

# SOT-227 Silicon Carbide Schottky Barrier Diode, 650 V, 40 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)

## 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 20 A, per diode	1.36 V
$Q_C$ (typical), per diode	56 nC
$I_{F(DC)}$ per module at $T_C = 136^\circ\text{C}$	40 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	$I_F$	$T_C = 136^\circ\text{C}$	20	A
Single pulse forward current per diode	$I_{FSM}$	$T_J = 25^\circ\text{C}$ , 6 ms square pulse	105	
Maximum power dissipation per module	$P_D$	$T_C = 136^\circ\text{C}$	74	W
RMS isolation voltage	$V_{ISOL}$	Any terminal to case, $t = 1$ min	2500	V
Operating junction and storage temperature range	$T_J, T_{Stg}$		-55 to +175	$^\circ\text{C}$

ELECTRICAL SPECIFICATIONS ( $T_J = 25^\circ\text{C}$ unless otherwise specified)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Cathode to anode breakdown voltage	$V_{BR}$	$I_R = 100\ \mu\text{A}$	650	-	-	V
Forward voltage	$V_{FM}$	$I_F = 20\ \text{A}$	-	1.36	1.55	
		$I_F = 20\ \text{A}, T_J = 150^\circ\text{C}$	-	1.57	-	
Reverse leakage current	$I_{RM}$	$V_R = 650\ \text{V}$	-	1	40	$\mu\text{A}$
		$T_J = 125^\circ\text{C}, V_R = 650\ \text{V}$	-	3.1	-	
		$T_J = 150^\circ\text{C}, V_R = 650\ \text{V}$	-	4.6	-	
Junction capacitance	$C_T$	$V_R = 650\ \text{V}, f = 1\ \text{MHz}$	-	82	-	pF

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

PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Total capacitive charge	$Q_C$	$V_R = 400\text{ V}$	-	56	-	nC

**THERMAL - MECHANICAL SPECIFICATIONS**

PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Thermal resistance junction to case, per diode	$R_{thJC}$		-	-	1.06	$^\circ\text{C/W}$
Thermal resistance junction to case, per module			-	-	0.53	
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			

