

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


RoHS
COMPLIANT

PRODUCT SUMMARY	
Package	PowerTab®
$I_{F(AV)}$	175 A
V_R	45 V
V_F at I_F	0.7 V
I_{RM}	640 mA at 125 °C
T_J max.	150 °C
Diode variation	Single die
E_{AS}	40 mJ

DESCRIPTION

The VS-175BGQ045 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	103	°C
V_{RRM}		45	V
I_{FSM}	$t_p = 5 \mu s$ sine	8700	A
V_F	175 A _{pk} (typical)	0.63	V
	T_J	150	°C
T_J	Range	-55 to +150	°C

VOLTAGE RATINGS			
PARAMETER	SYMBOL	175BGQ045	UNITS
Maximum DC reverse voltage	V_R	45	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 $T_C = 103$ °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	8700	A
		10 ms sine or 6 ms rect. pulse		1550	
Non-repetitive avalanche energy	E_{AS}	$T_J = 25$ °C, $I_{AS} = 6$ A, $L = 2$ mH		40	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		6	A

ELECTRICAL SPECIFICATIONS						
PARAMETER	SYMBOL	TEST CONDITIONS		TYP.	MAX.	UNITS
Forward voltage drop	$V_{FM}^{(1)}$	100 A	$T_J = 25\text{ }^\circ\text{C}$	0.55	0.58	V
		175 A		0.67	0.75	
		100 A	$T_J = 150\text{ }^\circ\text{C}$	0.49	0.54	
		175 A		0.63	0.7	
Reverse leakage current	$I_{RM}^{(1)}$	$T_J = 150\text{ }^\circ\text{C}, V_R = 45\text{ V}$		1200	2000	mA
		$T_J = 25\text{ }^\circ\text{C}$	$V_R = \text{Rated } V_R$	0.6	2	
		$T_J = 125\text{ }^\circ\text{C}$		360	640	
Maximum junction capacitance	C_T	$V_R = 5 V_{DC}$, (test signal range 100 kHz to 1 MHz) $25\text{ }^\circ\text{C}$		5600		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	$^\circ\text{C}$
Maximum thermal resistance, junction to case	R_{thJC}	DC operation	0.25	$^\circ\text{C/W}$
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®	175BGQ045	

