

FRED

Ultrafast Soft Recovery Diode

200A / 600V



FEATURES

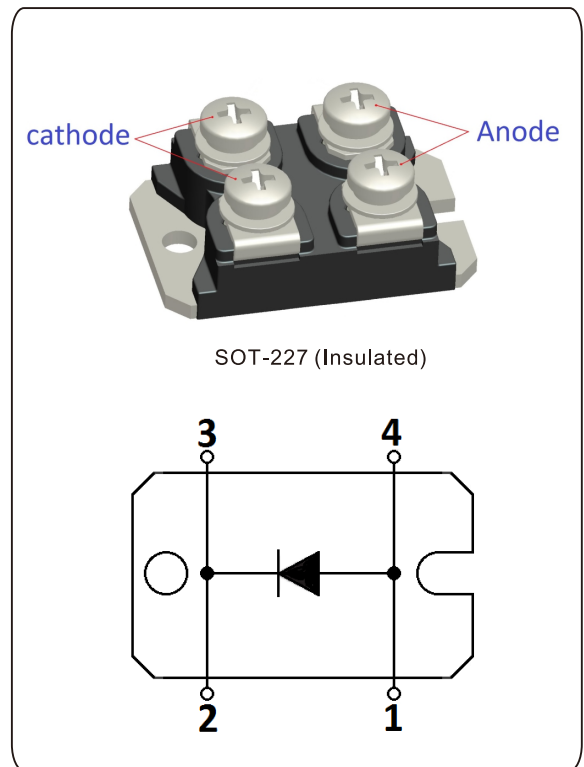
- Fast recovery time characteristic
- Electrically isolated base plate
- Large creepage distance between terminal
- Simplified mechanical designs, rapid assembly
- Compliant to RoHS
- Designed and for industrial level
- Planar passivated chips

DESCRIPTION

This SOT-227 modules with FRED rectifier are available in single diode configuration. The semiconductor in the SOT-227 package is isolated from the copper base plate, allowing for common heatsinks and compact assemblies to be built.

APPLICATIONS

- Switching power supplies
- Inverters
- Motor controllers
- Converters
- Snubber diodes
- Uninterruptible power supplies (UPS)
- Induction heating
- High speed rectifiers
- Free wheeling diodes
- DC choppers



PRODUCT SUMMARY

V_R	600 V
V_F (typical) at 125 °C	1.00 V
t_{rr} (typical)	65 ns
$I_{F(DC)}$ at T_C per diode	200A at 90 °C

ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Cathode to anode voltage	V_R		600	V
Maximum continuous forward current	I_F	$T_C = 90\text{ °C}$	200	A
Single pulse forward current	I_{FSM}	$T_J = 25\text{ °C}$	2000	
RMS isolation voltage, any terminal to case	V_{ISOL}	$t = 1\text{ minute}$	2500	V
Maximum power dissipation	P_D	$T_c = 25\text{ °C}$	710	W
Operating junction and storage temperature range	T_J, T_{Stg}		- 55 to 175	°C

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ELECTRICAL SPECIFICATIONS ($T_J = 25\text{ }^{\circ}\text{C}$ unless otherwise specified)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Cathode to anode breakdown voltage	V_{BR}	$I_R = 100\text{ }\mu\text{A}$	600	-	-	V
Maximum forward voltage	V_{FM}	$I_F = 200\text{ A}$	-	1.20	1.45	
		$I_F = 200\text{ A}, T_J = 125\text{ }^{\circ}\text{C}$	-	1.00	-	
Maximum reverse leakage current	I_{RM}	$V_R = V_R\text{ rated}$	-	0.5	5	μA
		$T_J = 125\text{ }^{\circ}\text{C}, V_R = V_R\text{ rated}$	-	-	0.5	mA
Junction capacitance	C_J	$V_R = 200\text{ V}$	400			pF