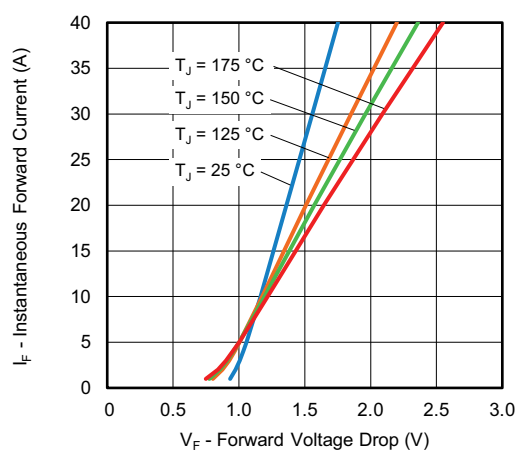


Fig. 1 - Typical Forward Voltage Drop Characteristics

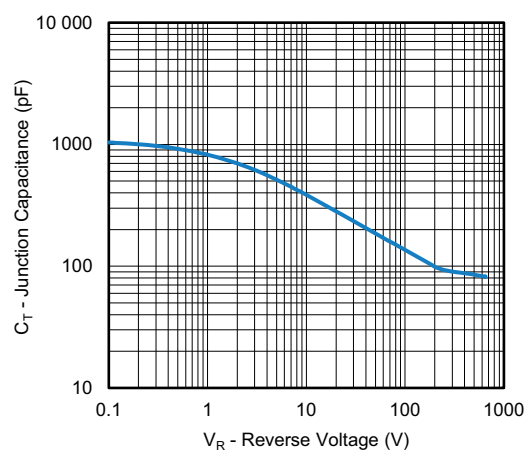


Fig. 3 - Junction Capacitance vs. Reverse Voltage

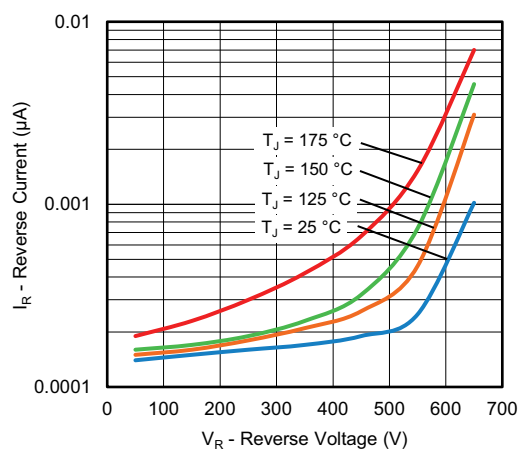


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

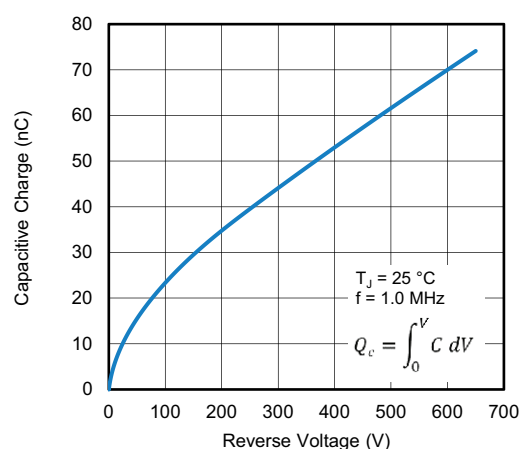


Fig. 4 - Typical Capacitive Charge vs. Reverse Voltage

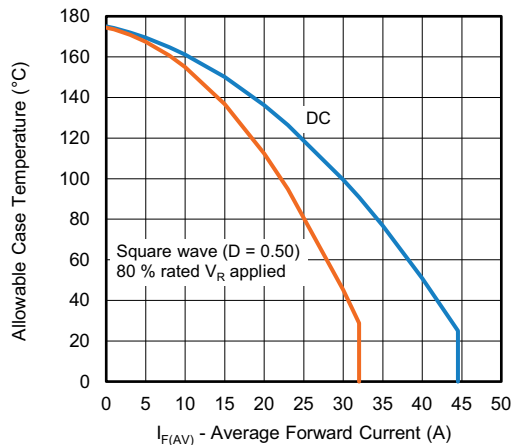


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

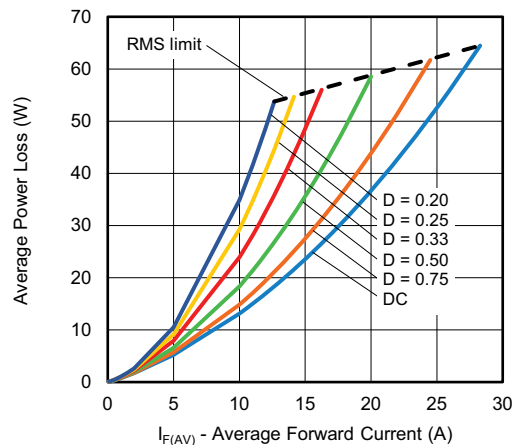


Fig. 6 - Forward Power Loss Characteristics

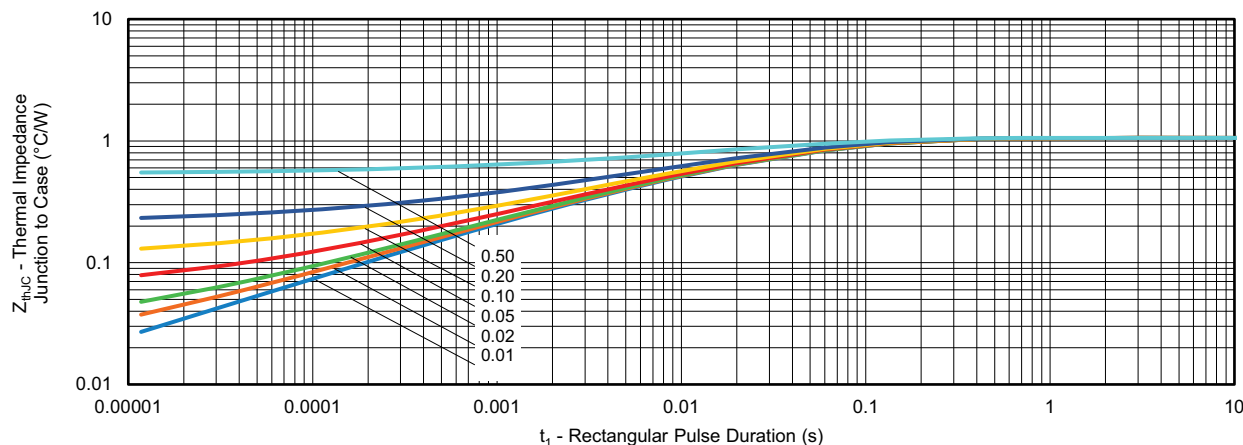


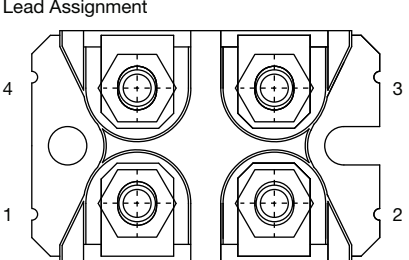
