Bulletin PD-21060 06/05

International
IOR Rectifier

163CNQ... SERIES

SCHOTTKY RECTIFIER 160 Amp

$I_{F(AV)}$ = 160 Amp
V_R = 60/ 100V

Major Ratings and Characteristics

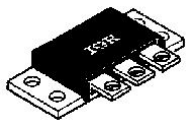
Characteristics		Values	Units
$I_{F(AV)}$	Rectangular waveform	160	A
V_{RRM}	range	60/ 100	V
I_{FSM}	@tp = 5 µs sine	9000	A
V_F	@80 Apk, T_J = 125°C (per leg)	0.80	V
T_J	range	-55 to 175	°C

Description/ Features

The 163CNQ isolated center tap Schottky rectifier module 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
- Not Isolated heatsink
- Center tap module
- High purity, high temperature epoxy encapsulation for enhanced mechanical strength and moisture resistance
- Low forward voltage drop
- High frequency operation
- Guard ring for enhanced ruggedness and long term reliability
- Low profile, high current package

Case Styles



TO-249AA

Voltage Ratings

	Part number	163CNQ060	163CNQ080	163CNQ090	163CNQ100
V_R	Max. DC Reverse Voltage (V)	60	80	90	100
V_{RWM}	Max. Working Peak Reverse Voltage (V)				

Absolute Maximum Ratings

	Parameters	163CNQ	Units	Conditions	
$I_{F(AV)}$	Max. Average Forward Current * See Fig. 5 Per Device	160	A	50% duty cycle @ T_C = 122 °C, rectangular waveform	
	Per Leg	80			
I_{FSM}	Max. Peak One Cycle Non-Repetitive Surge Current (Per Leg) * See Fig. 7	9000	A	5µs Sine or 3µs Rect. pulse	Following any rated load condition and with rated V_{RRM} applied
		800		10ms Sine or 6ms Rect. pulse	
E_{AS}	Non-Repetitive Avalanche Energy (Per Leg)	15	mJ	T_J = 25 °C, I_{AS} = 1 Amps, L = 30 mH	
I_{AR}	Repetitive Avalanche Current (Per Leg)	1	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	163CNQ	Units	Conditions	
V_{FM}	Max. Forward Voltage Drop (Per Leg) * See Fig. 1 (1)	0.98	V	@ 80A	T_J = 25 °C
		1.17	V	@ 160A	
		0.80	V	@ 80A	T_J = 125 °C
		0.96	V	@ 160A	
I_{RM}	Max. Reverse Leakage Current (Per Leg) * See Fig. 2 (1)	1.5	mA	T_J = 25 °C	V_R = rated V_R
		20	mA	T_J = 125 °C	
C_T	Max. Junction Capacitance (Per Leg)	1400	pF	V_R = 5V_{DC} (test signal range 100Khz to 1Mhz) 25°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)	10000	V/ µs		

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

Thermal-Mechanical Specifications

	Parameters		163CNQ	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)		0.70	°C/W	DC operation * See Fig. 4
R_{thJC}	Max. Thermal Resistance Junction to Case (Per Package)		0.35	°C/W	DC operation
R_{thCS}	Typical Thermal Resistance, Case to Heatsink		0.10	°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

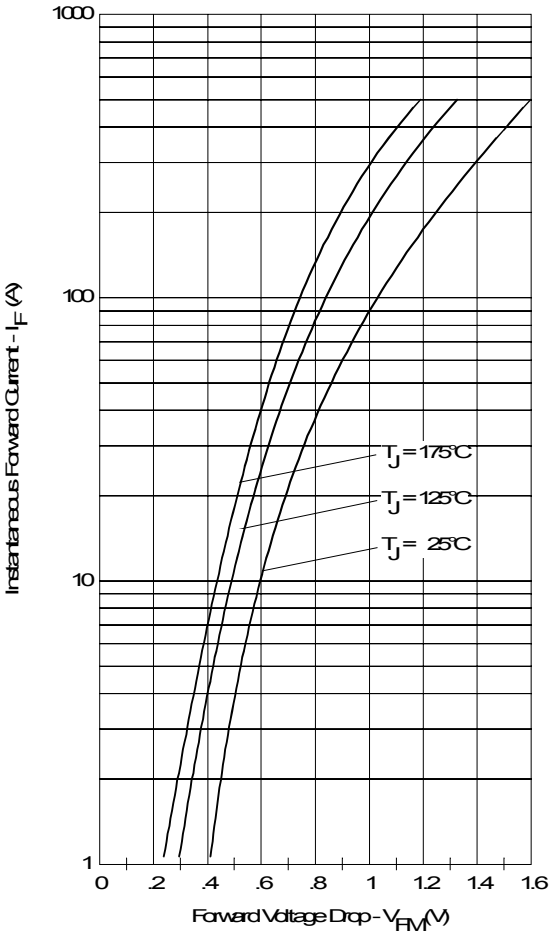


Fig. 1 - Max. Forward Voltage Drop Characteristics (Per Leg)

