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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!



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Thyristor Module

 V_{RRM} 1600 V

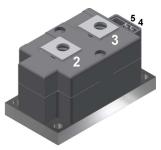
560 A

 V_{τ} 1.01 V

Single Thyristor

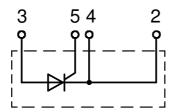
Part number

MCO500-16io1



Backside: isolated





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

Terms _Conditions of usage:

The data contained in this product data sheet is exclusively intended for technically trained staff. The user will have to evaluate the suitability of the product for the intended application and the completeness of the product data with respect to his application. The specifications of our components may not be considered as an assurance of component characteristics. The information in the valid application- and assembly notes must be considered. Should you require product information in excess of the data given in this product data sheet or which concerns the specific application of your product, please contact your local sales office.

Due to technical requirements our product may contain dangerous substances. For information on the types in question please contact your local sales office.

Should you intend to use the product in aviation, in health or life endangering or life support applications, please notify. For any such application we urgently recommend

to perform joint risk and quality assessments;
the conclusion of quality agreements;

- to establish joint measures of an ongoing product survey, and that we may make delivery dependent on the realization of any such measures.

IXYS reserves the right to change limits, conditions and dimensions.

Data according to IEC 60747 and per semiconductor unless otherwise specified

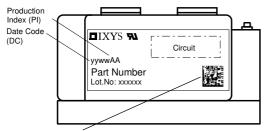
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Thyristo				1	Ratings		!
Symbol	Definition	Conditions		min.	typ.	max.	Un
V _{RSM/DSM}	max. non-repetitive reverse/forwa	rd blocking voltage	$T_{VJ} = 25^{\circ}C$			1700	<u>i</u>
V _{RRM/DRM}	max. repetitive reverse/forward bl	0 0	$T_{VJ} = 25^{\circ}C$			1600	1
R/D	reverse current, drain current	$V_{R/D} = 1600 \text{ V}$	$T_{VJ} = 25^{\circ}C$			2	m
		$V_{R/D} = 1600 \text{ V}$	$T_{VJ} = 125^{\circ}C$			40	m
V _T	forward voltage drop	$I_T = 500 A$	$T_{VJ} = 25^{\circ}C$			1.08	1 1 1
		$I_{T} = 1000 \text{ A}$				1.27	
		I _T = 500 A	T _{VJ} = 125°C			1.01	1
		$I_{T} = 1000 \text{ A}$				1.24	i i i
I _{TAV}	average forward current	T _C = 85°C	T _{vJ} = 140°C			560	1
T(RMS)	RMS forward current	180° sine				880	i 1 1
V _{T0}	threshold voltage		T _{vJ} = 140°C			0.80	
r _T	slope resistance } for power lo	oss calculation only				0.38	m!
R _{thJC}	thermal resistance junction to cas	e				0.072	K/V
R _{thCH}	thermal resistance case to heatsin				0.024		K/V
P _{tot}	total power dissipation		$T_{\rm C} = 25^{\circ}{\rm C}$			1600	٧
I _{TSM}	max. forward surge current	t = 10 ms; (50 Hz), sine	$T_{V,I} = 45^{\circ}C$			17.0	<u> </u>
- 15W	5	t = 8.3 ms; (60 Hz), sine	$V_R = 0 V$			18.4	-
		t = 10 ms; (50 Hz), sine	$T_{VJ} = 140^{\circ}C$			14.5	1
		t = 8.3 ms; (60 Hz), sine	$V_{R} = 0 V$			15.6	k
l²t	value for fusing	t = 10 ms; (50 Hz), sine	$T_{VJ} = 45^{\circ}C$			1.45	ļ
-ι	value for rushing	t = 8,3 ms; (60 Hz), sine	$V_{R} = 0 V$			1.40	1
		t = 6.5 ms, (60 Hz), sine t = 10 ms; (50 Hz), sine	$T_{VJ} = 140 ^{\circ}C$			1.40	!
		. , , , , , , , , , , , , , , , , , , ,					i
^	iunation canacitanas	t = 8,3 ms; (60 Hz), sine	$V_R = 0 V$		076	1.01	-
C,	junction capacitance	V _R = 400 V f = 1 MHz	$T_{VJ} = 25^{\circ}C$		876	100	р
P_{GM}	max. gate power dissipation	$t_P = 30 \mu s$	$T_{C} = 140 ^{\circ}C$			120	1
_		$t_{P} = 300 \mu s$				60	۷
P _{GAV}	average gate power dissipation					20	۷
(di/dt) _{cr}	critical rate of rise of current	•	epetitive, $I_T = 1500 A$			100	A/µ
		$t_P = 200 \mu s; di_G/dt = 1 A/\mu s; -$					
			on-repet., $I_T = 500 A$				A/μ
$(dv/dt)_{cr}$	critical rate of rise of voltage	$V = \frac{2}{3} V_{DRM}$	$T_{VJ} = 140$ °C			1000	V/μ
		R _{GK} = ∞; method 1 (linear volta					
V_{GT}	gate trigger voltage	$V_D = 6 V$	$T_{VJ} = 25^{\circ}C$			2	; ;
			$T_{VJ} = -40$ °C			3	
I _{GT}	gate trigger current	$V_D = 6 V$	$T_{VJ} = 25^{\circ}C$			300	m
			$T_{VJ} = -40$ °C			400	m.
V _{GD}	gate non-trigger voltage	$V_D = \frac{2}{3} V_{DRM}$	$T_{VJ} = 140^{\circ}C$			0.25	,
I _{GD}	gate non-trigger current					10	m
l _L	latching current	t _p = 30 μs	$T_{VJ} = 25$ °C			400	m
		$I_G = 1 \text{ A}; \text{ di}_G/\text{dt} = 1 \text{ A}/\mu \text{s}$	3				
I _H	holding current	$V_D = 6 \text{ V } R_{GK} = \infty$	$T_{VJ} = 25$ °C			300	m
t _{gd}	gate controlled delay time	$V_{D} = \frac{1}{2} V_{DRM}$	$T_{VJ} = 25$ °C			2	+
gu	· , · · ·	$I_G = 1 \text{ A}; \text{ di}_G/\text{dt} = 1 \text{ A}/\mu \text{s}$				_	
+	turn-off time	$V_{\rm R} = 100 \text{ V}; \ I_{\rm T} = 500 \text{ A}; \ V = \frac{2}{3}$			350		μ
t _q	ta on time		$/\mu s t_{p} = 200 \mu s$		550		μ



