

HFA08PB120PbF

Ultrafast, Soft Recovery Diode

Features

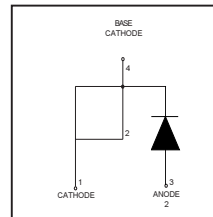
- Ultrafast Recovery
- Ultrasoft Recovery
- Very Low I_{RRM}
- Very Low Q_{rr}
- Specified at Operating Conditions
- Lead-Free

Benefits

- Reduced RFI and EMI
- Reduced Power Loss in Diode and Switching Transistor
- Higher Frequency Operation
- Reduced Snubbing
- Reduced Parts Count

Description

International Rectifier's HFA08PB120 is a state of the art ultra fast recovery diode. Employing the latest in epitaxial construction and advanced processing techniques it features a superb combination of characteristics which result in performance which is unsurpassed by any rectifier previously available. With basic ratings of 1200 volts and 8 amps continuous current, the HFA08PB120 is especially well suited for use as the companion diode for IGBTs and MOSFETs. In addition to ultra fast recovery time, the HEXFRED product line features extremely low values of peak recovery current (I_{RRM}) and does not exhibit any tendency to "snap-off" during the t_b portion of recovery. The HEXFRED features combine to offer designers a rectifier with lower noise and significantly lower switching losses in both the diode and the switching transistor. These HEXFRED advantages can help to significantly reduce snubbing, component count and heatsink sizes. The HEXFRED HFA08PB120 is ideally suited for applications in power supplies and power conversion systems (such as inverters), motor drives, and many other similar applications where high speed, high efficiency is needed.



| |
|---------------------------------------|
| $V_R = 1200V$ |
| $V_F (typ.)^* = 2.4V$ |
| $I_F (AV) = 8.0A$ |
| $Q_{rr} (typ.) = 140nC$ |
| $I_{RRM} (typ.) = 4.5A$ |
| $t_{rr} (typ.) = 28ns$ |
| $di_{(rec)M}/dt (typ.)^* = 85A/\mu s$ |



Absolute Maximum Ratings

| | Parameter | Max | Units |
|---------------------------|---|-------------|------------|
| V_R | Cathode-to-Anode Voltage | 1200 | V |
| $I_F @ T_C = 100^\circ C$ | Continuous Forward Current | 8.0 | A |
| I_{FSM} | Single Pulse Forward Current | 130 | |
| I_{FRM} | Maximum Repetitive Forward Current | 32 | |
| $P_D @ T_C = 25^\circ C$ | Maximum Power Dissipation | 73.5 | W |
| $P_D @ T_C = 100^\circ C$ | Maximum Power Dissipation | 29 | |
| T_J T_{STG} | Operating Junction and Storage Temperature Range | - 55 to 150 | $^\circ C$ |

*125°C

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

| Parameter | Min | Typ | Max | Units | Test Conditions |
|---|------|------|------|-------|---|
| V _{BR} Cathode Anode Breakdown Voltage | 1200 | - | - | V | I _R = 100μA |
| V _{FM} Max. Forward Voltage | - | 2.6 | 3.3 | V | I _F = 8.0A |
| | - | 3.4 | 4.3 | | I _F = 16A See Fig. 1 |
| | - | 2.4 | 3.1 | | I _F = 8.0A, T _J = 125°C |
| I _{RM} Max. Reverse Leakage Current | - | 0.31 | 10 | μA | V _R = V _R Rated See Fig. 2 |
| | - | 135 | 1000 | | T _J = 125°C, V _R = 0.8 x V _R Rated |
| C _T Junction Capacitance | - | 11 | 20 | pF | V _R = 200V See Fig. 3 |
| L _S Series Inductance | - | 8.0 | - | nH | Measured lead to lead 5mm from pkg body |

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

| Parameter | Min | Typ | Max | Units | Test Conditions | |
|--|------------------------------|-----|-----|-------|---|------------------------|
| t _{rr} Reverse Recovery Time | - | 28 | - | ns | I _F = 1.0A, di _F /dt = 200A/μs, V _R = 30V | |
| t _{rr1} See Fig. 5, 10 | - | 63 | 95 | | | T _J = 25°C |
| t _{rr2} | - | 106 | 160 | | | T _J = 125°C |
| I _{RRM1} Peak Recovery Current | - | 4.5 | 8.0 | A | I _F = 8.0A V _R = 200V di _F /dt = 200A/μs | |
| | I _{RRM2} See Fig. 6 | - | 6.2 | | | 11 |
| Q _{rr1} Reverse Recovery Charge | - | 140 | 380 | nC | T _J = 25°C | |
| | Q _{rr2} See Fig. 7 | - | 335 | | | 880 |
| di _{(rec)M} /dt1 Peak Rate of Recovery | - | 133 | - | A/μs | T _J = 25°C | |
| di _{(rec)M} /dt2 Current During t _b See Fig. 8 | - | 85 | - | | | T _J = 125°C |

