International Rectifier

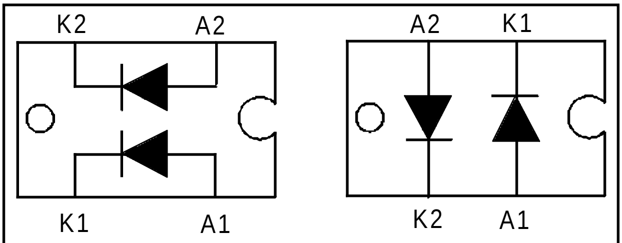
PD -2.531

HFA120FA60, HFA120EA60

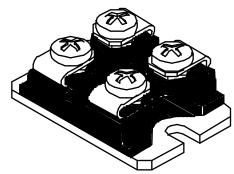
HEXFRED™

Ultrafast, Soft Recovery Diode

V_R = 600V
V_F(typ.)* = 1.4V
$I_{F(AV)}$ = 60A
Q_{rr} (typ.) = 270nC
I_{RRM}(typ.) = 7.0A
t_{rr}(typ.) = 65ns
$di_{(rec)M}/dt$ (typ.)* = 270A/µs



HFA120FA60 HFA120EA60



SOT-227

Features

- Fast Recovery time characteristic
- Eletrically isolated base plate
- Large creepage distance between terminal
- Simplified mechanical designs, rapid assembly

Description

This SOT-227 modules with FRED rectifier are available in two basic configurations. They are the antiparallel and the parallel configurations. The antiparallel configuration (HFA120EA60) is used for simple series rectifier and high voltage application. The parallel configuration (HFA120FA60) is used for simple parallel rectifier and high current application. The semiconductor in the SOT-227 package is isolated from the copper base plate, allowing for common heatsinks and compact assemblies to be built.

These modules are intended for general applications such as power supplies, battery chargers, electronic welders, motor control, DC chopper, and inverters.

Absolute Maximum Ratings (per Leg)

	Parameter	Max.	Units
V_R	Cathode-to-Anode Voltage	600	V
I_F @ T_C = 25°C	Continuous Forward Current	75	A
I_F @ T_C = 100°C	Continuous Forward Current	40	
I_{FSM}	Single Pulse Forward Current	TBD	
I_{FRM}	Maximum Repetitive Forward Current	180	
V_{ISOL}	RMS Isolation Voltage, Any Terminal to Case, t=1 min	2500	V
P_D @ T_C = 25°C	Maximum Power Dissipation	180	W
P_D @ T_C = 100°C	Maximum Power Dissipation	71	
T_J T_{STG}	Operating Junction and Storage Temperature Range	-55 to +150	°C

*125 °C

Electrical Characteristics (per Leg) @ T_J = 25°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	——	1.5	1.7	V	I_F = 60A	See Fig. 1
		——	1.9	2.1		I_F = 120A	
		——	1.4	1.6		I_F = 60A, T_J = 125°C	
I_{RM}	Max Reverse Leakage Current	——	2.5	20	µA	V_R = V_R Rated	See Fig. 2
		——	130	2000		T_J = 125°C, V_R = 0.8 x V_R Rated	
C_T	Junction Capacitance	——	120	170	pF	V_R = 200V	See Fig. 3

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

	Parameter	Min.	Typ.	Max.	Units	Test Conditions	
t_{rr}	Reverse Recovery Time	——	34	——	ns	I_F = 1.0A, di_f/dt = 200A/µs, V_R = 30V	
t_{rr1}	See Fig. 5, 6 & 16	——	65	98		T_J = 25°C	I_F = 60A
t_{rr2}		——	130	200		T_J = 125°C	
I_{RRM1}	Peak Recovery Current	——	7.0	13	A	T_J = 25°C	
I_{RRM2}	See Fig. 7& 8	——	13	23		T_J = 125°C	V_R = 200V
Q_{rr1}	Reverse Recovery Charge	——	270	410	nC	T_J = 25°C	
Q_{rr2}	See Fig. 9 & 10	——	490	740		T_J = 125°C	di_f/dt = 200A/µs
$di_{(rec)M}/dt1$	Peak Rate of Fall of Recovery Current	——	350	——	A/µs	T_J = 25°C	
$di_{(rec)M}/dt2$	During t_b See Fig. 11 & 12	——	270	——		T_J = 125°C	

