Bulletin PD-20843 rev. B 05/06

International
IOR Rectifier

25CTQ...PbF Series

SCHOTTKY RECTIFIER

30 Amp

$I_{F(AV)}$ = 30Amp
V_R = 35/ 45V

Major Ratings and Characteristics

Characteristics	Values	Units
$I_{F(AV)}$ Rectangular waveform	30	A
V_{RRM} range	35/45	V
I_{FSM} @tp = 5 µs sine	990	A
V_F @15 Apk, T_J=125°C (per leg)	0.50	V
T_J range	- 55 to 150	°C

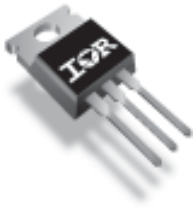
Description/ Features

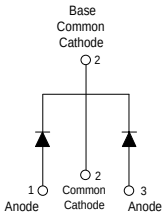
The 25CTQ...PbF center tap Schottky rectifier series has been optimized for very low forward voltage drop, with moderate leakage. The proprietary barrier technology allows for reliable operation up to 150°C junction temperature. Typical applications are in switching power supplies, converters, freewheeling diodes, and reverse battery protection.

- 175° C T_J operation
- Center tap TO-220 package
- 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

25CTQ...PbF





TO-220

Voltage Ratings

	Part number	25CTQ035PbF	25CTQ040PbF	25CTQ045PbF
V_R	Max. DC Reverse Voltage (V)	35	40	45
V_{RWM}	Max. Working Peak Reverse Voltage (V)			

Absolute Maximum Ratings

	Parameters	25CTQ	Units	Conditions	
$I_{F(AV)}$	Max. Average Forward Current * See Fig. 5	30	A	50% duty cycle @ T_C = 102 °C, rectangular wave form	
I_{FSM}	Max. Peak One Cycle Non-Repetitive Surge Current (Per Leg) * See Fig. 7	990	A	5µs Sine or 3µs Rect. pulse	Following any rated load condition and with rated V_{RRM} applied
		250		10ms Sine or 6ms Rect. pulse	
E_{AS}	Non-Repetitive Avalanche Energy (Per Leg)	20	mJ	T_J = 25 °C, I_{AS} = 3 Amps, L = 4.40 mH	
I_{AR}	Repetitive Avalanche Current (Per Leg)	3	A	Current decaying linearly to zero in 1 µsec Frequency limited by T_J max. V_A = 1.5 x V_R typical	

Electrical Specifications

	Parameters	25CTQ	Units	Conditions	
V_{FM}	Max. Forward Voltage Drop (Per Leg) * See Fig. 1 (1)	0.56	V	@ 15A	T_J = 25 °C
		0.71	V	@ 30A	
		0.50	V	@ 15A	T_J = 125 °C
		0.64	V	@ 30A	
I_{RM}	Max. Reverse Leakage Current (Per Leg) * See Fig. 2 (1)	1.75	mA	T_J = 25 °C	V_R = rated V_R
		70	mA	T_J = 125 °C	
C_T	Max. Junction Capacitance (Per Leg)	900	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 (Rated V_R)	10000	V/ µs		

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

Thermal-Mechanical Specifications

	Parameters		25CTQ	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 * See Fig. 4
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 (0.07)	g (oz.)	
T	Mounting Torque	Min.	6 (5)	Kg-cm (lbf-in)	
		Max.	12 (10)		
	Marking Device		25CTQ045		

