

HEXFRED®

Ultrafast Soft Recovery Diode, 70 A



SOT-227

FEATURES

- Fast recovery time characteristic
- Electrically isolated base plate
- Antiparallel diodes
- 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


RoHS
COMPLIANT

PRODUCT SUMMARY

V_R	1200 V
V_F (typical)	2.2 V
t_{rr} (typical)	48 ns
$I_{F(DC)}$ at T_C , per module	70 A at 121 °C
Package	SOT-227

DESCRIPTION/APPLICATIONS

This SOT-227 modules with HEXFRED® rectifier are in antiparallel configuration. The antiparallel configuration is used for simple series rectifier and high voltage application. The semiconductor in the SOT-227 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 voltage	V_R		1200	V
Continuous forward current, per leg	I_F	$T_C = 121\text{ °C}$	35	A
Single pulse forward current	I_{FSM}	$T_J = 25\text{ °C}$	350	
Maximum power dissipation, per leg	P_D	$T_C = 25\text{ °C}$	357	W
		$T_C = 100\text{ °C}$	143	
RMS isolation voltage	V_{ISOL}	Any terminal to case, $t = 1$ minute	2500	V
Operating junction and storage temperature range	T_J, T_{Stg}		- 55 to 150	°C

ELECTRICAL SPECIFICATIONS ($T_J = 25\text{ °C}$ unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Cathode to anode breakdown voltage	V_{BR}	$I_R = 100\text{ }\mu\text{A}$	1200	-	-	V
Forward voltage, per leg	V_{FM}	$I_F = 30\text{ A}$	-	2.2	3.0	
		$I_F = 60\text{ A}$	-	2.8	4.0	
		$I_F = 30\text{ A}, T_J = 125\text{ °C}$	-	2.13	-	
		$I_F = 60\text{ A}, T_J = 125\text{ °C}$	-	2.70	-	
		$I_F = 30\text{ A}, T_J = 150\text{ °C}$	-	2.04	-	
Reverse leakage current, per leg	I_{RM}	$V_R = V_R$ rated	-	2.0	75	μA
		$T_J = 125\text{ °C}, V_R = V_R$ rated	-	1.6	5	mA
		$T_J = 150\text{ °C}, V_R = V_R$ rated	-	5	10	



DYNAMIC RECOVERY CHARACTERISTICS ($T_J = 25\text{ }^\circ\text{C}$ unless otherwise specified)							
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS	
Reverse recovery time, per leg	t_{rr}	$I_F = 1\text{ A}; dI_F/dt = 200\text{ A}/\mu\text{s}; V_R = 30\text{ V}$	-	48	-	ns	
		$T_J = 25\text{ }^\circ\text{C}$	-	145	-		
		$T_J = 125\text{ }^\circ\text{C}$	-	218	-		
Peak recovery current, per leg	I_{RRM}	$I_F = 50\text{ A}$ $dI_F/dt = -200\text{ A}/\mu\text{s}$ $V_R = 200\text{ V}$	$T_J = 25\text{ }^\circ\text{C}$	-	13	-	A
			$T_J = 125\text{ }^\circ\text{C}$	-	19	-	
Reverse recovery charge, per leg	Q_{rr}		$T_J = 25\text{ }^\circ\text{C}$	-	910	-	nC
			$T_J = 125\text{ }^\circ\text{C}$	-	1920	-	
Junction capacitance, per leg	C_T	$V_R = 1200\text{ V}$	-	27	-	pF	

THERMAL - MECHANICAL SPECIFICATIONS						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Junction to case, single leg conducting	R_{thJC}	Flat, greased surface	-	-	0.35	$^\circ\text{C}/\text{W}$
Junction to case, both legs conducting			-	-	0.175	
Case to heatsink	R_{thCS}			-	0.05	
Weight			-	30	-	g
Mounting torque			-	-	1.3	Nm
Case style			SOT-227			

