



**SEMITOP<sup>®</sup> 2**

## IGBT Module

**SK25GB12T4**

Target Data

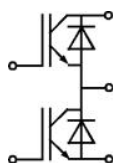
### Features

- One screw mounting module
- Trench4 IGBT technology
- CAL4 technology FWD

### Typical Applications\*

### Remarks

- $V_{CE,sat}$ ,  $V_F$  = chip level value



**GB**

| Absolute Maximum Ratings |                                                                                                          |                      |  | $T_s = 25\text{ °C}$ , unless otherwise specified |                    |
|--------------------------|----------------------------------------------------------------------------------------------------------|----------------------|--|---------------------------------------------------|--------------------|
| Symbol                   | Conditions                                                                                               |                      |  | Values                                            | Units              |
| <b>IGBT</b>              |                                                                                                          |                      |  |                                                   |                    |
| $V_{CES}$                | $T_j = 25\text{ °C}$                                                                                     |                      |  | 1200                                              | V                  |
| $I_C$                    | $T_j = 175\text{ °C}$                                                                                    | $T_s = 25\text{ °C}$ |  | 37                                                | A                  |
|                          |                                                                                                          | $T_s = 70\text{ °C}$ |  | 30                                                | A                  |
| $I_{CRM}$                | $I_{CRM} = 3 \times I_{Cnom}$                                                                            |                      |  | 75                                                | A                  |
| $V_{GES}$                |                                                                                                          |                      |  | $\pm 20$                                          | V                  |
| $t_{psc}$                | $V_{CC} = 800\text{ V}$ ; $V_{GE} \leq 15\text{ V}$ ; $T_j = 150\text{ °C}$<br>$V_{CES} < 1200\text{ V}$ |                      |  | 10                                                | $\mu s$            |
| <b>Inverse Diode</b>     |                                                                                                          |                      |  |                                                   |                    |
| $I_F$                    | $T_j = 175\text{ °C}$                                                                                    | $T_s = 25\text{ °C}$ |  | 30                                                | A                  |
|                          |                                                                                                          | $T_s = 70\text{ °C}$ |  | 25                                                | A                  |
| $I_{FRM}$                | $I_{FRM} = 3 \times I_{Fnom}$                                                                            |                      |  | 75                                                | A                  |
| $I_{FSM}$                | $t_p = 10\text{ ms}$ ; half sine wave $T_j = 150\text{ °C}$                                              |                      |  | 160                                               | A                  |
| <b>Module</b>            |                                                                                                          |                      |  |                                                   |                    |
| $I_{t(RMS)}$             |                                                                                                          |                      |  |                                                   | A                  |
| $T_{vj}$                 |                                                                                                          |                      |  | -40 ... +175                                      | $^{\circ}\text{C}$ |
| $T_{stg}$                |                                                                                                          |                      |  | -40 ... +125                                      | $^{\circ}\text{C}$ |
| $V_{isol}$               | AC, 1 min.                                                                                               |                      |  | 2500                                              | V                  |

| Characteristics                                           |                                                              |                                                                                         | T <sub>s</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> = 0,85 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<br>T <sub>J</sub> = 125 °C                                       | 0,0024                                             |      |              | mA<br>mA       |
| I <sub>GES</sub>                                          | V <sub>CE</sub> = 0 V, V <sub>GE</sub> = 20 V                | T <sub>J</sub> = 25 °C<br>T <sub>J</sub> = 125 °C                                       | 120                                                |      |              | nA<br>nA       |
| V <sub>CE0</sub>                                          |                                                              | T <sub>J</sub> = 25 °C<br>T <sub>J</sub> = 150 °C                                       | 1,1<br>1                                           |      | 1,3<br>1,2   | V<br>V         |
| r <sub>CE</sub>                                           | V <sub>GE</sub> = 15 V                                       | T <sub>J</sub> = 25°C<br>T <sub>J</sub> = 150°C                                         | 30<br>50                                           |      |              | mΩ<br>mΩ       |
| V <sub>CE(sat)</sub>                                      | I <sub>Cnom</sub> = 25 A, V <sub>GE</sub> = 15 V             | T <sub>J</sub> = 25°C <sub>chiplev.</sub><br>T <sub>J</sub> = 150°C <sub>chiplev.</sub> | 1,85<br>2,25                                       |      | 2,05<br>2,45 | V<br>V         |
| C <sub>ies</sub><br>C <sub>oes</sub><br>C <sub>res</sub>  | V <sub>CE</sub> = 25, V <sub>GE</sub> = 0 V                  | f = 1 MHz                                                                               | 1,43<br>0,115<br>0,085                             |      |              | nF<br>nF<br>nF |
| Q <sub>G</sub>                                            | V <sub>GE</sub> =-7V...+15V                                  |                                                                                         | 137,5                                              |      |              | nC             |
| t <sub>d(on)</sub><br>t <sub>r</sub><br>E <sub>on</sub>   | R <sub>Gon</sub> = 19 Ω<br>di/dt = 2825 A/μs                 | V <sub>CC</sub> = 600V<br>I <sub>C</sub> = 25A                                          | 22<br>19,5<br>2,27                                 |      |              | ns<br>ns<br>mJ |
| t <sub>d(off)</sub><br>t <sub>f</sub><br>E <sub>off</sub> | R <sub>Goff</sub> = 19 Ω<br>di/dt = 2825 A/μs                | T <sub>J</sub> = 150 °C<br>V <sub>GE</sub> = -7/+15V                                    | 288<br>77,5<br>2,7                                 |      |              | ns<br>ns<br>mJ |
| R <sub>th(j-s)</sub>                                      | per IGBT                                                     |                                                                                         | 1,31                                               |      |              | K/W            |

