International
IOR Rectifier

189NQ... SERIES

SCHOTTKY RECTIFIER

180 Amp

Major Ratings and Characteristics

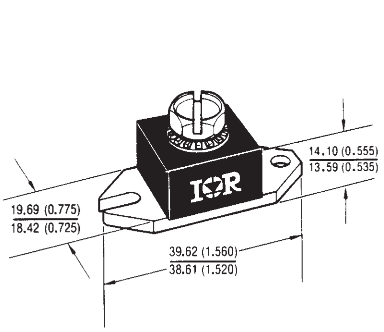
Characteristics		189NQ...	Units
$I_{F(AV)}$	Rectangular waveform	180	A
V_{RRM}	range	135 to 150	V
I_{FSM}	@ tp = 5 μs sine	15000	A
V_F	@ 180Apk, T_J=125°C	0.74	V
T_J	range	-55 to 175	°C

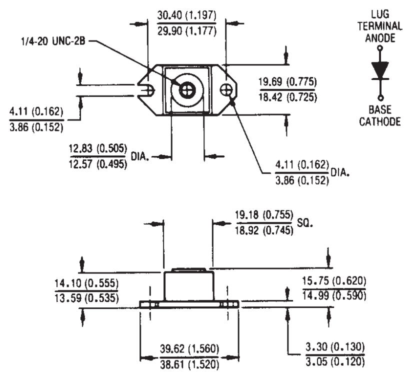
Description/Features

The 189NQ 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 three 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

CASE STYLE AND DIMENSIONS





Outline HALF PAK Module

Dimensions in millimeters and inches

Voltage Ratings

	Part number	189NQ135	189NQ150
V_R	Max. DC Reverse Voltage (V)	135	150
V_{RWM}	Max. Working Peak Reverse Voltage (V)		

Absolute Maximum Ratings

	Parameters	189NQ	Units	Conditions	
$I_{F(AV)}$	Max. Average Forward Current * See Fig. 5	180	A	50% duty cycle @ T_C = 110° C, rectangular wave form	
I_{FSM}	Max. Peak One Cycle Non-Repetitive Surge Current * See Fig. 7	15000	A	5µs Sine or 3µs Rect. pulse	Following any rated load condition and with rated V_{RRM} applied
		1770		10ms Sine or 6ms Rect. pulse	
E_{AS}	Non-Repetitive Avalanche Energy	15	mJ	T_J = 25 °C, I_{AS} = 1 Amps, L = 30 mH	
I_{AR}	Repetitive Avalanche Current	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	189NQ	Units	Conditions	
V_{FM}	Max. Forward Voltage Drop (1) * See Fig. 1	1.07	V	@ 180A	T_J = 25 °C
		1.27	V	@ 360A	
		0.74	V	@ 180A	T_J = 125 °C
		0.86	V	@ 360A	
I_{RM}	Max. Reverse Leakage Current (1) * See Fig. 2	4.5	mA	T_J = 25 °C	V_R = rated V_R
		65	mA	T_J = 125 °C	
C_T	Max. Junction Capacitance	4500	pF	V_R = 5V_{DC}, (test signal range 100Khz to 1Mhz) 25 °C	
L_S	Typical Series Inductance	6.0	nH	From top of terminal hole to mounting plane	
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		189NQ	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		0.30	°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.	40 (35)	Kg-cm (lbf-in)	Non-lubricated threads
		Max.	58 (50)		
	Terminal Torque	Min.	58 (50)		
		Max.	86 (75)		
	Case Style		HALF PAK Module		

