


# SOT-227 Silicon Carbide Schottky Barrier Diode, 650 V, 120 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](http://www.vishay.com/doc?99912)

PRIMARY CHARACTERISTICS	
$V_R$	650 V
$V_F$ (typical) at 60 A, per diode	1.39 V
$Q_C$ (typical), per diode	164 nC
$I_{F(DC)}$ per module at $T_C = 127\text{ }^\circ\text{C}$	120 A
Type	Modules - diode, SiC Schottky
Package	SOT-227
Circuit configuration	Two separate diodes, parallel pin-out

**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

ABSOLUTE MAXIMUM RATINGS				
PARAMETER	SYMBOL	TEST CONDITIONS	MAX.	UNITS
Cathode to anode voltage	$V_R$		650	V
Continuous forward current per diode	$I_F$	$T_C = 127\text{ }^\circ\text{C}$	60	A
Single pulse forward current per diode	$I_{FSM}$	$T_J = 25\text{ }^\circ\text{C}$ , 6 ms square pulse	340	
Maximum power dissipation per module	$P_D$	$T_C = 127\text{ }^\circ\text{C}$	228	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	$V_{BR}$	$I_R = 300\text{ }\mu\text{A}$	650	-	-	V
Forward voltage	$V_{FM}$	$I_F = 60\text{ A}$	-	1.39	1.59	
		$I_F = 60\text{ A}$ , $T_J = 150\text{ }^\circ\text{C}$	-	1.61	-	
Reverse leakage current	$I_{RM}$	$V_R = 650\text{ V}$	-	2.6	120	$\mu\text{A}$
		$T_J = 125\text{ }^\circ\text{C}$ , $V_R = 650\text{ V}$	-	9.2	-	
		$T_J = 150\text{ }^\circ\text{C}$ , $V_R = 650\text{ V}$	-	13.1	-	
Junction capacitance	$C_T$	$V_R = 650\text{ V}$ , $f = 1\text{ MHz}$	-	240	-	pF



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	$R_{thJC}$		-	-	0.42	$^\circ\text{C/W}$
Thermal resistance junction to case, per module			-	-	0.21	
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			

