

International
IOR Rectifier

16CTQ...SPbF Series 16CTQ...-1PbF 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} @ $t_p = 5\mu\text{s}$ sine	850	A
V_F @8 Apk, $T_J = 125^\circ\text{C}$ (per leg)	0.58	V
T_J range	-55 to 175	$^\circ\text{C}$

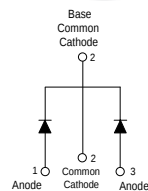
Description/ Features

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)

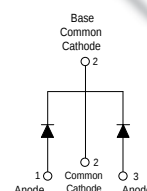
Case Styles

16CTQ...SPbF



D²PAK

16CTQ...-1PbF



TO-262

Voltage Ratings

Parameters	16CTQ060SPbF 16CTQ060-1PbF	16CTQ080SPbF 16CTQ080-1PbF	16CTQ100SPbF 16CTQ100-1PbF
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 16	A	50% duty cycle @ $T_C = 148^\circ\text{C}$, rectangular wave form
I_{FSM} Max. Peak One Cycle Non-Repetitive Surge Current (Per Leg) * See Fig. 7	850 275	A	5 μs Sine or 3 μs Rect. pulse 10ms Sine or 6ms Rect. pulse Following any rated load condition and with rated V_{RRM} applied
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 $T_J = 25^\circ\text{C}$
	0.88	V	@ 16A
	0.58	V	@ 8A $T_J = 125^\circ\text{C}$
	0.69	V	@ 16A
I_{RM} Max. Reverse Leakage Current (Per Leg) * See Fig. 2 (1)	0.55	mA	$T_J = 25^\circ\text{C}$ $V_R = \text{rated } V_R$
	7.0	mA	$T_J = 125^\circ\text{C}$
$V_{F(TO)}$ Threshold Voltage	0.415	V	$T_J = T_J \text{ max.}$
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	°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	16CTQ...S	Case style D ² Pak	
		16CTQ...-1	Case style TO-262	

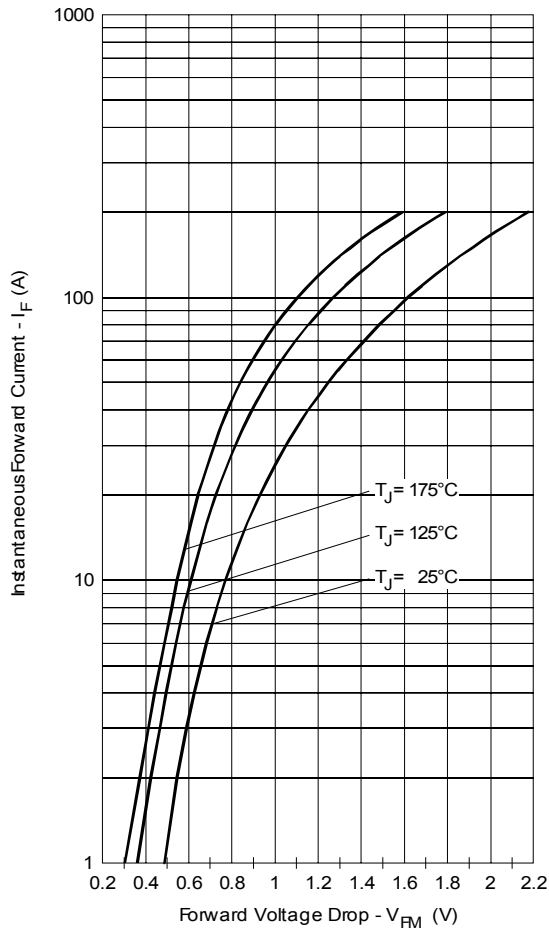


Fig. 1 - Max. Forward Voltage Drop Characteristics (Per Leg)

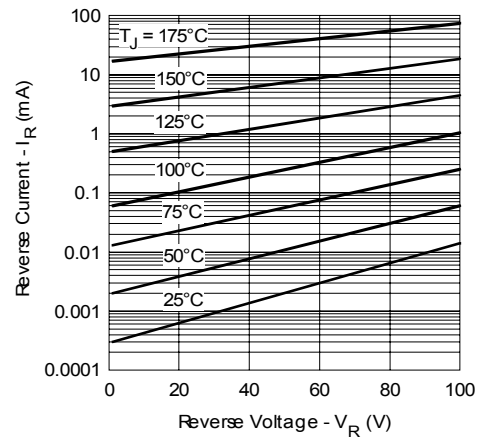


Fig. 2 - Typical Values Of Reverse Current Vs. Reverse Voltage (Per Leg)

