

High Performance Schottky Rectifier, 175 A



PowerTab®

Cathode — Anode

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


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
	$175 A_{pk}$ (typical)	0.47	V
V_F	T_J	150	°C
	Range	-55 to +150	°C
T_J			

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 $T_C = 97$ °C, rectangular waveform	175	A
Maximum peak one cycle non-repetitive surge current	I_{FSM}	5 μs sine or 3 μs rect. pulse	7400	A
		10 ms sine or 6 ms rect. pulse	1400	
Non-repetitive avalanche energy	E_{AS}	$T_J = 25$ °C, $I_{AS} = 12$ A, $L = 1.12$ mH	80	mJ
Repetitive avalanche current	I_{AR}	Current decaying linearly to zero in 1 μs 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	$T_J = 25^\circ\text{C}$		0.47	0.49	V	
		175 A			0.55	0.59		
		100 A	$T_J = 150^\circ\text{C}$		0.36	0.39		
		175 A			0.47	0.52		
Reverse leakage current	$I_{RM}^{(1)}$	$T_J = 125^\circ\text{C}, V_R = 15\text{ V}$			160	220	mA	
		$T_J = 150^\circ\text{C}, V_R = 30\text{ V}$			1400	2000		
		$T_J = 25^\circ\text{C}$	$V_R = \text{Rated } V_R$		1.3	4.5		
		$T_J = 125^\circ\text{C}$			450	650		
Maximum junction capacitance	C_T	$V_R = 5\text{ V}_{\text{DC}}$, (test signal range 100 kHz to 1 MHz), 25°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/ μ s	

Note

(1) Pulse width < 300 μ 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	°C
Maximum thermal resistance, junction to case	R_{thJC}	DC operation	0.35	°C/W
			0.20	
Typical thermal resistance, case to heatsink	R_{thCS}	Mounting surface, smooth and greased	5	g
			0.18	oz.
Approximate weight			1.2 (10)	N · m (lbf · in)
			2.4 (20)	
Mounting torque	minimum			
	maximum			
Marking device		Case style PowerTab®	175BGQ030H	

