


## Insulated Gen 2 Schottky Rectifier Module, 250 A



SOT-227


**RoHS**  
COMPLIANT

### FEATURES

- Max.  $T_J = 175\text{ }^\circ\text{C}$
- Two fully independent diodes
- Fully insulated package
- Trench MOS Barrier Schottky technology
- Ultra low forward voltage drop
- Optimized for power conversion: welding and industrial SMPS applications
- Easy to use and parallel
- Industry standard outline
- UL approved file E78996 
- Designed and qualified for industrial level
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)

### DESCRIPTION

The VS-QA250FA20 insulated modules integrate two state of the art Trench MOS Schottky technology rectifiers in the compact, industry standard SOT-227 package.

These devices are thus intended for high frequency converters and switching power supplies.

PRIMARY CHARACTERISTICS	
$I_{F(AV)}$ per module at $T_C = 106\text{ }^\circ\text{C}$	250 A
$V_R$	200 V
$V_{FM}$ at 200 A, $T_C = 25\text{ }^\circ\text{C}$	1.0 V
Package	SOT-227
Circuit configuration	Two separate diodes, parallel pin-out

MAJOR RATINGS AND CHARACTERISTICS			
SYMBOL	CHARACTERISTICS	VALUES	UNITS
$V_F$	$T_J = 125\text{ }^\circ\text{C}$	1.09	V
$T_J$	Range	-55 to +175	$^\circ\text{C}$

ABSOLUTE MAXIMUM RATINGS ( $T_C = 25\text{ }^\circ\text{C}$ unless otherwise specified)				
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum average forward current per module	$I_{F(AV)}$	$T_C = 106\text{ }^\circ\text{C}$	250	A
Maximum cathode to anode voltage	$V_R$		200	V
Maximum continuous forward current per diode	$I_F$	$T_C = 95\text{ }^\circ\text{C}$	183	A
Maximum single pulse forward current per diode	$I_{FSM}$	$T_C = 175\text{ }^\circ\text{C}$ , $t = 6\text{ ms}$ , square	900	
Maximum power dissipation per diode	$P_D$	$T_C = 95\text{ }^\circ\text{C}$	182	W
Non-repetitive avalanche energy per diode	$E_{AS}$	$T_J = 25\text{ }^\circ\text{C}$ , $I_{AS} = 19\text{ A}$ , $L = 10\text{ mH}$	1800	mJ
RMS isolation voltage	$V_{ISOL}$	Any terminal to case, $t = 1\text{ minute}$	2500	V
Operating junction and storage temperatures	$T_J, T_{Stg}$		-55 to +175	$^\circ\text{C}$



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	$V_{BR}$	$I_R = 2\text{ mA}$	200	-	-	V
Forward voltage	$V_{FM}$	$I_F = 200\text{ A}$	-	1.0	1.2	
		$I_F = 200\text{ A}, T_J = 125\text{ }^\circ\text{C}$	-	0.89	1.09	
Reverse leakage current	$I_{RM}$	$V_R = 200\text{ V}$	-	13	90	$\mu\text{A}$
		$T_J = 125\text{ }^\circ\text{C}, V_R = V_R\text{ rated}$	-	14	-	$\text{mA}$
Junction capacitance	$C_T$	$V_R = 200\text{ V}$	-	380	-	$\text{pF}$

DYNAMIC RECOVERY CHARACTERISTICS ( $T_J = 25\text{ }^\circ\text{C}$ unless otherwise specified)							
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS	
Reverse recovery time	$t_{rr}$	$T_J = 25\text{ }^\circ\text{C}$	-	54	-	ns	
		$T_J = 125\text{ }^\circ\text{C}$	-	67	-		
Peak recovery current	$I_{RRM}$	$T_J = 25\text{ }^\circ\text{C}$	$I_F = 50\text{ A}$ $di_F/dt = 200\text{ A}/\mu\text{s}$ $V_R = 100\text{ V}$	-	6	-	A
		$T_J = 125\text{ }^\circ\text{C}$		-	8.4	-	
Reverse recovery charge	$Q_{rr}$	$T_J = 25\text{ }^\circ\text{C}$		-	165	-	nC
		$T_J = 125\text{ }^\circ\text{C}$		-	296	-	

