



SEMITOP®E1

MOSFET Module

Engineering Sample SK50MH65TE1

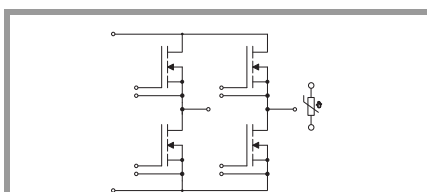
Target Data

Features

- Low inductive design
- Press-Fit contact technology
- Rugged mounting due to integrated mounting clamps
- Heat transfer and insulation through direct copper bonded aluminium oxide ceramic (DBC)
- 650V Super Junction MOSFET Technology
- Integrated NTC temperature sensor
- UL recognized file no. E 63 532

Typical Applications*

- EV battery charger
- Switched mode power supplies
- UPS



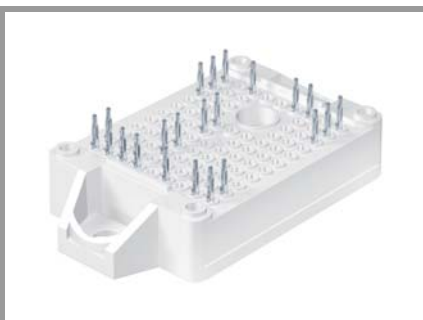
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| Absolute Maximum Ratings | | | | |
|------------------------------|-----------------------------------|----------------------|------|---|
| Symbol | Conditions | Values | Unit | |
| MOSFET 1 | | | | |
| V_{DSS} | | 650 | V | |
| I_D | $T_j = 150\text{ °C}$ | $T_s = 25\text{ °C}$ | 55 | A |
| | | $T_s = 70\text{ °C}$ | 44 | A |
| I_{DM} | pulse-width limited by T_{jmax} | 300 | A | |
| I_{DRM} | | t.b.d. | A | |
| V_{GS} | | -30 ... 30 | V | |
| T_j | | -40 ... 175 | °C | |
| Integrated body diode | | | | |
| I_{FM} | pulse-width limited by T_{jmax} | 300 | A | |
| I_{FRM} | | t.b.d. | A | |

| Absolute Maximum Ratings | | | |
|--------------------------|--|-------------|------|
| Symbol | Conditions | Values | Unit |
| Module | | | |
| $I_{t(RMS)}$ | $T_{terminal} = 80\text{ °C}$, $T_s = 60\text{ °C}$, per pin | 30 | A |
| T_{stg} | | -40 ... 125 | °C |
| V_{isol} | AC, sinusoidal, $t = 1\text{ min}$ | 2500 | V |

| Characteristics | | | | | |
|------------------------------|--|-----------------------|-------|------|------|
| Symbol | Conditions | min. | typ. | max. | Unit |
| MOSFET 1 | | | | | |
| $V_{(BR)DSS}$ | $V_{GS} = 0\text{ V}$, $I_D = 1\text{ mA}$ | 650 | | | V |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}$, $I_D = 7.5\text{ mA}$ | 2.5 | | 4.5 | V |
| I_{DSS} | $V_{GS} = 0\text{ V}$, $V_{DS} = 650\text{ V}$, $T_j = 25\text{ °C}$ | | | 0.01 | mA |
| I_{GSS} | $V_{DS} = 0\text{ V}$, $V_{GS} = 30\text{ V}$, $T_j = 25\text{ °C}$ | | | 100 | nA |
| $R_{DS(on)}$ | $V_{GS} = 10\text{ V}$ $I_D = 37.5\text{ A}$ chipelevel | $T_j = 25\text{ °C}$ | 20 | 23 | mΩ |
| | | $T_j = 150\text{ °C}$ | 46 | 55 | mΩ |
| C_{iss} | $V_{GS} = 10\text{ V}$, $V_{DS} = 400\text{ V}$, $f = 1\text{ MHz}$ | | 7160 | | nF |
| C_{oss} | $V_{GS} = 10\text{ V}$, $V_{DS} = 400\text{ V}$, $f = 1\text{ MHz}$ | | 0.195 | | nF |
| C_{rss} | $V_{GS} = 10\text{ V}$, $V_{DS} = 400\text{ V}$, $f = 1\text{ MHz}$ | | | | nF |
| R_{Gint} | $T_j = 25\text{ °C}$ | | | | Ω |
| Q_G | $V_{DS}=400\text{V}$, $V_{GS}=10\text{V}$, $I_D = 37.5\text{ A}$ | | 222 | | nC |
| $t_{d(on)}$ | $V_{DD} = 400\text{ V}$ $V_{GS} = 10\text{ V}$ $I_D = 37.5\text{ A}$ | $T_j = 150\text{ °C}$ | | | ns |
| $t_{d(off)}$ | | $T_j = 150\text{ °C}$ | | | ns |
| t_r | | $T_j = 150\text{ °C}$ | | | ns |
| t_f | | $T_j = 150\text{ °C}$ | | | ns |
| E_{on} | | | 0.75 | | mJ |
| E_{off} | | | 1.26 | | mJ |
| $R_{th(j-s)}$ | per MOSFET | | 0.68 | | K/W |
| Integrated body diode | | | | | |
| $V_F = V_{SD}$ | $-I_D = 37.5\text{ A}$ $V_{GS} = 0\text{ V}$ chipelevel | $T_j = 25\text{ °C}$ | 0.85 | | V |
| | | $T_j = 150\text{ °C}$ | 0.70 | | V |
| $V_{F0} = V_{SD0}$ | chipelevel | $T_j = 25\text{ °C}$ | 0.70 | | V |
| | | $T_j = 150\text{ °C}$ | 0.50 | | V |
| $r_F = r_{SD}$ | chipelevel | $T_j = 25\text{ °C}$ | 4.0 | | mΩ |
| | | $T_j = 150\text{ °C}$ | 5.3 | | mΩ |
| t_{rr} | $V_{DD} = 400\text{ V}$ $I_D = 37.5\text{ A}$ | $T_j = 150\text{ °C}$ | - | | ns |
| Q_{rr} | | $T_j = 150\text{ °C}$ | - | | μC |
| I_{rr} | | $T_j = 150\text{ °C}$ | - | | A |
| E_{rr} | $V_{GS} = 10\text{ V}$ | $T_j = 150\text{ °C}$ | 2 | | mJ |

