PD -2.475A

International
IOR Rectifier

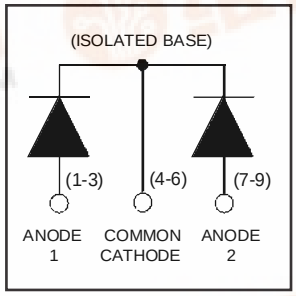
HFA75MB40C

HEXFRED™

Ultrafast, Soft Recovery Diode

Features

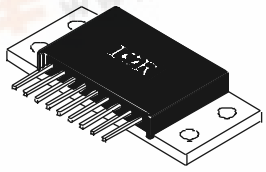
- Reduced RFI and EMI
- Reduced Snubbing
- Extensive Characterization of Recovery Parameters



V_R = 400V
V_F(typ.)③ = 1V
$I_{F(AV)}$ = 75A
Q_{rr} (typ.) = 200nC
I_{RRM}(typ.) = 6A
t_{rr}(typ.) = 30ns
$di_{(rec)M}/dt$ (typ.)③ = 190A/µs

Description

HEXFRED™ 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.



D-60
(MODIFIED T0-249AA)

Absolute Maximum Ratings (per Leg)

	Parameter	Max.	Units
V_R	Cathode-to-Anode Voltage	400	V
I_F @ T_C = 25°C	Continuous Forward Current	75	A
I_F @ T_C = 100°C	Continuous Forward Current	36	
I_{FSM}	Single Pulse Forward Current ①	300	
I_{AS}	Maximum Single Pulse Avalanche Current ②	5.0	
E_{AS}	Non-Repetitive Avalanche Energy ②	1.4	mJ
P_D @ T_C = 25°C	Maximum Power Dissipation	125	W
P_D @ T_C = 100°C	Maximum Power Dissipation	50	
T_J T_{STG}	Operating Junction and Storage Temperature Range	-55 to +150	°C
	Soldering Temperature, for 10 sec.	300 (0.063 in. (1.6mm) from case)	

Thermal - Mechanical Characteristics

	Parameter	Min.	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case, Single Leg Conducting	-----	-----	1.0	°C/W K/W
	Junction-to-Case, Both Legs Conducting	-----	-----	0.50	
$R_{\theta CS}$	Case-to-Sink, Flat, Greased Surface	-----	0.10	-----	
Wt	Weight	-----	58 (2.0)	-----	g (oz)
	Mounting Torque	35 (4.0)	-----	50 (5.7)	lbf•in (N•m)

Note: ① Limited by junction temperature
② L = 100µH, duty cycle limited by max T_J
③ 125°C

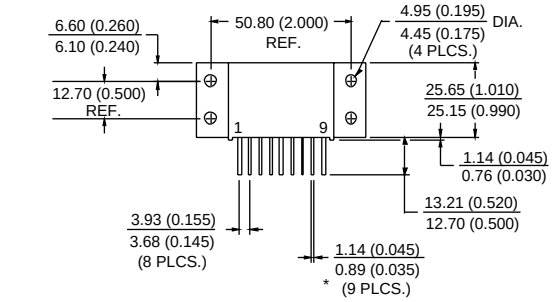
5/5/97

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

	Parameter	Min.	Typ.	Max.	Units	Test Conditions	
V_{BR}	Cathode Anode Breakdown Voltage	400	–––	–––	V	I_R = 100µA	
V_{FM}	Max Forward Voltage	–––	1.1	1.3	V	I_F = 35A	See Fig. 1
		–––	1.3	1.5		I_F = 75A	
		–––	1.0	1.2		I_F = 35A, T_J = 125°C	
I_{RM}	Max Reverse Leakage Current	–––	0.50	3.0	µA	V_R = V_R Rated	See Fig. 2
		–––	0.75	4.0	mA	T_J = 125°C, V_R = 320V	
C_T	Junction Capacitance	–––	90	125	pF	V_R = 200V	See Fig. 3
L_S	Series Inductance	–––	9.2	–––	nH	Lead to lead 5mm from package body	

