

## Single Phase Fast Recovery Bridge (Power Modules), 60 A



SOT-227

### FEATURES

- Fast recovery time characteristic
- Electrically isolated base plate
- Simplified mechanical designs, rapid assembly
- UL pending
- Excellent power/volume ratio
- Compliant to RoHS Directive 2002/95/EC
- Designed and qualified for industrial and consumer level


**RoHS**  
COMPLIANT

### PRODUCT SUMMARY

$I_{T(AV)}$	60 A
Type	Modules - Bridge, Fast

### DESCRIPTION

The semiconductor in the SOT-227 package is isolated from the copper base plate, allowing for common heatsinks and compact assemblies to be built.

### MAJOR RATINGS AND CHARACTERISTICS

SYMBOL	CHARACTERISTICS	VALUES	UNITS
$I_o$		60	A
	$T_C$	59	°C
$I_{FSM}$	50 Hz	300	A
	60 Hz	310	
$I^2t$	50 Hz	442	A <sup>2</sup> s
	60 Hz	402	
$V_{RRM}$		600	V
$T_J$		- 55 to 150	°C

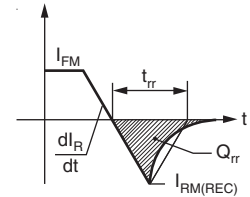
### ELECTRICAL SPECIFICATIONS

#### VOLTAGE RATINGS

TYPE NUMBER	VOLTAGE CODE	$V_{RRM}$ , MAXIMUM REPETITIVE PEAK REVERSE VOLTAGE V	$V_{RSM}$ , MAXIMUM NON-REPETITIVE PEAK REVERSE VOLTAGE V	$I_{RRM}$ MAXIMUM AT $T_J$ MAXIMUM
SA60BA60	60	600	700	5

FORWARD CONDUCTION					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum DC output current at case temperature	$I_O$	Resistive or inductive load		60	A
				59	°C
Maximum peak, one-cycle non-repetitive forward current	$I_{FSM}$	t = 10 ms	No voltage reapplied	300	A
		t = 8.3 ms		310	
		t = 10 ms	100 % $V_{RRM}$ reapplied	250	
		t = 8.3 ms		260	
Maximum $I^2t$ for fusing	$I^2t$	t = 10 ms	No voltage reapplied	442	A <sup>2</sup> s
		t = 8.3 ms		402	
		t = 10 ms	100 % $V_{RRM}$ reapplied	313	
		t = 8.3 ms		284	
Maximum $I^2\sqrt{t}$ for fusing	$I^2\sqrt{t}$	$I^2t$ for time $t_x = I_2\sqrt{t} \times \sqrt{t_x}$ ; $0.1 \leq t_x \leq 10$ ms, $V_{RRM} = 0$ V		4.4	kA <sup>2</sup> √s
Value of threshold voltage	$V_{F(TO)}$	T <sub>J</sub> maximum		0.914	V
Forward slope resistance	$r_t$			10.5	mΩ
Maximum forward voltage drop	$V_{FM}$	T <sub>J</sub> = 25 °C, $I_{FM} = 30$ A <sub>pk</sub>		t <sub>p</sub> = 400 μs	V
		T <sub>J</sub> = T <sub>J</sub> maximum, $I_{FM} = 30$ A <sub>pk</sub>			
RMS isolation voltage base plate	$V_{INS}$	f = 50 Hz, t = 1 s		3000	

RECOVERY CHARACTERISTICS				
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Reverse recovery time	$t_{rr}$	T <sub>J</sub> = 25 °C, $I_F = 20$ A, $V_R = 30$ V, $dI_F/dt = 100$ A/μs	160	ns
		T <sub>J</sub> = 125 °C, $I_F = 20$ A, $V_R = 30$ V, $dI_F/dt = 100$ A/μs	250	
Reverse recovery current	$I_{rr}$	T <sub>J</sub> = 25 °C, $I_F = 20$ A, $V_R = 30$ V, $dI_F/dt = 100$ A/μs	10	A
		T <sub>J</sub> = 125 °C, $I_F = 20$ A, $V_R = 30$ V, $dI_F/dt = 100$ A/μs	15	
Reverse recovery charge	$Q_{rr}$	T <sub>J</sub> = 25 °C, $I_F = 20$ A, $V_R = 30$ V, $dI_F/dt = 100$ A/μs	1.20	nC
		T <sub>J</sub> = 125 °C, $I_F = 20$ A, $V_R = 30$ V, $dI_F/dt = 100$ A/μs	2.90	
Snap factor, typical	S	T <sub>J</sub> = 25 °C	0.6	-



