Bulletin PD-20832 rev. C 05/06

International
IOR Rectifier

16CTQ...PbF Series

SCHOTTKY RECTIFIER

16 Amp

$I_{F(AV)}$ = 16Amp
V_R = 60/ 100V

Major Ratings and Characteristics

Characteristics	Values	Units
$I_{F(AV)}$ Rectangular waveform	16	A
V_{RRM}	60 / 100	V
I_{FSM} @ tp = 5 µs sine	850	A
V_F @8 Apk, T_J = 125°C (per leg)	0.58	V
T_J range	- 55 to 175	°C

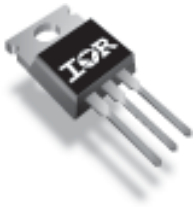
Description/ Features

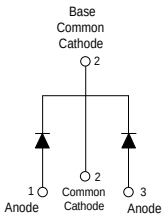
This center tap Schottky rectifier series has been optimized for low reverse leakage at high temperature. The proprietary barrier technology allows for reliable operation up to 175°C junction temperature. Typical applications are in switching power supplies, converters, free-wheeling diodes, and reverse battery protection.

- 175° C T_J operation
- Center tap configuration
- 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

16CTQ...PbF





TO-220

Voltage Ratings

	Parameters	16CTQ060PbF	16CTQ80PbF	16CTQ100PbF
V_R	Max. DC Reverse Voltage (V)	60	80	100
V_{RWM}	Max. Working Peak Reverse Voltage (V)			

Absolute Maximum Ratings

	Parameters	Values	Units	Conditions	
$I_{F(AV)}$	Max. Average Forward (Per Leg)	8	A	50% duty cycle @ T_C = 148°C, rectangular wave form	
	Current * See Fig. 5 (Per Device)	16			
I_{FSM}	Max. Peak One Cycle Non-Repetitive	850	A	5µs Sine or 3µs Rect. pulse	Following any rated load condition and with rated V_{RRM} applied
	Surge Current (Per Leg) * See Fig. 7	275		10ms Sine or 6ms Rect. pulse	
E_{AS}	Non-Repetitive Avalanche Energy (Per Leg)	7.50	mJ	T_J = 25 °C, I_{AS} = 0.50 Amps, L = 60 mH	
I_{AR}	Repetitive Avalanche Current (Per Leg)	0.50	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	Values	Units	Conditions	
V_{FM}	Max. Forward Voltage Drop (Per Leg) * See Fig. 1 (1)	0.72	V	@ 8A	T_J = 25 °C
		0.88	V	@ 16A	
		0.58	V	@ 8A	T_J = 125 °C
		0.69	V	@ 16A	
I_{RM}	Max. Reverse Leakage Current (Per Leg) * See Fig. 2 (1)	0.55	mA	T_J = 25 °C	V_R = rated V_R
		7.0	mA	T_J = 125 °C	
$V_{F(TO)}$	Threshold Voltage	0.415	V	T_J = T_J max.	
r_t	Forward Slope Resistance	11.07	mΩ		
C_T	Max. Junction Capacitance (Per Leg)	500	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 175	°C	
T_{stg}	Max. Storage Temperature Range		-55 to 175	°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		16CTQ100		

