

HFA35HB120C

PD-20371F

Ultrafast, Soft Recovery Diode Thru-Hole (TO-254AA) 1200V, 15A

Features

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

Product Summary

- V_R : 1200V
- V_F : 4.4V
- t_{rr} : 100ns
- Q_{rr} : 370nC
- $di_{(rec)M}/dt$: 380A/ μ s

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
HFA35HB120C	TO-254AA	COTS
HFA35HB120SCV	TO-254AA	JANTXV-equivalent
HFA35HB120SCX	TO-254AA	JANTX-equivalent
HFA35HB120SCS	TO-254AA	S-level

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Absolute Maximum Ratings

1 Absolute Maximum Ratings

Table 2 Absolute Maximum Ratings

Symbol	Parameter	Value	Unit
V_R	DC Reverse Voltage	1200	V
I_F	Continuous Forward Current, $T_C = 100^\circ\text{C}$ ¹	15	A
I_{FSM}	Single pulse Forward Current, $T_C = 25^\circ\text{C}$ ² (Per Leg)	50	A
$P_D @ T_C = 25^\circ\text{C}$	Maximum Power Dissipation	63	W
T_J T_{STG}	Operating Junction and Storage Temperature Range	-55 to 150	$^\circ\text{C}$
Wt	Weight	9.3 (Typical)	g

¹ DC = 50% rect. wave

² 1/2 sine wave, 60 Hz, Pulse width = 8.33 ms

Device Characteristics

2 Device Characteristics

2.1 Electrical Characteristics

Table 3 Electrical Characteristics (Per Leg) @ $T_J = 25^\circ\text{C}$ (unless otherwise specified)

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
V_{BR}	Cathode Anode Breakdown Voltage	1200	—	—	V	$I_R = 250\mu\text{A}$
V_F	Forward Voltage Drop See Fig. 1	—	—	3.1	V	$I_F = 7.0\text{A}$, $T_J = -55^\circ\text{C}$
		—	—	3.3		$I_F = 7.0\text{A}$, $T_J = 25^\circ\text{C}$
		—	—	4.4		$I_F = 15\text{A}$, $T_J = 25^\circ\text{C}$
		—	—	2.8		$I_F = 7.0\text{A}$, $T_J = 125^\circ\text{C}$
I_R	Reverse Leakage Current See Fig. 2	—	—	10	μA	$V_R = V_R$ Rated
		—	—	1.0	mA	$V_R = 960\text{V}$, $T_J = 125^\circ\text{C}$
C_T	Junction Capacitance See Fig. 3	—	10	15	pF	$V_R = 200\text{V}$
L_S	Series Inductance	—	8.7	—	nH	Measured from anode lead to cathode lead, 6mm (0.25 in) from package

2.2 Dynamic Recovery Characteristics

Table 4 Dynamic Recovery Characteristics (Per Leg) @ $T_J = 25^\circ\text{C}$ (unless otherwise specified)

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
t_{rr1}	Reverse Recovery Time See Fig. 5	—	58	100	ns	$T_J = 25^\circ\text{C}$
t_{rr2}		—	110	165		$T_J = 125^\circ\text{C}$
I_{RRM1}	Peak Recovery Current See Fig. 6	—	5.4	8.1	A	$T_J = 25^\circ\text{C}$
I_{RRM2}		—	7.2	10.8		$T_J = 125^\circ\text{C}$
Q_{rr1}	Reverse Recovery Charge See Fig. 7	—	185	370	nC	$T_J = 25^\circ\text{C}$
Q_{rr2}		—	395	590		$T_J = 125^\circ\text{C}$
$di_{(rec)M}/dt_1$	Peak Rate of Fall of Recovery Current During t_b See Fig. 8	—	255	380	A/ μs	$T_J = 25^\circ\text{C}$
$di_{(rec)M}/dt_2$		—	160	240		$T_J = 125^\circ\text{C}$

2.3 Thermal-Mechanical Characteristics

Table 5 Thermal-Mechanical Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JC}$	Junction to Case, Single Leg Conducting	—	2.0	$^\circ\text{C}/\text{W}$

