HFA35HB60

HEXFRED
ULTRAFAST, SOFT RECOVERY DIODE

V_R = 600V

V_F = 1.75V

Q_{rr} = 380nC

$di_{(rec)M}/dt$ = 400A/μs

Features

- Reduced RFI and EMI
- Reduced Snubbing
- Extensive Characterization of Recovery Parameters
- Hermetically Sealed
- Ceramic Eyelets

Description

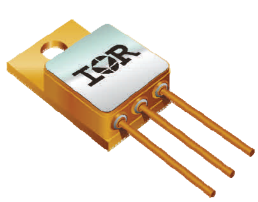
HFA35HB60 is part of the International Rectifier HiRel family of products. These diodes are optimized to reduce losses and EMI/RFI in high frequency power conditioning systems. An extensive characterization of the recovery behavior for different values of current, temperature and di/dt simplifies the calculations of losses in the operating conditions. The softness of the recovery eliminates the need for a snubber in most applications. These devices are ideally suited for power converters, motors drives and other applications where switching losses are significant portion of the total losses.

Absolute Maximum Ratings

Characteristics	Characteristics	Max.	Units
V_R	D.C. Reverse Voltage	600	V
I_F @ T_C = 100°C	Continuous Forward Current ①	22	A
I_{FSM} @ T_C = 25°C	Single Pulse Forward Current ②	225	A
P_D @ T_C = 25°C	Maximum Power Dissipation	83	W
T_J, T_{STG}	Operating Junction and Storage Temperature Range	-55 to 150	°C

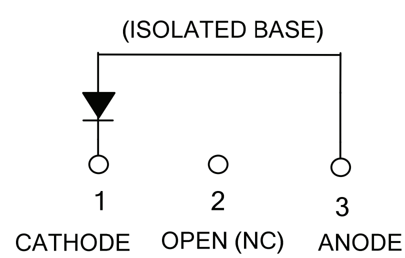
Notes:
① D.C. = 50% rectangle wave
② 1/2 sine wave, 60Hz, Pulse Width = 8.33ms

CASE STYLE



TO-254AA

PIN ASSIGNMENTS



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

	Parameter	Min.	Typ.	Max.	Units	Test Conditions
V_{BR}	Cathode Anode Breakdown Voltage	600	—	—	V	I_R = 100μA
V_{FM}	Max. Forward Voltage See Fig. 1	—	—	1.55	V	I_F = 22A, T_J = -55°C
		—	—	1.75		I_F = 22A, T_J = 25°C
		—	—	2.25		I_F = 45A, T_J = 25°C
		—	—	1.64		I_F = 22A, T_J = 125°C
I_{RM}	Max. Reverse Leakage Current	—	—	10	μA	$V_R = V_R$ Rated
	See Fig. 2			1.0	mA	V_R = 480V T_J = 125°C
C_T	Junction Capacitance, See Fig. 3	—	56	59	pF	V_R = 200V
L_S	Series Inductance	—	8.7	—	nH	Measured from center of bond pad to end of anode bonding wire

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

	Parameter	Min.	Typ.	Max.	Units	Test Conditions	
t_{rr1}	Reverse Recovery Time	—	60	97	ns	T_J = 25°C	I_F = 22A
t_{rr2}	See Fig. 5	—	110	165		T_J = 125°C	
I_{RRM1}	Peak Recovery Current	—	5.2	11	A	T_J = 25°C	V_R = 200V
I_{RRM2}	See Fig. 6	—	8.5	13		T_J = 125°C	
Q_{rr1}	Reverse Recovery Charge	—	190	380	nC	T_J = 25°C	di_f/dt = 200A/μs
Q_{rr2}	See Fig. 7	—	560	840		T_J = 125°C	
$di_{(rec)M}/dt1$	Peak Rate of Fall of Recovery Current	—	270	400	A/μs	T_J = 25°C	
$di_{(rec)M}/dt1$	During tb - See Fig. 8	—	170	250		T_J = 125°C	

Thermal - Mechanical Characteristics

	Parameter	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case, Single Leg Conducting	—	1.5	°C/W
Wt	Weight	9.3	—	g