# SK25GB12T4



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## IGBT Module

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### Remarks

- $V_{CE,sat}$ ,  $V_F$  = chip level value

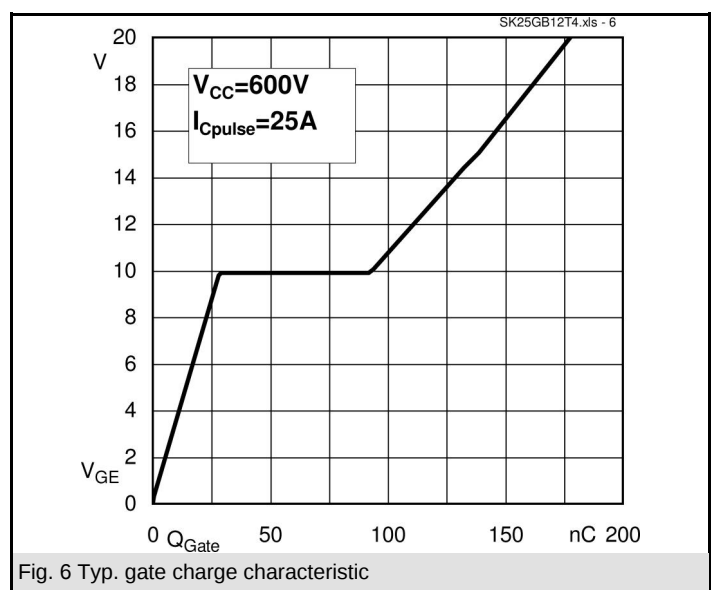
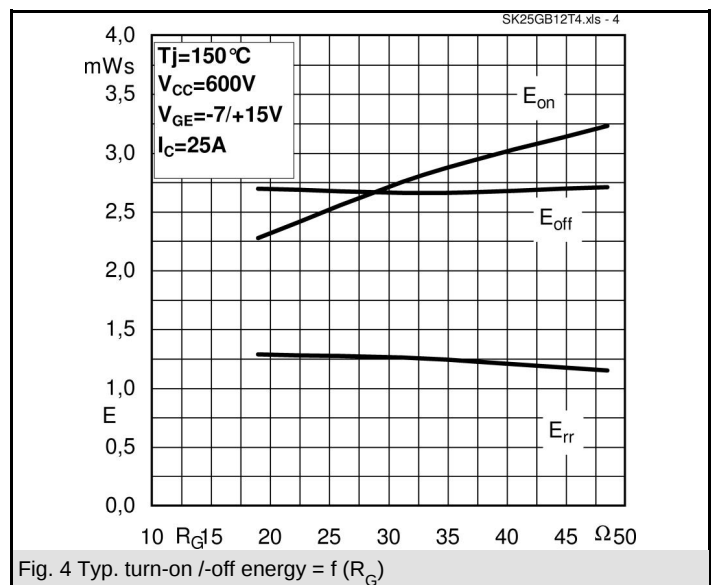
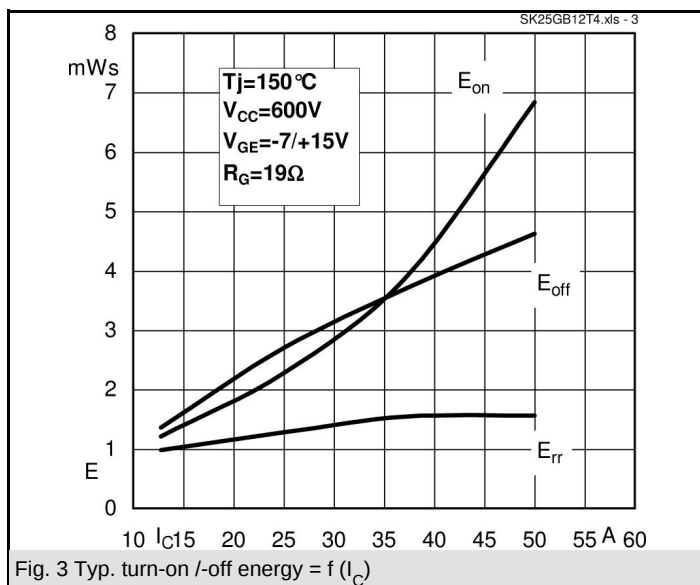
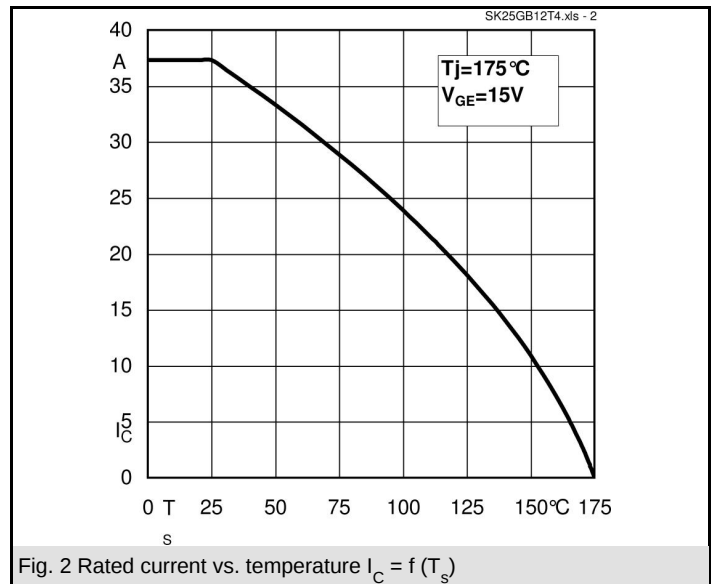
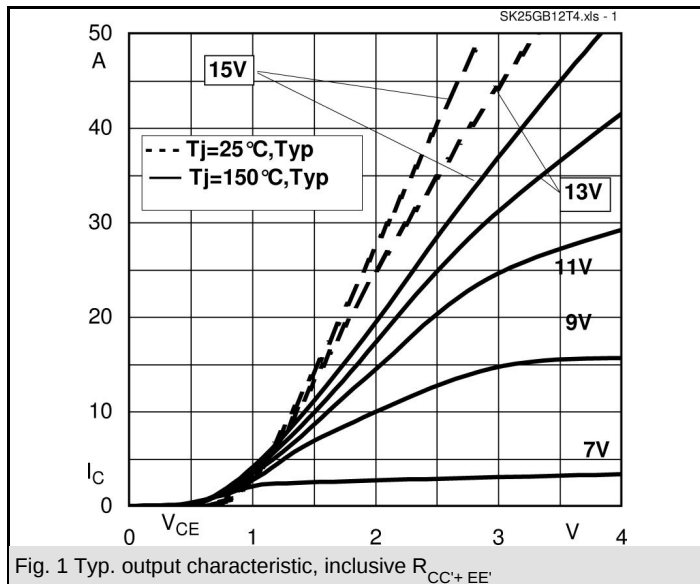
| Characteristics                  |                                                 |                                             |      |      |      |       |
|----------------------------------|-------------------------------------------------|---------------------------------------------|------|------|------|-------|
| Symbol                           | Conditions                                      |                                             | min. | typ. | max. | Units |
| Inverse Diode                    |                                                 |                                             |      |      |      |       |
| V <sub>F</sub> = V <sub>EC</sub> | I <sub>Fnom</sub> = 25 A; V <sub>GE</sub> = 0 V | T <sub>j</sub> = 25 °C <sub>chiplev.</sub>  |      | 2,4  | 2,62 | V     |
|                                  |                                                 | T <sub>j</sub> = 150 °C <sub>chiplev.</sub> |      | 2,45 | 2,8  | V     |
| V <sub>F0</sub>                  |                                                 | T <sub>j</sub> = 25 °C                      |      | 1,3  | 1,5  | V     |
|                                  |                                                 | T <sub>j</sub> = 150 °C                     |      | 0,9  | 1,1  | V     |
| r <sub>F</sub>                   |                                                 | T <sub>j</sub> = 25 °C                      |      | 44   | 45   | mΩ    |
|                                  |                                                 | T <sub>j</sub> = 150 °C                     |      | 62   | 68   | mΩ    |
| I <sub>RRM</sub>                 | I <sub>F</sub> = 25 A                           | T <sub>j</sub> = 150 °C                     |      | 31,5 |      | A     |
| Q <sub>rr</sub>                  | di/dt = 2825 A/μs                               |                                             |      | 1,15 |      | μC    |
| E <sub>rr</sub>                  | V <sub>CC</sub> = 600V                          |                                             |      | 1,28 |      | mJ    |
| R <sub>th(j-s)D</sub>            | per diode                                       |                                             |      | 1,91 |      | K/W   |
| M <sub>s</sub>                   | to heat sink                                    |                                             | 2,25 |      | 2,5  | Nm    |
| w                                |                                                 |                                             |      | 30   |      | g     |

