International
IOR Rectifier

HFA08TB60PbF

Ultrafast, Soft Recovery Diode

V_R	600	V
$V_{F(Max)}$	1.7	V
Qrr	65	nC
$D_{I\ (rec)M}/dt$	240	A/µs

HFA08TB60PbF

- Ultra fast Recovery
- Ultra soft Recovery
- Very Low IRRM
- Very Low Qrr
- 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 HFA08TB60PbF 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 per Leg continuous current, the HFA08TB60PbF is especially well suited for use as the companion diode for IGBTs and MOSFETs. In addition to ultra fast recovery time, the ultra fast recovery diode product line features extremely low values of peak recovery current (IRRM) and does not exhibit any tendency to "snap-off" during the tb portion of recovery. The ultra fast recovery diode features combine to offer designers a rectifier with lower noise and significantly lower switching losses in both the diode and the switching transistor. These ultra fast recovery diode advantages can help to significantly reduce snubbing, component count and heat sink sizes. The HFA08TB60PbF 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.

Base part number	Package Type	Standard Pack		Orderable Part Number
		Form	Quantity	
HFA08TB60PbF	TO-220AC	Tube	50	HFA08TB60PbF

Absolute Maximum Ratings

	Parameter	Max.	Units
V_R	Cathode -to – Anode Voltage	600	V
I_F @ T_C = 100°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°C	Maximum Power Dissipation	36	W
P_D @T_C = 100°C	Maximum Power Dissipation	14	
T_J T_{STG}	Operating Junction and Storage Temperature Range	-55 to + 150	°C

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

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

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

	Parameter	Min.	Typ.	Max.	Units	Conditions	
trr	Reverse Recovery Time See Fig. 5	——	18	——	ns	I_F = 1.0A, dif/dt = 200A/µs, V_R = 30V	
trr1		——	37	55		T_J = 25°C	I_F =8.0A
trr2		——	55	90		T_J = 125°C	V_R =200V
I_{RRM1}	Peak Recovery Current See Fig. 6	——	3.5	5.0	A	T_J = 25°C	di/dt = 200A/µs
I_{RRM2}		——	4.5	8.0		T_J = 125°C	
Q_{rr1}	Reverse Recovery Charge See Fig.7	——	65	138	nC	T_J = 25°C	
Q_{rr2}		——	124	360		T_J = 125°C	
$di_{(rec)M}/dt1$	Peak Rate of Fall of Recovery Current During tb See Fig.8	——	240	——	A/µs	T_J = 25°C	
$di_{(rec)M}/dt2$		——	210	——		T_J = 125°C	

Thermal Resistance

	Parameter	Min.	Typ.	Max.	Units
T_{lead} ①	Lead Temperature	——	——	300	°C/W
$R_{\theta JC}$	Thermal Resistance, Junction to Case	——	——	3.5	
$R_{\theta JA}$ ②	Thermal Resistance, Junction to Ambient	——	——	62	
$R_{\theta CS}$ ③	Thermal Resistance, Case to Heat Sink	——	0.50	——	
Wt	Weight	——	2.0	——	g
		——	0.07	——	(oz)
T	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

