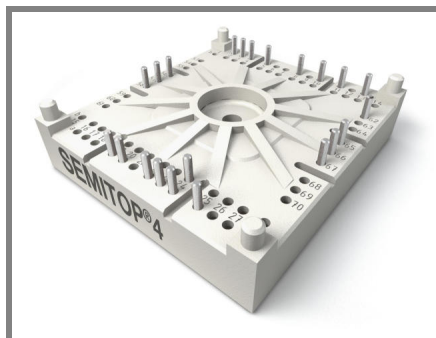


# SK50GH12T4T



**SEMITOP®4**

## IGBT module

**SK50GH12T4T**

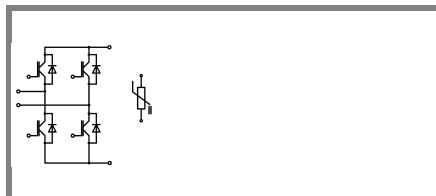
### Target Data

### Features

- One screw mounting module
- Fully compatible with SEMITOP®1,2,3
- Improved thermal performances by aluminium oxide substrate
- New IGBT4 Technology
- CAL 4 technology FWD
- Integrated NTC Temperature sensor

### Typical Applications\*

- Voltage regulator

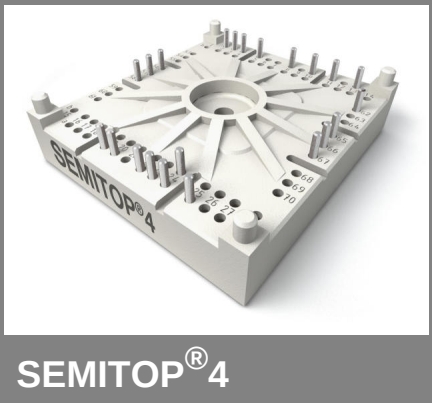


**GH-T**

| Absolute Maximum Ratings |                                                                                                       |                        | T <sub>s</sub> = 25 °C, unless otherwise specified |       |
|--------------------------|-------------------------------------------------------------------------------------------------------|------------------------|----------------------------------------------------|-------|
| Symbol                   | Conditions                                                                                            |                        | Values                                             | Units |
| IGBT                     |                                                                                                       |                        |                                                    |       |
| V <sub>CES</sub>         | T <sub>j</sub> = 25 °C                                                                                |                        | 1200                                               | V     |
| I <sub>C</sub>           | T <sub>j</sub> = 175 °C                                                                               | T <sub>s</sub> = 25 °C | 75                                                 | A     |
|                          |                                                                                                       | T <sub>s</sub> = 70 °C | 60                                                 | A     |
| I <sub>CRM</sub>         | I <sub>CRM</sub> = 3 x I <sub>Cnom</sub> , t <sub>p</sub> ≤ 1ms                                       |                        | 150                                                | A     |
| V <sub>GES</sub>         |                                                                                                       |                        | ±20                                                | V     |
| t <sub>psc</sub>         | V <sub>CC</sub> = 800 V; V <sub>GE</sub> ≤ 15 V; T <sub>j</sub> = 150 °C<br>V <sub>CES</sub> < 1200 V |                        | 10                                                 | μs    |
| Inverse Diode            |                                                                                                       |                        |                                                    |       |
| I <sub>F</sub>           | T <sub>j</sub> = 175 °C                                                                               | T <sub>s</sub> = 25 °C | 56                                                 | A     |
|                          |                                                                                                       | T <sub>s</sub> = 70 °C | 45                                                 | A     |
| I <sub>FRM</sub>         | I <sub>FRM</sub> = 3 x I <sub>Fnom</sub> , t <sub>p</sub> ≤ 1ms                                       |                        | 150                                                | A     |
| I <sub>FSM</sub>         | t <sub>p</sub> = 10 ms; half sine wave T <sub>j</sub> = 150 °C                                        |                        | 335                                                | A     |
| Module                   |                                                                                                       |                        |                                                    |       |
| I <sub>t(RMS)</sub>      |                                                                                                       |                        |                                                    | A     |
| T <sub>vj</sub>          |                                                                                                       |                        | -40 ... +175                                       | °C    |
| T <sub>stg</sub>         |                                                                                                       |                        | -40 ... +125                                       | °C    |
| V <sub>isol</sub>        | AC, 1 min.                                                                                            |                        | 2500                                               | V     |

