

80CPQ020

SCHOTTKY RECTIFIER

80 Amp



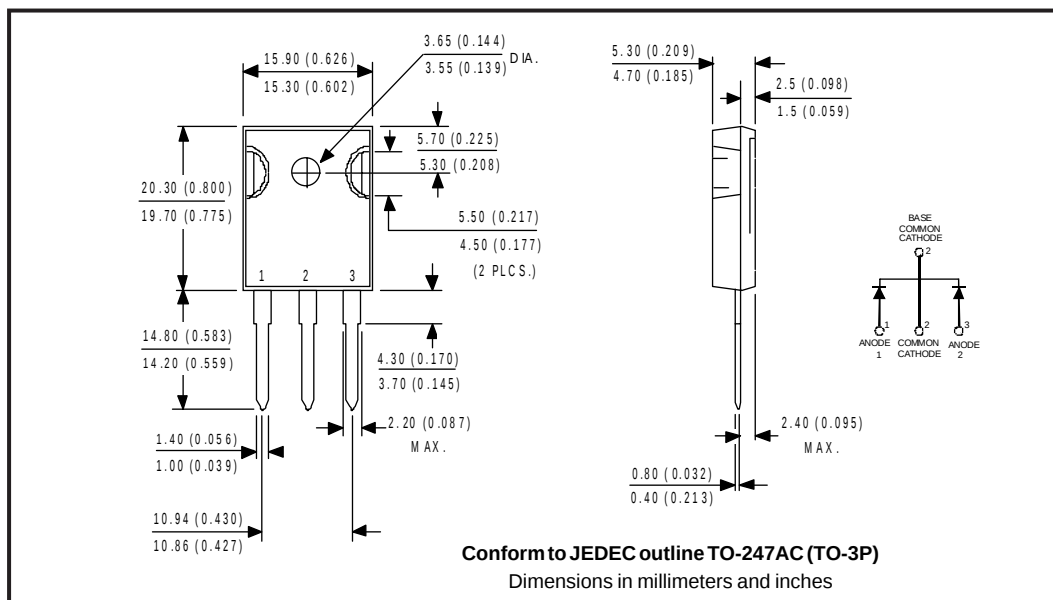
Major Ratings and Characteristics

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

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 $^\circ C$ junction temperature. Typical applications are in parallel switching power supplies, converters, reverse battery protection, and redundant power subsystems.

- 150 $^\circ C$ 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



80CPQ020

PD-20711 rev. B 11/99

International
IOR Rectifier

Voltage Ratings

Part number	80CPQ020
V_R Max. DC Reverse Voltage (V)	20

Absolute Maximum Ratings

Parameters			Values	Units	Conditions	
$I_{F(AV)}$	Max. Average Forward Current	(Per Leg)	40	A	50% duty cycle @ $T_C = 138^{\circ}\text{C}$, rectangular wave form	
		(Per Device)	80			
I_{FSM}	Max. Peak One Cycle Non-Repetitive Surge Current	(Per Leg)	2200	A	5 μs Sine or 3 μs Rect. pulse	Following any rated load condition and with rated V_{RRM} applied
			500		10ms Sine or 6ms Rect. pulse	
E_{AS}	Non-Repetitive Avalanche Energy (Per Leg)		27	mJ	$T_J = 25^{\circ}\text{C}$, $I_{AS} = 6$ Amps, $L = 1.5$ 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	$T_J = 25\text{ }^{\circ}\text{C}$
		0.55	V	@ 80A	
		0.36	V	@ 40A	$T_J = 125\text{ }^{\circ}\text{C}$
		0.46	V	@ 80A	
		0.32	V	@ 40A	$T_J = 150\text{ }^{\circ}\text{C}$
		0.43	V	@ 80A	
I_{RM}	Max. Reverse Leakage Current (Per Leg) (1)	5.5	mA	$T_J = 25\text{ }^{\circ}\text{C}$	$V_R = \text{rated } V_R$
		1100	mA	$T_J = 125\text{ }^{\circ}\text{C}$	
		110	mA	$T_J = 125\text{ }^{\circ}\text{C}$	$V_R = 5\text{V}$
		600	mA	$T_J = 150\text{ }^{\circ}\text{C}$	$V_R = 10\text{V}$
$V_{F(To)}$	Threshold Voltage	0.185	V	$T_J = T_J \text{ max.}$	
r_f	Forward Slope Resistance	3.2	m Ω		
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 (Rated V_R)	10,000	V/ μ s		

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

Thermal-Mechanical Specifications

Parameters		Values	Units	Conditions
T _J	Max. Junction Temperature Range	-55to150	°C	
T _{stg}	Max. Storage Temperature Range	-55to150	°C	
R _{thJC}	Max. ThermalResistanceJunction to Case (Per Leg)	0.6	°C/W	DC operation
R _{thJC}	Max. ThermalResistanceJunction to Case (Per Package)	0.3	°C/W	DC operation
R _{thCS}	Typical ThermalResistance, Case to Heatsink	0.25	°C/W	Mounting surface , smooth and greased
wt	ApproximateWeight	6(0.21)	g(oz.)	
T	MountingTorque	Min.	6(5)	Kg-cm (lbf-in)
		Max.	12(10)	
Case Style		TO-247AC(TO-3P)		JEDEC

