



SEMITOP® 3

MOSFET Module

Engineering Sample SK165MBBB060

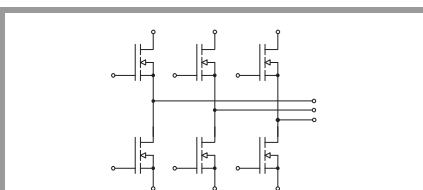
Target Data

Features

- Three legs of inverter
- Compact design
- One screw mounting
- Improved thermal performance by aluminum oxide substrate
- Trench technology
- Short internal connections and low inductance case
- UL recognized, file no. E63532

Typical Applications*

- Low power SMPS
- EV vehicles



MBBB

| Absolute Maximum Ratings | | | | |
|------------------------------|-----------------------|----------------------|------|---|
| Symbol | Conditions | Values | Unit | |
| MOSFET | | | | |
| V_{DSS} | | 60 | V | |
| I_D | $T_j = 175\text{ °C}$ | $T_s = 25\text{ °C}$ | 188 | A |
| | | $T_s = 70\text{ °C}$ | 158 | A |
| I_{DM} | | 720 | A | |
| I_{DRM} | | t.b.d. | A | |
| V_{GS} | | -20 ... 20 | V | |
| T_j | | -40 ... 175 | °C | |
| Integrated body diode | | | | |
| I_{FM} | | 720 | A | |
| I_{FRM} | | t.b.d. | A | |

| Absolute Maximum Ratings | | | |
|--------------------------|---------------------------|-------------|------|
| Symbol | Conditions | Values | Unit |
| Module | | | |
| $I_{t(RMS)}$ | | t.b.d. | A |
| T_{stg} | | -40 ... 125 | °C |
| V_{isol} | AC, sinusoidal, t = 1 min | 2500 | V |

| Characteristics | | | | | |
|------------------------------|---|-----------------------|-------|------|------|
| Symbol | Conditions | min. | typ. | max. | Unit |
| MOSFET | | | | | |
| $V_{(BR)DSS}$ | $V_{GS} = 0\text{ V}, I_D = 1\text{ mA}$ | 60 | | | V |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}, I_D = 0.196\text{ mA}$ | 2 | 3 | 4 | V |
| I_{DSS} | $V_{GS} = 0\text{ V}, V_{DS} = 60\text{ V}, T_j = 25\text{ °C}$ | | | 0.1 | mA |
| I_{GSS} | $V_{DS} = 0\text{ V}, V_{GS} = 20\text{ V}, T_j = 25\text{ °C}$ | | | 100 | nA |
| $R_{DS(on)}$ | $V_{GS} = 10\text{ V}$ $I_D = 100\text{ A}$ | $T_j = 25\text{ °C}$ | 1.30 | 1.70 | mΩ |
| | | $T_j = 150\text{ °C}$ | 2.2 | 2.8 | mΩ |
| C_{iss} | $V_{GS} = 0\text{ V}, V_{DS} = 30\text{ V}, f = 1\text{ MHz}$ | | 17000 | | pF |
| C_{oss} | $V_{GS} = 0\text{ V}, V_{DS} = 30\text{ V}, f = 1\text{ MHz}$ | | 3700 | | pF |
| C_{rss} | $V_{GS} = 0\text{ V}, V_{DS} = 30\text{ V}, f = 1\text{ MHz}$ | | 120 | | pF |
| R_{Gint} | $T_j = 25\text{ °C}$ | | 0.0 | | Ω |
| Q_G | $V_{GS} = 0...+10\text{ V}, V_{DD} = 30\text{ V}, I_D = 100\text{ A}$ | | 206 | | nC |
| $t_{d(on)}$ | $V_{DD} = 30\text{ V}$ | | | | ns |
| $t_{d(off)}$ | $V_{GS} = 10\text{ V}$ | $T_j = 150\text{ °C}$ | | | ns |
| | | $T_j = 150\text{ °C}$ | | | ns |
| t_r | $I_D = 100\text{ A}$ | | | | ns |
| t_f | | | | | ns |
| E_{on} | | | 0.15 | | mJ |
| E_{off} | | | 0.05 | | mJ |
| $R_{th(j-s)}$ | per MOSFET | | 1.4 | | K/W |
| Integrated body diode | | | | | |
| $V_F = V_{SD}$ | $-I_D = 100\text{ A}$ $V_{GS} = 0\text{ V}$ chipelevel | $T_j = 25\text{ °C}$ | 0.85 | | V |
| | | $T_j = 150\text{ °C}$ | 0.70 | | V |
| $V_{F0} = V_{SD0}$ | chipelevel | $T_j = 25\text{ °C}$ | 0.78 | | V |
| | | $T_j = 150\text{ °C}$ | 0.57 | | V |
| $r_F = r_{SD}$ | chipelevel | $T_j = 25\text{ °C}$ | 0.70 | | mΩ |
| | | $T_j = 150\text{ °C}$ | 1.30 | | mΩ |
| t_{rr} | $V_{DD} = 30\text{ V}$ | | | | ns |
| Q_{rr} | $-I_D = 100\text{ A}$ | | | | μC |
| I_{rr} | | | | | A |
| E_{rr} | $V_{GS} = 10\text{ V}$ | | 0.004 | | mJ |

