# imall

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** 

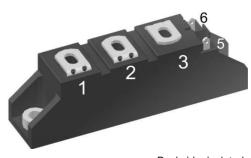
### MCC44-12io8B

$V_{\text{RRM}}$	<i>=</i> 2x 1200 V		
I <sub>tav</sub>	=	49 A	
Vτ	=	1.34 V	

Phase leg

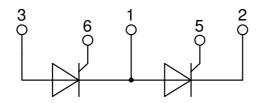
Part number

MCC44-12io8B



Backside: isolated **E**72873

20161222b



### 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: 3600 V~
- Industry standard outline
- RoHS compliant
- Soldering pins for PCB mounting
- Base plate: DCB ceramic
- Reduced weight
- 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 60747and per semiconductor unless otherwise specified

# LIXYS

## MCC44-12io8B

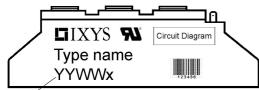
Definition	Conditions			1		
Demmaon	Conditions		min.	typ.	max.	Uni
max. non-repetitive reverse/forwa	rd blocking voltage	$T_{vJ} = 25^{\circ}C$			1300	\
max. repetitive reverse/forward bl					1200	٧
reverse current, drain current					100	μA
	V <sub>R/D</sub> = 1200 V				5	mA
forward voltage drop	$I_{T} = 100 \text{ A}$	$T_{vJ} = 25^{\circ}C$			1.34	V
	$I_{T} = 200 \text{ A}$				1.75	V
	$I_{T} = 100 \text{ A}$	$T_{vJ} = 125 ^{\circ}C$			1.34	V
	$I_{T} = 200 \text{ A}$				1.80	V
average forward current	$T_c = 85^{\circ}C$	$T_{vJ} = 125^{\circ}C$			49	A
RMS forward current	180° sine				77	A
threshold voltage	and adjustice only	$T_{vJ} = 125^{\circ}C$			0.85	V
slope resistance f for power in	oss calculation only				3.7	mΩ
thermal resistance junction to cas	e				0.53	K/W
thermal resistance case to heatsing	nk			0.20		K/W
total power dissipation		$T_c = 25^{\circ}C$			180	W
max. forward surge current	t = 10 ms; (50 Hz), sine	$T_{vJ} = 45^{\circ}C$			1.15	k۸
	t = 8,3 ms; (60 Hz), sine	$V_{R} = 0 V$			1.24	kA
	t = 10 ms; (50 Hz), sine	$T_{vJ} = 125^{\circ}C$			980	A
	t = 8,3 ms; (60 Hz), sine	$V_{R} = 0 V$			1.06	kA
value for fusing	t = 10 ms; (50 Hz), sine	$T_{vJ} = 45^{\circ}C$			6.62	kA <sup>2</sup> s
	t = 8,3 ms; (60 Hz), sine	$V_{R} = 0 V$			6.40	kA <sup>2</sup> s
	t = 10 ms; (50 Hz), sine	T <sub>vJ</sub> = 125°C			4.80	kA <sup>2</sup> s
	t = 8,3 ms; (60 Hz), sine	$V_{R} = 0 V$			4.63	kA <sup>2</sup> s
junction capacitance	$V_{R} = 400 V f = 1 MHz$	$T_{vJ} = 25^{\circ}C$		54		pF
max. gate power dissipation	t <sub>P</sub> = 30 μs	T <sub>c</sub> = 125°C			10	W
	t <sub>P</sub> = 300 μs				5	W
average gate power dissipation					0.5	W
critical rate of rise of current	$T_{vJ} = 125 ^{\circ}C; f = 50 \text{Hz}$ repetitive, $I_{T} = 150 \text{A}$				150	A/μs
	$t_{\rm P} = 200 \mu {\rm s}; di_{\rm G}/dt = 0.45 {\rm A}/\mu {\rm s}; -$					<u> </u>
					500	A/us
critical rate of rise of voltage						1
Ū	5.11					
gate trigger voltage					1.5	V
						V
gate trigger current	$V_{\rm p} = 6 V$					mA
						mA
gate non-trigger voltage	$V_{c} = \frac{2}{3} V_{cont}$					\ \
		. vj0 0				mA
	t = 10 us	T 25°C				mA
