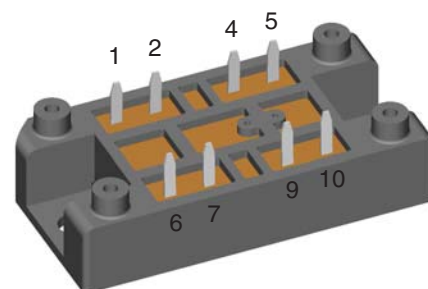
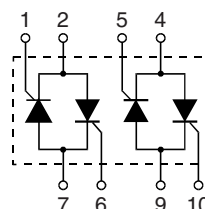


# AC Controller Modules

$$I_{RMS} = 2 \times 45 \text{ A}$$

$$V_{RRM} = 1200-1600 \text{ V}$$

| $V_{RSM}$<br>$V_{DSM}$<br><b>V</b> | $V_{RRM}$<br>$V_{DRM}$<br><b>V</b> | Type         |
|------------------------------------|------------------------------------|--------------|
| 1200                               | 1200                               | VW2x45-12io1 |
| 1400                               | 1400                               | VW2x45-14io1 |
| 1600                               | 1600                               | VW2x45-16io1 |



| Symbol         | Conditions                                                                                                                                                             | Maximum Ratings                    |                       |
|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|-----------------------|
| $I_{RMS}$      | $T_C = 85^\circ\text{C}$ ; (per phase)                                                                                                                                 | 45                                 | A                     |
| $I_{TRMS}$     | $T_{VJ} = T_{VJM}$                                                                                                                                                     | 32                                 | A                     |
| $I_{TAVM}$     | $T_C = 85^\circ\text{C}$ ; (180° sine ; per thyristor)                                                                                                                 | 20                                 | A                     |
| $I_{TSM}$      | $T_{VJ} = 45^\circ\text{C}$                                                                                                                                            | $t = 10 \text{ ms}$ (50 Hz), sine  | 300 A                 |
|                | $V_R = 0$                                                                                                                                                              | $t = 8.3 \text{ ms}$ (60 Hz), sine | 320 A                 |
|                | $T_{VJ} = T_{VJM}$                                                                                                                                                     | $t = 10 \text{ ms}$ (50 Hz), sine  | 270 A                 |
|                | $V_R = 0$                                                                                                                                                              | $t = 8.3 \text{ ms}$ (60 Hz), sine | 290 A                 |
| $I^2t$         | $T_{VJ} = 45^\circ\text{C}$                                                                                                                                            | $t = 10 \text{ ms}$ (50 Hz), sine  | 450 A <sup>2</sup> s  |
|                | $V_R = 0$                                                                                                                                                              | $t = 8.3 \text{ ms}$ (60 Hz), sine | 430 A <sup>2</sup> s  |
|                | $T_{VJ} = T_{VJM}$                                                                                                                                                     | $t = 10 \text{ ms}$ (50 Hz), sine  | 360 A <sup>2</sup> s  |
|                | $V_R = 0$                                                                                                                                                              | $t = 8.3 \text{ ms}$ (60 Hz), sine | 350 A <sup>2</sup> s  |
| $(di/dt)_{cr}$ | $T_{VJ} = T_{VJM}$<br>$f = 50 \text{ Hz}$ , $t_p = 200 \mu\text{s}$<br>$V_D = \frac{2}{3} V_{DRM}$<br>$I_G = 0.45 \text{ A}$<br>$di_G/dt = 0.45 \text{ A}/\mu\text{s}$ | repetitive, $I_T = 45 \text{ A}$   | 100 A/ $\mu\text{s}$  |
|                |                                                                                                                                                                        | non repetitive, $I_T = I_{TAVM}$   | 500 A/ $\mu\text{s}$  |
| $(dv/dt)_{cr}$ | $T_{VJ} = T_{VJM}$<br>$R_{GK} = \infty$ ; method 1 (linear voltage rise)                                                                                               | $V_{DR} = \frac{2}{3} V_{DRM}$     | 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                   |
| $P_{GAVM}$     |                                                                                                                                                                        |                                    | 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)                                                                                                                                                   |                                    | 2-2.5/18-22 Nm/lb.in. |
| Weight         | typ.                                                                                                                                                                   |                                    | 35 g                  |

Data according to IEC 60747 refer to a single thyristor/diode unless otherwise stated.