Package Y1				Ratings			
Symbol	Definition	Conditions		min.	typ.	max.	Unit
I _{RMS}	RMS current	per terminal				600	Α
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
$\mathbf{M}_{\scriptscriptstyleT}$	terminal torque			11		13	Nm
d _{Spp/App}	araanaga diatanaa an ayrfaaa l	atrilina diatanaa thraugh air	terminal to terminal	16.0			mm
d _{Spb/Apb}	creepage distance on surface striking distance thr		terminal to backside	25.0			mm
V _{ISOL}	isolation voltage	t = 1 second		3600			V
.002	t = 1 minute		50/60 Hz, RMS; IISOL ≤ 1 mA	3000			٧



Data Matrix: part no. (1-19), DC + PI (20-25), lot.no.# (26-31), blank (32), serial no.# (33-36)

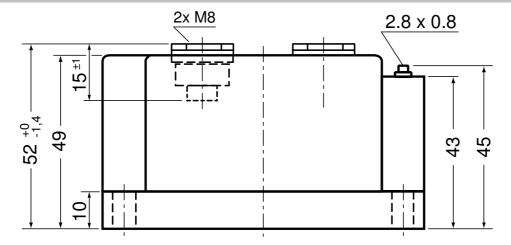
Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	MCO500-16io1	MCO500-16io1	Box	3	463744

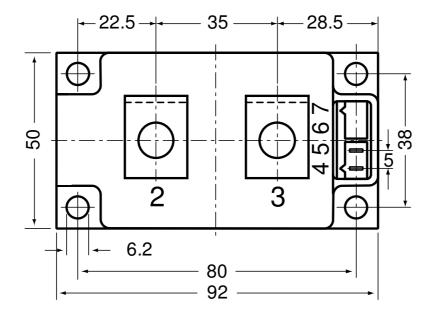
Similar Part	Package	Voltage class
MCO500-12io1	Y1-2-CU	1200
MCO500-14io1	Y1-2-CU	1400
MCO500-18io1	Y1-2-CU	1800
MCO600-20io1	Y1-2-CU	2000
MCO600-22io1	Y1-2-CU	2200

Equiv	alent Circuits for	Simulation	* on die level	T _{VJ} = 140 °C
$I \rightarrow V_0$	R_0	Thyristor		
V _{0 max}	threshold voltage	8.0		V
$R_{0 max}$	slope resistance *	0.22		mΩ



