High Performance Schottky Rectifier, 100 A

PowerTab®

FEATURES

- Ultralow forward voltage drop
- Optimized for OR-ing applications
- Guard ring for enhanced ruggedness and long term reliability
- Screw mounting only
- Designed and qualified according to JEDEC®-JESD47
- 125 °C max. operating junction temperature (V_R < 5 V)
- High frequency operation
- Continuous high current operation
- PowerTab® package
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

Pb-free

e4

RoHS COMPLIANT

DESCRIPTION

The VS-100BGQ015 Schottky rectifier has been optimized for ultralow forward voltage drop specifically for the OR-ing of parallel power supplies. The proprietary barrier technology allows for reliable operation up to 125 °C junction temperature. Typical applications are in parallel switching power supplies, converters, reverse battery protection, and redundant power subsystems.

PRODUCT SUMMARY	
Package	PowerTab®
$I_{F(AV)}$	100 A
V_R	15 V
V_F at I_F	0.45 V
I_{RM}	870 mA at 100 °C
T_J max.	125 °C
Diode variation	Single die
E_{AS}	9 mJ

MAJOR RATINGS AND CHARACTERISTICS			
SYMBOL	CHARACTERISTICS	VALUES	UNITS
$I_{F(AV)}$	Rectangular waveform	100	A
	T_C	88	°C
V_{RRM}		15	V
I_{FSM}	t_p = 5 µs sine	5000	A
V_F	100 A_{pk} (typical)	0.39	V
	T_J	125	°C
T_J	Range	-55 to +125	°C

VOLTAGE RATINGS				
PARAMETER	SYMBOL	TEST CONDITIONS	VS-100BGQ015	UNITS
Maximum DC reverse voltage	V_R	T_J = 100 °C	15	V
		T_J = 125 °C	5	

ABSOLUTE MAXIMUM RATINGS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum average forward current	$I_{F(AV)}$	50 % duty cycle at T_C = 88 °C, rectangular waveform		100	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	5000	A
		10 ms sine or 6 ms rect. pulse		1000	
Non-repetitive avalanche energy	E_{AS}	T_J = 25 °C, I_{AS} = 2 A, L = 4.5 mH		9	mJ
Repetitive avalanche current	I_{AR}	Current decaying linearly to zero in 1 µs Frequency limited by T_J maximum V_A = 3 x V_R typical		2	A

ELECTRICAL SPECIFICATIONS

PARAMETER	SYMBOL	TEST CONDITIONS		TYP.	MAX.	UNITS
Forward voltage drop	V_{FM} (1)	50 A	T_J = 25 °C	0.36	0.4	V
		100 A		0.45	0.52	
		50 A	T_J = 125 °C	0.27	0.31	
		100 A		0.39	0.45	
Maximum reverse leakage current	I_{RM} (1)	T_J = 100 °C, V_R = 12 V		480	700	mA
		T_J = 125 °C, V_R = 5 V		1	1.2	A
		T_J = 25 °C	V_R = Rated V_R	7	18	mA
		T_J = 100 °C		580	870	
Maximum junction capacitance	C_T	V_R = 5 V_{DC}, (test signal range 100 kHz to 1 MHz), 25 °C		3800		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 temperature range		T_J		-55 to +125	°C
Maximum storage temperature range		T_{Stg}		-55 to +150	
Maximum thermal resistance, junction to case		R_{thJC}	DC operation	0.50	°C/W
Maximum thermal resistance, case to heatsink		R_{thCS}	Mounting surface, smooth and greased	0.30	
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®	100BGQ015	