Thermal - Mechanical Characteristics

	Parameter	Min.	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case, Single Leg Conducting	——	——	0.70	°C/W K/W
	Junction-to-Case, Both Legs Conducting	——	——	0.35	
$R_{\theta CS}$	Case-to-Sink, Flat , Greased Surface	——	0.05	——	
Wt	Weight	——	30	——	gm
	Mounting Torque	——	1.3	——	(N•m)

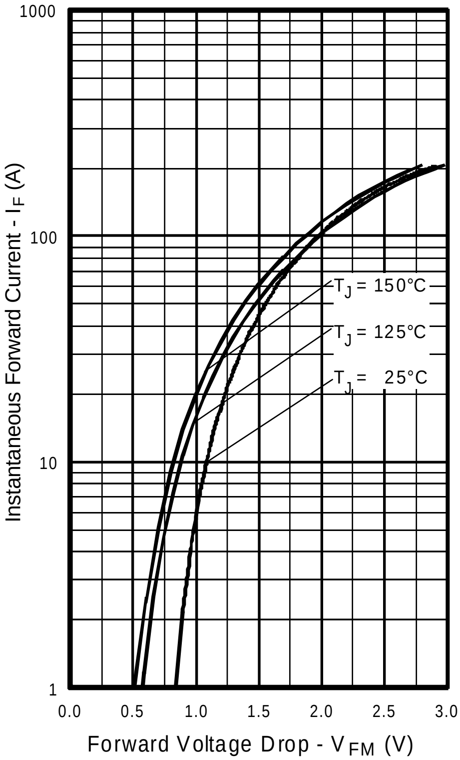


Fig. 1 - Maximum Forward Voltage Drop vs. Instantaneous Forward Current, (per Leg)

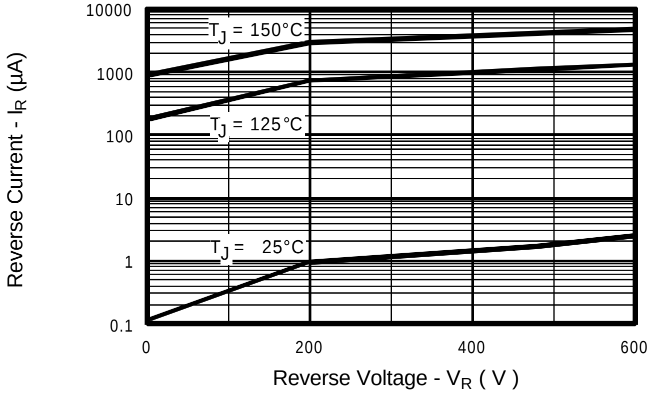


Fig. 2 - Typical Reverse Current vs. Reverse Voltage, (per Leg)

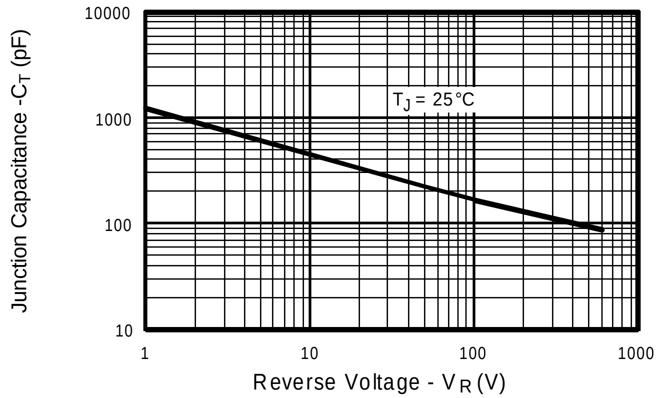


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage, (per Leg)

