HEXFRED®
Ultrafast Soft Recovery Diode, 90 A

SOT-227

FEATURES

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

Pb-free
RoHS COMPLIANT

PRIMARY CHARACTERISTICS	
V_R	1200 V
V_F (typical)	2.46 V
t_{rr} (typical)	35 ns
$I_{F(AV)}$ per module at T_C	90 A at 63 °C
Package	SOT-227

DESCRIPTION / APPLICATIONS

The dual diode series configuration (VS-HFA90FA120) is used for output rectification or freewheeling/clamping operation and high voltage application.
The semiconductor in the SOT-227 Gen 2 package is isolated from the copper base plate, allowing for common heatsinks and compact assemblies to be built.
These modules are intended for general applications such as HV power supplies, electronic welders, motor control and inverters.

ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	TEST CONDITIONS	MAX.	UNITS
Cathode to anode breakdown voltage	V_R		1200	V
Continuous forward current, per leg	I_F	T_C = 83 °C	45	A
Single pulse forward current, per leg	I_{FSM}	T_J = 25 °C	400	
Maximum power dissipation, per leg	P_D	T_C = 83 °C	139	W
		T_C = 100 °C	104	
RMS isolation voltage	V_{ISOL}	Any terminal to case, t = 1 min	2500	V
Operating junction and storage temperature range	T_J, T_{Stg}		-55 to +150	°C

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 = 100 μA		1200	-	-	V
Forward voltage	V_{FM}	I_F = 25 A	See fig. 1	-	2.46	3.0	
		I_F = 40 A		-	2.68	3.3	
		I_F = 25 A, T_J = 125 °C		-	2.22	-	
		I_F = 40 A, T_J = 125 °C		-	2.52	-	
		I_F = 25 A, T_J = 150 °C		-	2.12	2.55	
		I_F = 40 A, T_J = 150 °C		-	2.43	2.96	
Reverse leakage current	I_{RM}	V_R = V_R rated	See fig. 2	-	1.5	75	μA
		T_J = 125 °C, V_R = V_R rated		-	0.5	2	mA
		T_J = 150 °C, V_R = V_R rated		-	2	5	
Junction capacitance	C_T	V_R = 1200 V	See fig. 3	-	30	-	pF

DYNAMIC RECOVERY CHARACTERISTICS (T_J = 25 °C unless otherwise specified)							
PARAMETER	**SYMBOL**	**TEST CONDITIONS**		**MIN.**	**TYP.**	**MAX.**	**UNITS**
Reverse recovery time	t_{rr}	I_F = 1.0 A, dI_F/dt = 200 A/μs, V_R = 30 V		-	35	-	ns
		T_J = 25 °C	I_F = 40 A dI_F/dt = - 200 A/μs V_R = 200 V	-	80	-	
		T_J = 125 °C		-	130	-	
Peak recovery current	I_{RRM}	T_J = 25 °C		-	6.8	-	A
		T_J = 125 °C		-	11.5	-	
Reverse recovery charge	Q_{rr}	T_J = 25 °C		-	270	-	nC
		T_J = 125 °C		-	740	-	

THERMAL - MECHANICAL SPECIFICATIONS						
PARAMETER	**SYMBOL**	**TEST CONDITIONS**	**MIN.**	**TYP.**	**MAX.**	**UNITS**
Junction to case, single leg conducting	R_{thJC}		-	-	0.48	°C/W
Junction to case, both legs conducting			-	-	0.24	
Case to heatsink	R_{thCS}	Flat, greased surface	-	0.10	-	
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			

