

# 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

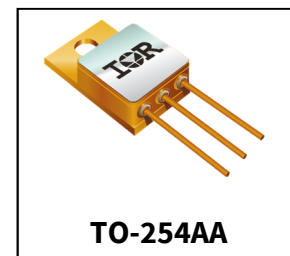
- **Part number:** HFB35HB20C
- **$I_{F(AV)}$ :** 35A
- **$V_{RRM}$  (per leg):** 200V
- **$t_{rr}$ :** 35ns
- **$I_{FSM}$  @  $t_p = 8.33ms$  half-sine (per leg):** 150A

### Potential Applications

- DC-DC converter
- Motor drives

### 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

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**Absolute Maximum Ratings****1 Absolute Maximum Ratings****Table 2 Absolute Maximum Ratings**

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

<sup>1</sup> D.C. = 50% rect. wave<sup>2</sup> ½ sine wave, 60 Hz, P.W. = 8.33 ms

## Device Characteristics

## 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	$I_R = 100\mu A$
$V_F$	Forward Voltage Drop (Per Leg) See Fig. 1	—	—	1.3	V	$I_F = 17.5A, T_J = -55^\circ C$
		—	—	1.1	V	$I_F = 17.5A, T_J = 25^\circ C$
		—	—	1.4	V	$I_F = 35A, T_J = 25^\circ C$
		—	—	1.0	V	$I_F = 17.5A, T_J = 125^\circ C$
$I_R$	Reverse Leakage Current (Per Leg) See Fig. 2	—	—	10	$\mu A$	$V_R = V_R$ Rated
		—	—	50	$\mu A$	$V_R = V_R$ Rated, $T_J = 125^\circ C$
$C_J$	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

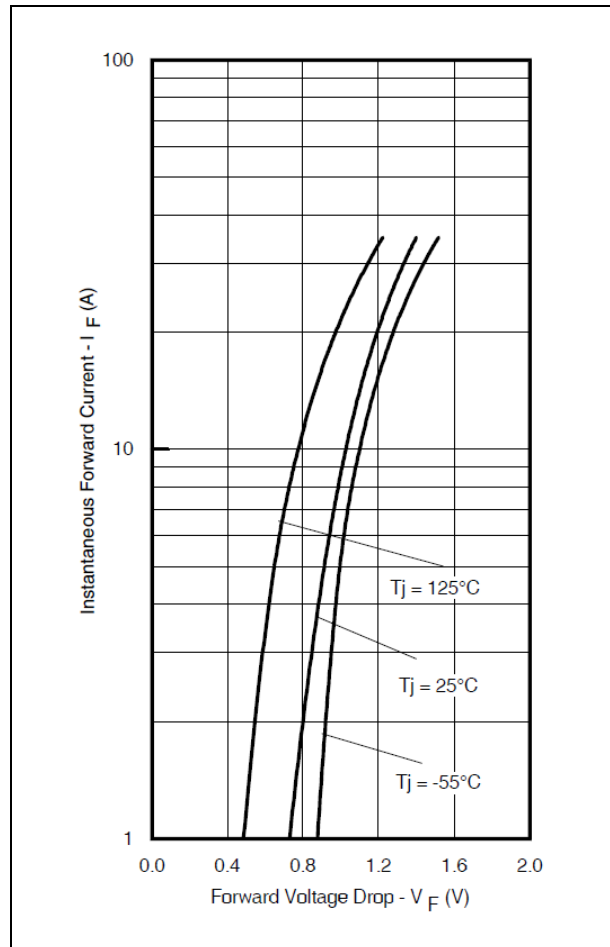
Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
$t_{rr}$	Reverse Recovery Time (Per Leg)	—	—	45	ns	$I_F = 35A, V_R = 160V, d_{if}/dt = 200A/\mu s$
$t_{rr1}$	Reverse Recovery Time (Per Leg) See Fig. 5	—	28	—	ns	$T_J = 25^\circ C$
$t_{rr2}$		—	46	—	ns	$T_J = 125^\circ C$
$I_{RRM1}$	Peak Recovery Current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

