

Schottky Rectifier, 175 A



PowerTab™



FEATURES

- Ultralow forward voltage drop
- High frequency operation
- Guard ring for enhanced ruggedness and long term reliability
- 150 °C T_J operation
- Continuous high current operation
- PowerTab™ package
- Lead (Pb)-free plating
- Compliant to RoHS Directive 2002/95/EC


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

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.

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}	$t_p = 5 \mu s$ sine	7400	A
V_F	175 Apk (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 $V_A = 1.5 \times V_R$ 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	$V_R = 5\text{ V}_{DC}$, (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/ 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	$^\circ\text{C}$
Maximum thermal resistance, junction to case	R_{thJC}	DC operation		0.25	$^\circ\text{C}/\text{W}$
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	

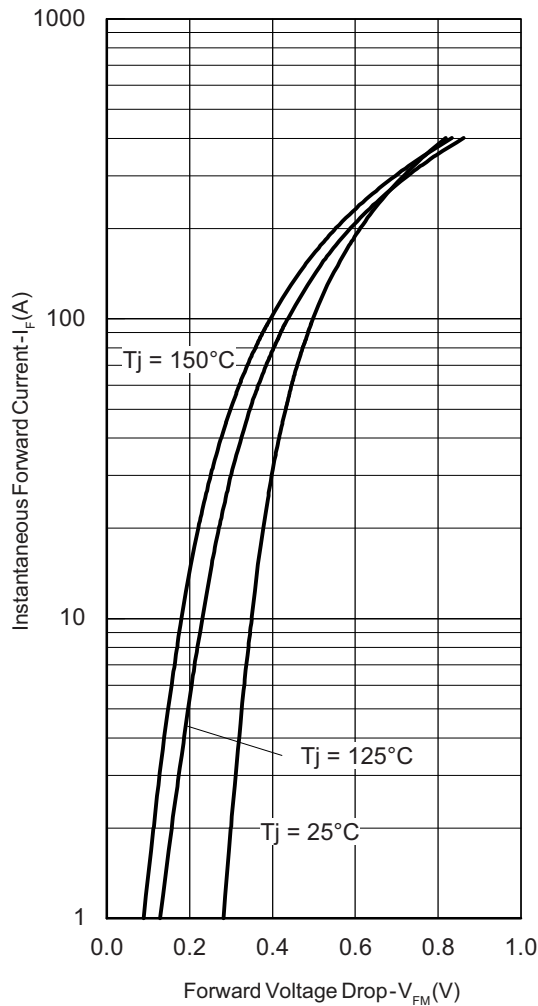


Fig. 1 - Maximum Forward Voltage Drop Characteristics

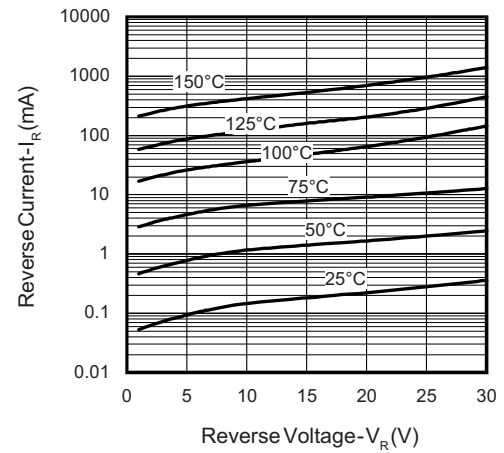


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

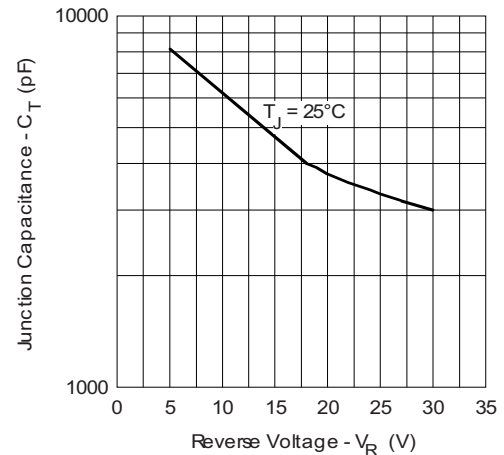
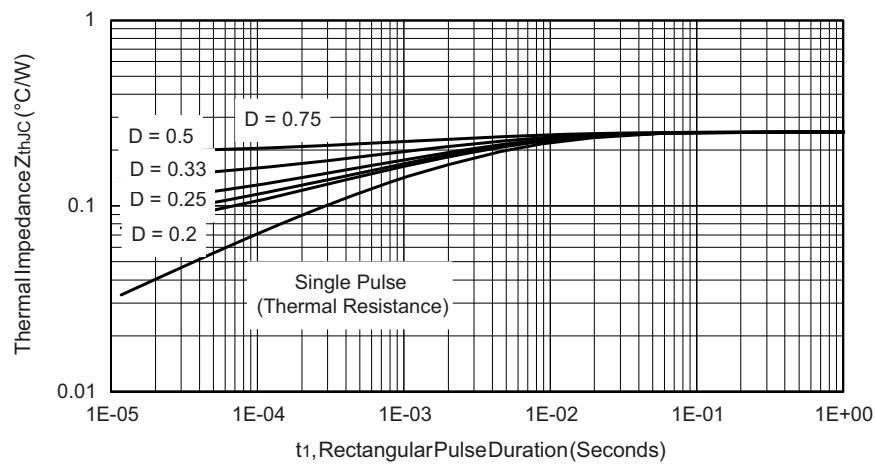


