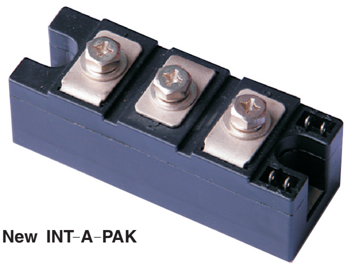
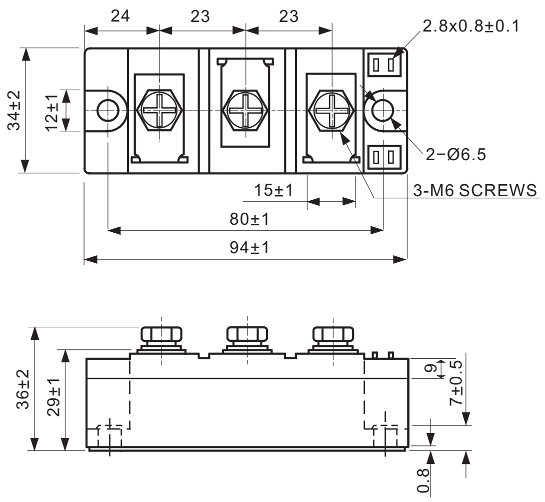
Thyristor/Diode and Thyristor/Thyristor, 200A
(New INT-A-PAK Power Modules)


New INT-A-PAK



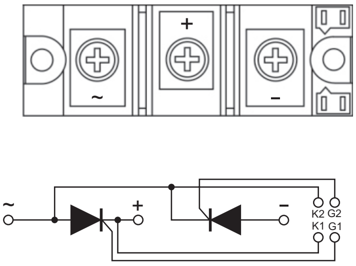
All dimensions in millimeters

FEATURES

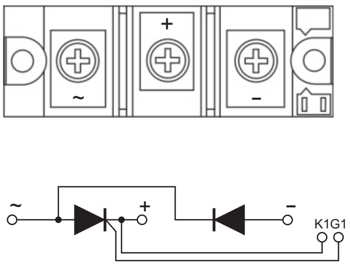
- High voltage
- Electrically isolated by DBC ceramic (Al_2O_3)
- 3500 V_{RMS} isolating voltage
- Industrial standard package
- High surge capability
- Glass passivated chips
- Modules uses high voltage power thyristor/diodes in two basic configurations
- Simple mounting
- UL approved file E320098
- Compliant to RoHS
- Designed and qualified for multiple level

RoHS COMPLIANT

NKT



NKH



APPLICATIONS

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

PRODUCT SUMMARY

$I_{T(AV)}$	200 A

MAJOR RATINGS AND CHARACTERISTICS

SYMBOL	CHARACTERISTICS	VALUES	UNITS
$I_{T(AV)}$	85 °C	200	A
$I_{T(RMS)}$	85 °C	314	A
I_{TSM}	50 Hz	7200	
	60 Hz	7560	
I^2t	50 Hz	259	kA^2s
	60 Hz	236	
$I^2\sqrt{t}$		2592	$kA^2\sqrt{s}$
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
NKT200 NKH200	04	400	500	30
	08	800	900	
	12	1200	1300	
	14	1400	1500	
	16	1600	1700	

FORWARD CONDUCTION

PARAMETER	SYMBOL	TEST CONDITIONS			VALUES	UNITS
Maximum average on-state current at case temperature	$I_{T(AV)}$	180° conduction, half sine wave ,50Hz			200	A
					85	°C
Maximum RMS on-state current	$I_{T(RMS)}$	180° conduction, half sine wave ,50Hz ,T_C = 85°C			314	A
Maximum peak, one-cycle, on-state non-repetitive surge current	I_{TSM}	t = 10 ms	No voltage reapplied	Sine half wave, initial T_J = T_J maximum	7200	
		t = 8.3 ms			7560	
Maximum I^2t for fusing	I^2t	t = 10 ms			259	kA^2s
		t = 8.3 ms			236	
		t = 10 ms	100%V_{RRM} reapplied		181	
		t = 8.3 ms			165	
Maximum $I^2\sqrt{t}$ for fusing	$I^2\sqrt{t}$	t = 0.1 ms to 10 ms, no voltage reapplied			2592	$kA^2\sqrt{s}$
Maximum on-state voltage drop	V_{TM}	I_{TM} = 600A , T_J = 25 °C, 180° conduction			1.7	V
Maximum forward voltage drop	V_{FM}	I_{FM} = 600A, T_J = 25 °C, 180° conduction			1.4	
Maximum holding current	I_H	Anode supply = 12 V initial I_T = 30 A, T_J = 25 °C			40~150	mA
Maximum latching current	I_L	Anode supply = 12 V resistive load = 1 Ω Gate pulse: 10 V, 100 μs, T_J = 25 °C			400	

