

Insulated Gen 2 Schottky Rectifier Module, 300 A



SOT-227

ADDITIONAL RESOURCES



Application Notes

PRIMARY CHARACTERISTICS	
$I_{F(AV)}$ per module at $T_C = 132\text{ }^\circ\text{C}$	300 A
V_R	170 V
V_{FM} at 100 A, $T_C = 25\text{ }^\circ\text{C}$	0.79 V
Package	SOT-227
Circuit configuration	Two separate diodes, parallel pin-out

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
- Designed and qualified for industrial level
- UL approved file E78996
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912


RoHS
COMPLIANT

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.

MAJOR RATINGS AND CHARACTERISTICS

SYMBOL	CHARACTERISTICS	VALUES	UNITS
V_F	$T_J = 150\text{ }^\circ\text{C}$	0.69	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
Average forward current per module	$I_{F(AV)}$	$T_C = 132\text{ }^\circ\text{C}$	300	A
Cathode to anode voltage	V_R		170	V
Continuous forward current per diode	I_F	$T_C = 90\text{ }^\circ\text{C}$	330	A
Single pulse forward current per diode	I_{FSM}	$T_C = 175\text{ }^\circ\text{C}$, $t = 6\text{ ms}$, square	1575	
Maximum power dissipation per diode	P_D	$T_C = 90\text{ }^\circ\text{C}$	327	W
Non-repetitive avalanche energy per diode	E_{AS}	$T_J = 25\text{ }^\circ\text{C}$, $I_{AS} = 27\text{ A}$, $L = 10\text{ mH}$	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	$^\circ\text{C}$



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}	$I_R = 2\text{ mA}$	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	μA
		$T_J = 125\text{ }^\circ\text{C}, V_R = 170\text{ V}$	-	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}	$T_J = 25\text{ }^\circ\text{C}$	-	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	$^\circ\text{C/W}$
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			

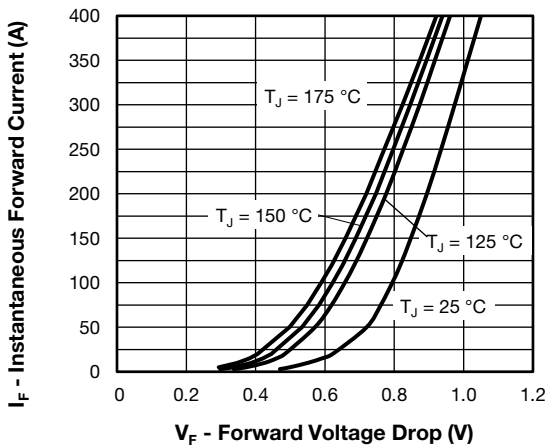


Fig. 1 - Typical Forward Voltage Drop vs. Instantaneous Forward Current (Per Diode)

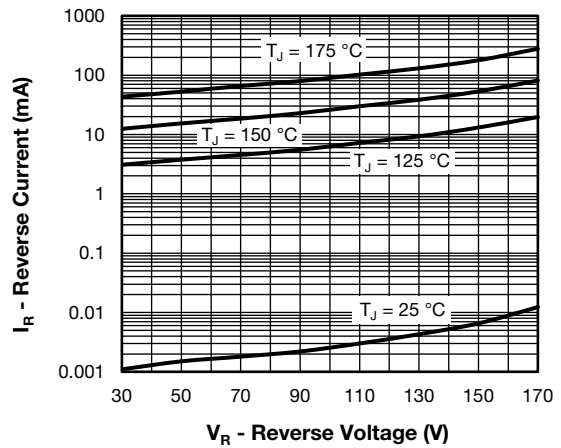


Fig. 2 - Typical Reverse Current vs. Reverse Voltage (Per Diode)

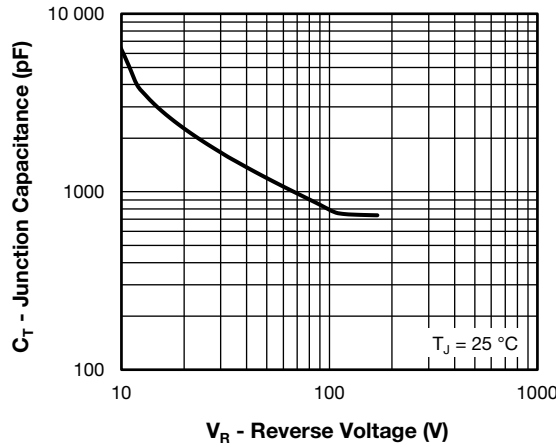


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Diode)

