

## Insulated Gen 2 Schottky Rectifier Module, 300 A



SOT-227


**RoHS**  
COMPLIANT

### FEATURES

- Max.  $T_J = 175\text{ °C}$
- 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-QA300FA17 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 $T_C = 132\text{ °C}$	300 A
$V_R$	170 V
$V_{FM}$ at 100 A, $T_C = 25\text{ °C}$	0.79 V
Package	SOT-227
Circuit configuration	Two separate diodes, parallel pin-out

MAJOR RATINGS AND CHARACTERISTICS			
SYMBOL	CHARACTERISTICS	VALUES	UNITS
$V_F$	$T_J = 150\text{ °C}$	0.69	V
$T_J$	Range	-55 to +175	°C

ABSOLUTE MAXIMUM RATINGS ( $T_C = 25\text{ °C}$ unless otherwise specified)				
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Average forward current per module	$I_{F(AV)}$	$T_C = 132\text{ °C}$	300	A
Cathode to anode voltage	$V_R$		170	V
Continuous forward current per diode	$I_F$	$T_C = 90\text{ °C}$	330	A
Single pulse forward current per diode	$I_{FSM}$	$T_C = 175\text{ °C}$ , $t = 6\text{ ms}$ , square	1575	
Maximum power dissipation per diode	$P_D$	$T_C = 90\text{ °C}$	327	W
Non-repetitive avalanche energy per diode	$E_{AS}$	$T_J = 25\text{ °C}$ , $I_{AS} = 27\text{ A}$ , $L = 10\text{ mH}$	3700	mJ
RMS isolation voltage	$V_{ISOL}$	Any terminal to case, $t = 1\text{ min}$	2500	V
Operating junction and storage temperatures	$T_J, T_{Stg}$		-55 to +175	°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	$V_{BR}$	$I_R = 2\text{ mA}$	170	-	-	V
Forward voltage	$V_{FM}$	$I_F = 100\text{ A}$	-	0.79	0.85	
		$I_F = 100\text{ A}, T_J = 150\text{ }^\circ\text{C}$	-	0.62	-	
		$I_F = 200\text{ A}$	-	0.89	0.98	
Reverse leakage current	$I_{RM}$	$V_R = 170\text{ V}$	-	13	200	$\mu\text{A}$
		$T_J = 125\text{ }^\circ\text{C}, V_R = 170\text{ V}$	-	20	-	mA
Junction capacitance	$C_T$	$V_R = 170\text{ V}$	-	737	-	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	$t_{rr}$	$T_J = 25\text{ }^\circ\text{C}$	-	71	-	ns	
		$T_J = 125\text{ }^\circ\text{C}$	-	82	-		
Peak recovery current	$I_{RRM}$	$T_J = 25\text{ }^\circ\text{C}$	$I_F = 50\text{ A}$ $di_F/dt = 200\text{ A}/\mu\text{s}$ $V_R = 100\text{ V}$	-	7.1	-	A
		$T_J = 125\text{ }^\circ\text{C}$		-	8.8	-	
Reverse recovery charge	$Q_{rr}$	$T_J = 25\text{ }^\circ\text{C}$		-	252	-	nC
		$T_J = 125\text{ }^\circ\text{C}$		-	352	-	

THERMAL - MECHANICAL SPECIFICATIONS						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Junction-to-case, single leg conducting	$R_{thJC}$		-	-	0.26	$^\circ\text{C}/\text{W}$
Junction-to-case, both leg conducting			-	-	0.13	
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			

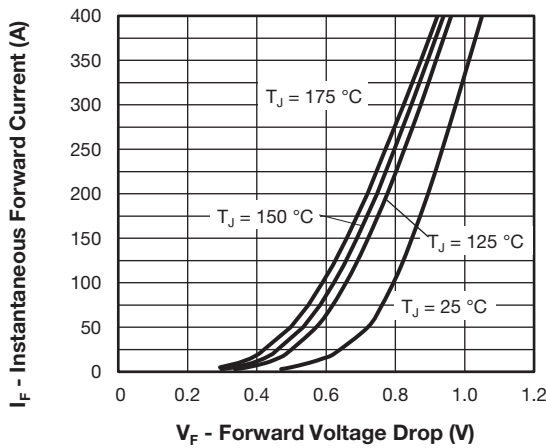


Fig. 1 - Typical Forward Voltage Drop vs. Instantaneous Forward Current (Per Diode)

