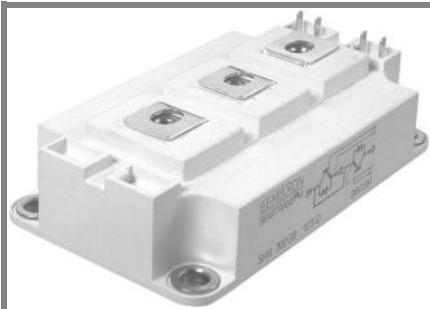


# SKM 300GB12T4



SEMITRANS® 3

## IGBT4 Modules

SKM 300GB12T4

Target Data

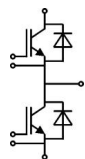
### Features

- IGBT4 = 4. Generation (Trench) IGBT
- $V_{CEsat}$  with positive temperature coefficient
- High short circuit capability, self limiting to  $6 \times I_{CNOM}$
- Soft switching 4. Generation CAL diode (CAL4)

### Typical Applications

### Remarks

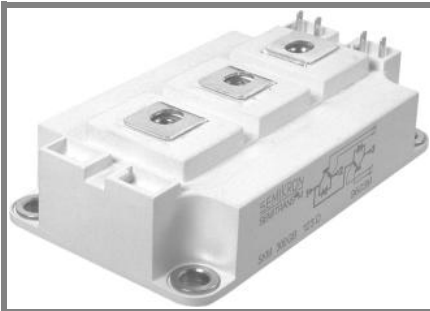
- Case temperature limited to  $T_C = 125^\circ\text{C}$  max, recomm.  $T_{op} = -40 \dots +150^\circ\text{C}$ , product rel. results valid for  $T_j \leq 150^\circ$



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| Absolute Maximum Ratings |   | $T_C = 25^\circ\text{C}$ , unless otherwise specified |      |                  |
|--------------------------|---|---|------|------------------|
| Symbol                   | Conditions  | Values  |      | Units            |
| <b>IGBT</b>              |   |   |      |                  |
| $V_{CES}$                | $T_j = 25^\circ\text{C}$  | 1200  |      | V                |
| $I_C$                    | $T_j = 175^\circ\text{C}$   | $T_{case} = 25^\circ\text{C}$                         | 420  | A                |
|                          |   | $T_{case} = 80^\circ\text{C}$                         | 325  | A                |
| $I_{CRM}$                | $I_{CRM} = 3 \times I_{CNOM}$   | 900   |      | A                |
| $V_{GES}$                |   | $\pm 20$  |      | V                |
| $t_{psc}$                | $V_{CC} = 600\text{V}; V_{GE} \leq 15\text{V}; T_j = 150^\circ\text{C}$<br>$V_{CES} < 1200\text{V}$ | 10  |      | $\mu\text{s}$    |
| <b>Inverse Diode</b>     |   |   |      |                  |
| $I_F$                    | $T_j = 175^\circ\text{C}$   | $T_{case} = 25^\circ\text{C}$                         | 350  | A                |
|                          |   | $T_{case} = 80^\circ\text{C}$                         | 260  | A                |
| $I_{FRM}$                | $I_{FRM} = 3 \times I_{FNOM}$   | 900   |      | A                |
| $I_{FSM}$                | $t_p = 10\text{ms}; \text{sin.}$  | $T_j = 175^\circ\text{C}$                             | 1720 | A                |
| <b>Module</b>            |   |   |      |                  |
| $I_{t(RMS)}$             |   | 500   |      | A                |
| $T_{vj}$                 |   | -40 ... +175  |      | $^\circ\text{C}$ |
| $T_{stg}$                |   | -40 ... +125  |      | $^\circ\text{C}$ |
| $V_{isol}$               | AC, 1 min.  | 4000  |      | V                |

