

Thyristor/Diode and Thyristor/Thyristor, 110A (ADD-A-PAK Power Modules)



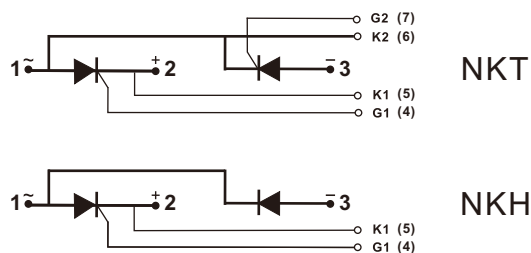
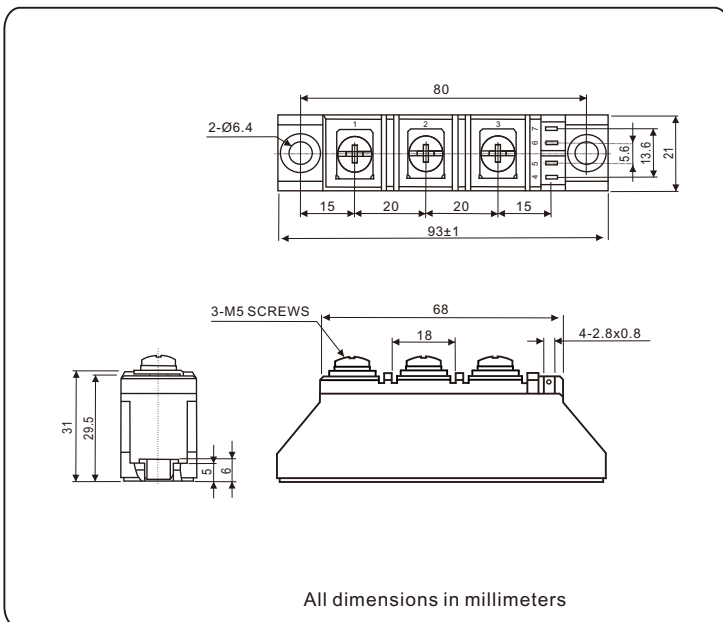
ADD-A-PAK

FEATURES

- High voltage
- Electrically isolated by DBC ceramic (Al_2O_3)
- 3000 V_{RMS} isolating voltage
- Industrial standard package
- High surge capability
- SCR GPP chips
- Modules uses high voltage power thyristors/diodes in two basic configurations
- Simple mounting
- UL approved file E320098 
- Compliant to RoHS 
- Designed and qualified for multiple level

APPLICATIONS

- DC motor control and drives
- Battery charges
- Welders
- Power converters
- Lighting control
- Heat and temperature control



PRODUCT SUMMARY

$I_{T(AV)} / I_{F(AV)}$	110 A
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MAJOR RATINGS AND CHARACTERISTICS

SYMBOL	CHARACTERISTICS	VALUE	UNITS
$I_{T(AV)} / I_{F(AV)}$	85 °C	110	A
$I_{T(RMS)} / I_{F(RMS)}$	85 °C	173	A
I_{TSM} / I_{FSM}	50 Hz	2400	
	60 Hz	2520	
I^2t	50 Hz	28.8	kA ² s
	60 Hz	26.3	
$I^2\sqrt{t}$		288	kA ² √s
V_{DRM} / V_{RRM}	Range	400 to 1600	V
T_J	Range	-40 to 125	°C

ELECTRICAL SPECIFICATIONS

VOLTAGE RATINGS				
TYPE NUMBER	VOLTAGE CODE	V_{RRM}/V_{DRM} , MAXIMUM REPETITIVE PEAK REVERSE VOLTAGE V	V_{RSM}/V_{DSM} , MAXIMUM NON-REPETITIVE PEAK REVERSE VOLTAGE V	I_{RRM}/I_{DRM} AT 125 °C mA
NKT110..A NKH110..A	04	400	500	12
	08	800	900	
	12	1200	1300	
	14	1400	1500	
	16	1600	1700	
	18	1800	1900	
	20	2000	2100	

