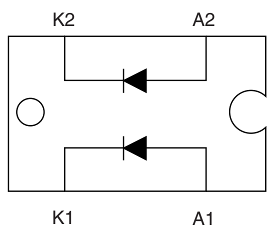
HEXFRED®
Ultrafast Soft Recovery Diode, 60 A

SOT-227



FEATURES

- Fast recovery time characteristic
- Electrically isolated base plate
- Large creepage distance between terminal
- Simplified mechanical designs, rapid assembly
- UL pending
- Totally lead (Pb)-free
- Designed for industrial level

Pb-free
RoHS COMPLIANT

PRODUCT SUMMARY	
V_R	600 V
V_F (typical) at 125 °C	1.4 V
Q_{rr} (typical)	270 nC
I_{RRM} (typical)	7.0 A
t_{rr} (typical)	65 ns
$dI_{(rec)M}/dt$ (typical) at 125 °C	270 A/µs
$I_{F(DC)}$ at T_C	40 A at 100 °C

DESCRIPTION

This SOT-227 modules with HEXFRED® 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	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Cathode to anode voltage	V_R		600	V
Continuous forward current	I_F	T_C = 25 °C	75	A
		T_C = 100 °C	40	
Single pulse forward current	I_{FSM}		TBD	
Maximum repetitive forward current	I_{FRM}		180	
RMS isolation voltage, any terminal to case	V_{ISOL}	t = 1 minute	2500	V
Maximum power dissipation	P_D	T_C = 25 °C	180	W
		T_C = 100 °C	71	
Operating junction and storage temperature range	T_J, T_{Stg}		- 55 to 150	°C

ELECTRICAL SPECIFICATIONS PER LEG (T_J = 25 °C unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNITS
Cathode to anode breakdown voltage	V_{BR}	I_R = 100 µA		600	-	-	V
Maximum forward voltage	V_{FM}	I_F = 60 A	See fig. 1	-	1.5	1.7	
		I_F = 120 A		-	1.9	2.1	
		I_F = 60 A, T_J = 125 °C		-	1.4	1.6	
Maximum reverse leakage current	I_{RM}	V_R = V_R rated	See fig. 2	-	2.5	20	µA
		T_J = 125 °C, V_R = 0.8 x V_R rated		-	130	2000	
Junction capacitance	C_T	V_R = 200 V	See fig. 3	-	120	170	pF

DYNAMIC RECOVERY CHARACTERISTICS PER LEG (T_J = 25 °C unless otherwise specified)							
PARAMETER	**SYMBOL**	**TEST CONDITIONS**		**MIN.**	**TYP.**	**MAX.**	**UNITS**
Reverse recovery time See fig. 5, 6 and 16	t_{rr}	I_F = 1.0 A, dI_F/dt = 200 A/µs, V_R = 30 V		-	34	-	ns
	t_{rr1}	T_J = 25 °C	I_F = 60 A dI_F/dt = 200 A/µs V_R = 200 V	-	65	98	
	t_{rr2}	T_J = 125 °C		-	130	200	
Peak recovery current See fig. 7 and 8	I_{RRM1}	T_J = 25 °C		-	7.0	13	A
	I_{RRM2}	T_J = 125 °C		-	13	23	
Reverse recovery charge See fig. 9 and 10	Q_{rr1}	T_J = 25 °C		-	270	410	nC
	Q_{rr2}	T_J = 125 °C		-	490	740	
Peak rate of recovery current during t_b See fig. 11 and 12	$dI_{(rec)M}/dt1$	T_J = 25 °C		-	350	-	A/µs
	$dI_{(rec)M}/dt2$	T_J = 125 °C		-	270	-	

THERMAL - MECHANICAL SPECIFICATIONS					
PARAMETER	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNITS**
Junction to case, single leg conducting	R_{thJC}	-	-	0.70	°C/W K/W
Junction to case, both legs conducting		-	-	0.35	
Case to sink, flat, greased surface	R_{thCS}	-	0.05	-	
Weight		-	30	-	g
Mounting torque		-	1.3	-	Nm

