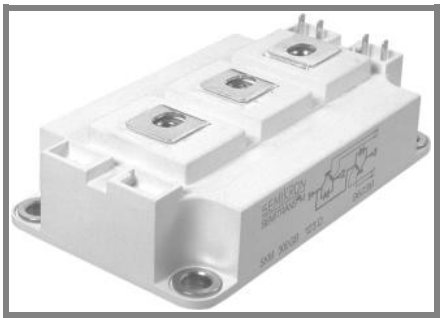
# SKM 100GB12T4G



**SEMITRANS® 3**

## IGBT4 Modules

**SKM 100GB12T4G**

Target Data

### Features

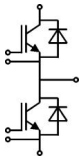
- IGBT4 = 4. Generation (Trench) IGBT
- $V_{CEsat}$ with positive temperature coefficient
- High short circuit capaility, self limiting to 6 x $I_{CNOM}$
- Soft switching 4. Generation CAL diode (CAL4)

### Typical Applications

- AC inverter drives
- UPS
- Electronic welders at $f_{sw}$ up to 20 kHz

### Remarks

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



**GB**

| **Absolute Maximum Ratings** | $T_c$ = 25 °C, unless otherwise specified | | | |
|---|---|---|---|---|
| **Symbol** | **Conditions** | | **Values** | **Units** |
| **IGBT** | | | | |
| $V_{CES}$ | $T_j$ = 25 °C | | 1200 | V |
| $I_C$ | $T_j$ = 175 °C | $T_{case}$ = 25 °C | 150 | A |
| | | $T_{case}$ = 80 °C | 115 | A |
| $I_{CRM}$ | $I_{CRM}$ = 3 x $I_{CNOM}$ | | 300 | A |
| $V_{GES}$ | | | ± 20 | V |
| $t_{psc}$ | $V_{CC}$ = 600 V; $V_{GE} \leq$ 15 V; $V_{CES}$ < 1200 V | $T_j$ = 150 °C | 10 | µs |
| **Inverse Diode** | | | | |
| $I_F$ | $T_j$ = 175 °C | $T_{case}$ = 25 °C | 120 | A |
| | | $T_{case}$ = 80 °C | 90 | A |
| $I_{FRM}$ | $I_{FRM}$ = 3 x $I_{FNOM}$ | | 300 | A |
| $I_{FSM}$ | $t_p$ = 10 ms; sin. | $T_j$ = 175 °C | 860 | A |
| **Module** | | | | |
| $I_{t(RMS)}$ | | | 500 | A |
| $T_{vj}$ | | | -40 ... +175 | °C |
| $T_{stg}$ | | | -40 ... +125 | °C |
| $V_{isol}$ | AC, 1 min. | | 4000 | V |

| **Characteristics** | $T_c$ = 25 °C, unless otherwise specified | | | | | |
|---|---|---|---|---|---|---|
| **Symbol** | **Conditions** | | **min.** | **typ.** | **max.** | **Units** |
| **IGBT** | | | | | | |
| $V_{GE(th)}$ | $V_{GE}$ = $V_{CE}$, $I_C$ = 4 mA | | 5 | 5,8 | 6,5 | V |
| $I_{CES}$ | $V_{GE}$ = 0 V, $V_{CE}$ = $V_{CES}$ | $T_j$ = 25 °C | | | | mA |
| $V_{CE0}$ | | $T_j$ = 25 °C | | 0,8 | 0,9 | V |
| | | $T_j$ = 150 °C | | 0,7 | 0,8 | V |
| $r_{CE}$ | $V_{GE}$ = 15 V | $T_j$ = 25°C | | 10,5 | 11,5 | mΩ |
| | | $T_j$ = 150°C | | 15,5 | 16,5 | mΩ |
| $V_{CE(sat)}$ | $I_{Cnom}$ = 100 A, $V_{GE}$ = 15 V | $T_j$ = 25°C$_{chiplev.}$ | | 1,85 | 2,05 | V |
| | | $T_j$ = 150°C$_{chiplev.}$ | | 2,25 | 2,45 | V |
| $C_{ies}$ | $V_{CE}$ = 25, $V_{GE}$ = 0 V | f = 1 MHz | | 6,2 | | nF |
| $C_{oes}$ | | | | 0,41 | | nF |
| $C_{res}$ | | | | 0,35 | | nF |
| $Q_G$ | $V_{GE}$ = -8V/+15V | | | 570 | | nC |
| $R_{Gint}$ | $T_j$ = 25 °C | | | 2 | | Ω |
| $t_{d(on)}$ | $R_{Gon}$ = Ω | $V_{CC}$ = 600V | | | | ns |
| $t_r$ | | | | | | ns |
| $E_{on}$ | | $I_{Cnom}$= 100A | | 11 | | mJ |
| $t_{d(off)}$ | $R_{Goff}$ = Ω | $T_j$ = 150 °C | | | | ns |
| $t_f$ | | $V_{GE} \leq$ -8V | | | | ns |
| $E_{off}$ | | | | 11 | | mJ |
| $R_{th(j-c)}$ | per IGBT | | | | 0,29 | K/W |

