

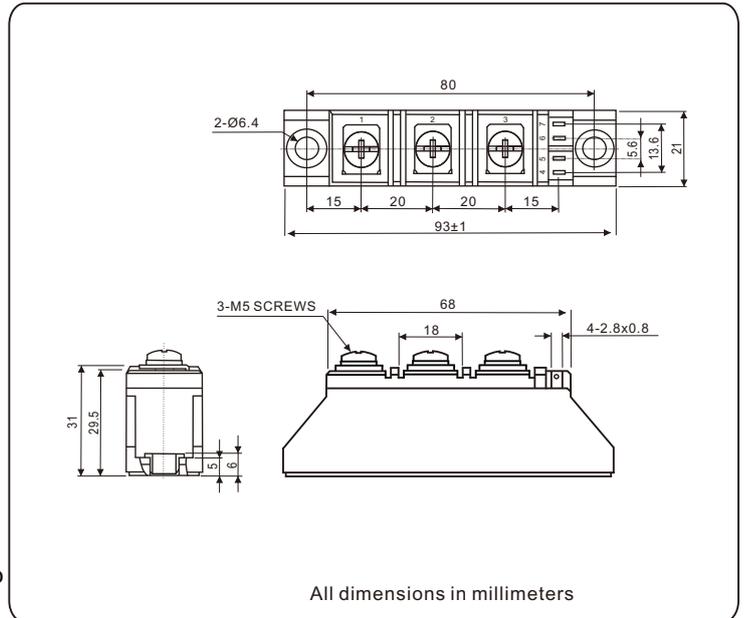
Thyristor/Diode and Thyristor/Thyristor, 110A (ADD-A-PAK Power Modules)



ADD-A-PAK

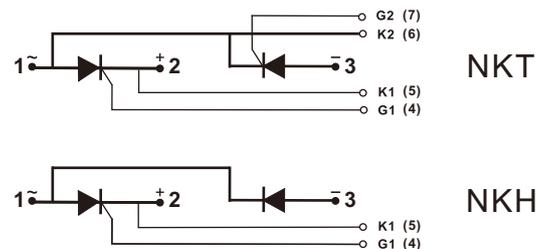
FEATURES

- 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

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	2400	
		t = 8.3 ms		2520	
		t = 10 ms	100% V_{RRM} reapplied	2016	
		t = 8.3 ms		2117	
Maximum I^2t for fusing	I^2t	t = 10 ms	No voltage reapplied	28.8	kA ² s
		t = 8.3 ms		26.3	
		t = 10 ms	100% V_{RRM} reapplied	20.3	
		t = 8.3 ms		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 √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}	$t_p \leq 5 \text{ ms}$, $T_J = T_J \text{ maximum}$		10	W
Maximum average gate power	$P_{G(AV)}$	$f = 50 \text{ Hz}$, $T_J = T_J \text{ maximum}$		3	
Maximum peak gate current	I_{GM}	$t_p \leq 5 \text{ ms}$, $T_J = T_J \text{ maximum}$		3	A
Maximum peak negative gate voltage	$-V_{GM}$			10	V
Maximum required DC gate voltage to trigger	V_{GT}	$T_J = 25^\circ\text{C}$	Anode supply = 6 V, resistive load; $R_a = 1 \Omega$	0.7~1.8	
Maximum required DC gate current to trigger	I_{GT}			20~150	
Maximum gate voltage that will not trigger	V_{GD}	$T_J = T_J \text{ maximum}$, 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	$T_J = 25^\circ\text{C}$, $I_{GM} = 1.5\text{A}$, $t_r \leq 0.5 \mu\text{s}$		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 $\pm 10\%$	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