## Features

- Thyristor controller for AC (circuit W2C acc. to IEC) for mains frequency
- Soldering connections for PCB mounting
- Isolation voltage 3600 V~
- Planar passivated chips
- UL applied

## Applications

- Switching and control of three phase AC circuits
- Softstart AC motor controller
- Solid state switches
- Light and temperature control

## Advantages

- Easy to mount with two screws
- Space and weight savings
- Improved temperature and power cycling

| Symbol     | Conditions                                                                                                                                                               | Characteristic Values  |
|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|
| $I_D, I_R$ | $T_{VJ} = T_{VJM}; V_R = V_{RRM}; V_D = V_{DRM}$                                                                                                                         | $\leq 5$ mA            |
| $V_T$      | $I_T = 45$ A; $T_{VJ} = 25^\circ\text{C}$                                                                                                                                | $\leq 1.52$ V          |
| $V_{T0}$   | For power-loss calculations only                                                                                                                                         | 0.85 V                 |
| $r_T$      |                                                                                                                                                                          | 15 m $\Omega$          |
| $V_{GT}$   | $V_D = 6$ V $T_{VJ} = 25^\circ\text{C}$                                                                                                                                  | $\leq 1.5$ V           |
|            | $T_{VJ} = -40^\circ\text{C}$                                                                                                                                             | $\leq 1.6$ V           |
| $I_{GT}$   | $V_D = 6$ V $T_{VJ} = 25^\circ\text{C}$                                                                                                                                  | $\leq 100$ mA          |
|            | $T_{VJ} = -40^\circ\text{C}$                                                                                                                                             | $\leq 200$ mA          |
| $V_{GD}$   | $T_{VJ} = T_{VJM} \quad V_D = \frac{2}{3} V_{DRM}$                                                                                                                       | $\leq 0.2$ V           |
| $I_{GD}$   |                                                                                                                                                                          | $\leq 5$ mA            |
| $I_L$      | $T_{VJ} = 25^\circ\text{C}; t_p = 10$ $\mu\text{s}$<br>$I_G = 0.45$ A; $di_G/dt = 0.45$ A/ $\mu\text{s}$                                                                 | $\leq 450$ mA          |
| $I_H$      | $T_{VJ} = 25^\circ\text{C}; V_D = 6$ V; $R_{GK} = \infty$                                                                                                                | $\leq 200$ mA          |
| $t_{gd}$   | $T_{VJ} = 25^\circ\text{C}; V_D = \frac{1}{2} V_{DRM}$<br>$I_G = 0.45$ A; $di_G/dt = 0.45$ A/ $\mu\text{s}$                                                              | $\leq 2$ $\mu\text{s}$ |
| $t_q$      | $T_{VJ} = T_{VJM}; I_T = 20$ A, $t_p = 200$ $\mu\text{s}$ ; $di/dt = -10$ A/ $\mu\text{s}$<br>$V_R = 100$ V; $dv/dt = 15$ V/ $\mu\text{s}$ ; $V_D = \frac{2}{3} V_{DRM}$ | typ. 150 $\mu\text{s}$ |
| $R_{thJC}$ | per thyristor; DC                                                                                                                                                        | 1.25 K/W               |
|            | per module                                                                                                                                                               | 0.31 K/W               |
| $R_{thJK}$ | per thyristor; DC                                                                                                                                                        | 1.55 K/W               |
|            | per module                                                                                                                                                               | 0.39 K/W               |
| $d_s$      | Creeping distance on surface                                                                                                                                             | 12.7 mm                |
| $d_A$      | Creepage distance in air                                                                                                                                                 | 9.4 mm                 |
| $a$        | Max. allowable acceleration                                                                                                                                              | 50 m/s <sup>2</sup>    |