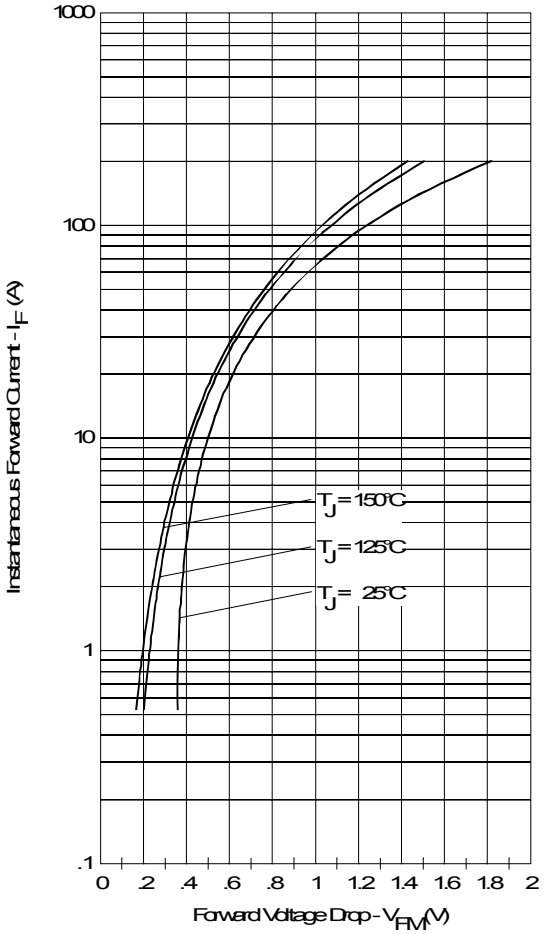


Fig. 1 - Max. Forward Voltage Drop Characteristics (Per Leg)

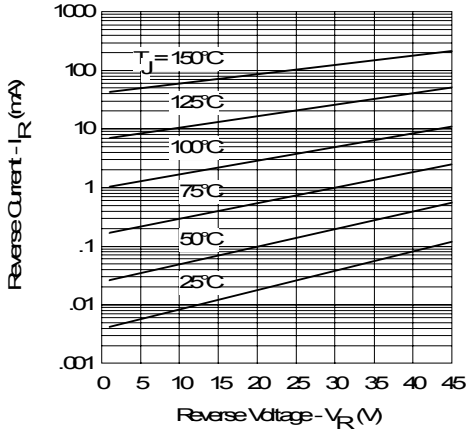


Fig. 2 - Typical Values Of Reverse Current Vs. Reverse Voltage (Per Leg)

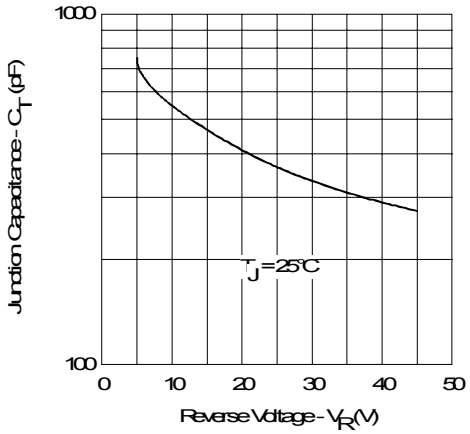


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage (Per Leg)

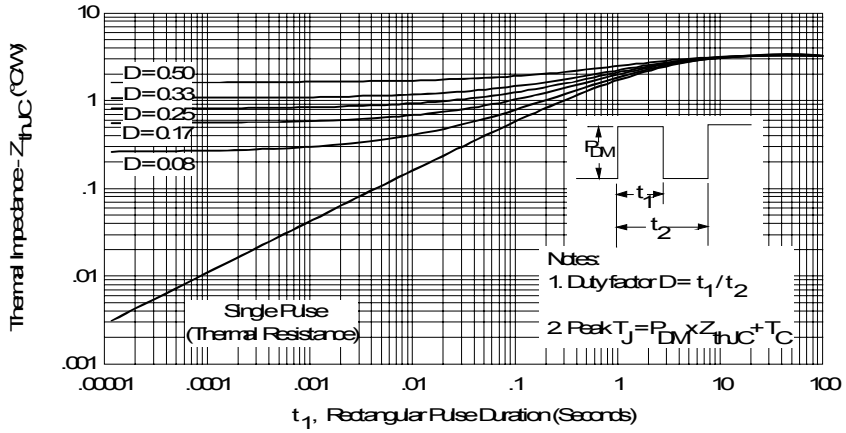


Fig. 4 - Max. Thermal Impedance Z_{thJC} Characteristics (Per Leg)

