

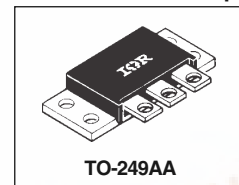
# International IOR Rectifier

Bulletin PD-2.316 05/00

## 160CNQ... SERIES

### SCHOTTKY RECTIFIER

160 Amp



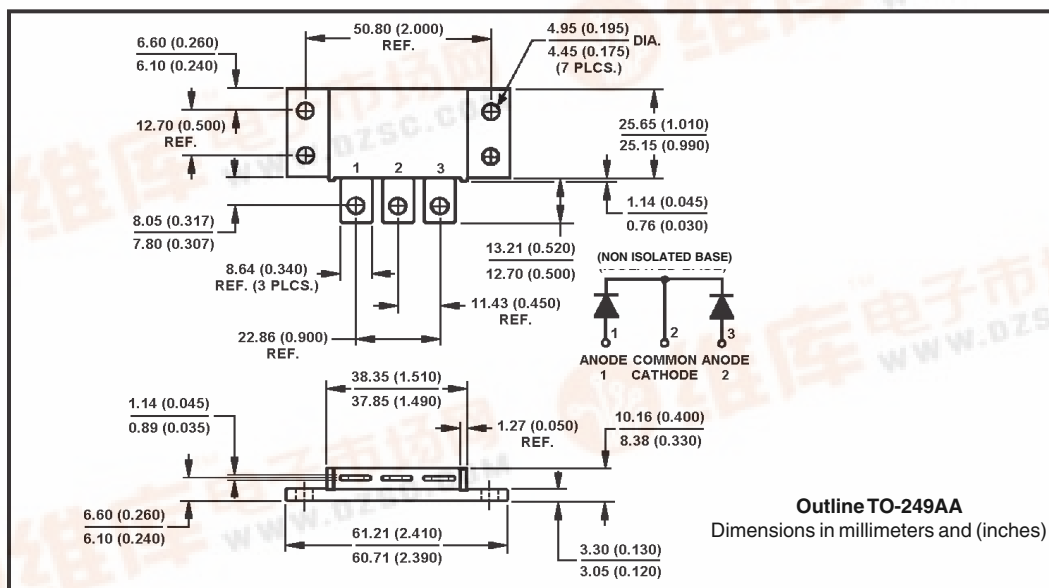
#### Major Ratings and Characteristics

Characteristics	160CNQ...	Units
$I_{F(AV)}$ Rectangular waveform	160	A
$V_{RRM}$ range	35 to 45	V
$I_{FSM}$ @ $t_p = 5 \mu s$ sine	6400	A
$V_F$ @ 80 Apk, $T_J = 125^\circ C$ (per leg)	0.60	V
$T_J$ range	-55 to 150	$^\circ C$

#### Description/Features

The 160CNQ non isolated, center tap Schottky rectifier module series has been optimized for very low forward voltage drop, with moderate leakage. The proprietary barrier technology allows for reliable operation up to  $150^\circ C$  junction temperature. Typical applications are in switching power supplies, converters, free-wheeling diodes, and reverse battery protection.

- $150^\circ C$   $T_J$  operation
- Isolated heatsink
- Center tap module
- High purity, high temperature epoxy encapsulation for enhanced mechanical strength and moisture resistance
- Very low forward voltage drop
- High frequency operation
- Guard ring for enhanced ruggedness and long term reliability
- Low profile, high current package



### Voltage Ratings

Part number	160CNQ035	160CNQ040	160CNQ045
$V_R$ Max. DC Reverse Voltage (V)	35	40	45
$V_{RWM}$ Max. Working Peak Reverse Voltage (V)			

### Absolute Maximum Ratings

Parameters	160CNQ	Units	Conditions
$I_{F(AV)}$ Max. Average Forward Current (Per Leg) * See Fig. 5 (Per Device)	80 160	A	50% duty cycle @ $T_C = 100^\circ\text{C}$ , rectangular waveform
$I_{FSM}$ Max. Peak One Cycle Non-Repetitive Surge Current (Per Leg) * See Fig. 7	6400 750	A	5 $\mu\text{s}$ Sine or 3 $\mu\text{s}$ Rect. pulse 10ms Sine or 6ms Rect. pulse Following any rated load condition and with rated $V_{RWM}$ applied
$E_{AS}$ Non-Repetitive Avalanche Energy (Per Leg)	108	mJ	$T_J = 25^\circ\text{C}$ , $I_{AS} = 16$ Amps, $L = 0.84$ mH
$I_{AR}$ Repetitive Avalanche Current (Per Leg)	16	A	Current decaying linearly to zero in 1 $\mu\text{sec}$ Frequency limited by $T_J$ max. $V_A = 1.5 \times V_R$ typical

