Insulated Single Phase Hyperfast Bridge (Power Modules), 60 A

SOT-227

FEATURES

- Hyperfast and soft recovery characteristic
- Electrically isolated base plate
- Simplified mechanical designs, rapid assembly
- High operation junction temperature (T_J max. = 175 °C)
- 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

Pb-free

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.

PRIMARY CHARACTERISTICS	
V_{RRM}	650 V
I_O at T_C = 123 °C	60 A
t_{rr}	63 ns
Type	Modules - Bridge, Hyperfast
Package	SOT-227
Circuit configuration	Single phase bridge

ABSOLUTE MAXIMUM RATINGS			
SYMBOL	CHARACTERISTICS	VALUES	UNITS
I_O		60	A
	T_C	123	°C
I_{FSM}	50 Hz	360	A
	60 Hz	377	
I^2t	50 Hz	648	A^2s
	60 Hz	589	
V_{RRM}		650	V
T_J		-55 to +175	°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
UFH60BA65	65	650	700	2

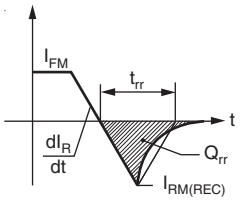
ELECTRICAL SPECIFICATIONS (T_J = 25 °C unless otherwise specified)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Cathode to anode breakdown voltage	V_{BR}	I_R = 250 µA	650	-	-	V
Forward voltage, per diode	V_{FM}	I_F = 60 A	-	1.7	2.35	
Reverse leakage current, per leg	I_{RM}	V_R = 650 V	-	1.0	100	µA
		V_R = 650 V, T_J = 150 °C	-	250	-	
RMS isolation voltage base plate	V_{ISOL}	f = 50 Hz, any terminal to case, t = 1 min	2500	-	-	V

FORWARD CONDUCTION

PARAMETER	SYMBOL	TEST CONDITIONS			VALUES	UNITS
Maximum DC output current at case temperature	I_O	Resistive or inductive load			60	A
					123	°C
Maximum peak, one-cycle non-repetitive forward current	I_{FSM}	t = 10 ms	No voltage reapplied	Initial T_J = 25 °C	360	A
		t = 8.3 ms			377	
		t = 10 ms	100 % V_{RRM} reapplied		303	
		t = 8.3 ms			317	
Maximum I^2t for fusing	I^2t	t = 10 ms	No voltage reapplied		648	A^2s
		t = 8.3 ms			589	
		t = 10 ms	100 % V_{RRM} reapplied		458	
		t = 8.3 ms			417	
Maximum $I^2\sqrt{t}$ for fusing	$I^2\sqrt{t}$	I^2t for time $t_x = I_2\sqrt{t} \times \sqrt{t_x}$; $0.1 \le t_x \le 10$ ms, V_{RRM} = 0 V			6.4	$kA^2\sqrt{s}$
Low level of threshold voltage, per leg	$V_{F(T0)1}$	$(16.7\ \% \times \pi \times I_{F(AV)}) < I < \pi \times I_{F(AV)}$, $T_J = T_J$ maximum			16.49	V
Low level value of forward slope resistance	r_{f1}				0.88	mΩ
High level of threshold voltage, per leg	$V_{F(T0)2}$	$(I > \pi \times I_{F(AV)})$, $T_J = T_J$ maximum			15.87	V
High level value of forward slope resistance	r_{f2}				1.16	mΩ
Maximum forward voltage, per diode	V_{FM}	I_F = 60 A			2.35	V

RECOVERY CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Typical reverse recovery time, per diode	t_{rr}	T_J = 25 °C, I_F = 50 A, V_R = 200 V, dI_F/dt = 200 A/µs	63	ns
		T_J = 125 °C, I_F = 50 A, V_R = 200 V, dI_F/dt = 200 A/µs	134	
Typical reverse recovery current, per diode	I_{rr}	T_J = 25 °C, I_F = 50 A, V_R = 200 V, dI_F/dt = 200 A/µs	4.1	A
		T_J = 125 °C, I_F = 50 A, V_R = 200 V, dI_F/dt = 200 A/µs	11.4	
Typical reverse recovery charge, per diode	Q_{rr}	T_J = 25 °C, I_F = 50 A, V_R = 200 V, dI_F/dt = 200 A/µs	130	nC
		T_J = 125 °C, I_F = 50 A, V_R = 200 V, dI_F/dt = 200 A/µs	765	
Typical junction capacitance	C_T	V_R = 650 V	77	pF



