International
IOR Rectifier

PD-20370

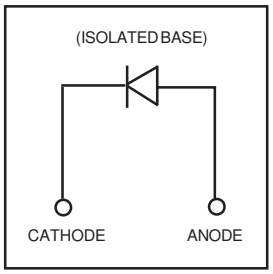
HFA35HB120

HEXFRED™

Ultrafast, Soft Recovery Diode

Features

- Reduced RFI and EMI
- Reduced Snubbing
- Extensive Characterization of Recovery Parameters
- Hermetic
- Electrically Isolated
- Ceramic Eyelets



V_R = 1200V

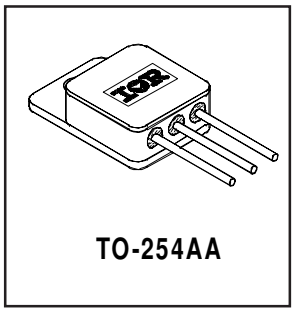
V_F = 3.1V

Q_{rr} = 510 nC

$di_{(rec)M}/dt$ = 350A/µs

Description

HEXFRED™ 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.



TO-254AA

Absolute Maximum Ratings (per Leg)

	Parameter	Max.	Units
V_R	D.C. Reverse Voltage	1200	V
I_F @ T_C = 100°C	Continuous Forward Current ①	11	A
I_{FSM} @ T_C = 25°C	Single Pulse Forward Current ②	190	
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

Thermal - Mechanical Characteristics

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

Note: ① D.C. = 50% rect. wave
② 1/2 sine wave, 60 Hz , P.W. = 8.33 ms

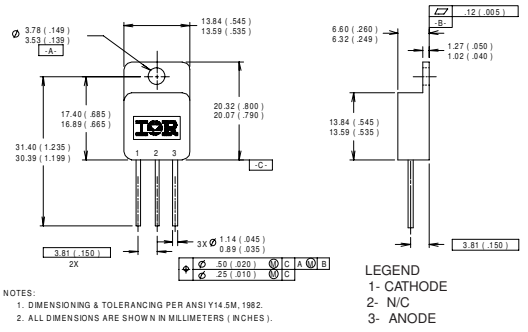
Electrical Characteristics (per Leg) @ T_J = 25°C (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Test Conditions	
V_{BR}	Cathode Anode Breakdown Voltage	1200	—	—	V	I_R = 100µA	
V_{FM}	Max Forward Voltage	—	—	3.1	V	I_F = 11A	
		—	—	4.0		I_F = 22A	See Fig. 1
		—	—	2.7		I_F = 11A, T_J = 125°C	
I_{RM}	Max Reverse Leakage Current	—	—	10	µA	V_R = V_R Rated	See Fig. 2
		—	—	1.0	mA	T_J = 125°C, V_R = 960V	
C_T	Junction Capacitance	—	28	42	pF	V_R = 200V	See Fig. 3
L_S	Series Inductance	—	8.7	—	nH	Measured from center of bond pad to end of anode bonding wire	

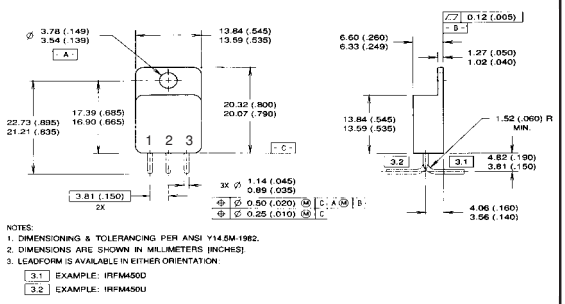
Dynamic Recovery Characteristics (per Leg) @ T_J = 25°C (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Test Conditions		
t_{rr1}	Reverse Recovery Time	—	80	120	ns	T_J = 25°C	See Fig.	I_F = 11A
t_{rr2}		—	130	195		T_J = 125°C	5	
I_{RRM1}	Peak Recovery Current	—	7.25	10.9	A	T_J = 25°C	See Fig.	
I_{RRM2}		—	10.2	15.3		T_J = 125°C	6	V_R = 200V
Q_{rr1}	Reverse Recovery Charge	—	340	510	nC	T_J = 25°C	See Fig.	
Q_{rr2}		—	825	1240		T_J = 125°C	7	di_f/dt = 200A/µs
$di_{(rec)M}/dt1$	Peak Rate of Fall of Recovery Current	—	230	350	A/µs	T_J = 25°C	See Fig.	
$di_{(rec)M}/dt2$	During t_b	—	160	240		T_J = 125°C	8	

Case Outline and Dimensions — TO-254AA



Conforms to JEDEC Outline TO-254AA
Dimensions in Millimeters and (Inches)



CAUTION
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.

