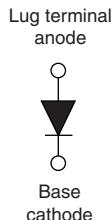


## High Performance Schottky Rectifier, 180 A


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

**RoHS**  
COMPLIANT

### 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
- UL approved file E222165
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)

### DESCRIPTION

The VS-183NQ.. 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.

PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	180 A
$V_R$	100 V
Package	HALF-PAK (D-67)
Circuit configuration	Single diode

MAJOR RATINGS AND CHARACTERISTICS			
SYMBOL	CHARACTERISTICS	VALUES	UNITS
$I_{F(AV)}$	Rectangular waveform	180	A
$V_{RRM}$		100	V
$I_{FSM}$	$t_p = 5 \mu s$ sine	22 000	A
$V_F$	180 A <sub>pk</sub> , $T_J = 125$ °C	0.73	V
$T_J$	Range	-55 to +175	°C

VOLTAGE RATINGS			
PARAMETER	SYMBOL	VS-183NQ100PbF	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 $T_C = 128$ °C, rectangular waveform		240	A	
Maximum peak one cycle non-repetitive surge current See fig. 7	$I_{FSM}$	5 $\mu s$ sine or 3 $\mu s$ rect. pulse	Following any rated load condition and with rated $V_{RRM}$ applied	22 000		
10 ms sine or 6 ms rect. pulse				2500		
Non-repetitive avalanche energy	$E_{AS}$	$T_J = 25$ °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**

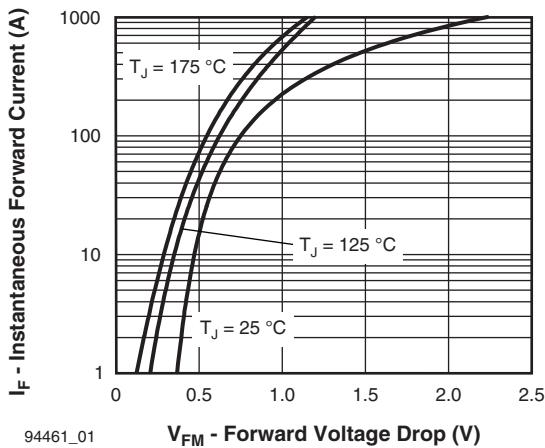
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS	
Maximum forward voltage drop See fig. 1	$V_{FM}^{(1)}$	180 A	$T_J = 25^\circ C$	0.91	V	
		360 A		1.23		
		180 A	$T_J = 125^\circ C$	0.73		
		360 A		0.9		
Maximum reverse leakage current See fig. 2	$I_{RM} (1)$	$T_J = 25^\circ C$	$V_R = \text{Rated } V_R$	4.5	mA	
		$T_J = 125^\circ C$		60		
Maximum junction capacitance	$C_T$	$V_R = 5 V_{DC}$ (test signal range 100 kHz to 1 MHz) $25^\circ C$		4150	pF	
Typical series inductance	$L_S$	From top of terminal hole to mounting plane		6.0	nH	
Maximum voltage rate of change	$dV/dt$	Rated $V_R$		10 000	V/ $\mu$ s	

**Note**

<sup>(1)</sup> Pulse width = 500  $\mu$ s

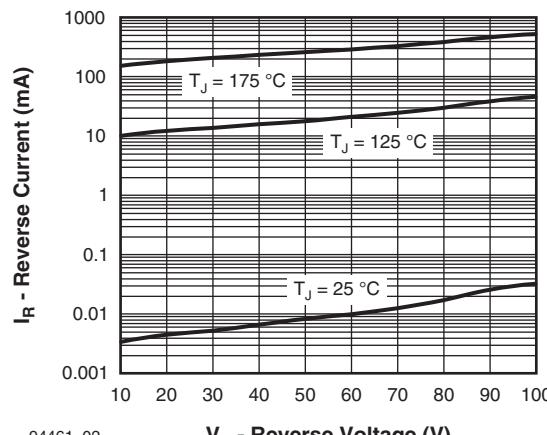
**THERMAL - MECHANICAL SPECIFICATIONS**

PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum junction and storage temperature range	$T_J, T_{Stg}$		-55 to 175	°C
Maximum thermal resistance, junction to case	$R_{thJC}$	DC operation See fig. 4	0.28	°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	



94461\_01  $V_{FM}$  - Forward Voltage Drop (V)

Fig. 1 - Maximum Forward Voltage Drop Characteristics



94461\_02  $V_R$  - Reverse Voltage (V)

