



80CPQ020PbF

SCHOTTKY RECTIFIER

80 Amp

$$I_{F(AV)} = 80\text{Amp}$$

$$V_R = 20\text{V}$$

Major Ratings and Characteristics

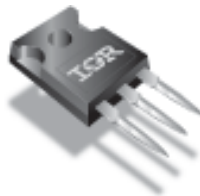
Characteristics	Values	Units
$I_{F(AV)}$ Rectangular waveform	80	A
V_{RRM}	20	V
I_{FSM} @ $t_p = 5 \mu\text{s}$ sine	2200	A
V_F @ 40 Apk, $T_J = 150^\circ\text{C}$ (per leg)	0.32	V
T_J range	-55 to 150	$^\circ\text{C}$

Description/ Features

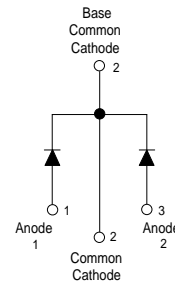
This center tap Schottky rectifier has been optimized for ultra low forward voltage drop specifically for 3.3V output power supplies. The proprietary barrier technology allows for reliable operation up to 150 °C junction temperature. Typical applications are in parallel switching power supplies, converters, reverse battery protection, and redundant power sub-systems.

- 150 °C T_J operation
- Center tap configuration
- Optimized for 3.3V application
- Ultra low forward voltage drop
- High frequency operation
- Guard ring for enhanced ruggedness and long term reliability
- High purity, high temperature epoxy encapsulation for enhanced mechanical strength and moisture resistance
- Lead-Free ("PbF" suffix)

Case Styles



TO-247AC



Voltage Ratings

Part number	80CPQ020PbF
V_R Max. DC Reverse Voltage (V)	20

Absolute Maximum Ratings

Parameters	Values	Units	Conditions
$I_{F(AV)}$ Max. Average Forward Current (Per Leg) (Per Device)	40 80	A	50% duty cycle @ $T_C = 138^\circ\text{C}$, rectangular wave form
I_{FSM} Max. Peak One Cycle Non-Repetitive Surge Current (Per Leg)	2200 500	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)	27	mJ	$T_J = 25^\circ\text{C}$, $I_{AS} = 6\text{Amps}$, $L = 1.5\text{mH}$
I_{AR} Repetitive Avalanche Current (Per Leg)	6	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) (1)	0.46	V	@ 40A $T_J = 25^\circ\text{C}$
	0.55	V	@ 80A
	0.36	V	@ 40A $T_J = 125^\circ\text{C}$
	0.46	V	@ 80A
	0.32	V	@ 40A $T_J = 150^\circ\text{C}$
	0.43	V	@ 80A
I_{RM} Max. Reverse Leakage Current (Per Leg) (1)	5.5	mA	$T_J = 25^\circ\text{C}$ $V_R = \text{rated } V_R$
	1100	mA	$T_J = 125^\circ\text{C}$
	110	mA	$T_J = 125^\circ\text{C}$ $V_R = 5\text{V}$
	600	mA	$T_J = 150^\circ\text{C}$ $V_R = 10\text{V}$
$V_{F(TO)}$ Threshold Voltage	0.185	V	$T_J = T_J \text{ max.}$
C_T Max. Junction Capacitance (Per Leg)	6500	pF	$V_R = 5V_{DC}$ (test signal range 100Khz to 1Mhz) 25°C
L_S Typical Series Inductance (Per Leg)	7.5	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 150	$^\circ\text{C}$	
T_{stg} Max. Storage Temperature Range	-55 to 150	$^\circ\text{C}$	
R_{thJC} Max. Thermal Resistance Junction to Case (Per Leg)	0.6	$^\circ\text{C/W}$	DC operation
R_{thJC} Max. Thermal Resistance Junction to Case (Per Package)	0.3	$^\circ\text{C/W}$	DC operation
R_{thCS} Typical Thermal Resistance, Case to Heatsink	0.25	$^\circ\text{C/W}$	Mounting surface, smooth and greased
wt Approximate Weight	6 (0.21)	g (oz.)	
T Mounting Torque	Min.	6 (5)	Kg-cm (lbf-in)
	Max.	12 (10)	
Case Style	TO-247AC (TO-3P)		JEDEC
Marking Device	80CPQ020		

