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.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!

Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832
Email & Skype: info@chipsmall.com Web: www.chipsmall.com
Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China

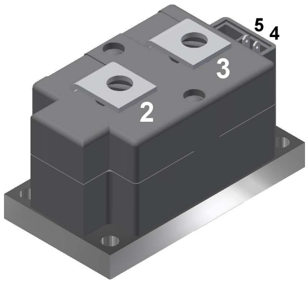
Thyristor Module

V_{RRM} = 1800 V
I_{TAV} = 560 A
V_T = 1.01 V

Single Thyristor

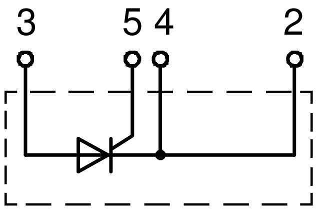
Part number

MCO500-18io1



Backside: isolated

UL E72873



Features / Advantages:

- Thyristor for line frequency
- Planar passivated chip
- Long-term stability
- Direct Copper Bonded Al2O3-ceramic

Applications:

- Line rectifying 50/60 Hz
- Softstart AC motor control
- DC Motor control
- Power converter
- AC power control
- Lighting and temperature control

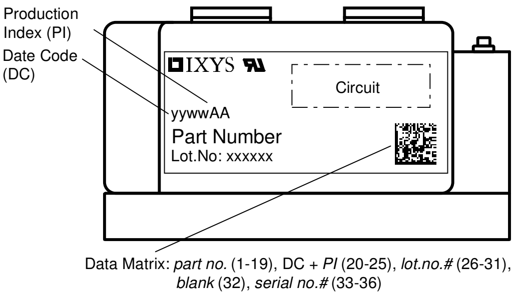
Package: Y1

- Isolation Voltage: 3600 V~
- Industry standard outline
- RoHS compliant
- Soldering pins for PCB mounting
- Base plate: Copper internally DCB isolated
- Advanced power cycling

Thyristor				Ratings			
Symbol	**Definition**	**Conditions**		**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			2	mA
		$V_{R/D}$ = 1800 V	T_{VJ} = 125°C			40	mA
V_T	*forward voltage drop*	I_T = 500 A	T_{VJ} = 25°C			1.08	V
		I_T = 1000 A				1.27	V
		I_T = 500 A	T_{VJ} = 125°C			1.01	V
		I_T = 1000 A				1.24	V
I_{TAV}	*average forward current*	T_C = 85°C	T_{VJ} = 140°C			560	A
$I_{T(RMS)}$	*RMS forward current*	180° sine				880	A
V_{T0}	*threshold voltage*	*for power loss calculation only*	T_{VJ} = 140°C			0.80	V
r_T	*slope resistance*	*for power loss calculation only*				0.38	mΩ
R_{thJC}	*thermal resistance junction to case*					0.072	K/W
R_{thCH}	*thermal resistance case to heatsink*				0.024		K/W
P_{tot}	*total power dissipation*		T_C = 25°C			1600	W
I_{TSM}	*max. forward surge current*	t = 10 ms; (50 Hz), sine	T_{VJ} = 45°C			17.0	kA
		t = 8,3 ms; (60 Hz), sine	V_R = 0 V			18.4	kA
		t = 10 ms; (50 Hz), sine	T_{VJ} = 140°C			14.5	kA
		t = 8,3 ms; (60 Hz), sine	V_R = 0 V			15.6	kA
I^2t	*value for fusing*	t = 10 ms; (50 Hz), sine	T_{VJ} = 45°C			1.45	MA²s
		t = 8,3 ms; (60 Hz), sine	V_R = 0 V			1.40	MA²s
		t = 10 ms; (50 Hz), sine	T_{VJ} = 140°C			1.04	MA²s
		t = 8,3 ms; (60 Hz), sine	V_R = 0 V			1.01	MA²s
C_J	*junction capacitance*	V_R = 400 V f = 1 MHz	T_{VJ} = 25°C		876		pF
P_{GM}	*max. gate power dissipation*	t_P = 30 µs	T_C = 140°C			120	W
		t_P = 300 µs				60	W
P_{GAV}	*average gate power dissipation*					20	W
$(di/dt)_{cr}$	*critical rate of rise of current*	T_{VJ} = 140°C; f = 50 Hz	repetitive, I_T = 1500 A			100	A/µs
		t_P = 200 µs; di_G/dt = 1 A/µs;					
		I_G = 1 A; V = ⅔ V_{DRM}	non-repet., I_T = 500 A			500	A/µs
$(dv/dt)_{cr}$	*critical rate of rise of voltage*	V = ⅔ V_{DRM}	T_{VJ} = 140°C			1000	V/µs
		R_{GK} = ∞; method 1 (linear voltage rise)					
V_{GT}	*gate trigger voltage*	V_D = 6 V	T_{VJ} = 25°C			2	V
			T_{VJ} = -40°C			3	V
I_{GT}	*gate trigger current*	V_D = 6 V	T_{VJ} = 25°C			300	mA
			T_{VJ} = -40°C			400	mA
V_{GD}	*gate non-trigger voltage*	V_D = ⅔ V_{DRM}	T_{VJ} = 140°C			0.25	V
I_{GD}	*gate non-trigger current*					10	mA
I_L	*latching current*	t_p = 30 µs	T_{VJ} = 25°C			400	mA
		I_G = 1 A; di_G/dt = 1 A/µs					
I_H	*holding current*	V_D = 6 V R_{GK} = ∞	T_{VJ} = 25°C			300	mA
t_{gd}	*gate controlled delay time*	V_D = ½ V_{DRM}	T_{VJ} = 25°C			2	µs
		I_G = 1 A; di_G/dt = 1 A/µs					
t_q	*turn-off time*	V_R = 100 V; I_T = 500 A; V = ⅔ V_{DRM}	T_{VJ} = 125 °C		350		µs
		di/dt = 10 A/µs dv/dt = 50 V/µs	t_p = 200 µs				