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage


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

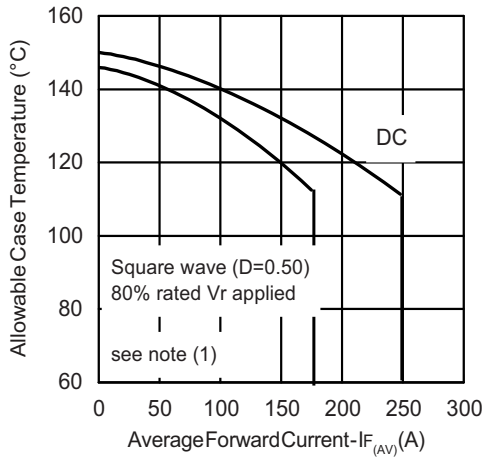


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

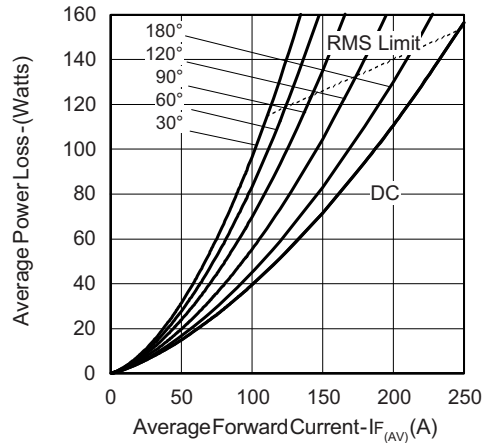


Fig. 6 - Forward Power Loss Characteristics

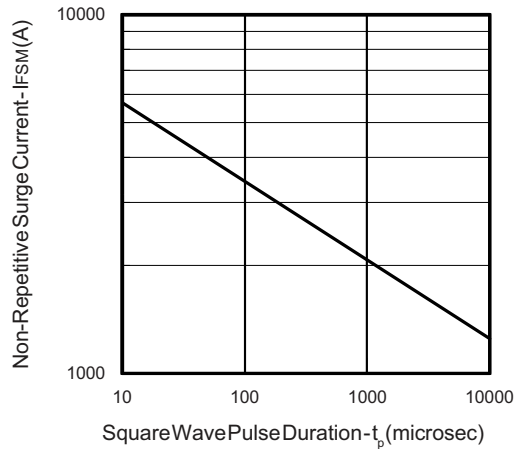


Fig. 7 - Maximum Non-Repetitive Surge Current

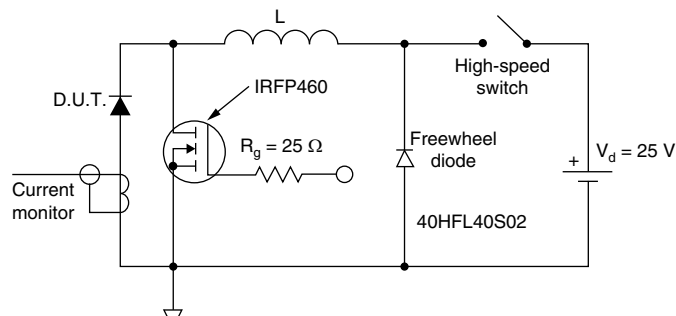


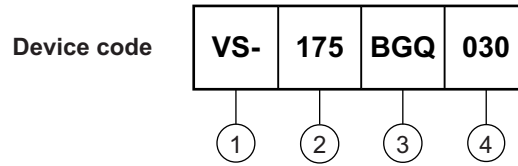
Fig. 8 - Unclamped Inductive Test Circuit

Note

- (1) Formula used: $T_C = T_J - (P_d + P_{dREV}) \times R_{thJC}$;
- 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



- 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



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