

# SKM 75GB063D



**SEMITRANS<sup>®</sup> 2**

## Superfast NPT-IGBT Modules

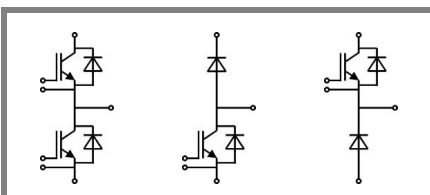
**SKM 75GB063D**  
**SKM 75GAR063D**  
**SKM 75GAL063D**

### Features

- N channel, homogeneous Si-structure (NPT-Non punch-through IGBT)
- Low tail current with low temperature dependence
- High short circuit capability, self limiting if term. G is clamped to E
- Pos. temp.-coeff. of  $V_{CEsat}$
- Very low  $C_{ies}$ ,  $C_{oes}$ ,  $C_{res}$
- Latch-up free
- Fast & soft inverse CAL diodes
- Isolated copper baseplate using DBC Direct Copper Bonding Technology without hard mould
- Large clearance (10 mm) and creepage distances (20 mm)

### Typical Applications\*

- Switching (not for linear use)
- Switched mode power supplies
- UPS
- Three phase inverters for servo / AC motor speed control
- Pulse frequencies also > 10kHz



**GB GAL GAR**

| Absolute Maximum Ratings  |   | $T_c = 25\text{ }^\circ\text{C}$ , unless otherwise specified |     |                  |   |
|---------------------------|---|---|-----|------------------|---|
| Symbol                    | Conditions  | Values  |     | Units            |   |
| <b>IGBT</b>               |   |   |     |                  |   |
| $V_{CES}$                 | $T_j = 25\text{ }^\circ\text{C}$  | 600   |     | V                |   |
| $I_C$                     | $T_j = 150\text{ }^\circ\text{C}$   | $T_{case} = 25\text{ }^\circ\text{C}$                         | 100 | A                |   |
|                           |   | $T_{case} = 75\text{ }^\circ\text{C}$                         | 75  | A                |   |
| $I_{CRM}$                 | $I_{CRM} = 2 \times I_{Cnom}$   | 150   |     | 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  |     | $\mu\text{s}$    |   |
| <b>Inverse Diode</b>      |   |   |     |                  |   |
| $I_F$                     | $T_j = 150\text{ }^\circ\text{C}$   | $T_{case} = 25\text{ }^\circ\text{C}$                         | 75  | A                |   |
|                           |   | $T_{case} = 80\text{ }^\circ\text{C}$                         | 50  | A                |   |
| $I_{FRM}$                 | $I_{FRM} = 2 \times I_{Fnom}$   | 150   |     | A                |   |
| $I_{FSM}$                 | $t_p = 10\text{ ms}; \sin.$   | $T_j = 150\text{ }^\circ\text{C}$                             | 440 |                  | A |
| <b>Freewheeling Diode</b> |   |   |     |                  |   |
| $I_F$                     | $T_j = 150\text{ }^\circ\text{C}$   | $T_c = 25\text{ }^\circ\text{C}$                              | 100 | A                |   |
|                           |   | $T_c = 80\text{ }^\circ\text{C}$                              | 75  | A                |   |
| $I_{FRM}$                 | $I_{FRM} = 2 \times I_{Fnom}$   | 200   |     | A                |   |
| $I_{FSM}$                 | $t_p = 10\text{ ms}; \sin$  | $T_j = 150\text{ }^\circ\text{C}$                             | 720 |                  | A |
| <b>Module</b>             |   |   |     |                  |   |
| $I_{t(RMS)}$              |   | 200   |     | A                |   |
| $T_{vj}$                  |   | - 40 ... + 150  |     | $^\circ\text{C}$ |   |
| $T_{stg}$                 |   | - 40 ... + 125  |     | $^\circ\text{C}$ |   |
| $V_{isol}$                | AC, 1 min.  | 2500  |     | V                |   |

