

International **IR** Rectifier HEXFRED™

PD-95737

HFA08TB60PbF

Ultrafast, Soft Recovery Diode

Features

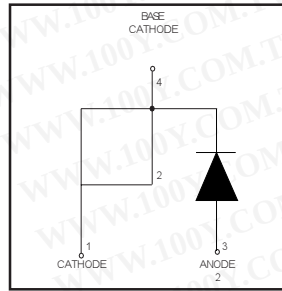
- Ultrafast Recovery
- Ultrasoft Recovery
- Very Low I_{RRM}
- Very Low Q_{rr}
- Specified at Operating Conditions
- Lead-Free

Benefits

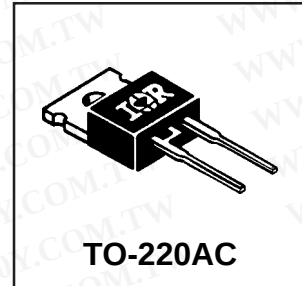
- Reduced RFI and EMI
- Reduced Power Loss in Diode and Switching Transistor
- Higher Frequency Operation
- Reduced Snubbing
- Reduced Parts Count

Description

International Rectifier's HFA08TB60 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 600 volts and 8 amps continuous current, the HFA08TB60 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 HFA08TB60 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.



$V_R = 600V$
$V_F(\text{typ.})^* = 1.4V$
$I_{F(AV)} = 8.0A$
$Q_{rr}(\text{typ.}) = 65nC$
$I_{RRM} = 5.0A$
$t_{rr}(\text{typ.}) = 18ns$
$di_{(rec)}/dt(\text{typ.}) = 240A/\mu s$



TO-220AC

Absolute Maximum Ratings

	Parameter	Max	Units
V_R	Cathode-to-Anode Voltage	600	V
$I_F @ T_C = 100^\circ C$	Continuous Forward Current	8.0	A
I_{FSM}	Single Pulse Forward Current	60	
I_{FRM}	Maximum Repetitive Forward Current	24	
$P_D @ T_C = 25^\circ C$	Maximum Power Dissipation	36	W
$P_D @ T_C = 100^\circ C$	Maximum Power Dissipation	14	
T_J T_{STG}	Operating Junction and Storage Temperature Range	- 55 to +150	C

* 125°C

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

	Parameter	Min	Typ	Max	Units	Test Conditions
V_{BR}	Cathode Anode Breakdown Voltage	600			V	$I_R = 100\mu\text{A}$
V_{FM}	Max Forward Voltage		1.4	1.7	V	$I_F = 8.0\text{A}$
			1.7	2.1		$I_F = 16\text{A}$ See Fig. 1
			1.4	1.7		$I_F = 8.0\text{A}, T_J = 125^\circ\text{C}$
I_{RM}	Max Reverse Leakage Current		0.3	5.0	μA	$V_R = V_R \text{ Rated}$ See Fig. 2
			100	500		$T_J = 125^\circ\text{C}, V_R = 0.8 \times V_R \text{ Rated}$
C_T	Junction Capacitance		10	25	pF	$V_R = 200\text{V}$ See Fig. 3
L_S	Series Inductance		8.0		nH	Measured lead to lead 5mm from package body

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

	Parameter	Min	Typ	Max	Units	Test Conditions
t_{rr}	Reverse Recovery Time		18			$I_F = 1.0\text{A}, di_F/dt = 200\text{A}/\mu\text{s}, V_R = 30\text{V}$
t_{rr1}	See Fig. 5, 6 & 16		37	55	ns	$T_J = 25^\circ\text{C}$
t_{rr2}			55	90		$T_J = 125^\circ\text{C}$
I_{RRM1}	Peak Recovery Current See Fig. 7 & 8		3.5	5.0	A	$T_J = 25^\circ\text{C}$
I_{RRM2}			4.5	8.0		$T_J = 125^\circ\text{C}$
Q_{rr1}	Reverse Recovery Charge See Fig. 9 & 10		65	138	nC	$T_J = 25^\circ\text{C}$
Q_{rr2}			124	360		$T_J = 125^\circ\text{C}$
$di_{(rec)M}/dt1$	Peak Rate of Fall of Recovery Current		240		A/ μs	$T_J = 25^\circ\text{C}$
$di_{(rec)M}/dt2$	During t_b See Fig. 11 & 12		210			$T_J = 125^\circ\text{C}$

Thermal - Mechanical Characteristics

	Parameter	Min	Typ	Max	Units
$T_{lead}^{①}$	Lead Temperature			300	$^\circ\text{C}$
R_{thJC}	Thermal Resistance, Junction to Case			3.5	K/W
$R_{thJA}^{②}$	Thermal Resistance, Junction to Ambient			80	
$R_{thCS}^{③}$	Thermal Resistance, Case to Heat Sink		0.5		
Wt	Weight		2.0		g
			0.07		(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

