

**HEXFRED  
ULTRAFast, SOFT RECOVERY DIODE**

$$V_R = 200V$$

$$I_{F(AV)} = 60A$$

$$t_{rr} = 50ns$$

**Features**

- Reduced RFI and EMI
- Extensive Characterization of Recovery Parameters
- Hermetically Sealed
- Surface Mount
- ESD Rating: Class 3B per MIL-STD-750, Method 1020

**Description**

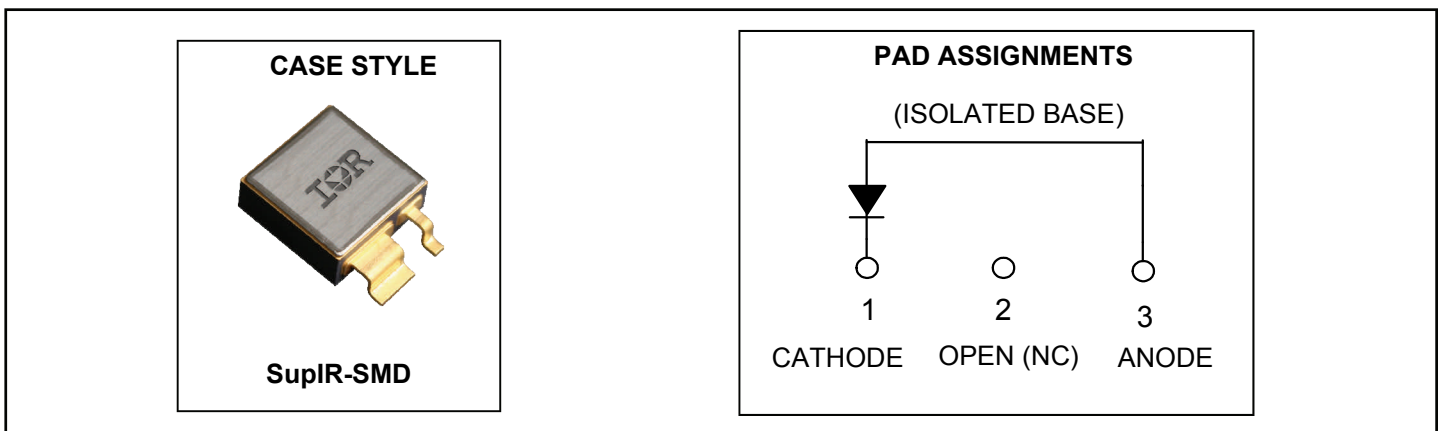
These ultrafast, soft recovery diodes are optimized to reduce losses and EMI/RFI in high frequency power conditioning systems. An extensive characterization of the recovery behavior for different values of current, temperature and di/dt simplifies the calculations of losses in the operating conditions. 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**

Characteristics	Parameter	Max.	Units
$V_R$	Cathode to Anode Voltage	200	V
$I_F @ T_C = 100^\circ C$	Continuous Forward Current ①	60	A
$I_{FSM} @ T_C = 25^\circ C$	Single Pulse Forward Current ②	500	A
$P_D @ T_C = 25^\circ C$	Maximum Power Dissipation	125	W
$T_J, T_{STG}$	Operating Junction and Storage Temperature Range	-55 to 150	°C

