

Insulated Gen 2 Schottky Rectifier Module, 250 A



SOT-227

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



RoHS
COMPLIANT

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

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.

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	$I_F^{(1)}$	$T_C = 95\text{ }^{\circ}\text{C}$	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	$^{\circ}\text{C}$

Note

(1) Maximum continuous forward current must be limited to 100 A to do not exceed the maximum temperature of power terminals

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	μA
		$T_J = 125\text{ }^{\circ}\text{C}, V_R = V_R\text{ rated}$	-	14	-	mA
Junction capacitance	C_T	$V_R = 200\text{ V}$	-	380	-	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}	$T_J = 25\text{ }^{\circ}\text{C}$	-	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	$^{\circ}\text{C/W}$
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			

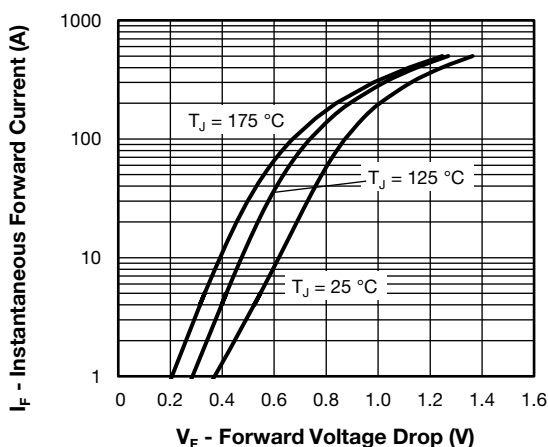


Fig. 1 - Typical Forward Voltage Drop vs. Instantaneous Forward Current (Per Diode)

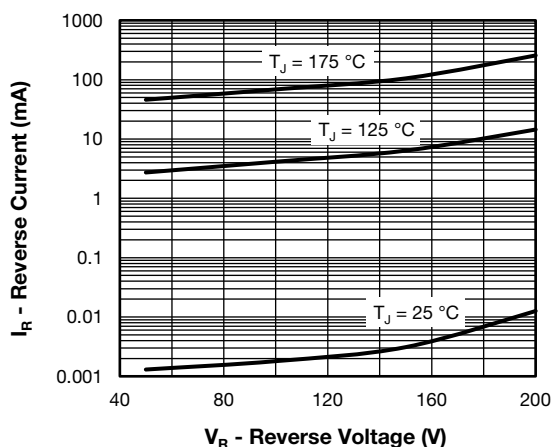


Fig. 2 - Typical Reverse Current vs. Reverse Voltage (Per Diode)

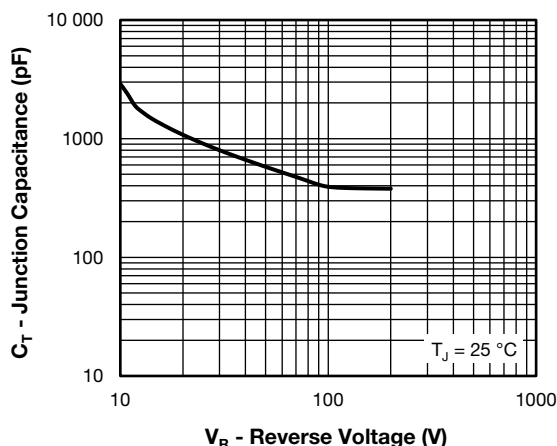


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Diode)

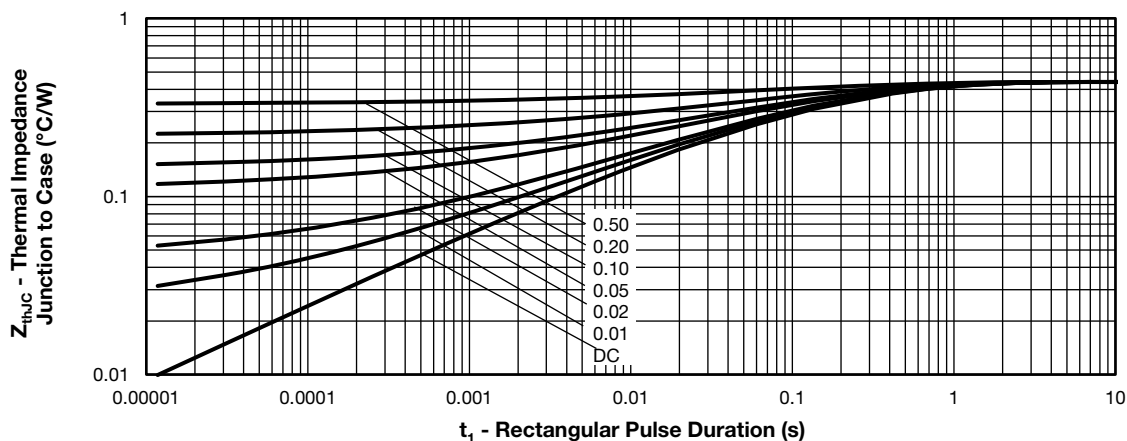
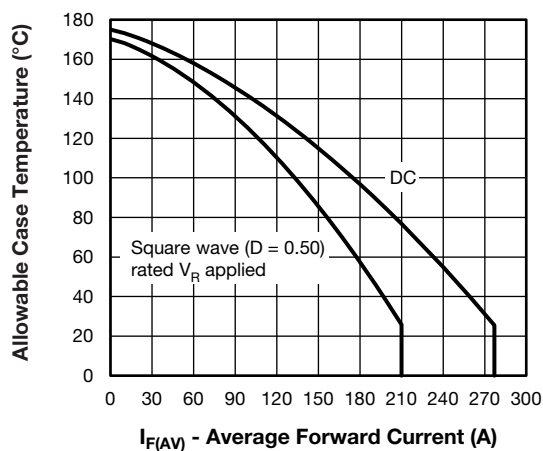

Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics (Per Diode)


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

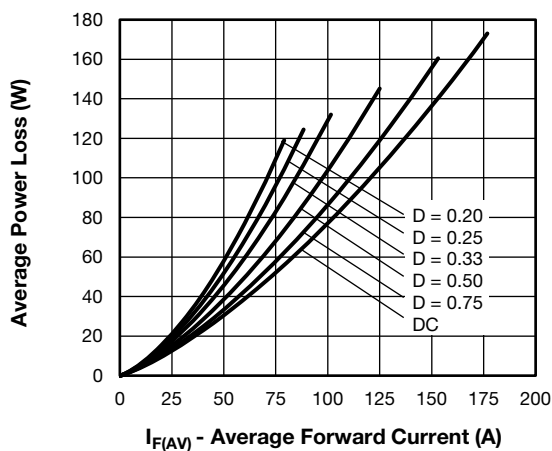


Fig. 6 - Forward Power Loss Characteristics (Per Diode)

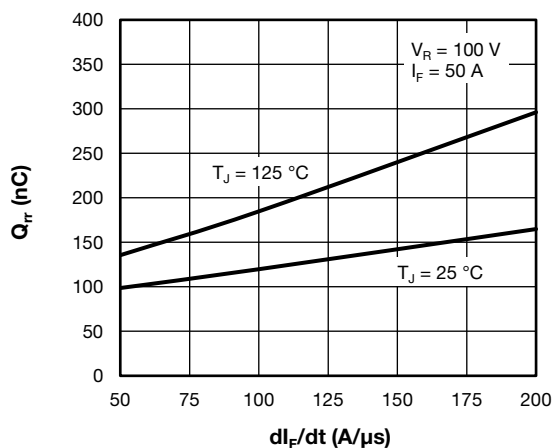
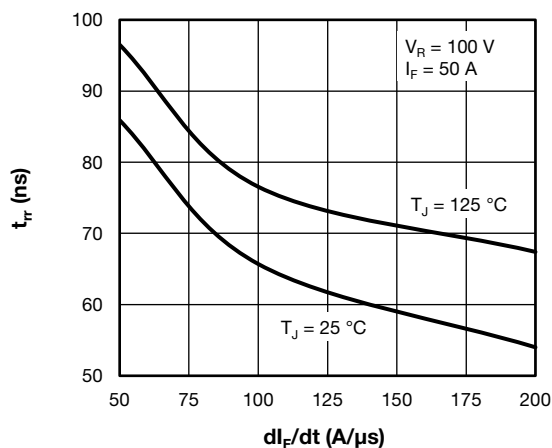
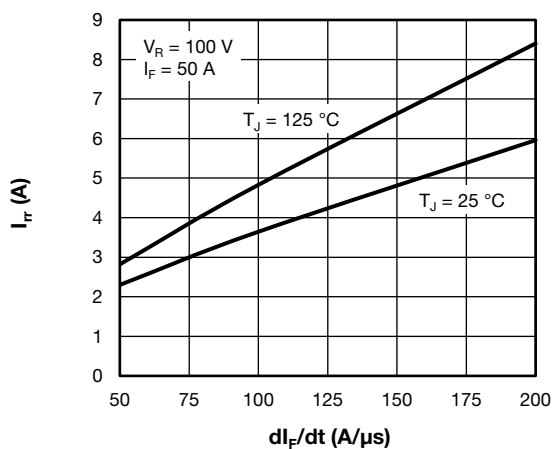
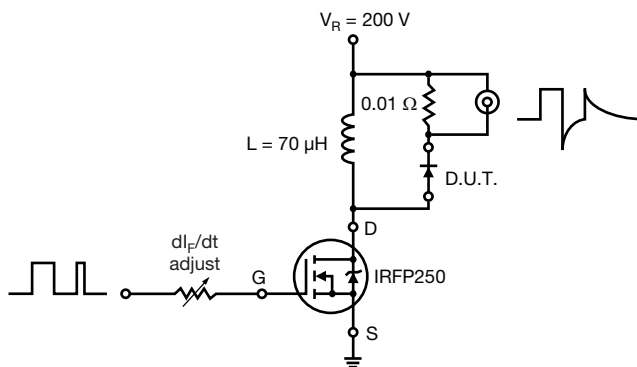
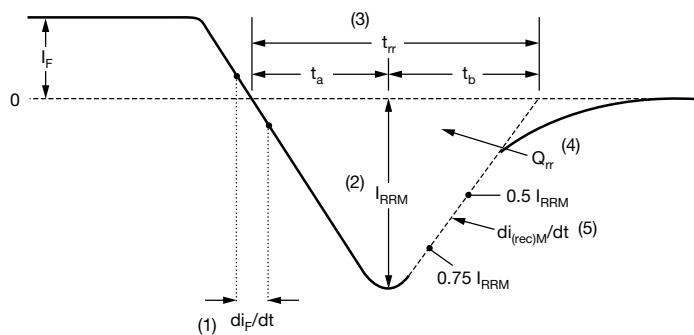

