HFB35HB20C

PD-94326B

Ultrafast, Soft Recovery Diode
Thru-Hole (TO-254AA)
200V, 35A

Features

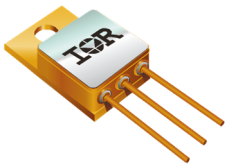
- Reduced RFI and EMI
- Reduced snubbing
- Extensive characterization of recovery parameters
- Hermetic package

Product Summary

- **Part number:** HFB35HB20C
- **$I_{F(AV)}$:** 35A
- **V_{RRM} (per leg):** 200V
- **t_{rr} :** 35ns
- **I_{FSM} @ t_p = 8.33ms half-sine (per leg) :** 150A

Potential Applications

- DC-DC converter
- Motor drives



TO-254AA

Product Validation

Qualified according to MIL-PRF-19500 for space applications

Description

These ultrafast, soft recovery 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.

Ordering Information

Table 1 Ordering options

Part number	Package	Screening Level
HFB35HB20C	TO-254AA	COTS
HFB35HB20CSCV	TO-254AA	JANTXV-equivalent
HFB35HB20CSCX	TO-254AA	JANTX-equivalent
HFB35HB20CSCS	TO-254AA	S-level

Table of contents

1 Absolute Maximum Ratings

Table 2 Absolute Maximum Ratings

Symbol	Parameter	Value	Unit
V_R	Cathode to anode voltage (per leg)	200	V
$I_{F(AV)}$	Continuous forward current, T_C =108 °C [1]	35	A
I_{FSM}	Single pulse forward current, T_C = 25°C (per leg) [2]	150	A
P_D @ T_C = 25°C	Maximum power dissipation	90	W
T_J T_{STG}	Operating Junction and Storage Temperature Range	-55 to 150	°C
Wt	Weight	9.3 (Typical)	g

[1] D.C. = 50% rect. wave

[2] ½ sine wave, 60 Hz, P.W. = 8.33 ms

2 Device Characteristics

2.1 Electrical Characteristics

Table 3 Electrical Characteristics

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
V_{BR}	Cathode Anode Breakdown Voltage	200	—	—	V	I_R = 100µA
V_F	Forward Voltage Drop (Per Leg) See Fig. 1	—	—	1.3	V	I_F = 17.5A, T_J = -55°C
		—	—	1.1	V	I_F = 17.5A, T_J = 25°C
		—	—	1.4	V	I_F = 35A, T_J = 25°C
		—	—	1.0	V	I_F = 17.5A, T_J = 125°C
I_R	Reverse Leakage Current (Per Leg) See Fig. 2	—	—	10	µA	V_R = V_R Rated
		—	—	50	µA	V_R = V_R Rated, T_J = 125°C
C_J	Junction Capacitance (Per Leg) See Fig. 3	—	—	150	pF	V_R = 200V
L_S	Series Inductance (Per Leg)	—	6.7	—	nH	Measured from anode lead to cathode lead , 6mm (0.025 in) from package

2.2 Dynamic Recovery Characteristics

Table 4 Dynamic Recovery Characteristics

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions	
t_{rr}	Reverse Recovery Time (Per Leg)	—	—	45	ns	I_F = 35A,V_R = 160V, d_{if}/dt = 200A/µs	
t_{rr1}	Reverse Recovery Time (Per Leg) See Fig. 5	—	28	—	ns	T_J = 25°C	I_F =35A V_R =160V d_{if}/dt = 200 A/ µs
t_{rr2}		—	46	—	ns	T_J = 125°C	
I_{RRM1}	Peak Recovery Current (Per Leg) See Fig. 6	—	4.0	—	A	T_J = 25°C	
I_{RRM2}		—	12.3	—	A	T_J = 125°C	
Q_{rr1}	Reverse Recovery Charge (Per Leg) See Fig. 7	—	66	—	nC	T_J = 25°C	
Q_{rr2}		—	190	—	nC	T_J = 125°C	
$di_{(rec)M}/dt1$	Peak Rate of Fall of Recovery Current During t_b (Per Leg) See Fig. 8	—	410	—	A/ µs	T_J = 25°C	
$di_{(rec)M}/dt2$		—	1740	—	A/ µs	T_J = 125°C	

2.3 Thermal-Mechanical Characteristics

Table 5 Thermal-Mechanical Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JC}$	Junction to Case, Single Leg Conducting	—	1.4	°C/W