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

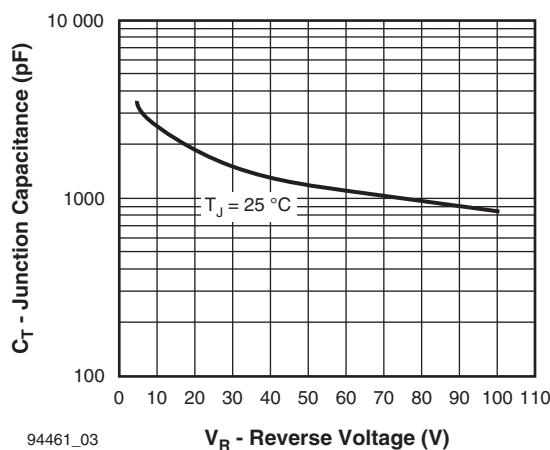


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

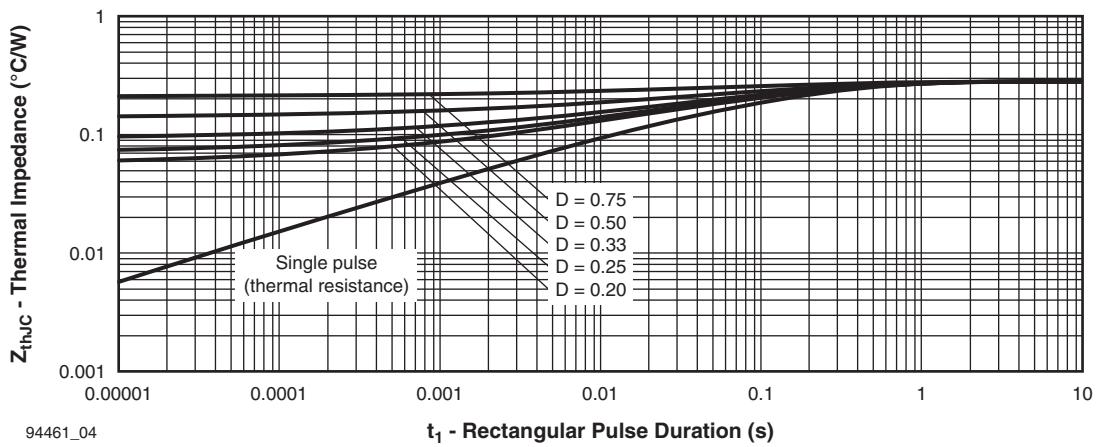


Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics

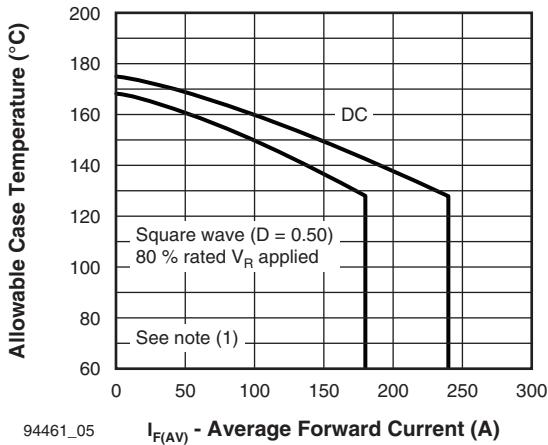


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

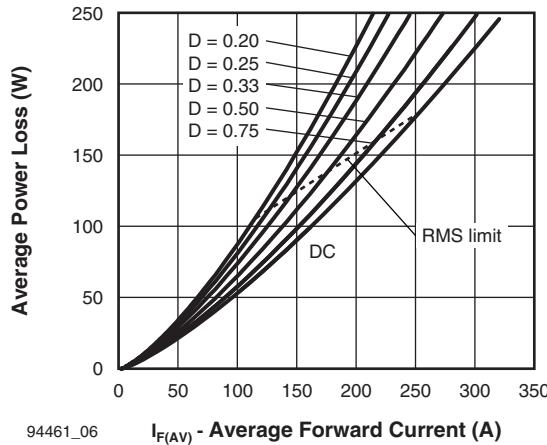


Fig. 6 - Forward Power Loss Characteristics

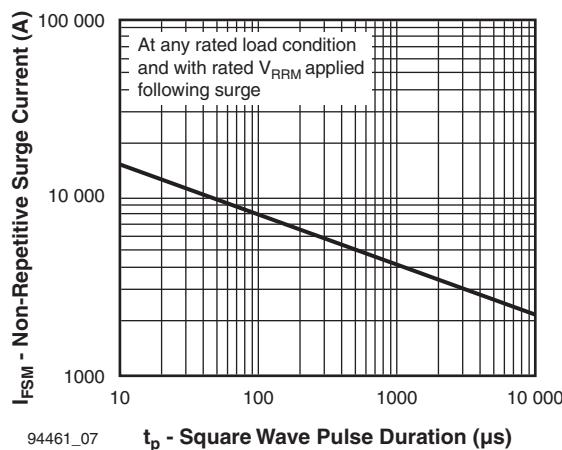


Fig. 7 - Maximum Non-Repetitive Surge Current

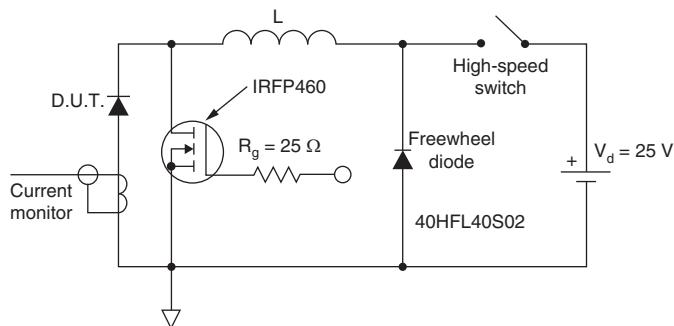


Fig. 8 - Unclamped Inductive Test Circuit

**Note**

(1) Formula used:  $T_C = T_J - (P_d + P_{dREV}) \times R_{thJC}$ ;  
