Insulated Gen 2 Schottky Rectifier Module, 300 A

SOT-227

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

FEATURES

- Max. T_J = 175 °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

Pb-free

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 °C	0.69	V
T_J	Range	-55 to +175	°C

ABSOLUTE MAXIMUM RATINGS (T_C = 25 °C unless otherwise specified)				
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Average forward current per module	$I_{F(AV)}$	T_C = 132 °C	300	A
Cathode to anode voltage	V_R		170	V
Continuous forward current per diode	I_F	T_C = 90 °C	330	A
Single pulse forward current per diode	I_{FSM}	T_C = 175 °C, t = 6 ms, square	1575	
Maximum power dissipation per diode	P_D	T_C = 90 °C	327	W
Non-repetitive avalanche energy per diode	E_{AS}	T_J = 25 °C, I_{AS} = 27 A, L = 10 mH	3700	mJ
RMS isolation voltage	V_{ISOL}	Any terminal to case, t = 1 min	2500	V
Operating junction and storage temperatures	T_J, T_{Stg}		-55 to +175	°C

ELECTRICAL SPECIFICATIONS PER DIODE (T_J = 25 °C unless otherwise specified)						
PARAMETER	**SYMBOL**	**TEST CONDITIONS**	**MIN.**	**TYP.**	**MAX.**	**UNITS**
Cathode to anode breakdown voltage	V_{BR}	I_R = 2 mA	170	-	-	V
Forward voltage	V_{FM}	I_F = 100 A	-	0.79	0.85	
		I_F = 100 A, T_J = 150 °C	-	0.62	-	
		I_F = 200 A	-	0.89	0.98	
		I_F = 200 A, T_J = 150 °C	-	0.75	-	
Reverse leakage current	I_{RM}	V_R = 170 V	-	13	200	μA
		T_J = 125 °C, V_R = 170 V	-	20	-	mA
Junction capacitance	C_T	V_R = 170 V	-	737	-	pF

DYNAMIC RECOVERY CHARACTERISTICS (T_J = 25 °C unless otherwise specified)							
PARAMETER	**SYMBOL**	**TEST CONDITIONS**		**MIN.**	**TYP.**	**MAX.**	**UNITS**
Reverse recovery time	t_{rr}	T_J = 25 °C	I_F = 50 A dI_F/dt = 200 A/μs V_R = 100 V	-	71	-	ns
		T_J = 125 °C		-	82	-	
Peak recovery current	I_{RRM}	T_J = 25 °C		-	7.1	-	A
		T_J = 125 °C		-	8.8	-	
Reverse recovery charge	Q_{rr}	T_J = 25 °C		-	252	-	nC
		T_J = 125 °C		-	352	-	

THERMAL - MECHANICAL SPECIFICATIONS						
PARAMETER	**SYMBOL**	**TEST CONDITIONS**	**MIN.**	**TYP.**	**MAX.**	**UNITS**
Junction-to-case, single leg conducting	R_{thJC}		-	-	0.26	°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			

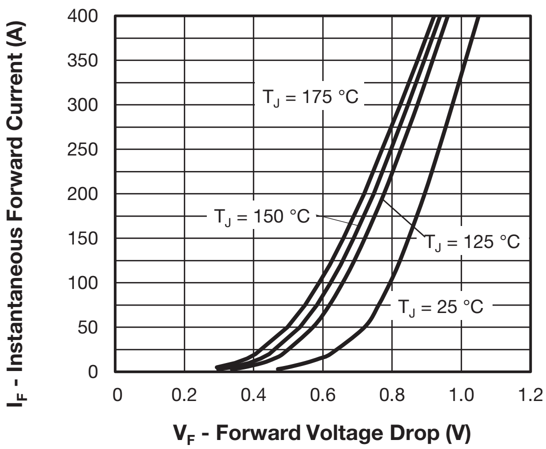


Fig. 1 - Typical Forward Voltage Drop vs. Instantaneous Forward Current (Per Diode)

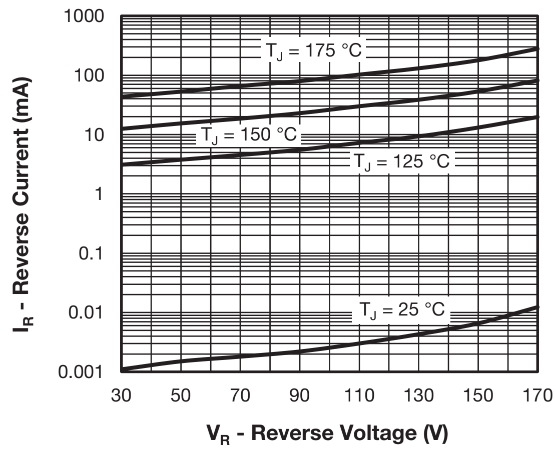


Fig. 2 - Typical Reverse Current vs. Reverse Voltage (Per Diode)