**Notes:**

- ① D.C. = 50% rectangle wave
- ② 1/2 sine wave, 60Hz, Pulse Width = 8.33ms



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

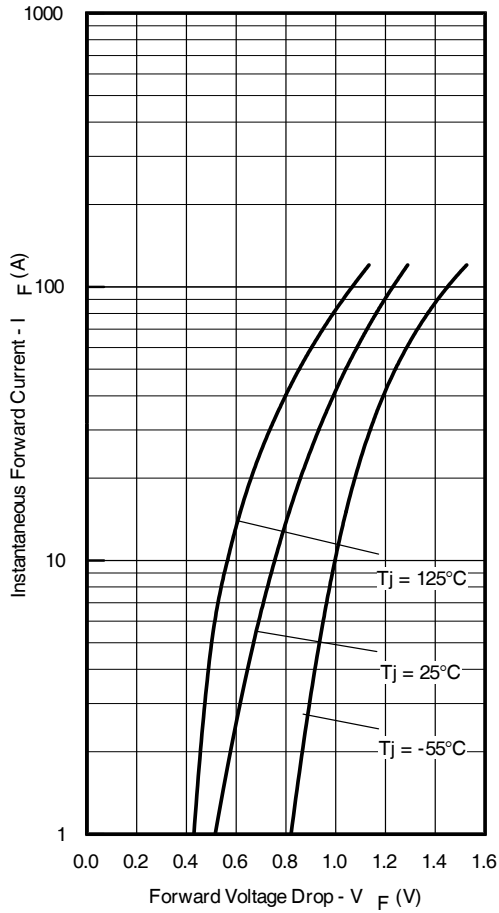
Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
$V_{BR}$	Cathode Anode Breakdown Voltage	200	—	—	V	$I_R = 100\mu\text{A}$
$V_{FM}$	Max. Forward Voltage See Fig. 1	—	—	1.15	V	$I_F = 30\text{A}, T_J = -55^\circ\text{C}$
		—	—	0.97		$I_F = 30\text{A}, T_J = 25^\circ\text{C}$
		—	—	1.08		$I_F = 60\text{A}, T_J = 25^\circ\text{C}$
		—	—	1.30		$I_F = 120\text{A}, T_J = 25^\circ\text{C}$
		—	—	0.8		$I_F = 30\text{A}, T_J = 125^\circ\text{C}$
$I_{RM}$	Max. Reverse Leakage Current See Fig. 2	—	—	50	$\mu\text{A}$	$V_R = V_R \text{ Rated}$
		—	—	1.0	$\text{mA}$	$V_R = V_R \text{ Rated}, T_J = 125^\circ\text{C}$
$C_T$	Junction Capacitance, See Fig. 3	—	—	200	$\text{pF}$	$V_R = 200\text{V}$
$L_S$	Series Inductance	—	5.9	—	$\text{nH}$	Measured from center of cathode pad the center of anode pad

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

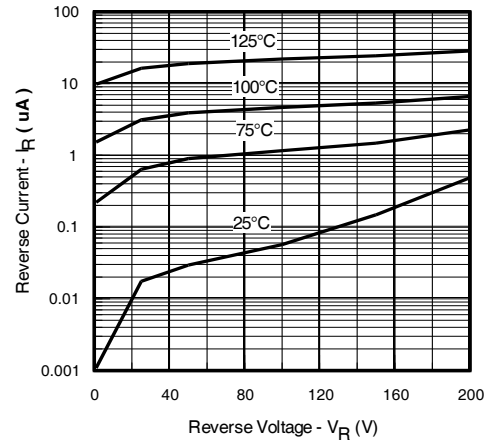
Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
$t_{rr1}$	Reverse Recovery Time See Fig. 5	—	45	50	ns	$T_J = 25^\circ\text{C}$
$t_{rr2}$		—	71	—		$T_J = 125^\circ\text{C}$
$I_{RRM1}$	Peak Recovery Current See Fig. 6	—	5.3	—	A	$T_J = 25^\circ\text{C}$
$I_{RRM2}$		—	10.3	—		$T_J = 125^\circ\text{C}$
$Q_{rr1}$	Reverse Recovery Charge See Fig. 7	—	120	—	nC	$T_J = 25^\circ\text{C}$
$Q_{rr2}$		—	366	—		$T_J = 125^\circ\text{C}$
$di_{(rec)M}/dt1$	Peak Rate of Fall of Recovery Current During $t_b$ - See Fig. 8	—	590	—	$\text{A}/\mu\text{s}$	$T_J = 25^\circ\text{C}$
$di_{(rec)M}/dt1$		—	1290	—		$T_J = 125^\circ\text{C}$

**Thermal - Mechanical Characteristics**

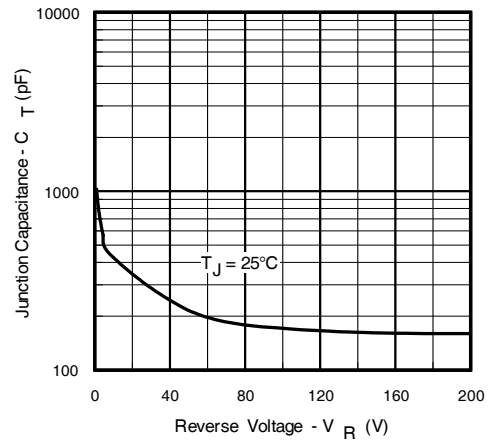
Symbol	Parameter	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case	—	1.0	$^\circ\text{C}/\text{W}$
Wt	Weight	3.0	—	g