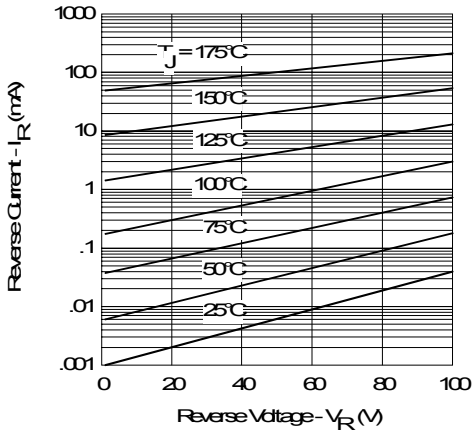


Fig. 2 - Typical Values Of Reverse Current Vs. Reverse Voltage (Per Leg)

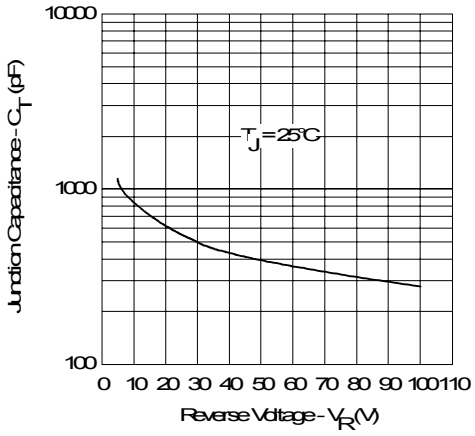


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage (Per Leg)

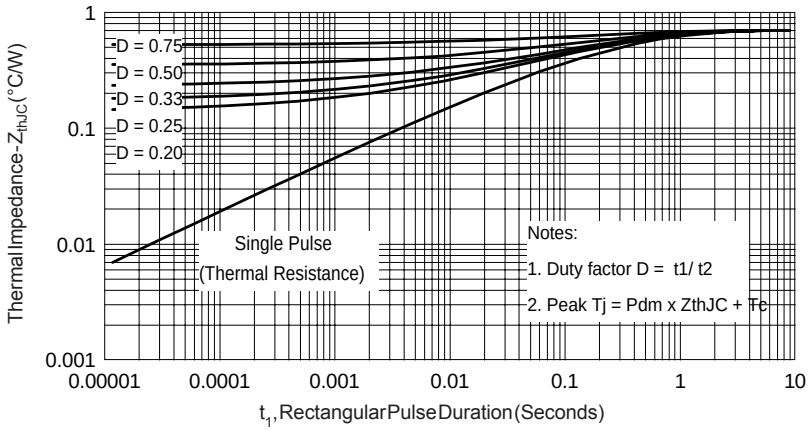


Fig. 4 - Max. Thermal Impedance Z_{thJC} Characteristics (Per Leg)

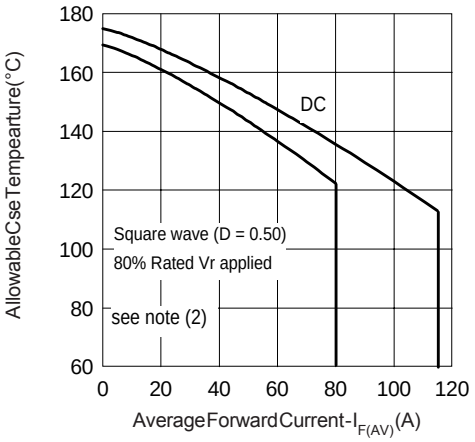


Fig. 5 - Max. Allowable Case Temperature Vs. Average Forward Current (Per Leg)

