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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.

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Thyristor Module

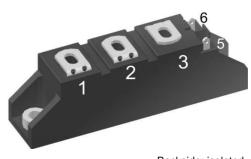
MCC44-14io8B

V_{RRM}	<i>=</i> 2x 1400 V		
I _{tav}	=	49 A	
Vτ	=	1.34 V	

Phase leg

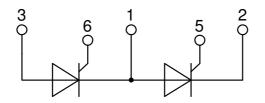
Part number

MCC44-14io8B



Backside: isolated **E**72873

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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

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MCC44-14io8B

Thyristo					Ratings		!
Symbol	Definition	Conditions		min.	typ.	max.	Unit
V _{RSM/DSM}	max. non-repetitive reverse/forwa	ard blocking voltage	$T_{VJ} = 25^{\circ}C$			1500	V
V _{RRM/DRM}	max. repetitive reverse/forward b	locking voltage	$T_{VJ} = 25^{\circ}C$			1400	V
I _{R/D}	reverse current, drain current	V _{R/D} = 1400 V	$T_{VJ} = 25^{\circ}C$			100	μA
		$V_{R/D} = 1400 V$	$T_{VJ} = 125^{\circ}C$			5	mA
VT	forward voltage drop	I _T = 100 A	$T_{VJ} = 25^{\circ}C$			1.34	V
		Ι _τ = 200 A				1.75	V
		$I_{T} = 100 \text{ A}$	T _{vJ} = 125°C			1.34	V
		Ι _τ = 200 A				1.80	v
ITAV	average forward current	T _c = 85°C	T _{v.i} = 125°C			49	A
I T(RMS)	RMS forward current	180° sine				77	А
V _{T0}	threshold voltage		T _{v.i} = 125°C			0.85	V
r _T	slope resistance { for power le	oss calculation only	vj			3.7	mΩ
R _{thJC}	thermal resistance junction to cas	20				0.53	K/W
R _{thCH}	thermal resistance case to heatsi			-	0.20	0.00	K/W
P _{tot}	total power dissipation		$T_c = 25^{\circ}C$		0.20	180	W
	max. forward surge current	t = 10 ms; (50 Hz), sine	$T_{c} = 25 \text{ C}$ $T_{v,i} = 45^{\circ}\text{C}$			1.15	kA
I _{TSM}	max. Iorward surge current						1
		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	$V_{\rm R} = 0 V$			1.06	kA
l²t	value for fusing	t = 10 ms; (50 Hz), sine	$T_{vJ} = 45^{\circ}C$			6.62	1
		t = 8,3 ms; (60 Hz), sine	$V_{R} = 0 V$			6.40	kA²s
		t = 10 ms; (50 Hz), sine	$T_{VJ} = 125^{\circ}C$			4.80	kA²s
		t = 8,3 ms; (60 Hz), sine	$V_{R} = 0 V$			4.63	kA²s
C	junction capacitance	$V_{R} = 400 V f = 1 MHz$	$T_{VJ} = 25^{\circ}C$		54		pF
P _{GM}	max. gate power dissipation	$t_P = 30 \ \mu s$	$T_c = 125^{\circ}C$			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} = 125 °C; f = 50 Hz re	petitive, $I_T = 150 A$			150	A/μs
		t_{P} = 200 µs; di _G /dt = 0.45 A/µs; —					
		$I_{G} = 0.45 \text{ A}; \text{ V} = \frac{2}{3} \text{ V}_{DRM}$ no	on-repet., $I_{\tau} = 49 \text{ A}$			500	A/μs
(dv/dt) _{cr}	critical rate of rise of voltage	$V = \frac{2}{3} V_{\text{DBM}}$	T _{vJ} = 125°C			1000	i
	-	$R_{GK} = \infty$; method 1 (linear voltage					· ·
V _{GT}	gate trigger voltage	$V_{\rm p} = 6 \text{ V}$	$T_{VJ} = 25^{\circ}C$			1.5	V
G			$T_{\rm VJ} = -40^{\circ}\rm C$			1.6	v
I _{GT}	gate trigger current	$V_{D} = 6 V$	$T_{VJ} = 25^{\circ}C$			100	mA
•GT	gate ingger ourrent	V _D = 0 V	$T_{VJ} = -40^{\circ}C$			200	mA
V	gate non-trigger voltage	$V_{D} = \frac{2}{3} V_{DBM}$	$T_{VJ} = -40^{\circ} \text{C}$ $T_{VJ} = 125^{\circ} \text{C}$			0.2	V
V _{GD}		$\mathbf{v}_{\mathrm{D}} = 73 \mathbf{v}_{\mathrm{DRM}}$	$T_{VJ} = T25 \text{ C}$				
I _{GD}	gate non-trigger current		T 0500			10	mA
I.	latching current	$t_p = 10 \ \mu s$	$T_{vJ} = 25 °C$			450	mA
		$I_{\rm G} = 0.45 \text{A}; \text{di}_{\rm G}/\text{dt} = 0.45 \text{A}/\mu\text{s}$					
I _H	holding current	$V_{D} = 6 V R_{GK} = \infty$	$T_{vJ} = 25 ^{\circ}C$			200	mA
t _{gd}	gate controlled delay time	$V_{D} = \frac{1}{2} V_{DRM}$	$T_{vJ} = 25 °C$			2	μs
		$I_{\rm G}~=~0.45{\rm A};~di_{\rm G}/dt~=~0.45{\rm A}/\mu{\rm s}$					1 1 1
t _q	turn-off time	$V_{R} = 100 \text{ V}; I_{T} = 150 \text{ A}; \text{ V} = \frac{2}{3}$	V_{DRM} T_{VJ} = 100 °C		150		μs
		di/dt = 10 A/µs dv/dt = 20 V/	μs t _n = 200 μs				1 1 1