 $P_d$  = 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  $V_R$

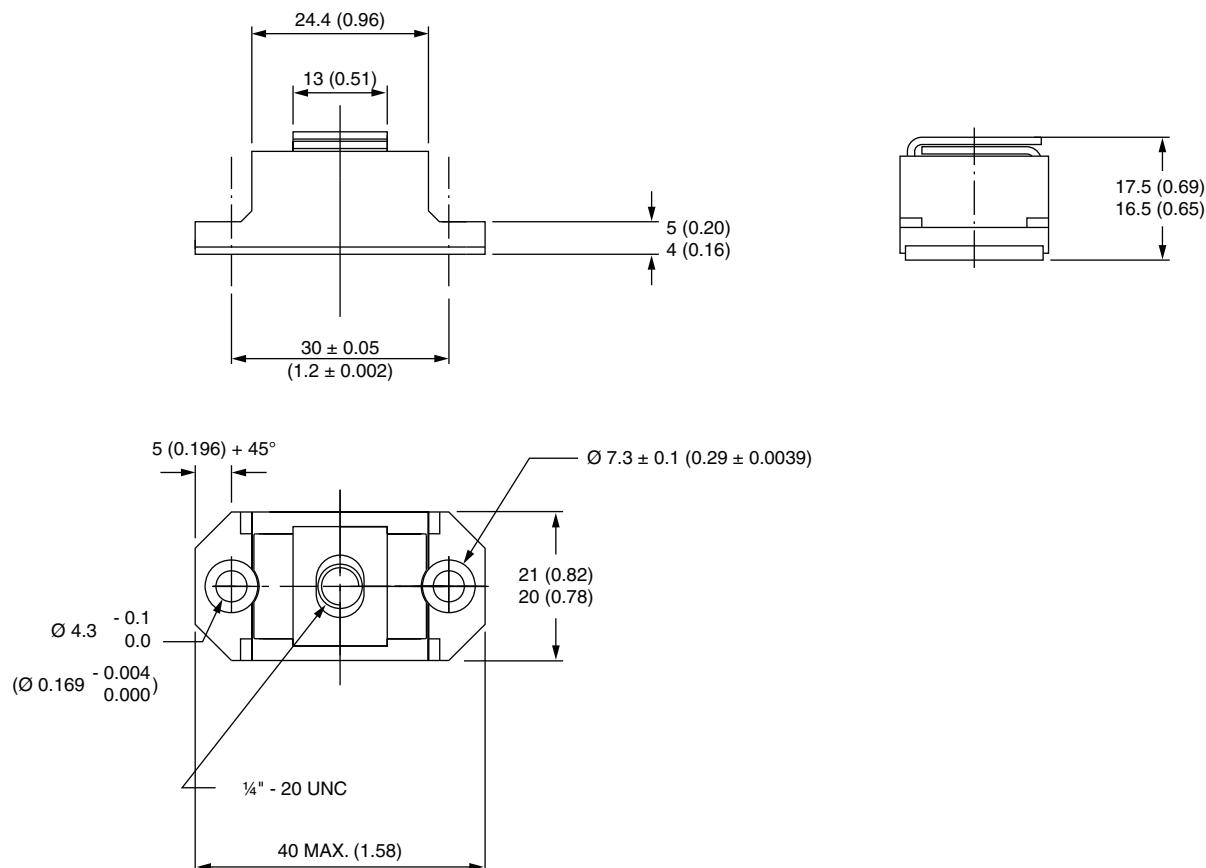
**ORDERING INFORMATION TABLE**

Device code	VS-	18	3	N	Q	100	PbF
	1	2	3	4	5	6	7
	- Vishay Semiconductors product						
	- Average current rating (x 10)						
	- Product silicon identification						
	- N = not isolated						
	- Q = Schottky rectifier diode						
	- Voltage rating (100 = 100 V)						
	- Lead (Pb)-free						

LINKS TO RELATED DOCUMENTS	
Dimensions	<a href="http://www.vishay.com/doc?95020">www.vishay.com/doc?95020</a>

### D-67 HALF-PAK

#### DIMENSIONS in millimeters (inches)



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