| Characteristics      |                                                             |                                                                           | T <sub>C</sub> = 25 °C, unless otherwise specified |      |      |       |  |
|----------------------|-------------------------------------------------------------|---------------------------------------------------------------------------|----------------------------------------------------|------|------|-------|--|
| Symbol               | Conditions                                                  |                                                                           | min.                                               | typ. | max. | Units |  |
| IGBT                 |                                                             |                                                                           |                                                    |      |      |       |  |
| V <sub>GE(th)</sub>  | V <sub>GE</sub> = V <sub>CE</sub> , I <sub>C</sub> = 1,7 mA |                                                                           | 5                                                  | 5,8  | 6,5  | V     |  |
| I <sub>CES</sub>     | V <sub>GE</sub> = 0 V, V <sub>CE</sub> = V <sub>CES</sub>   | T <sub>j</sub> = 25 °C                                                    |                                                    |      | 0,01 | mA    |  |
|                      |                                                             | T <sub>j</sub> = 125 °C                                                   |                                                    | 0,4  |      | mA    |  |
| I <sub>GES</sub>     | V <sub>CE</sub> = 0 V, V <sub>GE</sub> = 20 V               |                                                                           |                                                    |      | 600  | nA    |  |
| V <sub>CE0</sub>     |                                                             | T <sub>j</sub> = 25 °C                                                    |                                                    | 0,8  | 0,9  | V     |  |
|                      |                                                             | T <sub>j</sub> = 150 °C                                                   |                                                    | 0,7  | 0,8  | V     |  |
| r <sub>CE</sub>      | V <sub>GE</sub> = 15 V                                      | T <sub>j</sub> = 25°C                                                     |                                                    | 20   |      | mΩ    |  |
|                      |                                                             | T <sub>j</sub> = 150°C                                                    |                                                    | 30   |      | mΩ    |  |
| V <sub>CE(sat)</sub> | I <sub>Cnom</sub> = 50 A, V <sub>GE</sub> = 15 V            | T <sub>j</sub> = 25°C <sub>chiplev.</sub>                                 |                                                    | 1,8  | 2    | V     |  |
|                      |                                                             | T <sub>j</sub> = 150°C <sub>chiplev.</sub>                                |                                                    | 2,2  | 2,4  | V     |  |
| C <sub>ies</sub>     | V <sub>CE</sub> = 25, V <sub>GE</sub> = 0 V                 | f = 1 MHz                                                                 |                                                    | 5,54 |      | nF    |  |
| C <sub>oes</sub>     |                                                             |                                                                           |                                                    | 0,41 |      | nF    |  |
| C <sub>res</sub>     |                                                             |                                                                           |                                                    | 0,32 |      | nF    |  |
| Q <sub>G</sub>       | V <sub>GE</sub> = -7V...+15V                                |                                                                           |                                                    | 375  |      | nC    |  |
| R <sub>Gint</sub>    | T <sub>j</sub> = 25 °C                                      |                                                                           |                                                    | 4    |      | Ω     |  |
| t <sub>d(on)</sub>   | R <sub>Gon</sub> = 32 Ω<br>di/dt = 920 A/μs                 | V <sub>CC</sub> = 600V<br>I <sub>C</sub> = 50A<br>T <sub>j</sub> = 150 °C |                                                    | 63   |      | ns    |  |
| t <sub>r</sub>       |                                                             |                                                                           |                                                    | 65   |      | ns    |  |
| E <sub>on</sub>      |                                                             |                                                                           |                                                    | 8,3  |      | mJ    |  |
| t <sub>d(off)</sub>  | R <sub>Goff</sub> = 32 Ω                                    |                                                                           |                                                    | 521  |      | ns    |  |
| t <sub>f</sub>       |                                                             |                                                                           |                                                    | 80   |      | ns    |  |
| E <sub>off</sub>     |                                                             |                                                                           | 5                                                  |      | mJ   |       |  |
| R <sub>th(j-s)</sub> | per IGBT                                                    |                                                                           |                                                    | 0,65 |      | K/W   |  |

# SK50GH12T4T



## IGBT module

### SK50GH12T4T

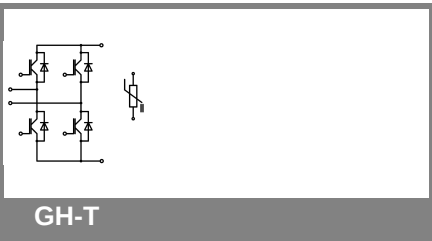
#### Target Data

#### Features

- One screw mounting module
- Fully compatible with SEMISTOP®1,2,3
- Improved thermal performances by aluminium oxide substrate
- New IGBT4 Technology
- CAL 4 technology FWD
- Integrated NTC Temperature sensor