Package Y1

Symbol	Definition	Conditions		Ratings min.	typ.	max.	Unit
I_{RMS}	*RMS current*	per terminal				600	A
T_{VJ}	*virtual junction temperature*			-40		140	°C
T_{op}	*operation temperature*			-40		125	°C
T_{stg}	*storage temperature*			-40		125	°C
Weight					650		g
M_D	*mounting torque*			4.5		7	Nm
M_T	*terminal torque*			11		13	Nm
$d_{Spp/App}$	*creepage distance on surface | striking distance through air*		*terminal to terminal*	16.0			mm
$d_{Spb/Apb}$			*terminal to backside*	25.0			mm
V_{ISOL}	*isolation voltage*	t = 1 second	50/60 Hz, RMS; I_{ISOL} ≤ 1 mA	3600			V
		t = 1 minute		3000			V

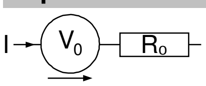


Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	MCO500-18io1	MCO500-18io1	Box	3	466433

Similar Part	Package	Voltage class
MCO500-12io1	Y1-2-CU	1200
MCO500-14io1	Y1-2-CU	1400
MCO500-16io1	Y1-2-CU	1600
MCO600-20io1	Y1-2-CU	2000
MCO600-22io1	Y1-2-CU	2200

