# 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.

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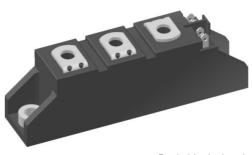
**Thyristor Module** 

## MCC19-12io1B

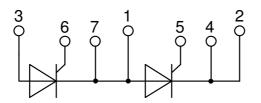
$V_{\text{RRM}}$	<i>=</i> 2x 1200 V		
I <sub>tav</sub>	=	18 A	
Vτ	=	1.57 V	

Phase leg

Part number MCC19-12io1B



Backside: isolated **E**72873



### 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.

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Data according to IEC 60747and per semiconductor unless otherwise specified

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## MCC19-12io1B

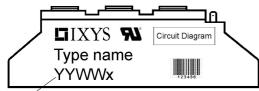
Thyristo				1	Ratings		
Symbol	Definition	Conditions	<b></b>	min.	typ.	max.	Uni
V <sub>RSM/DSM</sub>	max. non-repetitive reverse/forwa	0 0	$T_{VJ} = 25^{\circ}C$			1300	\
V <sub>RRM/DRM</sub>	max. repetitive reverse/forward bl		$T_{VJ} = 25^{\circ}C$			1200	١
R/D	reverse current, drain current	V <sub>R/D</sub> = 1200 V	$T_{vJ} = 25^{\circ}C$			100	μ/
		V <sub>R/D</sub> = 1200 V	$T_{VJ} = 125^{\circ}C$			3	mA
V <sub>T</sub>	forward voltage drop	$I_{T} = 40 \text{ A}$	$T_{vJ} = 25^{\circ}C$			1.56	١
		I <sub>T</sub> = 80 A				2.05	١
		$I_{T} = 40 \text{ A}$	$T_{VJ} = 125 \degree C$			1.57	١
		I <sub>T</sub> = 80 A				2.29	۱
ITAV	average forward current	$T_c = 85^{\circ}C$	T <sub>vJ</sub> = 125°C			18	A
T(RMS)	RMS forward current	180° sine				28	ļ
V <sub>T0</sub>	threshold voltage		T <sub>v.i</sub> = 125°C			0.85	١
r <sub>T</sub>	slope resistance } for power lo	oss calculation only	vo			18	mΩ
R <sub>thJC</sub>	thermal resistance junction to cas	6				1.3	K/W
R <sub>thCH</sub>	thermal resistance case to heatsi				0.20		K/W
P <sub>tot</sub>	total power dissipation		$T_c = 25^{\circ}C$		0.20	77	Ŵ
-	max. forward surge current	t = 10 ms; (50 Hz), sine	$T_{v,l} = 45^{\circ}C$			400	A
TSM	max. forward burge burrent	t = 8,3  ms; (60  Hz),  sine	$V_{\rm R} = 0 V$			430	, A
		t = 0.5 ms; (60 Hz), sine t = 10 ms; (50 Hz), sine	$V_{R} = 0 V$ $T_{V,I} = 125^{\circ}C$			430 340	, A
101	under for funcion	t = 8,3 ms; (60 Hz), sine	$\frac{V_{R} = 0 V}{T_{R} + 1500}$			365	A
l²t	value for fusing	t = 10 ms; (50 Hz), sine	$T_{VJ} = 45^{\circ}C$			800	A <sup>2</sup> s
		t = 8,3 ms; (60 Hz), sine	$V_{R} = 0 V$			770	A <sup>2</sup> s
		t = 10 ms; (50 Hz), sine	$T_{VJ} = 125$ °C			580	A²s
		t = 8,3 ms; (60 Hz), sine	$V_R = 0 V$			555	A <sup>2</sup> s
C	junction capacitance	$V_R = 400 V$ f = 1 MHz	$T_{vJ} = 25^{\circ}C$		22		pF
P <sub>GM</sub>	max. gate power dissipation	t <sub>P</sub> = 30 μs	$T_c = 125^{\circ}C$			10	W
		t <sub>P</sub> = 300 μs				5	W
P <sub>GAV</sub>	average gate power dissipation					0.5	W
(di/dt) <sub>cr</sub>	critical rate of rise of current	$T_{v_J} = 125 ^{\circ}C; f = 50  Hz$ re	epetitive, $I_{T} = 75 A$			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., $I_{\tau} = 18 \text{ A}$			500	A/μs
(dv/dt) <sub>cr</sub>	critical rate of rise of voltage	$V = \frac{2}{3} V_{DRM}$	$T_{vJ} = 125^{\circ}C$			1000	V/µs
		R <sub>GK</sub> = ∞; method 1 (linear volta	ge rise)				   
V <sub>gt</sub>	gate trigger voltage	$V_{\rm D} = 6 \text{ V}$	$T_{\rm VJ} = 25^{\circ}\rm C$			1.5	٧
		2	$T_{yJ} = -40$ °C			1.6	٧
I <sub>GT</sub>	gate trigger current	$V_{\rm D} = 6 \text{ V}$	T <sub>vJ</sub> = 25°C			100	mA
-01	0 00		$T_{vJ} = -40^{\circ}C$			200	mA
V <sub>gd</sub>	gate non-trigger voltage	$V_{\rm D} = \frac{2}{3} V_{\rm DBM}$	$T_{vJ} = 40^{\circ} \text{C}$ $T_{vJ} = 125^{\circ} \text{C}$			0.2	۱۱ <i>۱</i>
	gate non-trigger current		· <sub>v</sub> = 120 0			5	mA
	latching current	t - 10 up	$T_{y_J} = 25 ^{\circ}C$			450	
I.	atoming cullent	$t_p = 10 \ \mu s$				400	mA
		$I_{\rm G} = 0.45 \text{A};  \text{di}_{\rm G}/\text{dt} = 0.45 \text{A}/\mu\text{s}$				000	
I <sub>н</sub>	holding current	$V_{\rm D} = 6 \ V \ R_{\rm GK} = \infty$	$T_{VJ} = 25 \degree C$			200	mA
t <sub>gd</sub>	gate controlled delay time	$V_{\rm D} = \frac{1}{2} V_{\rm DRM}$	$T_{vJ} = 25^{\circ}C$			2	μ
		$I_{\rm G} = 0.45 \text{A};  \text{di}_{\rm G}/\text{dt} = 0.45 \text{A}/\mu\text{s}$					
tq	turn-off time	$V_{R} = 100 \text{ V}; I_{T} = 20 \text{ A}; \text{ V} = \frac{2}{2}$			150		με
		$di/dt = 10 \text{ A}/\mu \text{s} dv/dt = 20 \text{ V}/\mu \text{s}$	/μs t <sub>p</sub> = 200 μs				

