

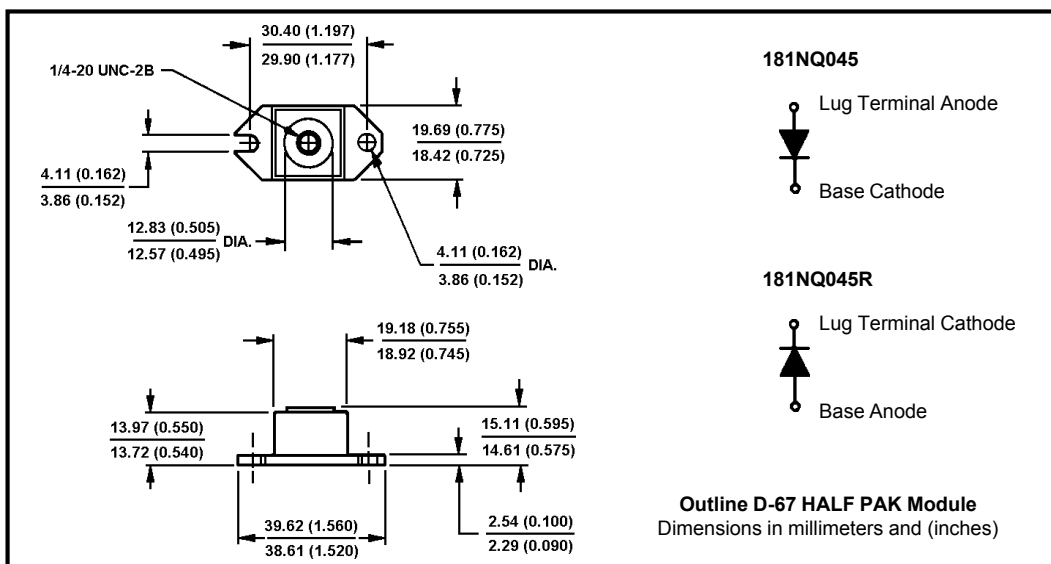
**Major Ratings and Characteristics**

Characteristics	181NQ...	Units
$I_{F(AV)}$ Rectangular waveform	180	A
$V_{RRM}$ range	30 to 45	V
$I_{FSM}$ @tp = 5 $\mu$ s sine	22,000	A
$V_F$ @180Apk, $T_J = 125^\circ\text{C}$	0.56	V
$T_J$ range	-55 to 175	$^\circ\text{C}$

**Description/ Features**

The 181NQ 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 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
- Very low forward voltage drop
- High frequency operation
- Guard ring for enhanced ruggedness and long term



## 181NQ...(R) Series

Bulletin PD-2.293 rev. B 05/02

International  
**IRF** Rectifier

### Voltage Ratings

Part number	181NQ030	181NQ035	181NQ040	181NQ045
$V_R$ Max. DC Reverse Voltage (V)	30	35	40	45
$V_{RWM}$ Max. Working Peak Reverse Voltage (V)				

### Absolute Maximum Ratings

Parameters	181NQ	Units	Conditions
$I_{F(AV)}$ Max. Average Forward Current * See Fig. 5	180	A	50% duty cycle @ $T_C = 125^\circ\text{C}$ , rectangular wave form
$I_{FSM}$ Max. Peak One Cycle Non-Repetitive Surge Current * See Fig. 7	22,000	A	Following any rated load condition and with rated $V_{RWM}$ applied
	2500		
$E_{AS}$ Non-Repetitive Avalanche Energy	243	mJ	$T_J = 25^\circ\text{C}$ , $I_{AS} = 36$ Amps, $L = 0.38$ mH
$I_{AR}$ Repetitive Avalanche Current	36	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	181NQ	Units	Conditions
$V_{FM}$ Max. Forward Voltage Drop (1) * See Fig. 1	0.66	V	@ 180A $T_J = 25^\circ\text{C}$
	0.80	V	@ 360A
	0.56	V	@ 180A $T_J = 125^\circ\text{C}$
	0.69	V	@ 360A
$I_{RM}$ Max. Reverse Leakage Current (1) * See Fig. 2	15	mA	$T_J = 25^\circ\text{C}$
	135	mA	$T_J = 125^\circ\text{C}$ $V_R = \text{rated } V_R$
$C_T$ Max. Junction Capacitance	7800	pF	$V_R = 5V_{DC}$ , (test signal range 100Khz to 1Mhz) $25^\circ\text{C}$
$L_S$ Typical Series Inductance	6.0	nH	From the 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	181NQ	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	0.30	$^\circ\text{C/W}$	DC operation * See Fig. 4	
$R_{thCS}$ Typical Thermal Resistance, Case to Heatsink	0.10	$^\circ\text{C/W}$	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			