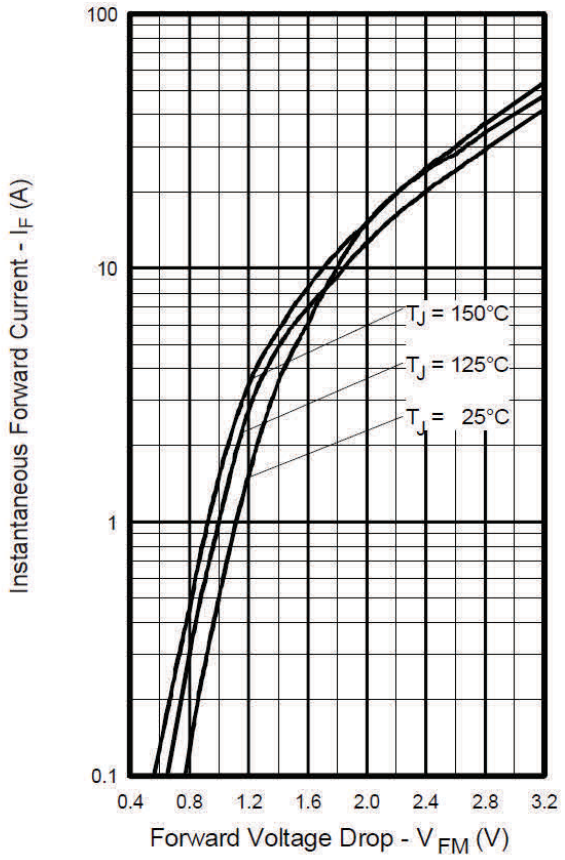


Fig. 1 - Maximum Forward Voltage Drop vs. Instantaneous Forward Current

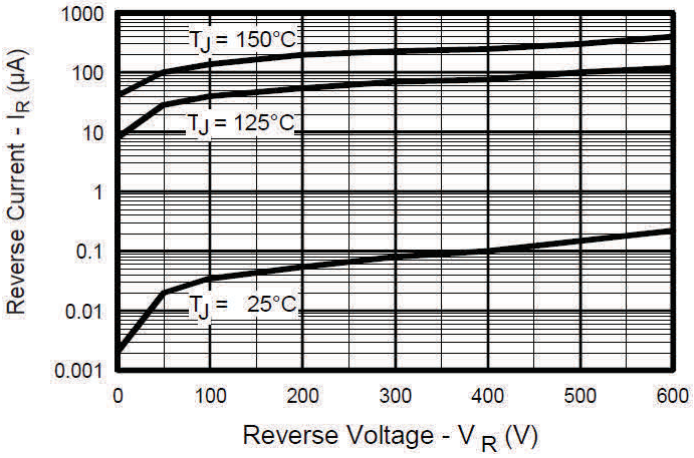


Fig. 2 - Typical Reverse Current vs. Reverse Voltage

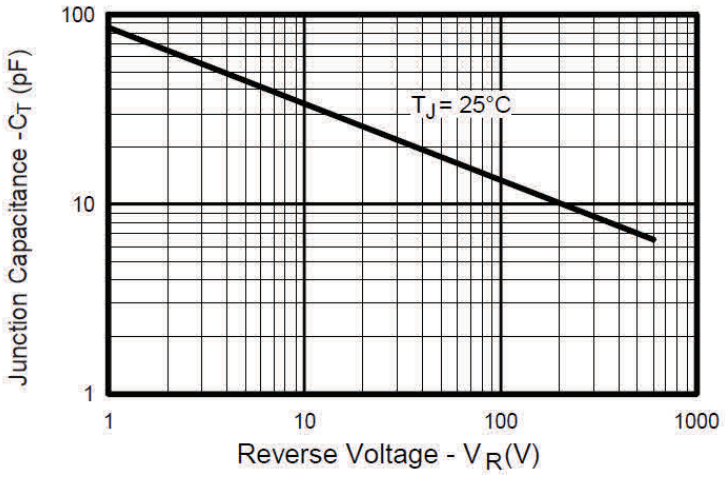


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