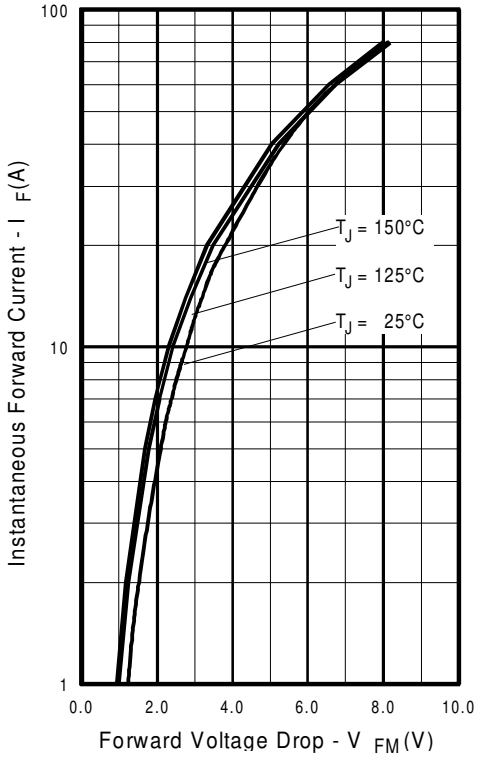


Fig. 1 - Maximum Forward Voltage Drop vs. Instantaneous Forward Current

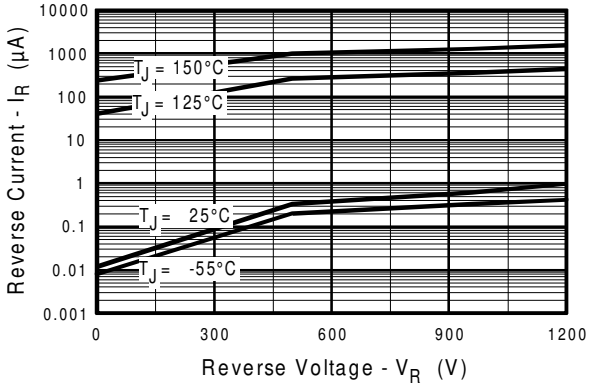


Fig. 2 - Typical Reverse Current vs. Reverse Voltage

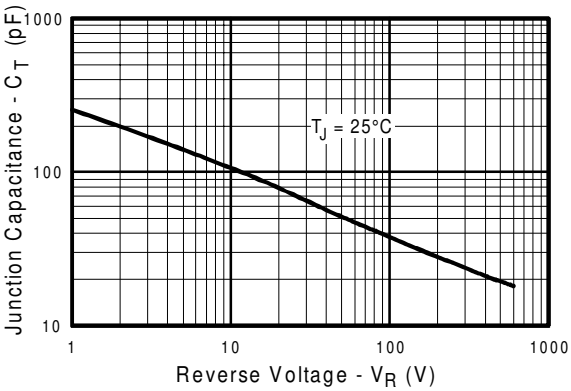


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

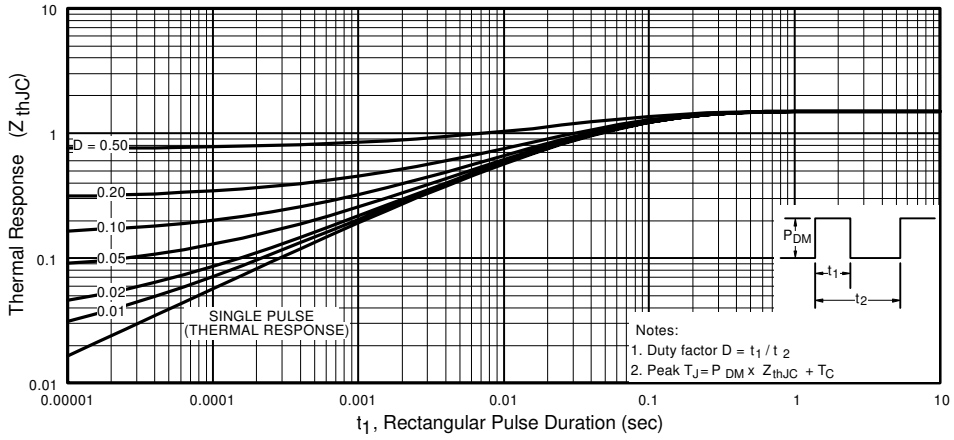


Fig. 4 - Maximum Thermal Impedance Z_{thjc} Characteristics

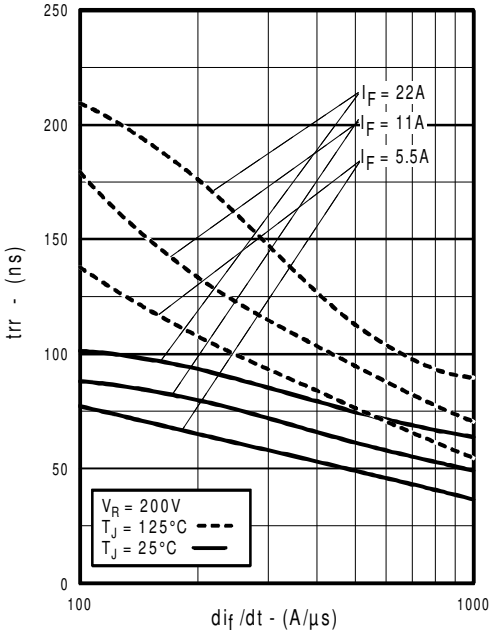


Fig. 5 - Typical Reverse Recovery vs. di_f/dt,

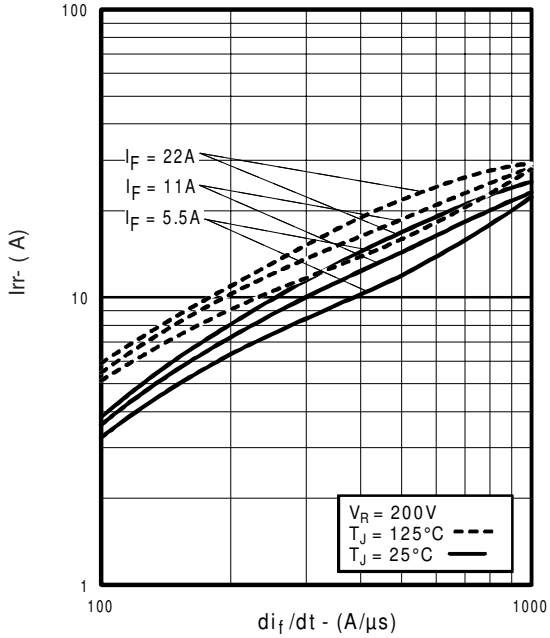


Fig. 6 - Typical Recovery Current vs. di_f/dt,

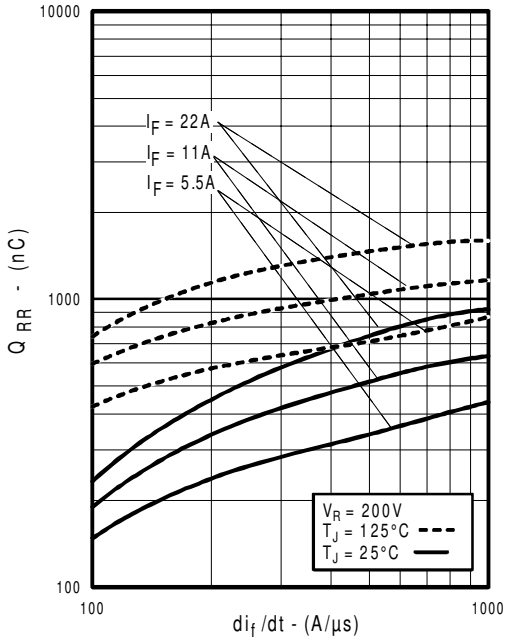


