


## SOT-227 Power Module

### Insulated Standard Recovery Rectifier, 160 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	160 A, $T_C = 101\text{ }^{\circ}\text{C}$
$V_{FM}$ typical at 100 A	1.16 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 $^{\circ}\text{C}$	91	A
$I_{F(RMS)}$		138	
$I_{FSM}$	50 Hz	940	
	60 Hz	985	
$I^2t$	50 Hz	4420	$\text{A}^2\text{s}$
	60 Hz	4015	
$I^2\sqrt{t}$		44 180	$\text{A}^2\sqrt{\text{s}}$
$V_{RRM}$		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-RA160FA120	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			91	A	
Maximum RMS forward current per leg	I <sub>F(RMS)</sub>	DC at 101 °C case temperature			138	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	940		
		t = 8.3 ms			985		
		t = 10 ms	100 % V <sub>RRM</sub> reapplied		790		
		t = 8.3 ms			825		
Maximum I <sup>2</sup> t for fusing per leg	I <sup>2</sup> t	t = 10 ms	No voltage reapplied			4420	A <sup>2</sup> s
		t = 8.3 ms				4015	
		t = 10 ms	100 % V <sub>RRM</sub> reapplied			3125	
		t = 8.3 ms				2840	
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			44 180	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> ) < I < π × I <sub>F(AV)</sub> , T <sub>J</sub> = T <sub>J</sub> maximum			0.80	V	
Low level value of forward slope resistance	r <sub>f1</sub>				4.32	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			0.93	V	
High level value of forward slope resistance	r <sub>f2</sub>				4.14	mΩ	
Maximum forward voltage drop per leg	V <sub>FM</sub>	I <sub>FM</sub> = 100 A, T <sub>J</sub> = 25 °C			1.27	V	
		I <sub>FM</sub> = 100 A, T <sub>J</sub> = 150 °C			1.22		

**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 AND MECHANICAL SPECIFICATIONS**

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNITS
Thermal resistance, junction to case	$R_{thJC}$	-	-	0.26	°C/W
		-	-	0.13	
Thermal resistance, case to heatsink	$R_{thCS}$	-	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			

**ΔR CONDUCTION PER JUNCTION**

DEVICE	SINE HALF WAVE CONDUCTION					RECTANGULAR WAVE CONDUCTION					UNITS
	180°	120°	90°	60°	30°	180°	120°	90°	60°	30°	
VS-RA160FA120	0.109	0.122	0.149	0.213	0.355	0.069	0.119	0.159	0.223	0.358	°C/W

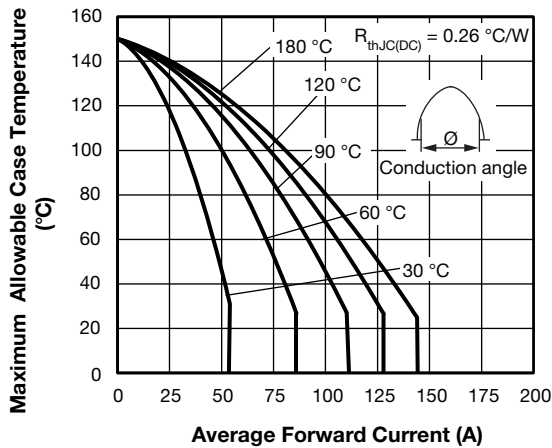


Fig. 1 - Current Ratings Characteristics (A)

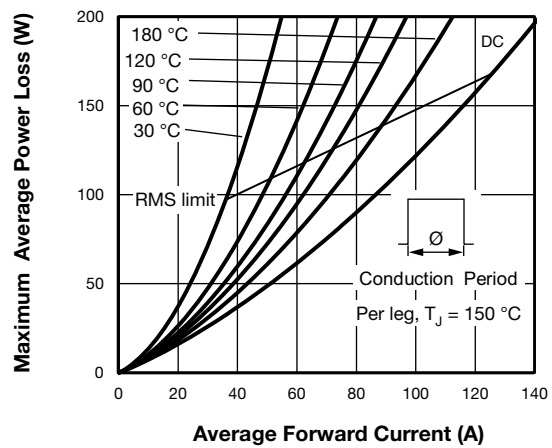


Fig. 4 - Forward Power Loss Characteristics

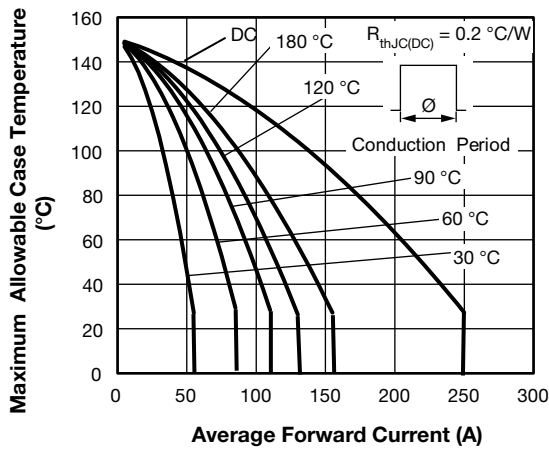


Fig. 2 - Current Ratings Characteristics (A)

