



SEMITOP[®] 3

IGBT Module

SK40GB067

SK40GAL067

SK40GAR067

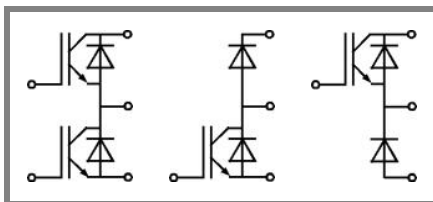
Target Data

Features

- Compact design
- One screw mounting
- Heat transfer and isolation through direct copper bonded aluminium oxide ceramic (DCB)
- Hyperfast NPT technology IGBT
- N-channel homogeneous silicon structure (NPT Non-Punch-Through IGBT)
- Positive $V_{ce,sat}$ temperature coefficient (Easy paralleling)
- Low tail current with low temperature dependence
- Low threshold voltage

Typical Applications*

- Switching (not for linear use)
- High Frequencies Applications
- Welding generator
- Switched mode power supplies
- UPS



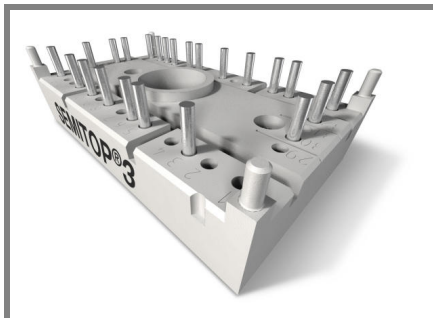
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| Absolute Maximum Ratings | | $T_s = 25\text{ °C}$, unless otherwise specified | | |
|---------------------------|---|---|-----|-------|
| Symbol | Conditions | Values | | Units |
| IGBT | | | | |
| V_{CES} | $T_j = 25\text{ °C}$ | 600 | | V |
| I_C | $T_j = 125\text{ °C}$ | $T_s = 25\text{ °C}$ | 62 | A |
| | | $T_s = 80\text{ °C}$ | 41 | A |
| I_{CRM} | $I_{CRM} = 2 \times I_{Cnom}$ | 180 | | A |
| V_{GES} | | ± 20 | | V |
| t_{psc} | $V_{CC} = 300\text{ V}; V_{GE} \leq 20\text{ V}; T_j = 125\text{ °C}$ $V_{CES} < 600\text{ V}$ | 10 | | µs |
| Inverse Diode | | | | |
| I_F | $T_j = 150\text{ °C}$ | $T_s = 25\text{ °C}$ | 62 | A |
| | | $T_s = 80\text{ °C}$ | 38 | A |
| I_{FRM} | $I_{FRM} = 2 \times I_{Fnom}$ | | | A |
| I_{FSM} | $t_p = 10\text{ ms}$; sinusoidal | $T_j = \text{ °C}$ | 270 | A |
| Freewheeling Diode | | | | |
| I_F | $T_j = 150\text{ °C}$ | $T_s = 25\text{ °C}$ | 62 | A |
| | | $T_s = 80\text{ °C}$ | 38 | A |
| I_{FRM} | $I_{FRM} = 2 \times I_{Fnom}$ | | | A |
| I_{FSM} | $t_p = 10\text{ ms}$; | $T_j = \text{ °C}$ | 270 | A |
| Module | | | | |
| $I_{t(RMS)}$ | | | | A |
| T_{vj} | | -40 ... +150 | | °C |
| T_{stg} | | -40 ... +125 | | °C |
| V_{isol} | AC, 1 min. | 2500 | | V |