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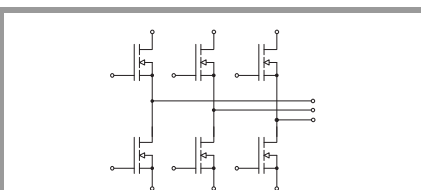
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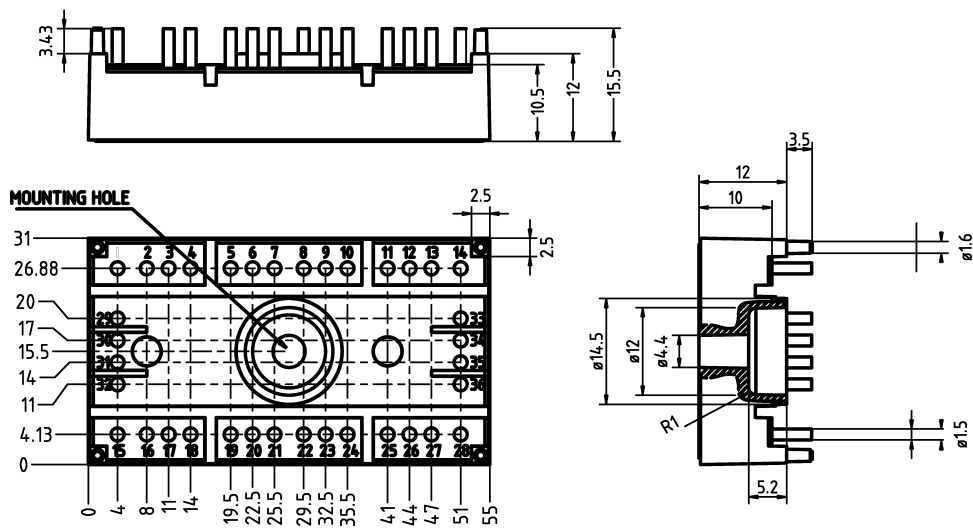
| Characteristics | | | | | |
|-----------------|-------------|------|--------|------|------|
| Symbol | Conditions | min. | typ. | max. | Unit |
| Module | | | | | |
| L_{CE} | | | t.b.d. | | nH |
| M_s | to heatsink | 2.25 | | 2.5 | Nm |
| w | weight | | 29 | | g |



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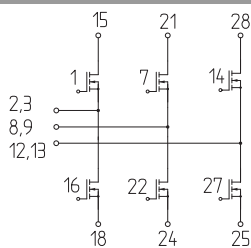
dimensions in mm
tolerance system: ISO 2768-m



Suggested hole diameter, in the PCB, for solder pins and mounting plastic pins: 2mm

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

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