

**HFB16HY20C**

FRED

Ultrafast, Soft Recovery Diode

**Features**

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

$V_R = 200V$
$I_{F(AV)} = 16A$
$t_{rr} = 35ns$


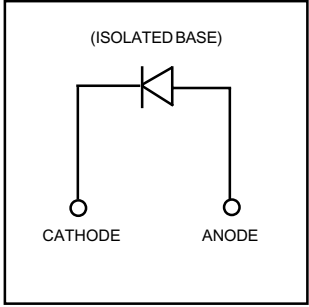
**Description**

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.

**Absolute Maximum Ratings**

	Parameter	Max.	Units
$V_R$	Cathode to Anode Voltage	200	V
$I_{F(AV)}$	Continuous Forward Current, ① $T_C = 120^\circ C$	16	A
$I_{FSM}$	Single Pulse Forward Current, ② $T_C = 25^\circ C$	140	
$P_D @ T_C = 25^\circ C$	Maximum Power Dissipation	100	W
$T_J, T_{STG}$	Operating Junction and Storage Temperature Range	-55 to +150	$^\circ C$

**Note:** ① D.C. = 50% rect. wave  
 ② 1/2 sine wave, 60 Hz , P.W. = 8.33 ms

 <p><b>CASE STYLE</b></p> <p><b>TO-257AA</b></p>	 <p>(ISOLATED BASE)</p> <p>CATHODE ANODE</p>
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**Electrical Characteristics @  $T_J = 25^\circ\text{C}$  (unless otherwise specified)**

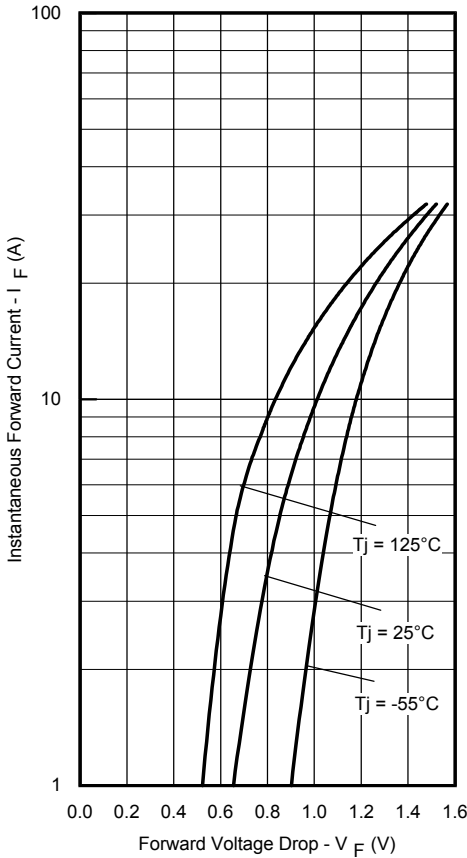
	Parameter	Min.	Typ.	Max.	Units	Test Conditions
$V_{BR}$	Cathode Anode Breakdown Voltage	200	—	—	V	$I_R = 100\mu\text{A}$
$V_F$	Forward Voltage See Fig. 1	—	—	1.29	V	$I_F = 16\text{A}, T_J = -55^\circ\text{C}$
		—	—	1.17		$I_F = 16\text{A}, T_J = 25^\circ\text{C}$
		—	—	1.52		$I_F = 32\text{A}, T_J = 25^\circ\text{C}$
		—	—	1.48		$I_F = 32\text{A}, T_J = 125^\circ\text{C}$
$I_R$	Reverse Leakage Current See Fig. 2	—	—	10	$\mu\text{A}$	$V_R = V_R \text{ Rated}$
		—	—	200	$\mu\text{A}$	$V_R = V_R \text{ Rated}, T_J = 125^\circ\text{C}$
$C_T$	Junction Capacitance, See Fig. 3	—	—	170	pF	$V_R = 200\text{V}$
$L_S$	Series Inductance	—	9.8	—	nH	Measured from anode lead to cathode lead, 6 mm ( 0.025 in ) from package