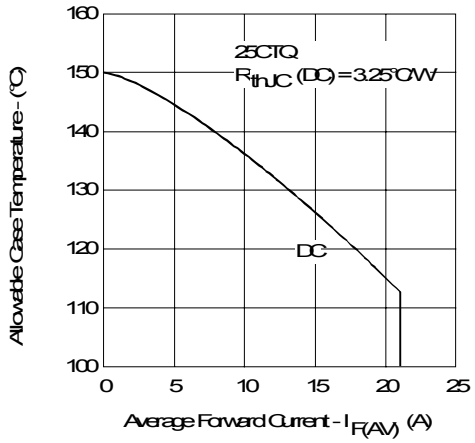


Fig. 5 - Max. Allowable Case Temperature
Vs. Average Forward Current (Per Leg)

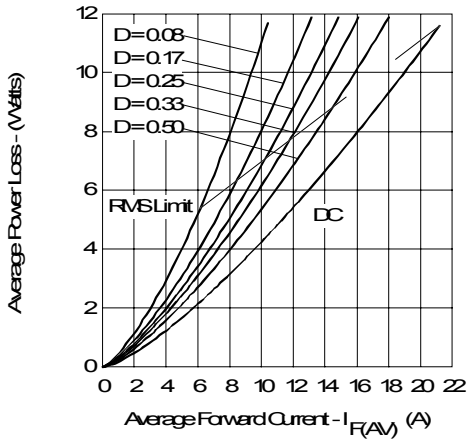


Fig. 6 - Forward Power Loss Characteristics
(Per Leg)

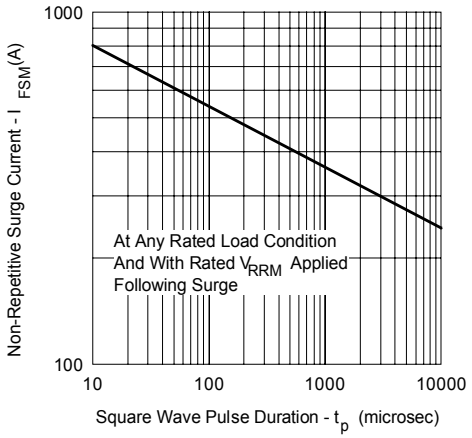


Fig. 7 - Max. Non-Repetitive Surge Current (Per Leg)

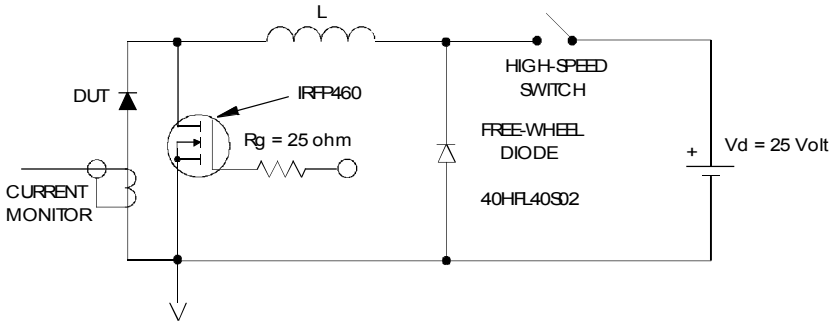
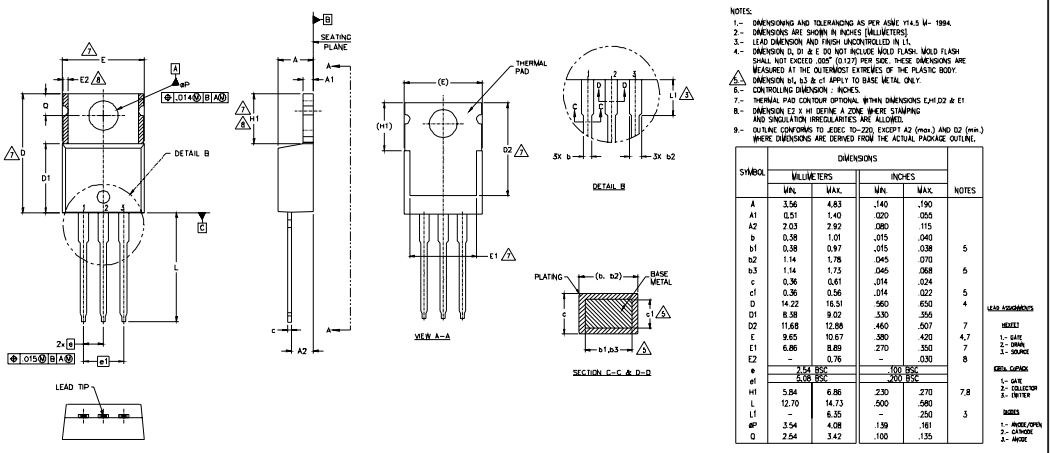


