

SEMİTOP® 2

IGBT Module

SK60GAL123

SK60GAR123

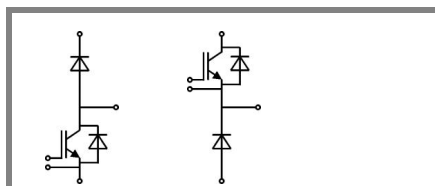
Preliminary Data

Features

- Compact design
- One screw mounting
- Heat transfer and isolation through direct copper bonded aluminium oxide ceramic (DCB)
- N-channel homogeneous silicon structure (NPT-Non punch-through IGBT)
- High short circuit capability
- $V_{ce,sat}$ with positive coefficient
- Low tail current with low temperature dependence

Typical Applications

- Switching (not for linear use)
- Inverter
- Switched mode power supplies
- UPS

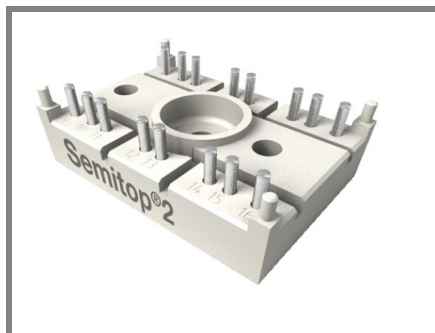


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| Absolute Maximum Ratings | | $T_s = 25\text{ °C}$, unless otherwise specified | | |
|---------------------------|--|---|----|--------------------|
| Symbol | Conditions | Values | | Units |
| IGBT | | | | |
| V_{CES} | $T_j = 25\text{ °C}$ | 1200 | | V |
| I_C | $T_j = 125\text{ °C}$ | $T_s = 25\text{ °C}$ | 58 | A |
| | | $T_s = 80\text{ °C}$ | 40 | A |
| I_{CRM} | $I_{CRM} = 2 \times I_{Cnom}$ | 100 | | A |
| V_{GES} | | ± 20 | | V |
| t_{psc} | $V_{CC} = 600\text{ V}; V_{GE} \leq 20\text{ V}; T_j = 125\text{ °C}$ $V_{CES} < 1200\text{ V}$ | 10 | | μs |
| Inverse Diode | | | | |
| I_F | $T_j = 150\text{ °C}$ | $T_s = 25\text{ °C}$ | 33 | A |
| | | $T_s = 80\text{ °C}$ | 23 | A |
| I_{FRM} | $I_{FRM} = 2 \times I_{Fnom}$ | | | A |
| I_{FSM} | $t_p = 10\text{ ms}; \text{half sine wave } T_j = 150\text{ °C}$ | 110 | | A |
| Freewheeling Diode | | | | |
| I_F | $T_j = 150\text{ °C}$ | $T_{case} = 25\text{ °C}$ | 57 | A |
| | | $T_{case} = 80\text{ °C}$ | 38 | A |
| I_{FRM} | | | | A |
| I_{FSM} | $t_p = 10\text{ ms}; \text{half sine wave } T_j = 150\text{ °C}$ | 550 | | A |
| Module | | | | |
| $I_{t(RMS)}$ | | | | A |
| T_{vj} | | -40 ... +150 | | $^{\circ}\text{C}$ |
| T_{stg} | | -40 ... +125 | | $^{\circ}\text{C}$ |
| V_{isol} | AC, 1 min. | 2500 | | V |