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

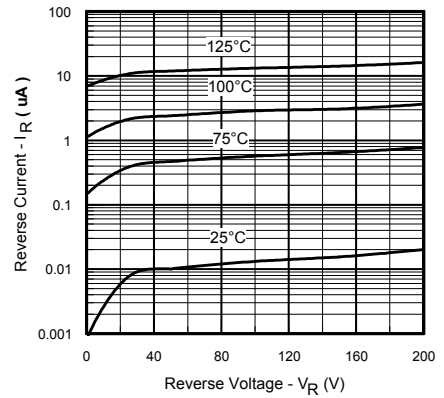
	Parameter	Min.	Typ.	Max.	Units	Test Conditions
$t_{rr}$	Reverse Recovery Time	—	—	35	ns	$I_F = 0.5\text{A}, V_R = 30\text{V}, di/dt = 250\text{A}/\mu\text{s}$
$t_{rr1}$	Reverse Recovery Time	—	42	—	ns	$T_J = 25^\circ\text{C}$ See Fig. 5
$t_{rr2}$		—	61	—		$T_J = 125^\circ\text{C}$ 5
$I_{RRM1}$	Peak Recovery Current	—	4.6	—	A	$T_J = 25^\circ\text{C}$ See Fig. 6
$I_{RRM2}$		—	8.4	—		$T_J = 125^\circ\text{C}$ 6
$Q_{rr1}$	Reverse Recovery Charge	—	105	—	nC	$T_J = 25^\circ\text{C}$ See Fig. 7
$Q_{rr2}$		—	280	—		$T_J = 125^\circ\text{C}$ 7
$di_{(rec)M}/dt1$	Peak Rate of Fall of Recovery Current	—	360	—	A/ $\mu\text{s}$	$T_J = 25^\circ\text{C}$ See Fig. 8
$di_{(rec)M}/dt2$	During $t_b$	—	685	—		$T_J = 125^\circ\text{C}$ 8

**Thermal - Mechanical Characteristics**

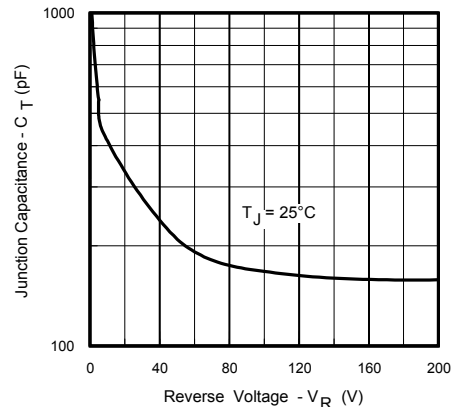
	Parameter	Typ.	Max.	Units
$R_{thJC}$	Junction-to-Case	—	1.25	$^\circ\text{C}/\text{W}$
Wt	Weight	4.3	—	g



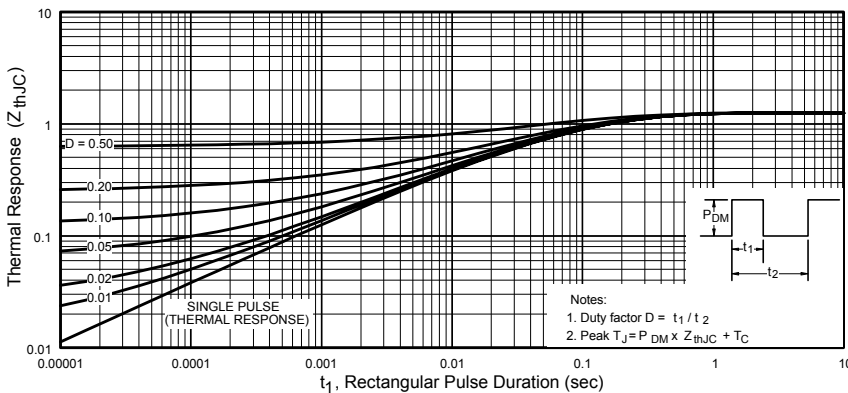
**Fig. 1** - Maximum Forward Voltage Drop Vs. Instantaneous Forward Current