#### Typical Applications\*

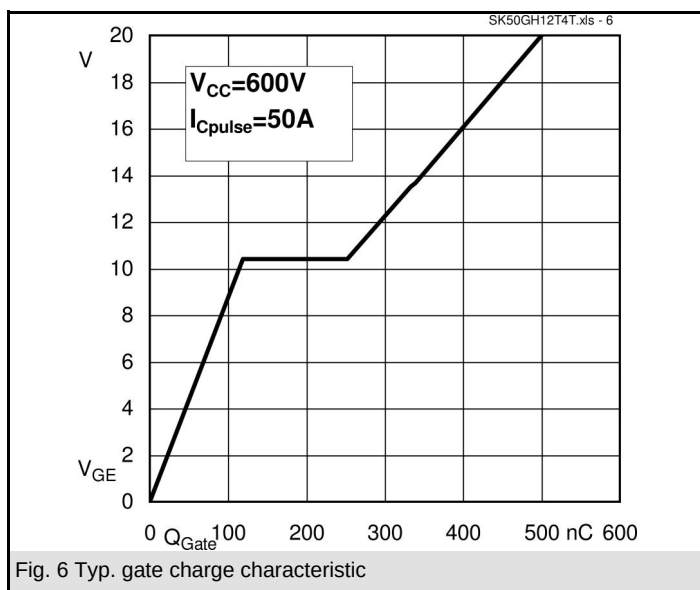
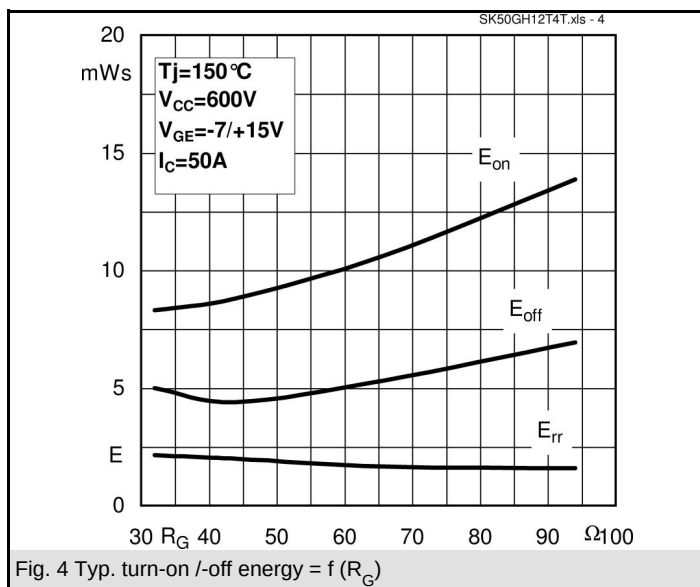