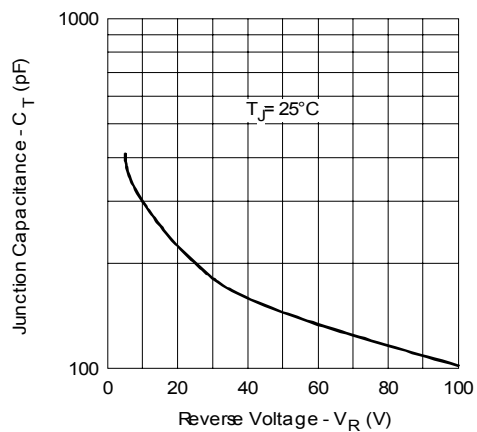


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage (Per Leg)

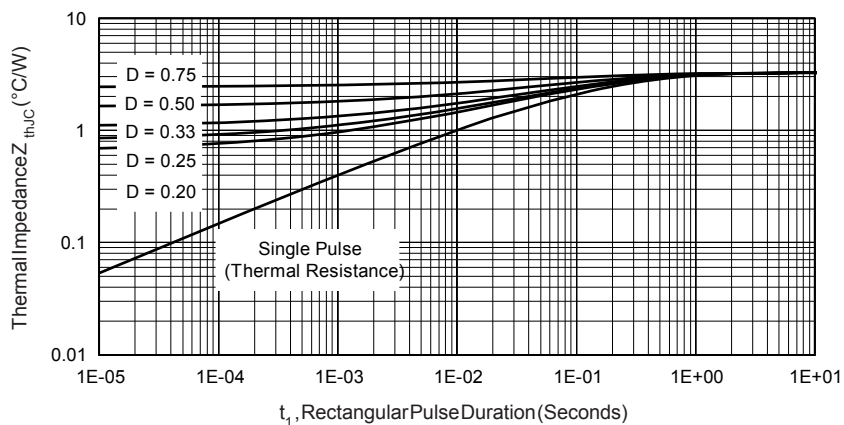


Fig. 4 - Max. Thermal Impedance Z_{thJC} Characteristics (Per Leg)

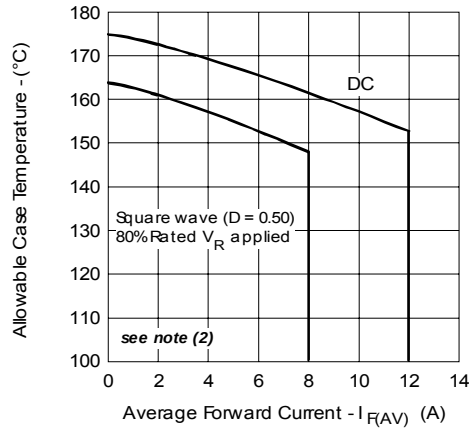


Fig. 5 - Max. Allowable Case Temperature Vs. Average Forward Current (Per Leg)

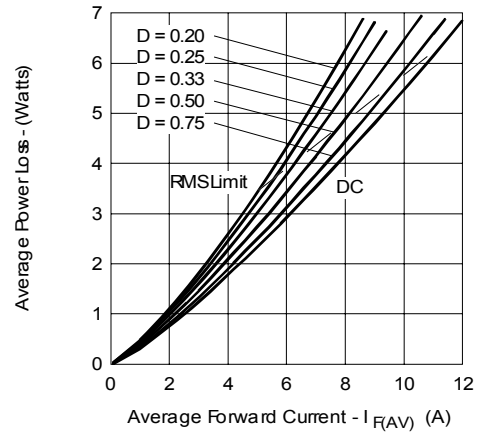


Fig. 6 - Forward Power Loss Characteristics (Per Leg)

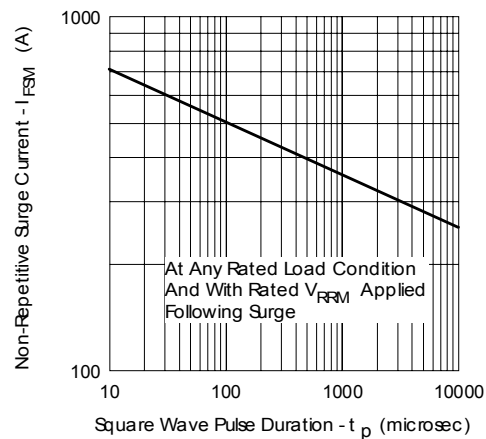


Fig. 7 - Max. Non-Repetitive Surge Current (Per Leg)