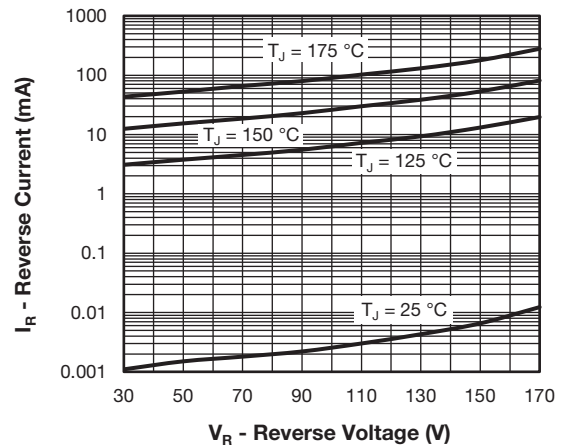


Fig. 2 - Typical Reverse Current vs. Reverse Voltage (Per Diode)

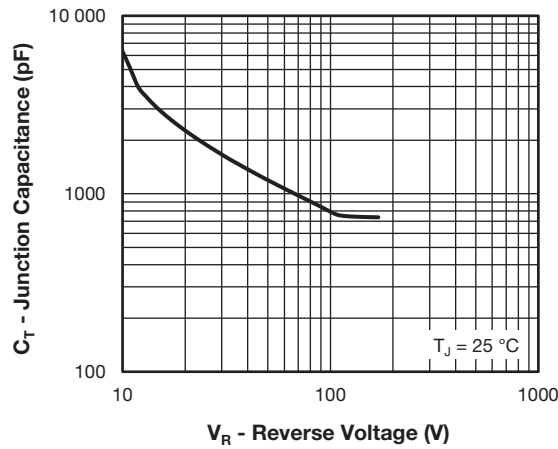


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Diode)

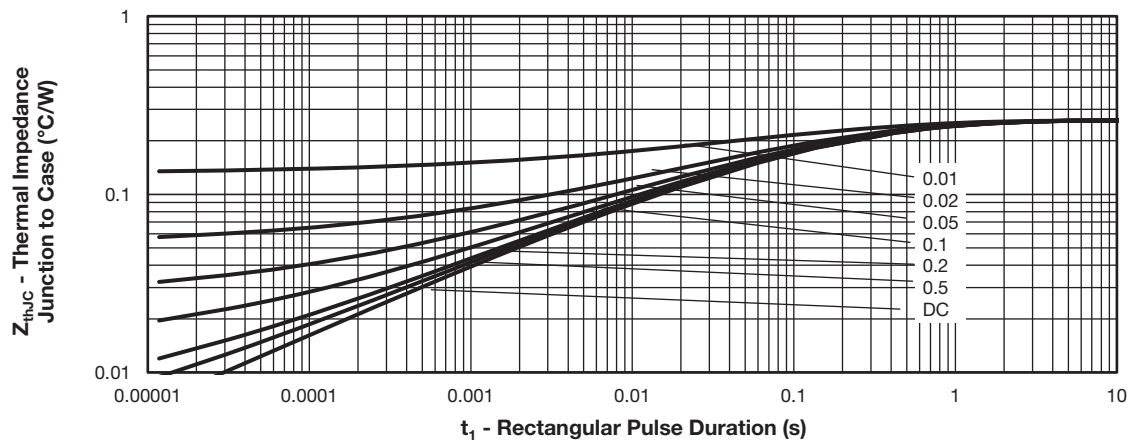


Fig. 4 - Maximum Thermal Impedance Junction-to-Case Characteristics (Per Diode)

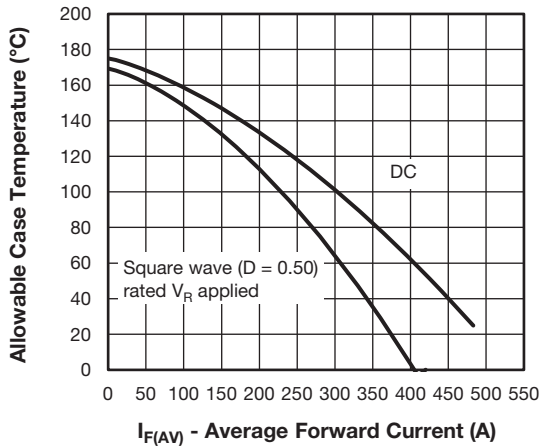


Fig. 5 - Maximum Current Rating Capability (Per Diode)

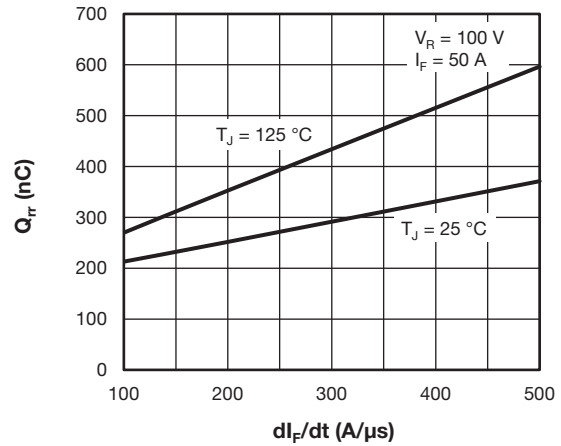


Fig. 7 - Typical Reverse Recovery Charge vs  $dI_F/dt$  (Per Diode)