| Characteristics | | $T_s = 25\text{ °C}$, unless otherwise specified | | | | | |
|-----------------|--|---|--------------------------|-----------------------|----------------------------|------------------|-----|
| Symbol | Conditions | min. | typ. | max. | Units | | |
| IGBT | | | | | | | |
| $V_{GE(th)}$ | $V_{GE} = V_{CE}, I_C = 2\text{ mA}$ | 4,5 | 5,5 | 6,5 | V | | |
| I_{CES} | $V_{GE} = 0\text{ V}, V_{CE} = V_{CES}$ | $T_j = 25\text{ °C}$ | | | 0,3 | mA | |
| | | $T_j = 125\text{ °C}$ | | | | mA | |
| I_{GES} | $V_{CE} = 0\text{ V}, V_{GE} = 30\text{ V}$ | $T_j = 25\text{ °C}$ | | | 300 | nA | |
| | | $T_j = 125\text{ °C}$ | | | | nA | |
| V_{CE0} | | $T_j = 25\text{ °C}$ | | | 1,2 | V | |
| | | $T_j = 125\text{ °C}$ | | | 1,2 | V | |
| r_{CE} | $V_{GE} = 15\text{ V}$ | $T_j = 25\text{ °C}$ | | | 26 | $\text{m}\Omega$ | |
| | | $T_j = 125\text{ °C}$ | | | 38 | $\text{m}\Omega$ | |
| $V_{CE(sat)}$ | $I_{Cnom} = 50\text{ A}, V_{GE} = 15\text{ V}$ | $T_j = 25\text{ °C}_{chiplev.}$ | 2,5 | 3 | V | | |
| | | $T_j = 125\text{ °C}_{chiplev.}$ | 3,1 | 3,7 | V | | |
| C_{ies} | $V_{CE} = 25, V_{GE} = 0\text{ V}$ | $f = 1\text{ MHz}$ | | | 3,3 | nF | |
| C_{oes} | | | | | 0,5 | nF | |
| C_{res} | | | | | 0,22 | nF | |
| Q_G | $V_{GE} = 0 \dots 20\text{ V}$ | | | 285 | nC | | |
| $t_{d(on)}$ | $R_{Gon} = 22\ \Omega$ | $V_{CC} = 600\text{ V}$ | $I_{Cnom} = 50\text{ A}$ | $T_j = 125\text{ °C}$ | $V_{GE} = \pm 15\text{ V}$ | 70 | ns |
| | | | | | | t_r | 90 |
| E_{on} | $R_{Goff} = 22\ \Omega$ | $V_{CC} = 600\text{ V}$ | $I_{Cnom} = 50\text{ A}$ | $T_j = 125\text{ °C}$ | $V_{GE} = \pm 15\text{ V}$ | 9,9 | mJ |
| | | | | | | $t_{d(off)}$ | 460 |
| t_f | $R_{Goff} = 22\ \Omega$ | $V_{CC} = 600\text{ V}$ | $I_{Cnom} = 50\text{ A}$ | $T_j = 125\text{ °C}$ | $V_{GE} = \pm 15\text{ V}$ | 30 | ns |
| | | | | | | E_{off} | 5,3 |
| $R_{th(j-s)}$ | per IGBT | | | 0,6 | K/W | | |



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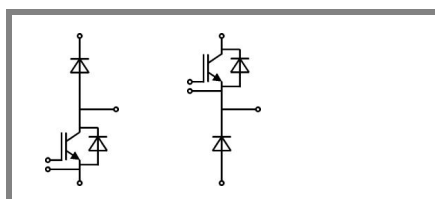
Preliminary Data