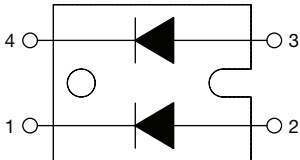
Fig. 7 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics

## ORDERING INFORMATION TABLE

Device code	VS-	SC	40	F	A	65
	①	②	③	④	⑤	⑥

- 1** - Vishay Semiconductors product
- 2** - SC = SiC Schottky Barrier Diode
- 3** - Current rating per module (40 = 40 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)

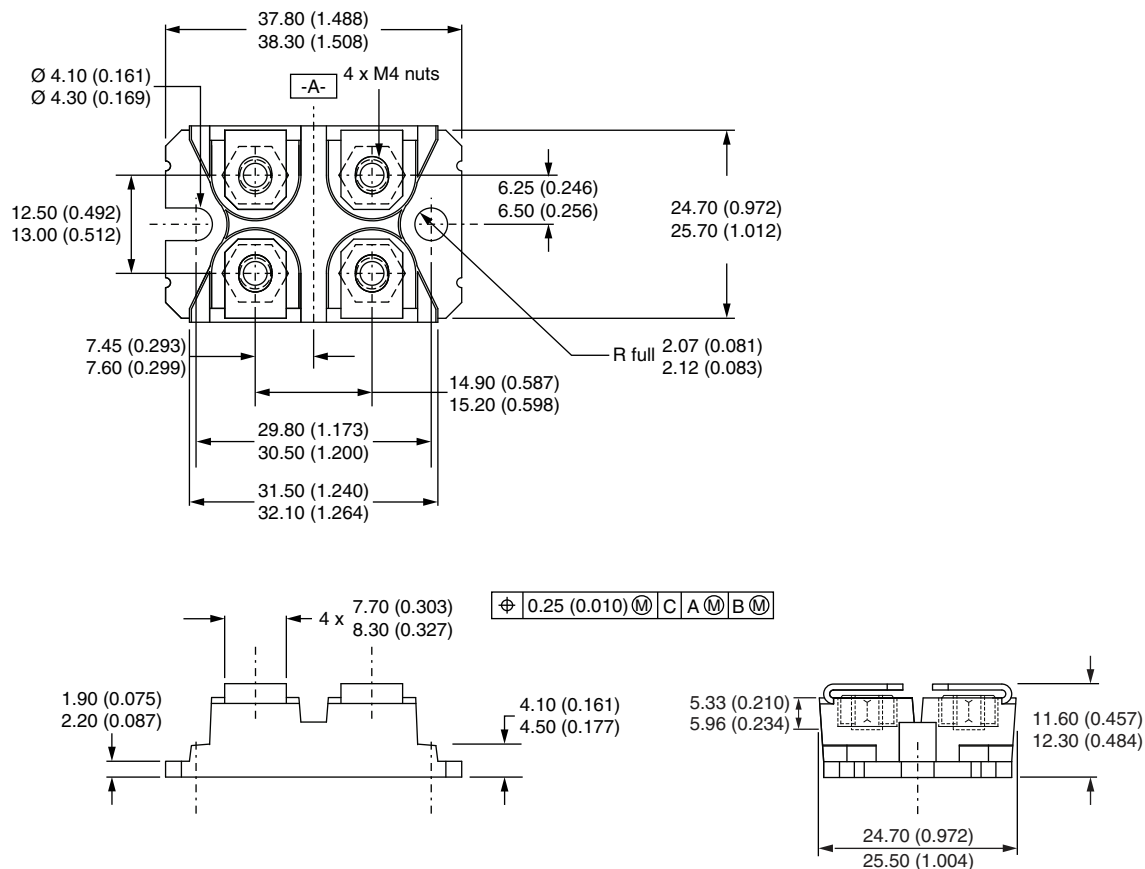


CIRCUIT CONFIGURATION		
CIRCUIT	CIRCUIT CONFIGURATION CODE	CIRCUIT DRAWING
Two separate diodes, parallel pin-out	F	<div></div>

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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