# STD49GKXX

## Thyristor-Diode Modules

| Type | $V_{RSM}$ $V_{DSM}$ V | $V_{RRM}$ $V_{DRM}$ V |
|------|------|------|
| STD49GK08 | 900 | 800 |
| STD49GK12 | 1300 | 1200 |
| STD49GK14 | 1500 | 1400 |
| STD49GK16 | 1700 | 1600 |
| STD49GK18 | 1900 | 1800 |

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

| Symbol | Test Conditions | | Maximum Ratings | Unit |
|--------|-----------------|--|-----------------|------|
| $I_{TRMS}$, $I_{FRMS}$ $I_{TAVM}$, $I_{FAVM}$ | $T_{VJ}=T_{VJM}$ $T_C=85^oC$; $180^o$ sine | | 80 49 | A |
| $I_{TSM}$, $I_{FSM}$ | $T_{VJ}=45^oC$ $V_R=0$ | t=10ms (50Hz), sine t=8.3ms (60Hz), sine | 1150 1230 | A |
| | $T_{VJ}=T_{VJM}$ $V_R=0$ | t=10ms(50Hz), sine t=8.3ms(60Hz), sine | 1000 1070 | |
| $\int i^2 dt$ | $T_{VJ}=45^oC$ $V_R=0$ | t=10ms (50Hz), sine t=8.3ms (60Hz), sine | 6600 6280 | $A^2s$ |
| | $T_{VJ}=T_{VJM}$ $V_R=0$ | t=10ms(50Hz), sine t=8.3ms(60Hz), sine | 5000 4750 | |
| $(di/dt)_{cr}$ | $T_{VJ}=T_{VJM}$ f=50Hz, $t_p=200us$ $V_D=2/3V_{DRM}$ $I_G=0.45A$ $di_G/dt=0.45A/us$ | repetitive, $I_T=150A$ non repetitive, $I_T=I_{TAVM}$ | 150 500 | A/us |
| $(dv/dt)_{cr}$ | $T_{VJ}=T_{VJM}$; $R_{GK}=\infty$; method 1 (linear voltage rise) | $V_{DR}=2/3V_{DRM}$ | 1000 | V/us |
| $P_{GM}$ | $T_{VJ}=T_{VJM}$ $I_T=I_{TAVM}$ | $t_p=30us$ $t_p=300us$ | 10 5 | W |
| $P_{GAV}$ | | | 0.5 | W |
| $V_{RGM}$ | | | 10 | V |
| $T_{VJ}$ $T_{VJM}$ $T_{stg}$ | | | -40...+125 125 -40...+125 | $^oC$ |
| $V_{ISOL}$ | 50/60Hz, RMS $I_{ISOL} \le 1mA$ | t=1min t=1s | 3000 3600 | V~ |
| $M_d$ | Mounting torque (M5) Terminal connection torque (M5) | | 2.5-4.0/22-35 2.5-4.0/22-35 | Nm/lb.in. |
| Weight | Typical | | 78 | g |

