

Thyristor Module

=2x1200 V

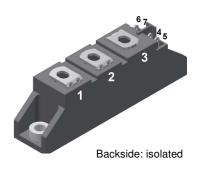
140 A

 V_{T} 1.28 V

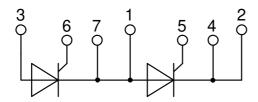
Phase leg

Part number

MCMA140P1200TA







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: TO-240AA

- Isolation Voltage: 4800 V~
- Industry standard outline
- RoHS compliant
- Soldering pins for PCB mounting
- Base plate: DCB ceramic
- · Reduced weight
- Advanced power cycling

Terms and 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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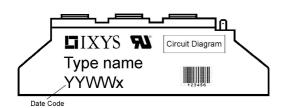


Thyristo				Ì	Ratings		
Symbol	Definition	Conditions		min.	typ.	max.	Uni
V _{RSM/DSM}	max. non-repetitive reverse/forwa	rd blocking voltage	$T_{VJ} = 25^{\circ}C$			1300	'
V _{RRM/DRM}	max. repetitive reverse/forward bl		$T_{VJ} = 25^{\circ}C$			1200	١
I _{R/D}	reverse current, drain current	$V_{R/D} = 1200 \text{ V}$	$T_{VJ} = 25^{\circ}C$			100	μ
		$V_{R/D} = 1200 \text{ V}$	$T_{VJ} = 140$ °C			10	m
V _T	forward voltage drop	I _T = 150 A	$T_{VJ} = 25^{\circ}C$			1.29	١
		$I_T = 300 \text{ A}$				1.63	١
		I _T = 150 A	T _{VJ} = 125°C			1.28	١
		$I_{T} = 300 \text{ A}$				1.70	١
I _{TAV}	average forward current	T _C = 85°C	T _{vJ} = 140°C			140	1
I _{T(RMS)}	RMS forward current	180° sine				220	,
V _{T0}	threshold voltage		T _{v.1} = 140°C			0.85	١
r _T	slope resistance } for power lo	oss calculation only	VO			2.8	m۵
R _{thJC}	thermal resistance junction to cas	e				0.22	K/V
R _{thCH}	thermal resistance case to heatsi				0.20		K/V
P _{tot}	total power dissipation	**	T _C = 25°C		0.20	520	۷
	max. forward surge current	t = 10 ms; (50 Hz), sine	$T_{V.I} = 45^{\circ}C$			2.40	k/
I _{TSM}	max. Torward Surge Surrent	t = 8,3 ms; (60 Hz), sine	$V_R = 0 V$			2.59	k/
		t = 0.5 ms; (60 Hz), sine t = 10 ms; (50 Hz), sine	$V_R = 0 V$ $T_{V,I} = 140 ^{\circ}C$			2.04	k/
		·	**				į
101	value for five in a	t = 8,3 ms; (60 Hz), sine	$V_R = 0 V$			2.21	k.
l²t	value for fusing	t = 10 ms; (50 Hz), sine	$T_{VJ} = 45^{\circ}C$			28.8	kA ²
		t = 8,3 ms; (60 Hz), sine	$V_R = 0 V$			27.9	kA ²
		t = 10 ms; (50 Hz), sine	$T_{VJ} = 140$ °C			20.8	kA ²
_		t = 8,3 ms; (60 Hz), sine	$V_R = 0 V$			20.2	-
C _J	junction capacitance	$V_R = 400 V$ f = 1 MHz	$T_{VJ} = 25^{\circ}C$		119		p
P_{GM}	max. gate power dissipation	$t_P = 30 \mu s$	$T_{\rm C} = 140 {\rm ^{\circ}C}$			10	٧
		t _P = 300 μs				5	٧
P _{GAV}	average gate power dissipation					0.5	٧
(di/dt) _{cr}	critical rate of rise of current	$T_{VJ} = 140 {}^{\circ}\text{C}; f = 50 \text{ Hz}$ re	epetitive, $I_T = 450 A$			150	A/μ
		$t_P = 200 \mu s; di_G/dt = 0.45 A/\mu s;$					
		$I_G = 0.45 A; V = \frac{2}{3} V_{DRM}$ no	on-repet., $I_T = 150 A$			500	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	ge rise)				
V _{GT}	gate trigger voltage	$V_D = 6 V$	$T_{VJ} = 25^{\circ}C$			1.5	١
			$T_{VJ} = -40$ °C			1.6	١
I _{GT}	gate trigger current	$V_D = 6 V$	$T_{VJ} = 25^{\circ}C$			150	m/
~ .		5	$T_{VJ} = -40$ °C			200	m/
V _{GD}	gate non-trigger voltage	$V_D = \frac{2}{3} V_{DRM}$	T _{VJ} = 140°C			0.2	١
I _{GD}	gate non-trigger current	D DITIM	***			10	m/
I _L	latching current	t _n = 10 μs	T _{vJ} = 25°C			200	m/
"L	atoming carrent	$I_{\rm G} = 0.45 \text{A}; \text{di}_{\rm G}/\text{dt} = 0.45 \text{A}/\mu \text{s}$				200	
	holding current	$V_D = 6 \text{ V } R_{GK} = \infty$	$T_{VJ} = 25$ °C			200	m/
I _H	gate controlled delay time	*	$T_{VJ} = 25 \text{ C}$ $T_{VJ} = 25 \text{ °C}$				i i
t _{gd}	gate controlled delay little	$V_D = \frac{1}{2} V_{DRM}$				2	μ
	town aff the a	$I_G = 0.45 \text{ A}; \text{ di}_G/\text{dt} = 0.45 \text{ A}/\mu\text{s}$			405		
t _q	turn-off time	$V_R = 100 \text{ V}; I_T = 150 \text{ A}; V = \frac{2}{3}$			185		μ
		$di/dt = 10 A/\mu s dv/dt = 20 V$	$/\mu s t_p = 200 \mu s$				i