### 2.3 Thermal-Mechanical Characteristics

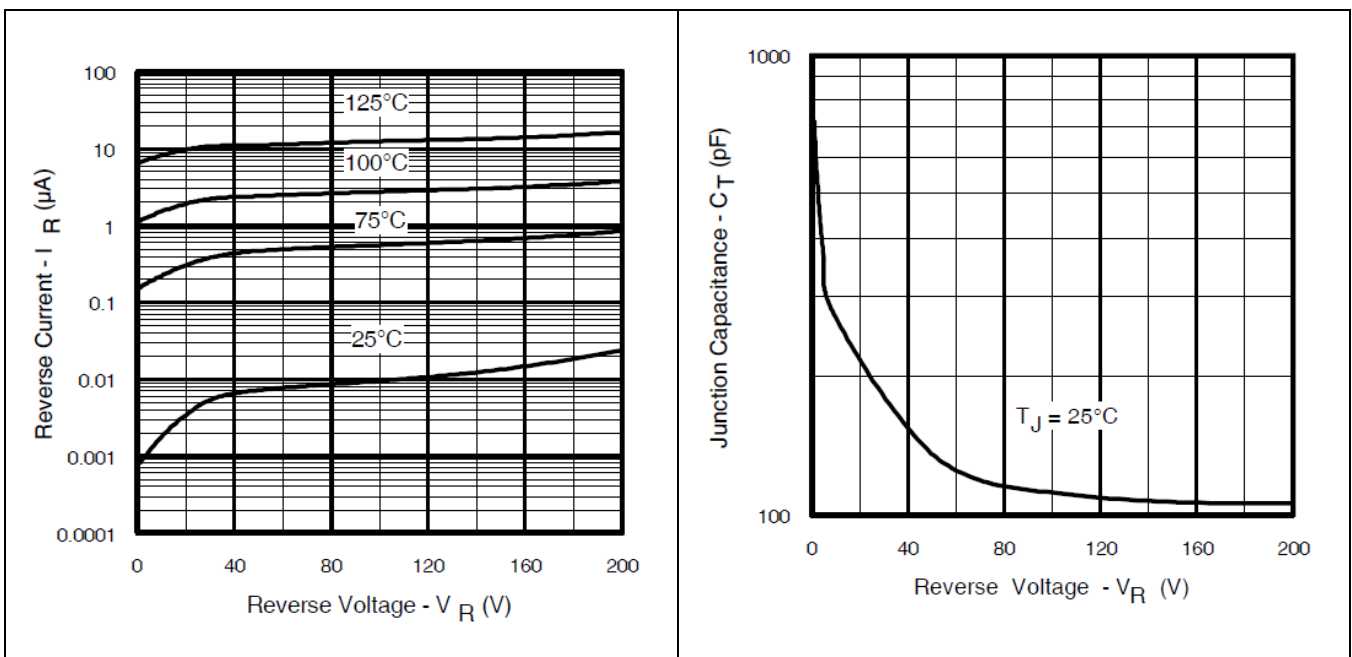
Table 5 Thermal-Mechanical Characteristics

