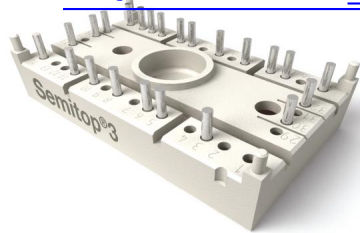


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**SEMITOP® 3**

## IGBT Module

**SK55GARL065E**

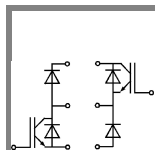
Preliminary Data

### 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
- Low tail current with low temperature dependence

### Typical Applications

- Switching (not for linear use)
- Switched mode power supplies
- UPS
- Double PFC
- Multilevel inverter



**GARL-E**

注意

| Absolute Maximum Ratings |                                                                                                                       | $T_s = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified |                    |   |
|--------------------------|-----------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|--------------------|---|
| Symbol                   | Conditions                                                                                                            | Values                                                          | Units              |   |
| IGBT                     |                                                                                                                       |                                                                 |                    |   |
| $V_{CES}$                | $T_j = 25\text{ }^{\circ}\text{C}$                                                                                    | 600                                                             | V                  |   |
| $I_C$                    | $T_j = 125\text{ }^{\circ}\text{C}$                                                                                   | $T_s = 25\text{ }^{\circ}\text{C}$                              | 54                 | A |
|                          |                                                                                                                       | $T_s = 80\text{ }^{\circ}\text{C}$                              | 40                 | A |
| $I_{CRM}$                | $I_{CRM} = 2 \times I_{Cnom}$                                                                                         | 120                                                             | A                  |   |
| $V_{GES}$                |                                                                                                                       | $\pm 20$                                                        | V                  |   |
| $t_{psc}$                | $V_{CC} = 300\text{ V}$ ; $V_{GE} \leq 20\text{ V}$ ; $T_j = 125\text{ }^{\circ}\text{C}$<br>$V_{CES} < 600\text{ V}$ | 10                                                              | $\mu\text{s}$      |   |
| Inverse Diode            |                                                                                                                       |                                                                 |                    |   |
| $I_F$                    | $T_j = 150\text{ }^{\circ}\text{C}$                                                                                   | $T_s = 25\text{ }^{\circ}\text{C}$                              | 36                 | A |
|                          |                                                                                                                       | $T_s = 80\text{ }^{\circ}\text{C}$                              | 24                 | A |
| $I_{FRM}$                | $I_{FRM} = 2 \times I_{Fnom}$                                                                                         |                                                                 | A                  |   |
| $I_{FSM}$                | $t_p = 10\text{ ms}$ ; half sine wave $T_j = 150\text{ }^{\circ}\text{C}$                                             | 200                                                             | A                  |   |
| Freewheeling Diode       |                                                                                                                       |                                                                 |                    |   |
| $I_F$                    | $T_j = 150\text{ }^{\circ}\text{C}$                                                                                   | $T_s = 25\text{ }^{\circ}\text{C}$                              | 64                 | A |
|                          |                                                                                                                       | $T_s = 80\text{ }^{\circ}\text{C}$                              | 48                 | A |
| $I_{FRM}$                | $I_{FRM} = 2 \times I_{Fnom}$                                                                                         |                                                                 | A                  |   |
| $I_{FSM}$                | $t_p = 10\text{ ms}$ ; half sine wave $T_j = 150\text{ }^{\circ}\text{C}$                                             | 440                                                             | 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 <sub>s</sub> = 25 °C, unless otherwise specified |      |        |       |
|----------------------|--------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|----------------------------------------------------|------|--------|-------|
| Symbol               | Conditions                                                                                 |                                                                                                        | min.                                               | typ. | max.   | Units |
| IGBT                 |                                                                                            |                                                                                                        |                                                    |      |        |       |
