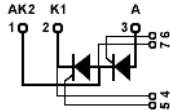
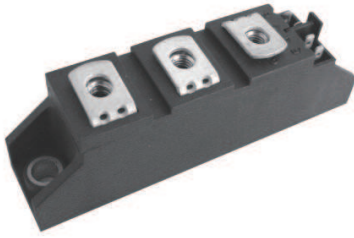


# STT27GKxx

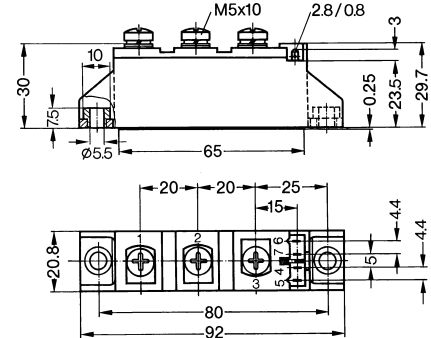
## Thyristor-Thyristor Modules



| Type      | $V_{RSM}$<br>$V_{DSM}$<br>V | $V_{RRM}$<br>$V_{DRM}$<br>V |
|-----------|-----------------------------|-----------------------------|
| STT27GK08 | 900                         | 800                         |
| STT27GK12 | 1300                        | 1200                        |
| STT27GK14 | 1500                        | 1400                        |
| STT27GK16 | 1700                        | 1600                        |

Tolerance:  $\pm 0.5\text{mm}$

Dimensions in mm (1mm=0.0394")



| Symbol                                       | Test Conditions                                                                                                                          |                                                               | Maximum Ratings                 | Unit                 |
|----------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------|---------------------------------|----------------------|
| $I_{TRMS}, I_{FRMS}$<br>$I_{TAVM}, I_{FAVM}$ | $T_{VJ}=T_{VJM}$<br>$T_C=85^\circ\text{C}; 180^\circ$ sine                                                                               |                                                               | 50<br>27                        | A                    |
| $I_{TSM}, I_{FSM}$                           | $T_{VJ}=45^\circ\text{C}$<br>$V_R=0$                                                                                                     | $t=10\text{ms}$ (50Hz), sine<br>$t=8.3\text{ms}$ (60Hz), sine | 520<br>560                      | A                    |
|                                              | $T_{VJ}=T_{VJM}$<br>$V_R=0$                                                                                                              | $t=10\text{ms}$ (50Hz), sine<br>$t=8.3\text{ms}$ (60Hz), sine | 460<br>500                      |                      |
| $\int i^2 dt$                                | $T_{VJ}=45^\circ\text{C}$<br>$V_R=0$                                                                                                     | $t=10\text{ms}$ (50Hz), sine<br>$t=8.3\text{ms}$ (60Hz), sine | 1350<br>1300                    | $\text{A}^2\text{s}$ |
|                                              | $T_{VJ}=T_{VJM}$<br>$V_R=0$                                                                                                              | $t=10\text{ms}$ (50Hz), sine<br>$t=8.3\text{ms}$ (60Hz), sine | 1050<br>1030                    |                      |
| $(di/dt)_{cr}$                               | $T_{VJ}=T_{VJM}$<br>$f=50\text{Hz}, t_p=200\mu\text{s}$<br>$V_D=2/3 V_{DRM}$<br>$I_G=0.45\text{A}$<br>$di_G/dt=0.45\text{A}/\mu\text{s}$ | repetitive, $I_T=45\text{A}$                                  | 150                             | A/ $\mu\text{s}$     |
|                                              |                                                                                                                                          | non repetitive, $I_T=I_{TAVM}$                                | 500                             |                      |
| $(dv/dt)_{cr}$                               | $T_{VJ}=T_{VJM};$<br>$R_{GK}=\infty$ ; method 1 (linear voltage rise)                                                                    | $V_{DR}=2/3 V_{DRM}$                                          | 1000                            | V/ $\mu\text{s}$     |
| $P_{GM}$                                     | $T_{VJ}=T_{VJM}$<br>$I_T=I_{TAVM}$                                                                                                       | $t_p=30\mu\text{s}$<br>$t_p=300\mu\text{s}$                   | 10<br>5                         | W                    |
| $P_{GAV}$                                    |                                                                                                                                          |                                                               | 0.5                             | W                    |
| $V_{RGM}$                                    |                                                                                                                                          |                                                               | 10                              | V                    |
| $T_{VJ}$<br>$T_{VJM}$<br>$T_{stg}$           |                                                                                                                                          |                                                               | -40...+125<br>125<br>-40...+125 | $^\circ\text{C}$     |
| $V_{ISOL}$                                   | 50/60Hz, RMS<br>$I_{ISOL} \leq 1\text{mA}$                                                                                               | $t=1\text{min}$<br>$t=1\text{s}$                              | 3000<br>3600                    | V~                   |
| $M_d$                                        | Mounting torque (M5)<br>Terminal connection torque (M5)                                                                                  |                                                               | 2.5-4.0/22-35<br>2.5-4.0/22-35  | Nm/lb.in.            |
| Weight                                       | Typ.                                                                                                                                     |                                                               | 81                              | g                    |

