


Single Phase Fast Recovery Bridge (Power Modules), 61 A



SOT-227

PRIMARY CHARACTERISTICS	
V_{RRM}	600 V
I_o	61 A
t_{rr}	170 ns
Type	Modules - Bridge, Fast
Package	SOT-227
Circuit configuration	Single phase bridge

FEATURES

- Fast recovery time characteristic
- Electrically isolated base plate
- Simplified mechanical designs, rapid assembly
- Excellent power/volume ratio
- Designed and qualified for industrial and consumer level
- UL approved file E78996 
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912


RoHS
COMPLIANT

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.

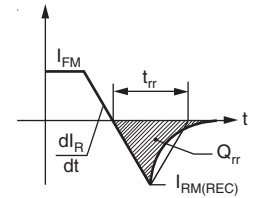
MAJOR RATINGS AND CHARACTERISTICS			
SYMBOL	CHARACTERISTICS	VALUES	UNITS
I_o		61	A
	T_C	57	°C
I_{FSM}	50 Hz	300	A
	60 Hz	310	
I^2t	50 Hz	442	A ² s
	60 Hz	402	
V_{RRM}		600	V
T_J		-55 to +150	°C

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 mA
SA61BA60	60	600	700	10

FORWARD CONDUCTION					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum DC output current at case temperature	I_O	Resistive or inductive load		61	A
				57	°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 ² 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 ² √s
Value of threshold voltage	$V_{F(TO)}$	T _J maximum		0.914	V
Forward slope resistance	r_t			10.5	mΩ
Maximum forward voltage drop	V_{FM}	T _J = 25 °C, $I_{FM} = 30$ A _{pk}	$t_p = 400$ μs	1.33	V
		T _J = T _J maximum, $I_{FM} = 30$ A _{pk}		1.23	
RMS isolation voltage base plate	V_{ISOL}	f = 50 Hz, t = 1 s		3000	

RECOVERY CHARACTERISTICS				
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Reverse recovery time, typical	t_{rr}	T _J = 25 °C, $I_F = 20$ A, $V_R = 30$ V, $di_F/dt = 100$ A/μs	170	ns
		T _J = 125 °C, $I_F = 20$ A, $V_R = 30$ V, $di_F/dt = 100$ A/μs	250	
Reverse recovery current, typical	I_{rr}	T _J = 25 °C, $I_F = 20$ A, $V_R = 30$ V, $di_F/dt = 100$ A/μs	10.5	A
		T _J = 125 °C, $I_F = 20$ A, $V_R = 30$ V, $di_F/dt = 100$ A/μs	16	
Reverse recovery charge, typical	Q_{rr}	T _J = 25 °C, $I_F = 20$ A, $V_R = 30$ V, $di_F/dt = 100$ A/μs	900	nC
		T _J = 125 °C, $I_F = 20$ A, $V_R = 30$ V, $di_F/dt = 100$ A/μs	1970	
Snap factor, typical	S	T _J = 25 °C	0.6	-
Junction capacitance, typical	C_T	$V_R = 600$ V	67	pF



THERMAL AND MECHANICAL SPECIFICATIONS						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Junction and storage temperature range	T _J , T _{Stg}		- 55	-	150	°C
Thermal resistance junction to case, per diode	R _{thJC}		-	-	1.2	°C/W
Thermal resistance junction to case, per module			-	-	0.30	
Thermal resistance case to heatsink	R _{thCS}	Flat, greased surface	-	0.05	-	
Weight			-	30	-	g
Mounting torque		Torque to terminal	-	-	1.1 (9.7)	Nm (lbf.in)
		Torque to heatsink	-	-	1.8 (15.9)	Nm (lbf.in)
Case style						SOT-227