| Characteristics |  | $T_c = 25\text{ }^\circ\text{C}$ , unless otherwise specified   |  |      |                  |   |
|-----------------|--|---|--|------|------------------|---|
| Symbol          | Conditions                                     | min.  | typ.   | max. | Units            |   |
| <b>IGBT</b>     |  |   |  |      |                  |   |
| $V_{GE(th)}$    | $V_{GE} = V_{CE}, I_C = 1\text{ mA}$           | 4,5   | 5,5  | 6,5  | V                |   |
| $I_{CES}$       | $V_{GE} = 0\text{ V}, V_{CE} = V_{CES}$        |   | $T_j = 25\text{ }^\circ\text{C}$<br>0,1      | 0,3  | $\text{mA}$      |   |
| $V_{CE0}$       |  |   | $T_j = 25\text{ }^\circ\text{C}$             | 1,05 | V                |   |
|                 |  |   | $T_j = 125\text{ }^\circ\text{C}$            | 1    | V                |   |
| $r_{CE}$        | $V_{GE} = 15\text{ V}$                         |   | $T_j = 25\text{ }^\circ\text{C}$             | 14   | $\text{m}\Omega$ |   |
|                 |  |   | $T_j = 125\text{ }^\circ\text{C}$            | 18,7 | $\text{m}\Omega$ |   |
| $V_{CE(sat)}$   | $I_{Cnom} = 75\text{ A}, V_{GE} = 15\text{ V}$ |   | $T_j = 25\text{ }^\circ\text{C}_{chiplev.}$  | 2,1  | 2,5              | V |
|                 |  |   | $T_j = 125\text{ }^\circ\text{C}_{chiplev.}$ | 2,4  | 2,8              | V |
| $C_{ies}$       | $V_{CE} = 25, V_{GE} = 0\text{ V}$             | $f = 1\text{ MHz}$  |  | 4,2  | nF               |   |
| $C_{oes}$       |  |   |  | 0,5  | nF               |   |
| $C_{res}$       |  |   |  | 0,3  | nF               |   |
| $Q_G$           | $V_{GE} = 0\text{ V} \dots +15\text{ V}$       |   | 180  |      | nC               |   |
| $R_{Gint}$      | $T_j = \text{ }^\circ\text{C}$                 |   | 0  |      | $\Omega$         |   |
| $t_{d(on)}$     | $R_{Gon} = 15\text{ } \Omega$                  | $V_{CC} = 300\text{ V}$<br>$I_C = 75\text{ A}$                  |  | 60   | ns               |   |
| $t_r$           |  |   |  | 50   | ns               |   |
| $E_{on}$        |  |   |  | 3    | mJ               |   |
| $t_{d(off)}$    | $R_{Goff} = 15\text{ } \Omega$                 | $T_j = 125\text{ }^\circ\text{C}$<br>$V_{GE} = \pm 15\text{ V}$ |  | 350  | ns               |   |
| $t_f$           |  |   |  | 35   | ns               |   |
| $E_{off}$       |  |   |  | 2,5  | mJ               |   |
| $R_{th(j-c)}$   | per IGBT                                       |   |  | 0,35 | K/W              |   |



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## Superfast NPT-IGBT Modules

**SKM 75GB063D**

**SKM 75GAR063D**

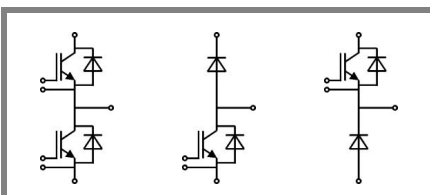
**SKM 75GAL063D**

### Features

- N channel, homogeneous Si-structure (NPT-Non punch-through IGBT)
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### Typical Applications\*