# STT27GKxx

## Thyristor-Thyristor Modules

| Symbol             | Test Conditions                                                                                               | Characteristic Values | Unit             |
|--------------------|---------------------------------------------------------------------------------------------------------------|-----------------------|------------------|
| $I_{RRM}, I_{DRM}$ | $T_{VJ}=T_{VJM}; V_R=V_{RRM}; V_D=V_{DRM}$                                                                    | 3                     | mA               |
| $V_T, V_F$         | $I_T, I_F=80A; T_{VJ}=25^{\circ}C$                                                                            | 1.64                  | V                |
| $V_{TO}$           | For power-loss calculations only ( $T_{VJ}=125^{\circ}C$ )                                                    | 0.85                  | V                |
| $r_T$              |                                                                                                               | 11                    | m $\Omega$       |
| $V_{GT}$           | $V_D=6V; T_{VJ}=25^{\circ}C$<br>$T_{VJ}=-40^{\circ}C$                                                         | 1.5<br>1.6            | V                |
| $I_{GT}$           | $V_D=6V; T_{VJ}=25^{\circ}C$<br>$T_{VJ}=-40^{\circ}C$                                                         | 100<br>200            | mA               |
| $V_{GD}$           | $T_{VJ}=T_{VJM}; V_D=2/3V_{DRM}$                                                                              | 0.2                   | V                |
| $I_{GD}$           |                                                                                                               | 10                    | mA               |
| $I_L$              | $T_{VJ}=25^{\circ}C; t_p=10\mu s; V_D=6V$<br>$I_G=0.45A; di_G/dt=0.45A/\mu s$                                 | 450                   | mA               |
| $I_H$              | $T_{VJ}=25^{\circ}C; V_D=6V; R_{GK}=\infty$                                                                   | 200                   | mA               |
| $t_{gd}$           | $T_{VJ}=25^{\circ}C; V_D=1/2V_{DRM}$<br>$I_G=0.45A; di_G/dt=0.45A/\mu s$                                      | 2                     | $\mu s$          |
| $t_q$              | $T_{VJ}=T_{VJM}; I_T=20A; t_p=200\mu s; -di/dt=10A/\mu s$<br>$V_R=100V; dv/dt=20V/\mu s; V_D=2/3V_{DRM}$ typ. | 150                   | $\mu s$          |
| $Q_s$              | $T_{VJ}=T_{VJM}; I_T, I_F=25A; -di/dt=0.64A/\mu s$                                                            | 50                    | $\mu C$          |
| $I_{RM}$           |                                                                                                               | 6                     | A                |
| $R_{thJC}$         | per thyristor/diode; DC current<br>per module                                                                 | 0.88<br>0.44          | K/W              |
| $R_{thJK}$         | per thyristor/diode; DC current<br>per module                                                                 | 1.08<br>0.54          | 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 <sup>2</sup> |

