

## High Performance Schottky Rectifier, 175 A



PowerTab®



### FEATURES

- 150 °C max. operating junction temperature
- High frequency operation
- Ultralow forward voltage drop
- Continuous high current operation
- Guard ring for enhanced ruggedness and long term reliability
- Screw mounting only
- AEC-Q101 qualified
- PowerTab® package
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)


**RoHS**  
COMPLIANT

PRODUCT SUMMARY	
Package	PowerTab®
$I_{F(AV)}$	175 A
$V_R$	30 V
$V_F$ at $I_F$	0.52 V
$I_{RM}$	650 mA at 125 °C
$T_J$ max.	150 °C
Diode variation	Single die
$E_{AS}$	80 mJ

### DESCRIPTION

The VS-175BGQ030HF4 Schottky rectifier has been optimized for ultralow forward voltage drop specifically for low voltage output in high current AC/DC power supplies. The proprietary barrier technology allows for reliable operation up to 150 °C junction temperature. Typical applications are in switching power supplies, converters, reverse battery protection, and redundant power subsystems.

MAJOR RATINGS AND CHARACTERISTICS			
SYMBOL	CHARACTERISTICS	VALUES	UNITS
$I_{F(AV)}$	Rectangular waveform	175	A
	$T_C$	97	°C
$V_{RRM}$		30	V
$I_{FSM}$	$t_p = 5 \mu s$ sine	7400	A
$V_F$	175 A <sub>pk</sub> (typical)	0.47	V
	$T_J$	150	°C
$T_J$	Range	-55 to +150	°C

VOLTAGE RATINGS			
PARAMETER	SYMBOL	VS-175BGQ030HF4	UNITS
Maximum DC reverse voltage	$V_R$	30	V
Maximum working peak reverse voltage	$V_{RWM}$		

ABSOLUTE MAXIMUM RATINGS				
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum average forward current	$I_{F(AV)}$	50 % duty cycle at $T_C = 97 \text{ °C}$ , rectangular waveform		175 A
Maximum peak one cycle non-repetitive surge current	$I_{FSM}$	5 $\mu s$ sine or 3 $\mu s$ rect. pulse	Following any rated load condition and with rated $V_{RRM}$ applied	7400 A
		10 ms sine or 6 ms rect. pulse		1400
Non-repetitive avalanche energy	$E_{AS}$	$T_J = 25 \text{ °C}$ , $I_{AS} = 12 \text{ A}$ , $L = 1.12 \text{ mH}$		80 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		12 A

ELECTRICAL SPECIFICATIONS						
PARAMETER	SYMBOL	TEST CONDITIONS		TYP.	MAX.	UNITS
Forward voltage drop	$V_{FM}^{(1)}$	100 A	$T_J = 25\text{ }^\circ\text{C}$	0.47	0.49	V
		175 A		0.55	0.59	
		100 A	$T_J = 150\text{ }^\circ\text{C}$	0.36	0.39	
		175 A		0.47	0.52	
Reverse leakage current	$I_{RM}^{(1)}$	$T_J = 125\text{ }^\circ\text{C}, V_R = 15\text{ V}$		160	220	mA
		$T_J = 150\text{ }^\circ\text{C}, V_R = 30\text{ V}$		1400	2000	
		$T_J = 25\text{ }^\circ\text{C}$	$V_R = \text{Rated } V_R$	1.3	4.5	
		$T_J = 125\text{ }^\circ\text{C}$		450	650	
Maximum junction capacitance	$C_T$	$V_R = 5 V_{DC}$ , (test signal range 100 kHz to 1 MHz), $25\text{ }^\circ\text{C}$		8500		pF
Typical series inductance	$L_S$	Measured from tab to mounting plane		3.5		nH
Maximum voltage rate of change	dV/dt	Rated $V_R$		10 000		V/ $\mu\text{s}$