	r ·				-50	111/-
holdina current					200	mA
-						İ
gale controlled delay lille	$v_{\rm D} = \frac{1}{2} v_{\rm DRM}$ $I_{\rm G} = 0.45 \text{A};  \text{di}_{\rm G}/\text{dt} = 0.45 \text{A}/\mu\text{s}$				2	με
						i.
turn-off time	$V_{\rm B} = 100 \text{ V}; \ \text{I}_{\rm T} = 150 \text{ A}; \text{ V} = \frac{2}{7}$			150		με
	max. repetitive reverse/forward bl         reverse current, drain current         forward voltage drop         average forward current         RMS forward current         threshold voltage slope resistance         for power log         thermal resistance junction to case thermal resistance case to heatsin         total power dissipation         max. forward surge current         value for fusing         junction capacitance         max. gate power dissipation         average gate power dissipation	$V_{RO} = 1200 V$ forward voltage drop $I_{T} = 100 A$ $I_{T} = 200 A$ $I_{T} = 200 A$ $I_{T} = 200 A$ average forward current $T_{C} = 85^{\circ}C$ RMS forward current $180^{\circ} sine$ threshold voltage slope resistance for power loss calculation only thermal resistance junction to case thermal resistance case to heatsink total power dissipation max. forward surge current $t = 10 \text{ ms; (50 Hz), sine}$ $t = 8,3 \text{ ms; (60 Hz), sine}$ $t = 10 \text{ ms; (50 Hz), sine}$ $t = 10 \text{ ms; (50 Hz), sine}$ $t = 8,3 \text{ ms; (60 Hz), sine}$ $t = 10 \text{ ms; (50 Hz), sine}$ $t = 8,3 \text{ ms; (60 Hz), sine}$ $t = 10 \text{ ms; (50 Hz), sine}$ $t = 8,3 \text{ ms; (60 Hz), sine}$ $t = 8,3 \text{ ms; (60 Hz), sine}$ $t = 10 \text{ ms; (50 Hz), sine}$ $t = 0.450 \text{ M} \text{ max}, gate power dissipation}$ $ritical rate of rise of voltage$ $V_{R} = 400 \text{ V} \text{ f = 1 MHz}$ $R_{GK} = \infty; \text{ method 1 (linear voltage)}$ $qate trigger voltage$ $V_{D} = 6 \text{ V}$ $gate trigger voltage$ $V_{D} = 3^{3} \text{ V}_{DRM}$ $I_{G} = 0.453 \text{ A; } \text{ G}_{G}/\text{d} = 0.45 \text{ A}/\mu\text{s};$ $I_{G} = 0.453 \text{ A; } \text{ G}_{G}/\text{d} = 0.45 \text{ A}/\mu\text{s};$ $I_{G} = 0.453 \text{ A; } \text{ G}_{G}/\text{d} = 0.45 \text{ A}/\mu\text{s};$ $I_{G} = 0.453 \text{ A; } \text{ G}_{G}/\text{d} = 0.45 \text{ A}/\mu\text{s};$ $I_{G} = 0.453 \text{ A; } \text{ G}_{G}/\text{d} = 0.45 \text{ A}/\mu\text{s};$ $I_{G} = 0.453 \text{ A; } \text{ G}_{G}/\text{d} = 0.45 \text{ A}/\mu\text{s};$ $I_{G} = 0.453 \text{ A; } \text{ G}_{G}/\text{d} = 0.45 \text{ A}/\mu\text{s};$ $I_{G} = 0.453 \text{ A}/\mu\text{s};$	$\begin{array}{c c c c c c c c c c c c c c c c c c c $	$\begin{array}{c c c c c c c c c c c c c c c c c c c $	$\begin{array}{c c c c c c c c c c c c c c c c c c c $	$\begin{array}{c c c c c c c c c c c c c c c c c c c $

 $\ensuremath{\mathsf{IXYS}}$  reserves the right to change limits, conditions and dimensions.

