HFB16HY20C

HEXFRED
ULTRAFAST, SOFT RECOVERY DIODE

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

Features

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

Description

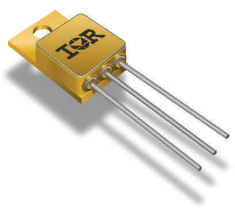
These Ultrafast, soft recovery diodes are optimized to reduce losses and EMI/RFI in high frequency power conditioning systems. An extensive characterization of the recovery behavior for different values of current, temperature and di/dt simplifies the calculations of losses in the operating conditions. 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

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

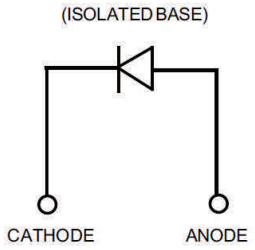
Notes:
① D.C. = 50% rectangle wave
② 1/2 sine wave, 60Hz, Pulse Width = 8.33ms

CASE STYLE



TO-257AA

PIN ASSIGNMENTS



Electrical Characteristics @ T_J = 25°C (unless otherwise specified)

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
V_{BR}	Cathode Anode Breakdown Voltage	200	——	——	V	I_R = 100µA
V_{FM}	Max Forward Voltage See Fig. 1	——	——	1.29	V	I_F = 16A, T_J = -55°C
		——	——	1.17		I_F = 16A, T_J = 25°C
		——	——	1.52		I_F = 32A, T_J = 25°C
		——	——	1.48		I_F = 32A, T_J = 125°C
I_{RM}	Max Reverse Leakage Current	——	——	10	µA	$V_R = V_R$ Rated
	See Fig. 2			200	µA	$V_R = V_R$ Rated, T_J = 125°C
C_T	Junction Capacitance, See Fig. 3	——	——	200	pF	V_R = 200V
L_S	Series Inductance	——	9.8	——	nH	Measured from anode lead to Cathode lead, 6mm (0.25 in) from package

Dynamic Recovery Characteristics @ T_J = 25°C (unless otherwise specified)

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions	
t_{rr}	Reverse Recovery Time	——	——	35	ns	I_F = 0.5A, V_R = 30V, di_f/dt = 250A/µs	
t_{rr1}	Reverse Recovery Time	——	42	——	ns	T_J = 25°C	I_F = 16A
t_{rr2}	See Fig. 5	——	61	——		T_J = 125°C	
I_{RRM1}	Peak Recovery Current	——	4.6	——	A	T_J = 25°C	V_R = 160V
I_{RRM2}	See Fig. 6	——	8.4	——		T_J = 125°C	
Q_{rr1}	Reverse Recovery Charge	——	105	——	nC	T_J = 25°C	di_f/dt = 200A/µs
Q_{rr2}	See Fig. 7	——	280	——		T_J = 125°C	
$di_{(rec)M}/dt1$	Peak Rate of Fall of Recovery Current	——	360	——	A/µs	T_J = 25°C	
$di_{(rec)M}/dt1$	During tb - See Fig. 8	——	685	——		T_J = 125°C	

Thermal - Mechanical Characteristics

Symbol	Parameter	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case, See Fig. 4	——	1.25	°C/W
Wt	Weight	4.3	——	g