**Note**

 (1) Pulse width < 300  $\mu\text{s}$ , duty cycle < 2 %

THERMAL - MECHANICAL SPECIFICATIONS				
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum junction and storage temperature range	$T_J, T_{Stg}$		-55 to +150	$^\circ\text{C}$
Maximum thermal resistance, junction to case	$R_{thJC}$	DC operation	0.35	$^\circ\text{C/W}$
Typical thermal resistance, case to heatsink	$R_{thCS}$	Mounting surface, smooth and greased	0.20	
Approximate weight			5	g
			0.18	oz.
Mounting torque	minimum		1.2 (10)	N · m (lbf · in)
	maximum		2.4 (20)	
Marking device		Case style PowerTab <sup>®</sup>	175BGQ030H	

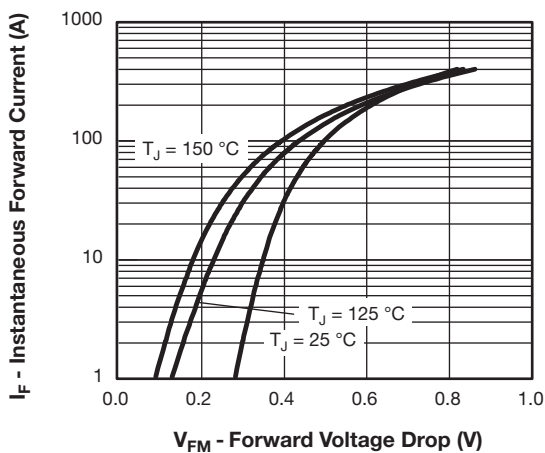


Fig. 1 - Maximum Forward Voltage Drop Characteristics

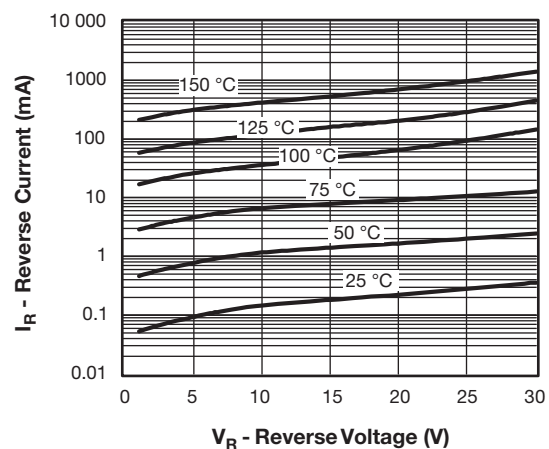


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

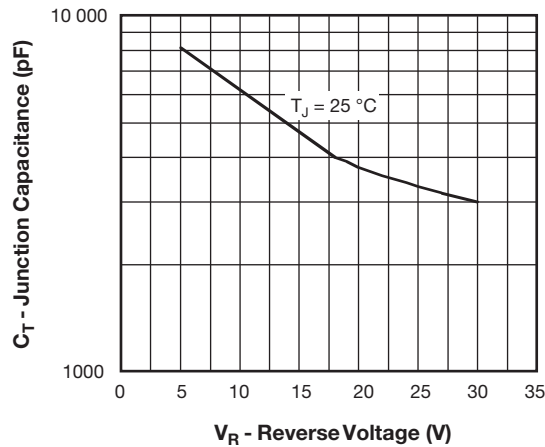


