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
- Designed and qualified according to JEDEC®-JESD 47
- PowerTab® package
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

Pb-free

e4

RoHS COMPLIANT

DESCRIPTION

The VS-175BGQ030 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.

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.	125 °C
Diode variation	Single die
E_{AS}	80 mJ

MAJOR RATINGS AND CHARACTERISTICS			
SYMBOL	CHARACTERISTICS	VALUES	UNITS
$I_{F(AV)}$	Rectangular waveform	175	A
	T_C	112	°C
V_{RRM}		30	V
I_{FSM}	t_p = 5 µs sine	7400	A
V_F	175 A_{pk} (typical)	0.47	V
	T_J	150	°C
T_J	Range	-55 to +150	°C

VOLTAGE RATINGS			
PARAMETER	SYMBOL	VS-175BGQ030	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 = 112 °C, rectangular waveform		175	A
Maximum peak one cycle non-repetitive surge current	I_{FSM}	5 µs sine or 3 µs 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 °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 x 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 °C	0.47	0.49	V
		175 A		0.55	0.59	
		100 A	T_J = 150 °C	0.36	0.39	
		175 A		0.47	0.52	
Reverse leakage current	I_{RM} (1)	T_J = 125 °C, V_R = 15 V		160	220	mA
		T_J = 150 °C, V_R = 30 V		1400	2000	
		T_J = 25 °C	V_R = Rated V_R	1.3	4.5	
		T_J = 125 °C		450	650	
Maximum junction capacitance	C_T	V_R = 5 V_{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/µs

Note

(1) Pulse width < 300 µs, 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	0.25	°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®	175BGQ045	

