

# High Performance Schottky Rectifier, 175 A



PowerTab®



**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**

## LINKS TO ADDITIONAL RESOURCES



PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	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
$E_{AS}$	36 mJ
Package	PowerTab®
Circuit configuration	Single

## 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](http://www.vishay.com/doc?99912)

## 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.

## MECHANICAL DATA

**Case:** PowerTab®

Molding compound meets UL 94 V-0 flammability rating

**Terminal:** nickel plated, screwable

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 <sub>pk</sub> (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 $\mu s$ sine or 3 $\mu s$ rect. pulse	8700	A
		10 ms sine or 6 ms rect. pulse	1500	
Non-repetitive avalanche energy	$E_{AS}$	$T_J = 25$ °C, $I_{AS} = 6$ A, $L = 2$ mH	36	mJ
Repetitive avalanche current	$I_{AR}$	Current decaying linearly to zero in 1 $\mu s$ 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	$I_{RM}^{(1)}$	$T_J = 150\text{ }^{\circ}\text{C}$ , $V_R = 45\text{ V}$		1300	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	$C_T$	$V_R = 5\text{ }V_{DC}$ , (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/ $\mu$ s

**Note**(1) Pulse width < 300  $\mu$ s, duty cycle < 2 %**THERMAL - MECHANICAL SPECIFICATIONS**

PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum junction and storage temperature range	T <sub>J</sub> , T <sub>Stg</sub>		-55 to +150	°C
Maximum thermal resistance, junction to case	R <sub>thJC</sub>	DC operation	0.25	°C/W
Typical thermal resistance, case to heatsink	R <sub>thCS</sub>	Mounting surface, smooth and greased	0.20	
Approximate weight			5	g
Mounting torque	minimum		1.2 (10)	N · m (lbf · in)
	maximum		2.4 (20)	
Marking device		Case style PowerTab®	175BGQ045	

