

SOT-227 Silicon Carbide Single Phase Bridge, 90 A



SOT-227

LINKS TO ADDITIONAL RESOURCES



PRIMARY CHARACTERISTICS	
I_O at $T_C = 111\text{ }^{\circ}\text{C}$	90 A
V_{RRM}	650 V
V_{FM} at 90 A, $T_C = 25\text{ }^{\circ}\text{C}$	1.61 V
Package	SOT-227
Circuit configuration	Single phase bridge

FEATURES

- Virtually no recovery tail and no switching losses
- Majority carrier diode using Schottky technology on SiC wide band gap material
- Improved V_F and efficiency by thin wafer technology
- High speed switching, low switching losses
- Positive temperature coefficient, for easy paralleling
- Electrically isolated base plate
- Large creepage distance between terminal
- Simplified mechanical designs, rapid assembly
- Designed and qualified for industrial level
- UL approved file E78996 
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912


RoHS
COMPLIANT

DESCRIPTION / APPLICATIONS

Wide band gap SiC based 650 V Schottky diode, designed for high performance and ruggedness.

Optimum choice for high speed hard switching and efficient operation over a wide temperature range, it is also recommended for all applications suffering from Silicon ultrafast recovery behavior.

Typical applications include AC/DC PFC and DC/DC ultra high frequency output rectification in FBPS and LLC converters

MAJOR RATINGS AND CHARACTERISTICS			
SYMBOL	CHARACTERISTICS	VALUES	UNITS
I_O	180° rect. conduction angle	90	A
	T_C	111	$^{\circ}\text{C}$
I_{FSM}	50 Hz	340	A
	60 Hz	356	
I^2t	50 Hz	578	A^2s
	60 Hz	528	
V_{RRM}		650	V
T_J		-40 to +175	$^{\circ}\text{C}$

ELECTRICAL SPECIFICATIONS

VOLTAGE RATINGS		
TYPE NUMBER	V_{RRM} , MAXIMUM REPETITIVE PEAK REVERSE VOLTAGE V	V_{RSM} , MAXIMUM NON-REPETITIVE PEAK REVERSE VOLTAGE V
VS-SC90BA65	650	650

**ELECTRICAL SPECIFICATIONS PER DIODE** ($T_J = 25\text{ }^{\circ}\text{C}$ unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Cathode to anode breakdown voltage	V_{BR}	$I_R = 300\text{ }\mu\text{A}$	650	-	-	V
Forward voltage	V_{FM}	$I_F = 90\text{ A}$	-	1.64	1.90	
		$I_F = 90\text{ A}, T_J = 150\text{ }^{\circ}\text{C}$	-	2.04	-	
Reverse leakage current	I_{RM}	$V_R = 650\text{ V}$	-	2.4	120	μA
		$T_J = 125\text{ }^{\circ}\text{C}, V_R = 650\text{ V}$	-	8.3	-	
		$T_J = 150\text{ }^{\circ}\text{C}, V_R = 650\text{ V}$	-	12.0	-	
Junction capacitance	C_T	$V_R = 650\text{ V}, f = 1\text{ MHz}$	-	243	-	pF
RMS isolation voltage base plate	V_{ISOL}	$f = 50\text{ Hz}$, any terminal to case, $t = 1\text{ min.}$	2500	-	-	V