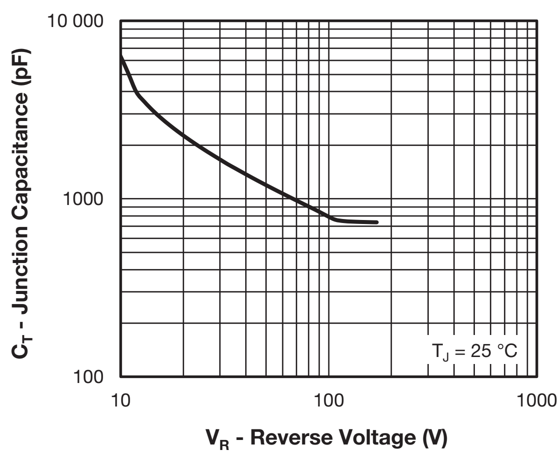


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Diode)

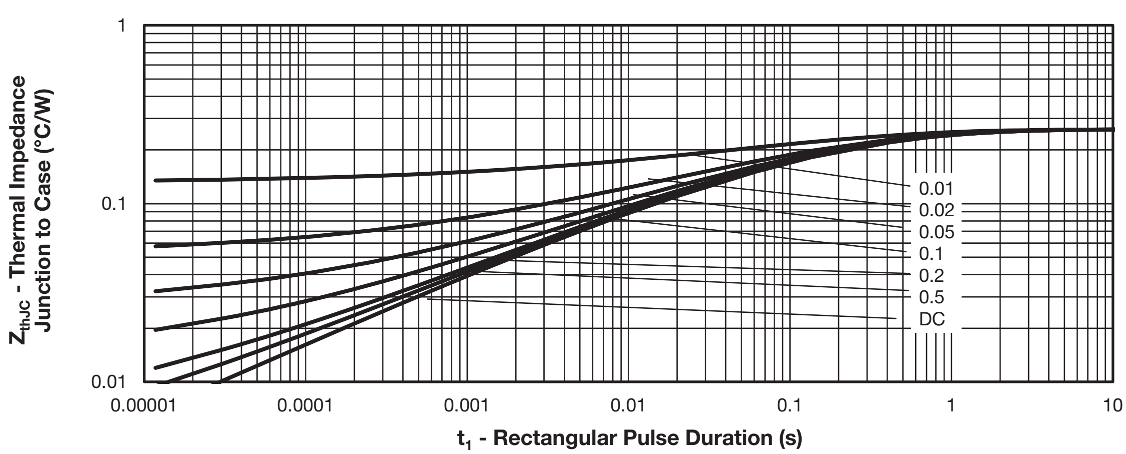


Fig. 4 - Maximum Thermal Impedance Junction-to-Case Characteristics (Per Diode)

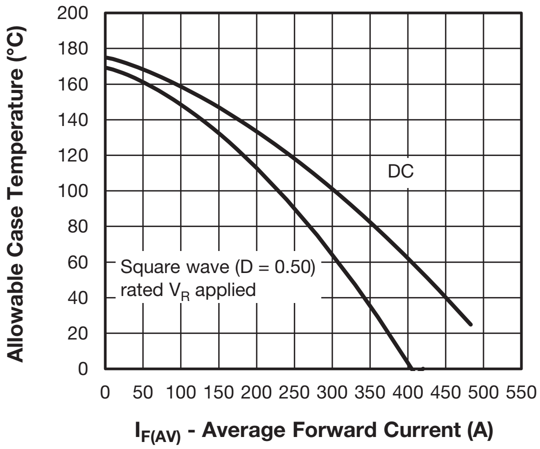


Fig. 5 - Maximum Current Rating Capability (Per Diode)

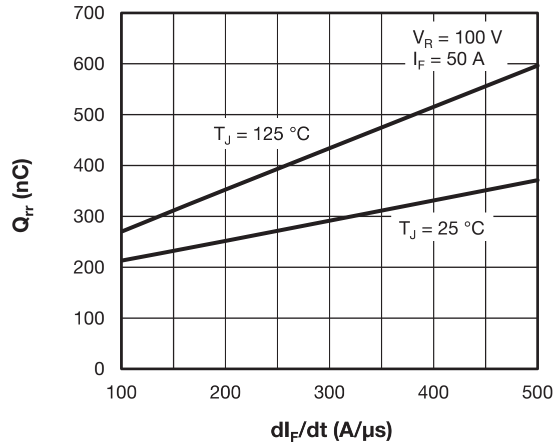


Fig. 7 - Typical Reverse Recovery Charge vs dI_F/dt (Per Diode)

