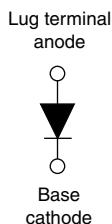


## High Performance Schottky Rectifiers, 120 A


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

Lug terminal  
anode

Base  
cathode

### FEATURES

- 125 °C  $T_J$  operation ( $V_R < 5$  V)
- Low forward voltage drop
- High frequency operation
- Guard ring for enhanced ruggedness and long term reliability
- Designed and qualified for industrial level
- UL approved file E222165 
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)


**RoHS**  
COMPLIANT

### DESCRIPTION

The VS-125NQ.. 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 125 °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.

### PRIMARY CHARACTERISTICS

$I_{F(AV)}$	120 A
$V_R$	15 V
Package	HALF-PAK (D-67)
Circuit configuration	Single diode

### MAJOR RATINGS AND CHARACTERISTICS

SYMBOL	CHARACTERISTICS	VALUES	UNITS
$I_{F(AV)}$	Rectangular waveform	120	A
$V_{RRM}$		15	V
$I_{FSM}$	$t_p = 5 \mu s$ sine	10 800	A
$V_F$	120 A <sub>pk</sub> , $T_J = 125$ °C	0.37	V
$T_J$	Range	-55 to +125	°C

### VOLTAGE RATINGS

PARAMETER	SYMBOL	VS-125NQ015PbF	UNITS
Maximum DC reverse voltage	$V_R$	15	V
Maximum working peak reverse voltage	$V_{RWM}$	25	

### ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum average forward current See fig. 5	$I_{F(AV)}$	50 % duty cycle at $T_C = 74$ °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	10 800	
		10 ms sine or 6 ms rect. pulse	1700	
Non-repetitive avalanche energy	$E_{AS}$	$T_J = 25$ °C, $I_{AS} = 5$ A, $L = 1$ mH	12	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	2	A

**ELECTRICAL SPECIFICATIONS**

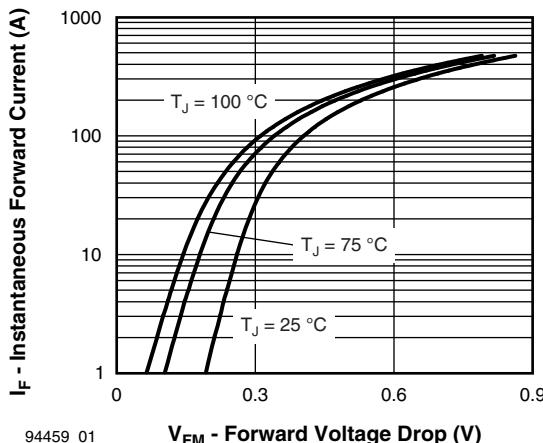
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS	
Maximum forward voltage drop per leg See fig. 1	$V_{FM}^{(1)}$	120 A	$T_J = 25 \text{ }^\circ\text{C}$	0.43	V	
		240 A		0.58		
		120 A	$T_J = 75 \text{ }^\circ\text{C}$	0.37		
		240 A		0.52		
Maximum reverse leakage current per leg See fig. 2	$I_{RM}^{(1)}$	$T_J = 25 \text{ }^\circ\text{C}$	$V_R = \text{Rated } V_R$	40	mA	
		$T_J = 100 \text{ }^\circ\text{C}$		2000		
Maximum junction capacitance	$C_T$	$V_R = 5 \text{ V}_\text{DC}$ (test signal range 100 kHz to 1 MHz) $25 \text{ }^\circ\text{C}$			7700 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/μs	

**Note**

(1) Pulse width < 300 μs, duty cycle < 2 %

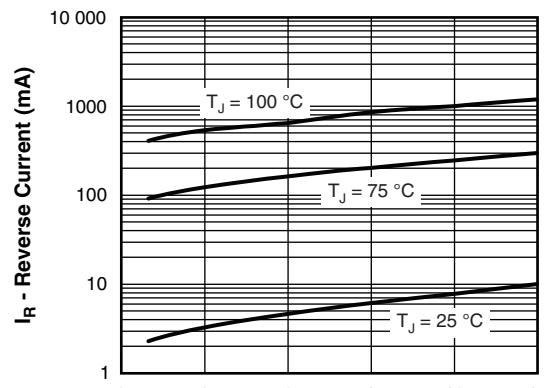
**THERMAL - MECHANICAL SPECIFICATIONS**

PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum junction temperature range	$T_J$			-55 to 125	°C
Maximum storage temperature range	$T_{Stg}$			-55 to 150	
Maximum thermal resistance, junction to case	$R_{thJC}$	DC operation See fig. 4		0.38	°C/W
Typical thermal resistance, case to heatsink	$R_{thCS}$	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	