Thermal - Mechanical Characteristics

| Parameter | Min | Typ | Max | Units |
|---|-----|------|-----|--------|
| T _{lead} ① Lead Temperature | - | - | 300 | °C |
| R _{thJC} Thermal Resistance, Junction to Case | - | - | 1.7 | k/W |
| R _{thJA} ② Thermal Resistance, Junction to Ambient | - | - | 40 | |
| R _{thCS} ③ Thermal Resistance, Case to Heat Sink | - | 0.25 | - | |
| Wt Weight | - | 6.0 | - | g |
| | - | 0.21 | - | (oz) |
| Mounting Torque | 6.0 | - | 12 | Kg-cm |
| | 5.0 | - | 10 | lbf•in |

- ① 0.063 in. from Case (1.6mm) for 10 sec
- ② Typical Socket Mount
- ③ Mounting Surface, Flat, Smooth and Greased

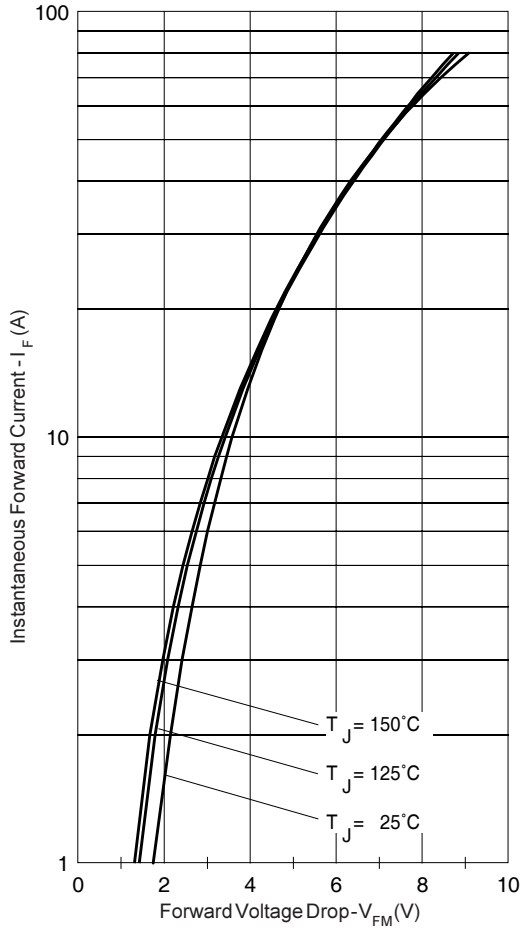


Fig. 1 - Max. Forward Voltage Drop Characteristics

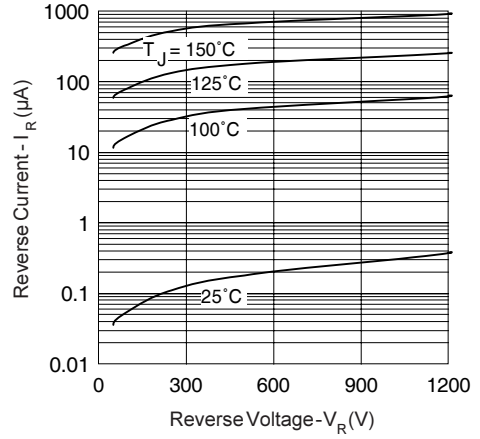


Fig. 2 - Typ. Values Of Reverse Current Vs. Reverse Voltage

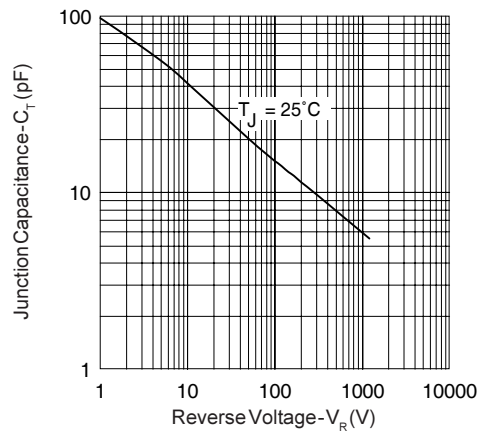


