

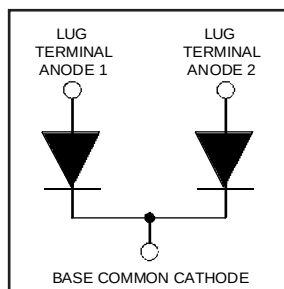
HFA210NJ60C

HEXFRED™

Ultrafast, Soft Recovery Diode

Features

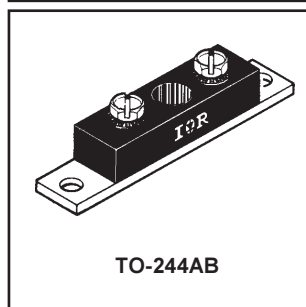
- Reduced RFI and EMI
- Reduced Snubbing
- Extensive Characterization of Recovery Parameters



$V_R = 600V$
$V_F(\text{typ.})^{\textcircled{3}} = 1.2V$
$I_F(AV) = 210A$
$Q_{rr}(\text{typ.}) = 450nC$
$I_{RRM}(\text{typ.}) = 10A$
$t_{rr}(\text{typ.}) = 35ns$
$di_{(rec)}/dt(\text{typ.})^{\textcircled{3}} = 240A/\mu s$

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.



TO-244AB

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	171	A
$I_F @ T_C = 100^\circ C$	Continuous Forward Current	85	
I_{FSM}	Single Pulse Forward Current ^①	600	
E_{AS}	Non-Repetitive Avalanche Energy ^②	220	μJ
$P_D @ T_C = 25^\circ C$	Maximum Power Dissipation	463	W
$P_D @ T_C = 100^\circ C$	Maximum Power Dissipation	185	
T_J	Operating Junction and	-55 to +150	C
T_{STG}	Storage Temperature Range		

Thermal - Mechanical Characteristics

	Parameter	Min.	Typ.	Max.	Units
R_{thJC}	Junction-to-Case, Single Leg Conducting	—	—	0.27	°C/W K/W
	Junction-to-Case, Both Legs Conducting	—	—	0.135	
R_{thCS}	Case-to-Sink, Flat, Greased Surface	—	0.10	—	
Wt	Weight	—	79 (2.8)	—	g (oz)
	Mounting Torque ^④	30 (3.4)	—	40 (4.6)	lbf•in (N•m)
	Mounting Torque Center Hole	12 (1.4)	—	18 (2.1)	
	Terminal Torque	30 (3.4)	—	40 (4.6)	
	Vertical Pull	—	—	80	lbf•in
	2 inch Lever Pull	—	—	35	

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

^④ Mounting surface must be smooth, flat, free of burrs or other protrusions. Apply a thin even film of thermal grease to mounting surface. Gradually tighten each mounting bolt in 5-10 lbf•in steps until desired or maximum torque limits are reached. Module