THERMAL AND MECHANICAL SPECIFICATIONS				
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Junction and storage temperature range	T <sub>J</sub> , T <sub>Stg</sub>		- 55 to 150	°C
Maximum thermal resistance junction to case per bridge	R <sub>thJC</sub>		0.30	°C/W
Typical thermal resistance, case to heatsink per module	R <sub>thCS</sub>	Mounting surface, smooth, flat and greased	0.05	
Approximate weight			30	g
Mounting torque ± 10 %		Bridge to heatsink	1.3	Nm
Case style			SOT-227	

# Single Phase Fast Recovery Bridge Vishay Semiconductors (Power Modules), 60 A

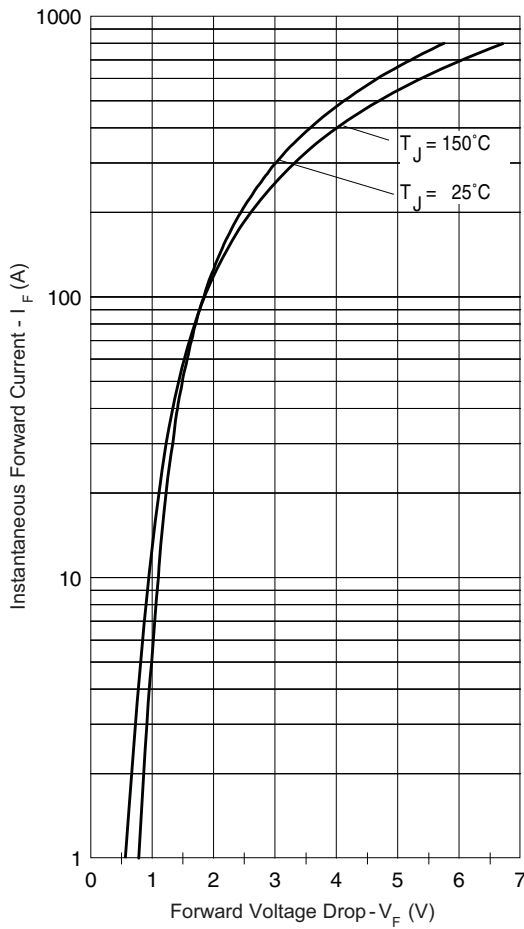


Fig. 1 - Typical Forward Voltage Drop Characteristics

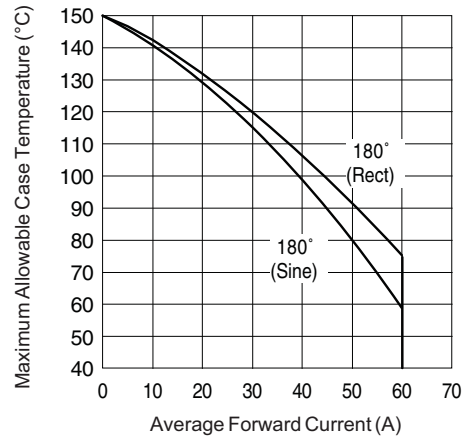


Fig. 2 - Current Rating Characteristics

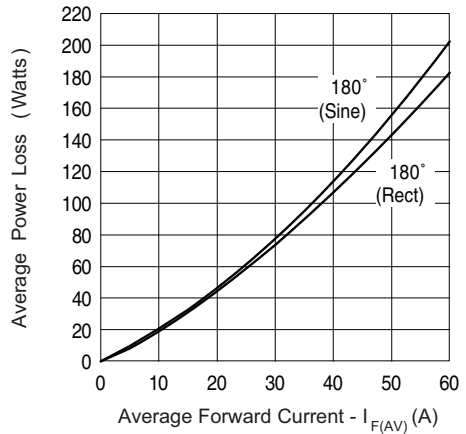


Fig. 3 - Forward Power Loss Characteristics

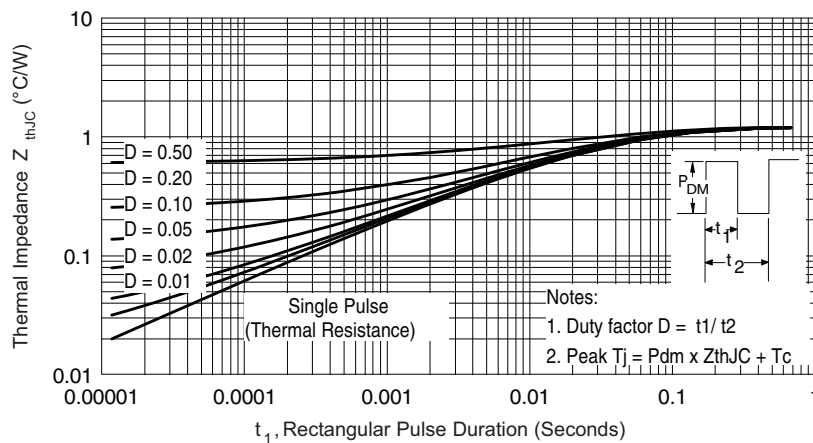


Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics (Per Leg)

Vishay Semiconductors Single Phase Fast Recovery Bridge  
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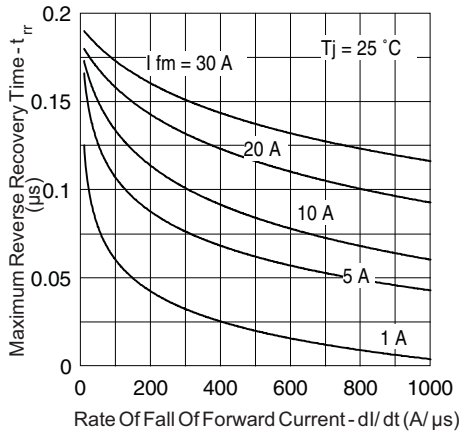


