

HEXFRED ULTRAFAST, SOFT RECOVERY DIODE

$$V_R = 1200V$$

$$V_F = 3.0V$$

$$Q_{RR} = 675nC$$

Features

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

Description

These 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

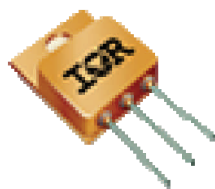
Characteristics	Characteristics	Max.	Units
V_R	Cathode to Anode Voltage (Per Leg)	1200	V
$I_F (AV)$	Continuous Forward Current, $T_C = 100^\circ C$ (Per Leg) ①	14	A
I_{FSM}	Single Pulse Forward Current, $T_C = 25^\circ C$ (Per Leg) ②	190	A
$P_D @ T_C = 25^\circ C$	Maximum Power Dissipation	104	W
T_J, T_{STG}	Operating Junction and Storage Temperature Range	-55 to 150	$^\circ C$

Notes:

① D.C. = 50% rectangle wave

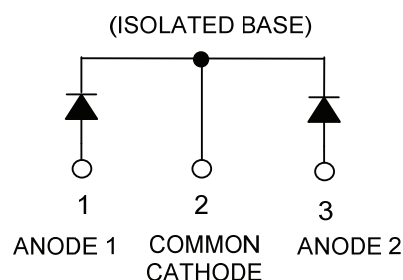
② 1/2 sine wave, 60Hz, Pulse Width = 8.33ms

CASE STYLE



TO-258AA

PIN ASSIGNMENTS



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

	Parameter	Min.	Typ.	Max.	Units	Test Conditions
V_{BR}	Cathode Anode Breakdown Voltage	1200	—		V	$I_R = 100\mu\text{A}$
V_{FM}	Max Forward Voltage See Fig. 1	—	—	3.5	V	$I_F = 14\text{A}$, $T_J = -55^\circ\text{C}$
		—	—	3.0		$I_F = 14\text{A}$
		—	—	3.9		$I_F = 28\text{A}$
		—	—	2.7		$I_F = 14\text{A}$, $T_J = 125^\circ\text{C}$
I_{RM}	Max Reverse Leakage Current See Fig. 2	—	—	10	μA	$V_R = V_R$ Rated
		—	—	1.0	mA	$V_R = V_R$ Rated, $T_J = 125^\circ\text{C}$
C_T	Junction Capacitance, See Fig. 3	—	—	40	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

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

	Parameter	Min.	Typ.	Max.	Units	Test Conditions	
t_{rr1}	Reverse Recovery Time	—	80	135	ns	$T_J = 25^\circ\text{C}$	$I_F = 14\text{A}$
t_{rr2}	See Fig. 5	—	120	—		$T_J = 125^\circ\text{C}$	
I_{RRM1}	Peak Recovery Current	—	6.0	10	A	$T_J = 25^\circ\text{C}$	$V_R = 200\text{V}$
I_{RRM2}	See Fig. 6	—	9.0	—		$T_J = 125^\circ\text{C}$	
Q_{rr1}	Reverse Recovery Charge	—	400	675	nC	$T_J = 25^\circ\text{C}$	$di_F/dt = 200\text{A}/\mu\text{s}$
Q_{rr2}	See Fig. 7	—	800	—		$T_J = 125^\circ\text{C}$	
$di_{(rec)M}/dt1$	Peak Rate of Fall of Recovery Current	—	190	—	A/ μs	$T_J = 25^\circ\text{C}$	
$di_{(rec)M}/dt1$	During t_b - See Fig. 8	—	170	—		$T_J = 125^\circ\text{C}$	

Thermal - Mechanical Characteristics

	Parameter	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case, Single Leg Conducting. See Fig. 4	—	1.2	$^\circ\text{C}/\text{W}$
Wt	Weight	10.9	—	g

