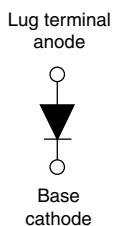


# High Performance Schottky Rectifier, 120 A


**HALF-PAK (D-67)**


## FEATURES

- 175 °C  $T_J$  operation
- Low forward voltage drop
- High frequency operation
- Guard ring for enhanced ruggedness and long term reliability
- Designed and qualified for industrial level
- Material categorization: For definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)


**RoHS**  
COMPLIANT

## DESCRIPTION

The VS-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, freewheeling diodes, welding, and reverse battery protection.

## PRODUCT SUMMARY

$I_{F(AV)}$	120 A
$V_R$	100 V
Package	HALF-PAK (D-67)
Circuit	Single diode

## MAJOR RATINGS AND CHARACTERISTICS

SYMBOL	CHARACTERISTICS	VALUES	UNITS
$I_{F(AV)}$	Rectangular waveform	120	A
$V_{RRM}$		100	V
$I_{FSM}$	$t_p = 5 \mu s$ sine	12 800	A
$V_F$	120 A <sub>pk</sub> , $T_J = 125^\circ C$	0.73	V
$T_J$	Range	-55 to 175	°C

## VOLTAGE RATINGS

PARAMETER	SYMBOL	VS-123NQ100PbF	UNITS
Maximum DC reverse voltage	$V_R$	100	V
Maximum working peak reverse voltage	$V_{RWM}$		

## ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum average forward current See fig. 5	$I_{F(AV)}$	50 % duty cycle at $T_C = 133^\circ C$ , rectangular waveform	120	A
Maximum peak one cycle non-repetitive surge current See fig. 7	$I_{FSM}$	5 $\mu s$ sine or 3 $\mu s$ rect. pulse	12 800	A
		10 ms sine or 6 ms rect. pulse	1800	
Non-repetitive avalanche energy	$E_{AS}$	$T_J = 25^\circ C$ , $I_{AS} = 5.5 A$ , $L = 1 mH$	15	mJ
Repetitive avalanche current	$I_{AR}$	Current decaying linearly to zero in 1 $\mu s$ Frequency limited by $T_J$ maximum $V_A = 1.5 \times V_R$ typical	1	A

**ELECTRICAL SPECIFICATIONS**

PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum forward voltage drop See fig. 1	$V_{FM}^{(1)}$	120 A	0.91	V
		240 A	1.26	
		120 A	0.73	
		240 A	0.9	
Maximum reverse leakage current See fig. 2	$I_{RM}$	$T_J = 25\text{ }^{\circ}\text{C}$	3	mA
		$T_J = 125\text{ }^{\circ}\text{C}$	40	
Maximum junction capacitance	$C_T$	$V_R = 5\text{ V}_{DC}$ (test signal range 100 kHz to 1 MHz) $25\text{ }^{\circ}\text{C}$	2650	pF
Typical series inductance	$L_S$	From top of terminal hole to mounting plane	7.0	nH
Maximum voltage rate of change	$dV/dt$	Rated $V_R$	10 000	V/ $\mu$ s

**Note**(1) Pulse width = 500  $\mu$ s**THERMAL - MECHANICAL SPECIFICATIONS**

PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum junction and storage temperature range	T <sub>J</sub> , T <sub>Stg</sub>		-55 to 175	°C
Maximum thermal resistance, junction to case	R <sub>thJC</sub>	DC operation See fig. 4	0.38	°C/W
Typical thermal resistance, case to heatsink	R <sub>thCS</sub>	Mounting surface, smooth and greased	0.05	
Approximate weight			30	g
			1.06	oz.
Mounting torque	minimum	Non-lubricated threads	3 (26.5)	N · m (lbf · in)
	maximum		4 (35.4)	
Terminal torque	minimum		3.4 (30)	
	maximum		5 (44.2)	
Case style			HALF-PAK module	