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| Symbol | Test Conditions | Characteristic Values | Unit |
|---|---|---|---|
| $I_{RRM}$, $I_{DRM}$ | $T_{VJ}=T_{VJM}$; $V_R=V_{RRM}$; $V_D=V_{DRM}$ | 5 | mA |
| $V_T$, $V_F$ | $I_T$, $I_F=200A$; $T_{VJ}=25^oC$ | 1.75 | V |
| $V_{TO}$ | For power-loss calculations only ($T_{VJ}=125^oC$) | 0.85 | V |
| $r_T$ | | 5.3 | m$\Omega$ |
| $V_{GT}$ | $V_D=6V$; $\qquad$ $T_{VJ}=25^oC$ <br> $T_{VJ}=-40^oC$ | 1.5 <br> 1.6 | V |
| $I_{GT}$ | $V_D=6V$; $\qquad$ $T_{VJ}=25^oC$ <br> $T_{VJ}=-40^oC$ | 100 <br> 200 | mA |
| $V_{GD}$ | $T_{VJ}=T_{VJM}$; $\qquad$ $V_D=2/3V_{DRM}$ | 0.2 | V |
| $I_{GD}$ | | 10 | mA |
| $I_L$ | $T_{VJ}=25^oC$; $t_p=10us$; $V_D=6V$ <br> $I_G=0.45A$; $di_G/dt=0.45A/us$ | 450 | mA |
| $I_H$ | $T_{VJ}=25^oC$; $V_D=6V$; $R_{GK}=\infty$ | 200 | mA |
| $t_{gd}$ | $T_{VJ}=25^oC$; $V_D=1/2V_{DRM}$ <br> $I_G=0.45A$; $di_G/dt=0.45A/us$ | 2 | us |
| $t_q$ | $T_{VJ}=T_{VJM}$; $I_T=120A$; $t_p=200us$; $-di/dt=10A/us$ $\qquad$ typ. <br> $V_R=100V$; $dv/dt=20V/us$; $V_D=2/3V_{DRM}$ | 150 | us |
| $Q_s$ | $T_{VJ}=T_{VJM}$; $I_T$, $I_F=50A$; $-di/dt=0.64A/us$ | 90 | uC |
| $I_{RM}$ | | 11 | A |
| $R_{thJC}$ | per thyristor/diode; DC current <br> per module | 0.53 <br> 0.265 | K/W |
| $R_{thJK}$ | per thyristor/diode; DC current <br> per module | 0.73 <br> 0.365 | K/W |
| $d_s$ | Creeping distance on surface | 12.7 | mm |
| $d_A$ | Strike distance through air | 9.6 | mm |
| a | Maximum allowable acceleration | 50 | m/s$^2$ |

### FEATURES
* International standard package
* DCB  base plate
* Glass passivated chips
* Isolation voltage 3600 V~
* UL File NO.E310749
* RoHS compliant

### 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

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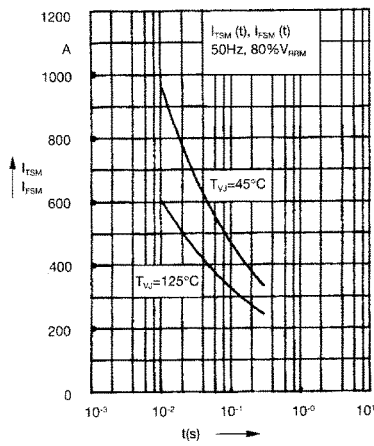
## Thyristor-Diode Modules



Fig. 1 Surge overload current
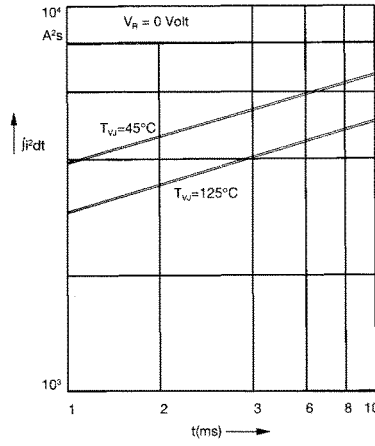$I_{TSM}$, $I_{FSM}$: Crest value, t: duration

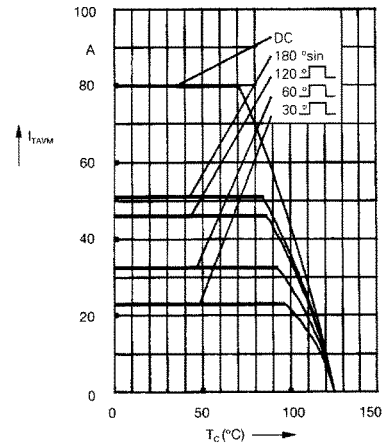Fig. 2 $\int i^2 dt$ versus time (1-10 ms)