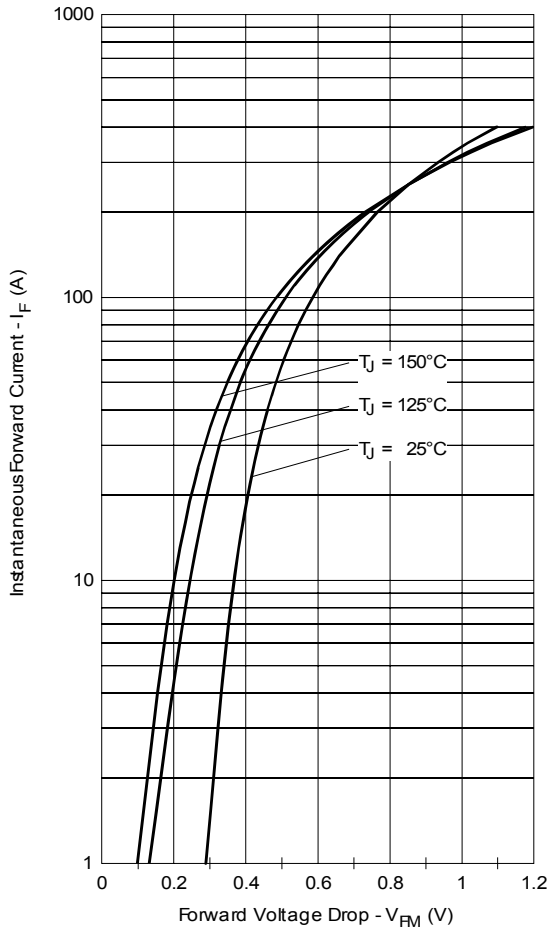


Fig. 1 - Max. Forward Voltage Drop Characteristics (Per Leg)

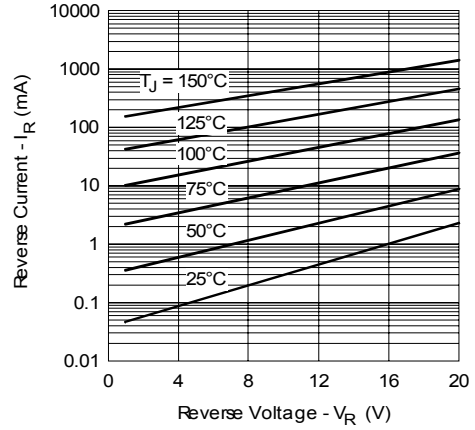


Fig. 2 - Typical Values Of Reverse Current Vs. Reverse Voltage (Per Leg)

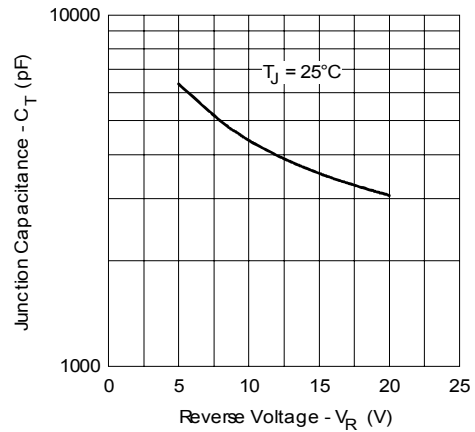


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage (Per Leg)

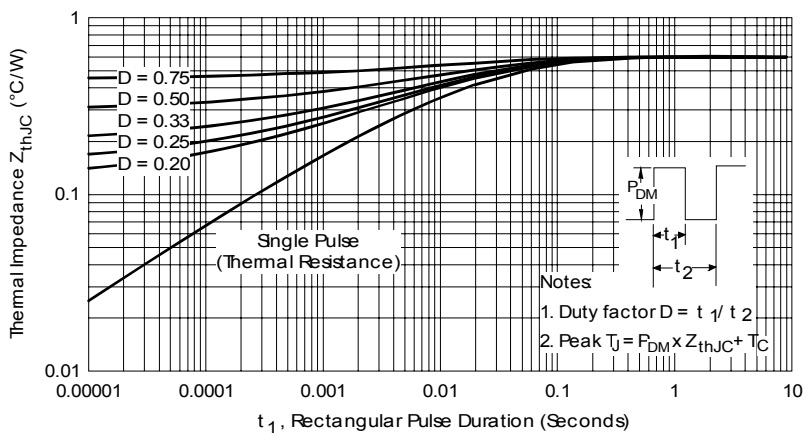


Fig. 4 - Max. Thermal Impedance Z_{thJC} Characteristics (Per Leg)