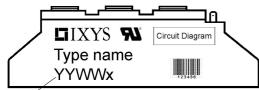
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MCC44-14io8B

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



Date Code

ſ	Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
	Standard	MCC44-14io8B	MCC44-14io8B	Box	36	452963

Similar Part	Package	Voltage class
MCMA50P1600TA	TO-240AA-1B	1600
MCMA65P1600TA	TO-240AA-1B	1600

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

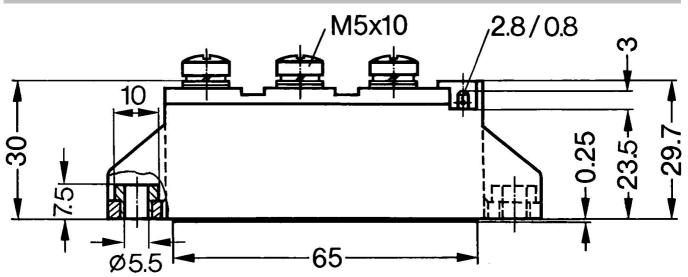
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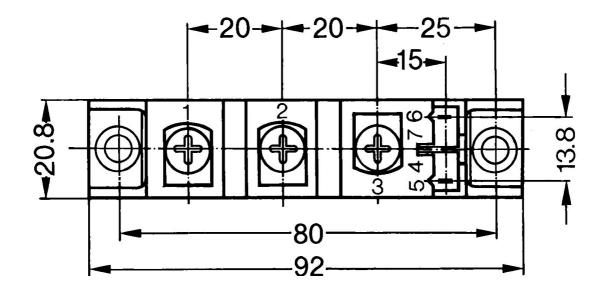
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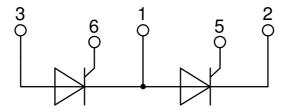
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Outlines TO-240AA







