


## 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 °C	91	A
$I_{F(RMS)}$		138	
$I_{FSM}$	50 Hz	940	
	60 Hz	985	
$I^2t$	50 Hz	4420	A <sup>2</sup> s
	60 Hz	4015	
$I^2\sqrt{t}$		44 180	A <sup>2</sup> √s
$V_{RRM}$		1200	V
$T_J$		-55 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-RA160FA120	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		91	A
Maximum RMS forward current per leg	$I_{F(RMS)}$	DC at 101 °C case temperature		138	A
Maximum peak, one-cycle forward, non-repetitive surge current per leg	$I_{FSM}$	t = 10 ms	No voltage reapplied	940	
		t = 8.3 ms	No voltage reapplied	985	
		t = 10 ms	100 % $V_{RRM}$ reapplied	790	
		t = 8.3 ms	100 % $V_{RRM}$ reapplied	825	
Maximum $I^2t$ for fusing per leg	$I^2t$	t = 10 ms	No voltage reapplied	4420	A <sup>2</sup> s
		t = 8.3 ms	No voltage reapplied	4015	
		t = 10 ms	100 % $V_{RRM}$ reapplied	3125	
		t = 8.3 ms	100 % $V_{RRM}$ reapplied	2840	
Maximum $I^2\sqrt{t}$ for fusing per leg	$I^2\sqrt{t}$	t = 0.1 ms to 10 ms, no voltage reapplied		44 180	A <sup>2</sup> √s
Low level of threshold voltage per leg	$V_{F(TO)1}$	$(16.7\% \times \pi \times I_{F(AV)}) < I < \pi \times I_{F(AV)}, T_J = T_J \text{ maximum}$		0.80	V
Low level value of forward slope resistance	$r_{f1}$			4.32	mΩ
High level of threshold voltage per leg	$V_{F(TO)2}$	$(I > \pi \times I_{F(AV)}, T_J = T_J \text{ maximum})$		0.93	V
High level value of forward slope resistance	$r_{f2}$			4.14	mΩ
Maximum forward voltage drop per leg	$V_{FM}$	$I_{FM} = 100 \text{ A}, T_J = 25 \text{ °C}$		1.27	V
		$I_{FM} = 100 \text{ A}, T_J = 150 \text{ °C}$		1.22	

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

THERMAL AND MECHANICAL SPECIFICATIONS						
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNITS	
Thermal resistance, junction to case	per leg	-	-	0.26	°C/W	
	per module	-	-	0.13		
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-RA160FA120	0.109	0.122	0.149	0.213	0.355	0.069	0.119	0.159	0.223	0.358	°C/W

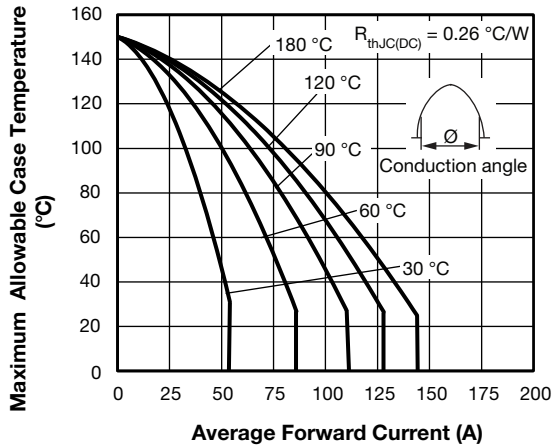


Fig. 1 - Current Ratings Characteristics (A)

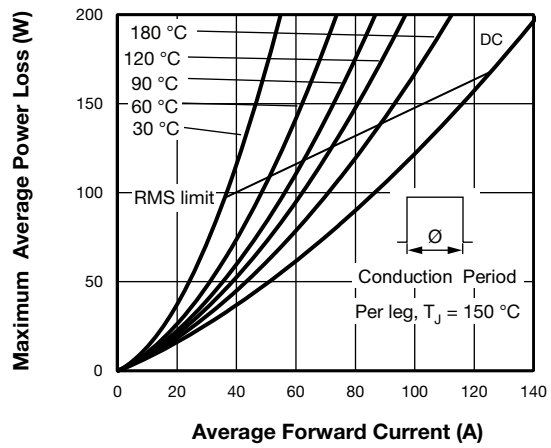


Fig. 4 - Forward Power Loss Characteristics

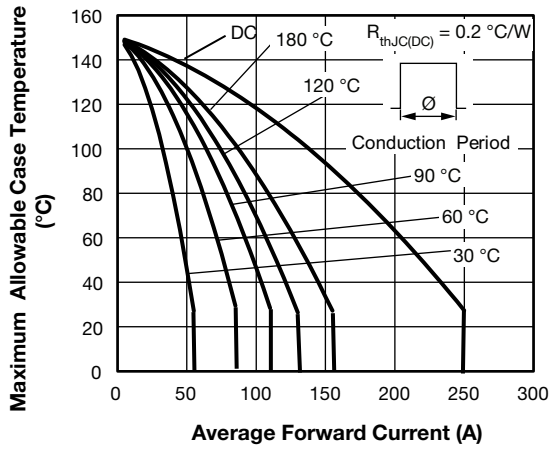


Fig. 2 - Current Ratings Characteristics (A)

