



SEMIPACK® 5

## Thyristor Modules

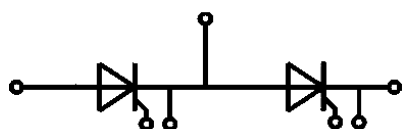
### SKKT 570/16 E

#### Features

- Heat transfer through aluminium nitride ceramic isolated metal baseplate
- Precious metal pressure contacts for high reliability
- Thyristor with amplifying gate
- UL recognized, file no. E 63 532

#### Typical Applications\*

- AC motor softstarters
- Input converters for AC inverter drives
- DC motor control (e.g. for machine tools)
- Temperature control (e.g. for ovens, chemical, processes)
- Professionals light dimming (studios, theaters)



SKKT

| Absolute Maximum Ratings |                         |                         |             |                  |
|--------------------------|-------------------------|-------------------------|-------------|------------------|
| Symbol                   | Conditions              |                         | Values      | Unit             |
| Chip                     |                         |                         |             |                  |
| I <sub>T(AV)</sub>       | sinus 180°              | T <sub>c</sub> = 85 °C  | 570         | A                |
|                          |                         | T <sub>c</sub> = 100 °C | 435         | A                |
| I <sub>TRMS</sub>        | continuous operation    |                         | 1000        | A                |
| I <sub>TSM</sub>         | 10 ms                   | T <sub>j</sub> = 25 °C  | 19000       | A                |
|                          |                         | T <sub>j</sub> = 135 °C | 15500       | A                |
| i <sup>2</sup> t         | 10 ms                   | T <sub>j</sub> = 25 °C  | 1805000     | A <sup>2</sup> s |
|                          |                         | T <sub>j</sub> = 135 °C | 1201250     | A <sup>2</sup> s |
| V <sub>RSM</sub>         |                         |                         | 1700        | V                |
| V <sub>RRM</sub>         |                         |                         | 1600        | V                |
| V <sub>DRM</sub>         |                         |                         | 1600        | V                |
| (di/dt) <sub>cr</sub>    | T <sub>j</sub> = 135 °C |                         | 250         | A/μs             |
| (dv/dt) <sub>cr</sub>    | T <sub>j</sub> = 135 °C |                         | 1000        | V/μs             |
| T <sub>j</sub>           |                         |                         | -40 ... 135 | °C               |
| Module                   |                         |                         |             |                  |
| T <sub>stg</sub>         |                         |                         | -40 ... 125 | °C               |
| V <sub>isol</sub>        | a.c.; 50 Hz; r.m.s.     | 1 min                   | 3000        | V                |
|                          |                         | 1 s                     | 3600        | V                |