THERMAL AND MECHANICAL SPECIFICATIONS

PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Junction and storage temperature range	T_J, T_{Stg}		-55	-	175	°C
Thermal resistance junction to case	R_{thJC}		-	-	0.91	°C/W
Thermal resistance case to heatsink	R_{thCS}	Flat, greased surface	-	0.1	-	
Weight			-	30	-	g
Mounting torque		Torque to terminal	-	-	1.1 (9.7)	Nm (lbf.in)
		Torque to heatsink	-	-	1.3 (11.5)	Nm (lbf.in)
Case style			SOT-227			

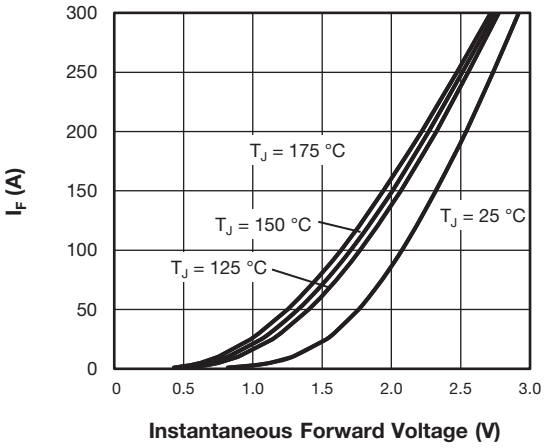


Fig. 1 - Typical Forward Voltage Characteristics

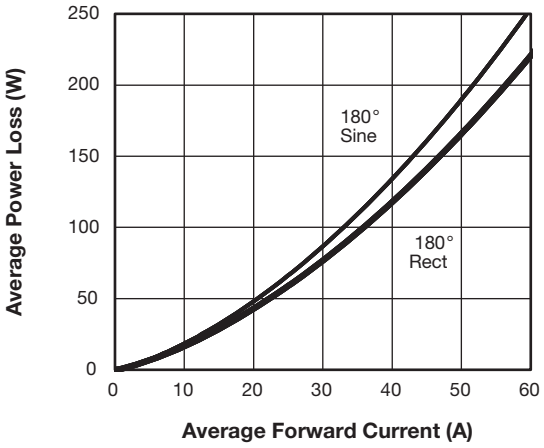


Fig. 4 - Forward Power Loss Characteristics

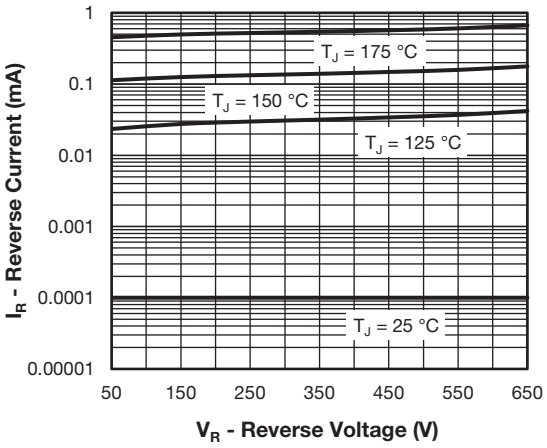


Fig. 2 - Typical Reverse Current vs. Reverse Voltage (Per Diode)

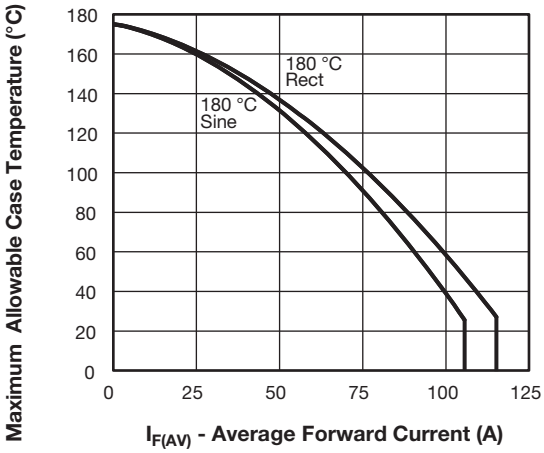


Fig. 5 - Current Rating Characteristics (A)

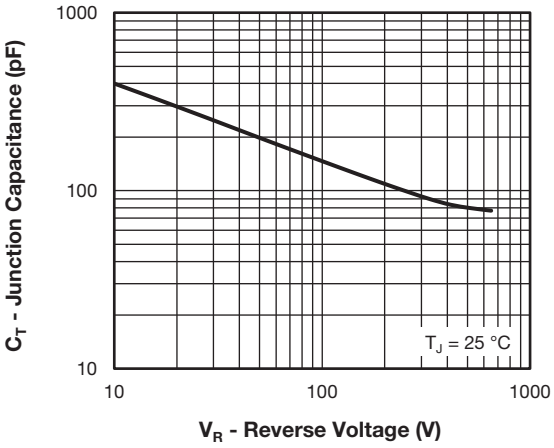


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Diode)