Outlines Y1



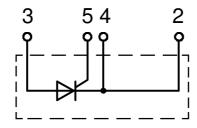


Optional accessories for modules

Keyed gate/cathode twin plugs with wire length = 350 mm, gate = white, cathode = red

Type ZY 180L (L = Left for pin pair 4/5)
Type ZY 180R (R = Right for pin pair 6/7)

UL 758, style 3751





Thyristor

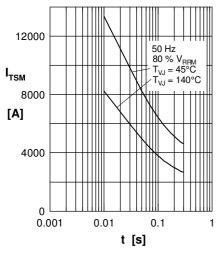


Fig. 1 Surge overload current I_{TSM} : Crest value, t: duration

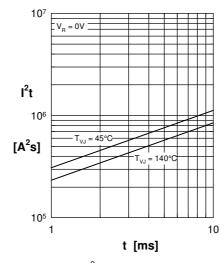


Fig. 2 I²t versus time (1-10 ms)

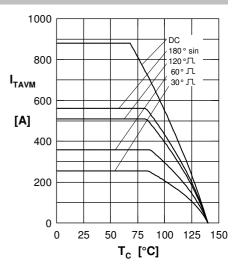


Fig. 3 Maximum forward current at case temperature

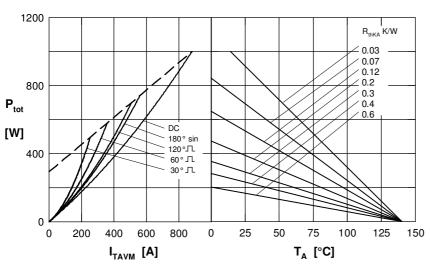


Fig. 4 Power dissipation versus on-state current & ambient temperature

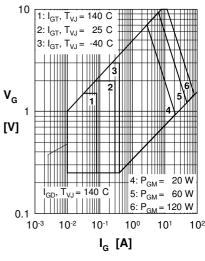


Fig. 5 Gate trigger characteristics

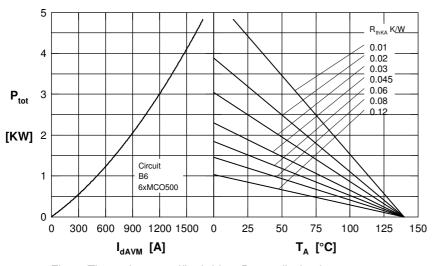


Fig. 6 Three phase rectifier bridge: Power dissipation versus direct output current and ambient temperature

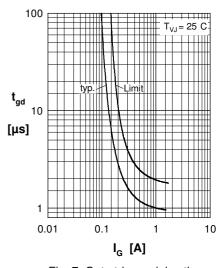


Fig. 7 Gate trigger delay time



Thyristor

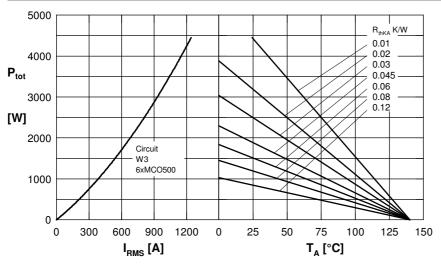


Fig. 8 Three phase AC-controller: Power dissipation versus RMS output current and ambient temperatur

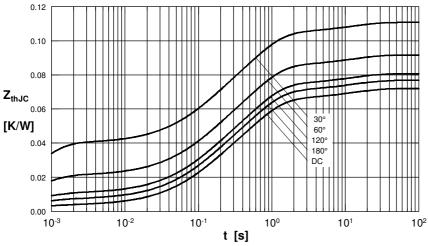


Fig. 9 Transient thermal impedance junction to case



liloc	
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	0.005
2	0.0186	0.098
3	0.0432	0.54
4	0.0067	12

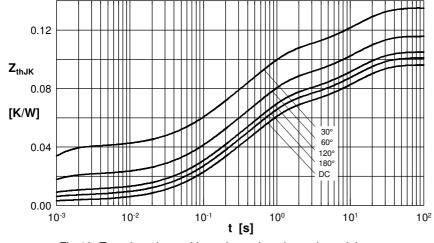


Fig.10 Transient thermal impedance junction to heatsink

R_{th.IK} for various conduction angles d:

uion	
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