HFB35HB20

HEXFRED
ULTRAFAST, SOFT RECOVERY DIODE

V_R = 200V
$I_{F(AV)}$ = 35A
t_{rr} = 35ns

Features

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

Description

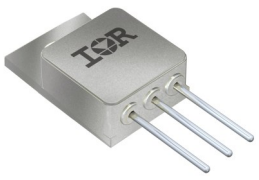
These diodes are optimized to reduce losses and EMI/RFI in high frequency power conditioning systems. An extensive characterization of the recovery behavior for different values of current, temperature and di/dt simplifies the calculations of losses in the operating conditions. The softness of the recovery 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	Parameter	Max.	Units
V_R	Cathode to Anode Voltage	200	V
$I_{F\ (AV)}$	Continuous Forward Current, T_C = 80°C ①	35	A
I_{FSM}	Single Pulse Forward Current , T_C = 25°C ②	150	A
P_D @ T_C = 25°C	Maximum Power Dissipation	125	W
T_J, T_{STG}	Operating Junction and Storage Temperature Range	-55 to 150	°C

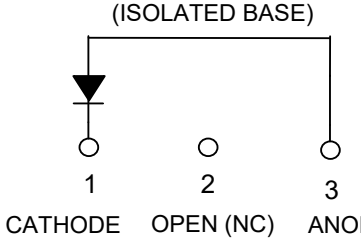
Notes:
① D.C. = 50% rectangle wave
② 1/2 sine wave, 60Hz, Pulse Width = 8.33ms

CASE STYLE



TO-254AA

PIN ASSIGNMENTS



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

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
V_{BR}	Cathode Anode Breakdown Voltage	200	—	—	V	I_R = 100µA
V_{FM}	Max Forward Voltage See Fig. 1	—	—	1.25	V	I_F = 20A, T_J = -55°C
		—	—	1.15		I_F = 20A, T_J = 25°C
		—	—	1.41		I_F = 35A, T_J = 25°C
		—	—	1.92		I_F = 70A, T_J = 25°C
		—	—	1.01		I_F = 20A, T_J = 125°C
I_{RM}	Max Reverse Leakage Current	—	—	10	µA	$V_R = V_R$ Rated
	See Fig. 2			1.0	mA	$V_R = V_R$ Rated, T_J = 125°C
C_T	Junction Capacitance, See Fig. 3	—	—	200	pF	V_R = 200V
L_S	Series Inductance	—	7.8	—	nH	Measured from anode lead to Cathode lead, 6mm (0.25 in) from package

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

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions	
t_{rr}	Reverse Recovery Time	—	—	35	ns	I_F = 1.0A, V_R = 30V, di_f/dt = 200A/µs	
t_{rr1}	Reverse Recovery Time	—	45	—	ns	T_J = 25°C	I_F = 35A
t_{rr2}	See Fig. 5	—	68	—		T_J = 125°C	
I_{RRM1}	Peak Recovery Current	—	3.3	—	A	T_J = 25°C	V_R = 160V
I_{RRM2}	See Fig. 6	—	7.6	—		T_J = 125°C	
Q_{rr1}	Reverse Recovery Charge	—	76	—	nC	T_J = 25°C	di_f/dt = 200A/µs
Q_{rr2}	See Fig. 7	—	270	—		T_J = 125°C	
$di_{(rec)M}/dt1$	Peak Rate of Fall of Recovery Current	—	236	—	A/µs	T_J = 25°C	
$di_{(rec)M}/dt1$	During tb - See Fig. 8	—	1020	—		T_J = 125°C	

Thermal - Mechanical Characteristics

Symbol	Parameter	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case, See Fig. 4	—	1.0	°C/W
Wt	Weight	9.3	—	g

