imall

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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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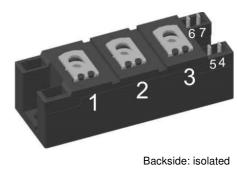
Thyristor Module

MCC200-18io1

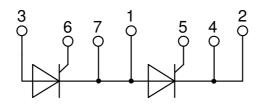
| V_{RRM} | <i>=</i> 2x 1800 V | | |
|------------------|--------------------|-------|--|
| I _{tav} | = | 216 A | |
| Vτ | = | 1.1 V | |

Phase leg

Part number MCC200-18io1



E72873



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

20160408b

MCC200-18io1

| Thyristo | | | | | Ratings | > | |
|-----------------------|---|--|---|------|---------|-------|-----------------|
| Symbol | Definition | Conditions | | min. | typ. | max. | Uni |
| V _{RSM/DSM} | max. non-repetitive reverse/forwa | ard blocking voltage | $T_{vJ} = 25^{\circ}C$ | | | 1900 | ١ |
| V _{RRM/DRM} | 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 _T = 200 A | $T_{VJ} = 25^{\circ}C$ | | | 1.20 | ١ |
| | | $I_{T} = 400 \text{ A}$ | | | | 1.52 | ١ |
| | | $I_{T} = 200 \text{ A}$ | T _{vJ} = 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 _{T0} | threshold voltage | | T _{v.i} = 125°C | | | 0.80 | ١ |
| r _T | slope resistance } for power l | oss calculation only | | | | 1.4 | m۵ |
| R _{thJC} | thermal resistance junction to cas | se | | | | 0.13 | K/W |
| R _{thCH} | thermal resistance case to heats | | | | 0.050 | | K/W |
| P _{tot} | total power dissipation | | $T_c = 25^{\circ}C$ | | | 770 | W |
| I _{TSM} | 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 _{v.I} = 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 ² |
| | Value for failing | t = 8,3 ms; (60 Hz), sine | $V_{\rm R} = 0 V$ | | | 310.5 | kA ² |
| | | 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 ² |
| | | | | | | | |
| <u>^</u> | iunation consoitance | t = 8,3 ms; (60 Hz), sine | $\frac{V_{R} = 0 V}{T_{R} = 0 V}$ | | 066 | 224.4 | kA ² |
| 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 _{GM} | max. gate power dissipation | $t_{\rm P} = 30 \mu s$ | $T_c = 125 °C$ | | | 120 | M |
| _ | | t _P = 500 μs | | | | 60 | M |
| P _{GAV} | average gate power dissipation | | | | | 20 | N |
| (di/dt) _{cr} | critical rate of rise of current | | | | | 100 | A/μ |
| | | t_{P} = 200 µs; di _G /dt = 0.5 A/µs; - | | | | | |
| | | | on-repet., $I_{T} = 200 \text{ A}$ | | | | A/μ |
| (dv/dt) _{cr} | 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 _{GT} | gate trigger voltage | $V_{D} = 6 V$ | $T_{vJ} = 25^{\circ}C$ | | | 2 | ١ |
| | | | $T_{vJ} = -40 ^{\circ}C$ | | | 3 | ١ |
| I _{GT} | gate trigger current | $V_{D} = 6 V$ | $T_{vJ} = 25^{\circ}C$ | | | 150 | m/ |
| | | | $T_{vJ} = -40 ^{\circ}\text{C}$ | | | 220 | m/ |
| V _{gd} | gate non-trigger voltage | $V_{\rm D} = \frac{2}{3} V_{\rm DRM}$ | $T_{vJ} = 125^{\circ}C$ | | | 0.25 | ١ |
| I _{GD} | gate non-trigger current | | | | | 10 | m/ |
| I. | latching current | t _p = 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 _H | holding current | $V_{\rm D} = 6 \text{ V} \text{R}_{\rm GK} = \infty$ | $T_{vJ} = 25 ^{\circ}C$ | | | 150 | m/ |
| t _{gd} | 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 _q | 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 |

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

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MCC200-18io1

| Package Y4 | | | Ratings | | | | | |
|-----------------------------|--|------------------------------------|-----------------------------|------|------|------|------|------|
| Symbol | Definition | Conditions | | | min. | typ. | max. | Unit |
| | RMS current | per terminal | | | | | 300 | Α |
| T _{vj} | virtual junction temperature | | | | -40 | | 125 | °C |
| T _{op} | operation temperature | | | | -40 | | 100 | °C |
| T _{stg} | storage temperature | | | -40 | | 125 | °C | |
| Weight | | | | | | 150 | | g |
| M _D | mounting torque | nounting torque | | 2.25 | | 2.75 | Nm | |
| M _T | terminal torque | | | | 4.5 | | 5.5 | Nm |
| d _{Spp/App} | creenade distance on surfac | ce striking distance through air | terminal to terminal | 14.0 | 10.0 | | | mm |
| d _{Spb/Apb} | 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 |