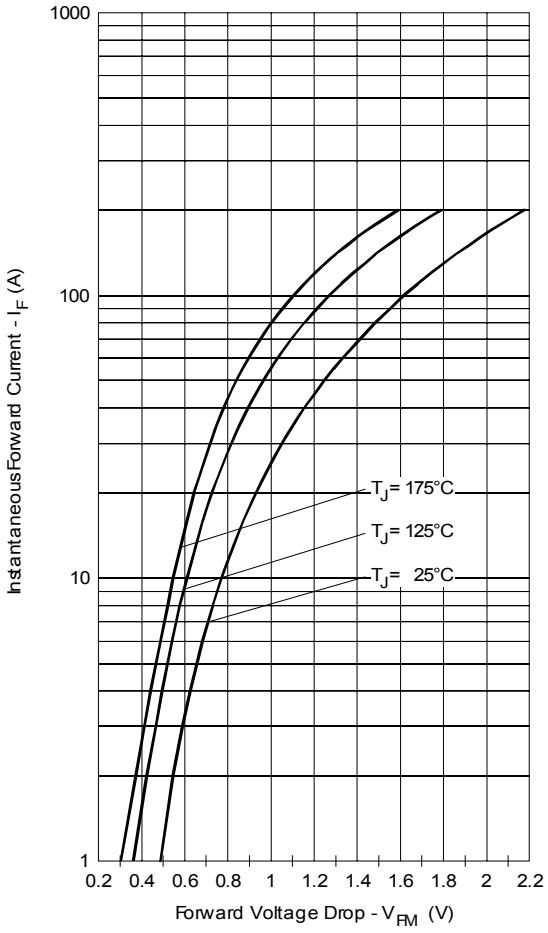


Fig. 1 - Max. Forward Voltage Drop Characteristics (Per Leg)

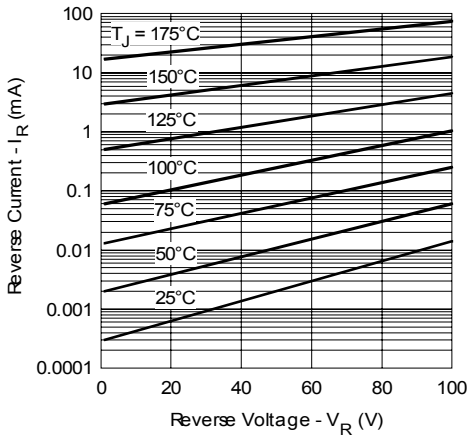


Fig. 2 - Typical Values Of Reverse Current Vs. Reverse Voltage (Per Leg)

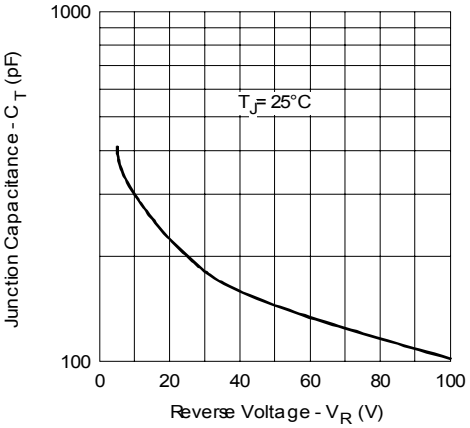


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage (Per Leg)

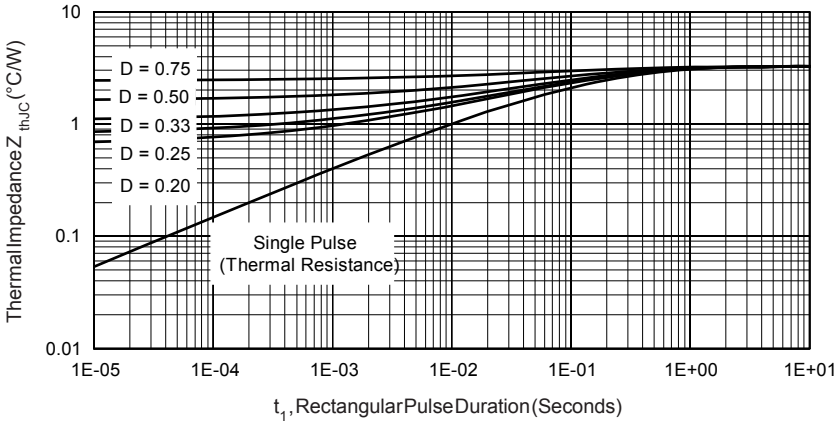


Fig. 4 - Max. Thermal Impedance Z_{thJC} Characteristics (Per Leg)

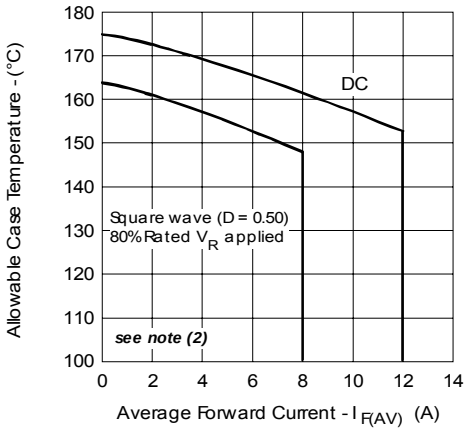


Fig. 5 - Max. Allowable Case Temperature Vs. Average Forward Current (Per Leg)