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

### 3 Electrical Characteristics Curves



**Figure 1** Maximum Forward Voltage Drop Characteristics (Per Leg)



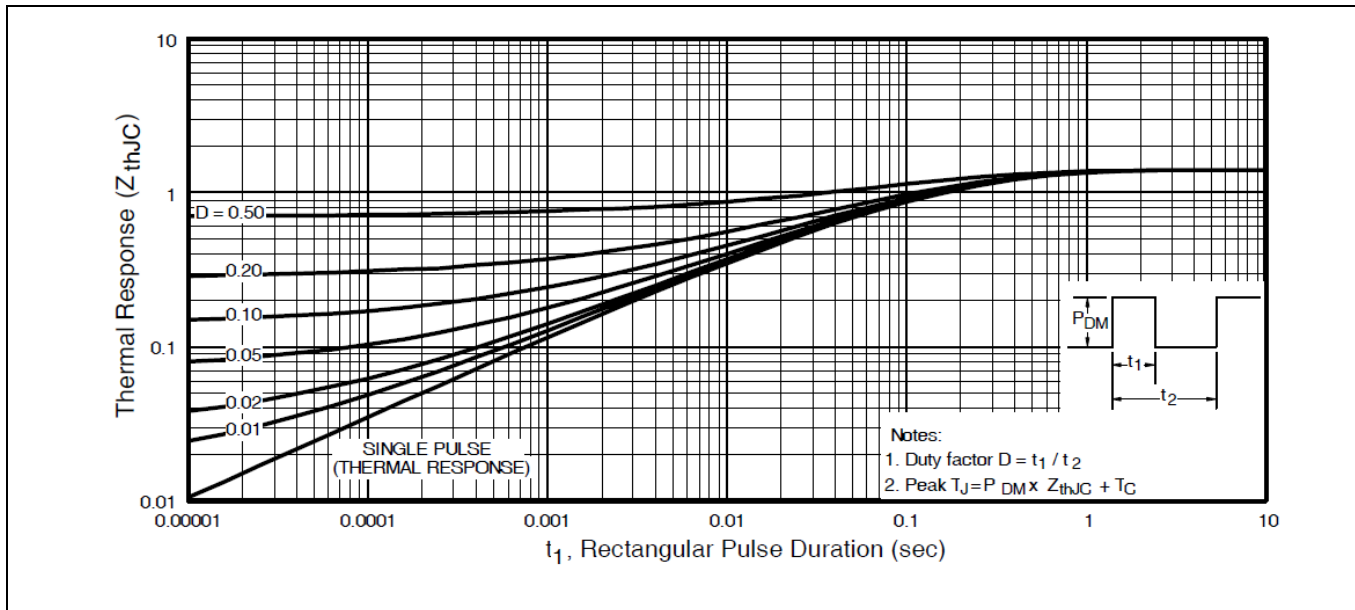
**Figure 2** Typical Values of Reverse Current Vs. Reverse Voltage (Per Leg)