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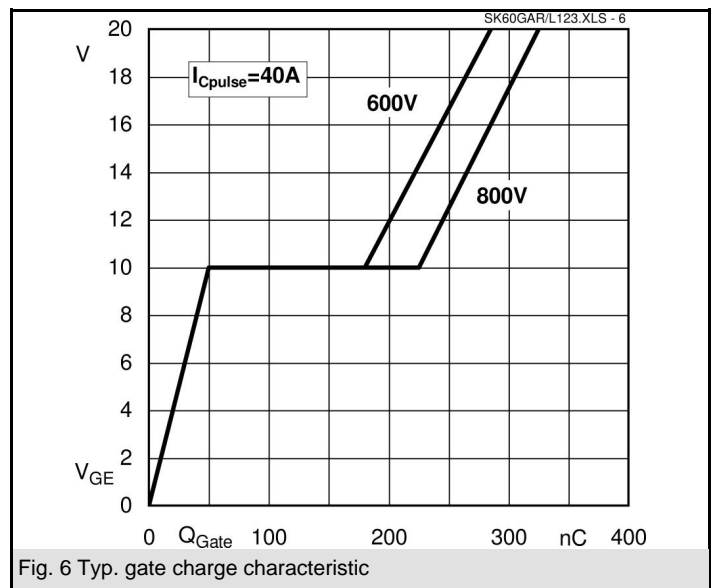
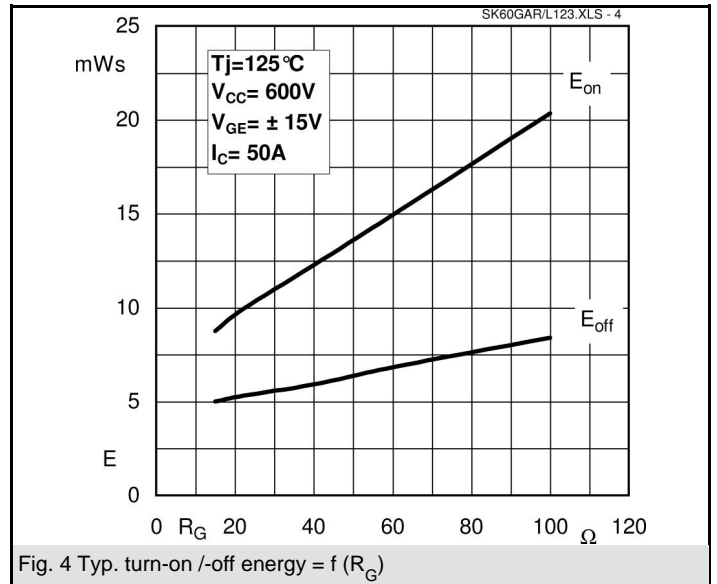
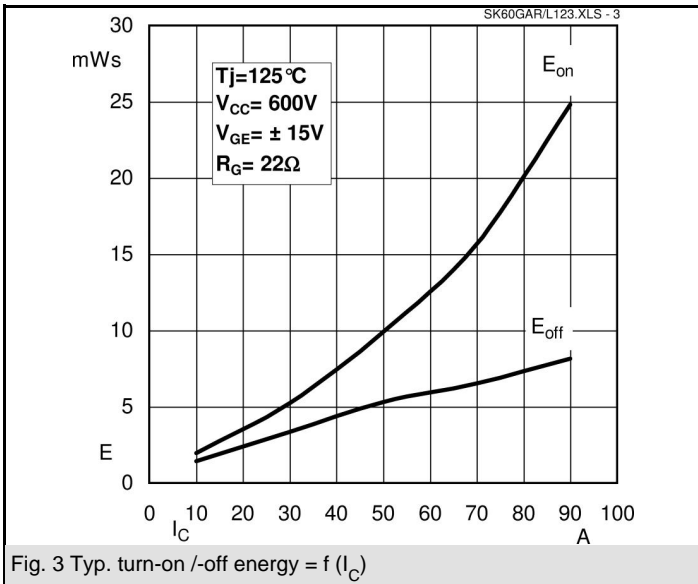
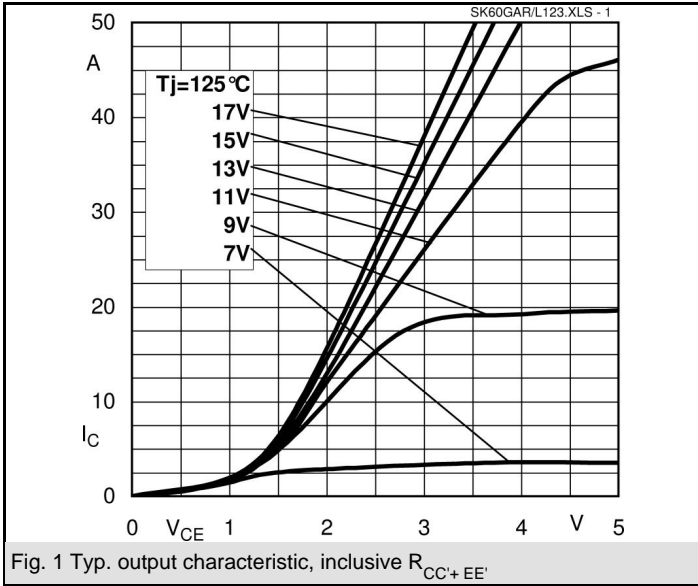
