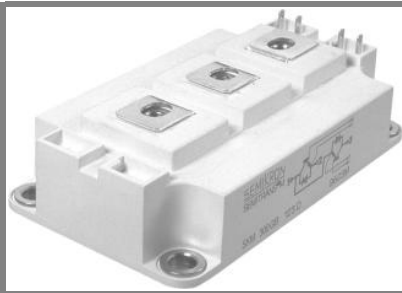


SKM 300GB123D



SEMITRANS[®] 3

IGBT Modules

SKM 300GB123D

SKM 300GAL123D

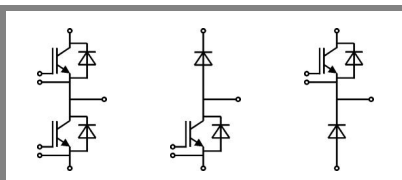
SKM 300GAR123D

Features

- MOS input (voltage controlled)
- N channel, Homogeneous Si
- Low inductance case
- Very low tail current with low temperature dependence
- High short circuit capability, self limiting to $6 \times I_{Cnom}$
- Latch-up free
- Fast & soft inverse CAL diodes
- Isolated copper baseplate using DCB Direct Copper Bonding Technology
- Large clearance (12 mm) and creepage distance (20 mm)

Typical Applications

- AC inverter drives
- UPS



GB

GAL

GAR

| Absolute Maximum Ratings | | $T_c = 25^\circ\text{C}$, unless otherwise specified | | |
|--------------------------|--|---|---------------|---|
| Symbol | Conditions | Values | Units | |
| IGBT | | | | |
| V_{CES} | $T_j = 25^\circ\text{C}$ | 1200 | V | |
| I_C | $T_j = 150^\circ\text{C}$ | $T_{case} = 25^\circ\text{C}$ | 300 | A |
| | | $T_{case} = 80^\circ\text{C}$ | 220 | A |
| I_{CRM} | $I_{CRM} = 2 \times I_{Cnom}$ | 400 | A | |
| V_{GES} | | ± 20 | V | |
| t_{psc} | $V_{CC} = 600\text{ V}; V_{GE} \leq 20\text{ V}; T_j = 125^\circ\text{C}$ $V_{CES} < 1200\text{ V}$ | 10 | μs | |

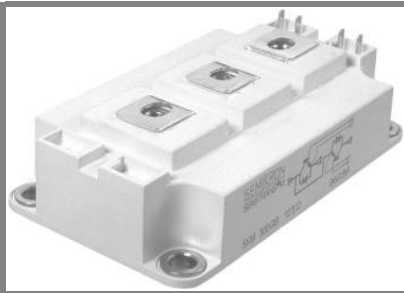
| Inverse Diode | | $T_c = 25^\circ\text{C}$, unless otherwise specified | | |
|---------------|-------------------------------|---|-------|---|
| Symbol | Conditions | Values | Units | |
| I_F | $T_j = 150^\circ\text{C}$ | $T_{case} = 25^\circ\text{C}$ | 260 | A |
| | | $T_{case} = 80^\circ\text{C}$ | 180 | A |
| I_{FRM} | $I_{FRM} = 2 \times I_{Fnom}$ | 400 | A | |
| I_{FSM} | $t_p = 10\text{ ms}; \sin.$ | $T_j = 150^\circ\text{C}$ | 2200 | A |

| Freewheeling Diode | | $T_c = 25^\circ\text{C}$, unless otherwise specified | | |
|--------------------|-------------------------------|---|-------|---|
| Symbol | Conditions | Values | Units | |
| I_F | $T_j = 150^\circ\text{C}$ | $T_{case} = 25^\circ\text{C}$ | 350 | A |
| | | $T_{case} = 80^\circ\text{C}$ | 230 | A |
| I_{FRM} | $I_{FRM} = 2 \times I_{Fnom}$ | 600 | A | |
| I_{FSM} | $t_p = 10\text{ ms}; \sin$ | $T_j = 150^\circ\text{C}$ | 2900 | A |