### Electrical Specifications

Parameters	160CNQ	Units	Conditions
$V_{FM}$ Max. Forward Voltage Drop (Per Leg) * See Fig. 1 (1)	0.64	V	@ 80A $T_J = 25^\circ\text{C}$
	0.86	V	@ 160A
	0.60	V	@ 80A $T_J = 125^\circ\text{C}$
	0.76	V	@ 160A
$I_{RM}$ Max. Reverse Leakage Current (Per Leg) * See Fig. 2 (1)	5	mA	$T_J = 25^\circ\text{C}$ $V_R = \text{rated } V_R$
	200	mA	$T_J = 125^\circ\text{C}$
$C_T$ Max. Junction Capacitance (Per Leg)	2600	pF	$V_R = 5V_{DC}$ (test signal range 100Khz to 1Mhz) $25^\circ\text{C}$
$L_S$ Typical Series Inductance (Per Leg)	8.0	nH	Measured from terminal hole to terminal hole
$dv/dt$ Max. Voltage Rate of Change (Rated $V_R$ )	10,000	V/ $\mu\text{s}$	

(1) Pulse Width < 300 $\mu\text{s}$ , Duty Cycle <2%

### Thermal-Mechanical Specifications

Parameters	160CNQ	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)	0.70	$^\circ\text{C/W}$	DC operation * See Fig. 4
$R_{thJC}$ Max. Thermal Resistance Junction to Case (Per Package)	0.35	$^\circ\text{C/W}$	DC operation
$R_{thCS}$ Typical Thermal Resistance, Case to Heatsink	0.10	$^\circ\text{C/W}$	Mounting surface, smooth and greased
wt Approximate Weight	58(2.0)	g(oz.)	
T Mounting Torque	Min. 40(35)	Kg-cm (lbf-in)	
	Max. 58(50)		
Case Style	TO - 249AA		JEDEC

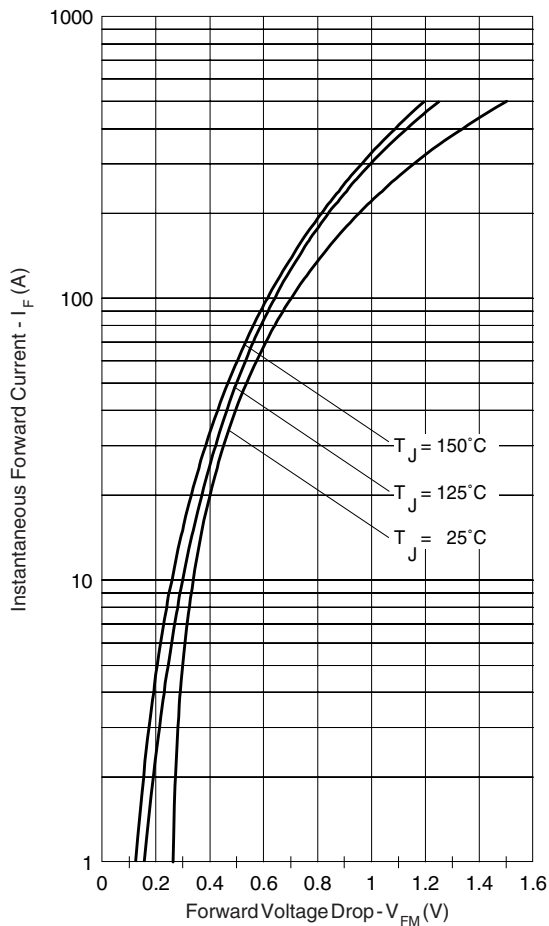


Fig. 1 - Max. Forward Voltage Drop Characteristics (PerLeg)

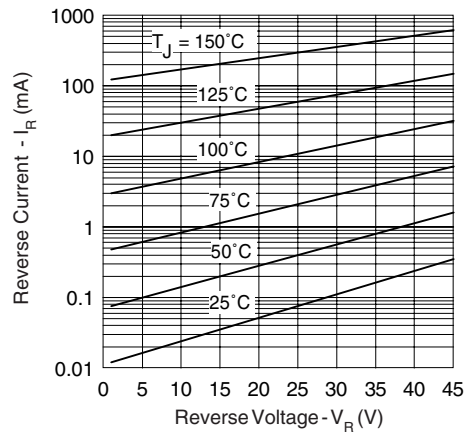


Fig. 2 - Typical Values Of Reverse Current Vs. Reverse Voltage (PerLeg)

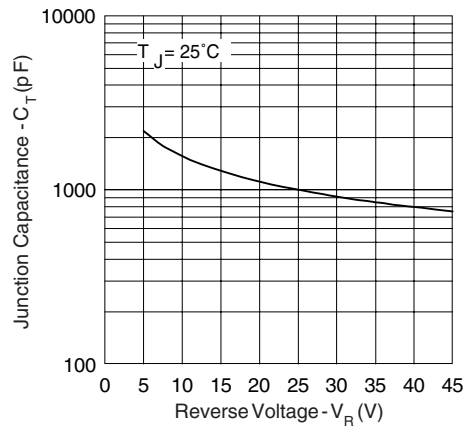


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage (PerLeg)

