


## SOT-227 Power Module

### Insulated Standard Recovery Rectifier, 220 A



SOT-227

#### FEATURES

- Two fully independent diodes
- Fully insulated package
- High voltage rectifiers optimized for very low forward voltage drop
- Industry standard outline
- UL approved file E78996 
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)


**RoHS**  
COMPLIANT

#### DESCRIPTION / APPLICATIONS

These devices are intended for use in main rectification. Single or three phase bridge.

#### PRIMARY CHARACTERISTICS

$I_{F(AV)}$ per module	220 A, $T_C = 88\text{ }^{\circ}\text{C}$
$V_{FM}$ typical at 110 A	1.13 V
Type	Modules - diode, high voltage
Package	SOT-227
Circuit configuration	Two separate diodes, parallel pin-out

#### MAJOR RATINGS AND CHARACTERISTICS

SYMBOL	CHARACTERISTICS	VALUES	UNITS
$I_{F(AV)}$	90 $^{\circ}\text{C}$	108	A
$I_{F(RMS)}$		173	
$I_{FSM}$	50 Hz	1170	
	60 Hz	1225	
$I^2t$	50 Hz	6840	$\text{A}^2\text{s}$
	60 Hz	6225	
$I^2\sqrt{t}$		68 440	$\text{A}^2\sqrt{\text{s}}$
$V_{RRM}$		1200	V
$T_J$		-55 to +150	$^{\circ}\text{C}$
$T_{Stg}$		-40 to +150	$^{\circ}\text{C}$

#### ELECTRICAL SPECIFICATIONS

##### VOLTAGE RATINGS

TYPE NUMBER	VOLTAGE CODE	$V_{RRM}$ , MAXIMUM REPETITIVE PEAK REVERSE VOLTAGE V	$V_{RSM}$ , MAXIMUM NON-REPETITIVE PEAK REVERSE VOLTAGE V	$I_{RRM}$ TYPICAL AT 150 $^{\circ}\text{C}$ mA
VS-RA220FA120	120	1200	1300	1.0



FORWARD CONDUCTION						
PARAMETER	SYMBOL	TEST CONDITIONS			VALUES	UNITS
Maximum average forward current at case temperature per leg	I <sub>F(AV)</sub>	180° conduction, half sine wave, 90 °C			108	A
Maximum RMS forward current per leg	I <sub>F(RMS)</sub>	DC at 94 °C case temperature			173	A
Maximum peak, one-cycle forward, non-repetitive surge current per leg	I <sub>FSM</sub>	t = 10 ms	No voltage reapplied	Sinusoidal half wave, initial T <sub>J</sub> = T <sub>J</sub> maximum	1170	
		t = 8.3 ms			1225	
		t = 10 ms	100 % V <sub>RRM</sub> reapplied		985	
		t = 8.3 ms			1030	
Maximum I <sup>2</sup> t for fusing per leg	I <sup>2</sup> t	t = 10 ms	No voltage reapplied		6840	A <sup>2</sup> s
		t = 8.3 ms		6225		
		t = 10 ms	100 % V <sub>RRM</sub> reapplied	4840		
		t = 8.3 ms		4400		
Maximum I <sup>2</sup> √t for fusing per leg	I <sup>2</sup> √t	t = 0.1 ms to 10 ms, no voltage reapplied			68 440	A <sup>2</sup> √s
Low level of threshold voltage per leg	V <sub>F(TO)1</sub>	(16.7 % × π × I <sub>F(AV)</sub> ), T <sub>J</sub> = T <sub>J</sub> maximum			0.75	V
Low level value of forward slope resistance	r <sub>f1</sub>				4.93	mΩ
High level of threshold voltage per leg	V <sub>F(TO)2</sub>	(I > π × I <sub>F(AV)</sub> ), T <sub>J</sub> = T <sub>J</sub> maximum			0.84	V
High level value of forward slope resistance	r <sub>f2</sub>				4.85	mΩ
Maximum forward voltage drop per leg	V <sub>FM</sub>	I <sub>FM</sub> = 110 A, T <sub>J</sub> = 25 °C			1.31	V
		I <sub>FM</sub> = 110 A, T <sub>J</sub> = 150 °C			1.24	

BLOCKING				
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum peak reverse leakage current per leg	$I_{RRM}$	$T_J = 25$ °C	150	μA
		$T_J = 150$ °C	1.5	mA
RMS insulation voltage	$V_{INS}$	$T_J = 25$ °C, any terminal to case, t = 1 minute	2500	V