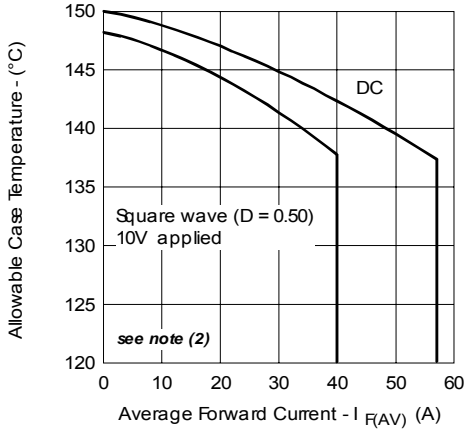


Fig. 5- Max. Allowable Case Temperature Vs. Average Forward Current (Per Leg)

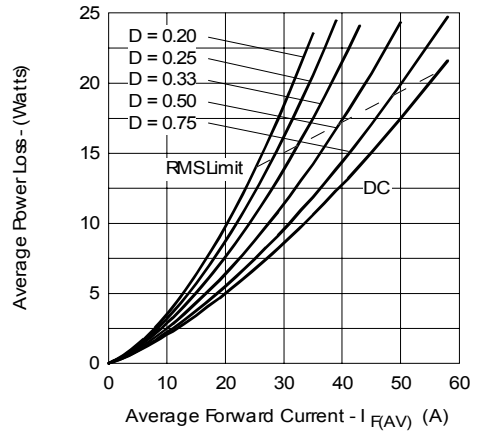


Fig. 6- Forward Power Loss Characteristics (Per Leg)

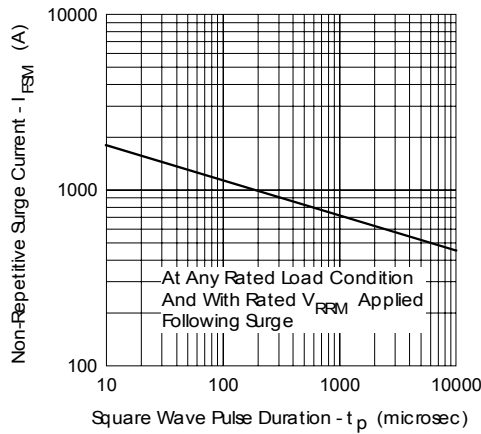


Fig. 7 - Max. Non-Repetitive Surge Current (Per Leg)

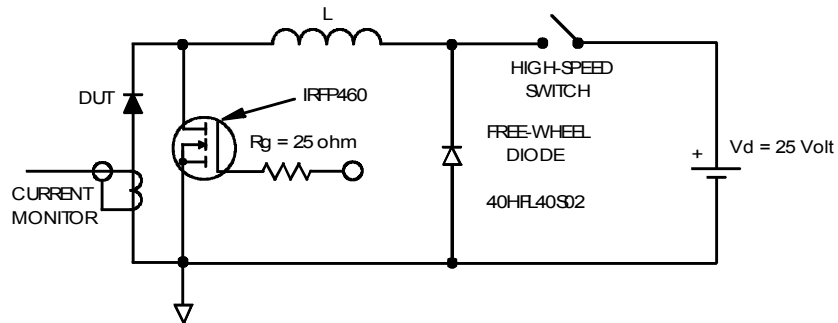
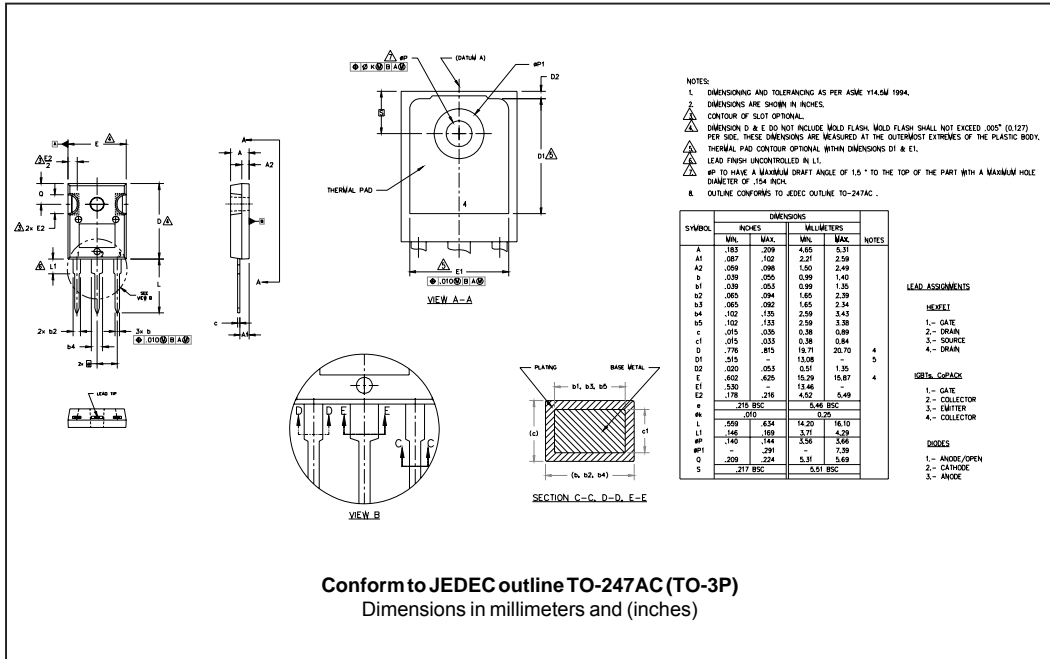