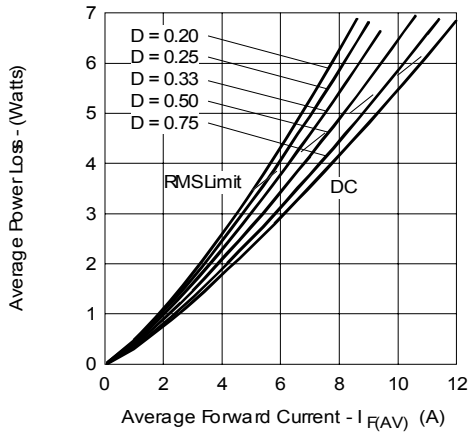


Fig. 6 - Forward Power Loss Characteristics (Per Leg)

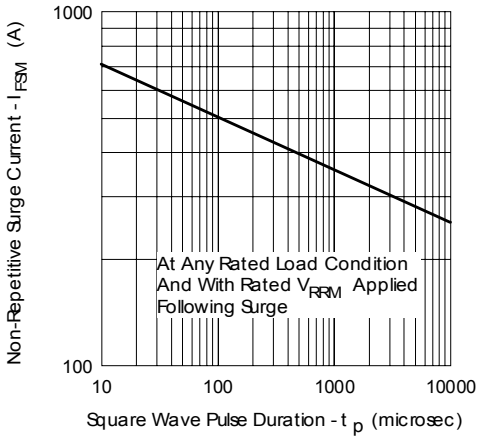


Fig. 7 - Max. Non-Repetitive Surge Current (Per Leg)

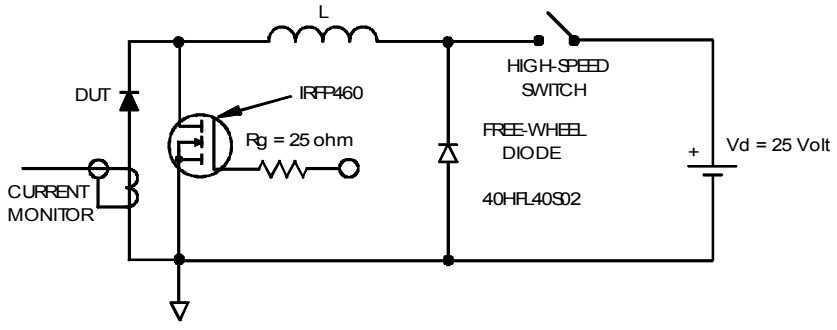
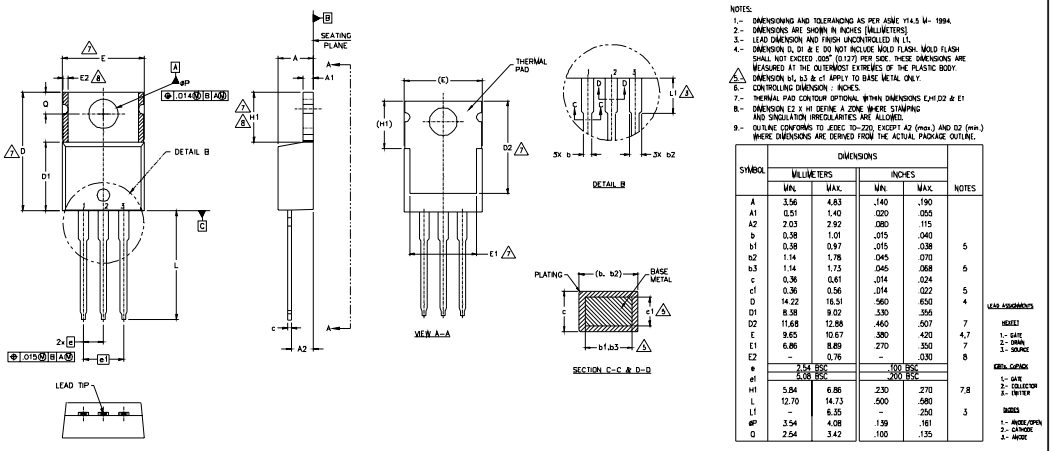


