

SKM 400GB124D



SEMITRANS™ 3

Low Loss IGBT Modules

SKM 400GB124D

SKM 400GAL124D

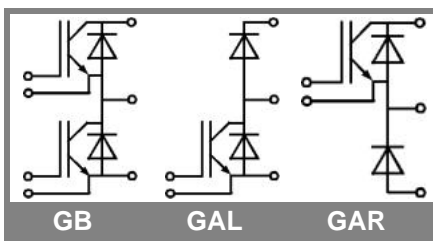
SKM 400GAR124D

Features

- MOS input (voltage controlled)
- N channel, homogeneous Si-structure (NPT- Non punch-through IGBT)
- 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 without hard mould
- Large clearance (12 mm) and creepage distance (20 mm)

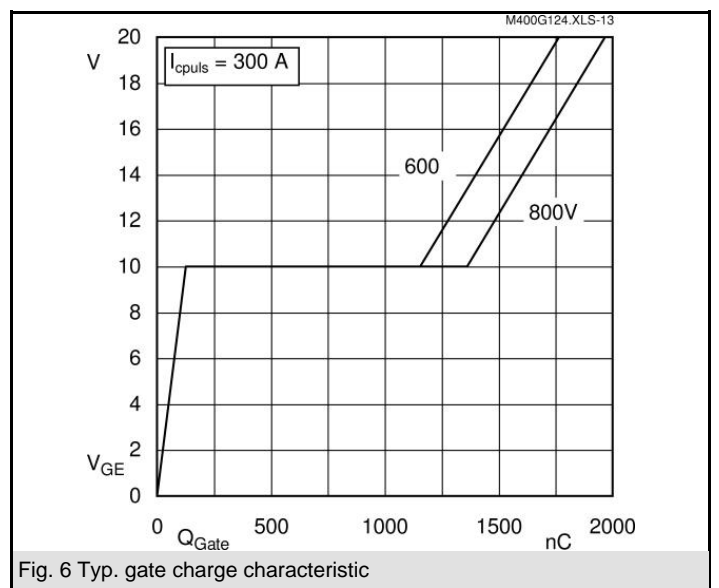
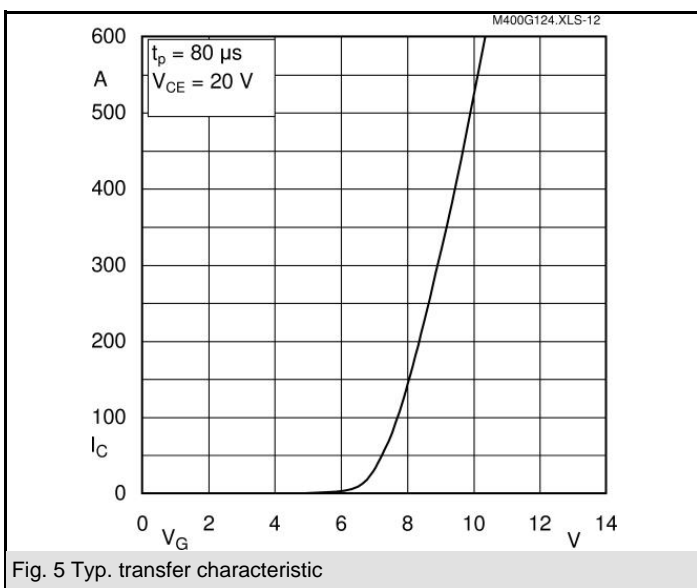
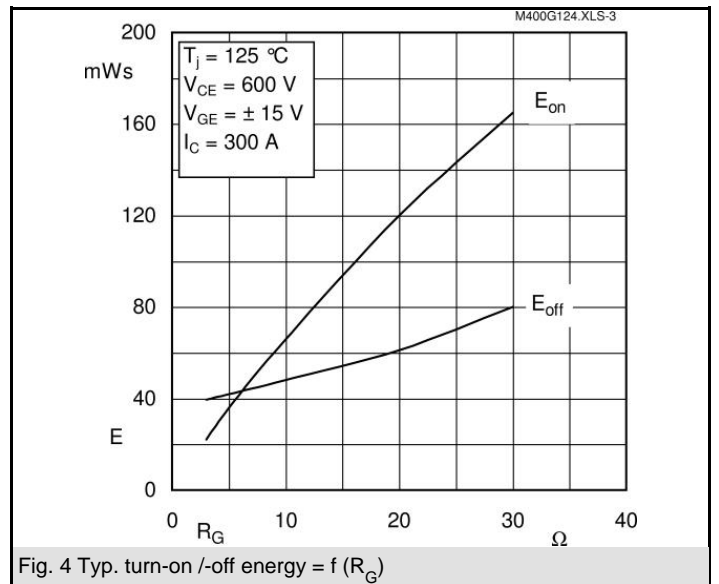
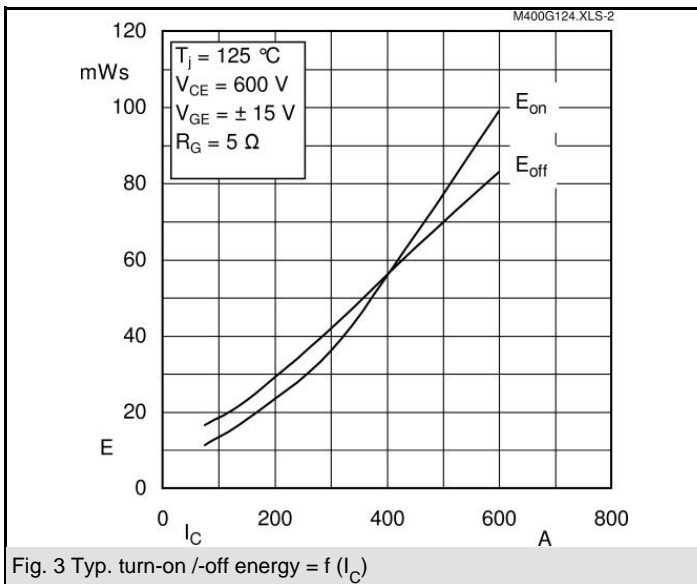
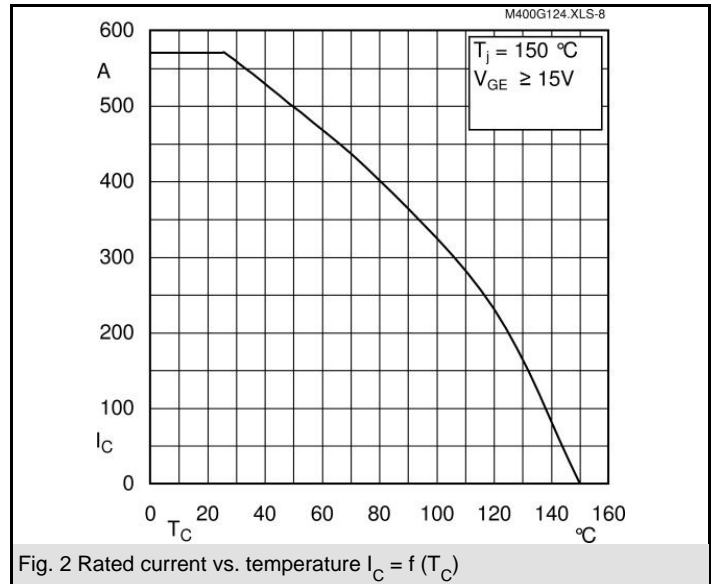
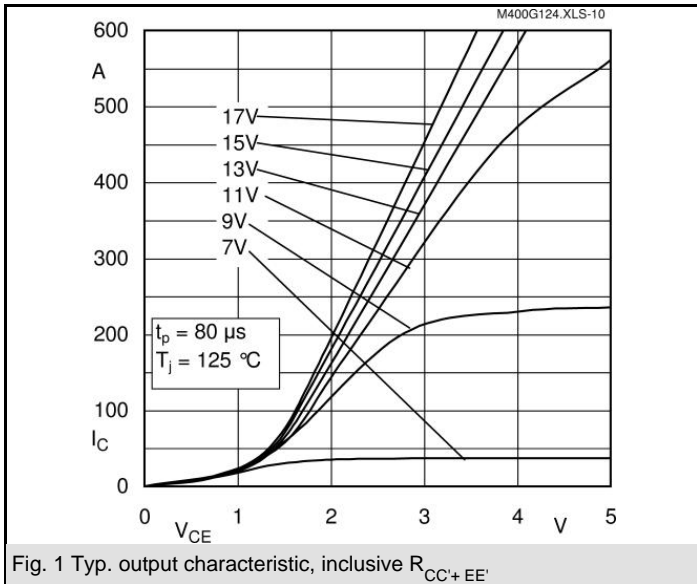
Typical Applications

