

SOT-227 Silicon Carbide Schottky Barrier Diode, 650 V, 160 A



SOT-227


**RoHS
COMPLIANT**

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

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

PRIMARY CHARACTERISTICS	
V_R	650 V
V_F (typical) at 80 A, per diode	1.38 V
Q_C (typical), per diode	220 nC
$I_{F(DC)}$ per module at $T_C = 124\text{ }^\circ\text{C}$	160 A
Type	Modules - diode, SiC Schottky
Package	SOT-227
Circuit configuration	Two separate diodes, parallel pin-out

ABSOLUTE MAXIMUM RATINGS				
PARAMETER	SYMBOL	TEST CONDITIONS	MAX.	UNITS
Cathode to anode voltage	V_R		650	V
Continuous forward current per diode	I_F	$T_C = 124\text{ }^\circ\text{C}$	80	A
Single pulse forward current per diode	I_{FSM}	$T_J = 25\text{ }^\circ\text{C}$, 6 ms square pulse	450	
Maximum power dissipation per module	P_D	$T_C = 124\text{ }^\circ\text{C}$	300	W
RMS isolation voltage	V_{ISOL}	Any terminal to case, $t = 1\text{ min}$	2500	V
Operating junction and storage temperature range	T_J, T_{Stg}		-55 to +175	$^\circ\text{C}$

ELECTRICAL SPECIFICATIONS ($T_J = 25\text{ }^\circ\text{C}$ unless otherwise specified)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Cathode to anode breakdown voltage	V_{BR}	$I_R = 400\text{ }\mu\text{A}$	650	-	-	V
Forward voltage	V_{FM}	$I_F = 80\text{ A}$	-	1.38	1.59	
		$I_F = 80\text{ A}$, $T_J = 150\text{ }^\circ\text{C}$	-	1.61	-	
Reverse leakage current	I_{RM}	$V_R = 650\text{ V}$	-	3.7	1.60	μA
		$T_J = 125\text{ }^\circ\text{C}$, $V_R = 650\text{ V}$	-	12.6	-	
		$T_J = 150\text{ }^\circ\text{C}$, $V_R = 650\text{ V}$	-	18.7	-	
Junction capacitance	C_T	$V_R = 650\text{ V}$, $f = 1\text{ MHz}$	-	318	-	pF

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

PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Total capacitive charge	Q_C	$V_R = 400\text{ V}$	-	220	-	nC

THERMAL - MECHANICAL SPECIFICATIONS

PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Thermal resistance junction to case, per diode	R_{thJC}		-	-	0.34	$^\circ\text{C/W}$
Thermal resistance junction to case, per module			-	-	0.17	
Thermal resistance case to heatsink, per module	R_{thCS}	Flat, greased surface	-	0.05	-	
Weight			-	30	-	g
Mounting torque		Torque per diode	-	-	1.1 (9.7)	Nm (lbf.in)
		Torque to heatsink	-	-	1.8 (15.9)	Nm (lbf.in)
Case style			SOT-227			