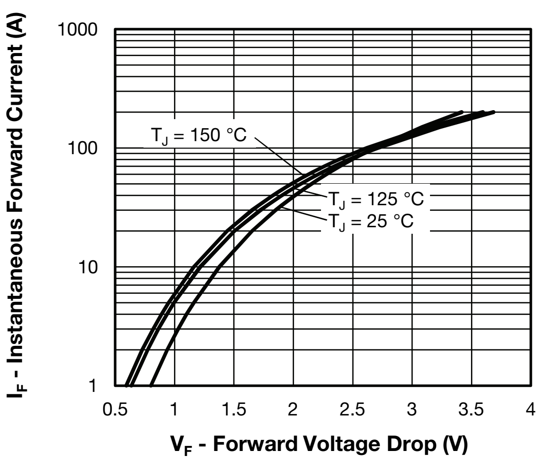


Fig. 1 - Typical Forward Voltage Drop Characteristics (Per Leg)

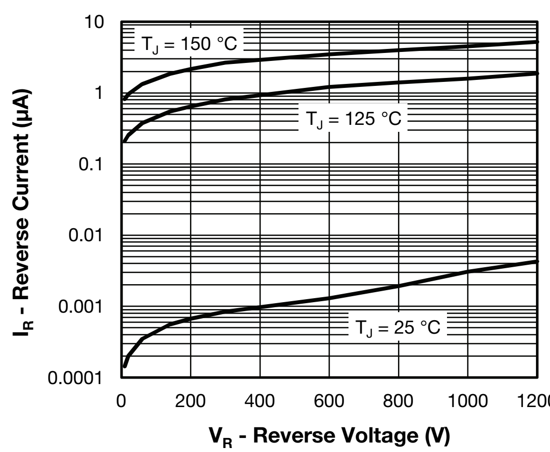


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

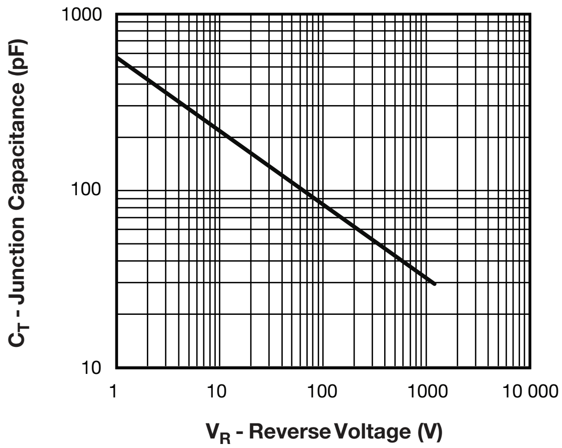


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

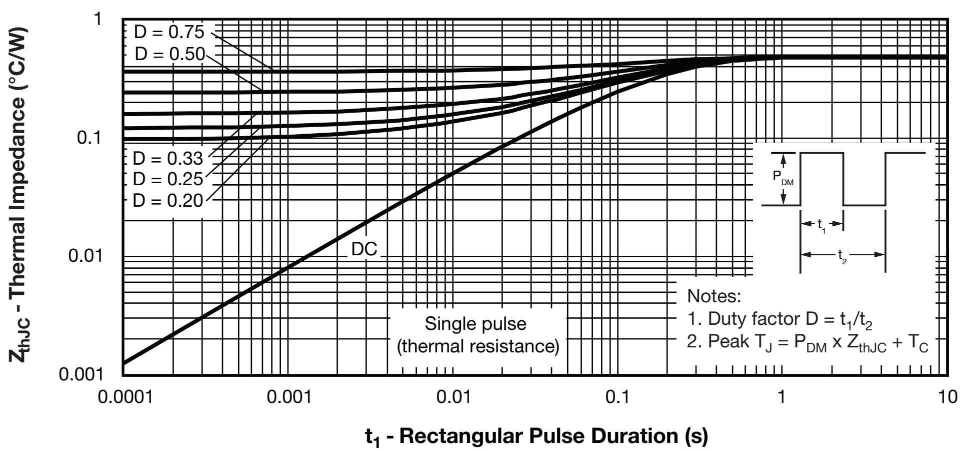


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics (Per Leg)

