

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


RoHS
COMPLIANT

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}	$I_R = 250$ μ A	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	μ A
		$V_R = 650$ 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	360	A			
		t = 8.3 ms		377				
		t = 10 ms	100 % V _{RRM} reapplied	303				
		t = 8.3 ms		317				
Maximum I ² t for fusing	I ² t	t = 10 ms	No voltage reapplied	648	A ² s			
		t = 8.3 ms		589				
		t = 10 ms	100 % V _{RRM} reapplied	458				
		t = 8.3 ms		417				
		Maximum I ² √t for fusing	I ² √t	I ² t for time t _x = I ₂ √t x √t _x ; 0.1 ≤ t _x ≤ 10 ms, V _{RRM} = 0 V		6.4	kA ² √s	
		Low level of threshold voltage, per leg	V _{F(T0)1}	(16.7 % x π x I _{F(AV)}) < I < π x 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 > π x 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}	$T_J = 25\text{ }^{\circ}\text{C}$, $I_F = 50\text{ A}$, $V_R = 200\text{ V}$, $di_F/dt = 200\text{ A}/\mu\text{s}$	63	ns
		$T_J = 125\text{ }^{\circ}\text{C}$, $I_F = 50\text{ A}$, $V_R = 200\text{ V}$, $di_F/dt = 200\text{ A}/\mu\text{s}$	134	
Typical reverse recovery current, per diode	I_{rr}	$T_J = 25\text{ }^{\circ}\text{C}$, $I_F = 50\text{ A}$, $V_R = 200\text{ V}$, $di_F/dt = 200\text{ A}/\mu\text{s}$	4.1	A
		$T_J = 125\text{ }^{\circ}\text{C}$, $I_F = 50\text{ A}$, $V_R = 200\text{ V}$, $di_F/dt = 200\text{ A}/\mu\text{s}$	11.4	
Typical reverse recovery charge, per diode	Q_{rr}	$T_J = 25\text{ }^{\circ}\text{C}$, $I_F = 50\text{ A}$, $V_R = 200\text{ V}$, $di_F/dt = 200\text{ A}/\mu\text{s}$	130	nC
		$T_J = 125\text{ }^{\circ}\text{C}$, $I_F = 50\text{ A}$, $V_R = 200\text{ V}$, $di_F/dt = 200\text{ A}/\mu\text{s}$	765	
Typical junction capacitance	C_T	$V_R = 650\text{ V}$	77	pF

The graph illustrates the reverse recovery characteristics of a diode. The vertical axis represents current I and the horizontal axis represents time t . The curve starts at a positive forward current I_{FM} , then transitions to a negative reverse current. The reverse recovery time t_{rr} is the time interval from the start of the reverse current to the point where the current reaches its minimum value $I_{RM(REC)}$. The reverse recovery charge Q_{rr} is the area under the reverse current curve during this time interval. The slope of the reverse current curve is labeled $\frac{di_R}{dt}$.