Electrical Characteristics Curves

3 Electrical Characteristics Curves

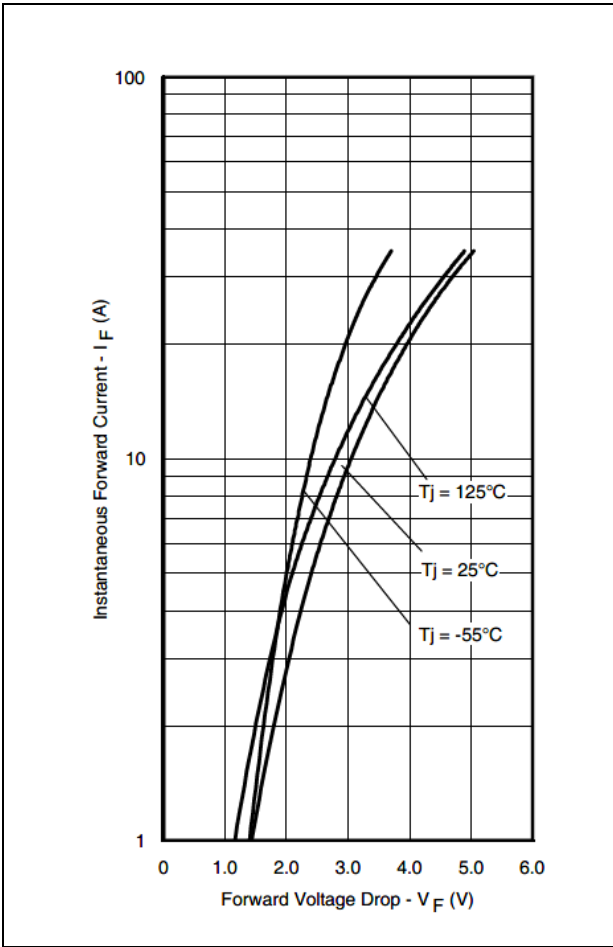


Figure 1 Typical Forward Voltage Drop Vs. Instantaneous Forward Current (Per Leg)

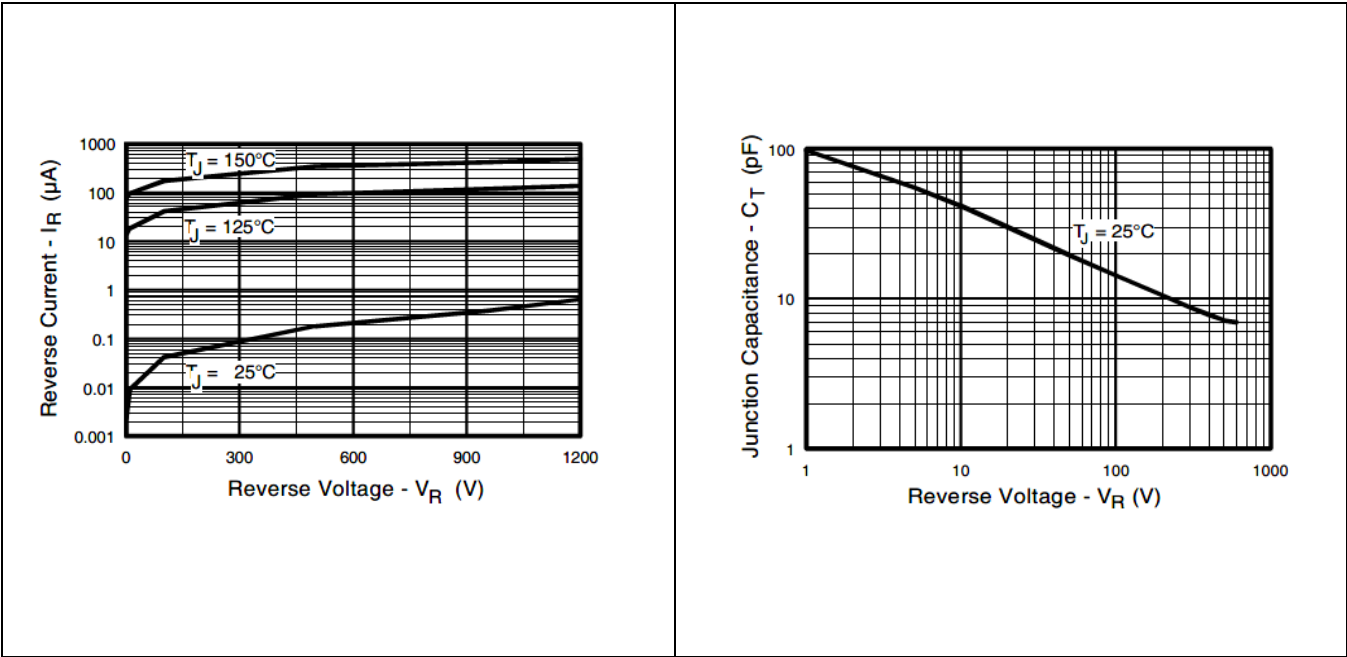


Figure 2 Typical Reverse Current Vs. Reverse Voltage (Per Leg)

