

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

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

Description/ Applications

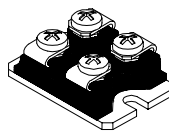
The dual diode series configuration (HFA80FA120) is used for output rectification or freewheeling/ clamping operation and high voltage application. The semiconductor in the SOT-227 package is isolated from the copper base plate, allowing for common heatsinks and compact assemblies to be built. These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

Absolute Maximum Ratings

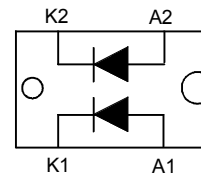
Parameters	Max	Units
V_R Cathode-to-Anode Voltage	1200	V
I_F Continuous Forward Current, $T_C = 60^\circ\text{C}$ Per Leg	40	A
I_{FSM} Single Pulse Forward Current, $T_J = 25^\circ\text{C}$ Per Leg	400	
I_{FRM} Maximum Repetitive Forward Current, Rated V_R , Square wave, 20KHz, $T_C = 60^\circ\text{C}$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

Case Styles

HFA80FA120



SOT-227



Electrical Characteristics @ $T_J = 25^\circ\text{C}$ (unless otherwise specified)

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

Dynamic Recovery Characteristics @ $T_C = 25^\circ\text{C}$ (unless otherwise specified)

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

$I_F = 40\text{A}$
 $di_F/dt = -200\text{A}/\mu\text{s}$
 $V_R = 200\text{V}$

Thermal - Mechanical Characteristics

Parameters	Min	Typ	Max	Units
R_{thJC} Junction to Case, Single Leg Conducting Both Leg Conducting			0.7	$^\circ\text{C}/\text{W}$
			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)