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage

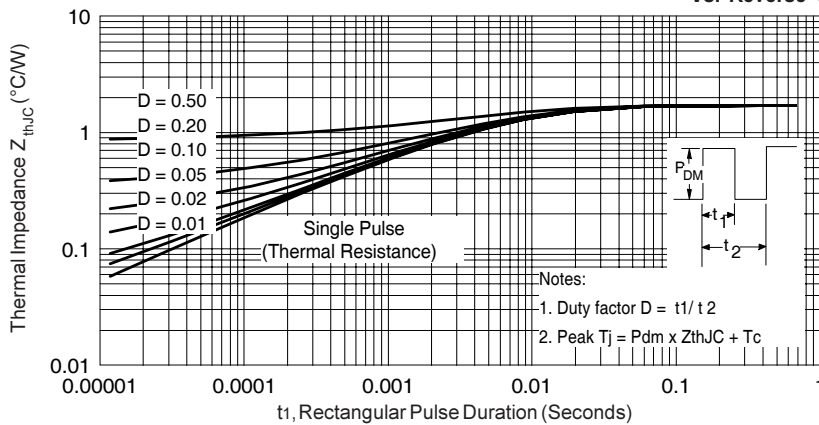


Fig. 4 - Max. Thermal Impedance Z_{thJC} Characteristics

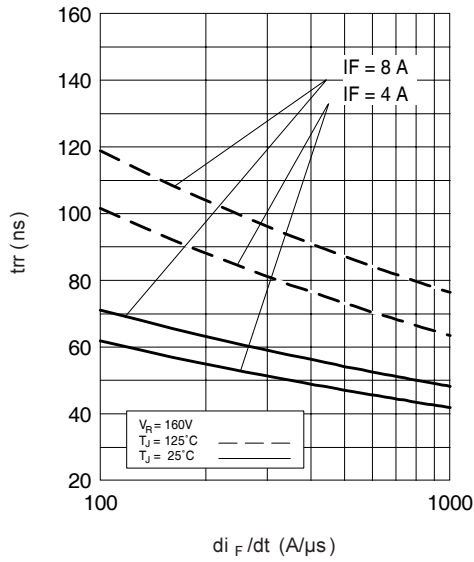


Fig. 5 - Typical Reverse Recovery Vs. di_f/dt

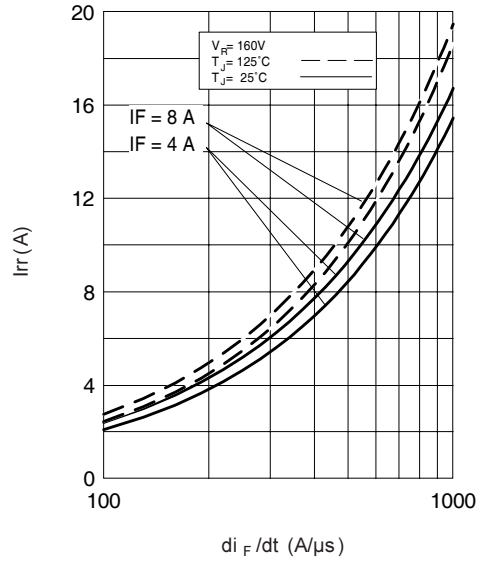


Fig. 6 - Typical Recovery Current Vs. di_f/dt

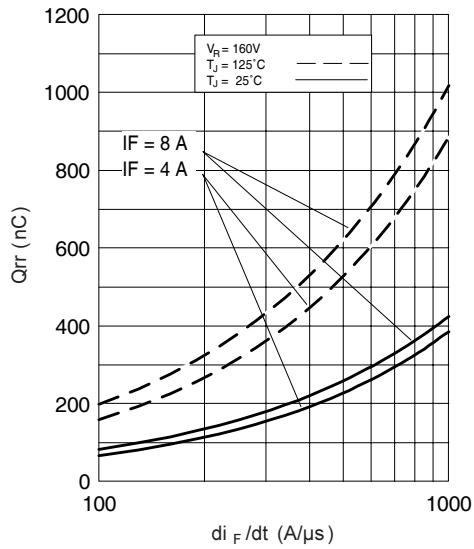


Fig. 8 - Typical Stored Charge vs. di_f/dt

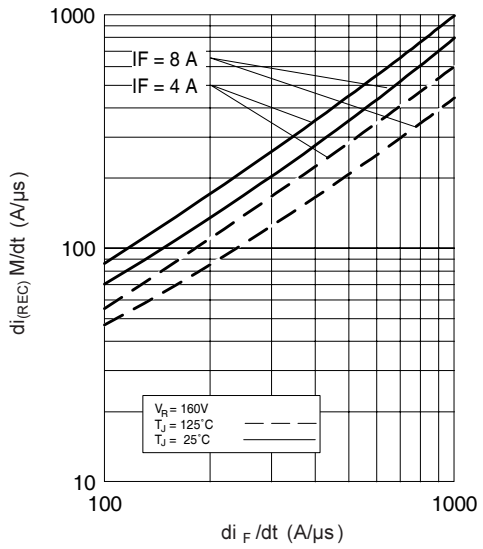


Fig. 7 - Typical $di_{(REC)} M/dt$ vs. di_f/dt

Reverse Recovery Circuit

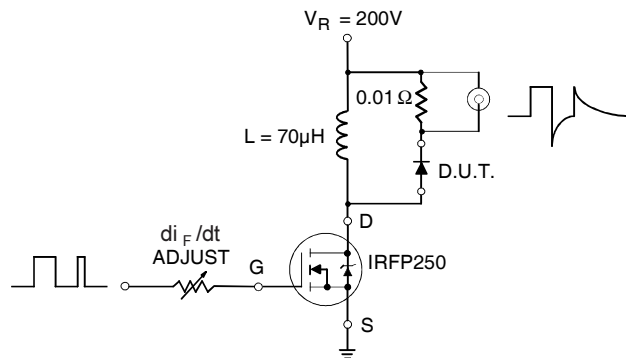
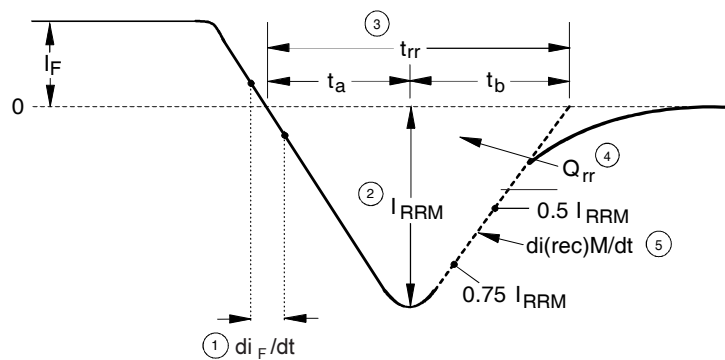


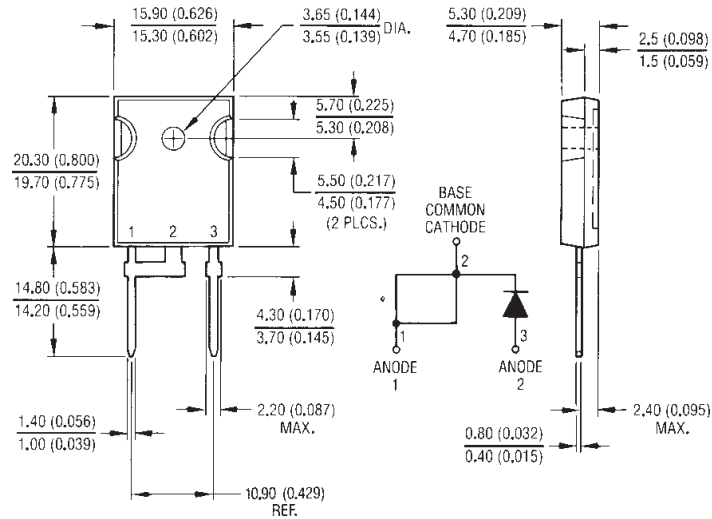
Fig. 9- Reverse Recovery Parameter Test Circuit



- | | |
|---|---|
| <p>1. di_F/dt - Rate of change of current through zero crossing</p> <p>2. I_{RRM} - Peak reverse recovery current</p> <p>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</p> | <p>4. Q_{rr} - Area under curve defined by t_{rr} and I_{RRM}</p> $Q_{rr} = \frac{t_{rr} \times I_{RRM}}{2}$ <p>5. $di_{(rec)M}/dt$ - Peak rate of change of current during t_b portion of t_{rr}</p> |
|---|---|

Fig. 10 - Reverse Recovery Waveform and Definitions

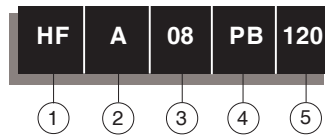
HFA08PB120PbF
Outline Table



Conforms to JEDEC Outline TO-247AC
Dimensions in millimeters and (inches)

Ordering Information Table

Device Code



- 1** - Hexfred Family
- 2** - Process Designator A = Electron Irradiated
B = Platinum Diffused
- 3** - Current Rating (08 = 8A)
- 4** - Package Outline (PB = TO-247, 2 pins)
- 5** - Voltage Rating (120 = 1200V)

Note: Marking "P" indicates Lead-Free.

Data and specifications subject to change without notice.