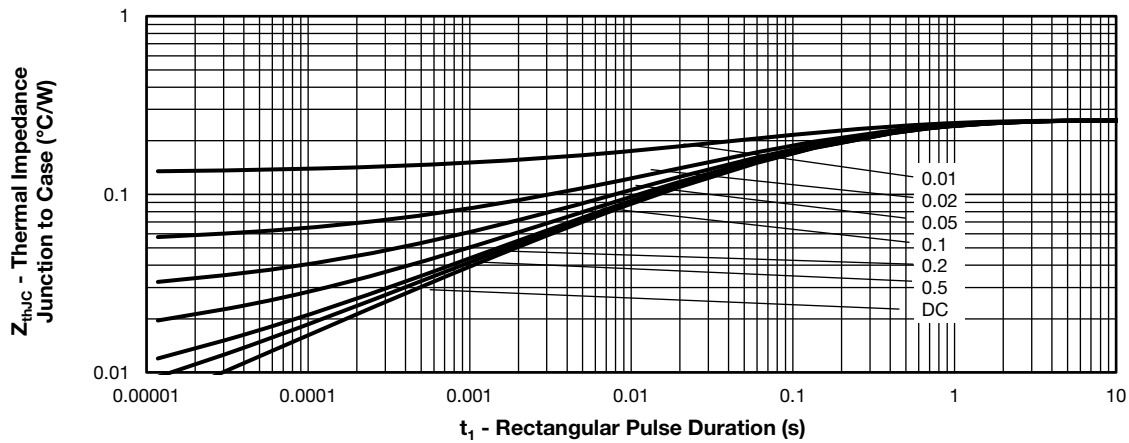


Fig. 4 - Maximum Thermal Impedance Junction-to-Case Characteristics (Per Diode)

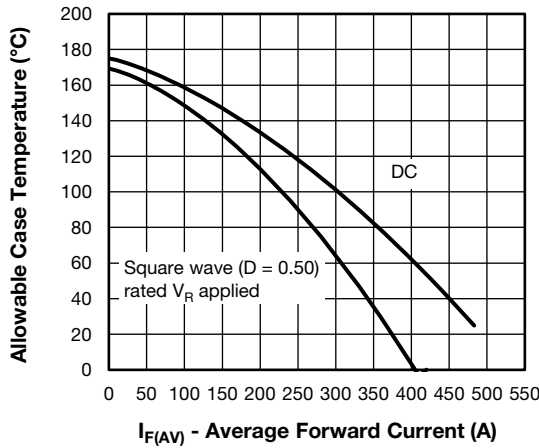


Fig. 5 - Maximum Current Rating Capability (Per Diode)

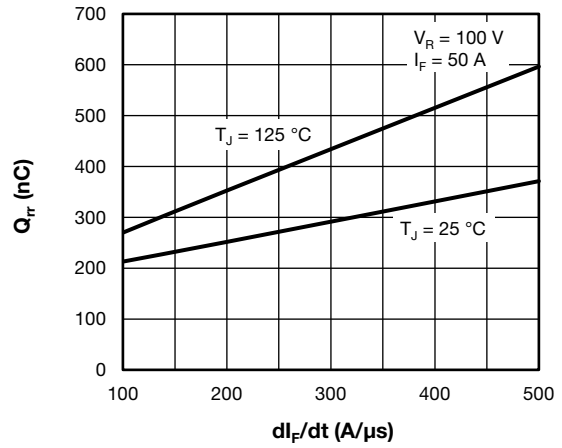


Fig. 7 - Typical Reverse Recovery Charge vs dI_F/dt (Per Diode)