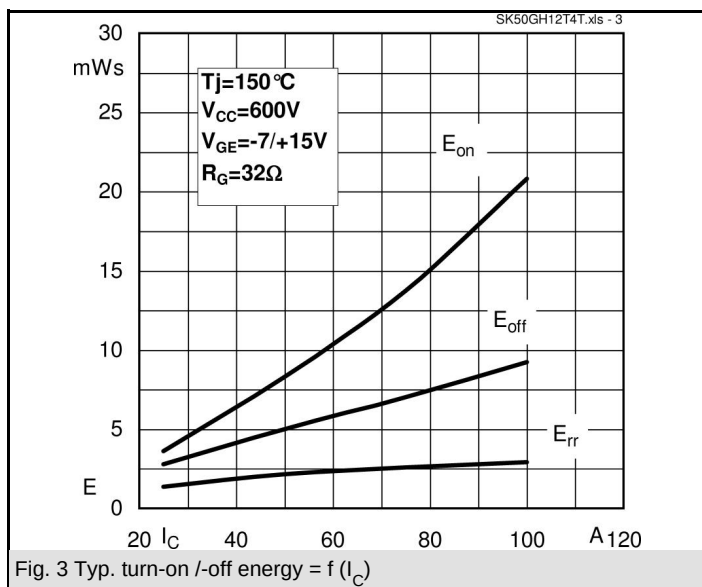
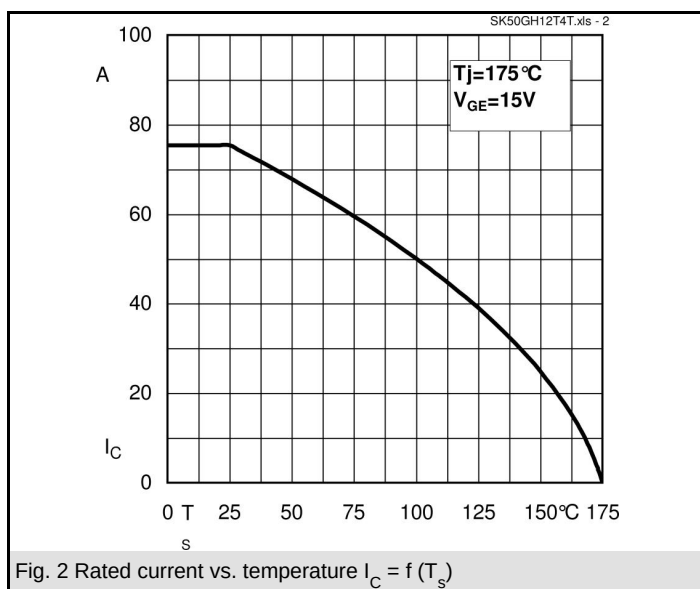
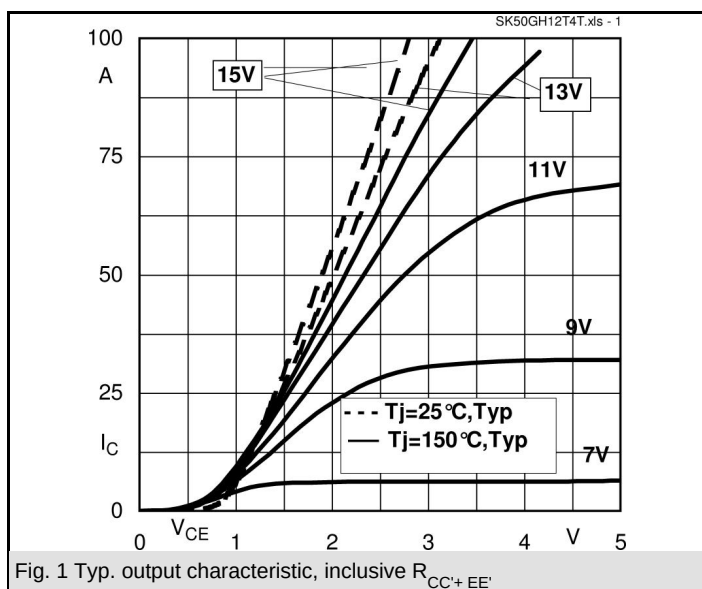
- Voltage regulator