FORWARD CONDUCTION

PARAMETER	SYMBOL	TEST CONDITIONS			VALUES	UNITS
Maximum DC output current at case temperature	I _O	Resistive or inductive load			90	A
					111	°C
Maximum peak, one-cycle non-repetitive forward current	I _{FSM}	t = 10 ms	No voltage reapplied	Initial T _J = 25 °C	340	A
		t = 8.3 ms			356	
		t = 10 ms	100 % V _{RRM} reapplied		286	
		t = 8.3 ms			299	
Maximum I ² t for fusing	I ² t	t = 10 ms	No voltage reapplied		578	A ² s
		t = 8.3 ms			528	
		t = 10 ms	100 % V _{RRM} reapplied		409	
		t = 8.3 ms			373	
Maximum I ² √t for fusing	I ² √t	I ² t for time t _x = I ₂ √t × √t _x ; 0.1 ≤ t _x ≤ 10 ms, V _{RRM} = 0 V			5.78	kA ² √s
Low level of threshold voltage, per leg	V _{F(T0)1}	(16.7 % × π × I _{F(AV)}) < I < π × I _{F(AV)} , T _J = T _J maximum			0.90	V
Low level value of forward slope resistance	r _{f1}				16.38	mΩ
High level of threshold voltage, per leg	V _{F(T0)2}	(I > π × I _{F(AV)}), T _J = T _J maximum			1.015	V
High level value of forward slope resistance	r _{f2}				16.17	mΩ
Maximum forward voltage, per diode	V _{FM}	I _F = 90 A			1.90	V

DYNAMIC RECOVERY CHARACTERISTICS ($T_J = 25\text{ }^{\circ}\text{C}$ unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Total capacitive charge	Q_C	$V_R = 400\text{ V}$	-	164	-	nC

THERMAL - MECHANICAL SPECIFICATIONS

PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Thermal resistance junction-to-case, per diode	R_{thJC}		-	-	0.6	$^{\circ}\text{C/W}$
Case-to-heatsink	R_{thCS}	Flat, greased surface	-	0.1	-	
Weight			-	30	-	g
Mounting torque		Torque to terminal	-	-	1.1 (9.7)	Nm (lbf.in)
		Torque to heatsink	-	-	1.8 (15.9)	Nm (lbf.in)
Case style			SOT-227			