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			

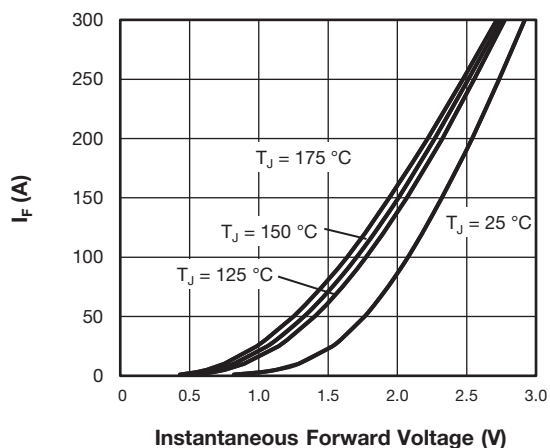


Fig. 1 - Typical Forward Voltage Characteristics

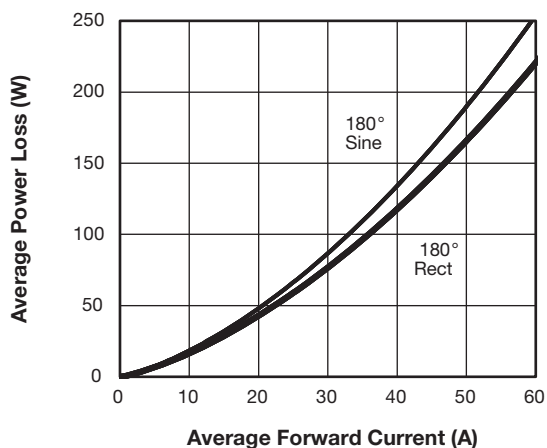


Fig. 4 - Forward Power Loss Characteristics

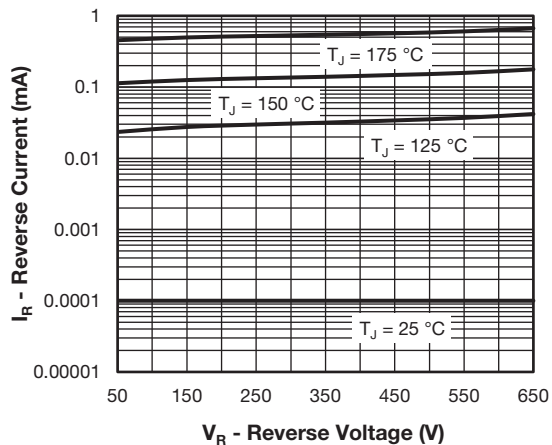


Fig. 2 - Typical Reverse Current vs. Reverse Voltage (Per Diode)

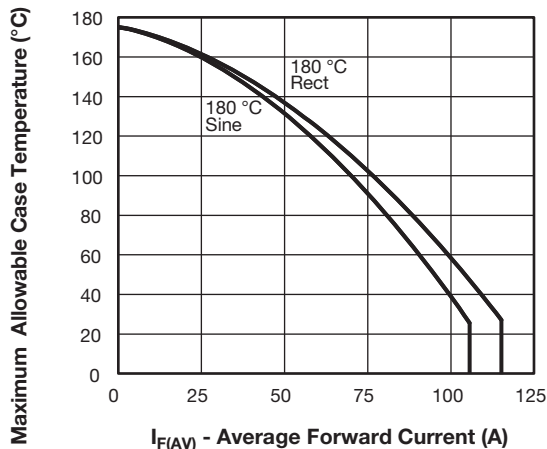


Fig. 5 - Current Rating Characteristics (A)