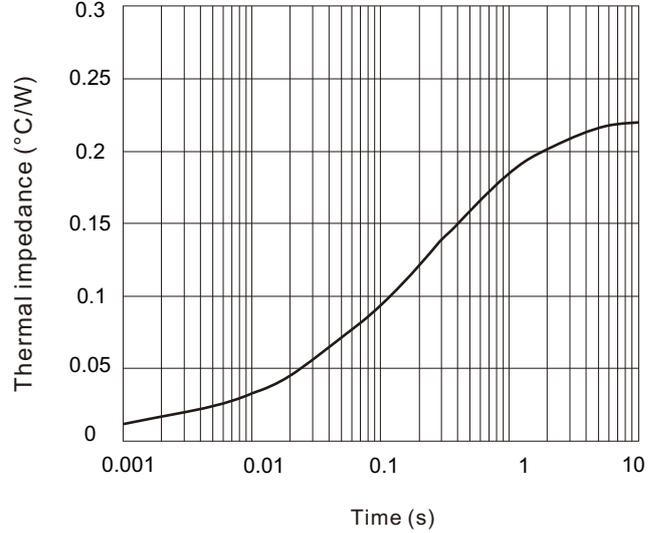
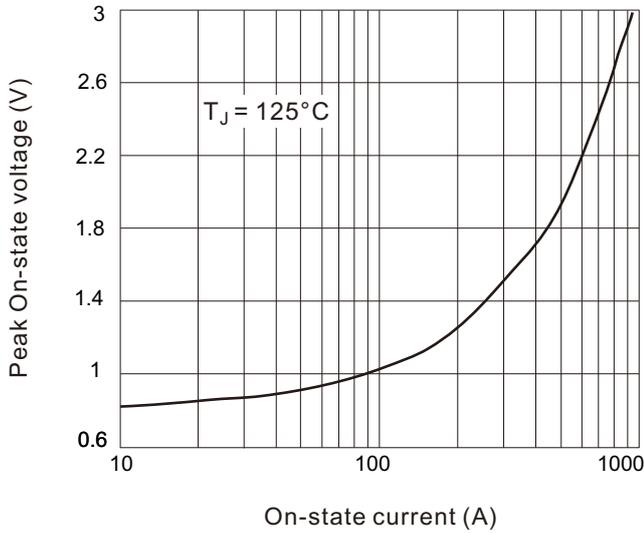


Fig.3 Power Dissipation Vs. Average On-state Current

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

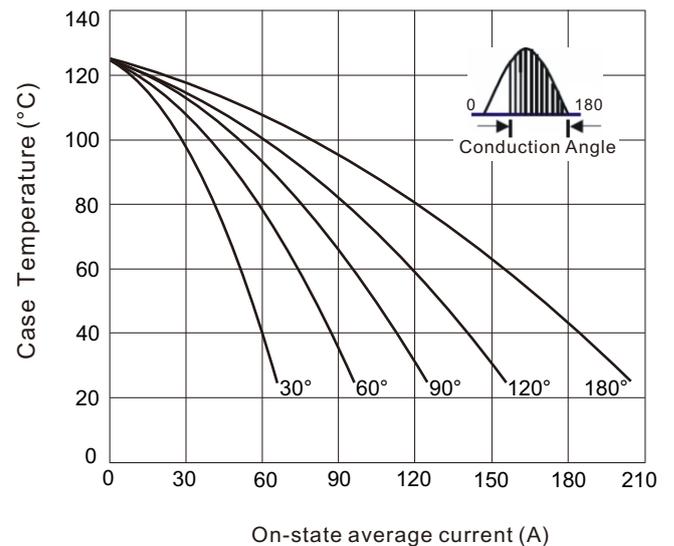
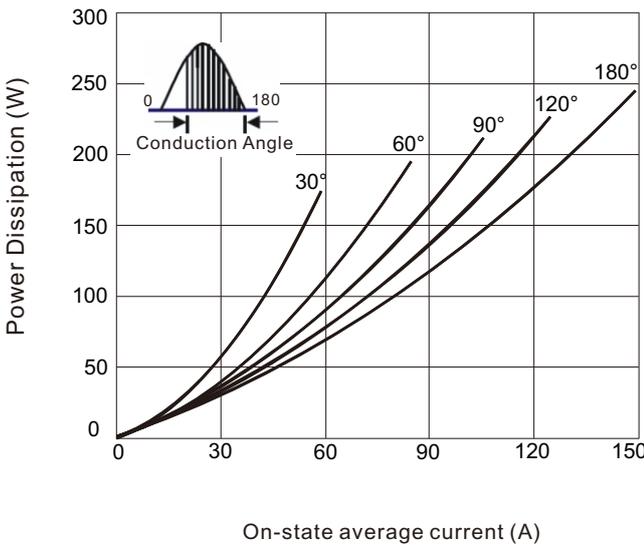


Fig.5 Surge On-state Current Vs. Cycles

Fig.6 Gate characteristics