3 Electrical Characteristics Curves

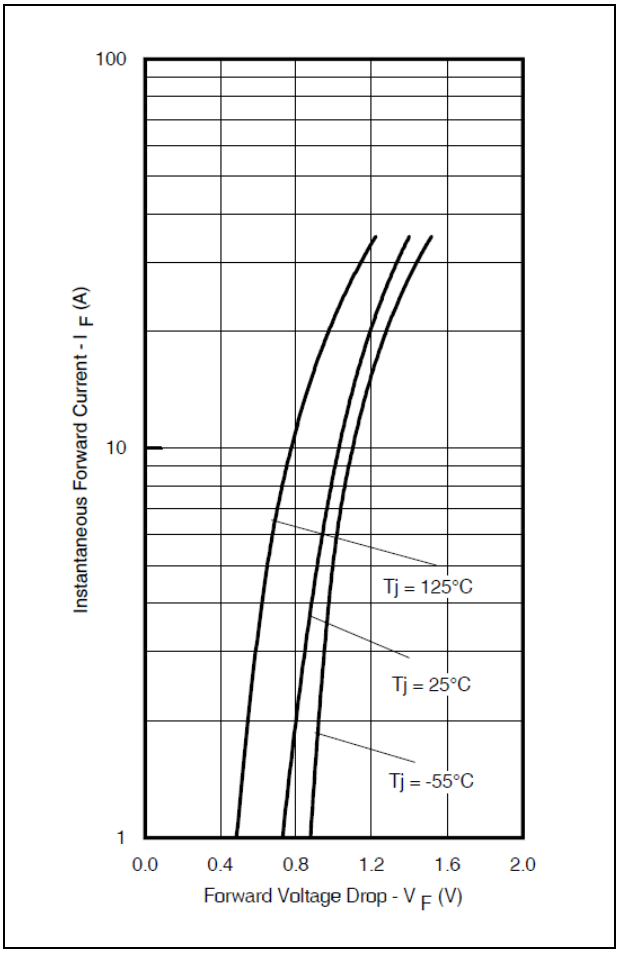


Figure 1 Maximum Forward Voltage Drop Characteristics (Per Leg)

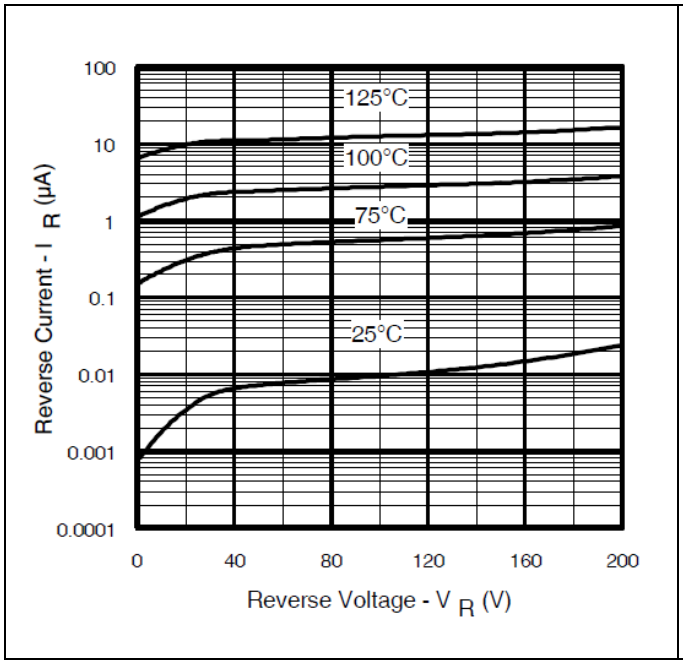


Figure 2 Typical Values of Reverse Current Vs. Reverse Voltage (Per Leg)