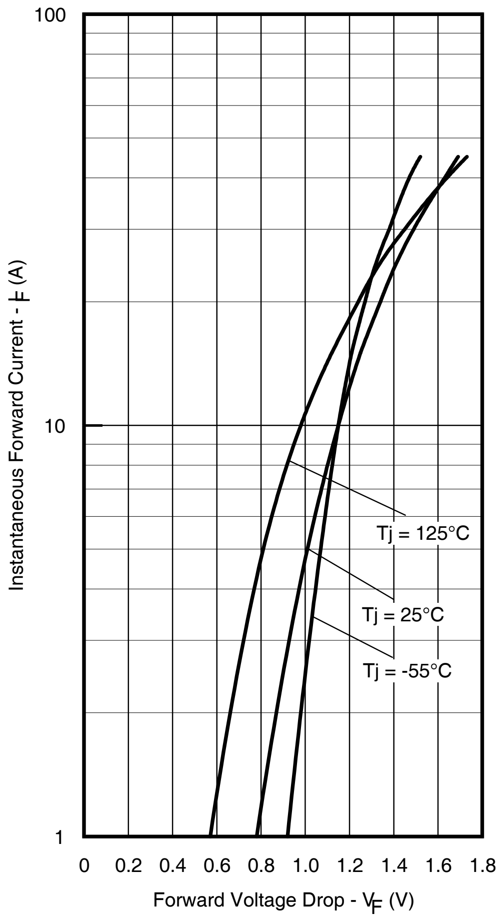


Fig. 1 Typical Forward Voltage Drop Vs. Instantaneous Forward Current

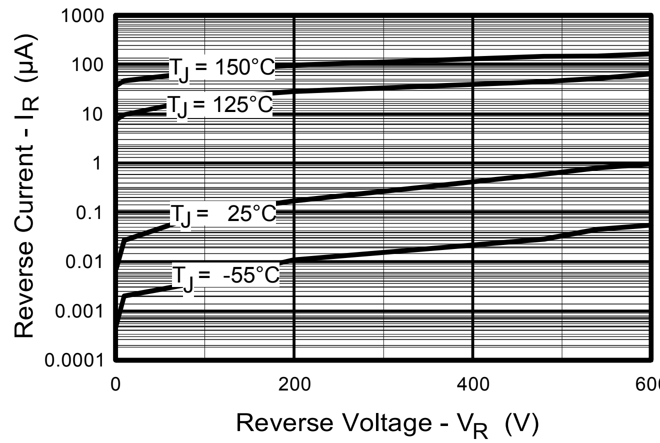


Fig. 2 Typical Values of Reverse Current Vs. Reverse Voltage

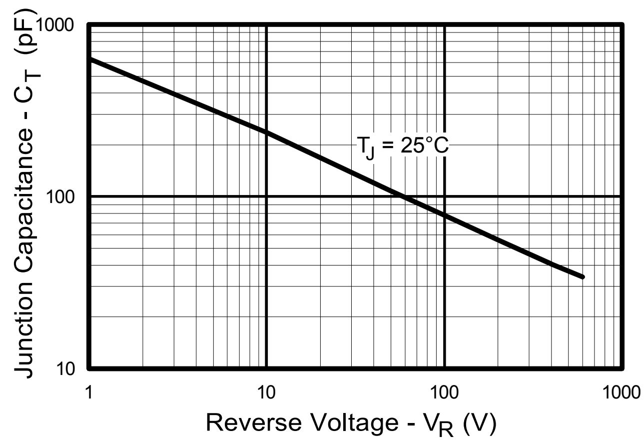


Fig. 3 Typical Junction Capacitance Vs. Reverse Voltage

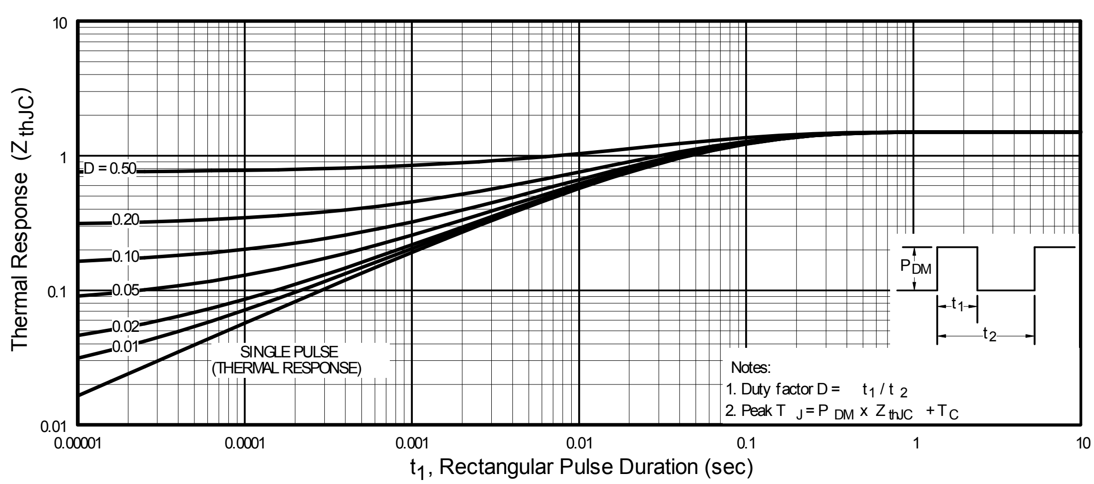


Fig. 4 Maximum Thermal Impedance Z_{thJC} Characteristics

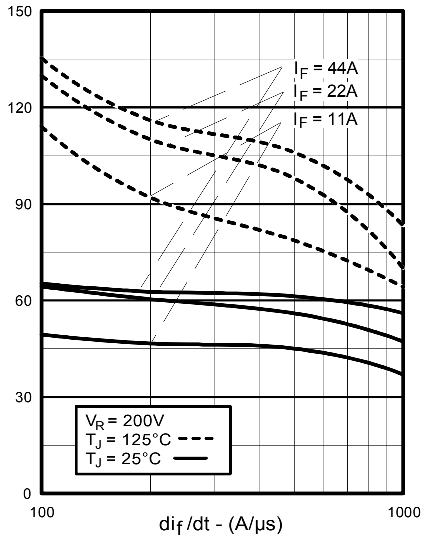


Fig. 5 Typical Reverse Recovery Vs di_f/dt

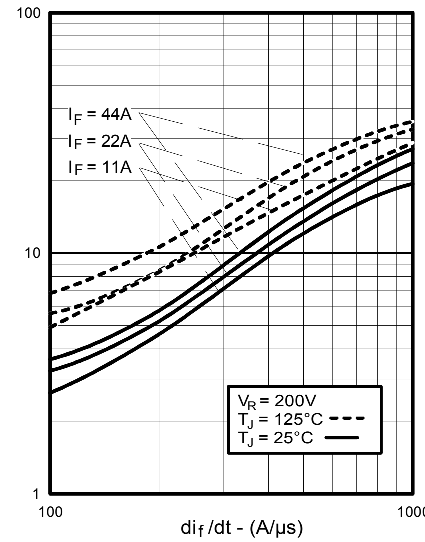


Fig. 6 Typical Recovery Current Vs di_f/dt

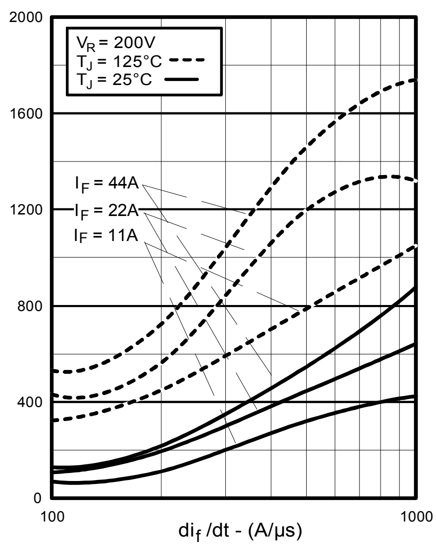


Fig. 7 Typical Stored Charge Vs di_f/dt

