Bulletin PD-2.224 rev. D 07/04

International
IOR Rectifier

120NQ...(R) SERIES

SCHOTTKY RECTIFIER

120 Amp

$I_{F(AV)}$ = 120 A
V_R = 35 to 45V

Major Ratings and Characteristics

Characteristics	120NQ..	Units
$I_{F(AV)}$ Rectangular waveform	120	A
V_{RRM} range	35 to 45	V
I_{FSM} @ tp = 5 µs sine	29,000	A
V_F @ 120Apk, T_J=125°C	0.52	V
T_J range	- 55 to 150	°C

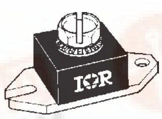
Description/ Features

The 120NQ...(R) high current 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° C junction temperature. Typical applications are in switching power supplies, converters, free-wheeling diodes, and reverse battery protection.

- 150° C T_J operation
- Unique high power, Half-Pak module
- Replaces two parallel DO-5's
- Easier to mount and lower profile than DO-5's
- 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

Case Styles

120NQ...(R)



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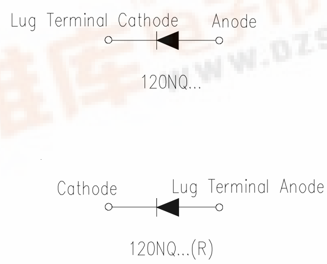


Voltage Ratings

	Part number	120NQ035(R)	120NQ040(R)	120NQ045(R)
V_R	Max. DC Reverse Voltage (V)	35	40	45
V_{RWM}	Max. Working Peak Reverse Voltage (V)			

Absolute Maximum Ratings

	Parameters	120NQ	Units	Conditions	
$I_{F(AV)}$	Max. Average Forward Current * See Fig. 5	120	A	50% duty cycle @ T_C = 106° C, rectangular wave form	
I_{FSM}	Max. Peak One Cycle Non-Repetitive	29,000	A	5µs Sine or 3µs Rect. pulse	Following any rated load condition and with rated V_{RRM} applied
	Surge Current * See Fig. 7	1550		10ms Sine or 6ms Rect. pulse	
E_{AS}	Non-Repetitive Avalanche Energy	81	mJ	T_J = 25 °C, I_{AS} = 12 Amps, L = 1.12 mH	
I_{AR}	Repetitive Avalanche Current	12	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	120NQ	Units	Conditions	
V_{FM}	Max. Forward Voltage Drop (1)	0.57	V	@ 120A	T_J = 25 °C
	* See Fig. 1	0.73	V	@ 240A	
		0.52	V	@ 120A	T_J = 125 °C
		0.69	V	@ 240A	
I_{RM}	Max. Reverse Leakage Current (1)	10	mA	T_J = 25 °C	V_R = rated V_R
	* See Fig. 2	500	mA	T_J = 125 °C	
$V_{F(TO)}$	Threshold Voltage	0.32	V	T_J = T_J max.	
r_t	Forward Slope Resistance	1.37	mΩ		
C_T	Max. Junction Capacitance	5200	pF	V_R = 5V_{DC}, (test signal range 100Khz to 1Mhz) 25 °C	
L_S	Typical Series Inductance	7.0	nH	From top of terminal hole to mounting plane	
dv/dt	Max. Voltage Rate of Change (Rated V_R)	10000	V/ µs		

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

Thermal-Mechanical Specifications

	Parameters		120NQ	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		0.40	°C/W	DC operation * See Fig. 4
R_{thCS}	Typical Thermal Resistance, Case to Heatsink		0.15	°C/W	Mounting surface , smooth and greased
wt	Approximate Weight		25.6 (0.9)	g (oz.)	
T	Mounting Torque	Min.	17 (15)	Kg-cm (lbf-in)	Non-lubricated threads
		Max.	29 (25)		
	Terminal Torque	Min.	23 (20)		
		Max.	46 (40)		
	Case Style		HALF PAK Module		