| Module | | $T_c = 25^\circ\text{C}$, unless otherwise specified | |
|--------------|------------|---|------------------|
| Symbol | Conditions | Values | Units |
| $I_{t(RMS)}$ | | 500 | 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 | | | | | | |
| $V_{GE(th)}$ | $V_{GE} = V_{CE}, I_C = 8\text{ mA}$ | 4,5 | 5,5 | 6,5 | V | |
| I_{CES} | $V_{GE} = 0\text{ V}, V_{CE} = V_{CES}$ | | 0,1 | 0,3 | mA | |
| V_{CE0} | | | $T_j = 25^\circ\text{C}$ | 1,4 | 1,6 | V |
| | | | $T_j = 125^\circ\text{C}$ | 1,6 | 1,8 | V |
| r_{CE} | $V_{GE} = 15\text{ V}$ | | $T_j = 25^\circ\text{C}$ | 5,5 | 7 | m Ω |
| | | | $T_j = 125^\circ\text{C}$ | 7,5 | 9,5 | m Ω |
| $V_{CE(sat)}$ | $I_{Cnom} = 200\text{ A}, V_{GE} = 15\text{ V}$ | | $T_j = 25^\circ\text{C}_{chiplev.}$ | 2,5 | 3 | V |
| | | | $T_j = 125^\circ\text{C}_{chiplev.}$ | 3,1 | 3,7 | V |
| C_{res} | $V_{CE} = 25, V_{GE} = 0\text{ V}$ | $f = 1\text{ MHz}$ | | 18 | 24 | nF |
| C_{oes} | | | 2,5 | 3,2 | nF | |
| C_{res} | | | 1 | 1,3 | nF | |
| Q_G | -8V - +20V | | 2000 | | nC | |
| R_{Gint} | $T_j = ^\circ\text{C}$ | | 2,5 | | Ω | |
| $t_{d(on)}$ | $R_{Gon} = 4,7\ \Omega$ | $V_{CC} = 600\text{ V}$ $I_{Cnom} = 200\text{ A}$ | | 250 | 400 | ns |
| t_r | | | | 90 | 160 | ns |
| E_{on} | $R_{Goff} = 4,7\ \Omega$ | $T_j = 125^\circ\text{C}$ | | 28 | | mJ |
| $t_{d(off)}$ | | | | 550 | 700 | ns |
| t_f | | | | 70 | 100 | ns |
| E_{off} | | | | 26 | | mJ |
| $R_{th(j-c)}$ | per IGBT | | | 0,075 | K/W | |

SKM 300GB123D



SEMITRANS[®] 3

IGBT Modules

SKM 300GB123D

SKM 300GAL123D

SKM 300GAR123D

Features

- MOS input (voltage controlled)
- N channel, Homogeneous Si
- Low inductance case
- Very low tail current with low temperature dependence
- High short circuit capability, self limiting to $6 \times I_{cnom}$
- Latch-up free
- Fast & soft inverse CAL diodes
- Isolated copper baseplate using DCB Direct Copper Bonding Technology
- Large clearance (12 mm) and creepage distance (20 mm)