**Fig. 2** - Typical Reverse Current Vs. Reverse Voltage



**Fig. 3** - Typical Junction Capacitance Vs. Reverse Voltage



**Fig. 4** - Maximum Thermal Impedance  $Z_{thjC}$  Characteristics

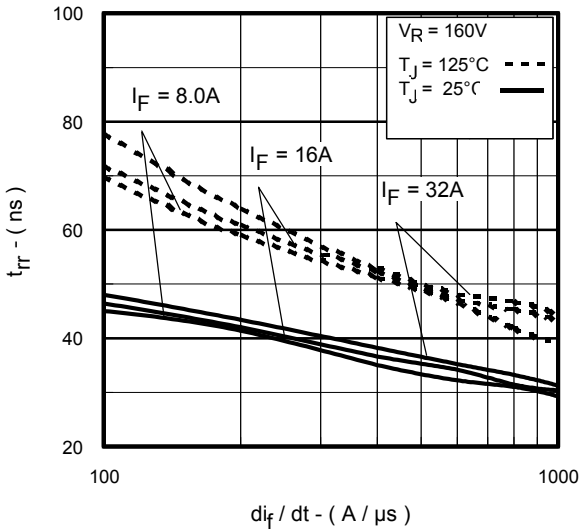


Fig. 5 - Typical Reverse Recovery Vs.  $di_f/dt$ ,

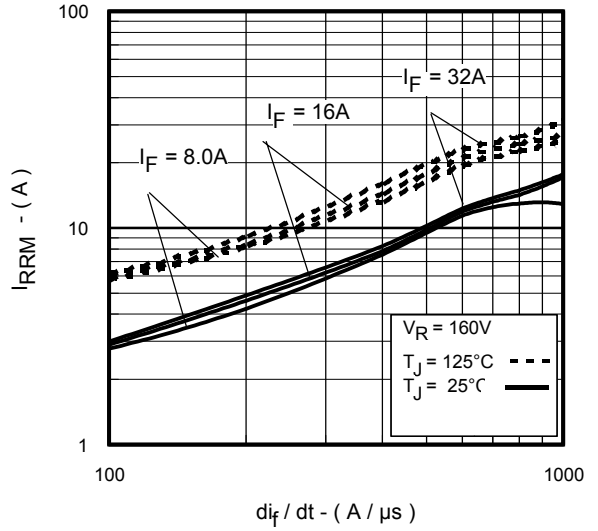


Fig. 6 - Typical Recovery Current Vs.  $di_f/dt$ ,

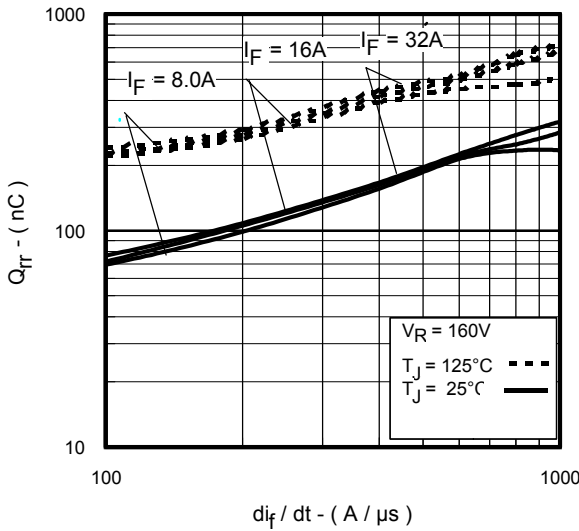


Fig. 7 - Typical Stored Charge Vs.  $di_f/dt$

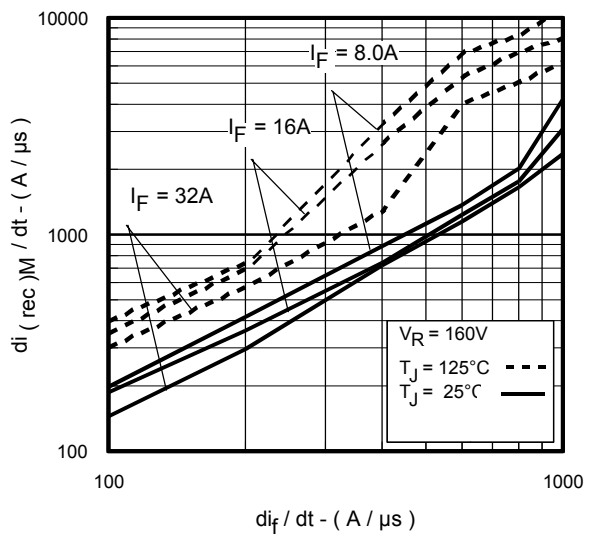


Fig. 8 - Typical  $di_{(rec)M}/dt$  Vs.  $di_f/dt$

