

HFB20HJ20C

PD-94169B

Ultrafast, Soft Recovery Diode Surface Mount (SMD-0.5) 200V, 20A

Features

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

Product Summary

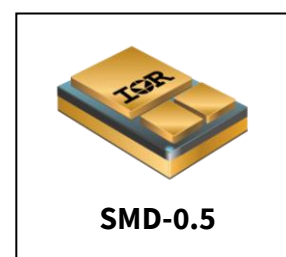
- V_R : 200V
- V_F : 1.3V
- t_{rr} : 40ns

Potential Applications

- DC-DC converter
- Motor drives

Product Validation

Qualified according to MIL-PRF-19500 for space applications



Description

HFB20HJ20C is part of the IR HiRel family of products. 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, motor 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
HFB20HJ20C	SMD-0.5	COTS
HFB20HJ20CSCV	SMD-0.5	JANTXV-equivalent
HFB20HJ20CSCX	SMD-0.5	JANTX-equivalent
HFB20HJ20CSCS	SMD-0.5	S-level

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Absolute Maximum Ratings**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, $T_C = 85^\circ\text{C}$ ¹	20	A
I_{FSM}	Single pulse forward current, $T_C = 25^\circ\text{C}$ ² (Per Leg)	125	A
$P_D @ T_C = 25^\circ\text{C}$	Maximum power dissipation	28	W
T_J T_{STG}	Operating Junction and Storage Temperature Range	-55 to 150	$^\circ\text{C}$
Wt	Weight	1.0 (Typical)	g

¹ DC = 50% rectangle wave² 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	200	—	—	V	$I_R = 100\mu\text{A}$
V_F	Max Forward Voltage Drop See Fig. 1	—	—	1.26	V	$I_F = 10\text{A}$, $T_J = -55^\circ\text{C}$
		—	—	1.11	V	$I_F = 10\text{A}$, $T_J = 25^\circ\text{C}$
		—	—	1.30	V	$I_F = 20\text{A}$, $T_J = 25^\circ\text{C}$
		—	—	0.96	V	$I_F = 10\text{A}$, $T_J = 125^\circ\text{C}$
I_R	Max 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_J	Junction Capacitance See Fig. 3	—	—	41	pF	$V_R = 200\text{V}$
L_S	Series Inductance	—	4.8	—	nH	Measured from center of cathode pad to center of anode pad

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_{rr}	Reverse Recovery Time	—	—	40	ns	$T_J = 25^\circ\text{C}$
I_{RRM1}	Peak Recovery Current See Fig. 6	—	3.5	—	A	$T_J = 25^\circ\text{C}$
I_{RRM2}		—	5.5	—		$T_J = 125^\circ\text{C}$
Q_{rr1}	Reverse Recovery Charge See Fig. 7	—	54	—	nC	$T_J = 25^\circ\text{C}$
Q_{rr2}		—	120	—		$T_J = 125^\circ\text{C}$
$di_{(rec)M}/dt_1$	Peak Rate of Fall of Recovery Current During t_b See Fig. 8	—	640	—	A/ μs	$T_J = 25^\circ\text{C}$
$di_{(rec)M}/dt_2$		—	850	—		$T_J = 125^\circ\text{C}$

2.3 Thermal-Mechanical Characteristics

Table 5 Thermal-Mechanical Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JC}$	Junction to Case, Single Leg Conducting	—	4.5	$^\circ\text{C}/\text{W}$

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Electrical Characteristics Curves

