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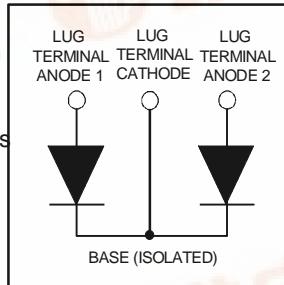
HFA100MD60C

HEXFRED™

Ultrafast, Soft Recovery Diode

Features

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

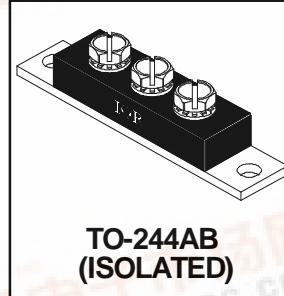


$V_R = 600V$
$V_F = 1.4V$
$Q_{rr}^* = 780nC$
$dI_{(rec)}M/dt^* = 240A/\mu s$

* 125°C

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.

**Absolute Maximum Ratings (per Leg)**

	Parameter	Max.	Units
V_R	Cathode-to-Anode Voltage	600	V
$I_F @ T_C = 25^\circ C$	Continuous Forward Current	83	A
$I_F @ T_C = 100^\circ C$	Continuous Forward Current	40	
I_{FSM}	Single Pulse Forward Current ①	400	
I_{AS}	Maximum Single Pulse Avalanche Current ②	2.0	
E_{AS}	Non-Repetitive Avalanche Energy ②	220	μJ
$P_D @ T_C = 25^\circ C$	Maximum Power Dissipation	180	W
$P_D @ T_C = 100^\circ C$	Maximum Power Dissipation	71	
T_J T_{STG}	Operating Junction and Storage Temperature Range	-55 to +150	C

Thermal - Mechanical Characteristics

	Parameter	Min.	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case, Single Leg Conducting	—	—	0.70	$^\circ C/W$ K/W
	Junction-to-Case, Both Legs Conducting	—	—	0.35	
$R_{\theta CS}$	Case-to-Sink, Flat, Greased Surface	—	0.10	—	
W_t	Weight	—	79 (2.8)	—	g (oz)
	Mounting Torque See Fig. 12	35 (4.0)	—	50 (5.7)	$lb\cdot in$ (N·m)
	Terminal Torque	50 (5.7)	—	75 (8.5)	

Note: ① Limited by junction temperature

② $L = 100\mu H$, duty cycle limited by max T_J

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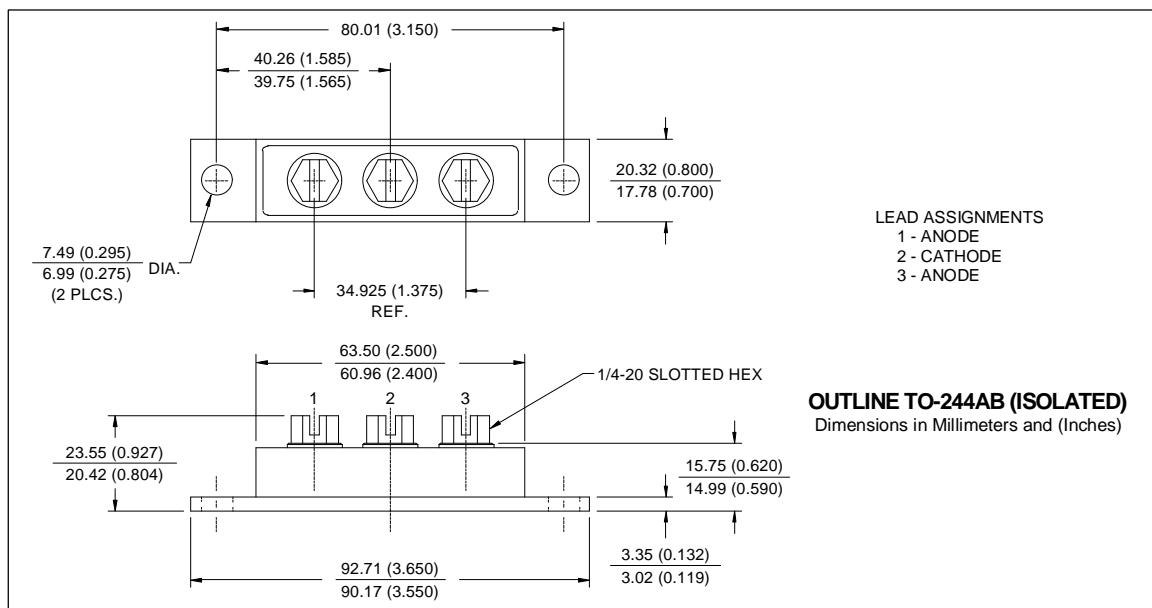