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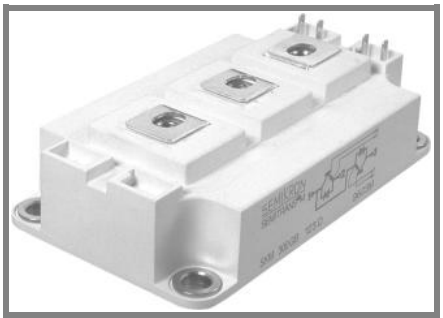

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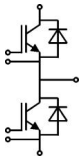

**GB**

| Characteristics | | | | | | |
|---|---|---|---|---|---|---|
| **Symbol** | **Conditions** | | **min.** | **typ.** | **max.** | **Units** |
| **Inverse Diode** | | | | | | |
| $V_F = V_{EC}$ | $I_{Fnom}$ = 100 A; $V_{GE}$ = 0 V | $T_j$ = 25 °$C_{chiplev.}$ | | 2,25 | 2,55 | V |
| | | $T_j$ = 150 °$C_{chiplev.}$ | | 2,2 | 2,5 | V |
| $V_{F0}$ | | $T_j$ = 25 °C | | 1,3 | 1,5 | V |
| | | $T_j$ = 150 °C | | 0,9 | 1,1 | V |
| $r_F$ | | $T_j$ = 25 °C | | 9,5 | 10,5 | mΩ |
| | | $T_j$ = 150 °C | | 13 | 14 | mΩ |
| $I_{RRM}$ | $I_{Fnom}$ = 100 A | $T_j$ = 150 °C | | | | A |
| $Q_{rr}$ | | | | | | µC |
| $E_{rr}$ | $V_{GE} \leq$ -8V | | | 7,5 | | mJ |
| $R_{th(j-c)}$ | per diode | | | | 0,49 | K/W |
| **Freewheeling Diode** | | | | | | |
| $V_F = V_{EC}$ | $I_{Fnom}$ = A; $V_{GE}$ = V | $T_j$ = °$C_{chiplev.}$ | | | | V |
| $V_{F0}$ | | $T_j$ = °C | | | | V |
| $r_F$ | | $T_j$ = °C | | | | V |
| $I_{RRM}$ | $I_{Fnom}$ = A | $T_j$ = °C | | | | A |
| $Q_{rr}$ | | | | | | µC |
| $E_{rr}$ | | | | | | mJ |
| | per diode | | | | | K/W |
| **Module** | | | | | | |
| $L_{CE}$ | | | | 15 | 20 | nH |
| $R_{CC'+EE'}$ | res., terminal-chip | $T_{case}$= 25 °C | | | 0,35 | mΩ |
| | | $T_{case}$= 125 °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.

