

SKM 75GB063D



SEMITRANS[®] 2

Superfast NPT-IGBT Modules

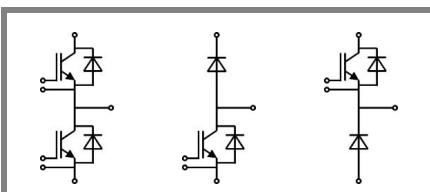
SKM 75GB063D
SKM 75GAR063D
SKM 75GAL063D

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 | | $T_c = 25^\circ\text{C}$, unless otherwise specified | | |
|---------------------------|--|---|-----|------------------|
| Symbol | Conditions | Values | | Units |
| IGBT | | | | |
| V_{CES} | $T_j = 25^\circ\text{C}$ | 600 | | V |
| I_C | $T_j = 150^\circ\text{C}$ | $T_{case} = 25^\circ\text{C}$ | 100 | A |
| | | $T_{case} = 75^\circ\text{C}$ | 75 | A |
| I_{CRM} | $I_{CRM} = 2 \times I_{Cnom}$ | 150 | | A |
| V_{GES} | | ± 20 | | V |
| t_{psc} | $V_{CC} = 300\text{V}; V_{GE} \leq 20\text{V}; T_j = 125^\circ\text{C}$ $V_{CES} < 600\text{V}$ | 10 | | μs |
| Inverse Diode | | | | |
| I_F | $T_j = 150^\circ\text{C}$ | $T_{case} = 25^\circ\text{C}$ | 75 | A |
| | | $T_{case} = 80^\circ\text{C}$ | 50 | A |
| I_{FRM} | $I_{FRM} = 2 \times I_{Fnom}$ | 150 | | A |
| I_{FSM} | $t_p = 10\text{ms}; \sin.$ | $T_j = 150^\circ\text{C}$ | 440 | |
| Freewheeling Diode | | | | |
| I_F | $T_j = 150^\circ\text{C}$ | $T_c = 25^\circ\text{C}$ | 100 | A |
| | | $T_c = 80^\circ\text{C}$ | 75 | A |
| I_{FRM} | $I_{FRM} = 2 \times I_{Fnom}$ | 200 | | A |
| I_{FSM} | $t_p = 10\text{ms}; \sin$ | $T_j = 150^\circ\text{C}$ | 720 | |
| Module | | | | |
| $I_{t(RMS)}$ | | 200 | | A |
| T_{vj} | | - 40 ... + 150 | | $^\circ\text{C}$ |
| T_{stg} | | - 40 ... + 125 | | $^\circ\text{C}$ |
| V_{isol} | AC, 1 min. | 2500 | | V |

| Characteristics | | $T_c = 25^\circ\text{C}$, unless otherwise specified | | | |
|-----------------|--|---|--------------------------------------|----------------------------------|------------------|
| Symbol | Conditions | min. | typ. | max. | Units |
| IGBT | | | | | |
| $V_{GE(th)}$ | $V_{GE} = V_{CE}, I_C = 1\text{mA}$ | 4,5 | 5,5 | 6,5 | V |
| I_{CES} | $V_{GE} = 0\text{V}, V_{CE} = V_{CES}$ | | $T_j = 25^\circ\text{C}$ 0,1 | $T_j = 125^\circ\text{C}$ 0,3 | mA |
| V_{CE0} | | | $T_j = 25^\circ\text{C}$ | 1,05 | V |
| | | | $T_j = 125^\circ\text{C}$ | 1 | V |
| r_{CE} | $V_{GE} = 15\text{V}$ | | $T_j = 25^\circ\text{C}$ | 14 | $\text{m}\Omega$ |
| | | | $T_j = 125^\circ\text{C}$ | 18,7 | $\text{m}\Omega$ |
| $V_{CE(sat)}$ | $I_{Cnom} = 75\text{A}, V_{GE} = 15\text{V}$ | | $T_j = 25^\circ\text{C}_{chiplev.}$ | 2,1 | 2,5 |
| | | | $T_j = 125^\circ\text{C}_{chiplev.}$ | 2,4 | 2,8 |
| 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} | $T_j = ^\circ\text{C}$ | 0 | | Ω | |
| $t_{d(on)}$ | $R_{Gon} = 15\Omega$ | $V_{CC} = 300\text{V}$ $I_C = 75\text{A}$ | 60 | | ns |
| | | | $T_j = 125^\circ\text{C}$ | 50 | ns |
| E_{on} | $R_{Goff} = 15\Omega$ | $V_{GE} = \pm 15\text{V}$ | 3 | | mJ |
| $t_{d(off)}$ | | | 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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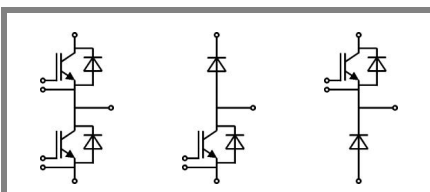
SKM 75GAL063D