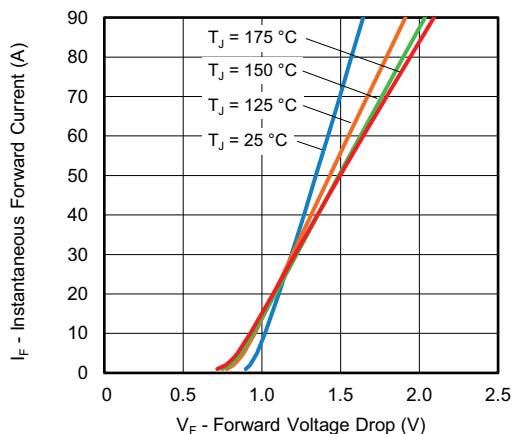


Fig. 1 - Typical Forward Voltage Drop Characteristics

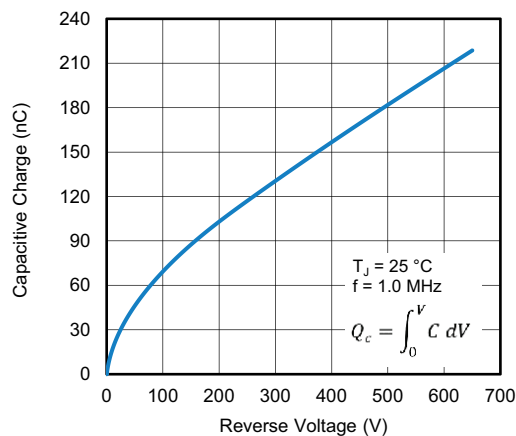


Fig. 4 - Typical Capacitive Charge vs. Reverse Voltage

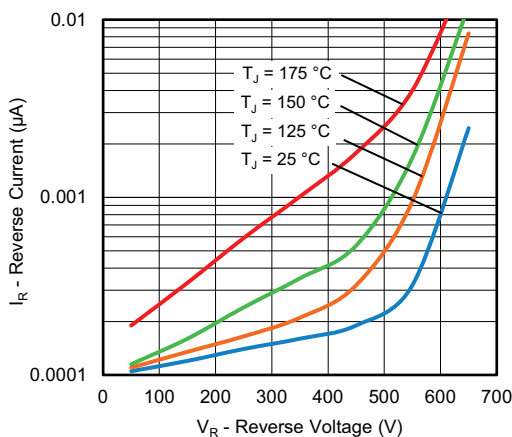


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

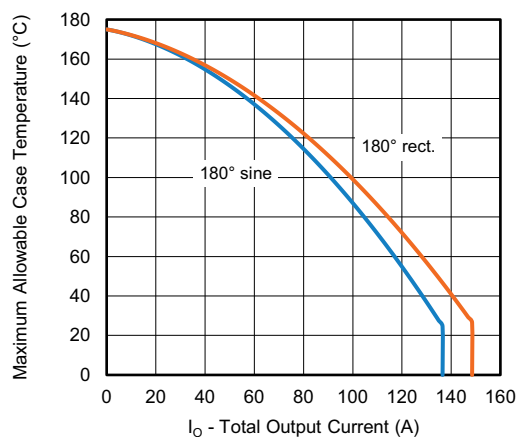


Fig. 5 - Current Rating Characteristics

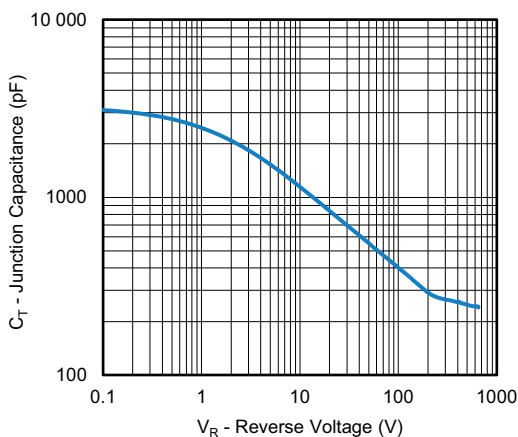


Fig. 3 - Junction Capacitance vs. Reverse Voltage

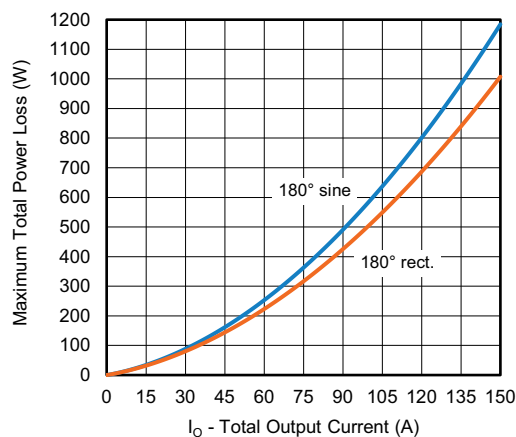


Fig. 6 - Total Power Loss Characteristics

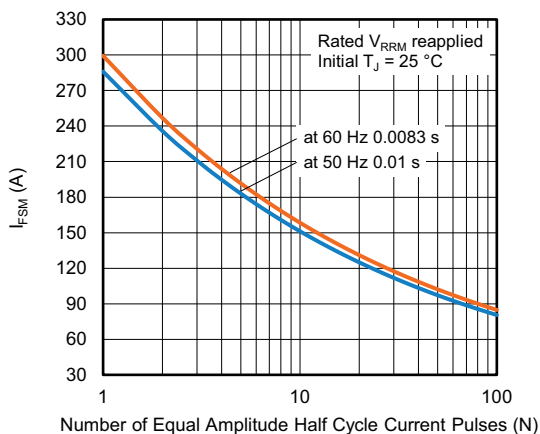


Fig. 7 - Non-Repetitive Peak Forward Surge Current vs. Number Pulses

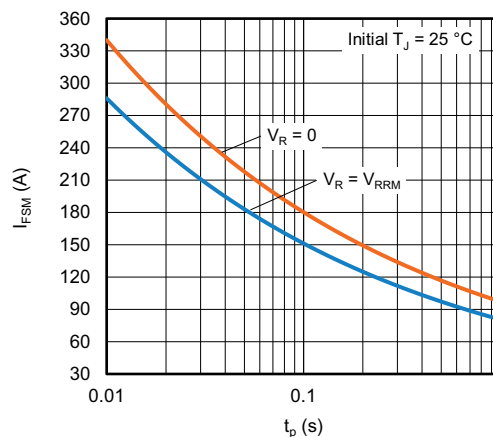


Fig. 8 - Non-Repetitive Peak Forward Surge Current vs. Pulse Duration

