

## 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	$^\circ\text{C}$

**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 reappplied	1170	
		t = 8.3 ms	No voltage reappplied	1225	
		t = 10 ms	100 % $V_{RRM}$ reappplied	985	
		t = 8.3 ms	100 % $V_{RRM}$ reappplied	1030	
Maximum $I^2t$ for fusing per leg	$I^2t$	t = 10 ms	No voltage reappplied	6840	A <sup>2</sup> s
		t = 8.3 ms	No voltage reappplied	6225	
		t = 10 ms	100 % $V_{RRM}$ reappplied	4840	
		t = 8.3 ms	100 % $V_{RRM}$ reappplied	4400	
Maximum $I^2\sqrt{t}$ for fusing per leg	$I^2\sqrt{t}$	t = 0.1 ms to 10 ms, no voltage reappplied		68 440	A <sup>2</sup> √s
Low level of threshold voltage per leg	$V_{F(TO)1}$	(16.7 % $\times \pi \times I_{F(AV)}$ ), $T_J = T_J$ maximum		0.75	V
Low level value of forward slope resistance	$r_{f1}$			4.93	mΩ
High level of threshold voltage per leg	$V_{F(TO)2}$	(1 > $\pi \times I_{F(AV)}$ ), $T_J = T_J$ 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	-	-	0.2	°C/W	
	per module	-	-	0.1		
Thermal resistance, case to heatsink	per module	-	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

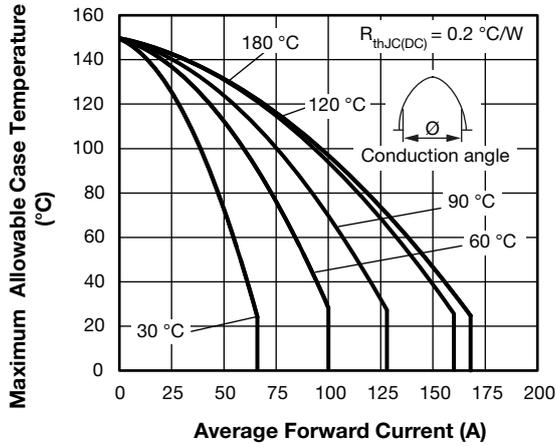


Fig. 1 - Current Ratings Characteristics (A)

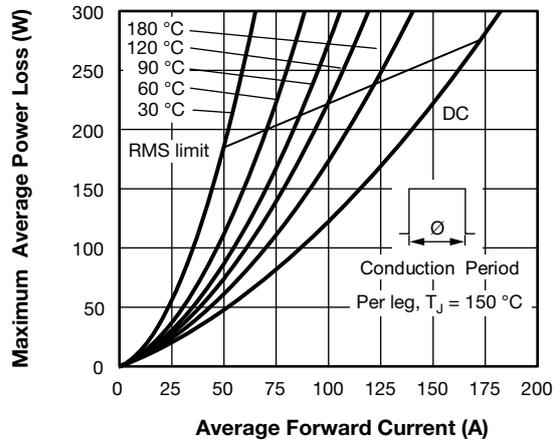


Fig. 4 - Forward Power Loss Characteristics

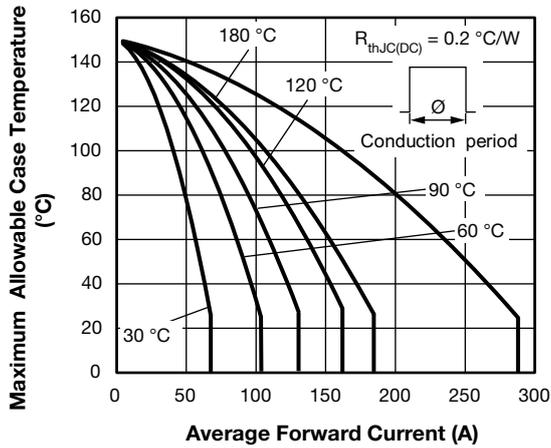


Fig. 2 - Current Ratings Characteristics (A)

