

## 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](http://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	$\mu\text{A}$
		$T_J = 125\text{ °C}, V_R = V_R$ rated	-	1.6	5	mA
		$T_J = 150\text{ °C}, V_R = V_R$ rated	-	5	10	



<b>DYNAMIC RECOVERY CHARACTERISTICS</b> ( $T_J = 25\text{ }^\circ\text{C}$ 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	

<b>THERMAL - MECHANICAL SPECIFICATIONS</b>						
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			

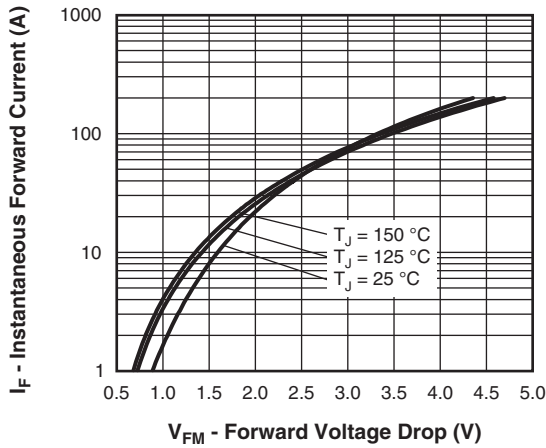


Fig. 1 - Typical Forward Voltage Drop Characteristics

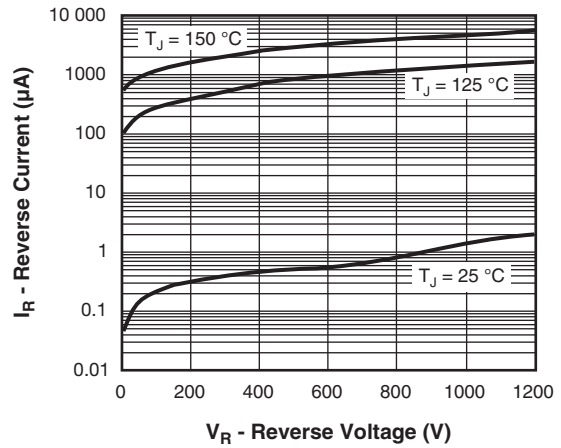


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

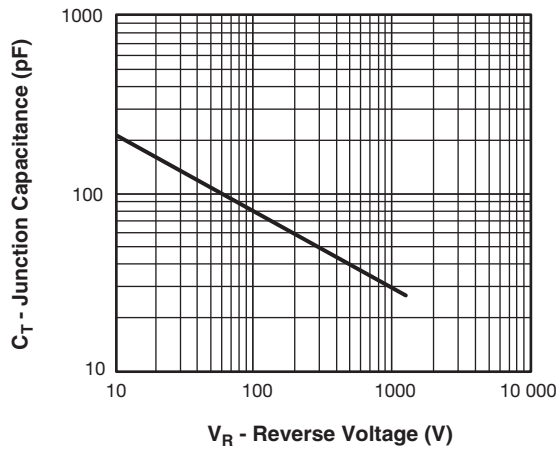


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

