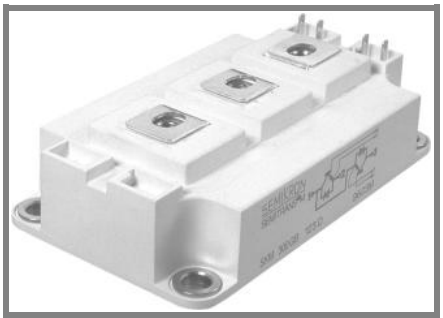
# SKM 300GB125D



**SEMITRANS® 3**

## Ultra Fast IGBT Module

**SKM 300GB125D**

Preliminary Data

### Features

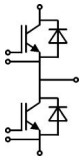
- NPT - Non punch-through IGBT
- Low inductance case
- Short tail current with low temperature dependence
- High short circuit capability, self limiting
- Fast & soft inverse CAL diodes
- Isolated copper baseplate using DCB Direct Copper Bonding Technology
- Large clearance (10 mm) and creepage distances (20 mm)

### Typical Applications

- Switched mode power supplies at $f_{sw}$ > 20 kHz
- Resonant inverters up to 100 kHz
- Inductive heating
- UPS Uninterruptable power supplies at $f_{sw}$ > 20 kHz
- Electronic welders at $f_{sw}$ > 20 kHz

| **Absolute Maximum Ratings** | | | $T_c$ = 25 °C, unless otherwise specified | |
|---|---|---|---|---|
| **Symbol** | **Conditions** | | **Values** | **Units** |
| **IGBT** | | | | |
| $V_{CES}$ | $T_j$ = 25 °C | | 1200 | V |
| $I_C$ | $T_j$ = 150 °C | $T_{case}$ = 25 °C | 300 | A |
| | | $T_{case}$ = 80 °C | 210 | A |
| $I_{CRM}$ | $I_{CRM}$=2x$I_{Cnom}$ | | 400 | A |
| $V_{GES}$ | | | ± 20 | V |
| $t_{psc}$ | $V_{CC}$ = 600 V; $V_{GE} \leq$ 20 V; $V_{CES}$ < 1200 V | $T_j$ = 125 °C | 10 | µs |
| **Inverse Diode** | | | | |
| $I_F$ | $T_j$ = 150 °C | $T_{case}$ = 25 °C | 260 | A |
| | | $T_{case}$ = 80 °C | 180 | A |
| $I_{FRM}$ | $I_{FRM}$=2x$I_{Fnom}$ | | 400 | A |
| $I_{FSM}$ | $t_p$ = 10 ms; sin. | $T_j$ = 150 °C | 1800 | A |
| **Module** | | | | |
| $I_{t(RMS)}$ | | | 500 | A |
| $T_{vj}$ | | | - 40...+ 150 | °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** | | | | | | |
| $V_{GE(th)}$ | $V_{GE}$ = $V_{CE}$, $I_C$ = 8 mA | | 4,5 | 5,5 | 6,5 | V |
| $I_{CES}$ | $V_{GE}$ = 0 V, $V_{CE}$ = $V_{CES}$ | $T_j$ = 25 °C | | 0,1 | 0,3 | mA |
| $V_{CE0}$ | | $T_j$ = 25 °C | | 1,5 | 1,75 | V |
| | | $T_j$ = 125 °C | | 1,7 | | V |
| $r_{CE}$ | $V_{GE}$ = 15 V | $T_j$ = 25°C | | 9 | 10,5 | mΩ |
| | | $T_j$ = 125°C | | 11,5 | | mΩ |
| $V_{CE(sat)}$ | $I_{Cnom}$ = 200 A, $V_{GE}$ = 15 V | $T_j$ = °$C_{chiplev.}$ | | 3,3 | 3,85 | V |
| $C_{ies}$ | $V_{CE}$ = 25, $V_{GE}$ = 0 V | f = 1 MHz | | 18 | 24 | nF |
| $C_{oes}$ | | | | 2,5 | 3,2 | nF |
| $C_{res}$ | | | | 1 | 1,3 | nF |
| $Q_G$ | $V_{GE}$ = 0V - +20V | | | 2000 | | nC |
| $R_{Gint}$ | $T_j$ = °C | | | 2,5 | | Ω |
| $t_{d(on)}$ | $R_{Gon}$ = 3 Ω | $V_{CC}$ = 600V | | 130 | | ns |
| $t_r$ | | $I_C$= 200A | | 40 | | ns |
| $E_{on}$ | | $T_j$ = 125 °C | | 16 | | mJ |
| $t_{d(off)}$ | $R_{Goff}$ = 3 Ω | $V_{GE}$ = ± 15V | | 460 | | ns |
| $t_f$ | | | | 30 | | ns |
| $E_{off}$ | | | | | | mJ |
| $R_{th(j-c)}$ | per IGBT | | | | 0,075 | K/W |



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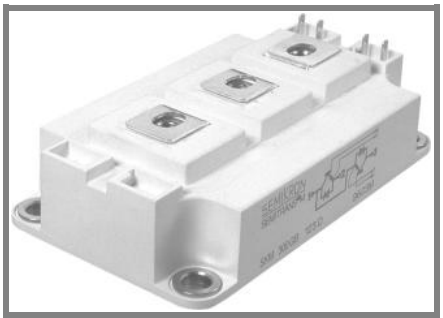

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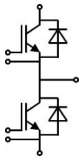