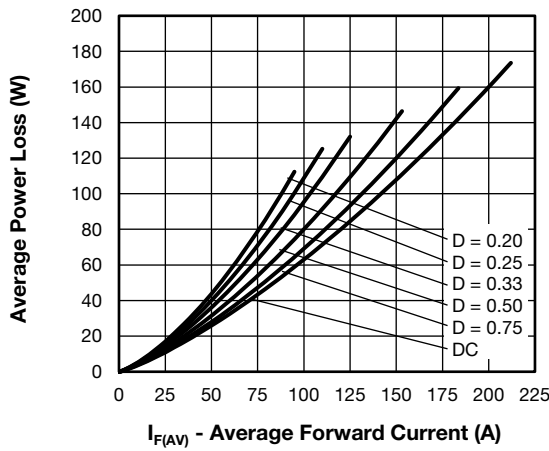


Fig. 6 - Forward Power Loss Characteristics (Per Diode)

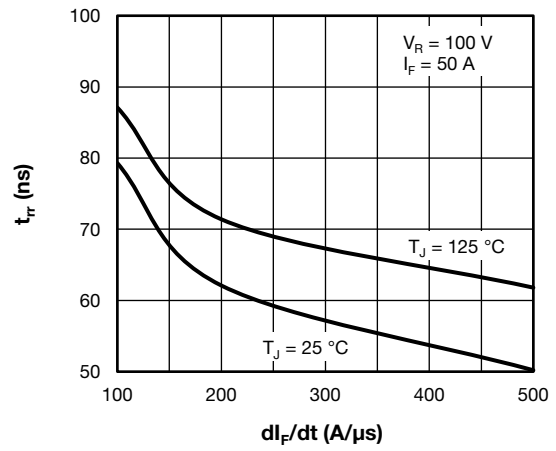


Fig. 8 - Typical Reverse Recovery Time vs dI_F/dt (Per Diode)

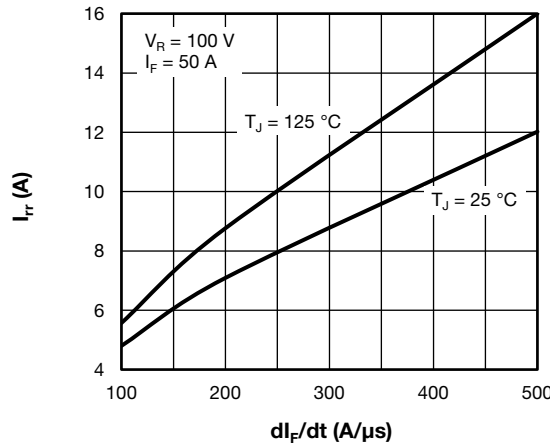


Fig. 9 - Typical Reverse Recovery Current vs dI_F/dt (Per Diode)

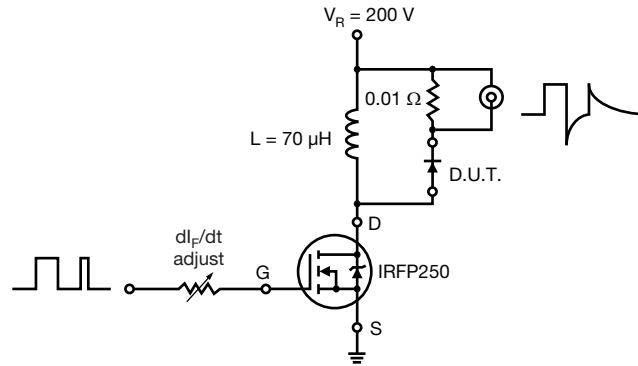
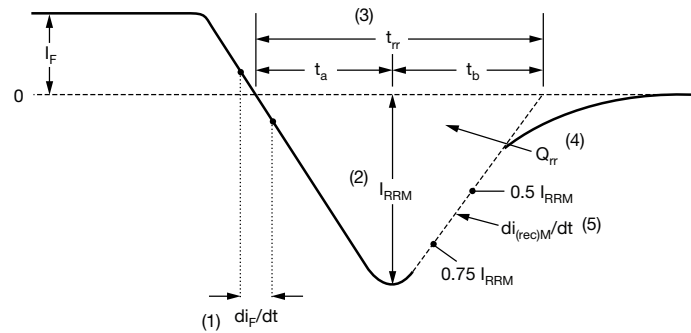