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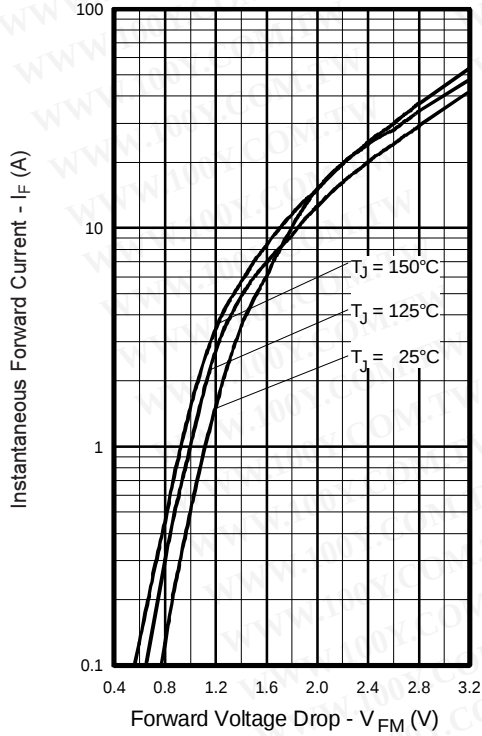


Fig. 1 - Maximum Forward Voltage Drop vs. Instantaneous Forward Current

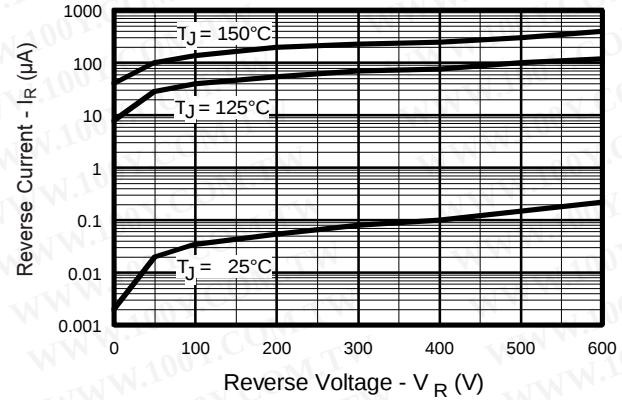


Fig. 2 - Typical Reverse Current vs. Reverse Voltage

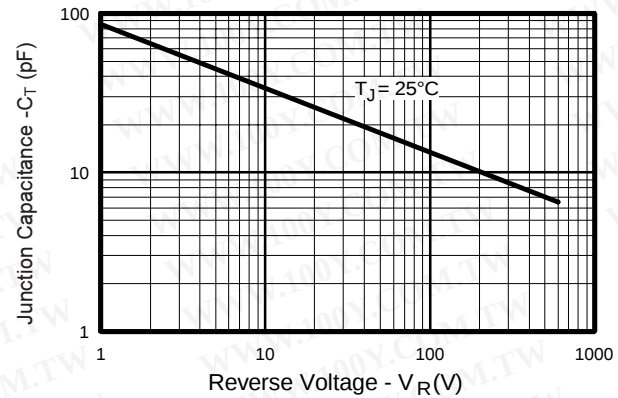


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

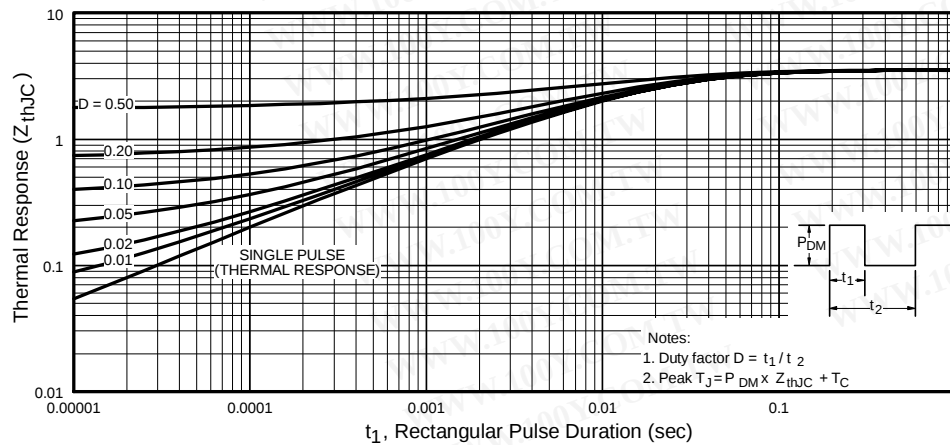


Fig. 4 - Maximum Thermal Impedance Z_{thjc} Characteristics

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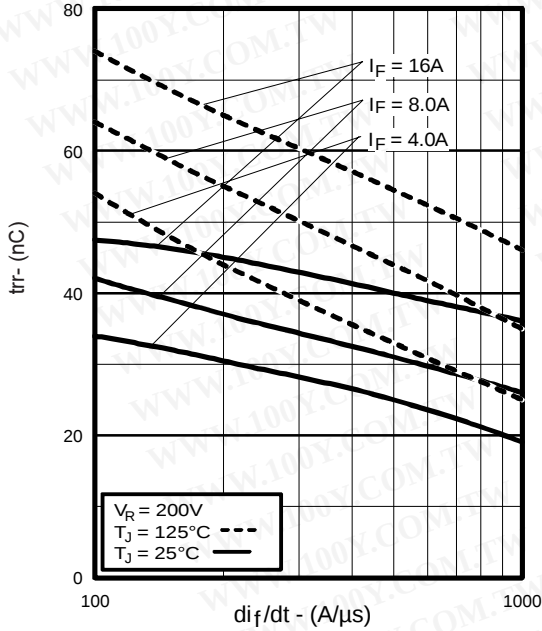


