

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



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

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.

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 ² s
	60 Hz	589	
V_{RRM}		650	V
T_J		-55 to +175	°C

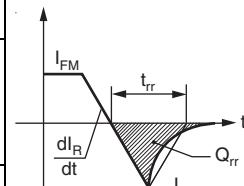
ELECTRICAL SPECIFICATIONS

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}	$t = 10 \text{ ms}$	No voltage reapplied	Initial $T_J = 25 \text{ °C}$	360	A			
		$t = 8.3 \text{ ms}$			377				
		$t = 10 \text{ ms}$	100 % V_{RRM} reapplied		303				
		$t = 8.3 \text{ ms}$			317				
Maximum I^2t for fusing	I^2t	$t = 10 \text{ ms}$	No voltage reapplied	Initial $T_J = 25 \text{ °C}$	648	A^2s			
		$t = 8.3 \text{ ms}$			589				
		$t = 10 \text{ ms}$	100 % V_{RRM} reapplied		458				
		$t = 8.3 \text{ ms}$			417				
Maximum $I^2\sqrt{t}$ for fusing	$I^2\sqrt{t}$	I^2t for time $t_x = I_2\sqrt{t} \times \sqrt{t_x}$; $0.1 \leq t_x \leq 10 \text{ ms}$, $V_{RRM} = 0 \text{ V}$			6.4	$\text{kA}^2\sqrt{\text{s}}$			
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	$\text{m}\Omega$			
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	$\text{m}\Omega$			
Maximum forward voltage, per diode	V_{FM}	$I_F = 60 \text{ A}$			2.35	V			

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

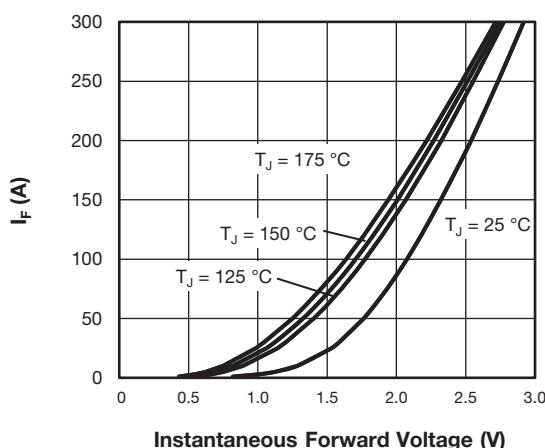


Fig. 1 - Typical Forward Voltage Characteristics

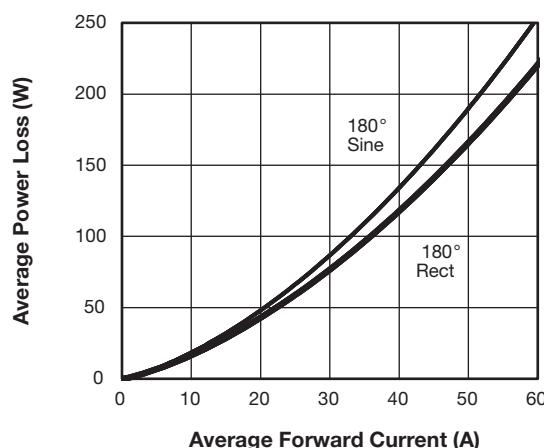


Fig. 4 - Forward Power Loss Characteristics

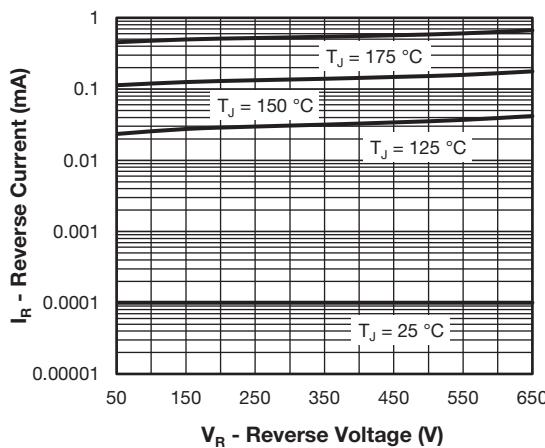


Fig. 2 - Typical Reverse Current vs. Reverse Voltage (Per Diode)