94459\_01  **$V_{FM}$  - Forward Voltage Drop (V)**

Fig. 1 - Maximum Forward Voltage Drop Characteristics



94459\_02  **$V_R$  - Reverse Voltage (V)**

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

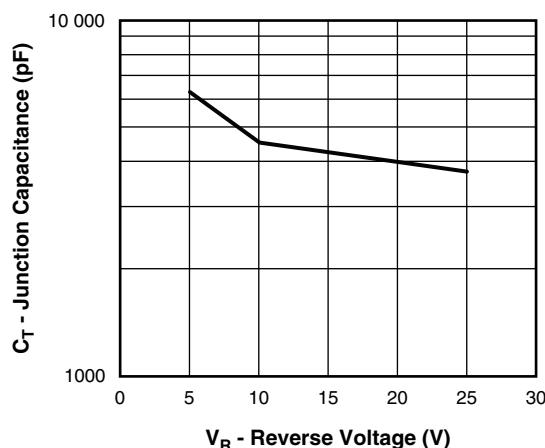


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

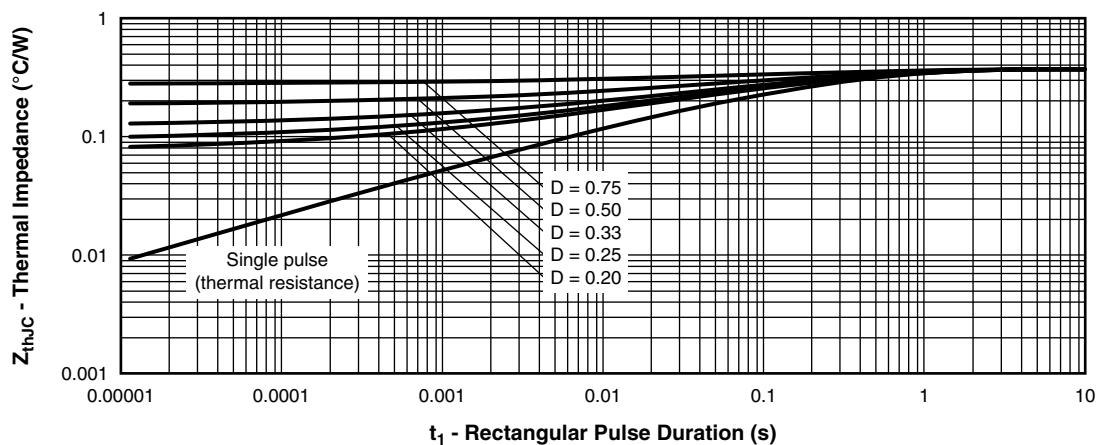


Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics

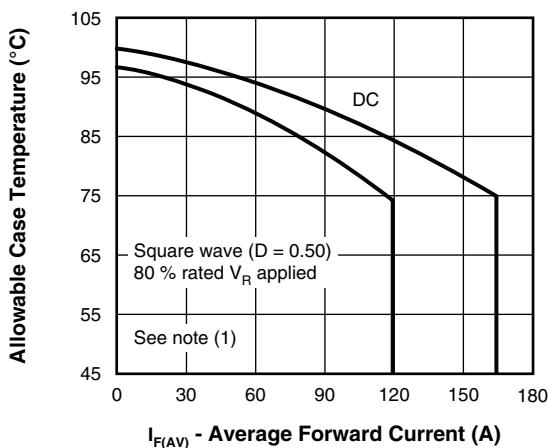


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

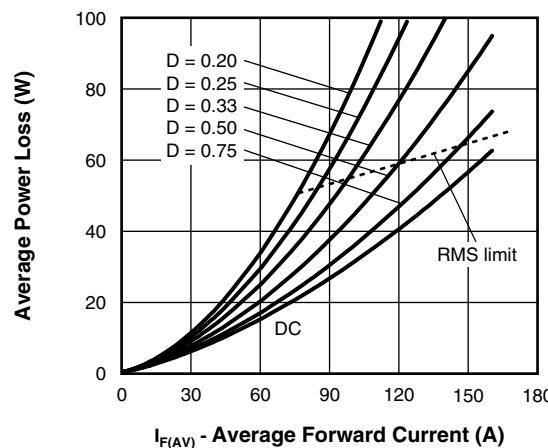


Fig. 6 - Forward Power Loss Characteristics

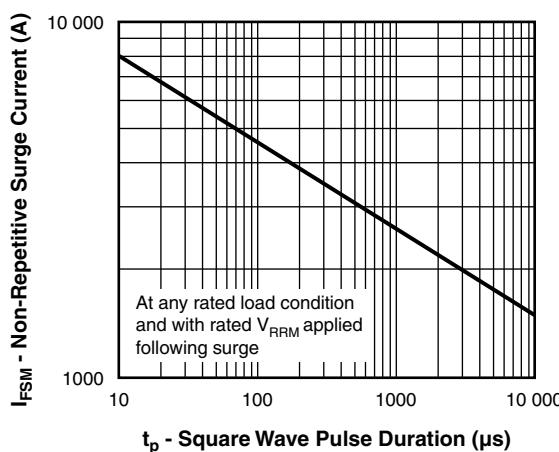


Fig. 7 - Maximum Non-Repetitive Surge Current