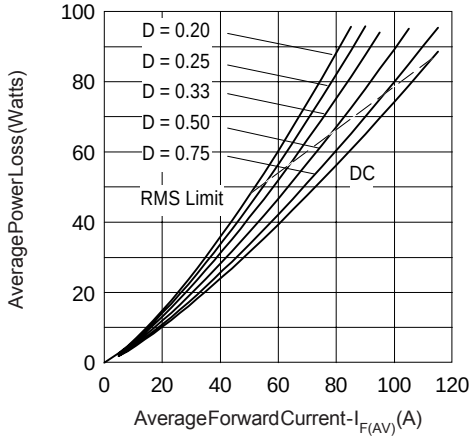


Fig. 6 - Forward Power Loss Characteristics (Per Leg)

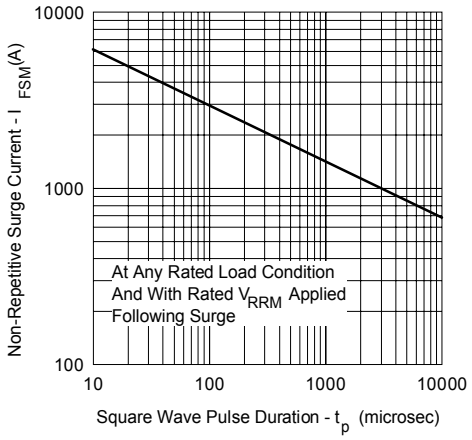


Fig. 7 - Max. Non-Repetitive Surge Current (Per Leg)

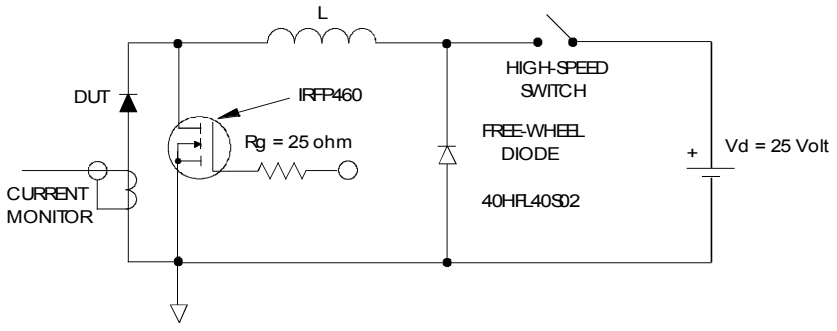
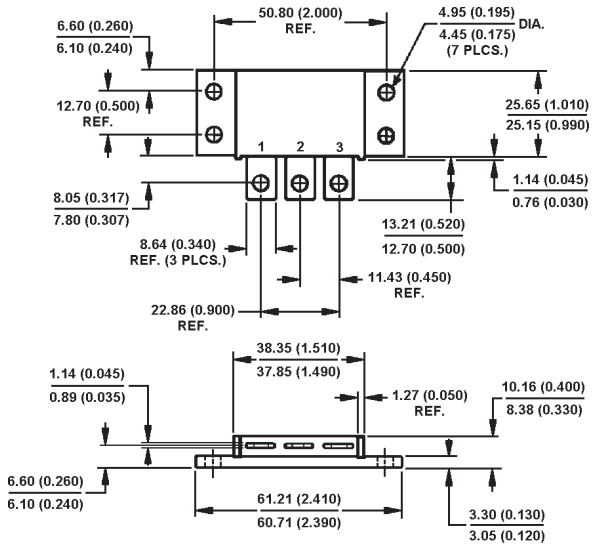


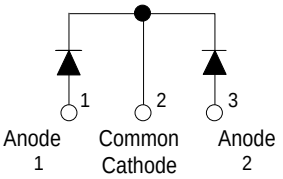
Fig. 8 - Unclamped Inductive Test Circuit

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

Outline Table



NOT (Isolated Base)



Outline D-60 (Modified JEDEC TO-249AA)
Dimensions in millimeters and (inches)

Ordering Information Table

Device Code

163	C	N	Q	100
1	2	3	4	5

- **1** - Current Rating (160A, xx3 100V Process 175°C)
- **2** - Circuit Configuration
  - C = Common Cathode
- **3** - Package
  - N = Module (Not Isolated)
- **4** - Schottky "Q" Series
- **5** - Voltage Ratings
  - 060 = 60V
  - 080 = 80V
  - 090 = 90V
  - 100 = 100V

Data and specifications subject to change without notice.
This product has been designed and qualified for Industrial Level.
Qualification Standards can be found on IR's Web site.

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