



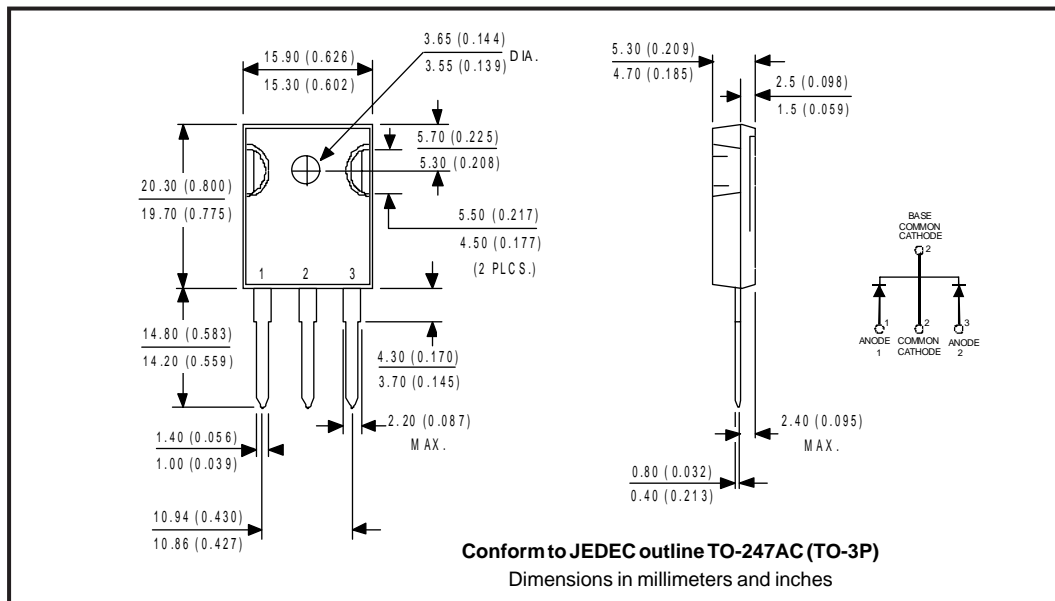
Major Ratings and Characteristics

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

- 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



80CPQ020

PD-20711 rev. B 11/99



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) (Per Device)	80	A	50% duty cycle @ T _C = 138°C, rectangular wave form
	40		
I _{FSM} Max. Peak One Cycle Non-Repetitive Surge Current (Per Leg)	2200	A	5μs Sine or 3μs Rect. pulse
	500		10ms Sine or 6ms Rect. pulse
E _{AS} Non-Repetitive Avalanche Energy (Per Leg)	27	mJ	T _J = 25 °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 x V _R typical

Electrical Specifications

Parameters	Values	Units	Conditions
V _{FM} Max. Forward Voltage Drop (Per Leg) (1)	0.46	V	@ 40A
	0.55	V	@ 80A
	0.36	V	@ 40A
	0.46	V	@ 80A
	0.32	V	@ 40A
	0.43	V	@ 80A
I _{RM} Max. Reverse Leakage Current (Per Leg) (1)	5.5	mA	T _J = 25 °C
	1100	mA	T _J = 125 °C
	110	mA	T _J = 125 °C
	600	mA	T _J = 150 °C
V _{F(TO)} Threshold Voltage	0.185	V	T _J = T _J max.
r _f Forward Slope Resistance	3.2	mΩ	
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/μs	

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

Thermal-Mechanical Specifications

Parameters	Values	Units	Conditions
T _J Max. Junction Temperature Range	-55 to 150	°C	
T _{stg} Max. Storage Temperature Range	-55 to 150	°C	
R _{thJC} Max. Thermal Resistance Junction to Case (Per Leg)	0.6	°C/W	DC operation
R _{thJC} Max. Thermal Resistance Junction to Case (Per Package)	0.3	°C/W	DC operation
R _{thCS} Typical Thermal Resistance, Case to Heatsink	0.25	°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	