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

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Electrical Characteristics Curves

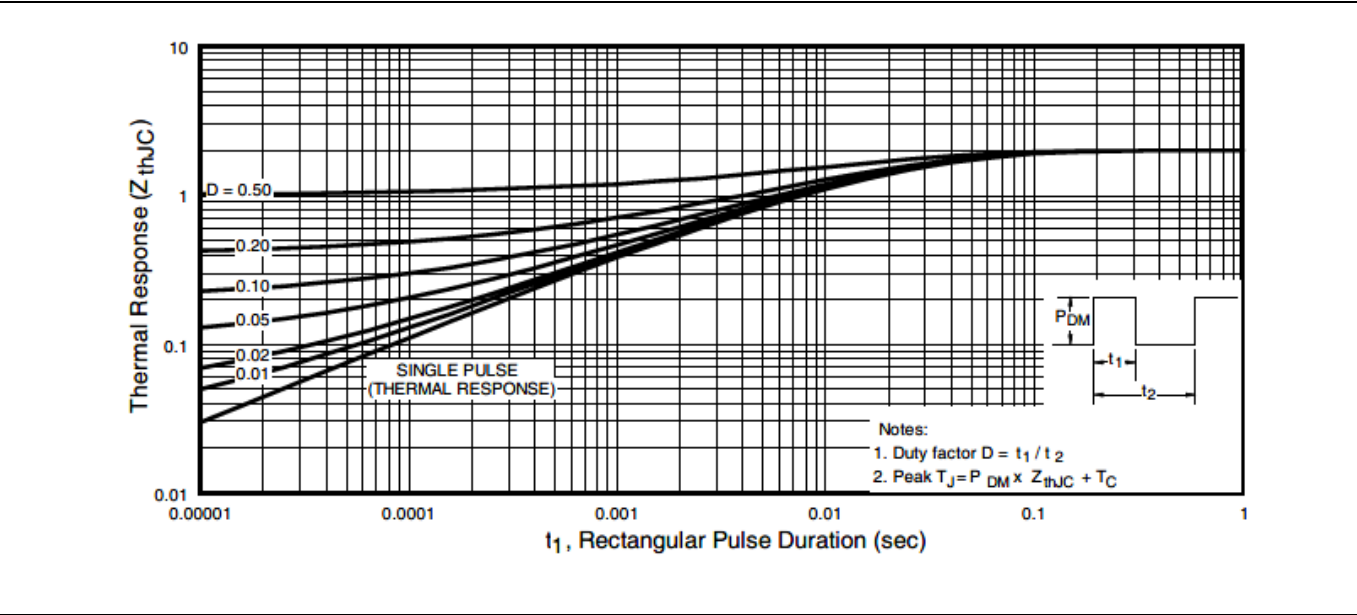


Figure 4 Maximum Thermal Impedance Z_{thJC} Characteristics (Per Leg)

