# 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

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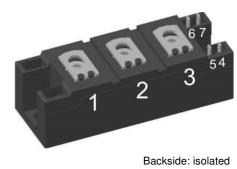
**Thyristor Module** 

### MCC200-18io1

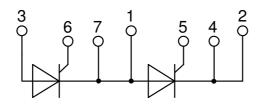
$V_{\text{RRM}}$	<i>=</i> 2x 1800 V		
I <sub>tav</sub>	=	216 A	
Vτ	=	1.1 V	

Phase leg

Part number MCC200-18io1



**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: Y4

- 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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## MCC200-18io1

Thyristo					Ratings	>	
Symbol	Definition	Conditions		min.	typ.	max.	Uni
V <sub>RSM/DSM</sub>	max. non-repetitive reverse/forwa	ard blocking voltage	$T_{vJ} = 25^{\circ}C$			1900	١
V <sub>RRM/DRM</sub>	max. repetitive reverse/forward b	locking voltage	$T_{VJ} = 25^{\circ}C$			1800	١
R/D	reverse current, drain current	$V_{R/D} = 1800 V$	$T_{VJ} = 25^{\circ}C$			400	μ/
		$V_{R/D} = 1800 V$	$T_{vJ} = 125^{\circ}C$			15	m/
VT	forward voltage drop	I <sub>T</sub> = 200 A	$T_{VJ} = 25^{\circ}C$			1.20	١
		$I_{T} = 400 \text{ A}$				1.52	١
		$I_{T} = 200 \text{ A}$	T <sub>vJ</sub> = 125°C			1.10	١
		$I_{T} = 400 \text{ A}$				1.50	١
ITAV	average forward current	$T_c = 85^{\circ}C$	$T_{vJ} = 125^{\circ}C$			216	1
I T(RMS)	RMS forward current	180° sine				340	ļ
V <sub>T0</sub>	threshold voltage		T <sub>v.i</sub> = 125°C			0.80	١
r <sub>T</sub>	slope resistance } for power l	oss calculation only				1.4	m۵
R <sub>thJC</sub>	thermal resistance junction to cas	se				0.13	K/W
R <sub>thCH</sub>	thermal resistance case to heats				0.050		K/W
P <sub>tot</sub>	total power dissipation		$T_c = 25^{\circ}C$			770	W
I <sub>TSM</sub>	max. forward surge current	t = 10 ms; (50 Hz), sine	$T_{\rm v,i} = 45^{\circ}\rm C$			8.00	k/
- 15M	C C	t = 8,3 ms; (60 Hz), sine	$V_{\rm R} = 0 V$			8.64	k/
		$\frac{t = 0,0 \text{ ms}; (00 \text{ Hz}), \text{ sine}}{t = 10 \text{ ms}; (50 \text{ Hz}), \text{ sine}}$	T <sub>v.I</sub> = 125°C			6.80	k/
		t = 8,3  ms; (60  Hz),  sine	$V_{\rm N} = 0 V$			7.35	k/
l²t	value for fusing	t = 0.0  ms; (50  Hz),  sine	$\frac{V_{R}}{T_{VJ}} = 45^{\circ}C$			320.0	kA <sup>2</sup>
	Value for failing	t = 8,3 ms; (60 Hz), sine	$V_{\rm R} = 0 V$			310.5	kA <sup>2</sup>
		t = 0.3  ms; (50  Hz),  sine t = 10  ms; (50  Hz),  sine	$V_{R} = 0.V$ $T_{V,I} = 125^{\circ}C$			231.2	kA <sup>2</sup>
<u>^</u>	iunation consoitance	t = 8,3 ms; (60 Hz), sine	$\frac{V_{R} = 0 V}{T_{R} = 0 V}$		066	224.4	kA <sup>2</sup>
C,	junction capacitance	$V_{\rm R} = 400  \text{V}  \text{f} = 1  \text{MHz}$	$T_{\rm VJ} = 25^{\circ}\rm C$		366	100	pl
P <sub>GM</sub>	max. gate power dissipation	$t_{\rm P} = 30 \mu s$	$T_c = 125 °C$			120	M
_		t <sub>P</sub> = 500 μs				60	M
P <sub>GAV</sub>	average gate power dissipation					20	N
(di/dt) <sub>cr</sub>	critical rate of rise of current					100	A/μ
		$t_{P}$ = 200 µs; di <sub>G</sub> /dt = 0.5 A/µs; -					 
			on-repet., $I_{T} = 200 \text{ A}$				A/μ
(dv/dt) <sub>cr</sub>	critical rate of rise of voltage	$V = \frac{2}{3} V_{DRM}$	$T_{vJ} = 125^{\circ}C$			1000	V/µ
		$R_{GK} = \infty$ ; method 1 (linear volta					
V <sub>GT</sub>	gate trigger voltage	$V_{D} = 6 V$	$T_{vJ} = 25^{\circ}C$			2	١
			$T_{vJ} = -40 ^{\circ}C$			3	١
I <sub>GT</sub>	gate trigger current	$V_{D} = 6 V$	$T_{vJ} = 25^{\circ}C$			150	m/
			$T_{vJ} = -40 ^{\circ}\text{C}$			220	m/
V <sub>gd</sub>	gate non-trigger voltage	$V_{\rm D} = \frac{2}{3} V_{\rm DRM}$	$T_{vJ} = 125^{\circ}C$			0.25	١
I <sub>GD</sub>	gate non-trigger current					10	m/
I.	latching current	t <sub>p</sub> = 30 μs	$T_{vJ} = 25 ^{\circ}C$			200	m/
	$I_{\rm g} = 0.5 \text{A};  \text{di}_{\rm g}/\text{dt} = 0.5 \text{A}/\mu\text{s}$						
I <sub>H</sub>	holding current	$V_{\rm D} = 6 \text{ V}  \text{R}_{\rm GK} = \infty$	$T_{vJ} = 25 ^{\circ}C$			150	m/
t <sub>gd</sub>	gate controlled delay time	$V_D = \frac{1}{2} V_{DRM}$	$T_{\rm VJ} = 25^{\circ}{\rm C}$			2	μ
yu		$I_{\rm G} = 0.5 \text{A};  \text{di}_{\rm G}/\text{dt} = 0.5 \text{A}/\mu\text{s}$				_	
t <sub>q</sub>	turn-off time	$V_{\rm B} = 100 \text{ V}; \ I_{\rm T} = 300 \text{ A}; \text{ V} = \frac{2}{3}$			200		μ
۰q			$7/\mu s t_p = 200 \ \mu s$		200		μ

