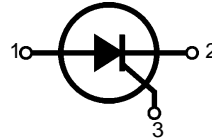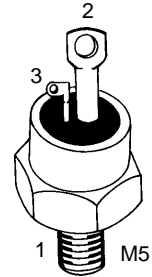# Phase Control Thyristors

$V_{RRM}$ = 800-1200 V
$I_{T(RMS)}$ = 25 A
$I_{T(AV)M}$ = 16 A

| $V_{RSM}$ $V_{DSM}$ V | $V_{RRM}$ $V_{DRM}$ V | Type |
|---|---|---|
| 900 | 800 | CS 8-08io2 |
| 1300 | 1200 | CS 8-12io2 |



**TO-64**



1 = Anode, 2 = Cathode, 3 = Gate

| Symbol | Test Conditions | | Maximum Ratings | |
|---|---|---|---|---|
| $I_{T(RMS)}$ | $T_{VJ}$ = $T_{VJM}$ | | 25 | A |
| $I_{T(AV)M}$ | $T_{case}$ = 85°C; 180° sine | | 16 | A |
| $I_{TSM}$ | $T_{VJ}$ = 45°C; | t = 10 ms (50 Hz), sine | 250 | A |
| | $V_R$ = 0 | t = 8.3 ms (60 Hz), sine | 270 | A |
| | $T_{VJ}$ = $T_{VJM}$ | t = 10 ms (50 Hz), sine | 200 | A |
| | $V_R$ = 0 | t = 8.3 ms (60 Hz), sine | 220 | A |
| $I^2t$ | $T_{VJ}$ = 45°C | t = 10 ms (50 Hz), sine | 310 | $A^2s$ |
| | $V_R$ = 0 | t = 8.3 ms (60 Hz), sine | 306 | $A^2s$ |
| | $T_{VJ}$ = $T_{VJM}$ | t = 10 ms (50 Hz), sine | 200 | $A^2s$ |
| | $V_R$ = 0 | t = 8.3 ms (60 Hz), sine | 200 | $A^2s$ |
| $(di/dt)_{cr}$ | $T_{VJ}$ = $T_{VJM}$ f = 50 Hz, $t_P$ =200 μs $V_D$ = 2/3 $V_{DRM}$ | repetitive, $I_T$ = 48 A | 150 | A/μs |
| | $I_G$ = 0.2 A $di_G$/dt = 0.2 A/μs | non repetitive, $I_T$ = $I_{T(AV)M}$ | 500 | A/μs |
| $(dv/dt)_{cr}$ | $T_{VJ}$ = $T_{VJM}$; $R_{GK}$ = ∞; method 1 (linear voltage rise) | $V_{DR}$ = 2/3 $V_{DRM}$ | 1000 | V/μs |
| $P_{GM}$ | $T_{VJ}$ = $T_{VJM}$ | $t_P$ = 30 μs | 10 | W |
| | $I_T$ = $I_{T(AV)M}$ | $t_P$ = 300 μs | 5 | W |
| $P_{G(AV)}$ | | | 0.5 | W |
| $V_{RGM}$ | | | 10 | V |
| $T_{VJ}$ | | | -40...+125 | °C |
| $T_{VJM}$ | | | 125 | °C |
| $T_{stg}$ | | | -40...+125 | °C |
| $M_d$ | Mounting torque | | 2.5 | Nm |
| | | | 22 | lb.in. |
| **Weight** | | | 6 | g |

**Features**
- Thyristor for line frequencies
- International standard package JEDEC TO-64
- Planar glassivated chip
- Long-term stability of blocking currents and voltages

**Applications**
- Motor control
- Power converter
- AC power controller

**Advantages**
- Space and weight savings
- Simple mounting
- Improved temperature and power cycling

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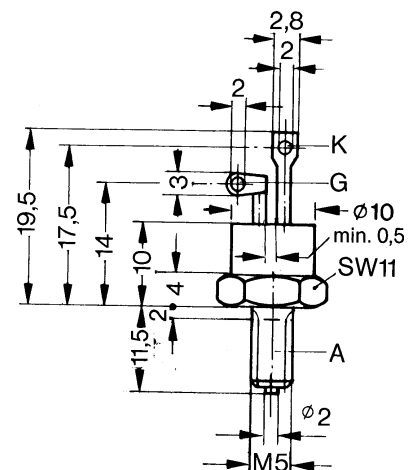


