

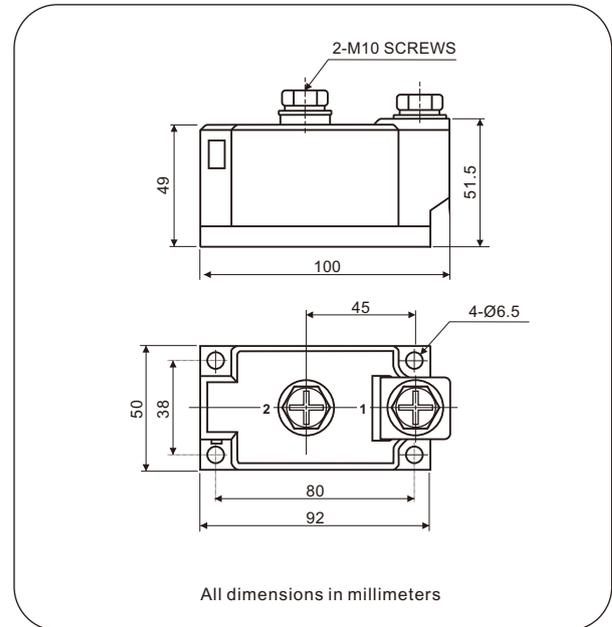
### Standard Recovery Diodes, 600 A (MAGN-A-PAK Power Modules)



MAP Module

#### FEATURES

- High voltage
- Electrically isolated by DBC ceramic ( $Al_2O_3$ )
- 3000  $V_{RMS}$  isolating voltage
- Industrial standard package
- High surge capability
- Modules uses high voltage power diodes in basic configuration
- 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



#### PRODUCT SUMMARY

$I_{F(AV)}$	600A
Type	Single Diode, High Voltage

#### MAJOR RATINGS AND CHARACTERISTICS

SYMBOL	CHARACTERISTICS	VALUES	UNIT
$I_{F(AV)}$		600	A
	$T_C$	100	$^{\circ}C$
$I_{F(RMS)}$		942	A
$I_{FSM}$	50 HZ	23000	
	60 HZ	24081	
$I^2t$	50 HZ	2645	$kA^2s$
	60 HZ	2407	
$I^2\sqrt{t}$		26450	$kA^2\sqrt{s}$
$V_{RRM}$		400 to 3000	V
$t_J$	Range	-40 to 150	$^{\circ}C$

### ELECTRICAL SPECIFICATIONS

VOLTAGE RATINGS				
TYPE NUMBER	VOLTAGE CODE	$V_{RRM}$ , MAXIMUM REPETITIVE PEAK REVERSE VOLTAGE V	$V_{RSM}$ , MAXIMUM NON-REPETITIVE PEAK REVERSE VOLTAGE V	$I_{RRM}$ AT $T_J = 150^\circ\text{C}$ mA
NKE600	04	400	500	30
	08	800	900	
	12	1200	1300	
	16	1600	1700	
	20	2000	2100	
	25	2500	2600	
	30	3000	3100	

FORWARD CONDUCTION						
PARAMETER	SYMBOL	TEST CONDITIONS			VALUES	UNIT
Maximum average on-state current at case temperature	$I_{F(AV)}$	180° conduction, half sine wave			600	A
					100	°C
Maximum RMS on-state current	$I_{F(RMS)}$	180° conduction, half sine wave, 50HZ, $T_C = 100^\circ\text{C}$			942	A
Maximum peak, one-cycle, on-state non-reptitive surge current	$I_{FSM}$	t = 10ms	No voltage reappplied	Sine half wave, initial $T_J = T_J$ maximum	23000	
		t = 8.3ms			24081	
		t = 10ms	100% $V_{RRM}$ reappplied		19320	
		t = 8.3ms			20228	
Maximum $I^2t$ for fusing	$I^2t$	t = 10ms	No voltage reappplied		2645	
		t = 8.3ms			2407	
		t = 10ms	100% $V_{RRM}$ reappplied		1866	
		t = 8.3ms			1698	
Maximum $I^2\sqrt{t}$ for fusing	$I^2\sqrt{t}$	t = 0.1 to 10 ms, no voltage reappplied			26450	$\text{kA}^2\sqrt{\text{s}}$
Maximum forward voltage drop	$V_{FM}$	$I_{FM} = 1800\text{A}$ , $T_J = 25^\circ\text{C}$ , 180° conduction			1.45	V