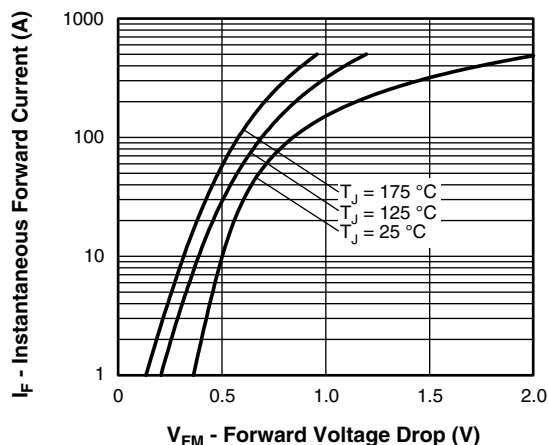


Fig. 1 - Maximum Forward Voltage Drop Characteristics

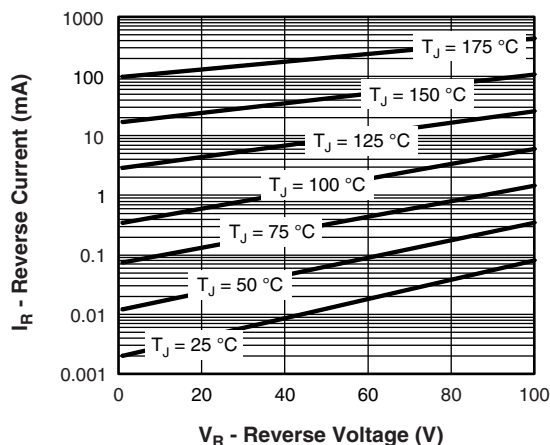


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

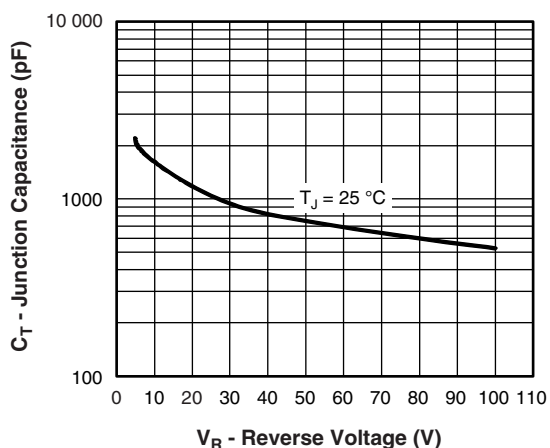


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

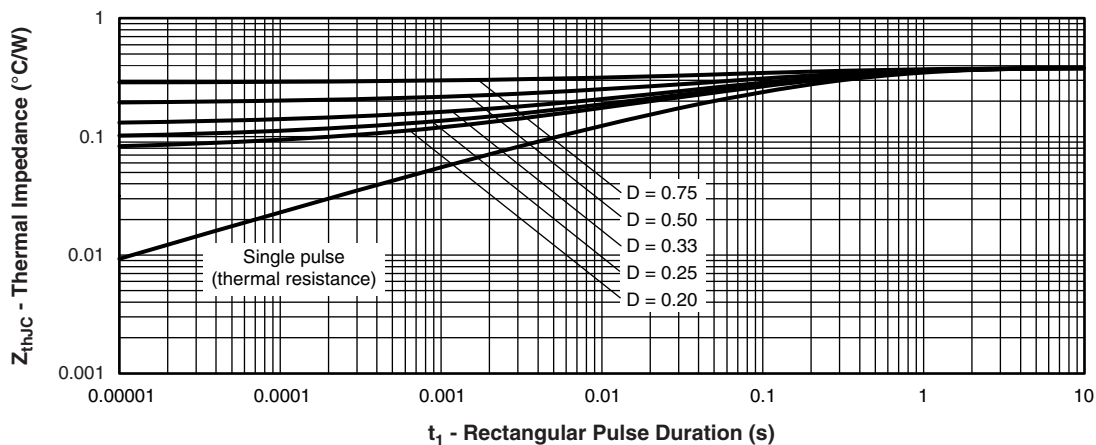
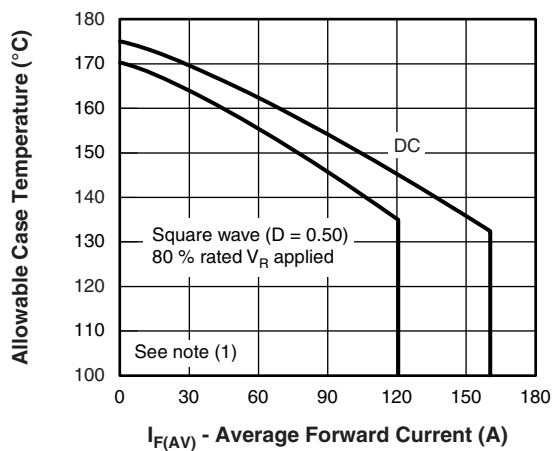

Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics


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

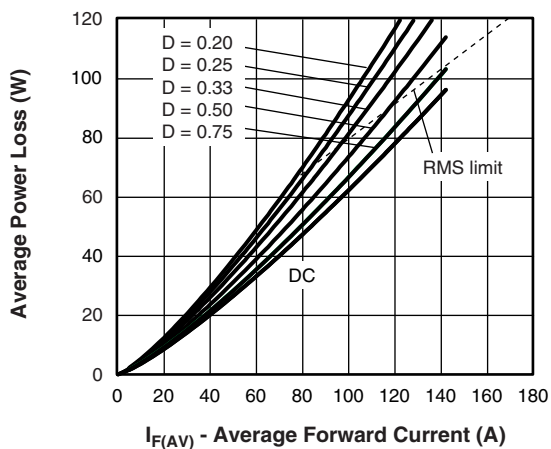


Fig. 6 - Forward Power Loss Characteristics

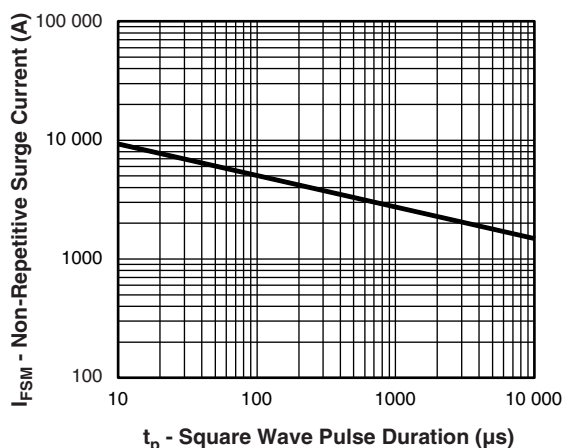


Fig. 7 - Maximum Non-Repetitive Surge Current

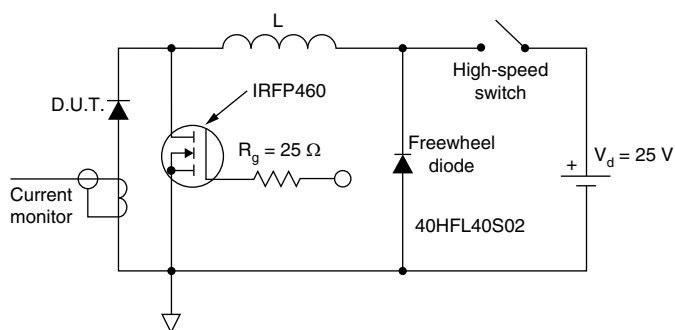


Fig. 8 - Unclamped Inductive Test Circuit

### Note

- (1) Formula used:  $T_C = T_J - (P_d + P_{dREV}) \times R_{thJC}$ ;  
 $P_d$  = Forward power loss =  $I_{F(AV)} \times V_{FM}$  at  $(I_{F(AV)}/D)$  (see fig. 6);  
 $P_{dREV}$  = Inverse power loss =  $V_{R1} \times I_R (1 - D)$ ;  $I_R$  at  $V_{R1}$  = Rated  $V_R$

## ORDERING INFORMATION TABLE

Device code	VS-	12	3	N	Q	100	PbF
	①	②	③	④	⑤	⑥	⑦
①	- Vishay Semiconductors product						
②	- Average current rating (x 10)						
③	- Product silicon identification						
④	- N = Not isolated						
⑤	- Q = Schottky rectifier diode						
⑥	- Voltage rating (100 = 100 V)						
⑦	- Lead (Pb)-free						

### LINKS TO RELATED DOCUMENTS

Dimensions	<a href="http://www.vishay.com/doc?95020">www.vishay.com/doc?95020</a>
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## D-67 HALF-PAK

**DIMENSIONS** in millimeters (inches)





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