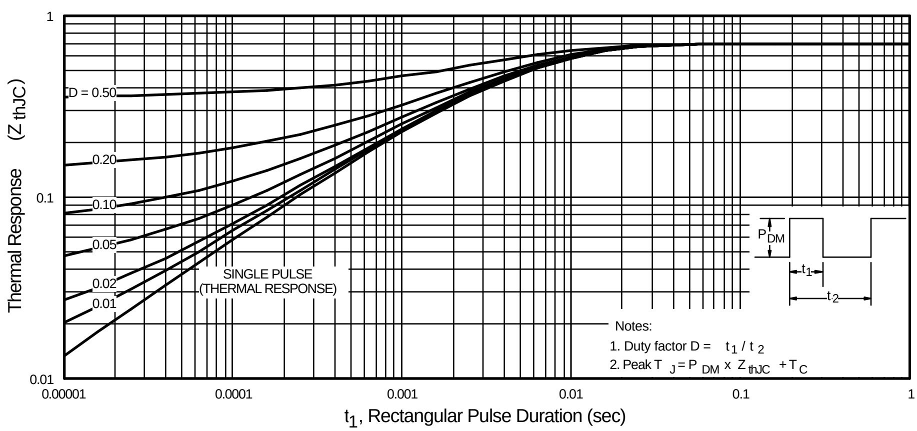


Fig. 4 - Maximum Thermal Impedance Z_{thjc} Characteristics, (per Leg)

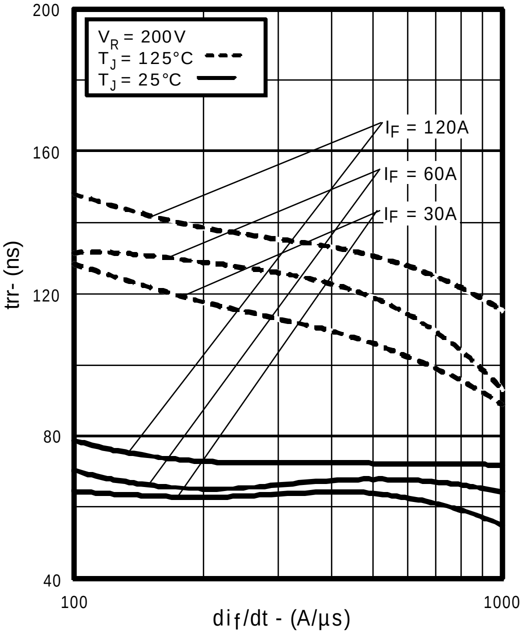


Fig. 5 - Typical Reverse Recovery vs. di_f/dt, (per Leg)

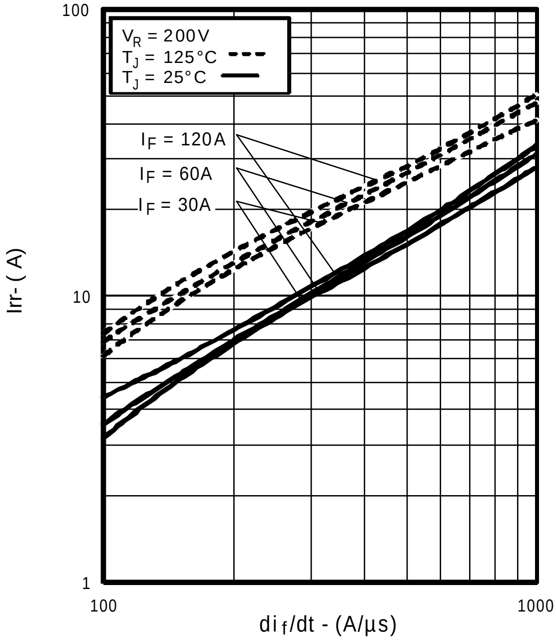


Fig. 6 - Typical Recovery Current vs. di_f/dt, (per Leg)

