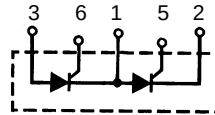
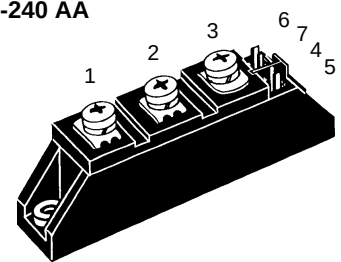


# Thyristor Modules

| $V_{RSM}$ | $V_{RRM}$ | Type           |
|-----------|-----------|----------------|
| $V_{DSM}$ | $V_{DRM}$ |                |
| V         | V         |                |
| 900       | 800       | MCC 21-08io8 B |
| 1300      | 1200      | MCC 21-12io8 B |
| 1500      | 1400      | MCC 21-14io8 B |
| 1700      | 1600      | MCC 21-16io8 B |



TO-240 AA



| Symbol         | Conditions                                                                                                | Maximum Ratings                    |                       |
|----------------|-----------------------------------------------------------------------------------------------------------|------------------------------------|-----------------------|
| $I_{TRMS}$     | $T_{VJ} = T_{VJM}$                                                                                        | 33                                 | A                     |
| $I_{TAVM}$     | $T_C = 85^{\circ}\text{C}$ ; 180° sine                                                                    | 21                                 | A                     |
| $I_{TSM}$      | $T_{VJ} = 45^{\circ}\text{C}$ ;<br>$V_R = 0$                                                              | $t = 10 \text{ ms}$ (50 Hz), sine  | 320 A                 |
|                |                                                                                                           | $t = 8.3 \text{ ms}$ (60 Hz), sine | 350 A                 |
|                | $T_{VJ} = T_{VJM}$                                                                                        | $t = 10 \text{ ms}$ (50 Hz), sine  | 280 A                 |
|                | $V_R = 0$                                                                                                 | $t = 8.3 \text{ ms}$ (60 Hz), sine | 310 A                 |
| $P_{dt}$       | $T_{VJ} = 45^{\circ}\text{C}$                                                                             | $t = 10 \text{ ms}$ (50 Hz), sine  | 500 A <sup>2</sup> s  |
|                | $V_R = 0$                                                                                                 | $t = 8.3 \text{ ms}$ (60 Hz), sine | 520 A <sup>2</sup> s  |
|                | $T_{VJ} = T_{VJM}$                                                                                        | $t = 10 \text{ ms}$ (50 Hz), sine  | 390 A <sup>2</sup> s  |
|                | $V_R = 0$                                                                                                 | $t = 8.3 \text{ ms}$ (60 Hz), sine | 400 A <sup>2</sup> s  |
| $(di/dt)_{cr}$ | $T_{VJ} = T_{VJM}$<br>$f = 50\text{Hz}$ , $t_p = 200\mu\text{s}$                                          | repetitive, $I_T = 45 \text{ A}$   | 150 A/ $\mu\text{s}$  |
|                | $V_D = \frac{2}{3} V_{DRM}$<br>$I_G = 0.45 \text{ A}$<br>$di_G/dt = 0.45 \text{ A}/\mu\text{s}$           | non repetitive, $I_T = I_{TAVM}$   | 500 A/ $\mu\text{s}$  |
| $(dv/dt)_{cr}$ | $T_{VJ} = T_{VJM}$ ; $V_{DR} = \frac{2}{3} V_{DRM}$<br>$R_{GK} = \infty$ ; method 1 (linear voltage rise) |                                    | 1000 V/ $\mu\text{s}$ |
| $P_{GM}$       | $T_{VJ} = T_{VJM}$                                                                                        | $t_p = 30 \mu\text{s}$             | 10 W                  |
|                | $I_T = I_{TAVM}$                                                                                          | $t_p = 300 \mu\text{s}$            | 5 W                   |
| $P_{GAV}$      |                                                                                                           |                                    | 0.5 W                 |
| $V_{RGM}$      |                                                                                                           |                                    | 10 V                  |
| $T_{VJ}$       |                                                                                                           | -40...+125                         | °C                    |
| $T_{VJM}$      |                                                                                                           | 125                                | °C                    |
| $T_{stg}$      |                                                                                                           | -40...+125                         | °C                    |
| $V_{ISOL}$     | 50/60 Hz, RMS                                                                                             | $t = 1 \text{ min}$                | 3000 V~               |
|                | $I_{ISOL} \leq 1 \text{ mA}$                                                                              | $t = 1 \text{ s}$                  | 3600 V~               |
| $M_d$          | Mounting torque (M5)                                                                                      | 2.5-4.0/22-35                      | Nm/lb.in.             |
|                | Terminal connection torque (M5)                                                                           | 2.5-4.0/22-35                      | Nm/lb.in.             |
| Weight         | Typical including screws                                                                                  | 90                                 | g                     |

Data according to DIN/IEC 747 and refer to a single thyristor unless otherwise stated.