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

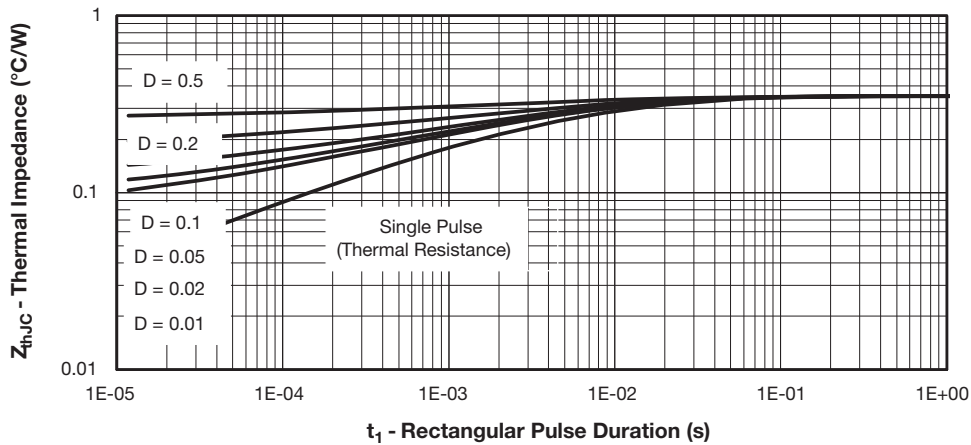


Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics

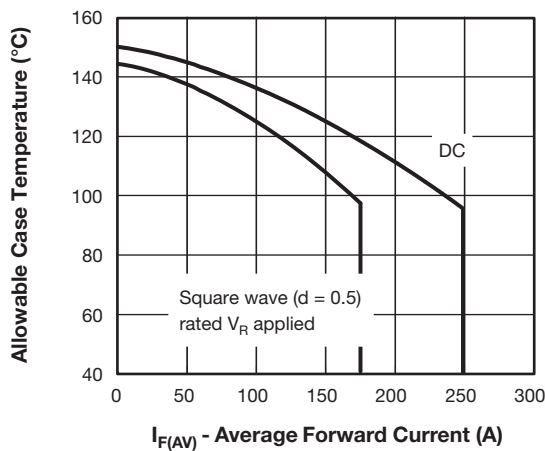


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

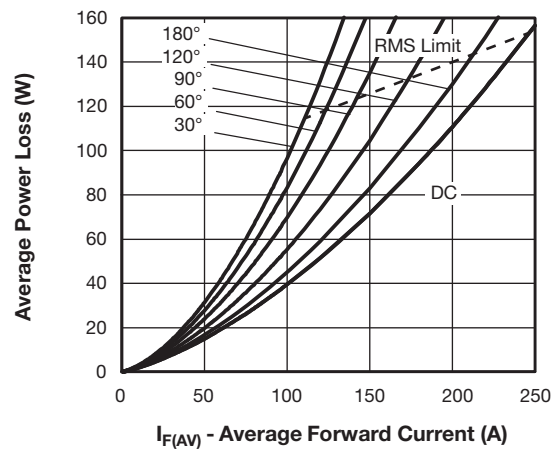
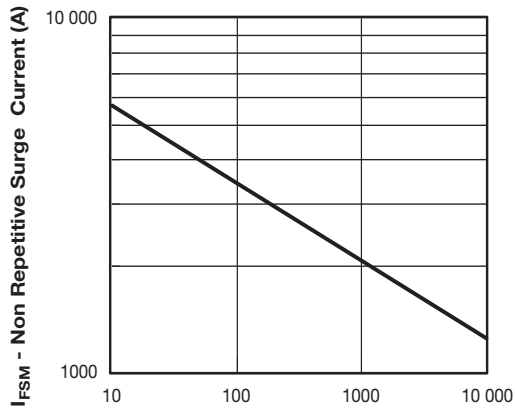
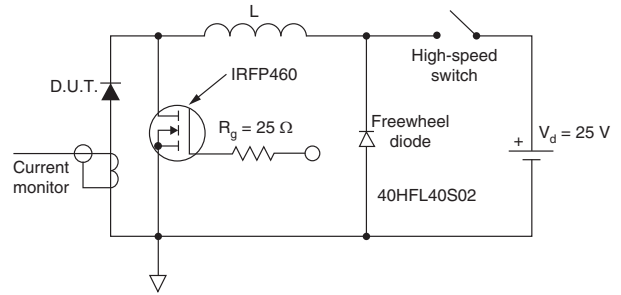


Fig. 6 - Forward Power Loss Characteristics



**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  $V_{R1} = 80\%$  rated  $V_R$

**ORDERING INFORMATION TABLE**

Device code	<b>VS-</b>	<b>175</b>	<b>BGQ</b>	<b>030</b>	<b>H</b>	<b>F4</b>
	①	②	③	④	⑤	⑥

- 1** - Vishay Semiconductors product
- 2** - Current rating (175 = 175 A)
- 3** - Essential part number
- 4** - Voltage rating (030 = 30 V)
- 5** - H = AEC-Q101 qualified
- 6** - Environmental digit:
- F4 = RoHS compliant and totally lead (Pb)-free