Fig. 5 - Recovery Time Characteristics,  $T_J = 25\text{ }^\circ\text{C}$

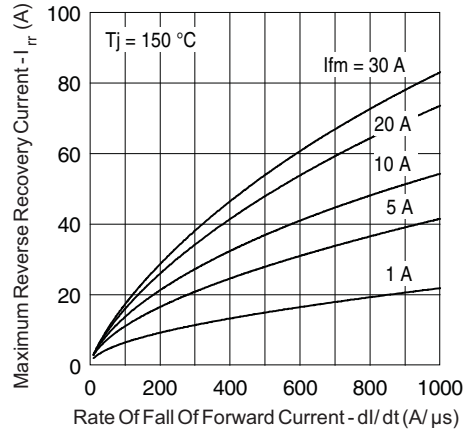


Fig. 8 - Recovery Charge Characteristics,  $T_J = 150\text{ }^\circ\text{C}$

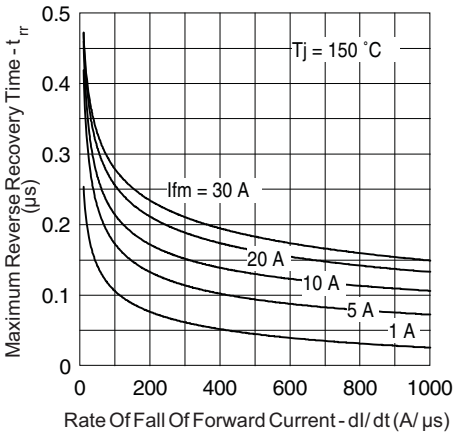


Fig. 6 - Recovery Time Characteristics,  $T_J = 150\text{ }^\circ\text{C}$

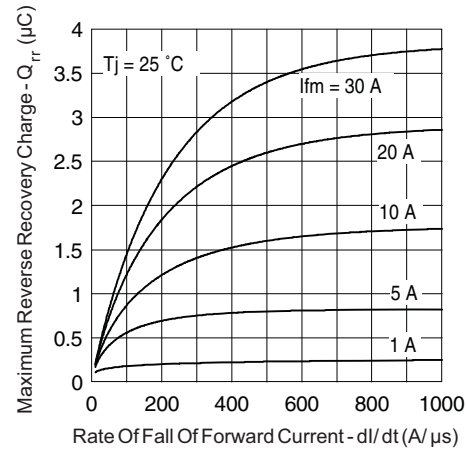


Fig. 9 - Recovery Current Characteristics,  $T_J = 25\text{ }^\circ\text{C}$

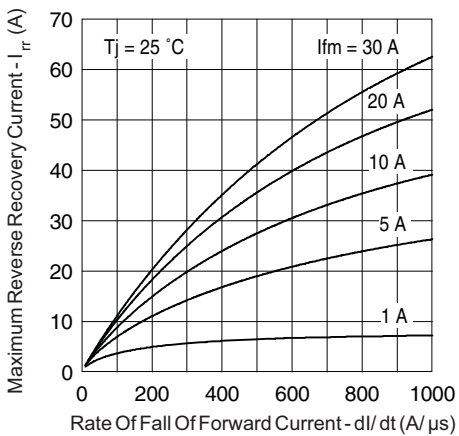


Fig. 7 - Recovery Charge Characteristics,  $T_J = 25\text{ }^\circ\text{C}$

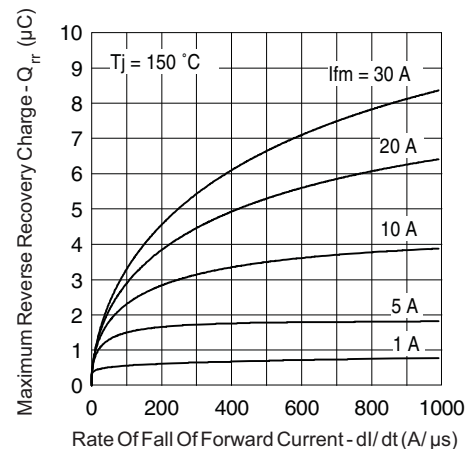