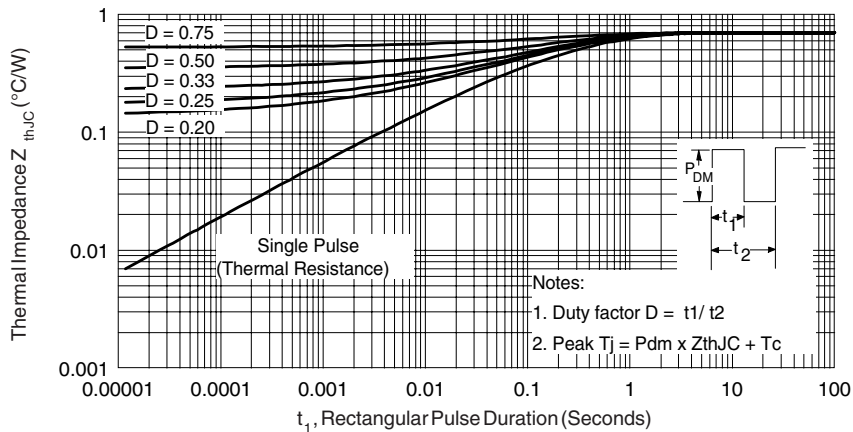


Fig. 4 - Max. Thermal Impedance  $Z_{thJC}$  Characteristics (PerLeg)

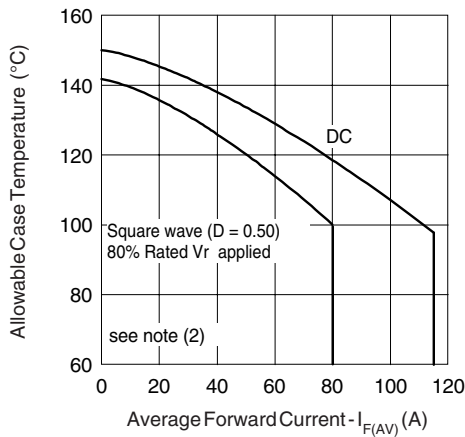


Fig. 5 - Max. Allowable Case Temperature Vs. Average Forward Current (Per Leg)

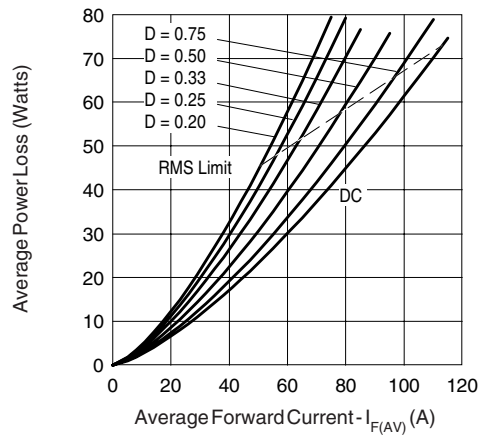


Fig. 6 - Forward Power Loss Characteristics (Per Leg)

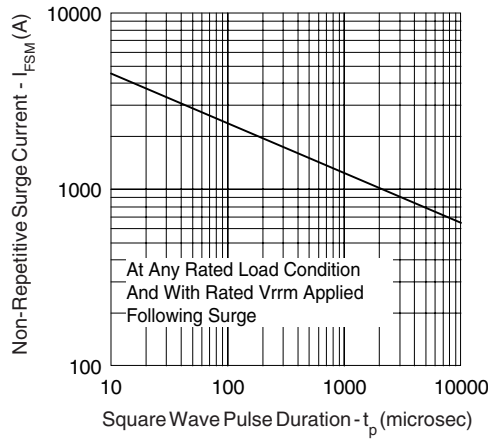


Fig. 7 - Max. Non-Repetitive Surge Current (Per Leg)

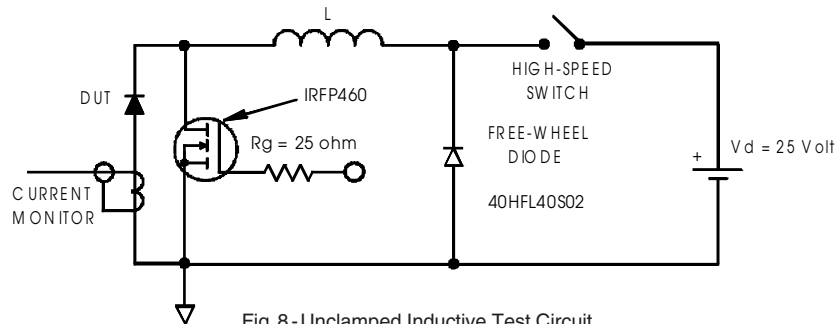


Fig. 8 - Unclamped Inductive Test Circuit

- (2) Formula used:  $T_C = T_J - (Pd + Pd_{REV}) \times R_{thJC}$   
 $Pd = \text{Forward Power Loss} = I_{F(AV)} \times V_{FM} @ (I_{F(AV)}/D)$  (see Fig. 6);  
 $Pd_{REV} = \text{Inverse Power Loss} = V_{R1} \times I_{R1} (1 - D)$ ;  $I_R @ V_{R1} = 80\%$  rated  $V_R$

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