BLOCKING

PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum peak reverse and off-state leakage current	I_{RRM}, I_{DRM}	T_J = 125 °C	30	mA
RMS isolation Voltage	V_{ISO}	50 Hz, circuit to base, all terminals shorted	2500 (1min) 3500 (1s)	V
Critical rate of rise of off-state voltage	dV/dt	T_J = T_J maximum, exponential to 67 % rated V_{DRM}	500	V/μs

TRIGGERING

PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum peak gate power	P_{GM}	$t_p \le 5$ 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}	$t_p \le 5$ 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 = 12 V, resistive load; $R_a = 1\,\Omega$	0.7~1.8	
Maximum required DC gate current to trigger	I_{GT}			30~150	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, $I_{GM} = 1.5$A, $t_r \le 0.5$ 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	0.14	°C/W
Maximum thermal resistance, case to heatsink per module		R_{thCS}	Mounting surface, smooth, flat and greased	0.025	
Mounting torque ± 10 %	IAP to heatsink, M6 busbar to IAP, M6		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 to 6	N.m
Approximate weight				220	g
				7.05	oz.
Case style				New INT-A-PAK	

ORDERING INFORMATION TABLE

Device code	NKT	200	/	16	A
	①	②		③	④

1 - Module type: NKT for (Thyristor + Thyristor) module
NKH for (Thyristor + Diode) module

2 - Current rating: $I_{T(AV)}$

3 - Voltage code x 100 = V_{RRM}

4 - Assembly type,"A" for soldering type

Fig.1 On-state current vs. voltage characteristic

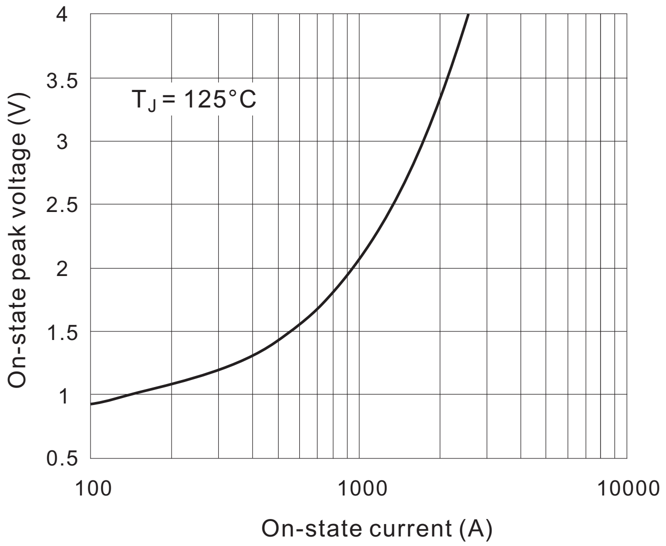


Fig.2 Transient thermal impedance(junction-case)