Dimensions in mm (1 mm = 0.0394")

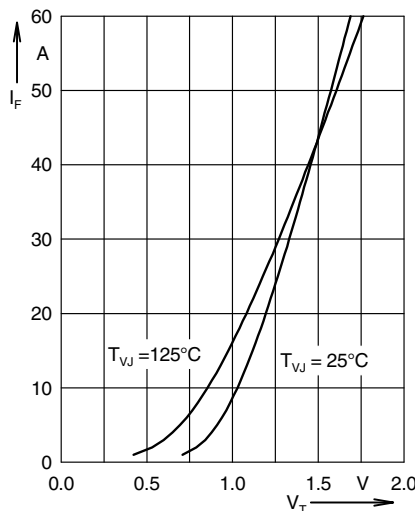
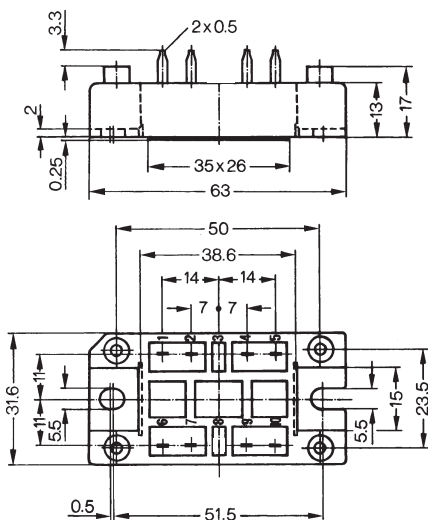


Fig. 3 Forward current vs. voltage drop per leg

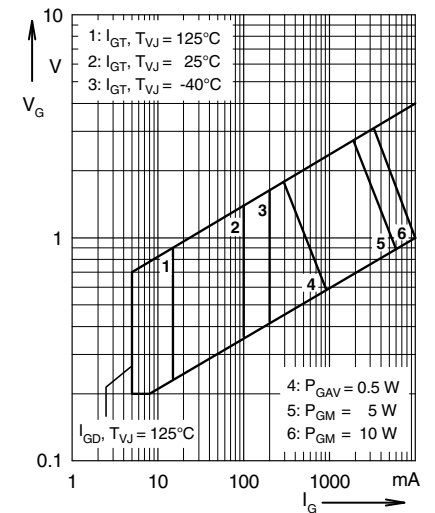


Fig. 1 Gate trigger characteristics

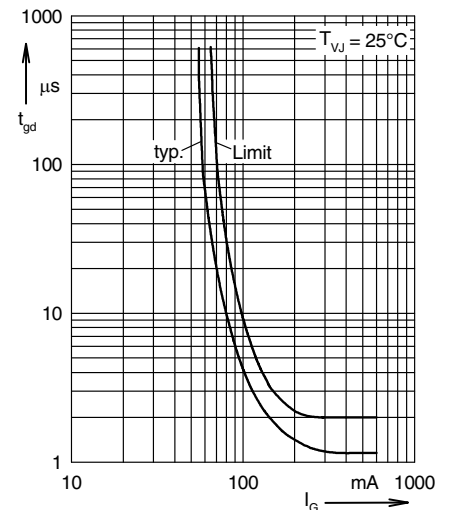


Fig. 2 Gate trigger delay time

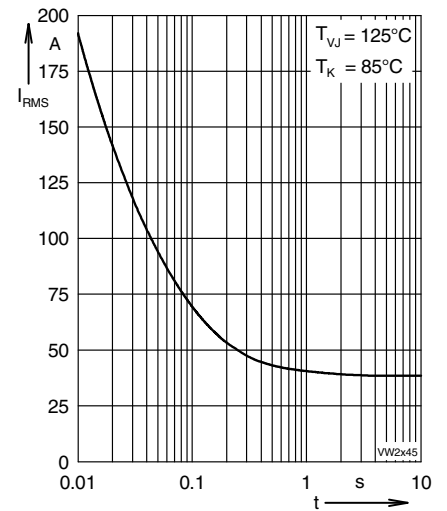


Fig. 4 Rated RMS current vs. time (360° conduction)