DYNAMIC RECOVERY CHARACTERISTICS PERLEG ($T_J = 25\text{ }^{\circ}\text{C}$ unless otherwise specified)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Reverse recovery time	t_{rr}	$I_F = 0.5\text{ A}, I_R = 1.0\text{ A}, I_{RR} = 250\text{ mA (RG\#1 CKT)}$	-	105	130	ns
		$I_F = 1.0\text{ A}, dI_F/dt = -200\text{ A}/\mu\text{s}, V_R = 30\text{ V}, T_J = 25\text{ }^{\circ}\text{C}$	-	65	-	
	t_{rr1}	$T_J = 25\text{ }^{\circ}\text{C}$	-	100	-	
	t_{rr2}	$T_J = 125\text{ }^{\circ}\text{C}$	-	300	-	
Reverse recovery current	I_{RRM1}	$T_J = 25\text{ }^{\circ}\text{C}$	-	13	-	A
	I_{RRM2}	$T_J = 125\text{ }^{\circ}\text{C}$	-	19	-	
Reverse recovery charge	Q_{rr1}	$T_J = 25\text{ }^{\circ}\text{C}$	-	650	-	nC
	Q_{rr2}	$T_J = 125\text{ }^{\circ}\text{C}$	-	2850	-	

THERMAL - MECHANICAL SPECIFICATIONS ($T_J = 25\text{ }^{\circ}\text{C}$ unless otherwise specified)						
PARAMETER	SYMBOL		MIN.	TYP.	MAX.	UNITS
Junction to case, both legs conducting per module	R_{thJC}		-	-	0.21	$^{\circ}\text{C}/\text{W}$ (K/W)
Case to sink, flat, greased surface	R_{thCS}		-	0.05	-	
Weight			-	30	-	g
Mounting torque			-	1.3	-	Nm

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Fig.1a Maximum effective transient thermal impedance, junction-to-case vs. pulse duration