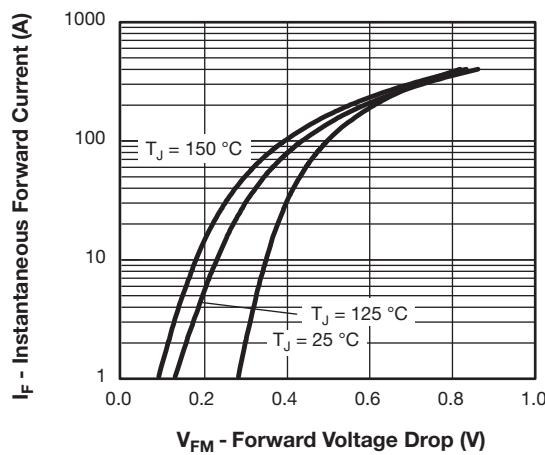


Fig. 1 - Maximum Forward Voltage Drop Characteristics

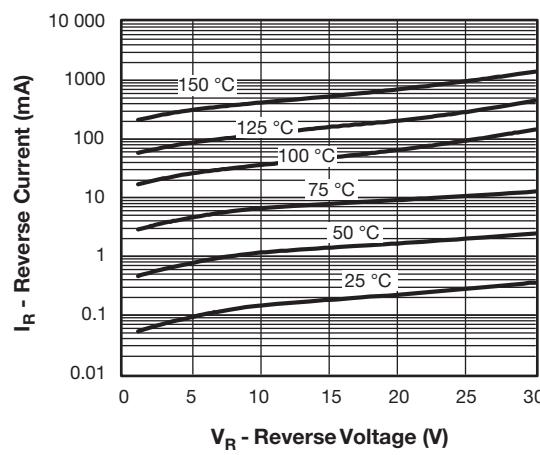


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

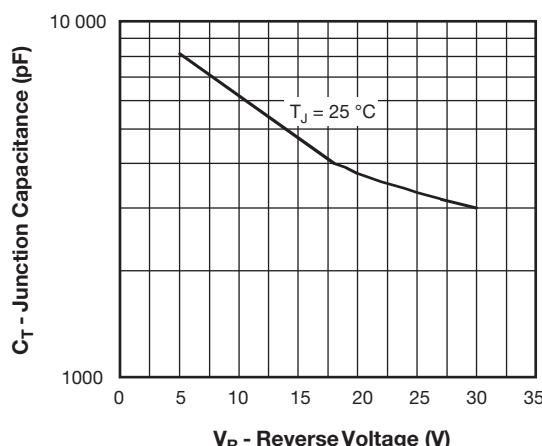


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

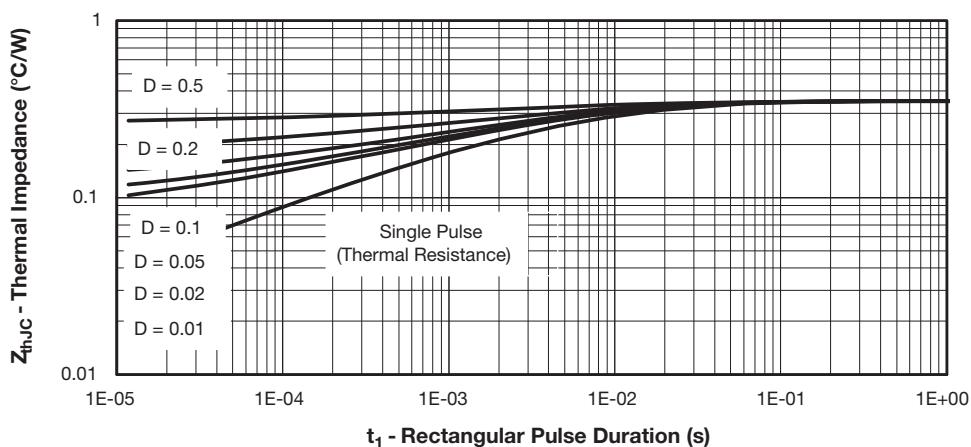


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

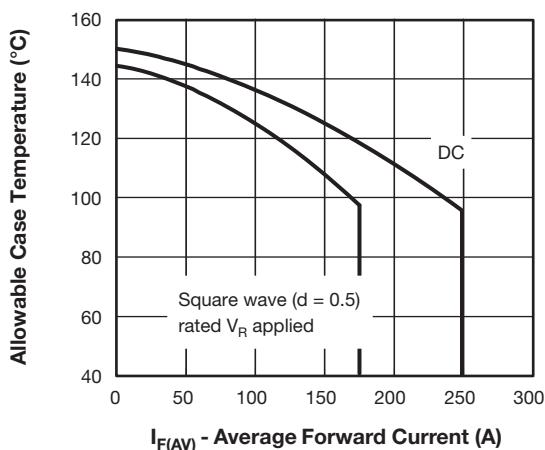


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

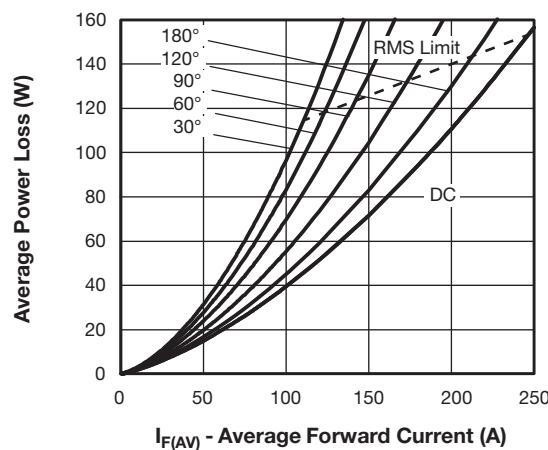


Fig. 6 - Forward Power Loss Characteristics

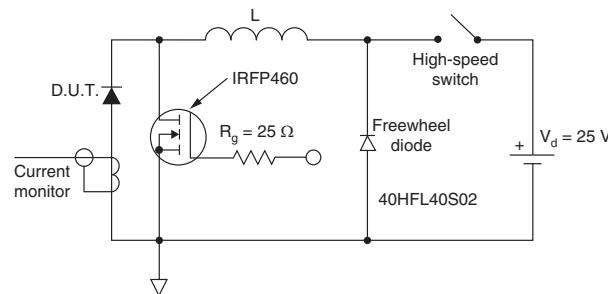
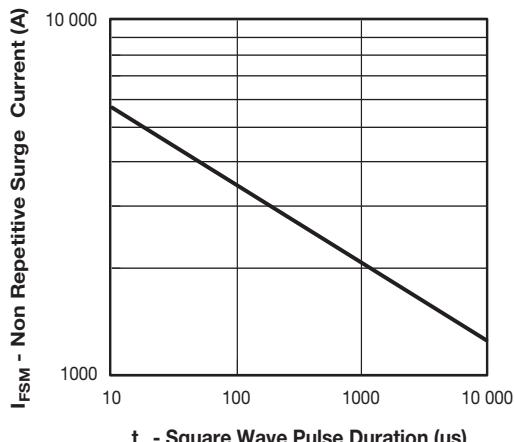