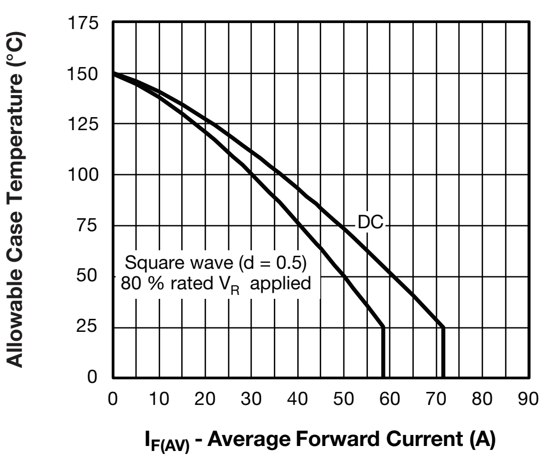


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current (Per Leg)

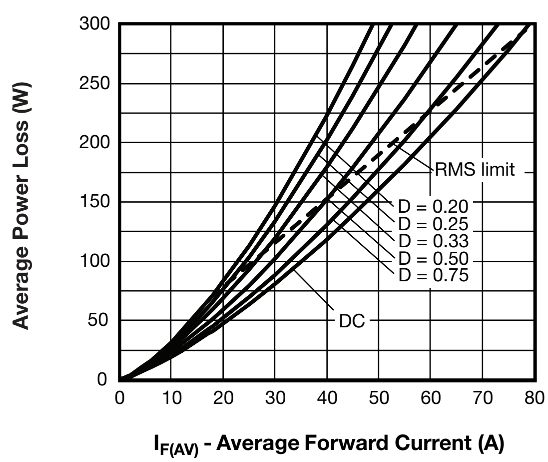


Fig. 6 - Forward Power Loss Characteristics (Per Leg)

