

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 pending
- 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

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		985	
		t = 10 ms	100 % V_{RRM} reapplied	790	
		t = 8.3 ms		825	
Maximum I^2t for fusing per leg	I^2t	t = 10 ms	No voltage reapplied	4420	A ² s
		t = 8.3 ms		4015	
		t = 10 ms	100 % V_{RRM} reapplied	3125	
		t = 8.3 ms		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 ² √s
Low level of threshold voltage per leg	$V_{F(TO)1}$	$(16.7 \% \times \pi \times I_{F(AV)}) < I < \pi \times I_{F(AV)}, T_J = T_J \text{ maximum}$		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 - 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

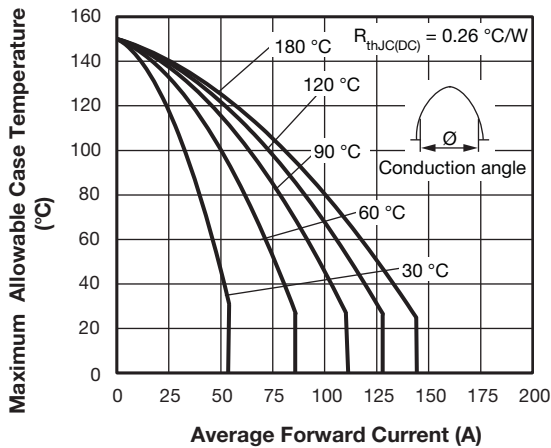


Fig. 1 - Current Ratings Characteristics (A)

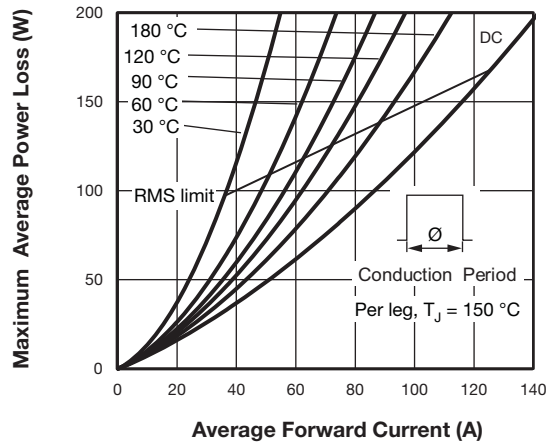


Fig. 4 - Forward Power Loss Characteristics

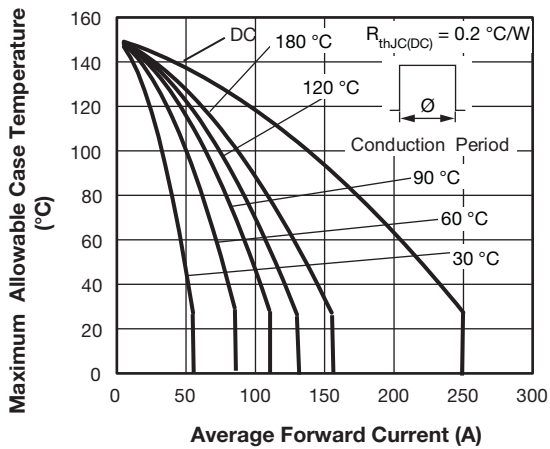


Fig. 2 - Current Ratings Characteristics (A)

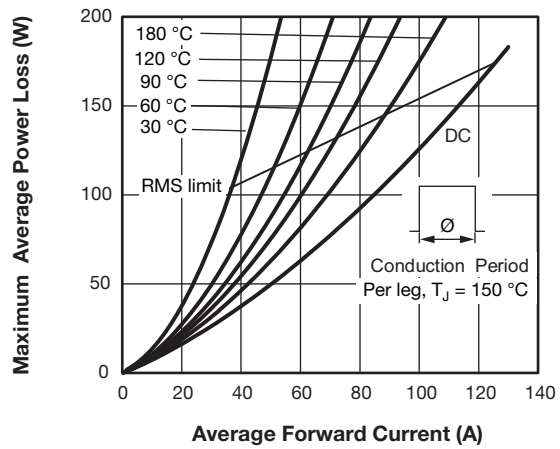


Fig. 5 - Forward Power Loss Characteristics

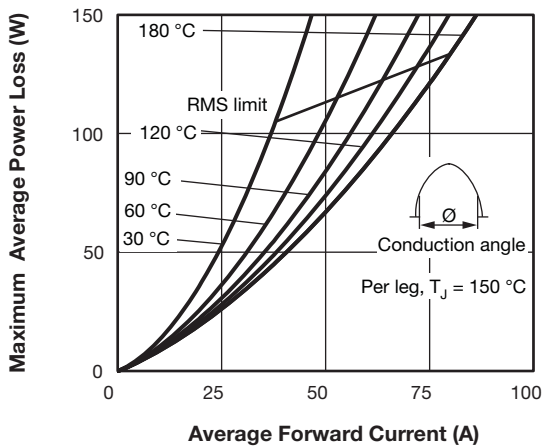


Fig. 3 - Current Ratings Characteristics (A)