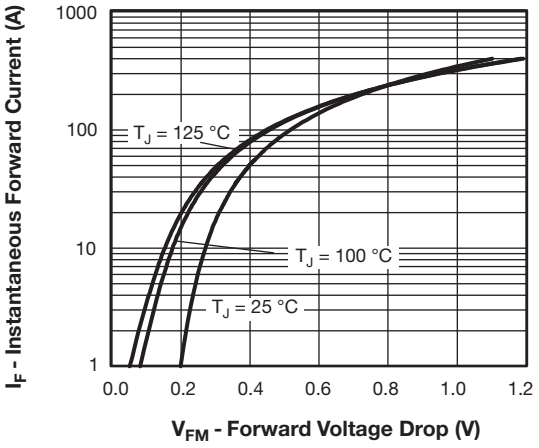


Fig. 1 - Maximum Forward Voltage Drop Characteristics

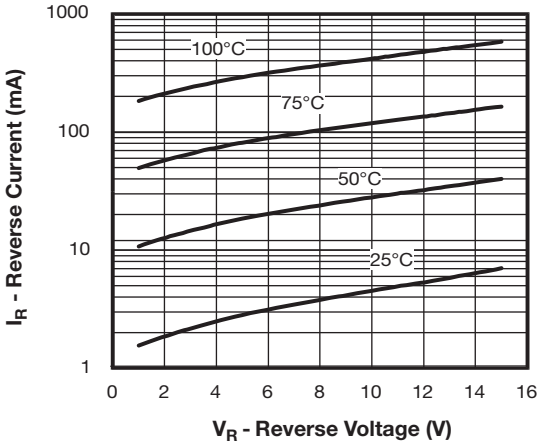


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

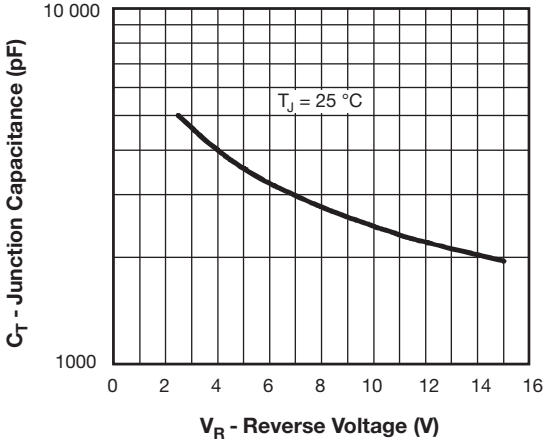


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

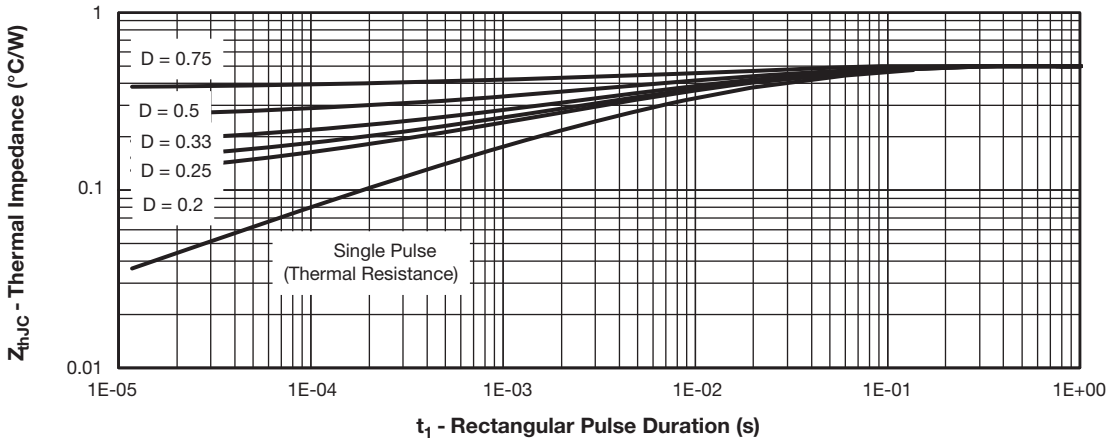


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

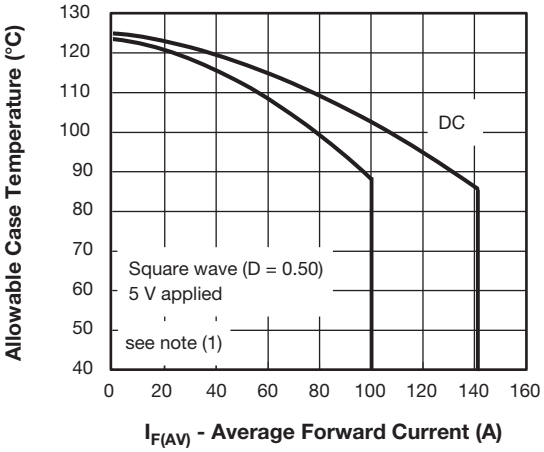


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

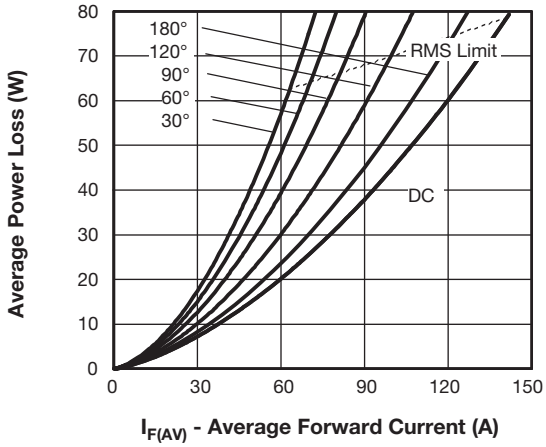


Fig. 6 - Forward Power Loss Characteristics

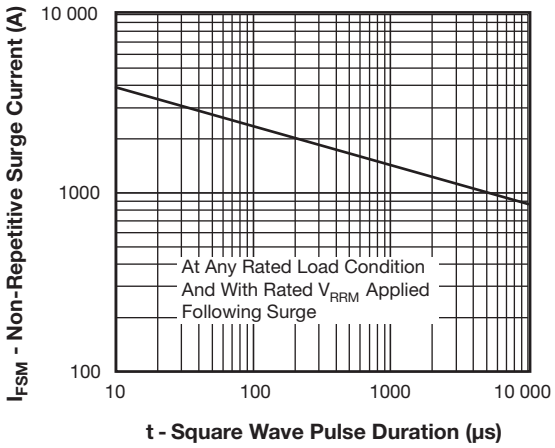


Fig. 7 - Maximum Non-Repetitive Surge Current

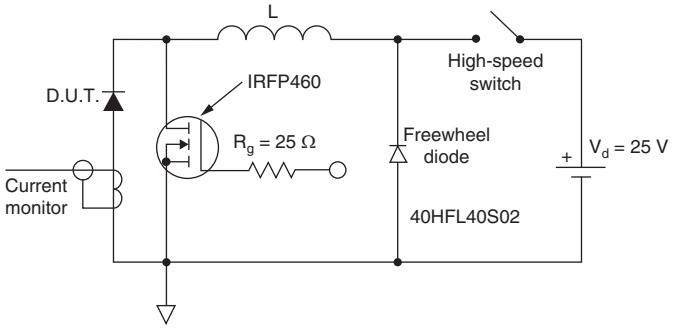