| Characteristics |   | $T_C = 25^\circ\text{C}$ , unless otherwise specified   |      |          |                  |
|-----------------|---|---|------|----------|------------------|
| Symbol          | Conditions                                    | min.  | typ. | max.     | Units            |
| <b>IGBT</b>     |   |   |      |          |                  |
| $V_{GE(th)}$    | $V_{GE} = V_{CE}, I_C = 12\text{mA}$          | 5   | 5,8  | 6,5      | V                |
| $I_{CES}$       | $V_{GE} = 0\text{V}, V_{CE} = V_{CES}$        | $T_j = 25^\circ\text{C}$                                |      |          | mA               |
|                 |   | $T_j = 150^\circ\text{C}$                               |      |          |                  |
| $V_{CE0}$       |   | $T_j = 25^\circ\text{C}$                                | 0,8  | 0,9      | V                |
|                 |   | $T_j = 150^\circ\text{C}$                               | 0,7  | 0,8      | V                |
| $r_{CE}$        | $V_{GE} = 15\text{V}$                         | $T_j = 25^\circ\text{C}$                                | 3,5  | 3,8      | $\text{m}\Omega$ |
|                 |   | $T_j = 150^\circ\text{C}$                               | 5,2  | 5,5      | $\text{m}\Omega$ |
| $V_{CE(sat)}$   | $I_{Cnom} = 300\text{A}, V_{GE} = 15\text{V}$ | $T_j = 25^\circ\text{C}_{chiplev.}$                     | 1,85 | 2,05     | V                |
|                 |   | $T_j = 150^\circ\text{C}_{chiplev.}$                    | 2,25 | 2,45     | V                |
| $C_{res}$       | $V_{CE} = , V_{GE} = \text{V}$                | $f = \text{MHz}$  | 18,6 |          | nF               |
| $C_{oes}$       |   |   | 1,2  |          | nF               |
| $C_{res}$       |   |   | 1    |          | nF               |
| $Q_G$           | $V_{GE} = -8\text{V} / +15\text{V}$           | 1700  |      | nC       |                  |
| $R_{Gint}$      | $T_j = 25^\circ\text{C}$                      | 2,5   |      | $\Omega$ |                  |
| $t_{d(on)}$     | $R_{Gon} = \Omega$                            | $V_{CC} = 600\text{V}$<br>$I_{Cnom} = 300\text{A}$      | 33   |          | ns               |
| $t_r$           |   |   |      |          | ns               |
| $E_{on}$        | $R_{Goff} = \Omega$                           | $T_j = 150^\circ\text{C}$<br>$V_{GE} = -\pm 15\text{V}$ | 33   |          | mJ               |
| $t_{d(off)}$    |   |   |      |          | ns               |
| $t_f$           |   |   |      |          | ns               |
| $E_{off}$       |   |   | 33   |          | mJ               |
| $R_{th(j-c)}$   | per IGBT                                      |   |      | 0,11     | K/W              |



**SEMITRANS® 3**

## IGBT4 Modules

**SKM 300GB12T4**

Target Data

### Features

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- $V_{CEsat}$  with positive temperature coefficient
- High short circuit capability, self limiting to  $6 \times I_{CNOM}$
- Soft switching 4. Generation CAL diode (CAL4)

### Typical Applications

### Remarks

- Case temperature limited to  $T_c = 125^\circ\text{C}$  max, recomm.  $T_{op} = -40 \dots +150^\circ\text{C}$ , product rel. results valid for  $T_j \leq 150^\circ$

