

Bulletin PD-20832 rev. C 05/06

International
IOR Rectifier

16CTQ...PbF Series

SCHOTTKY RECTIFIER

16 Amp

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

Major Ratings and Characteristics

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

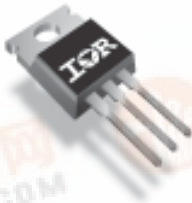
Description/ Features

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.

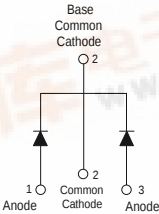
- 175° C T_J operation
- Center tap configuration
- Low forward voltage drop
- High purity, high temperature epoxy encapsulation for enhanced mechanical strength and moisture resistance
- High frequency operation
- Guard ring for enhanced ruggedness and long term reliability
- Lead-Free ("PbF" suffix)

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) Current * See Fig. 5 (Per Device)	8	A	50% duty cycle @ $T_C = 148^\circ\text{C}$, rectangular wave form
	16		
I_{FSM} Max. Peak One Cycle Non-Repetitive Surge Current (Per Leg) * See Fig. 7	850	A	5 μs Sine or 3 μs Rect. pulse 10ms Sine or 6ms Rect. pulse
	275		
E_{AS} Non-Repetitive Avalanche Energy (Per Leg)	7.50	mJ	$T_J = 25^\circ\text{C}$, $I_{AS} = 0.50$ 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. $V_A = 1.5 \times V_R$ typical

Electrical Specifications

Parameters	Values	Units	Conditions
V_{FM} Max. Forward Voltage Drop (Per Leg) * See Fig. 1 (1)	0.72	V	@ 8A
	0.88	V	@ 16A
	0.58	V	@ 8A
	0.69	V	@ 16A
I_{RM} Max. Reverse Leakage Current (Per Leg) * See Fig. 2 (1)	0.55	mA	$T_J = 25^\circ\text{C}$
	7.0	mA	$T_J = 125^\circ\text{C}$
$V_{F(TO)}$ Threshold Voltage	0.415	V	$T_J = T_J$ max.
r_t Forward Slope Resistance	11.07	m Ω	
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 < 300 μs , Duty Cycle <2%

Thermal-Mechanical Specifications

Parameters	Values	Units	Conditions
T_J Max. Junction Temperature Range	-55 to 175	$^\circ\text{C}$	
T_{stg} Max. Storage Temperature Range	-55 to 175	$^\circ\text{C}$	
R_{thJC} Max. Thermal Resistance Junction to Case (Per Leg)	3.25	$^\circ\text{C/W}$	DC operation
R_{thJC} Max. Thermal Resistance Junction to Case (Per Package)	1.63	$^\circ\text{C/W}$	DC operation
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)	
Marking Device	16CTQ100		

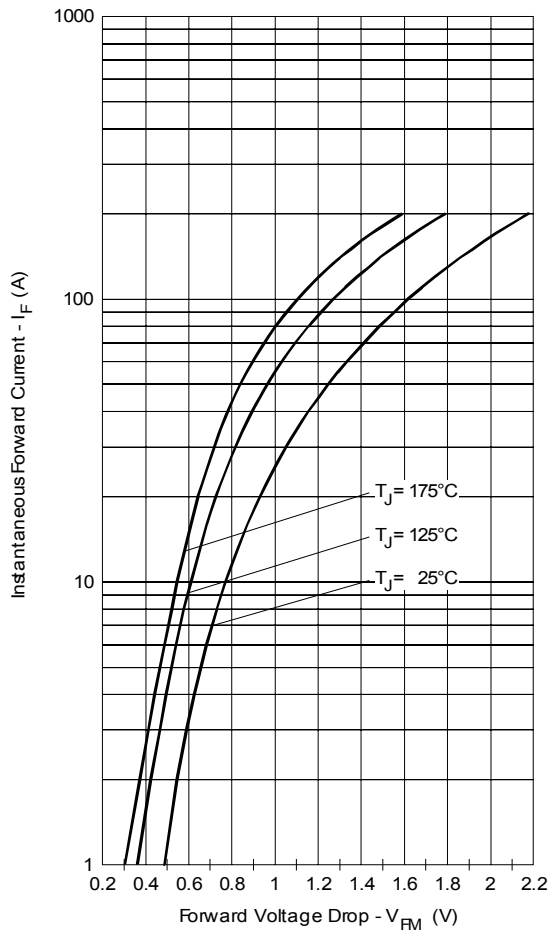


Fig. 1 - Max. Forward Voltage Drop Characteristics (Per Leg)