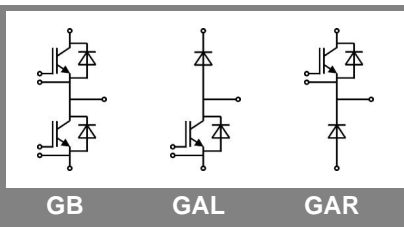
Typical Applications

- AC inverter drives
- UPS

| Characteristics | | | | | |
|---------------------------|--|--|------|-------|---------------|
| Symbol | Conditions | min. | typ. | max. | Units |
| Inverse Diode | | | | | |
| $V_F = V_{EC}$ | $I_{Fnom} = 200 \text{ A}; V_{GE} = 0 \text{ V}$ | $T_j = 25 \text{ }^\circ\text{C}_{chiplev.}$ | 2 | 2,5 | V |
| V_{F0} | | $T_j = 25 \text{ }^\circ\text{C}$ | 1,1 | 1,2 | V |
| | | $T_j = 125 \text{ }^\circ\text{C}$ | | | V |
| r_F | | $T_j = 25 \text{ }^\circ\text{C}$ | 4,5 | 6,5 | m Ω |
| | | $T_j = 125 \text{ }^\circ\text{C}$ | | | m Ω |
| I_{RRM} | $I_{Fnom} = 200 \text{ A}$ | $T_j = 125 \text{ }^\circ\text{C}$ | 105 | | A |
| Q_{rr} | $di/dt = 4000 \text{ A}/\mu\text{s}$ | | 10 | | μC |
| E_{rr} | $V_{GE} = 0 \text{ V}; V_{CC} = 600 \text{ V}$ | | | | mJ |
| $R_{th(j-c)D}$ | per diode | | | 0,18 | K/W |
| Freewheeling Diode | | | | | |
| $V_F = V_{EC}$ | $I_{Fnom} = 300 \text{ A}; V_{GE} = 0 \text{ V}$ | $T_j = 25 \text{ }^\circ\text{C}_{chiplev.}$ | 2 | 2,5 | V |
| V_{F0} | | $T_j = 25 \text{ }^\circ\text{C}$ | 1,1 | 1,2 | V |
| | | $T_j = 125 \text{ }^\circ\text{C}$ | | | V |
| r_F | | $T_j = 25 \text{ }^\circ\text{C}$ | 3 | 4,3 | V |
| | | $T_j = 125 \text{ }^\circ\text{C}$ | | | V |
| I_{RRM} | $I_{Fnom} = 200 \text{ A}$ | $T_j = 125 \text{ }^\circ\text{C}$ | 140 | | A |
| Q_{rr} | $di/dt = 3500 \text{ A}/\mu\text{s}$ | | 34 | | μC |
| E_{rr} | $V_{GE} = 0 \text{ V}; V_{CC} = 600 \text{ V}$ | | | | mJ |
| $R_{th(j-c)FD}$ | per diode | | | 0,15 | K/W |
| Module | | | | | |
| L_{CE} | | | 15 | 20 | nH |
| R_{CC+EE} | res., terminal-chip | $T_{case} = 25 \text{ }^\circ\text{C}$ | 0,35 | | m Ω |
| | | $T_{case} = 125 \text{ }^\circ\text{C}$ | 0,5 | | m Ω |
| $R_{th(c-s)}$ | per module | | | 0,038 | K/W |
| M_s | to heat sink M6 | | 3 | 5 | Nm |
| M_t | to terminals M6 | | 2,5 | 5 | Nm |
| w | | | | 325 | 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.

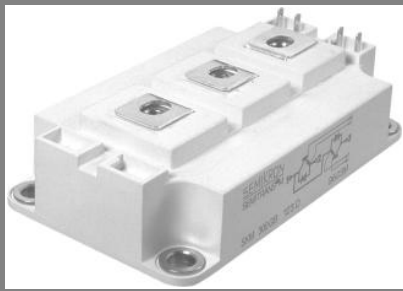


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SKM 300GB123D



SEMITRANS[®] 3

IGBT Modules

SKM 300GB123D

SKM 300GAL123D

SKM 300GAR123D

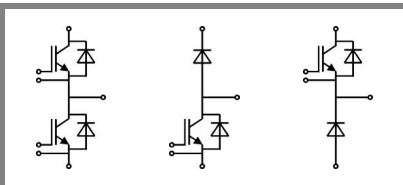
Features

- MOS input (voltage controlled)
- N channel , Homogeneous Si
- Low inductance case
- Very low tail current with low temperature dependence
- High short circuit capability, self limiting to $6 \times I_{cnom}$
- Latch-up free
- Fast & soft inverse CAL diodes
- Isolated copper baseplate using DCB Direct Copper Bonding Technology
- Large clearance (12 mm) and creepage distance (20 mm)

