


## 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	$I_{F(AV)}$	180° conduction, half sine wave, 90 °C			108	A
Maximum RMS forward current per leg	$I_{F(RMS)}$	DC at 94 °C case temperature			173	A
Maximum peak, one-cycle forward, non-repetitive surge current per leg	$I_{FSM}$	t = 10 ms	No voltage reapplied	Sinusoidal half wave, initial $T_J = T_J$ maximum	1170	
		t = 8.3 ms			1225	
		t = 10 ms	100 % $V_{RRM}$ reapplied		985	
		t = 8.3 ms			1030	
Maximum $I^2t$ for fusing per leg	$I^2t$	t = 10 ms	No voltage reapplied		6840	A²s
		t = 8.3 ms			6225	
		t = 10 ms	100 % $V_{RRM}$ reapplied		4840	
		t = 8.3 ms			4400	
Maximum $I^2\sqrt{t}$ for fusing per leg	$I^2\sqrt{t}$	t = 0.1 ms to 10 ms, no voltage reapplied			68 440	A²√s
Low level of threshold voltage per leg	$V_{F(TO)1}$	(16.7 % x $\pi$ x $I_{F(AV)}$ ), $T_J = T_J$ maximum			0.75	V
Low level value of forward slope resistance	$r_{f1}$				4.93	mΩ
High level of threshold voltage per leg	$V_{F(TO)2}$	(l > $\pi$ x $I_{F(AV)}$ ), $T_J = T_J$ maximum			0.84	V
High level value of forward slope resistance	$r_{f2}$				4.85	mΩ
Maximum forward voltage drop per leg	$V_{FM}$	$I_{FM} = 110$ A, $T_J = 25$ °C			1.31	V
		$I_{FM} = 110$ A, $T_J = 150$ °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

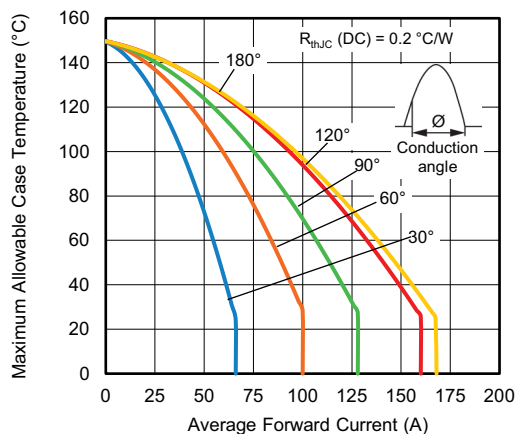


Fig. 1 - Current Ratings Characteristics (A)

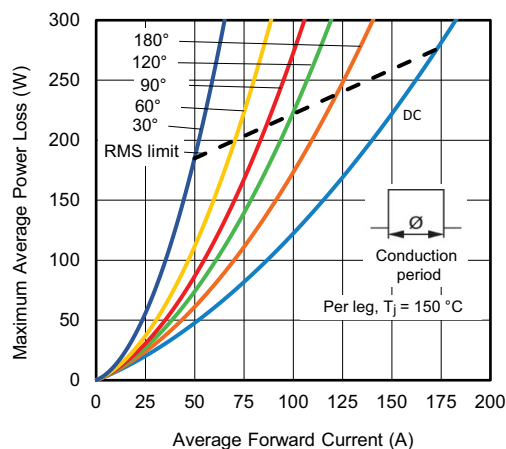


Fig. 4 - Forward Power Loss Characteristics

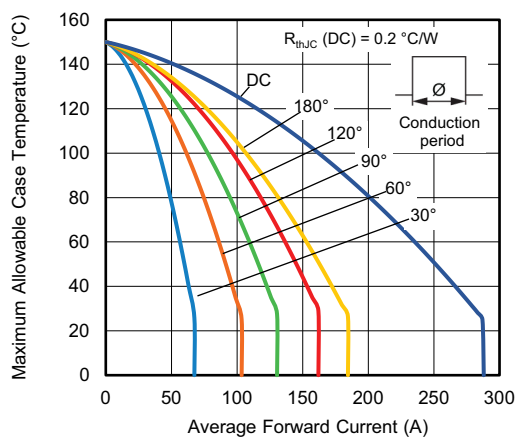


Fig. 2 - Current Ratings Characteristics (A)