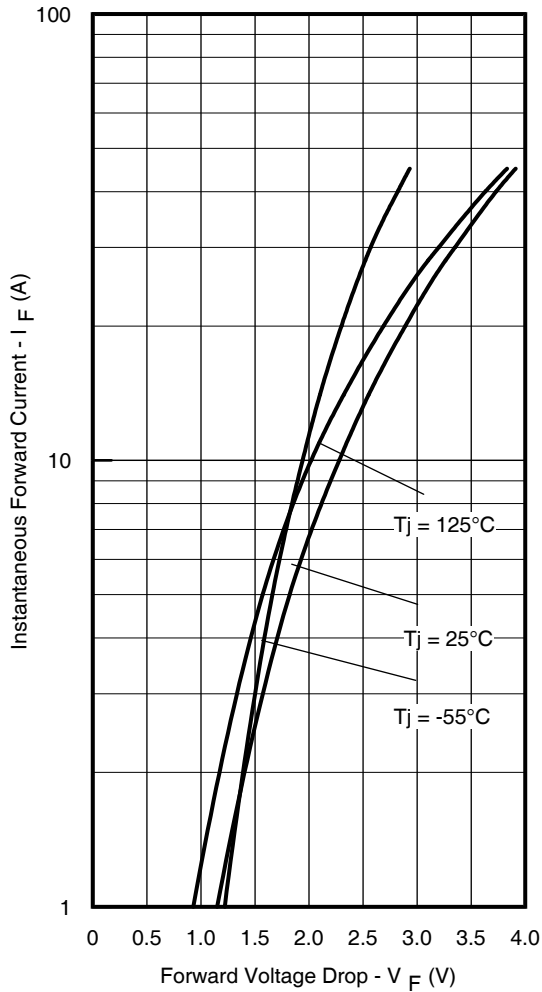


Fig. 1 Typical Forward Voltage Drop Characteristics (Per Leg)

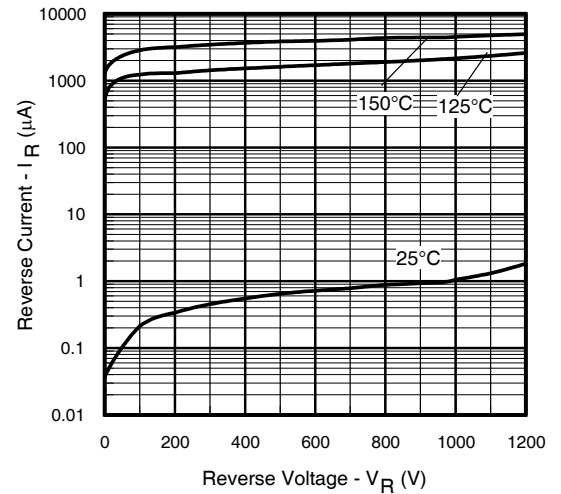


Fig. 2 Typical Values of Reverse Current Vs. Reverse Voltage (Per Leg)

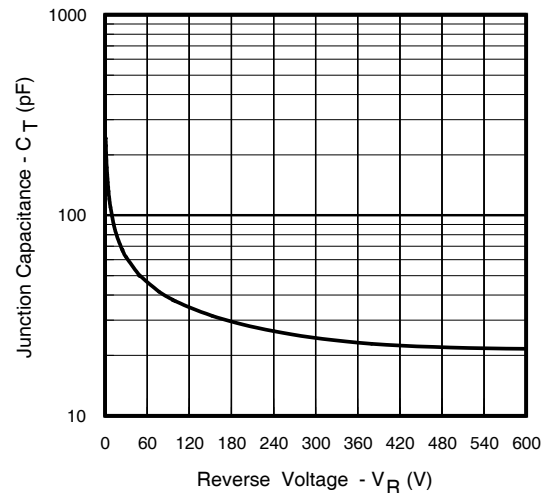


Fig. 3 Typical Junction Capacitance Vs. Reverse Voltage (Per Leg)

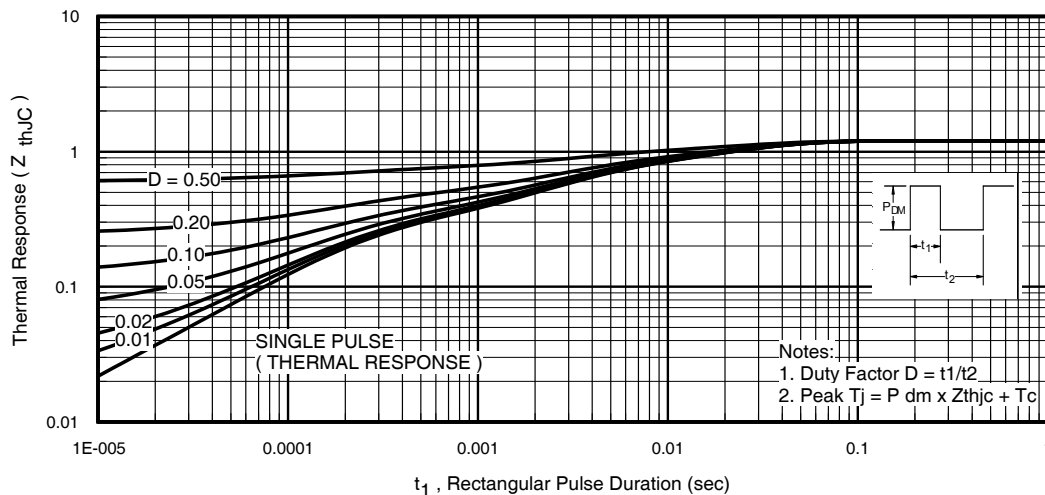


Fig. 4 Max. Thermal Impedance Z_{thJC} Characteristics (Per Leg)

