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 ![UL logo]
- Material categorization: for definitions of compliance please see 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 °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 °C	108	A
$I_{F(RMS)}$		173	
I_{FSM}	50 Hz	1170	
	60 Hz	1225	
I^2t	50 Hz	6840	A^2s
	60 Hz	6225	
$I^2\sqrt{t}$		68 440	$A^2\sqrt{s}$
V_{RRM}		1200	V
T_J		-55 to +150	°C
T_{Stg}		-40 to +150	°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 °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	
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	A
		t = 8.3 ms			1225	
		t = 10 ms	100 % V_{RRM} reapplied		985	
		t = 8.3 ms			1030	
Maximum I²t for fusing per leg	I^2t	t = 10 ms	No voltage reapplied		6840	A^2s
		t = 8.3 ms			6225	
		t = 10 ms	100 % V_{RRM} reapplied		4840	
		t = 8.3 ms			4400	
Maximum I²√t for fusing per leg	$I^2\sqrt{t}$	t = 0.1 ms to 10 ms, no voltage reapplied			68 440	$A^2\sqrt{s}$
Low level of threshold voltage per leg	$V_{F(TO)1}$	(16.7 % x π 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	$V_{F(TO)2}$	(I > π 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_{thJC}	-	-	0.2	°C/W
	per module		-	-	0.1	
Thermal resistance, case to heatsink	per module	R_{thCS}	-	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			

∆R CONDUCTION PER JUNCTION

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

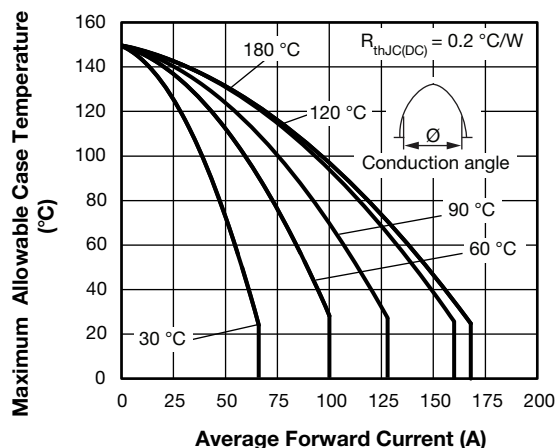Fig. 1 - Current Ratings Characteristics (A)
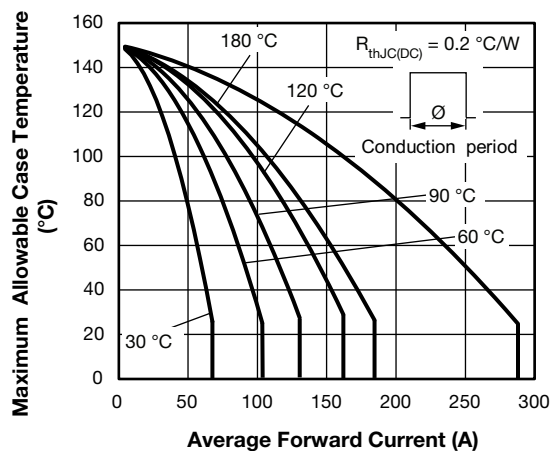
Fig. 2 - Current Ratings Characteristics (A)
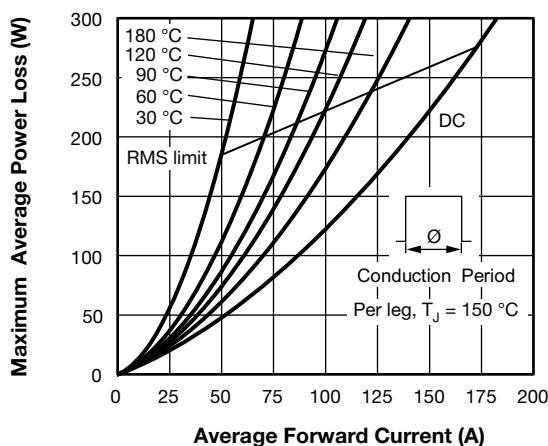
Fig. 3 - Forward Power Loss Characteristics
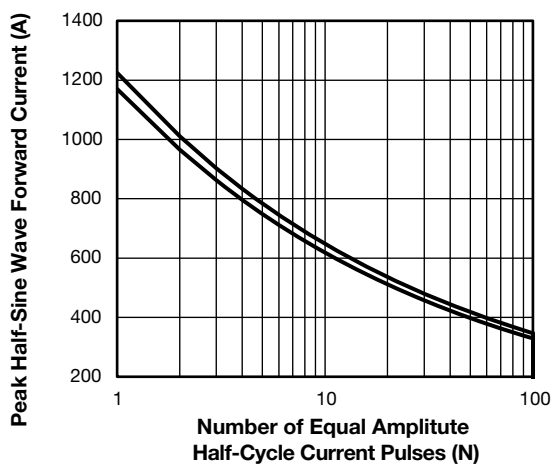
Fig. 4 - Forward Power Loss Characteristics