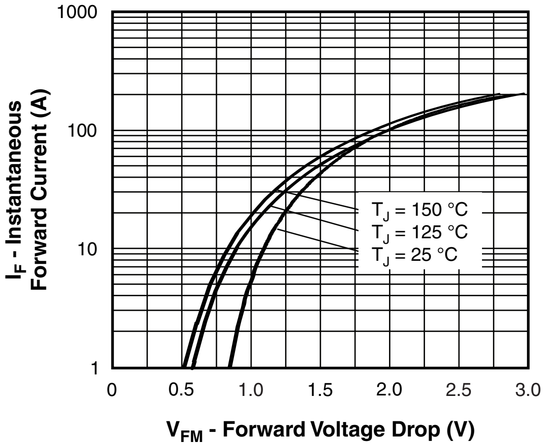


Fig. 1 - Maximum Forward Voltage Drop vs. Instantaneous Forward Current (Per Leg)

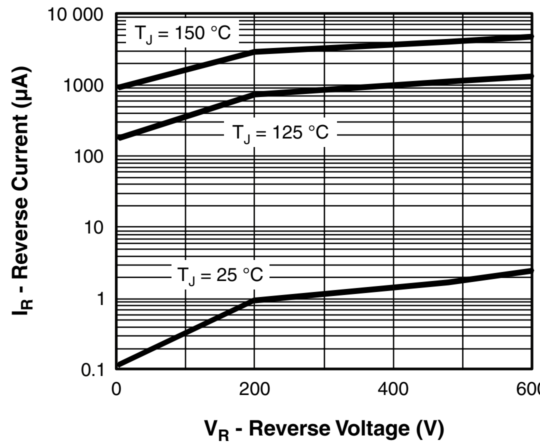


Fig. 2 - Typical Reverse Current vs. Reverse Voltage (Per Leg)

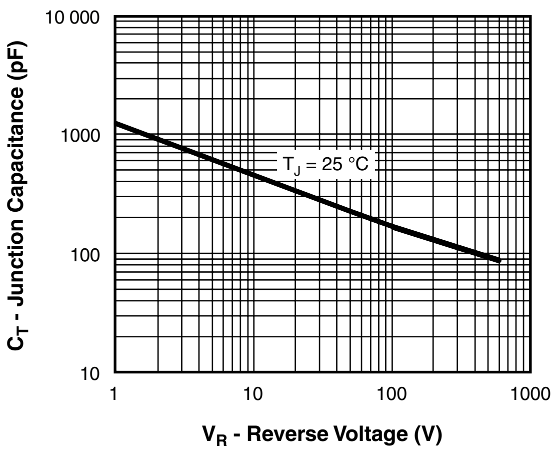


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Leg)

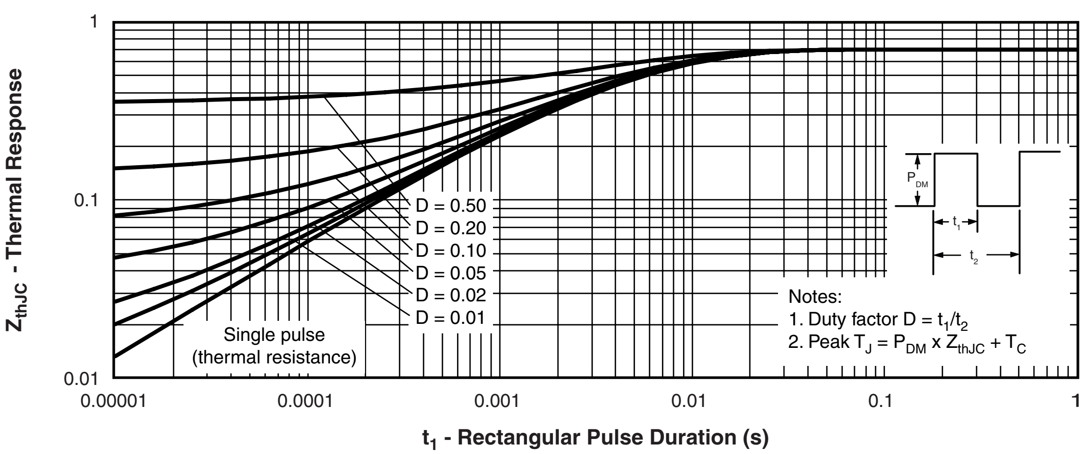


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics (Per Leg)