3 Electrical Characteristics Curves

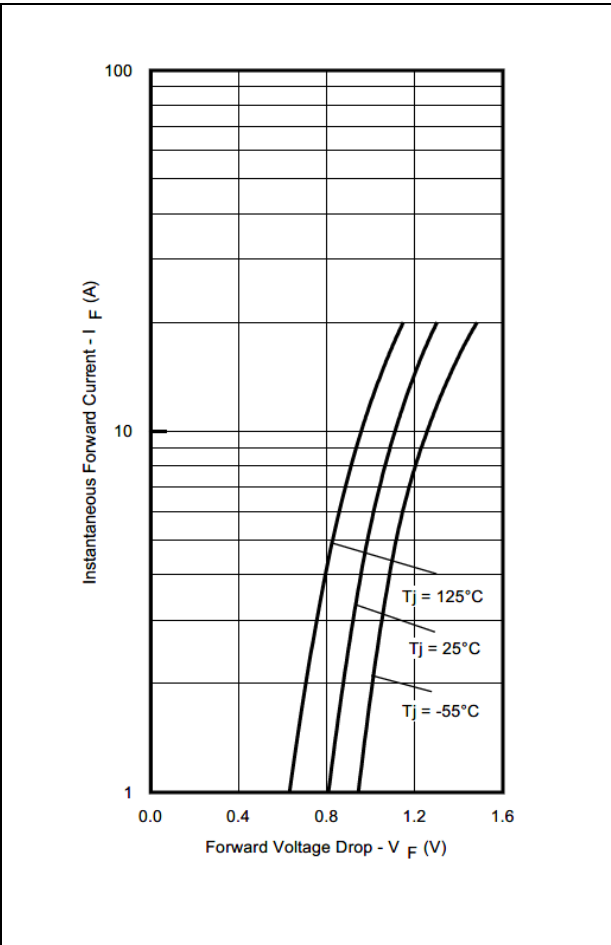


Figure 1 Typical Forward Voltage Drop Vs. Instantaneous Forward Current (Per Leg)

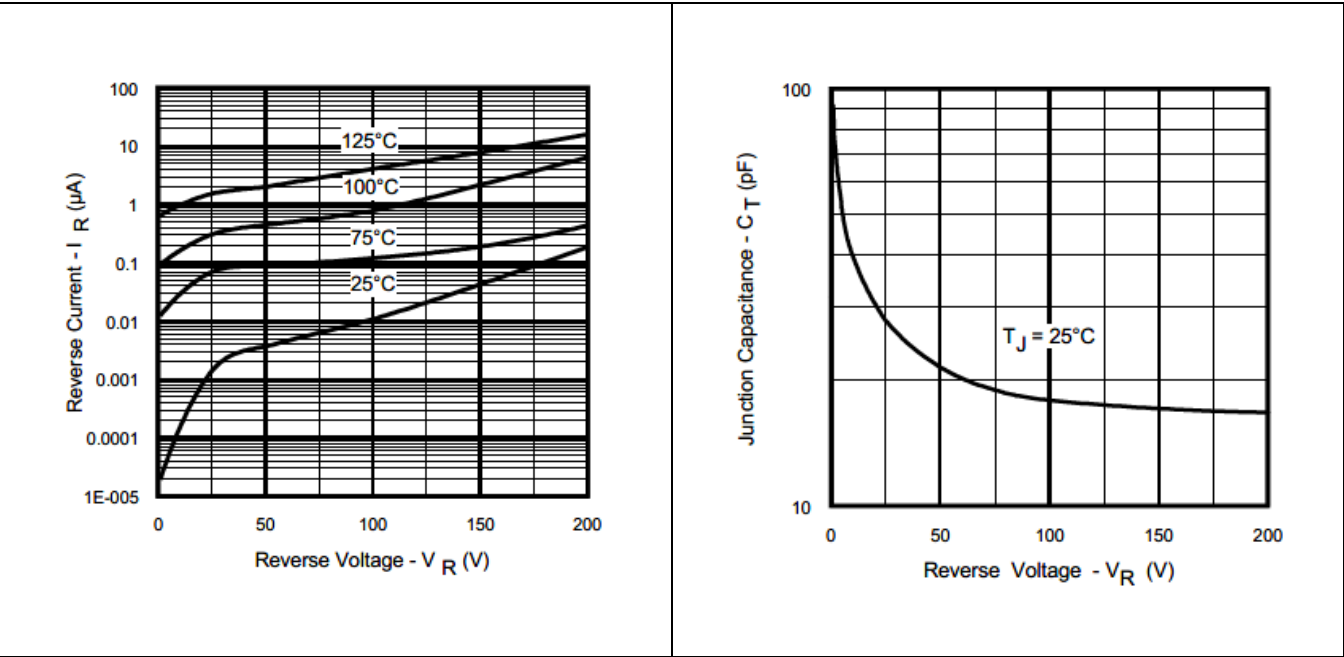


Figure 2 Typical Values of Reverse Current Vs. Reverse Voltage (Per Leg)