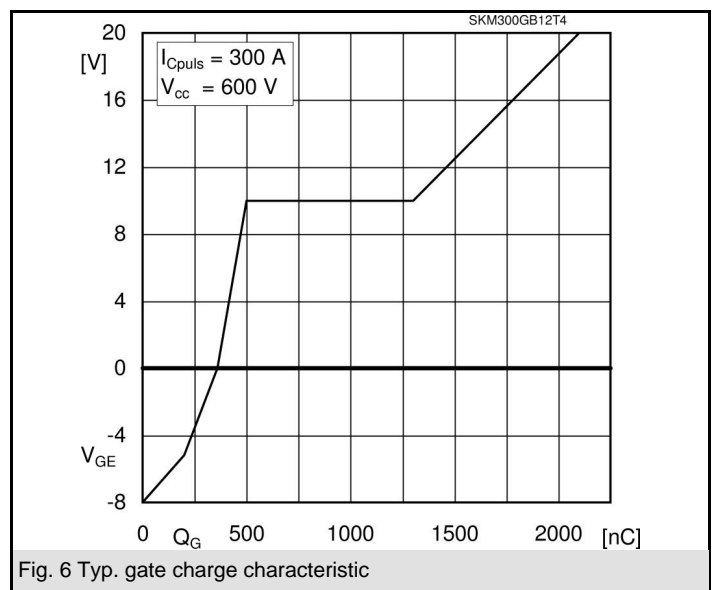
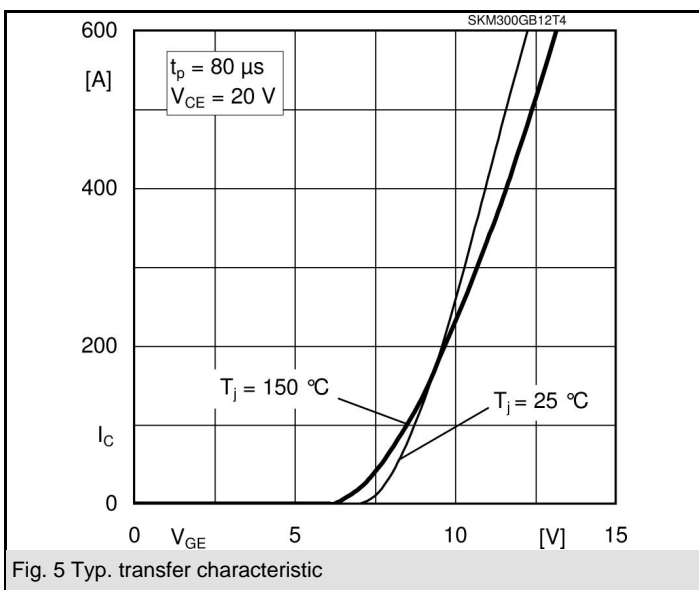
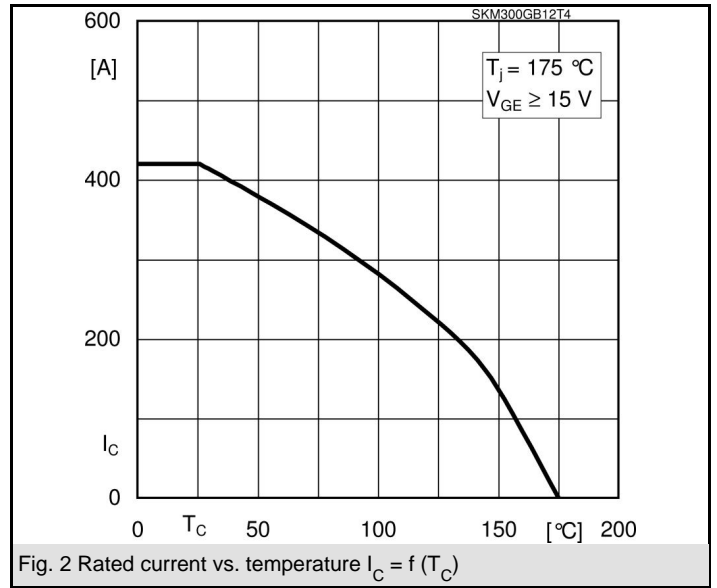
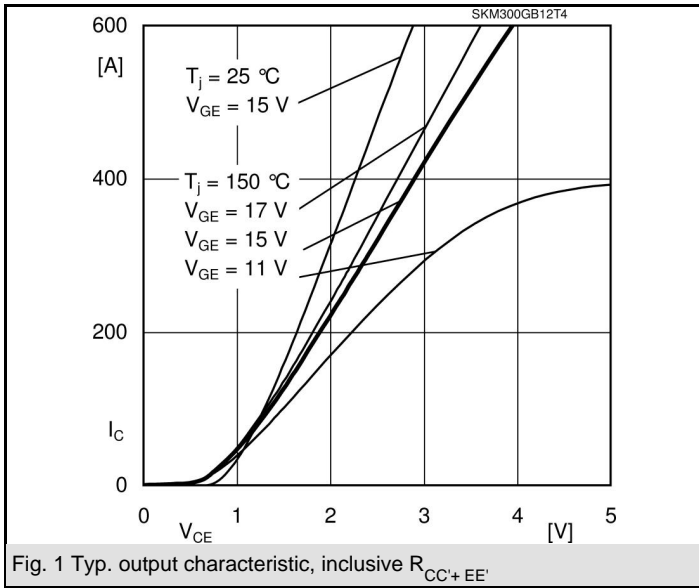
| Characteristics           |  |                                      | min. | typ. | max.  | Units |
|---------------------------|--|--------------------------------------|------|------|-------|-------|
| Symbol                    | Conditions                                       |                                      |      |      |       |       |
| <b>Inverse Diode</b>      |  |                                      |      |      |       |       |
| $V_F = V_{EC}$            | $I_{Fnom} = 300 \text{ A}; V_{GE} = 0 \text{ V}$ | $T_j = 25^\circ\text{C}_{chiplev.}$  |      | 2,2  | 2,5   | V     |
|                           |  | $T_j = 150^\circ\text{C}_{chiplev.}$ |      | 2,1  | 2,45  | V     |
| $V_{F0}$                  |  | $T_j = 25^\circ\text{C}$             |      | 1,3  | 1,5   | V     |
|                           |  | $T_j = 150^\circ\text{C}$            |      | 0,9  | 1,1   | V     |
| $r_F$                     |  | $T_j = 25^\circ\text{C}$             |      | 3    | 3,33  | mΩ    |
|                           |  | $T_j = 150^\circ\text{C}$            |      | 4    | 4,5   | mΩ    |
| $I_{RRM}$                 | $I_{Fnom} = 300 \text{ A}$                       | $T_j = 150^\circ\text{C}$            |      |      |       | A     |
| $Q_{rr}$                  |  |                                      |      | 22,5 |       | μC    |
| $E_{rr}$                  |  |                                      |      |      |       | mJ    |
| $R_{th(j-c)}$             | per diode  |                                      |      |      | 0,17  | K/W   |
| <b>Freewheeling Diode</b> |  |                                      |      |      |       |       |
| $V_F = V_{EC}$            | $I_{Fnom} = \text{A}; V_{GE} = \text{V}$         | $T_j = ^\circ\text{C}_{chiplev.}$    |      |      |       | V     |
| $V_{F0}$                  |  | $T_j = ^\circ\text{C}$               |      |      |       | V     |
| $r_F$                     |  | $T_j = ^\circ\text{C}$               |      |      |       | V     |
| $I_{RRM}$                 | $I_{Fnom} = \text{A}$                            | $T_j = ^\circ\text{C}$               |      |      |       | A     |
| $Q_{rr}$                  |  |                                      |      |      |       | μC    |
| $E_{rr}$                  |  |                                      |      |      |       | mJ    |
|                           | per diode  |                                      |      |      |       | K/W   |
| <b>Module</b>             |  |                                      |      |      |       |       |
| $L_{CE}$                  |  |                                      |      | 15   | 20    | nH    |
| $R_{CC'+EE'}$             | res., terminal-chip                              | $T_{case} = 25^\circ\text{C}$        |      |      | 0,35  | mΩ    |
|                           |  | $T_{case} = 125^\circ\text{C}$       |      |      | 0,5   | mΩ    |
| $R_{th(c-s)}$             | per module                                       |                                      |      | 0,02 | 0,038 | K/W   |
| $M_s$                     | to heat sink M6                                  |                                      |      | 3    | 5     | Nm    |
| $M_t$                     | to terminals M6                                  |                                      |      | 2,5  | 5     | Nm    |
| w                         |  |                                      |      |      | 325   | g     |