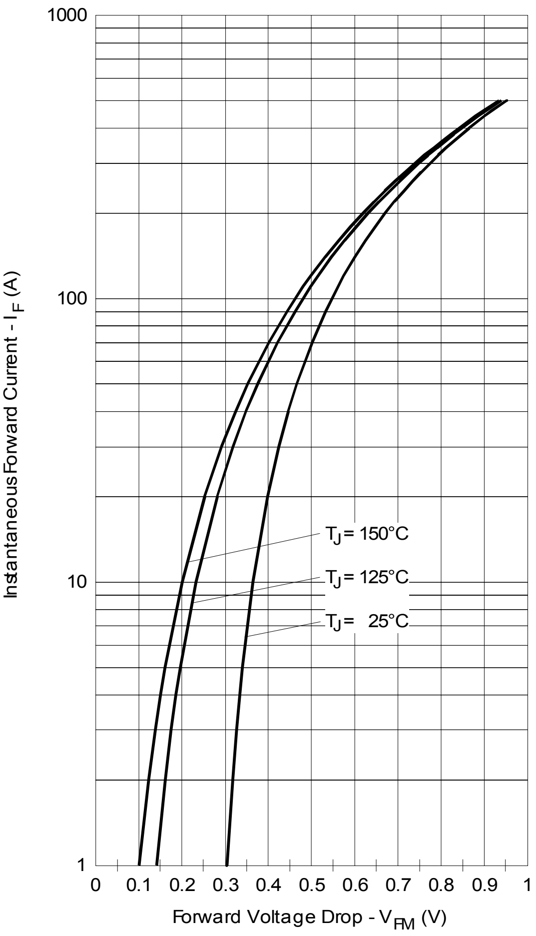


Fig. 1 - Maximum Forward Voltage Drop Characteristics

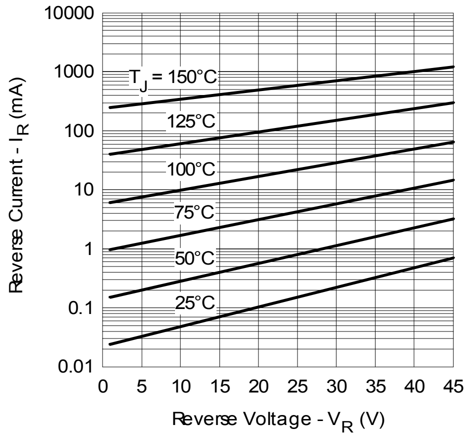


Fig. 2 - Typical Values of Reverse Current Vs. Reverse Voltage

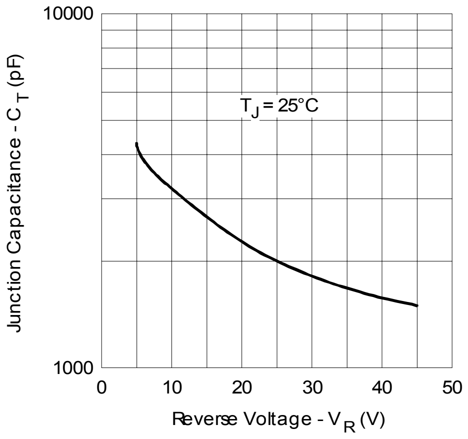


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage

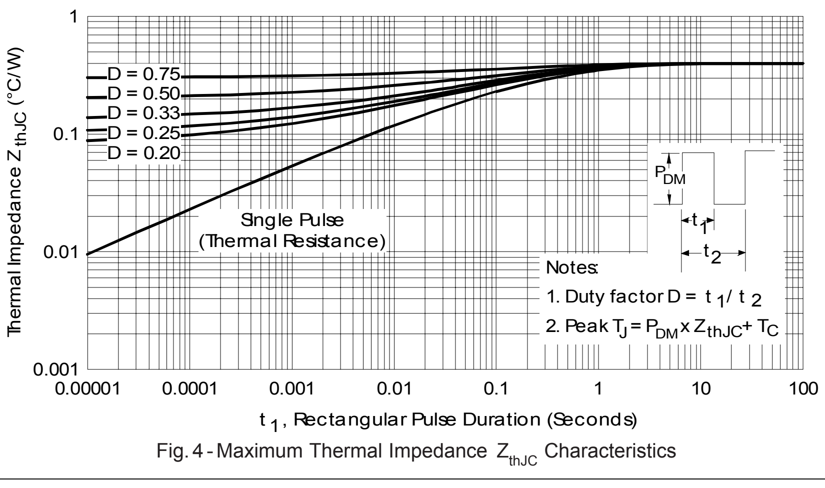


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

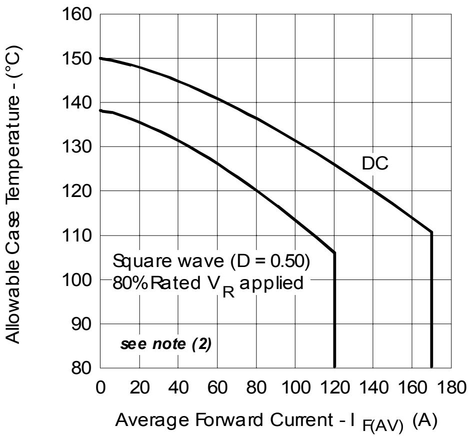


Fig. 5 - Maximum Allowable Case Temperature Vs. Average Forward Current