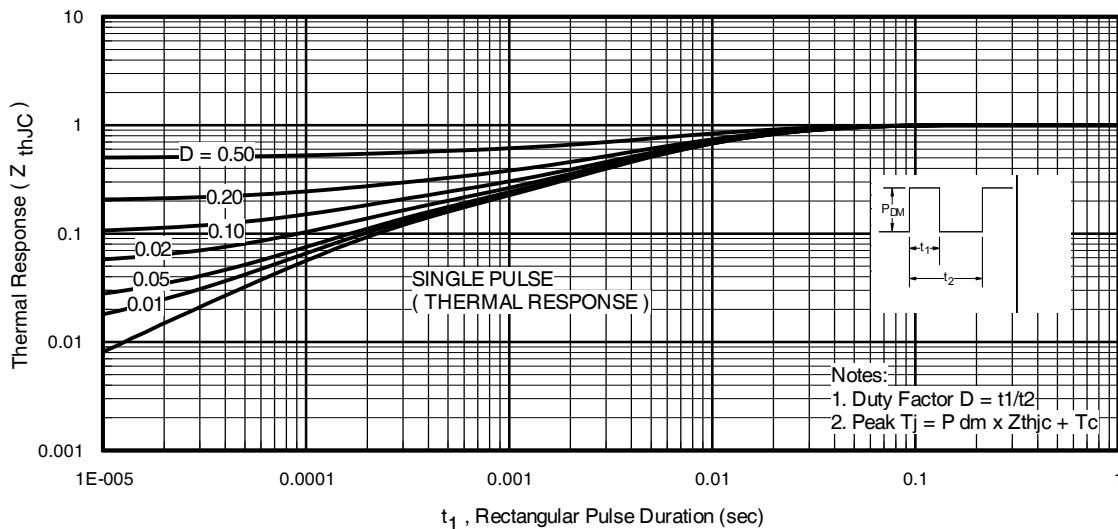
**Fig. 1** Maximum Forward Voltage Drop Vs. Instantaneous Forward Current



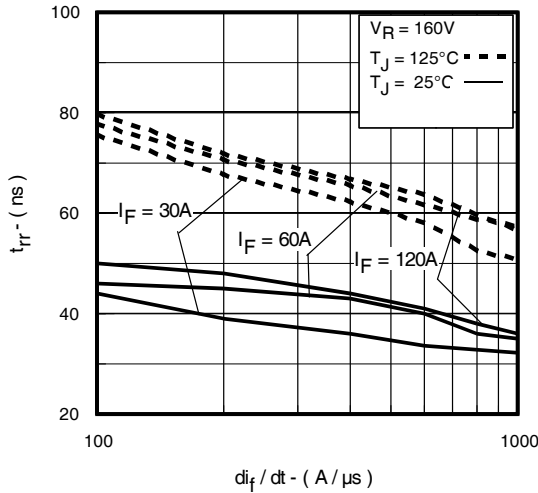
**Fig. 2** Typical Values of Reverse Current Vs. Reverse Voltage



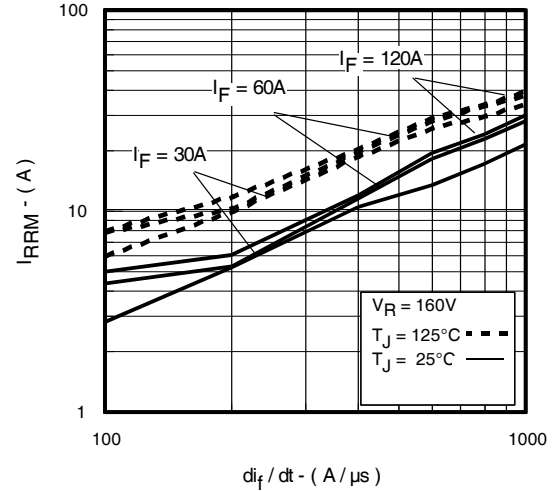
**Fig. 3** Typical Junction Capacitance Vs. Reverse Voltage