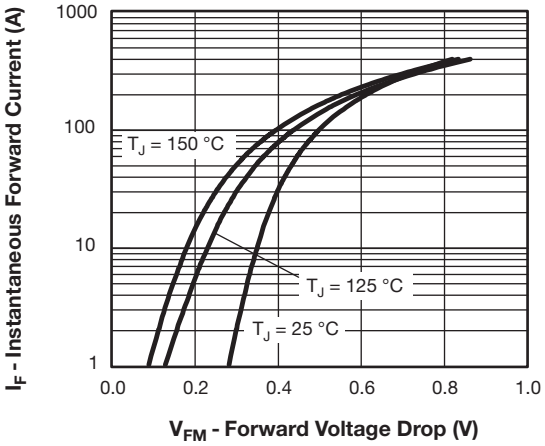


Fig. 1 - Maximum Forward Voltage Drop Characteristics

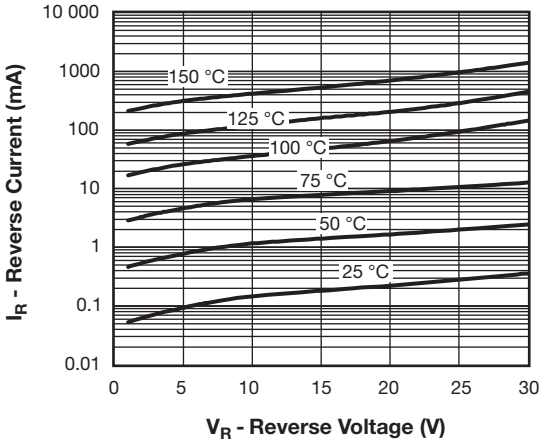


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

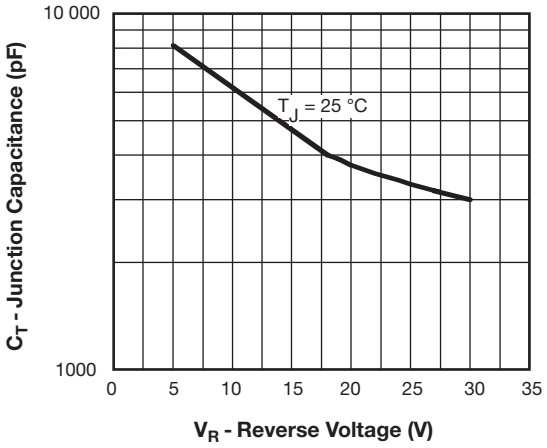


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

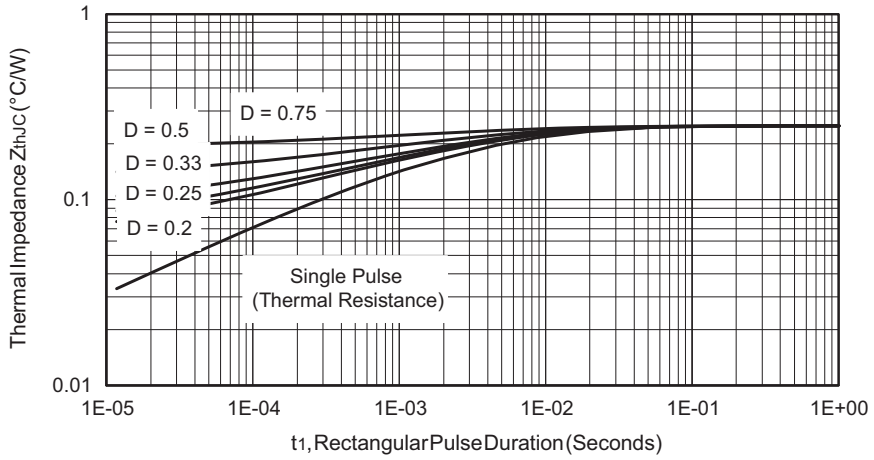


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

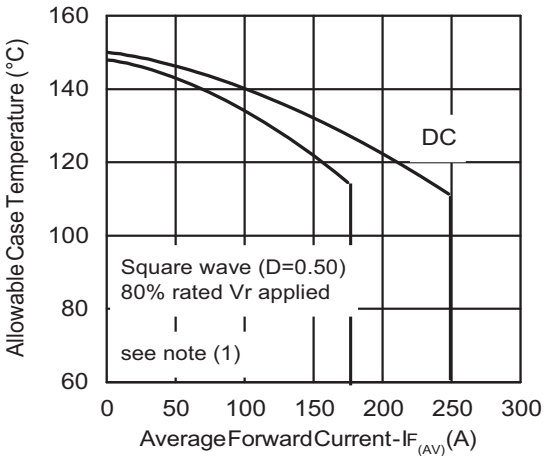


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

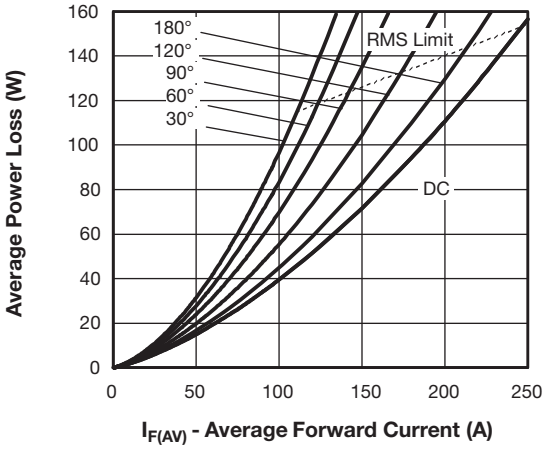


Fig. 6 - Forward Power Loss Characteristics

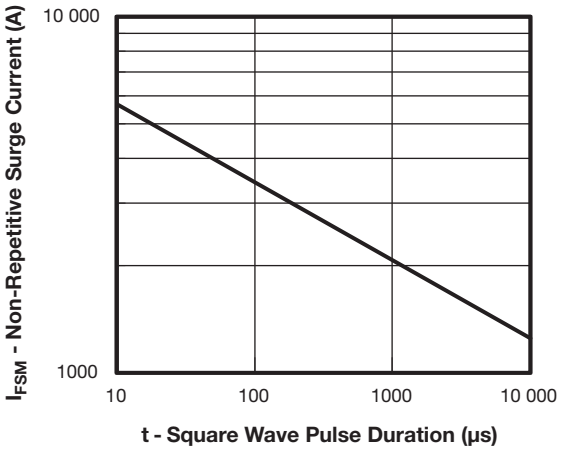


Fig. 7 - Maximum Non-Repetitive Surge Current

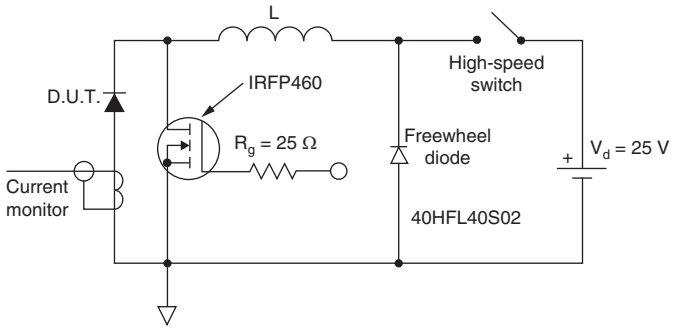


Fig. 8 - Unclamped Inductive Test Circuit

Note

(1) Formula used: $T_C = T_J - (Pd + Pd_{REV}) \times R_{thJC}$;
Pd = Forward power loss = $I_{F(AV)} \times V_{FM}$ at ($I_{F(AV)}$/D) (see fig. 6);
Pd_{REV} = Inverse power loss = $V_{R1} \times I_R (1 - D)$; I_R at V_{R1} = 80 % rated V_R