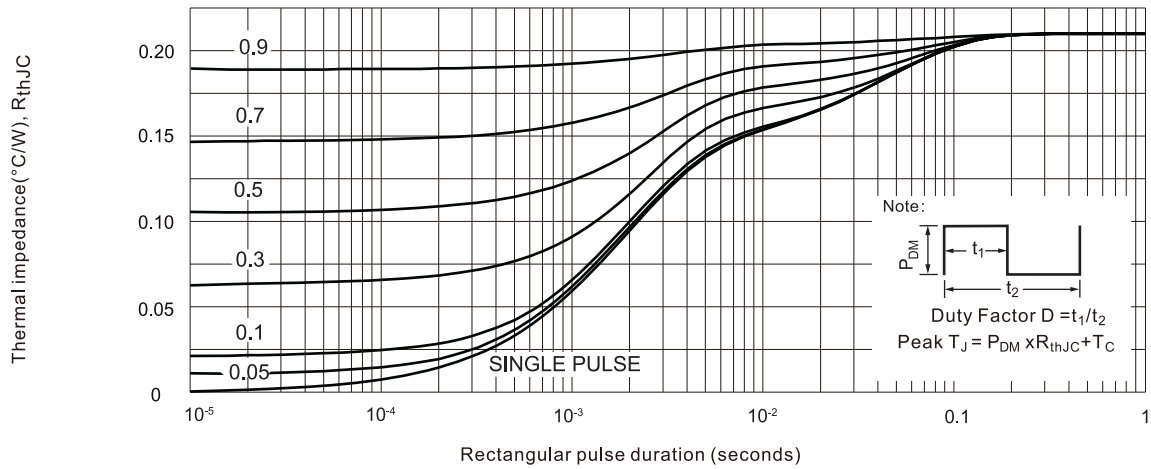


Fig.2 Forward current vs. forward voltage

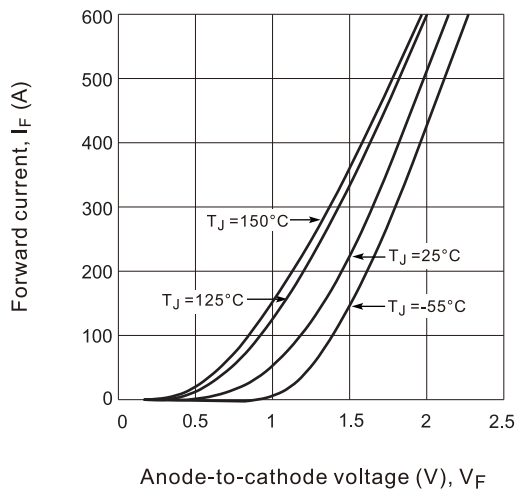


Fig.3 Reverse recovery time vs. current rate of change

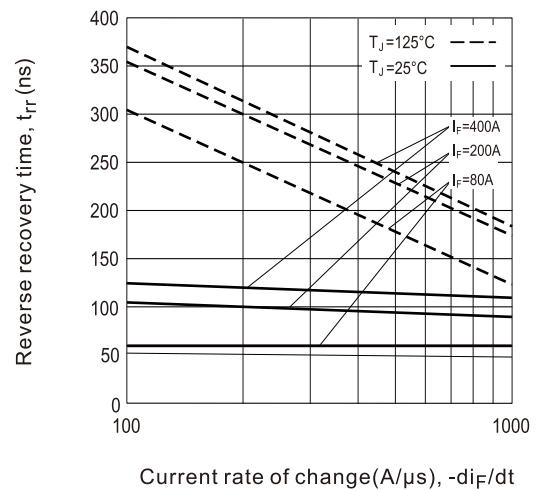


Fig.4 Reverse recovery charge vs. current rate of change

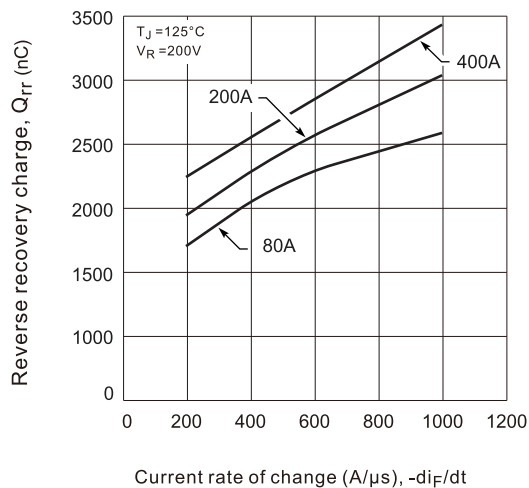
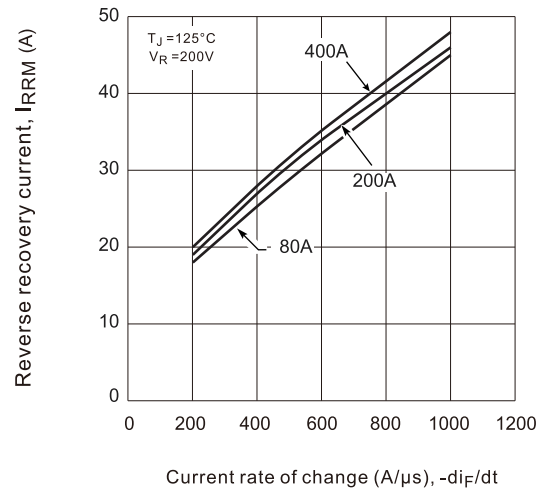


Fig.5 Reverse recovery current vs. current rate of change



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Fig.6 Maximum average forward current vs. case temperature