Equivalent Circuits for Simulation

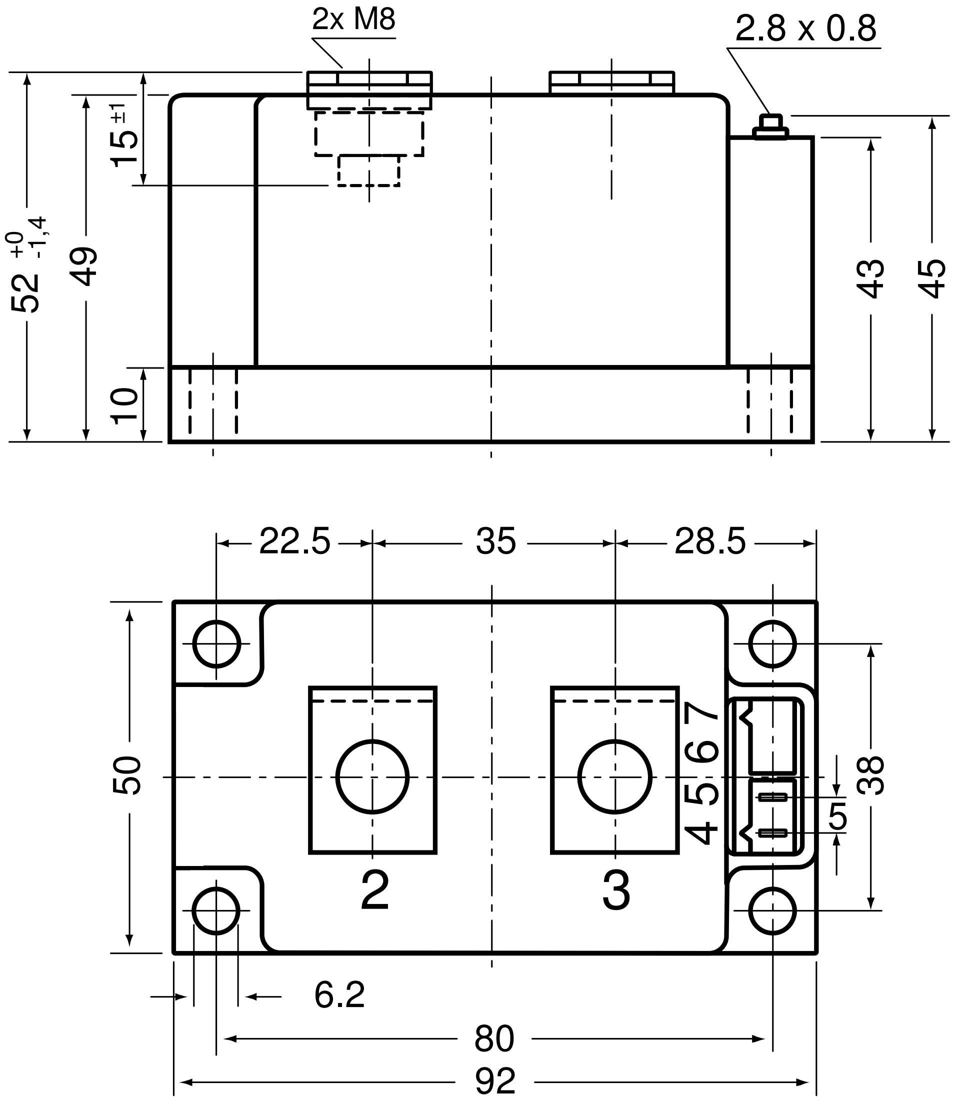
** on die level* T_{VJ} = 140 °C



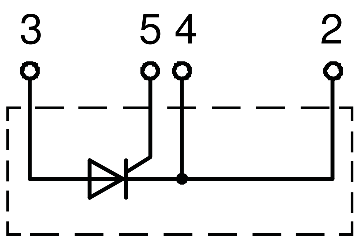
Thyristor

$V_{0\,max}$	*threshold voltage*	0.8	V
$R_{0\,max}$	*slope resistance **	0.22	mΩ

Outlines Y1



Optional accessories for modules
Keyed gate/cathode twin plugs with wire length = 350 mm, gate = white, cathode = red
Type ZY 180L (L = Left for pin pair 4/5) } UL 758, style 3751
Type ZY 180R (R = Right for pin pair 6/7) }