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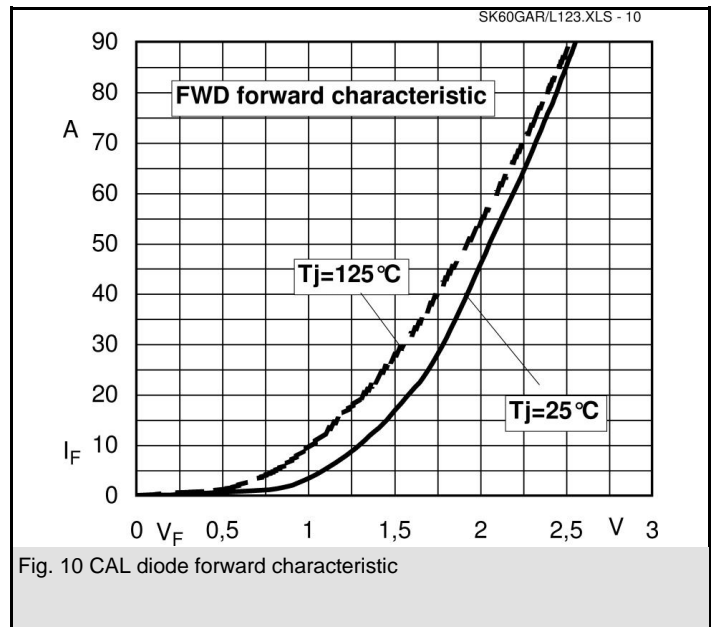
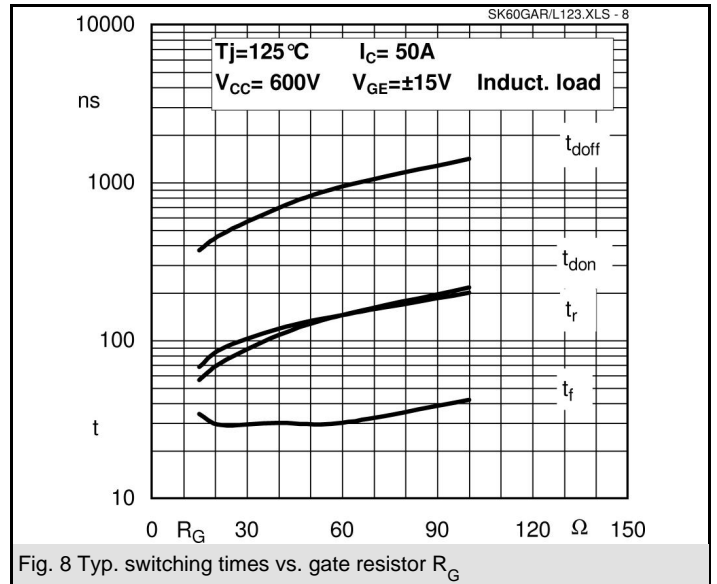
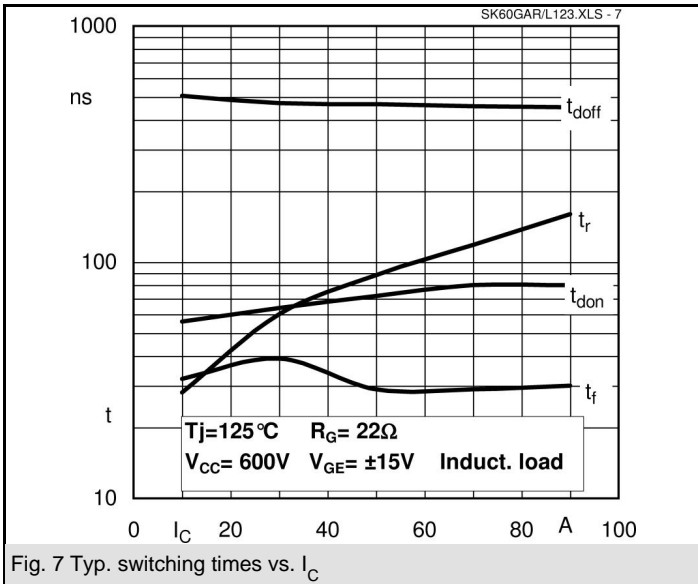
Characteristics