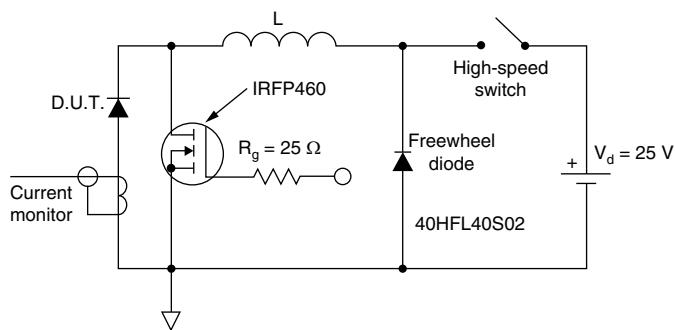


Fig. 8 - Unclamped Inductive Test Circuit

#### Note

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

#### ORDERING INFORMATION TABLE

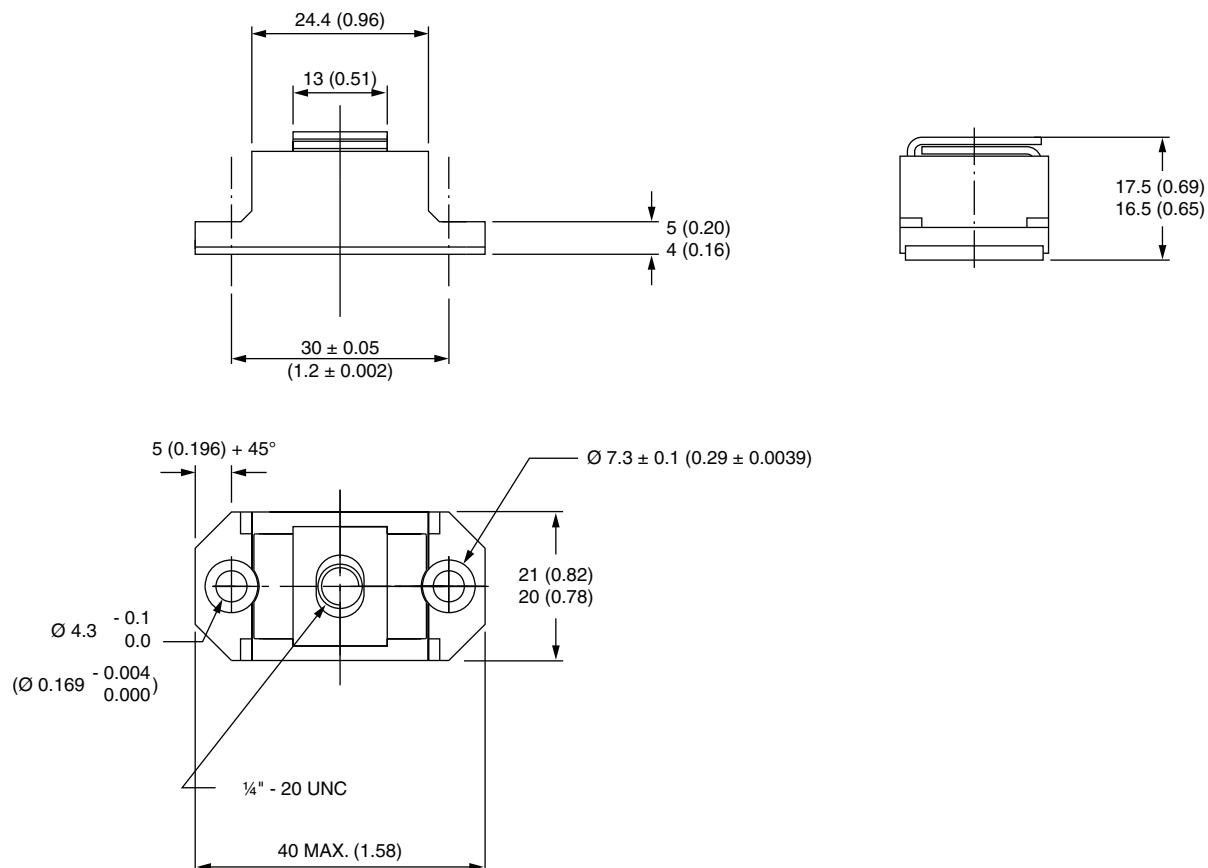
Device code	VS-	12	5	N	Q	015	PbF
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
1 - Vishay Semiconductors product							
2 - Average current rating (x 10)							
3 - Product silicon identification							
4 - N = not isolated							
5 - Q = Schottky rectifier diode							
6 - Voltage rating (015 = 15 V)							
7 - Lead (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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