

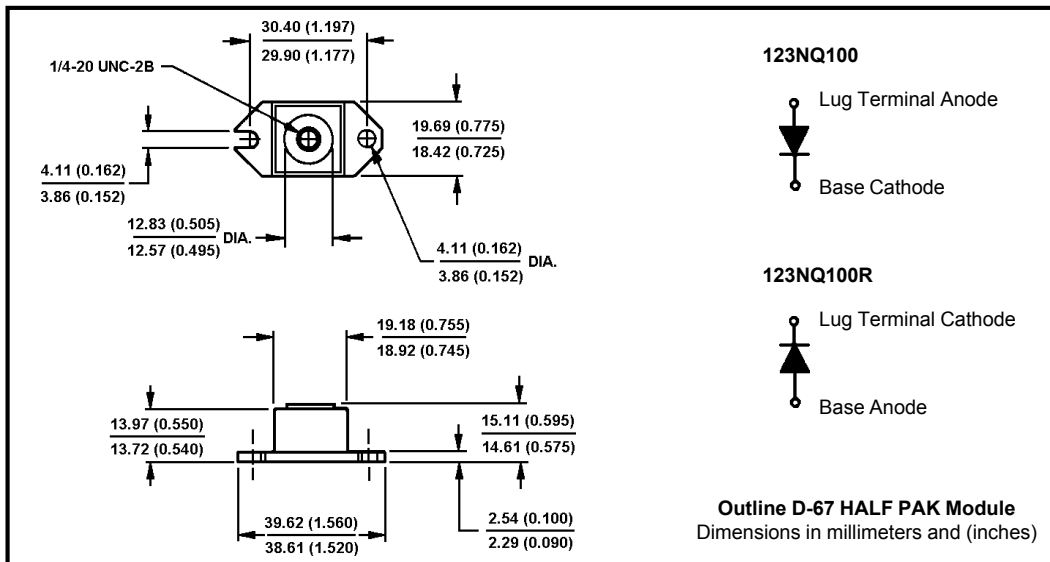
**Major Ratings and Characteristics**

Characteristics	121NQ...(R)	Units
$I_{F(AV)}$ Rectangular waveform	120	A
$V_{RRM}$ range	35 to 50	V
$I_{FSM}$ @ $t_p = 5 \mu s$ sine	19,800	A
$V_F$ @ 120Apk, $T_J = 125^\circ C$	0.56	V
$T_J$ range	-55 to 175	$^\circ C$

**Description/Features**

The 121NQ... (R) high current 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
- 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
- Low forward voltage drop
- High frequency operation
- Guard ring for enhanced ruggedness and long term reliability



## 121NQ...(R) Series

Bulletin PD-2.249 rev. C 05/02

International  
IRF Rectifier

### Voltage Ratings

Part number	121NQ035	121NQ040	121NQ045	121NQ050
$V_R$ Max. DC Reverse Voltage (V)	35	40	45	50
$V_{RWM}$ Max. Working Peak Reverse Voltage (V)				

### Absolute Maximum Ratings

Parameters	121NQ	Units	Conditions
$I_{F(AV)}$ Max. Average Forward Current * See Fig. 5	120	A	50% duty cycle @ $T_C = 133^\circ\text{C}$ , rectangular wave form
$I_{FSM}$ Max. Peak One Cycle Non-Repetitive Surge Current * See Fig. 7	19,800	A	5 $\mu\text{s}$ Sine or 3 $\mu\text{s}$ Rect. pulse
	2200		10ms Sine or 6ms Rect. pulse
$E_{AS}$ Non-Repetitive Avalanche Energy	81	mJ	$T_J = 25^\circ\text{C}$ , $I_{AS} = 12\text{Amps}$ , $L = 1.12\text{mH}$
$I_{AR}$ Repetitive Avalanche Current	12	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	121NQ	Units	Conditions
$V_{FM}$ Max. Forward Voltage Drop (1) * See Fig. 1	0.65	V	@ 120A
	0.83	V	@ 240A
	0.56	V	@ 120A
	0.70	V	@ 240A
$I_{RM}$ Max. Reverse Leakage Current (1) * See Fig. 2	10	mA	$T_J = 25^\circ\text{C}$
	90	mA	$T_J = 125^\circ\text{C}$
$C_T$ Max. Junction Capacitance	5200	pF	$V_R = 5V_{DC}$ , (test signal range 100Khz to 1Mhz) $25^\circ\text{C}$
$L_S$ 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/ $\mu\text{s}$	