Typical Applications

- AC inverter drives
- UPS

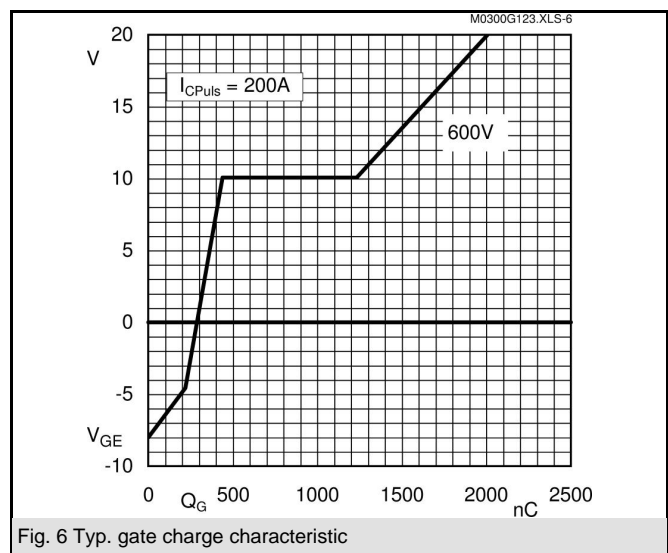
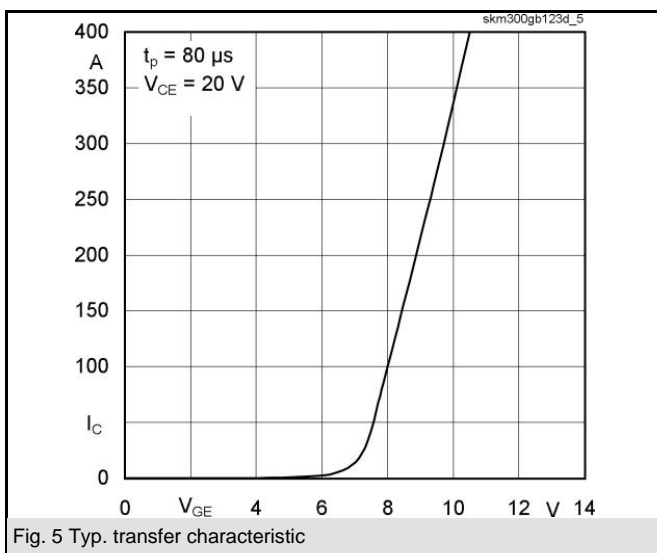
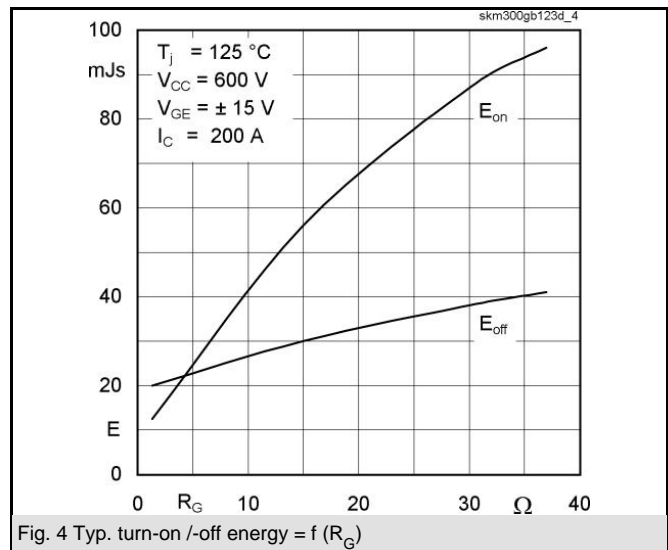
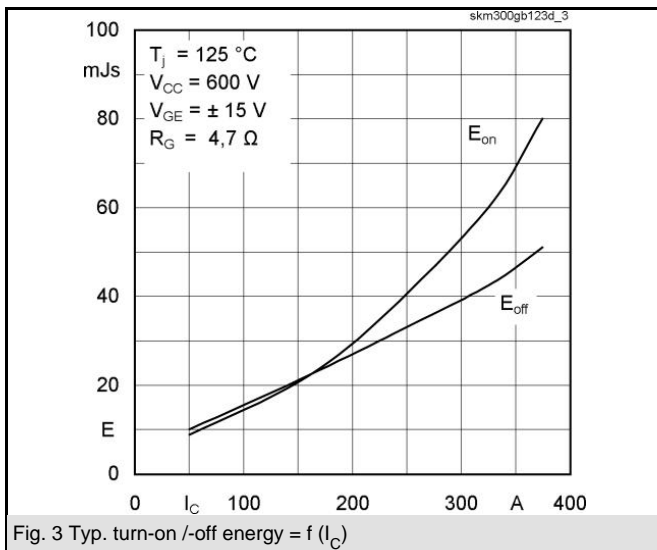
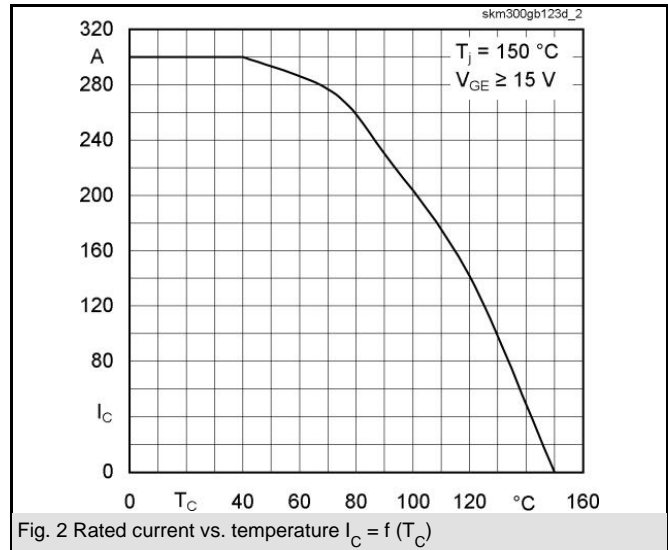
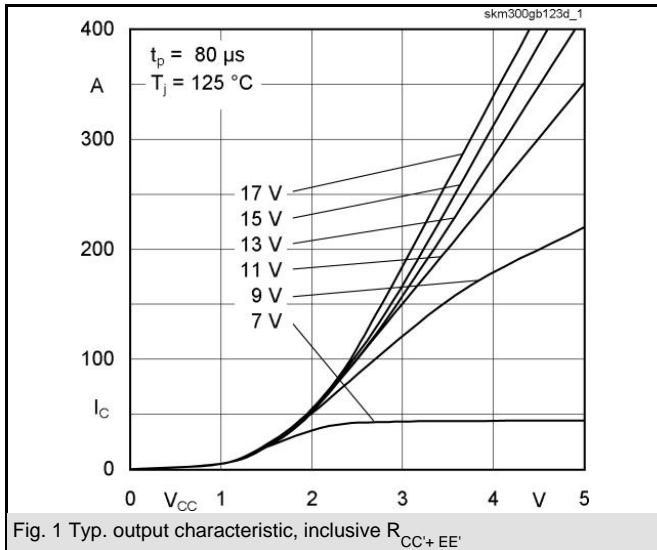
| Z_{th} | | Values | Units |
|----------------|------------|--------|-------|
| Symbol | Conditions | | |
| $Z_{th(j-c)I}$ | | | |
| R_i | $i = 1$ | 53 | mk/W |
| R_i | $i = 2$ | 18,5 | mk/W |
| R_i | $i = 3$ | 3,1 | mk/W |
| R_i | $i = 4$ | 0,4 | mk/W |
| τ_{u_i} | $i = 1$ | 0,04 | s |
| τ_{u_i} | $i = 2$ | 0,0189 | s |
| τ_{u_i} | $i = 3$ | 0,0017 | s |
| τ_{u_i} | $i = 4$ | 0,003 | s |
| $Z_{th(j-c)D}$ | | | |
| R_i | $i = 1$ | 0,1151 | mk/W |
| R_i | $i = 2$ | 0,0525 | mk/W |
| R_i | $i = 3$ | 0,0111 | mk/W |
| R_i | $i = 4$ | 0,0022 | mk/W |
| τ_{u_i} | $i = 1$ | 0,0366 | s |
| τ_{u_i} | $i = 2$ | 0,0113 | s |
| τ_{u_i} | $i = 3$ | 0,003 | s |
| τ_{u_i} | $i = 4$ | 0,0002 | s |