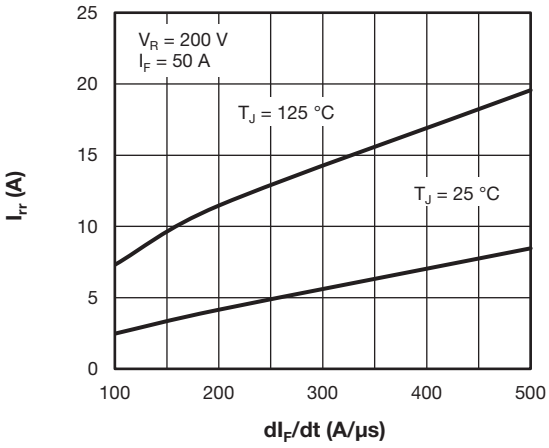


Fig. 6 - Typical Reverse Recovery Current vs. dI_F/dt

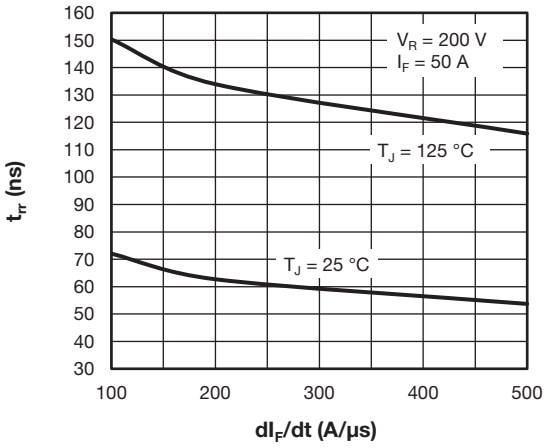


Fig. 7 - Typical Reverse Recovery Time vs. dI_F/dt

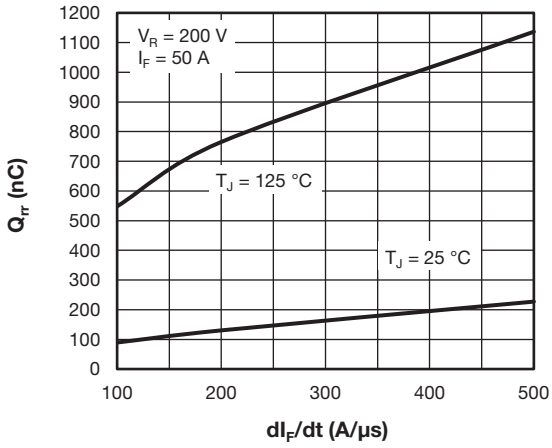


Fig. 8 - Reverse Recovery Charge vs. dI_F/dt

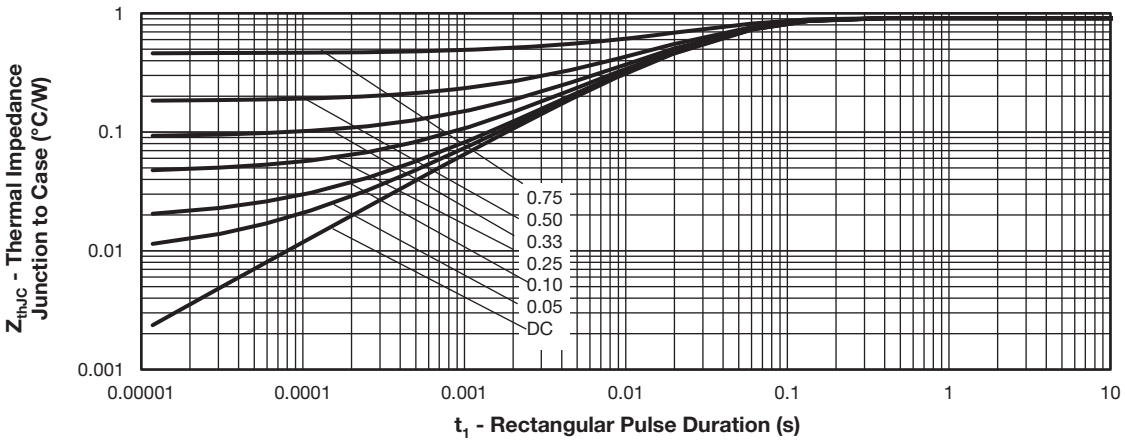


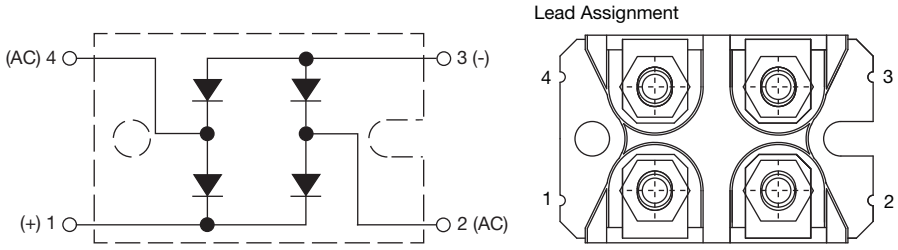
Fig. 9 - Typical Reverse Recovery Current vs. dI_F/dt (Per Diode)

ORDERING INFORMATION TABLE

Device code

VS-	UF	H	60	B	A	65
1	2	3	4	5	6	7