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PD-2.448 rev. B 02/99

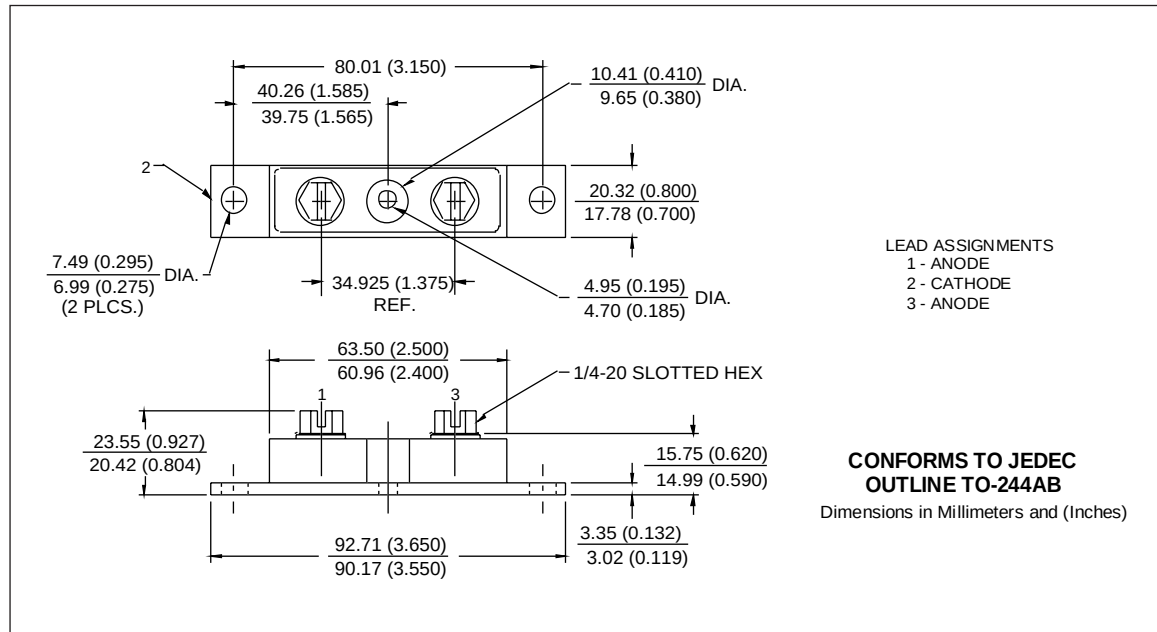
International
IOR Rectifier

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	$I_R = 100\mu\text{A}$
V_{FM} Max Forward Voltage	—	1.3	1.5	V	$I_F = 105\text{A}$
	—	1.5	1.7		$I_F = 210\text{A}$ See Fig. 1
	—	1.2	1.4		$I_F = 105\text{A}, T_J = 125^\circ\text{C}$
I_{RM} Max Reverse Leakage Current	—	6.0	30	μA	$V_R = V_R \text{ Rated}$ See Fig. 2
	—	1.5	6.0	mA	$T_J = 125^\circ\text{C}, V_R = 480\text{V}$
C_T Junction Capacitance	—	200	300	pF	$V_R = 200\text{V}$ See Fig. 3
L_S Series Inductance	—	6.0	—	nH	From top of terminal hole to mounting plane

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

Parameter	Min.	Typ.	Max.	Units	Test Conditions
t_{rr} Reverse Recovery Time	—	35	—	ns	$I_F = 1.0\text{A}, di_f/dt = 200\text{A}/\mu\text{s}, V_R = 30\text{V}$
t_{rr1}	—	90	140		$T_J = 25^\circ\text{C}$
t_{rr2}	—	160	240		$T_J = 125^\circ\text{C}$
I_{RRM1} Peak Recovery Current	—	10	18	A	$T_J = 25^\circ\text{C}$
I_{RRM2}	—	15	30		$T_J = 125^\circ\text{C}$
Q_{rr1} Reverse Recovery Charge	—	450	1300	nC	$T_J = 25^\circ\text{C}$
Q_{rr2}	—	1200	3600		$T_J = 125^\circ\text{C}$
$di_{(rec)M}/dt1$ Peak Rate of Fall of Recovery Current	—	310	—	$\text{A}/\mu\text{s}$	$T_J = 25^\circ\text{C}$
$di_{(rec)M}/dt2$ During t_b	—	240	—		$T_J = 125^\circ\text{C}$



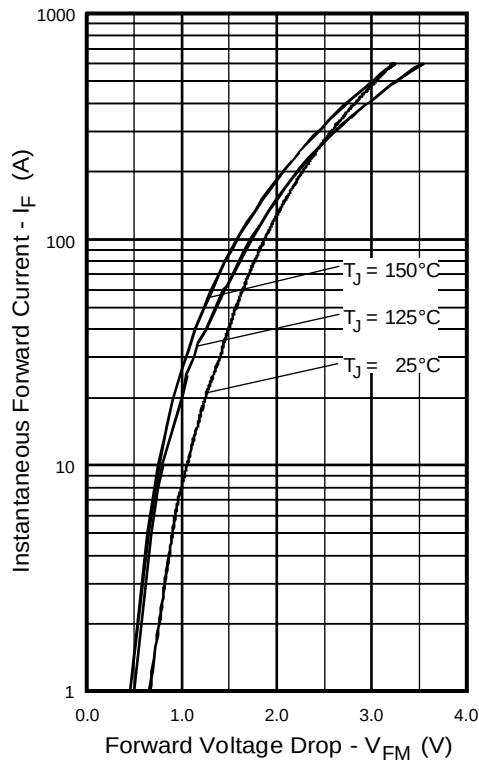


Fig. 1 - Maximum Forward Voltage Drop vs. Instantaneous Forward Current, (per Leg)