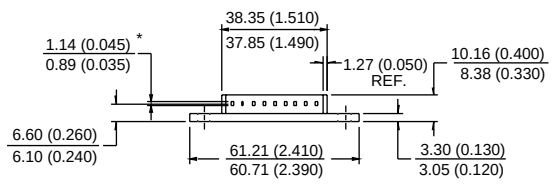
Dynamic Recovery Characteristics (per Leg) @ T_J = 25°C (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Test Conditions		
t_{rr}	Reverse Recovery Time	–––	30	–––	ns	I_F = 1.0A, di_f/dt = 200A/µs, V_R = 30V		
t_{rr1}		–––	67	100		T_J = 25°C	See Fig.	I_F = 35A
t_{rr2}		–––	110	170		T_J = 125°C	5	
I_{RRM1}	Peak Recovery Current	–––	6.0	11	A	T_J = 25°C	See Fig.	V_R = 200V
I_{RRM2}		–––	9.0	16		T_J = 125°C	6	
Q_{rr1}	Reverse Recovery Charge	–––	200	540	nC	T_J = 25°C	See Fig.	di_f/dt = 200A/µs
Q_{rr2}		–––	500	1300		T_J = 125°C	7	
$di_{(rec)M}/dt1$	Peak Rate of Fall of Recovery Current	–––	240	–––	A/µs	T_J = 25°C	See Fig.	
$di_{(rec)M}/dt2$	During t_b	–––	190	–––		T_J = 125°C	8	



* PRE-SOLDER DIP DIMENSIONS

LEAD ASSIGNMENTS
1-3 ANODE
4-6 CATHODE
7-9 ANODE
BASE (ISOLATED)



Outline D-60 (Modfied JEDEC TO - 249AA)
Dimensions in millimeters and inches

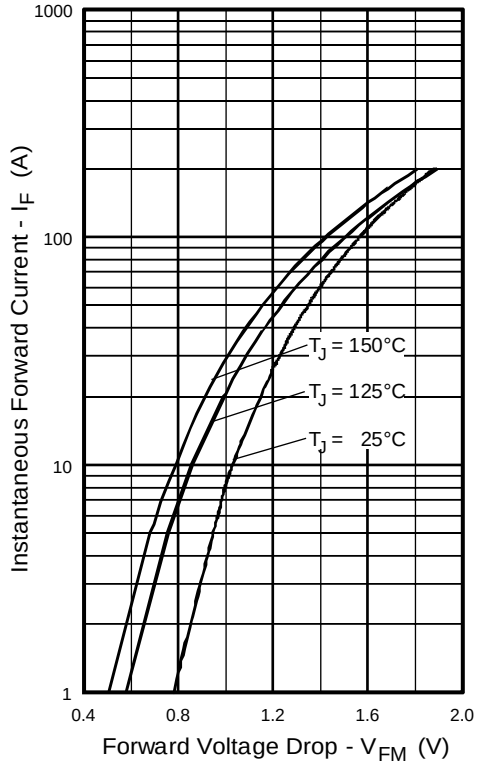


Fig. 1 - Maximum Forward Voltage Drop vs. Instantaneous Forward Current, (per Leg)

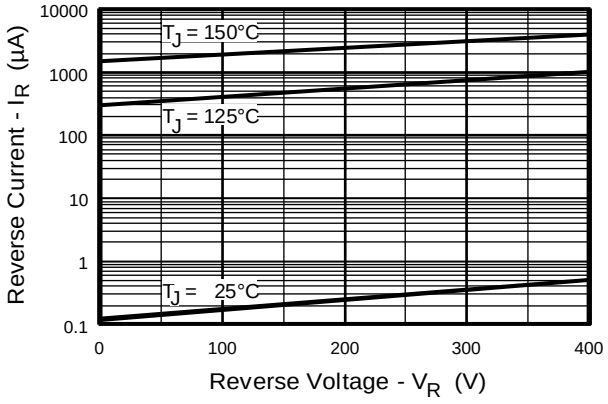


Fig. 2 - Typical Reverse Current vs. Reverse Voltage, (per Leg)

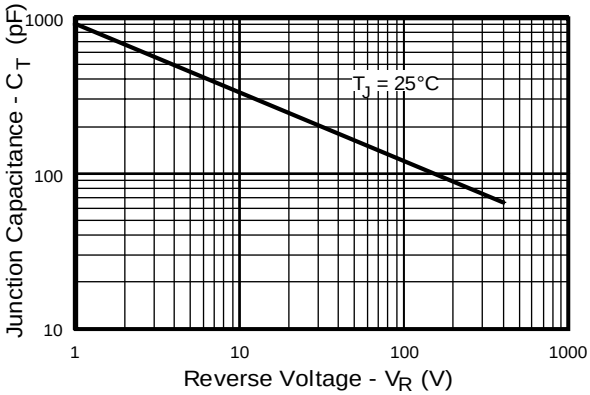


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage, (per Leg)