| Characteristics                  |                                                                                                  |            |      |      |          |                  |
|----------------------------------|--------------------------------------------------------------------------------------------------|------------|------|------|----------|------------------|
| Symbol                           | Conditions                                                                                       |            | min. | typ. | max.     | Unit             |
| Chip                             |                                                                                                  |            |      |      |          |                  |
| V <sub>T</sub>                   | T <sub>J</sub> = 25 °C, I <sub>T</sub> = 1700 A                                                  |            |      |      | 1.44     | V                |
| V <sub>T(TO)</sub>               | T <sub>J</sub> = 135 °C                                                                          |            |      |      | 0.78     | V                |
| r <sub>T</sub>                   | T <sub>J</sub> = 135 °C                                                                          |            |      |      | 0.32     | mΩ               |
| I <sub>DD</sub> ;I <sub>RD</sub> | T <sub>J</sub> = 135 °C, V <sub>DD</sub> = V <sub>DRM</sub> ; V <sub>RD</sub> = V <sub>RRM</sub> |            |      |      | 225      | mA               |
| t <sub>gd</sub>                  | T <sub>J</sub> = 25 °C, I <sub>G</sub> = 1 A, di <sub>G</sub> /dt = 1 A/μs                       |            |      | 1    |          | μs               |
| t <sub>gr</sub>                  | V <sub>D</sub> = 0.67 * V <sub>DRM</sub>                                                         |            |      | 2    |          | μs               |
| t <sub>q</sub>                   | T <sub>J</sub> = 135 °C                                                                          |            |      | 200  |          | μs               |
| I <sub>H</sub>                   | T <sub>J</sub> = 25 °C                                                                           |            |      | 150  | 500      | mA               |
| I <sub>L</sub>                   | T <sub>J</sub> = 25 °C, R <sub>G</sub> = 33 Ω                                                    |            |      | 300  | 2000     | mA               |
| V <sub>GT</sub>                  | T <sub>J</sub> = 25 °C, d.c.                                                                     |            | 3    |      |          | V                |
| I <sub>GT</sub>                  | T <sub>J</sub> = 25 °C, d.c.                                                                     |            | 200  |      |          | mA               |
| V <sub>GD</sub>                  | T <sub>J</sub> = 135 °C, d.c.                                                                    |            |      |      | 0.25     | V                |
| I <sub>GD</sub>                  | T <sub>J</sub> = 135 °C, d.c.                                                                    |            |      |      | 10       | mA               |
| R <sub>th(j-c)</sub>             | continuous DC                                                                                    | per chip   |      |      | 0.069    | K/W              |
|                                  |                                                                                                  | per module |      |      | 0.034    | K/W              |
| R <sub>th(j-c)</sub>             | sin. 180°                                                                                        | per chip   |      |      | 0.072    | K/W              |
|                                  |                                                                                                  | per module |      |      | 0.036    | K/W              |
| R <sub>th(j-c)</sub>             | rec. 120°                                                                                        | per chip   |      |      | 0.077    | K/W              |
|                                  |                                                                                                  | per module |      |      | 0.038    | K/W              |
| Module                           |                                                                                                  |            |      |      |          |                  |
| R <sub>th(c-s)</sub>             | chip                                                                                             |            |      |      | 0.02     | K/W              |
|                                  | module                                                                                           |            |      |      | 0.01     | K/W              |
| M <sub>s</sub>                   | to heatsink M6                                                                                   |            | 4.25 |      | 5.75     | Nm               |
| M <sub>t</sub>                   | to heatsink M10                                                                                  |            | 10.2 |      | 13.8     | Nm               |
| a                                |                                                                                                  |            |      |      | 5 * 9,81 | m/s <sup>2</sup> |
| w                                |                                                                                                  |            |      | 1400 |          | g                |