THERMAL - MECHANICAL SPECIFICATIONS						
PARAMETER		SYMBOL	MIN.	TYP.	MAX.	UNITS
Thermal resistance, junction to case	per leg	R <sub>thJC</sub>	-	-	0.2	°C/W
	per module		-	-	0.1	
Thermal resistance, case to heatsink	per module	R <sub>thCS</sub>	-	0.1	-	
Weight			-	30	-	g
Mounting torque to terminal			-	-	1.1 (9.7)	Nm (lbf. in)
Mounting torque to heatsink			-	-	1.8 (15.9)	Nm (lbf. in)
Case style			SOT-227			

ΔR CONDUCTION PER JUNCTION											
DEVICE	SINE HALF WAVE CONDUCTION					RECTANGULAR WAVE CONDUCTION					UNITS
	180°	120°	90°	60°	30°	180°	120°	90°	60°	30°	
VS-RA220FA120	0.06	0.037	0.082	0.116	0.188	0.039	0.066	0.087	0.121	0.19	°C/W

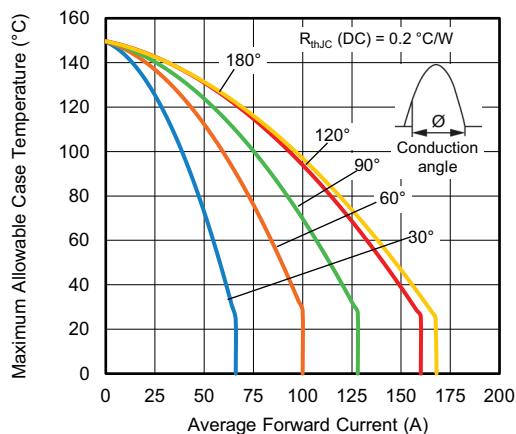


Fig. 1 - Current Ratings Characteristics (A)

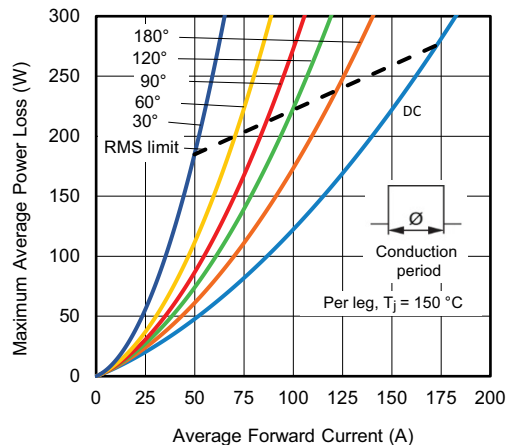


Fig. 4 - Forward Power Loss Characteristics

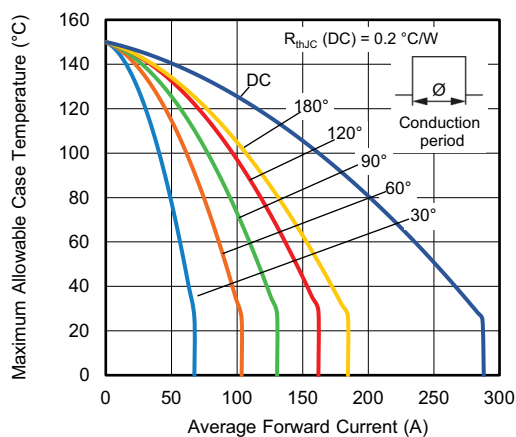


Fig. 2 - Current Ratings Characteristics (A)

