

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


**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 ² s
	60 Hz	4015	
$I^2\sqrt{t}$		44 180	A ² √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-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 reappplied	940	
		t = 8.3 ms	No voltage reappplied	985	
		t = 10 ms	100 % V_{RRM} reappplied	790	
		t = 8.3 ms	100 % V_{RRM} reappplied	825	
Maximum I^2t for fusing per leg	I^2t	t = 10 ms	No voltage reappplied	4420	A ² s
		t = 8.3 ms	No voltage reappplied	4015	
		t = 10 ms	100 % V_{RRM} reappplied	3125	
		t = 8.3 ms	100 % V_{RRM} reappplied	2840	
Maximum $I^2\sqrt{t}$ for fusing per leg	$I^2\sqrt{t}$	t = 0.1 ms to 10 ms, no voltage reappplied		44 180	A ² √s
Low level of threshold voltage per leg	$V_{F(TO)1}$	$(16.7 \% \times \pi \times I_{F(AV)}) < I < \pi \times I_{F(AV)}$, $T_J = T_J$ maximum		0.80	V
Low level value of forward slope resistance	r_{f1}			4.32	mΩ
High level of threshold voltage per leg	$V_{F(TO)2}$	$I > \pi \times I_{F(AV)}$, $T_J = T_J$ maximum		0.93	V
High level value of forward slope resistance	r_{f2}			4.14	mΩ
Maximum forward voltage drop per leg	V_{FM}	$I_{FM} = 100$ A, $T_J = 25$ °C		1.27	V
		$I_{FM} = 100$ A, $T_J = 150$ °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	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

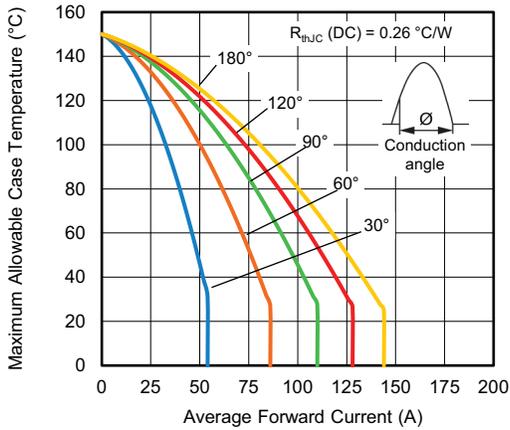


Fig. 1 - Current Ratings Characteristics (A)

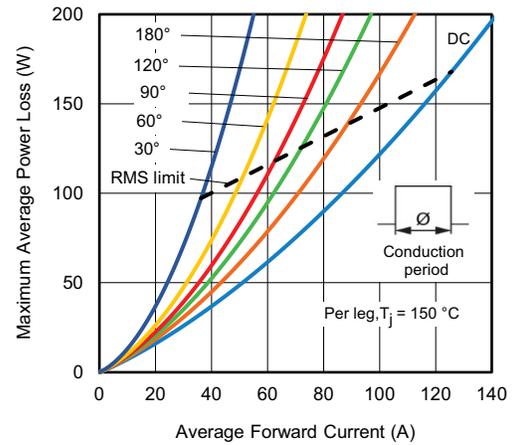


Fig. 4 - Forward Power Loss Characteristics

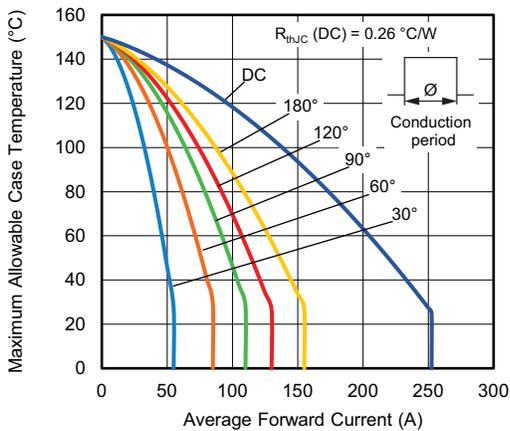


Fig. 2 - Current Ratings Characteristics (A)