FORWARD CONDUCTION						
PARAMETER	SYMBOL	TEST CONDITIONS			VALUE	UNITS
Maximum average on-state current (thyristors)	$I_{T(AV)}$	180° conduction, half sine wave, 50Hz , $T_C = 85^{\circ}\text{C}$			110	A
Maximum average forward current (diodes)	$I_{F(AV)}$					
Maximum RMS on-state current	$I_{T(RMS)}$ $I_{F(RMS)}$	180° conduction, half sine wave, 50Hz , $T_C = 85^{\circ}\text{C}$			173	A
Maximum peak, one-cycle, on-state non-repetitive surge current	I_{TSM} I_{FSM}	t = 10 ms	No voltage reapplied	Sine half wave, initial $T_J = T_J$ maximum	2400	
		t = 8.3 ms	No voltage reapplied		2520	
		t = 10 ms	100% V_{RRM} reapplied		2016	
		t = 8.3 ms	100% V_{RRM} reapplied		2117	
Maximum I^2t for fusing	I^2t	t = 10 ms	No voltage reapplied		28.8	kA ² s
		t = 8.3 ms	No voltage reapplied		26.3	
		t = 10 ms	100% V_{RRM} reapplied		20.3	
		t = 8.3 ms	100% V_{RRM} reapplied		18.6	
Maximum $I^2\sqrt{t}$ for fusing	$I^2\sqrt{t}$	t = 0.1 ms to 10 ms, no voltage reapplied			288	kA ² $\sqrt{s}$
Maximum value of threshold voltage	$V_{T(TO)}$	$T_J = T_J$ Maximum			1.0	V
Maximum value of on-state slope resistance	r_t				2.5	mΩ
Maximum on-state voltage drop	V_{TM}	$I_{TM} = 330\text{A}$, $T_J = 25^{\circ}\text{C}$, 180° conduction			1.6	V
Maximum forward voltage drop	V_{FM}	$I_{FM} = 330\text{A}$, $T_J = 25^{\circ}\text{C}$, 180° conduction			1.3	
Maximum holding current	I_H	Anode supply = 6V, resistive load $T_J = 25^{\circ}\text{C}$			250	mA
Maximum latching current	I_L				400	

BLOCKING				
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum peak reverse and off-state leakage current	I_{RRM} I_{DRM}	$T_J = 125^\circ\text{C}$	12	mA
RMS isolation Voltage	V_{ISO}	50 Hz, circuit to base, all terminals shorted	2500 (1min) 3000 (1s)	V
Critical rate of rise of off-state voltage	dV/dt	$T_J = T_J$ maximum, exponential to 67 % rated V_{DRM}	1000	V/μs

TRIGGERING					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum peak gate power	P _{GM}	t _p ≤ 5 ms, T _J = T _J maximum		10	W
Maximum average gate power	P _{G(AV)}	f = 50 Hz, T _J = T _J maximum		3	
Maximum peak gate current	I _{GM}	t _p ≤ 5 ms, T _J = T _J maximum		3	A
Maximum peak negative gate voltage	- V _{GM}			10	V
Maximum required DC gate voltage to trigger	V _{GT}	T _J = 25 °C	Anode supply = 6 V, resistive load; R _a = 1 Ω	0.7~1.8	
Maximum required DC gate current to trigger	I _{GT}			20~150	mA
Maximum gate voltage that will not trigger	V _{GD}	T _J = T _J maximum, 66.7% V _{DRM} applied		0.25	V
Maximum gate current that will not trigger	I _{GD}			10	mA
Maximum rate of rise of turned-on current	di/dt	T _J = 25°C ,I _{GM} = 1.5A ,t _r ≤ 0.5 μs		150	A/μs

THERMAL AND MECHANICAL SPECIFICATIONS					
PARAMETER		SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum junction operating temperature range		T _J		- 40 to 125	°C
Maximum storage temperature range		T _{Stg}		- 40 to 150	
Maximum thermal resistance, junction to case per junction		R _{thJC}	DC operation	0.22	°C/W
Maximum thermal resistance, case to heatsink per module		R _{thCS}	Mounting surface, smooth , flat and greased	0.10	
Mounting torque ± 10 %	AAP to heatsink, M6 busbar to AAP, M5		A mounting compound is recommended and the torque should be rechecked after a period of 3 hours to allow for the spread of the compound. Lubricated threads.	4	N.m
Approximate weight				120	g
				4.23	oz.
Case style				ADD-A-PAK	

ORDERING INFORMATION TABLE

Device code	NKT	110	/	16	A
	①	②	③	④	
①	- Module type: NKT for (Thyristor + Thyristor) module NKH for (Thyristor + Diode) module				
②	- Current rating: $I_{T(AV)}$ / $I_{F(AV)}$				
③	- Voltage code $\times 100 = V_{RRM}$				
④	- Assembly type, "A" for soldering type				