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GB

GAL

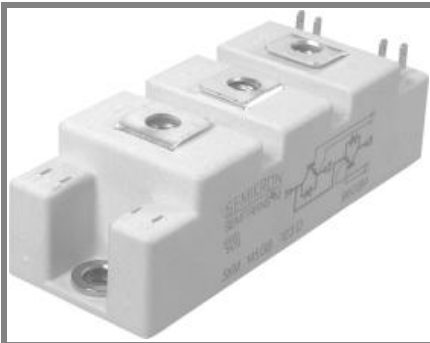
GAR

| Characteristics           |  | min.                                    | typ. | max. | Units         |
|---------------------------|--|---|------|------|---------------|
| <b>Inverse Diode</b>      |  |   |      |      |               |
| $V_F = V_{EC}$            | $I_{Fnom} = 75 \text{ A}; V_{GE} = 0 \text{ V}$  |   | 1,55 | 1,9  | V             |
|                           | $T_j = 25 \text{ }^\circ\text{C}_{chiplev.}$     |   |      |      |               |
|                           | $T_j = 125 \text{ }^\circ\text{C}_{chiplev.}$    |   | 1,55 |      | V             |
| $V_{F0}$                  |  |   |      | 0,9  | V             |
| $r_F$                     |  |   | 10   | 13,3 | m $\Omega$    |
| $I_{RRM}$                 | $I_F = 75 \text{ A}$                             |   | 30   |      | A             |
| $Q_{rr}$                  | $di/dt = 800 \text{ A}/\mu\text{s}$              |   | 3,7  |      | $\mu\text{C}$ |
| $E_{rr}$                  | $V_{GE} = -15 \text{ V}; V_{CC} = 300 \text{ V}$ |   |      |      | mJ            |
| $R_{th(j-c)D}$            | per diode  |   |      | 0,72 | K/W           |
| <b>Freewheeling Diode</b> |  |   |      |      |               |
| $V_F = V_{EC}$            | $I_{Fnom} = 100 \text{ A}; V_{GE} = 0 \text{ V}$ |   | 1,55 | 1,9  | V             |
|                           | $T_j = 25 \text{ }^\circ\text{C}_{chiplev.}$     |   |      |      |               |
|                           | $T_j = 125 \text{ }^\circ\text{C}_{chiplev.}$    |   | 1,55 |      | V             |
| $V_{F0}$                  |  |   |      | 0,9  | V             |
| $r_F$                     |  |   | 8    | 10   | V             |
| $I_{RRM}$                 | $I_F = 100 \text{ A}$                            |   | 44   |      | A             |
| $Q_{rr}$                  | $di/dt = 0 \text{ A}/\mu\text{s}$                |   | 6    |      | $\mu\text{C}$ |
| $E_{rr}$                  | $V_{GE} = -15 \text{ V}; V_{CC} = 300 \text{ V}$ |   |      |      | mJ            |
| $R_{th(j-c)FD}$           | per diode  |   |      | 0,6  | K/W           |
| <b>Module</b>             |  |   |      |      |               |
| $L_{CE}$                  |  |   |      | 30   | nH            |
| $R_{CC+EE'}$              | res., terminal-chip                              | $T_{case} = 25 \text{ }^\circ\text{C}$  | 0,75 |      | m $\Omega$    |
|                           |  | $T_{case} = 125 \text{ }^\circ\text{C}$ | 1    |      | m $\Omega$    |
| $R_{th(c-s)}$             | per module                                       |   |      | 0,05 | K/W           |
| $M_s$                     | to heat sink M6                                  |   | 3    | 5    | Nm            |
| $M_t$                     | to terminals M5                                  |   | 2,5  | 5    | Nm            |
| w                         |  |   |      | 160  | 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.

# SKM 75GB063D



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## Superfast NPT-IGBT Modules