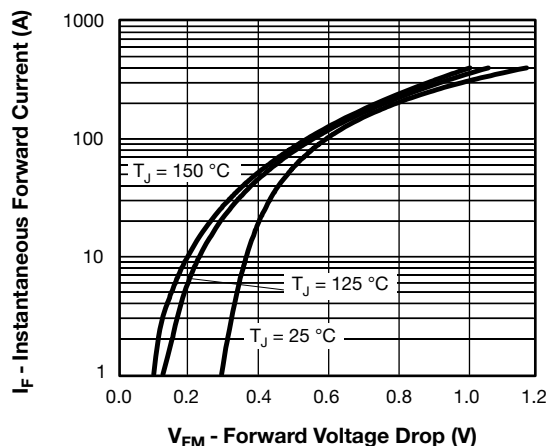


Fig. 1 - Maximum Forward Voltage Drop Characteristics

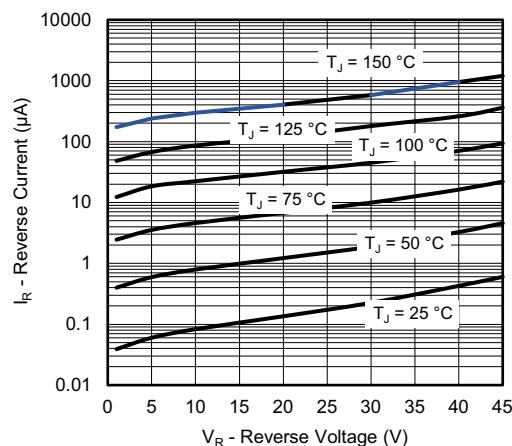


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

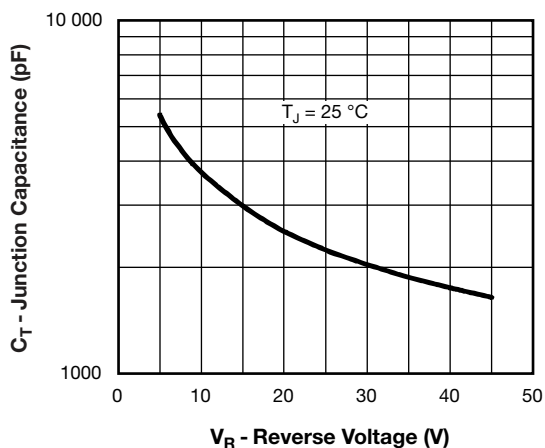


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

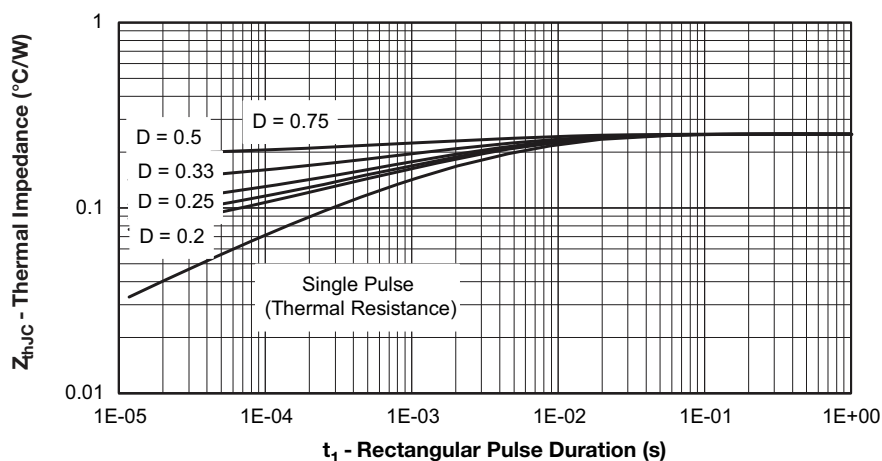
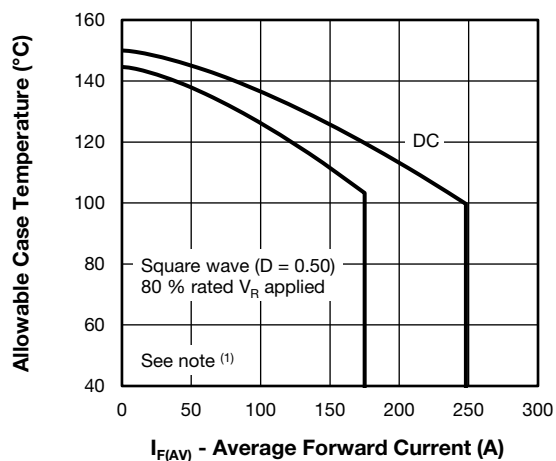

Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics


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

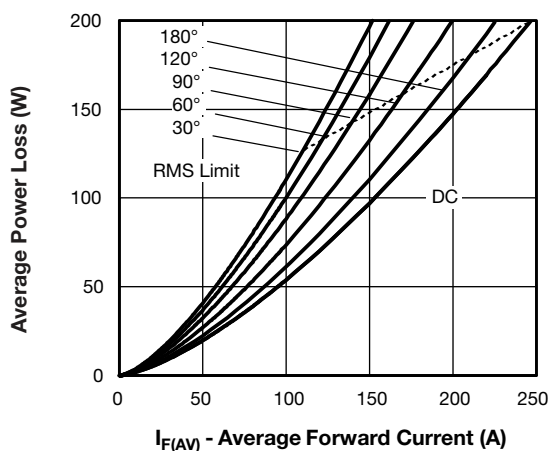


Fig. 6 - Forward Power Loss Characteristics

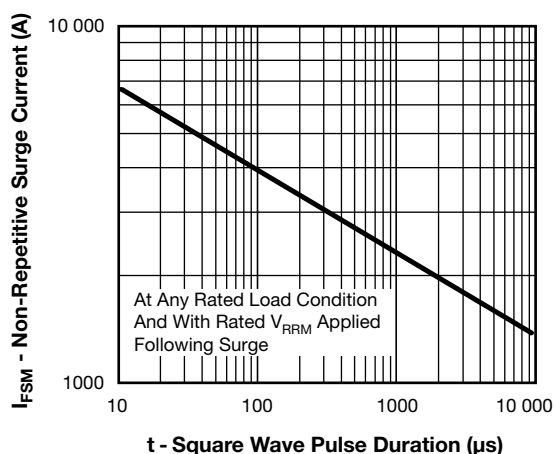


Fig. 7 - Maximum Non-Repetitive Surge Current

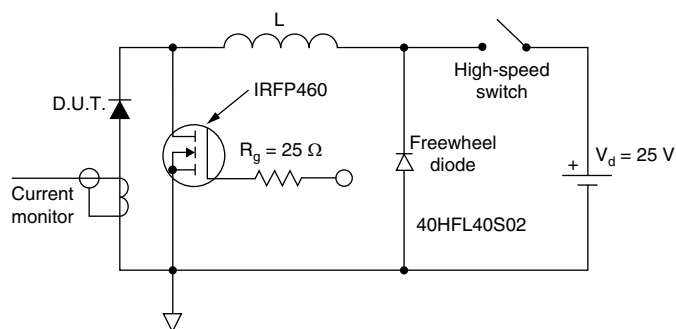


Fig. 8 - Unclamped Inductive Test Circuit

#### 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**

Device code	<b>VS-</b>	<b>175</b>	<b>BGQ</b>	<b>045</b>	<b>-N4</b>
	1	2	3	4	5

- |          |  |
|----------|--|
| <b>1</b> | - Vishay Semiconductors product  |
| <b>2</b> | - Current rating (100 = 100 A)   |
| <b>3</b> | - Essential part number  |
| <b>4</b> | - Voltage rating (045 = 45 V)  |
| <b>5</b> | - Environmental digit:<br>- -N4 = Halogen-free, RoHS compliant, and totally lead (Pb)-free |