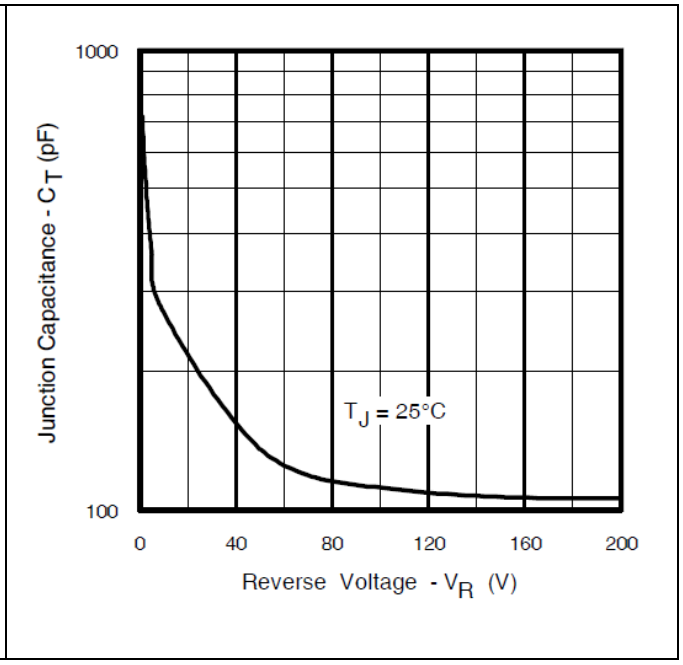


Figure 3 Typical Junction Capacitance Vs. Reverse Voltage (Per Leg)

Electrical Characteristics Curves

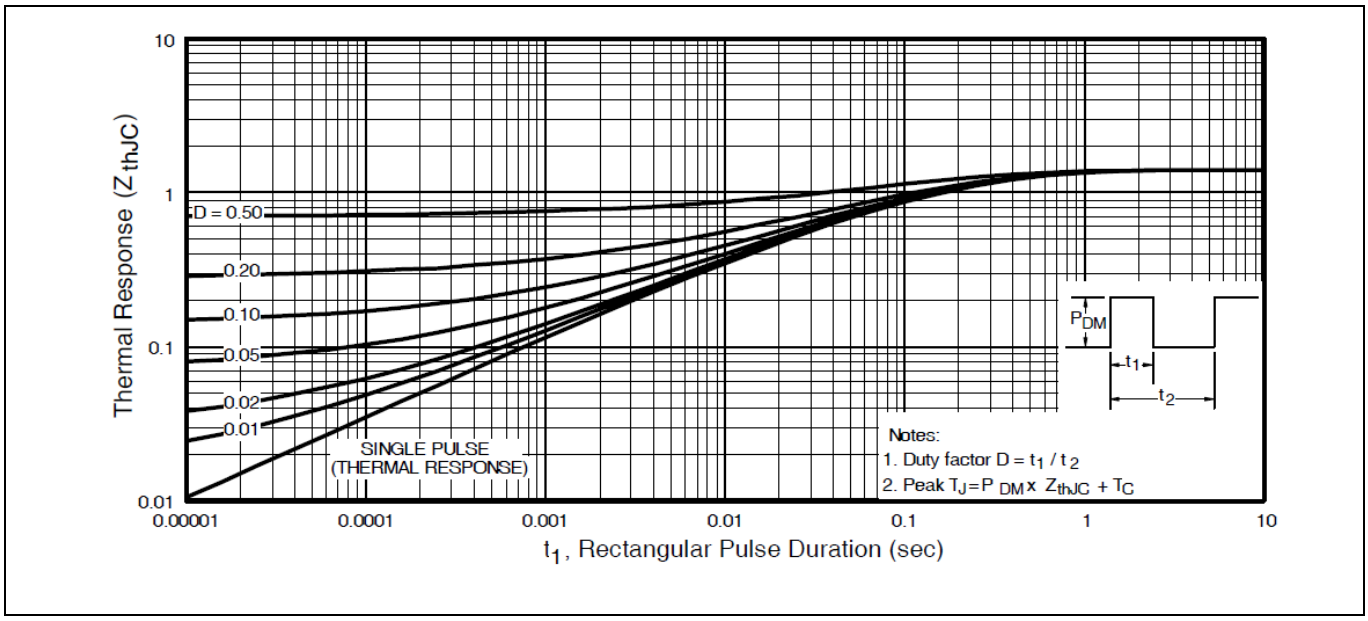


Figure 4 Maximum Thermal Impedance Z_{thJC} Characteristics (Per Leg)

