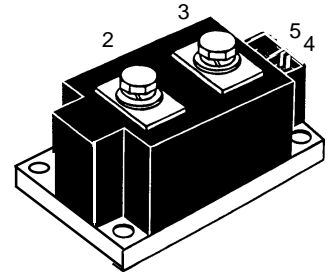
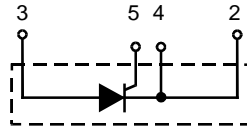


High Power Single Thyristor Module

$I_{TRMS} = 750 \text{ A}$
 $I_{TAV} = 464 \text{ A}$
 $V_{RRM} = 2000\text{-}2200 \text{ V}$

| V_{RSM} | V_{RRM} | Type |
|-------------|-------------|----------------------|
| V_{DSM} | V_{DRM} | |
| V | V | |
| 2100 | 2000 | MCO 450-20io1 |
| 2300 | 2200 | MCO 450-22io1 |



| Symbol | Test Conditions | Maximum Ratings |
|----------------|---|---|
| I_{TRMS} | $T_{VJ} = T_{VJM}$ | 750 A |
| I_{TAV} | $T_C = 85^\circ\text{C}; 180^\circ \text{ sine}$ | 464 A |
| I_{TSM} | $T_{VJ} = 45^\circ\text{C}$ $V_R = 0$ | t = 10 ms (50 Hz) 15000 A t = 8.3 ms (60 Hz) 16000 A |
| | $T_{VJ} = T_{VJM}$ $V_R = 0$ | t = 10 ms (50 Hz) 13000 A t = 8.3 ms (60 Hz) 14400 A |
| I^2t | $T_{VJ} = 45^\circ\text{C}$ $V_R = 0$ | t = 10 ms (50 Hz) 1125000 A ² s t = 8.3 ms (60 Hz) 1062000 A ² s |
| | $T_{VJ} = T_{VJM}$ $V_R = 0$ | t = 10 ms (50 Hz) 845000 A ² s t = 8.3 ms (60 Hz) 813000 A ² s |
| $(di/dt)_{cr}$ | $T_{VJ} = T_{VJM}$ repetitive, $I_T = 960 \text{ A}$ $f = 50 \text{ Hz}, t_p = 200 \mu\text{s}$ $V_D = 2/3 V_{DRM}$ | 100 A/ μs |
| | $I_G = 1 \text{ A},$ non repetitive, $I_T = I_{TAVM}$ $di_G/dt = 1 \text{ A}/\mu\text{s}$ | 500 A/ μs |
| $(dv/dt)_{cr}$ | $T_{VJ} = T_{VJM}; V_{DR} = 2/3 V_{DRM}$ $R_{GK} = \infty;$ method 1 (linear voltage rise) | 1000 V/ μs |
| P_{GM} | $T_{VJ} = T_{VJM}$ $t_p = 30 \mu\text{s}$ | 120 W |
| | $I_T = I_{TAVM}$ $t_p = 500 \mu\text{s}$ | 60 W |
| P_{GAV} | | 30 W |
| V_{RGM} | | 10 V |
| T_{VJ} | | -40...130 °C |
| T_{VJM} | | 130 °C |
| T_{stg} | | -40...125 °C |
| V_{ISOL} | 50/60 Hz, RMS t = 1 min | 3000 V~ |
| | $I_{ISOL} \leq 1 \text{ mA}$ t = 1 s | 3600 V~ |
| M_d | Mounting torque (M6) | 4.5-7/40-62 Nm/lb.in. |
| | Terminal connection torque (M8) | 11-13/97-115 Nm/lb.in. |
| Weight | Typical including screws | 650 g |

Features

- Direct copper bonded Al_2O_3 -ceramic with copper base plate
- Planar passivated chips
- Isolation voltage 3600 V~
- UL applied
- Keyed gate/cathode twin pins

Applications

- Motor control, soft starter
- Power converter
- Heat and temperature control for industrial furnaces and chemical processes
- Lighting control
- Solid state switches