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### MCC200-18io1

Package Y4			Ratings					
Symbol	Definition	Conditions			min.	typ.	max.	Unit
	RMS current	per terminal					300	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						150		g
M <sub>D</sub>	mounting torque	nounting torque		2.25		2.75	Nm	
M <sub>T</sub>	terminal torque				4.5		5.5	Nm
d <sub>Spp/App</sub>	creenade distance on surfac	ce   striking distance through air	terminal to terminal	14.0	10.0			mm
<b>d</b> <sub>Spb/Apb</sub>	creepage ustance on sunat	e   stirking distance through an	terminal to backside 16.		16.0			mm
V	ISOL isolation voltage t = 1 second t = 1 minute		50/60 Hz, RMS; liso∟ ≤ 1 mA		3600			V
					3000			V

<u> </u>			
Date Code (DC) + Production Index (PI)	UIXYS N yywwAA Part Number Lot.No: xxxxxx	Circuit	1

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	MCC200-18io1	MCC200-18io1	Box	6	497479

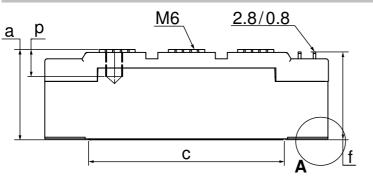
Equiv	alent Circuits for	Simulation	* on die level	T <sub>vj</sub> = 125 °C
	$-R_{o}-$	Thyristor		
$V_{0 max}$	threshold voltage	0.8		V
$\mathbf{R}_{0 \text{ max}}$	slope resistance *	0.7		mΩ

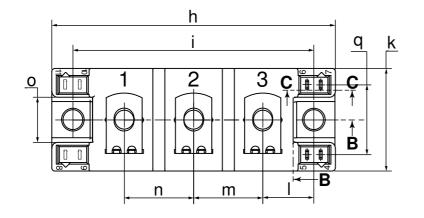
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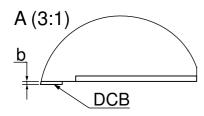
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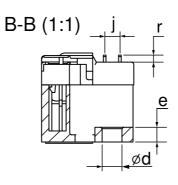
Outlines Y4