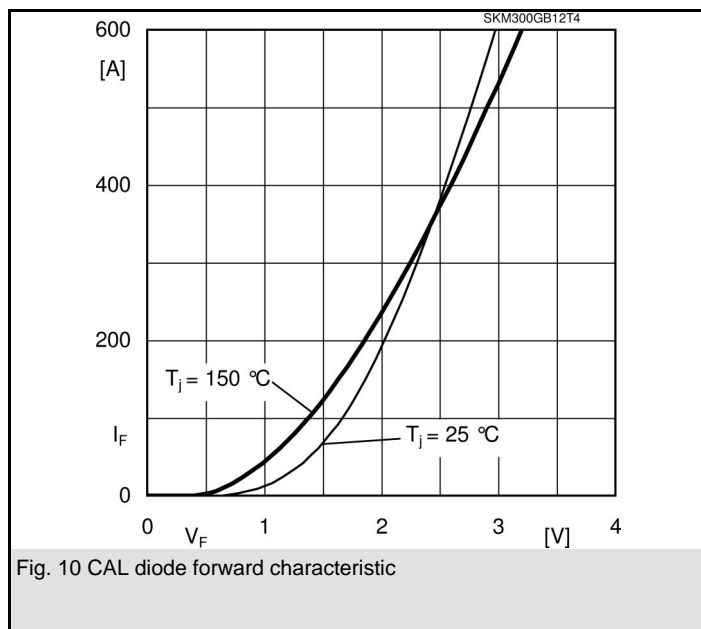
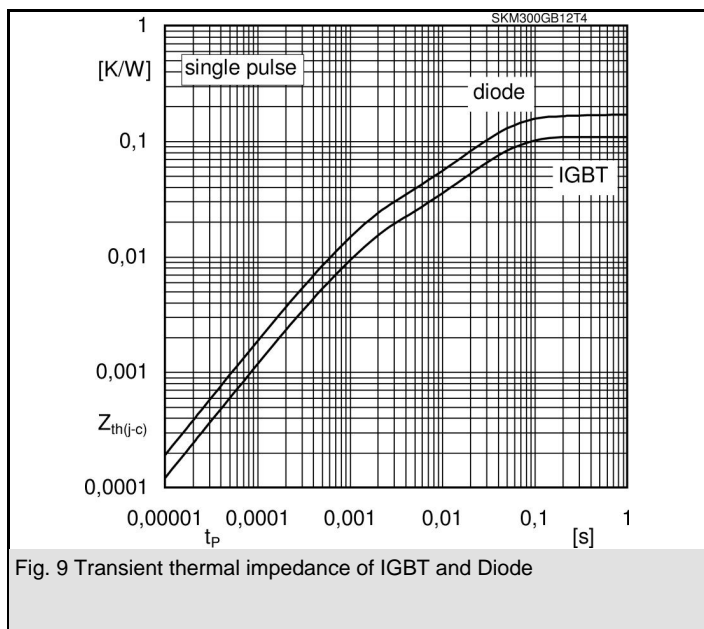
This is an electrostatic discharge sensitive device (ESDS), international standard IEC 60747-1, Chapter IX.

