# SKM350MB120SCH17



**SEMITRANS® 3**

## SiC MOSFET Module

**Engineering Sample**

**SKM350MB120SCH17**

Target Data

### Features

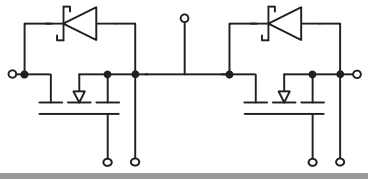
- Full Silicon Carbide (SiC) power module
- Latest generation SiC MOSFETs
- External SiC Schottky Barrier Diode embedded
- Optimized for fast switching and lowest power losses
- Insulated copper baseplate using DBC technology (Direct Bonded Copper)
- Improved thermal performances with Aluminium Nitride (AIN) substrate
- UL recognized, file no. E63532

### Typical Applications*

- High frequency power supplies
- AC inverters

### Remarks

- Case temperature limited to Tc=125°C max.
- Recommended Top= -40…+150°C



**MB**

| Absolute Maximum Ratings | | | | |
|---|---|---|---|---|
| **Symbol** | **Conditions** | | **Values** | **Unit** |
| **MOSFET** | | | | |
| $V_{DSS}$ | | | 1200 | V |
| $I_D$ | $T_j$ = 175 °C | $T_c$ = 25 °C | 523 | A |
| | | $T_c$ = 80 °C | 416 | A |
| $I_{DM}$ | | | 1280 | A |
| $V_{GS}$ | | | -6 ... 22 | V |
| $T_j$ | | | -40 ... 175 | °C |
| **Integrated body Diode** | | | | |
| $I_{FM}$ | | | | A |

| Absolute Maximum Ratings | | | | |
|---|---|---|---|---|
| **Symbol** | **Conditions** | | **Values** | **Unit** |
| **Inverse diode** | | | | |
| $V_{RRM}$ | $T_j$ = 25 °C | | 1200 | V |
| $I_F$ | $T_j$ = 175 °C | $T_c$ = 25 °C | 212 | A |
| | | $T_c$ = 80 °C | 163 | A |
| $I_{Fnom}$ | | | 100 | A |
| $I_{FRM}$ | $I_{FRM}$ = 3x$I_{Fnom}$ | | 300 | A |
| $I_{FSM}$ | $t_p$ = 8.3 ms, sin 180°, $T_j$ = 25 °C | | 373 | A |
| $T_j$ | | | -40 ... 175 | °C |

| Absolute Maximum Ratings | | | |
|---|---|---|---|
| **Symbol** | **Conditions** | **Values** | **Unit** |
| **Module** | | | |
| $I_{t(RMS)}$ | | 500 | A |
| $T_{stg}$ | | -40 ... 125 | °C |
| $V_{isol}$ | AC sinus 50 Hz, t = 1 min | 4000 | V |