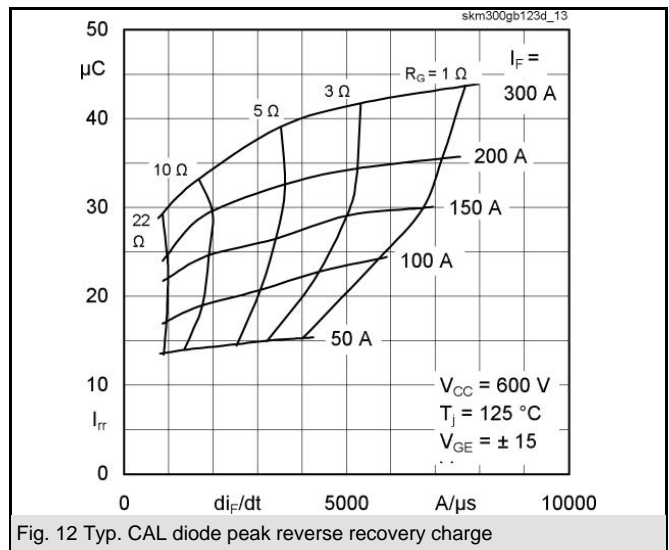
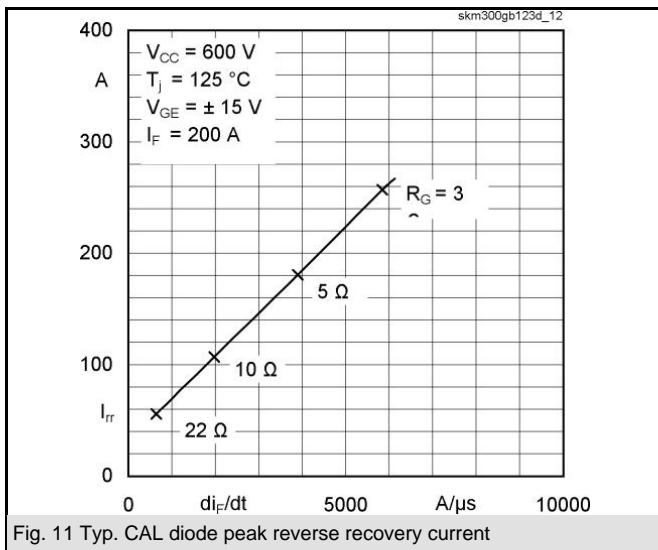
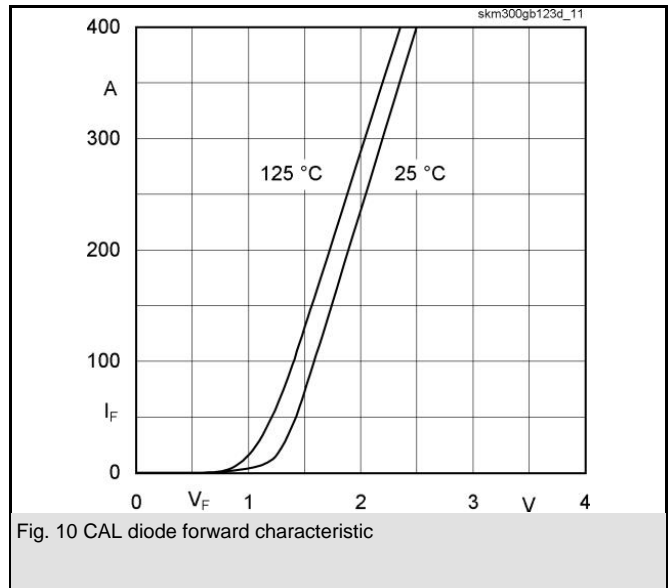
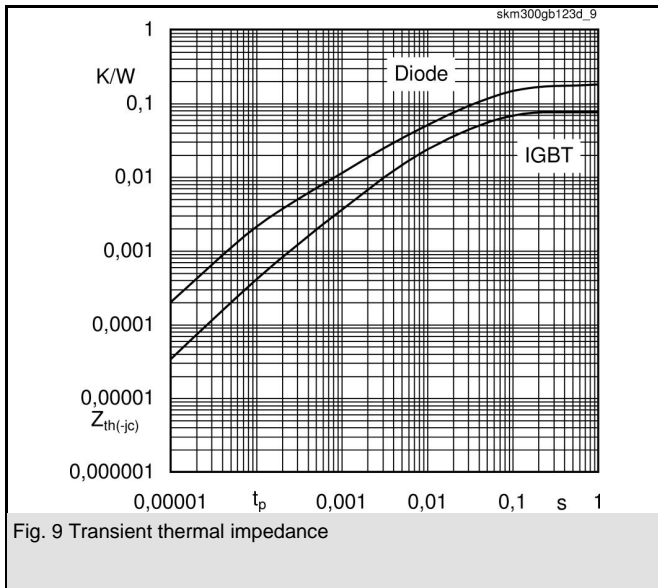
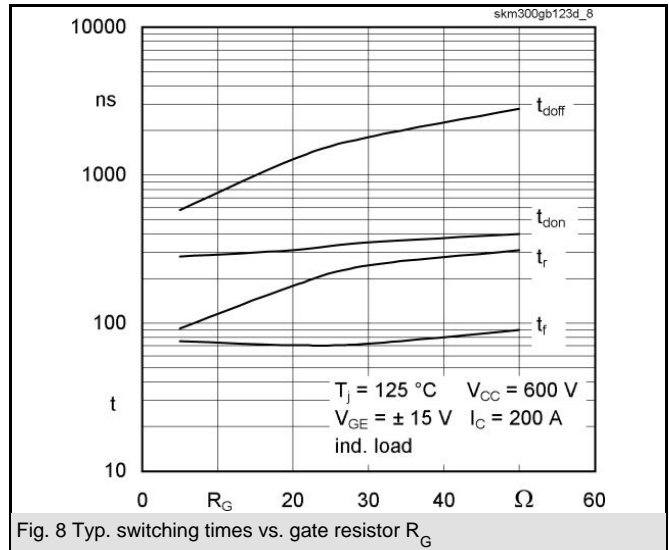
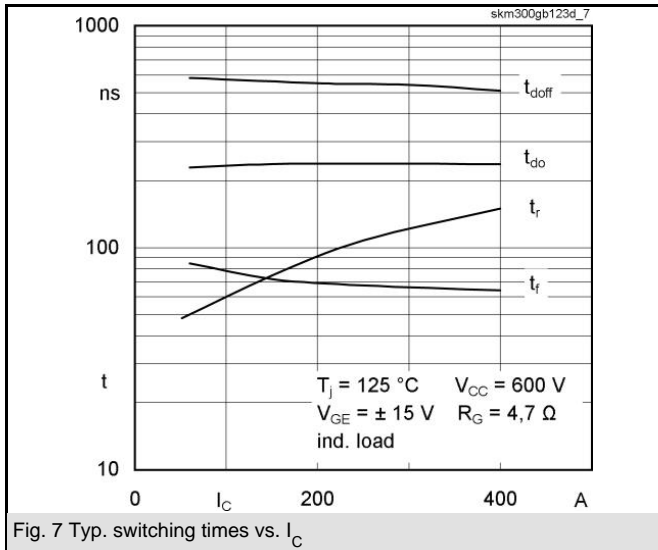