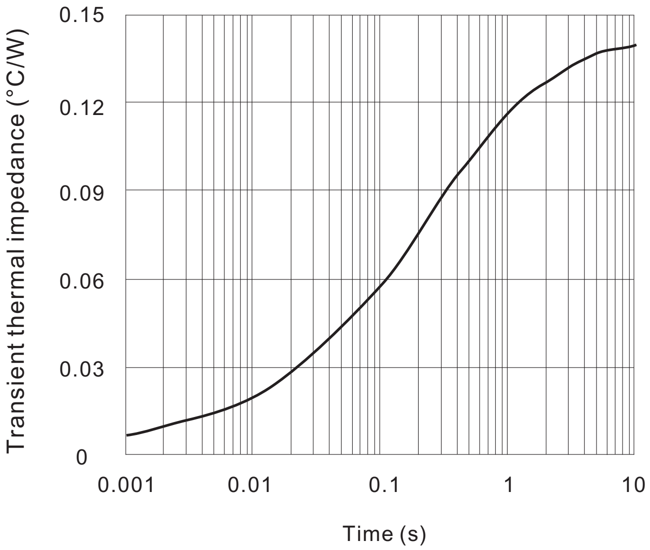


Fig.3 Power consumption vs. average current

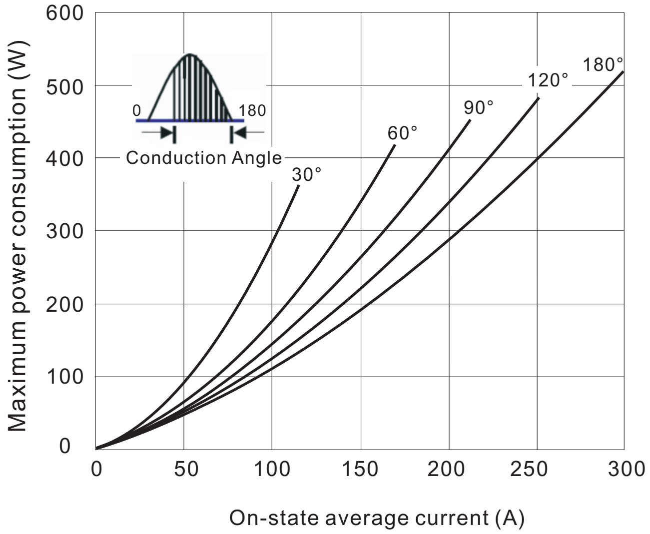


Fig.4 Case temperature vs. on-state average current

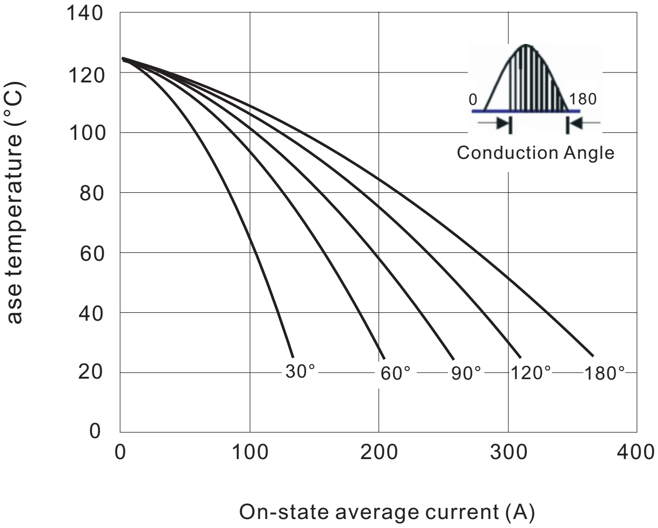


Fig.5 On-state surge current vs cycles

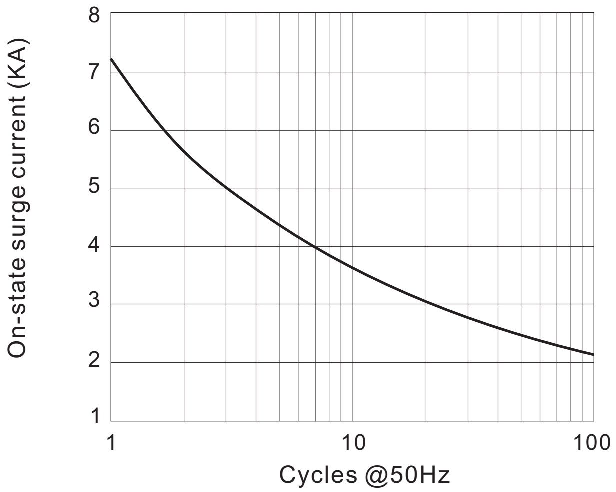


Fig.6 I^{2}t characteristics