| Characteristics | | | | | | |
|---|---|---|---|---|---|---|
| **Symbol** | **Conditions** | | **min.** | **typ.** | **max.** | **Unit** |
| **MOSFET** | | | | | | |
| $V_{(BR)DSS}$ | $V_{GS}$ = 0 V, $I_D$ = 8 mA | | 1200 | | | V |
| $V_{GS(th)}$ | $V_{GS}$ = $V_{GS}$, $I_D$ = 71.2 mA | | 1.6 | | 4 | V |
| $I_{DSS}$ | $V_{GS}$ = 0 V, $V_{DS}$ = 1200 V, $T_j$ = 25 °C | | | | 0.08 | mA |
| $I_{GSS}$ | $V_{GS}$ = 22 V, $V_{DS}$ = 0 V | | | | 600 | nA |
| $R_{DS(on)}$ | $V_{GS}$ = 18 V | $T_j$ = 25 °C | | 5.6 | 7.0 | mΩ |
| | $I_D$ = 176 A | $T_j$ = 150 °C | | 9.5 | | mΩ |
| $C_{iss}$ | $V_{GS}$ = 0 V | | | 34.48 | | nF |
| $C_{oss}$ | $V_{DS}$ = 800 V | | | 1.096 | | nF |
| $C_{rss}$ | f = 1 MHz | | | 0.152 | | nF |
| $R_{Gint}$ | 25 °C | | | 0.6 | | Ω |
| $Q_G$ | $V_{GS}$ = 18 V | | | 1512 | | nC |
| $t_{d(on)}$ | $V_{DD}$ = 600 V | $T_j$ = 150 °C | | | | ns |
| $t_r$ | $I_D$ = 300 A | $T_j$ = 150 °C | | | | ns |
| $t_{d(off)}$ | $V_{GS}$ = -5 ... 20 V | $T_j$ = 150 °C | | | | ns |
| $t_f$ | $R_{Gon}$ = 0.5 Ω | $T_j$ = 150 °C | | | | ns |
| $E_{on}$ | $R_{Goff}$ = 1 Ω | $T_j$ = 150 °C | | 4.73 | | mJ |
| $E_{off}$ | | $T_j$ = 150 °C | | 2.3 | | mJ |
| $R_{th(j-c)}$ | per MOSFET | | | | 0.045 | K/W |
| $R_{th(c-s)}$ | per MOSFET | | | | 0.03 | K/W |



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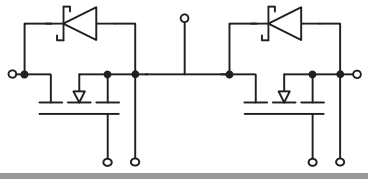
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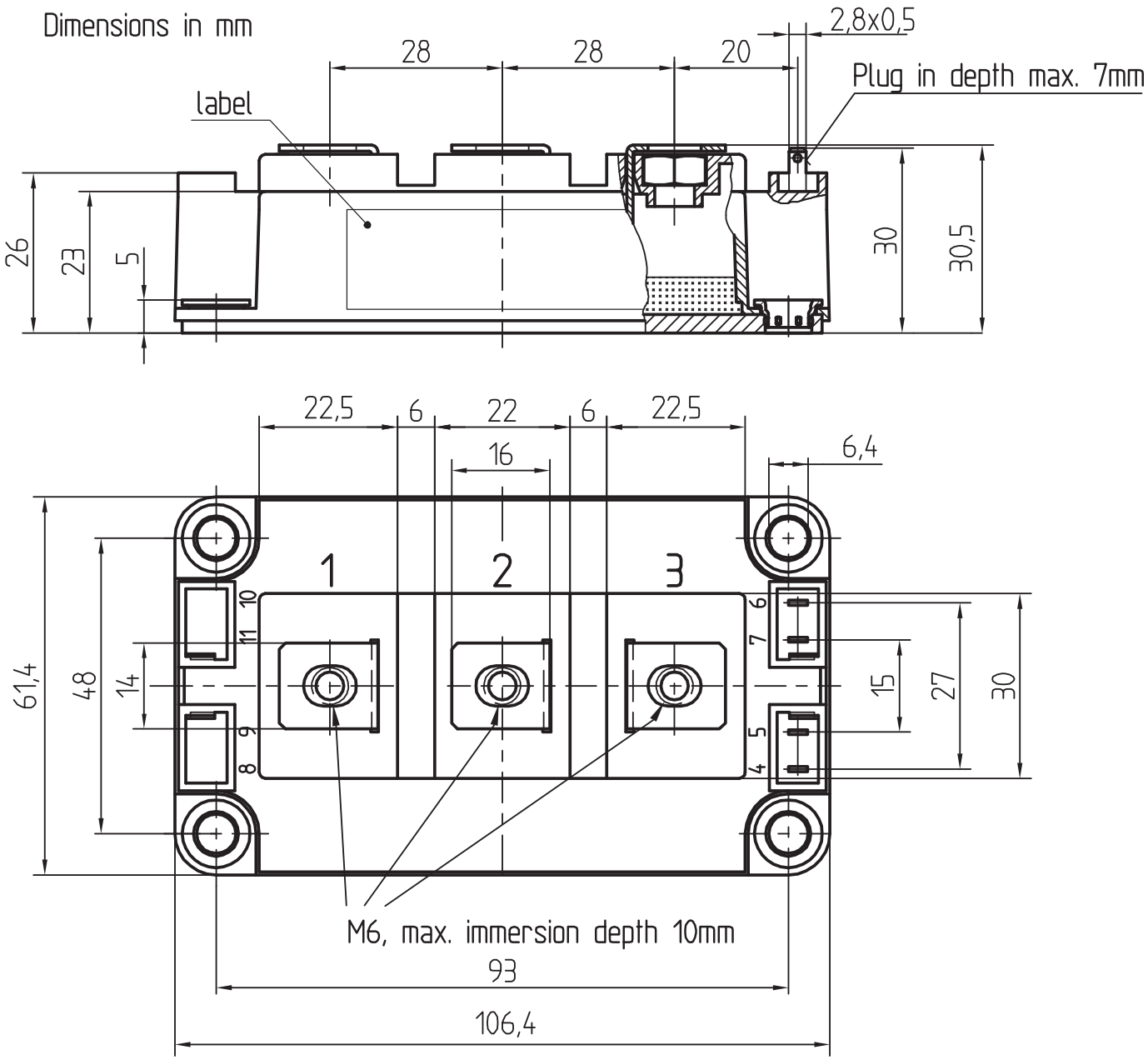
**Characteristics**