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

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Electrical Characteristics Curves

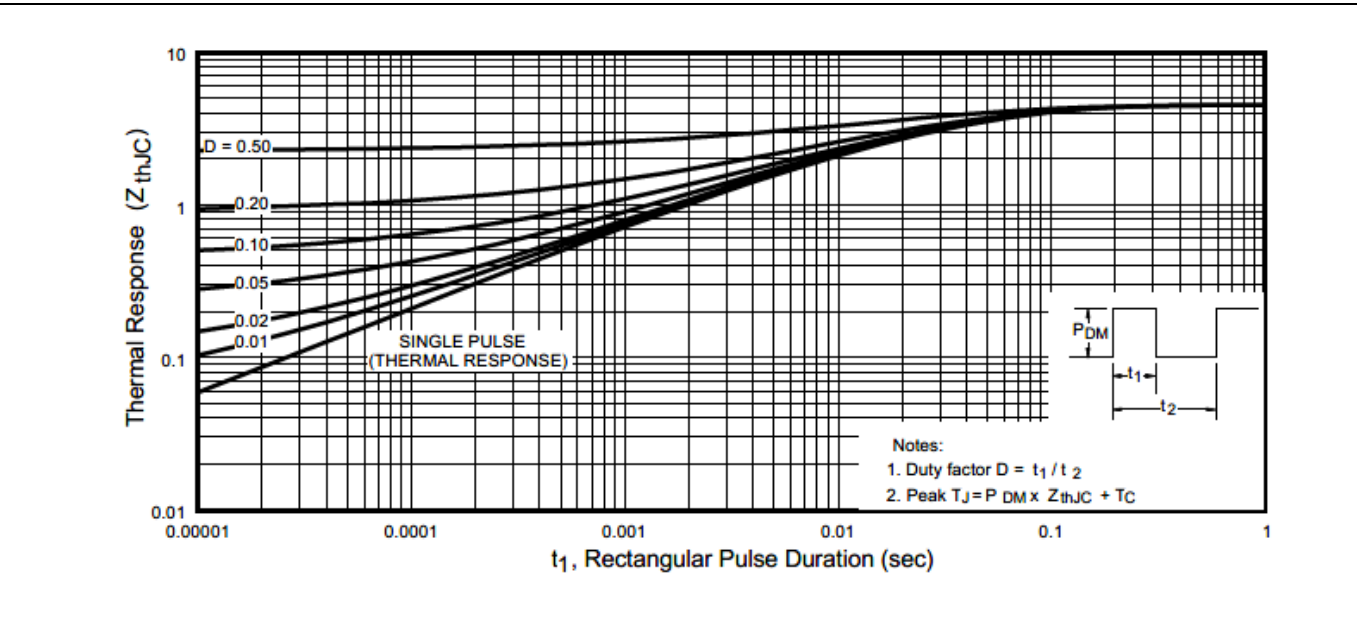


Figure 4 Maximum Thermal Impedance Z_{thJC} Characteristics (Per Leg)

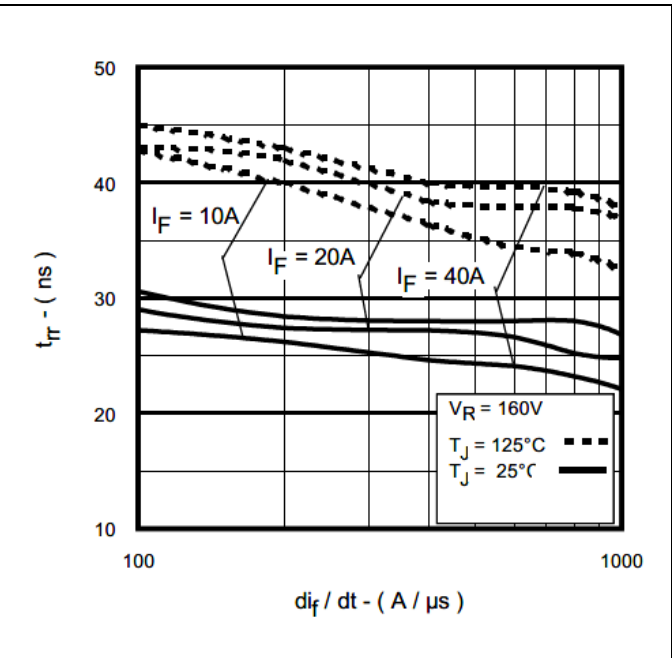


Figure 5 Typical Reverse Recovery Vs. di_F/dt (Per Leg)