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## MCC19-12io1B

Package	TO-240AA				F	Ratings	S	
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>	creenage distance on surfac	e / striking distance through air	terminal to terminal	13.0	9.7			mm
<b>d</b> <sub>Spb/Apb</sub>	creepage distance on surface   striking distance through air		terminal to backside	16.0	16.0			mm
V	isolation voltage	t = 1 second			3600			V
	t = 1 minute		50/60 Hz, RMS; lıso∟ ≤ 1 mA		3000			V



Date Code

ſ	Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
	Standard	MCC19-12io1B	MCC19-12io1B	Box	36	452831

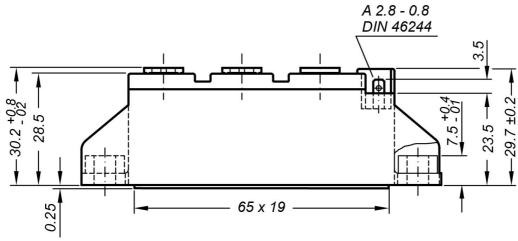
Similar Part	Package	Voltage class
MCMA25P1200TA	TO-240AA-1B	1200
MCMA35P1200TA	TO-240AA-1B	1200

Equiva	lent Circuits for	Simulation	* on die level	T <sub>vj</sub> = 125 °C
	- Ro -	Thyristor		
V <sub>0 max</sub>	threshold voltage	0.85		V
$\mathbf{R}_{0 \text{ max}}$	slope resistance *	16.8		mΩ

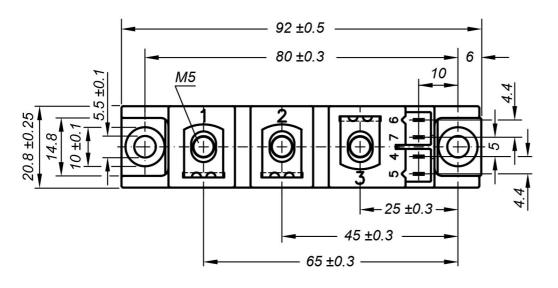
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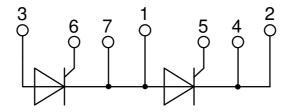
Outlines TO-240AA



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)



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DC

50

1:  $I_{GT}$ ,  $T_{VJ} = 125^{\circ}C$ 2:  $I_{GT}$ ,  $T_{VJ}$  = 25°C

3: I<sub>GT</sub>, T<sub>VJ</sub> = -40°C

T<sub>VJ</sub> = 125°C

10<sup>1</sup>

I<sub>GD</sub>

180° sin 120°₋∟

60° Л 30° □

100

at case temperature

T<sub>c</sub> [°C]