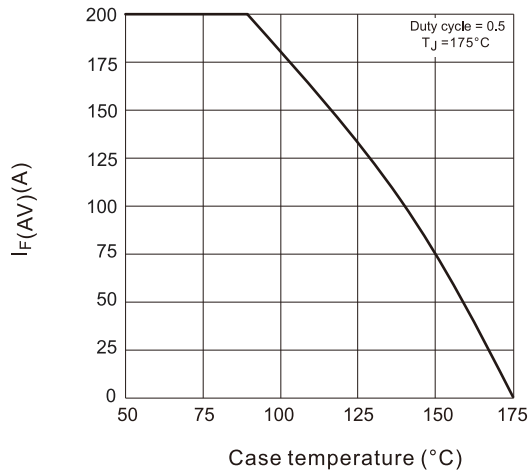


Fig.7 Junction capacitance vs. reverse voltage

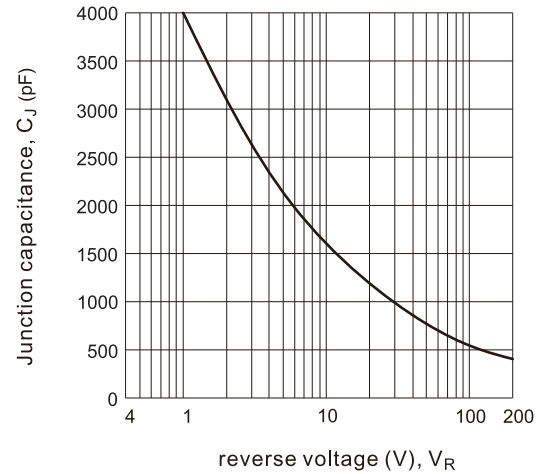


Fig.8 Reverse recovery parameter test circuit

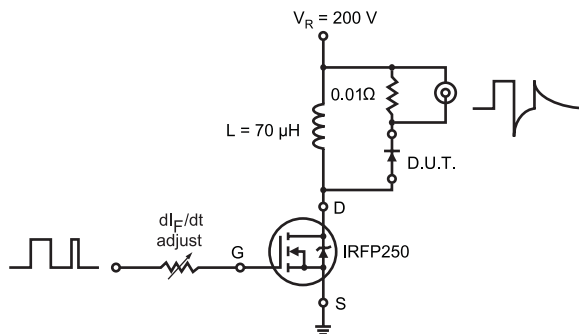
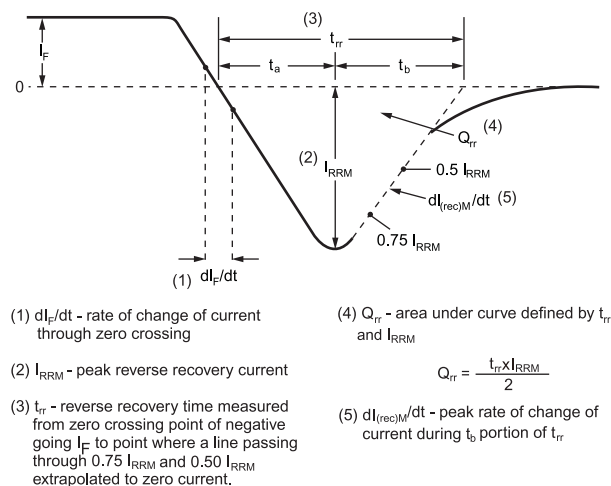
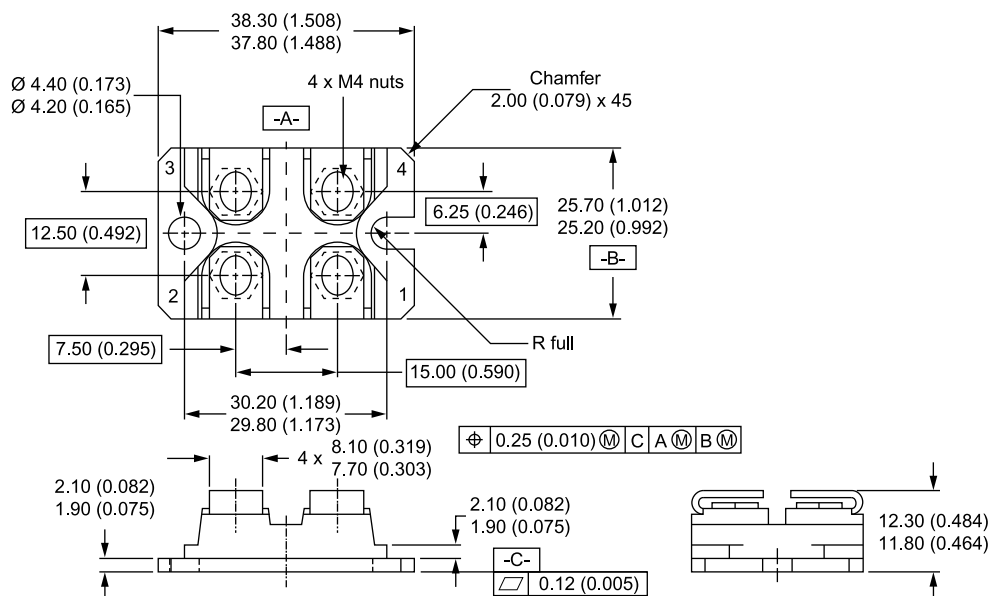


Fig.9 Reverse recovery waveform and definitions



SOT-227



All dimensions in millimeters (inches)

Notes

- Dimensioning and tolerancing per ANSI Y14.5M-1982
- Controlling dimension: millimeter

ORDERING INFORMATION TABLE

Device code	N	ST	200	F	06	E
	1	2	3	4	5	6

- 1 - Nell High Power Products
- 2 - Package indicator (SOT-227)
- 3 - Current rating (200 = 200A)
- 4 - F = FRED family, planar passivated chips
- 5 - Voltage rating (06 = 600 V)
- 6 - Circuit type, Single Diode insulated