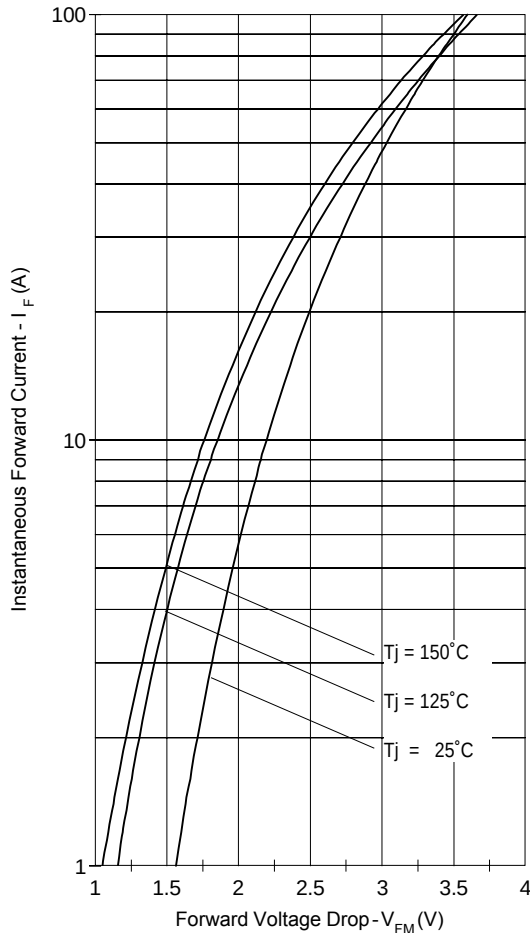


Fig. 1 - Typical Forward Voltage Drop Characteristics

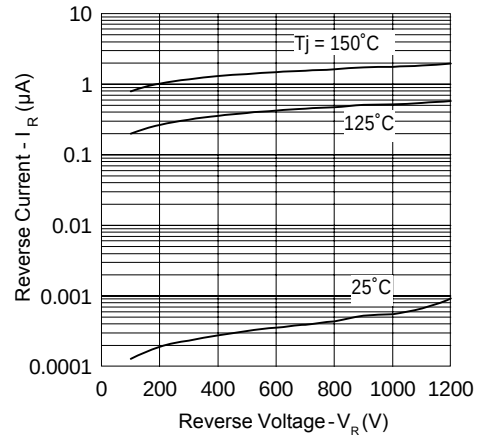


Fig. 2 - Typical Values Of Reverse Current Vs. Reverse Voltage

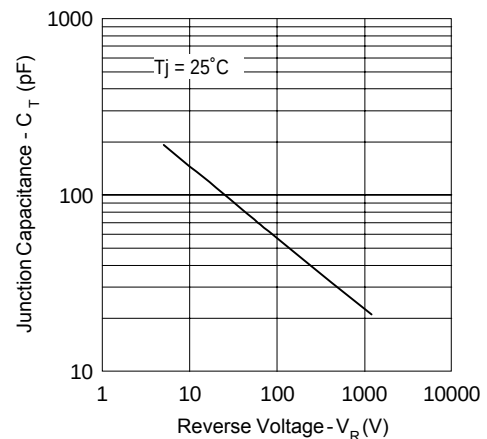


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage

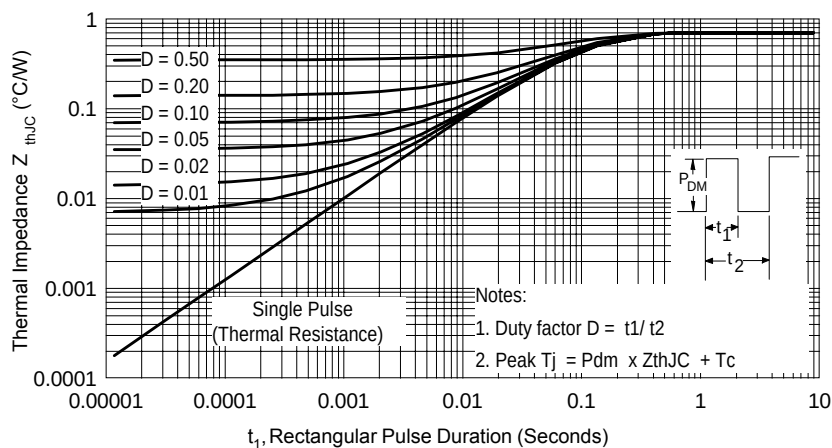


Fig. 4 - Max. Thermal Impedance Z_{thJC} Characteristics

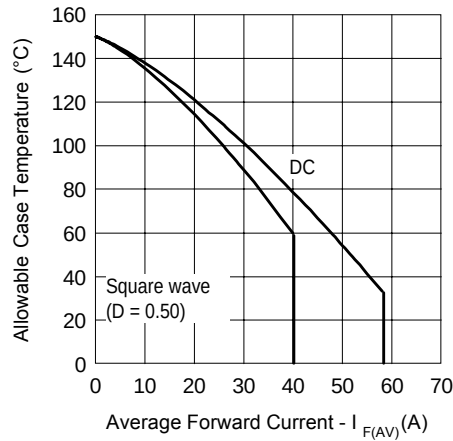


Fig. 5 - Max. Allowable Case Temperature Vs. Average Forward Current

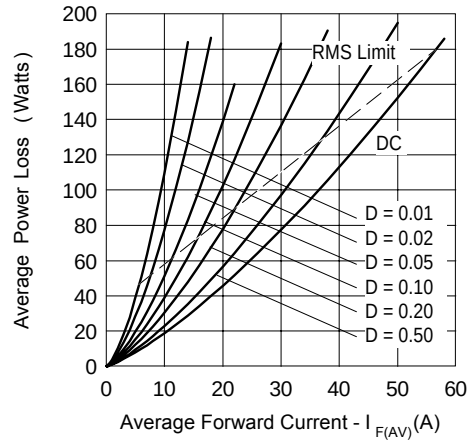


Fig. 6 - Forward Power Loss Characteristics

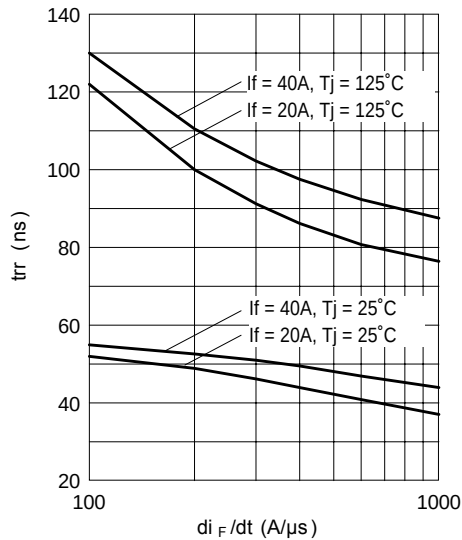


Fig. 7 - Typical Reverse Recovery vs. di_F/dt

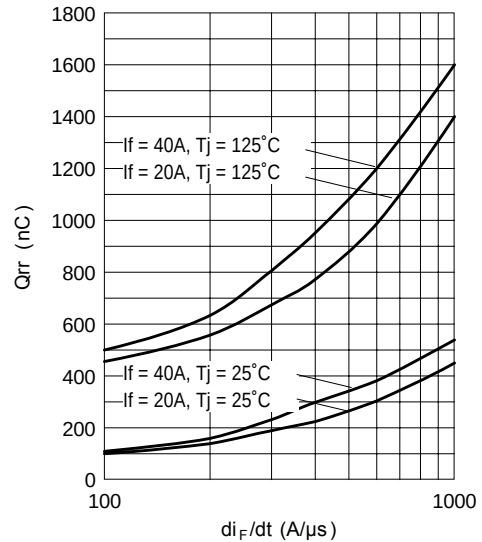
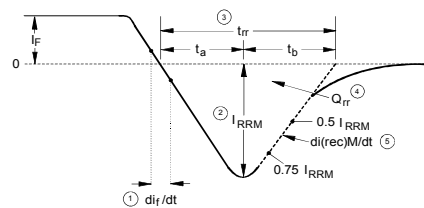
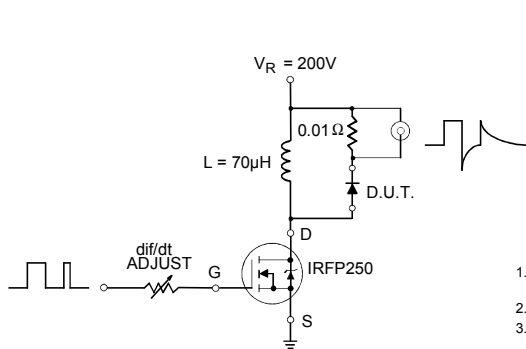


Fig. 8 - Typical Stored Charge vs. di_F/dt

(3) Formula used: $T_C = T_J - (P_d + P_{d_{REV}}) \times R_{thJC}$

P_d = Forward Power Loss = $I_{F(AV)} \times V_{FM} @ (I_{F(AV)} / D)$ (see Fig. 6);