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

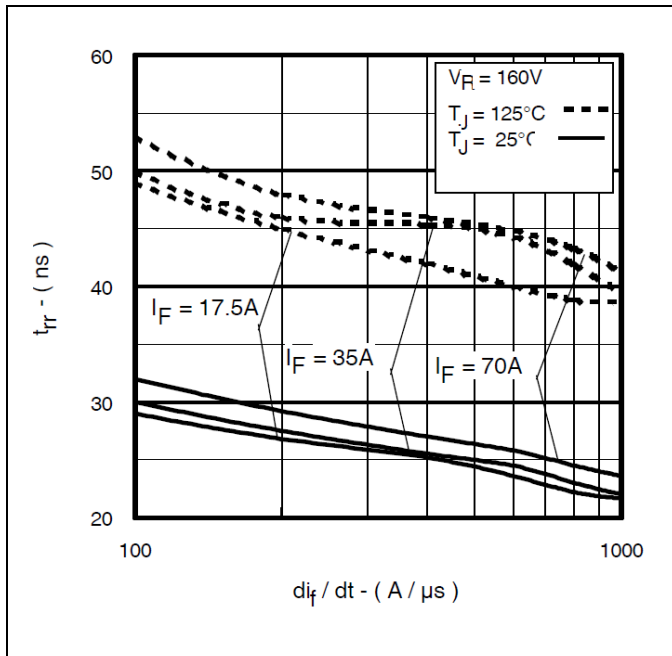
**HFB35HB20C**

**FRED Ultrafast, Soft Recovery Diode**

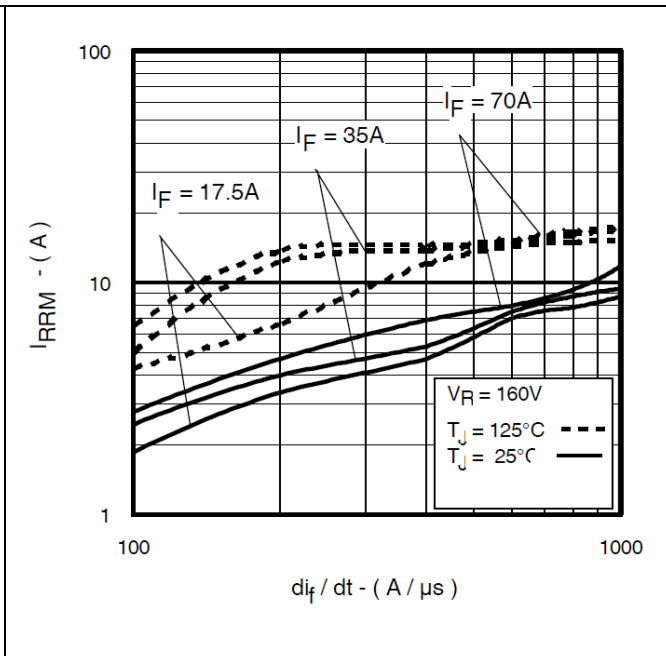
**Electrical Characteristics Curves**



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



**Figure 5 Typical Reverse Recovery Vs.  $di/dt$  (Per Leg)**

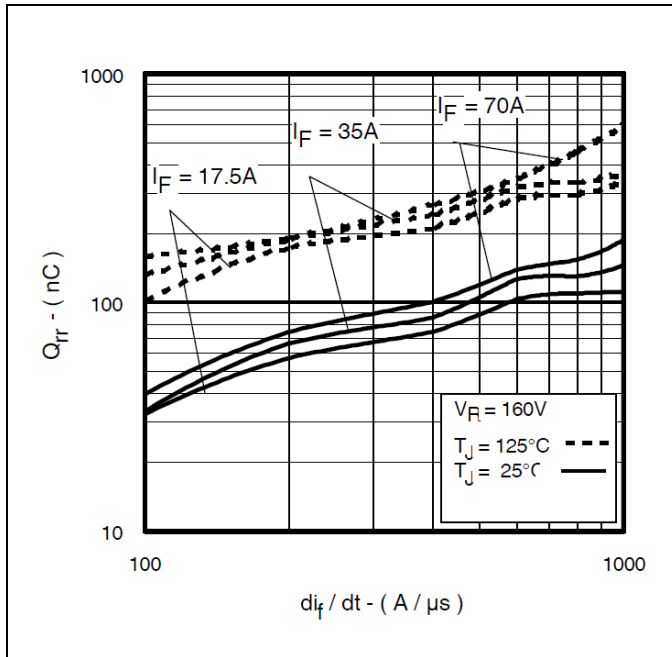