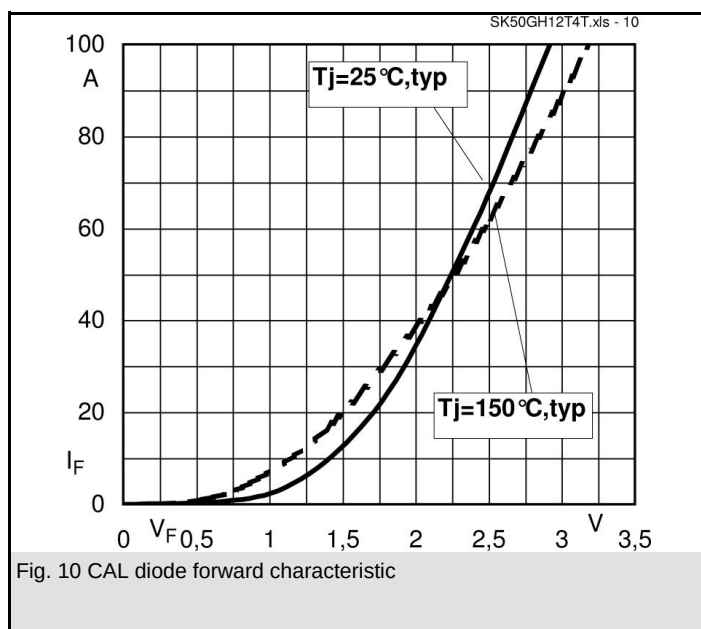
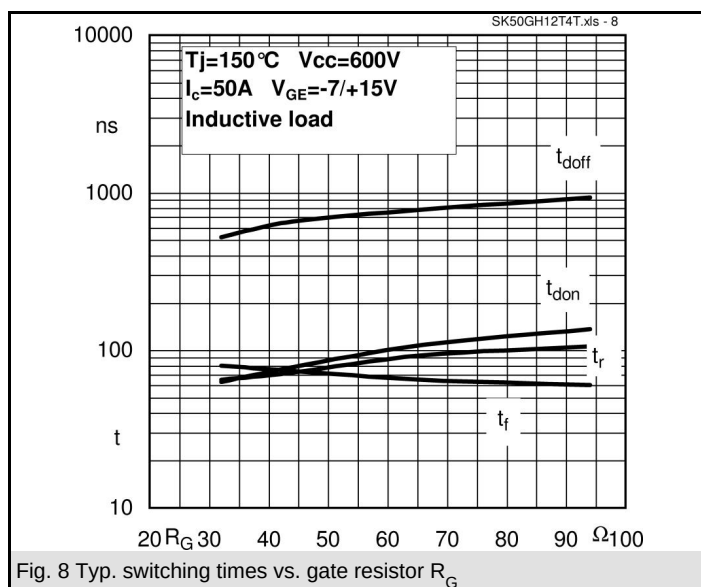
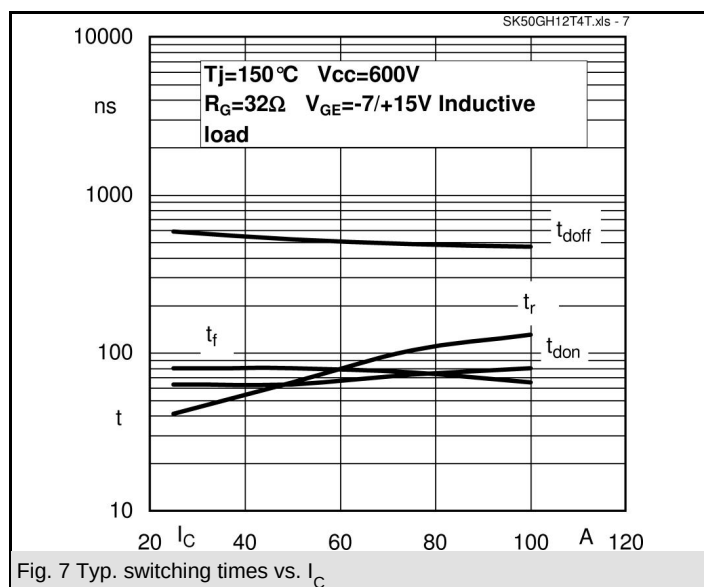