| V <sub>GE(th)</sub>  | V <sub>GE</sub> = V <sub>CE</sub> , I <sub>C</sub> = 1,4 mA                                |                                                                                                        | 3                                                  | 4    | 5      | V     |
| I <sub>CES</sub>     | V <sub>GE</sub> = 600 V, V <sub>CE</sub> = V <sub>CES</sub> T <sub>j</sub> = 25 °C         |                                                                                                        |                                                    |      | 0,0044 | mA    |
| I <sub>GES</sub>     | V <sub>CE</sub> = 0 V, V <sub>GE</sub> = 20 V T <sub>j</sub> = 25 °C                       |                                                                                                        |                                                    |      | 240    | nA    |
| V <sub>CE0</sub>     | T <sub>j</sub> = 25 °C                                                                     |                                                                                                        |                                                    | 1,2  | 1,3    | V     |
|                      | T <sub>j</sub> = 125 °C                                                                    |                                                                                                        |                                                    | 1,1  | 0,9    | V     |
| r <sub>CE</sub>      | V <sub>GE</sub> = 15 V T <sub>j</sub> = 25°C                                               |                                                                                                        |                                                    |      | 12     | mΩ    |
|                      | T <sub>j</sub> = 125°C                                                                     |                                                                                                        |                                                    |      | 22     | mΩ    |
| V <sub>CE(sat)</sub> | I <sub>Cnom</sub> = 60 A, V <sub>GE</sub> = 15 V T <sub>j</sub> = 25°C <sub>chiplev.</sub> |                                                                                                        |                                                    | 1,7  | 2      | V     |
|                      | T <sub>j</sub> = 125°C <sub>chiplev.</sub>                                                 |                                                                                                        |                                                    | 2,2  | 2,2    | V     |
| C <sub>ies</sub>     | V <sub>CE</sub> = 25, V <sub>GE</sub> = 0 V f = 1 MHz                                      |                                                                                                        |                                                    | 3,2  |        | nF    |
| C <sub>oes</sub>     |                                                                                            |                                                                                                        |                                                    | 0,3  |        | nF    |
| C <sub>res</sub>     |                                                                                            |                                                                                                        |                                                    | 0,18 |        | nF    |
| Q <sub>G</sub>       | V <sub>GE</sub> =0 ... 20 V                                                                |                                                                                                        |                                                    | 375  |        | nC    |
| t <sub>d(on)</sub>   | R <sub>Gon</sub> = 16 Ω                                                                    | V <sub>CC</sub> = 300V<br>I <sub>Cnom</sub> = 40A<br>T <sub>j</sub> = 125 °C<br>V <sub>GE</sub> = ±15V |                                                    | 60   | 80     | ns    |
| t <sub>r</sub>       |                                                                                            |                                                                                                        |                                                    | 30   | 40     | ns    |
| E <sub>on</sub>      |                                                                                            |                                                                                                        | 1,1                                                |      | mJ     |       |
| t <sub>d(off)</sub>  | R <sub>Goff</sub> = 16 Ω                                                                   |                                                                                                        |                                                    | 220  | 280    | ns    |
| t <sub>f</sub>       |                                                                                            |                                                                                                        |                                                    | 20   | 26     | ns    |
| E <sub>off</sub>     |                                                                                            |                                                                                                        |                                                    | 0,76 |        | mJ    |
| R <sub>th(j-s)</sub> | per IGBT                                                                                   |                                                                                                        |                                                    |      | 0,85   | K/W   |