Data according to IEC 60747
IXYS reserves the right to change limits, test conditions and dimensions

   

| Symbol | Test Conditions | | Characteristic Values | | |
|---|---|---|---|---|---|
| $I_R$, $I_D$ | $T_{VJ} = T_{VJM}$; $V_R = V_{RRM}$; $V_D = V_{DRM}$ | | $\leq$ | 3 | mA |
| $V_T$ | $I_T$ = 33 A; $T_{VJ} = 25°C$ | | $\leq$ | 1.6 | V |
| $V_{T0}$ | For power-loss calculations only ($T_{VJ} = 125°C$) | | | 1.0 | V |
| $r_T$ | | | | 18 | m$\Omega$ |
| $V_{GT}$ | $V_D = 6$ V; | $T_{VJ} = 25°C$ | $\leq$ | 2.5 | V |
| | | $T_{VJ} = -40°C$ | $\leq$ | 3.5 | V |
| $I_{GT}$ | $V_D = 6$ V; | $T_{VJ} = 25°C$ | $\leq$ | 30 | mA |
| | | $T_{VJ} = -40°C$ | $\leq$ | 50 | mA |
| $V_{GD}$ | $T_{VJ} = T_{VJM}$; | $V_D = 2/3\ V_{DRM}$ | $\leq$ | 0.2 | V |
| $I_{GD}$ | | | $\leq$ | 1 | mA |
| $I_L$ | $T_{VJ} = 25°C$; $t_P = 10$ µs | | $\leq$ | 100 | mA |
| | $I_G = 0.09$ A; $di_G/dt = 0.09$ A/µs | | | | |
| $I_H$ | $T_{VJ} = 25°C$; $V_D = 6$ V; $R_{GK} = \infty$ | | $\leq$ | 80 | mA |
| $t_{gd}$ | $T_{VJ} = 25°C$; $V_D = 1/2\ V_{DRM}$ | | $\leq$ | 2 | µs |
| | $I_G = 0.09$ A; $di_G/dt = 0.09$ A/µs | | | | |
| $t_q$ | $T_{VJ} = T_{VJM}$; $I_T = 16$ A, $t_P = 300$ µs; $di/dt = -20$ A/µs | | typ. | 60 | µs |
| | $V_R = 100$ V; $dv/dt = 20$ V/µs; $V_D = 2/3\ V_{DRM}$ | | | | |
| $R_{thJC}$ | DC current | | | 1.5 | K/W |
| $R_{thJH}$ | DC current | | | 2.5 | K/W |
| $d_S$ | Creepage distance on surface | | | 1.55 | mm |
| $d_A$ | Strike distance through air | | | 1.55 | mm |
| $a$ | Max. acceleration, 50 Hz | | | 50 | m/s$^2$ |

Accessories:
Nut M5 DIN 439/SW8
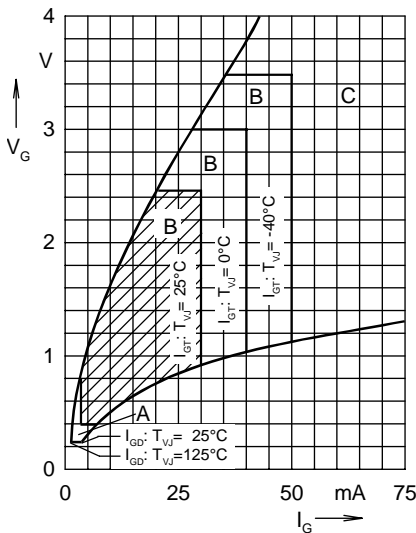Lock washer A5 DIN 128