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

### Thermal-Mechanical Specifications

Parameters	121NQ	Units	Conditions	
$T_J$ Max. Junction Temperature Range	-55 to 175	$^\circ\text{C}$		
$T_{stg}$ Max. Storage Temperature Range	-55 to 175	$^\circ\text{C}$		
$R_{thJC}$ Max. Thermal Resistance Junction to Case	0.40	$^\circ\text{C/W}$	DC operation * See Fig. 4	
$R_{thCS}$ Typical Thermal Resistance, Case to Heatsink	0.15	$^\circ\text{C/W}$	Mounting surface, smooth and greased	
wt Approximate Weight	25.6 (0.9)	g (oz.)		
T Mounting Torque	Min.	40 (35)	Non-lubricated threads	
	Max.	58 (50)		
	Terminal Torque	Min.		58 (50)
		Max.		86 (75)
Case Style	HALF PAK Module			

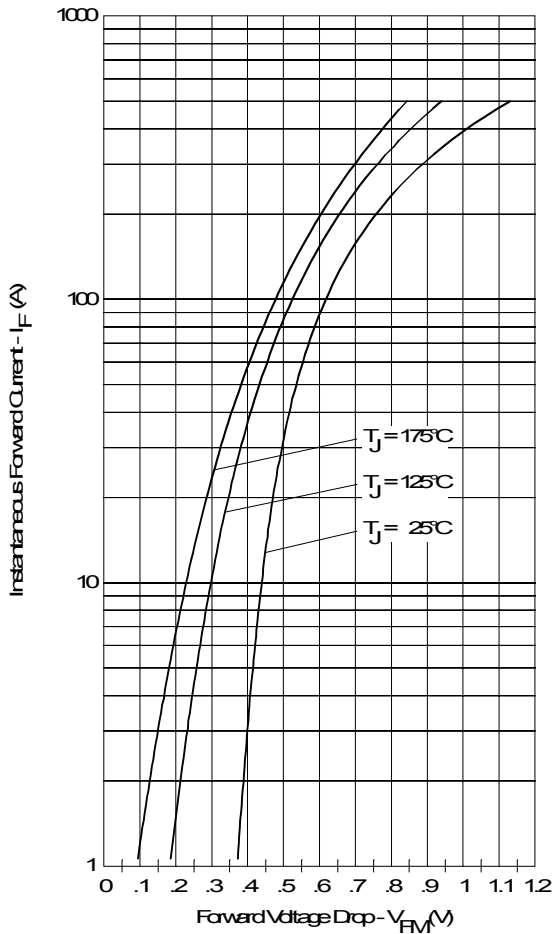


Fig. 1 - Maximum Forward Voltage Drop Characteristics

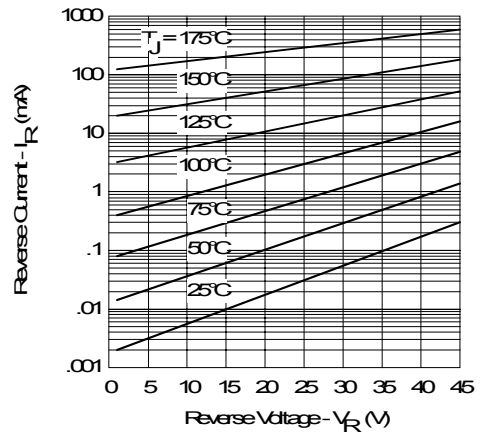


Fig. 2 - Typical Values of Reverse Current Vs. Reverse Voltage

