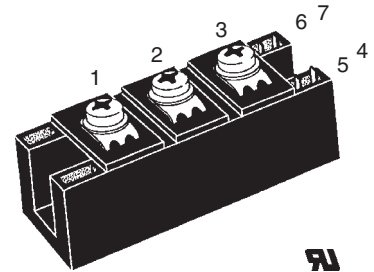
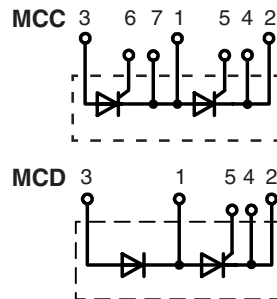


High Voltage Thyristor Module

$I_{TRMS} = 2 \times 300 \text{ A}$
 $I_{TAVM} = 2 \times 165 \text{ A}$
 $V_{RRM} = 2000\text{-}2200 \text{ V}$

| V_{RSM} | V_{RRM} | Type | |
|-----------|-----------|---------------|---------------|
| V_{DSM} | V_{DRM} | | |
| V | V | | |
| 2100 | 2000 | MCC 161-20io1 | MCD 161-20io1 |
| 2300 | 2200 | MCC 161-22io1 | MCD 161-22io1 |



| Symbol | Conditions | Maximum Ratings | |
|----------------|---|---------------------------------------|-------------------------|
| I_{TRMS} | $T_{VJ} = T_{VJM}$ | 300 | A |
| I_{TAVM} | $T_C = 85^\circ\text{C}$; 180° sine | 165 | A |
| I_{TSM} | $T_{VJ} = 45^\circ\text{C}$; $V_R = 0$ | $t = 10 \text{ ms}$ (50 Hz) | 6000 A |
| | | $t = 8.3 \text{ ms}$ (60 Hz) | 6400 A |
| | $T_{VJ} = T_{VJM}$; $V_R = 0$ | $t = 10 \text{ ms}$ (50 Hz) | 5250 A |
| | | $t = 8.3 \text{ ms}$ (60 Hz) | 5600 A |
| I^2dt | $T_{VJ} = 45^\circ\text{C}$; $V_R = 0$ | $t = 10 \text{ ms}$ (50 Hz) | 180000 A ² s |
| | | $t = 8.3 \text{ ms}$ (60 Hz) | 170000 A ² s |
| | $T_{VJ} = T_{VJM}$; $V_R = 0$ | $t = 10 \text{ ms}$ (50 Hz) | 137000 A ² s |
| | | $t = 8.3 \text{ ms}$ (60 Hz) | 128000 A ² s |
| $(di/dt)_{cr}$ | $T_{VJ} = T_{VJM}$; repetitive, $I_T = 500 \text{ A}$ $f = 50 \text{ Hz}$; $t_p = 200 \mu\text{s}$; $V_D = \frac{2}{3} V_{DRM}$; $I_G = 0.5 \text{ A}$; | non repetitive, $I_T = I_{TAVM}$ | 150 A/ μs |
| | | $di_G/dt = 0.5 \text{ A}/\mu\text{s}$ | 500 A/ μs |
| $(dv/dt)_{cr}$ | $T_{VJ} = T_{VJM}$; $V_{DR} = \frac{2}{3} V_{DRM}$ $R_{GK} = \infty$; method 1 (linear voltage rise) | 1000 | V/ μs |
| P_{GM} | $T_{VJ} = T_{VJM}$; $t_p = 30 \mu\text{s}$ $I_T = I_{TAVM}$; $t_p = 500 \mu\text{s}$ | 120 | W |
| | | 60 | W |
| P_{GAV} | | 8 | 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; $t = 1 \text{ min}$ $I_{ISOL} \leq 1 \text{ mA}$; $t = 1 \text{ s}$ | 3000 | V~ |
| | | 3600 | V~ |
| M_d | Mounting torque (M6) | 2.25-2.75 | Nm |
| | Terminal connection torque (M6) | 4.5-5.5 | Nm |
| Weight | Typical including screws | 125 | g |

Features

- International standard package
- **Direct Copper Bonded** Al₂O₃-ceramic base plate
- Planar passivated chips
- Isolation voltage 3600 V~
- UL registered, E 72873
- Keyed gate/cathode twin pins

Applications

- Motor control
- Power converter
- Heat and temperature control for industrial furnaces and chemical processes
- Lighting control
- Contactless switches

