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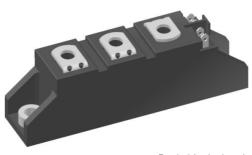
Thyristor Module

MCC19-12io1B

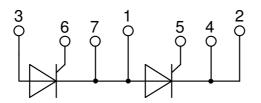
| V_{RRM} | <i>=</i> 2x 1200 V | | |
|------------------|--------------------|--------|--|
| I _{tav} | = | 18 A | |
| Vτ | = | 1.57 V | |

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.

IXYS reserves the right to change limits, conditions and dimensions.

Data according to IEC 60747and per semiconductor unless otherwise specified

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MCC19-12io1B

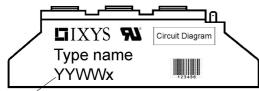
| Thyristo | | | | 1 | Ratings | | |
|-----------------------|------------------------------------|---|---|------|---------|------------|------------------|
| Symbol | Definition | Conditions | | min. | typ. | max. | Uni |
| V _{RSM/DSM} | max. non-repetitive reverse/forwa | 0 0 | $T_{VJ} = 25^{\circ}C$ | | | 1300 | \ |
| V _{RRM/DRM} | max. repetitive reverse/forward bl | | $T_{VJ} = 25^{\circ}C$ | | | 1200 | ١ |
| R/D | reverse current, drain current | V _{R/D} = 1200 V | $T_{vJ} = 25^{\circ}C$ | | | 100 | μ/ |
| | | V _{R/D} = 1200 V | $T_{VJ} = 125^{\circ}C$ | | | 3 | mA |
| V _T | forward voltage drop | $I_{T} = 40 \text{ A}$ | $T_{vJ} = 25^{\circ}C$ | | | 1.56 | ١ |
| | | I _T = 80 A | | | | 2.05 | ١ |
| | | $I_{T} = 40 \text{ A}$ | $T_{VJ} = 125 \degree C$ | | | 1.57 | ١ |
| | | I _T = 80 A | | | | 2.29 | ۱ |
| ITAV | average forward current | $T_c = 85^{\circ}C$ | T _{vJ} = 125°C | | | 18 | A |
| T(RMS) | RMS forward current | 180° sine | | | | 28 | ļ |
| V _{T0} | threshold voltage | | T _{v.i} = 125°C | | | 0.85 | ١ |
| r _T | slope resistance } for power lo | oss calculation only | vo | | | 18 | mΩ |
| R _{thJC} | thermal resistance junction to cas | 6 | | | | 1.3 | K/W |
| R _{thCH} | thermal resistance case to heatsi | | | | 0.20 | | K/W |
| P _{tot} | 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 ² s |
| | | t = 8,3 ms; (60 Hz), sine | $V_{R} = 0 V$ | | | 770 | A ² 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 ² s |
| C | junction capacitance | $V_R = 400 V$ f = 1 MHz | $T_{vJ} = 25^{\circ}C$ | | 22 | | pF |
| P _{GM} | max. gate power dissipation | t _P = 30 μs | $T_c = 125^{\circ}C$ | | | 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 | $T_{v_J} = 125 ^{\circ}C; f = 50 Hz$ 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) _{cr} | critical rate of rise of voltage | $V = \frac{2}{3} V_{DRM}$ | $T_{vJ} = 125^{\circ}C$ | | | 1000 | V/µs |
| | | R _{GK} = ∞; method 1 (linear volta | ge rise) | | | | |
| V _{gt} | 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 _{GT} | gate trigger current | $V_{\rm D} = 6 \text{ V}$ | T _{vJ} = 25°C | | | 100 | mA |
| -01 | 0 00 | | $T_{vJ} = -40^{\circ}C$ | | | 200 | mA |
| V _{gd} | 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 | | · _v = 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 _н | holding current | $V_{\rm D} = 6 \ V \ R_{\rm GK} = \infty$ | $T_{VJ} = 25 \degree C$ | | | 200 | mA |
| t _{gd} | 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 _p = 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 _{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} | creenage distance on surfac | e / striking distance through air | terminal to terminal | 13.0 | 9.7 | | | mm |
| d _{Spb/Apb} | 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 |

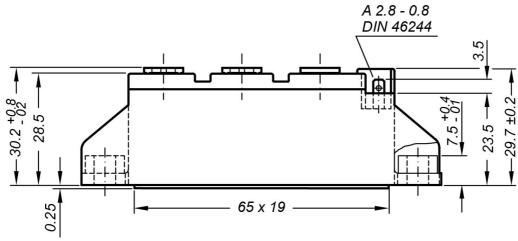
| Similar Part | Package | Voltage class |
|---------------|-------------|---------------|
| MCMA25P1200TA | TO-240AA-1B | 1200 |
| MCMA35P1200TA | TO-240AA-1B | 1200 |