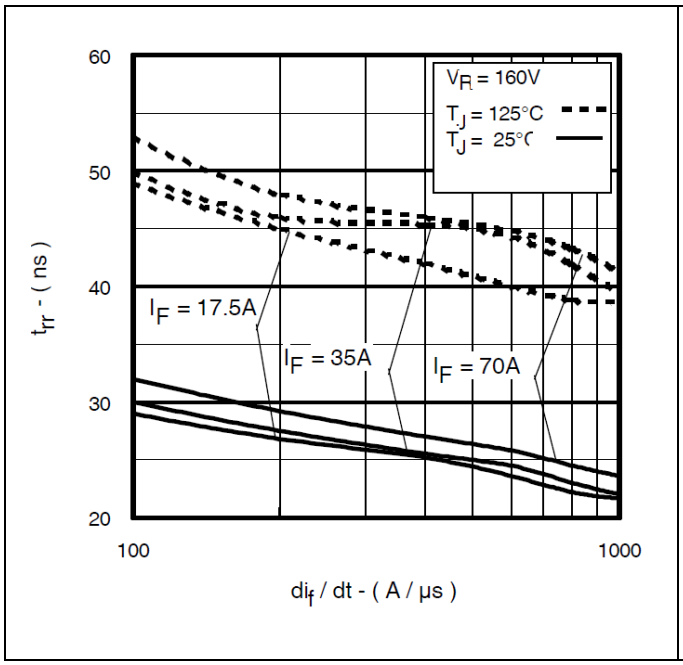


Figure 5 Typical Reverse Recovery Vs. dif/dt (Per Leg)

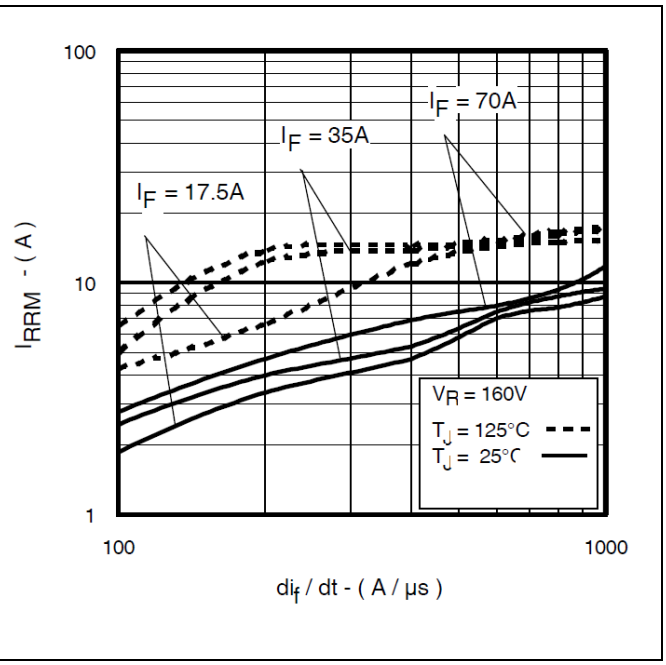


Figure 6 Typical Recovery Current Vs. dif/dt (Per Leg)

Electrical Characteristics Curves

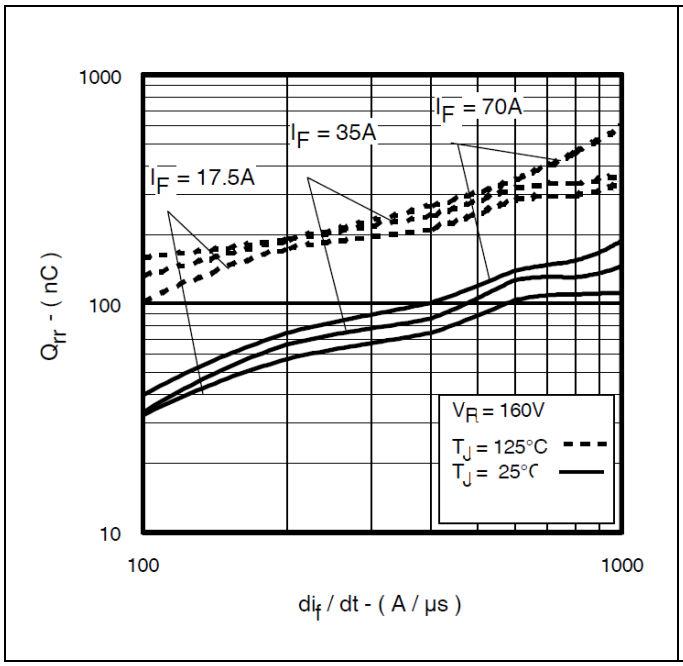


Figure 7 Typical Stored Charge Vs. dif/dt (Per Leg)

