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Vishay Semiconductors

Insulated Gen 2 Schottky Rectifier Module, 300 A



SOT-227

ADDITIONAL RESOURCES



PRIMARY CHARACTERISTICS						
$I_{F(AV)}$ per module at $T_C = 132 ^{\circ}C$	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
- Designed and qualified for industrial level

please see www.vishay.com/doc?99912

- UL approved file E78996
- Material categorization: for definitions of compliance

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		
TJ	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	Α	
Cathode to anode voltage	V_R		170	V	
Continuous forward current per diode	I _F	T _C = 90 °C	330	^	
Single pulse forward current per diode	I _{FSM}	$T_C = 175$ °C, t = 6 ms, square	1575	A	
Maximum power dissipation per diode	P_D	T _C = 90 °C	327	W	
Non-repetitive avalanche energy per diode	E _{AS}	$T_J = 25 ^{\circ}\text{C}, I_{AS} = 27 \text{A}, L = 10 \text{mH}$	3700	mJ	
RMS isolation voltage	V _{ISOL}	Any terminal to case, t = 1 min	2500	V	
Operating junction and storage temperatures	T _J , T _{Stg}		-55 to +175	°C	



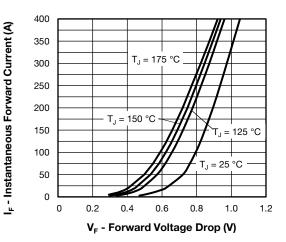
ELECTRICAL SPECIFICATIONS PER DIODE (T _J = 25 °C unless otherwise specified)						
PARAMETER	SYMBOL	YMBOL TEST CONDITIONS		TYP.	MAX.	UNITS
Cathode to anode breakdown voltage	V_{BR}	I _R = 2 mA	170	-	-	
	V	I _F = 100 A	-	0.79	0.85	
Forward voltage V _{FM}		I _F = 100 A, T _J = 150 °C	=	0.62	=	V
	I _F = 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	μΑ	
	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
Deverse receiver time		T _J = 25 °C	I _F = 50 A	-	71	-	ns
Reverse recovery time	t _{rr}	T _J = 125 °C		=	82	-	
Peak recovery current I _{RRM}		T _J = 25 °C		-	7.1	-	Δ.
	T _J = 125 °C	$di_F/dt = 200 \text{ A/}\mu\text{s}$ $V_R = 100 \text{ V}$	=	8.8	-	Α	
Reverse recovery charge	Q _{rr}	T _J = 25 °C	-n	-	252	-	~C
		T _J = 125 °C		-	352	-	nC

THERMAL - MECHANICAL SPECIFICATIONS						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Junction-to-case, single leg conducting			-	-	0.26	
Junction-to-case, both leg conducting	R_{thJC}		-	-	0.13	°C/W
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)
Mounting torque		Torque to heatsink	-	-	1.8 (15.9)	Nm (lbf.in)
Case style				SC	T-227	

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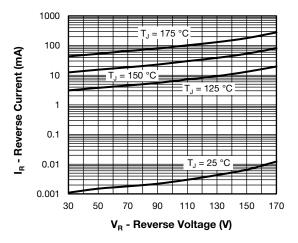


Fig. 1 - Typical Forward Voltage Drop vs. Instantaneous Forward Current (Per Diode)

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

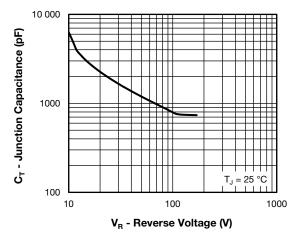


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Diode)

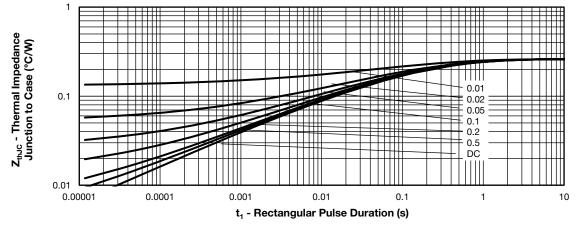


Fig. 4 - Maximum Thermal Impedance Junction-to-Case Characteristics (Per Diode)

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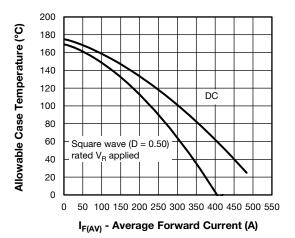