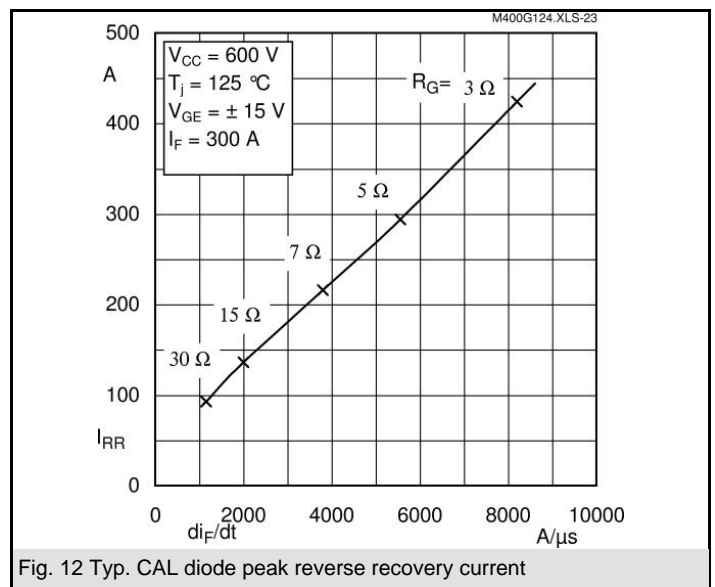
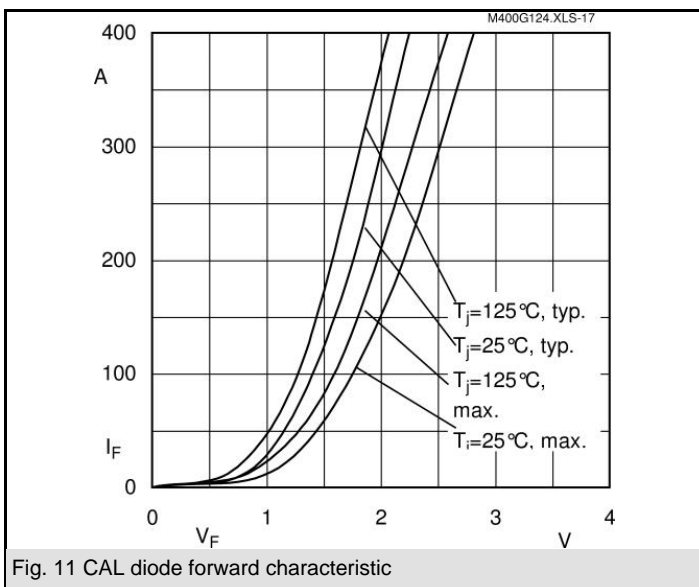
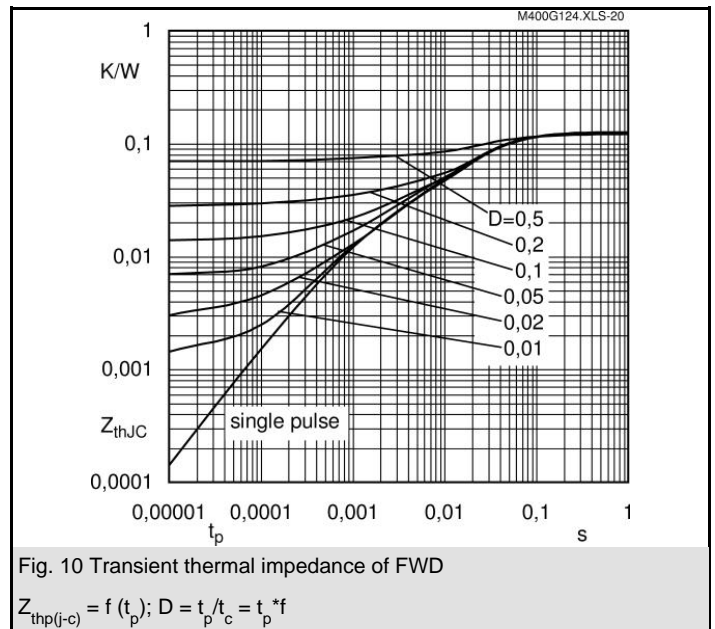
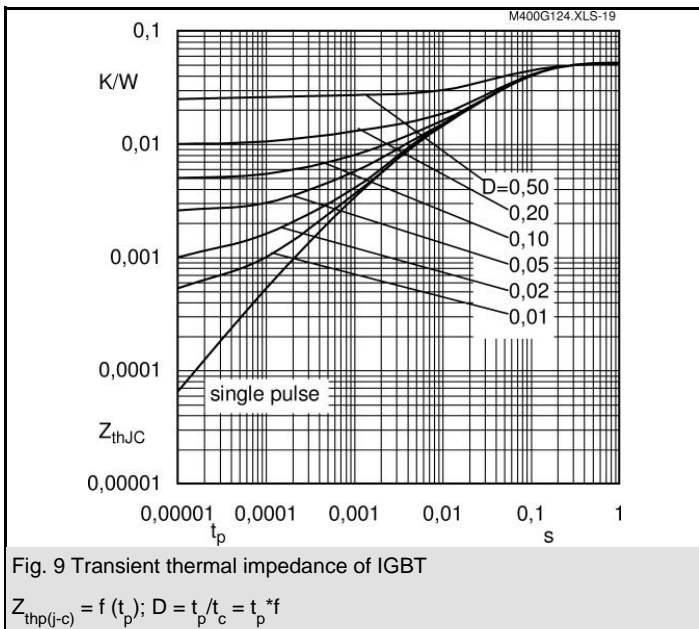