Fig. 10 - Reverse Recovery Parameter Test Circuit



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

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

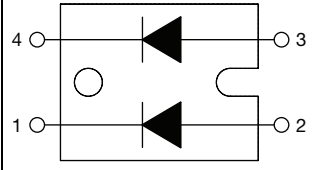
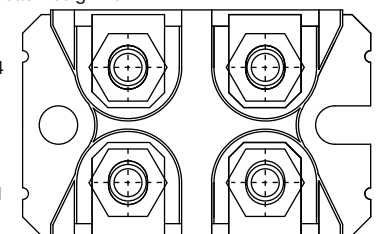
Fig. 11 - Reverse Recovery Waveform and Definitions

ORDERING INFORMATION TABLE

Device code	VS-	Q	A	300	F	A	17
	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

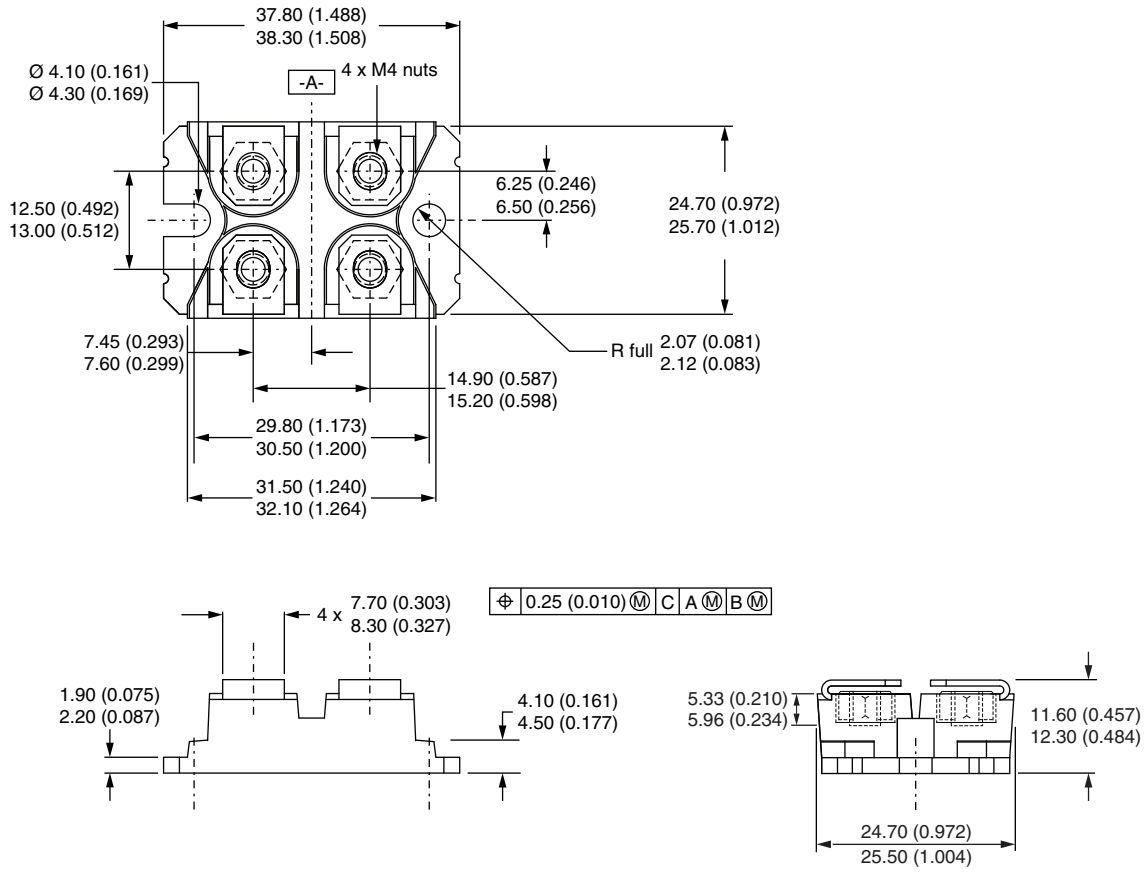
CIRCUIT CONFIGURATION		
CIRCUIT	CIRCUIT CONFIGURATION CODE	CIRCUIT DRAWING
Two separate diodes, parallel pin-out	F	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  </div> <div style="text-align: center;"> <p>Lead Assignment</p>  </div> </div>

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



SOT-227 Generation 2

DIMENSIONS in millimeters (inches)



Note

- Controlling dimension: millimeter



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