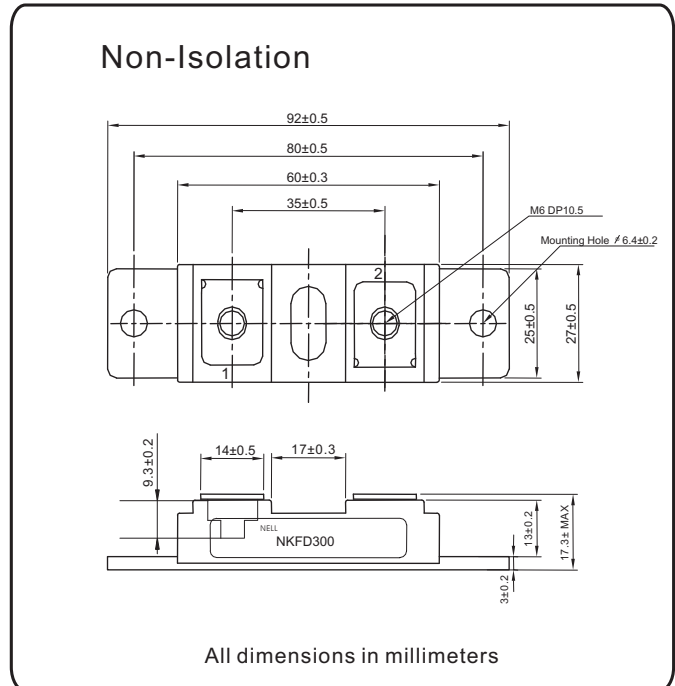


FRED Ultrafast Soft Recovery Diode, 300 A



FEATURES

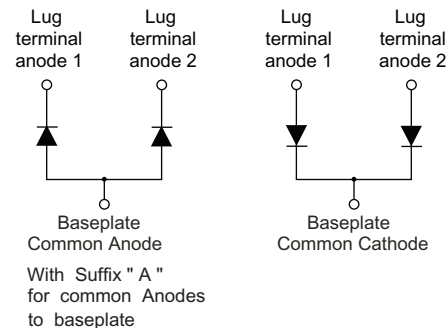
- Very low Q_{rr} and t_{rr}
- Lead (Pb)-free
- Designed and qualified for industrial level

BENEFITS

- Reduced RFI and EMI
- Reduced snubbing

DESCRIPTION

FRED 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.



PRODUCT SUMMARY	
$I_{F(AV)}$	300A
V_R	200 to 600 V
$I_{F(DC)}$ at T_c	300A at 85°C

ABSOLUTE MAXIMUM RATINGS				
PARAMETER	SYMBOL	TEST CONDITIO	VALUES	UNITS
Cathode to anode voltage	V_R		200 to 600	V
Continuous forward current	I_F	$T_C = 25^\circ C$	360	A
		$T_C = 85^\circ C$	300	
		$T_C = 100^\circ C$	150	
Single pulse forward current	I_{FSM}	Limited by junction temperature	1200	
Non-repetitive avalanche energy	E_{AS}	$L = 100 \mu H$, duty cycle limited by maximum T_J	1.4	mJ
Maximum power dissipation	P_D	$T_C = 25^\circ C$	625	W
		$T_C = 100^\circ C$	250	
Operating junction and storage temperatures range	T_J, T_{Stg}		- 40 to 150	°C