Fig. 7 - Typical Stored Charge vs. di_f/dt

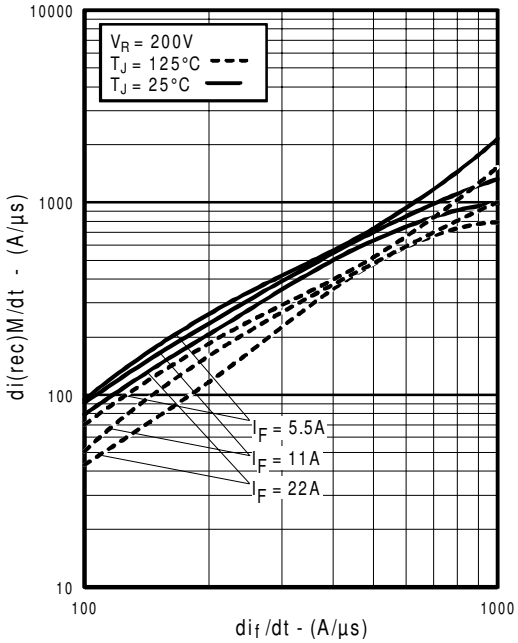


Fig. 8 - Typical $di_{(rec)M}/dt$ vs. di_f/dt

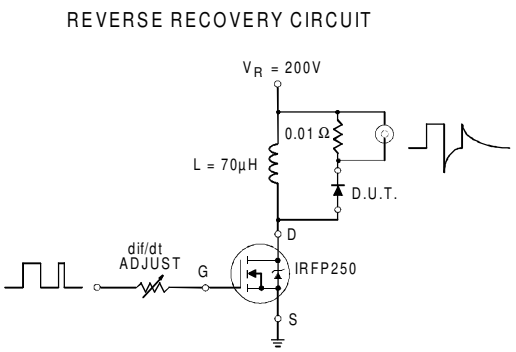
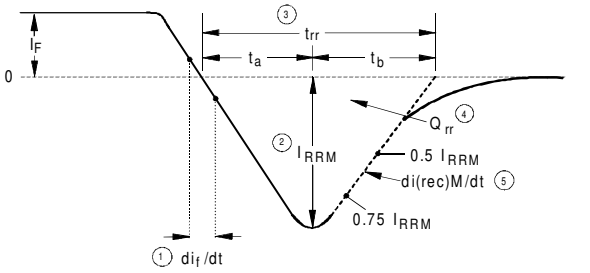


Fig. 9 - Reverse Recovery Parameter Test Circuit



1. di_f/dt - Rate of change of current through zero crossing
2. I_{RRM} - Peak reverse recovery current
3. trr - 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. 10 - Reverse Recovery Waveform and Definitions

International
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WORLD HEADQUARTERS: 233 Kansas St., El Segundo, California 90245, Tel: (310) 322 3331
IR GREAT BRITAIN: Hurst Green, Oxted, Surrey RH8 9BB, UK Tel: ++ 44 1883 732020
IR CANADA: 15 Lincoln Court, Brampton, Ontario L6T3Z2, Tel: (905) 453 2200
IR GERMANY: Saalburgstrasse 157, 61350 Bad Homburg Tel: ++ 49 6172 96590
IR ITALY: Via Liguria 49, 10071 Borgaro, Torino Tel: ++ 39 11 451 0111
IR FAR EAST: K&H Bldg., 2F, 30-4 Nishi-Ikebukuro 3-Chome, Toshima-Ku, Tokyo Japan 171 Tel: 81 3 3983 0086
IR SOUTHEAST ASIA: 1 Kim Seng Promenade, Great World City West Tower, 13-11, Singapore 237994 Tel: ++ 65 838 4630
IR TAIWAN:16 Fl. Suite D. 207, Sec. 2, Tun Haw South Road, Taipei, 10673, Taiwan Tel: 886-2-2377-9936
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