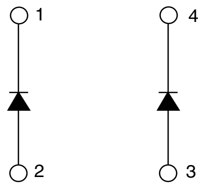
HEXFRED®
Ultrafast Soft Recovery Diode, 80 A

SOT-227



FEATURES

- Fast recovery time characteristic
- Electrically isolated base plate
- Large creepage distance between terminal
- Simplified mechanical designs, rapid assembly
- UL pending
- Totally lead (Pb)-free
- Designed and qualified for industrial level

Pb-free
RoHS COMPLIANT

PRODUCT SUMMARY	
V_R	1200 V
V_F (typical)	2.6 V
t_{rr} (typical)	25 ns
$I_{F(DC)}$ at T_C	40 A at 78 °C

DESCRIPTION/APPLICATIONS

The dual diode series configuration (HFA80FA120P) is used for output rectification or freewheeling/clamping operation 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 = 78 °C	40	A
Single pulse forward current	I_{FSM}	T_J = 25 °C	400	
Maximum repetitive forward current	I_{FRM}	Rated V_R, square wave, 20 kHz, T_C = 60 °C	72	
Maximum power dissipation	P_D	T_C = 25 °C	178	W
		T_C = 100 °C	71	
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	-	2.6	3.0	
		I_F = 40 A		-	2.9	3.3	
		I_F = 80 A, T_J = 125 °C		-	3.4	-	
Reverse leakage current	I_{RM}	V_R = V_R rated	See fig. 2	-	2.0	-	µA
		T_J = 125 °C, V_R = 0.8 x V_R rated		-	0.5	2	mA
Junction capacitance	C_T	V_R = 200 V	See fig. 3	-	43	-	pF

DYNAMIC RECOVERY CHARACTERISTICS (T_C = 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		-	25	-	ns
		T_J = 25 °C	I_F = 40 A dI_F/dt = - 200 A/µs V_R = 200 V	-	52	-	
		T_J = 125 °C		-	110	-	
Peak recovery current	I_{RRM}	T_J = 25 °C		-	5.9	-	A
		T_J = 125 °C		-	10.8	-	
Reverse recovery charge	Q_{rr}	T_J = 25 °C		-	160	-	nC
		T_J = 125 °C		-	630	-	

THERMAL - MECHANICAL SPECIFICATIONS						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Junction to case, single leg conducting	R_{thJC}		-	-	0.7	°C/W
Junction to case, both legs conducting			-	-	0.35	
Case to heatsink	R_{thCS}	Flat, greased and surface	-	0.05	-	
Weight			-	30	-	g
Mounting torque			-	1.3	-	Nm