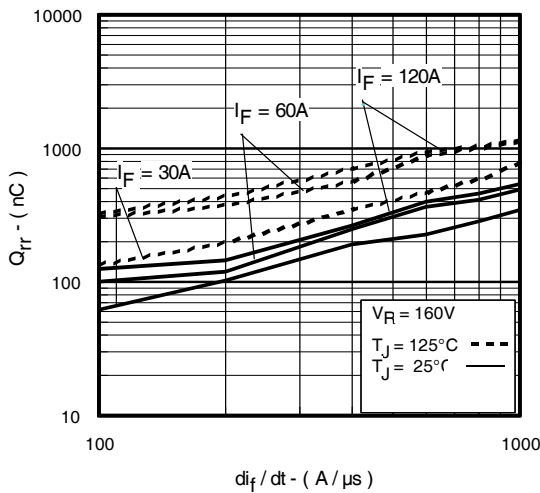
**Fig. 4** Maximum Thermal Impedance  $Z_{thJC}$  Characteristics



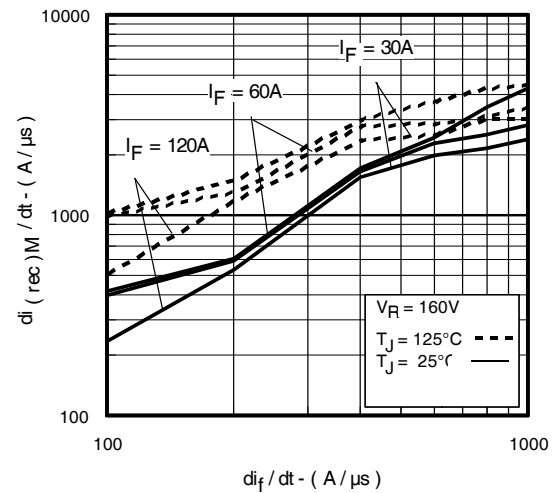
**Fig. 5** Typical Reverse Recovery Vs  $di_f/dt$



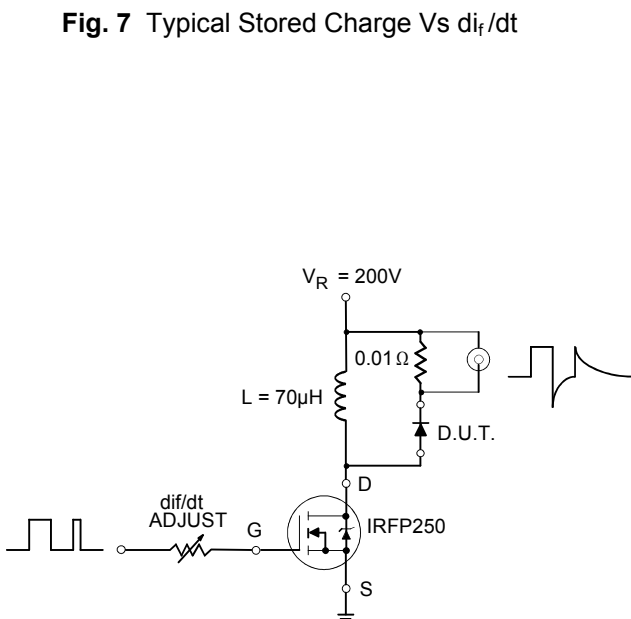
**Fig. 6** Typical Recovery Current Vs  $di_f/dt$



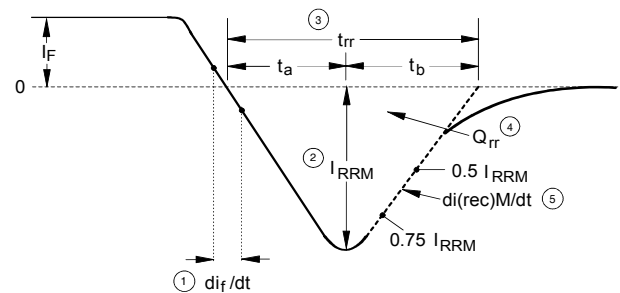
**Fig. 7** Typical Stored Charge Vs  $di_f/dt$