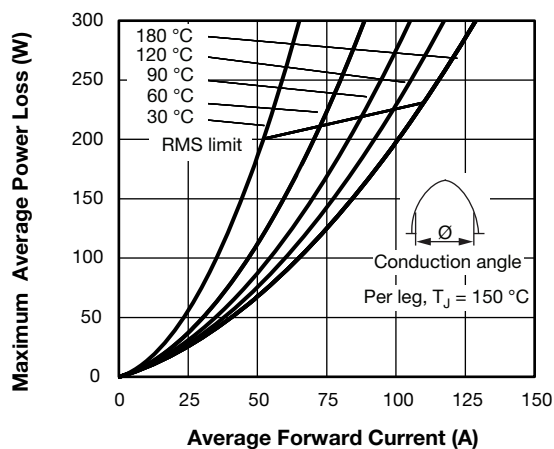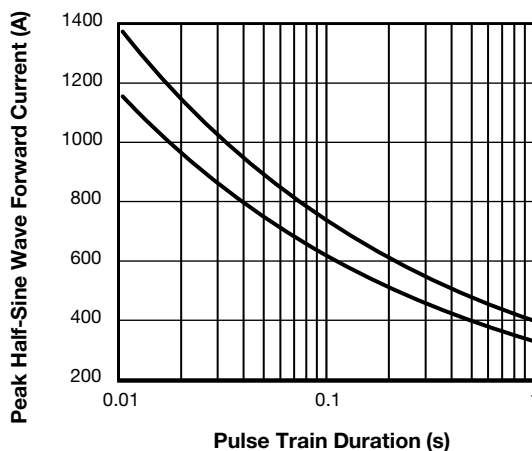Fig. 5 - Maximum Non-Repetitive Surge Current

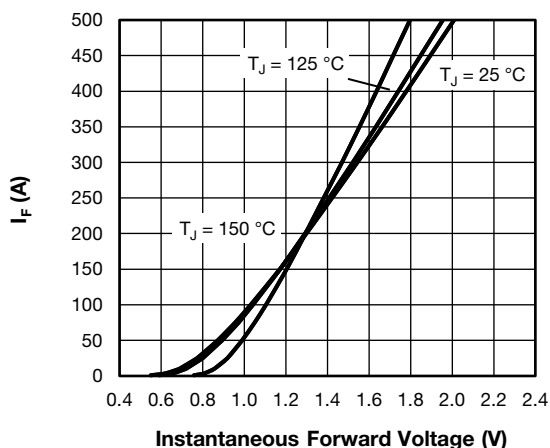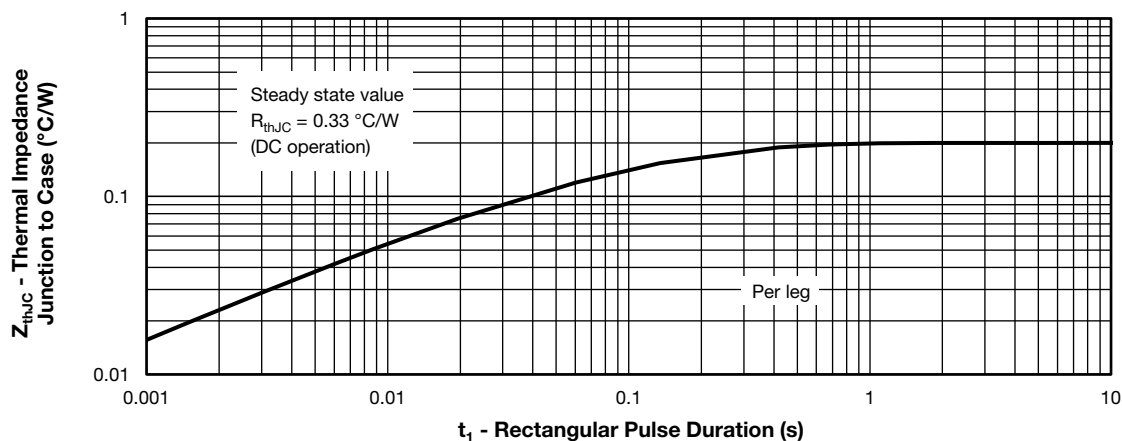Fig. 6 - Maximum Non-Repetitive Surge Current
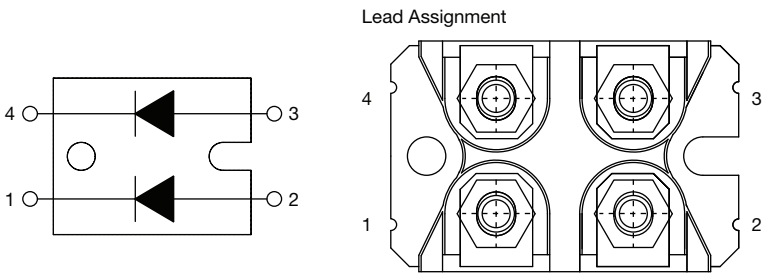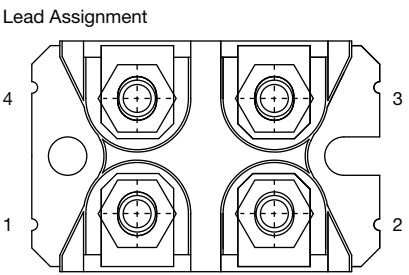
Fig. 7 - Typical Forward Voltage Characteristics

