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
- 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
	maximum			2.4 (20)	(lbf · in)
Marking device			Case style PowerTab®	175BGQ045	
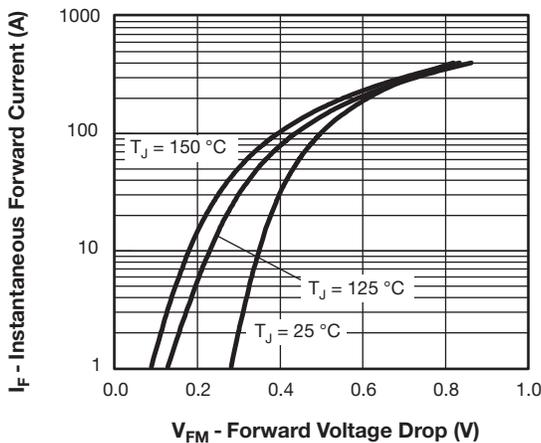
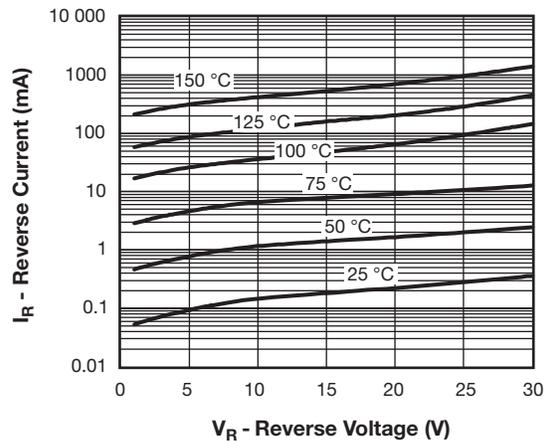Fig. 1 - Maximum Forward Voltage Drop Characteristics

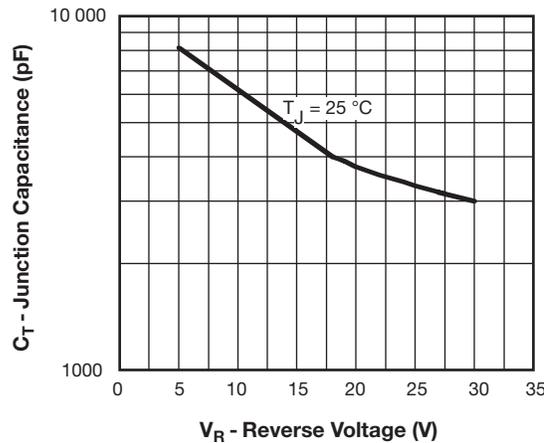Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

Fig. 3 - Typical Junction Capacitance vs.
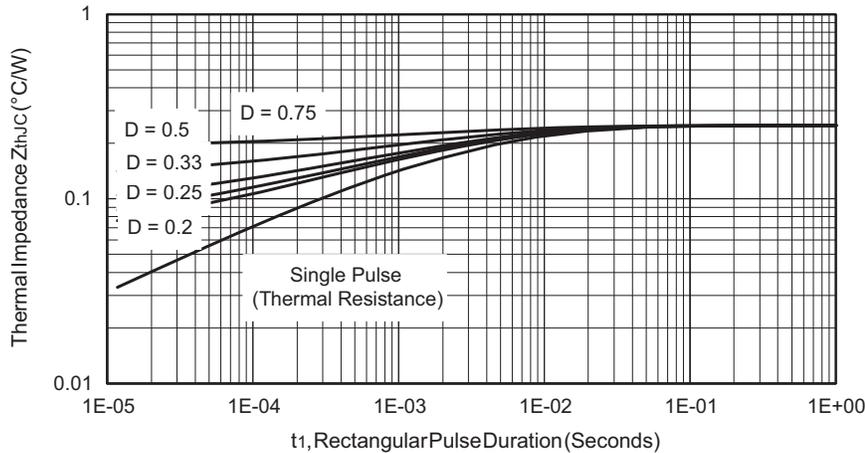Reverse Voltage