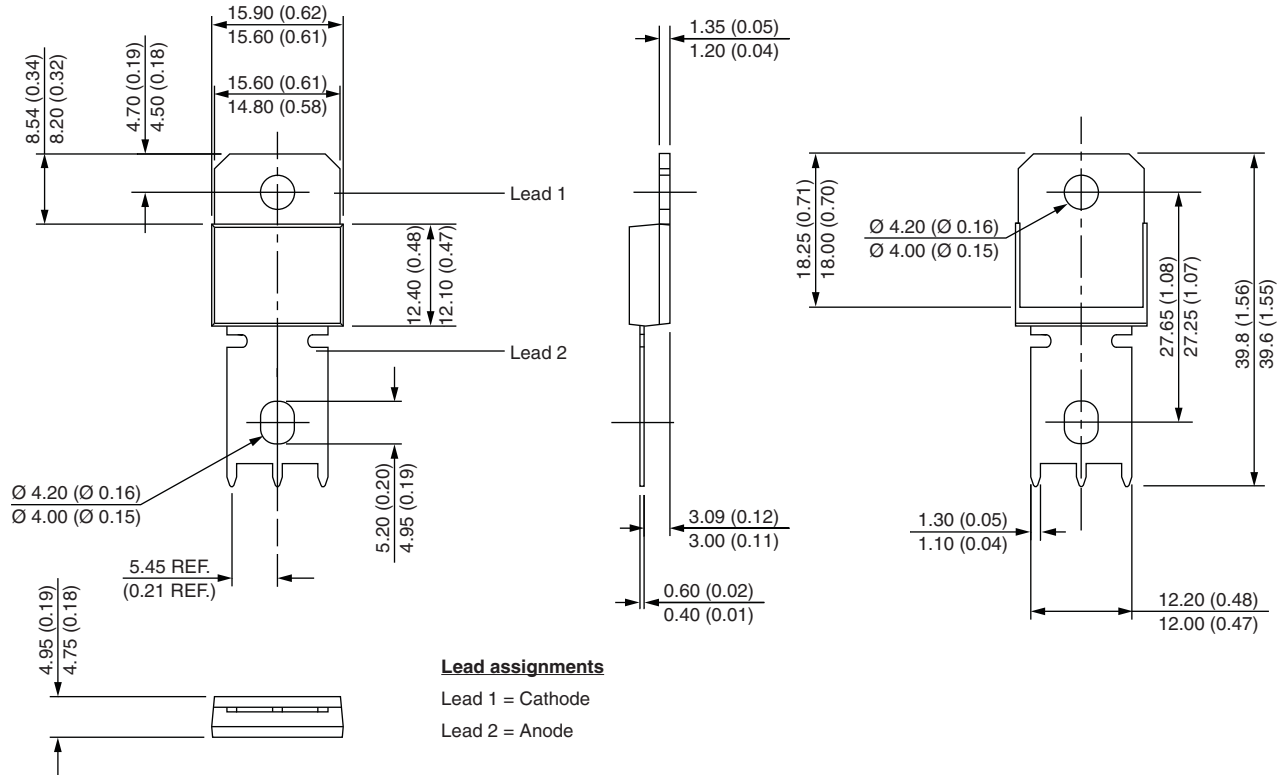
<b>ORDERING INFORMATION (Example)</b>			
PREFERRED P/N	QUANTITY PER T/R	MINIMUM ORDER QUANTITY	PACKAGING DESCRIPTION
VS-175BGQ030HF4	25	375	Antistatic plastic tube

<b>LINKS TO RELATED DOCUMENTS</b>	
Dimensions	<a href="http://www.vishay.com/doc?95240">www.vishay.com/doc?95240</a>
Part marking information	<a href="http://www.vishay.com/doc?95467">www.vishay.com/doc?95467</a>
SPICE model	<a href="http://www.vishay.com/doc?95427">www.vishay.com/doc?95427</a>
Application note	<a href="http://www.vishay.com/doc?95179">www.vishay.com/doc?95179</a>



## PowerTab®

**DIMENSIONS** in millimeters (inches)





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