This technical information specifies semiconductor devices but promises no characteristics. No warranty or guarantee expressed or implied is made regarding delivery, performance or suitability.



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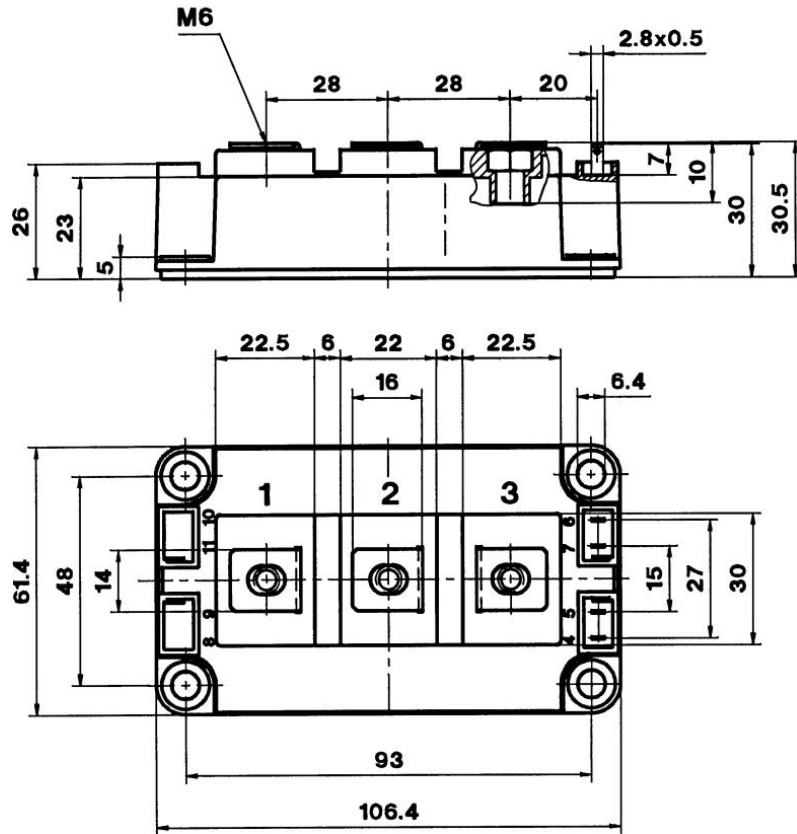


# SKM 300GB12T4

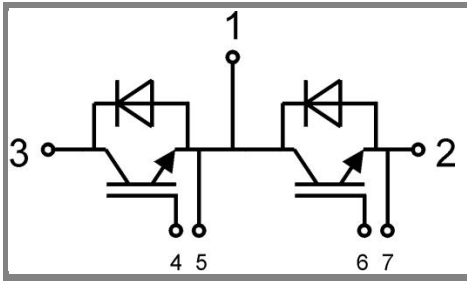
UL recognized file

CASED56

no. E 63 532



Case D56



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Case D56