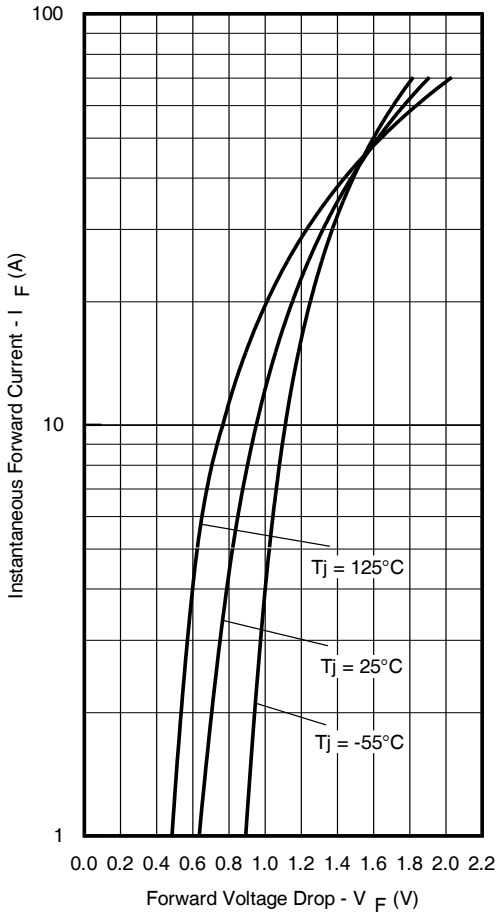


Fig. 1 Maximum Forward Voltage Drop Vs. Instantaneous Forward Current

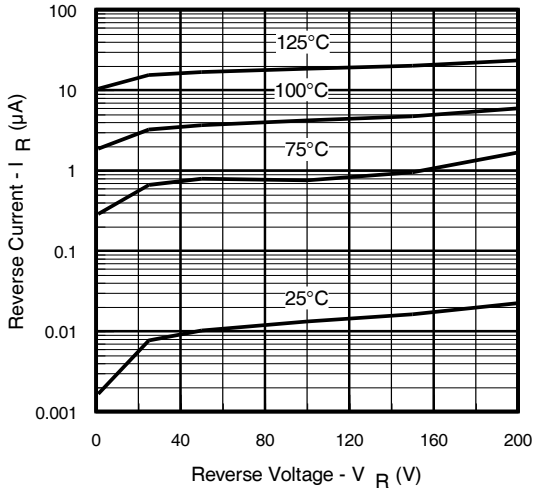


Fig. 2 Typical Values of Reverse Current

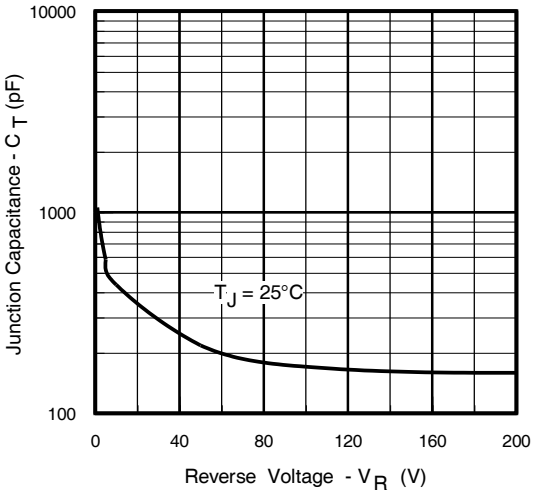


Fig. 3 Typical Junction Capacitance Vs. Reverse Voltage

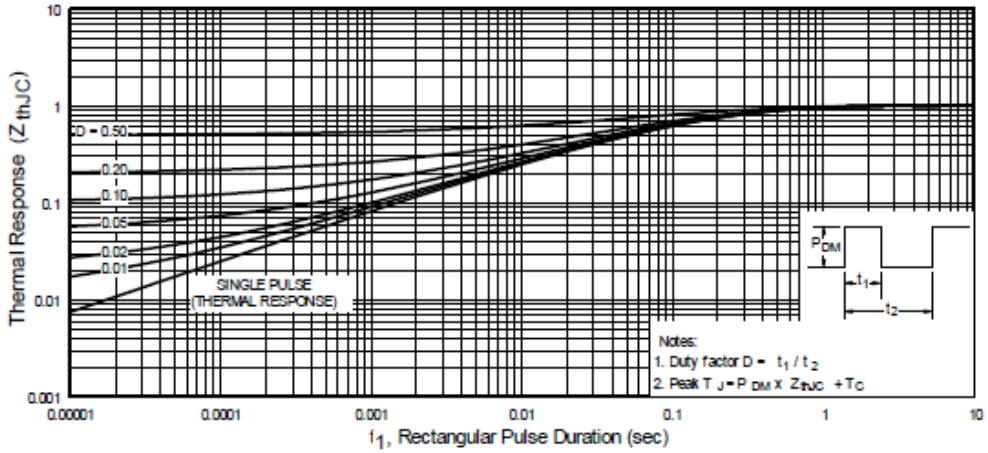


Fig. 4 Max. Thermal Impedance ZthJC Characteristics