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**SKM 75GAR063D**

**SKM 75GAL063D**

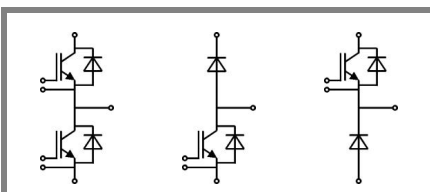
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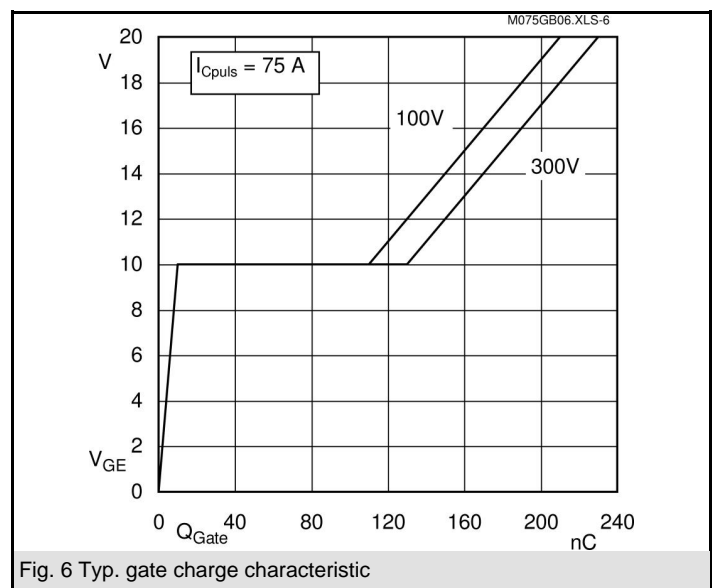
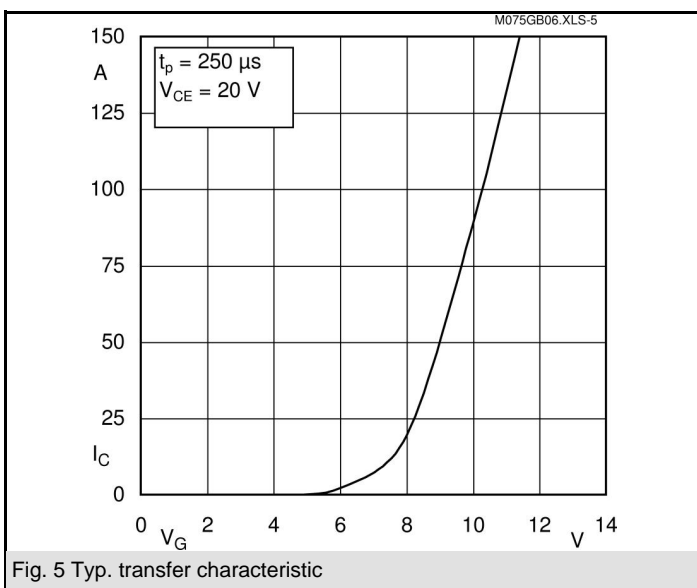
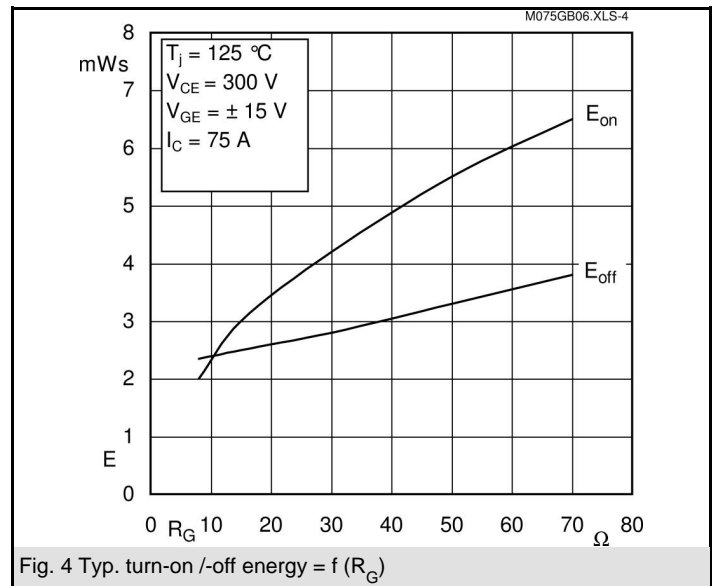
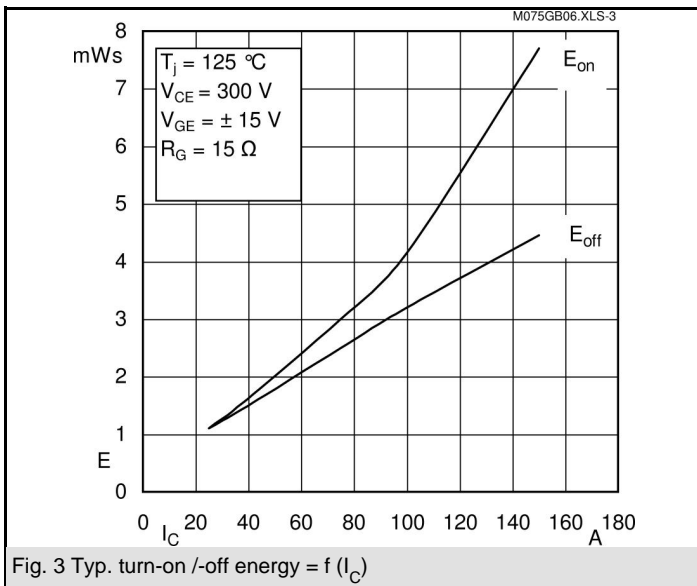
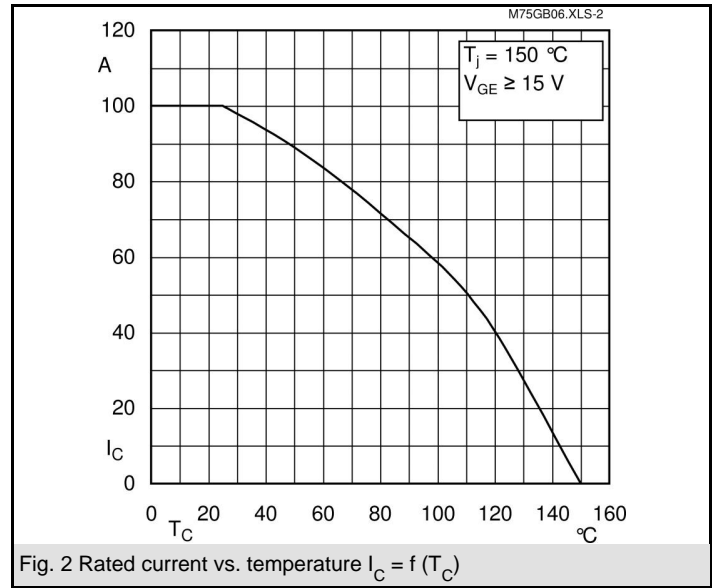
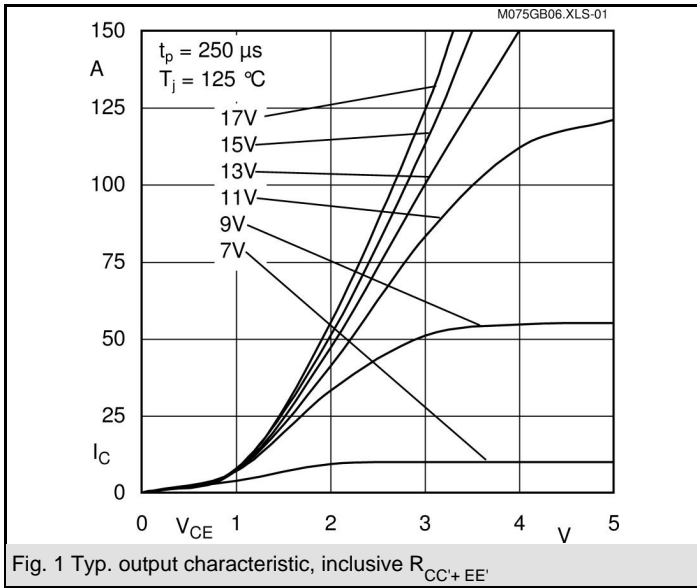
| $Z_{th}$       | Symbol          | Conditions | Values | Units |
|----------------|-----------------|------------|--------|-------|
| $Z_{th(j-c)I}$ | $R_{\theta}$    | i = 1      | 250    | mk/W  |
|                | $R_{\theta}$    | i = 2      | 70     | mk/W  |
|                | $R_{\theta}$    | i = 3      | 25     | mk/W  |
|                | $R_{\theta}$    | i = 4      | 5      | mk/W  |
|                | $\tau_{\theta}$ | i = 1      | 0,0874 | s     |
|                | $\tau_{\theta}$ | i = 2      | 0,0078 | s     |
|                | $\tau_{\theta}$ | i = 3      | 0,0017 | s     |
|                | $\tau_{\theta}$ | i = 4      | 0,0001 | s     |
| $Z_{th(j-c)D}$ | $R_{\theta}$    | i = 1      | 550    | mk/W  |
|                | $R_{\theta}$    | i = 2      | 340    | mk/W  |
|                | $R_{\theta}$    | i = 3      | 92     | mk/W  |
|                | $R_{\theta}$    | i = 4      | 18     | mk/W  |
|                | $\tau_{\theta}$ | i = 1      | 0,0761 | s     |
|                | $\tau_{\theta}$ | i = 2      | 0,0045 | s     |
|                | $\tau_{\theta}$ | i = 3      | 0,011  | s     |
|                | $\tau_{\theta}$ | i = 4      | 0,0002 | s     |