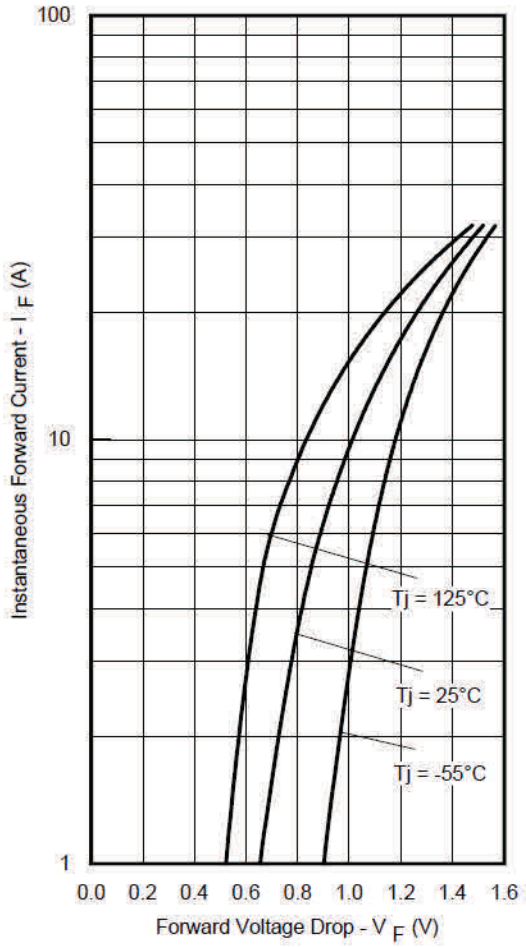


Fig. 1 Max. Forward Voltage Drop Characteristics

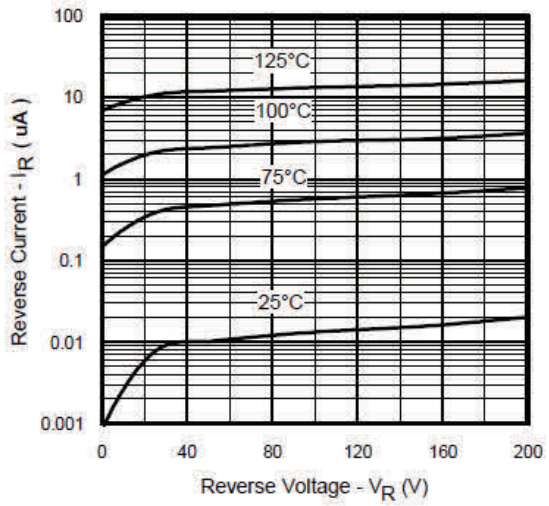


Fig. 2 Typical Values of Reverse Current Vs. Reverse Voltage

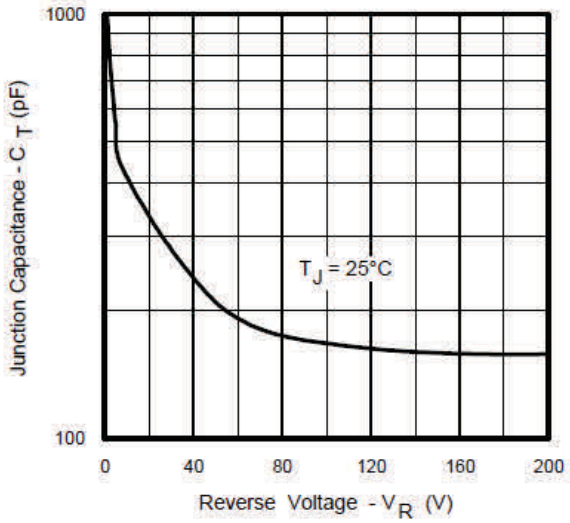


Fig. 3 Typical Junction Capacitance Vs. Reverse Voltage

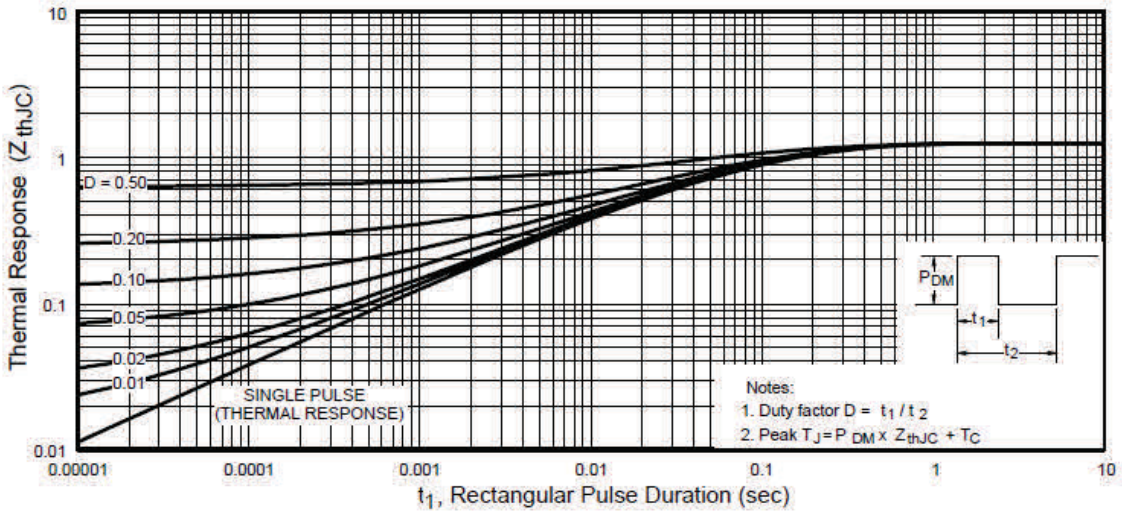


Fig. 4 Max. Thermal Impedance ZthJC Characteristics

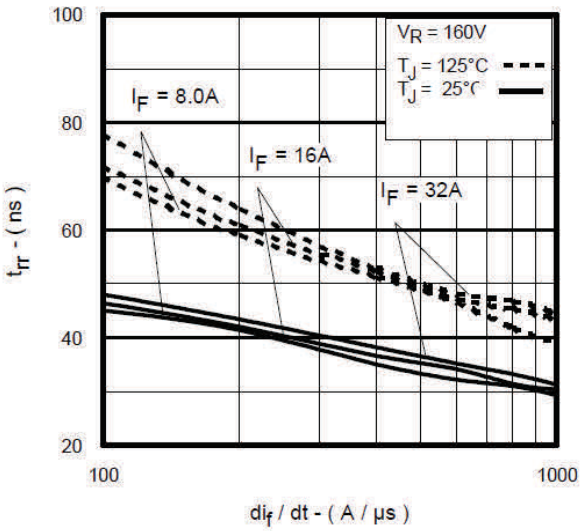


Fig. 5 Typical Reverse Recovery Vs di_f/dt

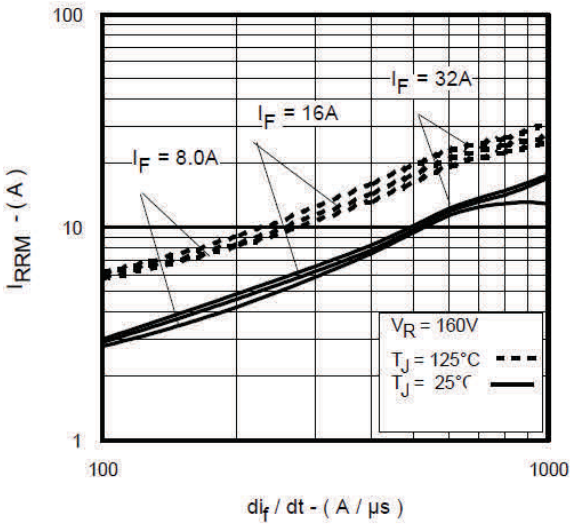


Fig. 6 Typical Recovery Current Vs di_f/dt