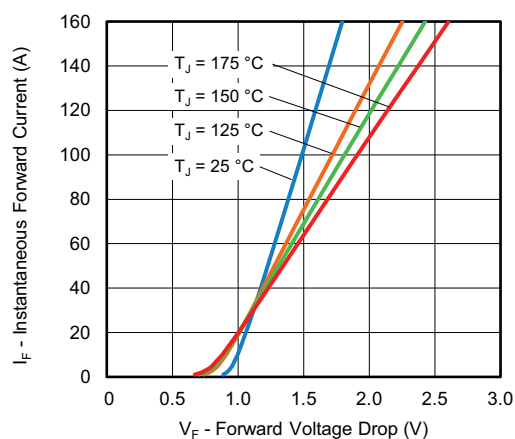


Fig. 1 - Typical Forward Voltage Drop Characteristics

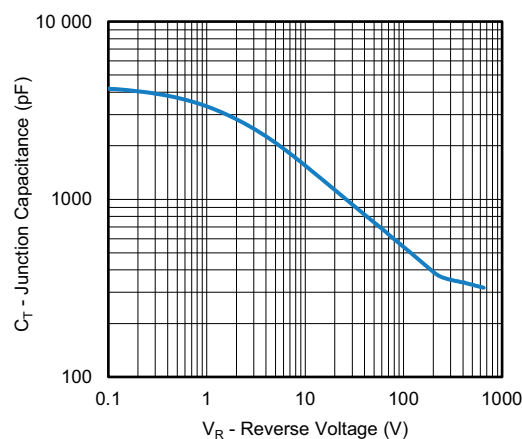


Fig. 3 - Junction Capacitance vs. Reverse Voltage

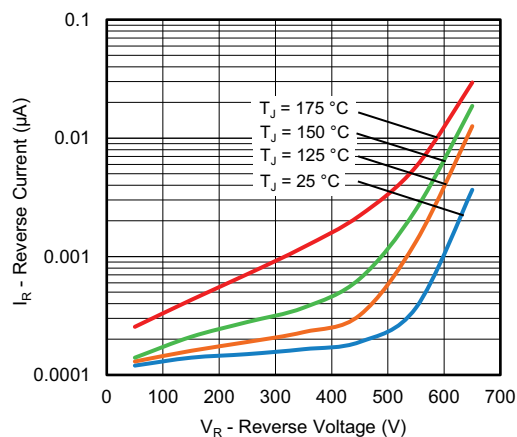


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

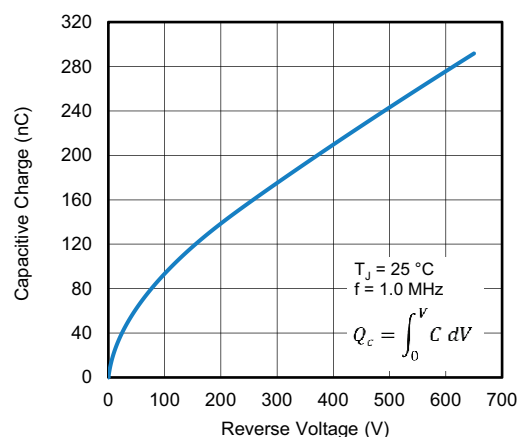


Fig. 4 - Typical Capacitive Charge vs. Reverse Voltage

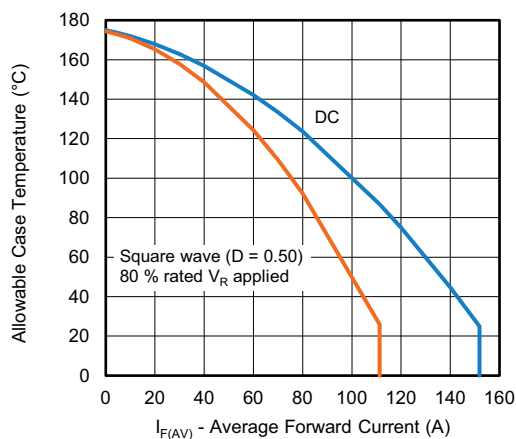


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

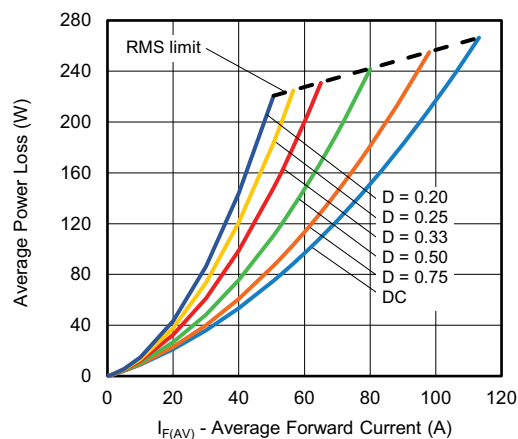


Fig. 6 - Forward Power Loss Characteristics

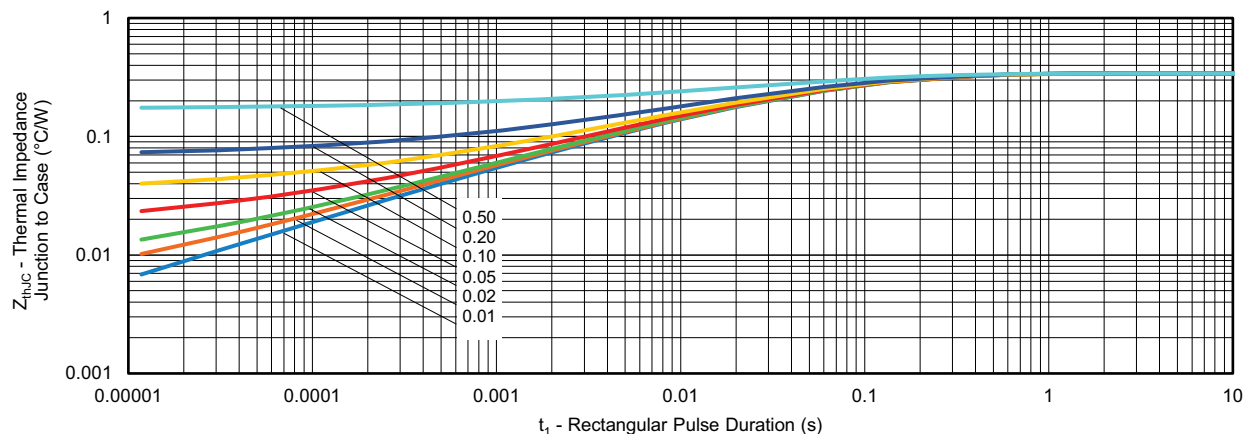


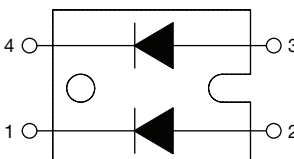
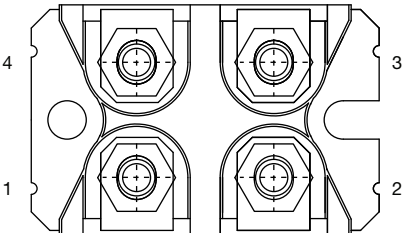
Fig. 7 - Maximum Thermal Impedance Z_{thJC} Characteristics