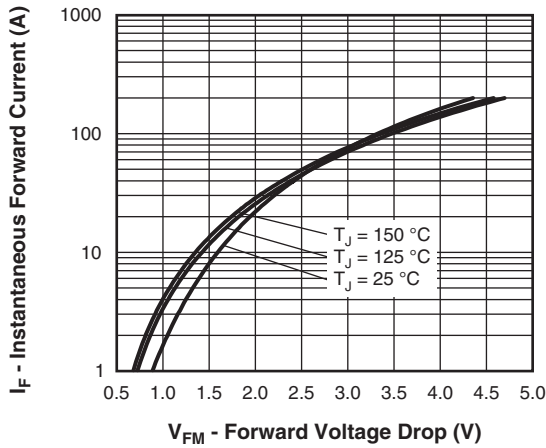


Fig. 1 - Typical Forward Voltage Drop Characteristics

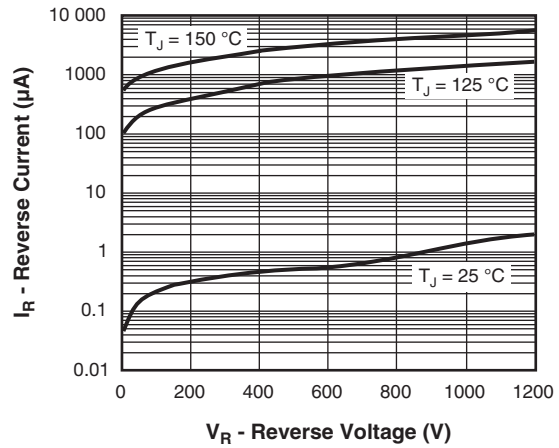


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

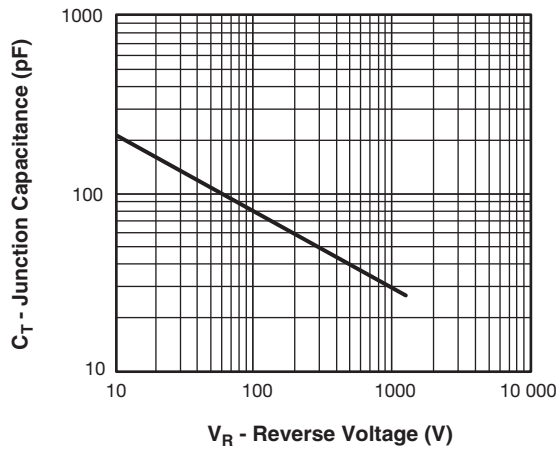


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

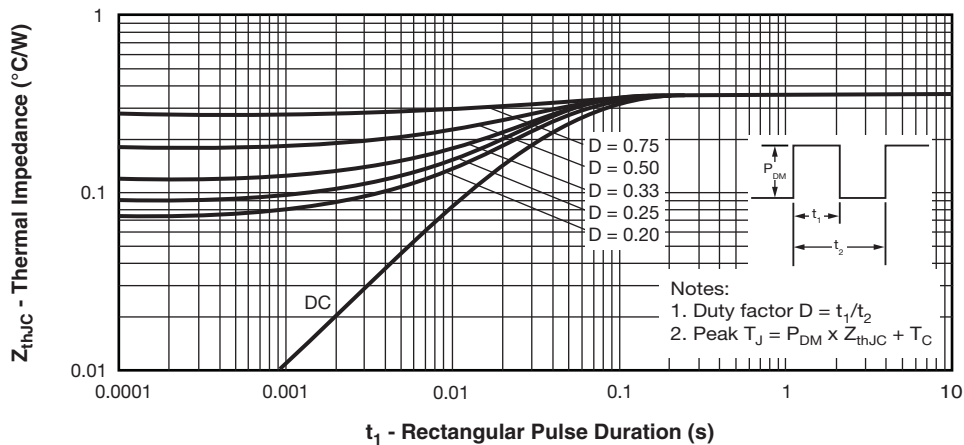


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

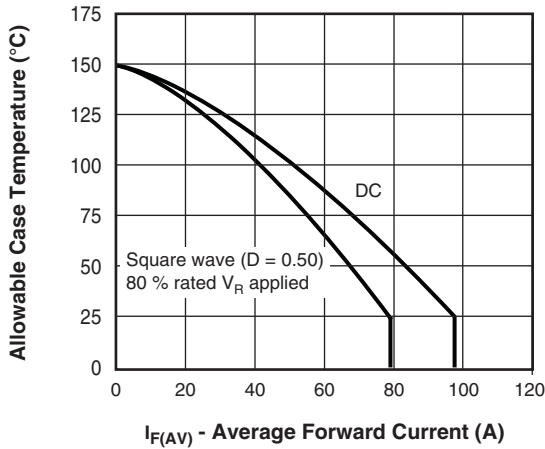


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

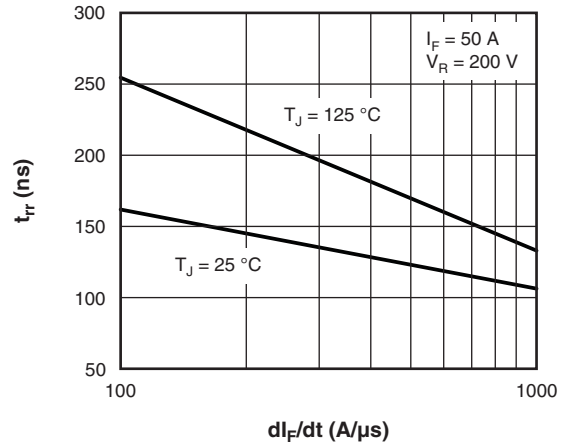


Fig. 7 - Typical Reverse Recovery Time vs. di_F/dt

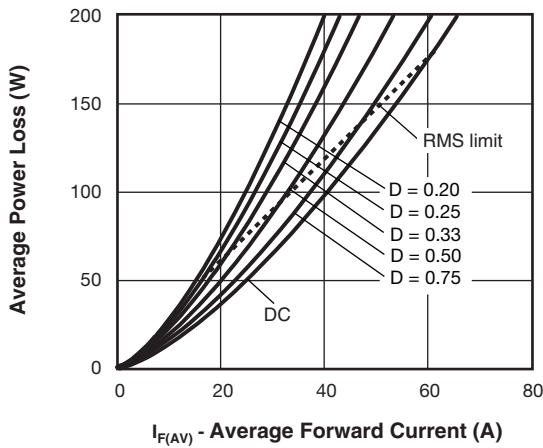


Fig. 6 - Forward Power Loss Characteristics

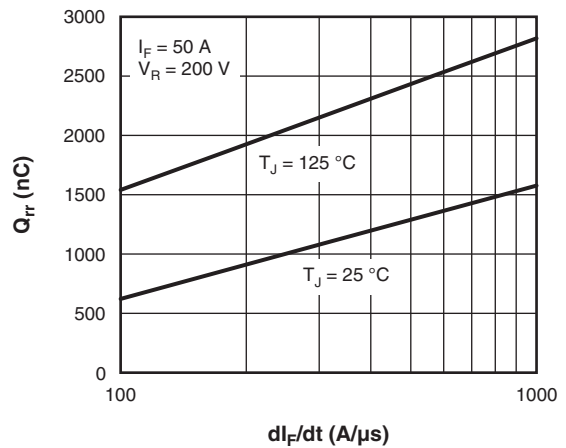


Fig. 8 - Typical Stored Charge vs. di_F/dt

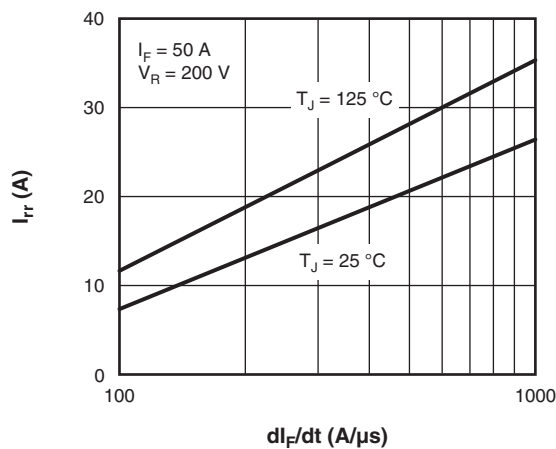


Fig. 9 - Typical Peak Recovery Current vs. di_F/dt

Note

- (1) Formula used: $T_C = T_J - (Pd + Pd_{REV}) \times R_{thJC}$;
- Pd = Forward power loss = $I_{F(AV)} \times V_{FM}$ at $(I_{F(AV)}/D)$ (see fig. 5);