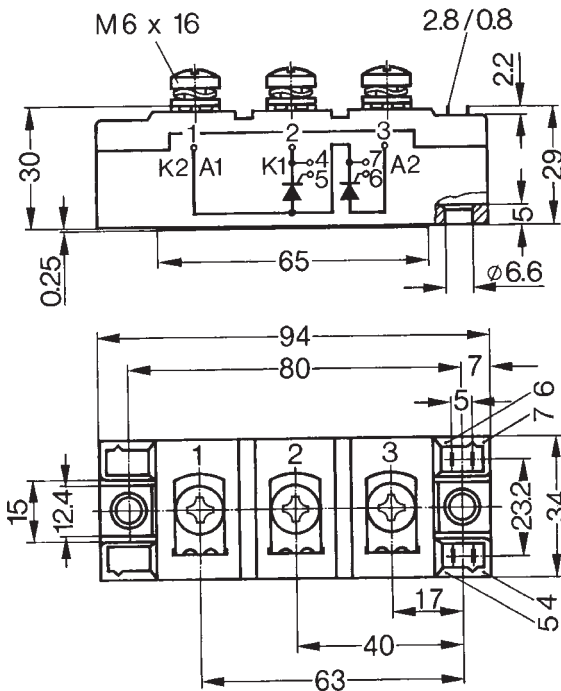
Advantages

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

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

| Symbol | Conditions | Characteristic Values |
|--------------------|--|-----------------------|
| I_{RRM}, I_{DRM} | $V_R = V_{RRM}; T_{VJ} = T_{VJM}$ | 40 mA |
| V_T | $I_T = 300A; T_{VJ} = 25^\circ C$ | 1.36 V |
| V_{T0} | For power-loss calculations only ($T_{VJ} = T_{VJM}$) | 0.8 V |
| r_T | | 1.6 mΩ |
| V_{GT} | $V_D = 6 V; T_{VJ} = 25^\circ C$ | 2 V |
| | $T_{VJ} = -40^\circ C$ | 2.6 V |
| I_{GT} | $V_D = 6 V; T_{VJ} = 25^\circ C$ | 150 mA |
| | $T_{VJ} = -40^\circ C$ | 200 mA |
| V_{GD} | $V_D = 2/3 V_{DRM}; T_{VJ} = T_{VJM}$ | 0.25 V |
| I_{GD} | $V_D = 2/3 V_{DRM}; T_{VJ} = T_{VJM}$ | 10 mA |
| I_L | $T_{VJ} = 25^\circ C; V_D = 6 V; t_p = 30 \mu s$ $di_G/dt = 0.45 A/\mu s; I_G = 0.45 A$ | 200 mA |
| I_H | $T_{VJ} = 25^\circ C; V_D = 6 V; R_{GK} = \infty$ | 150 mA |
| t_{gd} | $T_{VJ} = 25^\circ C; V_D = 1/2 V_{DRM}$ $di_G/dt = 0.5 A/\mu s; I_G = 0.5 A$ | 2 μs |
| t_q | $T_{VJ} = T_{VJM}; V_R = 100 V; V_D = 2/3 V_{DRM}; t_p = 200 \mu s$ $dv/dt = 20 V/\mu s; I_T = 160 A; -di/dt = 10A/\mu s$ | typ. 150 μs |
| Q_S | } $T_{VJ} = T_{VJM}$ } $-di/dt = 50 A/\mu s; I_T = 300 A$ | 550 μC |
| I_{RM} | | 235 A |
| R_{thJC} | per thyristor; DC current | 0.155 K/W |
| | per module | 0.078 K/W |
| R_{thJK} | per thyristor; DC current | 0.225 K/W |
| | per module | 0.113 K/W |
| d_s | Creeping distance on surface | 12.7 mm |
| d_A | Creepage distance in air | 9.6 mm |
| a | Maximum allowable acceleration | 50 m/s ² |

Dimensions in mm (1 mm = 0.0394")



Optional accessories for modules
 Keyed gate/cathode twin plugs with wire length = 350 mm, gate = yellow, cathode = red
 Type ZY 180L (L = Left for pin pair 4/5) } UL 758, style 1385,
 Type ZY 180R (R = right for pin pair 6/7) } CSA class 5851, guide 460-1-1