ORDERING INFORMATION TABLE

Device code

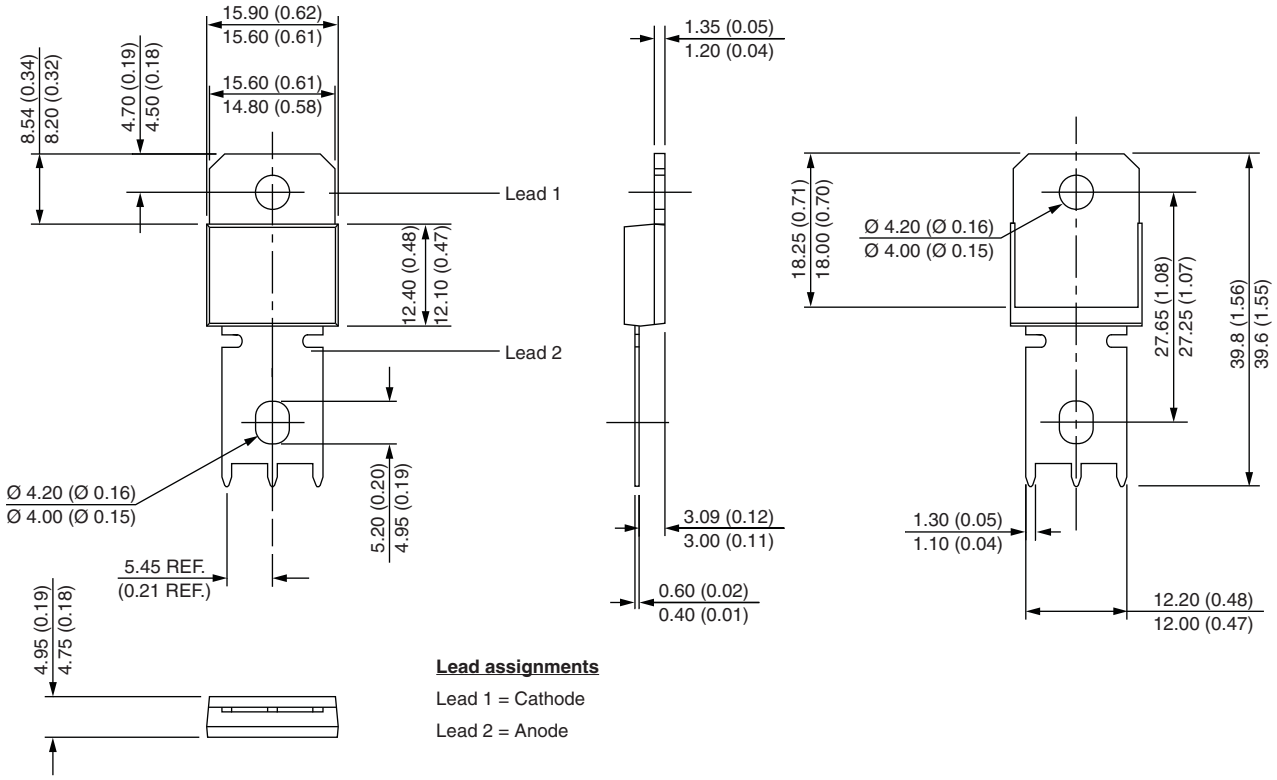
VS-	175	BGQ	030
1	2	3	4

1	-	Vishay Semiconductors product
2	-	Current rating
3	-	Essential part number
4	-	Voltage code = V_{RRM}

LINKS TO RELATED DOCUMENTS	
Dimensions	www.vishay.com/doc?95240
Part marking information	www.vishay.com/doc?95370
SPICE model	www.vishay.com/doc?95427
Application note	www.vishay.com/doc?95179

PowerTab®

DIMENSIONS in millimeters (inches)



Lead assignments

Lead 1 = Cathode

Lead 2 = Anode

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