

30 Amp

$I_{F(AV)} = 30\text{Amp}$
 $V_R = 50 - 60\text{V}$

Major Ratings and Characteristics

Characteristics	Values	Units
$I_{F(AV)}$ Rectangular waveform	30	A
V_{RRM}	50 - 60	V
I_{FSM} @ tp = 5 μs sine	1000	A
V_F @ 15 Apk, $T_J = 125^\circ\text{C}$ (per leg)	0.56	V
T_J range	-55 to 150	$^\circ\text{C}$

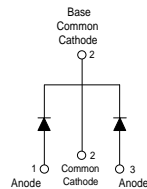
Description/ Features

This center tap 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
- Center tap configuration
- Very low forward voltage drop
- High purity, high temperature epoxy encapsulation for enhanced mechanical strength and moisture resistance
- High frequency operation
- Guard ring for enhanced ruggedness and long term reliability
- Lead-Free ("PbF" suffix)

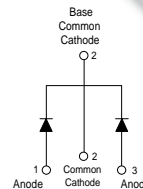
Case Styles

30CTQ...SPbF



D²PAK

30CTQ...-1PbF



TO-262

30CTQ...SPbF, 30CTQ...-1PbF

Bulletin PD-21018 rev. A 07/06



Voltage Ratings

Parameters	30CTQ050SPbF 30CTQ050-1PbF	30CTQ060SPbF 30CTQ060-1PbF
V _R Max. DC Reverse Voltage (V)	50	60
V _{RWM} Max. Working Peak Reverse Voltage (V)		

Absolute Maximum Ratings

Parameters	Values	Units	Conditions
I _{F(AV)} Max. Average Forward Current (Per Leg) * See Fig. 5 (Per Device)	15	A	50% duty cycle @ T _C = 105°C, rectangular wave form
	30		
I _{FSM} Max. Peak One Cycle Non-Repetitive Surge Current (Per Leg) * See Fig. 7	1000	A	5µs Sine or 3µs Rect. pulse 10ms Sine or 6ms Rect. pulse
	260		
E _{AS} Non-Repetitive Avalanche Energy (Per Leg)	13	mJ	T _J = 25 °C, I _{AS} = 1.50 Amps, L = 11.5 mH
I _{AR} Repetitive Avalanche Current (Per Leg)	1.50	A	Current decaying linearly to zero in 1µsec Frequency limited by T _J max. V _A = 1.5 x V _R typical

Electrical Specifications

Parameters	Values	Units	Conditions
V _{FM} Max. Forward Voltage Drop (Per Leg) * See Fig. 1 (1)	0.62	V	@ 15A T _J = 25 °C
	0.82	V	@ 30A
	0.56	V	@ 15A T _J = 125 °C
	0.71	V	@ 30A
I _{RM} Max. Reverse Leakage Current (Per Leg) * See Fig. 2 (1)	0.80	mA	T _J = 25 °C
	45	mA	T _J = 125 °C V _R = rated V _R
V _{F(TO)} Threshold Voltage	0.39	V	T _J = T _J max.
r _t Forward Slope Resistance	8.47	mΩ	
C _T Max. Junction Capacitance (Per Leg)	720	pF	V _R = 5V _{DC} (test signal range 100Khz to 1Mhz) 25°C
L _S Typical Series Inductance (Per Leg)	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	Values	Units	Conditions
T _J Max. Junction Temperature Range	-55 to 150	°C	
T _{stg} Max. Storage Temperature Range	-55 to 150	°C	
R _{thJC} Max. Thermal Resistance Junction to Case (Per Leg)	3.25	°C/W	DC operation
R _{thJC} Max. Thermal Resistance Junction to Case (Per Package)	1.63	°C/W	DC operation
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	30CTQ...S		Case style D ² Pak
	30CTQ...-1		Case style TO-262