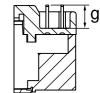


	N A IN I		N A IN I	
Dim.	MIN	MAX	MIN	MAX
	[mm]	[mm]	[inch]	[inch]
а	30.0	30.6	1.181	1.205
b	typ.	0.25	typ. (	0.010
с	64.0	65.0	2.520	2.559
d	6.5	7.0	0.256	0.275
е	4.9	5.1	0.193	0.201
f	28.6	29.2	1.126	1.150
g	7.3	7.7	0.287	0.303
h	93.5	94.5	3.681	3.720
i	79.5	80.5	3.130	3.169
j	4.8	5.2	0.189	0.205
k	33.4	34.0	1.315	1.339
Ι	16.7	17.3	0.657	0.681
m	22.7	23.3	0.894	0.917
n	22.7	23.3	0.894	0.917
0	14.0	15.0	0.551	0.591
р	typ.	10.5	typ. (	0.413
q	22.8	23.3	0.898	0.917
r	1.8	2.4	0.071	0.041





C-C (1:1)



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### MCC200-18io1

DC

,180° sin ,120° Л

60° Л

30° Л

400

300

200

100

0

10<sup>-3</sup>

100

10

1

0.01

0.1

I<sub>G</sub> [A]

Fig. 7 Gate trigger delay time

t<sub>gd</sub>

[µs]

10-2

**10**-1

I<sub>G</sub> [A]

Fig. 5 Gate trigger characteristics

10<sup>0</sup>

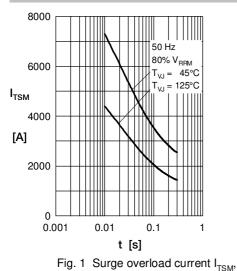
10<sup>1</sup>

10<sup>2</sup>

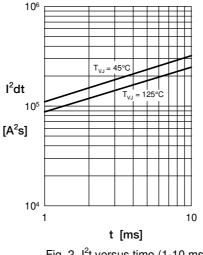
 $I_{TAVM}$ 

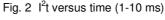
[A]

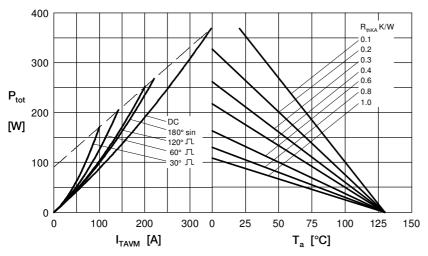
### Thyristor

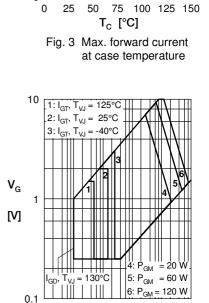


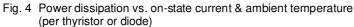
I<sub>FSM</sub>: Crest value, t: duration

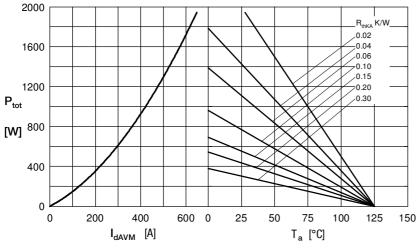


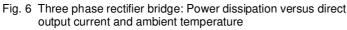






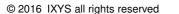




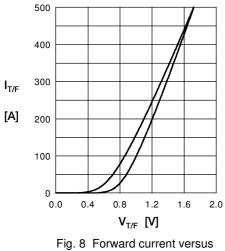


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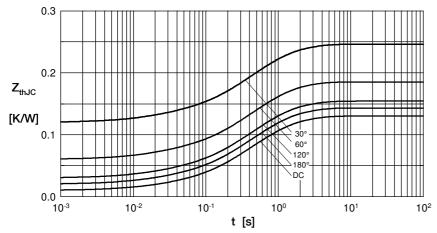
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### Thyristor



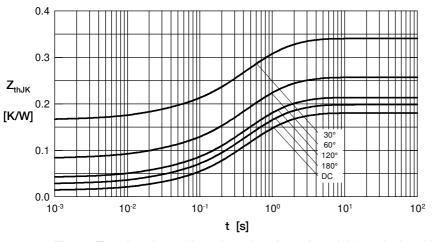
g. 8 Forward current versus voltage drop

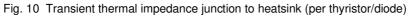


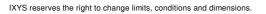
Constants for $\rm Z_{\rm thJC}$ calculation:				
i	R <sub>thi</sub> [K/W]	t <sub>i</sub> [s]		
1	0.0100	0.00014		

1	0.0100	0.00014
2	0.0065	0.019
3	0.0250	0.180
4	0.0615	0.520
5	0.0270	1.600

Fig. 9 Transient thermal impedance junction to case at various conduction angles







Data according to IEC 60747and per semiconductor unless otherwise specified