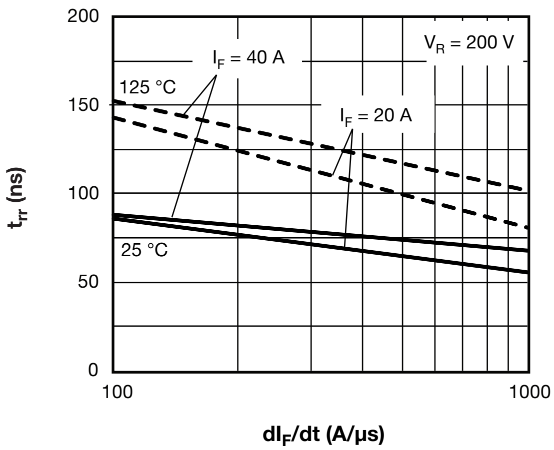


Fig. 7 - Typical Reverse Recovery Time vs. dI_F/dt

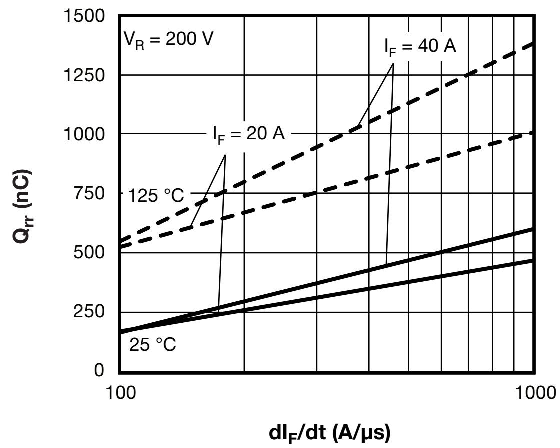


Fig. 8 - Typical Stored Charge vs. dI_F/dt

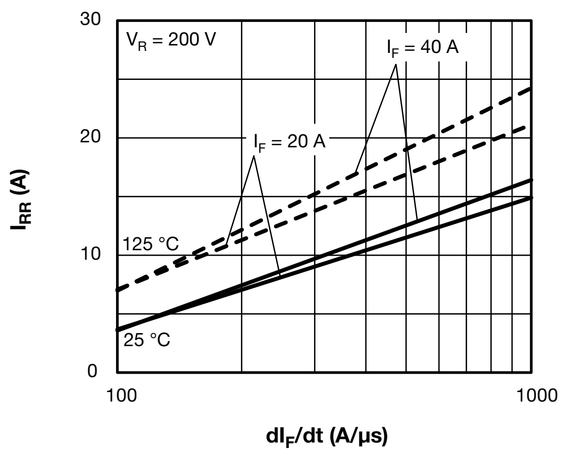


Fig. 9 - Typical Reverse Recovery Current vs. dI_F/dt

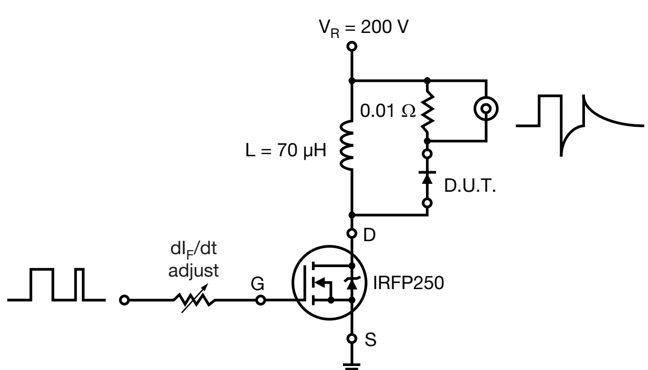
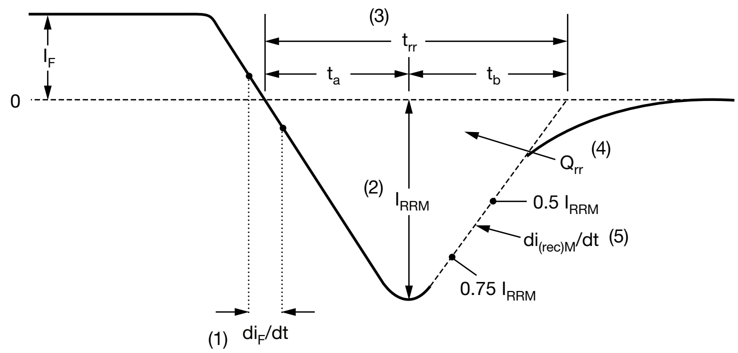


Fig. 10 - Reverse Recovery Parameter Test Circuit



(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}

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

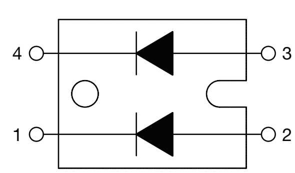
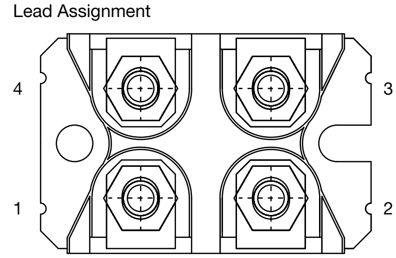
(5) $di_{(rec)M}/dt$ - peak rate of change of current during t_b portion of t_{rr}

Fig. 11 - Reverse Recovery Waveform and Definitions

ORDERING INFORMATION TABLE

Device code	VS-	HF	A	90	F	A	120
	1	2	3	4	5	6	7

1 - Vishay Semiconductors product
2 - HEXFRED® family
3 - Process designator (A = electron irradiated)
4 - Average current (90 = 90 A)
5 - Circuit configuration (two separate diodes, parallel pin-out)
6 - Package indicator (SOT-227 standard insulated base)
7 - Voltage rating (120 = 1200 V)

CIRCUIT CONFIGURATION		
CIRCUIT	**CIRCUIT CONFIGURATION CODE**	**CIRCUIT DRAWING**
two separate diodes, parallel pin-out	F	 Lead Assignment 

LINKS TO RELATED DOCUMENTS	
Dimensions	www.vishay.com/doc?95423
Packaging information	www.vishay.com/doc?95425

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