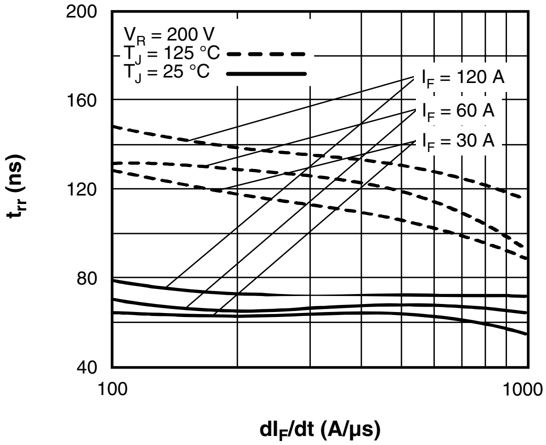


Fig. 5 - Typical Reverse Recovery Time vs. dI_F/dt (Per Leg)

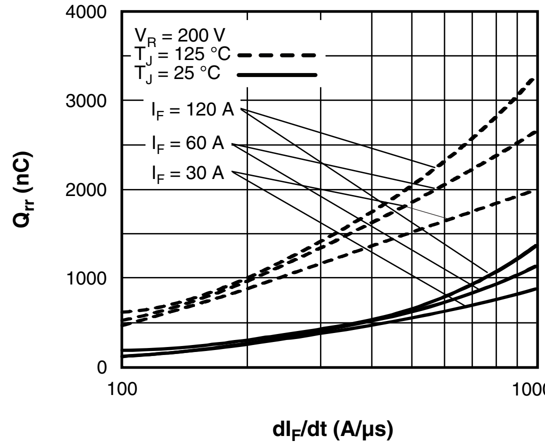


Fig. 7- Typical Stored Charge vs. dI_F/dt (Per Leg)

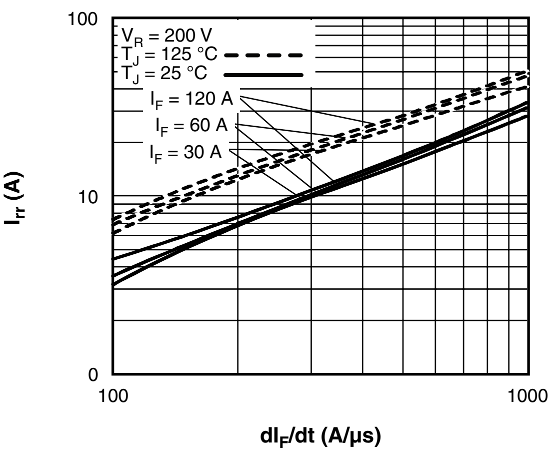


Fig. 6 - Typical Recovery Current vs. dI_F/dt (Per Leg)

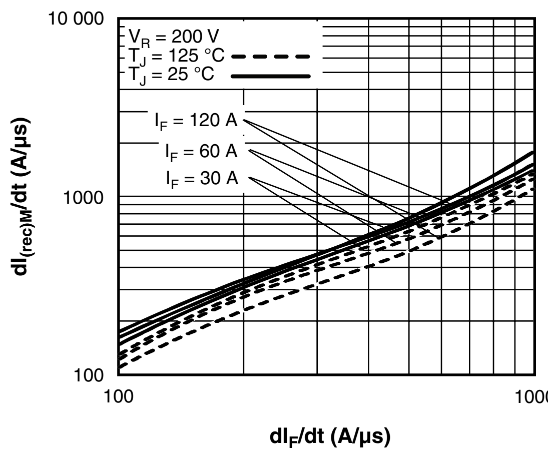


Fig. 8 - Typical $dI_{(rec)M}/dt$ vs. dI_F/dt (Per Leg)