Fig. 7 - Typical Reverse Recovery Charge vs. dI_F/dt (Per Diode)

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

(4) Q_{rr} - area under curve defined by t_{rr} and I_{BBM}

(2) I_{RRM} - peak reverse recovery current

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

(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.

(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	250	F	A	20
	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)

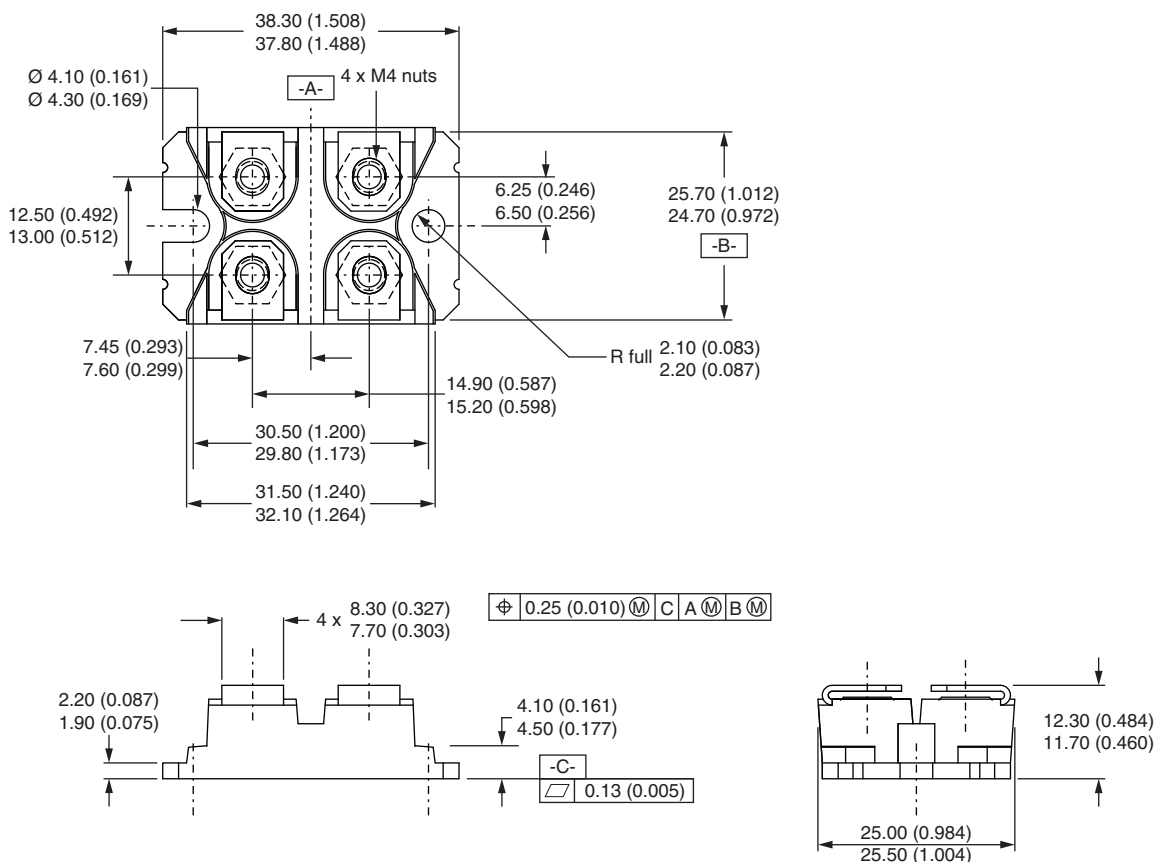
Quantity per tube is 10, M4 screw and washer included

Circuit Configuration		
Circuit	Circuit Configuration Code	Circuit Drawing
2 separate diodes, parallel pin-out	F	The circuit drawing for configuration F consists of two parts. On the left is a schematic diagram showing two diodes connected in parallel. The anodes of both diodes are connected to pin 4, and the cathodes are connected to pin 3. The cathodes of both diodes are also connected to pin 2. On the right is a physical component drawing of a dual in-line package (DIP) with four pins. The pins are labeled 1, 2, 3, and 4. The component has two diodes mounted on it, with their leads connected to pins 4, 3, 2, and 1 in sequence.

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

SOT-227 Generation II

DIMENSIONS in millimeters (inches)



Note

- Controlling dimension: millimeter



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