Advantages

- Improved temperature and power cycling
- Reduced protection circuits

Data according to IEC 60747 refer to a single thyristor/diode unless otherwise stated. IXYS reserves the right to change limits, test conditions and dimensions

| Symbol | Test Conditions | Characteristic Values | |
|------------|---|-----------------------|------------------|
| I_{RRM} | $T_{VJ} = T_{VJM}; V_R = V_{RRM}$ | 40 | mA |
| V_T | $I_T = 600 \text{ A}; T_{VJ} = 25^\circ\text{C}$ | 1.15 | V |
| V_{T0} | For power-loss calculations only ($T_{VJ} = T_{VJM}$) | 0.77 | V |
| r_T | | 0.42 | m Ω |
| V_{GT} | $V_D = 6 \text{ V}; T_{VJ} = 25^\circ\text{C}$ | 2 | V |
| | $T_{VJ} = -40^\circ\text{C}$ | 3 | V |
| I_{GT} | $V_D = 6 \text{ V}; T_{VJ} = 25^\circ\text{C}$ | 300 | mA |
| | $T_{VJ} = -40^\circ\text{C}$ | 400 | mA |
| V_{GD} | $T_{VJ} = T_{VJM}; V_D = 2/3 V_{DRM}$ | 0.25 | V |
| I_{GD} | $T_{VJ} = T_{VJM}; V_D = 2/3 V_{DRM}$ | 10 | mA |
| I_L | $T_{VJ} = 25^\circ\text{C}; V_D = 6 \text{ V}; t_p = 30 \mu\text{s}$ $di_G/dt = 1 \text{ A}/\mu\text{s}; I_G = 1 \text{ A}$ | 400 | mA |
| I_H | $T_{VJ} = 25^\circ\text{C}; V_D = 6 \text{ V}; R_{GK} = \infty$ | 300 | mA |
| t_{gd} | $T_{VJ} = 25^\circ\text{C}; V_D = 1/2 V_{DRM}$ $di_G/dt = 1 \text{ A}/\mu\text{s}; I_G = 1 \text{ A}$ | 2 | μs |
| t_q | $T_{VJ} = T_{VJM}; V_R = 100 \text{ V}; V_D = 2/3 V_{DRM}; t_p = 200 \mu\text{s}$ $dv/dt = 50 \text{ V}/\mu\text{s}; I_T = 500 \text{ A}; -di/dt = 10 \text{ A}/\mu\text{s}$ | typ. 350 | μs |
| R_{thJC} | DC current | 0.072 | K/W |
| R_{thJK} | DC current | 0.096 | K/W |
| d_s | Creep distance on surface | 12.7 | mm |
| d_A | Strike distance in air | 9.6 | mm |
| a | Maximum allowable acceleration | 50 | m/s ² |

Optional accessories for modules

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

Type **ZY 180 L** (L = Left for pin pair 4/5) $\left\{ \begin{array}{l} \text{UL 758, style 1385, File E 38136,} \\ \text{CSA class 5851, guide 460-1-1, appl. 41234} \end{array} \right.$

Dimensions in mm (1 mm = 0.0394")

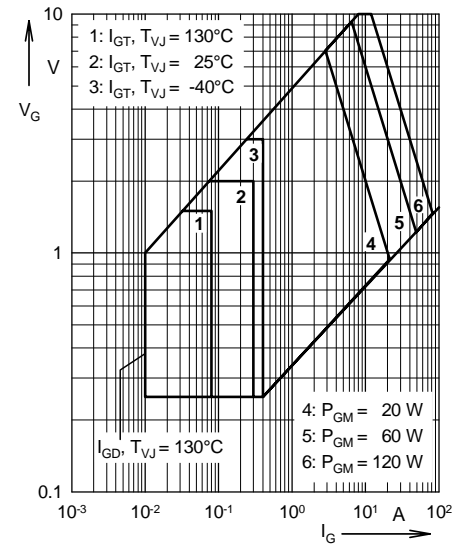
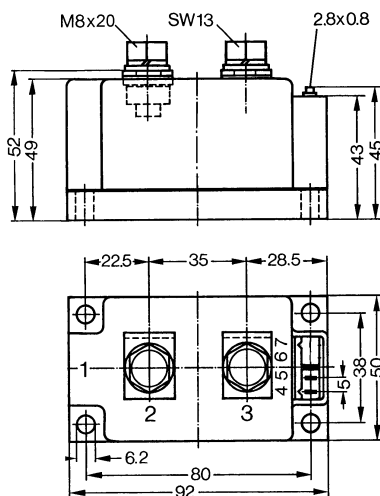