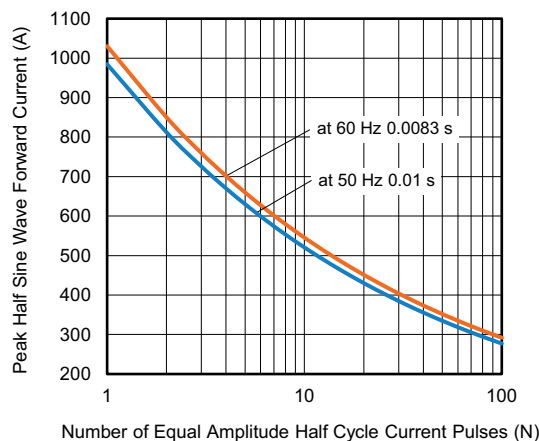


Fig. 5 - Maximum Non-Repetitive Surge Current

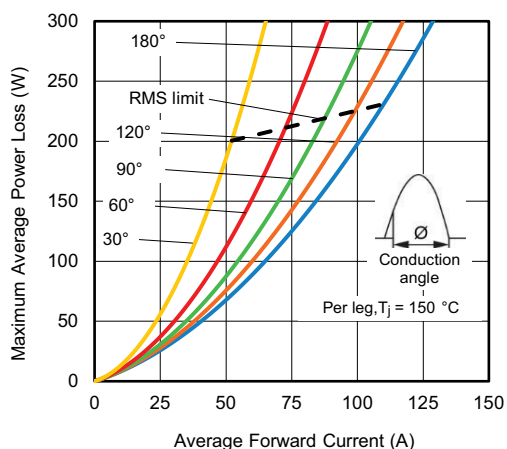


Fig. 3 - Forward Power Loss Characteristics

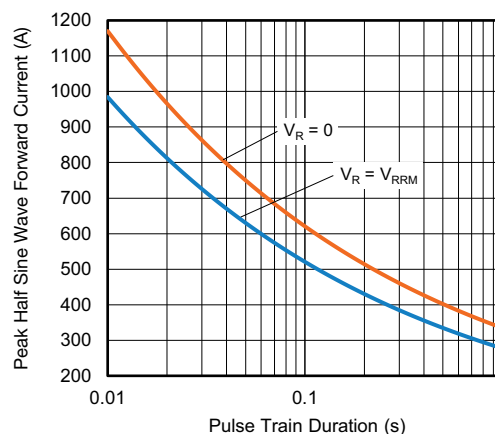


Fig. 6 - Maximum Non-Repetitive Surge Current

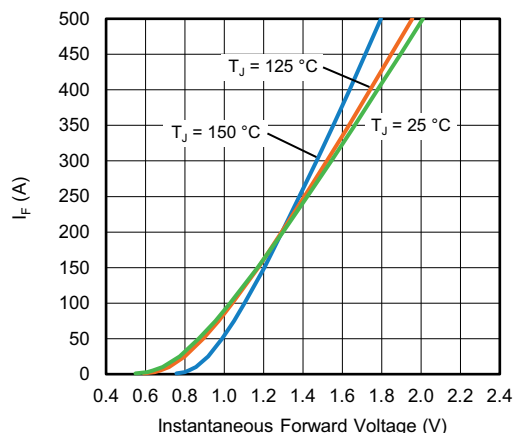
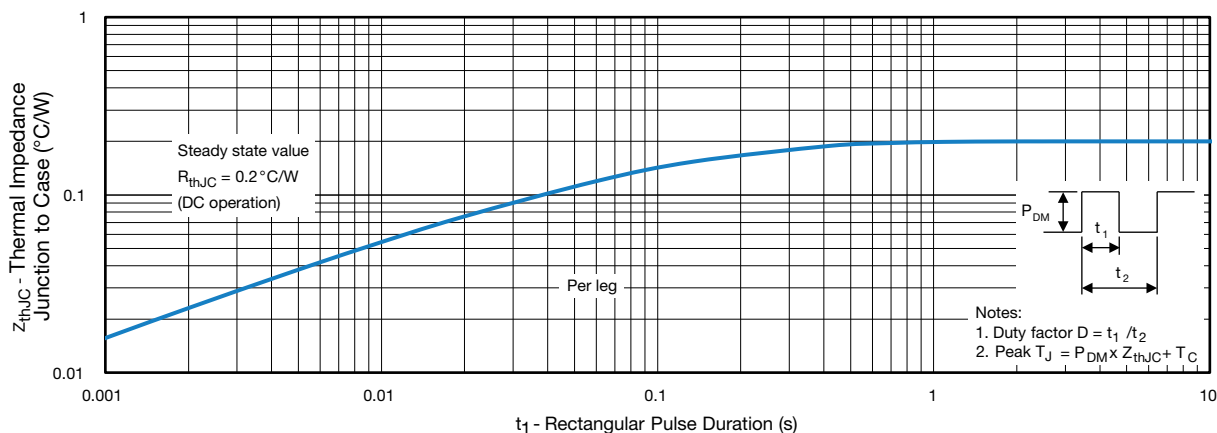