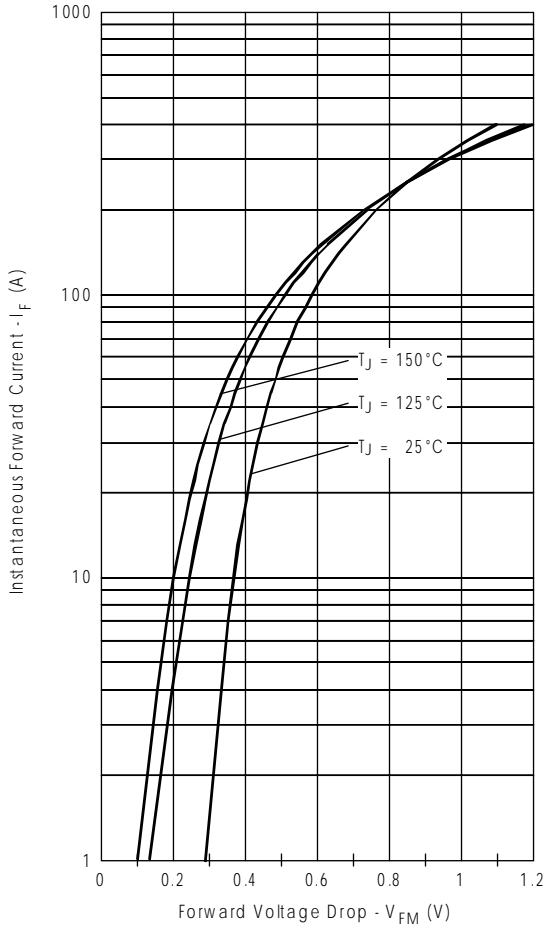


Fig. 1 - Max. Forward Voltage Drop Characteristics (PerLeg)

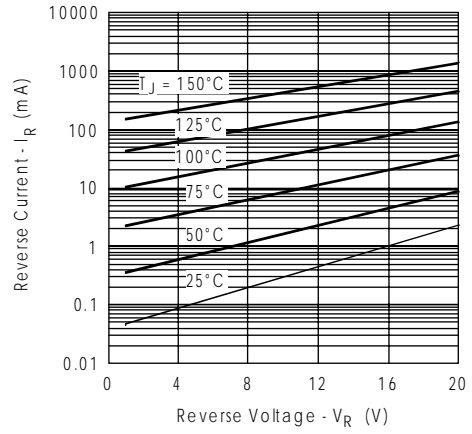


Fig. 2 - Typical Values Of Reverse Current Vs. Reverse Voltage (Per Leg)

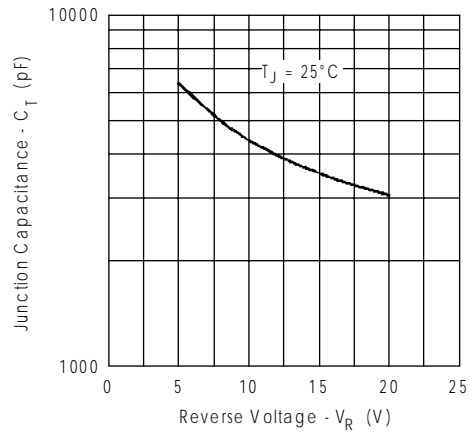


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage (Per Leg)

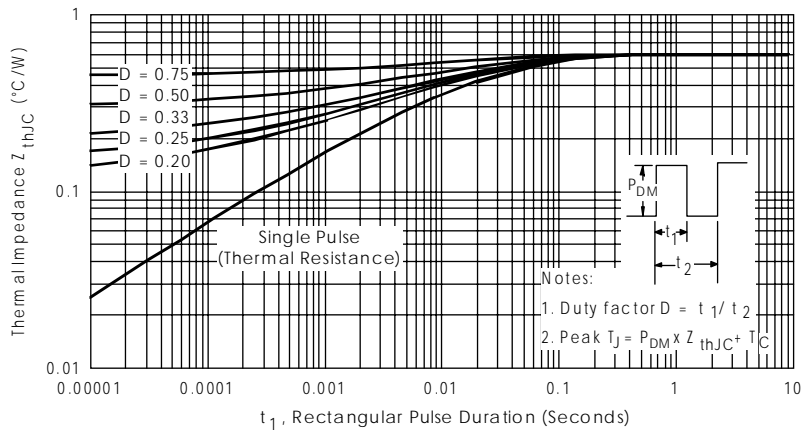


Fig. 4 - Max. Thermal Impedance Z_{thJC} Characteristics (Per Leg)