IGBT Module

SK55GARL065E

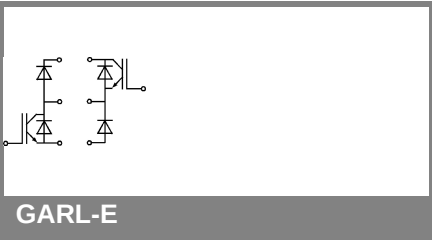
Preliminary Data

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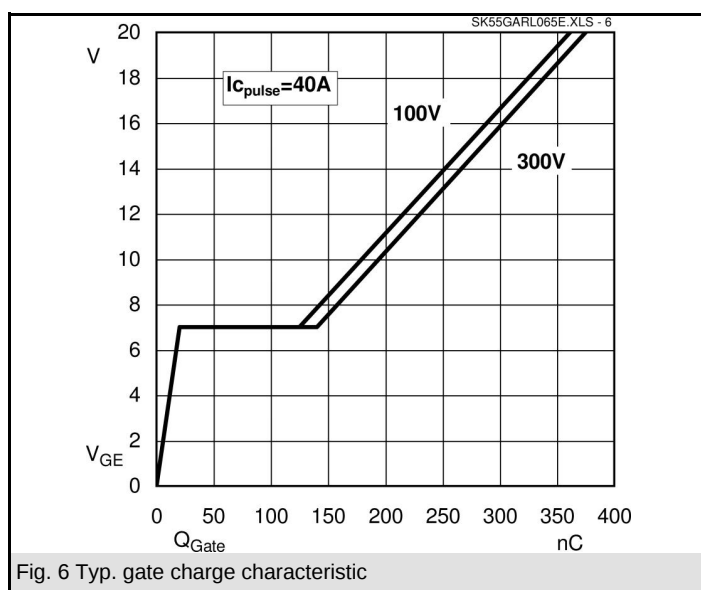
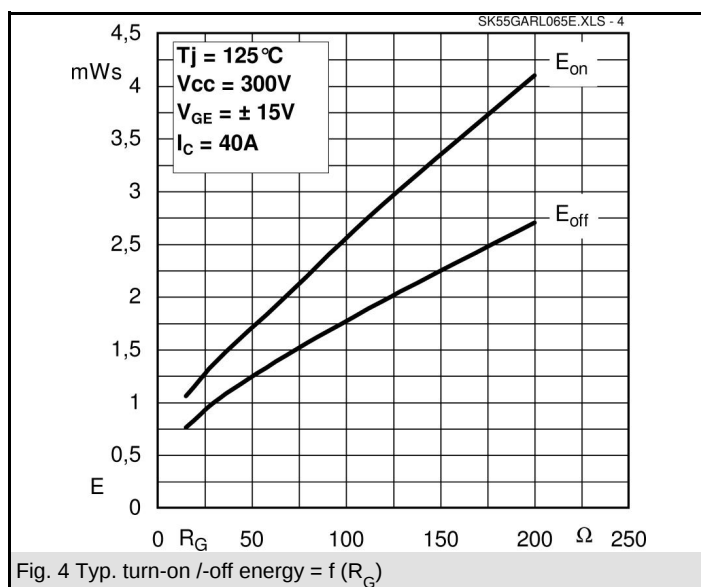
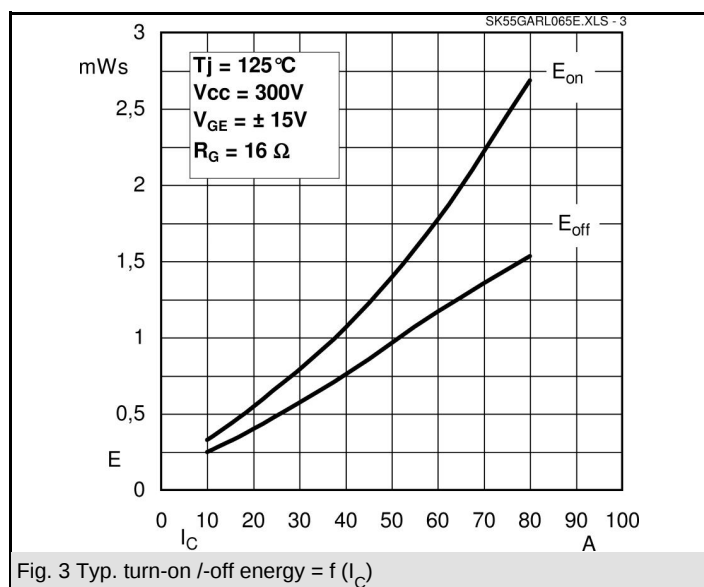
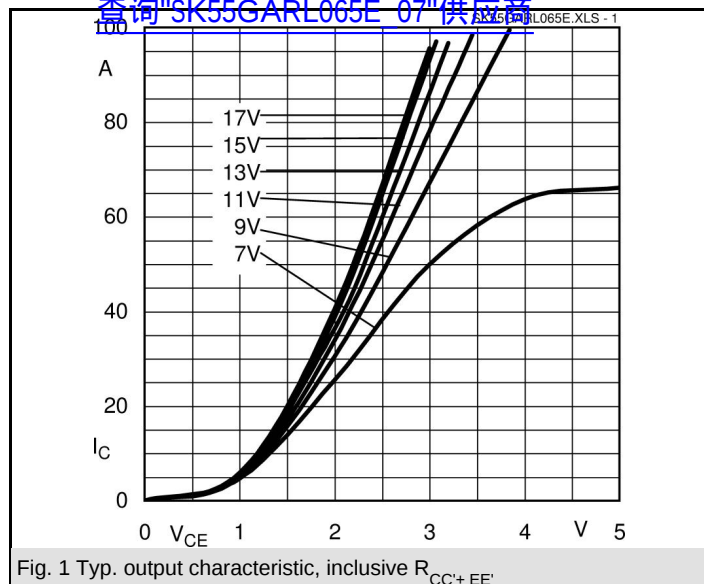