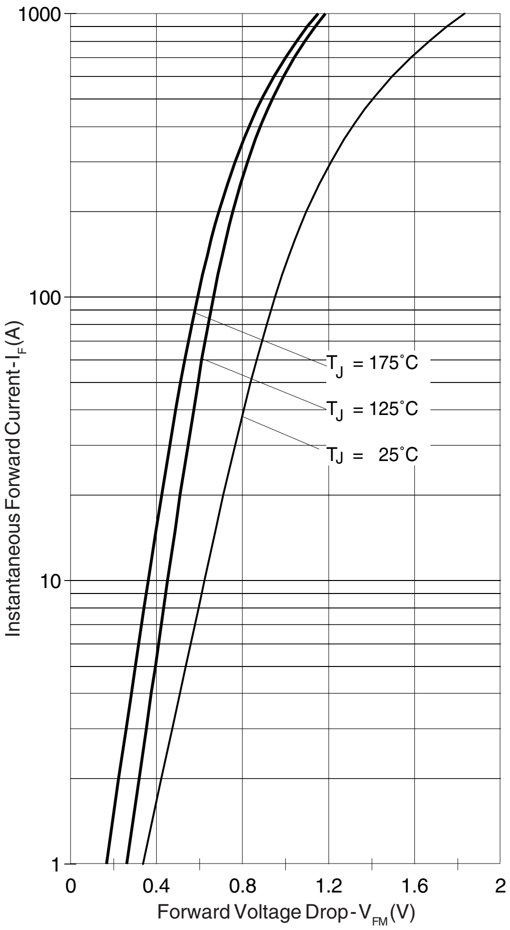


Fig. 1 - Max. Forward Voltage Drop Characteristics

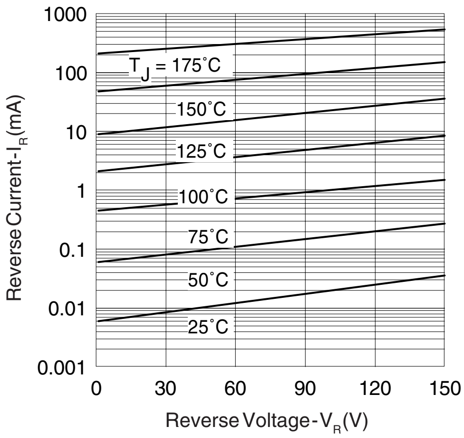


Fig. 2 - Typical Values Of Reverse Current Vs. Reverse Voltage

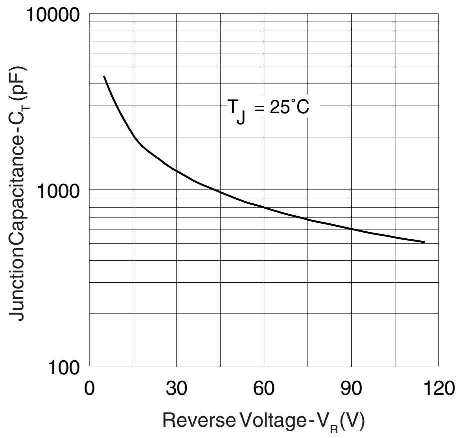


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage

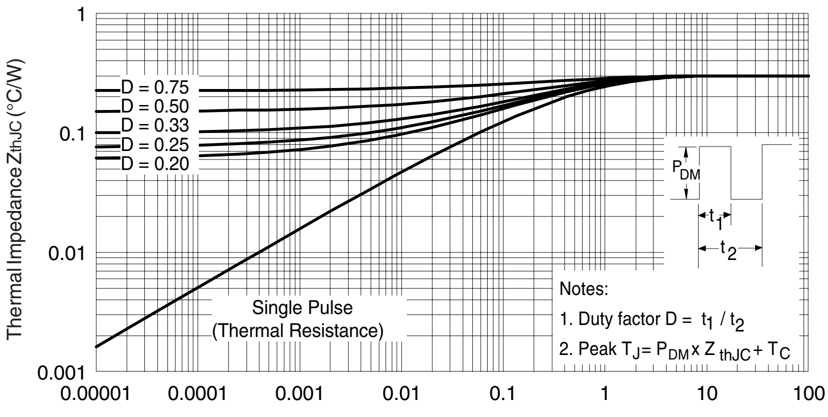


Fig. 4 - Max. Thermal Impedance Z_{thJC} Characteristics

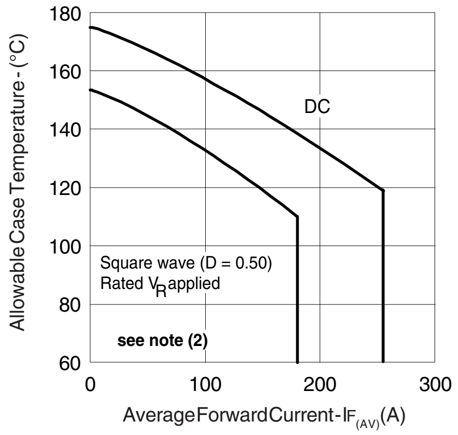


Fig. 5 - Max. Allowable Case Temperature Vs. Average Forward Current

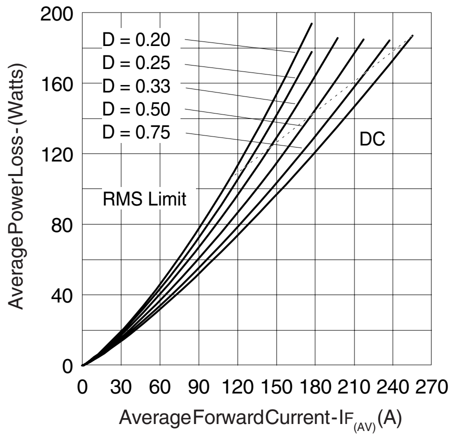


Fig. 6 - Forward Power Loss Characteristics

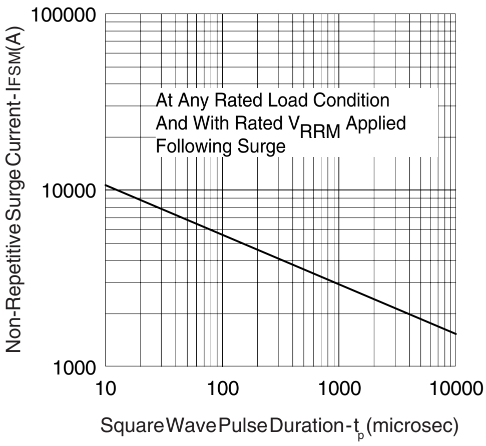


Fig. 7 - Max. Non-Repetitive Surge Current

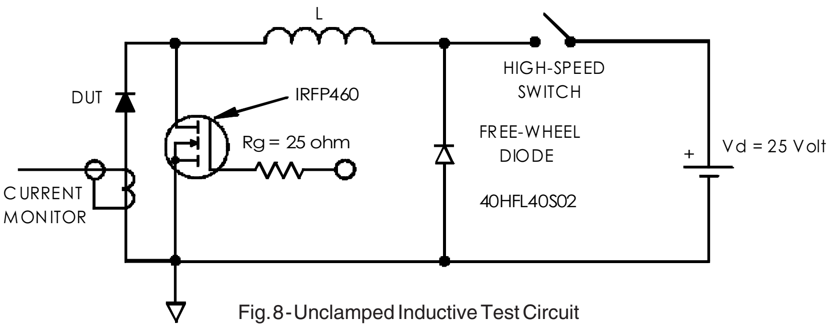


Fig. 8 - Unclamped Inductive Test Circuit

(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} = rated V_R

International Rectifier