THERMAL - MECHANICAL SPECIFICATIONS						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Junction to case, single leg conducting	$R_{thJC}$		-	-	0.44	$^\circ\text{C}/\text{W}$
Junction to case, both leg conducting			-	-	0.22	
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			

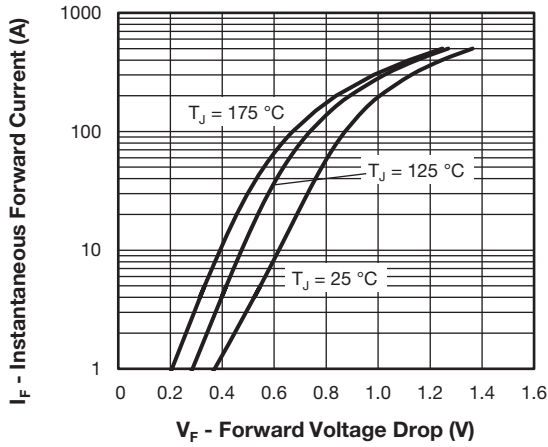


Fig. 1 - Typical Forward Voltage Drop vs. Instantaneous Forward Current (Per Diode)

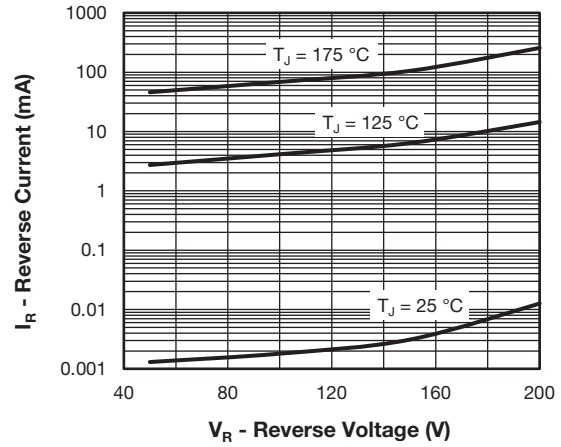


Fig. 2 - Typical Reverse Current vs. Reverse Voltage (Per Diode)

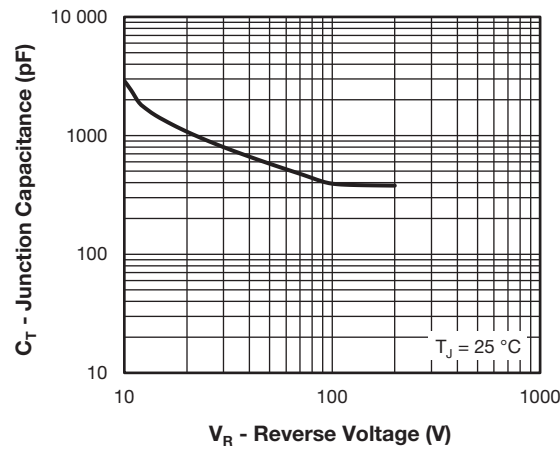


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Diode)

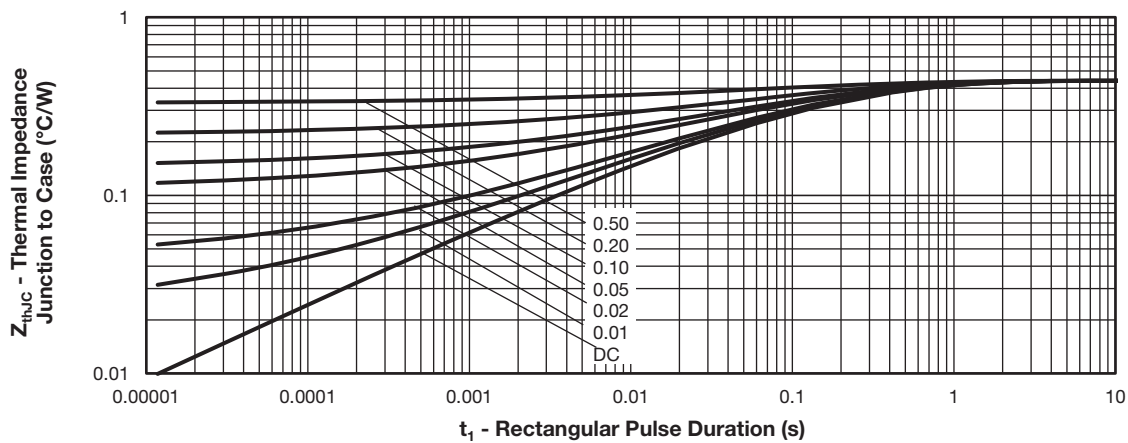


Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics (Per Diode)