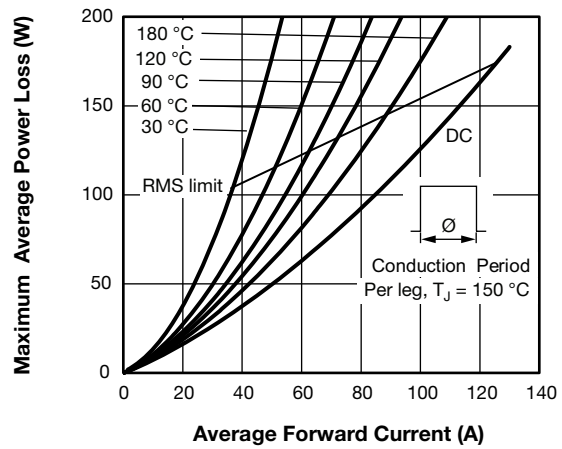


Fig. 5 - Forward Power Loss Characteristics

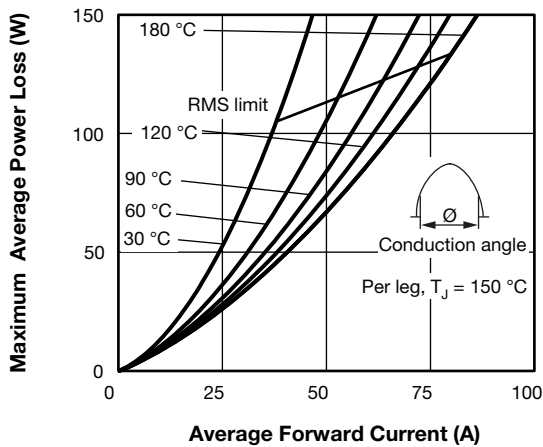


Fig. 3 - Current Ratings Characteristics (A)

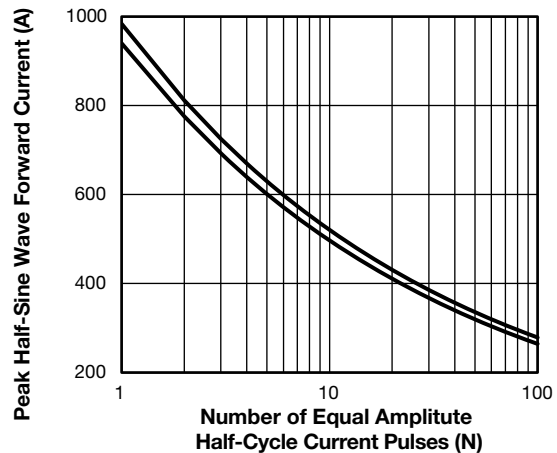


Fig. 6 - Maximum Non-Repetitive Surge Current

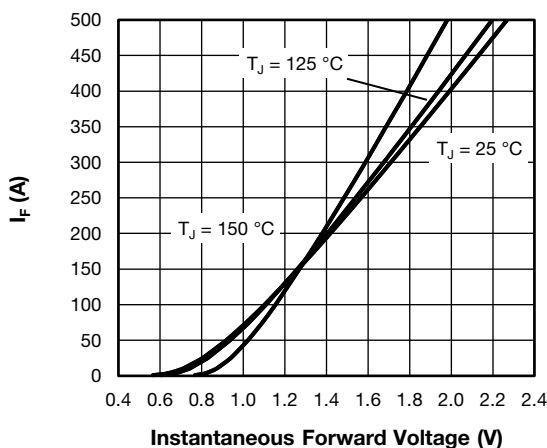
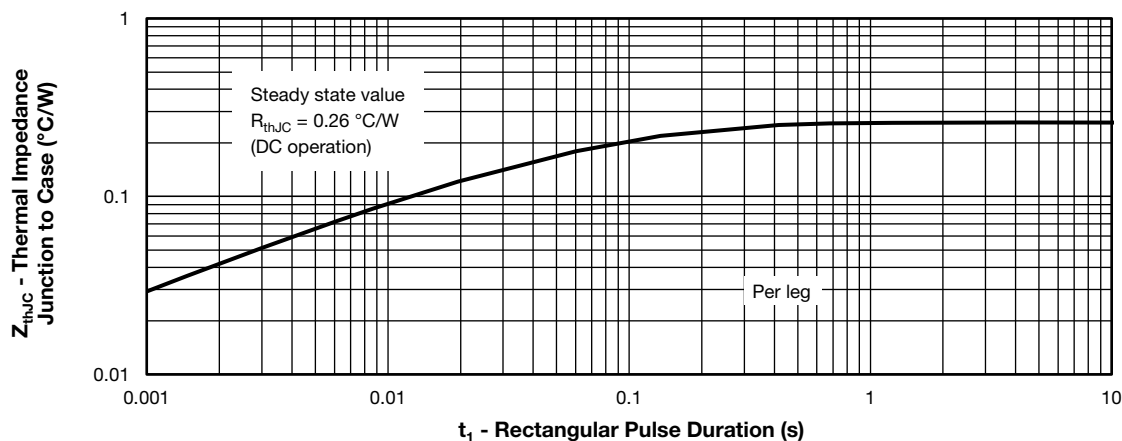