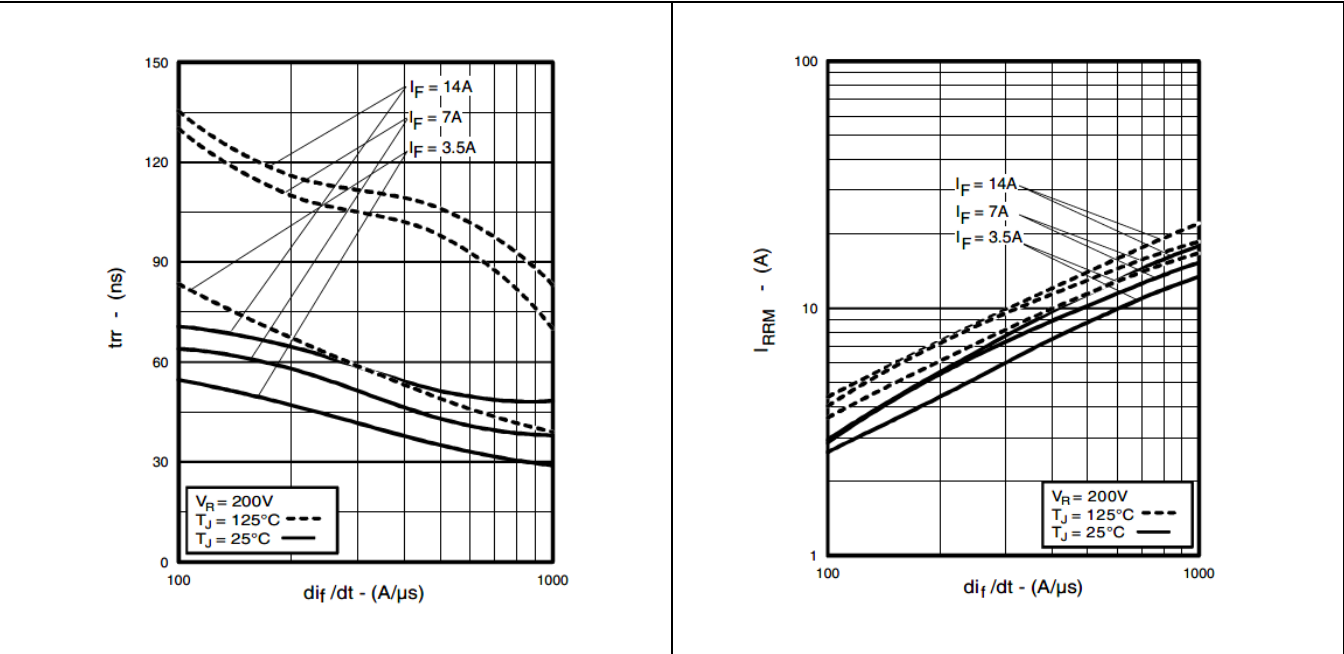


Figure 5 Typical Reverse Recovery Vs. d_i/d_t

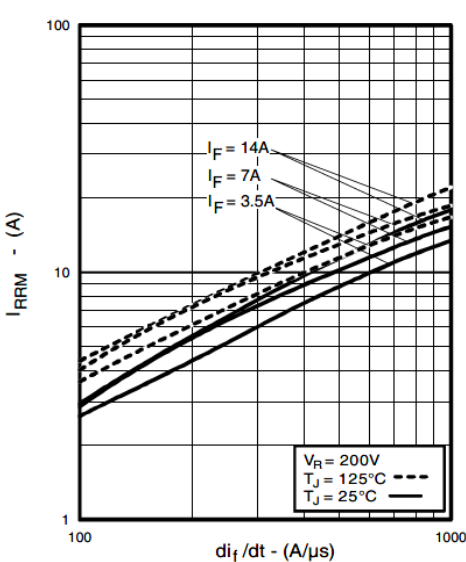


Figure 6 Typical Recovery Current Vs. d_i/d_t

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Electrical Characteristics Curves