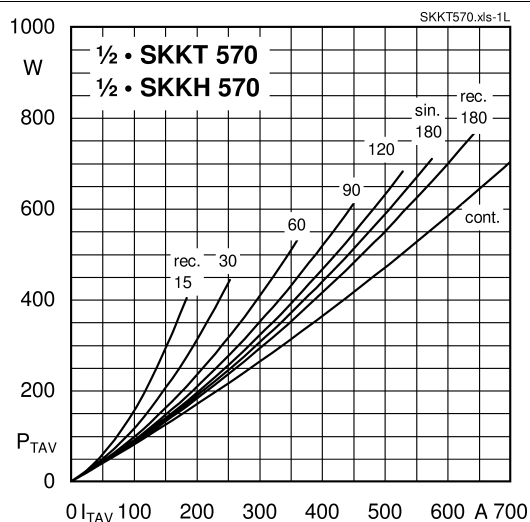


Fig. 1L: Power dissipation per thyristor vs. on-state current

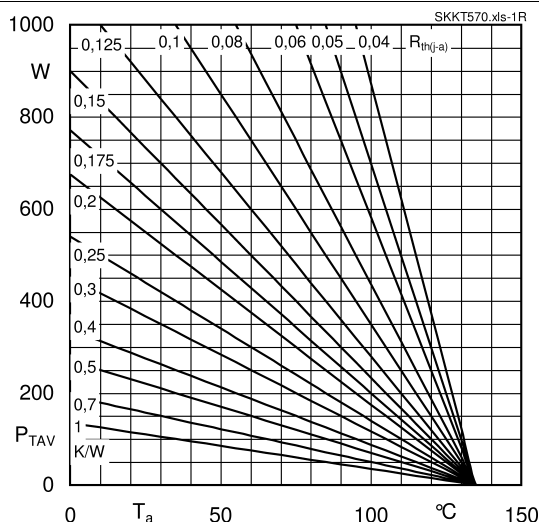


Fig. 1R: Power dissipation per thyristor vs. ambient temperature

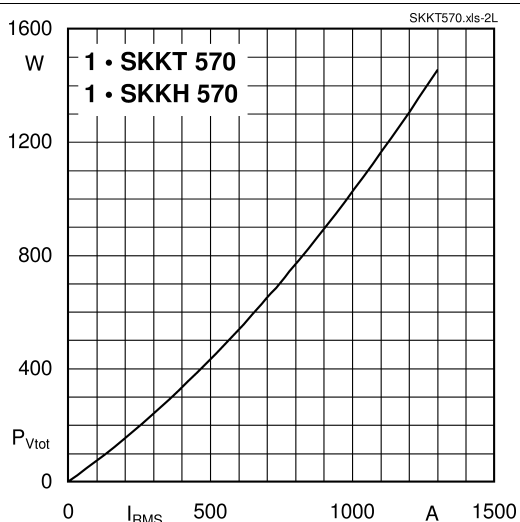


Fig. 2L: Power dissipation of one module vs. rms current

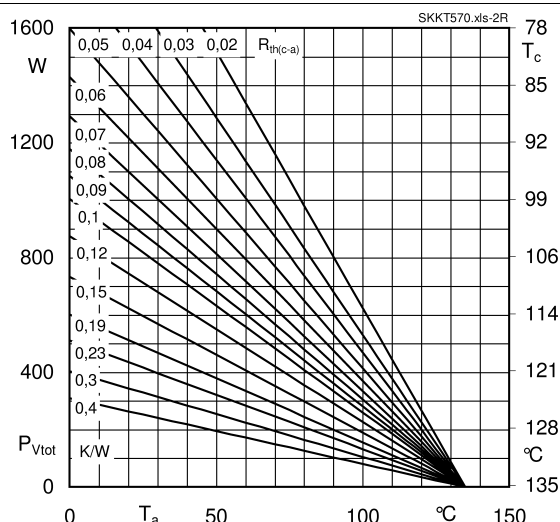


Fig. 2R: Max. power dissipation of one module vs. case temperature

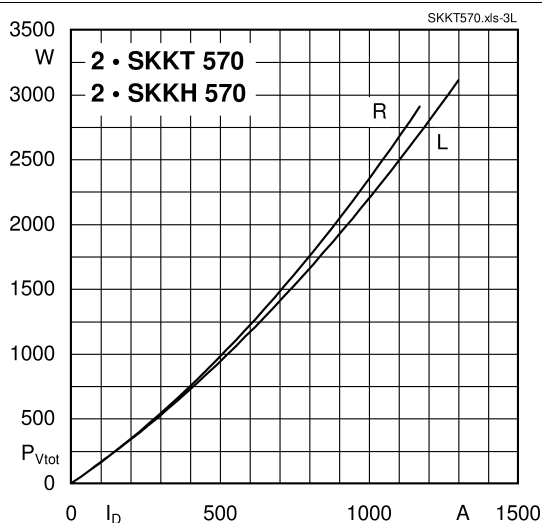


Fig. 3L: Power dissipation of two modules vs. direct current

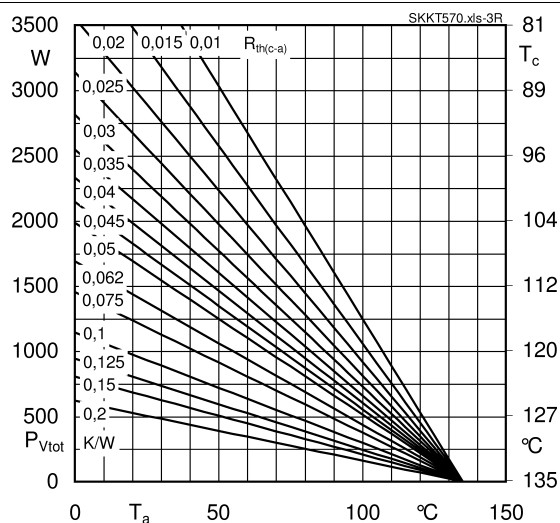


Fig. 3R: Power dissipation of two modules vs. case temperature