Fig. 5 - Maximum Current Rating Capability (Per Diode)

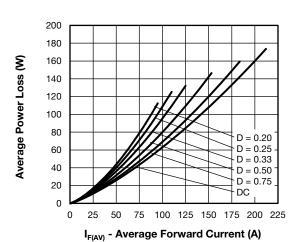


Fig. 6 - Forward Power Loss Characteristics (Per Diode)

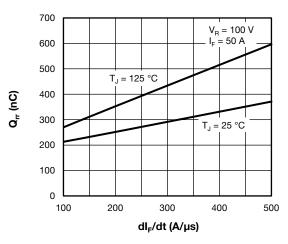


Fig. 7 - Typical Reverse Recovery Charge vs dl_E/dt (Per Diode)

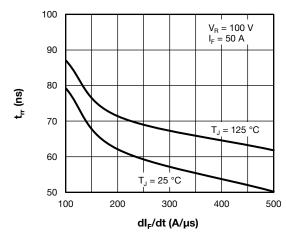


Fig. 8 - Typical Reverse Recovery Time vs dl_F/dt (Per Diode)

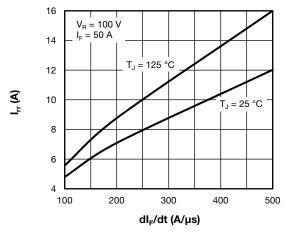


Fig. 9 - Typical Reverse Recovery Current vs dIFdt (Per Diode)

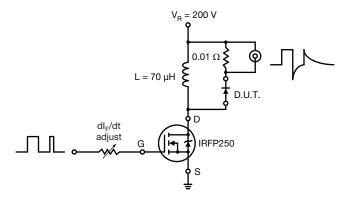
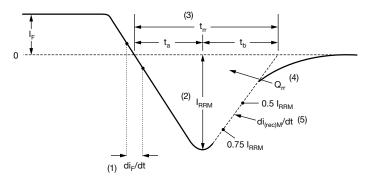


Fig. 10 - Reverse Recovery Parameter Test Circuit



- (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) $\mathbf{Q}_{\rm rr}$ area under curve defined by $\mathbf{t}_{\rm rr}$ and $\mathbf{I}_{\rm RRM}$

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

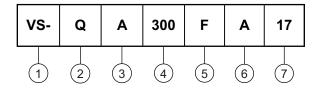
(5) di_{(rec)M}/dt - peak rate of change of current during t_b portion of t_{rr}

Fig. 11 - Reverse Recovery Waveform and Definitions



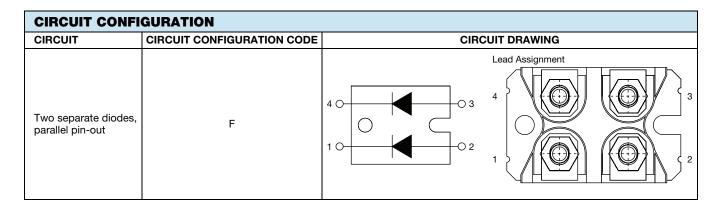
ORDERING INFORMATION TABLE

Device code



- 1 Vishay Semiconductors product
- 2 Schottky technologies
- Present silicon generation
- 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)

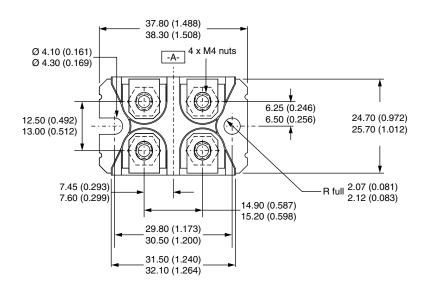
Quantity per tube is 10, M4 screw and washer included

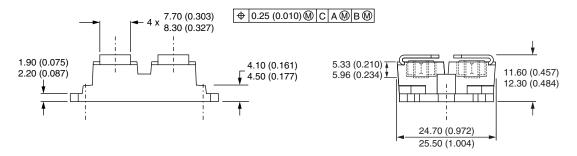


LINKS TO RELATED DOCUMENTS					
Dimensions <u>www.vishay.com/doc?95423</u>					
Part marking information	www.vishay.com/doc?95425				

SOT-227 Generation 2

DIMENSIONS in millimeters (inches)





Note

· Controlling dimension: millimeter



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