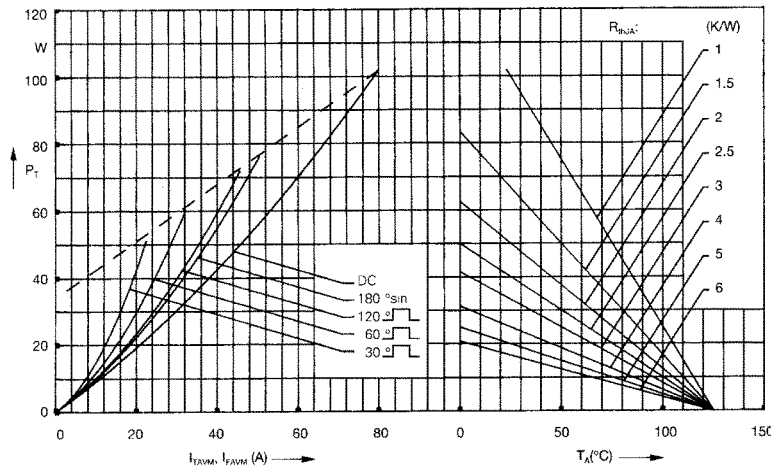Fig. 2a Maximum forward current at case temperature

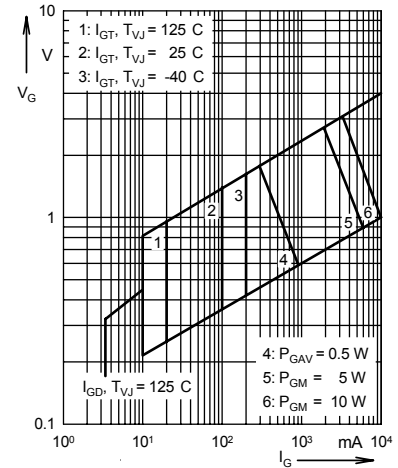Fig. 3 Power dissipation versus on-state current and ambient temperature (per thyristor or diode).

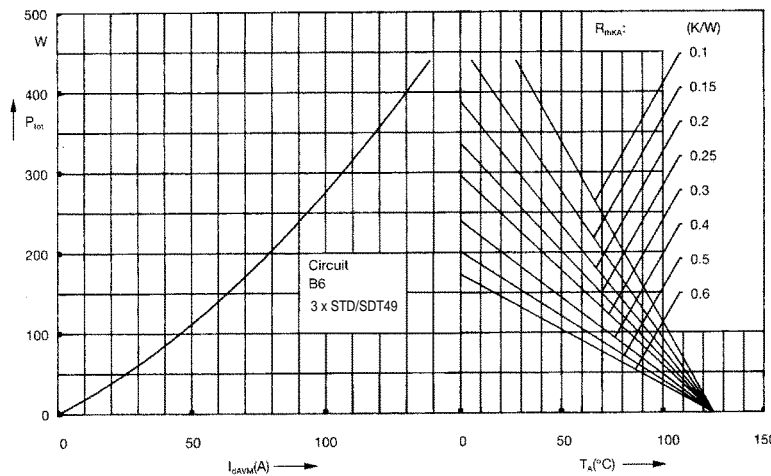Fig. 4 Gate trigger characteristics

Fig. 5 Three phase rectifier bridge: Power dissipation versus direct output current and ambient temperature
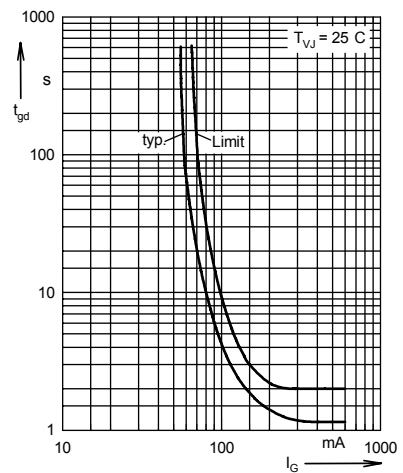
Fig. 6 Gate trigger delay time