### FEATURES

- \* International standard package
- \* DCB base plate
- \* Glass passivated chips
- \* Isolation voltage 3600 V~
- \* UL file NO.310749
- \* 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

# STT27GKxx

## Thyristor-Thyristor Modules

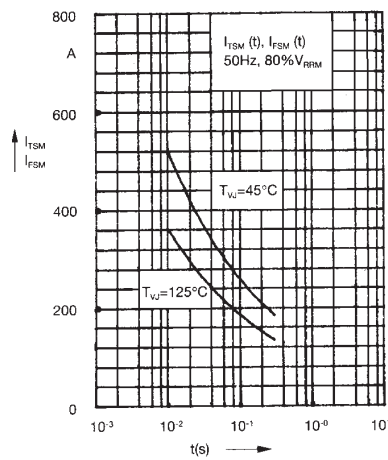


Fig. 1 Surge overload current  
 $I_{TSM}, I_{FSM}$ : Crest value,  $t$ : duration

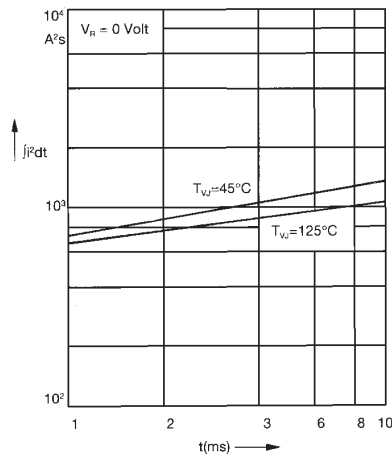


Fig. 2  $\int j^2 dt$  versus time (1-10 ms)

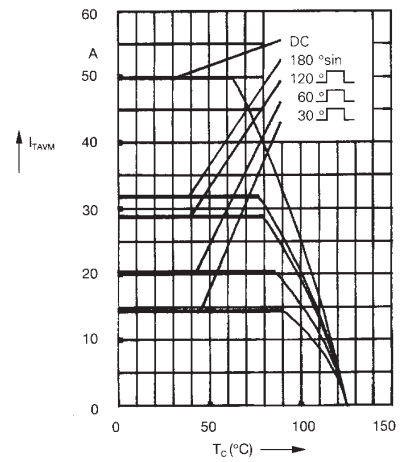


Fig. 2a Maximum forward current at case temperature

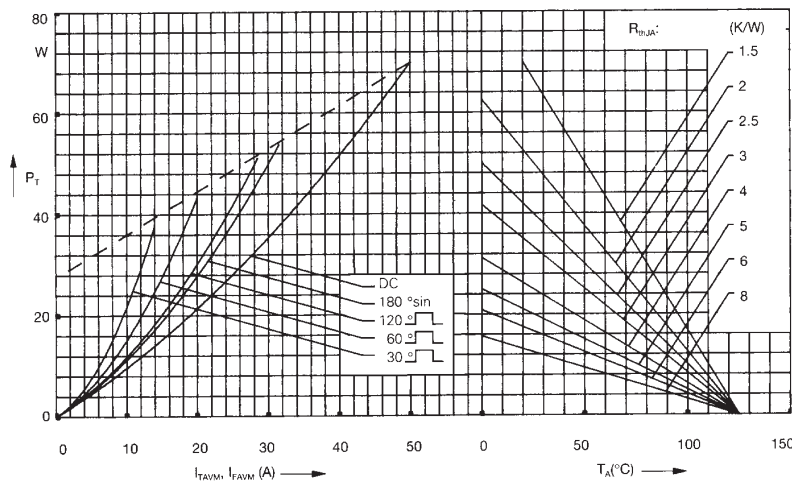


Fig. 3 Power dissipation versus on-state current and ambient temperature (per thyristor or diode)