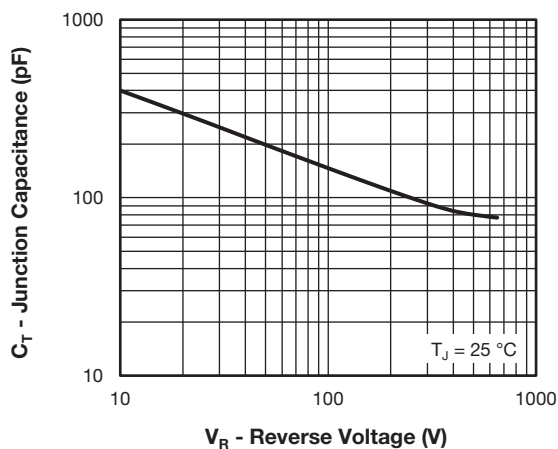
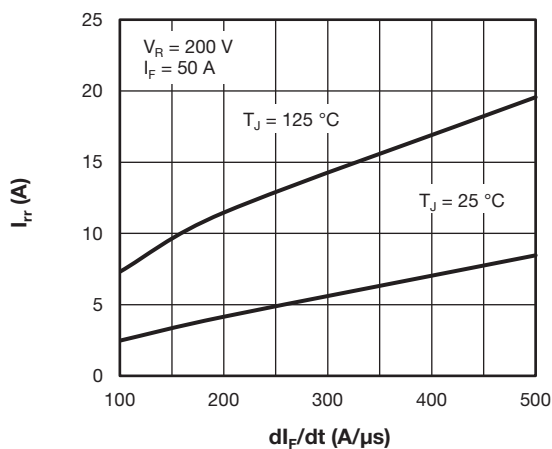
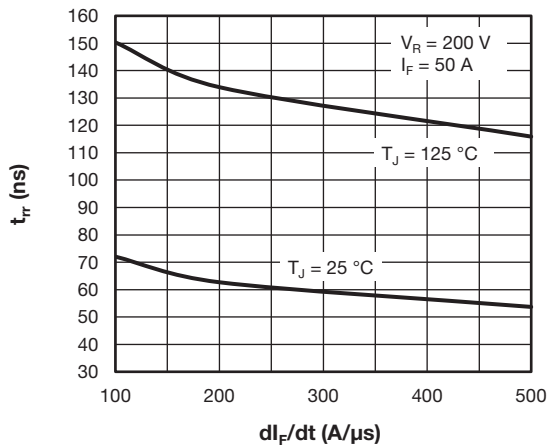
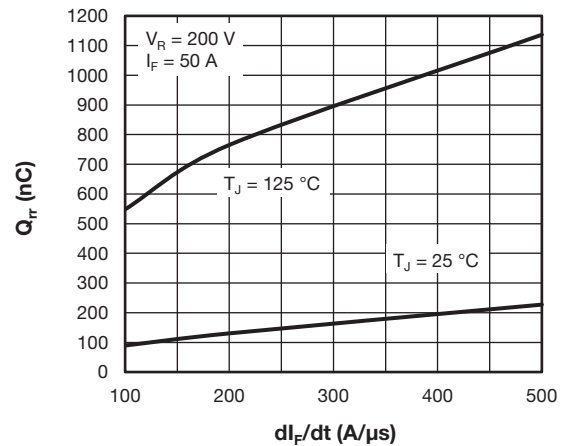
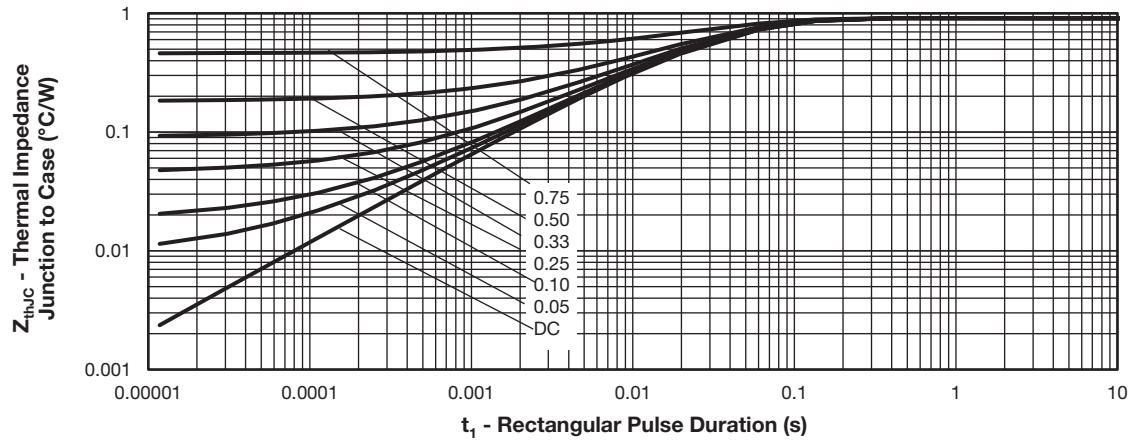


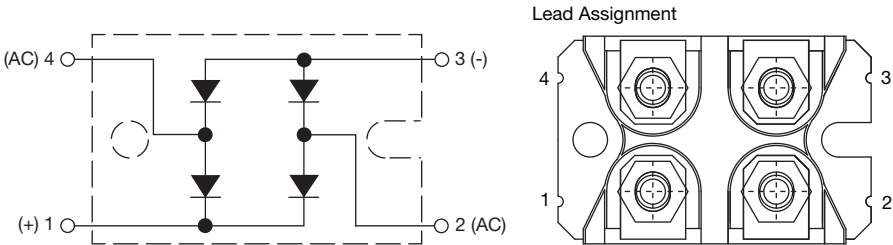
Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Diode)