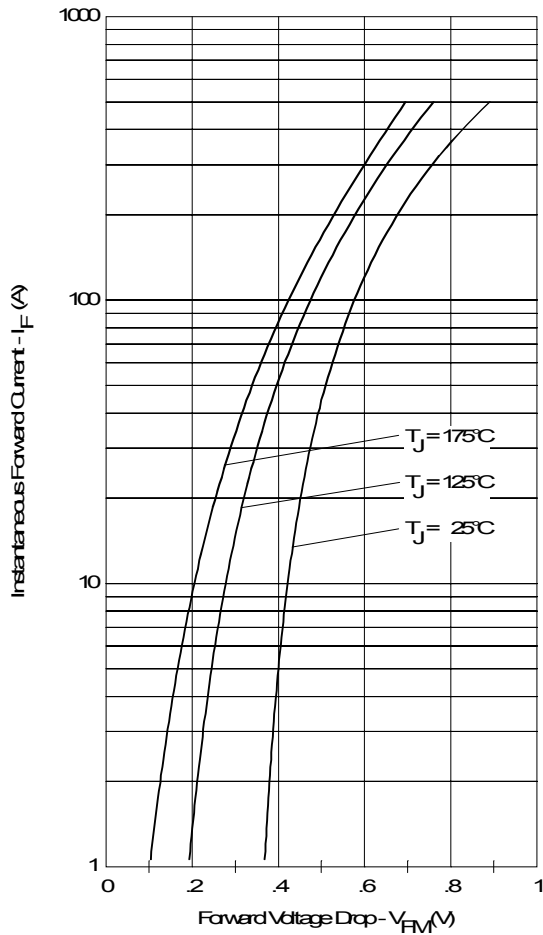


Fig. 1 - Maximum Forward Voltage Drop Characteristics

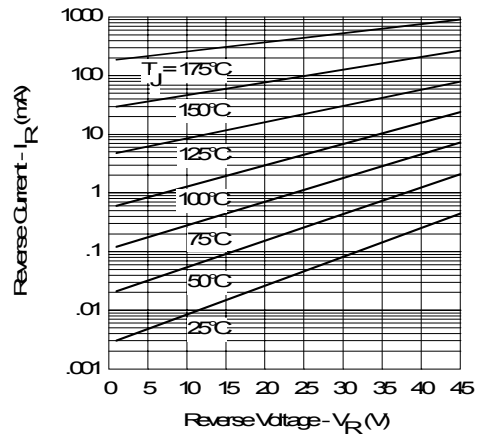


Fig. 2 - Typical Values of Reverse Current Vs. Reverse Voltage

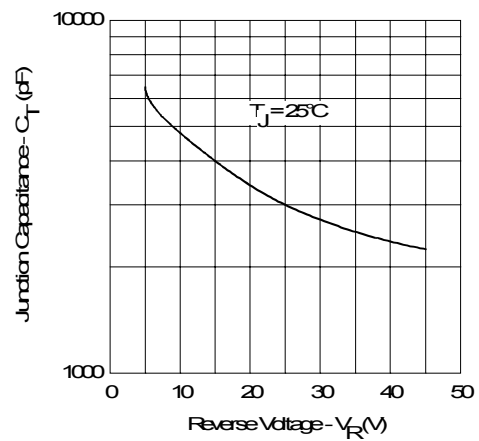


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage

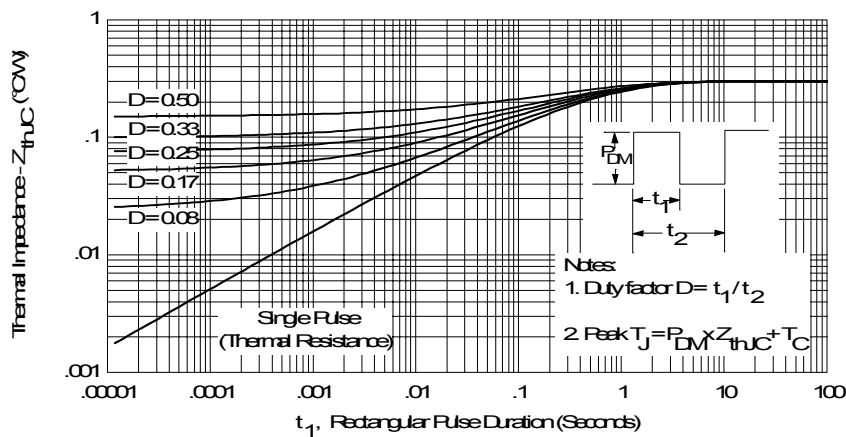


Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics

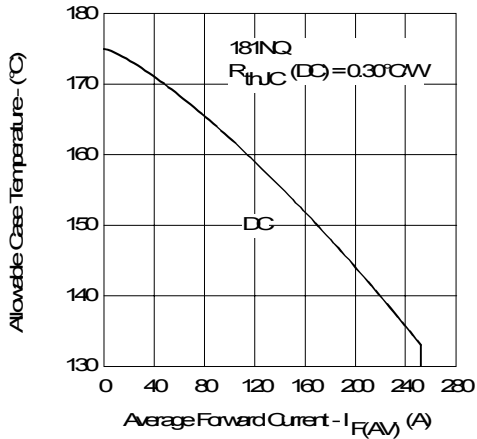