Fig. 8 - Unclamped Inductive Test Circuit

Outline Table



NOTES:
1.- DIMENSIONING AND TOLERANCING AS PER ASME Y14.5 M- 1994.
2.- DIMENSIONS ARE SHOWN IN INCHES [MILLIMETERS].
3.- LEAD DIMENSION AND FINISH UNCONTROLLED IN L1.
4.- DIMENSION D, D1 & E DO NOT INCLUDE MOLD FLASH. MOLD FLASH SHALL NOT EXCEED .005" (0.127) PER SIDE. THESE DIMENSIONS ARE MEASURED AT THE OUTERMOST EXTREMES OF THE PLASTIC BODY.
5.- DIMENSION b2, b3 & c1 APPLY TO BASE METAL ONLY.
6.- CONTROLLING DIMENSION : INCHES.
7.- THERMAL PAD CONTOUR OPTIONAL WITHIN DIMENSIONS E,H1,D2 & E1.
8.- DIMENSION E2 X H1 DEFINE A ZONE WHERE STAMPING AND SINGULATION IRREGULARITIES ARE ALLOWED.
9.- OUTLINE CONFORMS TO JEDEC TO-220, EXCEPT A2 (max.) AND D2 (min.) WHERE DIMENSIONS ARE DERIVED FROM THE ACTUAL PACKAGE OUTLINE.

SYMBOL	DIMENSIONS				
	MILLIMETERS		INCHES		NOTES
	MIN.	MAX.	MIN.	MAX.	
A	3.56	4.83	.140	.190	
A1	0.51	1.40	.020	.055	
A2	2.03	2.92	.080	.115	
b	0.38	1.01	.015	.040	
b1	0.38	0.97	.015	.038	5
b2	1.14	1.78	.045	.070	
b3	1.14	1.73	.045	.068	5
c	0.36	0.61	.014	.024	
c1	0.36	0.56	.014	.022	5
D	14.22	16.51	.560	.650	4
D1	8.38	9.02	.330	.355	
D2	11.68	12.88	.460	.507	7
E	9.65	10.67	.380	.420	4,7
E1	6.86	8.89	.270	.350	7
E2	-	0.76	-	.030	8
e	2.54 BSC		.100 BSC		
e1	5.08 BSC		.200 BSC		
H1	5.84	6.86	.230	.270	7,8
L	12.70	14.73	.500	.580	
L1	-	6.35	-	.250	3
øP	3.54	4.08	.139	.161	
Q	2.54	3.42	.100	.135	

LEAD ASSIGNMENTS
HEXFET
1.- GATE
2.- DRAIN
3.- SOURCE
IGBTs, CoPACK
1.- GATE
2.- COLLECTOR
3.- EMITTER
DIODES
1.- ANODE/OPEN
2.- CATHODE
3.- ANODE