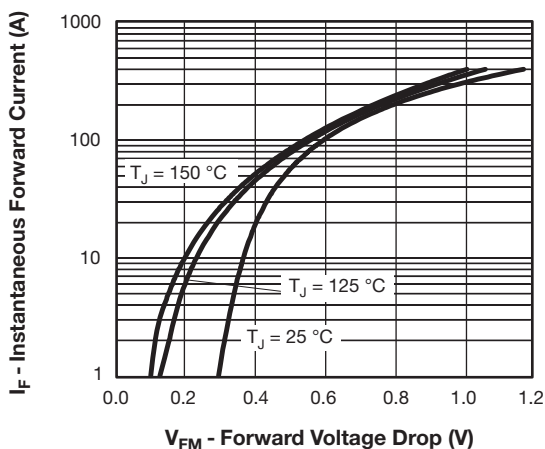


Fig. 1 - Maximum Forward Voltage Drop Characteristics

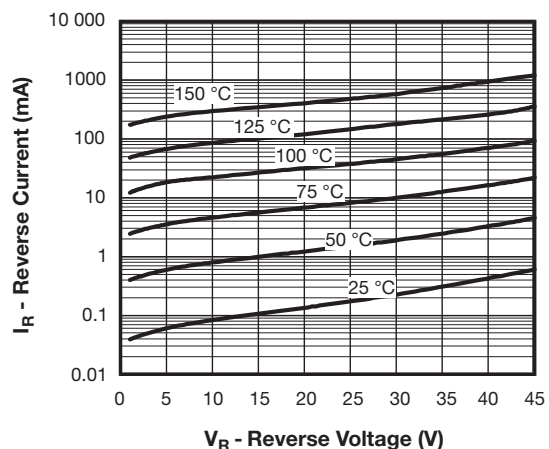


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

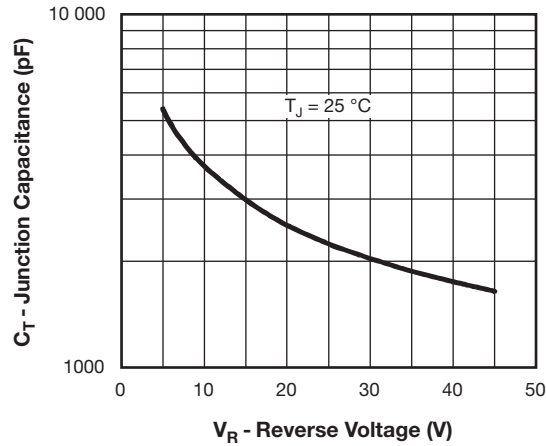


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

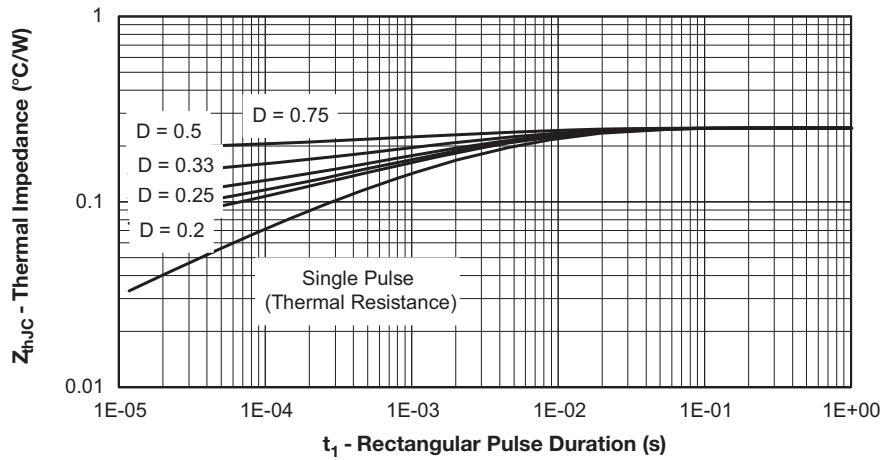


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

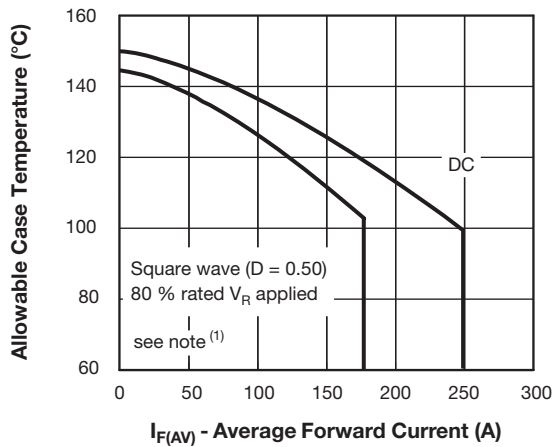


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

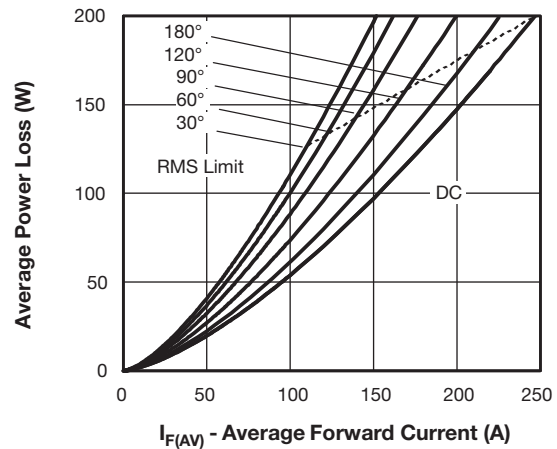


Fig. 6 - Forward Power Loss Characteristics

