Bulletin PD-20395 rev. A 01/02

International
IOR Rectifier

HFA80FA120

HEXFRED™ Ultrafast, Soft Recovery Diode

Features

- Fast Recovery Time Characteristic
- Electrically Isolated Base Plate
- Large Creepage Distance Between Terminal
- Simplified Mechanical Designs, Rapid Assembly

V_R = 1200V
$V_{F(typ)}$ = 2.6V
$I_{F(AV)}$ = 80A
$t_{rr\ (typ)}$ = 25ns

Description/ Applications

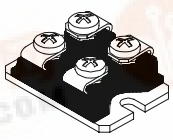
The dual diode series configuration (HFA80FA120) is used for output rectification or frewheeling/ clamping operation and high voltage application.
The semiconductor in the SOT-227 package is isolated from the copper base plate, allowing for common heatsinks and compact assemblies to be built.
These modules are intended for general applications such as HV power supplies, electronic welders, motor control and inverters.

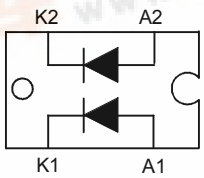
Absolute Maximum Ratings

	Parameters		Max	Units
V_R	Cathode-to-Anode Voltage		1200	V
I_F	Continuous Forward Current, T_C = 60°C	Per Leg	40	A
I_{FSM}	Single Pulse Forward Current, T_J = 25°C	Per Leg	400	
I_{FRM}	Maximum Repetitive Forward Current, Rated V_R, Square wave, 20KHz, T_C = 60°C		72	
P_D	Max Power Dissipation, T_C = 100°C		71	W
	Max Power Dissipation, T_C = 25°C		178	
V_{ISOL}	RMS Isolation Voltage, Any Terminal to Case, t = 1 min		2500	V
T_J, T_{STG}	Operating Junction and Storage Temperatures		- 55 to 150	°C

Case Styles

HFA80FA120





SOT-227

Electrical Characteristics @ T_J = 25°C (unless otherwise specified)

	Parameters	Min	Typ	Max	Units	Test Conditions	
V_{BR}	Cathode Anode Breakdown Voltage	1200	-	-	V	I_R = 100µA	
V_{FM}	Forward Voltage	-	2.6	3.0	V	I_F = 25A	Fig. 1
		-	2.9	3.3	V	I_F = 40A	
		-	3.4	-	V	I_F = 80A, T_J = 125°C	
I_{RM}	Reverse Leakage Current	-	2.0	-	µA	V_R = V_R Rated	Fig. 2
		-	0.5	2	mA	T_J = 125°C, V_R = 0.8 x V_R Rated	
C_T	Junction Capacitance	-	43	-	pF	V_R = 200V	Fig. 3

Dynamic Recovery Characteristics @ T_C = 25°C (unless otherwise specified)

	Parameters	Min	Typ	Max	Units	Test Conditions	
t_{rr}	Reverse Recovery Time	-	25	-	ns	I_F = 1A, di_F/dt = 200A/µs, V_R = 30V	
		-	52	-		T_J = 25°C	I_F = 40A di_F/dt = - 200A/µs V_R = 200V
		-	110	-		T_J = 125°C	
I_{RRM}	Peak Recovery Current	-	5.9	-	A	T_J = 25°C	
		-	10.8	-		T_J = 125°C	
Q_{rr}	Reverse Recovery Charge	-	160	-	nC	T_J = 25°C	
		-	630	-		T_J = 125°C	

Thermal - Mechanical Characteristics

	Parameters	Min	Typ	Max	Units
R_{thJC}	Junction to Case, Single Leg Conducting			0.7	°C/W
	Both Leg Conducting			0.35	K/W
R_{thCS}	Case to Heat Sink, Flat, Greased Surface		0.05		
Wt	Weight		30		g
T	Mounting Torque		1.3		(N*m)

