HEXFRED®
Ultrafast Soft Recovery Diode, 60 A

SOT-227

PRODUCT SUMMARY	
V_R	1200 V
V_F (typical)	2.2 V
t_{rr} (typical)	145 ns
$I_{F(DC)}$ at T_C	30 A at 120 °C
Package	SOT-227
Circuit configuration	Two separate diodes

FEATURES

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

Pb-free

RoHS
COMPLIANT

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	I_F	T_C = 120 °C	30	A
Single pulse forward current	I_{FSM}	T_J = 25 °C	350	
Maximum repetitive forward current	I_{FRM}	Rated V_R, square wave, 20 kHz, T_C = 60 °C	130	
Maximum power dissipation	P_D	T_C = 25 °C	312	W
		T_C = 100 °C	125	
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 °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 = 30 A	-	2.2	3.0	
		I_F = 60 A	-	2.7	3.8	
		I_F = 60 A, T_J = 150 °C	-	2.1	-	
Reverse leakage current	I_{RM}	V_R = V_R rated	-	2.0	75	μA
		T_J = 150 °C, V_R = V_R rated	-	2.7	10	mA

DYNAMIC RECOVERY CHARACTERISTICS (T_J = 25 °C unless otherwise specified)							
PARAMETER	**SYMBOL**	**TEST CONDITIONS**		**MIN.**	**TYP.**	**MAX.**	**UNITS**
Reverse recovery time	t_{rr}	T_J = 25 °C	I_F = 50 A dI_F/dt = - 200 A/μs V_R = 200 V	-	145	-	ns
		T_J = 125 °C		-	218	-	
Peak recovery current	I_{RRM}	T_J = 25 °C		-	13	-	A
		T_J = 125 °C		-	19	-	
Reverse recovery charge	Q_{rr}	T_J = 25 °C		-	910	-	nC
		T_J = 125 °C		-	1920	-	

THERMAL - MECHANICAL SPECIFICATIONS						
PARAMETER	**SYMBOL**	**TEST CONDITIONS**	**MIN.**	**TYP.**	**MAX.**	**UNITS**
Junction to case, single leg conducting	R_{thJC}		-	-	0.4	°C/W
Junction to case, both legs conducting			-	-	0.2	
Case to heatsink	R_{thCS}	Flat, greased and surface	-	0.05	-	
Weight			-	30	-	g
Mounting torque			-	-	1.3	Nm
Case style			SOT-227			