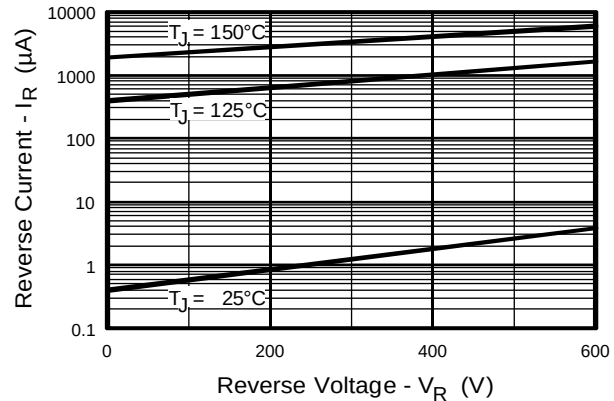


Fig. 2 - Typical Reverse Current vs. Reverse Voltage, (per Leg)

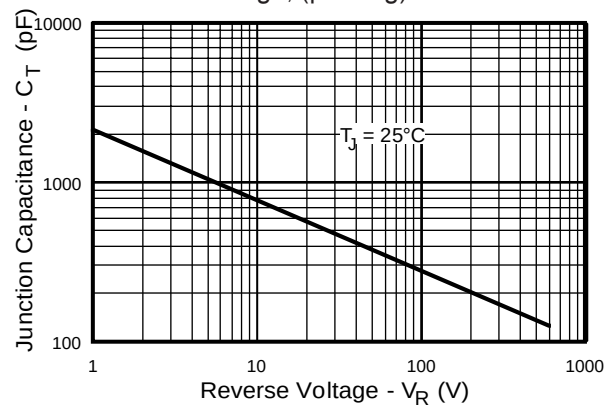


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage, (per Leg)

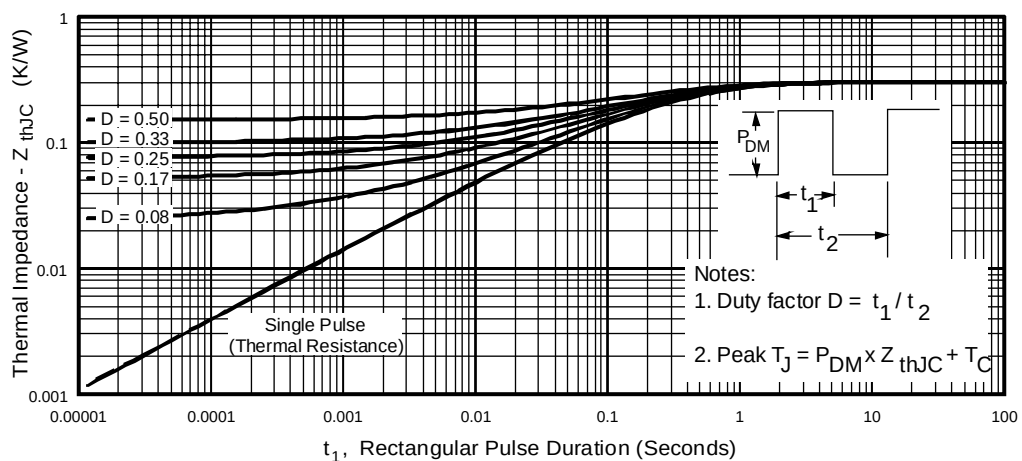


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics, (per Leg)