Thyristor

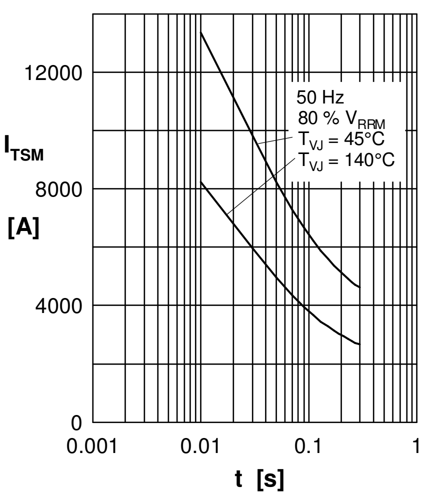


Fig. 1 Surge overload current I_{TSM}: Crest value, t: duration

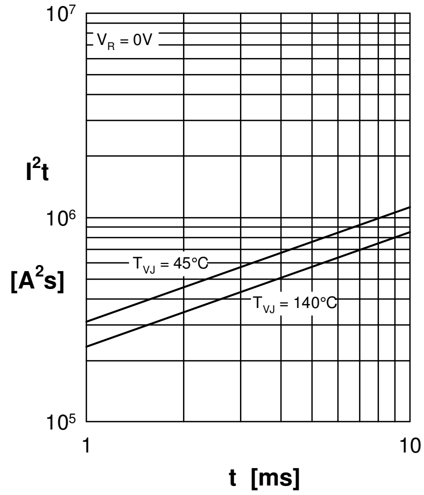


Fig. 2 I^2t versus time (1-10 ms)