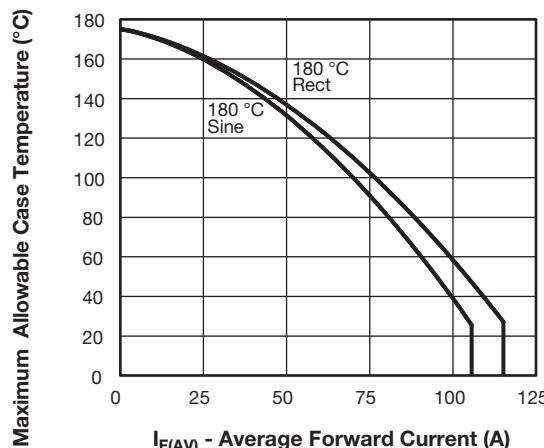


Fig. 5 - Current Rating Characteristics (A)

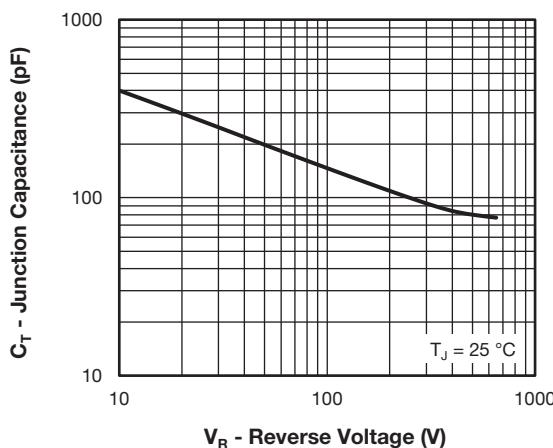


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Diode)