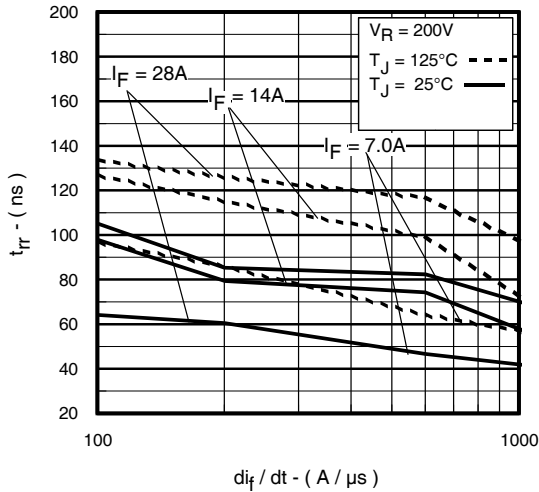


Fig. 5 Typical Reverse Recovery Vs di_f/dt (Per Leg)

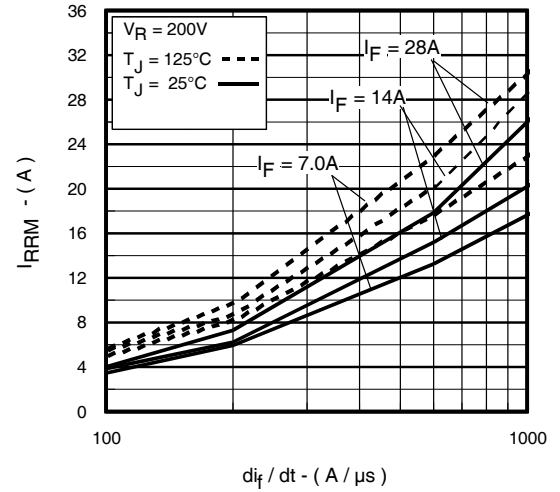


Fig. 6 Typical Recovery Current Vs di_f/dt (Per Leg)

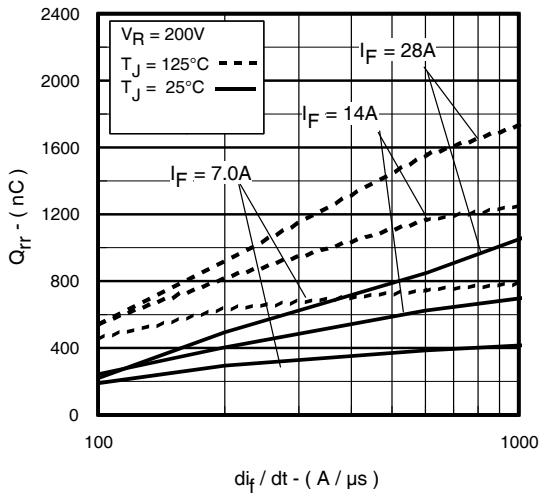


Fig. 7 Typical Stored Charge Vs di_f/dt (Per Leg)

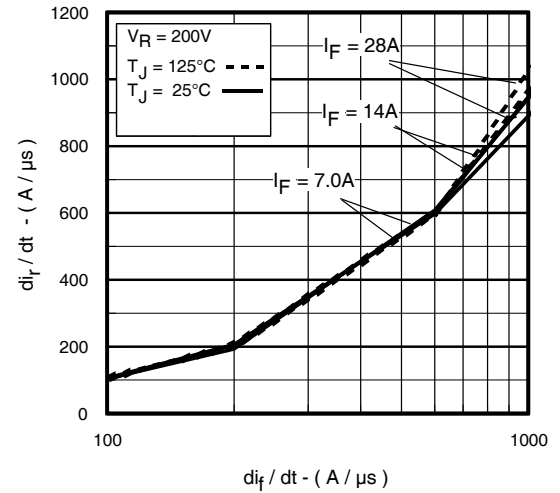


Fig. 8 Typical $di_{(rec)M}/dt$ Vs di_f/dt (Per Leg)