ORDERING INFORMATION TABLE

Device code	VS-	SC	160	F	A	65
	1	2	3	4	5	6

- 1** - Vishay Semiconductors product
- 2** - SC = SiC Schottky Barrier Diode
- 3** - Current rating per module (160 = 160 A)
- 4** - F = circuit configuration (two separate diodes, parallel pin-out)
- 5** - Package indicator (SOT-227 standard insulated base)
- 6** - Voltage rating (65 = 650 V)

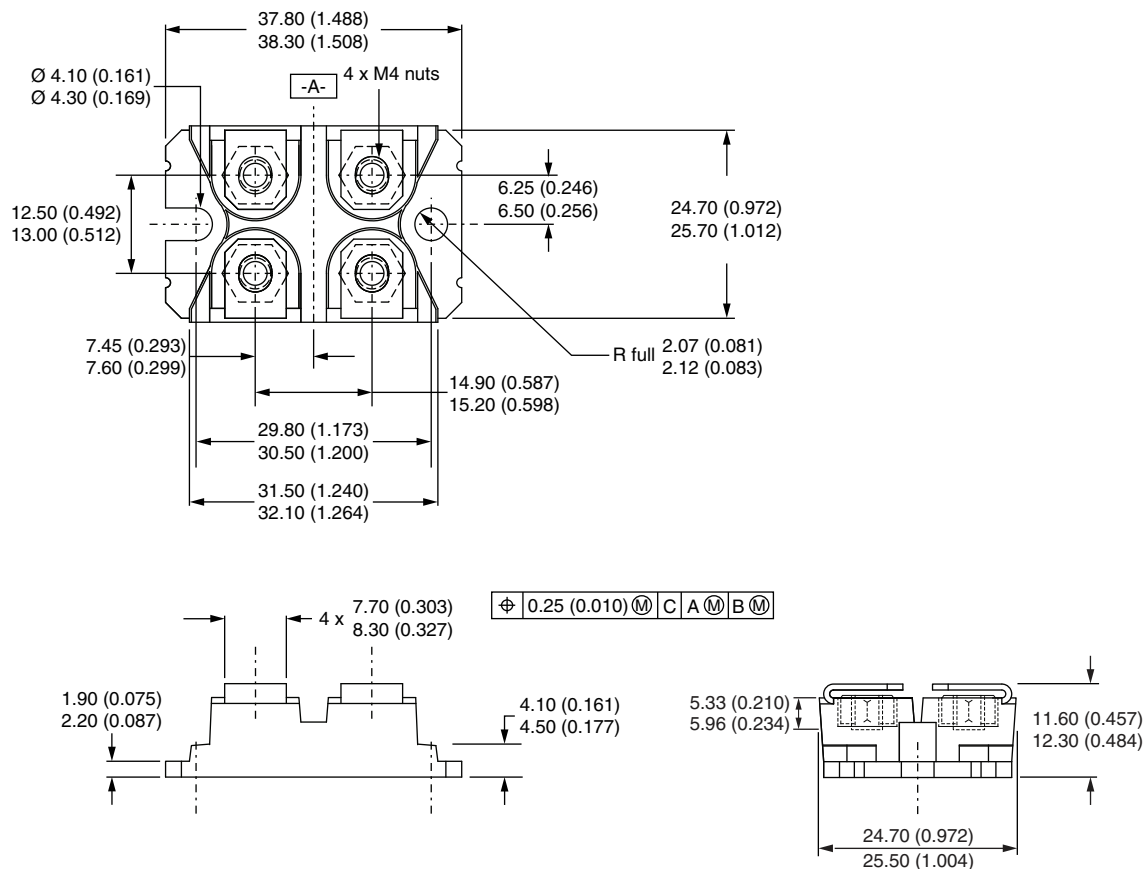


CIRCUIT CONFIGURATION		
CIRCUIT	CIRCUIT CONFIGURATION CODE	CIRCUIT DRAWING
Two separate diodes, parallel pin-out	F	 Lead Assignment 

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

SOT-227 Generation 2

DIMENSIONS in millimeters (inches)



Note

- Controlling dimension: millimeter



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