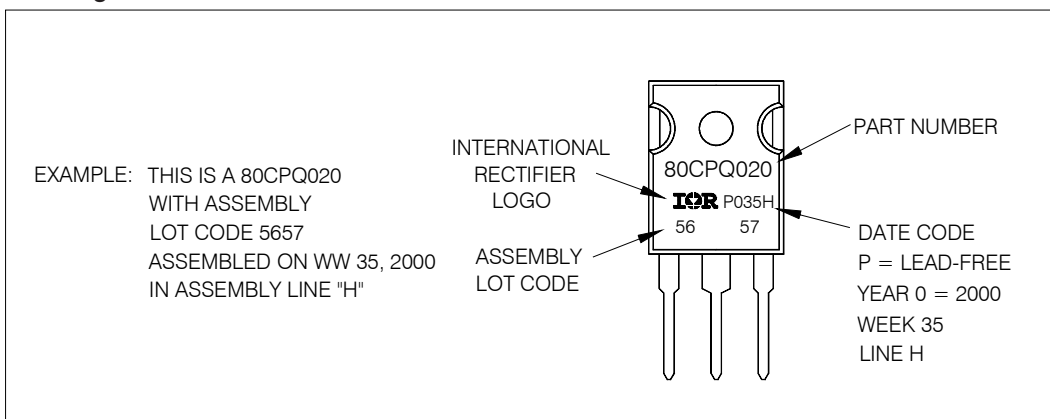
Fig. 8- Unclamped Inductive Test Circuit

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

Outline Table



Marking Information



Ordering Information Table

Device Code					
80	C	P	Q	020	PbF
①	②	③	④	⑤	⑥
1	-	Current Rating (80 = 80A)			
2	-	Circuit Configuration			
		C = Common Cathode			
3	-	Package			
		P = TO-247			
4	-	Schottky "Q" Series			
5	-	Voltage Code (020 = 20V)			
6	-	• none = Standard Production			
		• PbF = Lead-Free			
		Tube Standard Pack Quantity : 25 pieces			

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This model has been developed by
Wizard SPICE MODEL GENERATOR (1999)
(International Rectifier Corporation)
contains Proprietary Information

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SPICE Model Diode is composed by a
simple diode plus paralld VCG2T
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.SUBCKT 80CPQ20 ANO CAT
D1 ANO 1 DMOD (0.24404)
*Define diode model
.MODEL DMOD D (IS=1.94526715293228E-04A,N=1.08257328308575,
BV=24V,
+IBV=0.180500335087473A,RS=0.0002879672,CJO=7.1186179026719E-08,
+VJ=0.647017772282128,XTI=2,EG=0.696457884628633)
*****

* Implementation of VCG2T
VX 1 2 DC 0V
R1 2 CAT TRES 1E-6
.MODEL TRES RES (R=1,TC1=5.05442614166715)
GP1 ANO CAT VALUE= {-ABS (I(VX))*(EXP(((((-2.336086E-03/
5.054426)*((V(2,CAT)*1E6)/(I(VX)+1E-6)-1)))+1)*0.1610795*ABS(V(ANO,CAT)))-
1)}

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.ENDS 80CPQ20

Thermal Model Subcircuit
.SUBCKT 80CPQ20T 5 1

CTHERM1 5 4 1.10E-2
CTHERM2 4 3 1.38E-2
CTHERM3 3 2 1.36E-1
CTHERM4 2 1 1.86E+2

R THERM1 5 4 9.27E-2
R THERM2 4 3 7.39E-2
R THERM3 3 2 2.54E-1
R THERM4 2 1 1.12E-5

.ENDS 80CPQ20T
    
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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.