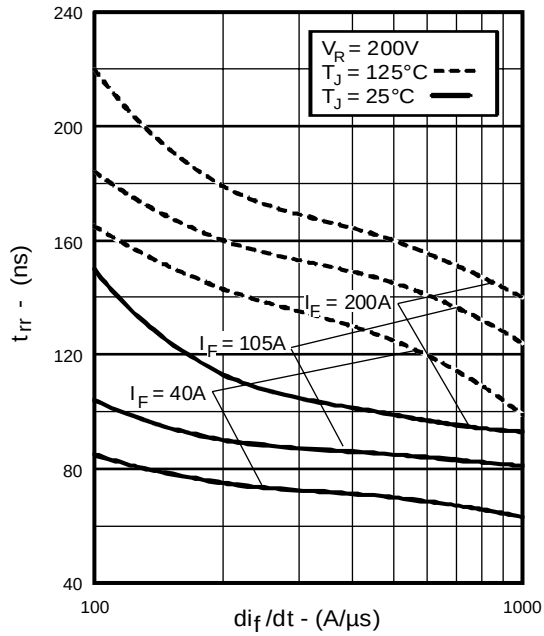


Fig. 5 - Typical Reverse Recovery vs. di_f/dt , (per Leg)

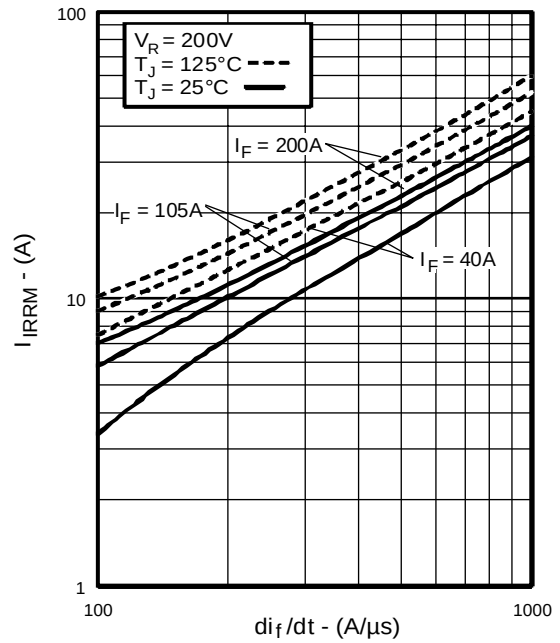


Fig. 6 - Typical Recovery Current vs. di_f/dt , (per Leg)

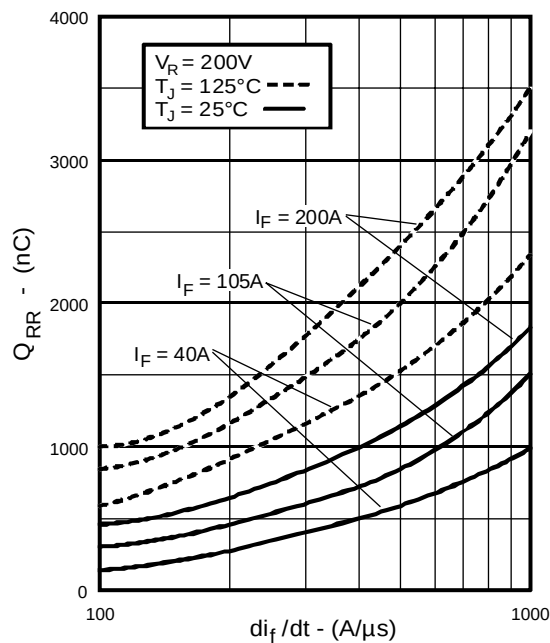


Fig. 7 - Typical Stored Charge vs. di_f/dt , (per Leg)