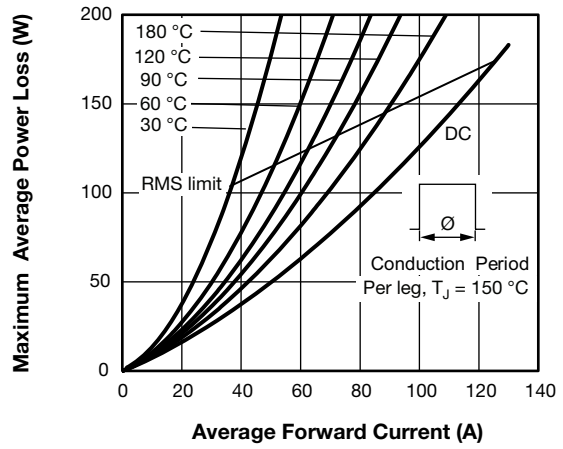


Fig. 5 - Forward Power Loss Characteristics

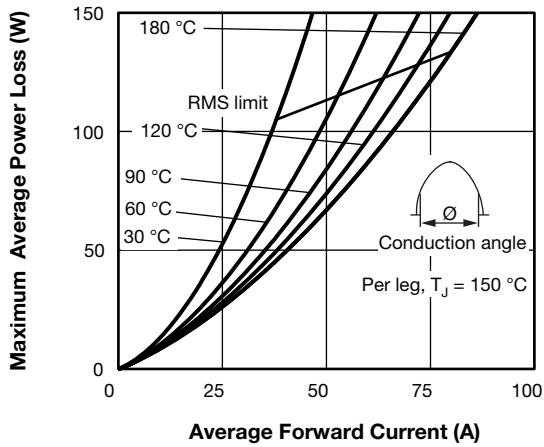


Fig. 3 - Current Ratings Characteristics (A)

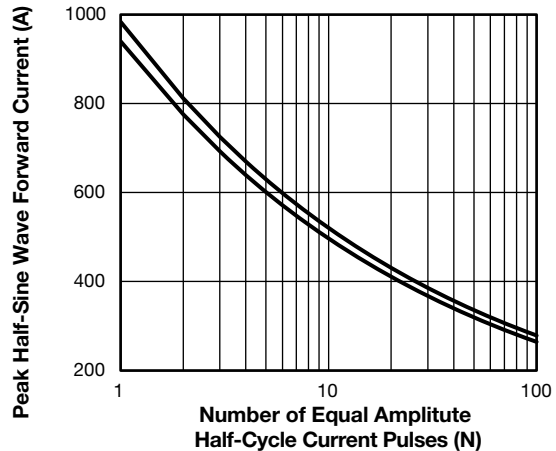


Fig. 6 - Maximum Non-Repetitive Surge Current

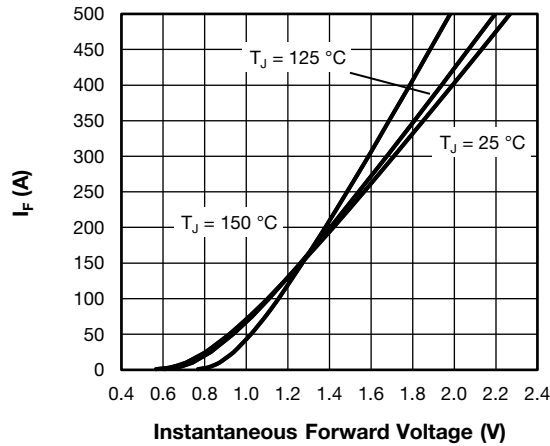


Fig. 7 - Typical Forward Voltage Characteristics

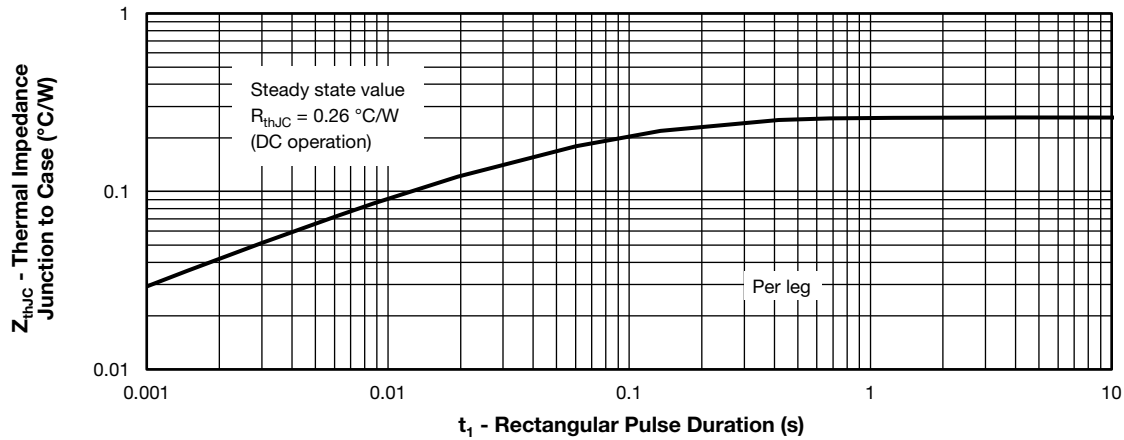
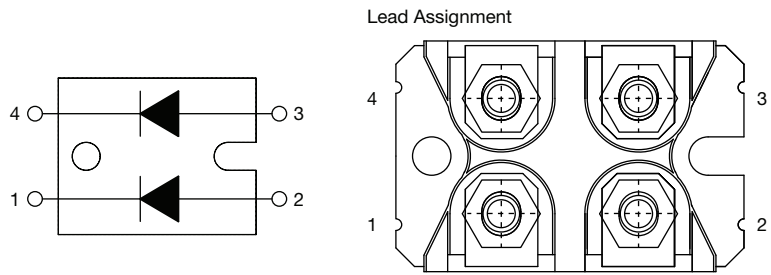