Nell High Power Products

Fig.1 Peak On-state Voltage vs. Peak On-state Current

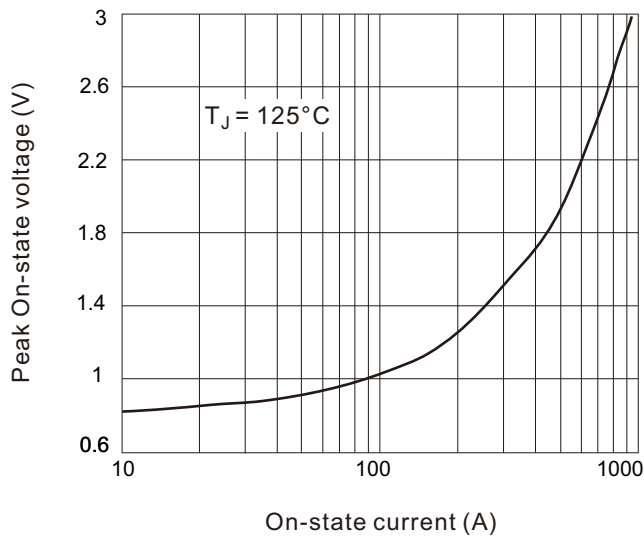


Fig.2 Max. Junction To case Thermal Impedance Vs. Time

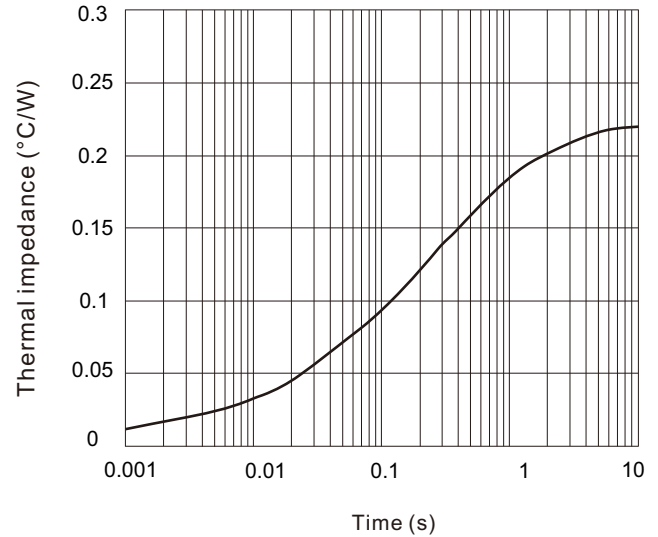


Fig.3 Power Dissipation Vs. Average On-state Current

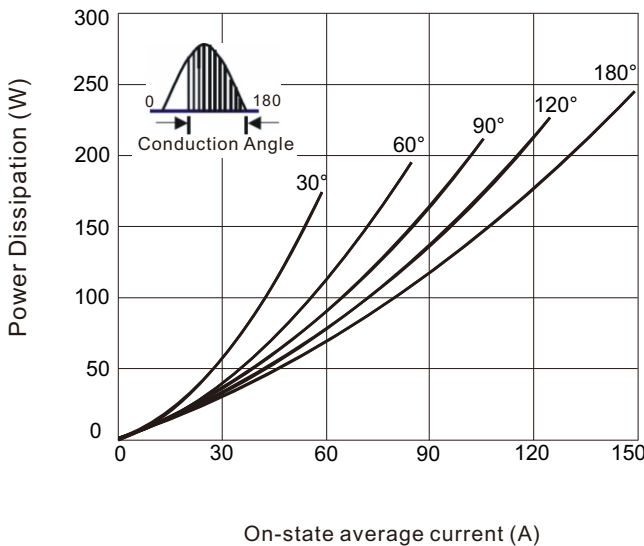


Fig.4 Case Temperature Vs. Average On-state Current

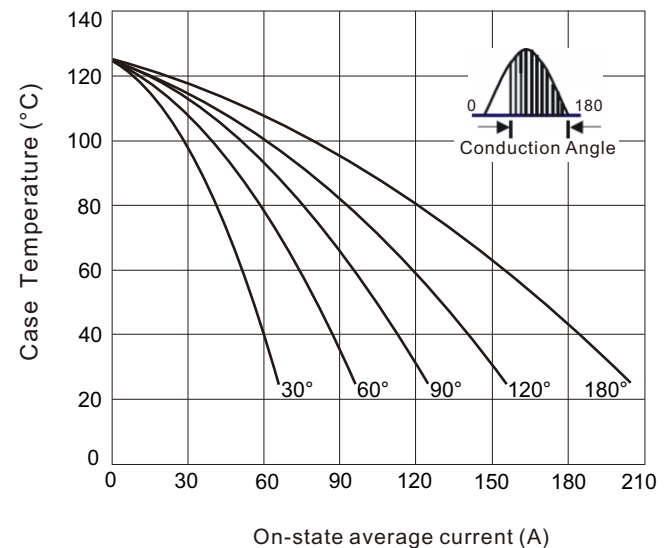


Fig.5 Surge On-state Current Vs. Cycles

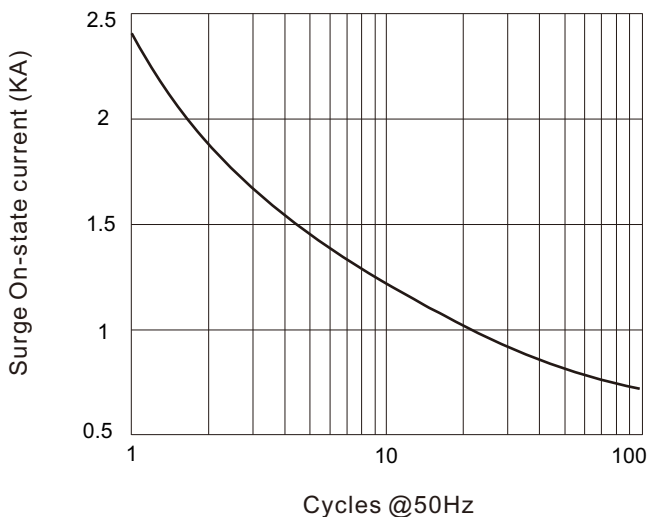


Fig.6 Gate characteristics