**Fig. 8** Typical  $di_{(rec)M}/dt$  Vs  $di_f/dt$



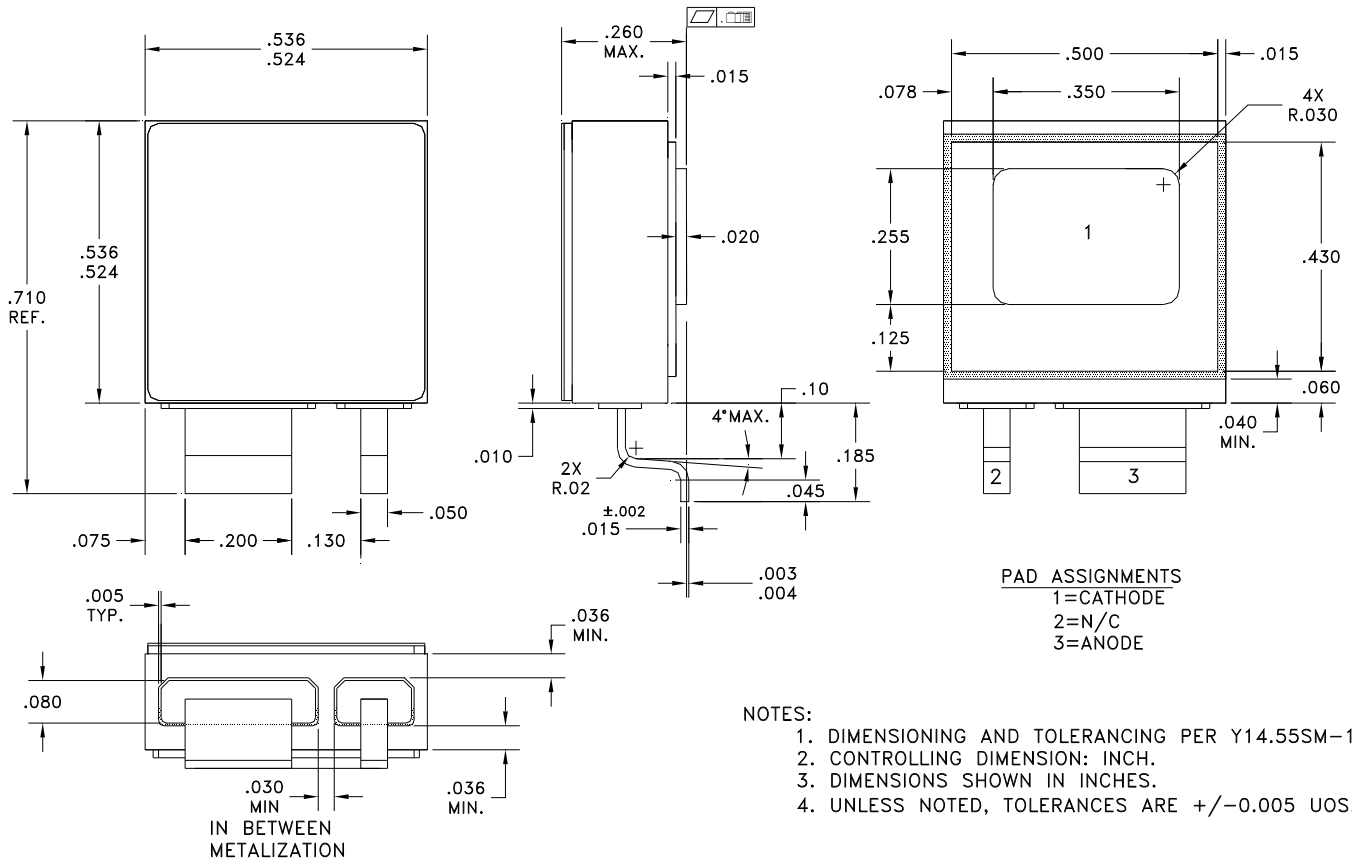
**Fig. 9** Typical Reverse Recovery Parameter Test Circuit



- 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  $0.75I_{RRM}$  and  $0.5I_{RRM}$  extrapolated to zero current.
- ④  $Q_{rr}$  - Area under curve defined by  $t_{rr}$  and  $I_{RRM}$  -  $Q_{rr} = (t_{rr} \times I_{RRM}) / 2$
- ⑤  $di_{(rec)M}/dt$  - Peak rate of change of current during  $t_b$  position of  $t_{rr}$ .

**Fig. 10** Reverse Recovery Waveform and Definitions

**Case Outline and Dimensions — SupIR-SMD**



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