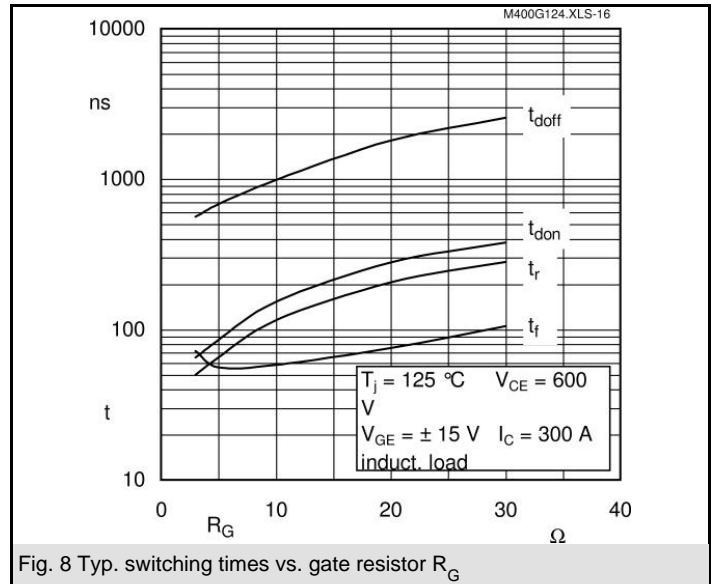
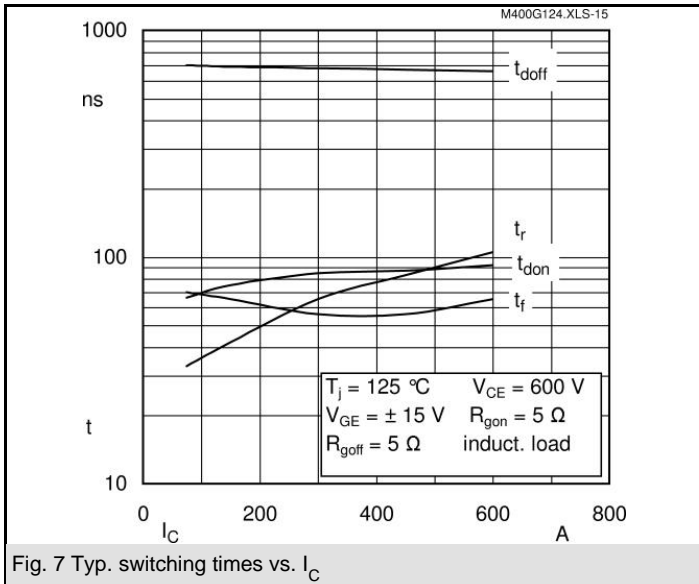
- Switching (not for lineal use)
- Inverter drives
- UPS