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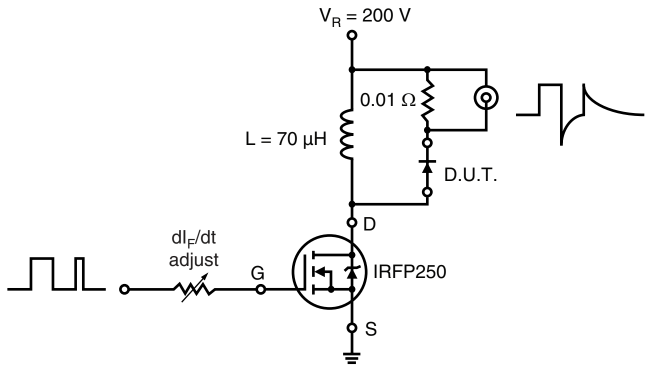
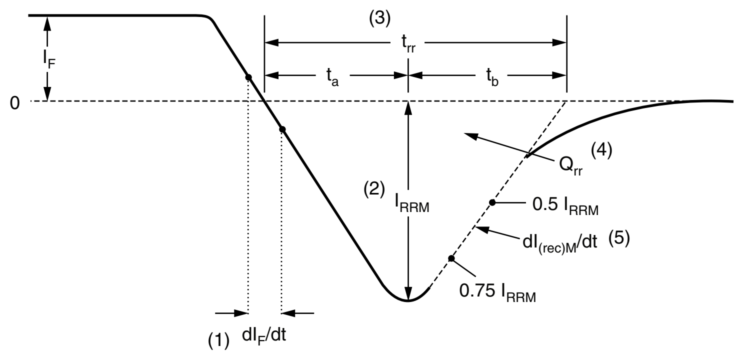


Fig. 9 - Reverse Recovery Parameter Test Circuit



(1) dI_F/dt - rate of change of current through zero crossing

(2) I_{RRM} - peak reverse recovery current

(3) 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}

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

(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

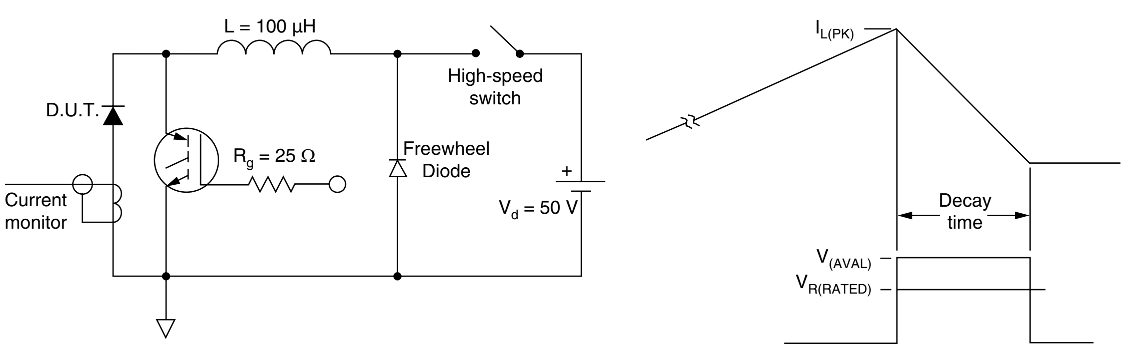


Fig. 11 - Avalanche Test Circuit and Waveforms

ORDERING INFORMATION TABLE

Device code	HF	A	120	FA	60	P
	1	2	3	4	5	6

1 - HEXFRED® family
2 - Process: A electron irradiated
3 - Current rating (120 = 120 A)
4 - Package indicator (SOT-227)
5 - Voltage rating (60 = 600 V)
6 - P = Lead (Pb)-free

LINKS TO RELATED DOCUMENTS	
Dimensions	http://www.vishay.com/doc?95036
Packaging information	http://www.vishay.com/doc?95037

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