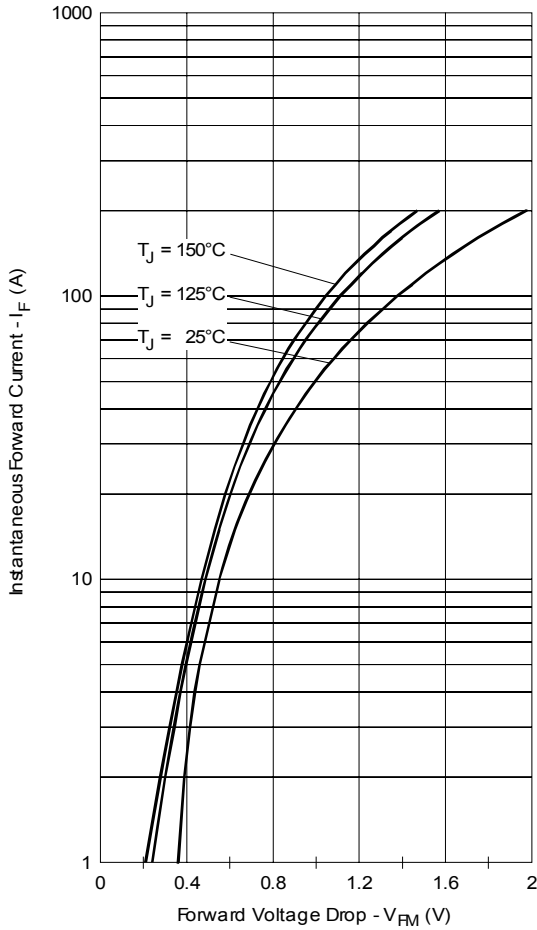


Fig. 1 - Max. Forward Voltage Drop Characteristics (Per Leg)

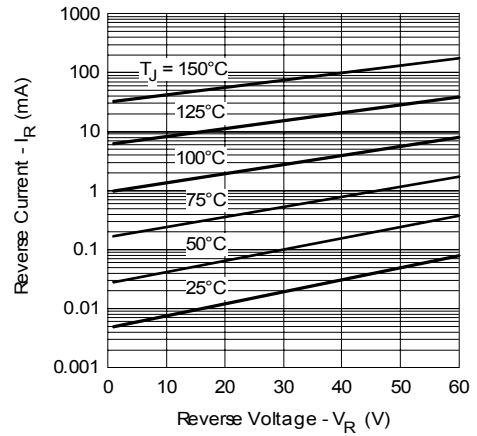


Fig. 2 - Typical Values Of Reverse Current Vs. Reverse Voltage (Per Leg)

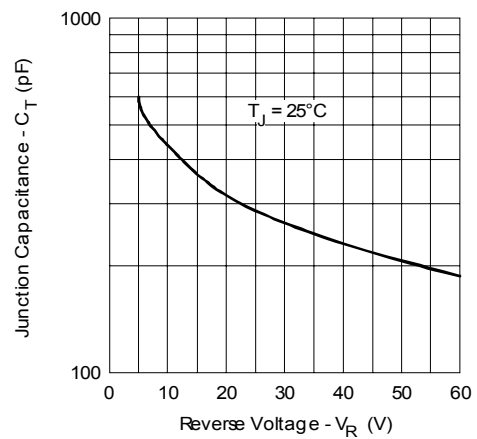


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage (Per Leg)

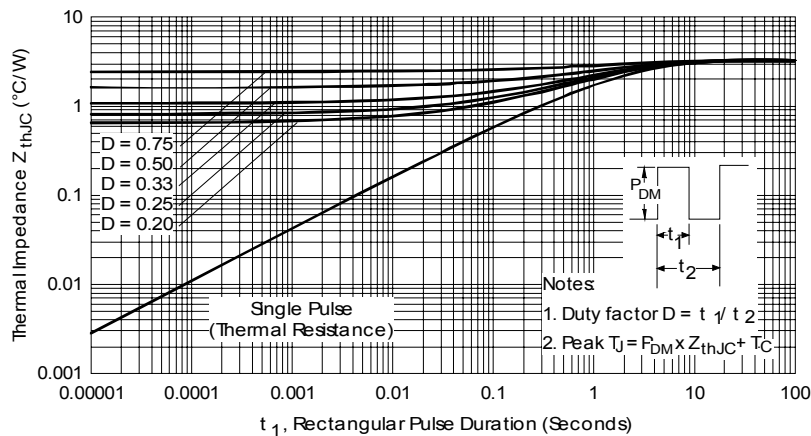


Fig. 4 - Max. Thermal Impedance Z_{thJC} Characteristics (Per Leg)