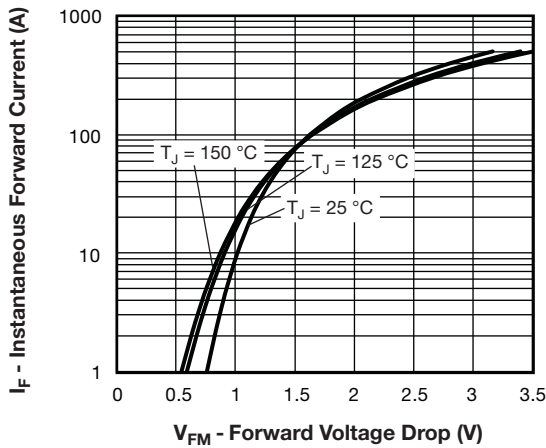


Fig. 1 - Typical Forward Voltage Drop Characteristics

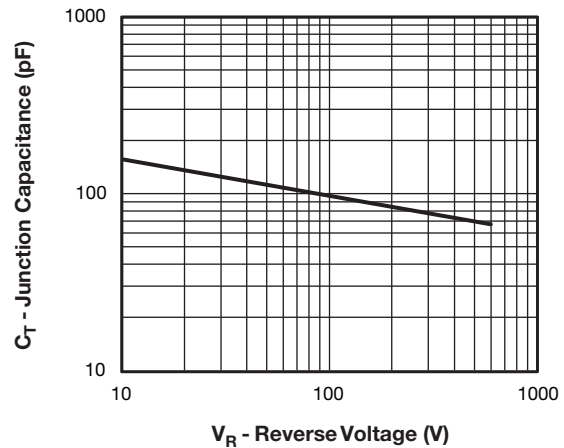


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

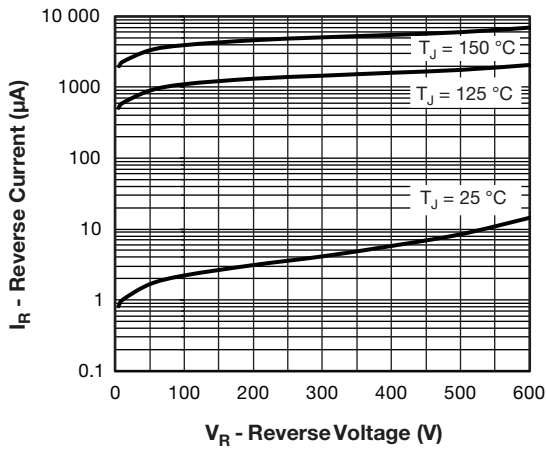


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

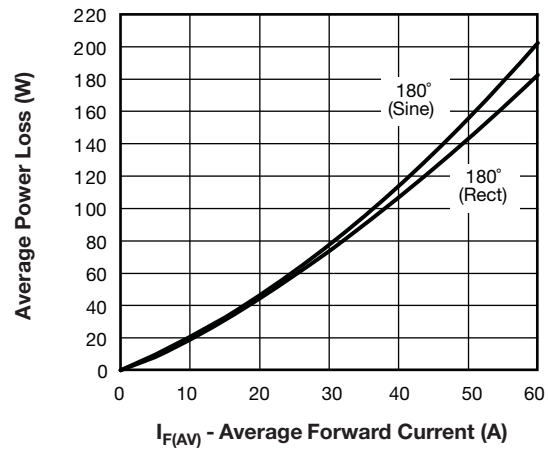


Fig. 4 - Current Rating Characteristics

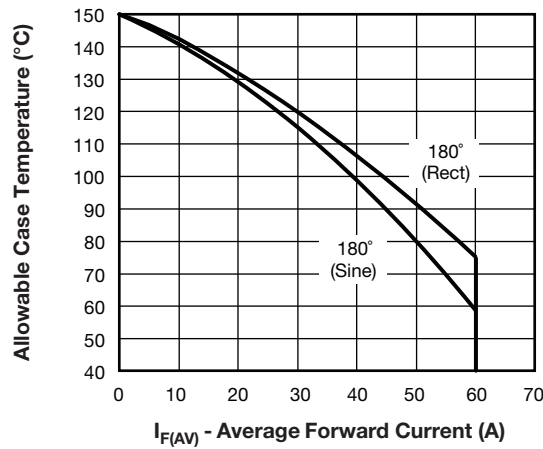


Fig. 5 - Forward Power Loss Characteristics

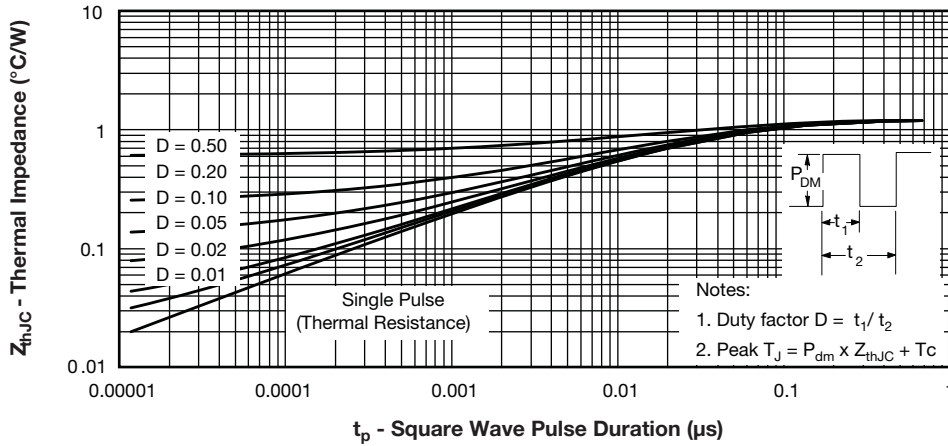


Fig. 6 - Typical Forward Voltage Drop Characteristics

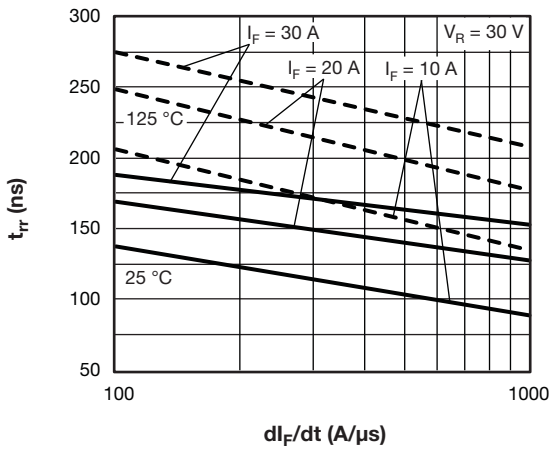


Fig. 7 - Typical Reverse Recovery Time vs. dI_F/dt

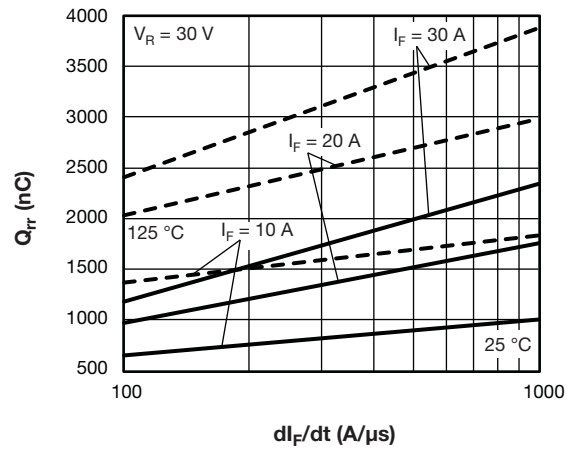


Fig. 8 - Typical Stored Charge vs. dI_F/dt

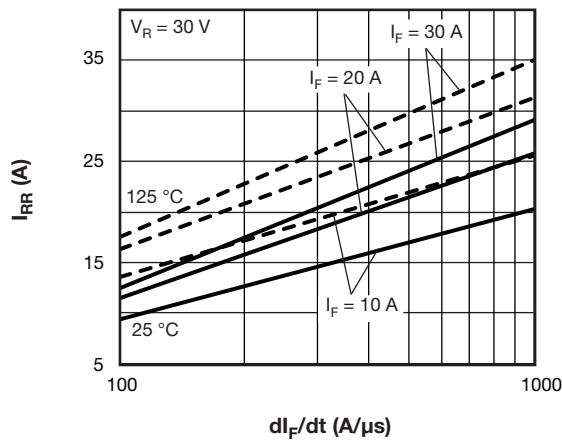


Fig. 9 - Typical Reverse Recovery Current vs. dI_F/dt

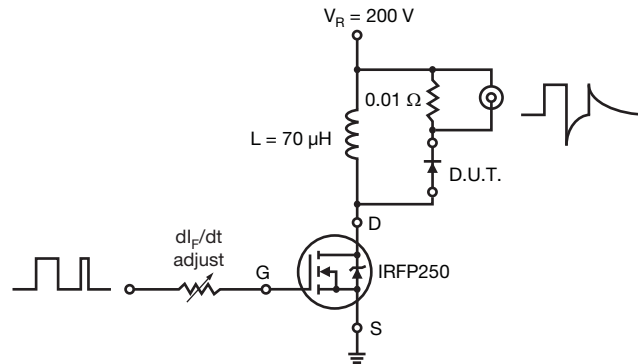