150

5 W 5: P<sub>CM</sub> =

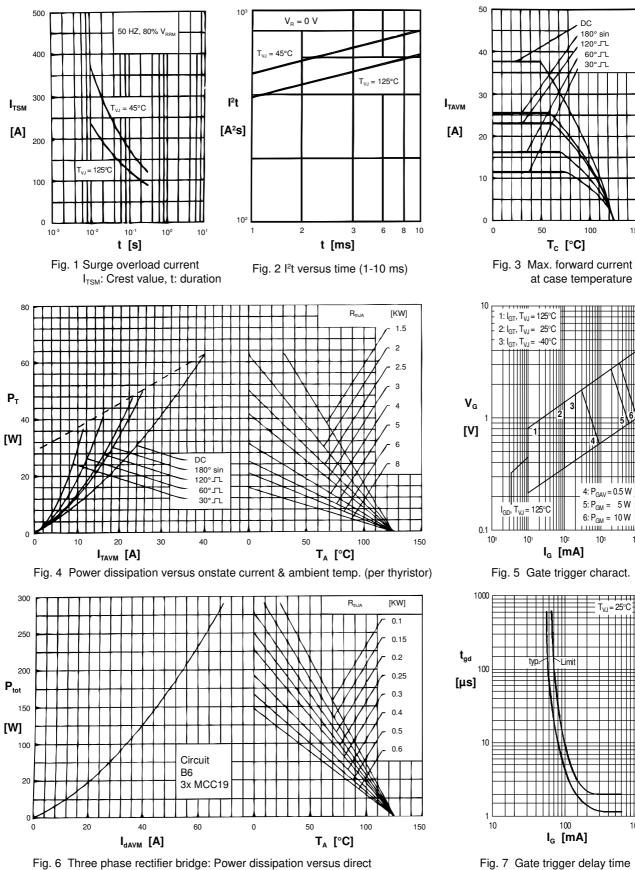
> 1.1.1111 11111

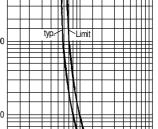
> > 104

6: P<sub>GM</sub> = 10 W

10<sup>3</sup>

### Thyristor





102

 $I_{G}$  [mA]



100

 $I_{G}$  [mA]

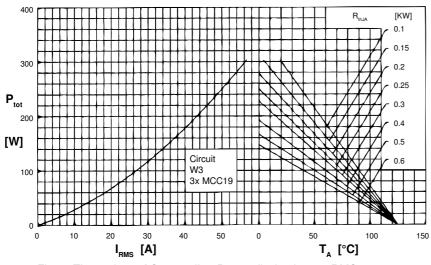
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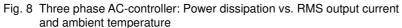
output current and ambient temperature

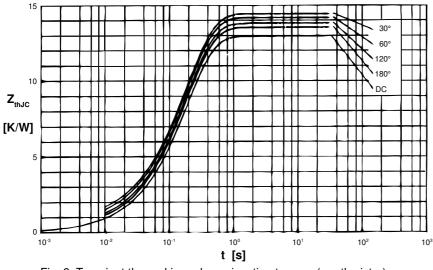
1000

## MCC19-12io1B

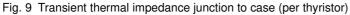
## Thyristor

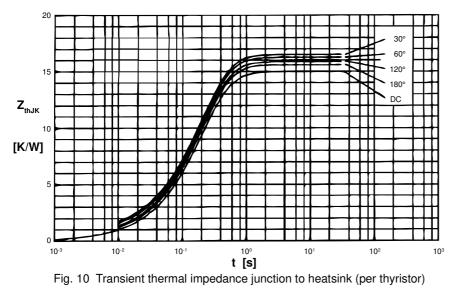






$R_{_{thJ}}$	$_{\rm c}$ for vario	ous conduct	ion angles d:
	d R <sub>tt</sub>	<sub>,JC</sub> [K/W]	
	DC	1.30	
	180°	1.35	
	120°	1.39	
	60°	1.42	
	30°	1.45	
Cor	nstants fo	r Z <sub>thJC</sub> calcu	lation:
i	R <sub>thi</sub> [K/W	] t <sub>i</sub> [s]	
1	0.018	0.0033	
2	0.041	0.0216	
3	1.241	0.1910	





R <sub>th</sub>	<sub>лк</sub> for varic	ous conduction angles d:				
	d R <sub>th</sub>	<sub>JK</sub> [K/W]				
	DC	1.50				
	180°	1.55				
	120°	1.59				
	60°	1.62				
	30°	1.65				
Co	Constants for $Z_{thJK}$ calculation:					
i	R <sub>thi</sub> [K/W	] t <sub>i</sub> [s]				
1	0.018	0.0033				
2	0.041	0.0216				
3	1.241	0.1910				
4	0.200	0.4600				

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