Fig. 8 - Thermal Impedance  $Z_{thJC}$  Characteristics

**ORDERING INFORMATION TABLE**

Device code	<b>VS-</b>	<b>R</b>	<b>A</b>	<b>160</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 (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)

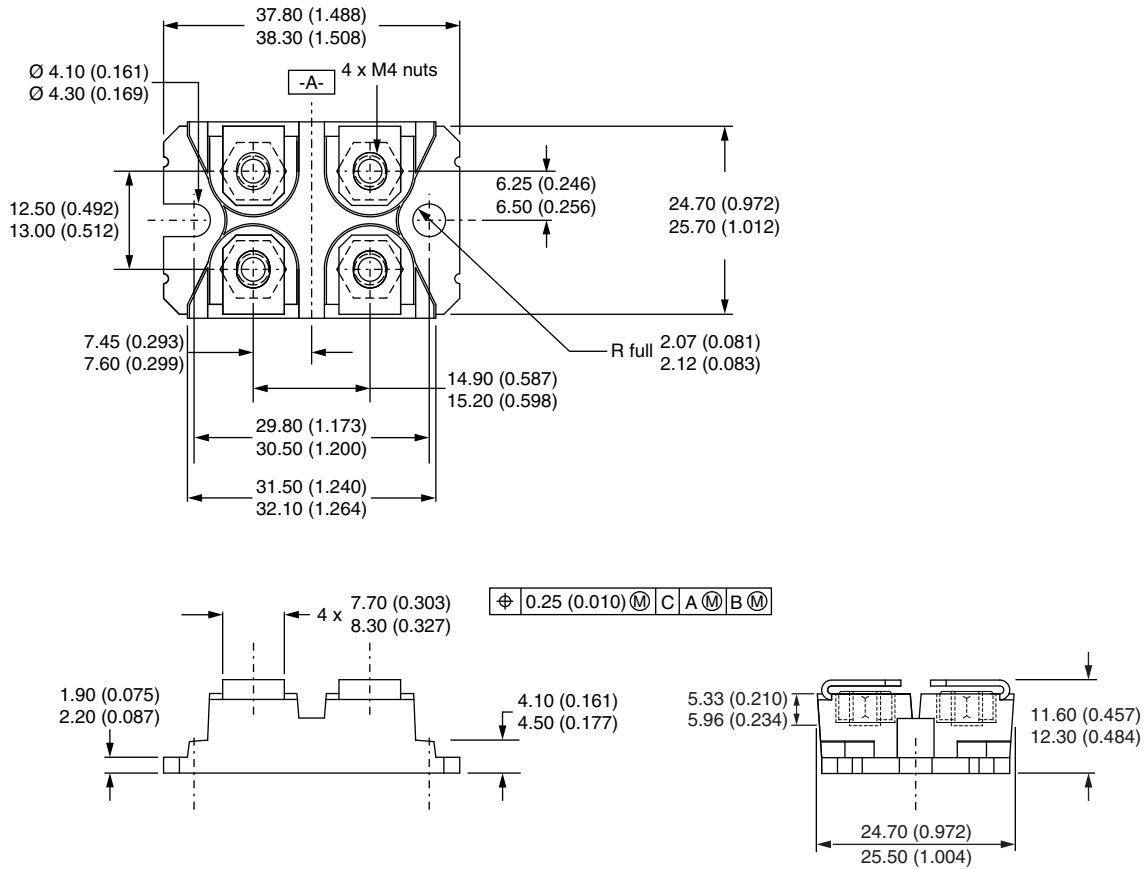
CIRCUIT CONFIGURATION		
CIRCUIT DESCRIPTION	CIRCUIT CONFIGURATION CODE	CIRCUIT DRAWING
Two separate diodes, parallel pin-out	F	 <p>The circuit drawing shows two diodes connected in parallel. The left diode has its cathode at pin 4 and its anode at pin 3. The right diode has its cathode at pin 1 and its anode at pin 2. A lead assignment diagram to the right shows the physical package with pins 1, 2, 3, and 4 labeled.</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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