

Major Ratings and Characteristics

Characteristics	Values	Units
$I_{F(AV)}$ Rectangular waveform	120	A
V_{RRM}	100	V
I_{FSM} @tp = 5 μ s sine	12800	A
V_F @120Apk, $T_J=125^\circ\text{C}$	0.73	V
T_J range	-55 to 175	$^\circ\text{C}$

Description/ Features

The 123NQ.. 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 $^\circ\text{C}$ junction temperature. Typical applications are in high current switching power supplies, plating power supplies, UPS systems, converters, free-wheeling diodes, welding, and reverse battery protection.

- 175 $^\circ\text{C}$ T_J operation
- Low forward voltage drop
- High frequency operation
- Guard ring for enhanced ruggedness and long term reliability
- Lead-Free

Case Styles



HALF-PAK (D-67)

Voltage Ratings

Part number	123NQ100PbF
V_R Max. DC Reverse Voltage (V)	100
V_{RWM} Max. Working Peak Reverse Voltage (V)	

Absolute Maximum Ratings

Parameters	123NQ	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	12800	A	Following any rated load condition and with rated V_{RRM} applied
	1800		
E_{AS} Non-Repetitive Avalanche Energy	15	mJ	$T_J = 25^\circ\text{C}$, $I_{AS} = 5.5$ Amps, $L = 1$ mH
I_{AR} Repetitive Avalanche Current	1	A	Current decaying linearly to zero in 1 μsec Frequency limited by T_J max. $V_A = 1.5 \times V_R$ typical

Electrical Specifications

Parameters	123NQ	Units	Conditions
V_{FM} Max. Forward Voltage Drop * See Fig. 1 (1)	0.91	V	@ 120A $T_J = 25^\circ\text{C}$
	1.26	V	@ 240A
	0.73	V	@ 120A $T_J = 125^\circ\text{C}$
	0.9	V	@ 240A
I_{RM} Max. Reverse Leakage Current * See Fig. 2	3	mA	$T_J = 25^\circ\text{C}$
	40	mA	$T_J = 125^\circ\text{C}$ $V_R = \text{rated } V_R$
C_T Max. Junction Capacitance	2650	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 500 μs

Thermal-Mechanical Specifications

Parameters	123NQ	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	0.38	$^\circ\text{C}/\text{W}$	DC operation * See Fig. 4
R_{thCS} Typical Thermal Resistance, Case to Heatsink	0.05	$^\circ\text{C}/\text{W}$	Mounting surface, smooth and greased
wt Approximate Weight	30 (1.06)	g (oz.)	
T Mounting Torque Terminal Torque	Min.	3 (26.5)	Non-lubricated threads
	Max.	4 (35.4)	
	Min.	3.4 (30)	
	Max.	5 (44.2)	
Case Style	HALF PAK Module		