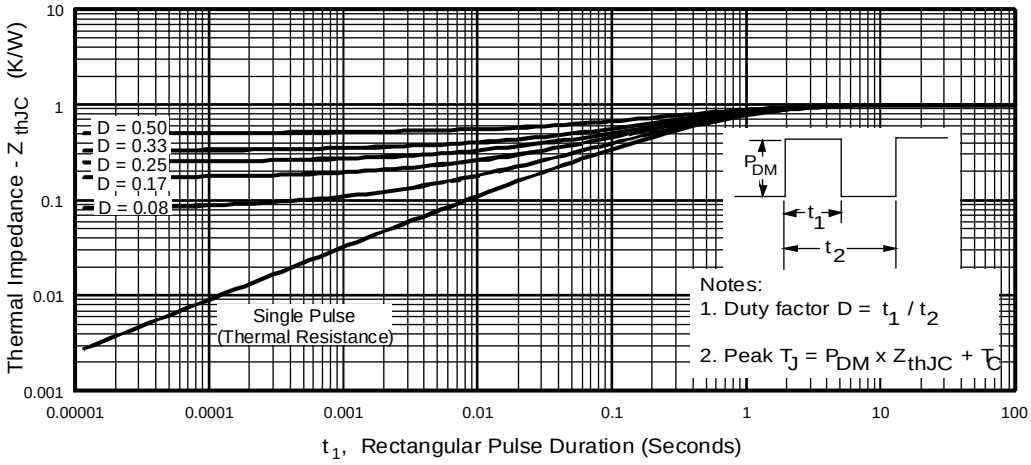


Fig. 4 - Maximum Thermal Impedance Z_{thjc} Characteristics, (per Leg)

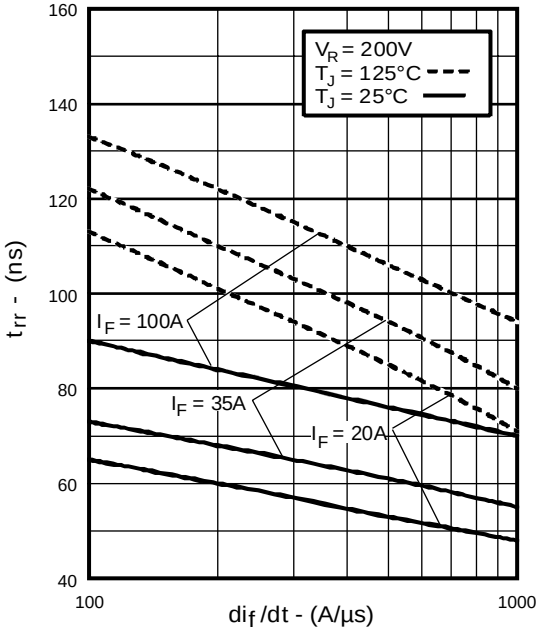


Fig. 5 - Typical Reverse Recovery vs. di_f/dt, (per Leg)

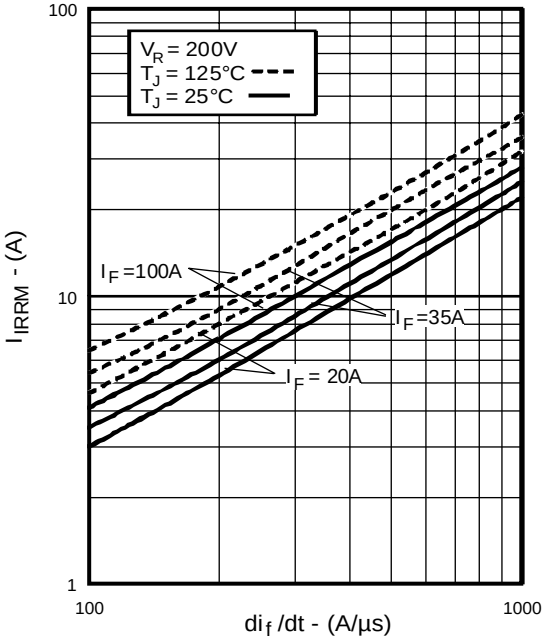


Fig. 6 - Typical Recovery Current vs. di_f/dt, (per Leg)

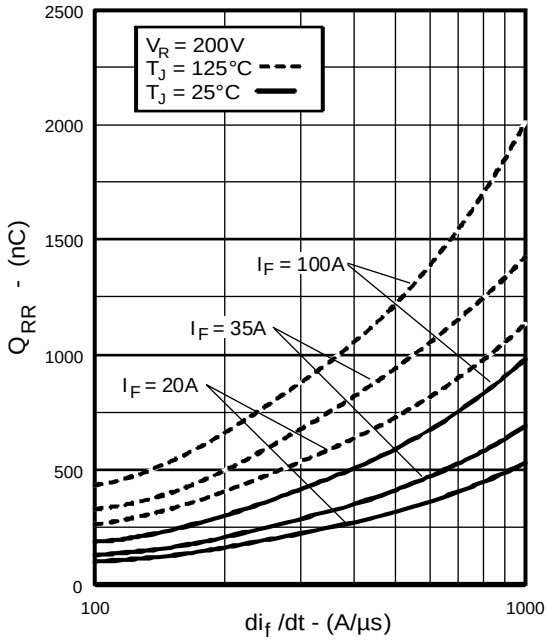


Fig. 7 - Typical Stored Charge vs. di_f/dt, (per Leg)