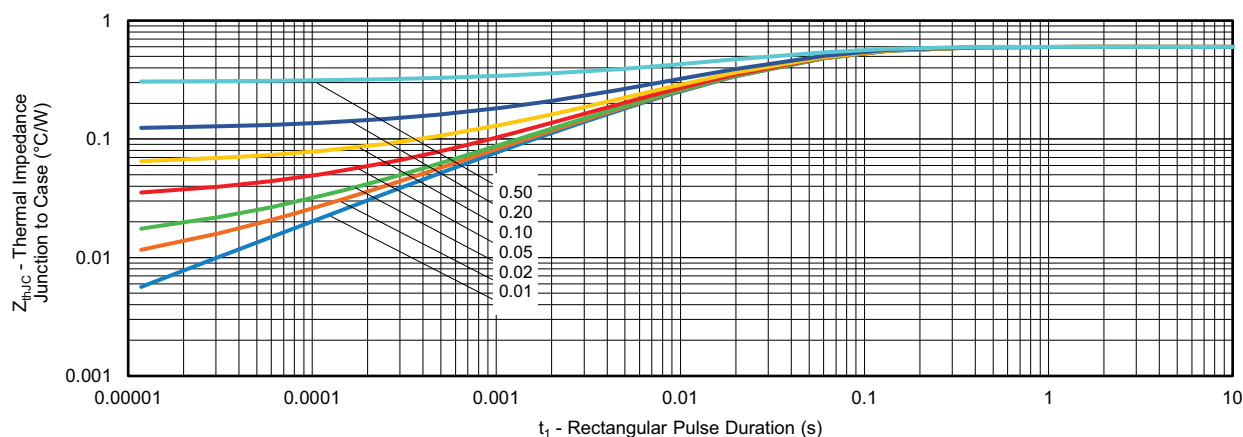


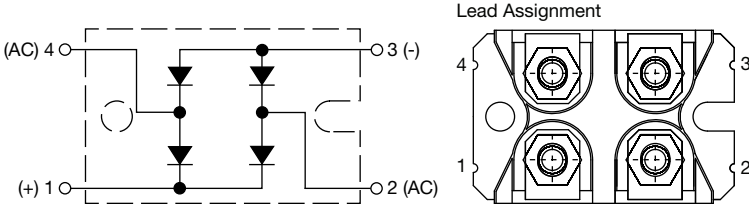
Fig. 9 - Maximum Thermal Impedance Characteristics

ORDERING INFORMATION TABLE

Device code	VS-	S	C	90	B	A	65
	1	2	3	4	5	6	7

- 1** - Vishay Semiconductors product
- 2** - Silicon Carbide diode
- 3** - Present silicon generation
- 4** - Current rating (90 = 90 A)
- 5** - Circuit configuration (single phase bridge)
- 6** - Package indicator (SOT-227 standard insulated base)
- 7** - Voltage rating (65 = 650 V)

Quantity per tube is 10, M4 screw and washer included

CIRCUIT CONFIGURATION		
CIRCUIT	CIRCUIT CONFIGURATION CODE	CIRCUIT DRAWING
Single phase bridge	B	

LINKS TO RELATED DOCUMENTS	
Dimensions	www.vishay.com/doc?95423
Part marking information	www.vishay.com/doc?95425



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