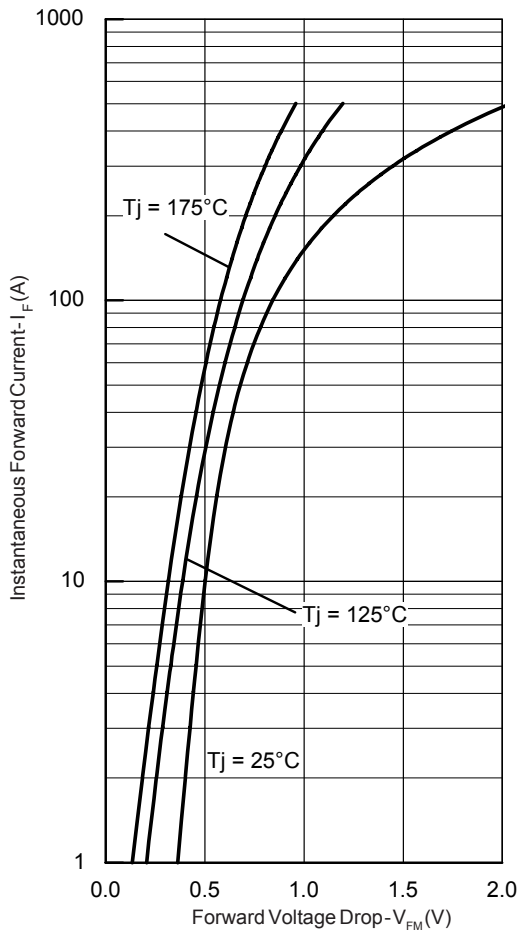


Fig. 1 - Max. Forward Voltage Drop Characteristics

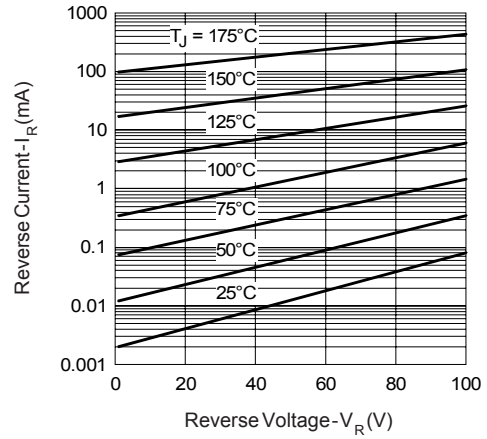


Fig. 2 - Typical Values Of Reverse Current Vs. Reverse Voltage

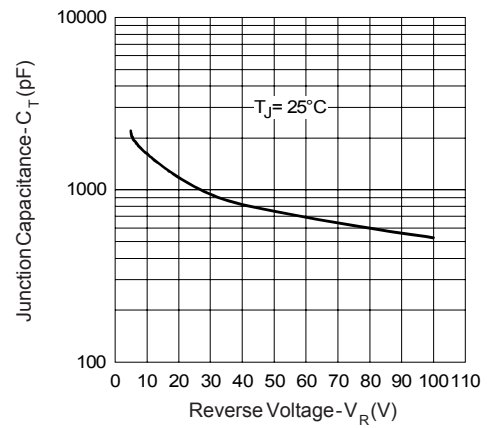


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage

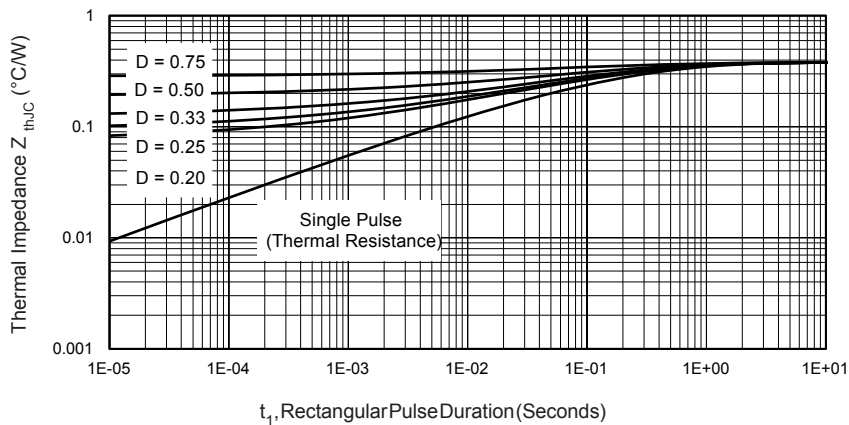


Fig. 4 - Max. Thermal Impedance Z_{thJC} Characteristics

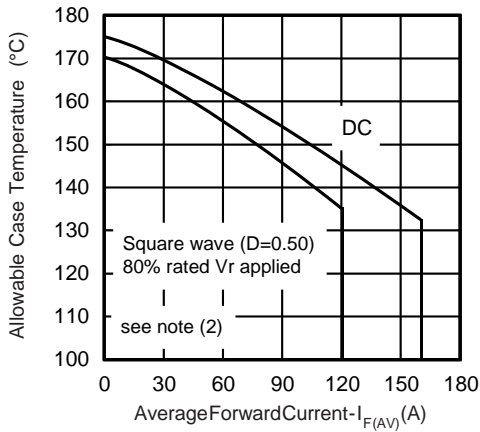


Fig. 5- Max. Allowable Case Temperature Vs. Average Forward Current

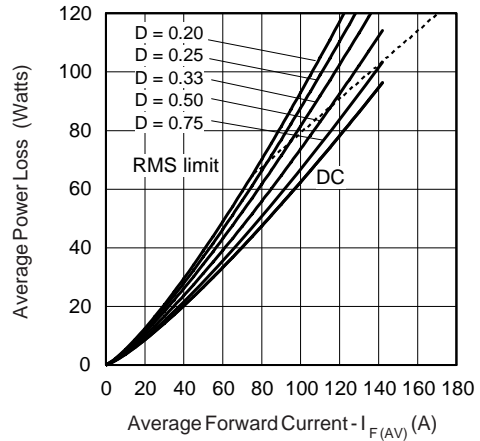


Fig. 6- Forward Power Loss Characteristics

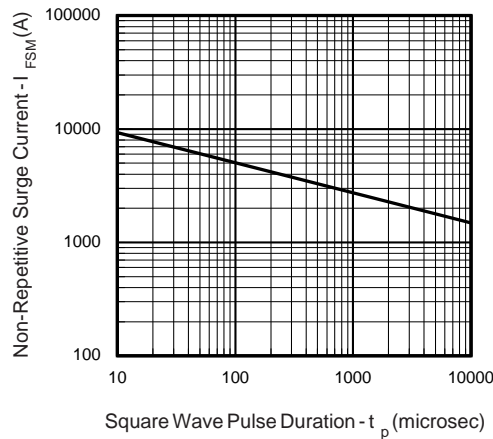


Fig. 7- Max. Non-Repetitive Surge Current

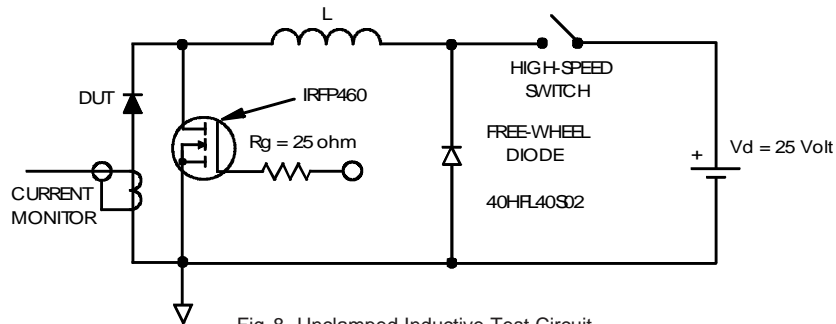


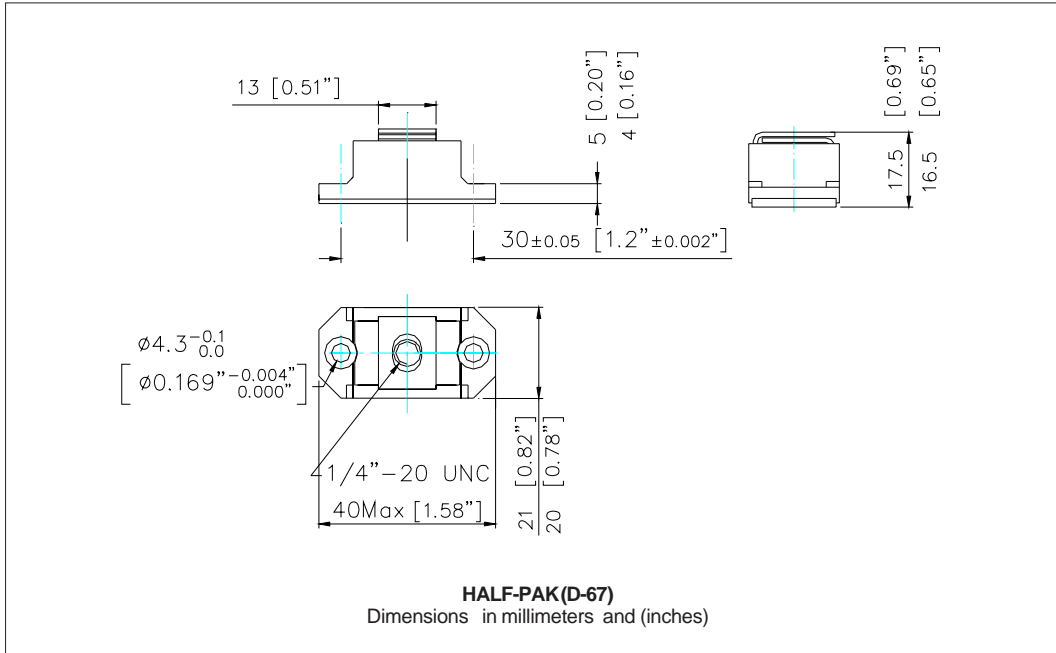
Fig. 8 - Unclamped Inductive Test Circuit

(2) Formula used: $T_c = T_j - (P_d + P_{d_{REV}}) \times R_{thJC}$;

$P_d = \text{Forward Power Loss} = I_{F(AV)} \times V_{FM} @ (I_{F(AV)}/D)$ (see Fig. 6);

$P_{d_{REV}} = \text{Inverse Power Loss} = V_{R1} \times I_{R1} (1 - D)$; $I_{R1} @ V_{R1} = \text{rated } V_R$

Outline Table



Ordering Information Table

Device Code	12	3	N	Q	100	PbF
	①	②	③	④	⑤	⑥
	1	-	Average Current Rating (x 10)			
	2	-	Product Silicon Identification			
	3	-	N = Not Isolated			
	4	-	Q = Schottky Rectifier Diode			
	5	-	Voltage Rating (100 = 100V)			
	6	-	Lead-Free			

123NQ100PbF

Bulletin PD-21144 rev. A 10/06

International
IOR Rectifier

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

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