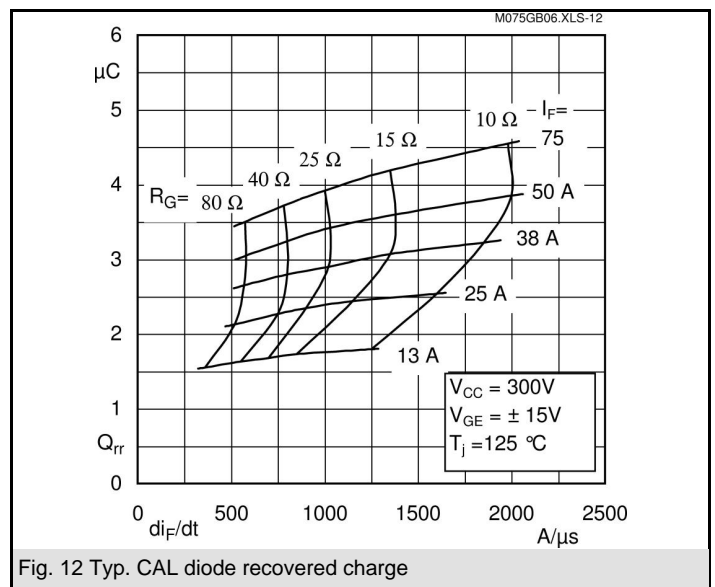
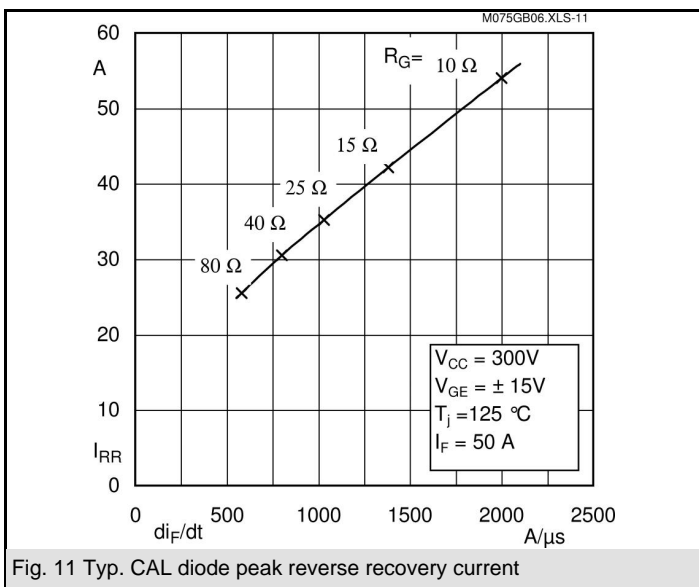
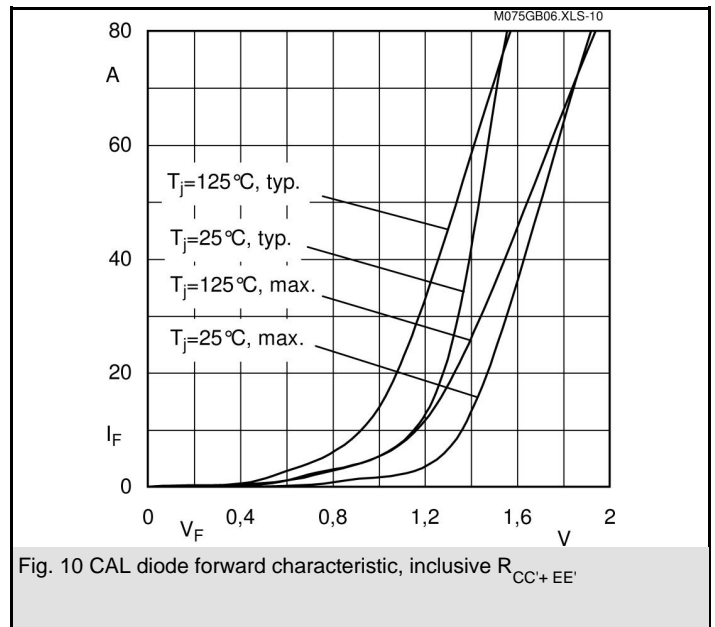