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sin

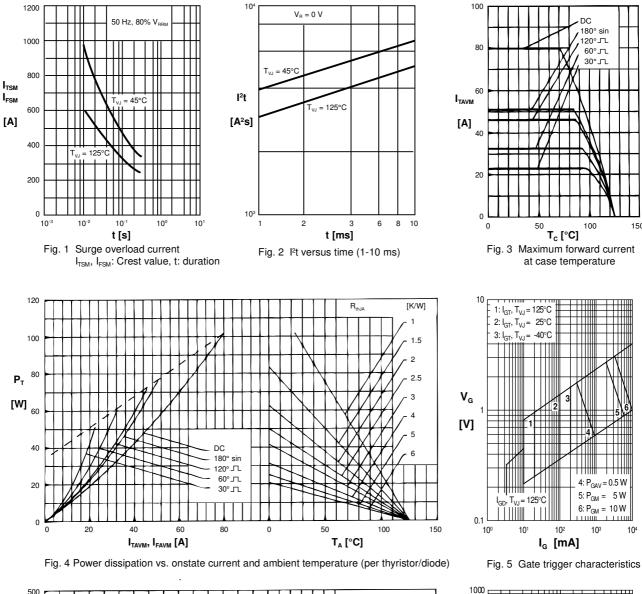
150

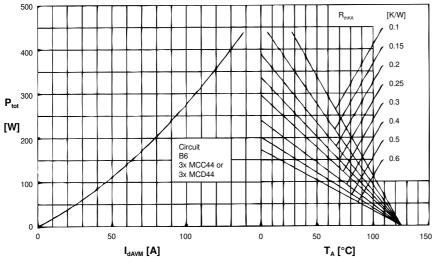
= 0.5 W

1.1.111

10

Thyristor





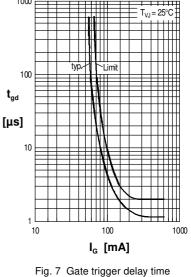


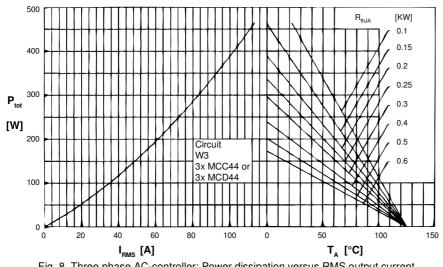
Fig. 6 Three phase rectifier bridge: Power dissipation versus direct output current and ambient temperature

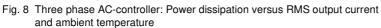
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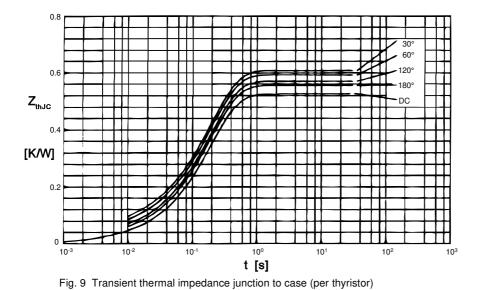
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Thyristor







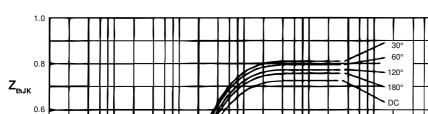
1100					
	dR	_{այշ} [K/W]			
	DC	0.53			
	180°	0.55			
	120°	0.58			
	60°	0.60			
	30°	0.62			
Constants for Z_{thJC} calculation:					
i F	R _{thi} [K/V	V] t _i [s]			
1	0.015	0.0035			
2	0.026	0.0200			

0.1950

 $\mathbf{R}_{_{thJC}}$ for various conduction angles d:

3

0.489



$R_{_{thJK}}$ for various conduction angles d:					
	d R _u	_{лэк} [K/W]			
	DC	0.73			
	180°	0.75			
	120°	0.78			
	60°	0.80			
	30°	0.82			
Con	stants fo	or Z_{thJK} calculation:			
i F	R _{thi} [K/W] t _i [s]			
1	0.015	0.0035			
2	0.026	0.0200			
3	0.489	0.0195			
4	0.200	0.6800			

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Fig. 10 Transient thermal impedance junction to heatsink (per thyristor)

100

t [s]

10

10²

10-



10⁻²

10³

[K/W]

0.4

0.2

0 10-3