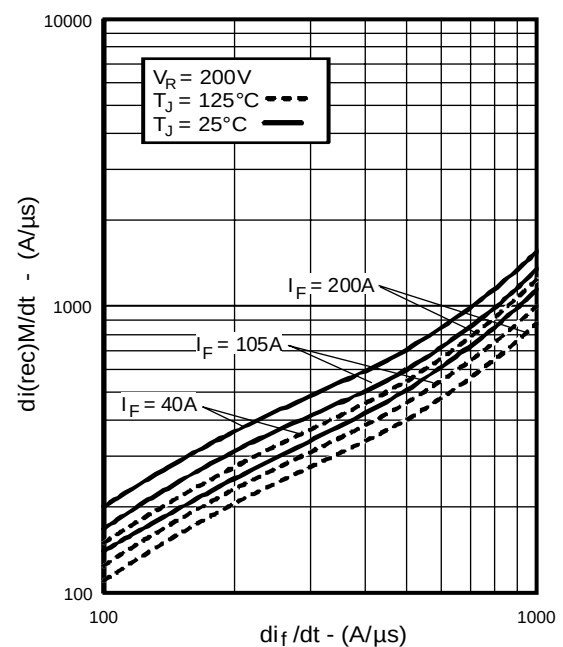


Fig. 8 - Typical $di(rec)M/dt$ vs. di_f/dt , (per Leg)

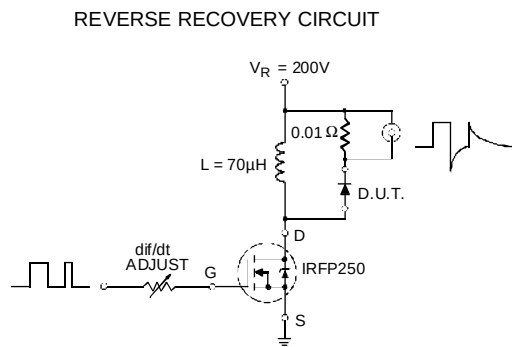


Fig. 9 - Reverse Recovery Parameter Test Circuit

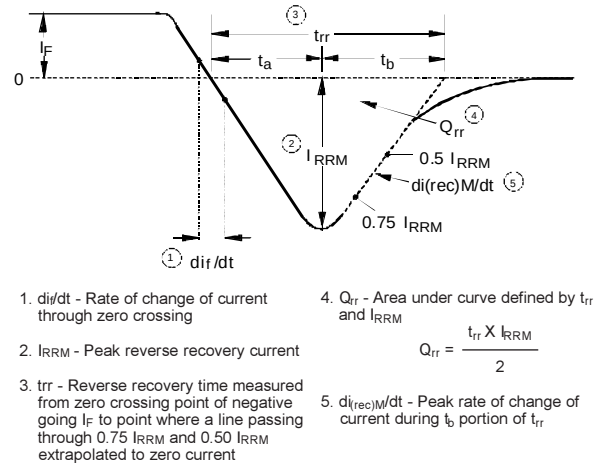


Fig. 10 - Reverse Recovery Waveform and Definitions

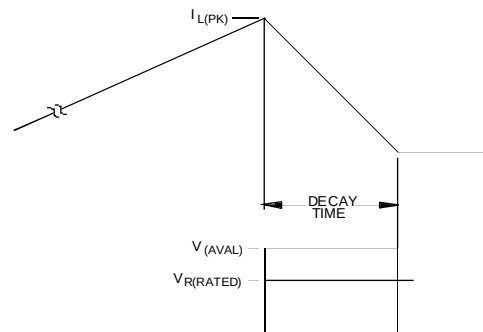
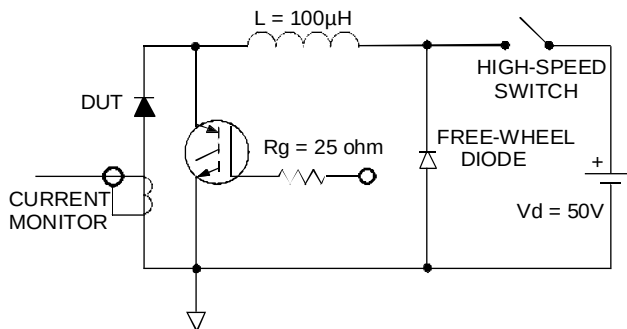


Fig. 11 - Avalanche Test Circuit and Waveforms