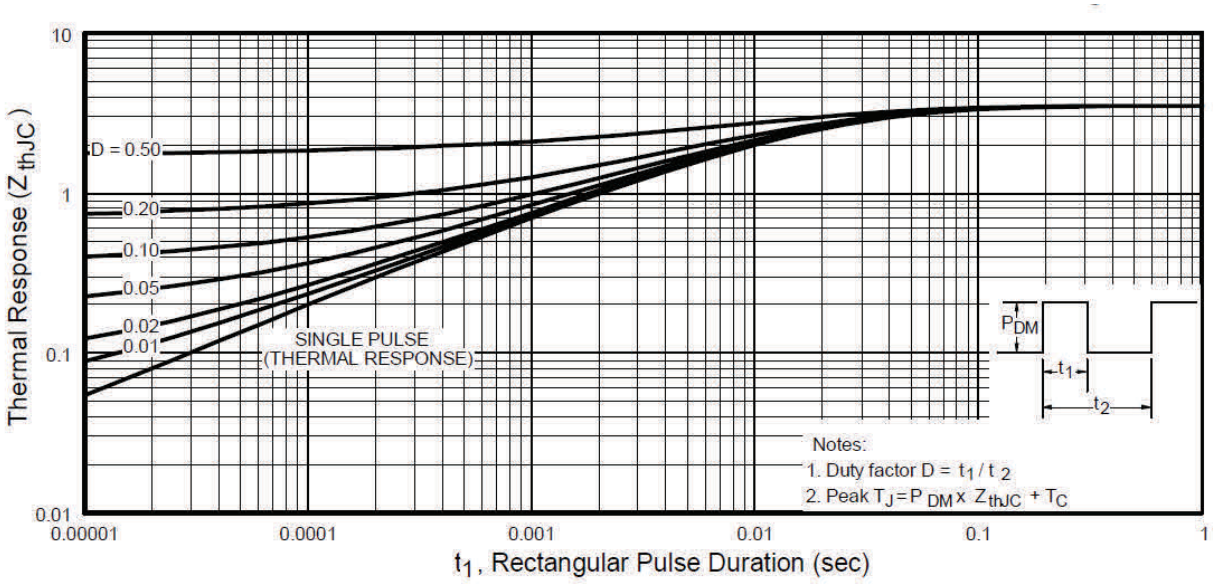


Fig. 4 - Maximum Thermal Impedance Z_{thjc} Characteristics

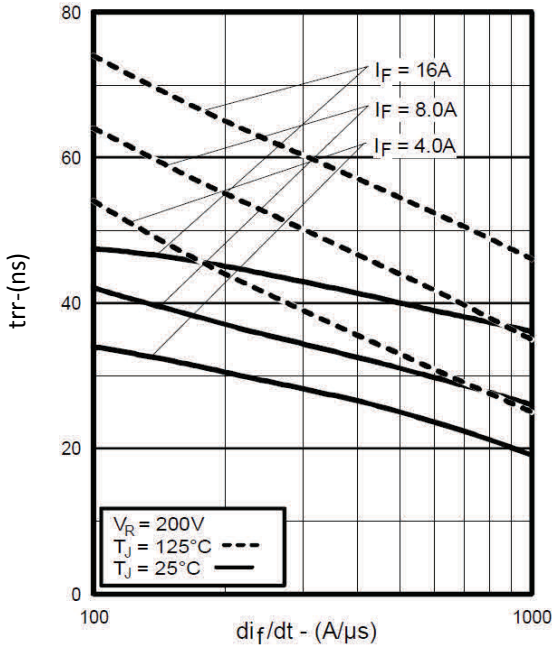


Fig. 5 - Typical Reverse Recovery vs. dif/dt

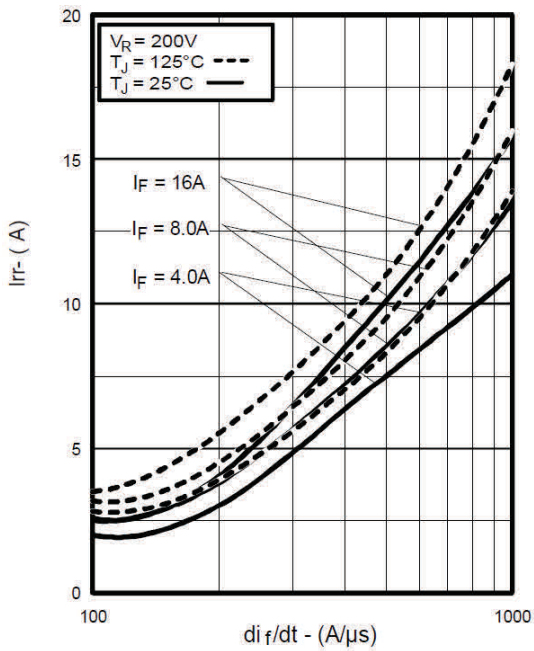