Fig. 1 Gate trigger characteristics

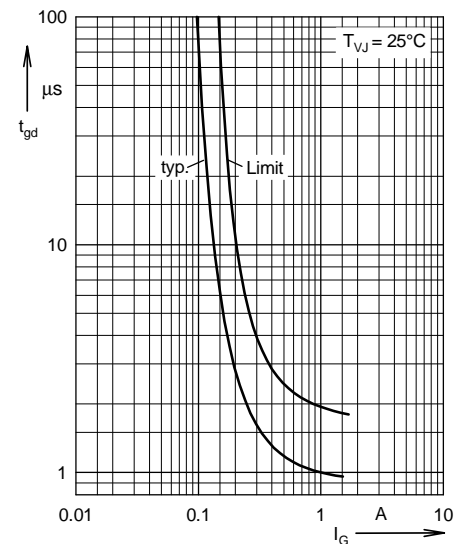


Fig. 2 Gate trigger delay time

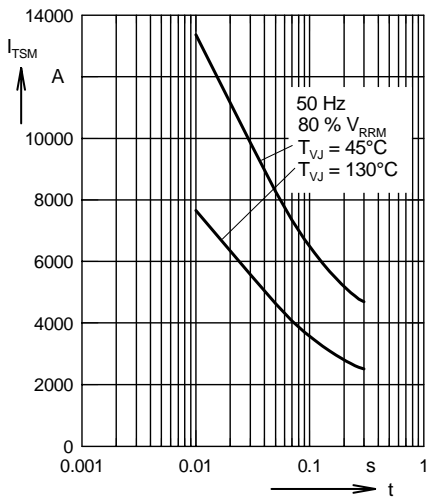


Fig. 3 Surge overload current
 I_{TSM} : Crest value, t : duration

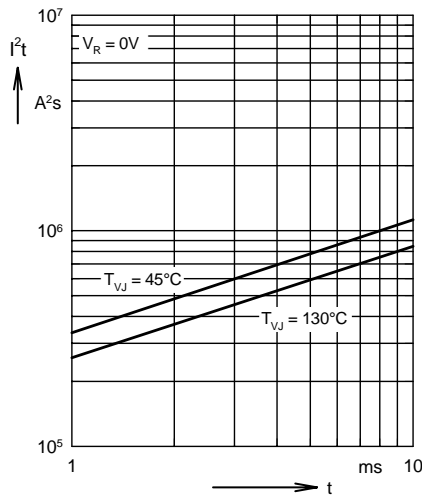


Fig. 4 I^2t versus time (1-10 ms)