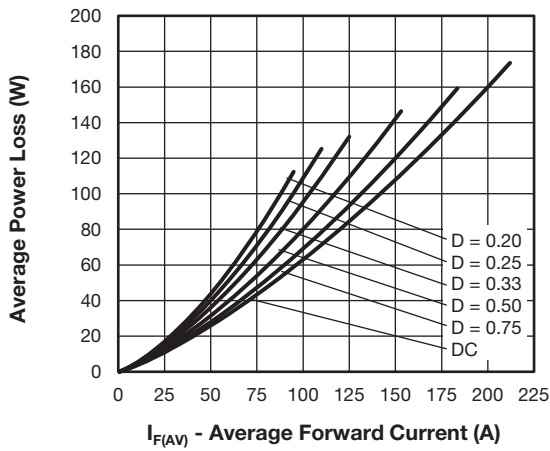


Fig. 6 - Forward Power Loss Characteristics (Per Diode)

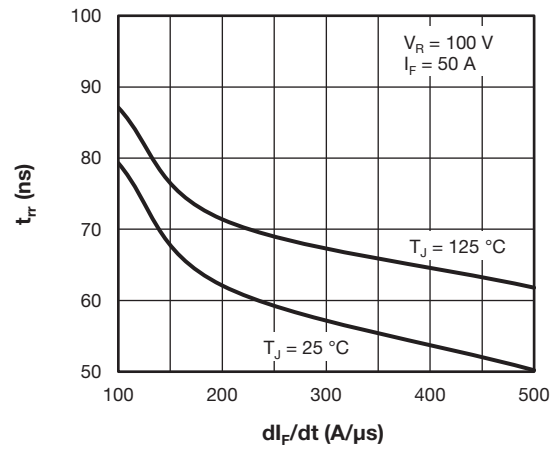


Fig. 8 - Typical Reverse Recovery Time vs  $dI_F/dt$  (Per Diode)

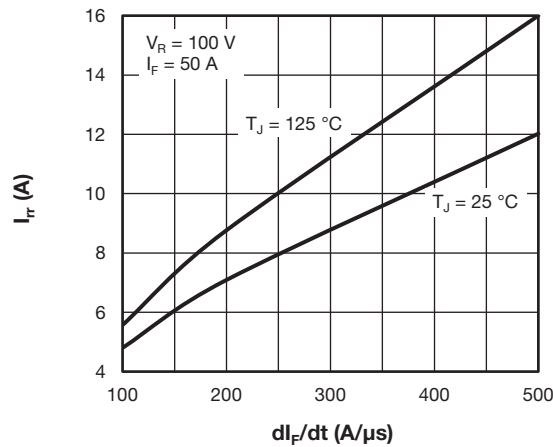


Fig. 9 - Typical Reverse Recovery Current vs  $dI_F/dt$  (Per Diode)

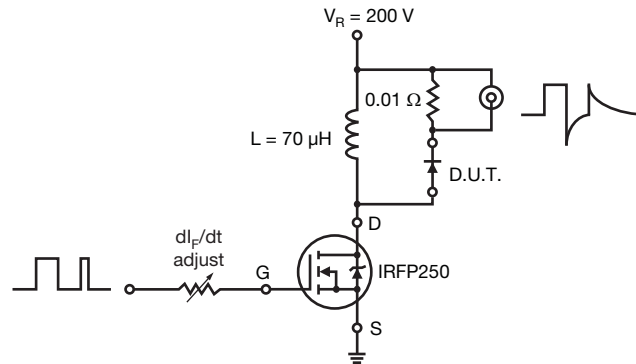
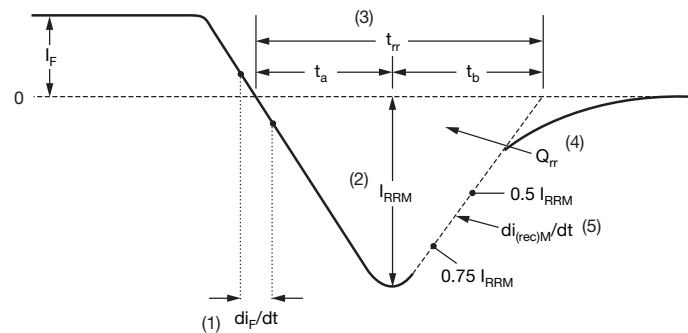


Fig. 10 - Reverse Recovery Parameter Test Circuit



(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  $I_{RRM}$

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

(5)  $di_{(rec)M}/dt$  - peak rate of change of current during  $t_b$  portion of  $t_{rr}$