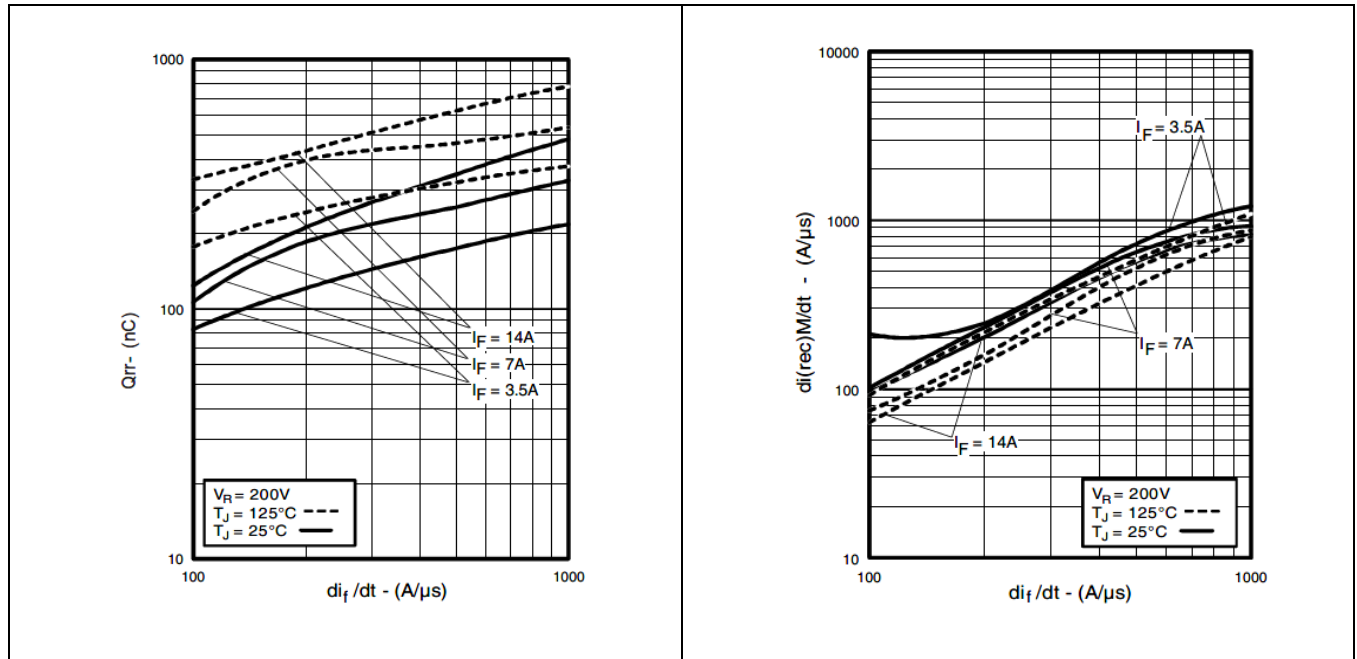


Figure 7 Typical Stored Charge Vs. d_i/dt

Figure 8 Typical $d_i(rec)M/dt$ Vs. d_i/dt

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Test Circuit

4 Test Circuit

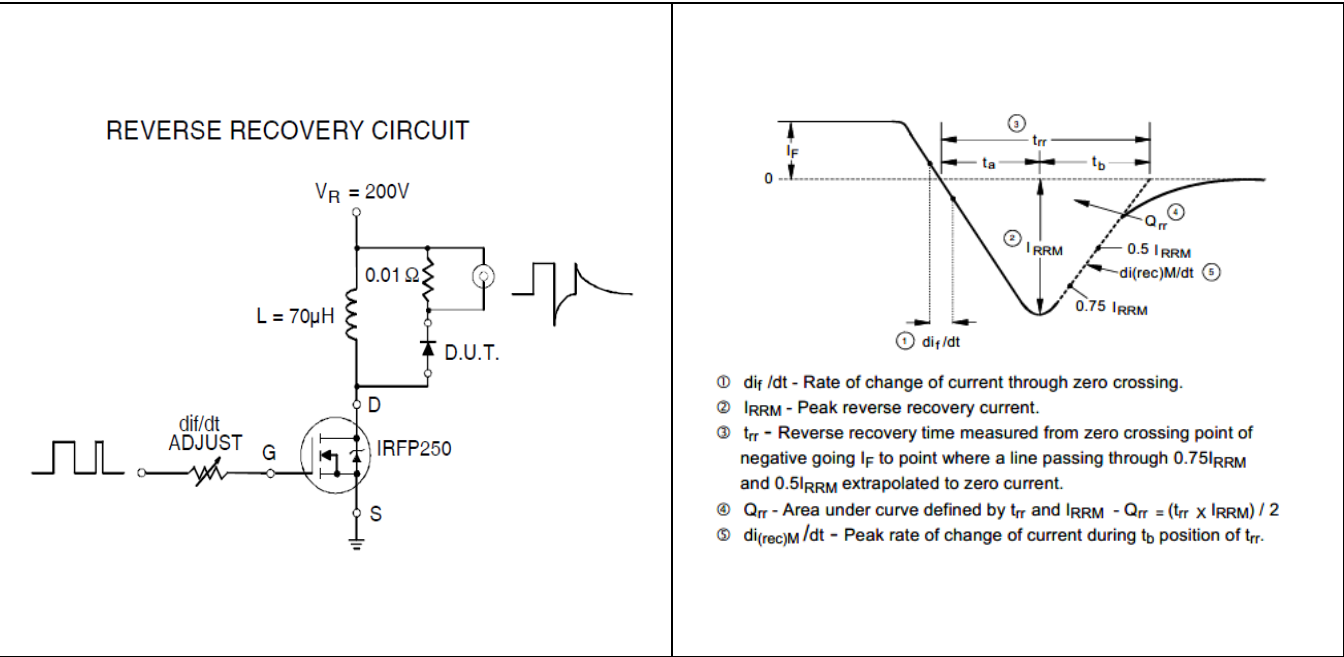


Figure 9 Reverse Recovery Parameter Test Circuit

Figure 10 Reverse Recovery Waveform and Definitions

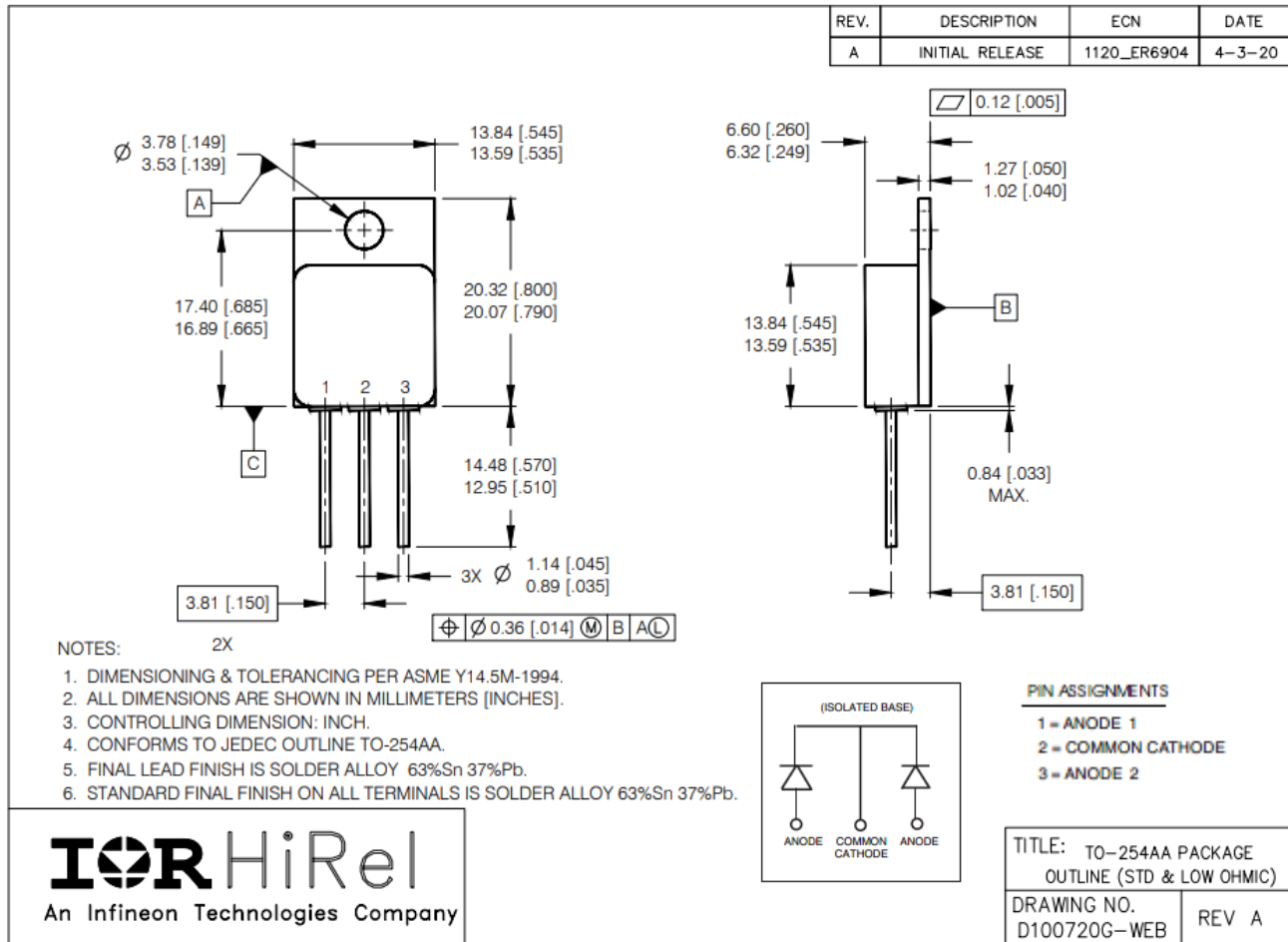
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Package Outline

5 Package Outline

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



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Revision history

Revision history

Document version	Date of release	Description of changes
	8/20/1998	Final datasheet (PD-20371A)
Rev B	01/11/2002	Updated Format
Rev C	07/01/2002	Updated IFSM @ 25C to 100A from 130A
Rev D	08/29/2002	Updated IFSM @ 25C to 80A from 100A
Rev E	04/27/2015	Updated per ECN-1120-03376
Rev F	05/31/2024	Updated per ECN-1120-09961

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