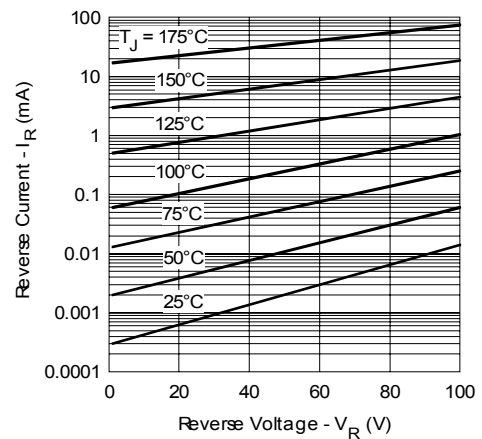


Fig. 2 - Typical Values Of Reverse Current Vs. Reverse Voltage (Per Leg)

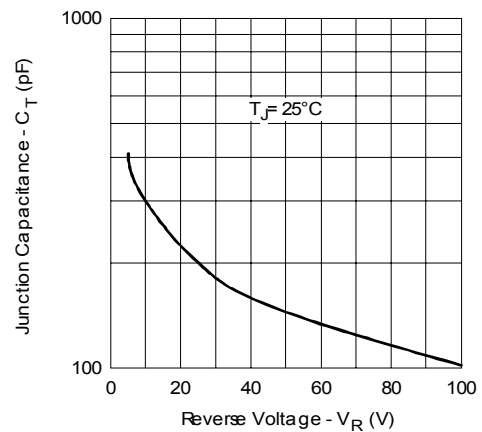


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage (Per Leg)

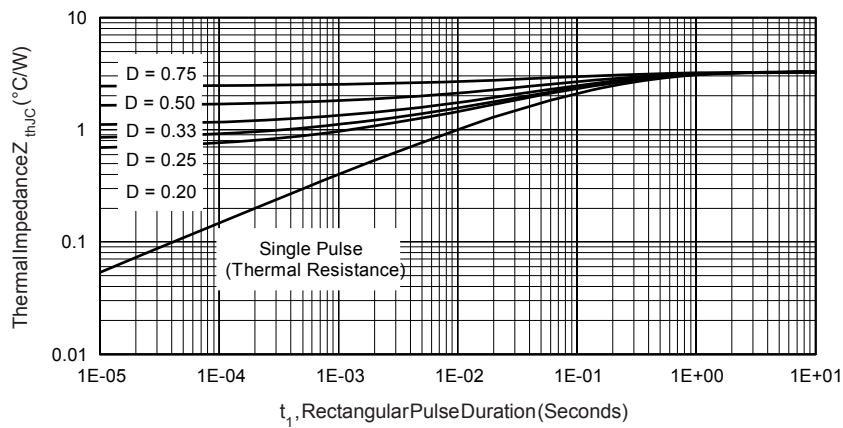


Fig. 4 - Max. Thermal Impedance Z_{thJC} Characteristics (Per Leg)

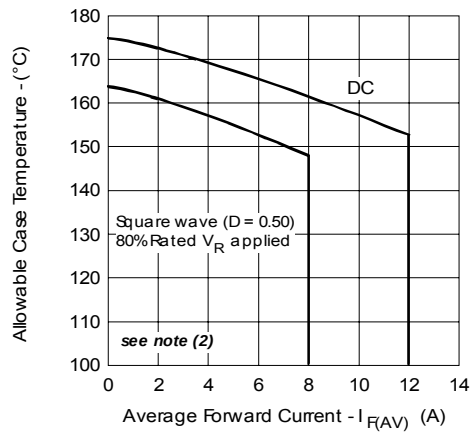


Fig. 5 - Max. Allowable Case Temperature Vs. Average Forward Current (Per Leg)