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## MCC44-12io8B

Package TO-240AA				Ratings				
Symbol	Definition	Conditions			min.	typ.	max.	Unit
	RMS current	per terminal					200	Α
T <sub>vj</sub>	virtual junction temperature				-40		125	°C
T <sub>op</sub>	operation temperature		-40		100	°C		
T <sub>stg</sub>	storage temperature		-40		125	°C		
Weight						81		g
M <sub>D</sub>	mounting torque				2.5		4	Nm
M <sub>T</sub>	terminal torque				2.5		4	Nm
d <sub>Spp/App</sub>	creepage distance on surface   striking distance through air		terminal to terminal	13.0	9.7			mm
<b>d</b> <sub>Spb/Apb</sub>			terminal to backside	16.0	16.0			mm
V	isolution voltage		3600			V		
		t = 1 minute	50/60 Hz, RMS; lıso∟ ≤ 1 mA		3000			V



Date Code

Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	MCC44-12io8B	MCC44-12io8B	Box	36	452955

Similar Part	Package	Voltage class
MCMA50P1200TA	TO-240AA-1B	1200
MCMA65P1200TA	TO-240AA-1B	1200

Equivalent Circuits for Simulation		* on die level	T <sub>vj</sub> = 125 °C	
	⊢R₀−	Thyristor		
V <sub>0 max</sub>	threshold voltage	0.85		V
$\mathbf{R}_{0 \max}$	slope resistance *	4.1		mΩ

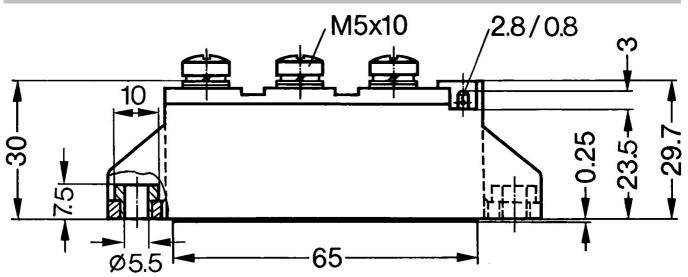
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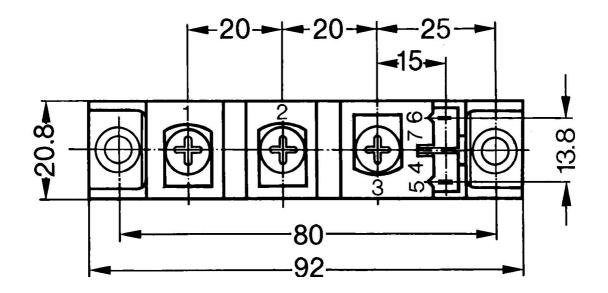
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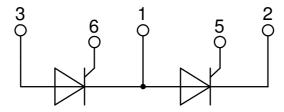
## MCC44-12io8B