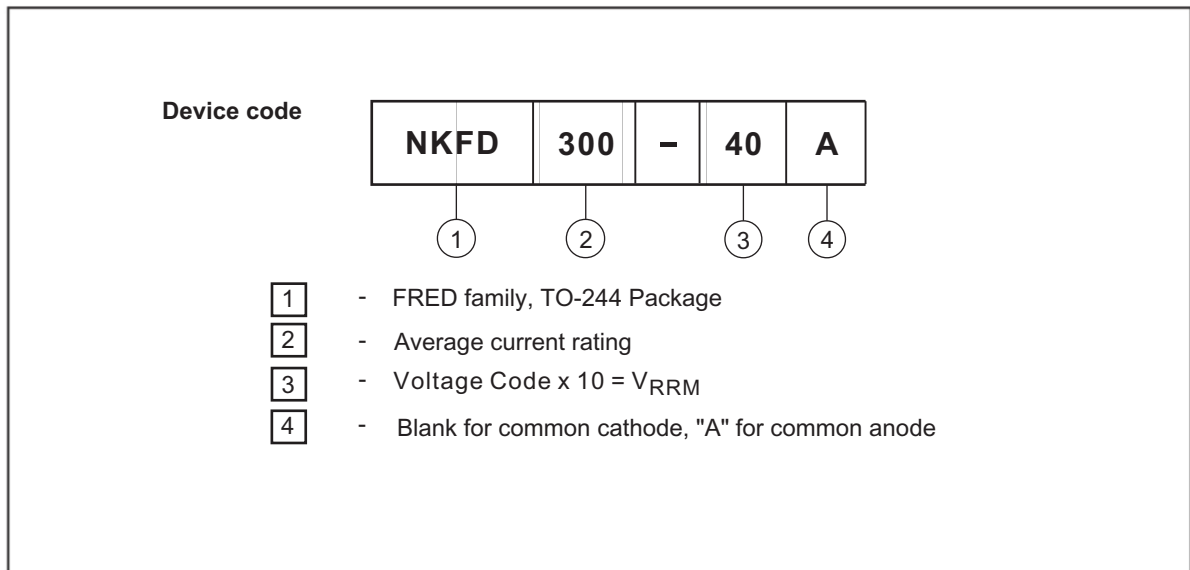
ELECTRICAL SPECIFICATIONS (T _J = 25 °C unless otherwise specified)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Cathode to anode breakdown voltage	V _{BR}	I _R = 100 μA	200 to 600			V
Maximum forward voltage	V _F	I _F = 150 A	-	1.1	1.35	
		I _F = 320 A	-	1.3	1.54	
		I _F = 150 A, T _J = 100 °C	-	1	1.2	
Maximum reverse leakage current	I _R	T _J = 125 °C, V _R = V _{RRM}	-	0.9	3	μA
Junction capacitance	C _T	V _R = 200 V	-	370	500	
Series inductance	L _S	From top of terminal hole to mounting plane	-	5	-	pF

DYNAMIC RECOVERY CHARACTERISTICS (T _J = 25 °C unless otherwise specified)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Reverse recovery time	t _{rr}	I _F = 0.5A, I _R = 1A, I _{RR} = 0.25A		75	-	ns
		T _J = 25 °C	-	90	140	
		T _J = 125 °C	-	290	440	
Peak recovery current	I _{RRM}	T _J = 25 °C	-	8.7	20	A
		T _J = 125 °C	-	18	30	
Reverse recovery charge	Q _{rr}	T _J = 25 °C	-	420	1100	nC
		T _J = 125 °C	-	2600	7000	
Peak rate of recovery current	di(rec)/dt	T _J = 25 °C	-	300	-	A/μs
		T _J = 125 °C	-	280	-	

THERMAL - MECHANICAL SPECIFICATIONS						
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNITS	
Maximum junction and storage temperature range	T _J , T _{stg}	40	-	150	°C	
Thermal resistance, junction to case	per leg	-	-	0.23	°C/W K/W	
	per module	-	-	0.115		
Typical thermal resistance, case to heatsink	R _{thCS}	-	0.12	-		
Weight		-	95	-	g	
		-	3.4	-	oz.	
Mounting torque (baseplate), M6 (1)		-	-	4	N · m	
Terminal torque (terminal), M6		-	-	3		