BLOCKING					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum peak reverse leakage current	$I_{RRM}$	$T_J = 150^\circ\text{C}$		30	mA
RMS insulation Voltage	$V_{ISO}$	50 Hz, circuit to base, all terminals shorted, t = 1s		3000	V
		t = 60s		2500	

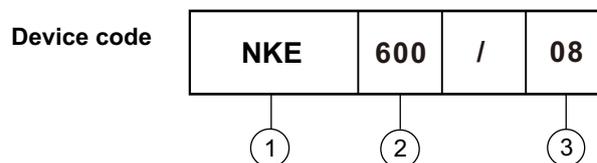
THERMAL AND MECHANICAL SPECIFICATIONS				
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNIT
Maximum junction operating temperature range	$T_J, T_{stg}$		-40 to 150	°C
Maximum thermal resistance, junction to case per junction	$R_{thJC}$	DC operation	0.054	°C/W
Maximum thermal resistance, case to heatsink per module	$R_{thCS}$	Mounting surface, smooth, flat and greased	0.02	
Mounting torque, $\pm 10\%$ <small>MAP to heatsink, M6 busbar to MAP, M10</small>		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
			9 to 12	
Approximate weight			900	g
			31.7	oz.
Case style			MAGN-A-PAK (MAP)	

$\Delta R_{thJC}$ CONDUCTION											
DEVICES	SINE HALF WAVE CONDUCTION AT $T_J$ MAXIMUM					RECTANGULAR WAVE CONDUCTION AT $T_J$ MAXIMUM					UNITS
	180°	120°	90°	60°	30°	180°	120°	90°	60°	30°	
NKE600	0.007	0.009	0.012	0.018	0.031	0.006	0.009	0.013	0.018	0.032	°C/W

**Note**

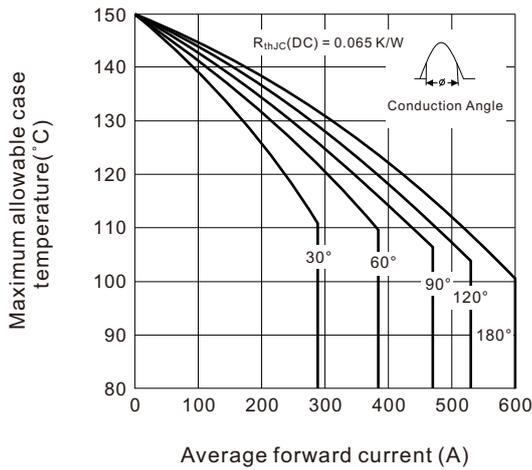
- Table shows the increment of thermal resistance  $R_{thJC}$  when devices operate at different conduction angles than DC

### Ordering Information Tabel

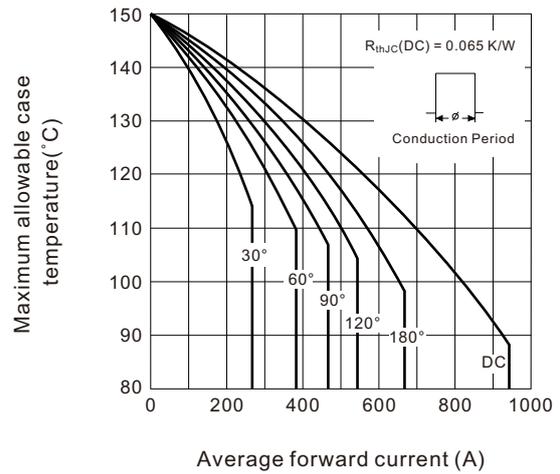


- ① - Module type, NKE for single diode module
- ② - Current rating :  $I_{F(AV)}$
- ③ - Voltage code x 100 =  $V_{RRM}$