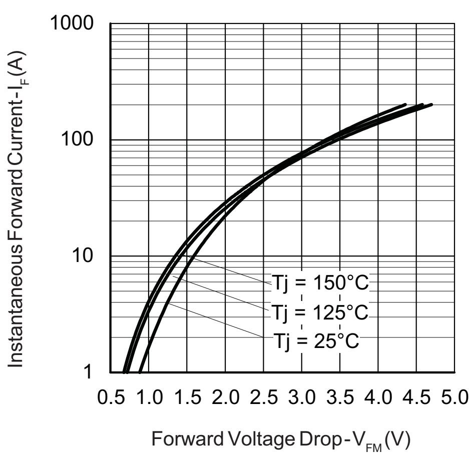


Fig. 1 - Typical Forward Voltage Drop Characteristics

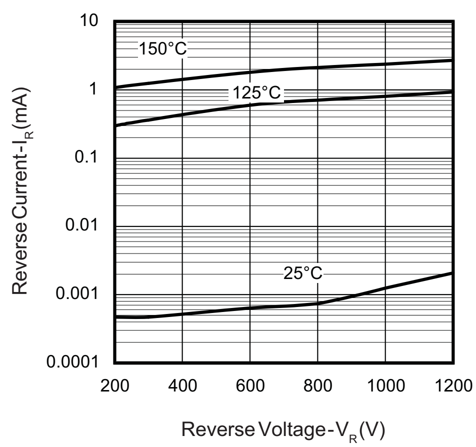


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

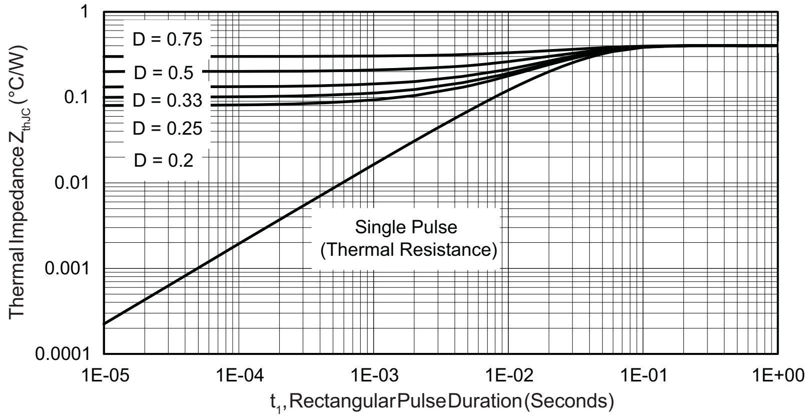


Fig. 3 - Maximum Thermal Impedance Z_{thJC} Characteristics

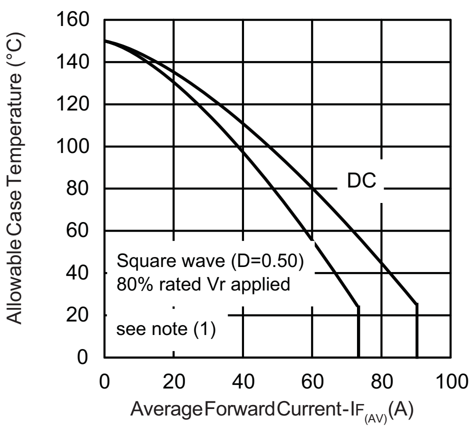


Fig. 4 - Maximum Allowable Case Temperature vs. Average Forward Current

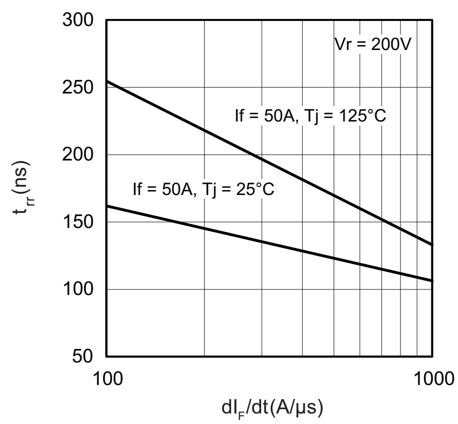


Fig. 6 - Typical Reverse Recovery Time vs. dI_F/dt

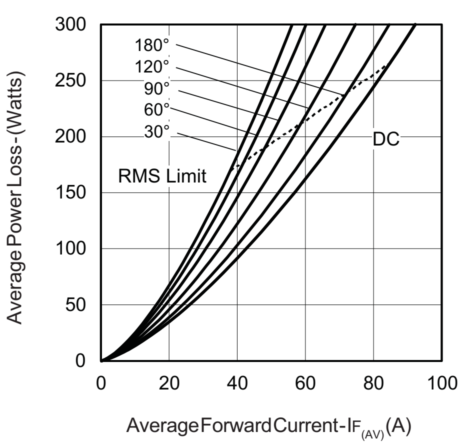


Fig. 5 - Forward Power Loss Characteristics

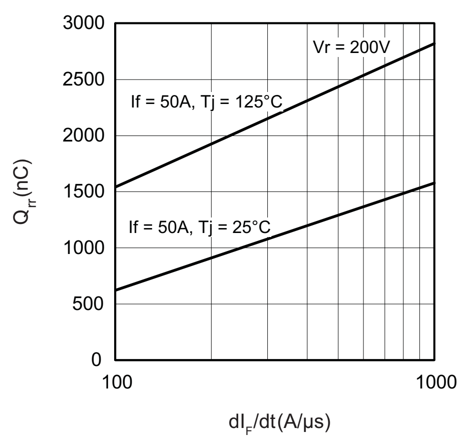


Fig. 7 - Typical Stored Charge vs. dI_F/dt

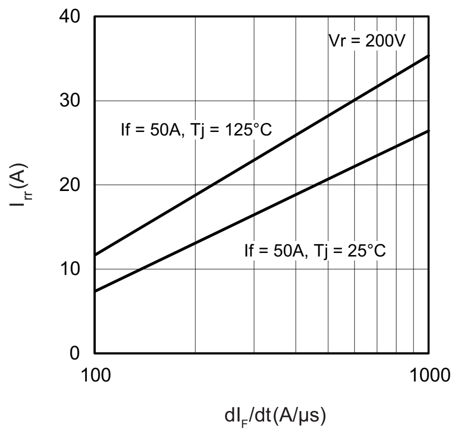


Fig. 8 - Typical Peak Recovery Current vs. dI_F/dt

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

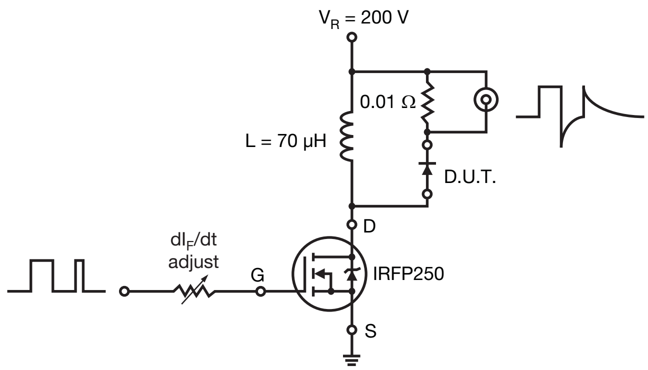
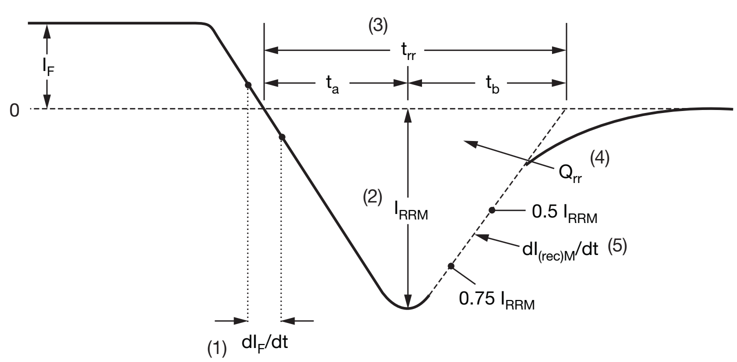