Fig. 5 - Typical Reverse Recovery vs. di_f/dt

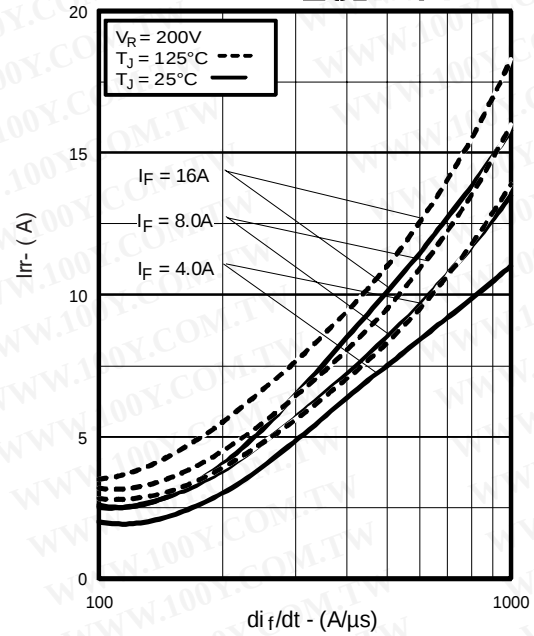


Fig. 6 - Typical Recovery Current vs. di_f/dt

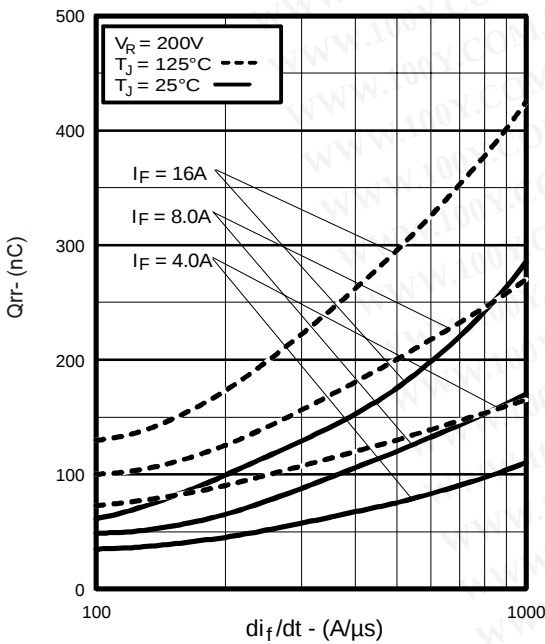


Fig. 7 - Typical Stored Charge vs. di_f/dt

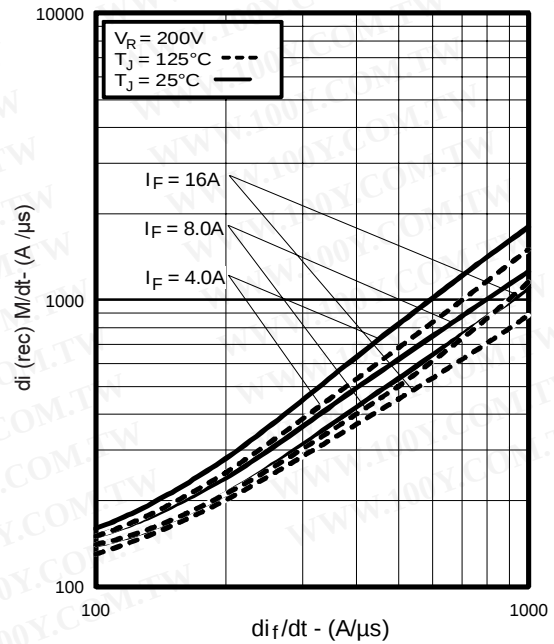


Fig. 8 - Typical $di_{(rec)}M/dt$ vs. di_f/dt

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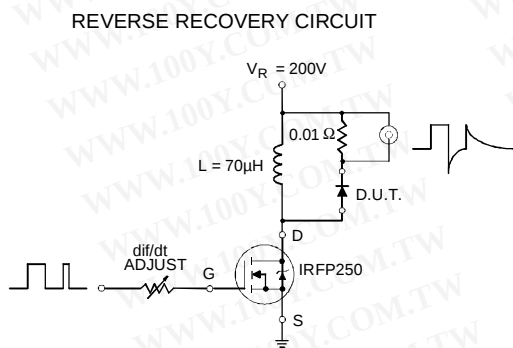
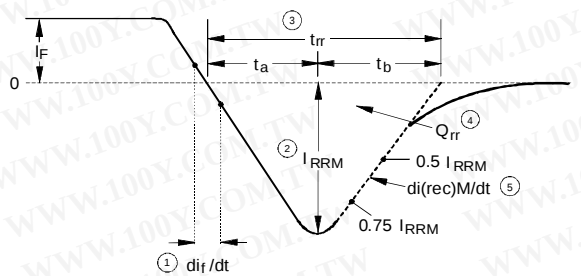


Fig. 9 - Reverse Recovery Parameter Test Circuit



1. di/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}
5. $di_{(rec)M}/dt$ - Peak rate of change of current during t_b portion of t_{rr}

$$Q_{rr} = \frac{t_{rr} \times I_{RRM}}{2}$$