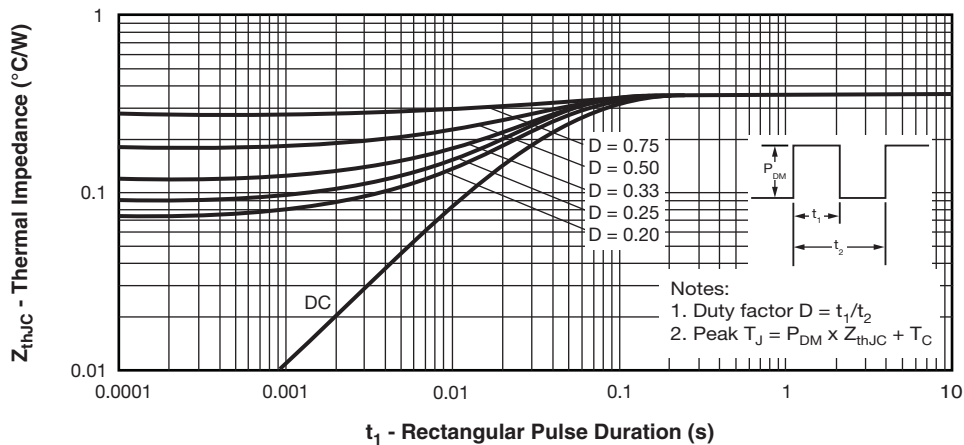


Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics

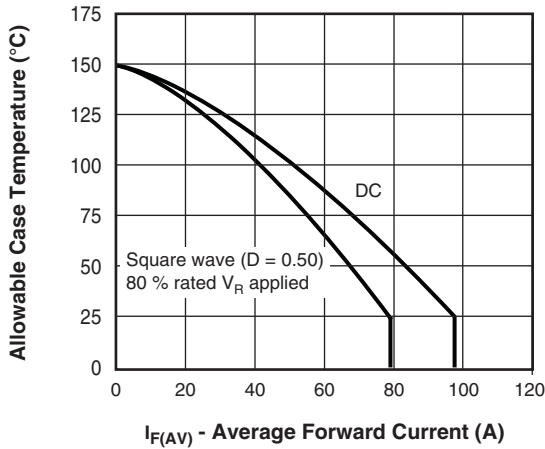


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

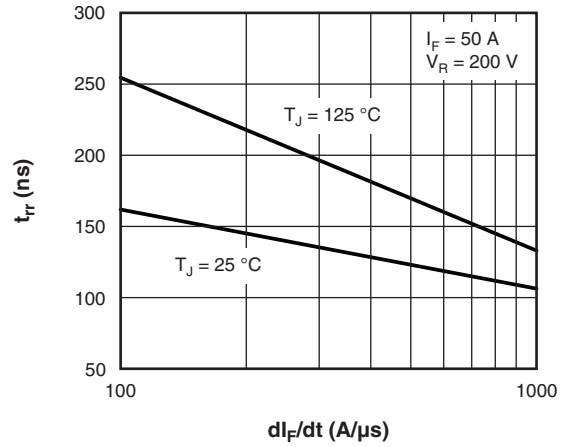


Fig. 7 - Typical Reverse Recovery Time vs.  $di_F/dt$

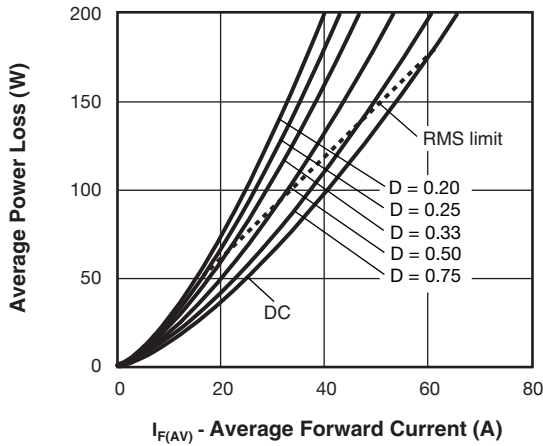


Fig. 6 - Forward Power Loss Characteristics

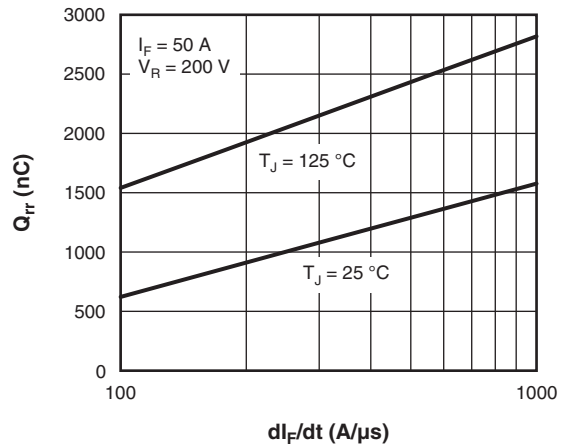


Fig. 8 - Typical Stored Charge vs.  $di_F/dt$

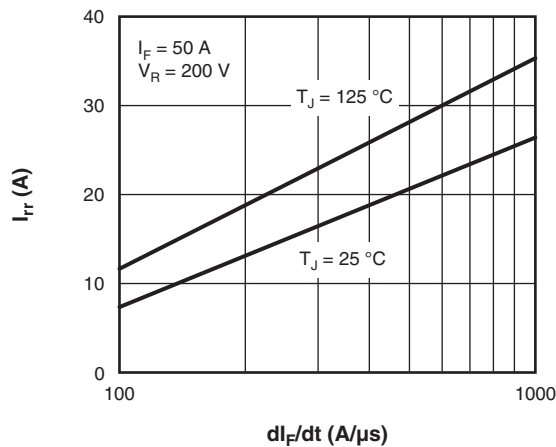


Fig. 9 - Typical Peak Recovery Current vs.  $di_F/dt$

**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  $V_R$

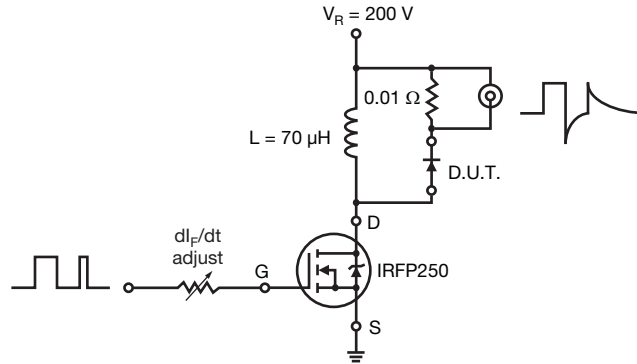
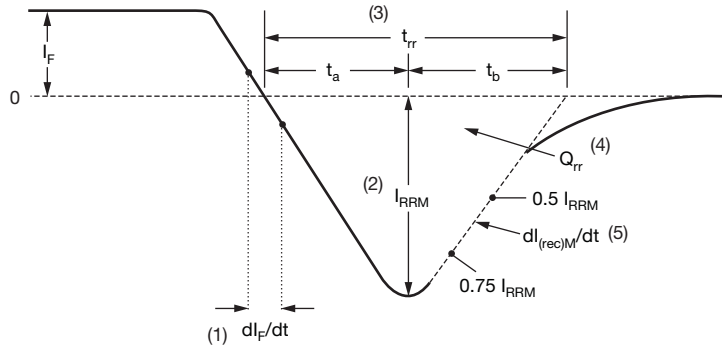