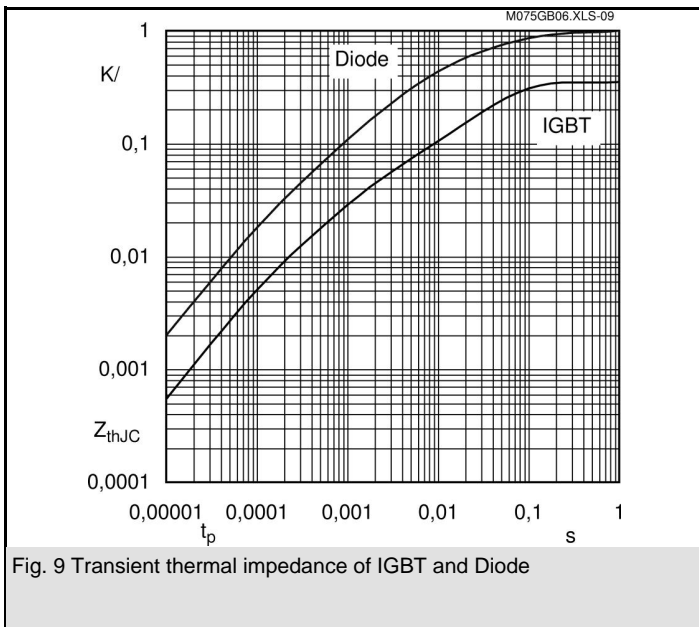
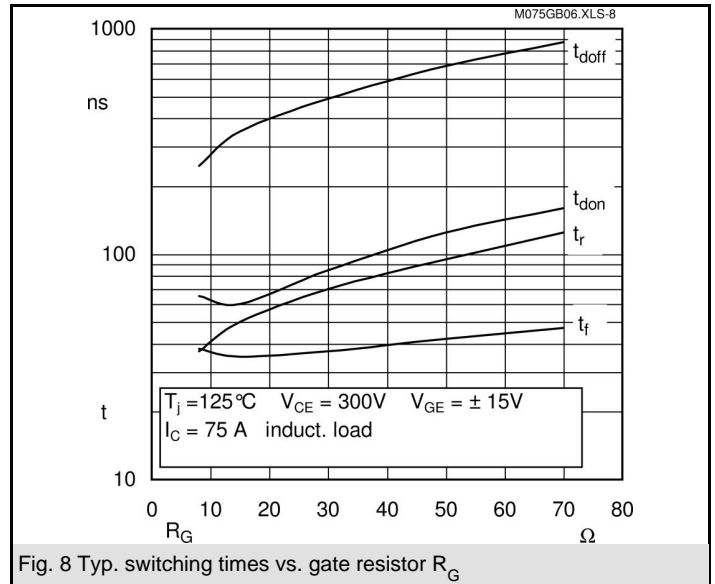
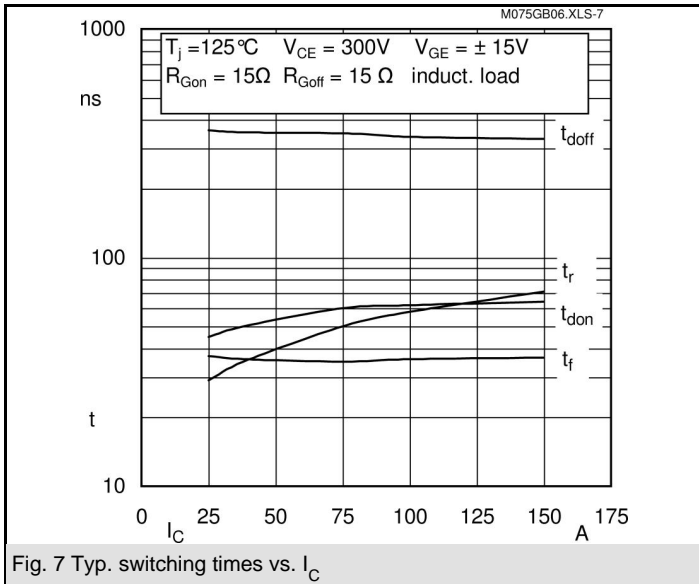