Fig. 10 - Recovery Current Characteristics,  $T_J = 150\text{ }^\circ\text{C}$

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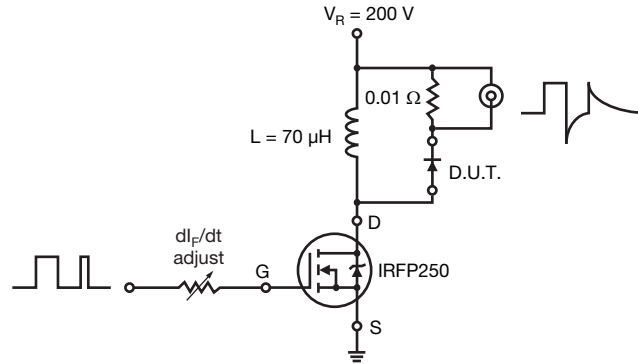
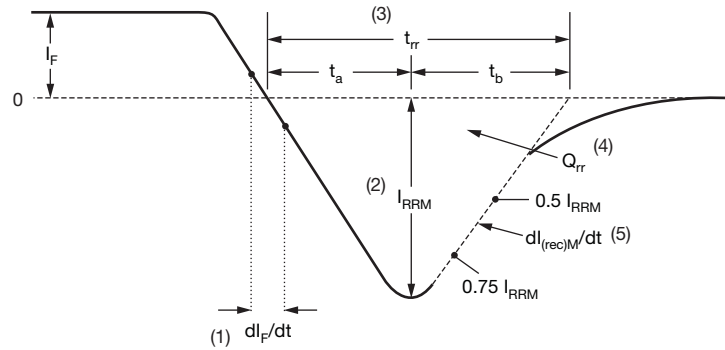


Fig. 11 - Reverse Recovery Parameter Test Circuit



(1)  $di_F/dt$  - rate of change of current through zero crossing

(2)  $I_{RRM}$  - peak reverse recovery current

(3)  $t_{rr}$  - reverse recovery time measured from zero crossing point of negative going  $I_F$  to point where a line passing through  $0.75 I_{RRM}$  and  $0.50 I_{RRM}$  extrapolated to zero current.