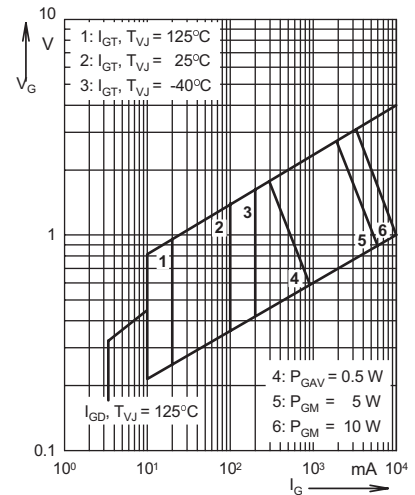


Fig. 4 Gate trigger characteristics

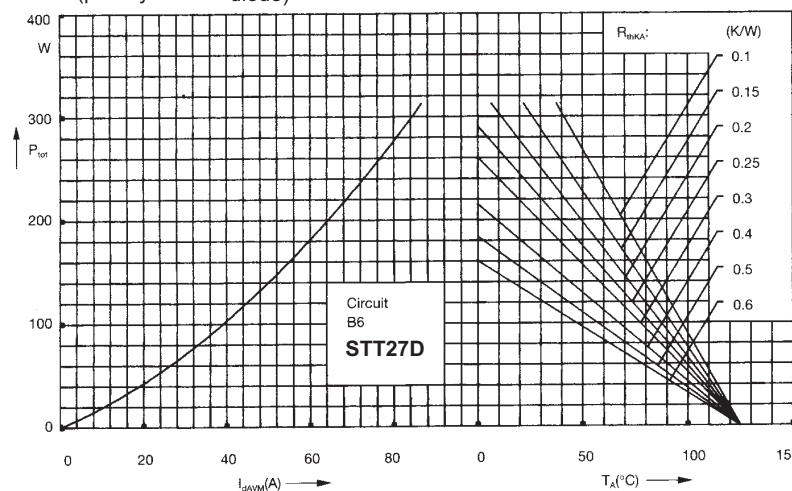


Fig. 5 Three phase rectifier bridge: Power dissipation versus direct output current and ambient temperature

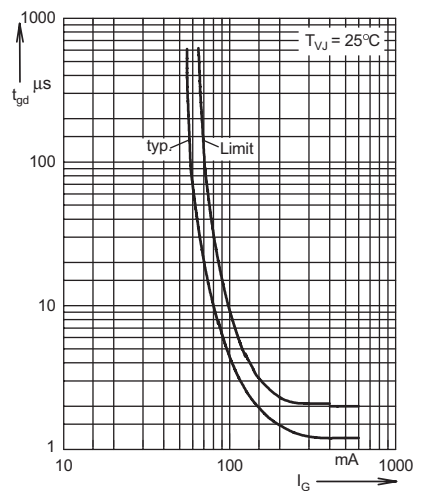


Fig. 6 Gate trigger delay time

# STT27GKxx

## Thyristor-Thyristor Modules

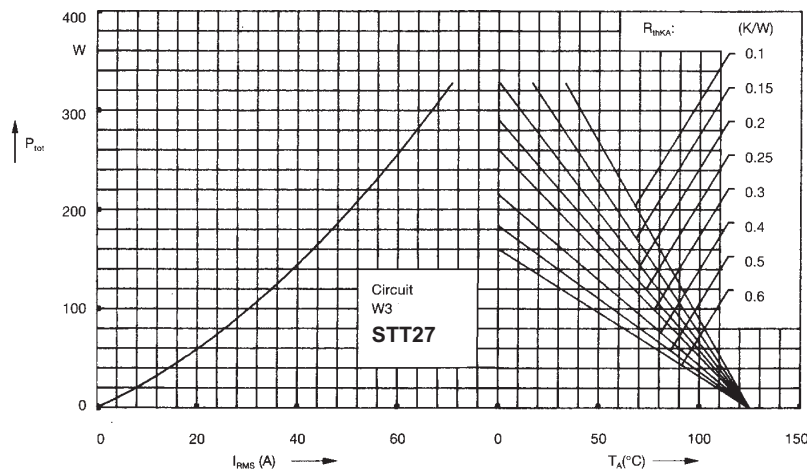


Fig. 7 Three phase AC-controller: Power dissipation versus RMS output current and ambient temperature