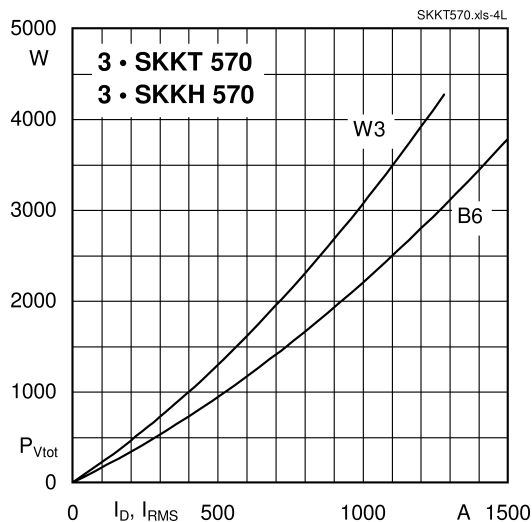


Fig. 4L: Power dissipation of three modules vs. direct and rms current

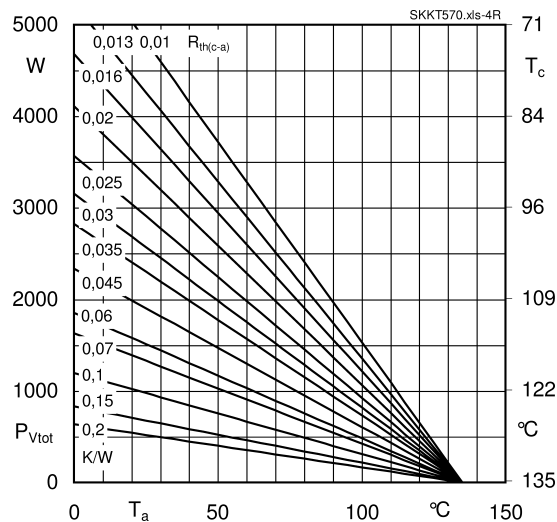


Fig. 4R: Power dissipation of three modules vs. case temperature

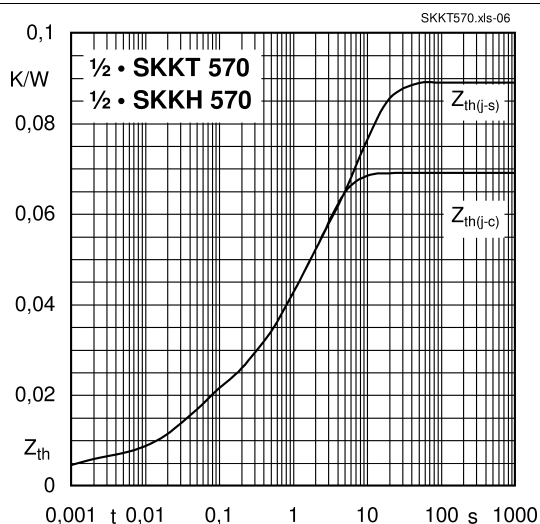


Fig. 6: Transient thermal impedance vs. time

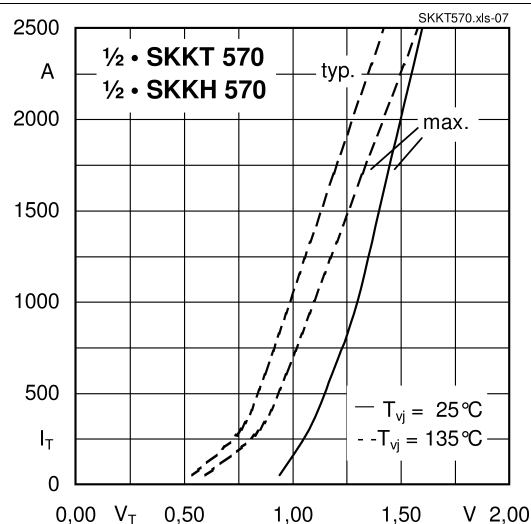


Fig. 7: On-state characteristics

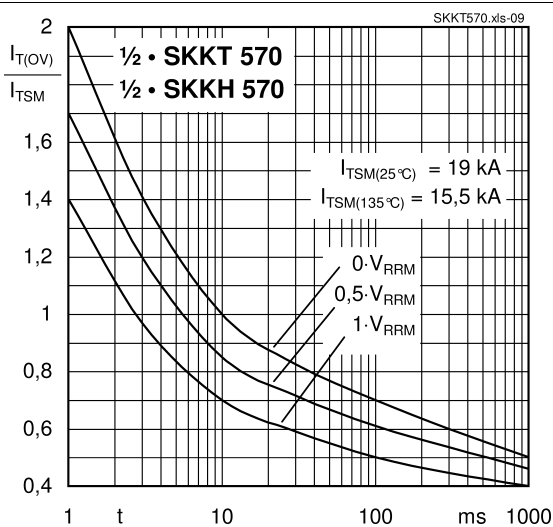


Fig. 8: Surge overload current vs. time

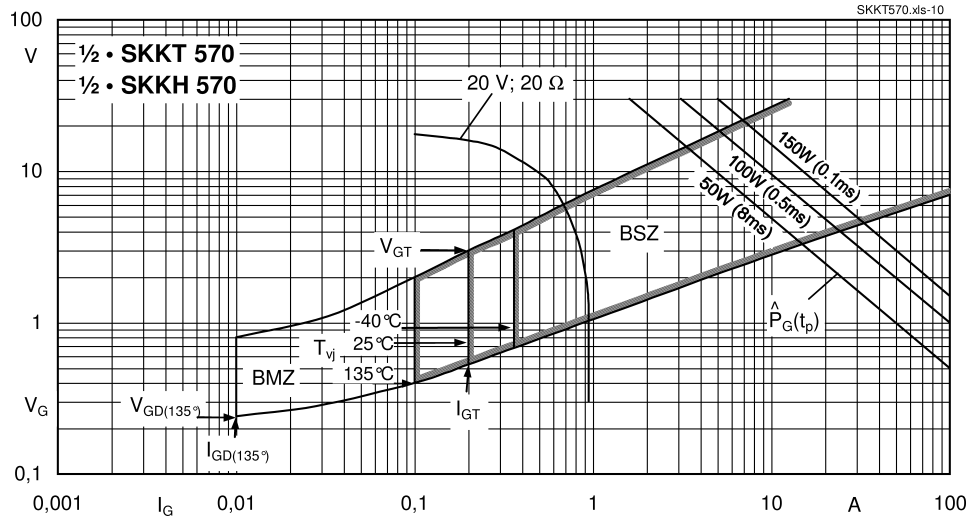
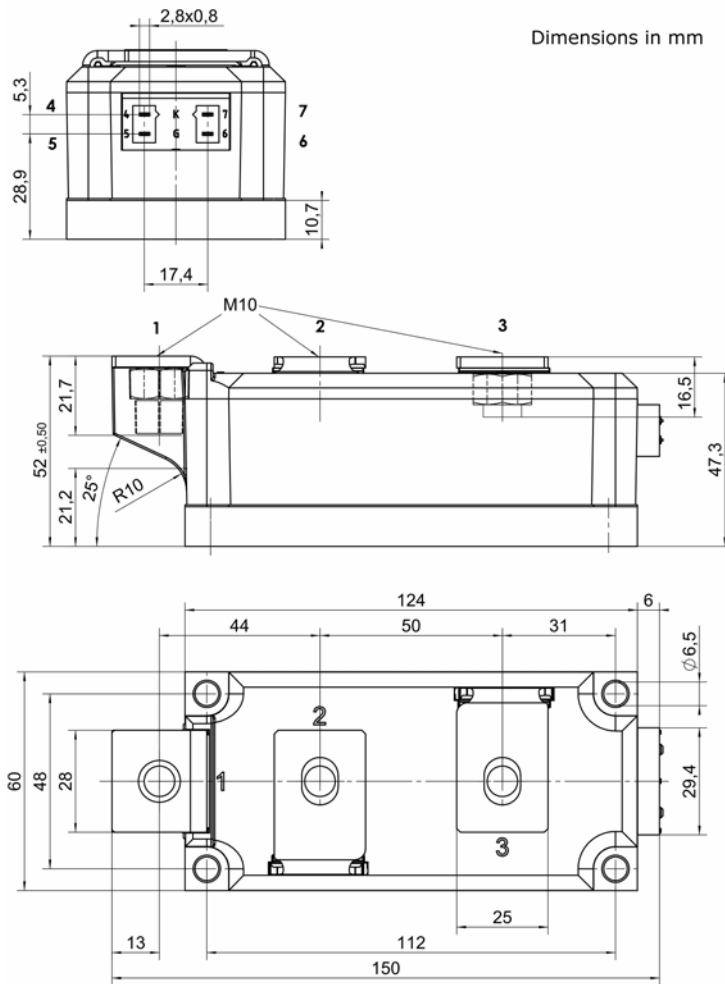
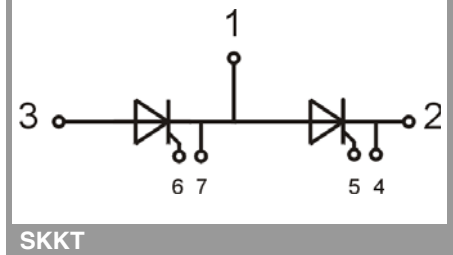


Fig. 9: Gate trigger characteristics



General tolerance  $\pm 0.5$  mm

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This is an electrostatic discharge sensitive device (ESDS), international standard IEC 60747-1, Chapter IX

\* The specifications of our components may not be considered as an assurance of component characteristics. Components have to be tested for the respective application. Adjustments may be necessary. The use of SEMIKRON products in life support appliances and systems is subject to prior specification and written approval by SEMIKRON. We therefore strongly recommend prior consultation of our staff.