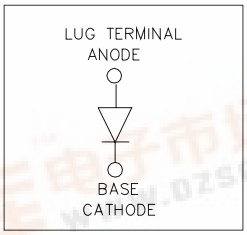
Bulletin PD-21144 rev. A 10/06

International
IOR Rectifier

123NQ100PbF

SCHOTTKY RECTIFIER

120Amp



Major Ratings and Characteristics

Characteristics		Values	Units
$I_{F(AV)}$	Rectangular waveform	120	A
V_{RRM}		100	V
I_{FSM}	@tp = 5 µs sine	12800	A
V_F	@120Apk, T_J=125°C	0.73	V
T_J	range	-55 to 175	°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 °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 °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 °C, rectangular wave form	
I_{FSM}	Max. Peak One Cycle Non-Repetitive Surge Current * See Fig. 7	12800	A	5µs Sine or 3µs Rect. pulse	Following any rated load condition and with rated V_{RRM} applied
		1800		10ms Sine or 6ms Rect. pulse	
E_{AS}	Non-Repetitive Avalanche Energy	15	mJ	T_J = 25 °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 x 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 °C
		1.26	V	@ 240A	
		0.73	V	@ 120A	T_J = 125 °C
		0.9	V	@ 240A	
I_{RM}	Max. Reverse Leakage Current * See Fig. 2	3	mA	T_J = 25 °C	V_R = rated V_R
		40	mA	T_J = 125 °C	
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 500µs