Electrical Characteristics (per Leg) @ $T_J = 25^\circ\text{C}$ (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Test Conditions
V _{BR}	Cathode Anode Breakdown Voltage	600	—	—	V	I _R = 100µA
V _{FM}	Max Forward Voltage	—	1.2	1.4	V	I _F = 50A
			1.4	1.6		I _F = 100A
			1.1	1.3	—	I _F = 50A, T _J = 125°C
I _{RM}	Max Reverse Leakage Current	—	4.0	20	µA	V _R = V _R Rated
			1.0	4.0	mA	T _J = 125°C, V _R = 480V
C _T	Junction Capacitance	—	140	250	pF	V _R = 200V
L _S	Series Inductance	—	7.0	—	nH	From top of terminal hole to mounting plane

Dynamic Recovery Characteristics (per Leg) @ $T_0 = 25^\circ\text{C}$ (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Test Conditions	
t_{rr}	Reverse Recovery Time	—	33	—	ns	$I_F = 1.0A$, $dI_f/dt = 200A/\mu s$, $V_R = 30V$	$I_F = 50A$ $V_R = 200V$ $dI_f/dt = 200A/\mu s$
t_{rr1}		—	76	115		$T_J = 25^{\circ}C$	
t_{rr2}		—	130	200		$T_J = 125^{\circ}C$	
I_{RRM1}	Peak Recovery Current	—	8.0	15	A	$T_J = 25^{\circ}C$	$V_R = 200V$
I_{RRM2}		—	12	22		$T_J = 125^{\circ}C$	
Q_{rr1}	Reverse Recovery Charge	—	300	900	nC	$T_J = 25^{\circ}C$	$dI_f/dt = 200A/\mu s$
Q_{rr2}		—	780	2200		$T_J = 125^{\circ}C$	
$di_{(rec)}/dt1$	Peak Rate of Fall of Recovery Current During t_b	—	340	—	A/ μs	$T_J = 25^{\circ}C$	$dI_f/dt = 200A/\mu s$
$di_{(rec)}/dt2$		—	240	—		$T_J = 125^{\circ}C$	