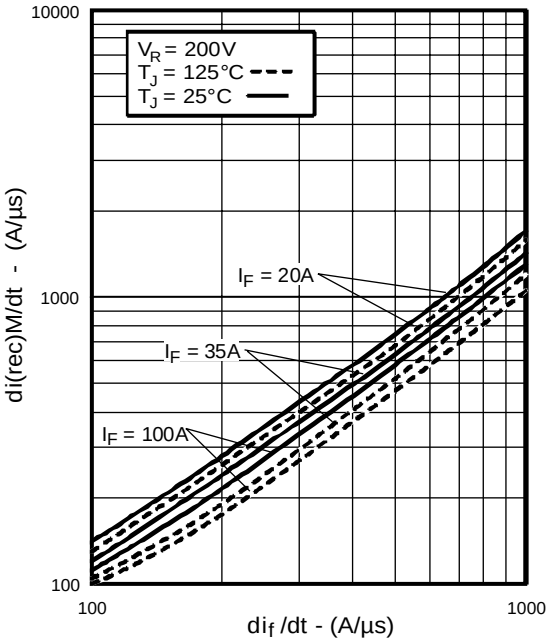


Fig. 8 - Typical $di_{(rec)M}/dt$ vs. di_f/dt, (per Leg)

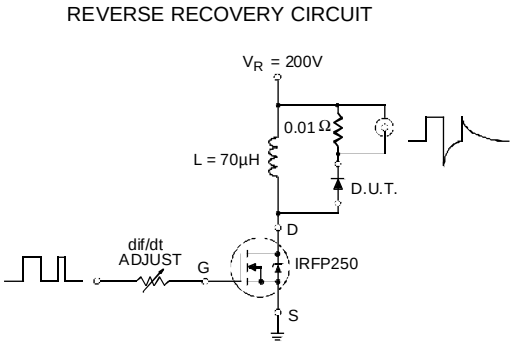


Fig. 9 - Reverse Recovery Parameter Test Circuit

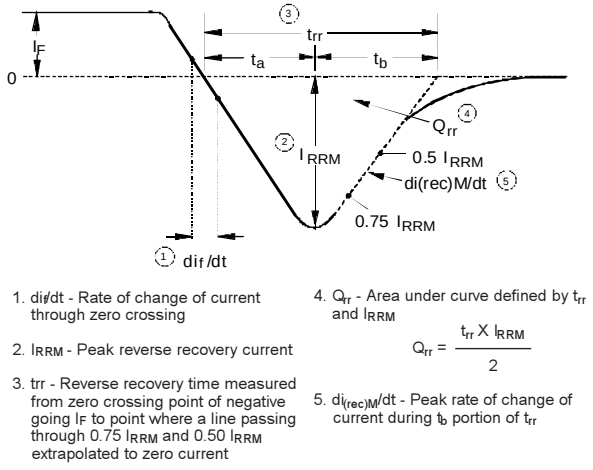


Fig. 10 - Reverse Recovery Waveform and Definitions

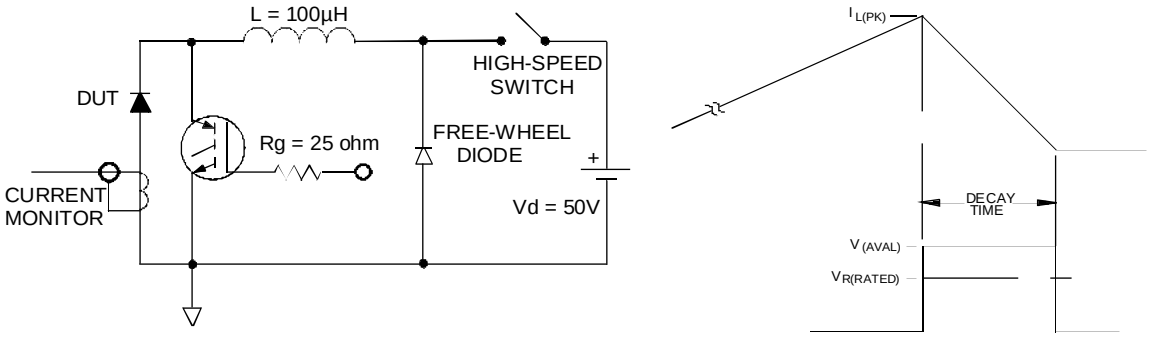


Fig. 11 - Avalanche Test Circuit and Waveforms

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