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Outlines TO-240AA







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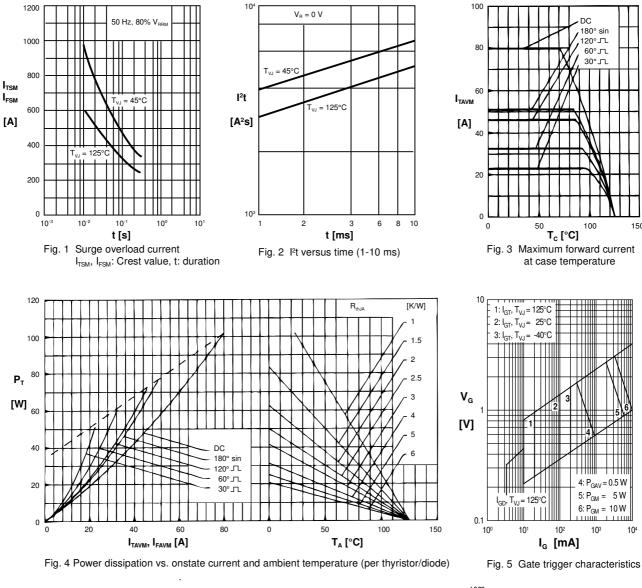
150

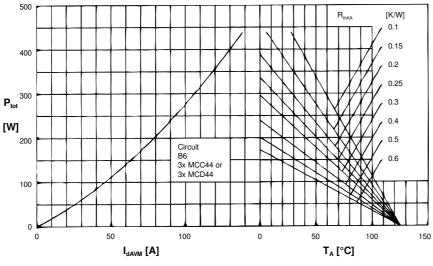
= 0.5 W

1.1.111

10

### Thyristor





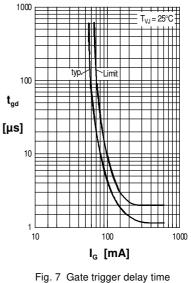


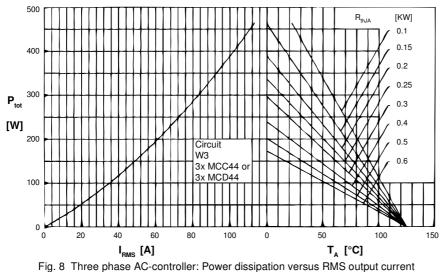
Fig. 6 Three phase rectifier bridge: Power dissipation versus direct output current and ambient temperature

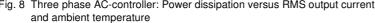
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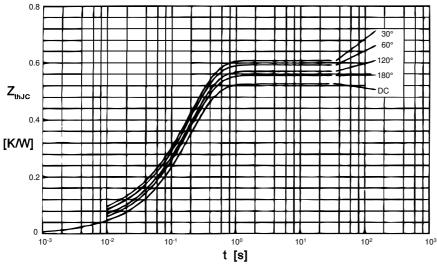
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## MCC44-12io8B

### Thyristor







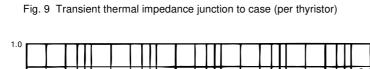
$R_{_{\mathrm{thJO}}}$	for var	ous conduction angles d:			
	dR	<sub>այշ</sub> [K/W]			
	DC	0.53			
	180°	0.55			
	120°	0.58			
	60°	0.60			
	30°	0.62			
Constants for $Z_{thJC}$ calculation:					
iR <sub>thi</sub> [K/W] t <sub>i</sub> [s]					
1	0.015	0.0035			
2	0.026	0.0200			

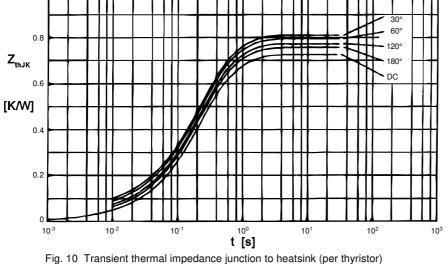
0.1950

 $R_{thJK}$  for various conduction angles d:

3

0.489





	dl	R <sub>њJK</sub> [K/W]	
	DC	0.73	
	180°	0.75	
	120°	0.78	
	60°	0.80	
	30°	0.82	
Со	nstants	for $Z_{thJK}$ calculation:	
i	R <sub>thi</sub> [K/	W] t <sub>i</sub> [s]	
1	0.01	5 0.0035	
2	0.02	6 0.0200	
3	0.48	9 0.0195	
4	0.20	0 0.6800	

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