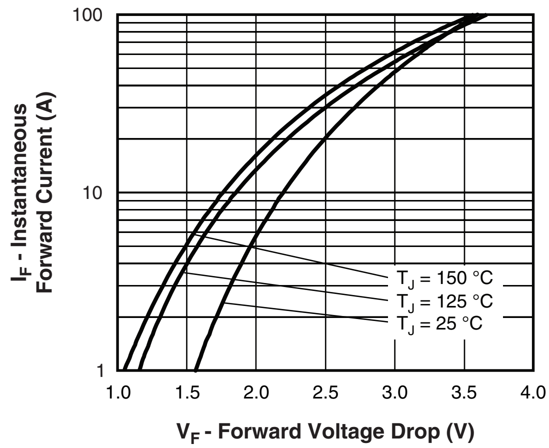


Fig. 1 - Typical Forward Voltage Drop Characteristics

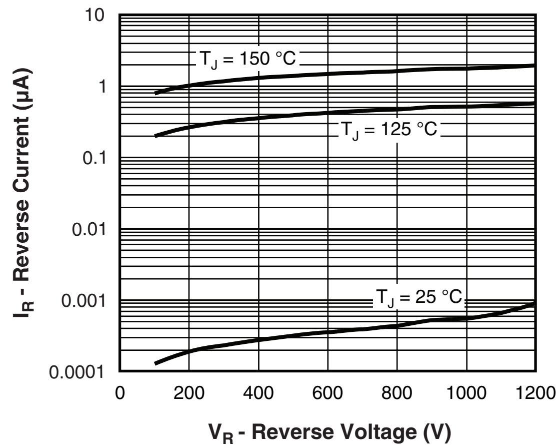


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

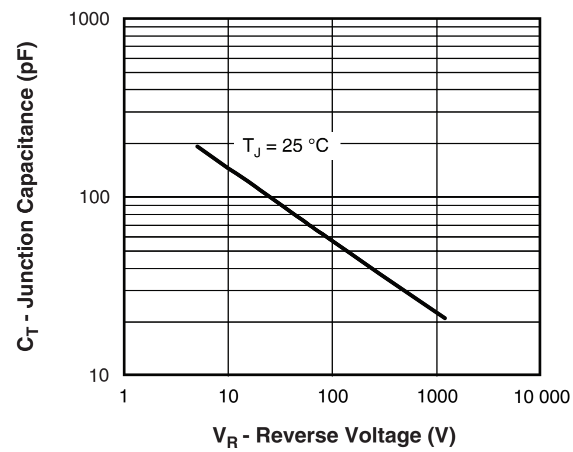


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

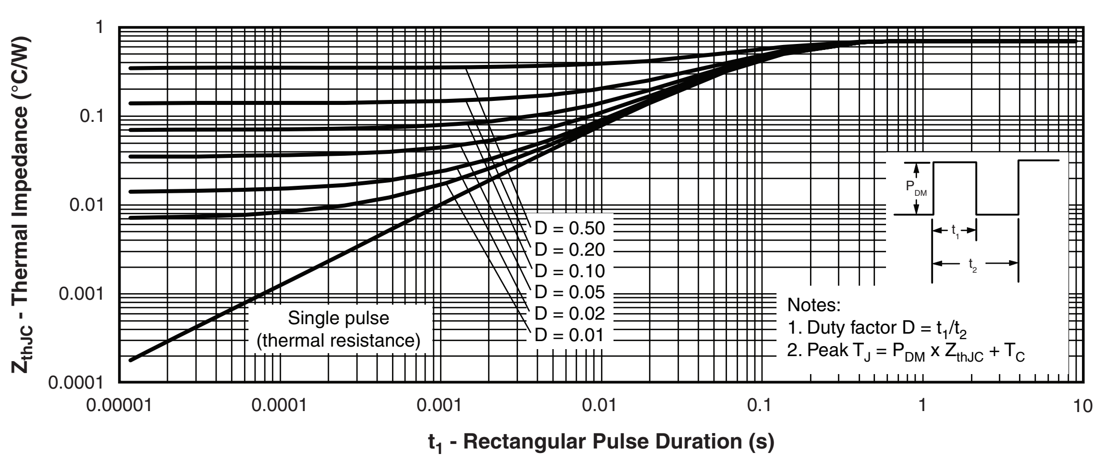


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

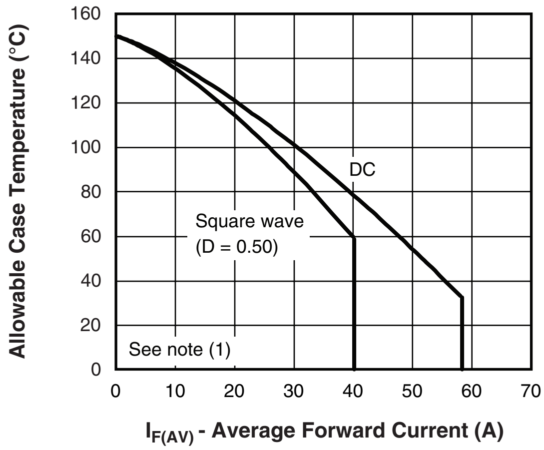


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

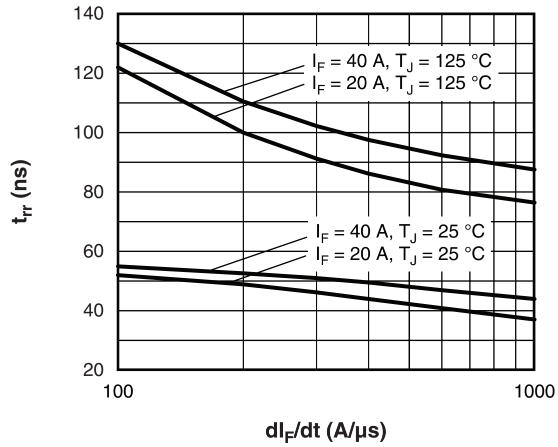


Fig. 7 - Typical Reverse Recovery Time vs. dI_F/dt

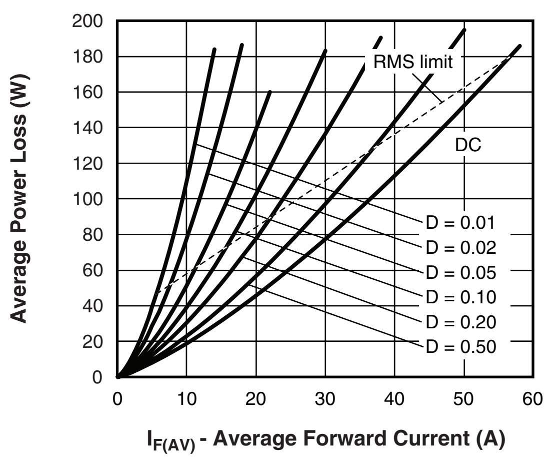


Fig. 6 - Forward Power Loss Characteristics

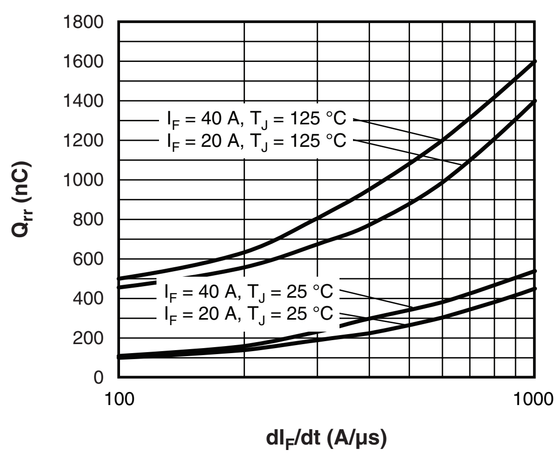