 

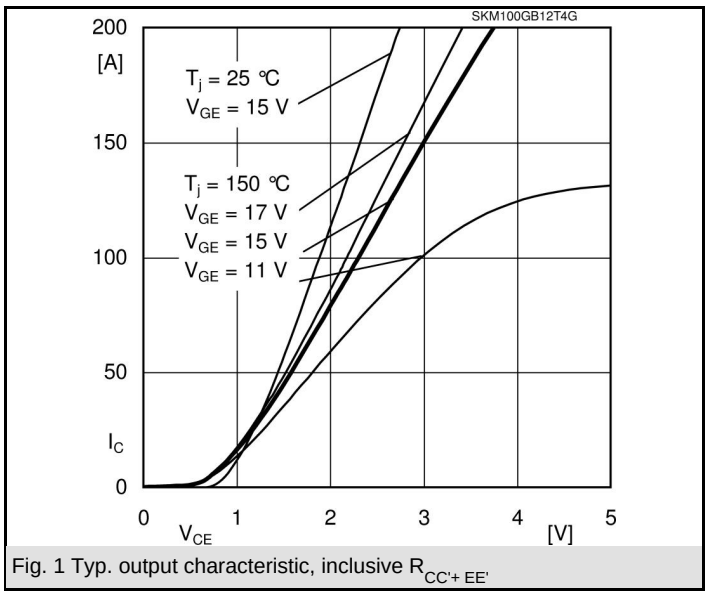


Fig. 1 Typ. output characteristic, inclusive $R_{CC'+EE'}$

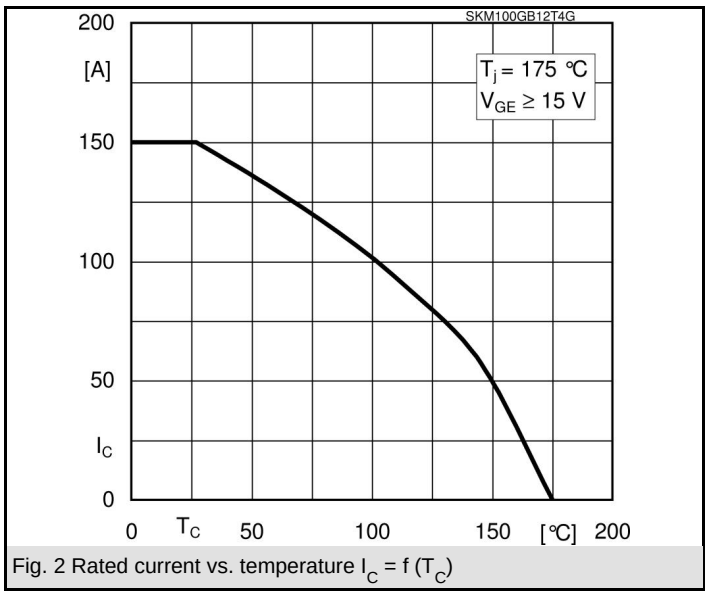


Fig. 2 Rated current vs. temperature $I_C = f(T_C)$

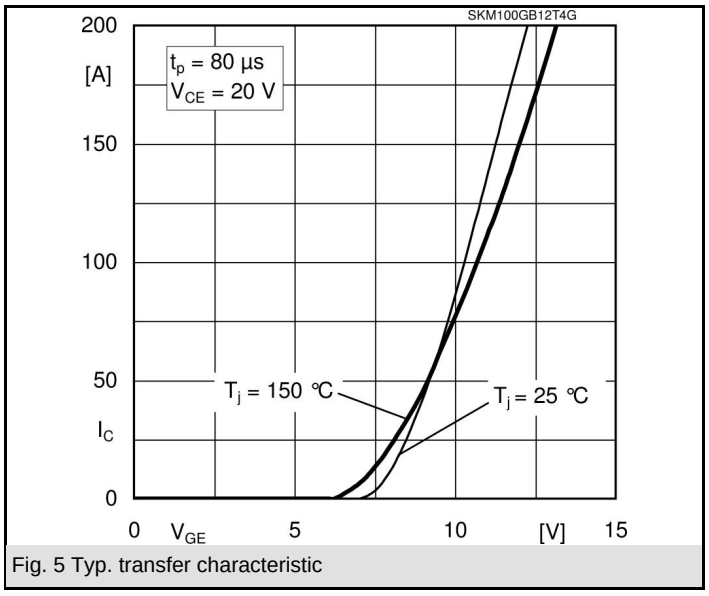


Fig. 5 Typ. transfer characteristic