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

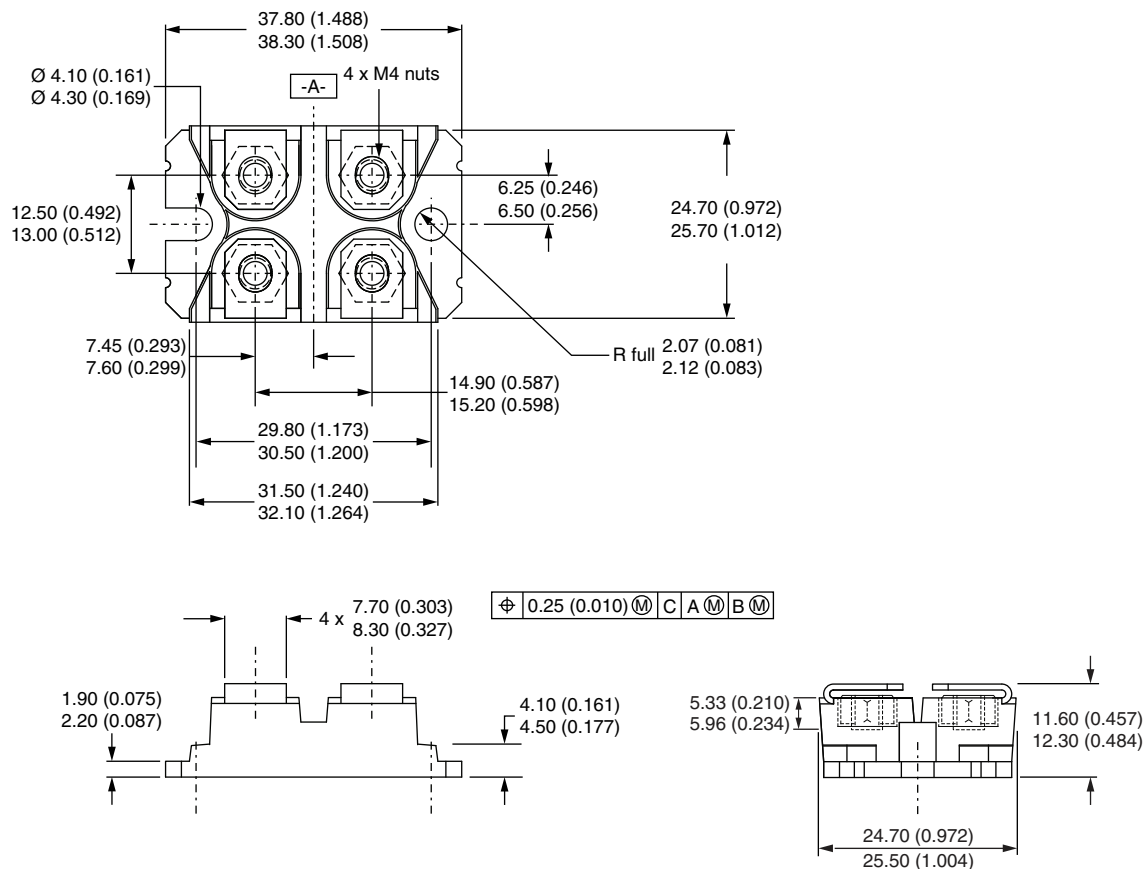
Device code	VS-	UF	H	60	B	A	65
	1	2	3	4	5	6	7
1	Vishay Semiconductors product						
2	Ultra fast rectifier						
3	Hyper fast FRED Pt [®] diffused						
4	Current rating (60 = 60 A)						
5	Circuit configuration: B = Single phase bridge						
6	Package indicator: A = SOT-227, standard insulated base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