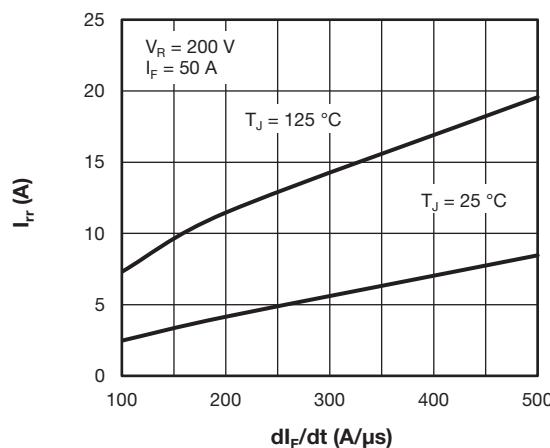


Fig. 6 - Typical Reverse Recovery Current vs. dI_F/dt

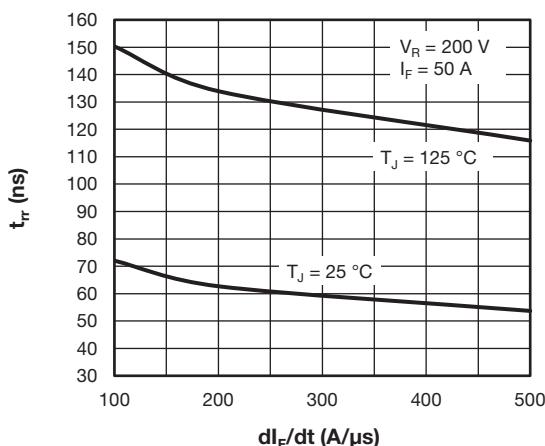


Fig. 7 - Typical Reverse Recovery Time vs. dI_F/dt

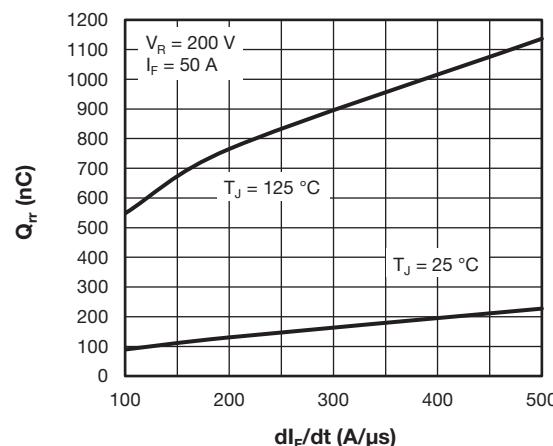


Fig. 8 - Reverse Recovery Charge vs. dI_F/dt

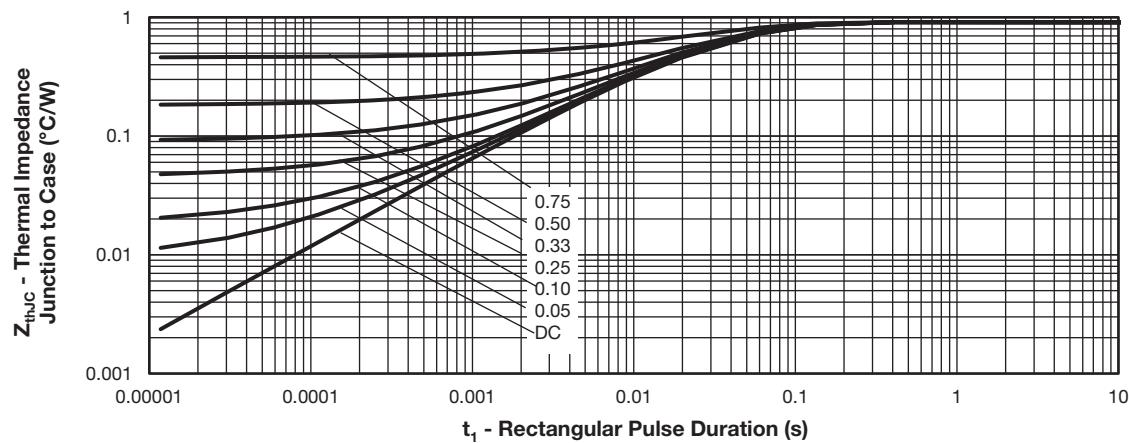


Fig. 9 - Typical Reverse Recovery Current vs. dI_F/dt (Per Diode)

ORDERING INFORMATION TABLE

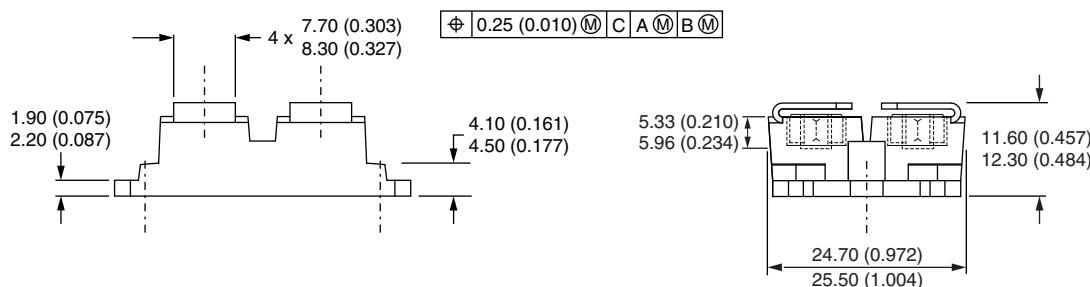
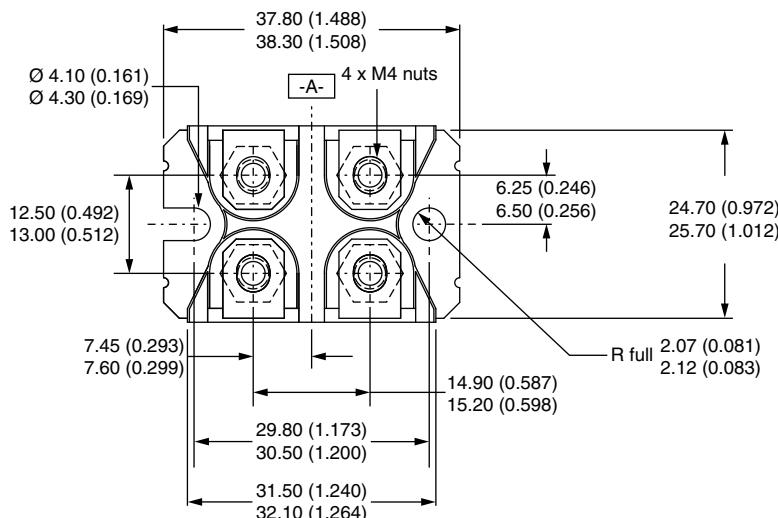
Device code	VS-	UF	H	60	B	A	65
	1	2	3	4	5	6	7
1 - Vishay Semiconductors product							
2 - Ultra fast rectifier							
3 - Hyper fast FRED Pt® diffused							
4 - Current rating (60 = 60 A)							
5 - Circuit configuration: B = Single phase bridge							
6 - Package indicator: A = SOT-227, standard insulated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

DIMENSIONS in millimeters (inches)



Note

- Controlling dimension: millimeter

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