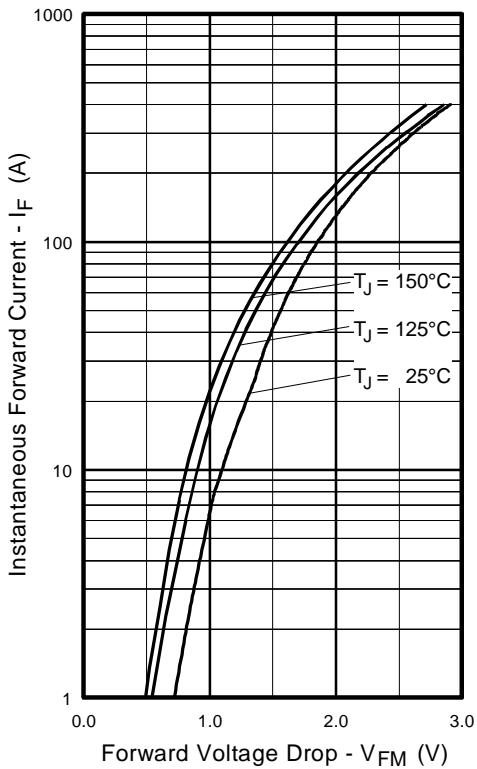
IOR**HFA100MD60C**

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

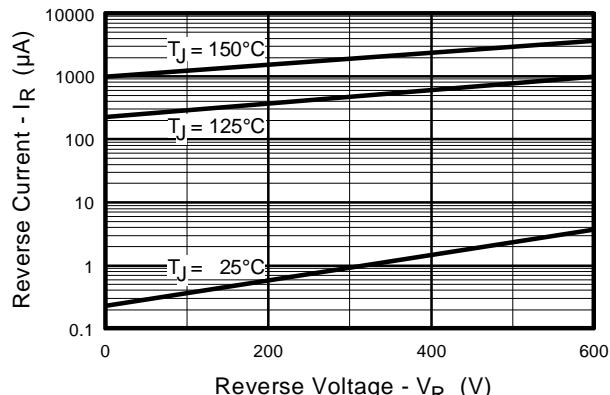


Fig. 2 - Typical Reverse Current vs. Reverse Voltage, (per Leg)

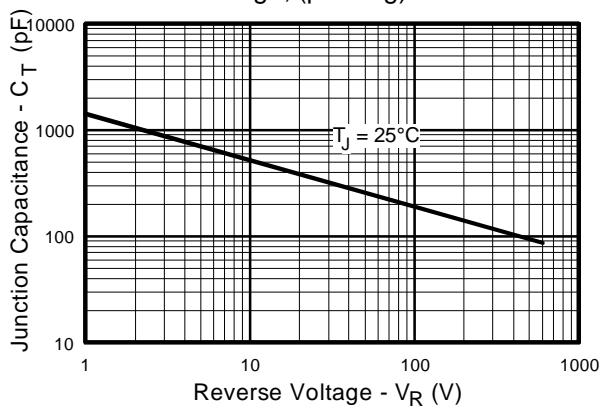


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage, (per Leg)

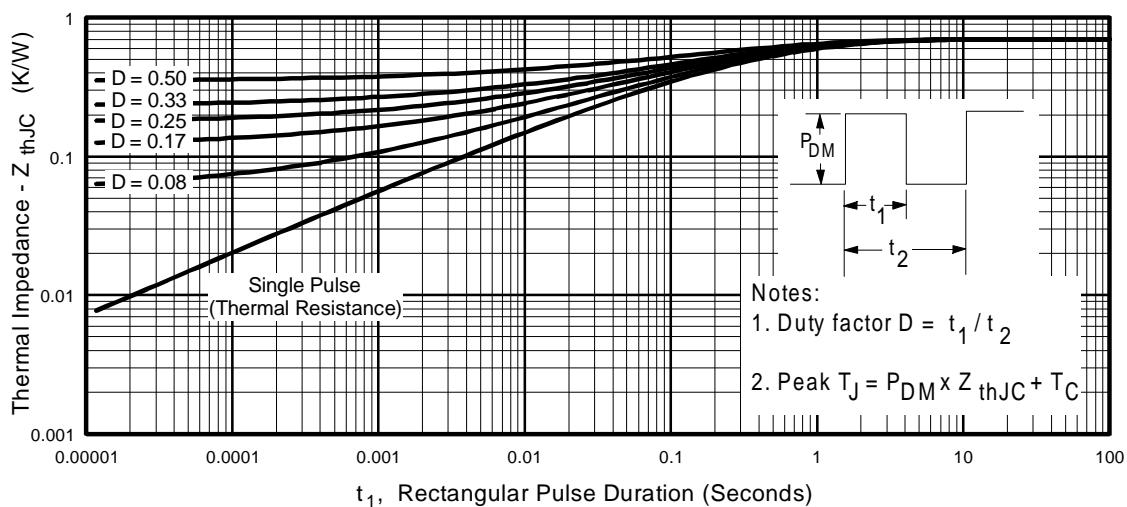
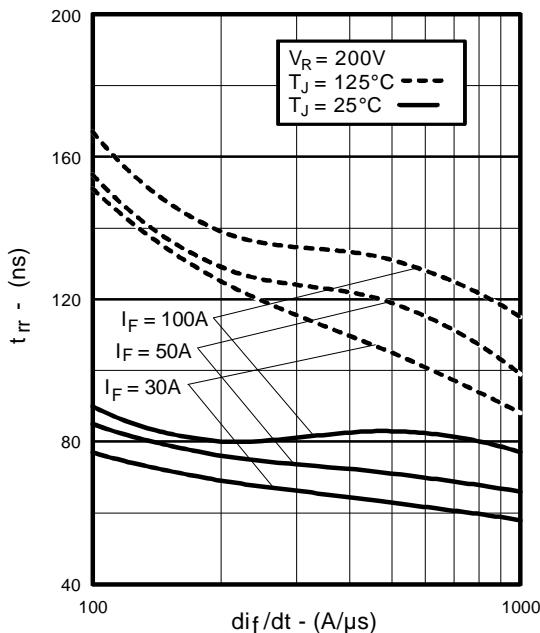