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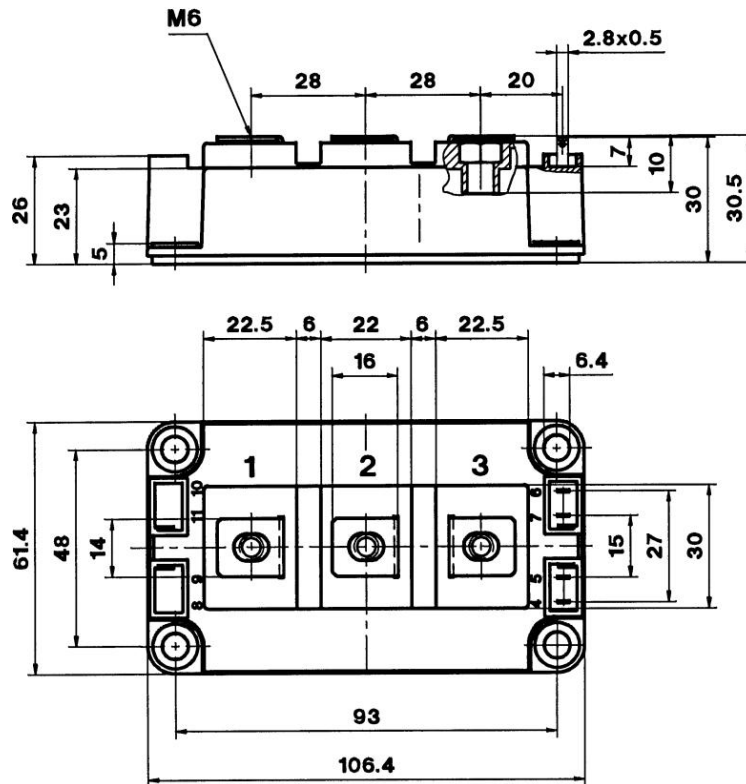