| Characteristics    |                                               |      |                                                |      |       |
|--------------------|-----------------------------------------------|------|------------------------------------------------|------|-------|
| Symbol             | Conditions                                    | min. | typ.                                           | max. | Units |
| Inverse Diode      |                                               |      |                                                |      |       |
| $V_F = V_{EC}$     | $I_{Fnom} = 25\text{ A}; V_{GE} = 0\text{ V}$ |      | $T_j = 25\text{ }^{\circ}\text{C}_{chiplev.}$  | 1,45 | 1,7   |
|                    |                                               |      | $T_j = 125\text{ }^{\circ}\text{C}_{chiplev.}$ | 1,4  | 1,75  |
| $V_{F0}$           | $T_j = 125\text{ }^{\circ}\text{C}$           |      | 0,85                                           | 0,9  | V     |
| $r_F$              | $T_j = 125\text{ }^{\circ}\text{C}$           |      | 22                                             | 32   | mΩ    |
| $I_{RRM}$          | $I_{Fnom} = 50\text{ A}$                      |      | 57                                             |      | A     |
| $Q_{rr}$           | $di/dt = -2400\text{ A/}\mu\text{s}$          |      | 4,6                                            |      | μC    |
| $E_{rr}$           | $V_{CC}=300\text{V}$                          |      | 0,9                                            |      | mJ    |
| $R_{th(j-s)D}$     | per diode                                     |      |                                                | 1,7  | K/W   |
| Freewheeling diode |                                               |      |                                                |      |       |
| $V_F = V_{EC}$     | $I_{Fnom} = 50\text{ A}; V_{GE} = 0\text{ V}$ |      | $T_j = 25\text{ }^{\circ}\text{C}_{chiplev.}$  | 1,45 | 1,7   |
|                    |                                               |      | $T_j = 125\text{ }^{\circ}\text{C}_{chiplev.}$ | 1,4  | 1,75  |
| $V_{F0}$           | $T_j = 125\text{ }^{\circ}\text{C}$           |      | 0,85                                           | 0,9  | V     |
| $r_F$              | $T_j = 125\text{ }^{\circ}\text{C}$           |      | 11                                             | 16   | V     |
| $I_{RRM}$          | $I_{Fnom} = 50\text{ A}$                      |      | 30                                             |      | A     |
| $Q_{rr}$           | $di/dt = -800\text{ A/}\mu\text{s}$           |      | 3,6                                            |      | μC    |
| $E_{rr}$           | $V_R=300\text{V}$                             |      | 0,95                                           |      | mJ    |
| $R_{th(j-s)D}$     | per diode                                     |      |                                                | 1,1  | K/W   |
| $M_s$              | to heat sink                                  | 2,25 |                                                | 2,5  | Nm    |
| w                  |                                               |      | 30                                             |      | g     |