Fig. 11 - Reverse Recovery Waveform and Definitions

## ORDERING INFORMATION TABLE

Device code	<b>VS-</b>	<b>Q</b>	<b>A</b>	<b>300</b>	<b>F</b>	<b>A</b>	<b>17</b>
	1	2	3	4	5	6	7

- 1** - Vishay Semiconductors product
- 2** - Schottky technologies
- 3** - Present silicon generation
- 4** - Current rating (300 = 300 A)
- 5** - Circuit configuration (two separate diodes, parallel pin-out)
- 6** - Package indicator (SOT-227 standard insulated base)
- 7** - Voltage rating (17 = 170 V)

Quantity per tube is 10, M4 screw and washer included



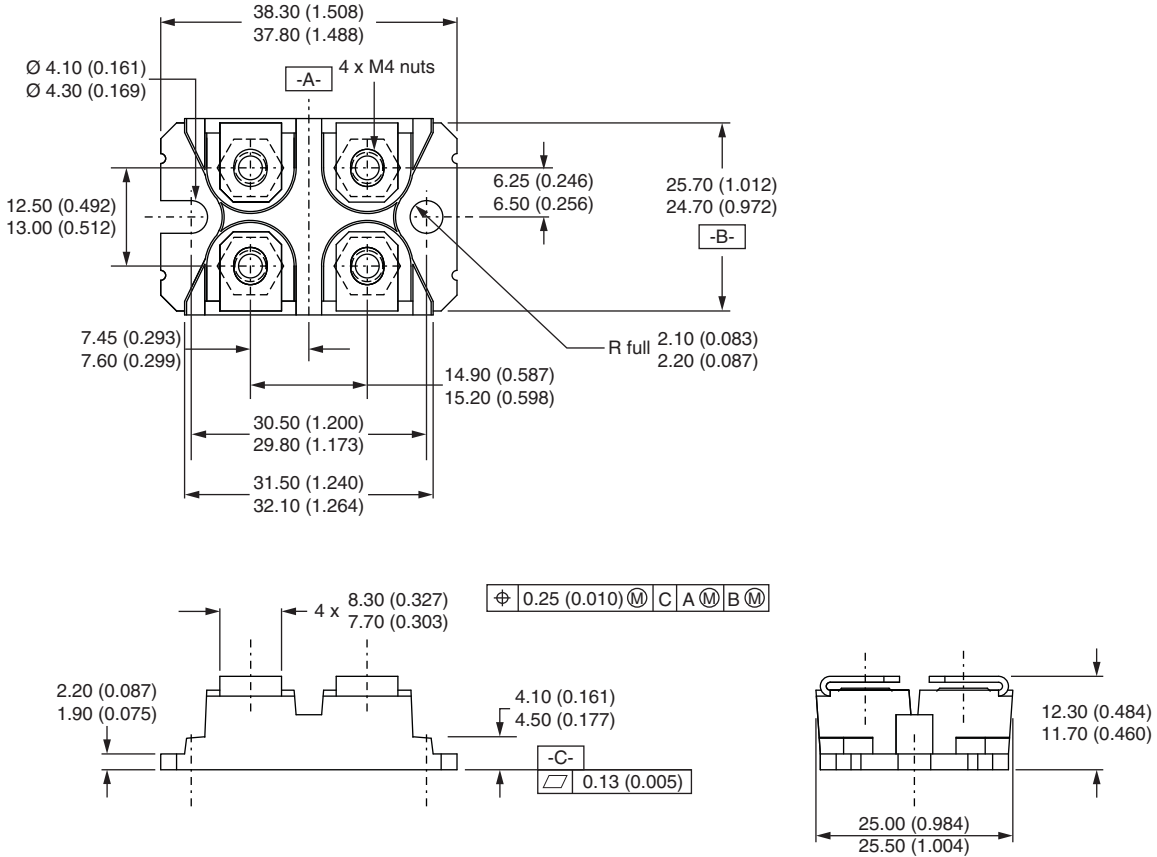
CIRCUIT CONFIGURATION		
CIRCUIT	CIRCUIT CONFIGURATION CODE	CIRCUIT DRAWING
Two separate diodes, parallel pin-out	F	<p>The circuit drawing shows two diodes connected in parallel. The top diode has its anode connected to pin 4 and its cathode to pin 3. The bottom diode has its anode connected to pin 1 and its cathode to pin 2. To the right, a lead assignment diagram shows the physical package with four pins labeled 1, 2, 3, and 4. Pin 1 is at the bottom left, pin 2 at the bottom right, pin 3 at the top right, and pin 4 at the top left.</p>

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



### SOT-227 Generation II

**DIMENSIONS** in millimeters (inches)



**Note**

- Controlling dimension: millimeter



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