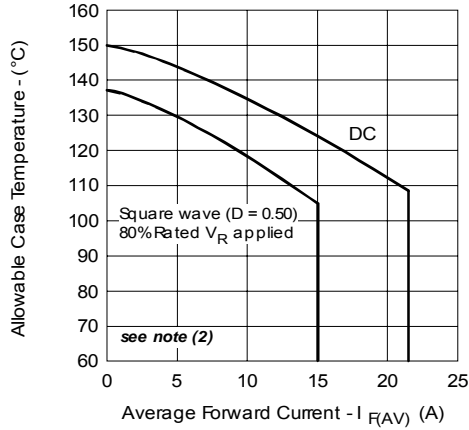


Fig. 5 - Max. Allowable Case Temperature Vs. Average Forward Current (Per Leg)

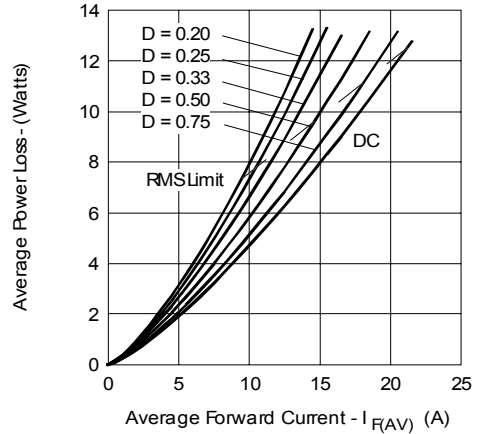


Fig. 6 - Forward Power Loss Characteristics (Per Leg)

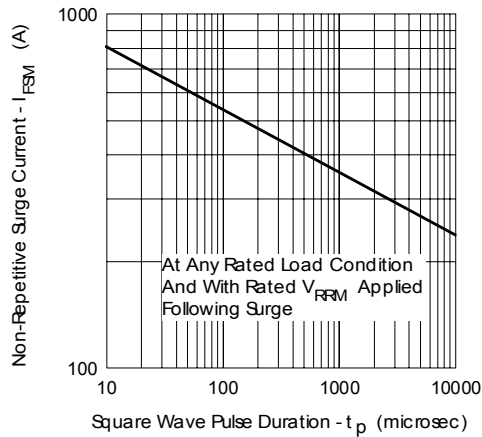


Fig. 7 - Max. Non-Repetitive Surge Current (Per Leg)

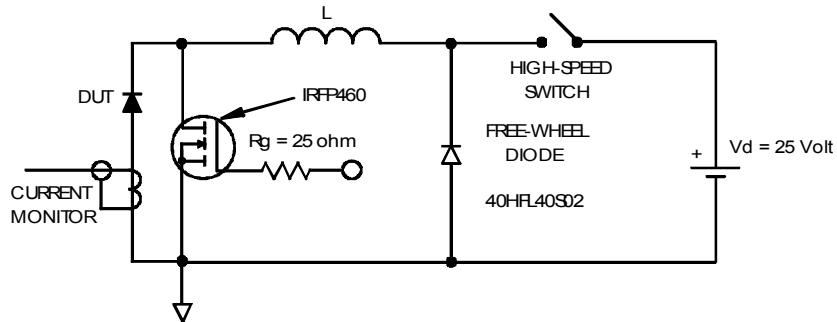


Fig. 8 - Unclamped Inductive Test Circuit

- (2) Formula used: $T_c = T_j - (P_d + P_{d_{REV}}) \times R_{thJC}$;
 $P_d = \text{Forward Power Loss} = I_{F(AV)} \times V_{FM} @ (I_{F(AV)} / D)$ (see Fig. 6);
 $P_{d_{REV}} = \text{Inverse Power Loss} = V_{R1} \times I_R (1 - D); I_R @ V_{R1} = 10V$

Outlines 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 DIMENSIONS: INCH.

SYMBOL	DIMENSIONS				NOTES	
	MILLIMETERS		INCHES			
	MIN.	MAX.	MIN.	MAX.		
A	4.06	4.83	.160	.190	4	
A1	0.00	0.254	.000	.010		
b	0.51	0.99	.020	.039		
b1	0.51	0.89	.020	.035		
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		3	
e	2.54 BSC		.100 BSC			
H	14.61	15.88	.575	.625	4	
L	1.78	2.79	.070	.110		
L1		1.65		.065	4	
L2	1.27	1.78	.050	.070		
L3	0.25 BSC		.010 BSC		4	
L4	4.78	5.28	.188	.208		
m	17.78		.700		4	
m1	8.89		.350			
n	11.43		.450		4	
o	2.08		.082			
p	3.81		.150		4	
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)

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. THERMAL PAD CONTOUR OPTIONAL WITHIN DIMENSION E, L1, D1 & E1.
 5. DIMENSION b1 AND c1 APPLY TO BASE METAL ONLY.
 6. CONTROLLING DIMENSIONS: INCH.
 7.- OUTLINE CONFORM TO JEDEC TO-262 EXCEPT A1(max.), b(min.), AND D1(min.) WHERE DIMENSIONS DERIVED THE ACTUAL PACKAGE OUTLINE.