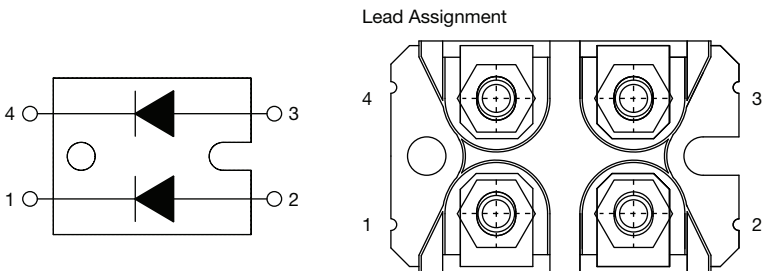
Fig. 7 - Typical Forward Voltage Characteristics


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

## ORDERING INFORMATION TABLE

Device code	VS-	R	A	160	F	A	120
	1	2	3	4	5	6	7

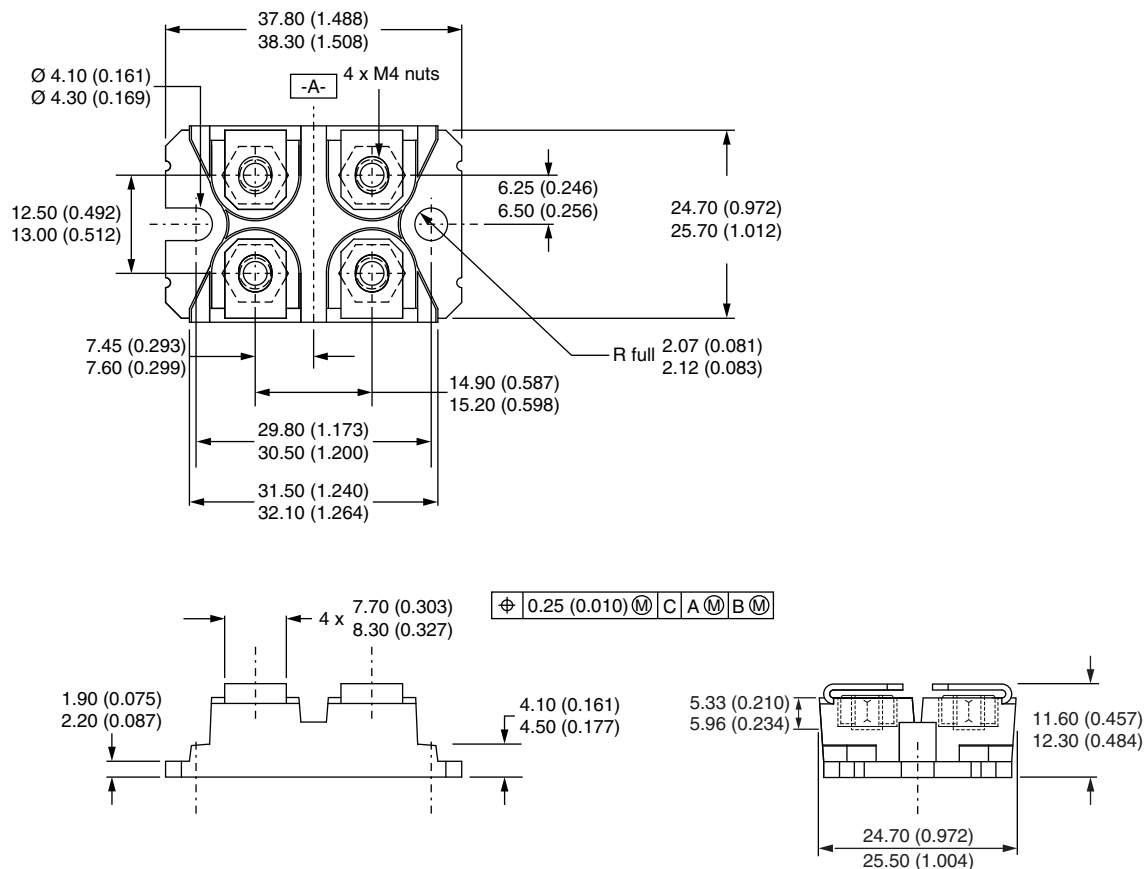
- 1** - Vishay Semiconductors product
- 2** - Standard recovery diode
- 3** - Present silicon generation
- 4** - Current rating (160 = 160 A)
- 5** - Circuit configuration (2 separate diodes, parallel pin-out)
- 6** - Package indicator (SOT-227 standard insulated base)
- 7** - Voltage rating (120 = 1200 V)

CIRCUIT CONFIGURATION		
CIRCUIT DESCRIPTION	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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