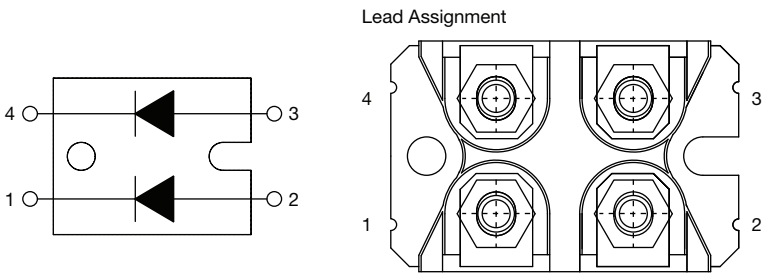
Fig. 7 - Typical Forward Voltage Characteristics


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)

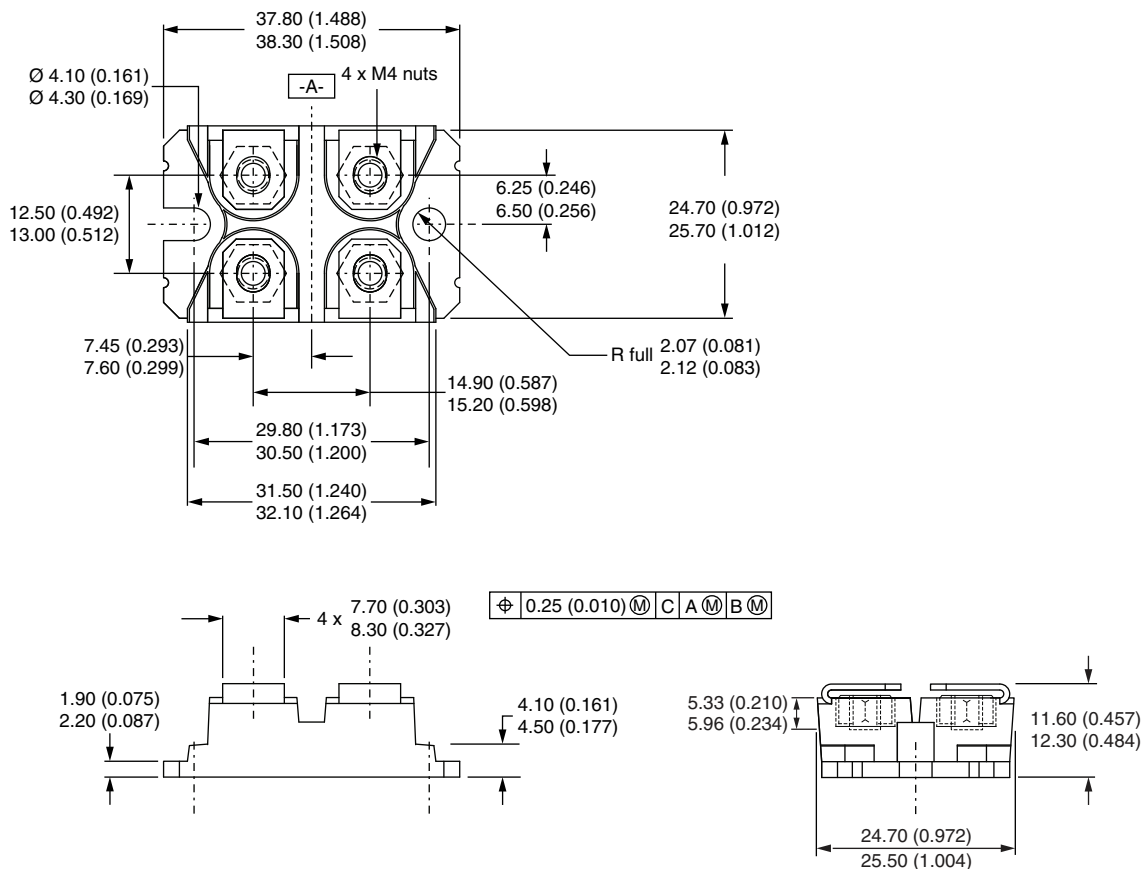
CIRCUIT CONFIGURATION		
CIRCUIT	CIRCUIT CONFIGURATION CODE	CIRCUIT DRAWING
Two separate diodes, parallel pin-out	F	 <p>Lead Assignment</p>

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)





## Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay's knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and / or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Hyperlinks included in this datasheet may direct users to third-party websites. These links are provided as a convenience and for informational purposes only. Inclusion of these hyperlinks does not constitute an endorsement or an approval by Vishay of any of the products, services or opinions of the corporation, organization or individual associated with the third-party website. Vishay disclaims any and all liability and bears no responsibility for the accuracy, legality or content of the third-party website or for that of subsequent links.

Vishay products are not designed for use in life-saving or life-sustaining applications or any application in which the failure of the Vishay product could result in personal injury or death unless specifically qualified in writing by Vishay. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.