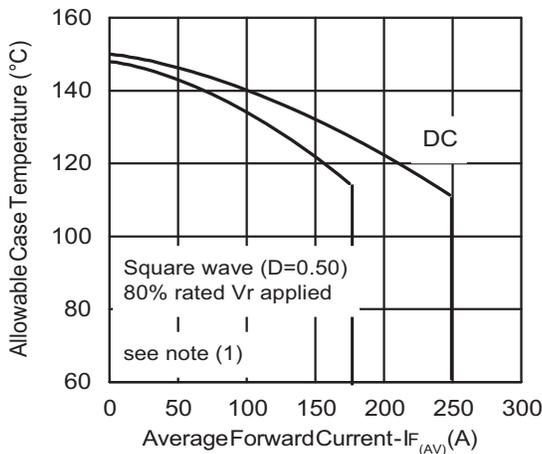Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

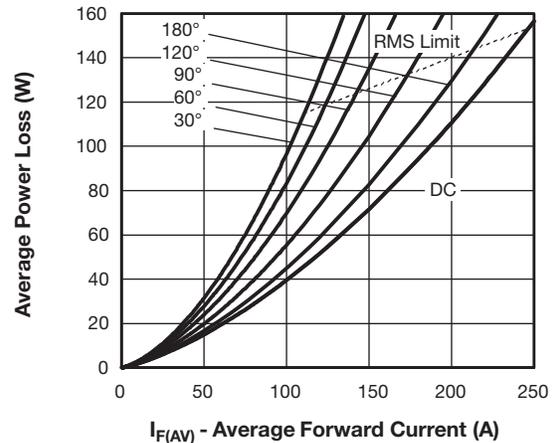Fig. 5 - Maximum Allowable Case Temperature vs.
Average Forward Current

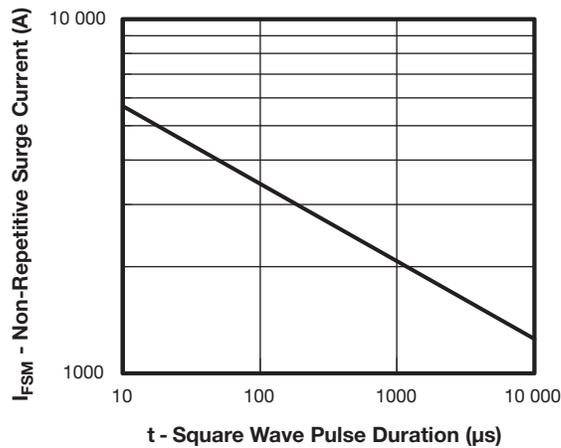Fig. 6 - Forward Power Loss Characteristics
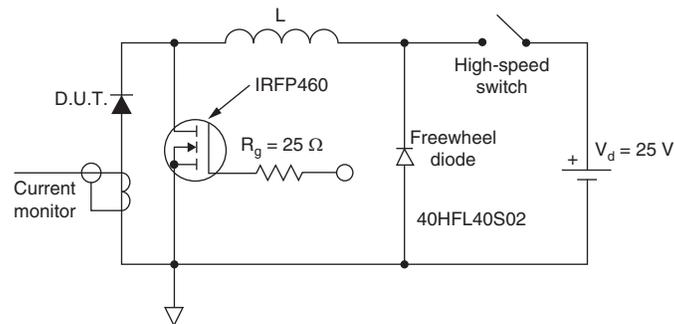
Fig. 7 - Maximum Non-Repetitive Surge Current

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 1

Lead 2

15.90 (0.62)
15.60 (0.61)

15.60 (0.61)
14.80 (0.58)

8.54 (0.34)
8.20 (0.32)

4.70 (0.19)
4.50 (0.18)

12.40 (0.48)
12.10 (0.47)

Ø 4.20 (Ø 0.16)
Ø 4.00 (Ø 0.15)