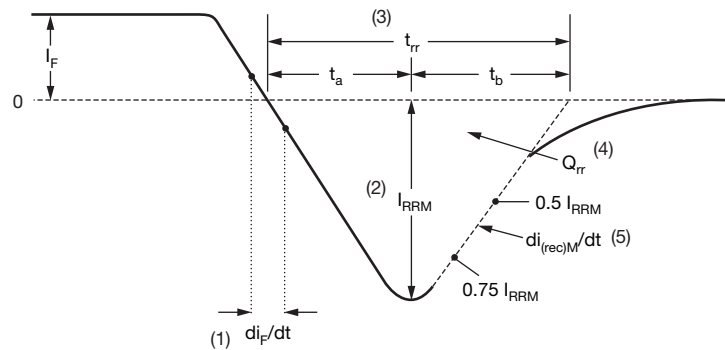


Fig. 10 - Reverse Recovery Parameter Test Circuit



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

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

Fig. 11 - Reverse Recovery Waveform and Definitions

ORDERING INFORMATION TABLE

Device code	VS-	S	A	61	B	A	60
	1	2	3	4	5	6	7
	1	2	3	4	5	6	7
	1	2	3	4	5	6	7
	1	2	3	4	5	6	7
	1	2	3	4	5	6	7
	1	2	3	4	5	6	7
	1	2	3	4	5	6	7
	1	2	3	4	5	6	7
	1	2	3	4	5	6	7

- 1 - Vishay Semiconductors product
- 2 - S = fast recovery diode
- 3 - A = present silicon generation
- 4 - Current rating (61 = 61 A)
- 5 - Circuit configuration:
B = single phase bridge
- 6 - Package indicator:
A = SOT-227, standard insulated base
- 7 - Voltage rating (60 = 600 V)



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

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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