| Characteristics | | $T_s = 25\text{ °C}$, unless otherwise specified | | | | |
|-----------------|---|---|------|-------|-------|----|
| Symbol | Conditions | min. | typ. | max. | Units | |
| IGBT | | | | | | |
| $V_{GE(th)}$ | $V_{GE} = V_{CE}, I_C = 0,9\text{ mA}$ | 3 | 4 | 5 | V | |
| I_{CES} | $V_{GE} = 0\text{ V}, V_{CE} = V_{CES}, T_j = 25\text{ °C}$ | | | 0,006 | mA | |
| I_{GES} | $V_{CE} = 0\text{ V}, V_{GE} = 20\text{ V}, T_j = 25\text{ °C}$ | | | 360 | nA | |
| V_{CE0} | $T_j = 150\text{ °C}$ | | | 2 | V | |
| r_{CE} | $V_{GE} = 15\text{ V}, T_j = 150\text{ °C}$ | | | 17 | mΩ | |
| $V_{CE(sat)}$ | $I_{Cnom} = 90\text{ A}, V_{GE} = 15\text{ V}$ | $T_j = 25\text{ °C}_{chiplev.}$ | 2,8 | 3,15 | V | |
| | | $T_j = 125\text{ °C}_{chiplev.}$ | 3,5 | 4 | V | |
| C_{ies} | $V_{CE} = 25, V_{GE} = 0\text{ V}, f = 1\text{ MHz}$ | | | 4,5 | nF | |
| C_{oes} | | | | 0,45 | nF | |
| C_{res} | | | | 0,27 | nF | |
| $t_{d(on)}$ | $R_{Gon} = 0\text{ Ω}$ | $V_{CC} = 400\text{ V}$ $I_C = 90\text{ A}$ | | | 40 | ns |
| t_r | | | | | 90 | ns |
| E_{on} | $R_{Goff} = 11\text{ Ω}$ | $T_j = 125\text{ °C}$ $V_{GE} = \pm 15\text{ V}$ | | | 2,44 | mJ |
| $t_{d(off)}$ | | | | | 262 | ns |
| t_f | | | | | 30 | ns |
| E_{off} | | | | | 2,54 | mJ |
| $R_{th(j-s)}$ | per IGBT | | | 0,6 | K/W | |



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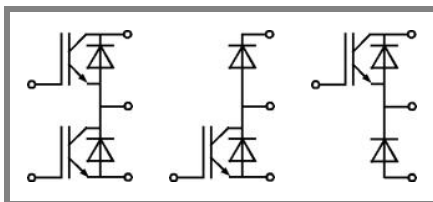
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Characteristics

| Symbol | Conditions | min. | typ. | max. | Units |
|----------------------------|---|------|------|------|---|
| Inverse Diode | | | | | |
| $V_F = V_{EC}$ | $I_{Fnom} = 90 \text{ A}; V_{GE} = 0 \text{ V}$ | | | 2 | V |
| | | | | | $T_j = 25 \text{ }^\circ\text{C}_{chiplev.}$ |
| | | | 1,25 | | $T_j = 150 \text{ }^\circ\text{C}_{chiplev.}$ |
| V_{F0} | | | | | $T_j = 25 \text{ }^\circ\text{C}$ |
| | | | 1 | | $T_j = 150 \text{ }^\circ\text{C}$ |
| r_F | | | | | $T_j = 25 \text{ }^\circ\text{C}$ |
| | | | 5,5 | | $T_j = 150 \text{ }^\circ\text{C}$ |
| I_{RRM} | $I_F = 90 \text{ A}$ | | 7,5 | | A |
| Q_{rr} | $di/dt = -270 \text{ A}/\mu\text{s}$ | | 4,65 | | μC |
| E_{rr} | $V_{CC} = 400\text{V}$ | | 0,93 | | mJ |
| $R_{th(j-s)D}$ | per diode | | | 1,2 | K/W |
| Free-wheeling diode | | | | | |
| $V_F = V_{EC}$ | $I_{Fnom} = 90 \text{ A}; V_{GE} = 0 \text{ V}$ | | | 2 | V |
| | | | | | $T_j = 25 \text{ }^\circ\text{C}_{chiplev.}$ |
| | | | 1,25 | | $T_j = 150 \text{ }^\circ\text{C}_{chiplev.}$ |
| V_{F0} | | | | | $T_j = 25 \text{ }^\circ\text{C}$ |
| | | | 1 | | $T_j = 150 \text{ }^\circ\text{C}$ |
| r_F | | | | | $T_j = 25 \text{ }^\circ\text{C}$ |
| | | | 5,5 | | $T_j = 150 \text{ }^\circ\text{C}$ |
| I_{RRM} | $I_F = 90 \text{ A}$ | | 7,5 | | A |
| Q_{rr} | $di/dt = -270 \text{ A}/\mu\text{s}$ | | 4,65 | | μC |
| E_{rr} | $V_{CC} = 400\text{V}$ | | 0,93 | | mJ |
| $R_{th(j-s)FD}$ | per diode | | | 1,2 | K/W |
| M_s | to heat sink | 2,25 | | 2,5 | Nm |
| w | | | 29 | | g |