Fig. 10 - Reverse Recovery Parameter Test Circuit



- (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  $t_{rr}$

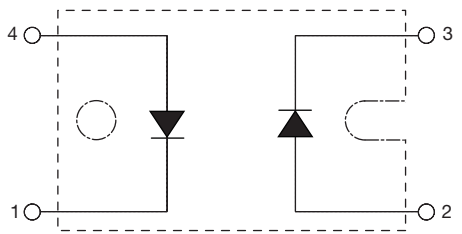
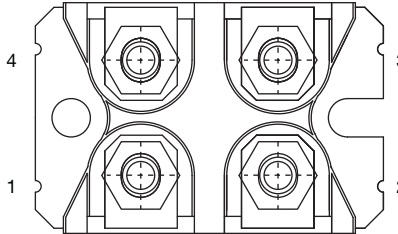
$$Q_{rr} = \frac{t_{rr} \times I_{RRM}}{2}$$

Fig. 11 - Reverse Recovery Waveform and Definitions

**ORDERING INFORMATION TABLE**

Device code	<b>VS-</b>	<b>HF</b>	<b>A</b>	<b>70</b>	<b>E</b>	<b>A</b>	<b>120</b>
	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: right;"> <p>Lead Assignment</p>  </div> </div>

LINKS TO RELATED DOCUMENTS	
Dimensions	<a href="http://www.vishay.com/doc?95423">www.vishay.com/doc?95423</a>
Part marking information	<a href="http://www.vishay.com/doc?95425">www.vishay.com/doc?95425</a>



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