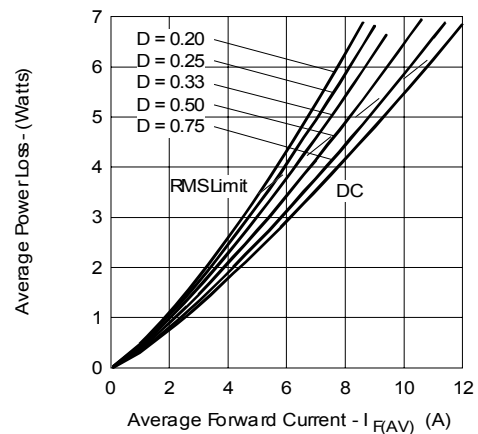


Fig. 6 - Forward Power Loss Characteristics (Per Leg)

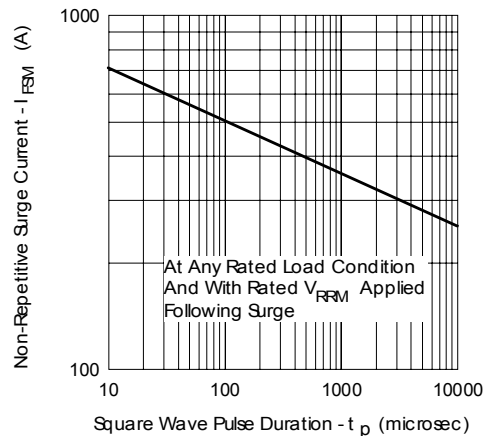


Fig. 7 - Max. Non-Repetitive Surge Current (Per Leg)

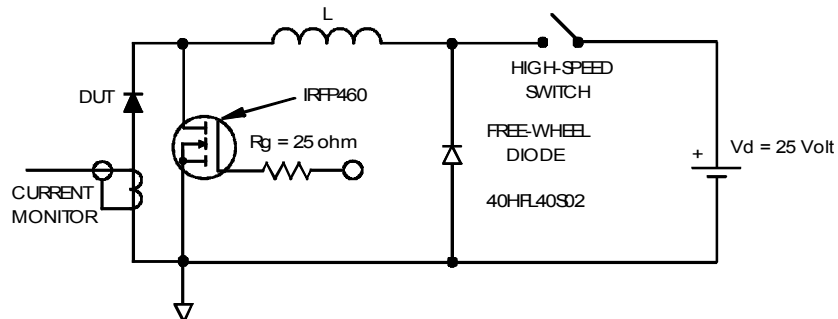


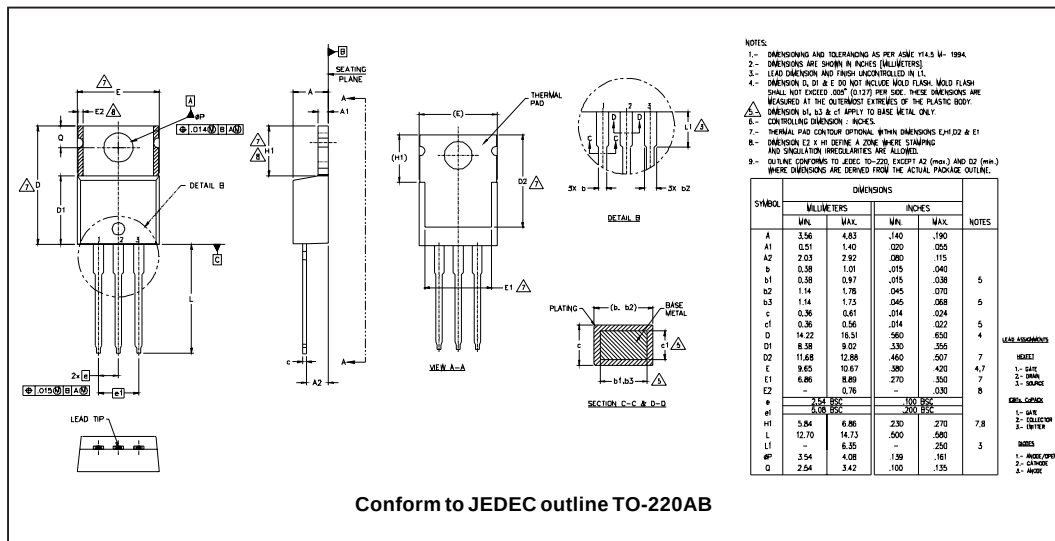
Fig. 8 - Unclamped Inductive Test Circuit