Fig. 8 - Typical Stored Charge vs. dI_F/dt

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. 6);
Pd_{REV} = Inverse power loss = $V_{R1} \times I_R (1 - D)$; I_R at V_{R1} = Rated V_R

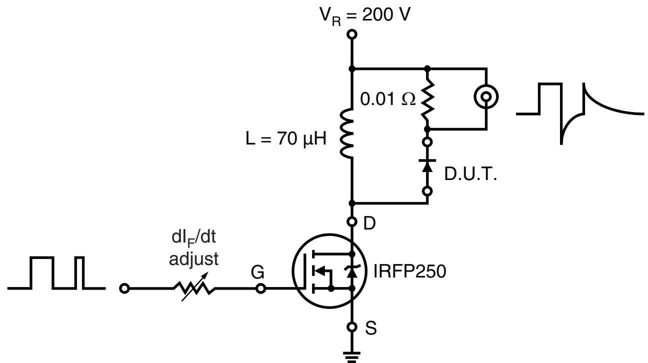
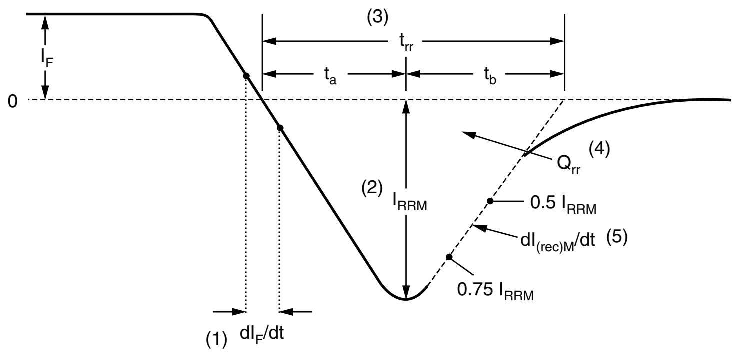


Fig. 9 - Reverse Recovery Parameter Test Circuit



(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	HF	A	80	FA	120	P
	1	2	3	4	5	6

1 - HEXFRED® family
2 - Process designator (A = Electron irradiated)
3 - Average current (80 = 80 A)
4 - Package outline (FA = SOT-227)
5 - Voltage rating (120 = 1200 V)
6 - P = Lead (Pb)-free

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

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