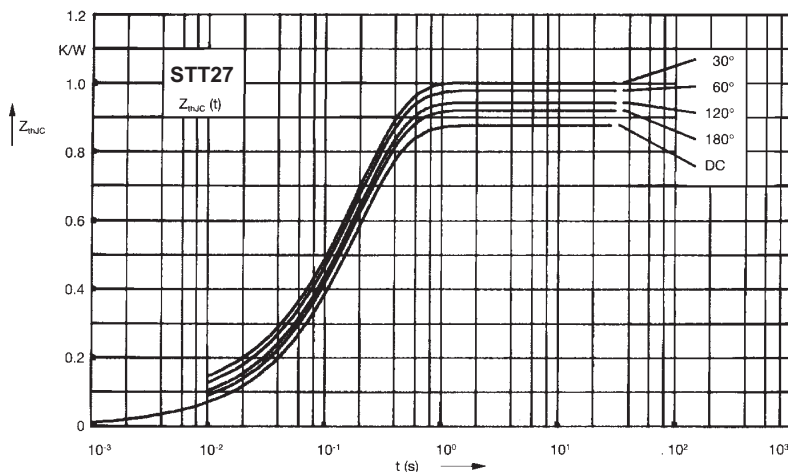


Fig. 8 Transient thermal impedance junction to case (per thyristor or diode)

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

| d    | $R_{thJC}$ (K/W) |
|------|------------------|
| DC   | 0.88             |
| 180° | 0.92             |
| 120° | 0.95             |
| 60°  | 0.98             |
| 30°  | 1.01             |

Constants for  $Z_{thJC}$  calculation:

| i | $R_{thi}$ (K/W) | $t_i$ (s) |
|---|-----------------|-----------|
| 1 | 0.019           | 0.0031    |
| 2 | 0.029           | 0.0216    |
| 3 | 0.832           | 0.191     |

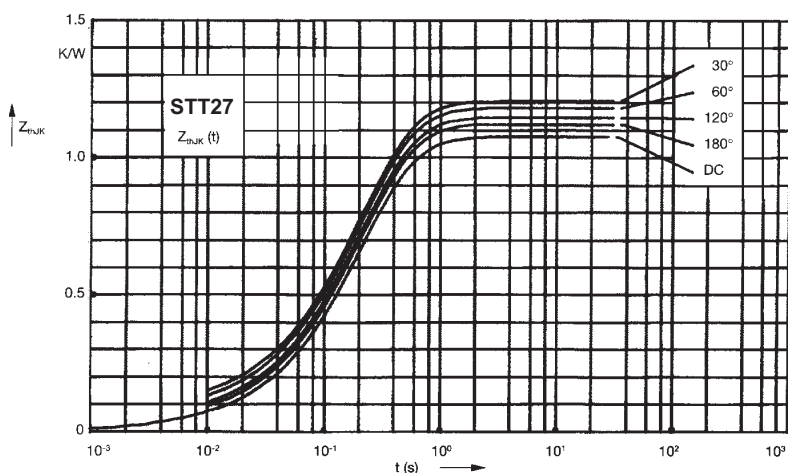


Fig. 9 Transient thermal impedance junction to heatsink (per thyristor or diode)

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

| d    | $R_{thJK}$ (K/W) |
|------|------------------|
| DC   | 1.08             |
| 180° | 1.12             |
| 120° | 1.15             |
| 60°  | 1.18             |
| 30°  | 1.21             |

Constants for  $Z_{thJK}$  calculation:

| i | $R_{thi}$ (K/W) | $t_i$ (s) |
|---|-----------------|-----------|
| 1 | 0.019           | 0.0031    |
| 2 | 0.029           | 0.0216    |
| 3 | 0.832           | 0.191     |
| 4 | 0.2             | 0.45      |