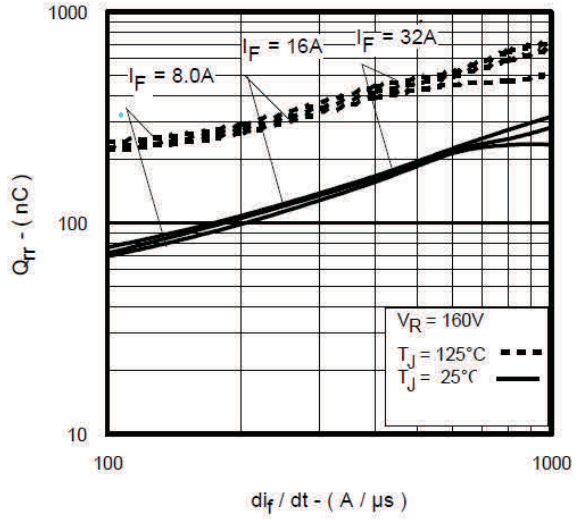


Fig. 7 Typical Stored Charge Vs di_f/dt

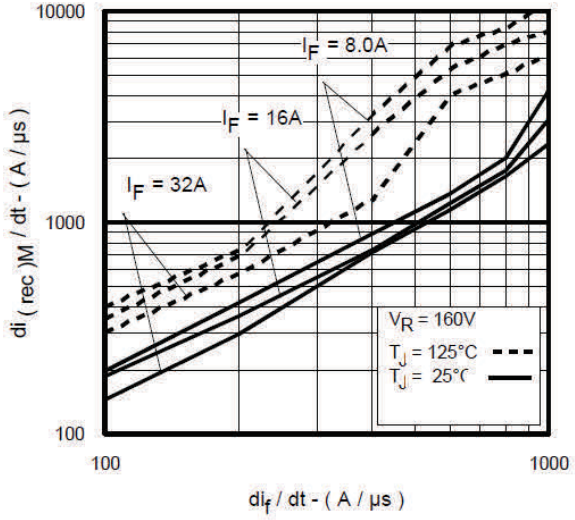


Fig. 8 Typical $di_{(rec)M}/dt$ Vs di_f/dt

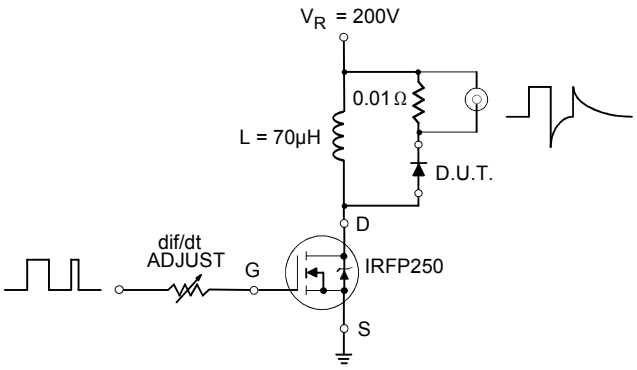
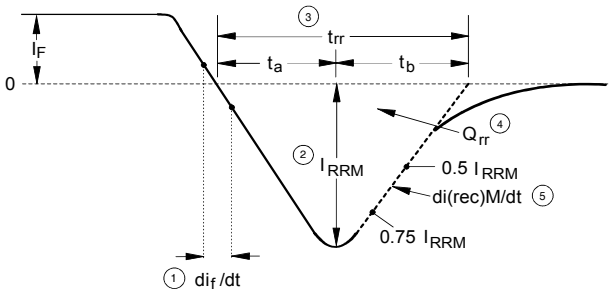


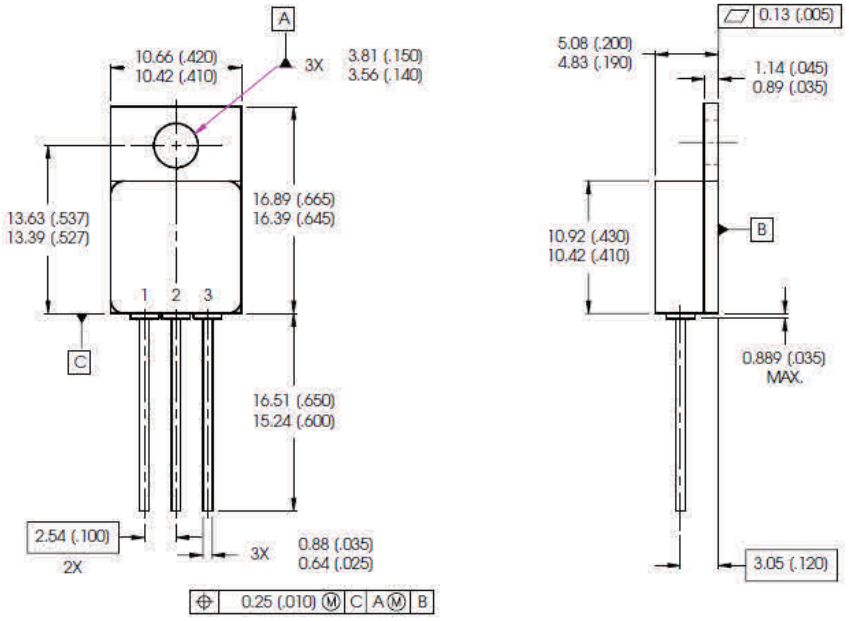
Fig. 9 Typical Reverse Recovery Parameter Test Circuit



① di_f/dt - Rate of change of current through zero crossing.
② I_{RRM} - Peak reverse recovery current.
③ t_{rr} - Reverse recovery time measured from zero crossing point of negative going I_F to point where a line passing through $0.75I_{RRM}$ and $0.5I_{RRM}$ extrapolated to zero current.
④ Q_{rr} - Area under curve defined by t_{rr} and I_{RRM} - $Q_{rr} = (t_{rr} \times I_{RRM}) / 2$
⑤ $di_{(rec)M}/dt$ - Peak rate of change of current during t_b position of t_{rr}.

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

Infineon Technologies Service Center: USA Tel: +1 (866) 951-9519 and International Tel: +49 89 234 65555
Leominster, Massachusetts 01453, USA Tel: +1 (978) 534-5776
San Jose, California 95134, USA Tel: +1 (408) 434-5000
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