- Pd_{REV} = Inverse power loss = $V_{R1} \times I_R (1 - D)$; I_R at V_{R1} = Rated V_R

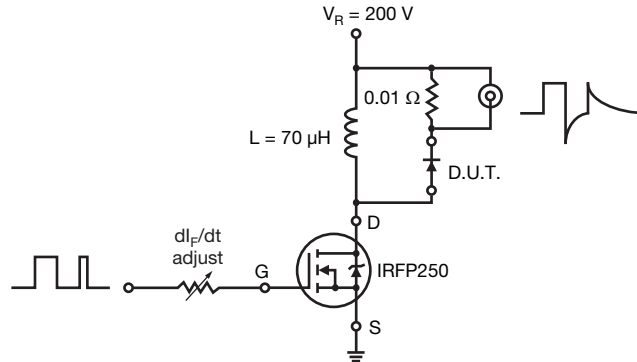
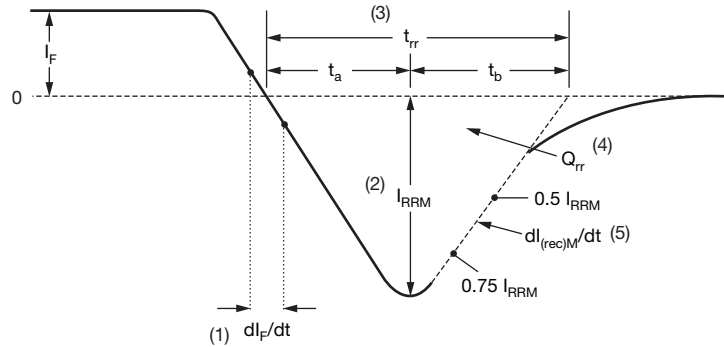


Fig. 10 - Reverse Recovery Parameter Test Circuit



- (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-	HF	A	70	E	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 (70 = 70 A)
- 5** - Circuit configuration (2 separate diodes, antiparallel pin-out)
- 6** - Package indicator (SOT-227 standard insulated base)
- 7** - Voltage rating (120 = 1200 V)

CIRCUIT CONFIGURATION		
CIRCUIT	CIRCUIT CONFIGURATION CODE	CIRCUIT DRAWING
2 separate diodes, antiparallel pin-out	E	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> </div> <div style="text-align: center;"> </div> </div>

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



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- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



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