Fig. 9 - Reverse Recovery Parameter Test Circuit



(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}

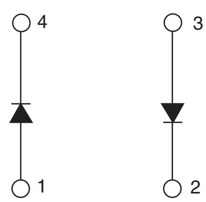
Fig. 10 - Reverse Recovery Waveform and Definitions

ORDERING INFORMATION TABLE

Device code	VS-	HF	A	60	EA	120	P
	1	2	3	4	5	6	7

1 - Vishay Semiconductors product
2 - HEXFRED® family
3 - Process designator (A = Electron irradiated)
4 - Average current (60 = 60 A)
5 - Package outline (EA = SOT-227, 2 diodes antiparallel)
6 - Voltage rating (120 = 1200 V)
7 - P = Lead (Pb)-free

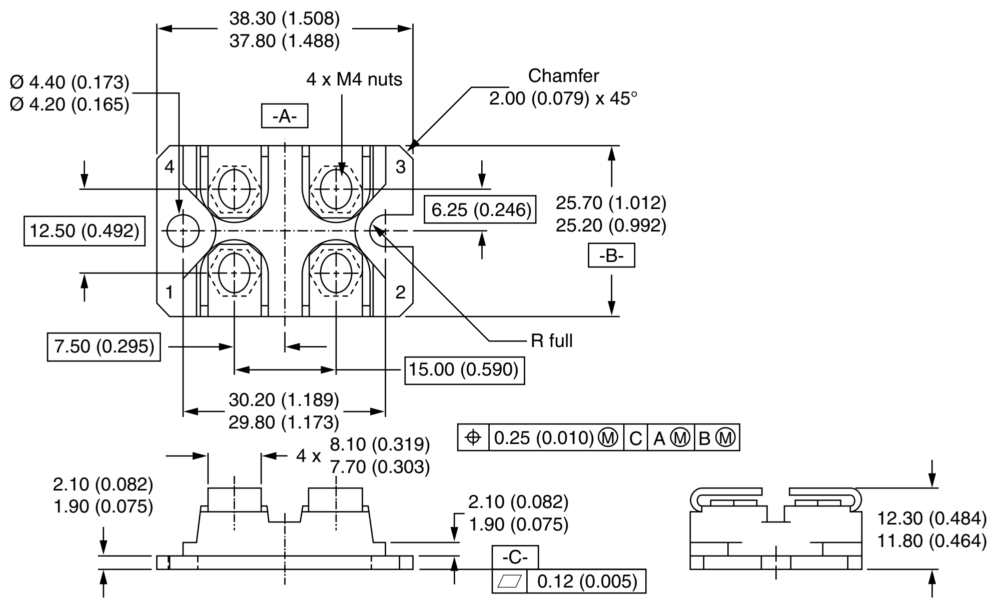
CIRCUIT CONFIGURATION



LINKS TO RELATED DOCUMENTS	
Dimensions	www.vishay.com/doc?95036
Packaging information	www.vishay.com/doc?95037

SOT-227

DIMENSIONS in millimeters (inches)



Notes

- Dimensioning and tolerancing per ANSI Y14.5M-1982
- Controlling dimension: millimeter

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