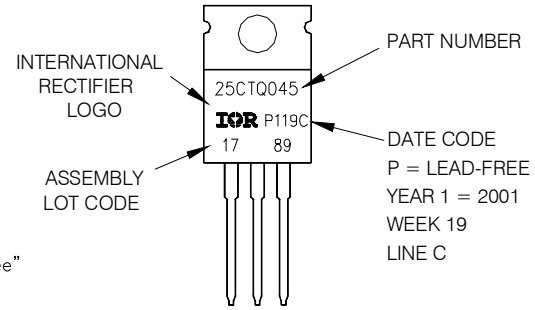
Conform to JEDEC outline TO-220AB

Part Marking Information

IRXC Assembly Line - SubCon Assembly Line

EXAMPLE: THIS IS A 25CTQ045
LOT CODE 1789
ASSEMBLED ON WW 19, 2001
IN THE ASSEMBLY LINE "C"

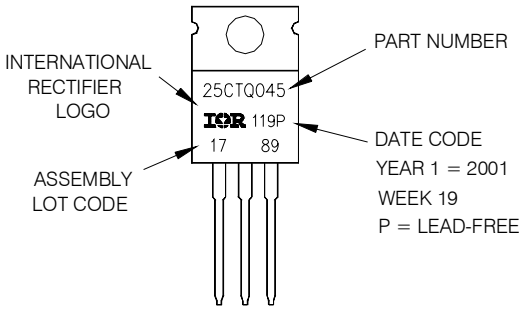
Note: "P" in the beginning of date code indicates "Lead–Free"



IRMX Assembly Line

EXAMPLE: THIS IS A 25CTQ045
LOT CODE 1789
ASSEMBLED ON WW 19, 2001

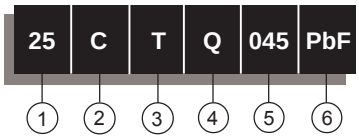
Note: "P" in assembly line position indicates "Lead–Free"



```
25CTQ045
********************************************
*     This model has been developed by                    *
*    Wizard SPICE MODEL GENERATOR (1999)     *
*         (International Rectifier Corporation             *
*    Contain Proprietary Information                      *
********************************************
* SPICE Model Diode is composed by a                       *
* simple diode plus paralled VCG2T                         *
********************************************
.SUBCKT 25CTQ045 ANO CAT
D1 ANO 1 DMOD (0.07089)
*Define diode model
.MODEL DMOD D(IS=1.72789623043916E-04A,N=1.16449261507669,BV=52V,
+ IBV=0.347382965330896A,RS= 0.000623832,CJO=2.01681525450576E-08,
+ VJ=1.79426113441105,XTI=2, EG=0.778356513713514)
********************************************
*Implementation of VCG2T
VX 1 2 DC 0V
R1 2 CAT TRES 1E-6
.MODEL TRES RES(R=1,TC1=30.866905105089)
GP1 ANO CAT VALUE={-ABS(I(VX))*(EXP((((-2.873853E-03/30.86691)*((V(2,CAT)*1E6)/(I(VX)+1E-6)-
1))+1)*5.486216E-02*ABS(V(ANO,CAT)))-1)}
********************************************
.ENDS 25CTQ045


Thermal Model Subcircuit
.SUBCKT 25CTQ045  5 1

CTHERM1     5     4     4.04E-01
CTHERM2     4     3     2.01E+00
CTHERM3     3     2     8.32E+00
CTHERM4     2     1     3.80E+02

RTHERM1     5     4     1.62E+00
RTHERM2     4     3     1.22E+00
RTHERM1     3     2     3.50E-01
RTHERM1     2     1     4.34E-02


.ENDS 25CTQ045
```

Ordering Information Table

Device Code



1 - Current Rating (25 = 25A)

2 - Circuit Configuration
C = Common Cathode

3 - Package
T = TO-220

4 - Schottky "Q" Series

5 - Voltage Ratings
- 035 = 35V
- 040 = 40V
- 045 = 45V

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

Tube Standard Pack Quantity : 50 pieces

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. 05/06