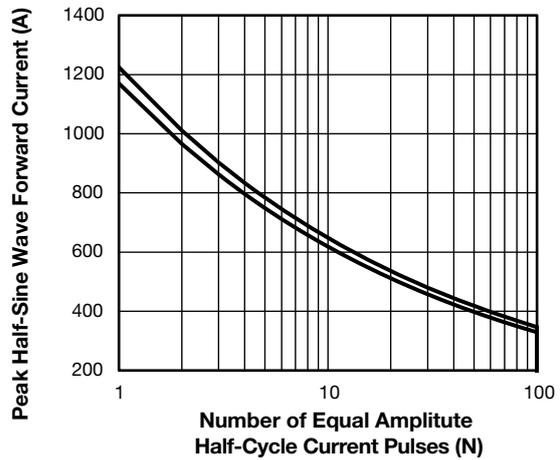


Fig. 5 - Maximum Non-Repetitive Surge Current

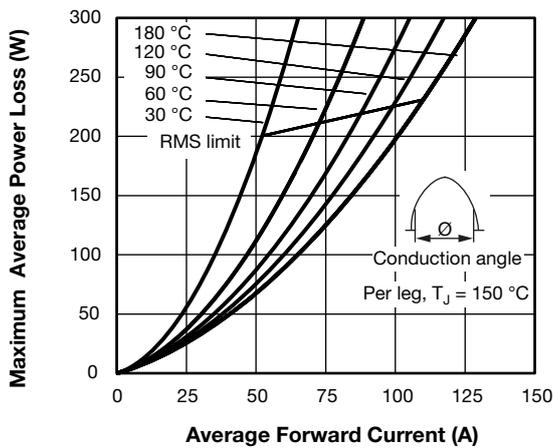


Fig. 3 - Forward Power Loss Characteristics

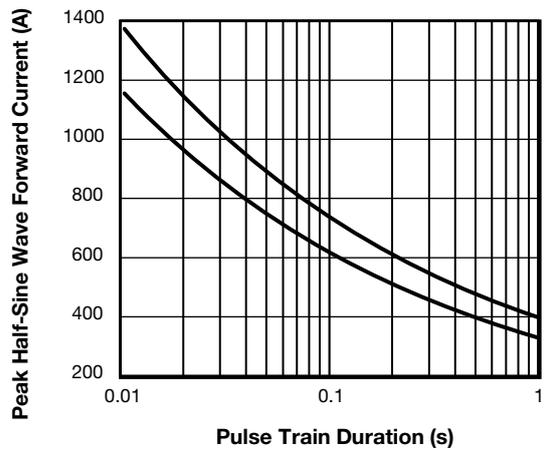


Fig. 6 - Maximum Non-Repetitive Surge Current

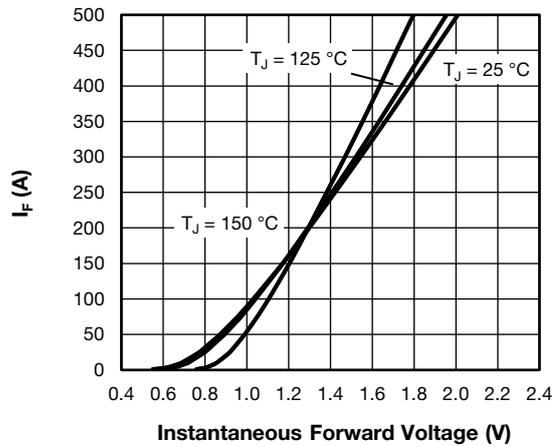


Fig. 7 - Typical Forward Voltage Characteristics

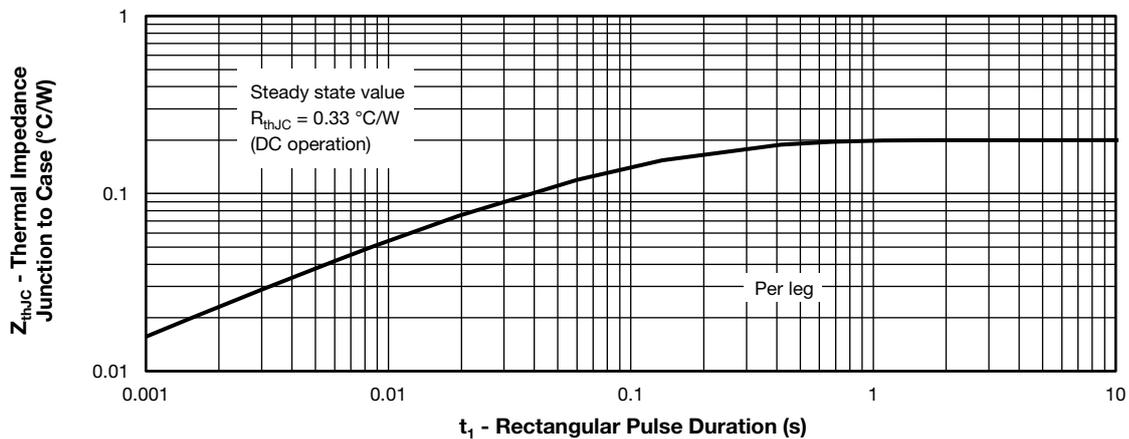


Fig. 8 - Thermal Impedance  $Z_{thJC}$  Characteristics