SKM 300GB123D

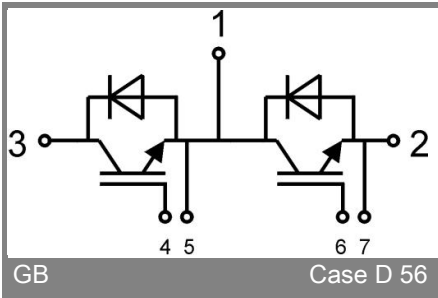
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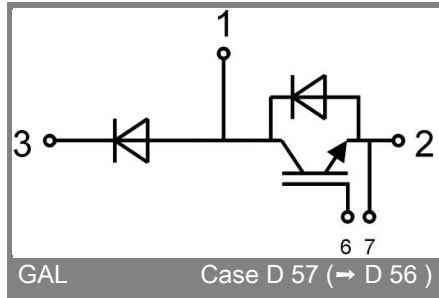


Case D 56



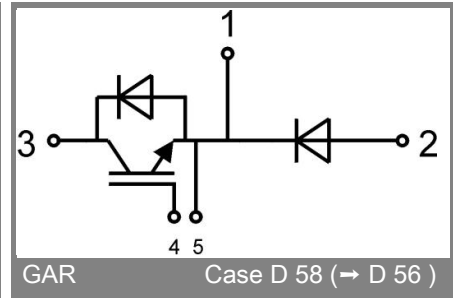
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Case D 56



GAL

Case D 57 (→ D 56)



GAR

Case D 58 (→ D 56)