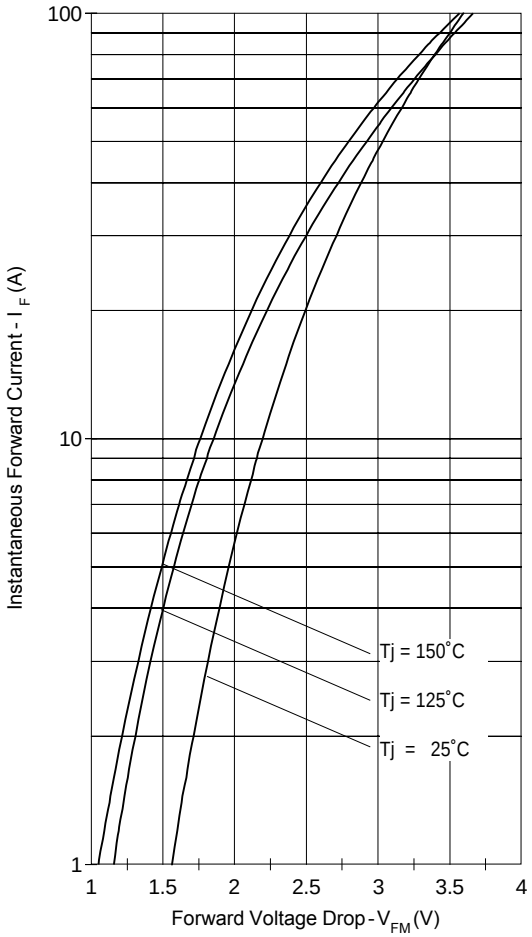


Fig. 1 - Typical Forward Voltage Drop Characteristics

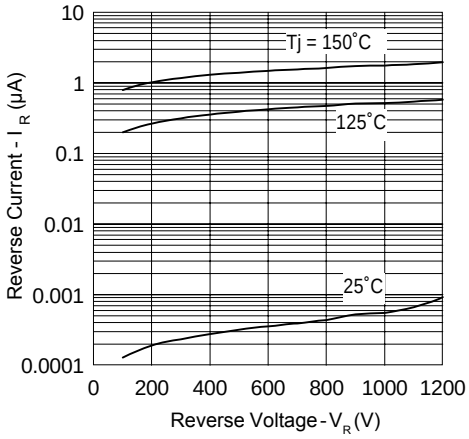


Fig. 2 - Typical Values Of Reverse Current Vs. Reverse Voltage

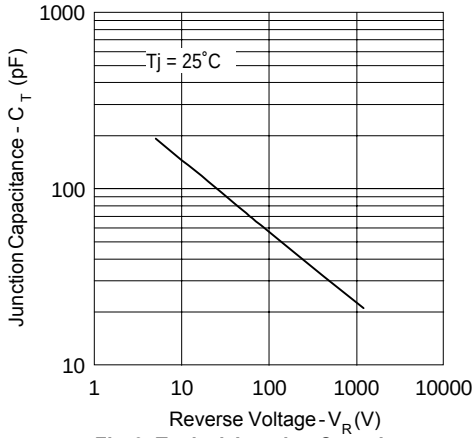


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage

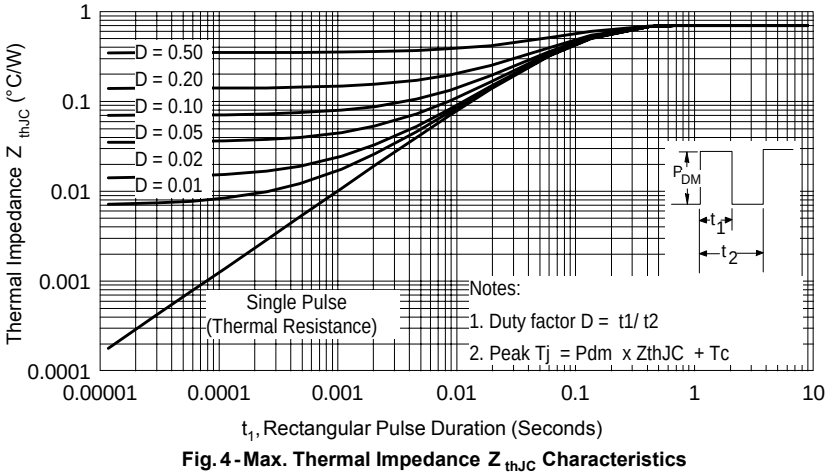


Fig. 4 - Max. Thermal Impedance Z_{thJC} Characteristics

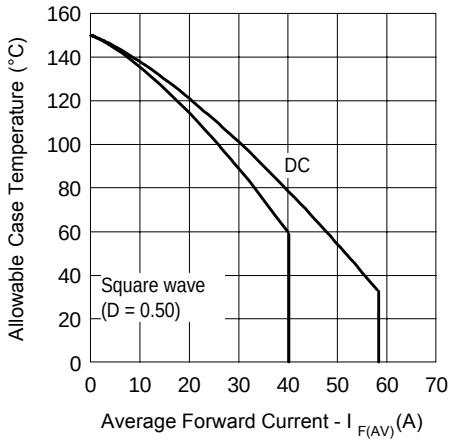


Fig. 5 - Max. Allowable Case Temperature Vs. Average Forward Current