SYMBOL	DIMENSIONS				NOTES	
	MILLIMETERS		INCHES			
	MIN.	MAX.	MIN.	MAX.		
A	4.06	4.83	.160	.190	5	
A1	2.03	3.02	.080	.119		
b	0.51	0.99	.020	.039		
b1	0.51	0.89	.020	.035		
b2	1.14	1.78	.045	.070		
b3	1.14	1.73	.045	.068		
c	0.38	0.74	.015	.029		
c1	0.38	0.58	.015	.023		5
c2	1.14	1.65	.045	.065		
D	8.38	9.65	.330	.380		3
D1	6.86		.270		4	
E	9.65	10.67	.380	.420	3,4	
E1	6.22		.245		4	
e	2.54 BSC		.100 BSC		4	
L	13.46	14.10	.530	.555		
L1		1.65		.065	4	
L2	3.56	3.71	.140	.146		

LEAD ASSIGNMENTS

HEXFET
 1.- GATE
 2.- DRAIN
 3.- SOURCE
 4.- DRAIN

IGBTs, CoPACK
 1.- GATE
 2.- COLLECTOR
 3.- EMITTER
 4.- COLLECTOR

Modified JEDEC outline TO-262
 Dimensions in millimeters and (inches)

30CTQ...SPbF, 30CTQ...-1PbF
 Bulletin PD-21018 rev. A 07/06



Part Marking Information

D²PAK

EXAMPLE: THIS IS A 30CTQ060S
 LOT CODE 8024
 ASSEMBLED ON WW 02, 2000

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

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

TO-262

EXAMPLE: THIS IS A 430CTQ060-1
 LOT CODE 1789
 ASSEMBLED ON WW 19, 1999

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

INTERNATIONAL RECTIFIER LOGO
 PART NUMBER
 DATE CODE
 YEAR 9 = 1999
 WEEK 19
 P = LEAD-FREE

Tape & Reel Information

SECTION Y-Y

A _o	10.50 +/- 0.1
B _o	15.80 +/- 0.1
B ₂	10.25 +/- 0.1
K _o	4.90 +/- 0.1
F	11.50 +/- 0.1
P ₁	16.00 +/- 0.1
W	24.00 +/- 0.3

NOTES:

- 1.0 SPROCKET HOLE PITCH CUMULATIVE TOLERANCE ±0.2
- 2.0 CAMBER NOT TO EXCEED 1mm in 100mm
- 3.0 MATERIAL: CONDUCTIVE BLACK STYRENIC ALLOY
- 4.0 K_o 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 10⁶ 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																	
	<table border="1" style="margin: auto;"> <tr> <td style="padding: 5px;">30</td> <td style="padding: 5px;">C</td> <td style="padding: 5px;">T</td> <td style="padding: 5px;">Q</td> <td style="padding: 5px;">060</td> <td style="padding: 5px;">S</td> <td style="padding: 5px;">TRL</td> <td style="padding: 5px;">PbF</td> </tr> <tr> <td style="text-align: center;">①</td> <td style="text-align: center;">②</td> <td style="text-align: center;">③</td> <td style="text-align: center;">④</td> <td style="text-align: center;">⑤</td> <td style="text-align: center;">⑥</td> <td style="text-align: center;">⑦</td> <td style="text-align: center;">⑧</td> </tr> </table>	30	C	T	Q	060	S	TRL	PbF	①	②	③	④	⑤	⑥	⑦	⑧
30	C	T	Q	060	S	TRL	PbF										
①	②	③	④	⑤	⑥	⑦	⑧										
1	- Current Rating (30A)																
2	- Circuit Configuration C = Common Cathode																
3	- T = TO-220																
4	- Schottky "Q" Series																
5	- Voltage Ratings																
6	- • S = D ² Pak • -1= TO-262																
7	- • none = Tube (50 pieces) • TRL = Tape & Reel (Left Oriented - for D ² Pak only) • TRR = Tape & Reel (Right Oriented - for D ² Pak only)																
8	- • none = Standard Production • PbF = Lead-Free																

050 = 50V
 060 = 60V

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.