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	

Lead Assignment

LINKS TO RELATED DOCUMENTS

Dimensions	www.vishay.com/doc?95423
Packaging information	www.vishay.com/doc?95425

SOT-227 Generation 2

DIMENSIONS in millimeters (inches)

37.80 (1.488)
38.30 (1.508)

Ø 4.10 (0.161)
Ø 4.30 (0.169)

-A-

4 x M4 nuts

12.50 (0.492)
13.00 (0.512)

6.25 (0.246)
6.50 (0.256)

24.70 (0.972)
25.70 (1.012)

7.45 (0.293)
7.60 (0.299)

R full 2.07 (0.081)
2.12 (0.083)

14.90 (0.587)
15.20 (0.598)

29.80 (1.173)
30.50 (1.200)

31.50 (1.240)
32.10 (1.264)

4 x 7.70 (0.303)
8.30 (0.327)

⊕ 0.25 (0.010) Ⓜ C A Ⓜ B Ⓜ

1.90 (0.075)
2.20 (0.087)

4.10 (0.161)
4.50 (0.177)

5.33 (0.210)
5.96 (0.234)

11.60 (0.457)
12.30 (0.484)

24.70 (0.972)
25.50 (1.004)
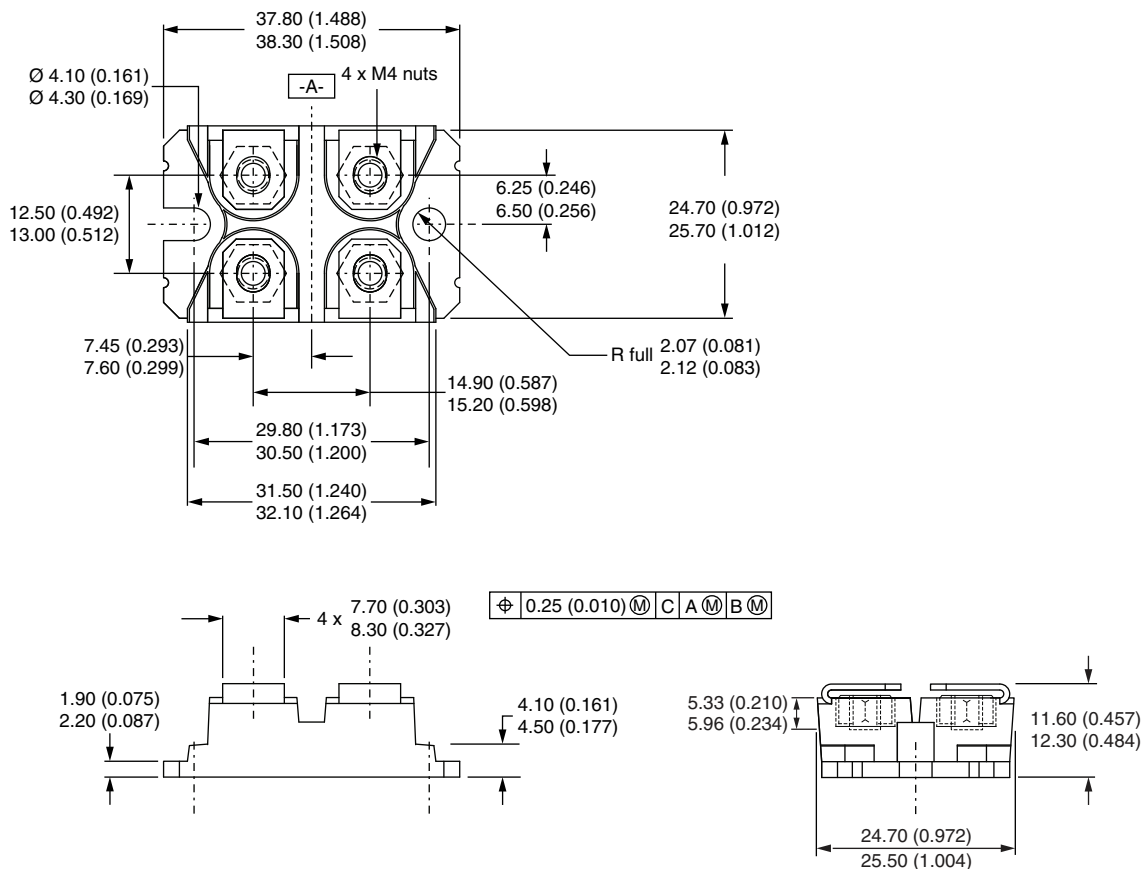
Note
- Controlling dimension: millimeter

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