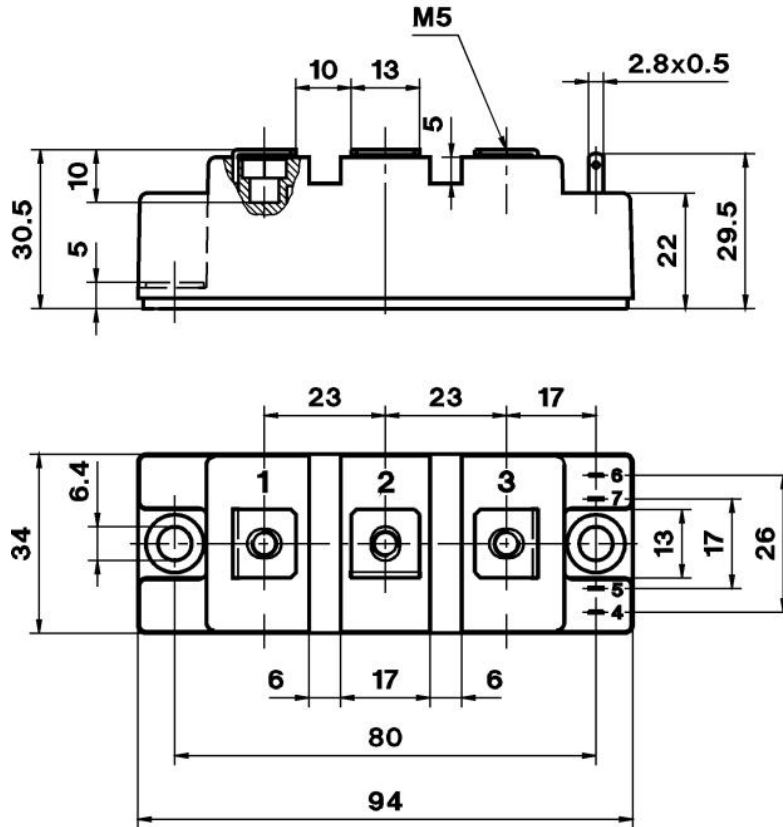
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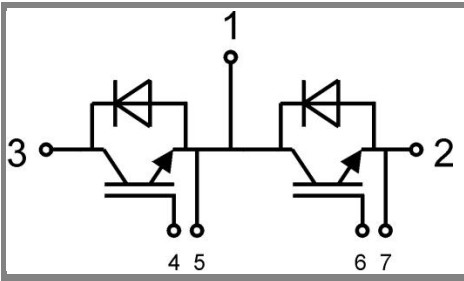
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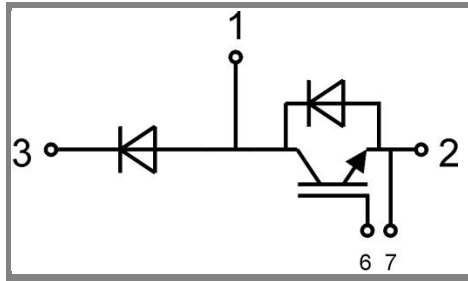




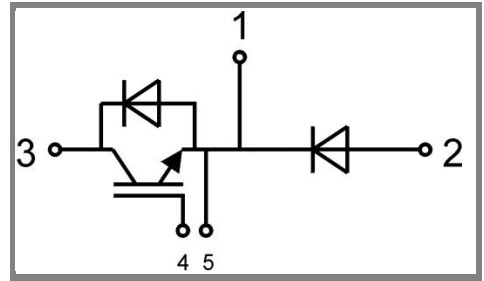
Case D 61



GB Case D 61



GAL Case D 62 (→ D 61)



GAR Case D 63 (→ D 61)