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- Latch-up free
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GB

GAL

GAR

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

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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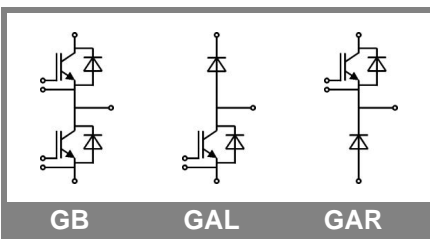
Features

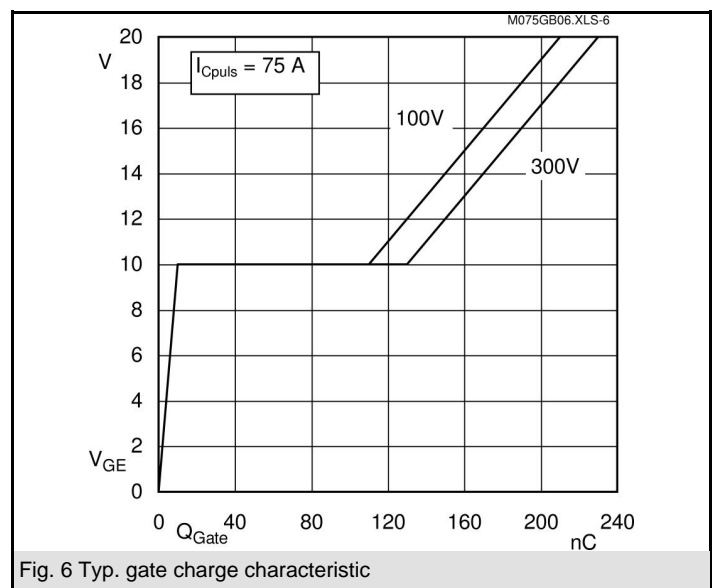
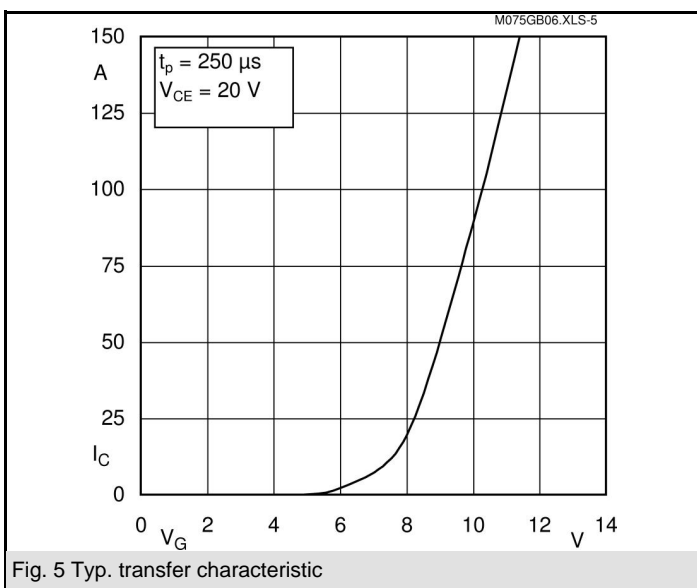
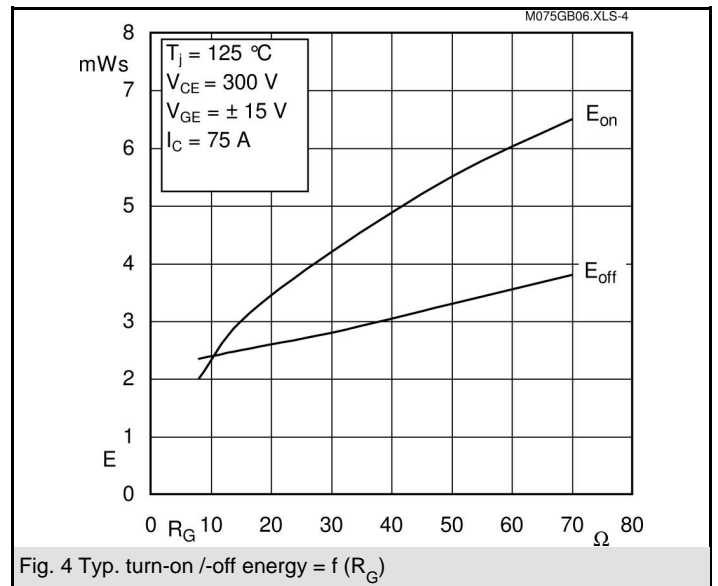
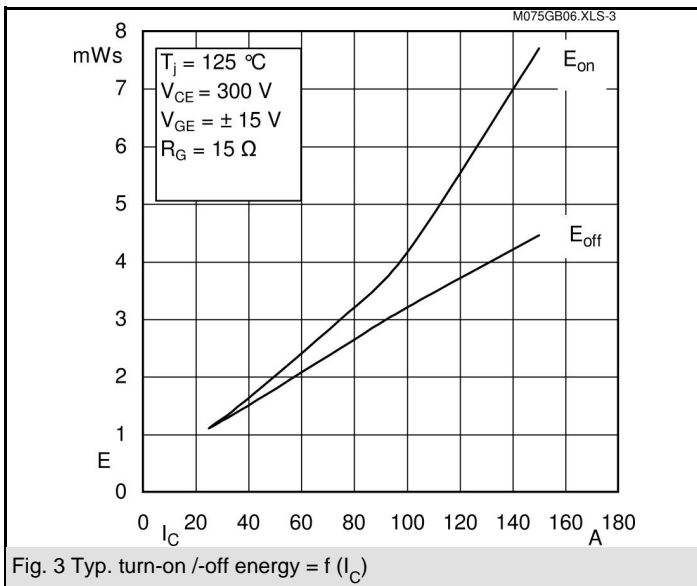
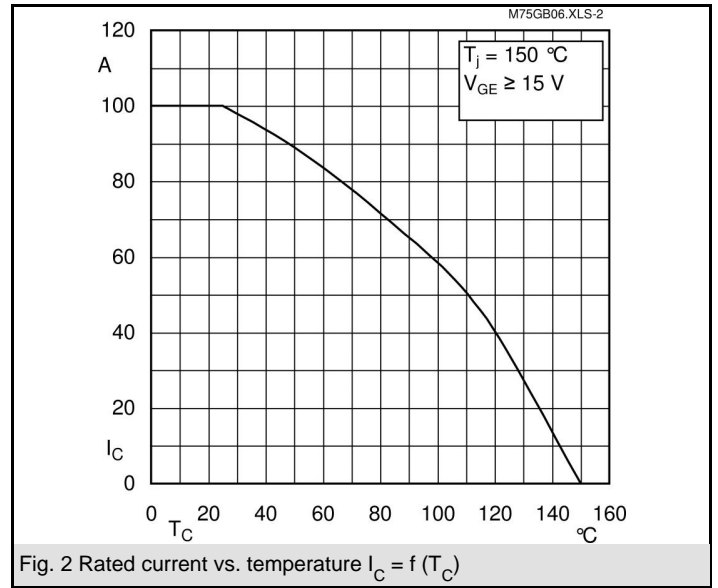
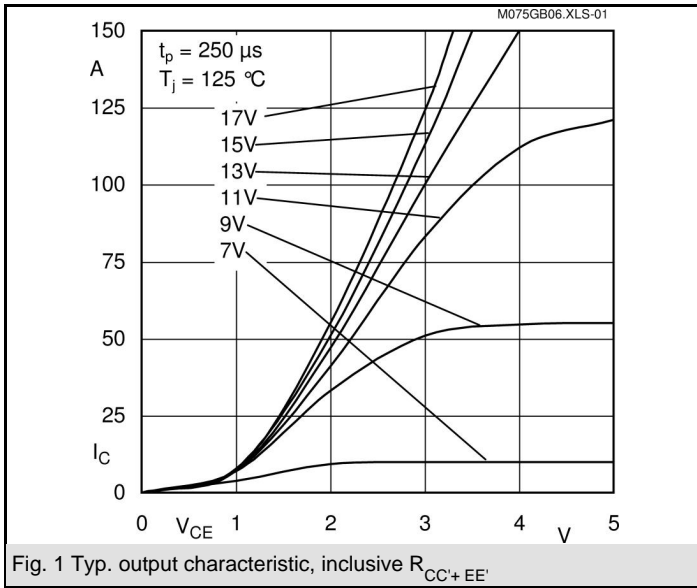
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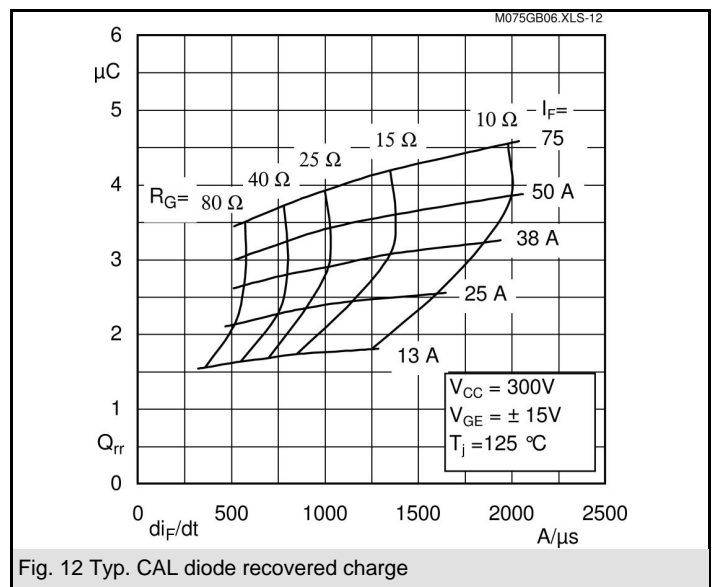