$P_{d_{REV}}$ = Inverse Power Loss = $V_{R1} \times I_R (1 - D)$; $I_R @ V_{R1} = \text{rated } V_R$

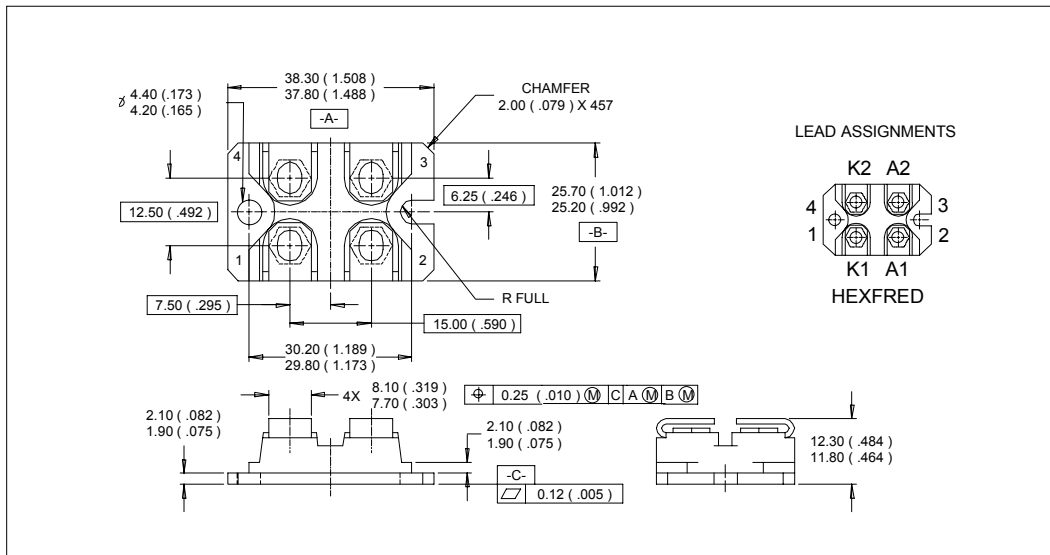


1. di_F/dt - Rate of change of current through zero crossing
2. I_{RRM} - Peak reverse recovery current
3. t_{rr} - Reverse recovery time measured from zero crossing point of negative going I_F to point where a line passing through $0.75 I_{RRM}$ and $0.50 I_{RRM}$ extrapolated to zero current
4. Q_{rr} - 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. 9 - Reverse Recovery Parameter Test Circuit

Fig. 10 - Reverse Recovery Waveform and Definitions

SOT-227 Package Details



HFA80FA120

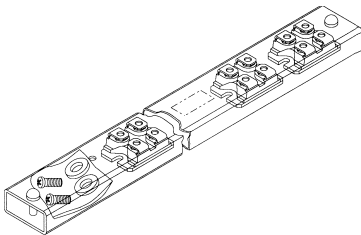
Bulletin PD-20395 rev. A 01/02



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.



IR WORLD HEADQUARTERS: 233 Kansas St., El Segundo, California 90245, USA Tel: (310) 252-7105
TAC Fax: (310) 252-7309
Visit us at www.irf.com for sales contact information. 01/02