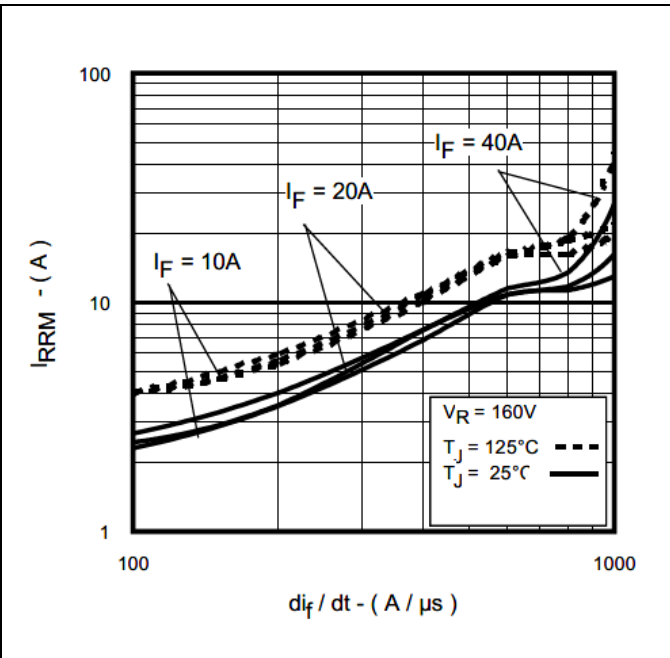


Figure 6 Typical Recovery Current Vs. di_F/dt (Per Leg)

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Electrical Characteristics Curves

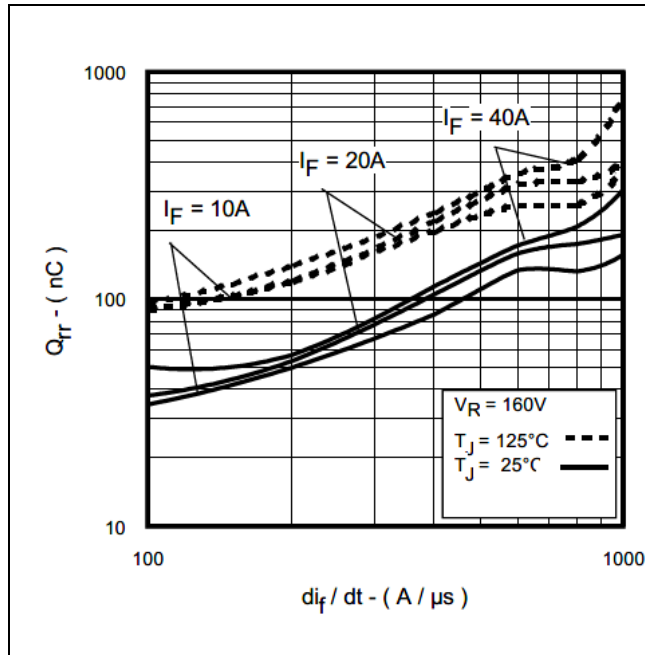


Figure 7 Typical Stored Charge Vs. di/dt (Per Leg)