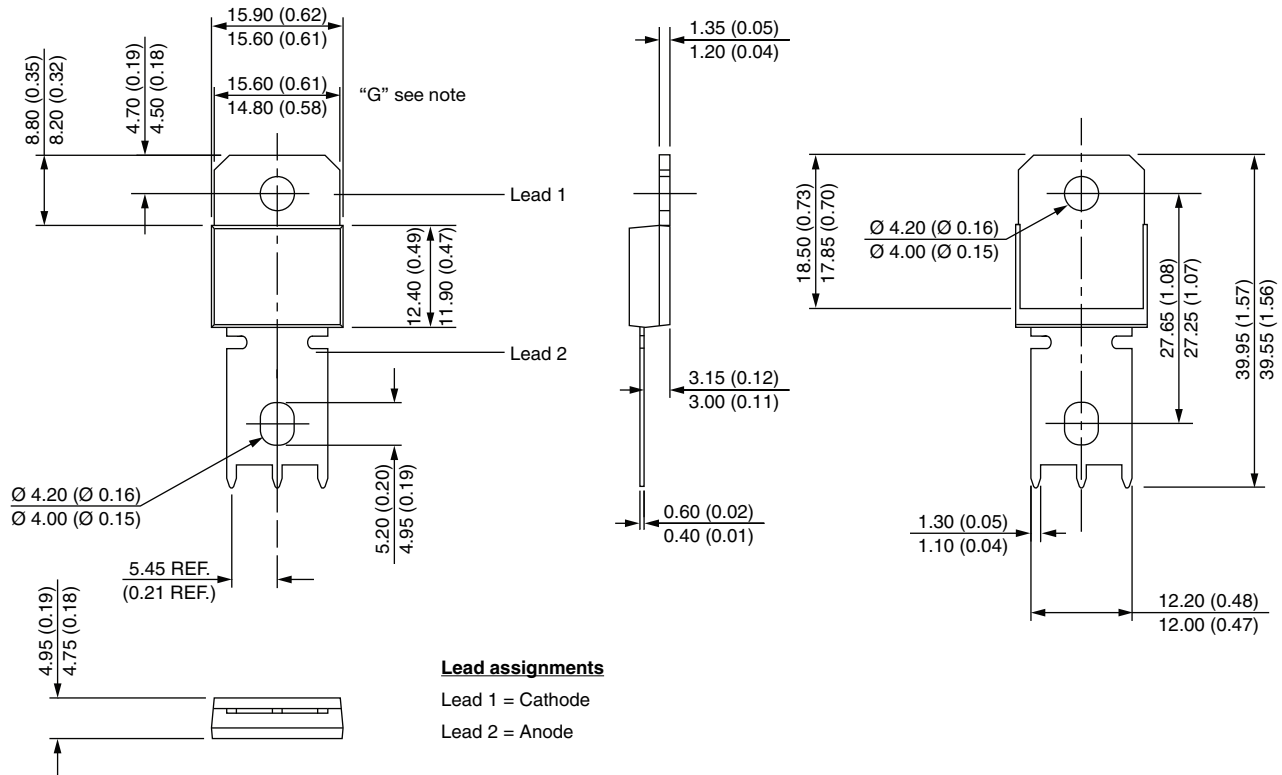
<b>ORDERING INFORMATION</b> (Example)		
<b>PREFERRED P/N</b>	<b>BASE QUANTITY</b>	<b>PACKAGING DESCRIPTION</b>
VS-175BGQ045-N4	25/tube	Antistatic plastic tube

<b>LINKS TO RELATED DOCUMENTS</b>	
Dimensions	<a href="http://www.vishay.com/doc?95240">www.vishay.com/doc?95240</a>
Part marking information	<a href="http://www.vishay.com/doc?95467">www.vishay.com/doc?95467</a>
Application note	<a href="http://www.vishay.com/doc?95179">www.vishay.com/doc?95179</a>



## PowerTab®

### DIMENSIONS in millimeters (inches)



#### Note:

Outline conform to JEDEC® TO-275, except for dimension "G" only



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