Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

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preliminary

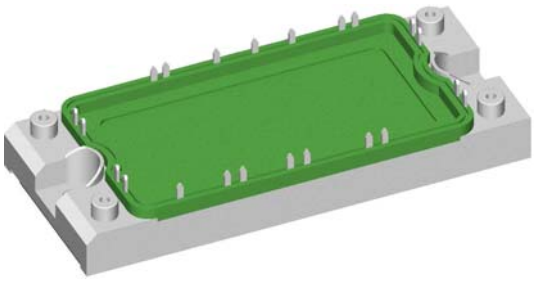
High Voltage Thyristor Module

3~ Rectifier	Brake Chopper
V_{RRM} = 2200 V	V_{CES} = 1700 V
I_{DAV} = 117 A	I_{C25} = 113 A
I_{FSM} = 500 A	$V_{CE(sat)}$ = 2.5 V

3~ Rectifier Bridge, half-controlled (high-side) + Brake Unit

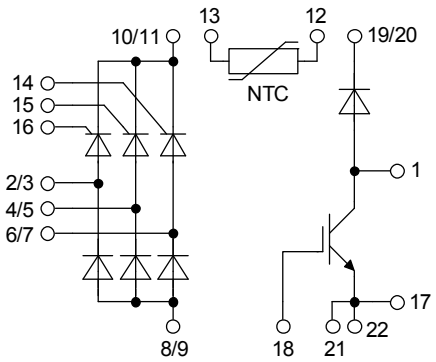
Part number

MCNA120UI2200TED



Backside: isolated

E72873



Features / Advantages:

- Thyristor/Standard Rectifier for line frequency
- Planar passivated chips
- Long-term stability
- Low forward voltage drop
- Leads suitable for PC board soldering
- Copper base plate with Direct Copper Bonded Al2O3-ceramic
- Improved temperature and power cycling

Applications:

- Drive Inverters with brake system

Package:

- Housing: E2-Pack
- International standard package
- RoHS compliant
- Isolation voltage: 3600 V~
- Advanced power cycling