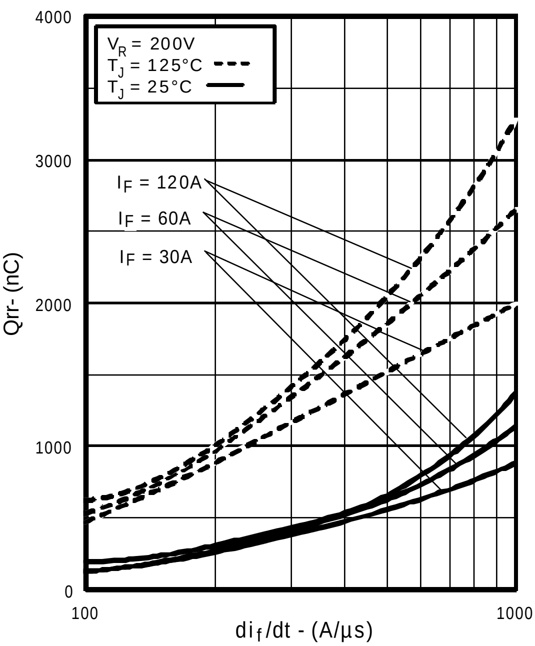


Fig. 7 - Typical Stored Charge vs. di_f/dt, (per Leg)

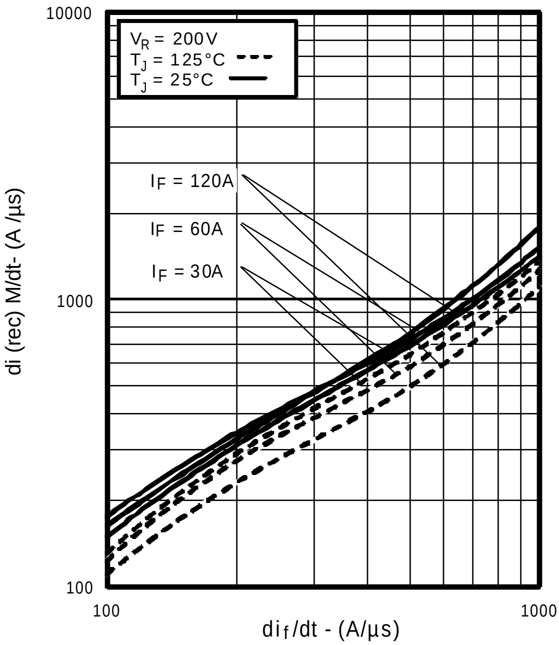


Fig. 8 - Typical $di_{(rec)M}/dt$ vs. di_f/dt, (per Leg)

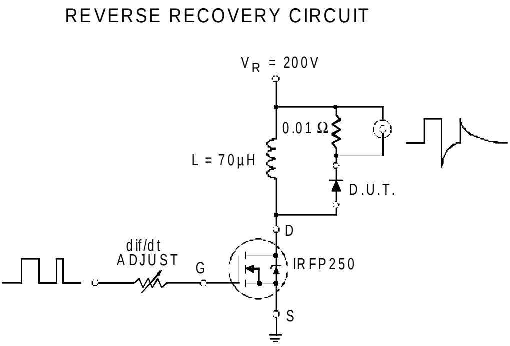
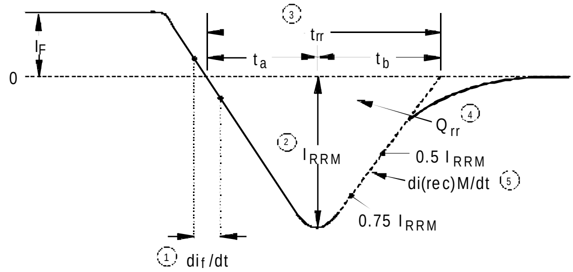


Fig. 9 - Reverse Recovery Parameter Test Circuit



1. di_f/dt - Rate of change of current through zero crossing
2. I_{RRM} - Peak reverse recovery current
3. trr - 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}

$$Q_{rr} = \frac{t_{rr} \times I_{RRM}}{2}$$

5. $di_{(rec)M}/dt$ - Peak rate of change of current during t_b portion of t_{rr}