Fig. 6 - Typical Recovery Current vs. dif/dt

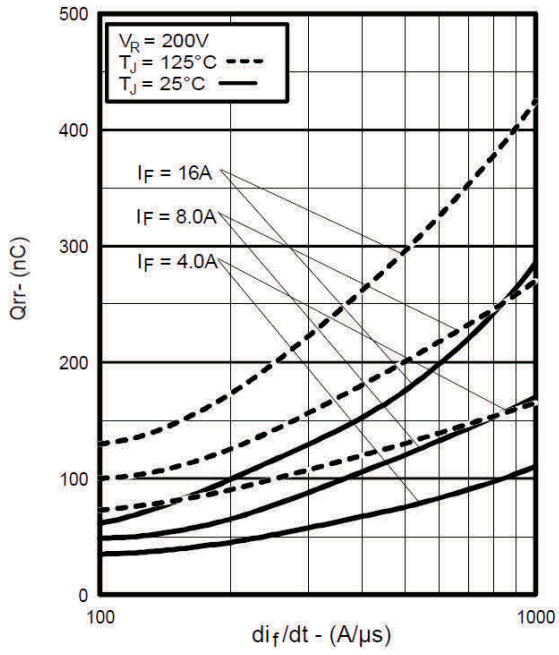


Fig. 7 - Typical Stored Charge vs. dif/dt

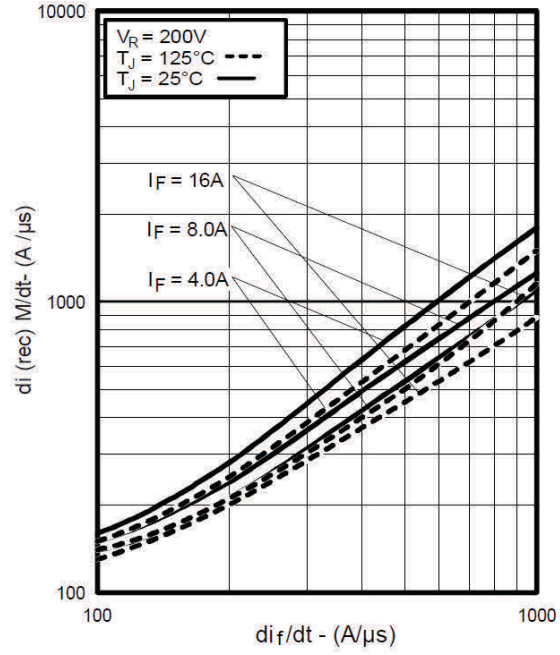


Fig. 8 - Typical $di_{(rec)M}/dt$ vs. dif/dt

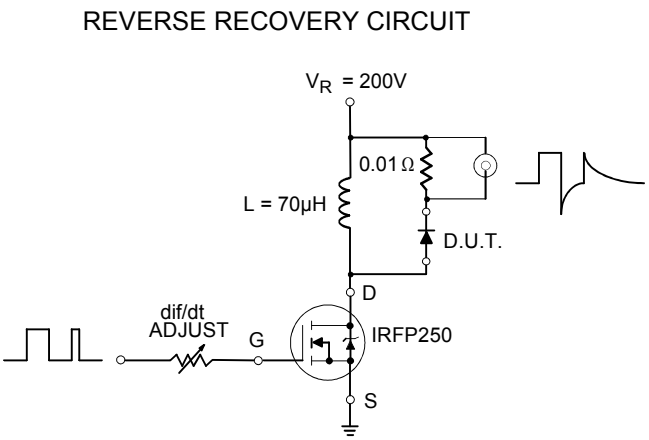
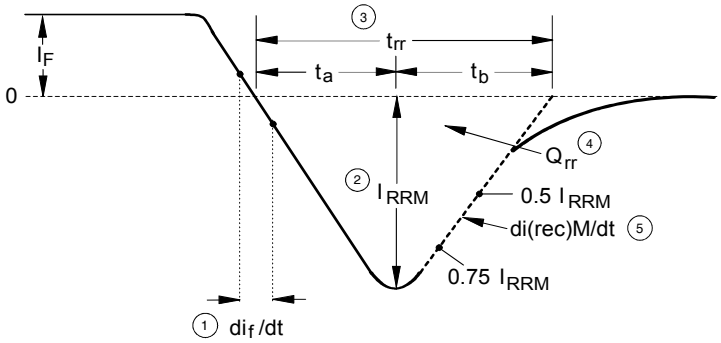