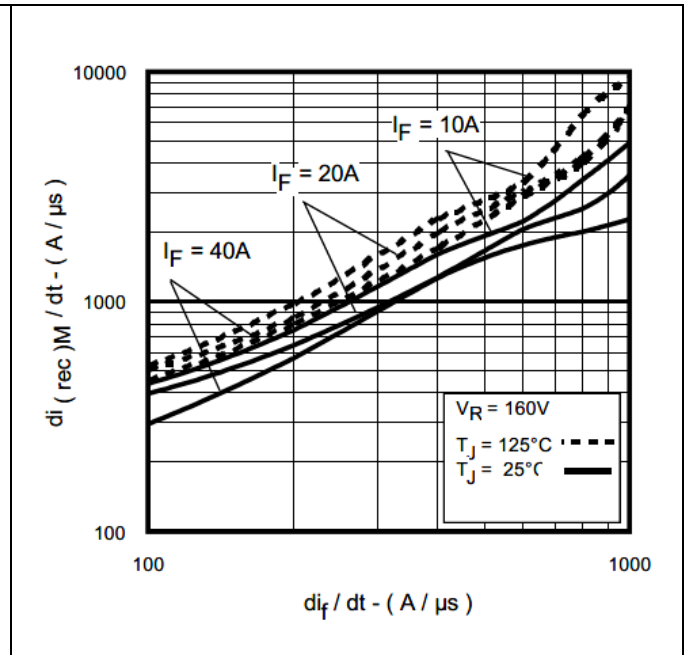


Figure 8 Typical $di_{(rec)M}/dt$ Vs. di/dt (Per Leg)