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

* The specifications of our components may not be considered as an assurance of component characteristics. Components have to be tested for the respective application. Adjustments may be necessary. The use of SEMIKRON products in life support appliances and systems is subject to prior specification and written approval by SEMIKRON. We therefore strongly recommend prior consultation of our personal.

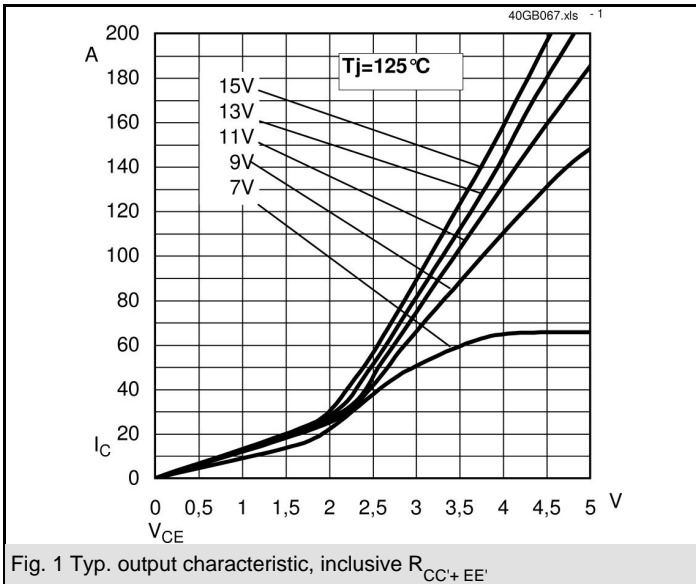


Fig. 1 Typ. output characteristic, inclusive $R_{CC+EE'}$

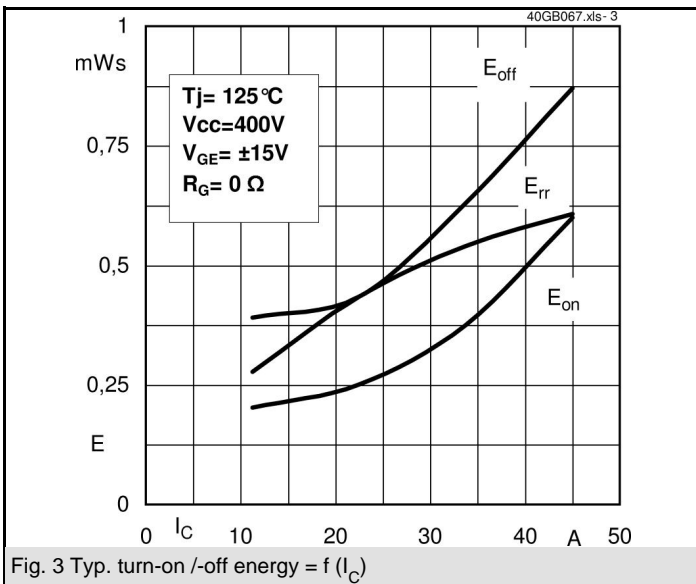


Fig. 3 Typ. turn-on /-off energy = $f(I_C)$

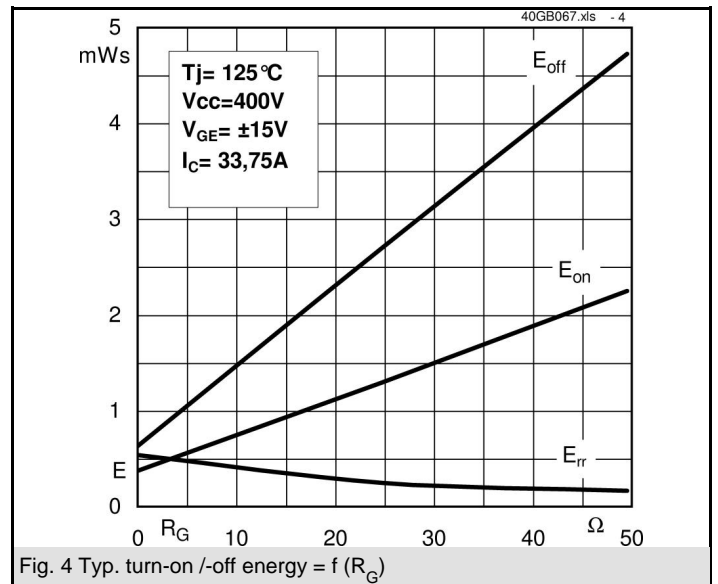