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Features

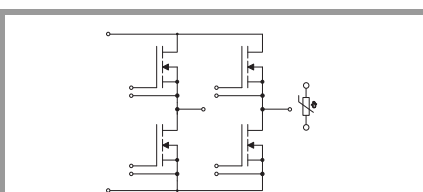
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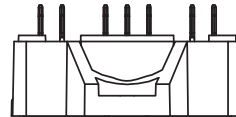
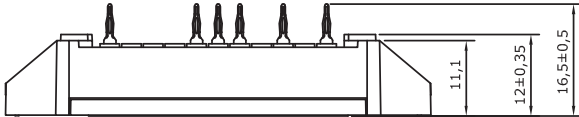
| Characteristics | | | | | |
|-----------------|-------------|------|------|------|------|
| Symbol | Conditions | min. | typ. | max. | Unit |
| Module | | | | | |
| M _s | to heatsink | 1.8 | | 2 | Nm |
| w | weight | | 25 | | g |

| Characteristics | | | | | |
|---------------------------|---|------|-----------|------|------|
| Symbol | Conditions | min. | typ. | max. | Unit |
| Temperature Sensor | | | | | |
| R ₁₀₀ | T _r = 100 °C (R ₂₅ =10 kΩ) | | 865 ± 5% | | Ω |
| B _{25/100} | $R_{(T)}=R_{100} \cdot \exp[B_{25/100} \cdot (1/T - 1/T_{100})]$, T[K]; | | 3630 ± 3% | | K |

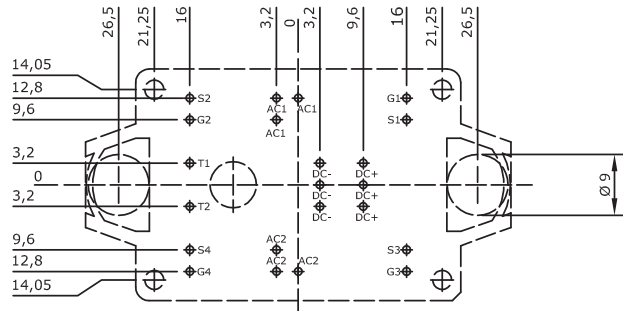
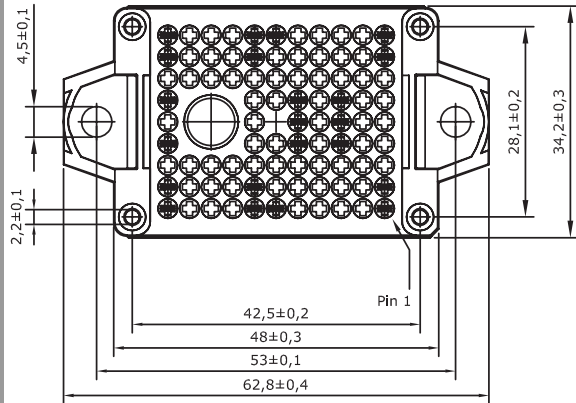


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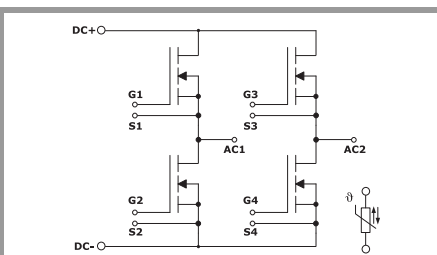
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- Pin-Grid 3.2 mm
- Tolerance of PCB hole pattern $\pm 0,025$
- Diameters of drill $\varnothing 1.15\text{mm}$
- Copper thickness in hole 25 - 50 μm
- Hole specification for contacts: refer to SEMITOP E1, E2 mounting instruction



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

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