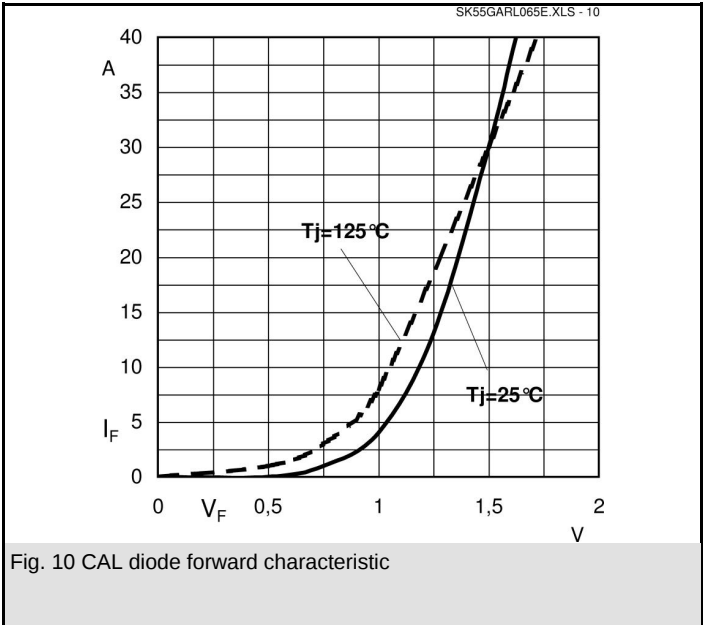
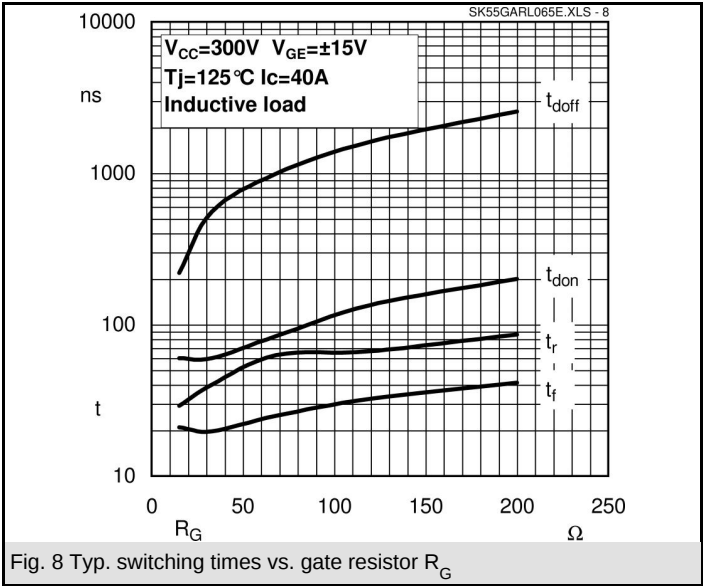
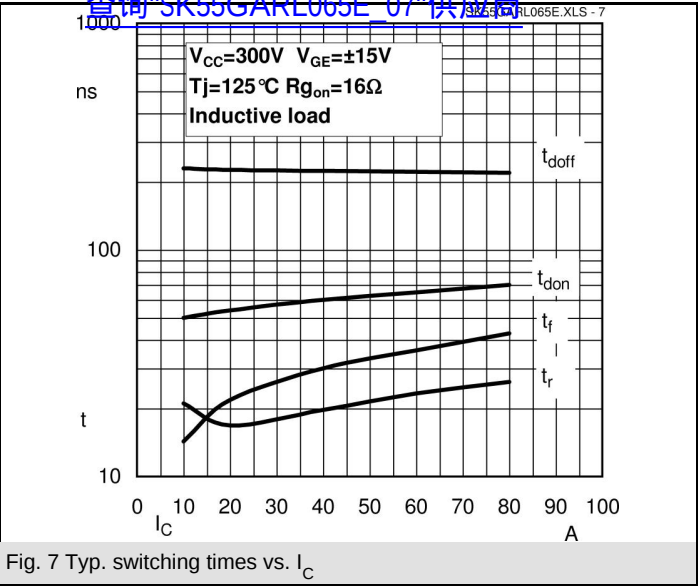
This is an electrostatic discharge sensitive device (ESDS), international standard IEC 60747-1, Chapter IX.