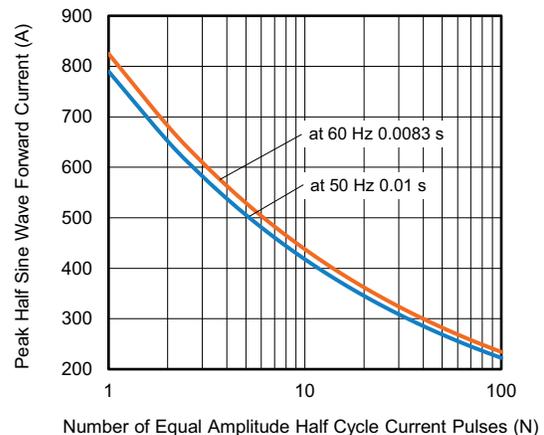


Fig. 5 - Forward Power Loss Characteristics

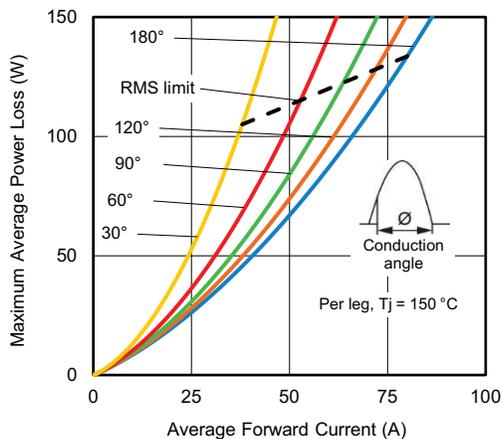


Fig. 3 - Current Ratings Characteristics (A)

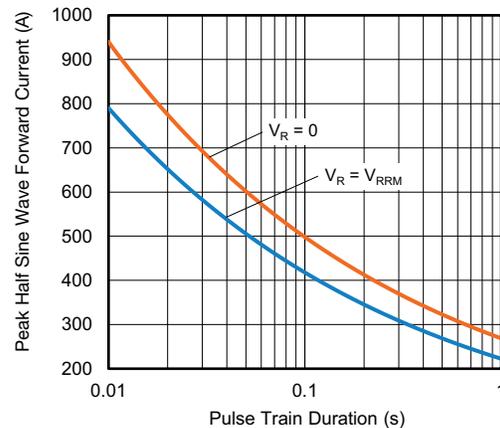


Fig. 6 - Maximum Non-Repetitive Surge Current

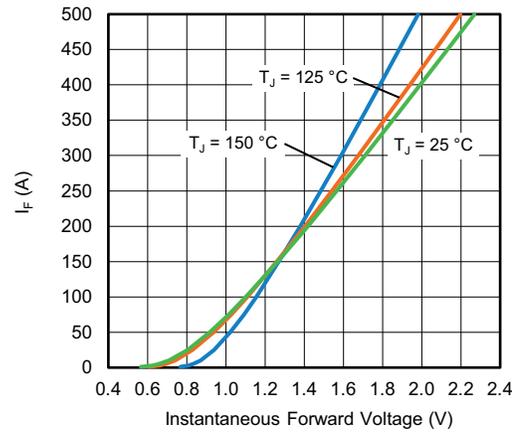


Fig. 7 - Typical Forward Voltage Characteristics

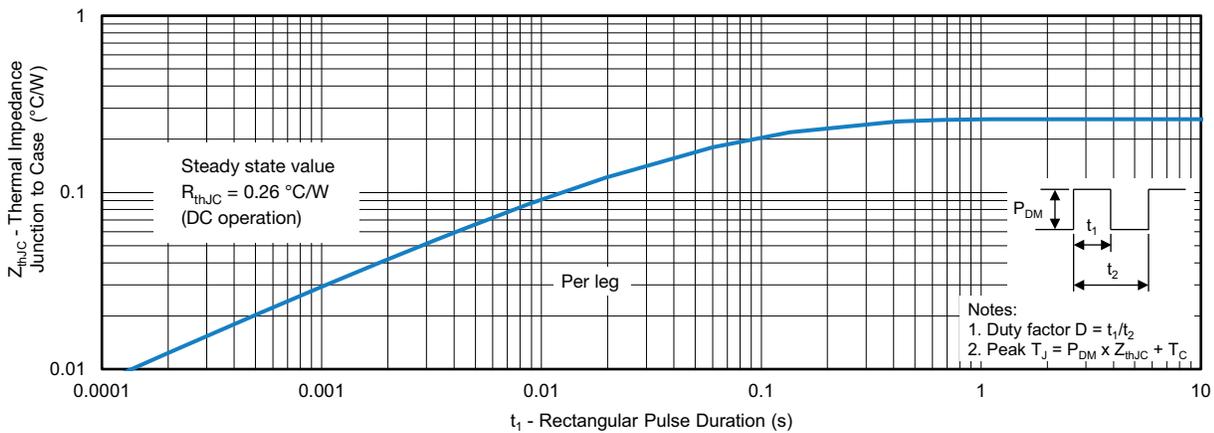


Fig. 8 - Thermal Impedance Z_{thJC} Characteristics

ORDERING INFORMATION TABLE

Device code	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)