| Symbol | Conditions | | min. | typ. | max. | Unit |
|---|---|---|---|---|---|---|
| **Inverse diode** | | | | | | |
| $V_F = V_{EC}$ | $I_F$ = 100 A | $T_j$ = 25 °C | | 1.40 | 1.60 | V |
| | chiplevel | $T_j$ = 150 °C | | 1.80 | 2.20 | V |
| $V_{F0}$ | chiplevel | $T_j$ = 25 °C | | 0.95 | 1.05 | V |
| | | $T_j$ = 150 °C | | 0.80 | 0.90 | V |
| $r_F$ | chiplevel | $T_j$ = 25 °C | | 4.5 | 5.5 | mΩ |
| | | $T_j$ = 150 °C | | 10.0 | 13 | mΩ |
| $C_j$ | parallel to $C_{oss}$, 1 MHz, 800 V, 25 °C | | | 0.42 | | nF |
| $Q_c$ | 800 V, 500 A/µs, 25 °C | | | 0.334 | | µC |
| $R_{th(j-c)}$ | per diode | | | | 0.18 | K/W |
| $R_{th(c-s)}$ | per diode | | | - | 0.12 | K/W |

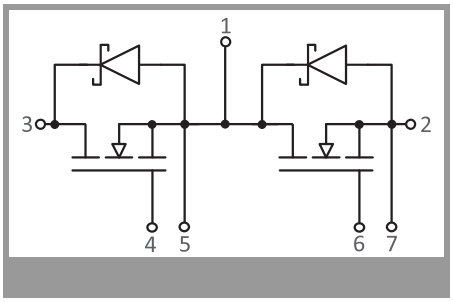
**Characteristics**

| Symbol | Conditions | | min. | typ. | max. | Unit |
|---|---|---|---|---|---|---|
| **Module** | | | | | | |
| $L_{CE}$ | | | | 15 | | nH |
| $R_{CC'+EE'}$ | measured per switch, | | | 0.55 | | mΩ |
| $Rth_{(c-s)1}$ | per module | | | 0.012 | | K/W |
| $Rth_{(c-s)2}$ | including thermal coupling, Ts underneath module | | | 0.0189 | | K/W |
| $M_s$ | to heat sink M6 | | 3 | | 5 | Nm |
| $M_t$ | | to terminals M6 | 2.5 | | 5 | Nm |
| | | | | | | Nm |
| w | | | | | 325 | g |

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General tolerance +/- 0,5 mm



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

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