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Test Circuit

4 Test Circuit

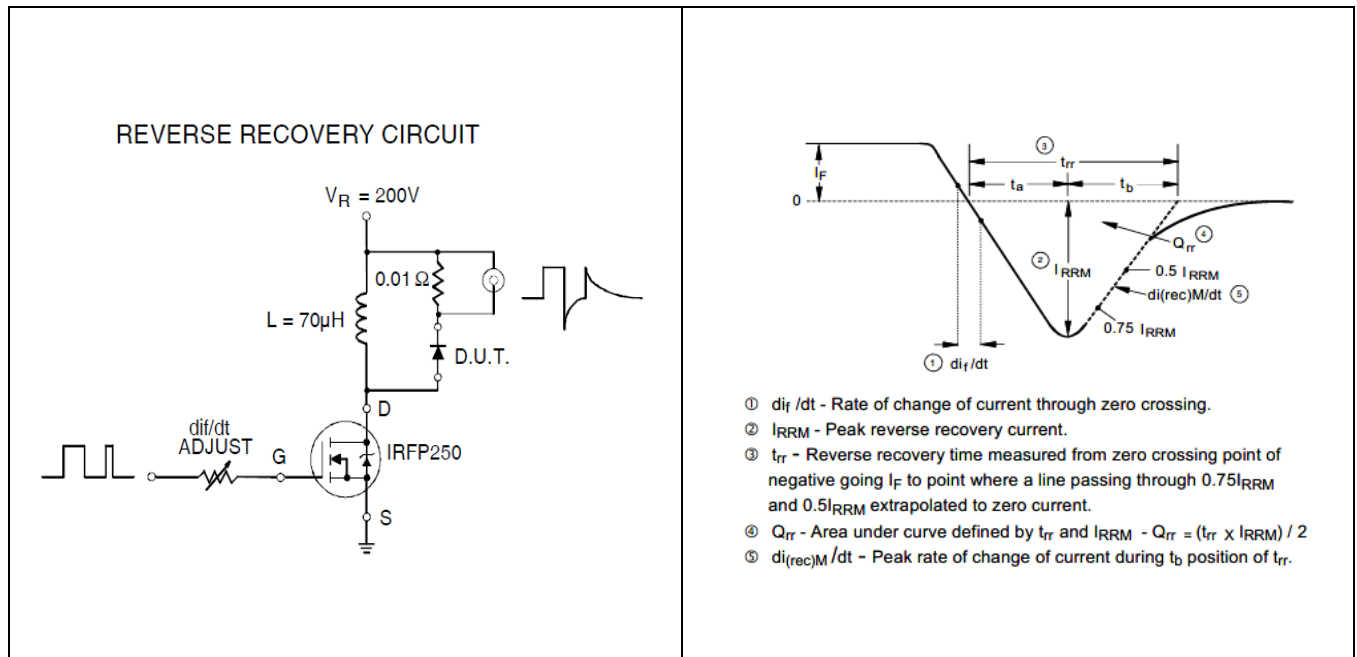


Figure 9 Reverse Recovery Parameter Test Circuit

Figure 10 Reverse Recovery Waveform and Definitions

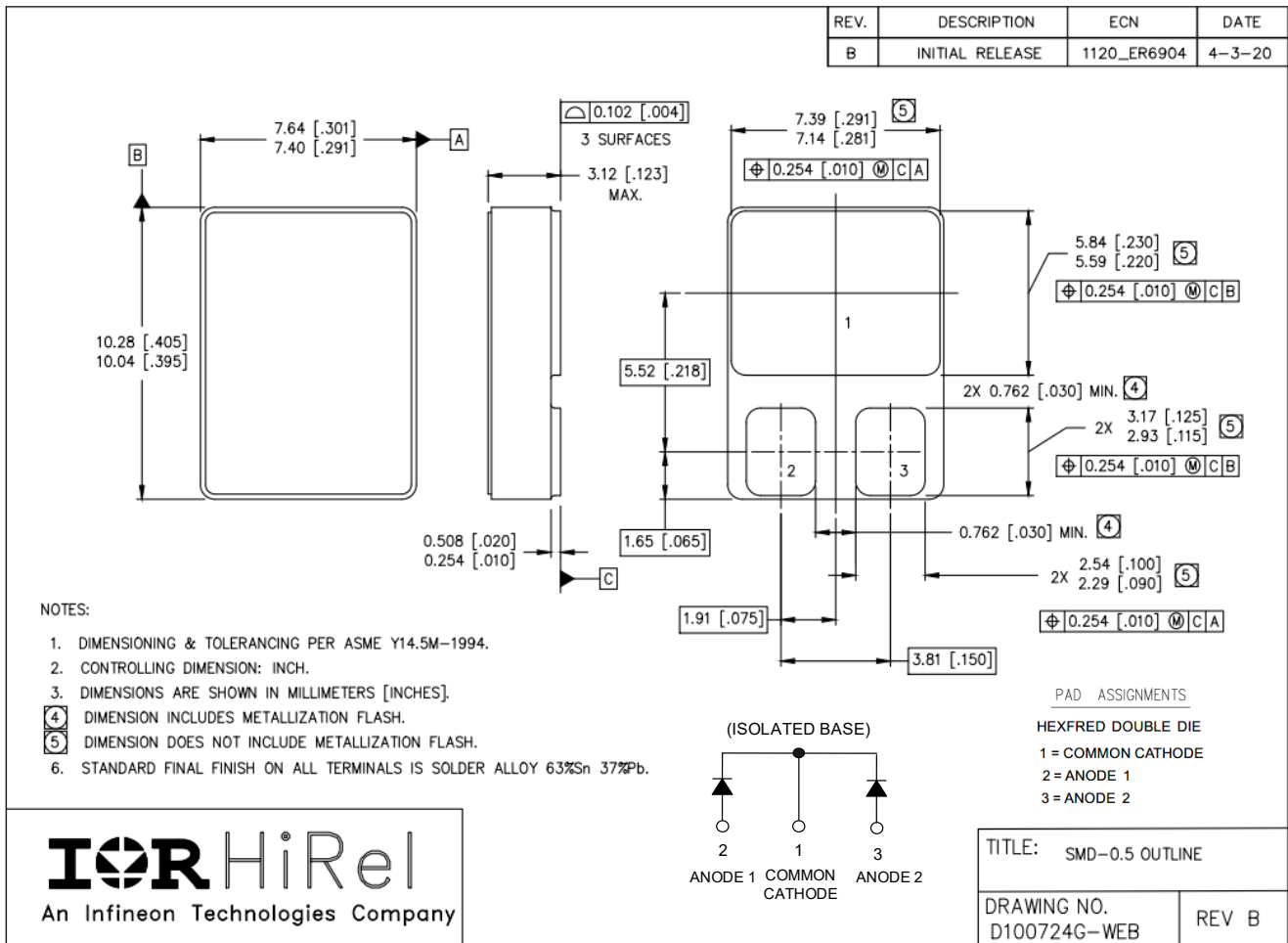
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Package Outline

5 Package Outline

Note: For the most updated package outline, please see the website: [SMD-0.5](#)



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Revision history

Revision history

Document version	Date of release	Description of changes
	04/30/1998	Final datasheet (PD-94169)
Rev A	05/08/2001	Updated per ECN-1120-03627
Rev B	10/06/2025	Updated per ECN-Z8F80840776

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