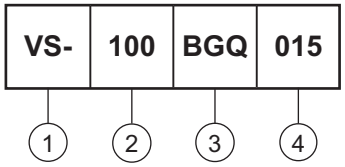
Fig. 8 - Unclamped Inductive Test Circuit

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} = 5 V

ORDERING INFORMATION TABLE

Device code

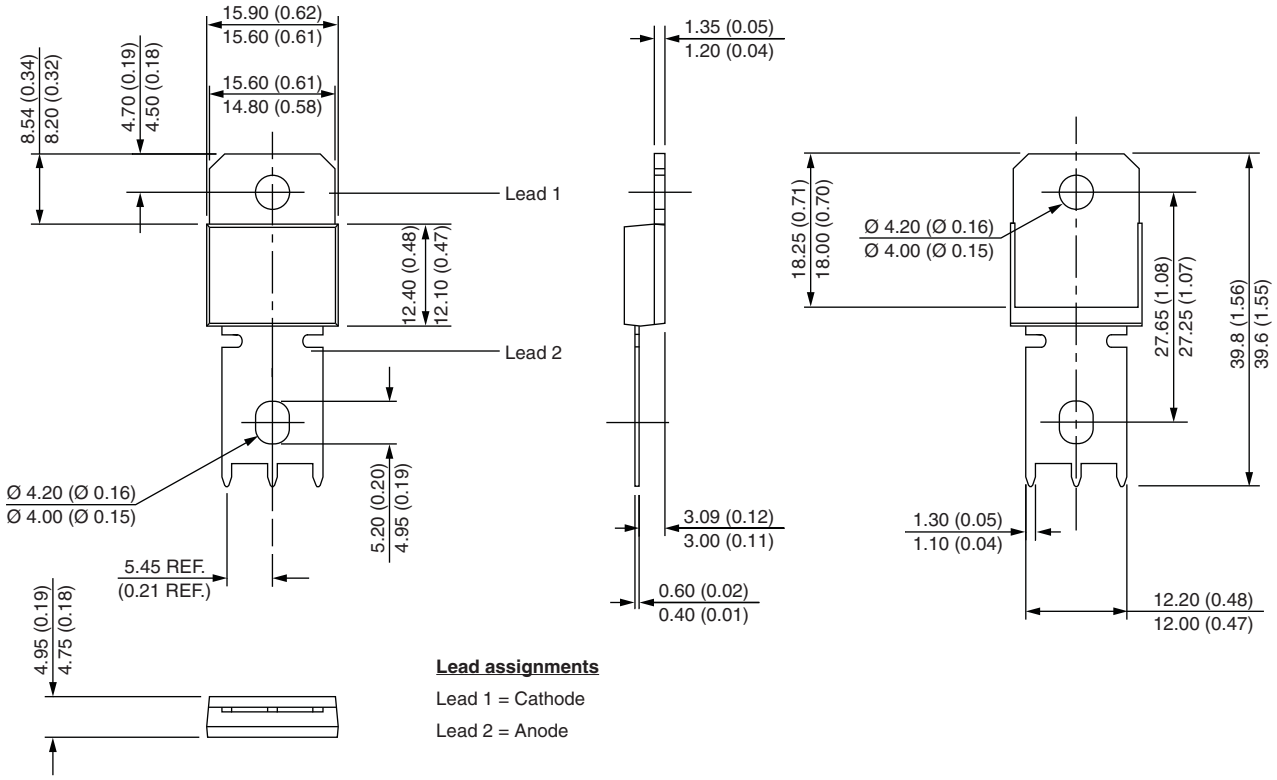


1 - Vishay Semiconductors product
2 - Current rating
3 - Essential part number
4 - Voltage code = V_{RRM}

LINKS TO RELATED DOCUMENTS	
Dimensions	www.vishay.com/doc?95240
Part marking information	www.vishay.com/doc?95370
SPICE model	www.vishay.com/doc?95428
Application note	www.vishay.com/doc?95179

PowerTab®

DIMENSIONS in millimeters (inches)



Lead assignments

Lead 1 = Cathode

Lead 2 = Anode

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