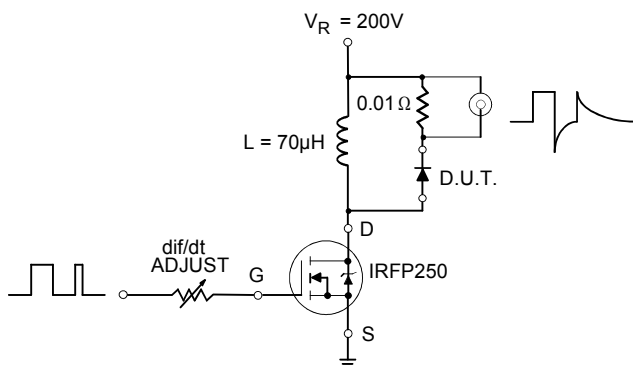
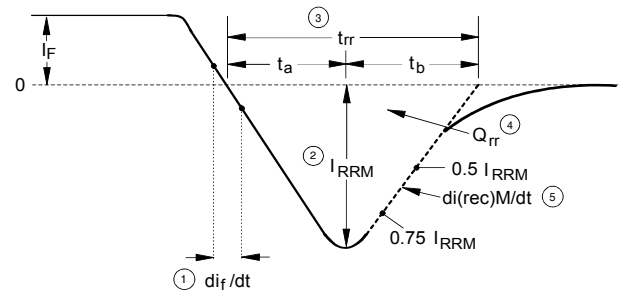


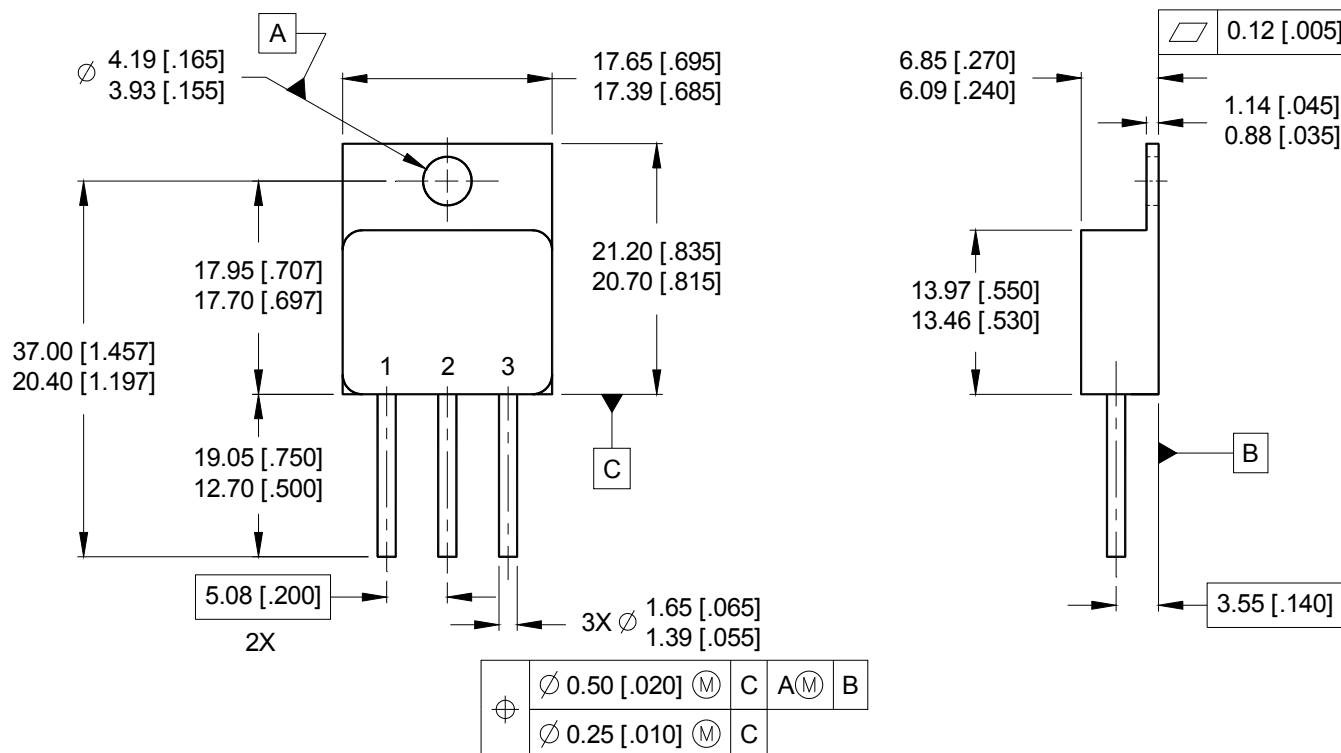
Fig. 9 Typical Reverse Recovery Parameter Test Circuit



- 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 of negative going I_F to point where a line passing through $0.75 I_{RRM}$ and $0.5 I_{RRM}$ 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-258AA



NOTES:

1. DIMENSIONING & TOLERANCING PER ASME Y14.5M-1994.
2. ALL DIMENSIONS ARE SHOWN IN MILLIMETERS [INCHES].
3. CONTROLLING DIMENSION: INCH.
4. CONFORMS TO JEDEC OUTLINE TO-258AA.

PIN ASSIGNMENTS

Refer to page 1.

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