Fig. 9 - Reverse Recovery Parameter Test Circuit



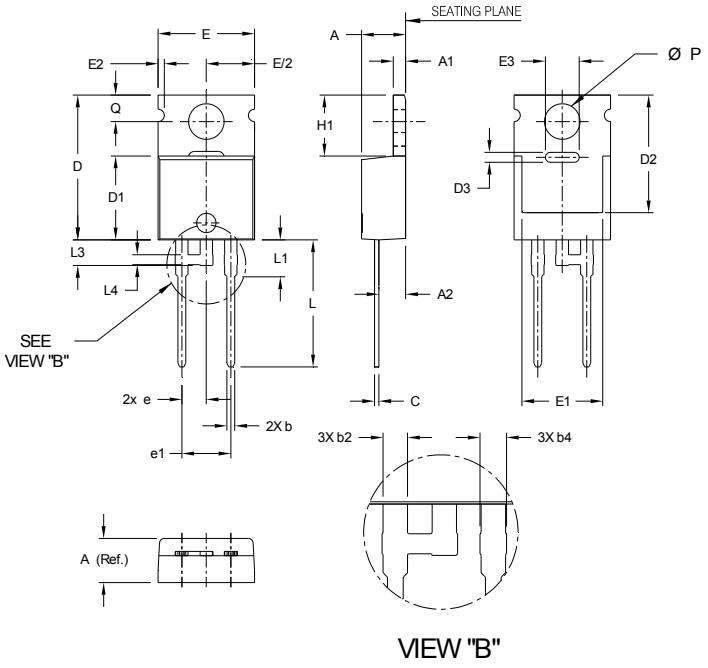
1. dif/dt - Rate of change of current through zero crossing
2. IRRM - Peak reverse recovery current
3. trr - Reverse recovery time measured from zero crossing point of negative going IF to point where a line passing through 0.75 IRRM and 0.50 IRRM extrapolated to zero current
4. Qrr - Area under curve defined by trr and IRRM

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

5. di(rec)M/dt - Peak rate of change of current during tb portion of trr

Fig. 10 - Reverse Recovery Waveform and Definitions

TO-220AC Package Outline (Dimensions are shown in millimeters (inches))

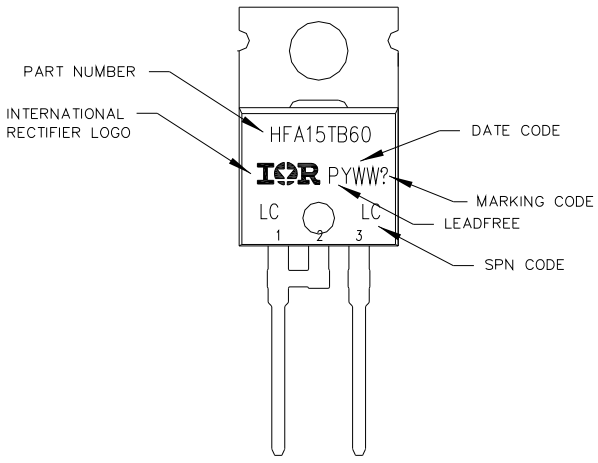


SYMBOL	MIN.	NOM.	MAX.
A	3.56	4.57	4.83
A1	1.14	1.27	1.40
A2	2.03	2.77	2.92
b	0.38	0.81	1.01
b2	1.17	1.27	1.37
b4	1.25	1.35	1.45
c	0.36	0.46	0.61
D	14.32	15.00	16.51
D1	8.38	8.69	9.02
D2	11.68	12.19	12.88
D3	0.82	1.02	1.22
E	9.65	10.00	10.67
E1	6.86	8.39	8.89
E2	--	--	0.76
E3	3.30	3.50	3.70
e	2.54 BASIC		
e1	5.08 BASIC		
H1	5.84	6.31	6.86
L	12.70	13.16	14.73
L1	3.56	3.83	4.06
L3	2.31	2.56	2.81
L4	0.76	1.01	1.27
øP	3.54	3.68	4.08
Q	2.54	2.74	3.42

NOTES:

1. DIMENSIONING AND TOLERANCING AS PER ASME Y14.5M 1994.
2. DIMENSIONS ARE SHOWN IN MILLIMETERS.

TO-220AC Part Marking Information



Note: For the most current drawing please refer to IR website at http://www.irf.com/package/

Qualification Information†

Qualification Level	Industrial (per JEDEC JESD47F) ††	
Moisture Sensitivity Level	TO-220AC	N/A
RoHS Compliant	Yes	

† Qualification standards can be found at International Rectifier's web site: http://www.irf.com/product-info/reliability/

†† Applicable version of JEDEC standard at the time of product release.

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