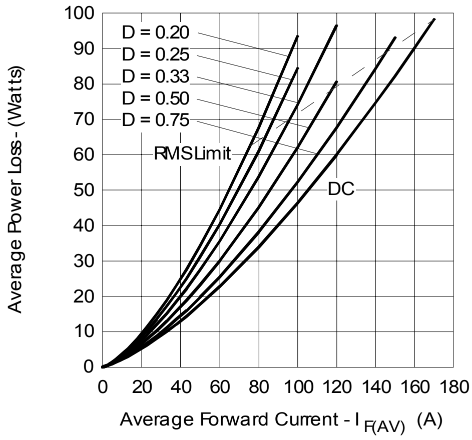


Fig. 6 - Forward Power Loss Characteristics

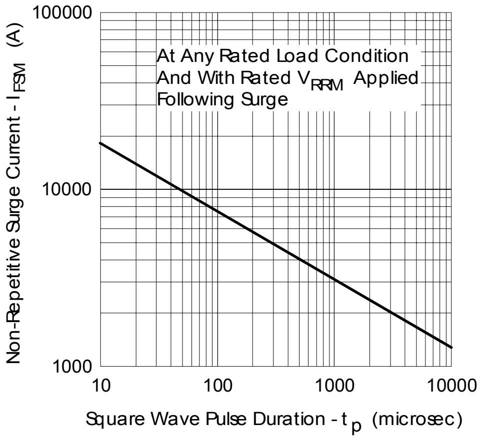


Fig. 7 - Maximum Non-Repetitive Surge Current

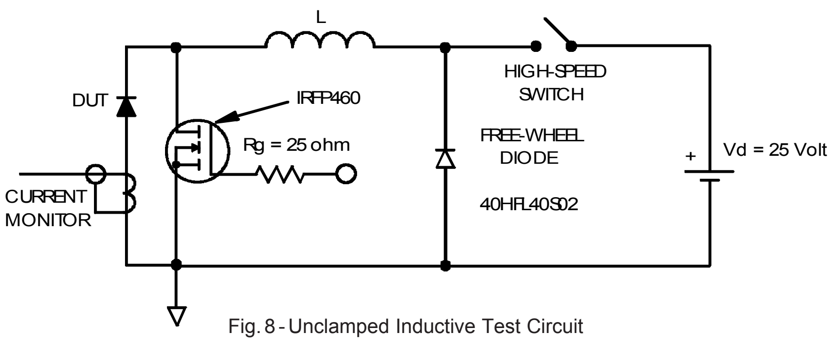


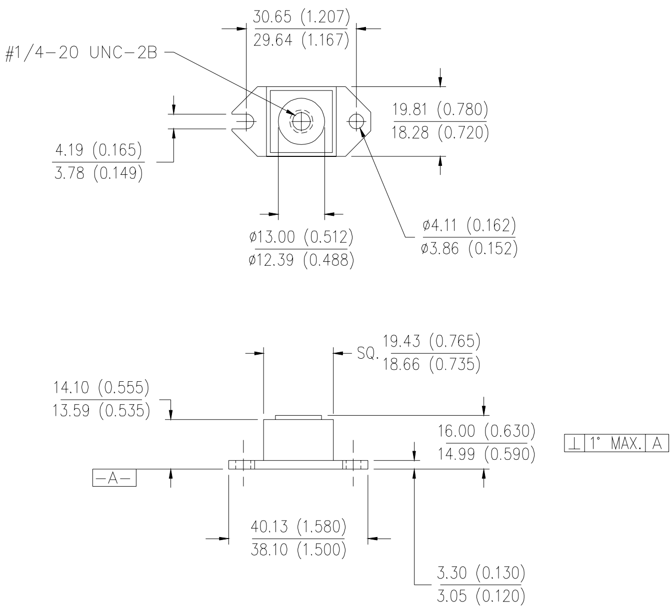
Fig. 8 - Unclamped Inductive Test Circuit

(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

Outline Table



Outline D-67 HALF PAK Module
Dimensions in millimeters and (inches)

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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