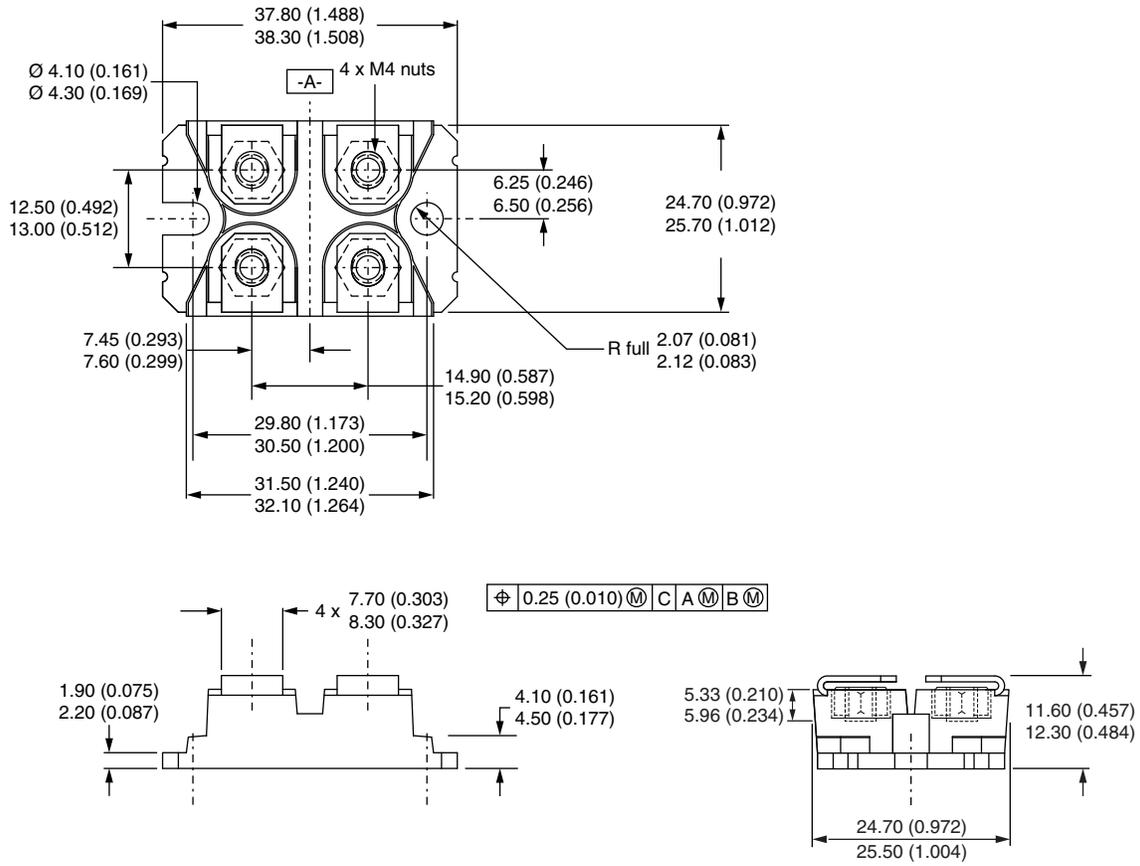
CIRCUIT CONFIGURATION		
CIRCUIT DESCRIPTION	CIRCUIT CONFIGURATION CODE	CIRCUIT DRAWING
Two separate diodes, parallel pin-out	F	<p>The circuit drawing shows two diodes connected in parallel. The left diode has its cathode to the left and anode to the right. The right diode has its cathode to the right and anode to the left. The left anode is connected to pin 4, and the right anode is connected to pin 3. The left cathode is connected to pin 1, and the right cathode is connected to pin 2. The lead assignment diagram shows a top-down view of the package with four leads labeled 1, 2, 3, and 4. Lead 1 is at the bottom left, lead 2 is at the bottom right, lead 3 is at the top right, and lead 4 is at the top left.</p>

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)



Note

- Controlling dimension: millimeter



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