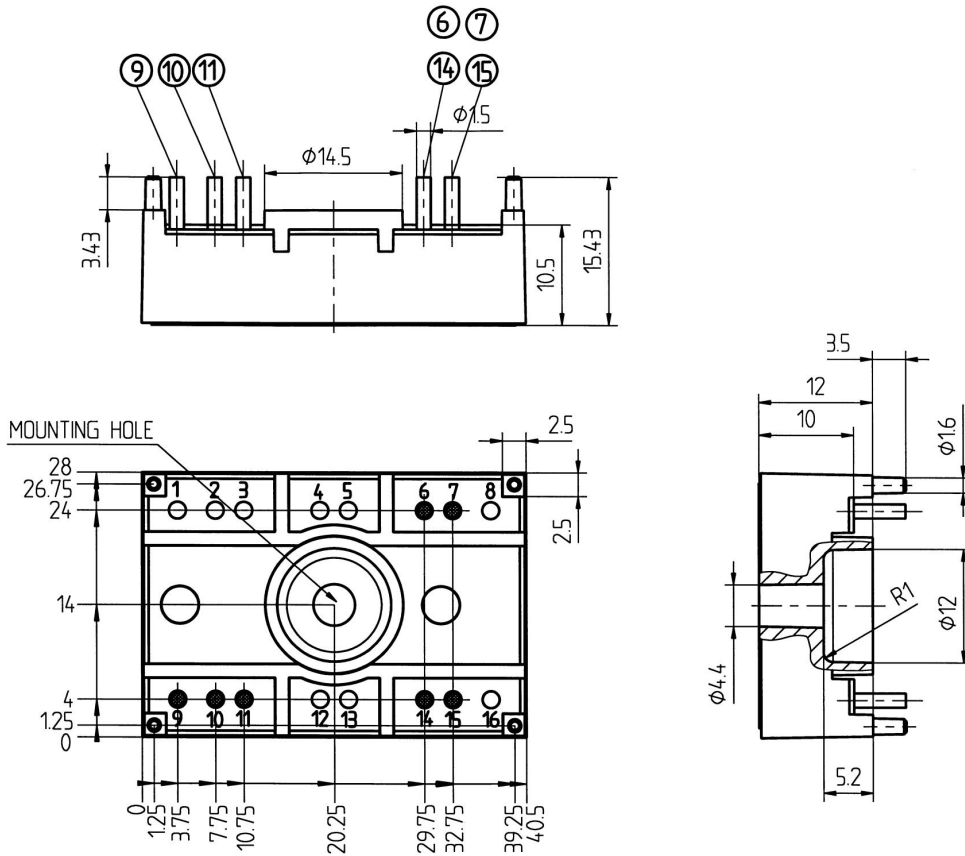
| Symbol | Conditions | min. | typ. | max. | Units |
|---------------------------|---|------|------|------|-------|
| Inverse Diode | | | | | |
| $V_F = V_{EC}$ | $I_{Fnom} = 10 \text{ A}; V_{GE} = 0 \text{ V}$ | | 2 | 2,5 | V |
| | | | 1,8 | 2,3 | V |
| V_{F0} | | | 1 | 1,2 | V |
| r_F | | | 80 | | mΩ |
| I_{RRM} | $I_{Fnom} = 10 \text{ A}$ | | 12 | | A |
| Q_{rr} | $di/dt = -300 \text{ A}/\mu\text{s}$ | | 1,8 | | μC |
| E_{rr} | $V_{CC} = 600 \text{ V}$ | | 0,4 | | mJ |
| $R_{th(j-s)D}$ | per diode | | | 2,1 | K/W |
| Freewheeling Diode | | | | | |
| $V_F = V_{EC}$ | $I_{Fnom} = 50 \text{ A}; V_{GE} = 0 \text{ V}$ | | 1 | 2,5 | V |
| | | | 1,8 | | V |
| V_{F0} | | | 1 | 1,2 | V |
| r_F | | | 18 | 22 | V |
| I_{RRM} | $I_{Fnom} = 50 \text{ A}$ | | 40 | | A |
| Q_{rr} | $di/dt = -800 \text{ A}/\mu\text{s}$ | | 8 | | μC |
| E_{rr} | $V_R = 600 \text{ V}$ | | 2,3 | | mJ |
| $R_{th(j-s)FD}$ | per diode | | | 0,9 | K/W |
| M_s | to heat sink M1 | | | 2 | Nm |
| w | | | 21 | | g |