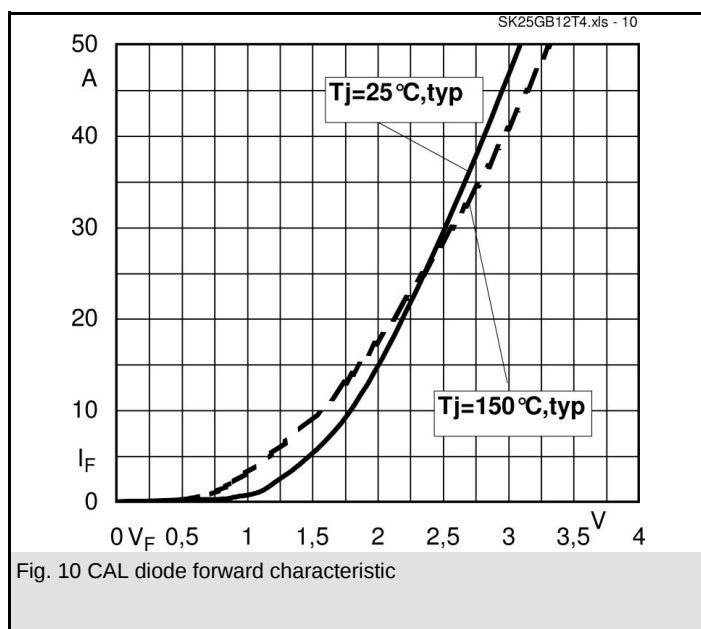
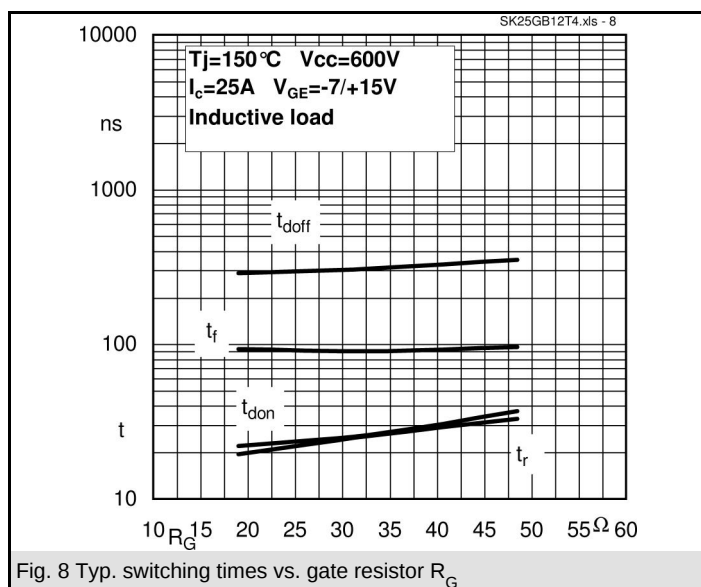
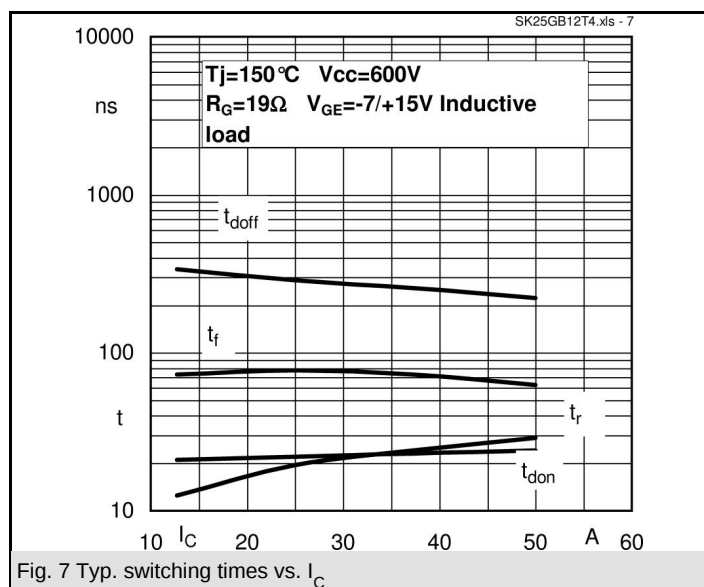
This is an electrostatic discharge sensitive device (ESDS), international standard IEC 60747-1, Chapter IX.