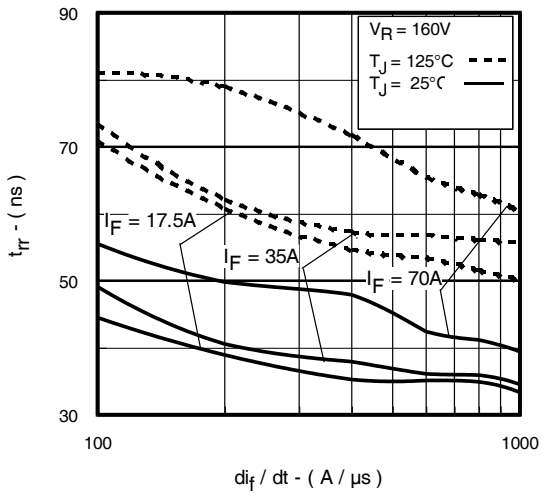


Fig. 5 Typical Reverse Recovery Vs di_f/dt

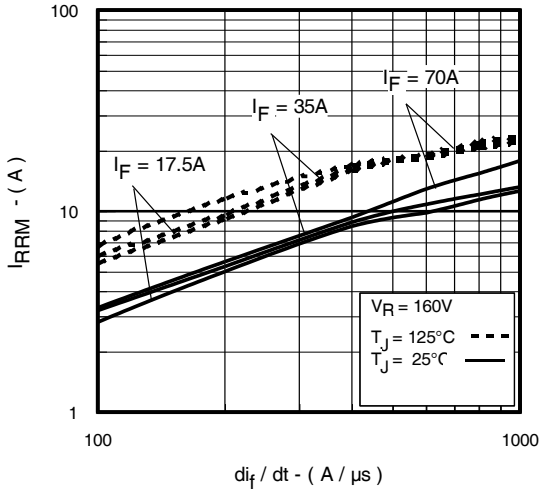


Fig. 6 Typical Recovery Current Vs di_f/dt

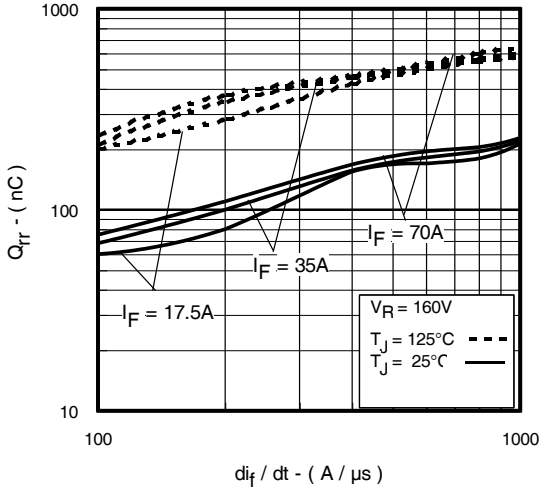


Fig. 7 Typical Stored Charge Vs di_f/dt

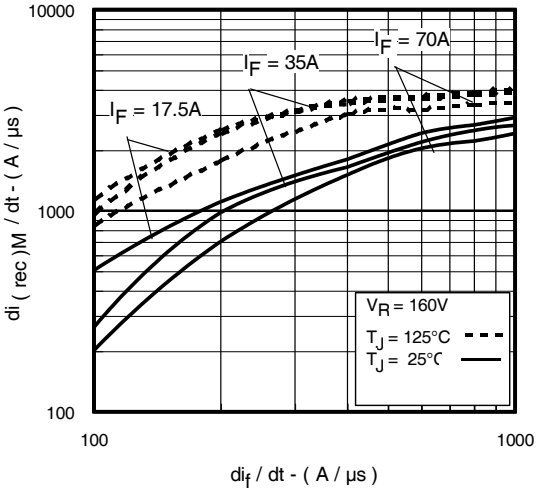


Fig. 8 Typical $di_{(rec)M}/dt$ Vs di_f/dt

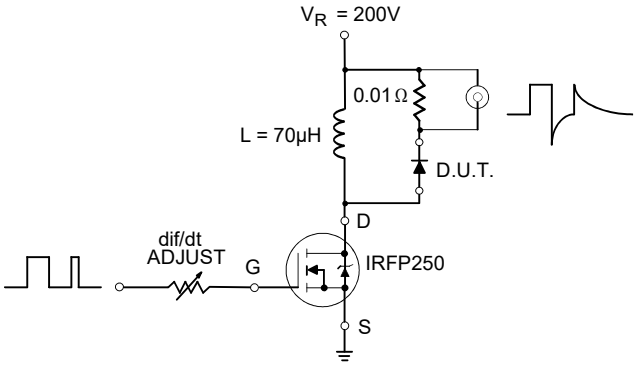
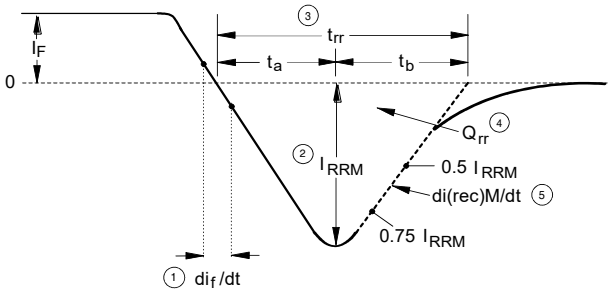