**ORDERING INFORMATION TABLE**

Device code	<b>VS-</b>	<b>R</b>	<b>A</b>	<b>220</b>	<b>F</b>	<b>A</b>	<b>120</b>
	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)



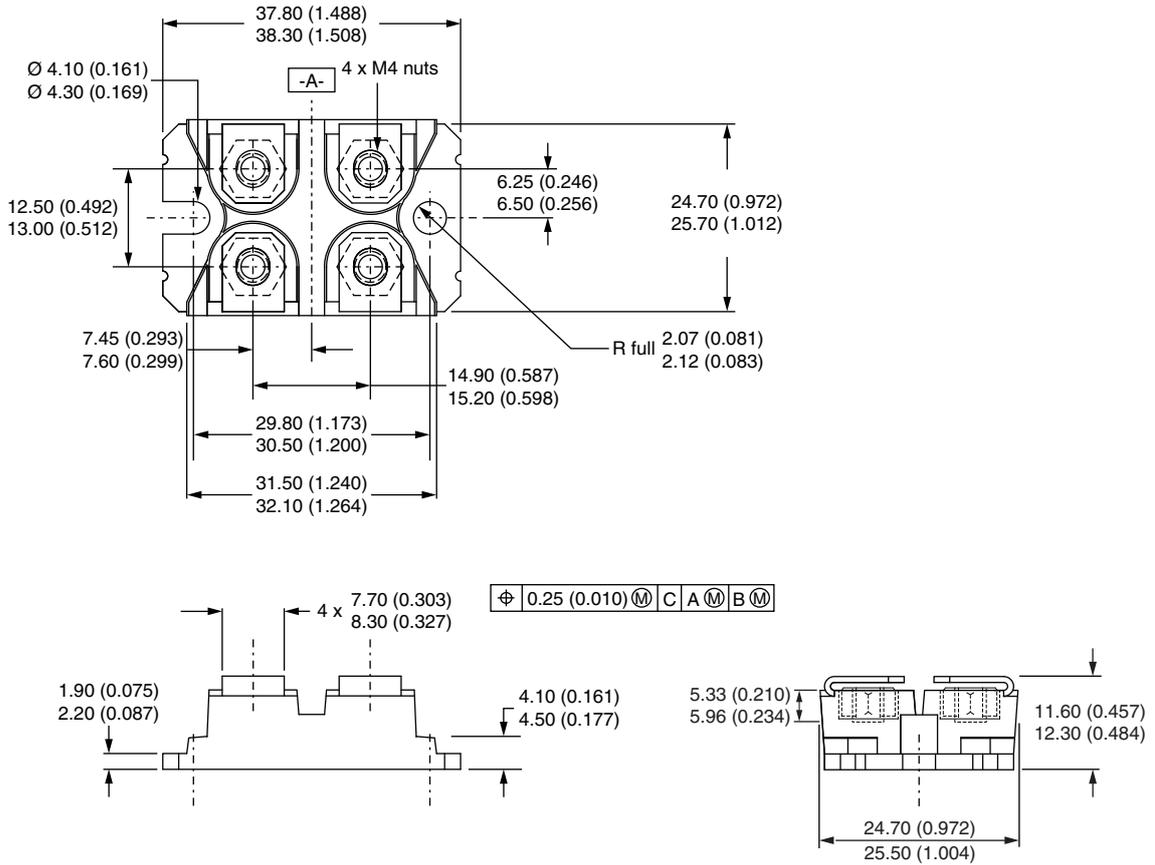
CIRCUIT CONFIGURATION		
CIRCUIT	CIRCUIT CONFIGURATION CODE	CIRCUIT DRAWING
Two separate diodes, parallel pin-out	F	<p>Lead Assignment</p>

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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