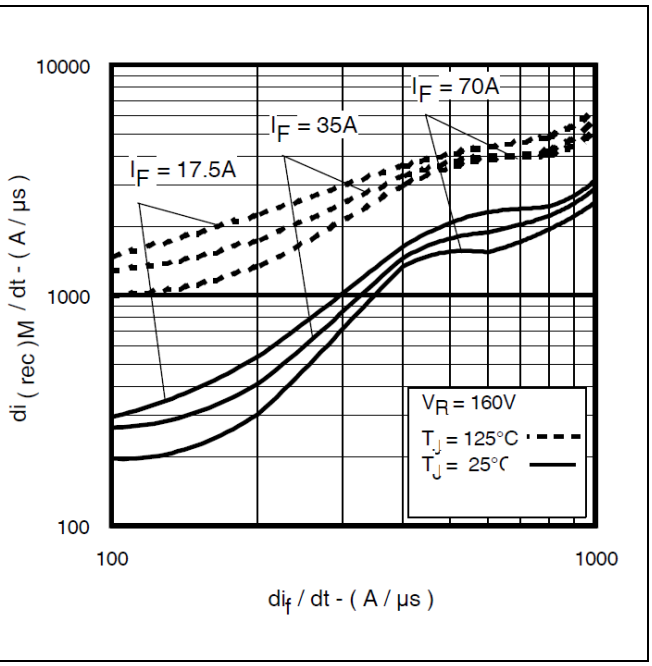


Figure 8 Typical di(rec)M/dt Vs. dif/dt (Per Leg)