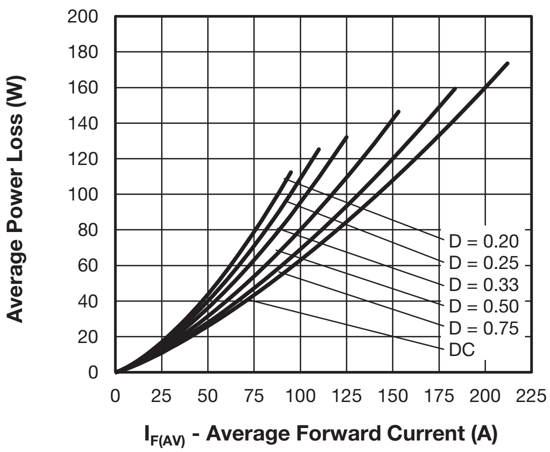


Fig. 6 - Forward Power Loss Characteristics (Per Diode)

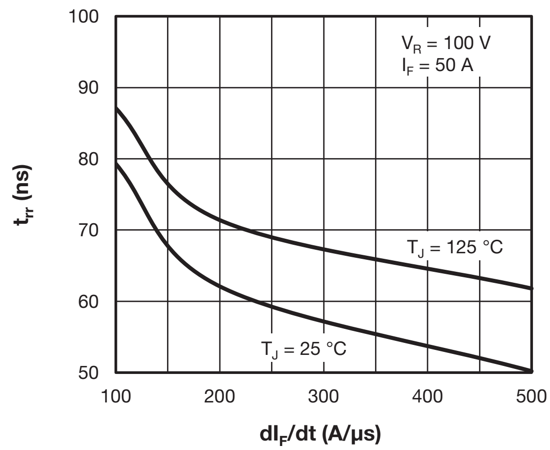


Fig. 8 - Typical Reverse Recovery Time vs dI_F/dt (Per Diode)

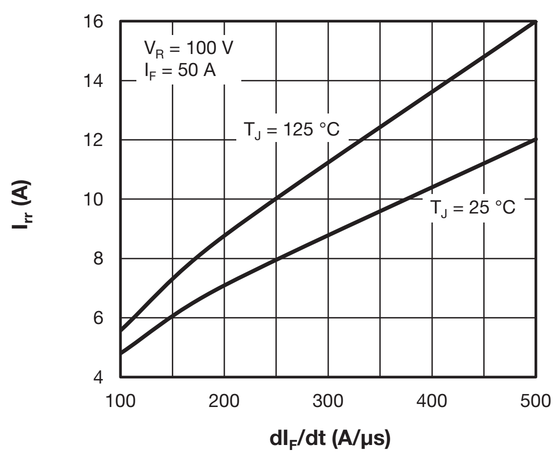


Fig. 9 - Typical Reverse Recovery Current vs dIFdt (Per Diode)

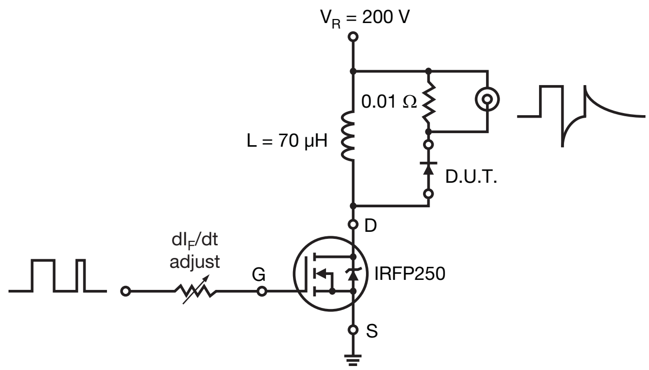
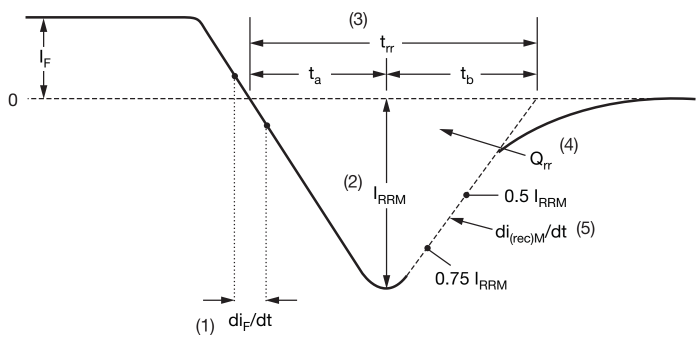