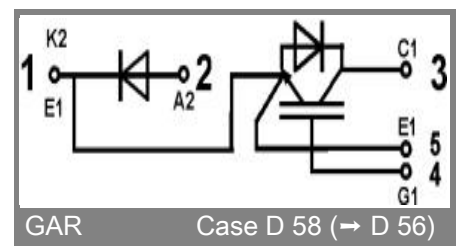
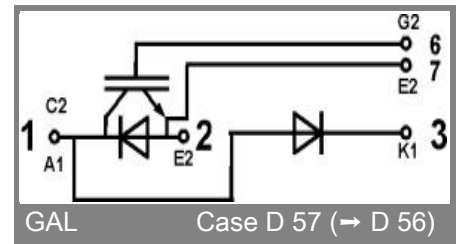
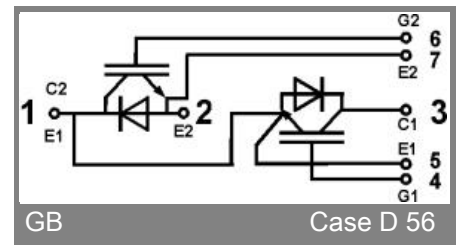
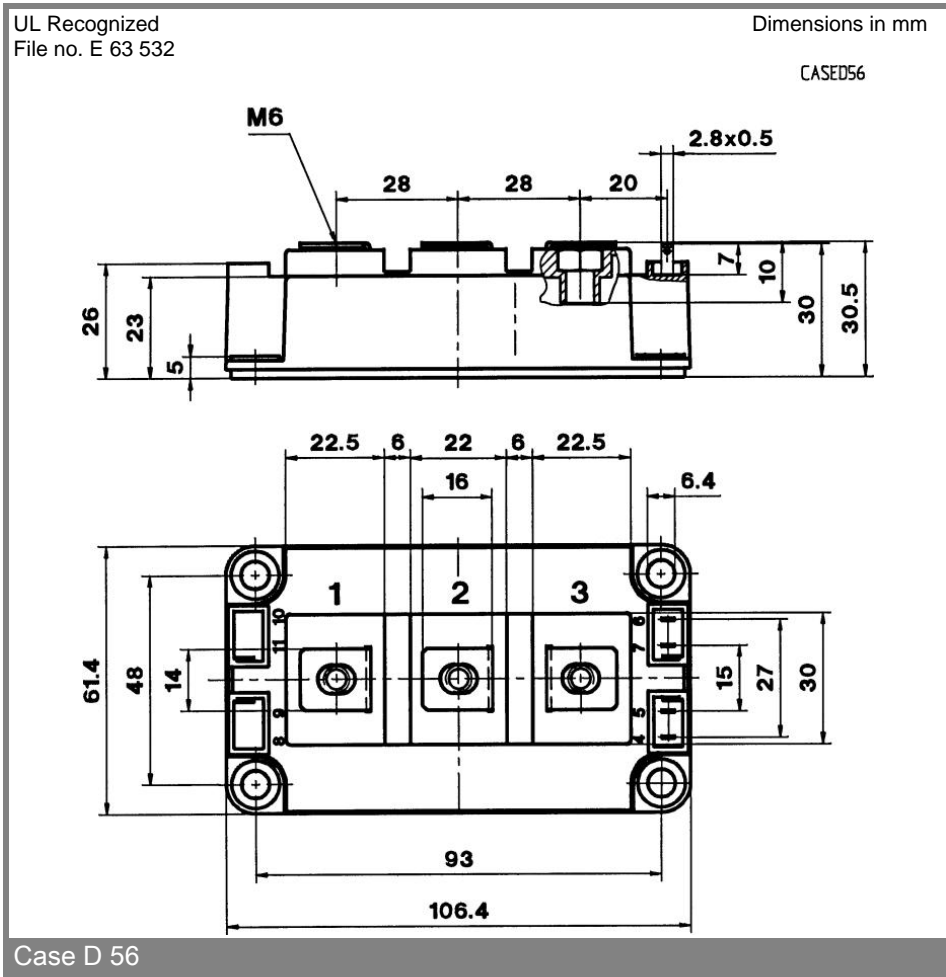
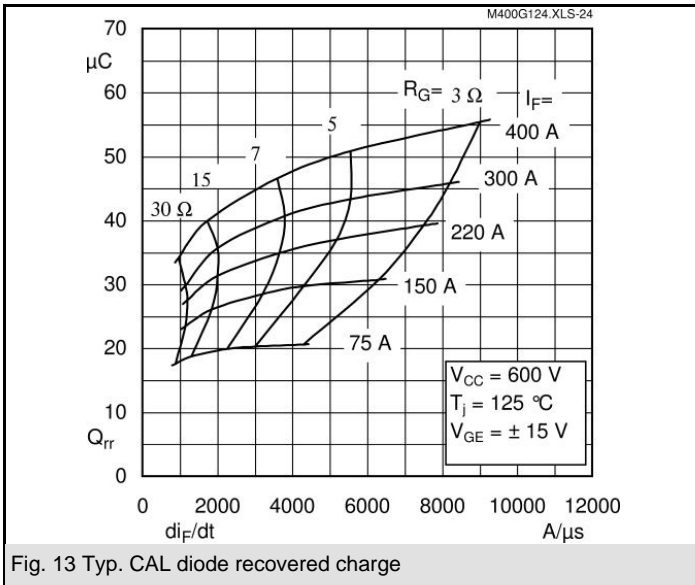
| Absolute Maximum Ratings | | $T_c = 25^\circ\text{C}$, unless otherwise specified | |
|---------------------------|---|---|------------------|
| Symbol | Conditions | Values | Units |
| IGBT | | | |
| V_{CES} | | 1200 | V |
| I_C | $T_c = 25 (80)^\circ\text{C}$ | 570 (400) | A |
| I_{CRM} | $t_p = 1 \text{ ms}$ | 600 | A |
| V_{GES} | | ± 20 | V |
| T_{vj} (T_{stg}) | $T_{OPERATION} \leq T_{stg}$ | - 40 ... + 150 (125) | $^\circ\text{C}$ |
| V_{isol} | AC, 1 min. | 2500 | V |
| Inverse diode | | | |
| I_F | $T_c = 25 (80)^\circ\text{C}$ | 390 (260) | A |
| I_{FRM} | $t_p = 1 \text{ ms}$ | 600 | A |
| I_{FSM} | $t_p = 10 \text{ ms}; \text{sin.}; T_j = 150^\circ\text{C}$ | 2900 | A |
| Freewheeling diode | | | |
| I_F | $T_c = 25 (80)^\circ\text{C}$ | 390 (260) | A |
| I_{FRM} | $t_p = 1 \text{ ms}$ | 600 | A |
| I_{FSM} | $t_p = 10 \text{ ms}; \text{sin.}; T_j = 150^\circ\text{C}$ | 2900 | A |