Fig. 8 - Unclamped Inductive Test Circuit

(2) Formula used: $T_C = T_J - (Pd + Pd_{REV}) \times R_{thJC}$;
Pd = Forward Power Loss = $I_{F(AV)} \times V_{FM} @ (I_{F(AV)} / D)$ (see Fig. 6);
Pd_{REV} = Inverse Power Loss = $V_{R1} \times I_R (1 - D)$; $I_R @ V_{R1} = 10\,V$

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 b1, 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				NOTES
	MILLIMETERS		INCHES		
	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	.356	
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

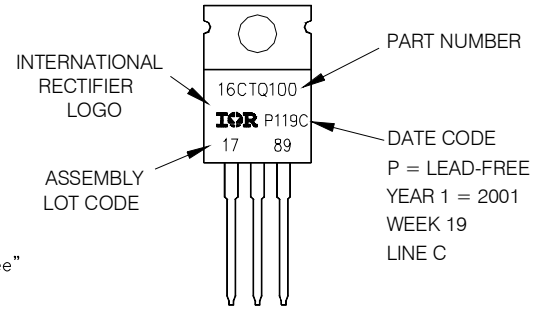
Conform to JEDEC outline TO-220AB

Part Marking Information

IRXC Assembly Line - SubCon Assembly Line

EXAMPLE: THIS IS A 16CTQ100
LOT CODE 1789
ASSEMBLED ON WW 19, 2001
IN THE ASSEMBLY LINE "C"

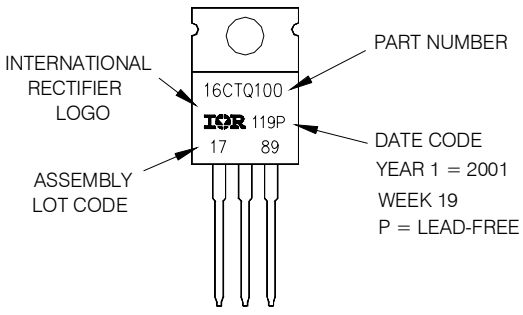
Note: "P" in the beginning of date code indicates "Lead-Free"



IRMX Assembly Line

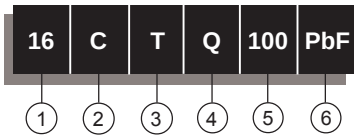
EXAMPLE: THIS IS A 16CTQ100
LOT CODE 1789
ASSEMBLED ON WW 19, 2001

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



Ordering Information Table

Device Code



1 - Current Rating (16 = 16A)

2 - Circuit Configuration
C = Common Cathode

3 - Package
T = TO-220

4 - Schottky "Q" Series

5 - Voltage Ratings
060 = 60V
080 = 80V
100 = 100V

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

Tube Standard Pack Quantity : 50 pieces

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16CTQ100
*****************************************
* SPICE Model Diode                     *
*****************************************
.SUBCKT 16CTQ100 ANO CAT
D1 ANO 1 DMOD (0.07089)
*Define diode model
.MODEL DMOD D(IS=21.21E-06,N=1.578,Rs=7.804E-03,Ikf=0.9497, Xti=2, Eg=1.11
+ Cjo=1.278E-09, M=0.4736, Vj=0.4972, Fc=0.5, Isr =1.114e-21, Nr=4.755,
+ Bv=119.9, Ibv=215.5E-06, Tt=18.2E-09)
*****************************************

.ENDS 16CTQ100


Thermal Model Subcircuit
.SUBCKT 16CTQ100  5 1

CTHERM1       5    4      1.45E+00
CTHERM2       4    3      4.54E+00
CTHERM3       3    2      1.09E+01
CTHERM4       2    1      1.01E+02

RTHERM1       5    4      2.49E+00
RTHERM2       4    3      5.20E-04
RTHERM1       3    2      5.43E-01
RTHERM1       2    1      3.05E-02


.ENDS 16CTQ100
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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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