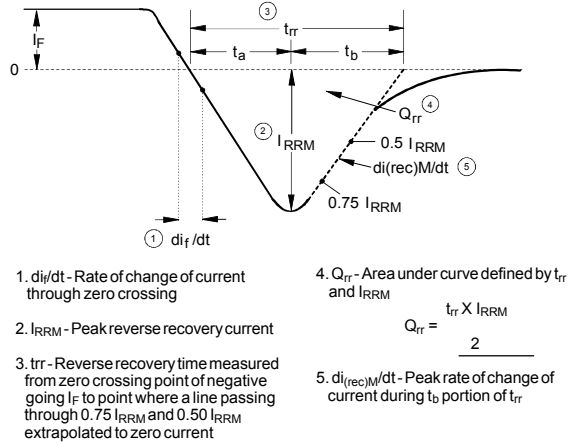
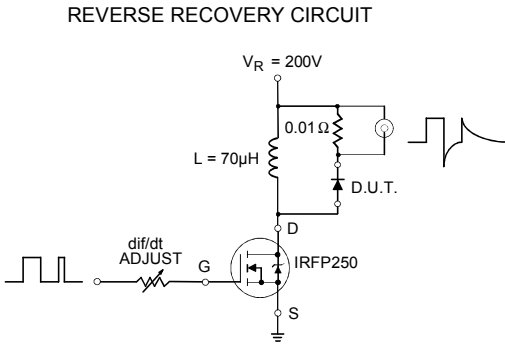
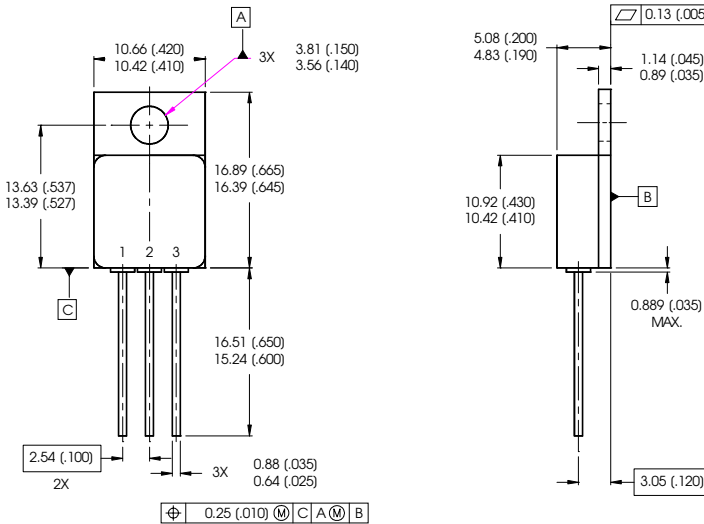


Fig. 9 - Reverse Recovery Parameter Test Circuit

Fig. 10 - Reverse Recovery Waveform and Definitions

Case Outline and Dimensions — TO-257AA



NOTES:

1. DIMENSIONING & TOLERANCING PER ANSI Y14.5M-1994.
2. CONTROLLING DIMENSION: INCH.
3. DIMENSIONS ARE SHOWN IN MILLIMETERS (INCHES).
4. OUTLINE CONFORMS TO JEDEC OUTLINE TO-257AA.

LEAD ASSIGNMENTS

- 1 = CATHODE
- 2 = NO CONNECTION
- 3 = ANODE