MCMA140P1200TA

Package TO-240AA			Ratings					
Symbol	Definition	Conditions			min.	typ.	max.	Unit
RMS	RMS current	per terminal					200	Α
T _{VJ}	virtual junction temperature	9			-40		140	°C
Top	operation temperature				-40		125	°C
T _{stg}	storage temperature			-40		125	°C	
Weight						81		g
M _D	mounting torque				2.5		4	Nm
$\mathbf{M}_{_{T}}$	terminal torque				2.5		4	Nm
d _{Spp/App}	oroonaga diatanaa an aurfe	and Latriking distance through air	terminal to terminal	13.0	9.7			mm
$d_{Spb/Apb}$	creepage distance on surface striking distance throug		terminal to backside	16.0	16.0			mm
V _{ISOL}	isolation voltage	t = 1 second	50/60 Hz, RMS; I _{ISOL} ≤ 1 mA		4800			٧
		t = 1 minute			4000			٧



Part description

M = Module

M = Module
C = Thyristor (SCR)
M = Thyristor
A = (up to 1800V)
140 = Current Rating [A]
P = Phase leg
1200 = Reverse Voltage [V]
TA = TO-240AA-1B

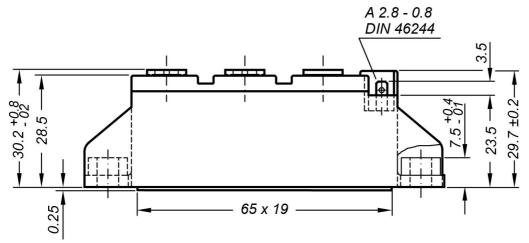
Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	MCMA140P1200TA	MCMA140P1200TA	Box	36	512625

Similar Part	Package	Voltage class		
MCMA140P1400TA	TO-240AA-1B	1400		

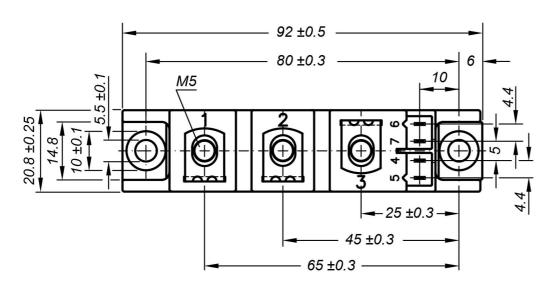
Equiva	alent Circuits for	Simulation	* on die level	T _{vJ} = 140 °C
$I \rightarrow V_0$)— <u>R</u> o	Thyristor		
V _{0 max}	threshold voltage	0.85		V
$R_{0 max}$	slope resistance *	1.6		$m\Omega$



Outlines TO-240AA

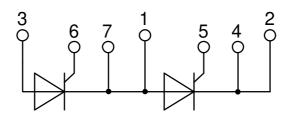


General tolerance: DIN ISO 2768 class "c"



Optional accessories: Keyed gate/cathode twin plugs Wire length: 350 mm, gate = white, cathode = red UL 758, style 3751

Type **ZY 200L** (L = Left for pin pair 4/5) Type **ZY 200R** (R = Right for pin pair 6/7)





Thyristor

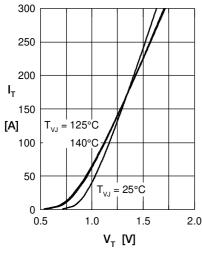


Fig. 1 Forward characteristics

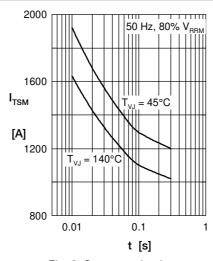


Fig. 2 Surge overload current I_{TSM} : crest value, t: duration

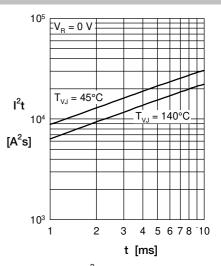


Fig. 3 I^2 t versus time (1-10 s)

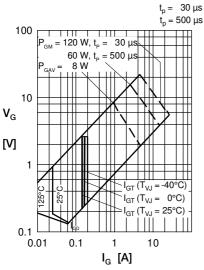


Fig. 4 Gate voltage & gate current

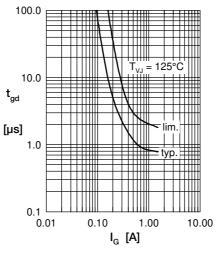


Fig. 5 Gate controlled delay time t_{ad}

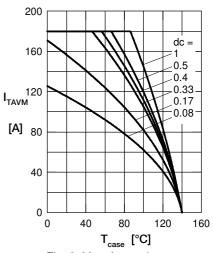


Fig. 6 Max. forward current at case temperature

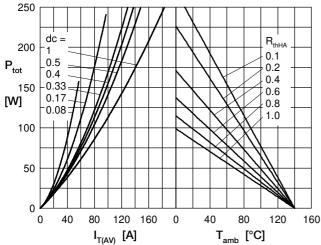


Fig. 7a Power dissipation versus direct output current Fig. 7b and ambient temperature

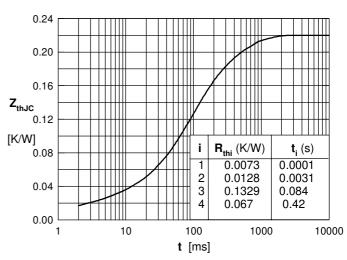


Fig. 8 Transient thermal impedance junction to case