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

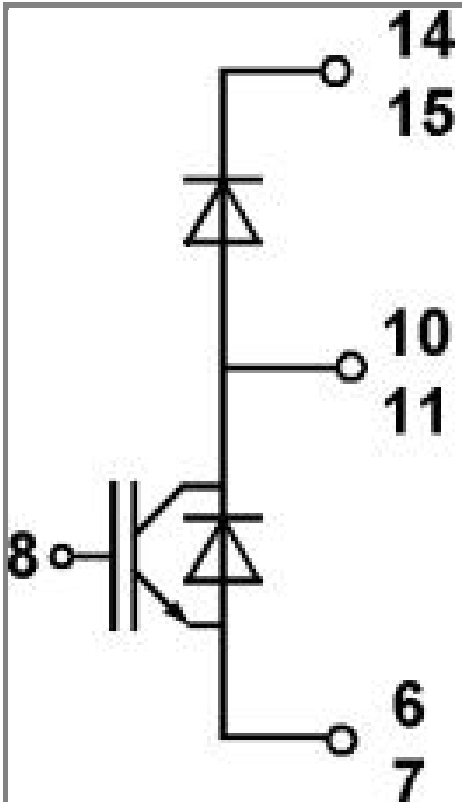
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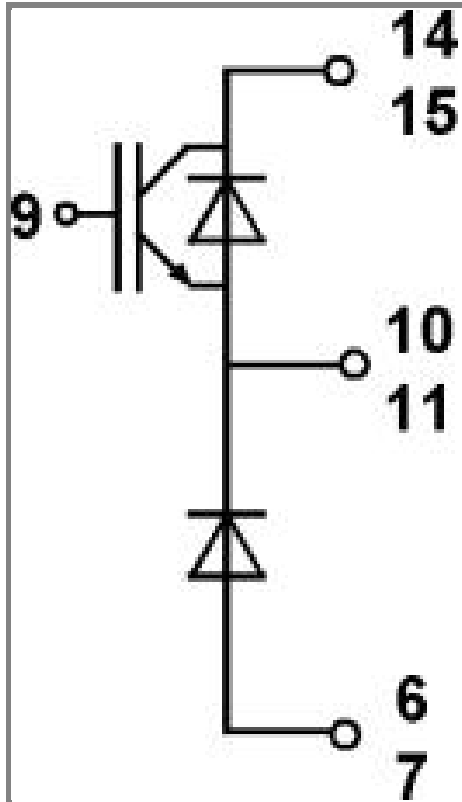


Case T18 (Suggested hole diameter, in the PCB, for solder pins and plastic mounting pins: 2mm)



Case T18

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Case T18

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