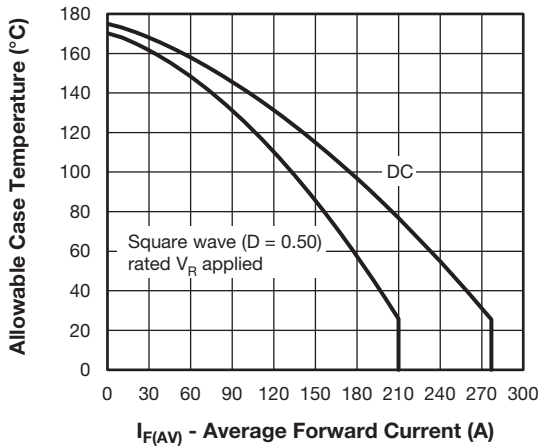


Fig. 5 - Maximum Current Rating Capability (Per Diode)

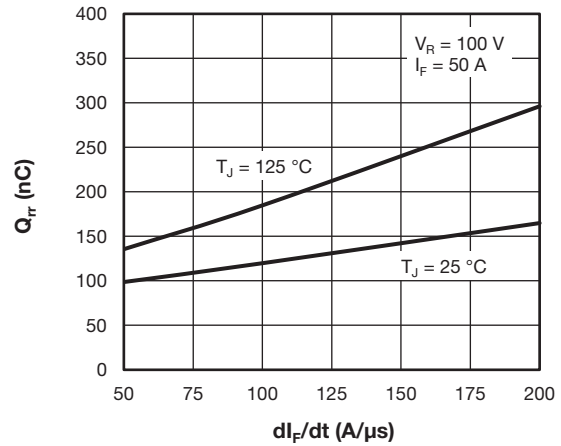


Fig. 7 - Typical Reverse Recovery Charge vs.  $di_F/dt$  (Per Diode)

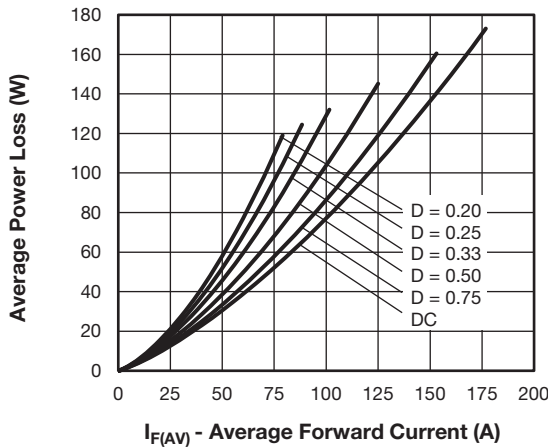


Fig. 6 - Forward Power Loss Characteristics (Per Diode)

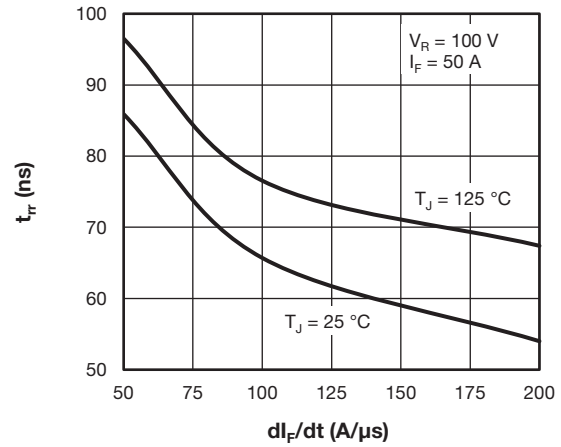


Fig. 8 - Typical Reverse Recovery Time vs.  $di_F/dt$  (Per Diode)