Thermal-Mechanical Specifications

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

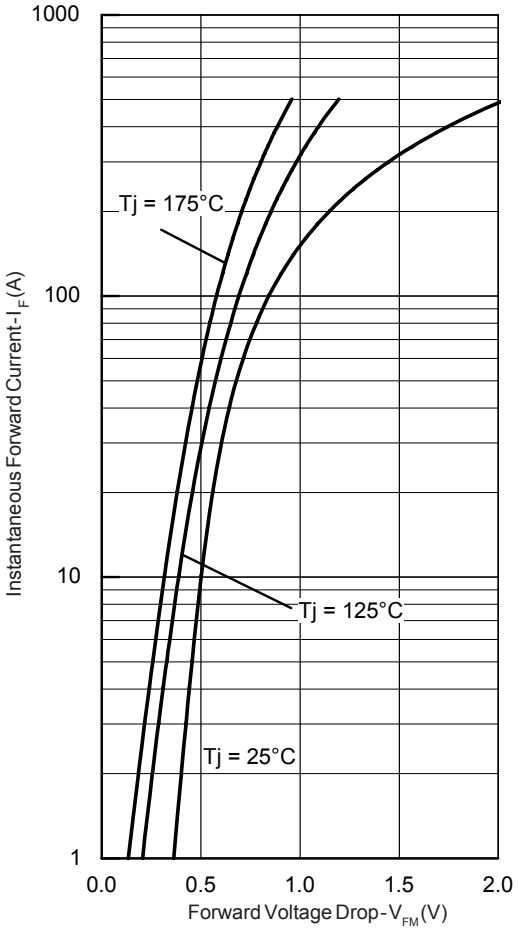


Fig. 1 - Max. Forward Voltage Drop Characteristics

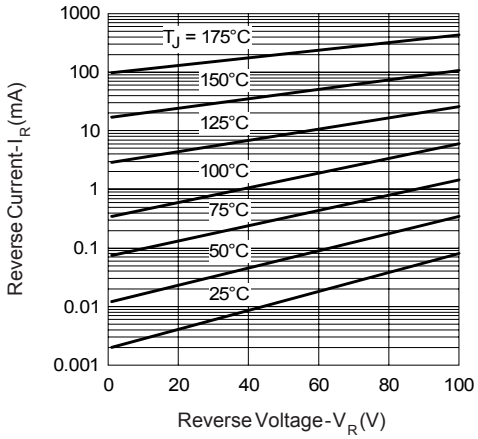


Fig. 2 - Typical Values Of Reverse Current Vs. Reverse Voltage

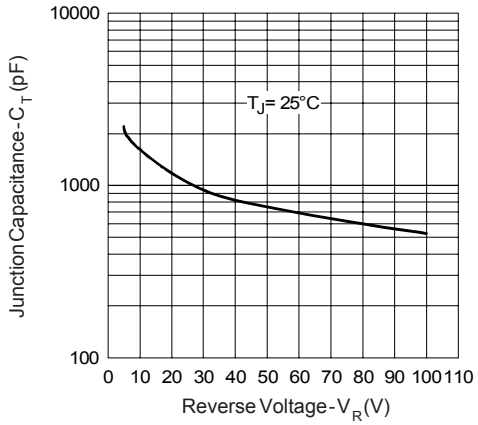


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage

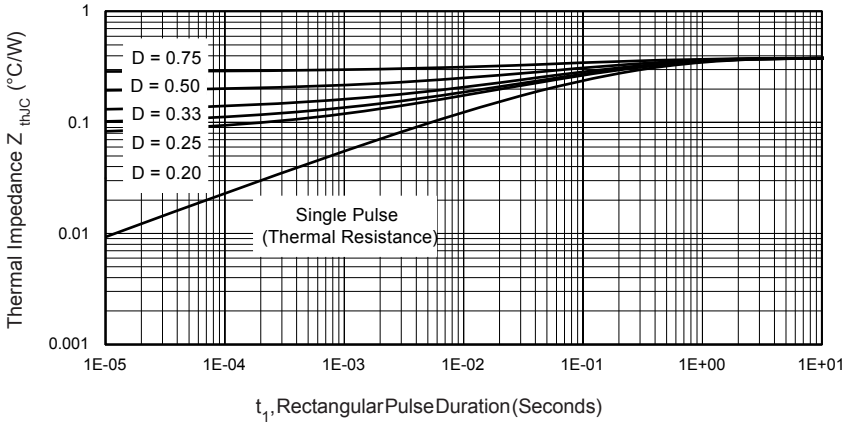


Fig. 4 - Max. Thermal Impedance Z_{thJC} Characteristics

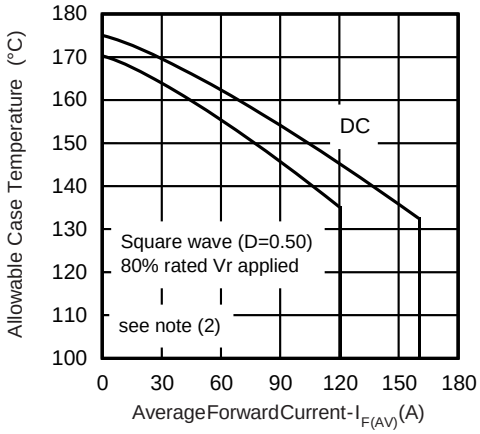


Fig. 5 - Max. Allowable Case Temperature Vs. Average Forward Current

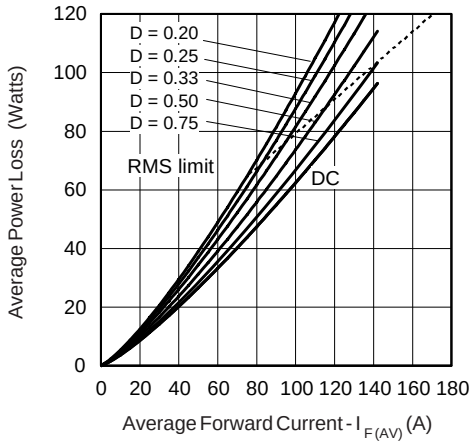


Fig. 6 - Forward Power Loss Characteristics

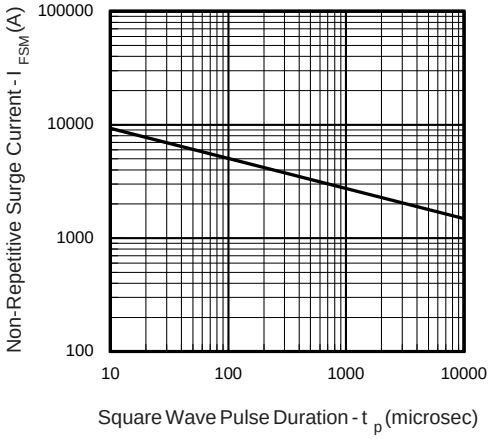


Fig. 7 - Max. Non-Repetitive Surge Current

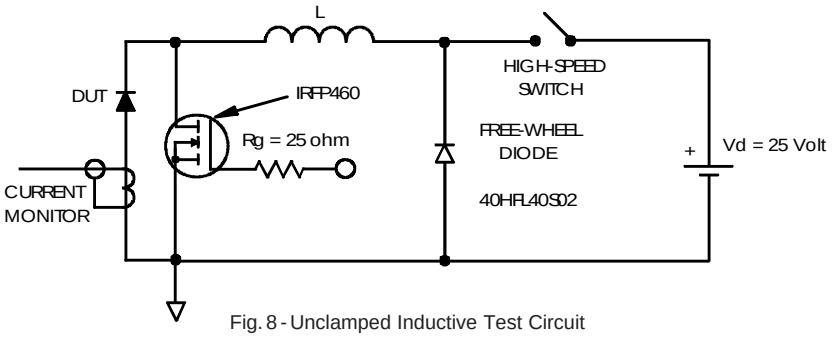
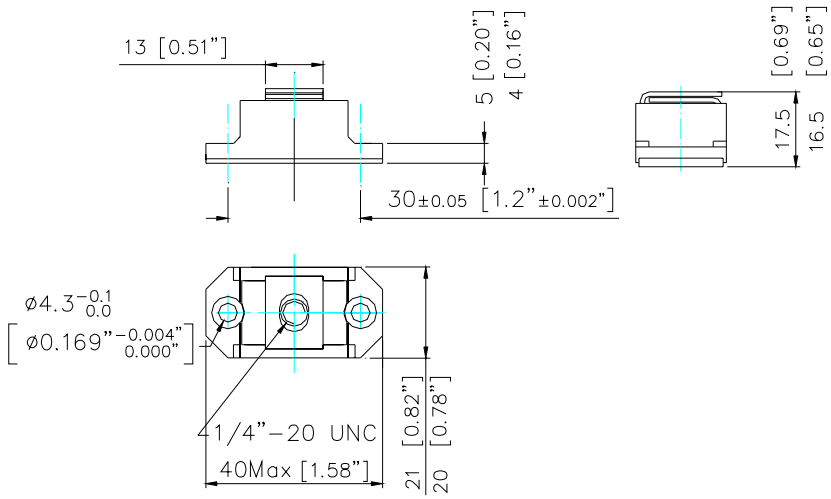


Fig. 8 - Unclamped Inductive Test Circuit

(2) Formula used: $T_C = T_J - (Pd + Pd_{REV}) \times R_{thJC}$;
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

Outline Table



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

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

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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