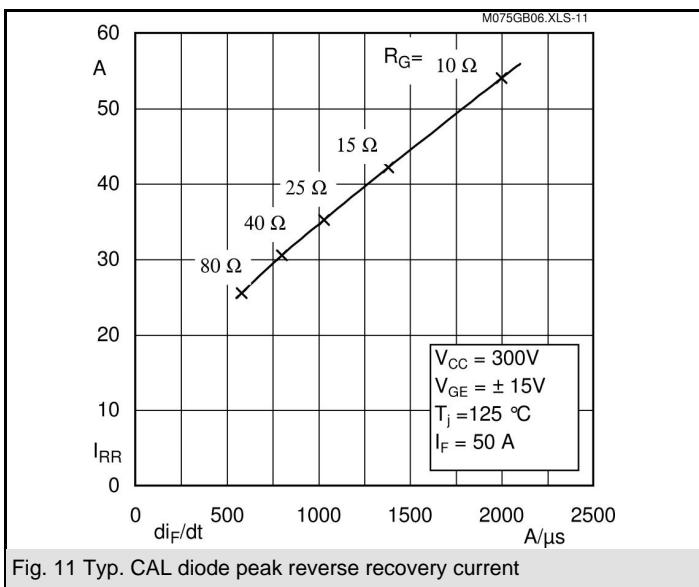
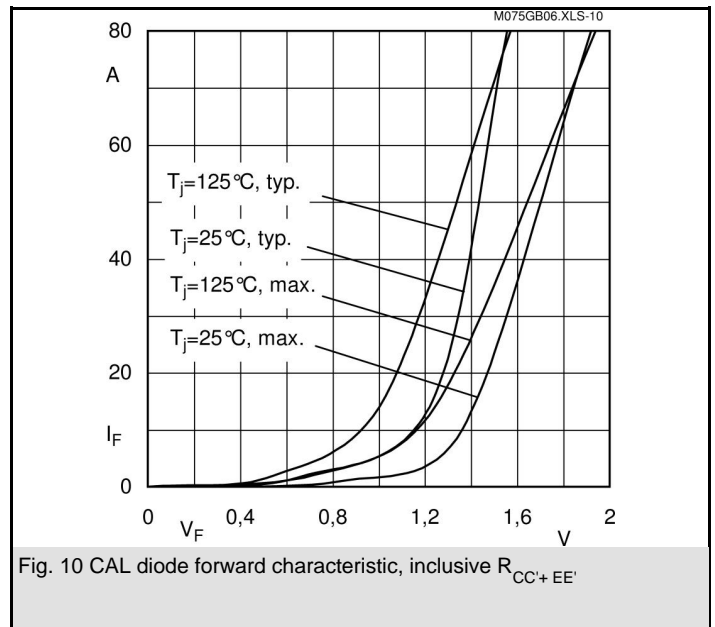
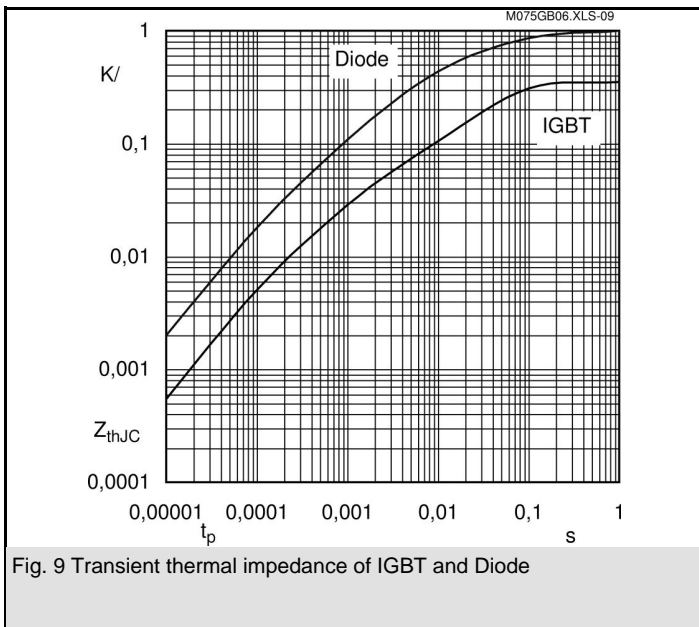
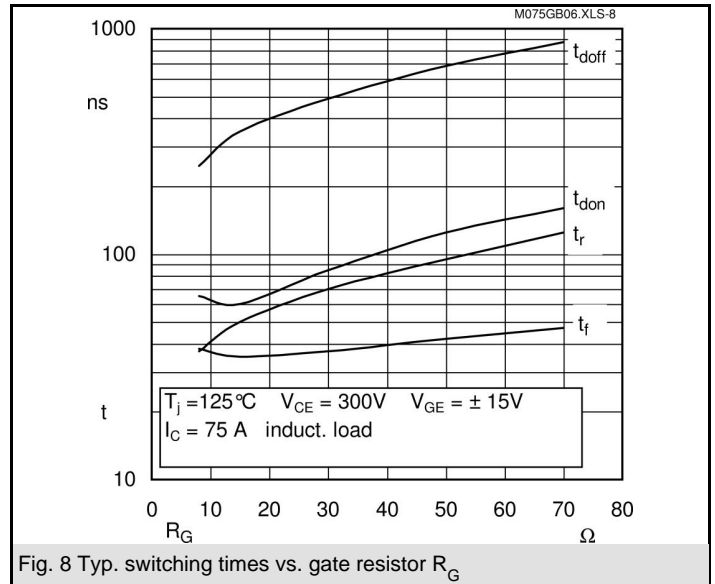
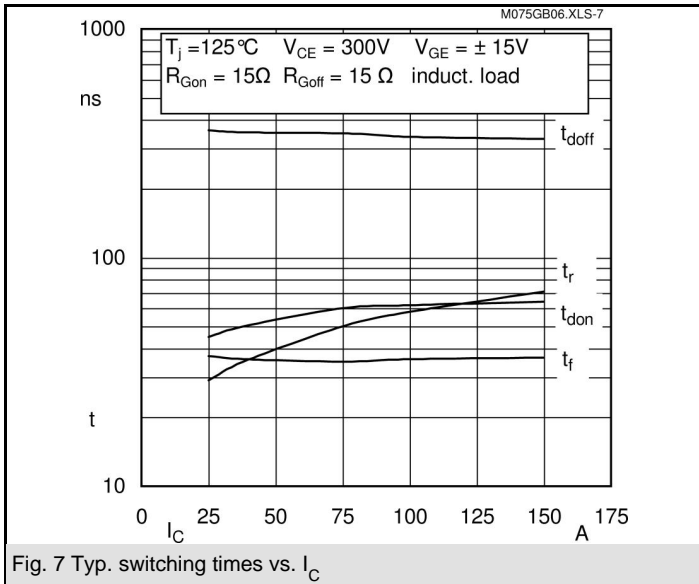
Typical Applications

- Switching (not for linear use)
- Switched mode power supplies
- UPS
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- Pulse frequencies also > 10kHz

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





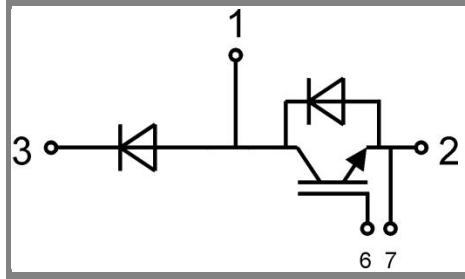




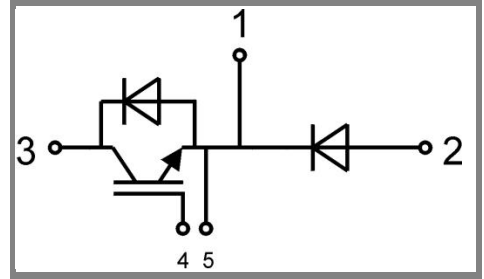
Case D 61



GB Case D 61



GAL Case D 62 (-> D 61)



GAR Case D 63 (-> D 61)