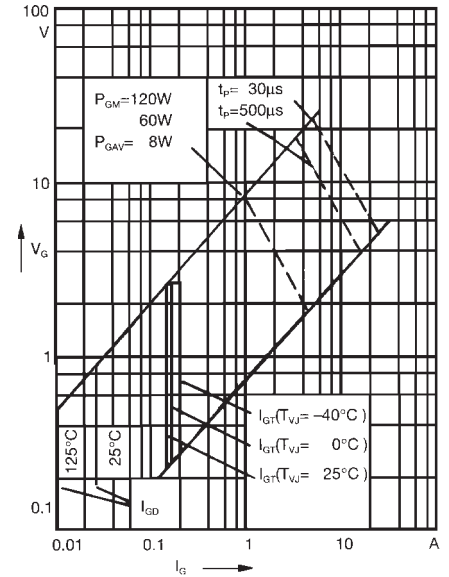


Fig. 1 Gate trigger characteristics

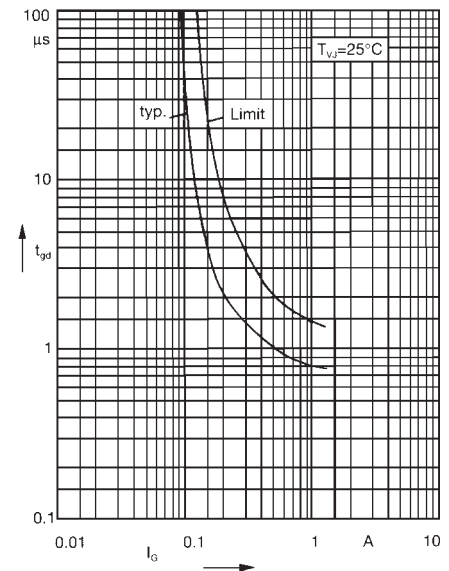


Fig. 2 Gate trigger delay time

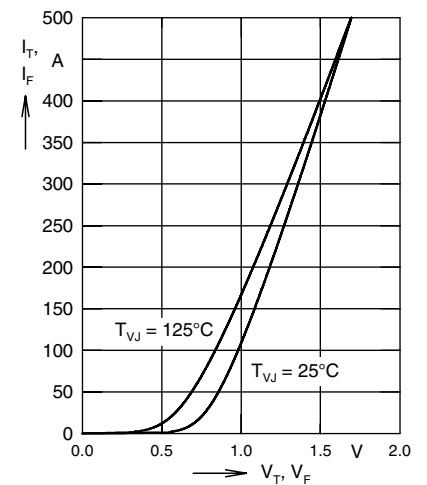
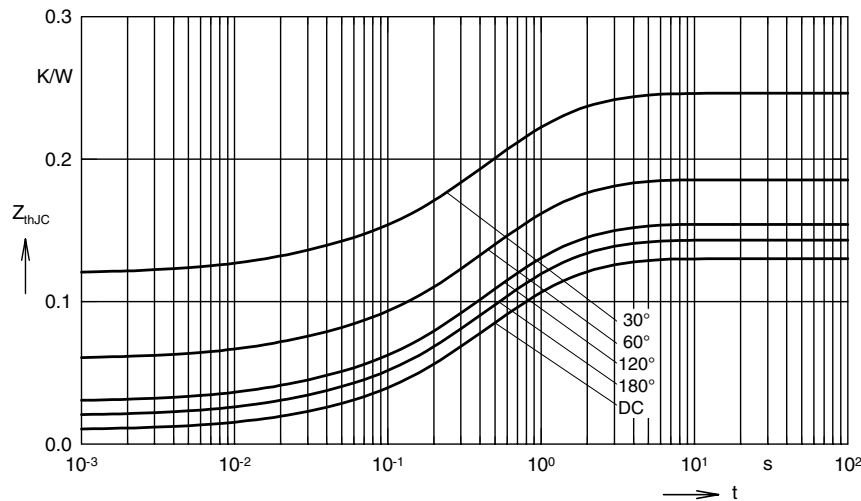
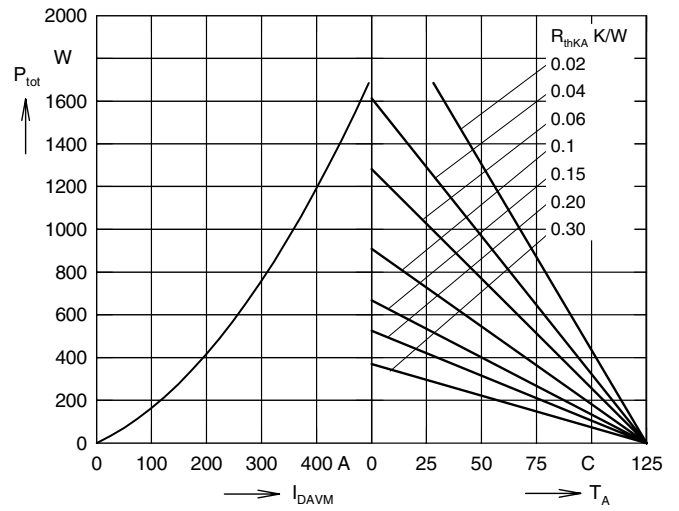
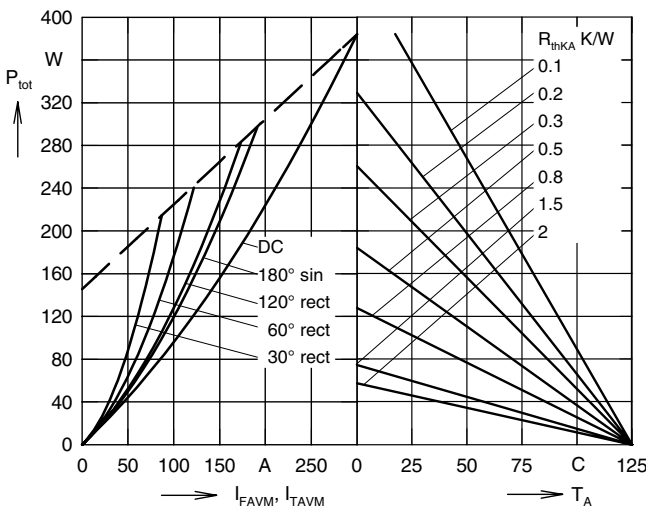
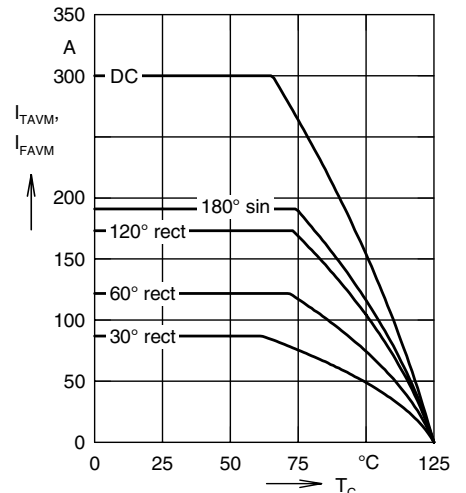
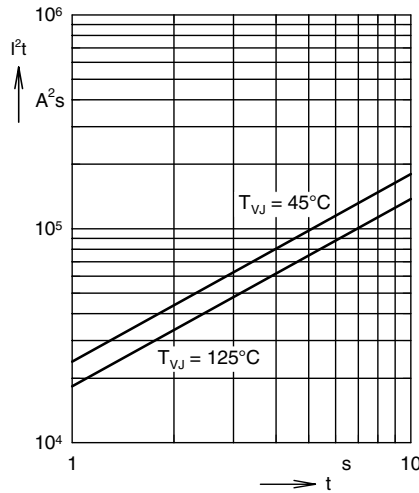
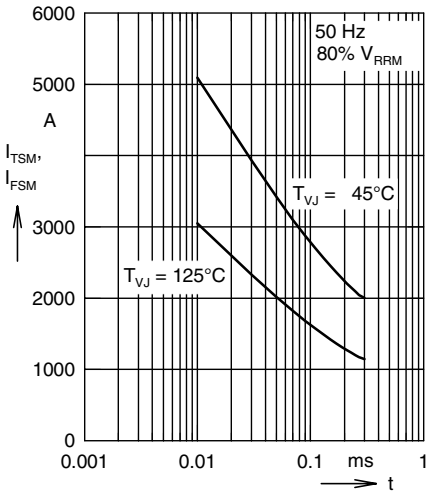


Fig 3: Forward current vs. voltage drop per thyristor/diode



R_{thJC} for various condition angles:

| d | R_{thJC} (K/W) |
|------|------------------|
| DC | 0.155 |
| 180° | 0.171 |
| 120° | 0.184 |
| 60° | 0.222 |
| 30° | 0.294 |

Constants for Z_{thJC} calculation (DC):

| i | R_{thi} (K/W) | t_i (s) |
|---|-----------------|-----------|
| 1 | 0.012 | 0.00014 |
| 2 | 0.008 | 0.019 |
| 3 | 0.03 | 0.18 |
| 4 | 0.073 | 0.52 |
| 5 | 0.032 | 1.6 |