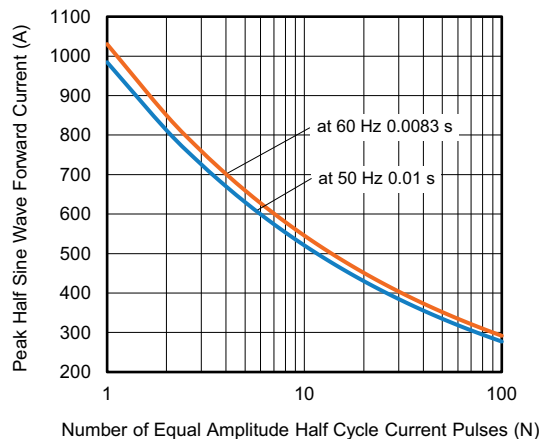


Fig. 5 - Maximum Non-Repetitive Surge Current

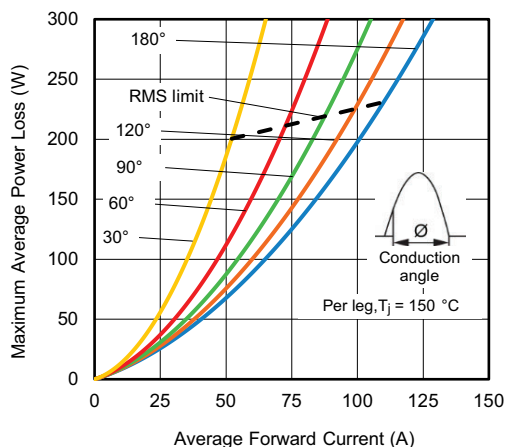


Fig. 3 - Forward Power Loss Characteristics

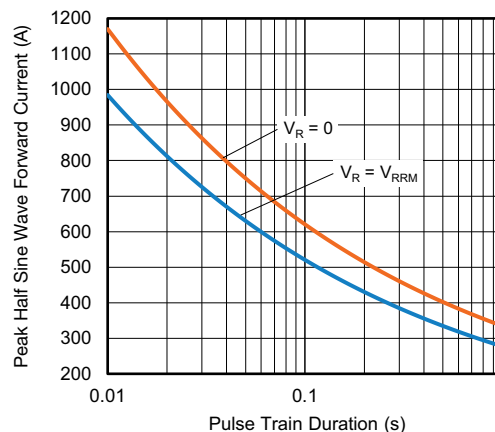


Fig. 6 - Maximum Non-Repetitive Surge Current

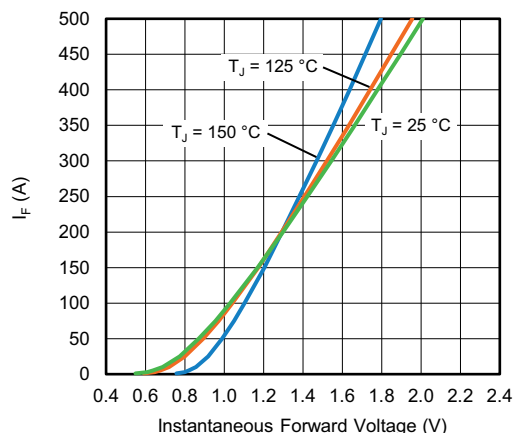
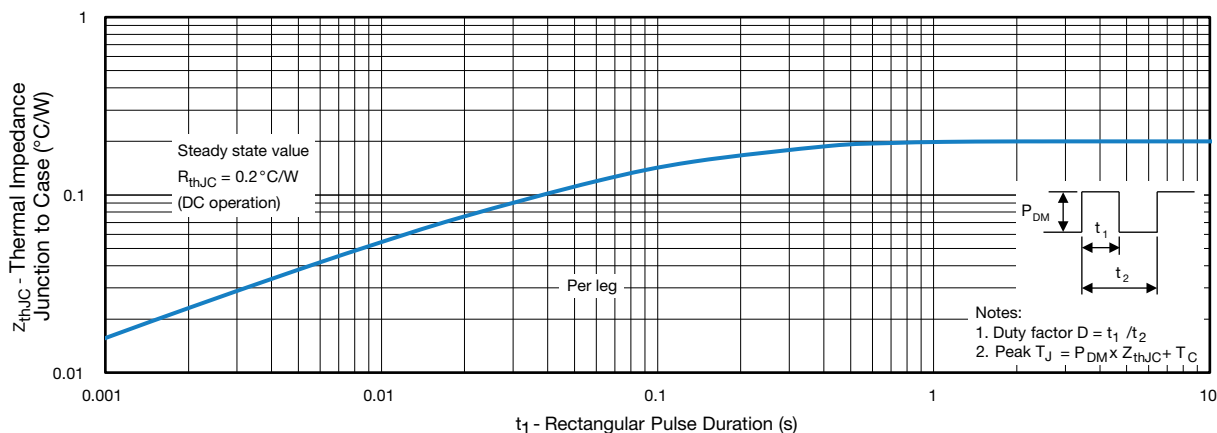


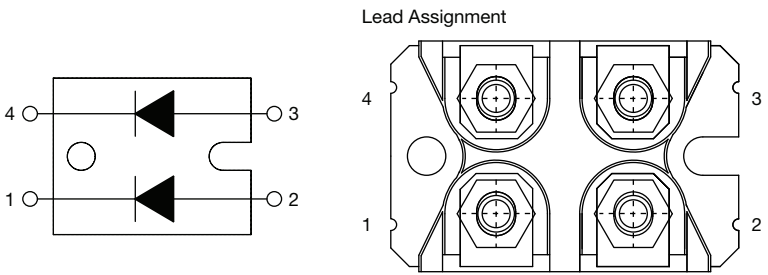
Fig. 7 - Typical Forward Voltage Characteristics