Fig. 9 Typical Reverse Recovery Parameter Test Cir-

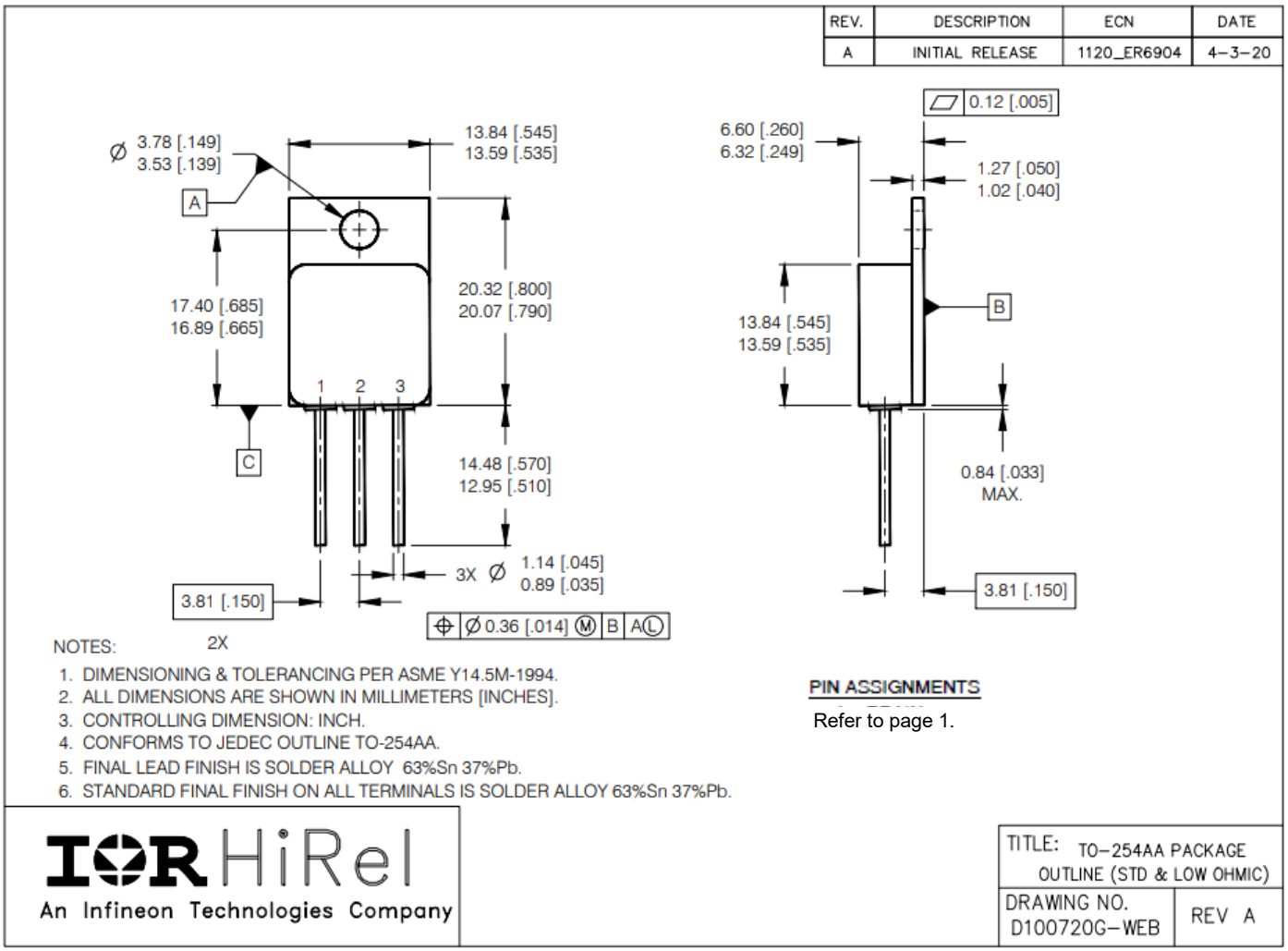


① di_f/dt - Rate of change of current through zero crossing.
② I_{RRM} - Peak reverse recovery current.
③ t_{rr} - Reverse recovery time measured from zero crossing point of negative going I_F to point where a line passing through 0.75I_{RRM} and 0.5I_{RRM} extrapolated to zero current.
④ Q_{rr} - Area 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

Note: For the most updated package outline, please see the website: TO-254AA

Case Outline and Dimensions - Low-Ohmic TO-254AA



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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