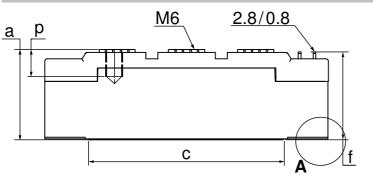
| Equiv | alent Circuits for | Simulation | * on die level | T _{vj} = 125 °C |
|------------------------------|--------------------|------------|----------------|--------------------------|
| | $-R_{o}-$ | Thyristor | | |
| $V_{0 max}$ | threshold voltage | 0.8 | | V |
| $\mathbf{R}_{0 \text{ max}}$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

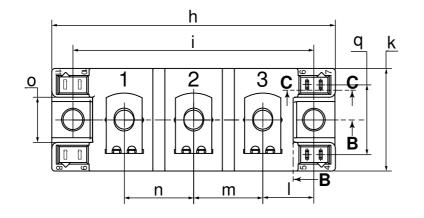
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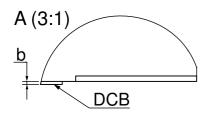
MCC200-18io1

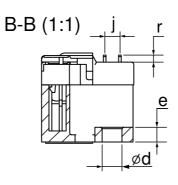
Outlines Y4



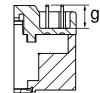


| | N A IN I | | N A IN I | |
|------|----------|------|----------|--------|
| Dim. | MIN | MAX | MIN | MAX |
| | [mm] | [mm] | [inch] | [inch] |
| а | 30.0 | 30.6 | 1.181 | 1.205 |
| b | typ. | 0.25 | typ. (| 0.010 |
| с | 64.0 | 65.0 | 2.520 | 2.559 |
| d | 6.5 | 7.0 | 0.256 | 0.275 |
| е | 4.9 | 5.1 | 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)



20160408b

MCC200-18io1

DC

,180° sin ,120° Л

60° Л

30° Л

400

300

200

100

0

10⁻³

100

10

1

0.01

0.1

I_G [A]

Fig. 7 Gate trigger delay time

t_{gd}

[µs]

10-2

10-1

I_G [A]

Fig. 5 Gate trigger characteristics

10⁰

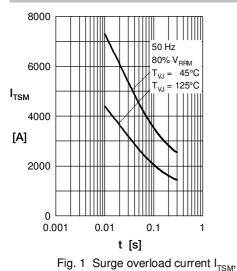
10¹

10²

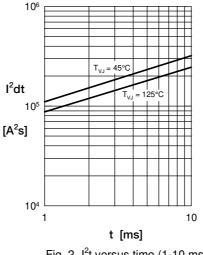
 I_{TAVM}

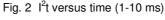
[A]

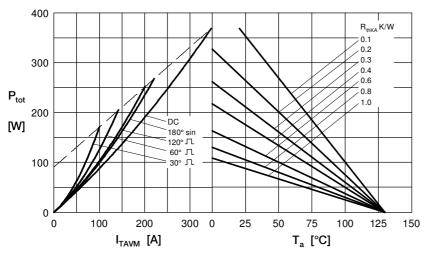
Thyristor

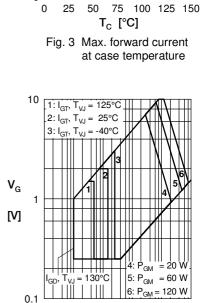


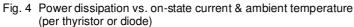
I_{FSM}: Crest value, t: duration

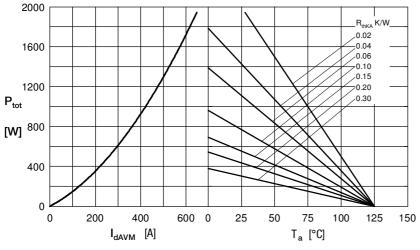


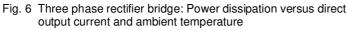






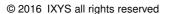




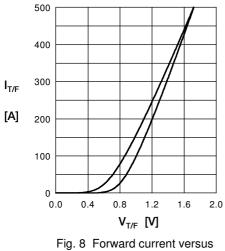


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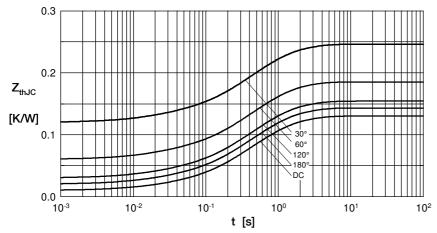
10



Thyristor



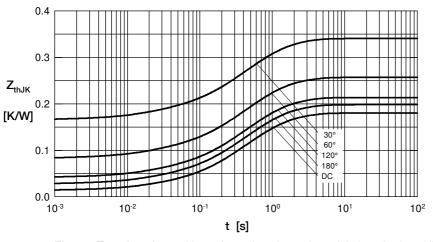
g. 8 Forward current versus voltage drop

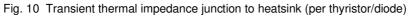


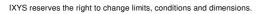
| Constants for $\rm Z_{\rm thJC}$ calculation: | | | | |
|---|------------------------|--------------------|--|--|
| i | R _{thi} [K/W] | t _i [s] | | |
| 1 | 0.0100 | 0.00014 | | |

| 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