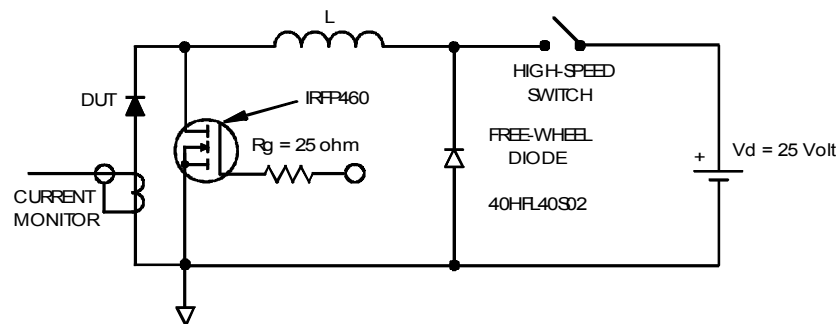


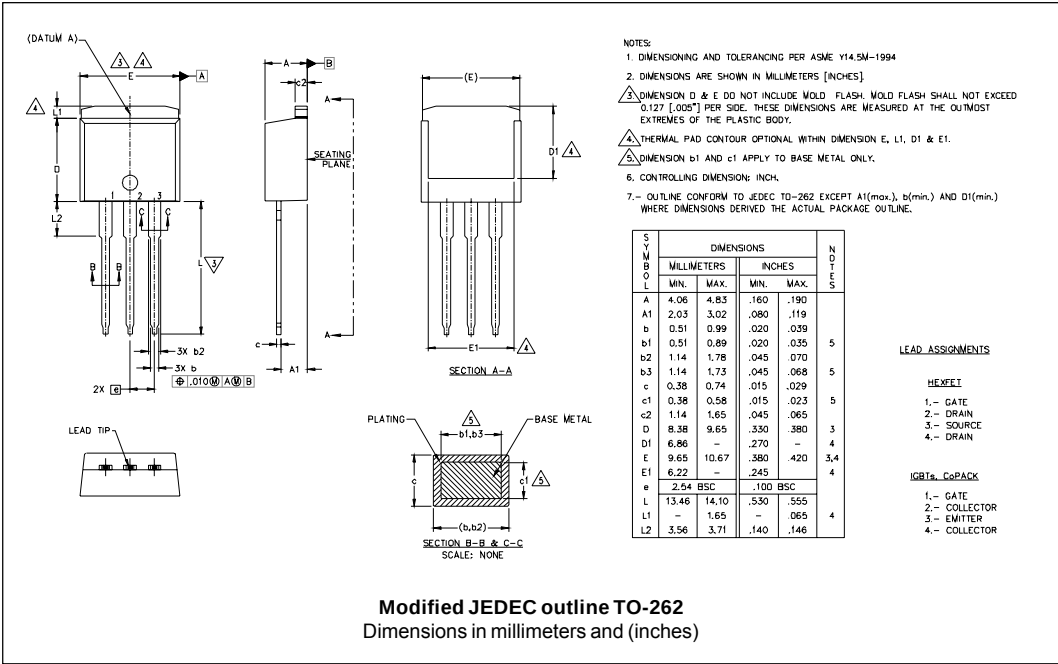
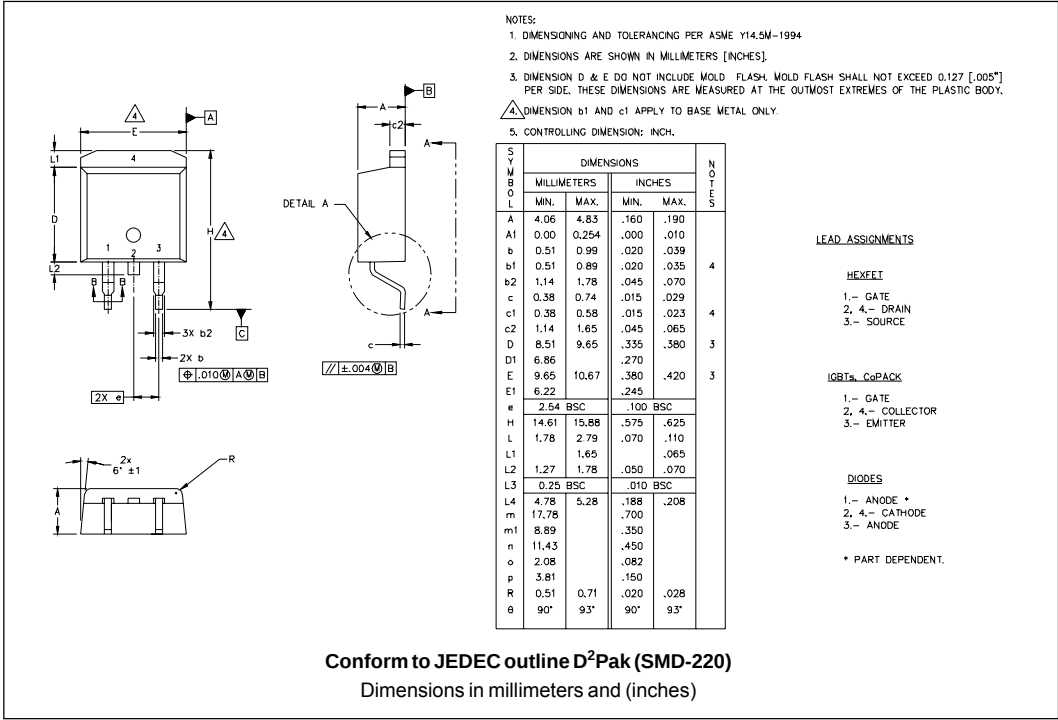
Fig. 8 - Unclamped Inductive Test Circuit