WORLD HEADQUARTERS: 233 Kansas St., El Segundo, California 90245 U.S.A. Tel: (310) 322 3331. Fax: (310) 322 3332.
EUROPEAN HEADQUARTERS: Hurst Green, Oxted, Surrey RH8 9BB, U.K. Tel: ++ 44 1883 732020. Fax: ++ 44 1883 733408.
IR CANADA: 15 Lincoln Court, Brampton, Markham, Ontario L6T3Z2. Tel: (905) 453 2200. Fax: (905) 475 8801.
IR GERMANY: Saalburgstrasse 157, 61350 Bad Homburg. Tel: ++ 49 6172 96590. Fax: ++ 49 6172 965933.
IR ITALY: Via Liguria 49, 10071 Borgaro, Torino. Tel: ++ 39 11 4510111. Fax: ++ 39 11 4510220.
IR FAR EAST: K&H Bldg., 2F, 30-4 Nishi-Ikebukuro 3-Chome, Toshima-Ku, Tokyo, Japan 171. Tel: 81 3 3983 0086.
IR SOUTHEAST ASIA: 1 Kim Seng Promenade, Great World City West Tower,13-11, Singapore 237994. Tel: ++ 65 838 4630.
IR TAIWAN: 16 Fl. Suite D.207, Sec. 2, Tun Haw South Road, Taipei, 10673, Taiwan. Tel: 886 2 2377 9936.