Fig. 4 Typ. turn-on /-off energy = $f(R_G)$

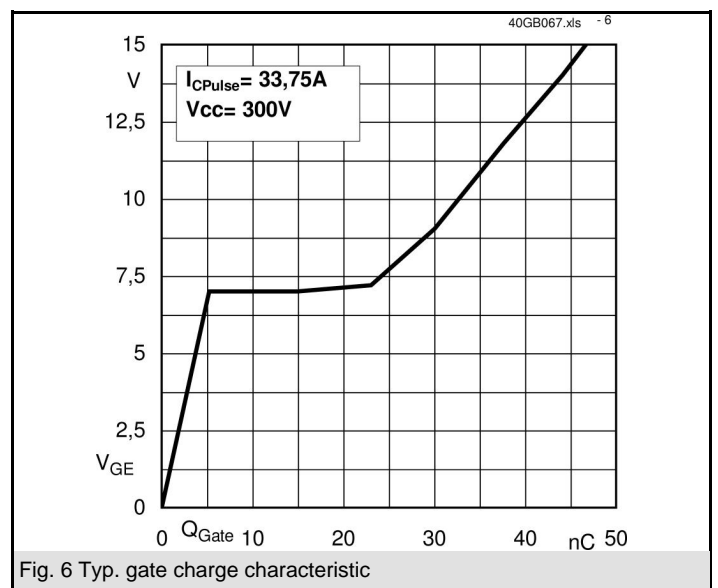
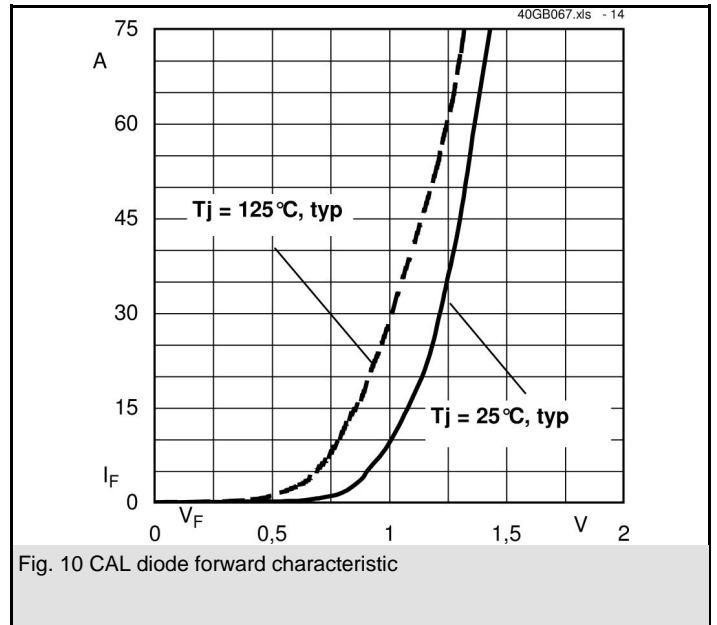
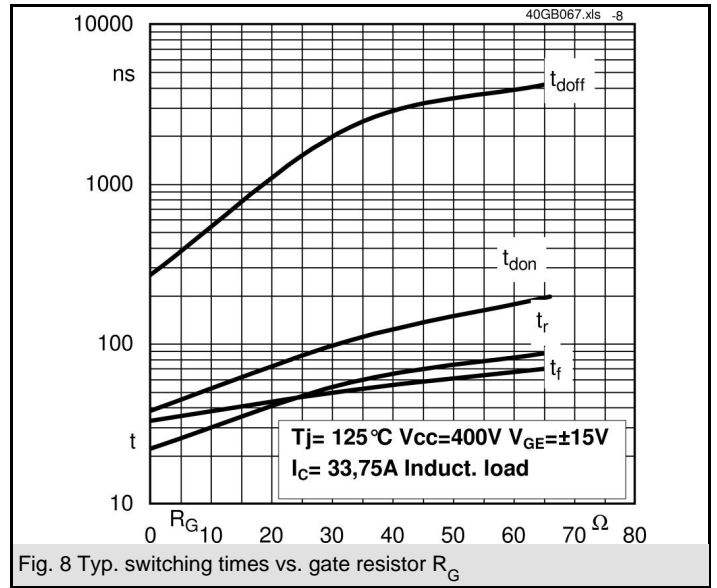
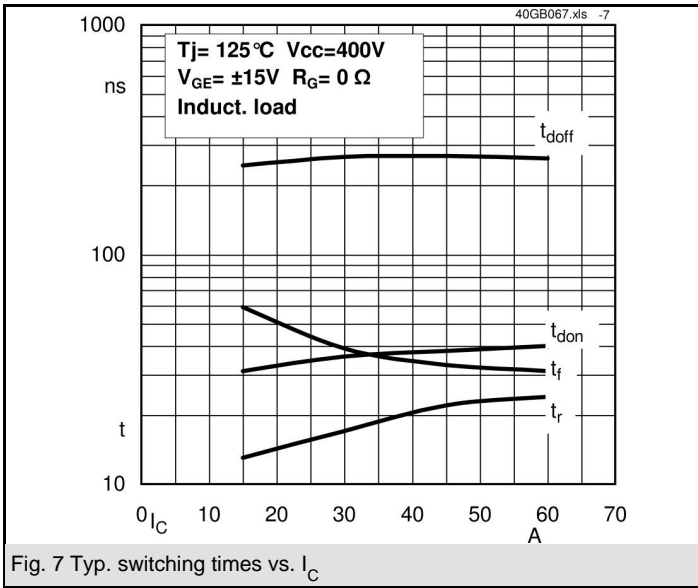
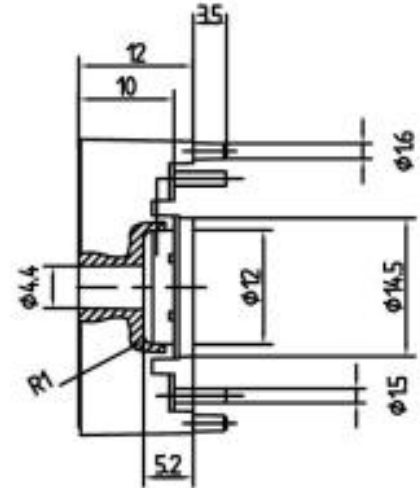
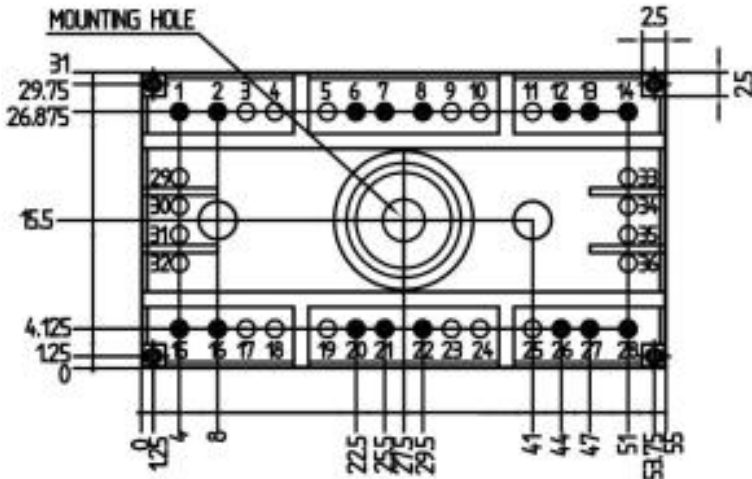
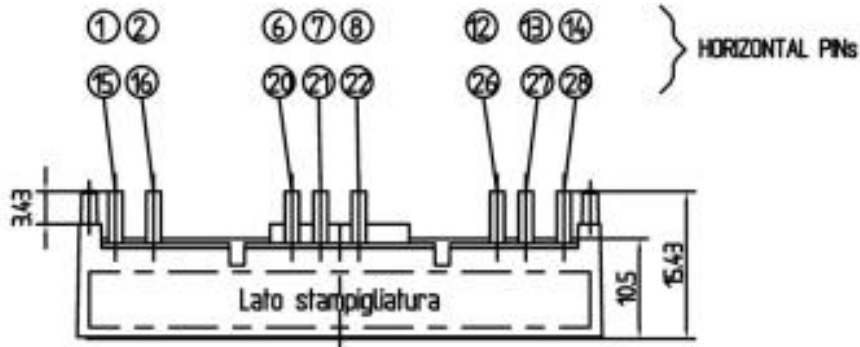
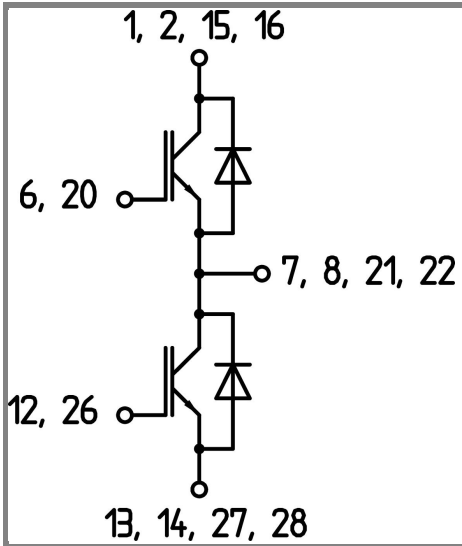