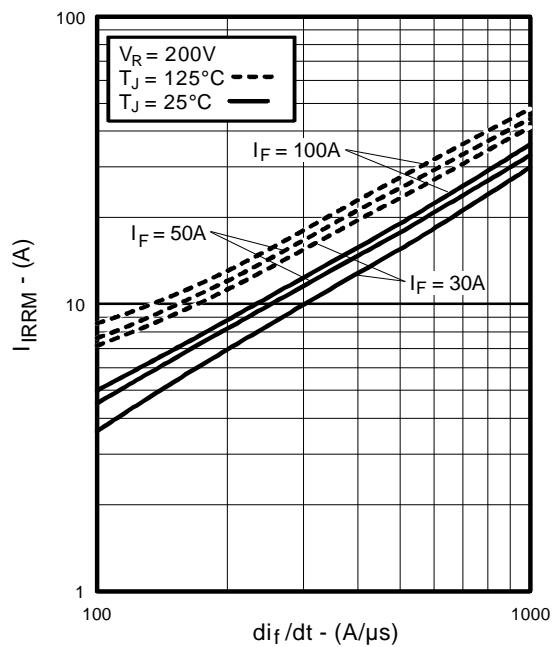
Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics, (per Leg)

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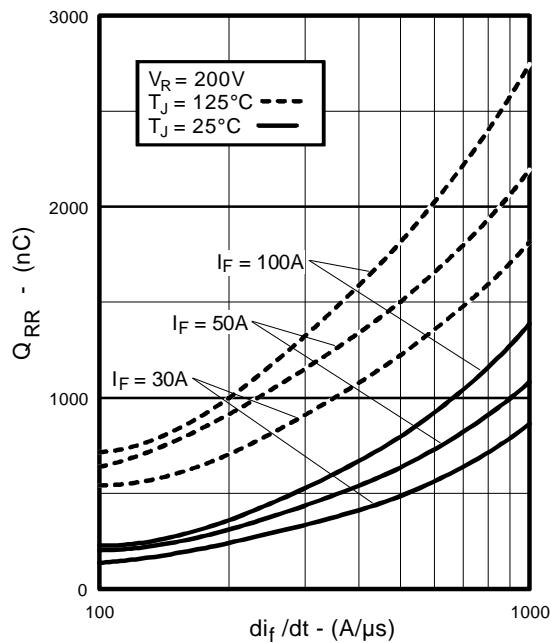
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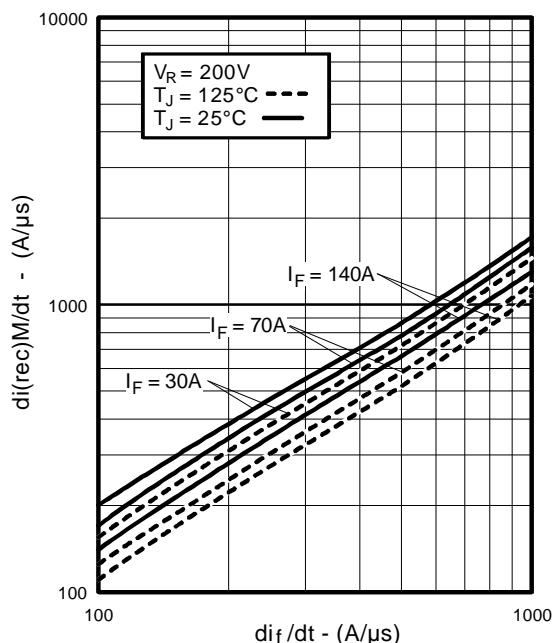
**Fig. 5 - Typical Reverse Recovery vs. dI/dt ,
(per Leg)**