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

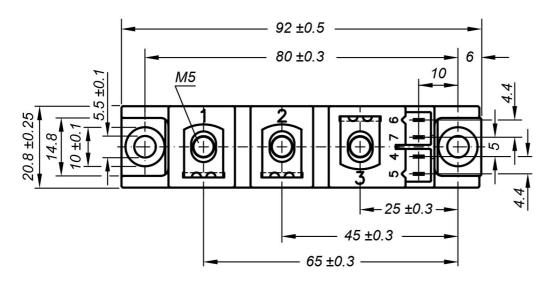
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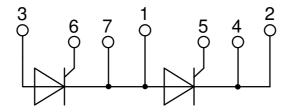
Outlines TO-240AA



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)



20161222b

DC

50

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

3: I_{GT}, T_{VJ} = -40°C

T_{VJ} = 125°C

10¹

I_{GD}

180° sin 120°₋∟

60° Л 30° □

100

at case temperature

T_c [°C]

150

5 W 5: P_{CM} =

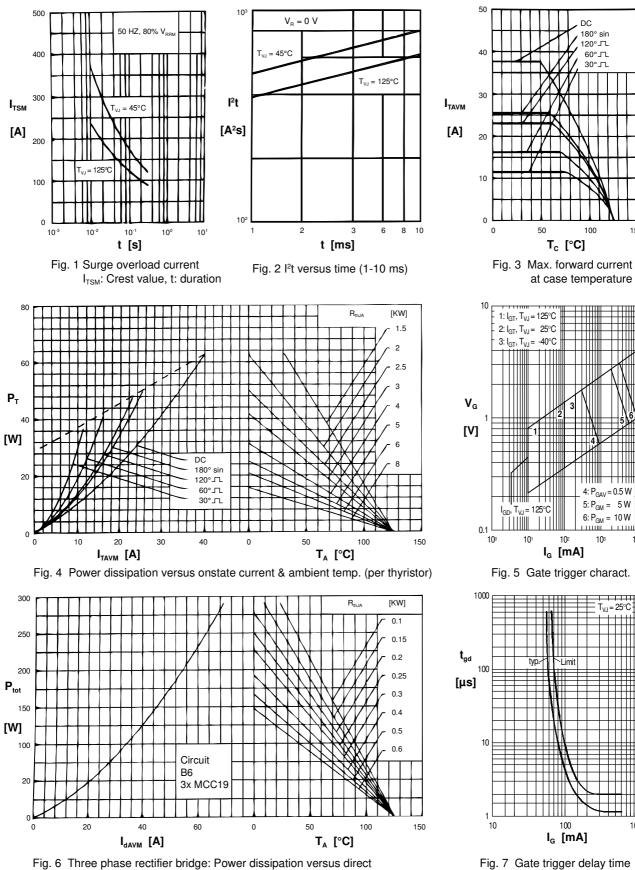
> 1.1.1111 11111

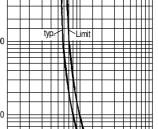
> > 104

6: P_{GM} = 10 W

10³

Thyristor





102

 I_{G} [mA]



100

 I_{G} [mA]

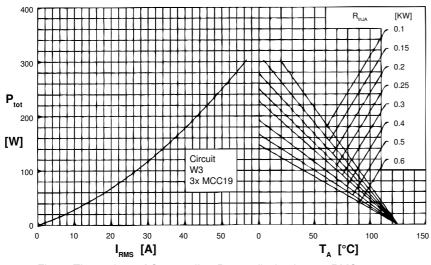
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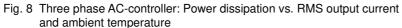
output current and ambient temperature

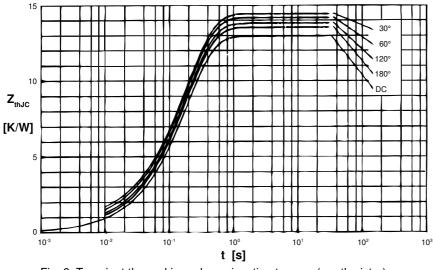
1000

MCC19-12io1B

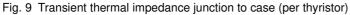
Thyristor

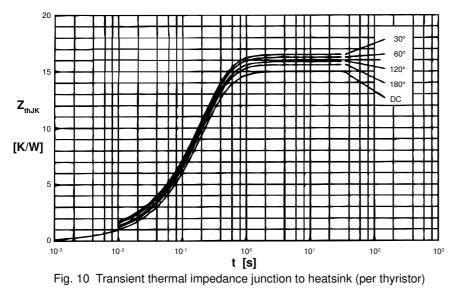






| $R_{_{thJ}}$ | $_{\rm c}$ for vario | ous conduct | ion angles d: |
|--------------|-----------------------|---------------------------|---------------|
| | d R _{tt} | _{,JC} [K/W] | |
| | DC | 1.30 | |
| | 180° | 1.35 | |
| | 120° | 1.39 | |
| | 60° | 1.42 | |
| | 30° | 1.45 | |
| Cor | nstants fo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





| R _{th} | _{лк} for varic | ous conduction angles d: | | | | |
|-----------------|---------------------------------------|--------------------------|--|--|--|--|
| | d R _{th} | _{JK} [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 _{thi} [K/W |] t _i [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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