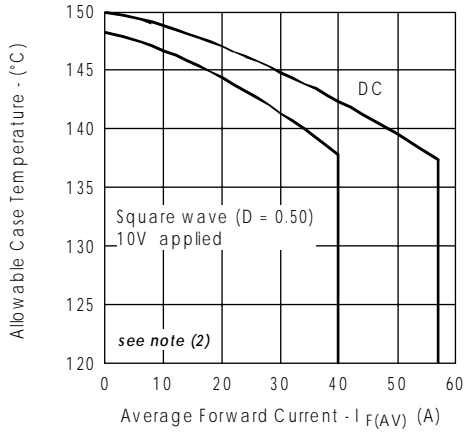


Fig. 5- Max. Allowable Case Temperature Vs. Average Forward Current (Per Leg)

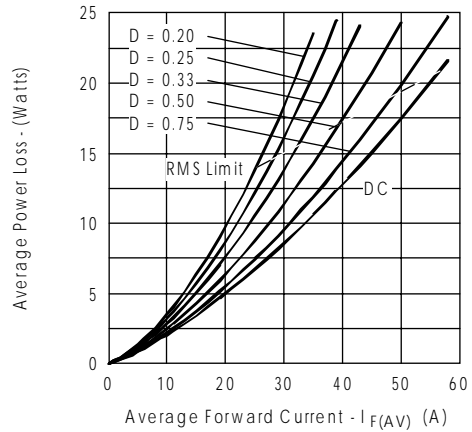


Fig. 6- Forward Power Loss Characteristics (Per Leg)

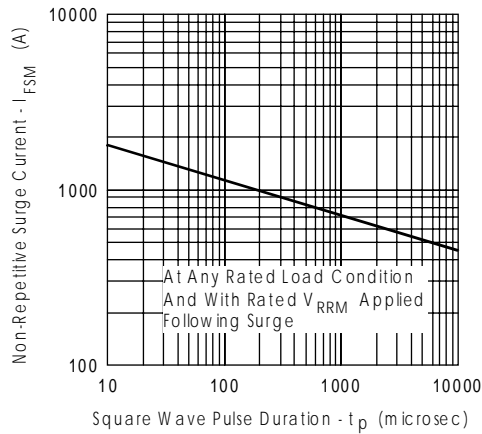


Fig. 7- Max. Non-Repetitive Surge Current (Per Leg)

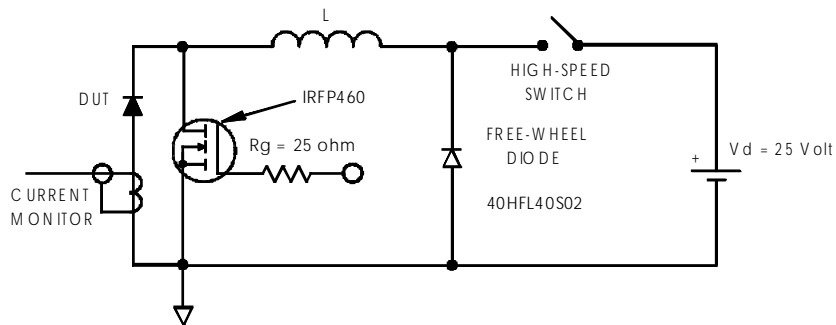


Fig. 8- Unclamped Inductive Test Circuit

- (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);
 $Pd_{REV} = \text{Inverse Power Loss} = V_{R1} \times I_R (1 - D); I_R @ V_{R1} = 10V$

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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

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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