Fig. 5 - Maximum Allowable Case Temperature Vs. Average Forward Current

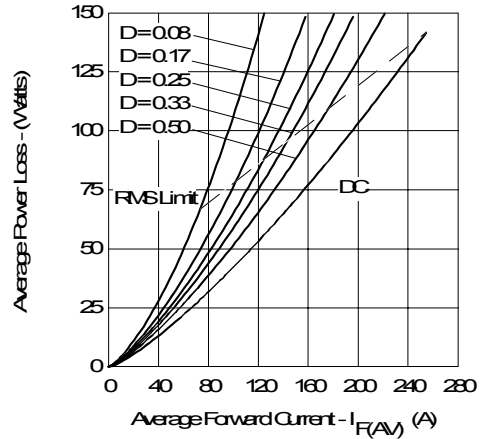


Fig. 6 - Forward Power Loss Characteristics

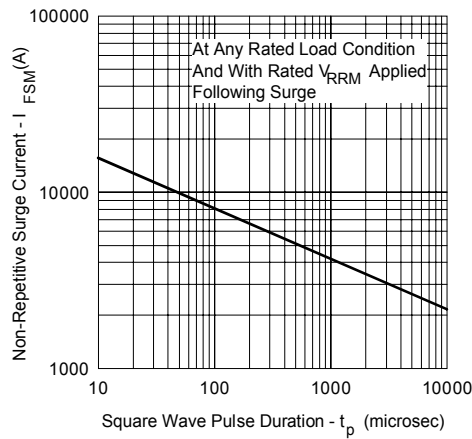


Fig. 7 - Maximum Non-Repetitive Surge Current

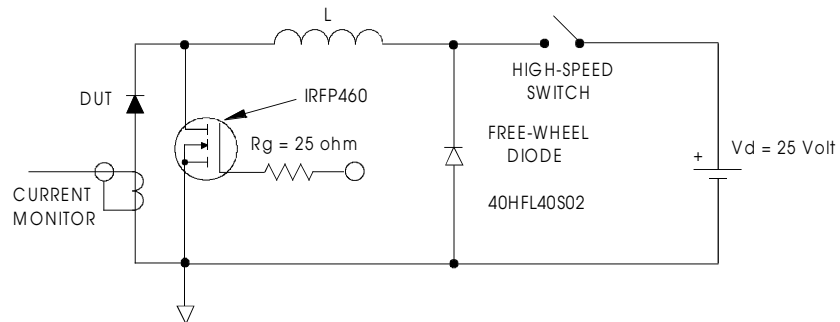


Fig. 8 - Unclamped Inductive Test Circuit

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

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