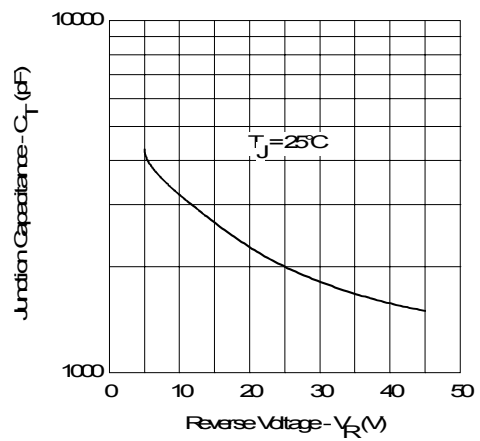


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage

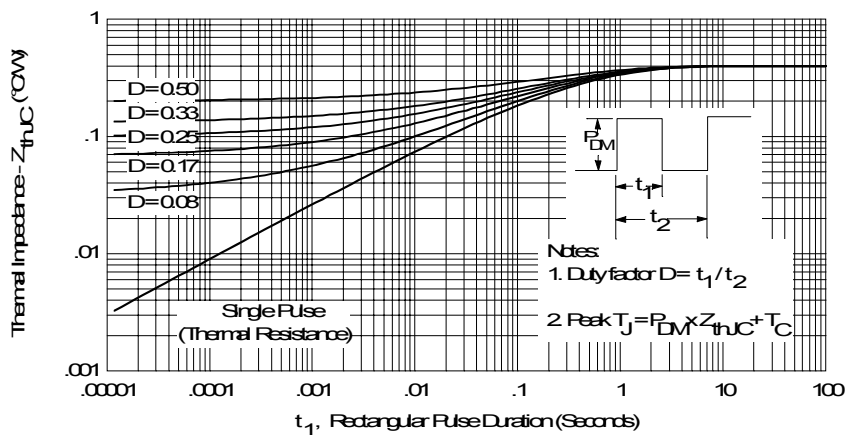


Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics

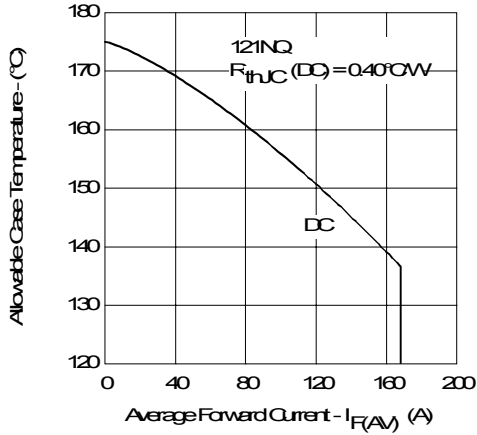


Fig. 5 - Maximum Allowable Case Temperature Vs. Average Forward Current

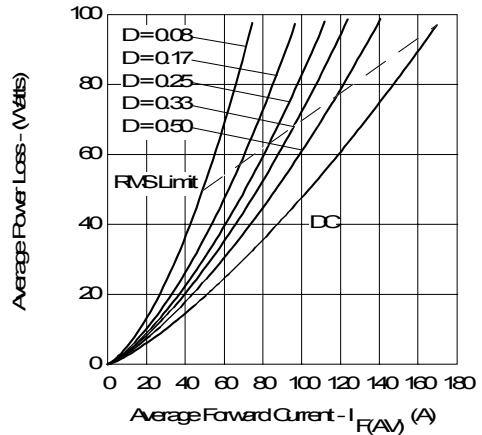


Fig. 6 - Forward Power Loss Characteristics

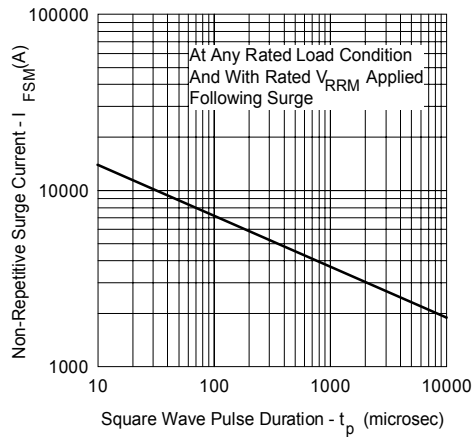


Fig. 7 - Maximum Non-Repetitive Surge Current

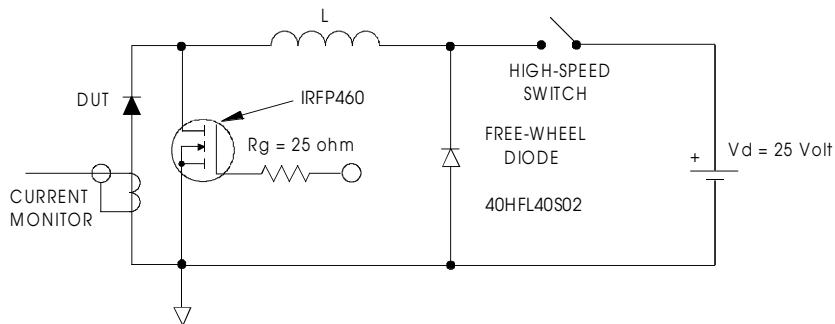


Fig. 8 - Unclamped Inductive Test Circuit

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.

International  
**IOR** Rectifier

**IR WORLD HEADQUARTERS:** 233 Kansas St., El Segundo, California 90245, USA Tel: (310) 252-7105  
TAC Fax: (310) 252-7309  
Visit us at [www.irf.com](http://www.irf.com) for sales contact information. 05/02