5.20 (0.20)
4.95 (0.19)

5.45 REF.
(0.21 REF.)

4.95 (0.19)
4.75 (0.18)

1.35 (0.05)
1.20 (0.04)

3.09 (0.12)
3.00 (0.11)

0.60 (0.02)
0.40 (0.01)

18.25 (0.71)
18.00 (0.70)

Ø 4.20 (Ø 0.16)
Ø 4.00 (Ø 0.15)

27.65 (1.08)
27.25 (1.07)

39.8 (1.56)
39.6 (1.55)

1.30 (0.05)
1.10 (0.04)

12.20 (0.48)
12.00 (0.47)

Lead assignments

Lead 1 = Cathode

Lead 2 = Anode
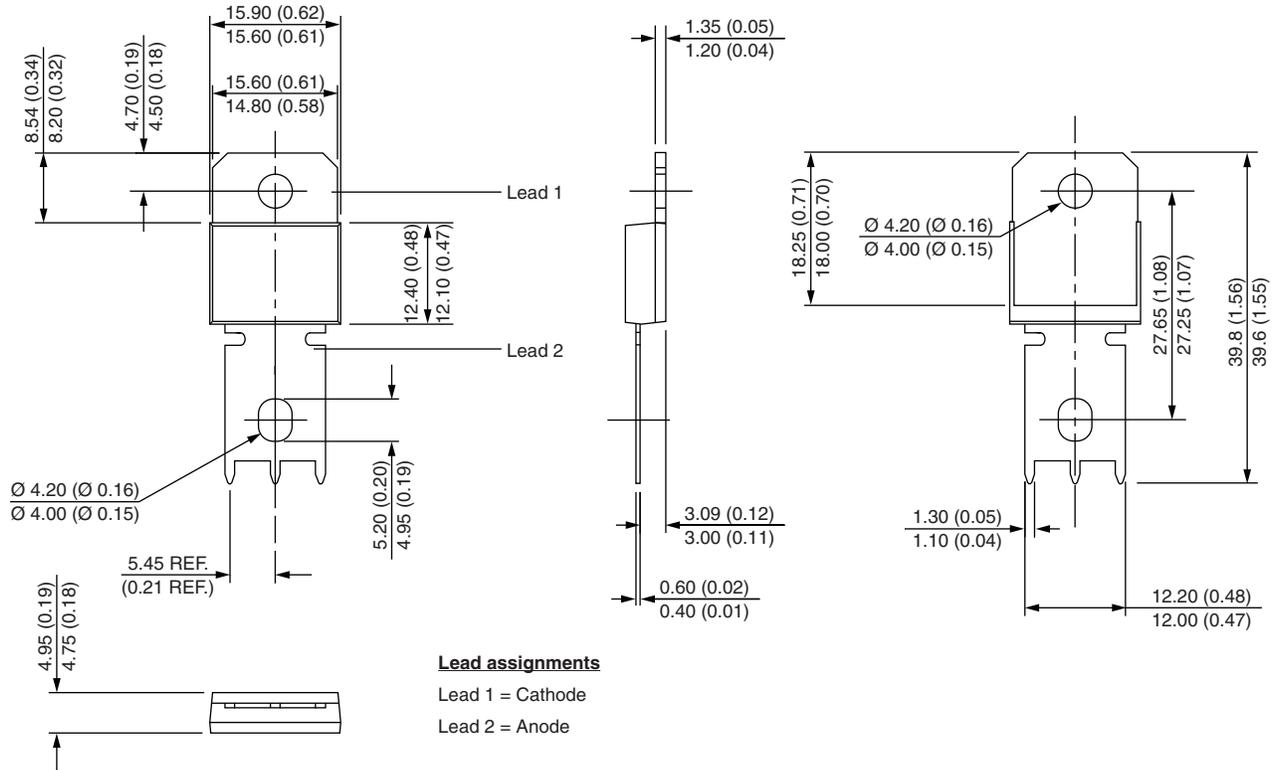
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