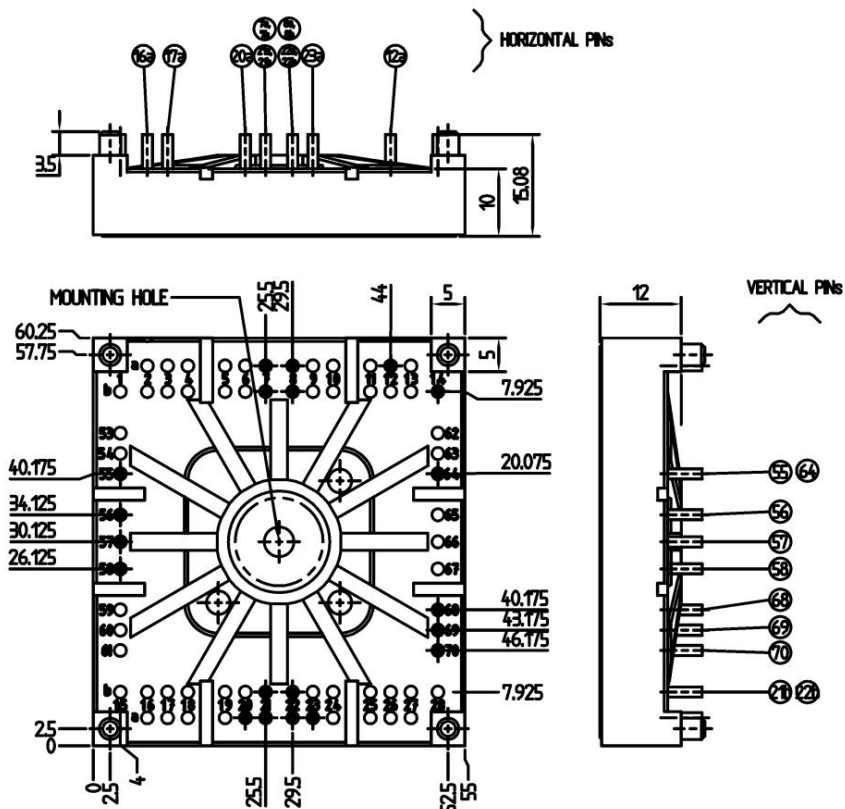
| Characteristics           |                                                      |      |        |      |       |
|---------------------------|------------------------------------------------------|------|--------|------|-------|
| Symbol                    | Conditions                                           | min. | typ.   | max. | Units |
| <b>Inverse Diode</b>      |                                                      |      |        |      |       |
| $V_F = V_{EC}$            | $I_{Fnom} = 50\text{ A}; V_{GE} = 0\text{ V}$        |      |        |      |       |
|                           | $T_j = 25\text{ }^{\circ}\text{C}_{chiplev.}$        |      | 2,2    | 2,5  | V     |
|                           | $T_j = 150\text{ }^{\circ}\text{C}_{chiplev.}$       |      | 2,1    | 2,45 | V     |
| $V_{F0}$                  |                                                      |      |        |      |       |
|                           | $T_j = 25\text{ }^{\circ}\text{C}$                   |      | 1,3    | 1,5  | V     |
|                           | $T_j = 150\text{ }^{\circ}\text{C}$                  |      | 0,9    | 1,1  | V     |
| $r_F$                     |                                                      |      |        |      |       |
|                           | $T_j = 25\text{ }^{\circ}\text{C}$                   |      | 18     |      | mΩ    |
|                           | $T_j = 150\text{ }^{\circ}\text{C}$                  |      | 24     |      | mΩ    |
| $I_{RRM}$                 | $I_F = 50\text{ A}$                                  |      | 30     |      | A     |
| $Q_{rr}$                  | $di/dt = 920\text{ A}/\mu\text{s}$                   |      | 7,2    |      | μC    |
| $E_{rr}$                  | $V_{CC}=600\text{ V}$                                |      | 2,15   |      | mJ    |
| $R_{th(j-s)D}$            | per diode                                            |      | 1,05   |      | K/W   |
| <b>Freewheeling Diode</b> |                                                      |      |        |      |       |
| $V_F = V_{EC}$            | $I_{Fnom} = \text{A}; V_{GE} = \text{V}$             |      |        |      | V     |
| $V_{F0}$                  |                                                      |      |        |      | V     |
| $r_F$                     |                                                      |      |        |      | V     |
| $I_{RRM}$                 | $I_F = \text{A}$                                     |      |        |      | A     |
| $Q_{rr}$                  |                                                      |      |        |      | μC    |
| $E_{rr}$                  |                                                      |      |        |      | mJ    |
|                           | per diode                                            |      |        |      | K/W   |
| $M_s$                     | to heat sink                                         | 2,5  |        | 2,75 | Nm    |
| w                         |                                                      |      | 60     |      | g     |
| <b>Temperature sensor</b> |                                                      |      |        |      |       |
| $R_{100}$                 | $T_s = 100^{\circ}\text{C} (R_{25}=5\text{k}\Omega)$ |      | 493±5% |      | Ω     |

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

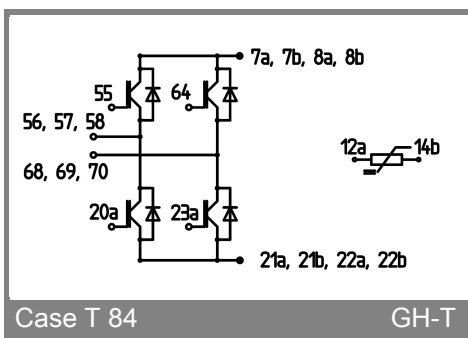
\* The specifications of our components may not be considered as an assurance of component characteristics. Components have to be tested for the respective application. Adjustments may be necessary. The use of SEMIKRON products in life support appliances and systems is subject to prior specification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







Case T84 (Suggested hole diameter, in the PCB, for solder pins and plastic mounting pins: 2mm)



Case T 84

GH-T