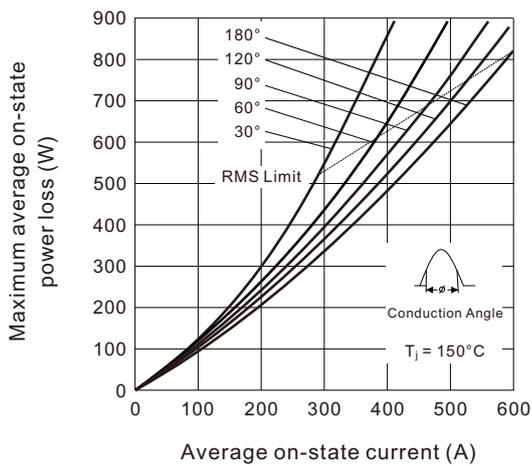
**Fig.1 Current ratings characteristics**



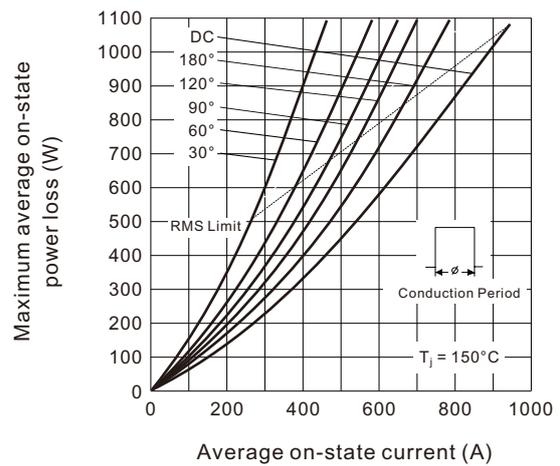
**Fig.2 Current ratings characteristics**



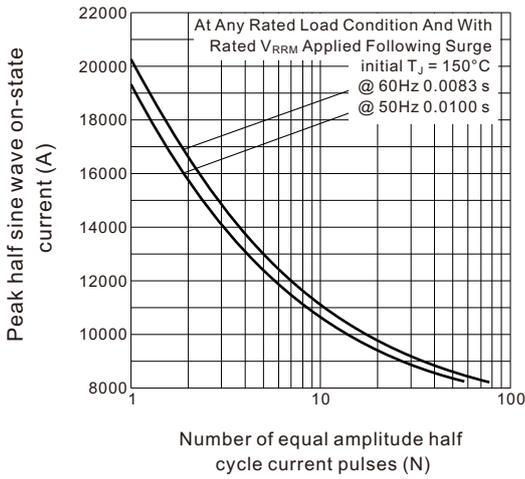
**Fig.3 On-state power loss characteristics**



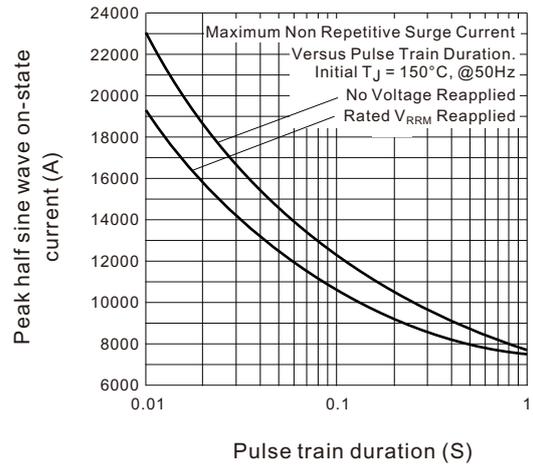
**Fig.4 On-state power loss characteristics**



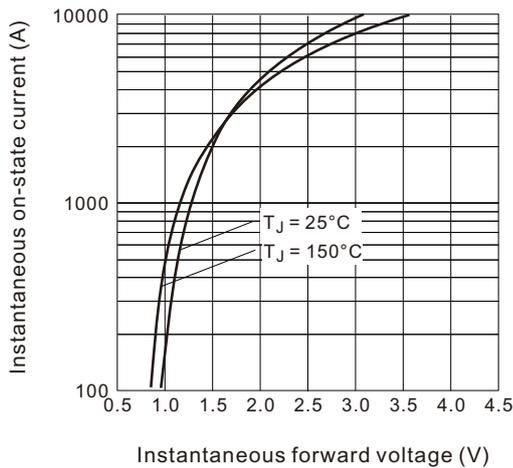
**Fig.5 Maximum non-repetitive surge current**



**Fig.6 Maximum non-repetitive surge current**



**Fig.7 On-state voltage drop characteristics**



**Fig.8 Thermal Impedance  $Z_{thJC}$  characteristics**