Fig. 10 - Reverse Recovery Waveform and Definitions

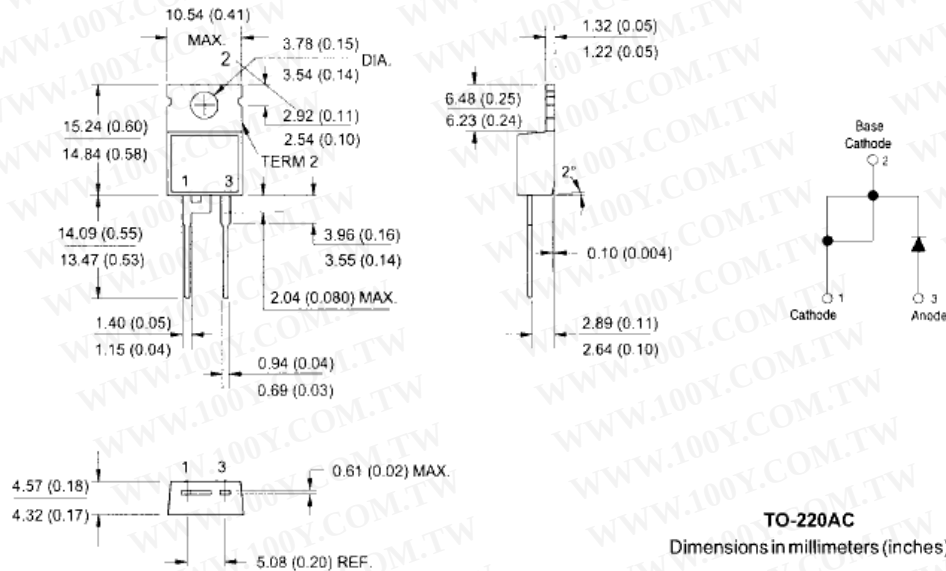
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TO-220AC Package Outline

Dimensions are shown in millimeters (inches)

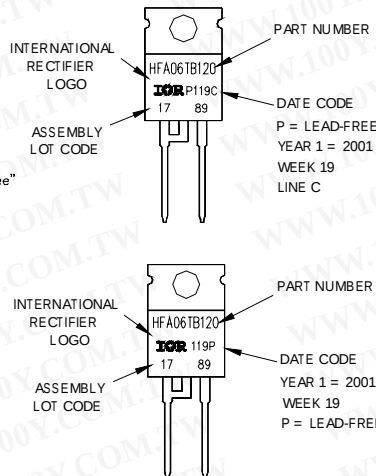


TO-220AC Part Marking Information

EXAMPLE: THIS IS A HFA06TB120
 LOT CODE 1789
 ASSEMBLED ON WW 19, 2001
 IN THE ASSEMBLY LINE "C"
 Note: "P" in the beginning of
 date code indicates "Lead-Free"

OR

EXAMPLE: THIS IS A HFA06TB120
 LOT CODE 1789
 ASSEMBLED ON WW 19, 2001
 IN THE ASSEMBLY LINE "C"
 Note: "P" in assembly line
 position indicates "Lead-Free"



Data and specifications subject to change without notice.

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