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

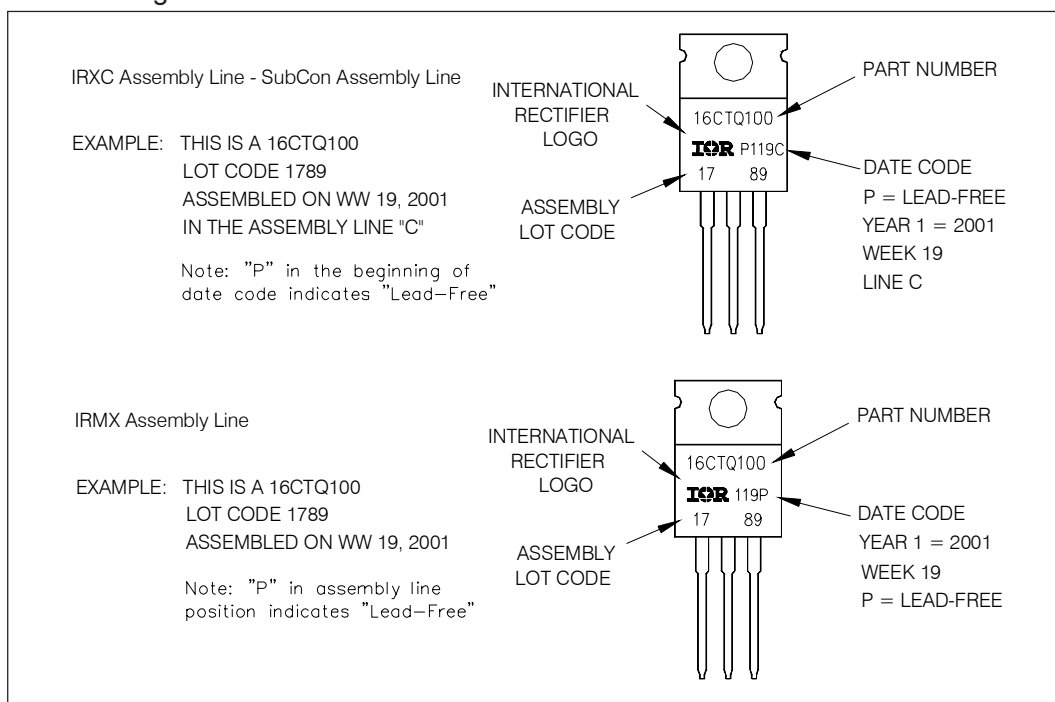
P_d = Forward Power Loss = $I_{F(AV)} \times V_{FM} @ (I_{F(AV)} / D)$ (see Fig. 6);

$P_{d_{REV}}$ = Inverse Power Loss = $V_{R1} \times I_{R1} (1 - D)$; $I_{R1} @ V_{R1} = 10$ V

Outline Table



Part Marking Information



Ordering Information Table

Device Code

16

C

T

Q

100

PbF

1

2

3

4

5

6

1

2

3

4

5

6

-

-

-

-

-

-

Current Rating (16 = 16A)

Circuit Configuration

Package

Schottky "Q" Series

Voltage Ratings

• none = Standard Production

C = Common Cathode

T = TO-220

• PbF = Lead-Free

060 = 60V

080 = 80V

100 = 100V

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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