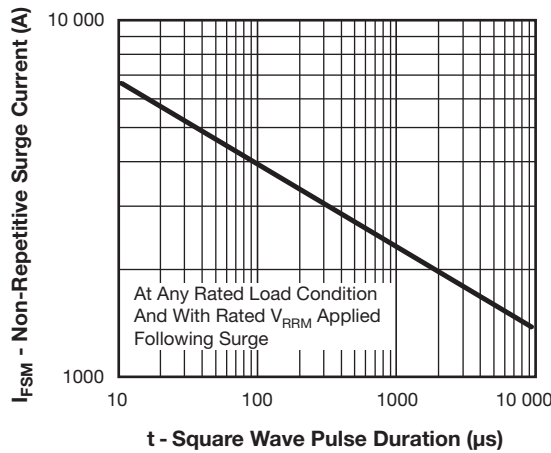


Fig. 7 - Maximum Non-Repetitive Surge Current

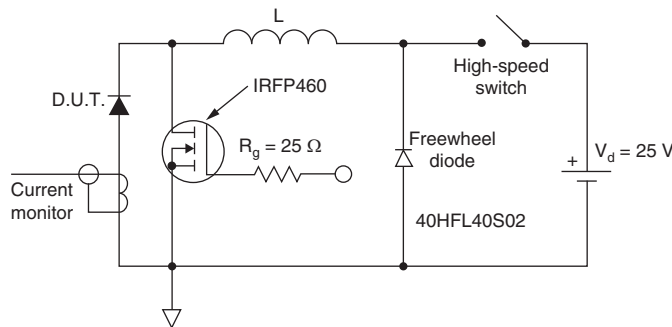


Fig. 8 - Unclamped Inductive Test Circuit

Note

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

ORDERING INFORMATION TABLE

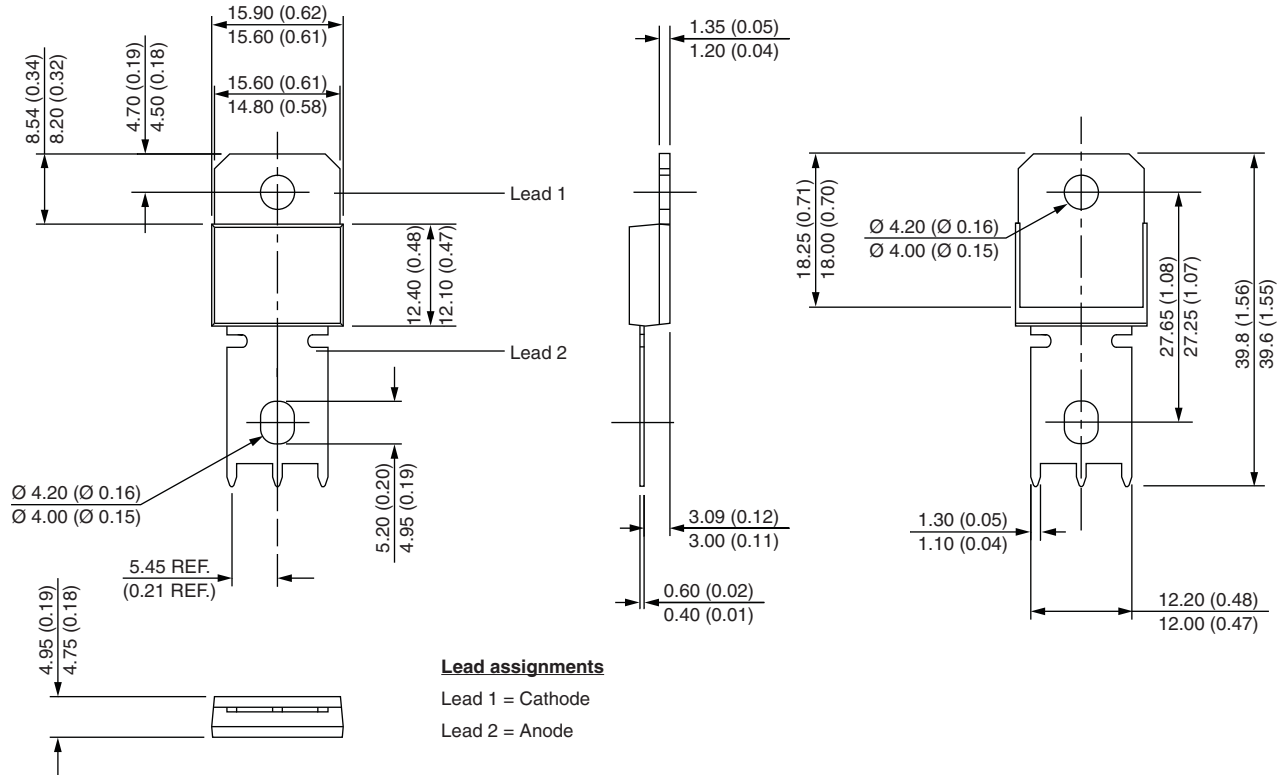
Device code	VS-	175	BGQ	045
	①	②	③	④
	1	2	3	4
	-	-	-	-
	Vishay Semiconductors product	Current rating	Essential part number	Voltage code = V_{RRM}

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



PowerTab®

DIMENSIONS in millimeters (inches)





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