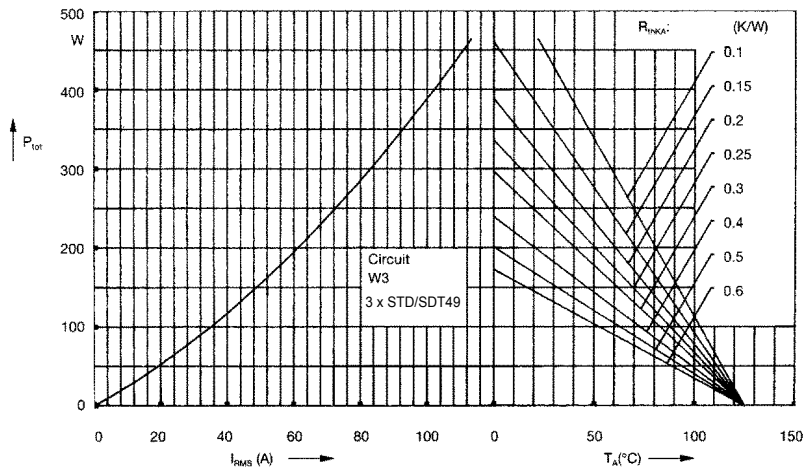Sirectifier®

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## Thyristor-Diode Modules

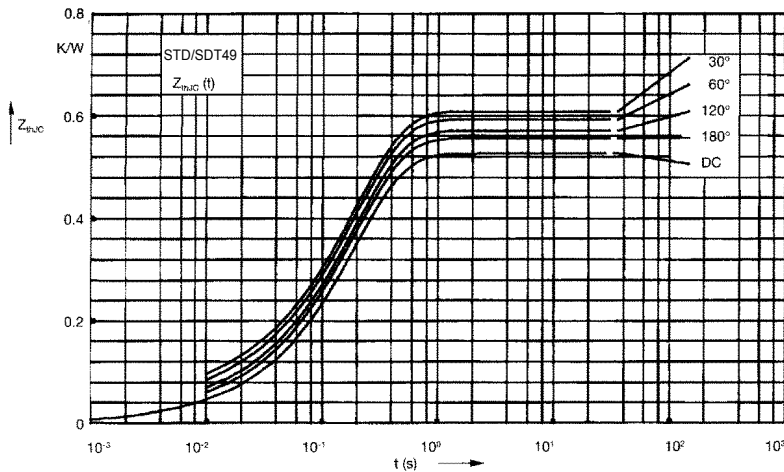Fig. 7 Three phase AC-controller: Power dissipation versus RMS output current and ambient temperature

Fig. 8 Transient thermal impedance junction to case (per thyristor or diode)

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

| d | $R_{thJC}$ (K/W) |
|---|---|
| DC | 0.53 |
| 180°C | 0.55 |
| 120°C | 0.58 |
| 60°C | 0.6 |
| 30°C | 0.62 |

Constants for $Z_{thJC}$ calculation:

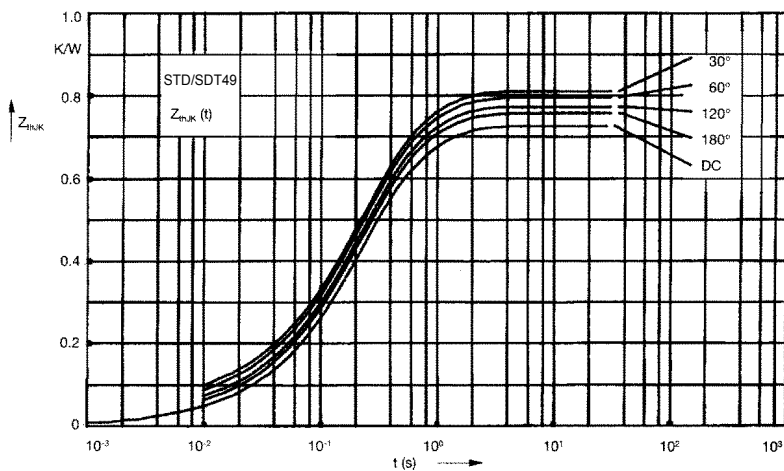| i | $R_{thi}$ (K/W) | $t_i$ (s) |
|---|---|---|
| 1 | 0.015 | 0.0035 |
| 2 | 0.026 | 0.02 |
| 3 | 0.489 | 0.195 |

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

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

| d | $R_{thJK}$ (K/W) |
|---|---|
| DC | 0.73 |
| 180°C | 0.75 |
| 120°C | 0.78 |
| 60°C | 0.8 |
| 30°C | 0.82 |

Constants for $Z_{thJK}$ calculation:

| i | $R_{thi}$ (K/W) | $t_i$ (s) |
|---|---|---|
| 1 | 0.015 | 0.0035 |
| 2 | 0.026 | 0.02 |
| 3 | 0.489 | 0.195 |
| 4 | 0.2 | 0.68 |

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