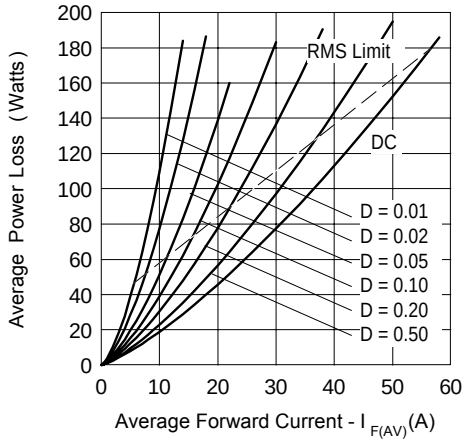


Fig. 6 - Forward Power Loss Characteristics

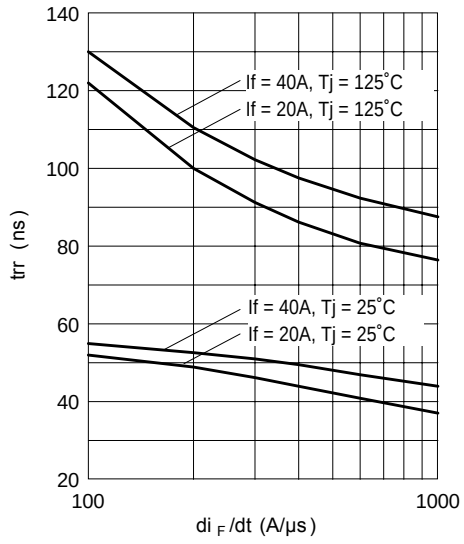


Fig. 7 - Typical Reverse Recovery vs. di_F/dt

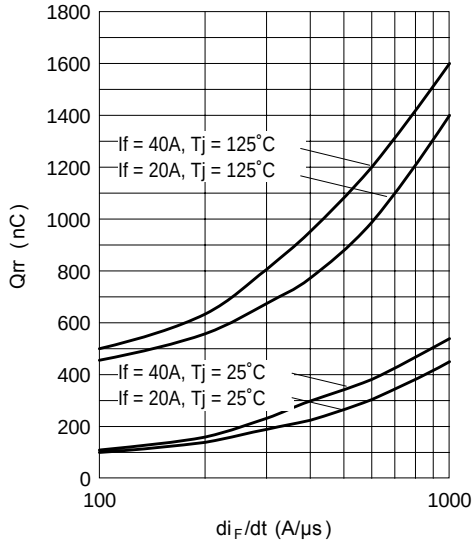


Fig. 8 - Typical Stored Charge vs. di_F/dt

(3) Formula used: $T_C = T_J - (Pd + Pd_{REV}) \times R_{thJC}$;
Pd = Forward Power Loss = $I_{F(AV)} \times V_{FM} @ (I_{F(AV)} / D)$ (see Fig. 6);
Pd_{REV} = Inverse Power Loss = $V_{R1} \times I_R (1 - D)$; $I_R @ V_{R1}$ = rated V_R