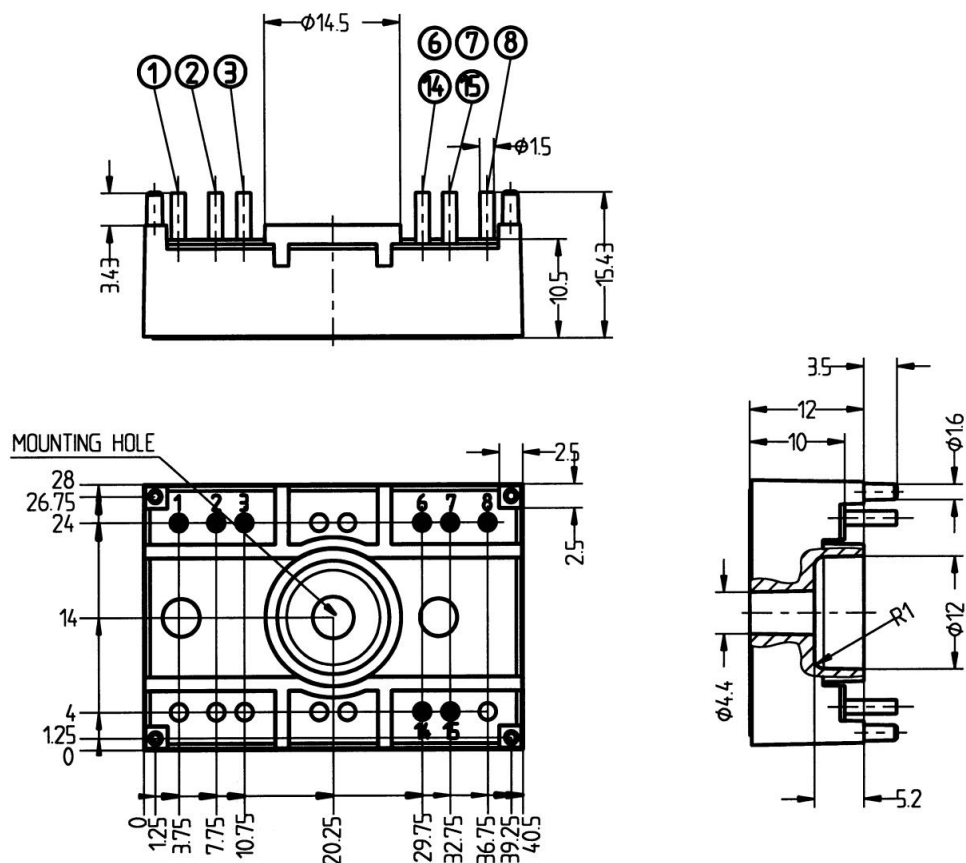
\* The specifications of our components may not be considered as an assurance of component characteristics. Components have to be tested for the respective application. Adjustments may be necessary. The use of SEMIKRON products in life support appliances and systems is subject to prior specification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



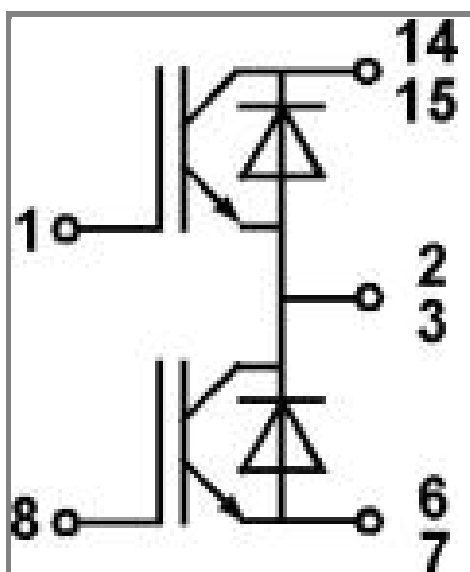
GB







Case T32 (Suggested hole diameter for solder pins and plastic mounting pins: 2mm)



Case T 32

GB