Fig. 8 - Thermal Impedance  $Z_{thJC}$  Characteristics

## ORDERING INFORMATION TABLE

Device code	VS-	R	A	220	F	A	120
	①	②	③	④	⑤	⑥	⑦

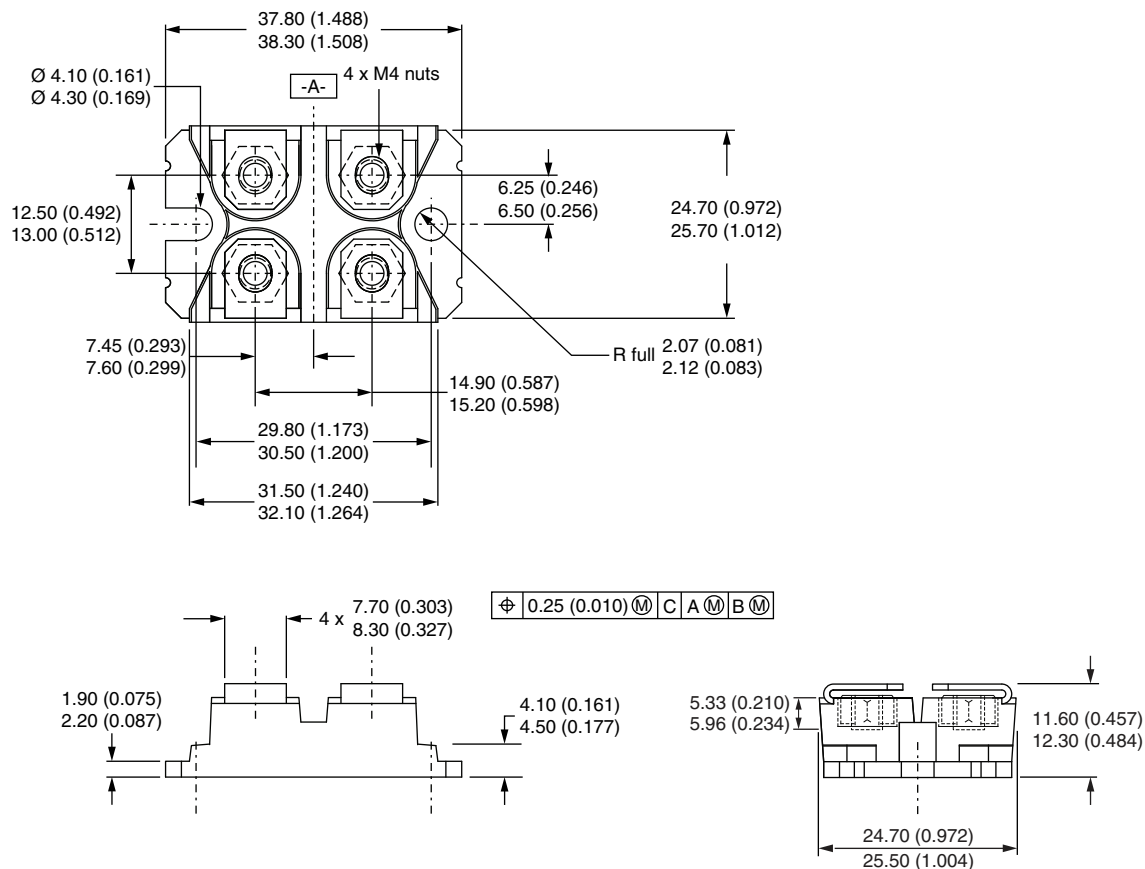
- 1** - Vishay Semiconductors product
- 2** - Standard recovery diode
- 3** - Present silicon generation
- 4** - Current rating (220 = 220 A)
- 5** - Circuit configuration (2 separate diodes, parallel pin-out)
- 6** - Package indicator (SOT-227 standard insulated base)
- 7** - Voltage rating (120 = 1200 V)

CIRCUIT CONFIGURATION		
CIRCUIT	CIRCUIT CONFIGURATION CODE	CIRCUIT DRAWING
Two separate diodes, parallel pin-out	F	 <p>Lead Assignment</p>

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

## SOT-227 Generation 2

**DIMENSIONS** in millimeters (inches)



### Note

- Controlling dimension: millimeter



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