Fig. 10 - Reverse Recovery Waveform and Definitions

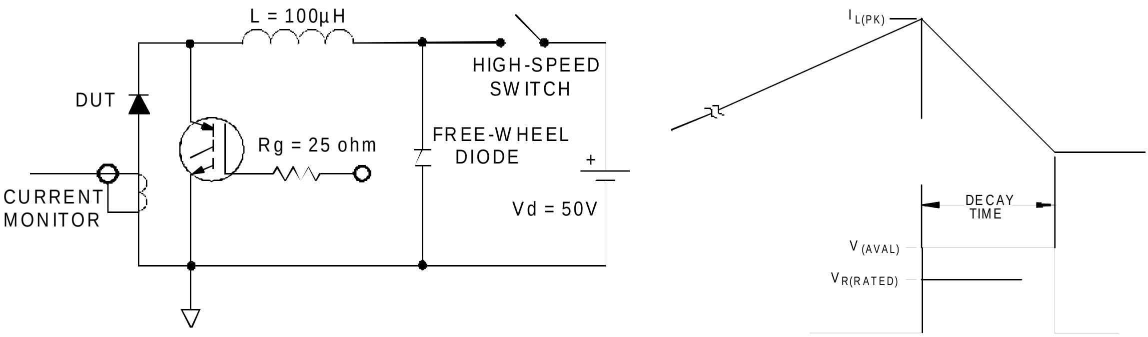
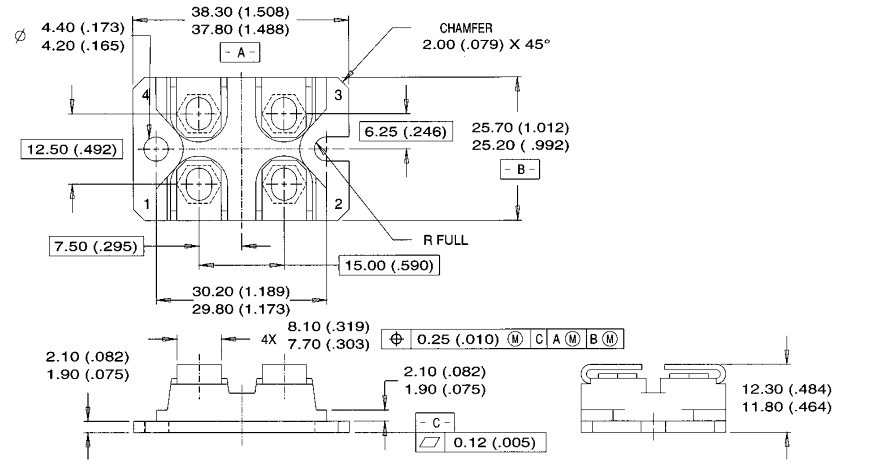
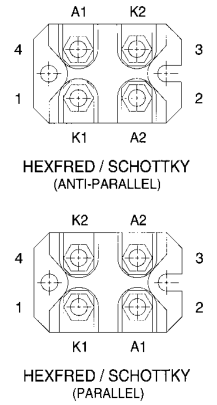


Fig. 11 - Avalanche Test Circuit and Waveforms

SOT-227 Package Details



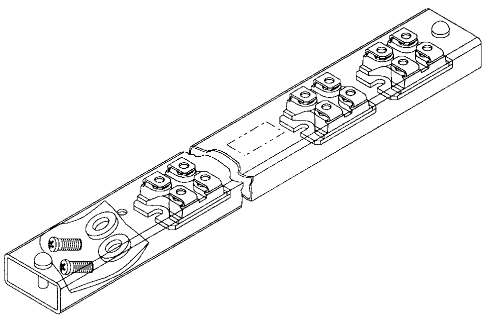
LEAD ASSIGNMENTS



NOTES:
1. DIMENSIONING & TOLERANCING PER ANSI Y14.5M-1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSIONS ARE SHOWN IN MILLIMETERS (INCHES).

Tube

QUANTITIES PER TUBE IS 10
M4 SREW AND WASHER INCLUDED



International IOR 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 1883 732020
IR CANADA: 7321 Victoria Park Ave., Suite 201, Markham, Ontario L3R 2Z8, Tel: (905) 475 1897
IR GERMANY: Saalburgstrasse 157, 61350 Bad Homburg Tel: ++ 49 6172 96590
IR ITALY: Via Liguria 49, 10071 Borgaro, Torino Tel: ++ 39 11 451 0111
IR FAR EAST: K&H Bldg., 2F, 30-4 Nishi-Ikebukuro 3-Chome, Toshima-Ku, Tokyo Japan 171 Tel: 81 3 3983 0086
IR SOUTHEAST ASIA: 315 Outram Road, #10-02 Tan Boon Liat Building, Singapore 0316 Tel: 65 221 8371