Fig. 6 Typ. gate charge characteristic



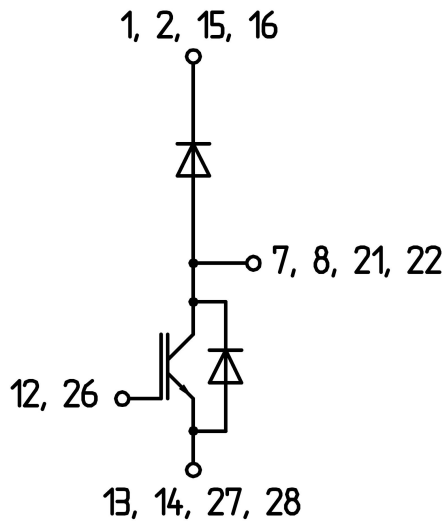


Case T66 (Suggested hole diameter, in the PCB, for solder pins and plastic mounting pins: 2mm)



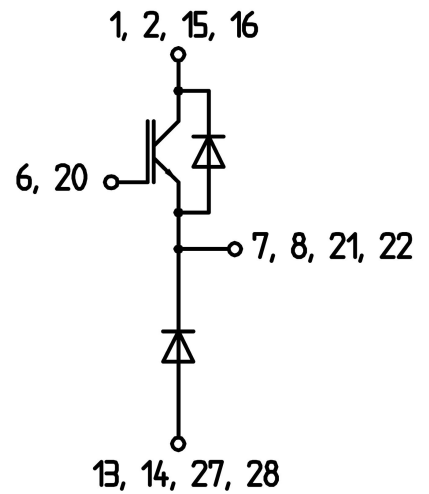
Case T 32

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Case T 70

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Case T 71

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