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Thyristor

Symbol	Definition	Conditions		Ratings min.	typ.	max.	Unit
$V_{RSM/DSM}$	*max. non-repetitive reverse/forward blocking voltage*		T_{VJ} = 25°C			2300	V
$V_{RRM/DRM}$	*max. repetitive reverse/forward blocking voltage*		T_{VJ} = 25°C			2200	V
$I_{R/D}$	*reverse current, drain current*	$V_{R/D}$ = 2200 V	T_{VJ} = 25°C			50	µA
		$V_{R/D}$ = 2200 V	T_{VJ} = 125°C			10	mA
V_T	*forward voltage drop*	I_T = 40 A	T_{VJ} = 25°C			1.33	V
		I_T = 80 A				1.70	V
		I_T = 40 A	T_{VJ} = 125°C			1.36	V
		I_T = 80 A				1.88	V
I_{DAV}	*bridge output current*	T_C = 80°C	T_{VJ} = 150°C			117	A
		rectangular d = ⅓					
V_{T0}	*threshold voltage* } *for power loss calculation only*		T_{VJ} = 150°C			0.83	V
r_T	*slope resistance* }					13.6	mΩ
R_{thJC}	*thermal resistance junction to case*					0.65	K/W
R_{thCH}	*thermal resistance case to heatsink*				0.10		K/W
P_{tot}	*total power dissipation*		T_C = 25°C			190	W
I_{TSM}	*max. forward surge current*	t = 10 ms; (50 Hz), sine	T_{VJ} = 45°C			500	A
		t = 8,3 ms; (60 Hz), sine	V_R = 0 V			540	A
		t = 10 ms; (50 Hz), sine	T_{VJ} = 150°C			425	A
		t = 8,3 ms; (60 Hz), sine	V_R = 0 V			460	A
I^2t	*value for fusing*	t = 10 ms; (50 Hz), sine	T_{VJ} = 45°C			1.25	kA²s
		t = 8,3 ms; (60 Hz), sine	V_R = 0 V			1.22	kA²s
		t = 10 ms; (50 Hz), sine	T_{VJ} = 150°C			905	A²s
		t = 8,3 ms; (60 Hz), sine	V_R = 0 V			880	A²s
C_J	*junction capacitance*	V_R = 400 V f = 1 MHz	T_{VJ} = 25°C		18		pF
P_{GM}	*max. gate power dissipation*	t_P = 30 µs	T_C = 150°C			10	W
		t_P = 300 µs				5	W
P_{GAV}	*average gate power dissipation*					0.5	W
$(di/dt)_{cr}$	*critical rate of rise of current*	T_{VJ} = 150°C; f = 50 Hz	repetitive, I_T = 120 A			150	A/µs
		t_P = 200 µs; di_G/dt = 0.45 A/µs					
		I_G = 0.45 A; V_D = ⅔ V_{DRM}	non-repet., I_T = 40 A			500	A/µs
$(dv/dt)_{cr}$	*critical rate of rise of voltage*	V_D = ⅔ V_{DRM}	T_{VJ} = 150 °C			1000	V/µs
		R_{GK} = ∞; method 1 (linear voltage rise)					
V_{GT}	*gate trigger voltage*	V_D = 6 V	T_{VJ} = 25 °C			1.4	V
			T_{VJ} = -40 °C			1.6	V
I_{GT}	*gate trigger current*	V_D = 6 V	T_{VJ} = 25 °C			70	mA
			T_{VJ} = -40 °C			150	mA
V_{GD}	*gate non-trigger voltage*	V_D = ⅔ V_{DRM}	T_{VJ} = 150 °C			0.2	V
I_{GD}	*gate non-trigger current*					5	mA
I_L	*latching current*	t_p = 10 µs	T_{VJ} = 25 °C			150	mA
		I_G = 0.45 A; di_G/dt = 0.45 A/µs					
I_H	*holding current*	V_D = 6 V R_{GK} = ∞	T_{VJ} = 25 °C			100	mA
t_{gd}	*gate controlled delay time*	V_D = ½ V_{DRM}	T_{VJ} = 25 °C			2	µs
		I_G = 0.45 A; di_G/dt = 0.45 A/µs					
t_q	*turn-off time*	V_R = 100 V; I_T = 40 A; V_D = ⅔ V_{DRM}	T_{VJ} = 150 °C		500		µs
		di/dt = 10 A/µs; dv/dt = 20 V/µs; t_p = 200 µs					

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Brake IGBT				Ratings			
Symbol	Definition	Conditions		min.	typ.	max.	Unit
V_{CES}	*collector emitter voltage*		T_{VJ} = 25°C			1700	V
V_{GES}	*max. DC gate voltage*					±20	V
V_{GEM}	*max. transient collector gate voltage*					±30	V
I_{C25}	*collector current*		T_C = 25°C			113	A
I_{C80}			T_C = 80°C			80	A
P_{tot}	*total power dissipation*		T_C = 25°C			445	W
$V_{CE(sat)}$	*collector emitter saturation voltage*	I_C = 75 A; V_{GE} = 15 V	T_{VJ} = 25°C		2.5	2.93	V
			T_{VJ} = 125°C		3		V
$V_{GE(th)}$	*gate emitter threshold voltage*	I_C = 3 mA; V_{GE} = V_{CE}	T_{VJ} = 25°C	5.2	5.8	6.4	V
I_{CES}	*collector emitter leakage current*	V_{CE} = V_{CES}; V_{GE} = 0 V	T_{VJ} = 25°C			0.6	mA
			T_{VJ} = 125°C		5		mA
I_{GES}	*gate emitter leakage current*	V_{GE} = ±20 V				400	nA
$Q_{G(on)}$	*total gate charge*	V_{CE} = 900 V; V_{GE} = 15 V; I_C = 75 A			850		nC
$t_{d(on)}$	*turn-on delay time*				220		ns
t_r	*current rise time*				100		ns
$t_{d(off)}$	*turn-off delay time*	inductive load	T_{VJ} = 125°C		880		ns
t_f	*current fall time*	V_{CE} = 900 V; I_C = 75 A			200		ns
E_{on}	*turn-on energy per pulse*	V_{GE} = ±15 V; R_G = 18 Ω			30		mJ
E_{off}	*turn-off energy per pulse*				25		mJ
RBSOA	*reverse bias safe operating area*	V_{GE} = ±15 V; R_G = 18 Ω	T_{VJ} = 125°C				
I_{CM}		V_{CEK} = 1700 V				150	A
SCSOA	*short circuit safe operating area*						
t_{SC}	*short circuit duration*	V_{CE} = 720 V; V_{GE} = ±15 V	T_{VJ} = 125°C			10	µs
I_{SC}	*short circuit current*	R_G = 18 Ω; non-repetitive			tbd		A
R_{thJC}	*thermal resistance junction to case*					0.28	K/W
R_{thCH}	*thermal resistance case to heatsink*				0.10		K/W