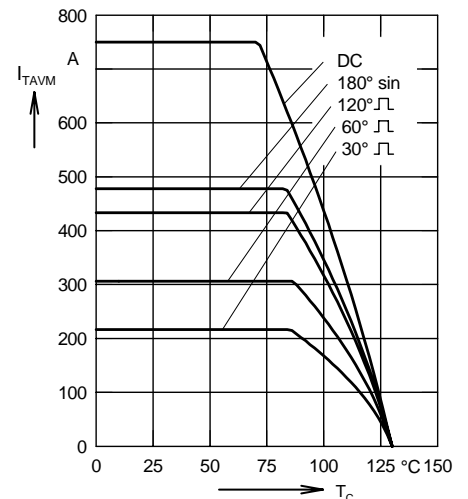


Fig. 5 Maximum forward current at case temperature

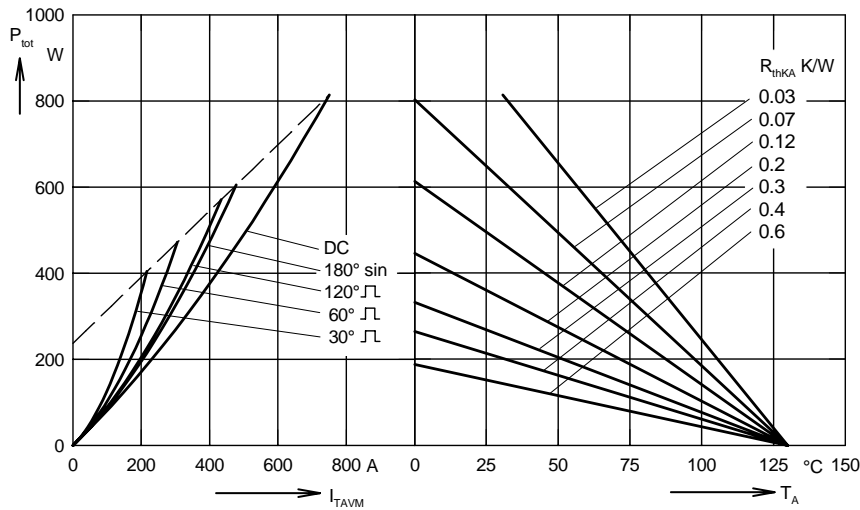


Fig. 6 Power dissipation versus on-state current and ambient temperature

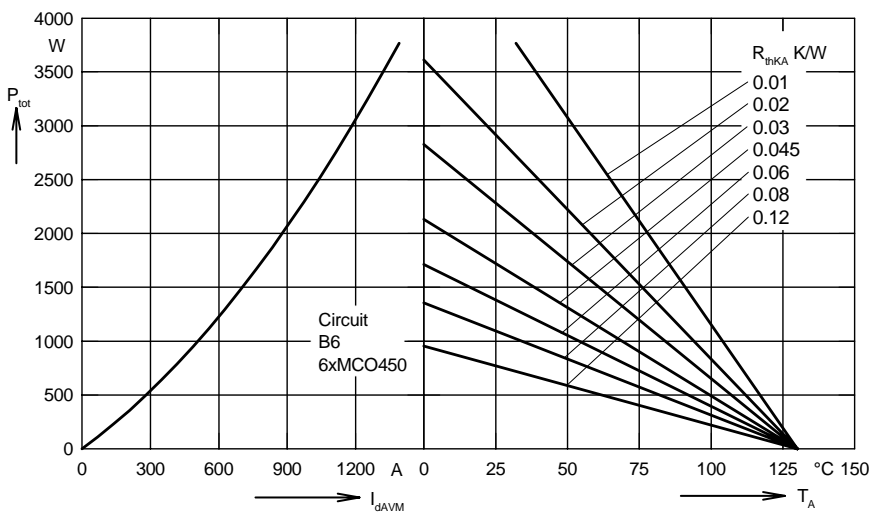


Fig. 7 Three phase rectifier bridge:
 Power dissipation versus direct output current and ambient temperature

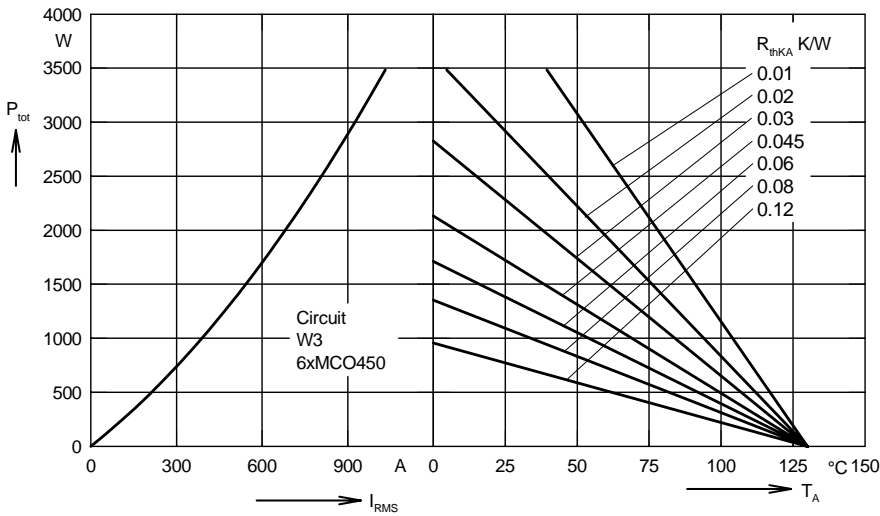


Fig. 8 Three phase AC-controller: Power dissipation versus RMS output current and ambient temperature