4 Test Circuit

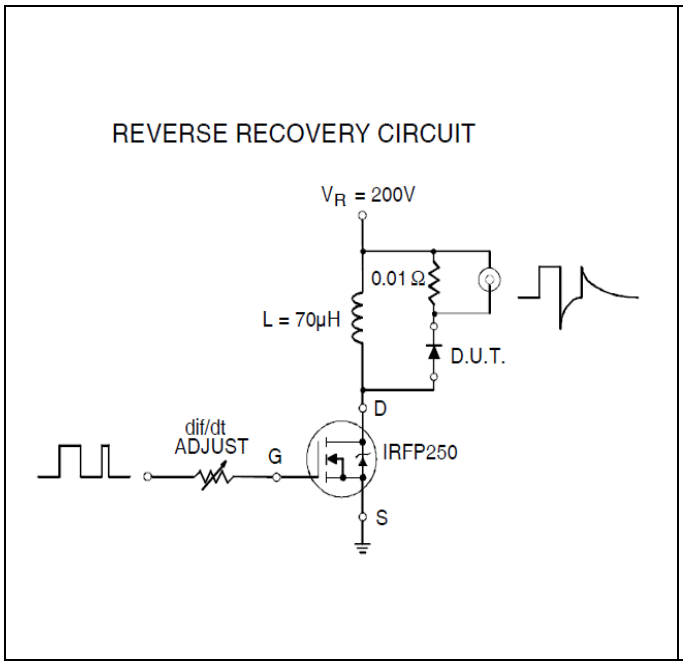


Figure 9 Reverse Recovery Parameter Test Circuit

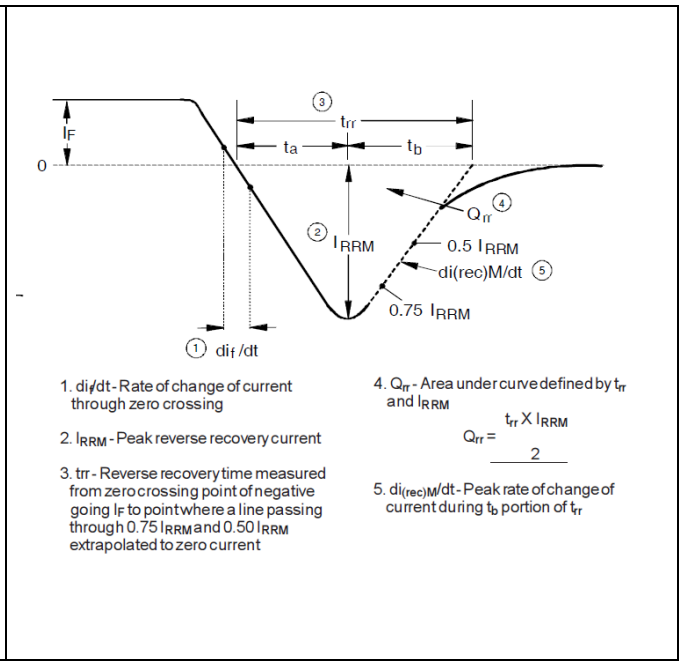
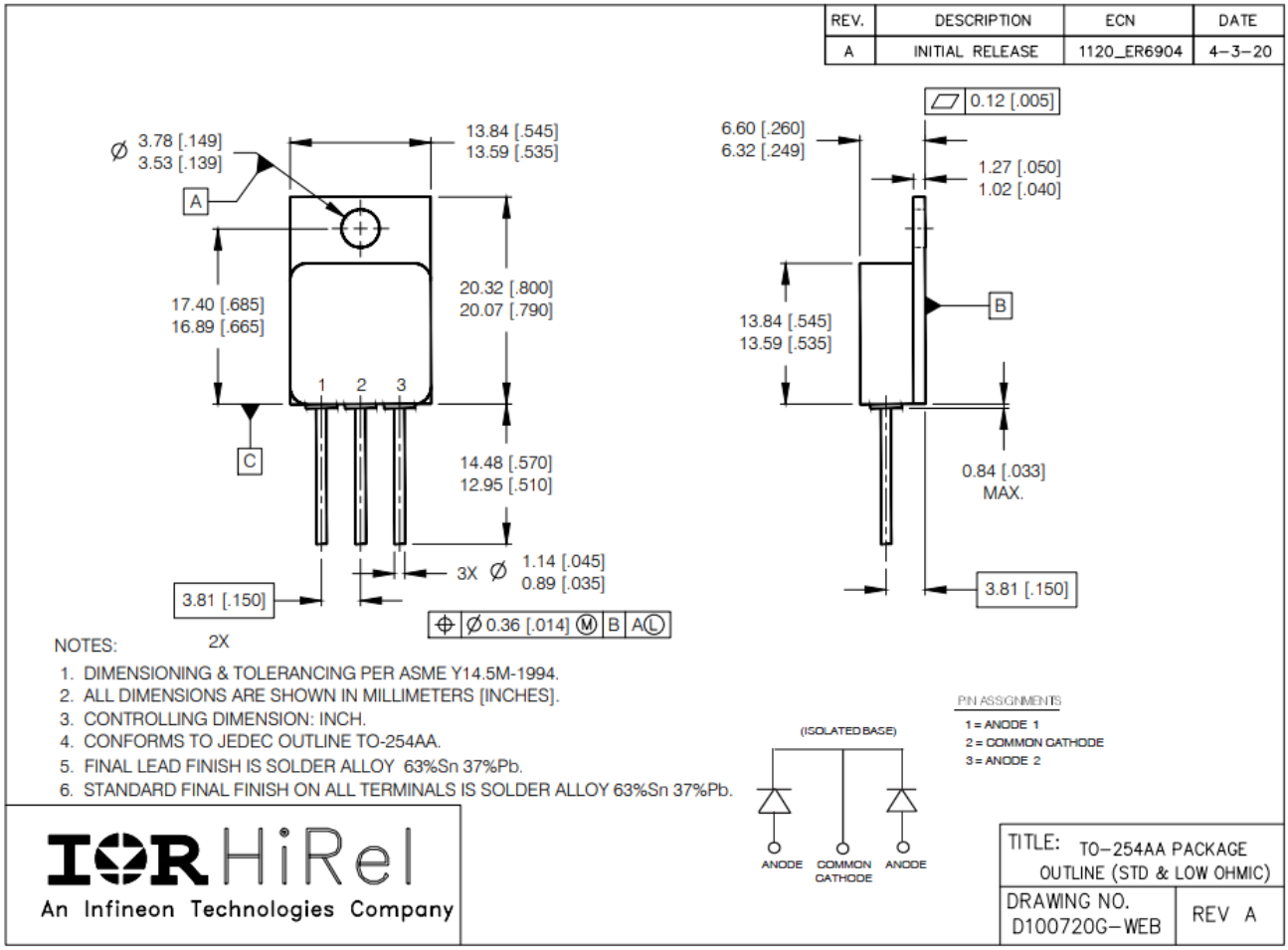


Figure 10 Reverse Recovery Waveform and Definitions

5 Package Outline

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



Revision history

Document version	Date of release	Description of changes
	10/18/2001	Final datasheet (PD-94326)
Rev A	02/20/2006	Updated per ECN-13810
Rev B	08/10/2021	Updated per ECN-1120-08717

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Edition 2021-08-10

Published by

International Rectifier HiRel Products, Inc.

An Infineon Technologies company

El Segundo, California 90245 USA

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Document reference

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