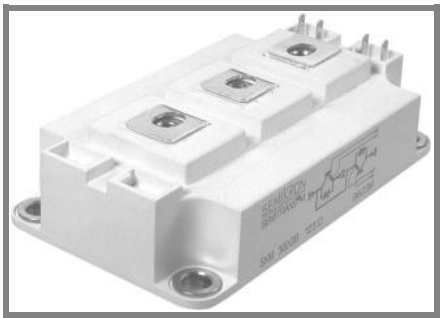
**GB**

| Characteristics | | | | | | |
|---|---|---|---|---|---|---|
| **Symbol** | **Conditions** | | **min.** | **typ.** | **max.** | **Units** |
| **Inverse Diode** | | | | | | |
| $V_F = V_{EC}$ | $I_{Fnom}$ = 200 A; $V_{GE}$ = 0 V | $T_j$ = 25 °$C_{chiplev.}$ | | 2 | 2,5 | V |
| | | $T_j$ = 125 °$C_{chiplev.}$ | | 1,8 | | V |
| $V_{F0}$ | | $T_j$ = 25 °C | | 1,1 | 1,2 | V |
| | | $T_j$ = 125 °C | | | | V |
| $r_F$ | | $T_j$ = 25 °C | | 4,5 | 6,5 | mΩ |
| | | $T_j$ = 125 °C | | | | mΩ |
| $I_{RRM}$ | $I_F$ = 200 A | $T_j$ = 125 °C | | 340 | | A |
| $Q_{rr}$ | di/dt = 8000 A/µs | | | 46 | | µC |
| $E_{rr}$ | $V_{GE}$ = 0 V; $V_{CC}$ = 600 V | | | | | mJ |
| $R_{th(j-c)D}$ | per diode | | | | 0,18 | 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 | | | | 0,038 | 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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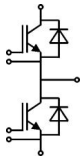

**GB**

| $Z_{th}$ Symbol | Conditions | Values | Units |
|---|---|---|---|
| **$Z_{th(j-c)I}$** | | | |
| $R_i$ | i = 1 | 53 | mk/W |
| $R_i$ | i = 2 | 18,5 | mk/W |
| $R_i$ | i = 3 | 3,1 | mk/W |
| $R_i$ | i = 4 | 4 | mk/W |
| $tau_i$ | i = 1 | 0,04 | s |
| $tau_i$ | i = 2 | 0,0189 | s |
| $tau_i$ | i = 3 | 0,0017 | s |
| $tau_i$ | i = 4 | 0,003 | s |
| **$Z_{th(j-c)D}$** | | | |
| $R_i$ | i = 1 | 115 | mk/W |
| $R_i$ | i = 2 | 52 | mk/W |
| $R_i$ | i = 3 | 11 | mk/W |
| $R_i$ | i = 4 | 2 | mk/W |
| $tau_i$ | i = 1 | 0,0366 | s |
| $tau_i$ | i = 2 | 0,0113 | s |
| $tau_i$ | i = 3 | 0,003 | s |
| $tau_i$ | i = 4 | 0,0002 | s |

 

UL Recognized File 63 532

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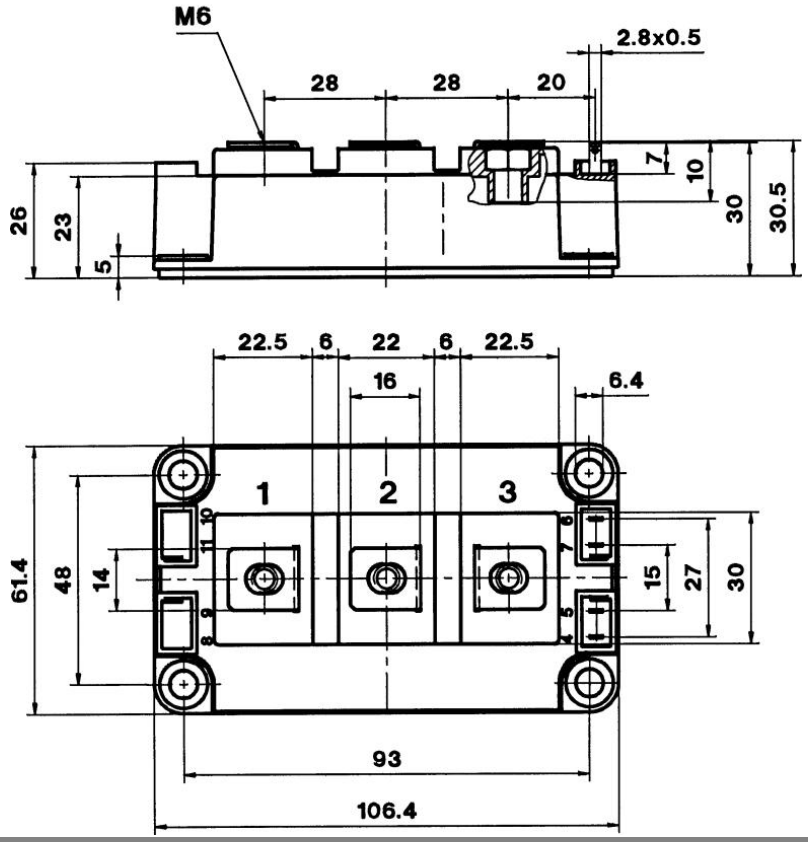
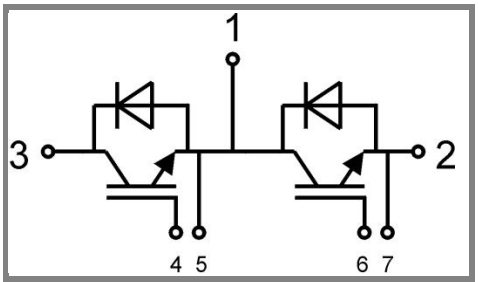



Case D 56




GB Case D 56