**Figure 6 Typical Recovery Current Vs.  $di/dt$  (Per Leg)**

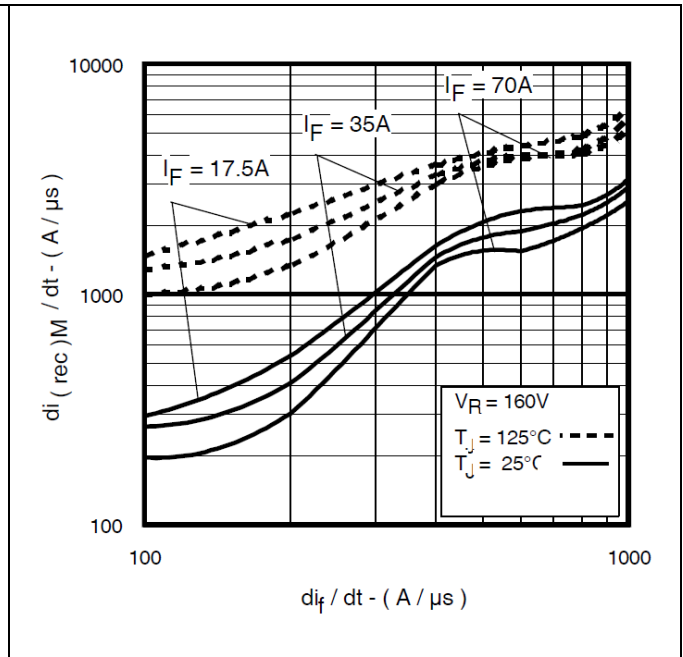
**HFB35HB20C**

**FRED Ultrafast, Soft Recovery Diode**

**Electrical Characteristics Curves**



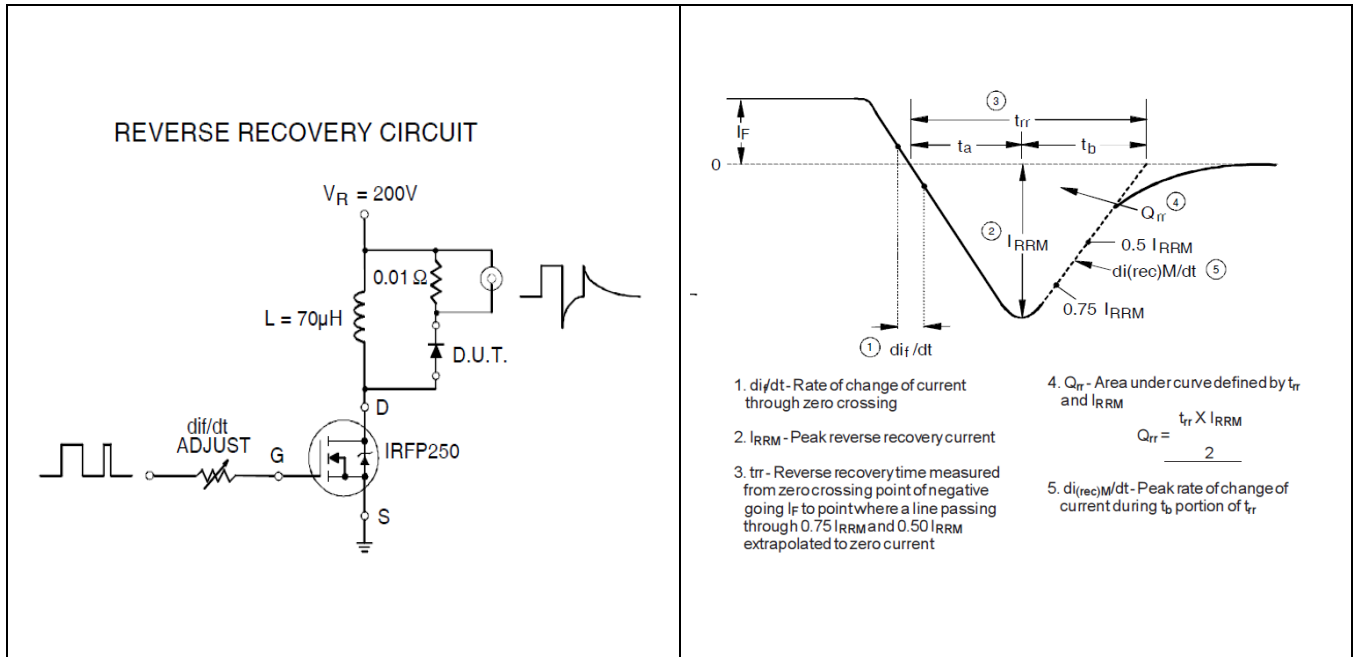
**Figure 7 Typical Stored Charge Vs. dif/dt (Per Leg)**



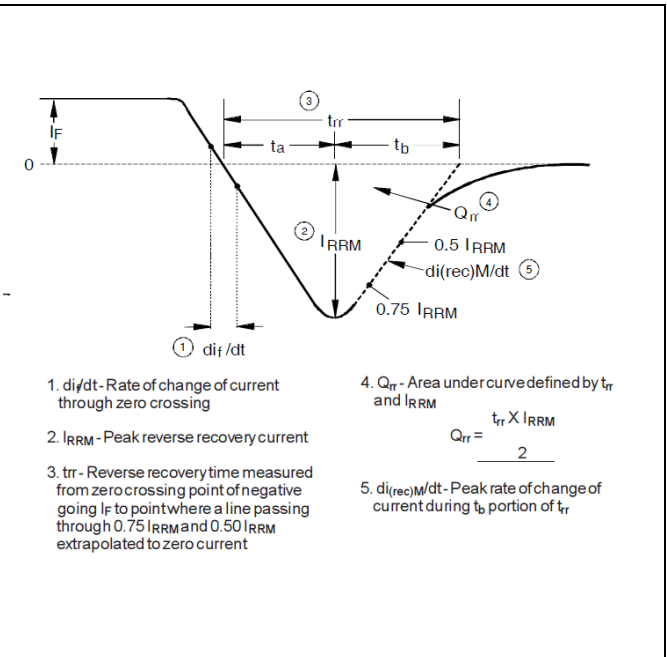
**Figure 8 Typical di(rec)M/dt Vs. dif/dt (Per Leg)**