Brake Diode							
V_{RRM}	*max. repetitive reverse voltage*		T_{VJ} = 25°C			1700	V
I_{F25}	*forward current*		T_C = 25°C			75	A
I_{F80}			T_C = 80°C			50	A
V_F	*forward voltage*	I_F = 60 A	T_{VJ} = 25°C			2.45	V
			T_{VJ} = 125°C			2.60	V
I_R	*reverse current*	V_R = V_{RRM}	T_{VJ} = 25°C			0.1	mA
			T_{VJ} = 125°C			1	mA
Q_{rr}	*reverse recovery charge*	V_R = 900 V			15		µC
I_{RM}	*max. reverse recovery current*	$-di_F/dt$ = 750 A/µs	T_{VJ} = 125°C		60		A
t_{rr}	*reverse recovery time*	I_F = 60 A			550		ns
E_{rec}	*reverse recovery energy*				10		mJ
R_{thJC}	*thermal resistance junction to case*					0.65	K/W
R_{thCH}	*thermal resistance case to heatsink*				0.10		K/W

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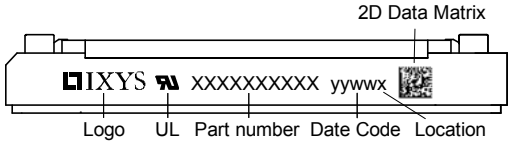
Package E2-Pack				Ratings			
Symbol	Definition	Conditions		min.	typ.	max.	Unit
I_{RMS}	*RMS current*	per terminal				200	A
T_{stg}	*storage temperature*			-40		125	°C
T_{VJ}	*virtual junction temperature*			-40		150	°C
Weight					176		g
M_D	*mounting torque*			3		6	Nm
V_{ISOL}	*isolation voltage*	t = 1 second		3600			V
		t = 1 minute		3000			V
$d_{Spp/App}$	*creepage distance on surface | striking distance through air*		*terminal to terminal*	6.0			mm
$d_{Spb/Apb}$			*terminal to backside*	12.0			mm



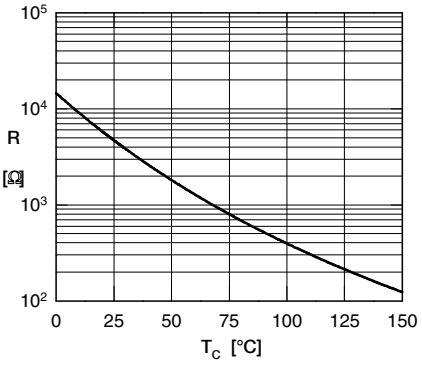
Part number

M = Module
C = Thyristor (SCR)
N = High Voltage Thyristor
A = (≥ 2000 V)
120 = Current Rating [A]
UI = 3~ Rectifier Bridge, half-controlled (high-side) + Brake Unit
2200 = Reverse Voltage [V]
T = Thermistor \ Temperature sensor
ED = E2-Pack

Ordering	Part Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	MCNA120UI2200TED	MCNA120UI2200TED	Box	6	510374

Temperature Sensor NTC

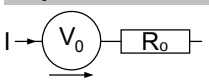
Symbol	Definition	Conditions	min.	typ.	max.	Unit
R_{25}	*resistance*	T_{VJ} = 25°	4.75	5	5.25	kΩ
$B_{25/50}$	*temperature coefficient*			3375		K



Typ. NTC resistance vs. temperature

Equivalent Circuits for Simulation

** on die level* T_{VJ} = 150°C



		Thyristor	Brake IGBT	Brake Diode	
$V_{0\,max}$	*threshold voltage*	0.83	1.17	1.34	V
$R_{0\,max}$	*slope resistance **	10.5	25	15.2	mΩ

Outlines E2-Pack