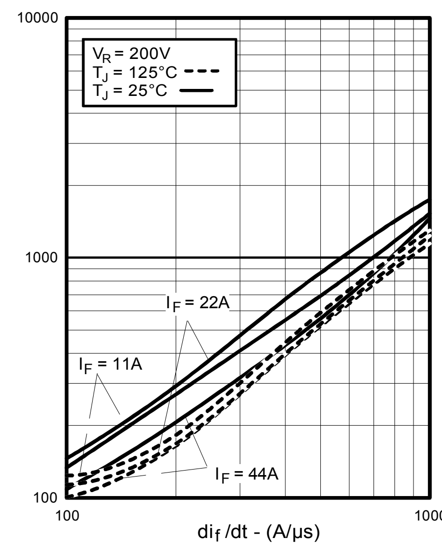


Fig. 8 Typical $di_{(rec)M}/dt$ Vs di_f/dt

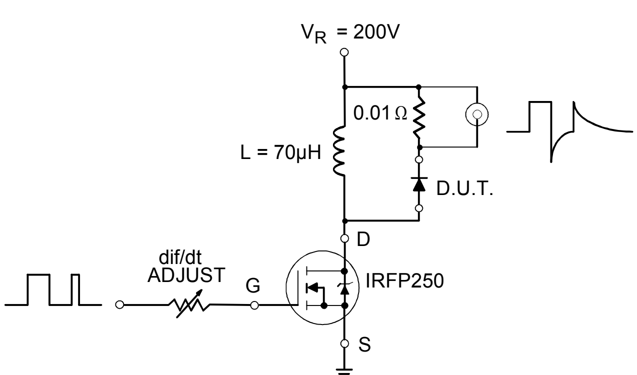
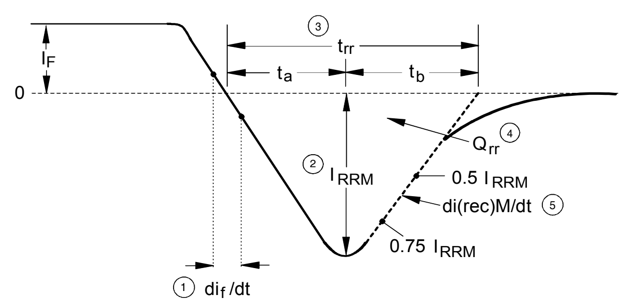


Fig. 9 Typical Reverse Recovery Parameter Test Circuit



① di_f/dt - Rate of change of current through zero crossing.

② I_{RRM} - Peak reverse recovery current.

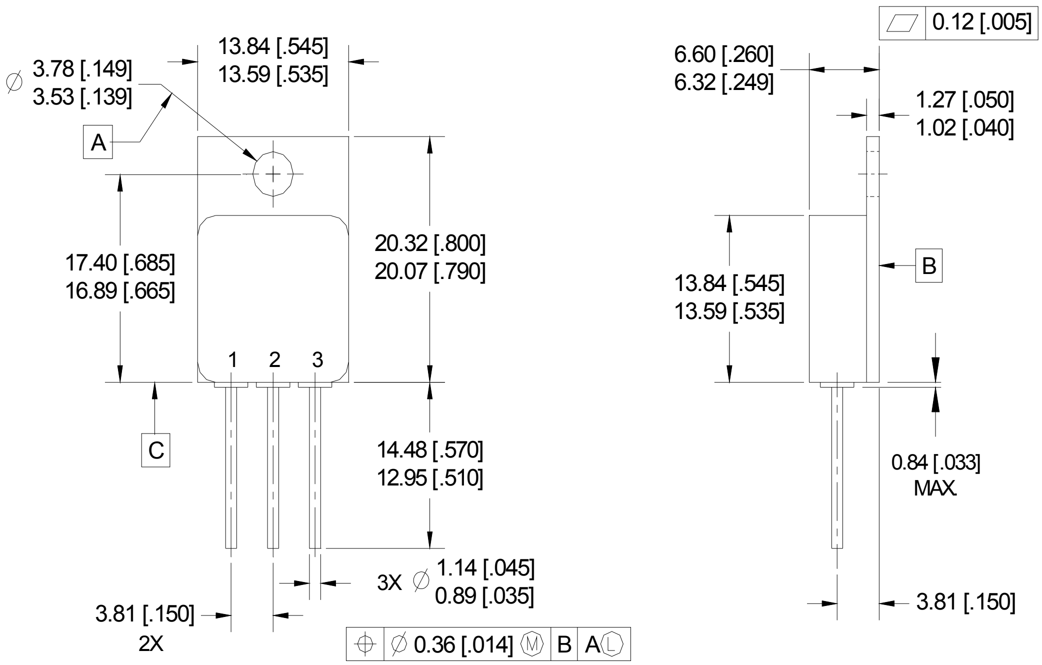
③ t_{rr} - Reverse recovery time measured from zero crossing point of negative going I_F to point where a line passing through $0.75I_{RRM}$ and $0.5I_{RRM}$ extrapolated to zero current.

④ Q_{rr} - Area under curve defined by t_{rr} and I_{RRM} - $Q_{rr} = (t_{rr} \times I_{RRM}) / 2$

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

Fig. 10 Reverse Recovery Waveform and Definitions

Case Outline and Dimensions — TO-254AA



NOTES:

1. DIMENSIONING & TOLERANCING PER ASME Y14.5M-1994.
2. ALL DIMENSIONS ARE SHOWN IN MILLIMETERS [INCHES].
3. CONTROLLING DIMENSION: INCH.
4. CONFORMS TO JEDEC OUTLINE TO-254AA.

PIN ASSIGNMENTS

Refer to page 1.

BERYLLIA WARNING PER MIL-PRF-19500

Package containing beryllia shall not be ground, sandblasted, machined, or have other operations performed on them which will produce beryllia or beryllium dust. Furthermore, beryllium oxide packages shall not be placed in acids that will produce fumes containing beryllium.

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