| Characteristics | | $T_c = 25^\circ\text{C}$, unless otherwise specified | | | |
|--------------------------------|--|---|------------|-------------|---------------|
| Symbol | Conditions | min. | typ. | max. | Units |
| IGBT | | | | | |
| $V_{GE(th)}$ | $V_{GE} = V_{CE}, I_C = 12 \text{ mA}$ | 4,5 | 5,5 | 6,5 | V |
| I_{CES} | $V_{GE} = 0, V_{CE} = V_{CES}, T_j = 25 (125)^\circ\text{C}$ | | 0,2 | 0,6 | mA |
| $V_{CE(TO)}$ | $T_j = 25 (125)^\circ\text{C}$ | | 1,1 (1,1) | 1,25 (1,25) | V |
| r_{CE} | $V_{GE} = 15 \text{ V}, T_j = 25 (125)^\circ\text{C}$ | | 3,3 (4,3) | 4 (5,3) | m Ω |
| $V_{CE(sat)}$ | $I_{Cnom} = 300 \text{ A}, V_{GE} = 15 \text{ V}$, chip level | | 2,1 (2,4) | 2,45 (2,85) | V |
| C_{res} | under following conditions | | 22 | 30 | nF |
| C_{oes} | $V_{GE} = 0, V_{CE} = 25 \text{ V}, f = 1 \text{ MHz}$ | | 3,3 | 4 | nF |
| C_{res} | | | 1,2 | 1,6 | nF |
| L_{CE} | | | | 20 | nH |
| $R_{CC'+EE'}$ | res., terminal-chip $T_c = 25 (125)^\circ\text{C}$ | | 0,35 (0,5) | | m Ω |
| $t_{d(on)}$ | $V_{CC} = 600 \text{ V}, I_{Cnom} = 300 \text{ A}$ | | 85 | | ns |
| t_r | $R_{Gon} = R_{Goff} = 5 \Omega, T_j = 125^\circ\text{C}$ | | 65 | | ns |
| $t_{d(off)}$ | $V_{GE} = \pm 15 \text{ V}$ | | 680 | | ns |
| t_f | | | 56 | | ns |
| $E_{on} (E_{off})$ | | | 36 (42) | | mJ |
| Inverse diode | | | | | |
| $V_F = V_{EC}$ | $I_{Fnom} = 300 \text{ A}; V_{GE} = 0 \text{ V}; T_j = 25 (125)^\circ\text{C}$ | | 2 (1,8) | 2,5 | V |
| $V_{(TO)}$ | $T_j = (125)^\circ\text{C}$ | | (1,1) | (1,2) | V |
| r_T | $T_j = (125)^\circ\text{C}$ | | | (3,5) | m Ω |
| I_{RRM} | $I_{Fnom} = 300 \text{ A}; T_j = (125)^\circ\text{C}$ | | (136) | | A |
| Q_{rr} | $di/dt = \text{A}/\mu\text{s}$ | | 36 | | μC |
| E_{rr} | $V_{GE} = \text{V}$ | | | | mJ |
| FWD | | | | | |
| $V_F = V_{EC}$ | $I_F = 300 \text{ A}; V_{GE} = 0 \text{ V}, T_j = 25 (125)^\circ\text{C}$ | | 2 (1,8) | 2,5 | V |
| $V_{(TO)}$ | $T_j = (125)^\circ\text{C}$ | | (1,1) | (1,2) | V |
| r_T | $T_j = (125)^\circ\text{C}$ | | | (3,5) | m Ω |
| I_{RRM} | $I_F = 300 \text{ A}; T_j = (125)^\circ\text{C}$ | | (136) | | A |
| Q_{rr} | $di/dt = \text{A}/\mu\text{s}$ | | 36 | | μC |
| E_{rr} | $V_{GE} = \text{V}$ | | | | mJ |
| Thermal characteristics | | | | | |
| $R_{th(j-c)}$ | per IGBT | | | 0,05 | K/W |
| $R_{th(j-c)D}$ | per Inverse Diode | | | 0,125 | K/W |
| $R_{th(j-c)FD}$ | per FWD | | | 0,125 | K/W |
| $R_{th(c-s)}$ | per module | | | 0,038 | K/W |
| Mechanical data | | | | | |
| M_s | to heatsink M6 | 3 | | 5 | Nm |
| M_t | to terminals M6 | 2,5 | | 5 | Nm |
| w | | | | 325 | g |





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

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