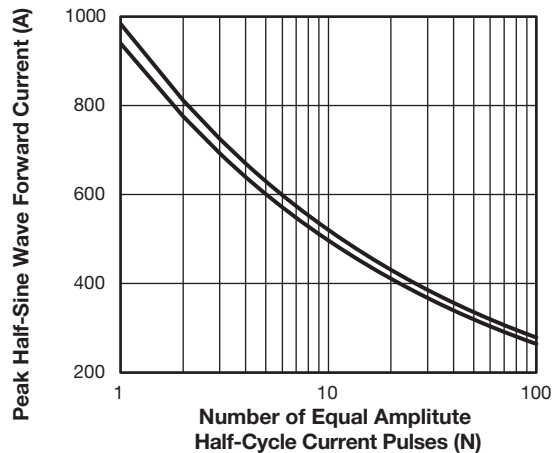


Fig. 6 - Maximum Non-Repetitive Surge Current

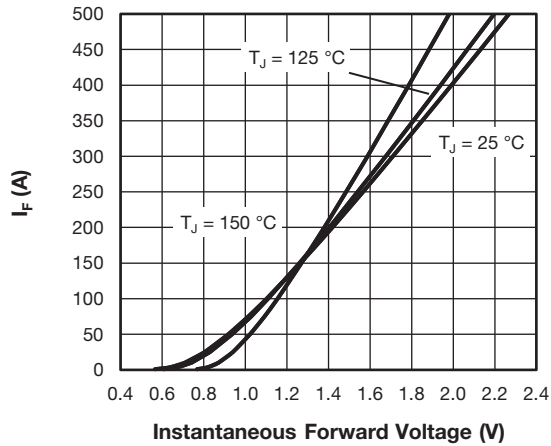


Fig. 7 - Typical Forward Voltage Characteristics

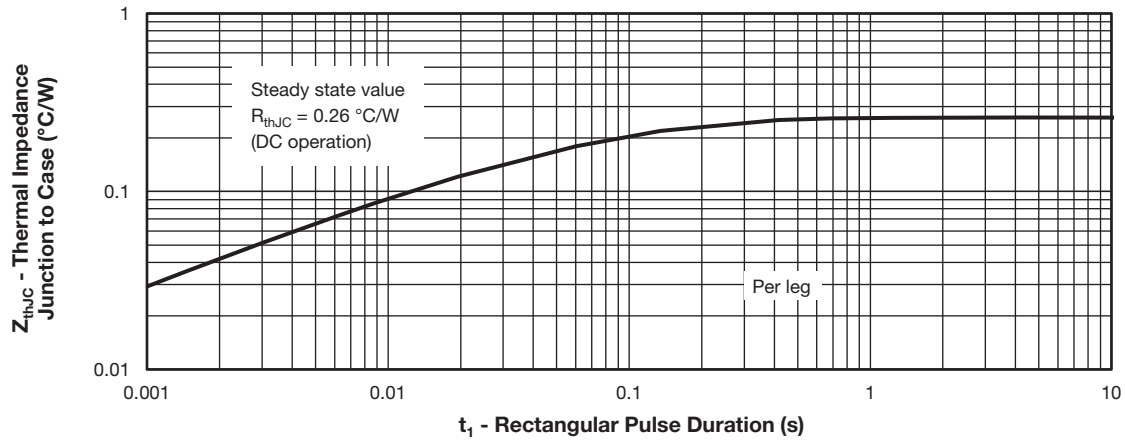


Fig. 8 - Thermal Impedance Z_{thJC} Characteristics

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	CIRCUIT CONFIGURATION CODE	CIRCUIT DRAWING
Two separate diodes, parallel pin-out	F	<p>The circuit drawing shows two diodes connected in parallel. The anodes are connected to pins 1 and 2, and the cathodes are connected to pins 3 and 4. The lead assignment diagram shows the physical layout of the diodes on the package with pins 1, 2, 3, and 4 labeled.</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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