Fig. 8 - Unclamped Inductive Test Circuit

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

ORDERING INFORMATION TABLE

Device code	VS-	175	BGQ	030	H	F4
	1	2	3	4	5	6

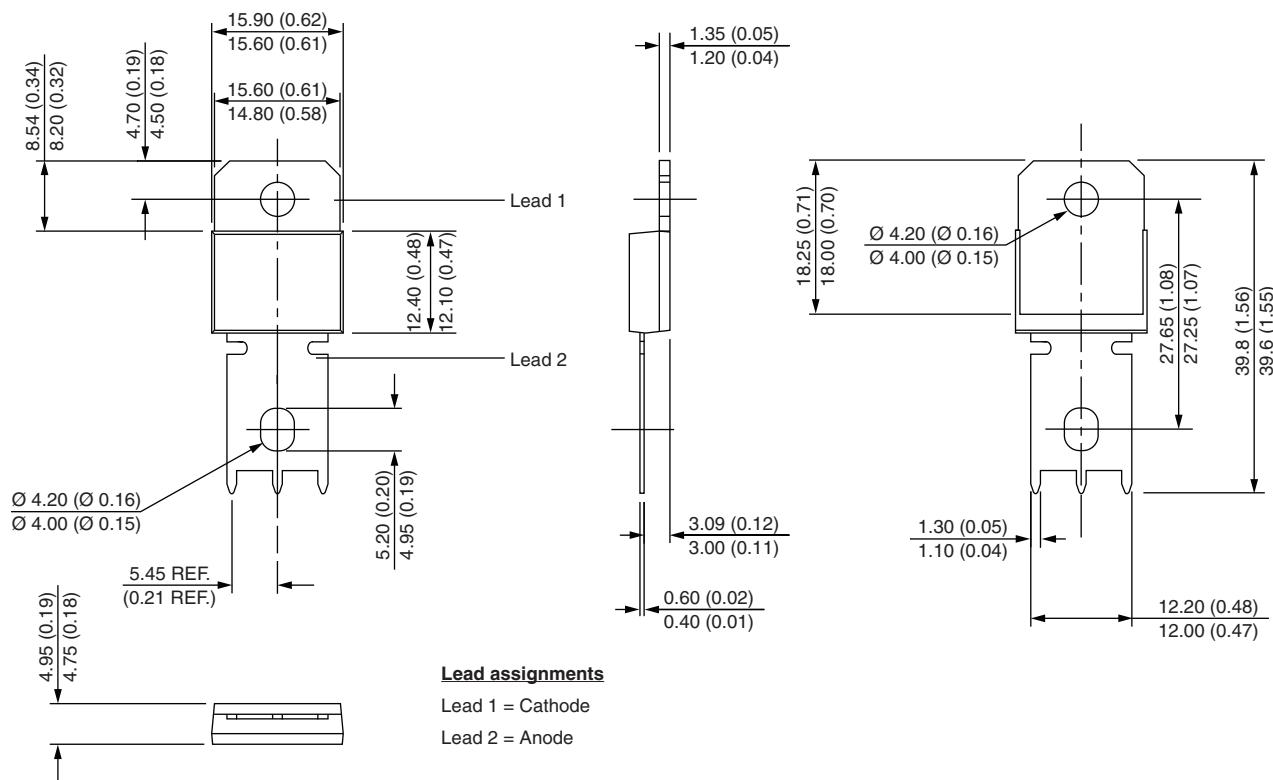
1	- Vishay Semiconductors product
2	- Current rating (175 = 175 A)
3	- Essential part number
4	- Voltage rating (030 = 30 V)
5	- H = AEC-Q101 qualified
6	- Environmental digit: - F4 = RoHS compliant and totally lead (Pb)-free

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

LINKS TO RELATED DOCUMENTS	
Dimensions	www.vishay.com/doc?95240
Part marking information	www.vishay.com/doc?95467
SPICE model	www.vishay.com/doc?95427
Application note	www.vishay.com/doc?95179

PowerTab®

DIMENSIONS in millimeters (inches)



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