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

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

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

Outlines Table



Part Marking Information

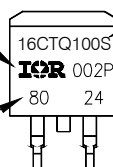
D²PAK

EXAMPLE: THIS IS A 16CTQ100S
LOT CODE 8024
ASSEMBLED ON WW 02, 2000

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

INTERNATIONAL
RECTIFIER
LOGO

ASSEMBLY-
LOT CODE



PART NUMBER

DATE CODE
YEAR 0 = 2000
WEEK 02
P = LEAD-FREE

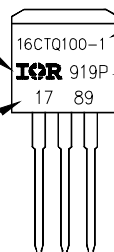
TO-262

EXAMPLE: THIS IS A 16CTQ100-1
LOT CODE 1789
ASSEMBLED ON WW 19, 1999

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

INTERNATIONAL
RECTIFIER
LOGO

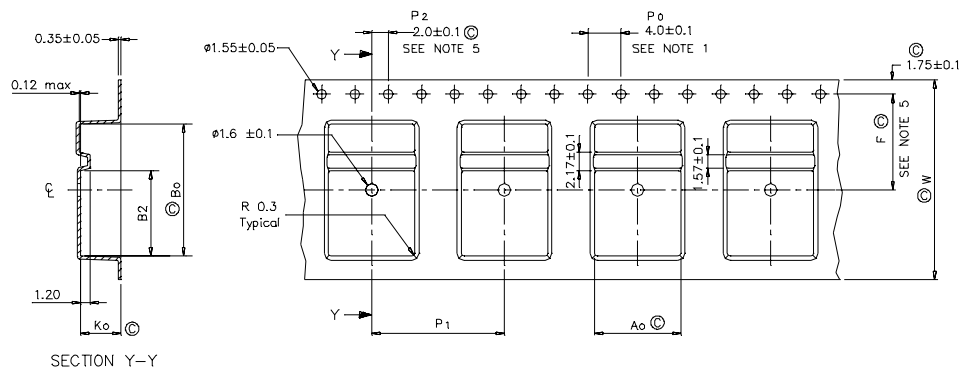
ASSEMBLY
LOT CODE



PART NUMBER

DATE CODE
YEAR 9 = 1999
WEEK 19
P = LEAD-FREE

Tape & Reel Information



NOTES:

- 1.0 10 SPROCKET HOLE PITH CUMULATIVE TOLERANCE ± 0.02
2.0 CAMBER NOT TO EXCEED 1mm in 100mm
3.0 MATERIAL: CONDUCTIVE BLACK STYRENIC ALLOY
4.0 K_0 MEASURED FROM A PLANE ON THE INSIDE BOTTOM OF THE POCKET TO THE TOP SURFACE OF THE CARRIER
5.0 MEASURED FROM CENTRELNE OF SPROCKET HOLE TO CENTRELNE 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 10^6 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 (C) CRITICAL

Ao	10.50 +/− 0.1
Bo	15.80 +/− 0.1
B2	10.25 +/− 0.1
Ko	4.90 +/− 0.1
F	11.50 +/− 0.1
P ₁	16.00 +/− 0.1
W	24.00 +/− 0.3

Dimensions in millimeters and (inches)

Ordering Information Table

Device Code							
16	C	T	Q	100	S	TRL	PbF
1	2	3	4	5	6	7	8
1	- Current Rating (16A)						
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						

060 = 60V
080 = 80V
100 = 100V

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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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16CTQ...SPbF, 16CTQ...-1PbF Series

Bulletin PD-21022 rev. B 06/06

International
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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.

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TAC Fax: (310) 252-7309
06/06



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