Fig. 10 - Reverse Recovery Parameter Test Circuit



(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	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

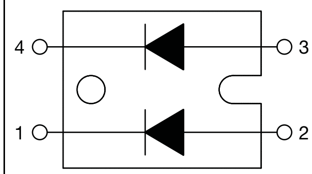
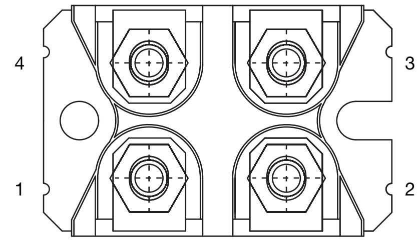
4 - Current rating (300 = 300 A)

5 - Circuit configuration (two separate diodes, parallel pin-out)

6 - Package indicator (SOT-227 standard insulated base)

7 - Voltage rating (17 = 170 V)

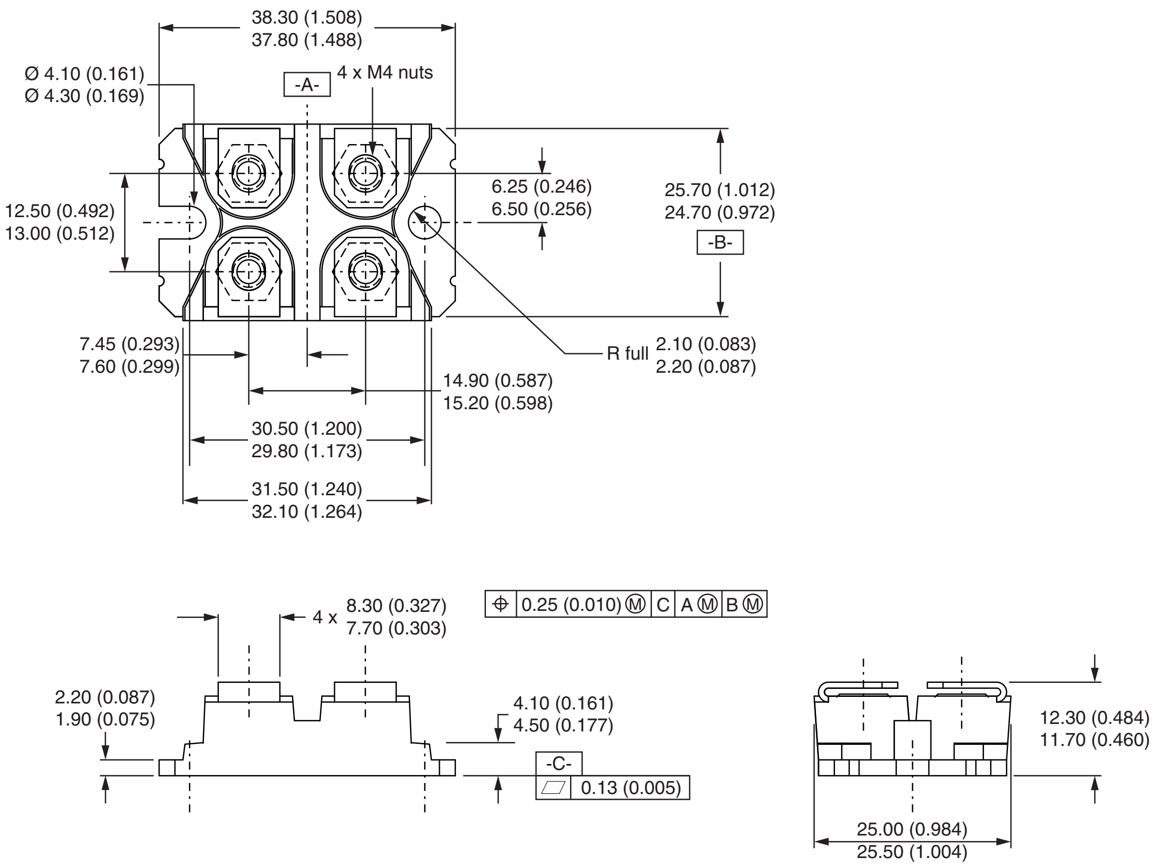
Quantity per tube is 10, M4 screw and washer included

CIRCUIT CONFIGURATION		
CIRCUIT	**CIRCUIT CONFIGURATION CODE**	**CIRCUIT DRAWING**
Two separate diodes, parallel pin-out	F	 Lead Assignment 

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

SOT-227 Generation II

DIMENSIONS in millimeters (inches)



Note

- Controlling dimension: millimeter

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