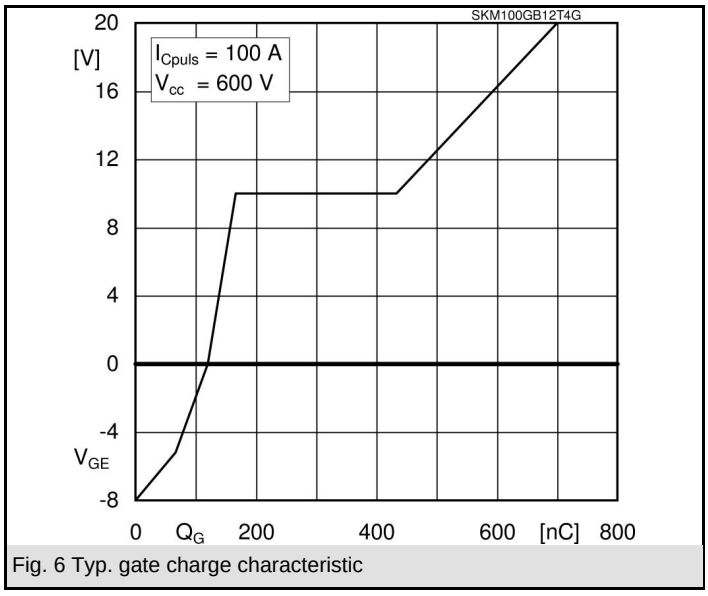


Fig. 6 Typ. gate charge characteristic

 

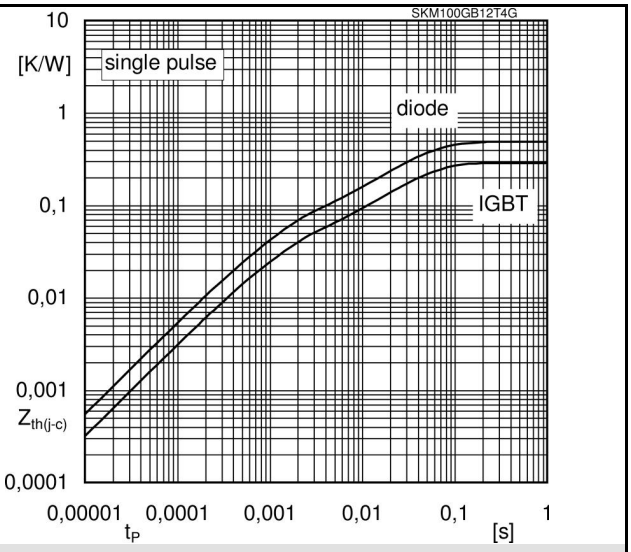


Fig. 9 Transient thermal impedance of IGBT and Diode

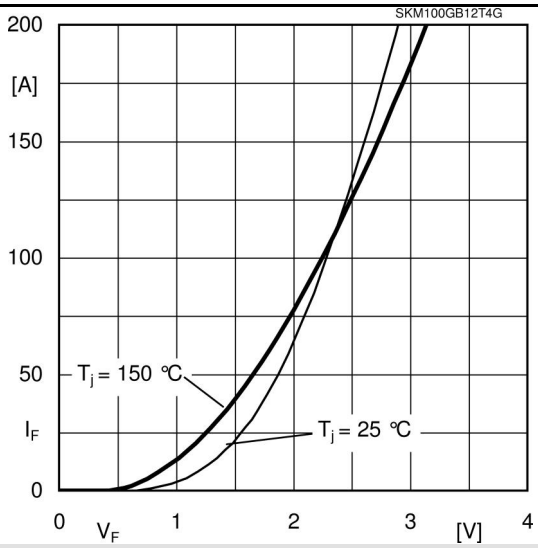


Fig. 10 CAL diode forward characteristic

 

 