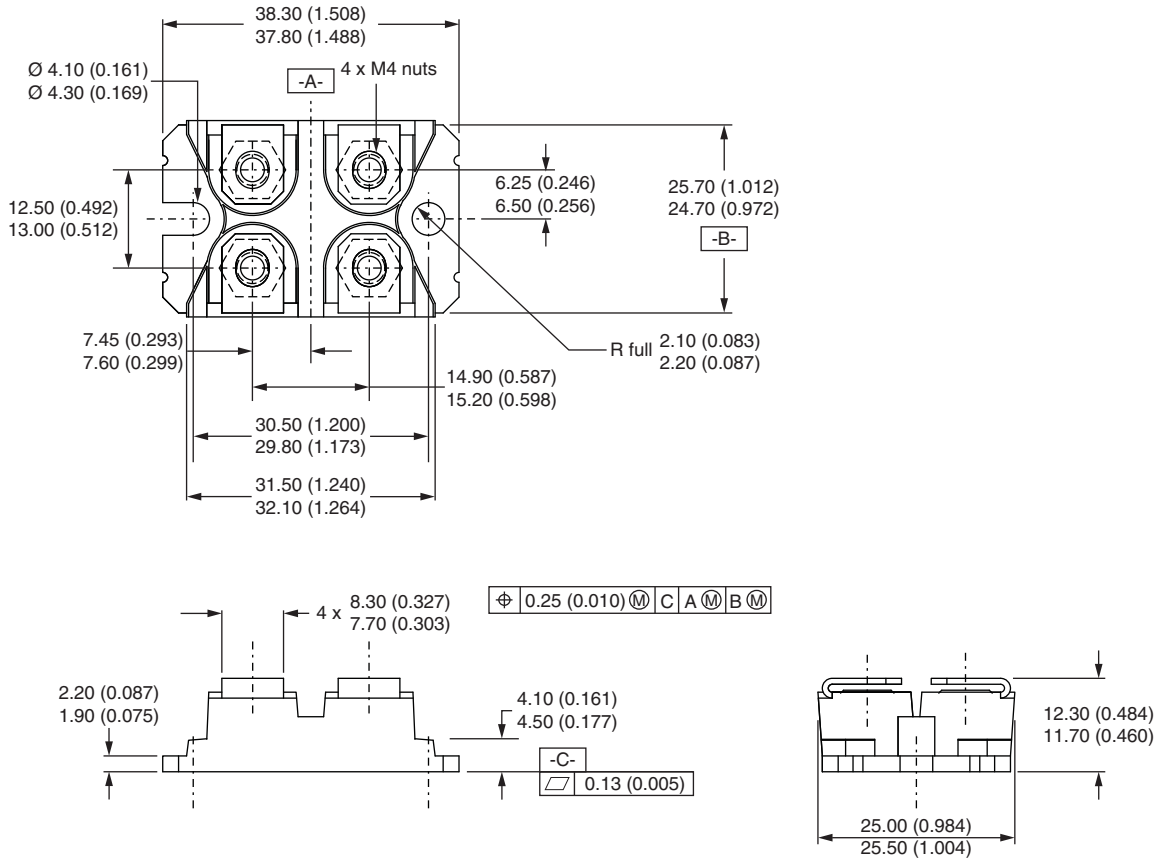
- 1 - Vishay Semiconductors product
- 2 - Ultra fast rectifier
- 3 - Hyper fast FRED Pt® diffused
- 4 - Current rating (60 = 60 A)
- 5 - Circuit configuration:
  B = Single phase bridge
- 6 - Package indicator:
  A = SOT-227, standard insulated base
- 7 - Voltage rating (65 = 650 V)

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 II

DIMENSIONS in millimeters (inches)



Note

- Controlling dimension: millimeter

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