Fig. 1 Gate voltage and gate current
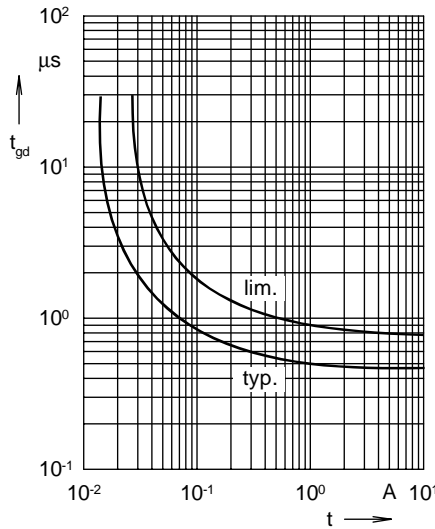Triggering:
A = no; B = possible; C = safe



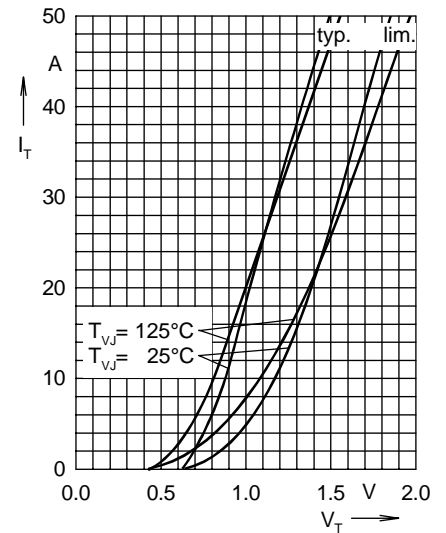Fig. 2 Gate controlled delay time $t_{gd}$
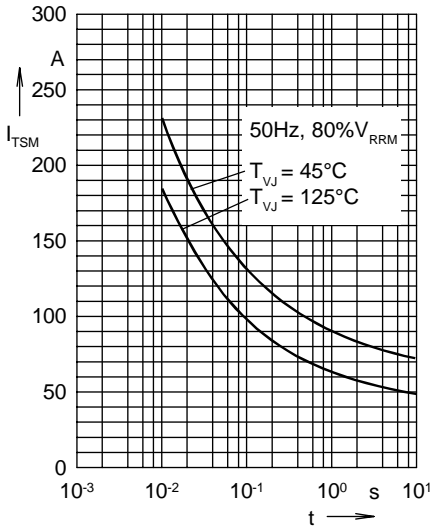


Fig. 3 On-state characteristics

Fig. 4  Surge overload current
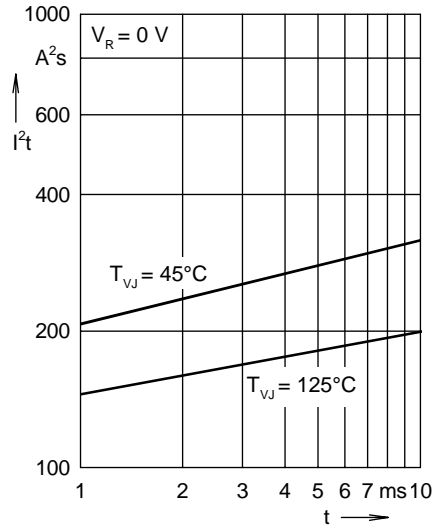$I_{TSM}$: crest value, t: duration



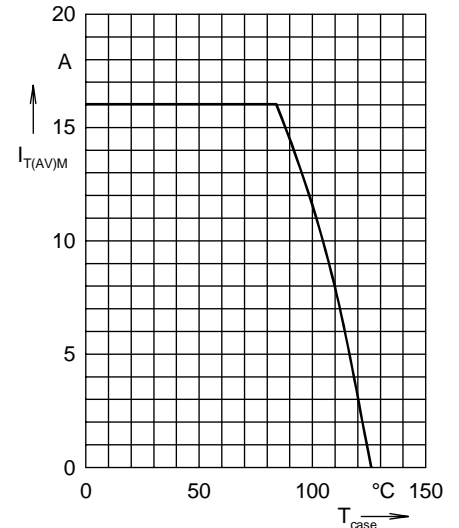Fig. 5  $I^2t$ versus time (1-10 ms)