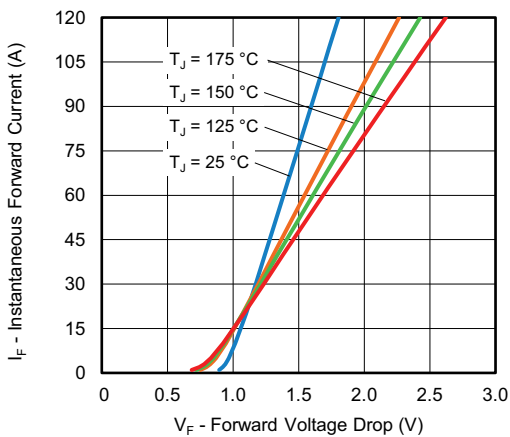


Fig. 1 - Instantaneous Forward Current vs. Forward Voltage Drop Characteristics

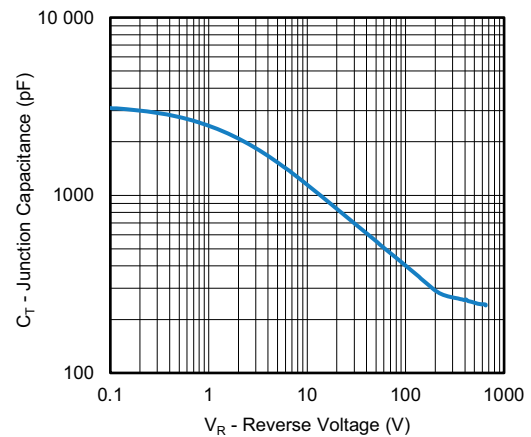


Fig. 3 - Junction Capacitance vs. Reverse Voltage

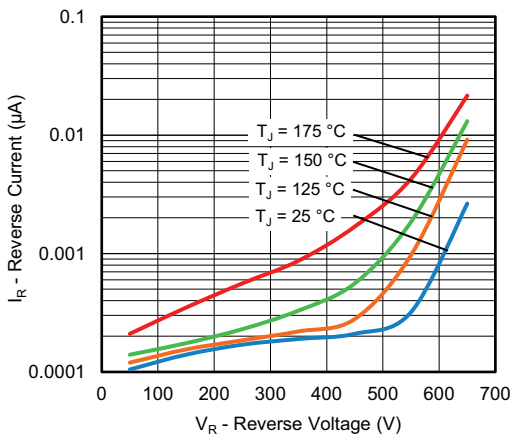


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

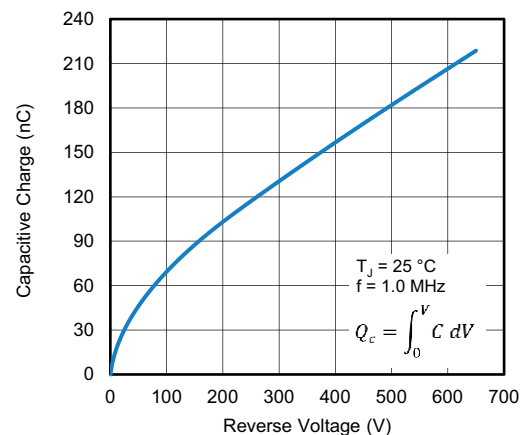


Fig. 4 - Typical Capacitive Charge vs. Reverse Voltage

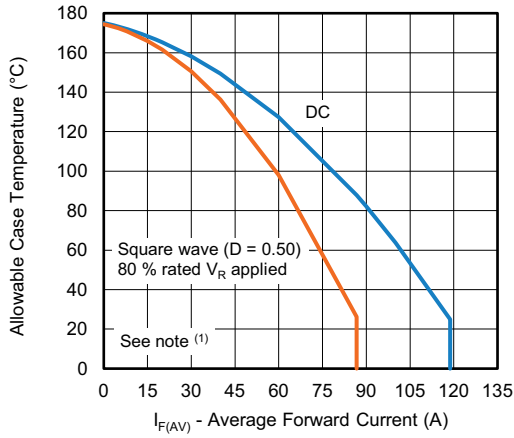


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

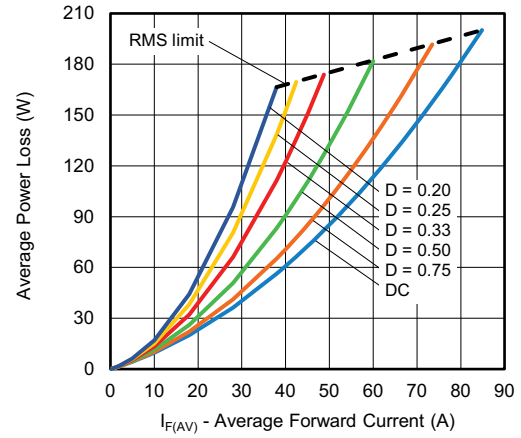


Fig. 6 - Forward Power Loss Characteristics

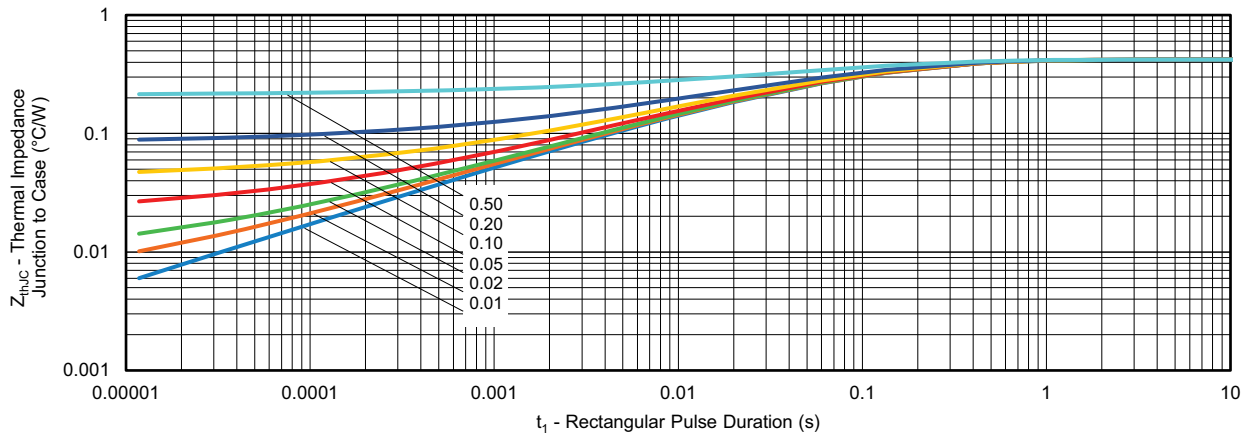


Fig. 7 - Maximum Thermal Impedance Characteristics

**ORDERING INFORMATION TABLE**

Device code	<b>VS-</b>	<b>SC</b>	<b>120</b>	<b>F</b>	<b>A</b>	<b>65</b>
	①	②	③	④	⑤	⑥

- ① - Vishay Semiconductors product
- ② - SC = SiC Schottky Barrier Diode
- ③ - Current rating per module (120 = 120 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	<p>Lead Assignment</p>

LINKS TO RELATED DOCUMENTS	
Dimensions	<a href="http://www.vishay.com/doc?95423">www.vishay.com/doc?95423</a>
Packaging information	<a href="http://www.vishay.com/doc?95425">www.vishay.com/doc?95425</a>



## SOT-227 Generation 2

**DIMENSIONS** in millimeters (inches)



**Note**

- Controlling dimension: millimeter



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