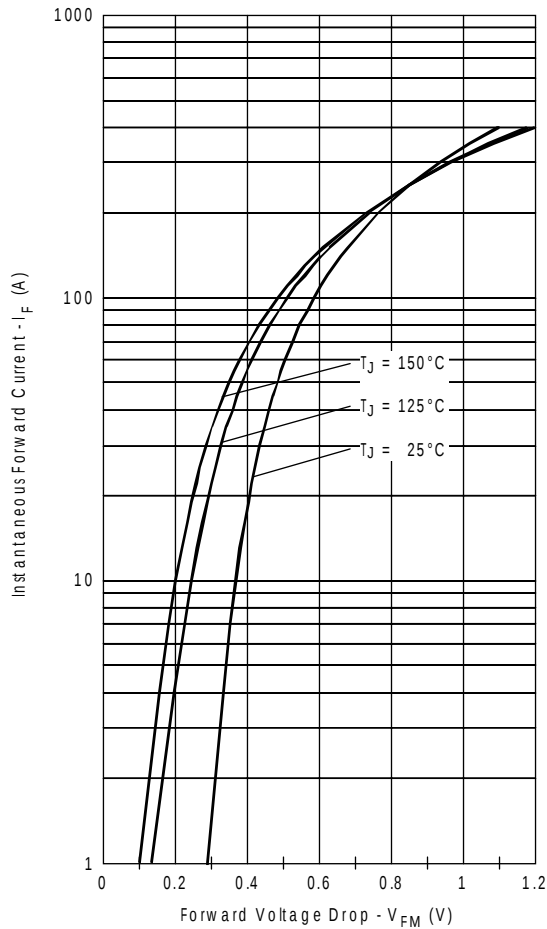


Fig. 1 - Max. Forward Voltage Drop Characteristics (PerLeg)

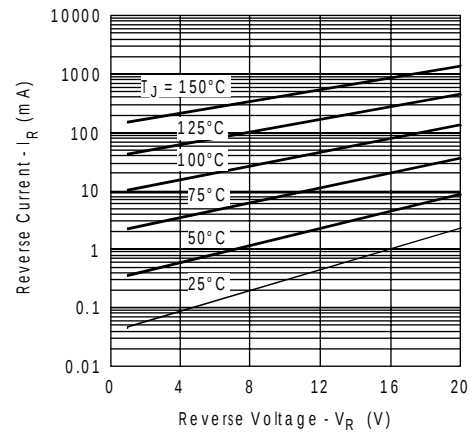


Fig. 2 - Typical Values Of Reverse Current Vs. Reverse Voltage (PerLeg)

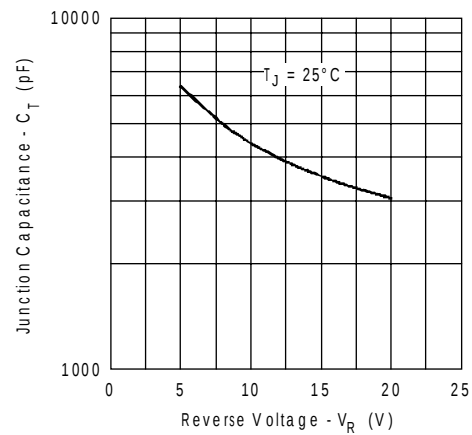


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage (PerLeg)

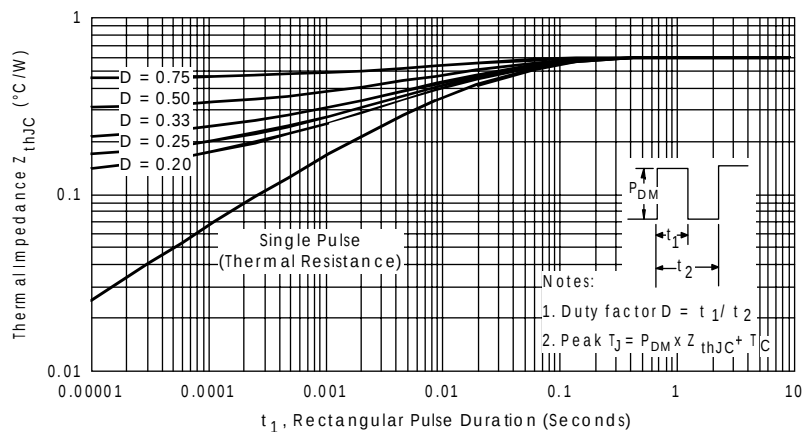


Fig. 4 - Max. Thermal Impedance Z_{thJC} Characteristics (PerLeg)