## Features

- International standard package, JEDEC TO-240 AA
- Direct copper bonded  $\text{Al}_2\text{O}_3$  -ceramic base plate
- Planar passivated chips
- Isolation voltage 3600 V~
- UL registered, E 72873
- Gate-cathode twin pins for version 1B

## Applications

- DC motor control
- Softstart AC motor controller
- Light, heat and temperature control

## Advantages

- Space and weight savings
- Simple mounting with two screws
- Improved temperature and power cycling
- Reduced protection circuits

| Symbol                   | Conditions                                                                                                                                                                                  | Characteristic Values                      |
|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|
| $I_{RRM}, I_{DRM}$       | $T_{VJ} = T_{VJM}; V_R = V_{RRM}; V_D = V_{DRM}$                                                                                                                                            | 5 mA                                       |
| $V_T$                    | $I_T = 45 \text{ A}; T_{VJ} = 25^\circ\text{C}$                                                                                                                                             | 1.6 V                                      |
| $V_{T0}$<br>$r_T$        | For power-loss calculations only ( $T_{VJ} = 125^\circ\text{C}$ )                                                                                                                           | 0.85 V<br>15 mΩ                            |
| $V_{GT}$                 | $V_D = 6 \text{ V}; T_{VJ} = 25^\circ\text{C}$<br>$T_{VJ} = -40^\circ\text{C}$                                                                                                              | 1.0 V<br>1.2 V                             |
| $I_{GT}$                 | $V_D = 6 \text{ V}; T_{VJ} = 25^\circ\text{C}$<br>$T_{VJ} = -40^\circ\text{C}$                                                                                                              | 65 mA<br>80 mA                             |
| $V_{GD}$<br>$I_{GD}$     | $T_{VJ} = T_{VJM}; V_D = \frac{2}{3} V_{DRM}$                                                                                                                                               | 0.2 V<br>5 mA                              |
| $I_L$                    | $T_{VJ} = 25^\circ\text{C}; t_p = 10 \mu\text{s}; V_D = 6 \text{ V}$<br>$I_G = 0.3 \text{ A}; di_G/dt = 0.3 \text{ A}/\mu\text{s}$                                                          | 150 mA                                     |
| $I_H$                    | $T_{VJ} = 25^\circ\text{C}; V_D = 6 \text{ V}; R_{GK} = \infty$                                                                                                                             | 100 mA                                     |
| $t_{gd}$                 | $T_{VJ} = 25^\circ\text{C}; V_D = \frac{1}{2} V_{DRM}$<br>$I_G = 0.3 \text{ A}; di_G/dt = 0.3 \text{ A}/\mu\text{s}$                                                                        | 2 μs                                       |
| $t_q$                    | $T_{VJ} = T_{VJM}; I_T = 15 \text{ A}; t_p = 300 \mu\text{s}; -di/dt = 10 \text{ A}/\mu\text{s}$ typ.<br>$V_R = 100 \text{ V}; dv/dt = 20 \text{ V}/\mu\text{s}; V_D = \frac{2}{3} V_{DRM}$ | 150 μs                                     |
| $I_{RM}$                 | $T_{VJ} = T_{VJM}; I_T = 30 \text{ A}; -di/dt = 0.3 \text{ A}/\mu\text{s}$                                                                                                                  | 4 A                                        |
| $R_{thJC}$<br>$R_{thJK}$ | per thyristor; DC current<br>per module<br>per thyristor; DC current<br>per module                                                                                                          | 1.1 K/W<br>0.55 K/W<br>1.3 K/W<br>0.65 K/W |
| $d_s$<br>$d_A$<br>$a$    | Creepage distance on surface<br>Strike distance through air<br>Maximum allowable acceleration                                                                                               | 12.7 mm<br>9.6 mm<br>50 m/s <sup>2</sup>   |

Optional accessories for module-type MCC 23 version 1 B

Keyed gate/cathode twin plugs with wire length = 350 mm, gate = yellow, cathode = red

Type **ZY 200L** (L = Left for pin pair 4/5) } UL 758, style 1385,

Type **ZY 200R** (R = right for pin pair 6/7) } CSA class 5851, guide 460-1-1

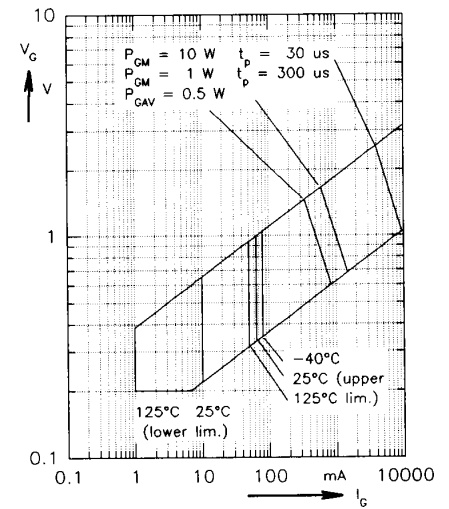


Fig. 1 Gate trigger characteristics

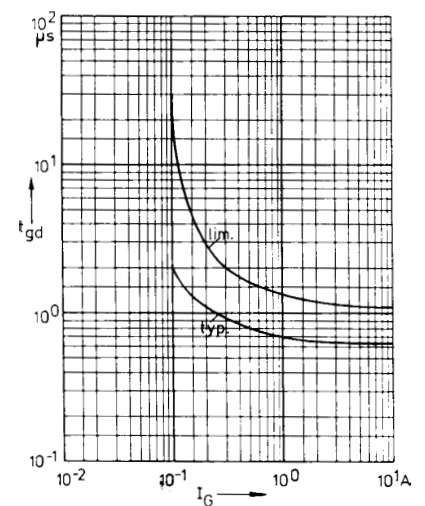


Fig. 2 Gate trigger delay time

## Dimensions in mm (1 mm = 0.0394")

