preliminary

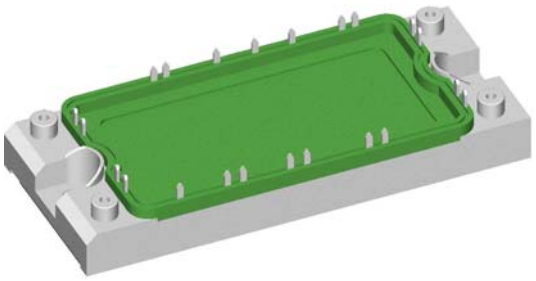
Thyristor Module

3~ Rectifier		
V_{RRM}	=	1800 V
I_{DAV}	=	117 A
I_{FSM}	=	500 A

3~ Rectifier Bridge, half-controlled (high-side) + free wheeling Diode

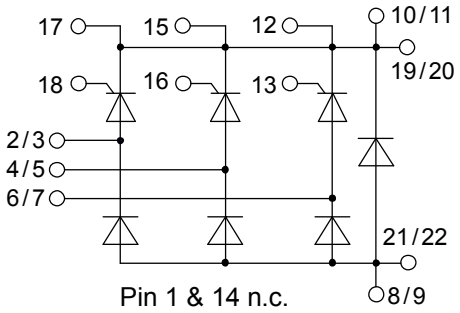
Part number

MCMA120UJ1800ED



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:

- Supplies for DC power equipment
- Input rectifiers for PWM inverter
- Battery DC power supplies
- Field supply for DC motors

Package:

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

preliminary

Thyristor

Symbol	Definition	Conditions		Ratings min.	typ.	max.	Unit
$V_{RSM/DSM}$	*max. non-repetitive reverse/forward blocking voltage*		T_{VJ} = 25°C			1900	V
$V_{RRM/DRM}$	*max. repetitive reverse/forward blocking voltage*		T_{VJ} = 25°C			1800	V
$I_{R/D}$	*reverse current, drain current*	$V_{R/D}$ = 1800 V	T_{VJ} = 25°C			50	µA
		$V_{R/D}$ = 1800 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			0.89	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			100	A/µs
		t_P = 200 µs; di_G/dt = 0.45 A/µs					
		I_G = 0.45A; 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 = 0.45A; 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 = 0.45A; 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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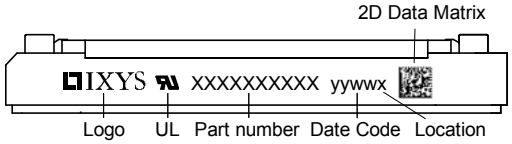
Package E2-Pack				Ratings			
Symbol	Definition	Conditions		min.	typ.	max.	Unit
I_{RMS}	*RMS current*	per terminal				200	A
T_{stg}	*storage temperature*			-40		125	°C
T_{VJ}	*virtual junction temperature*			-40		150	°C
Weight					176		g
M_D	*mounting torque*			3		6	Nm
V_{ISOL}	*isolation voltage*	t = 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



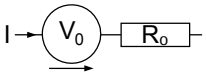
Part number

M = Module
C = Thyristor (SCR)
M = Thyristor
A = (up to 1800V)
120 = Current Rating [A]
UJ = 3~ Rectifier Bridge, half-controlled (high-side) + free wheeling Diode
1800 = Reverse Voltage [V]
ED = E2-Pack

Ordering	Part Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	MCMA120UJ1800ED	MCMA120UJ1800ED	Box	6	510125

Equivalent Circuits for Simulation

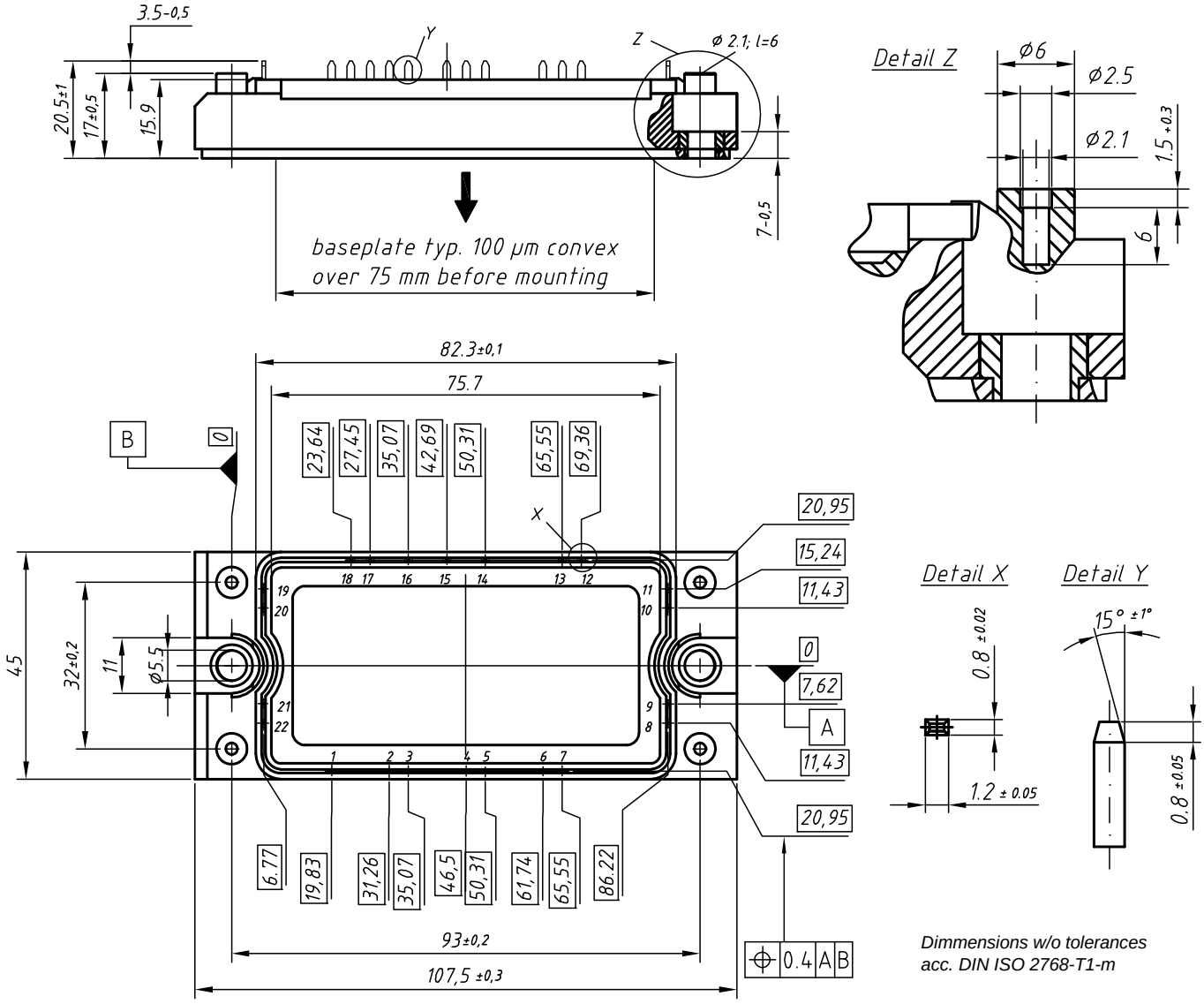
** on die level* T_{VJ} = 150°C



Thyristor

$V_{0\,max}$	*threshold voltage*	0.89	V
$R_{0\,max}$	*slope resistance **	10.5	mΩ

Outlines E2-Pack



Dimmensions w/o tolerances
acc. DIN ISO 2768-T1-m