**Test Circuit**

**4 Test Circuit**



**Figure 9 Reverse Recovery Parameter Test Circuit**



**Figure 10 Reverse Recovery Waveform and Definitions**



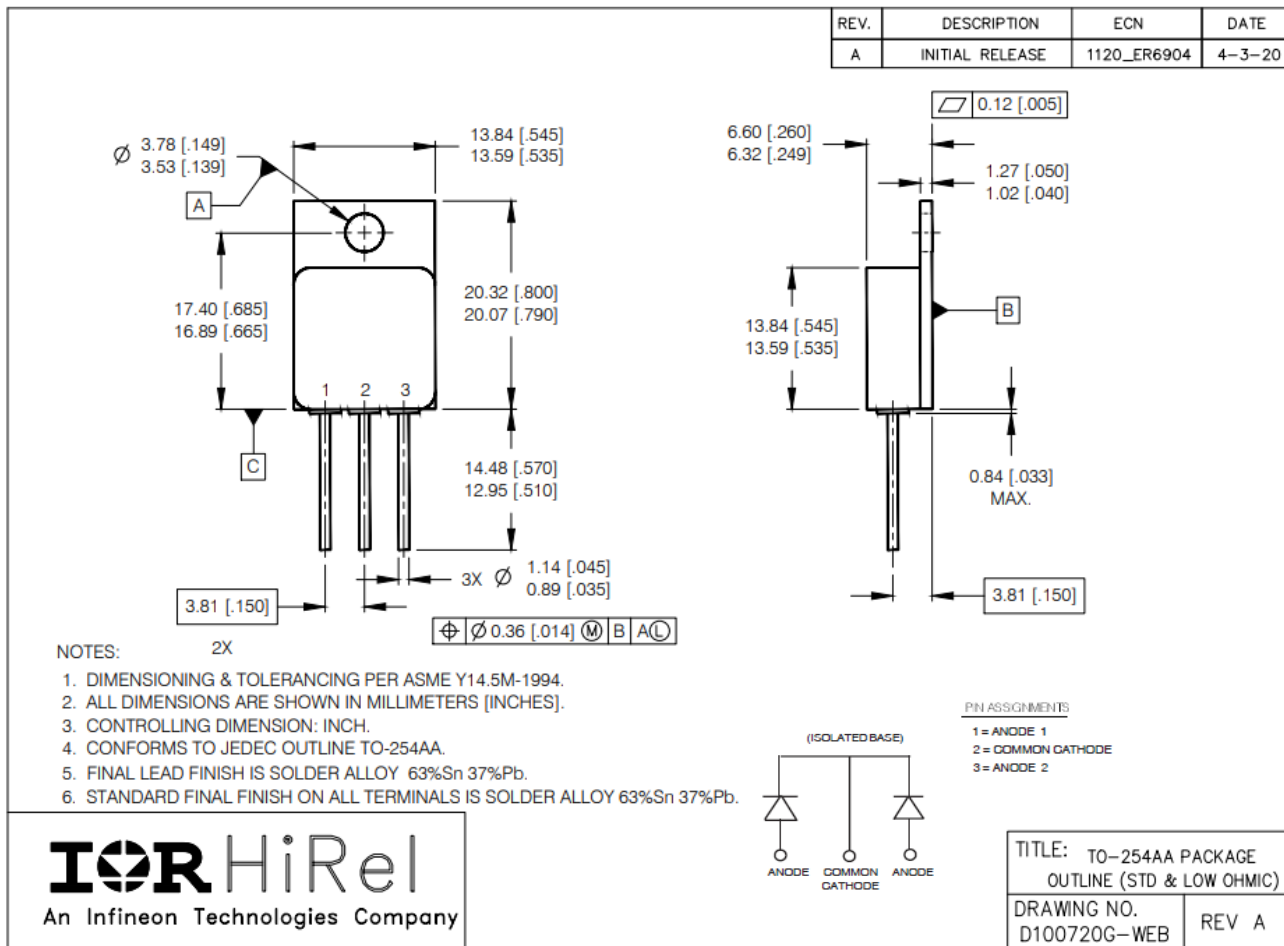
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## FRED Ultrafast, Soft Recovery Diode

### Package Outline

# 5 Package Outline

Note: For the most updated package outline, please see the website: [TO-254AA](http://www.infineon.com/toc-254aa)



# HFB35HB20C

## FRED Ultrafast, Soft Recovery Diode

### Revision history

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### 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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