Fig. 6  Maximum forward current at case temperature 180° sine
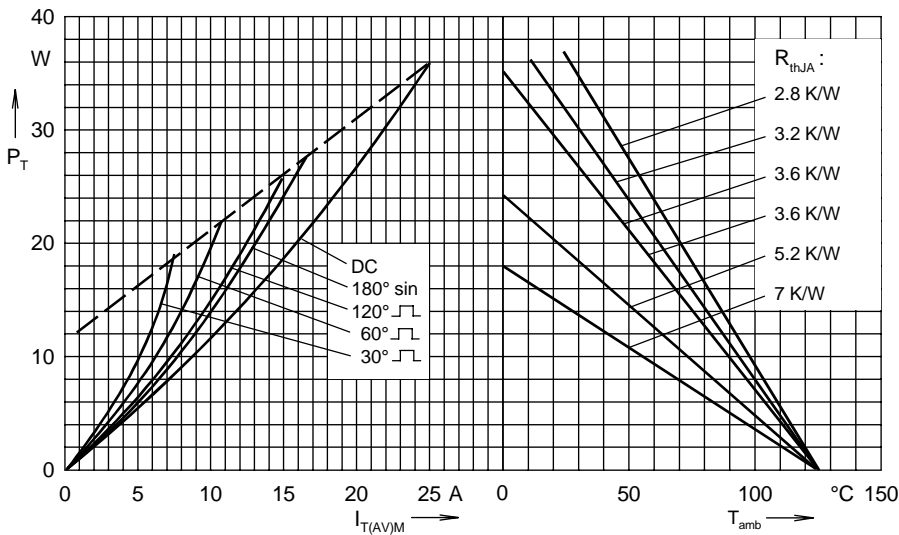


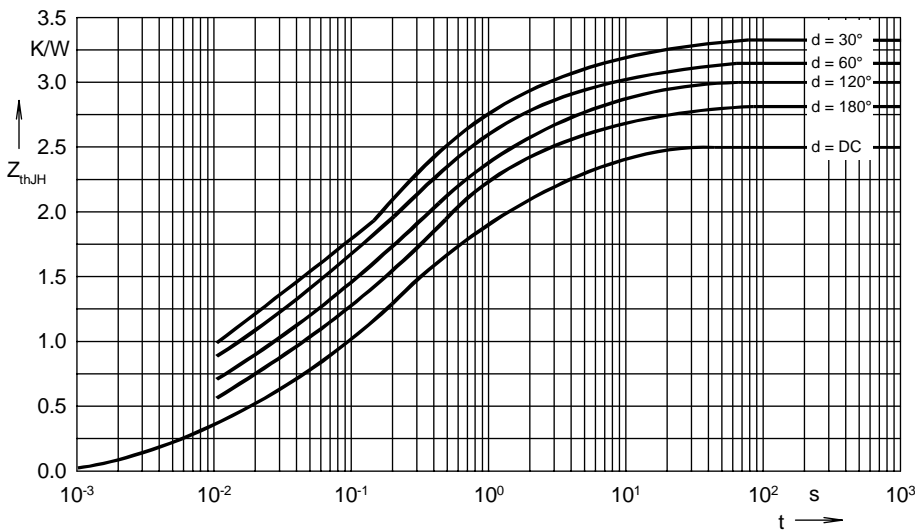Fig. 7  Power dissipation versus on-state current and ambient temperature



Fig. 8  Transient thermal impedance junction to heatsink

$R_{thJH}$ for various conduction angles d:

| d | $R_{thJH}$ (K/W) |
|------|---------|
| DC | 2.5 |
| 180° | 2.79 |
| 120° | 2.95 |
| 60° | 3.17 |
| 30° | 3.32 |

Constants for $Z_{thJH}$ calculation:

| i | $R_{thi}$ (K/W) | $t_i$ (s) |
|---|---------|---------|
| 1 | 0.252 | 0.005 |
| 2 | 0.333 | 0.0225 |
| 3 | 0.5 | 0.145 |
| 4 | 0.833 | 0.43 |
| 5 | 0.416 | 2.75 |
| 6 | 0.166 | 23 |