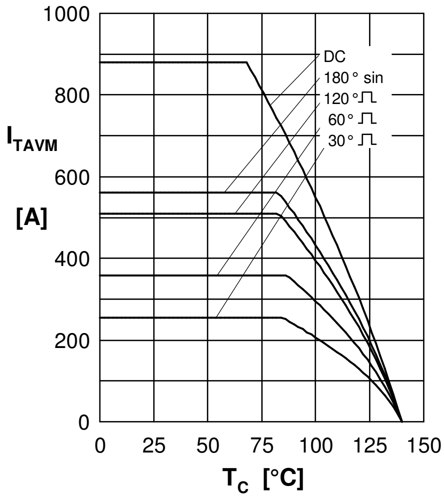


Fig. 3 Maximum forward current at case temperature

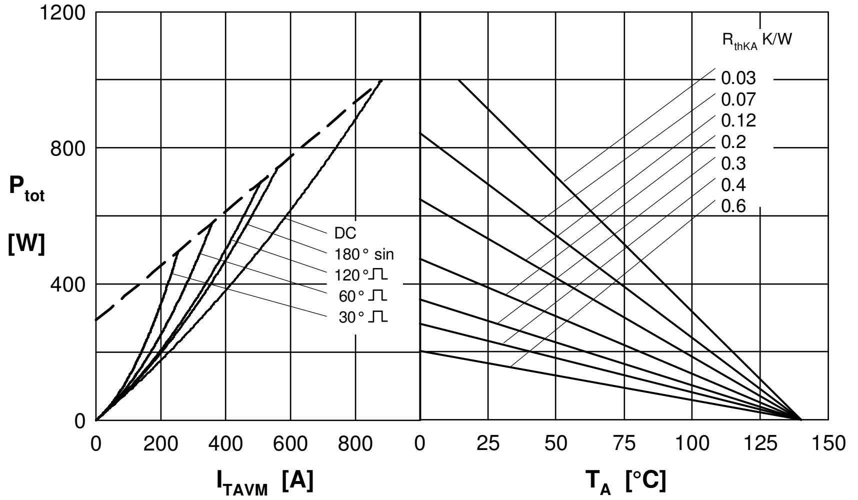


Fig. 4 Power dissipation versus on-state current & ambient temperature

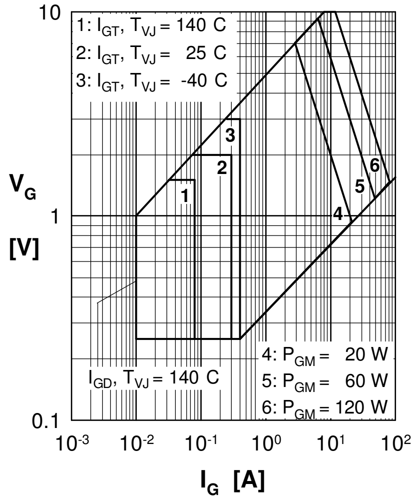


Fig. 5 Gate trigger characteristics

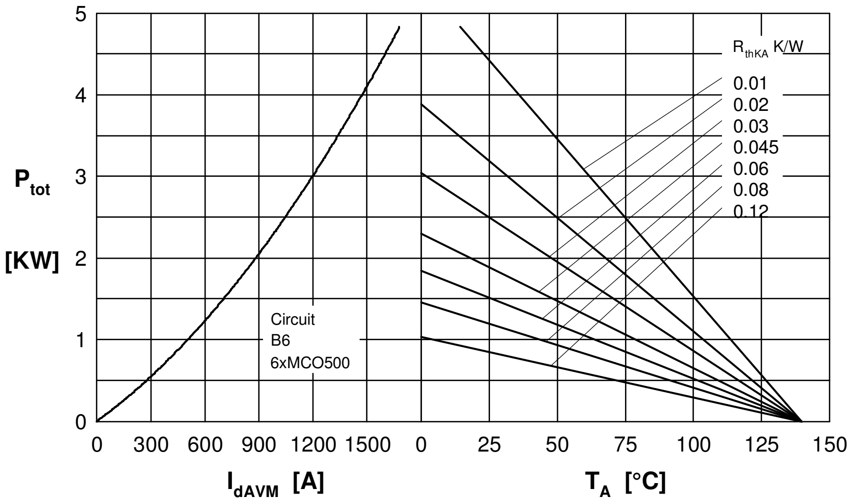


Fig. 6 Three phase rectifier bridge: Power dissipation versus direct output current and ambient temperature

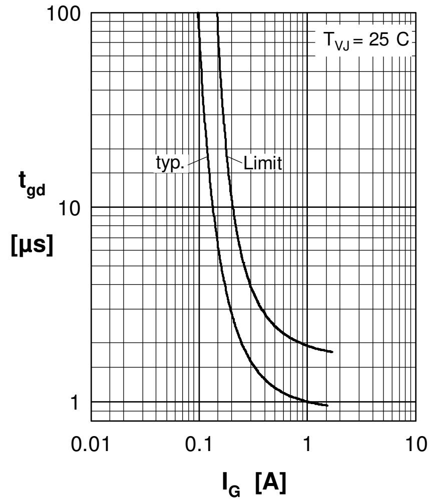


Fig. 7 Gate trigger delay time

Thyristor

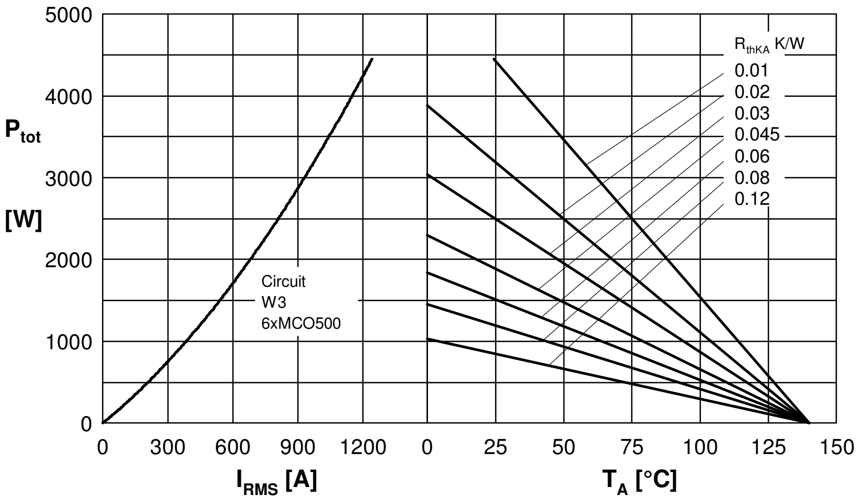


Fig. 8 Three phase AC-controller: Power dissipation versus RMS output current and ambient temperatur