This technical information specifies semiconductor devices but promises no characteristics. No warranty or guarantee expressed or implied is made regarding delivery, performance or suitability.

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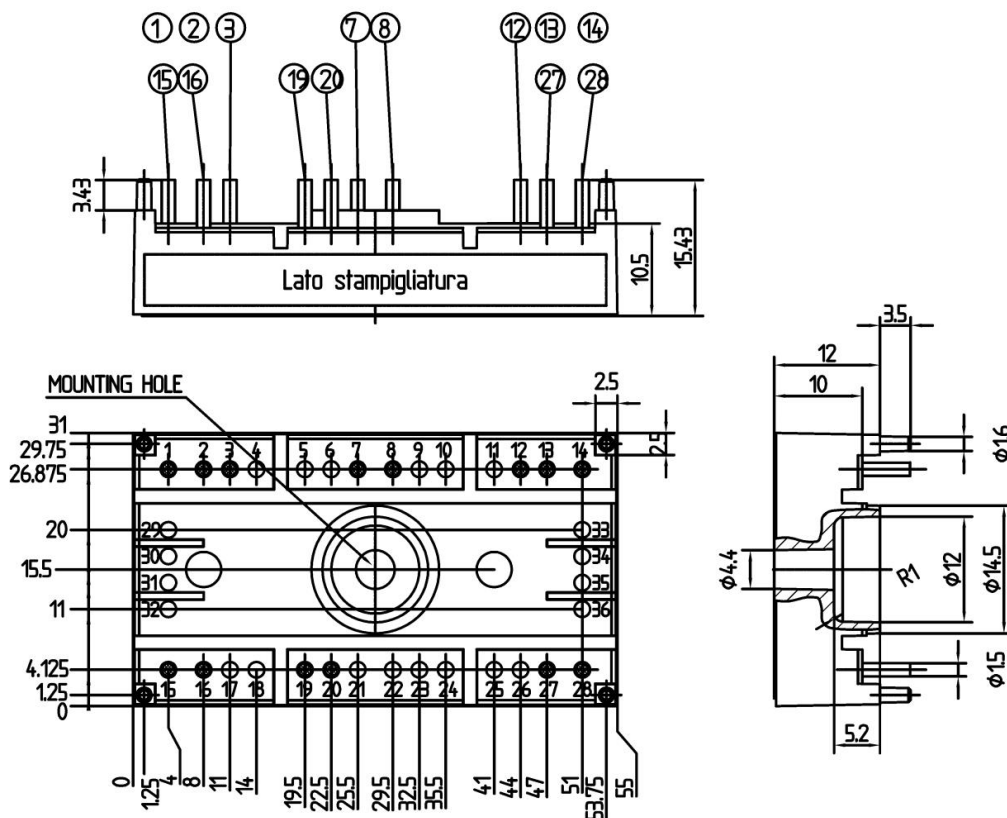
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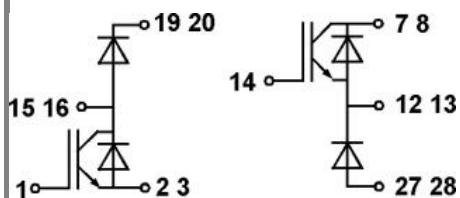
# SK55GARL065E

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no. E 63 532



Case T55 (Suggested hole diameter, in the PCB, for solder pins and plastic mounting pins: 2mm)



Case T55

GARL-E