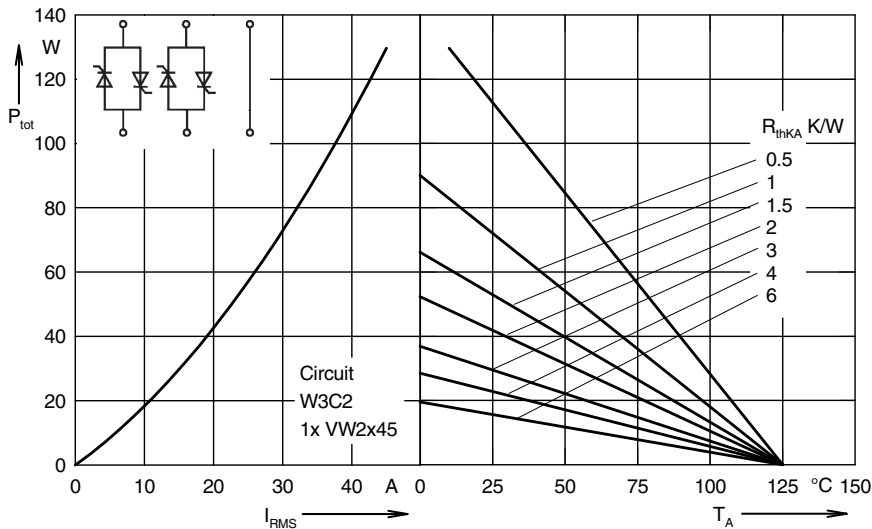


Fig. 5 Load current capability for two phase AC controller

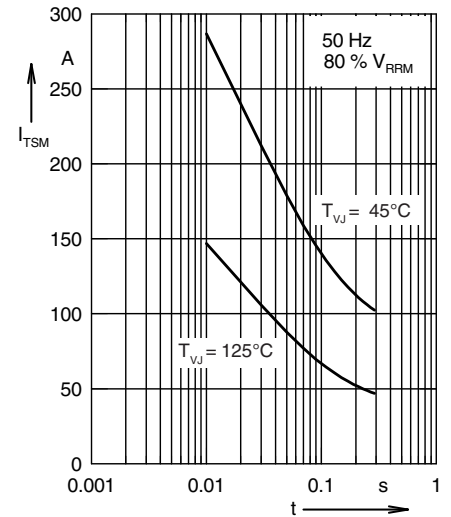


Fig. 6 Surge overload current

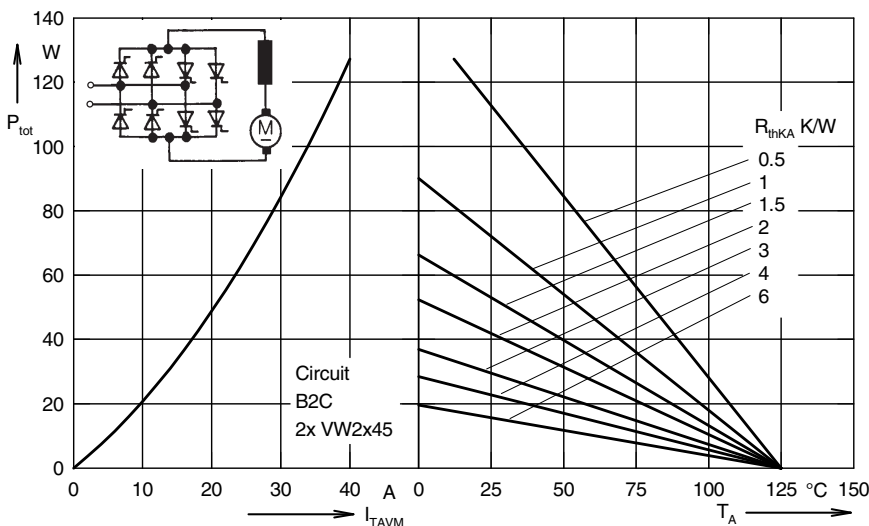


Fig. 7 Power dissipation vs. direct output current and ambient temperature  