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

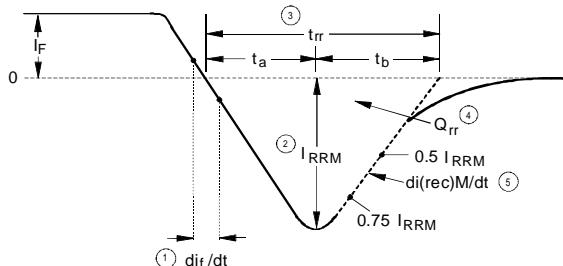
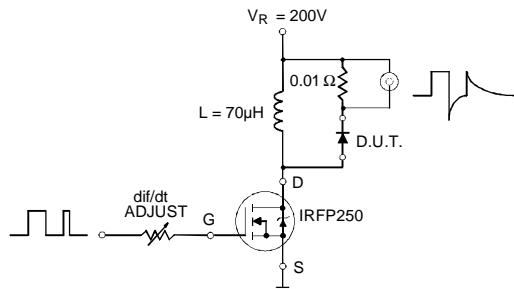


**Fig. 7 - Typical Stored Charge vs. dI/dt ,
(per Leg)**



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

REVERSE RECOVERY CIRCUIT



1. di/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 $0.75 I_{RRM}$ and $0.50 I_{RRM}$ extrapolated to zero current
 4. Q_{rr} - Area under curve defined by t_{rr} and I_{RRM}
 5. $di_{(rec)M}/dt$ - Peak rate of change of current during t_{rr} portion of t_{rr}
- $$Q_{rr} = \frac{t_{rr} \times I_{RRM}}{2}$$

Fig. 9 - Reverse Recovery Parameter Test Circuit

Fig. 10 - Reverse Recovery Waveform and Definitions

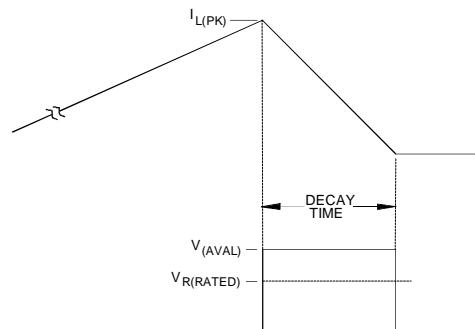
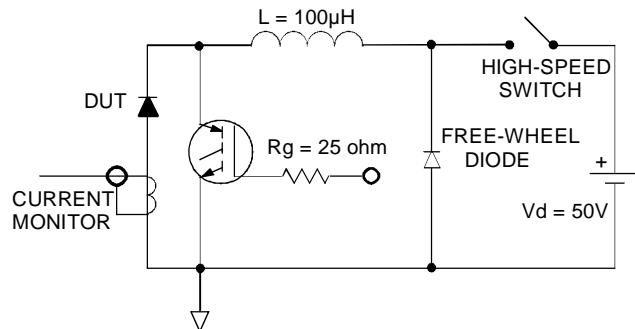


Fig. 11 - Avalanche Test Circuit and Waveforms

International
IR Rectifier

WORLD HEADQUARTERS: 233 Kansas St., El Segundo, California 90245, Tel: (310) 322 3331

EUROPEAN HEADQUARTERS: Hurst Green, Oxted, Surrey RH8 9BB, UK Tel: (44) 0883 713215

IR CANADA: 7321 Victoria Park Ave., Suite 201, Markham, Ontario L3R 3L1, Tel: (905) 475 1897 **IR GERMANY:** Saalburgstrasse 157, 61350 Bad Homburg Tel: 6172 37066 **IR ITALY:** Via Liguria 49, 10071 Borgaro, Torino Tel: (39) 1145 10111

IR FAR EAST: K&H Bldg., 2F, 3-30-4 Nishi-Ikeburo 3-Chome, Toshima-Ki, Tokyo 171 Tel: (03)3983 0641 **IR SOUTHEAST ASIA:** 315 Outram Road, #10-02 Tan Boon Liat Building, 0316 Tel: 65 221 8371

Data and specifications subject to change without notice.