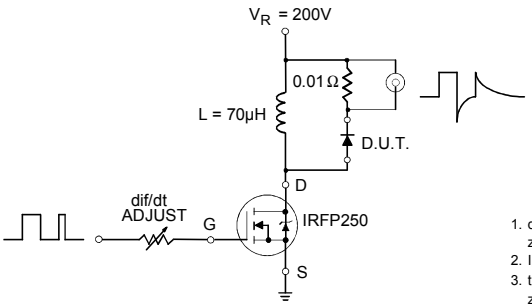
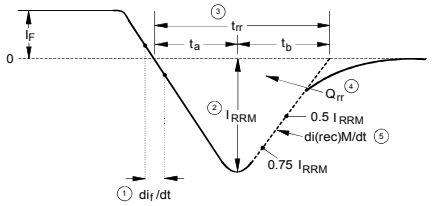


Fig. 9 - Reverse Recovery Parameter Test Circuit



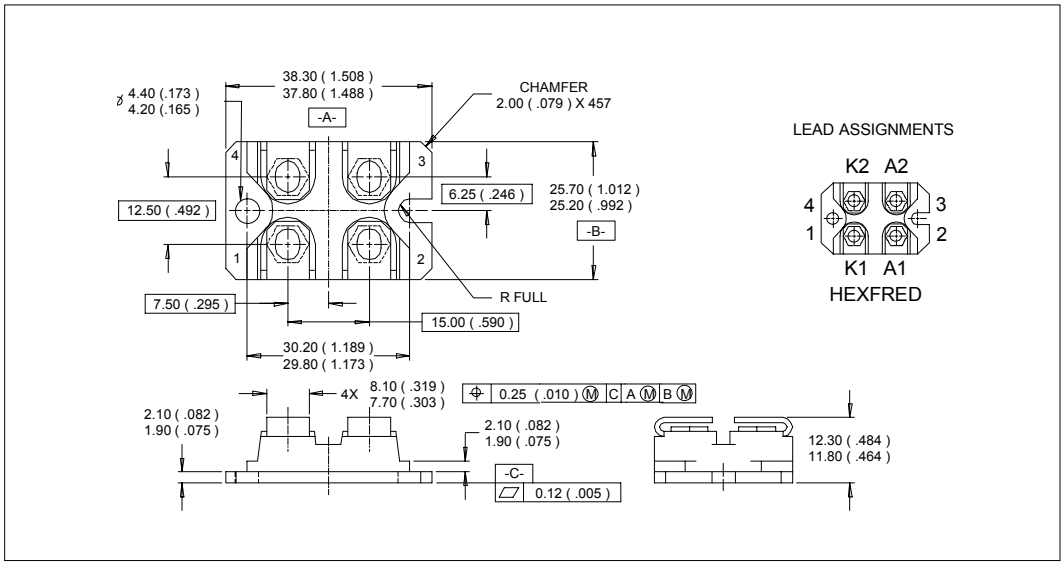
1. di_F/dt - Rate of change of current through zero crossing
2. I_{RRM} - Peak reverse recovery current
3. t_{rr} - Reverse recovery time measured from zero crossing point of negative going I_F to point where a line passing through 0.75 I_{RRM} and 0.50 I_{RRM} extrapolated to zero current
4. Q_{rr} - 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

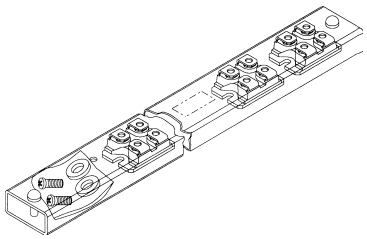
SOT-227 Package Details



SOT-227 Package Details

Tube

QUANTITIES PER TUBE IS 10
M4 SCREW AND WASHER INCLUDED



Ordering Information Table

Device Code

HF	A	80	FA	120
1	2	3	4	5

1	-	Hexfred Family
2	-	Process Designator (A = Electron Irradiated)
3	-	Average Current (80 = 80A)
4	-	Package Outline (FA = SOT-227)
5	-	Voltage Rating (120 = 1200V)

Data and specifications subject to change without notice.
This product has been designed and qualified for Industrial Level.
Qualification Standards can be found on IR's Web site.

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