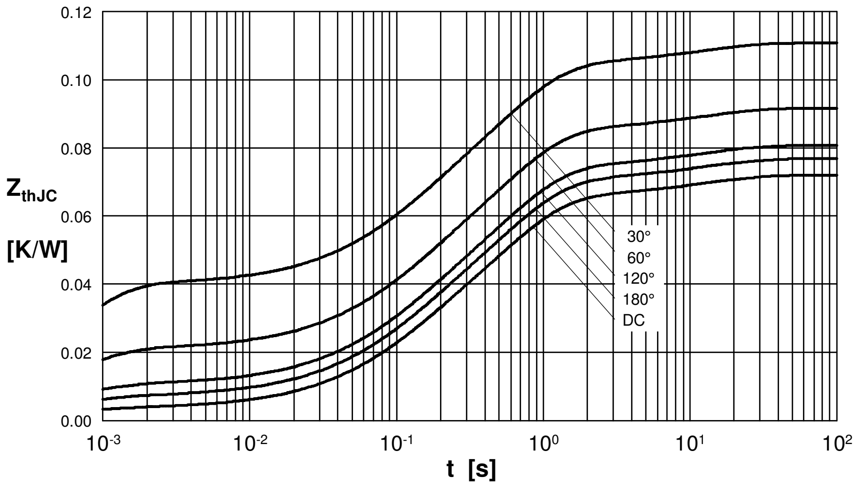


Fig. 9 Transient thermal impedance junction to case

R_{thJC} for various conduction angles d:

d	R_{thJC} (K/W)
DC	0.072
180°	0.0768
120°	0.081
60°	0.092
30°	0.111

Constants for Z_{thJC} calculation:

i	R_{thi} (K/W)	t_i (s)
1	0.0035	0.0054
2	0.0186	0.098
3	0.0432	0.54
4	0.0067	12

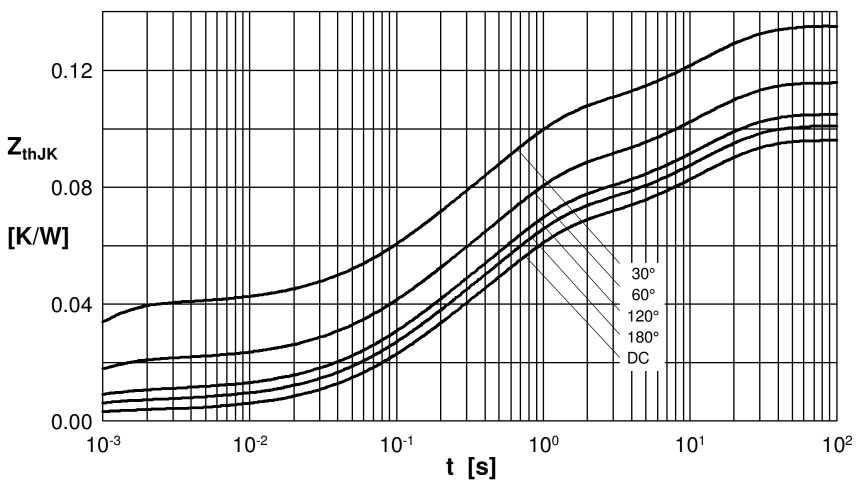


Fig.10 Transient thermal impedance junction to heatsink

R_{thJK} for various conduction angles d:

d	R_{thJK} (K/W)
DC	0.096
180°	0.1
120°	0.105
60°	0.116
30°	0.135

Constants for Z_{thJK} calculation:

i	R_{thi} (K/W)	t_i (s)
1	0.0035	0.0054
2	0.0186	0.098
3	0.0432	0.54
4	0.0067	12
5	0.024	12