(4)  $Q_{rr}$  - area under curve defined by  $t_{rr}$  and  $I_{RRM}$

$$Q_{rr} = \frac{t_{rr} \times I_{RRM}}{2}$$

(5)  $di_{(rec)M}/dt$  - peak rate of change of current during  $t_b$  portion of  $t_{rr}$

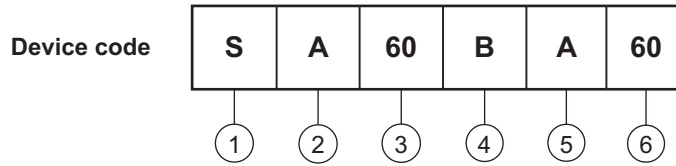
Fig. 12 - Reverse Recovery Waveform and Definitions

# SA60BA60



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## ORDERING INFORMATION TABLE



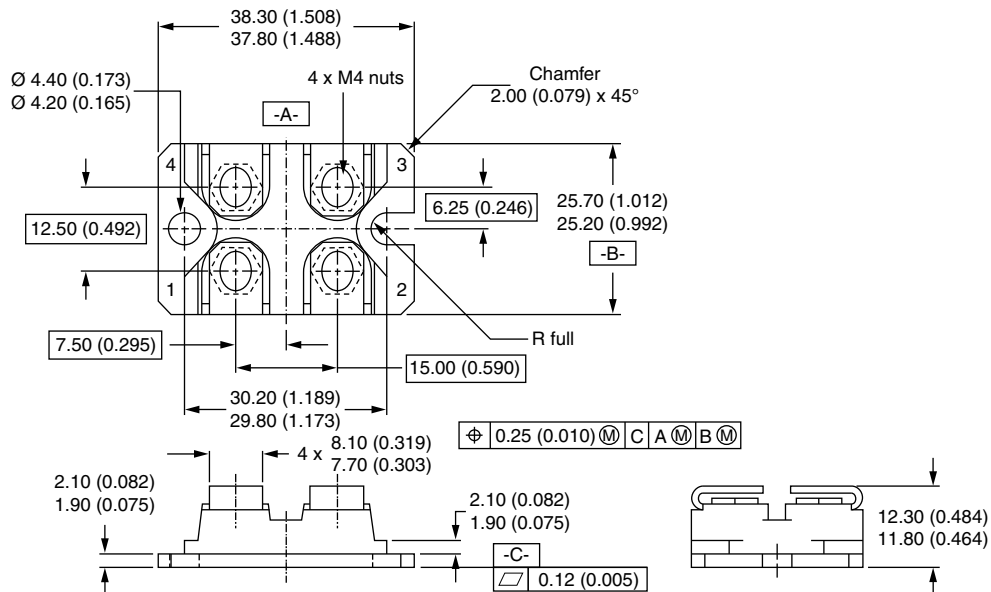
- 1** - S = Fast recovery diode
- 2** - A = Present Silicon Generation
- 3** - Current rating (60 = 60 A)
- 4** - Circuit configuration:  
B = Single phase bridge
- 5** - Package indicator:  
A = SOT-227, standard insulated base
- 6** - Voltage rating (60 = 600 V)

CIRCUIT CONFIGURATION		
CIRCUIT	CIRCUIT CONFIGURATION CODE	CIRCUIT DRAWING
Single phase bridge	B	

LINKS TO RELATED DOCUMENTS	
Dimensions	<a href="http://www.vishay.com/doc?95036">www.vishay.com/doc?95036</a>

## SOT-227

**DIMENSIONS** in millimeters (inches)



### Notes

- Dimensioning and tolerancing per ANSI Y14.5M-1982
- Controlling dimension: millimeter



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