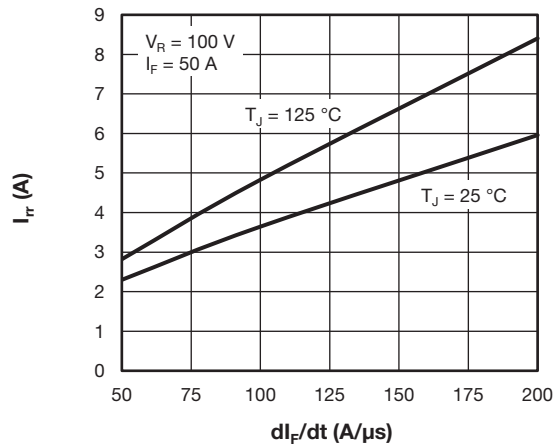


Fig. 9 - Typical Reverse Recovery Current vs.  $di_F/dt$  (Per Diode)

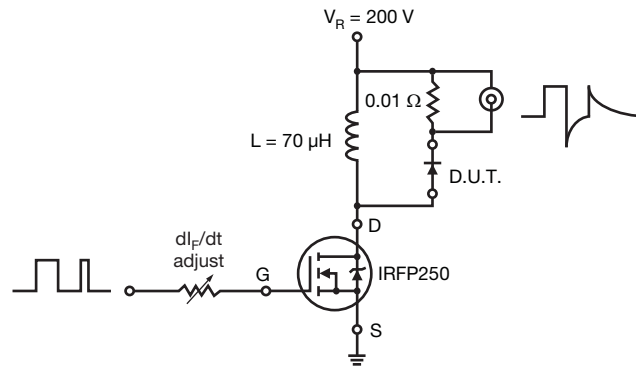
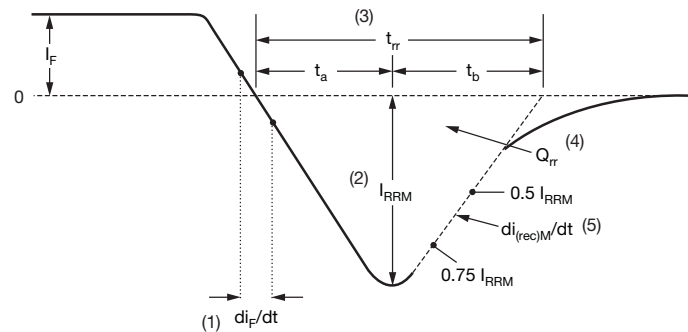


Fig. 10 - Reverse Recovery Parameter Test Circuit



- (1)  $di_F/dt$  - rate of change of current through zero crossing
- (2)  $I_{RRM}$  - peak reverse recovery current
- (3)  $t_{rr}$  - reverse recovery time measured from zero crossing point of negative going  $I_F$  to point where a line passing through  $0.75 I_{RRM}$  and  $0.50 I_{RRM}$  extrapolated to zero current.
- (4)  $Q_{rr}$  - area under curve defined by  $t_{rr}$  and  $I_{RRM}$
- (5)  $di_{(rec)M}/dt$  - peak rate of change of current during  $t_b$  portion of  $t_{rr}$

$$Q_{rr} = \frac{t_{rr} \times I_{RRM}}{2}$$

Fig. 11 - Reverse Recovery Waveform and Definitions

**ORDERING INFORMATION TABLE**

Device code	<b>VS-</b>	<b>Q</b>	<b>A</b>	<b>250</b>	<b>F</b>	<b>A</b>	<b>20</b>
	①	②	③	④	⑤	⑥	⑦

- 1** - Vishay Semiconductors product
- 2** - Schottky technologies
- 3** - Present silicon generation
- 4** - Current rating (250 = 250 A)
- 5** - Circuit configuration (2 separate diodes, parallel pin-out)
- 6** - Package indicator (SOT-227 standard insulated base)
- 7** - Voltage rating (20 = 200 V)

Quantity per tube is 10, M4 screw and washer included



CIRCUIT CONFIGURATION		
CIRCUIT	CIRCUIT CONFIGURATION CODE	CIRCUIT DRAWING
2 separate diodes, parallel pin-out	F	

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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