cyclo converter, four quadrant operation

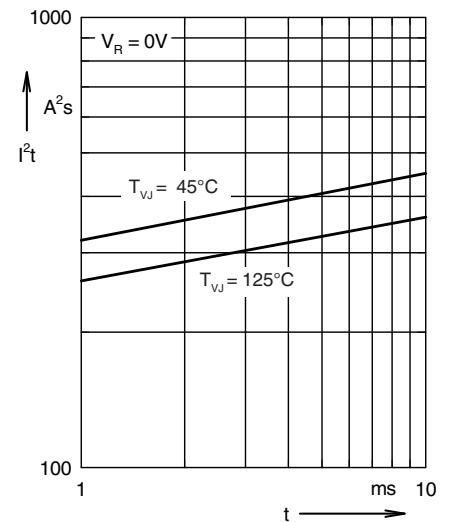


Fig. 8  $I^2t$  vs. time (per thyristor)

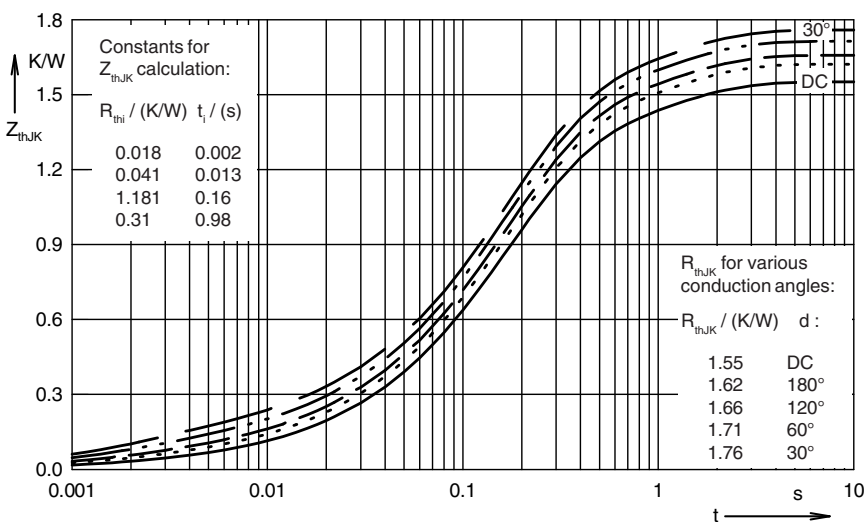


Fig. 9 Transient thermal impedance junction to heatsink (per thyristor)

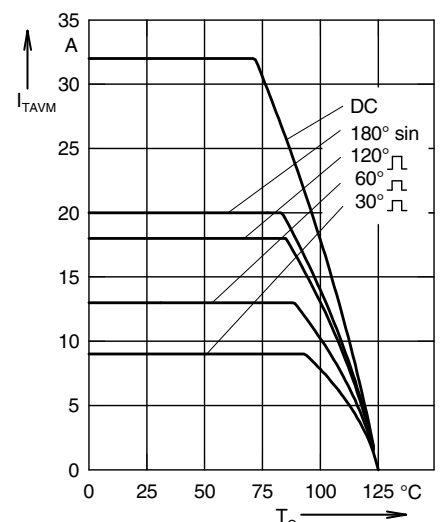


Fig. 10 Maximum forward current at case temperature