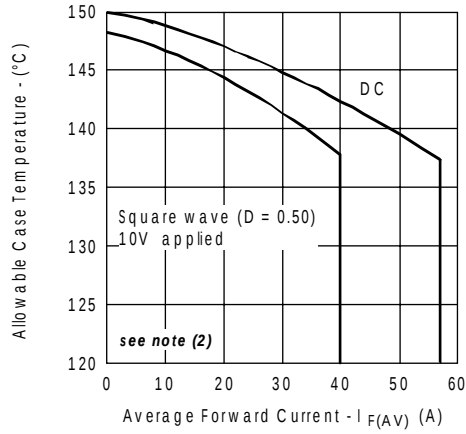


Fig. 5- Max. Allowable Case Temperature Vs. Average Forward Current (Per Leg)

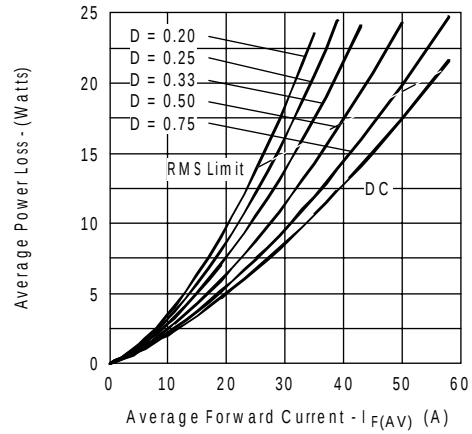


Fig. 6- Forward Power Loss Characteristics (Per Leg)

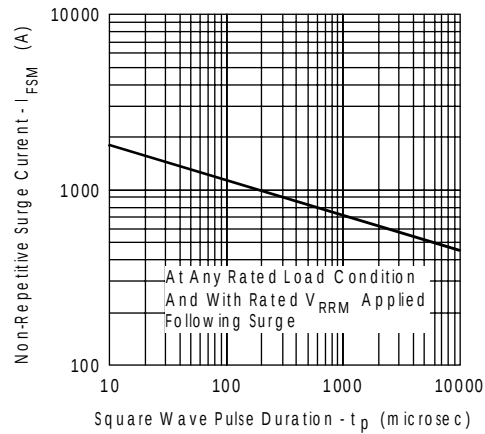


Fig. 7- Max. Non-Repetitive Surge Current (Per Leg)

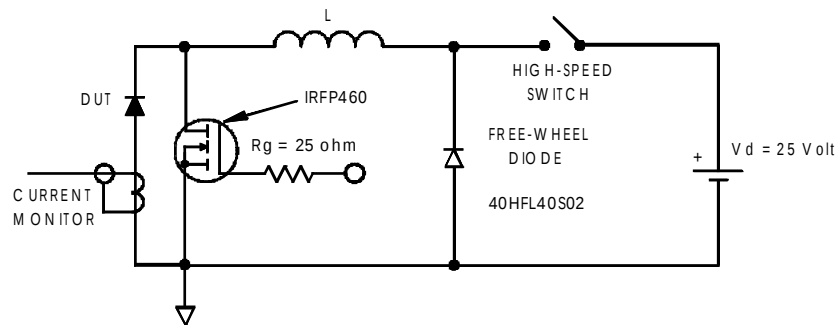


Fig. 8- Unclamped Inductive Test Circuit

(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 = $V_{R1} \times I_R (1 - D)$; $I_R @ V_{R1} = 10V$

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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 paralalled 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

RTERM1 5 4 9.27E-2
RTERM2 4 3 7.39E-2
RTERM3 3 2 2.54E-1
RTERM4 2 1 1.12E-5

.ENDS 80CPQ20T
  
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WORLD HEADQUARTERS: 233 Kansas St., El Segundo, California 90245 U.S.A. Tel: (310) 322 3331. Fax: (310) 322 3332.
EUROPEAN HEADQUARTERS: Hurst Green, Oxted, Surrey RH8 9BB, U.K. Tel: ++ 44 1883 732020. Fax: ++ 44 1883 733408.
IR CANADA: 15 Lincoln Court, Brampton, Markham, Ontario L6T3Z2. Tel: (905) 453 2200. Fax: (905) 475 8801.
IR GERMANY: Saalburgstrasse 157, 61350 Bad Homburg. Tel: ++ 49 6172 96590. Fax: ++ 49 6172 965933.
IR ITALY: Via Liguria 49, 10071 Borgaro, Torino. Tel: ++ 39 11 4510111. Fax: ++ 39 11 4510220.
IR FAR EAST: K&H Bldg., 2F, 30-4 Nishi-Ikebukuro 3-Chome, Toshima-Ku, Tokyo, Japan 171. Tel: 81 3 3983 0086.
IR SOUTHEAST ASIA: 1 Kim Seng Promenade, Great World City West Tower, 13-11, Singapore 237994. Tel: ++ 65 838 4630.
IR TAIWAN: 16 Fl. Suite D.207, Sec. 2, Tun Haw South Road, Taipei, 10673, Taiwan. Tel: 886 2 2377 9936.