Note

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

Ordering Information Tabel

Nell High Power Products

Fig.1 Typical Forward Characteristics

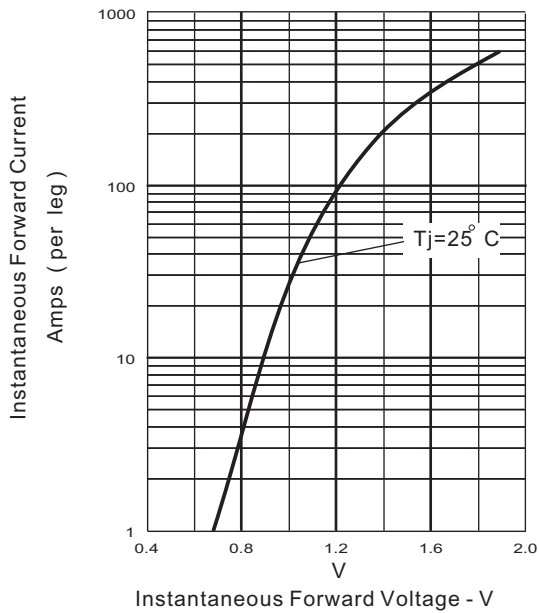


Fig.2 Forward Derating Curve

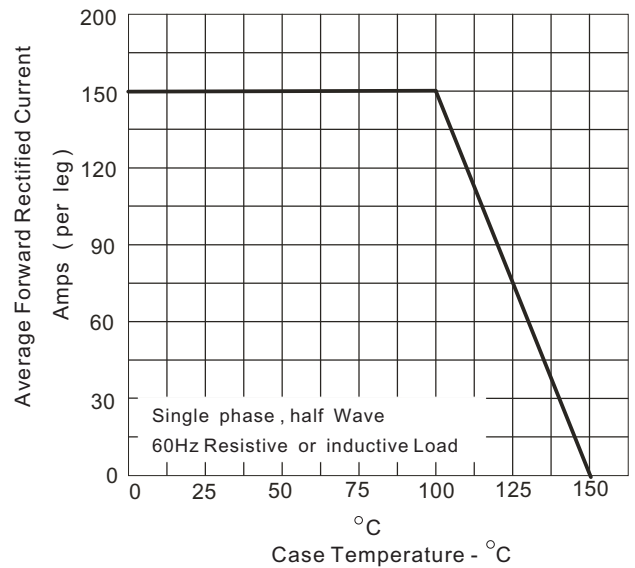


Fig.3 Peak Forward Surge Current

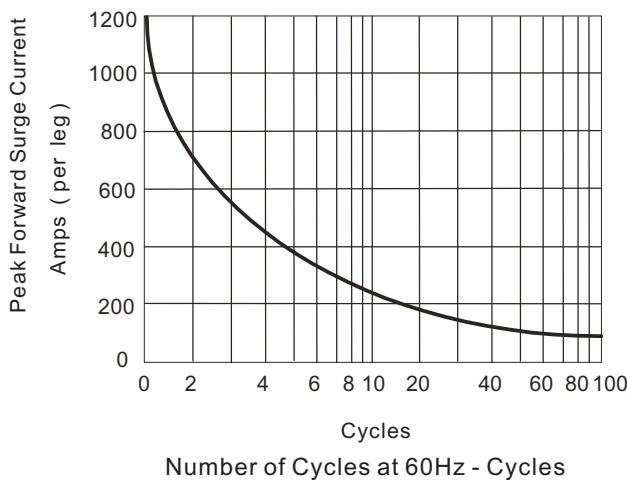


Fig.4 Typical Reverse Characteristics

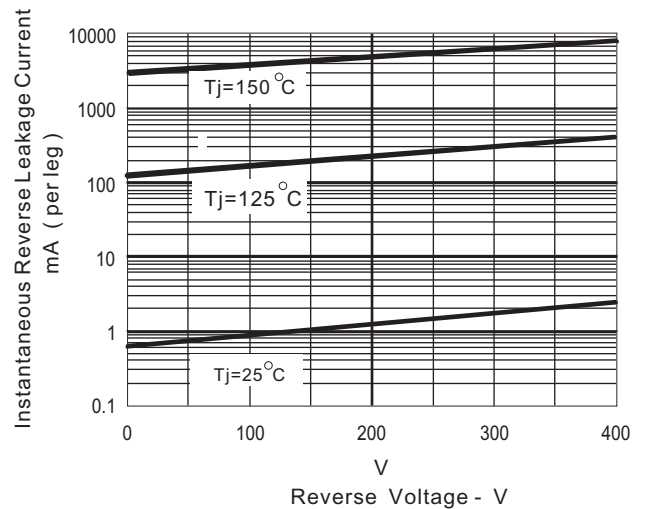


Fig.5 RG#1 Test Circuit