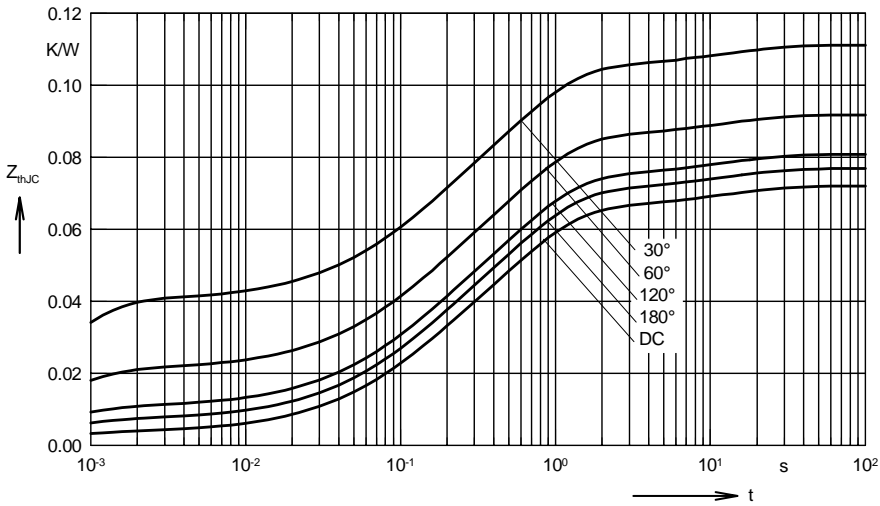


Fig. 9 Transient thermal impedance junction to case

R_{thJC} for various conduction angles d:

| d | R_{thJC} (K/W) |
|------|------------------|
| DC | 0.072 |
| 180° | 0.0768 |
| 120° | 0.081 |
| 60° | 0.092 |
| 30° | 0.111 |

Constants for Z_{thJC} calculation:

| i | R_{thi} (K/W) | t_i (s) |
|---|-----------------|-----------|
| 1 | 0.0035 | 0.0054 |
| 2 | 0.0186 | 0.098 |
| 3 | 0.0432 | 0.54 |
| 4 | 0.0067 | 12 |

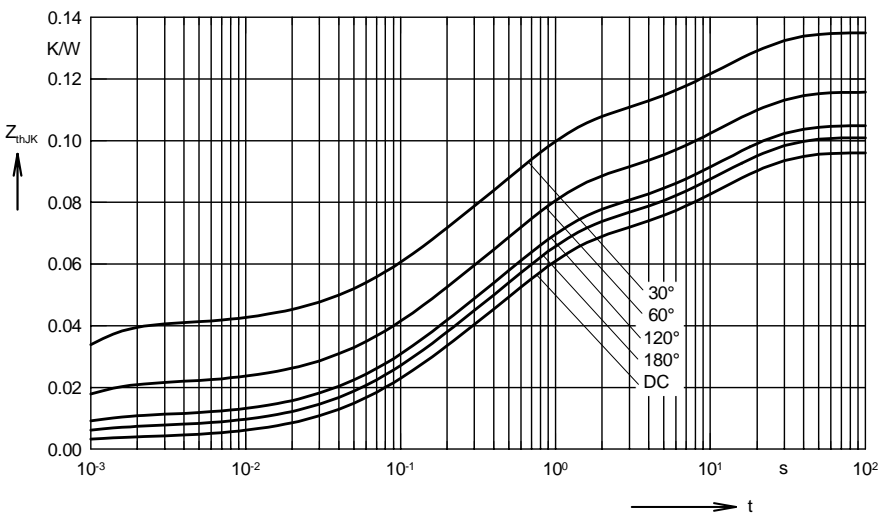


Fig.10 Transient thermal impedance junction to heatsink

R_{thJK} for various conduction angles d:

| d | R_{thJK} (K/W) |
|------|------------------|
| DC | 0.096 |
| 180° | 0.1 |
| 120° | 0.105 |
| 60° | 0.116 |
| 30° | 0.135 |

Constants for Z_{thJK} calculation:

| i | R_{thi} (K/W) | t_i (s) |
|---|-----------------|-----------|
| 1 | 0.0035 | 0.0054 |
| 2 | 0.0186 | 0.098 |
| 3 | 0.0432 | 0.54 |
| 4 | 0.0067 | 12 |
| 5 | 0.024 | 12 |