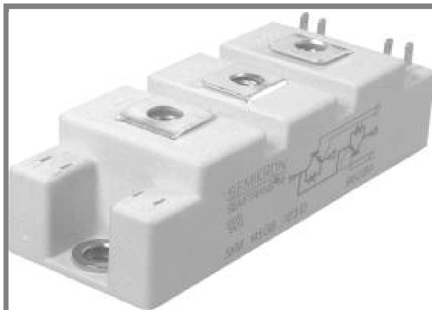
# SKM 195GB126D ...



**SEMITRANS™ 2**

## Trench IGBT Modules

**SKM 195GB126D**

**SKM 195GAL126D**

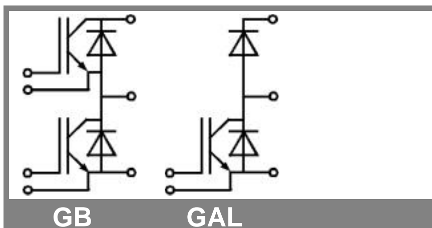
Target Data

### Features

- Homogeneous Si
- Trench = Trenchgate technology
- $V_{CE(sat)}$ with positive temperature coefficient
- High short circuit capability, self limiting to 6 x $I_C$

### Typical Applications

- AC inverter drives
- UPS
- Electronic welders




| Absolute Maximum Ratings | | $T_{case}$ = 25°C, unless otherwise specified | |
|---|---|---|---|
| **Symbol** | **Conditions** | **Values** | **Units** |
| **IGBT** | | | |
| $V_{CES}$ | | 1200 | V |
| $I_C$ | $T_c$ = 25 (80) °C | 220 (160) | A |
| $I_{CRM}$ | $T_c$ = 25 (80) °C, $t_p$ = 1 ms | 440 (320) | A |
| $V_{GES}$ | | ± 20 | V |
| $T_{vj}$, ($T_{stg}$) | $T_{OPERATION} \leq T_{stg}$ | -40 ... +150 (125) | °C |
| $V_{isol}$ | AC, 1 min. | 4000 | V |
| **Inverse diode** | | | |
| $I_F$ | $T_c$ = 25 (80) °C | 170 (115) | A |
| $I_{FRM}$ | $T_c$ = 25 (80) °C, $t_p$ = 1 ms | 440 (320) | A |
| $I_{FSM}$ | $t_p$ = 10 ms; sin.; $T_j$ = 150 °C | 1450 | A |
| **Freewheeling diode** | | | |
| $I_F$ | $T_c$ = 25 (80) °C | 170 (115) | A |
| $I_{FRM}$ | $T_c$ = 25 (80) °C, $t_p$ = 1 ms | 440 (320) | A |
| $I_{FSM}$ | $t_p$ = 10 ms; sin.; $T_j$ = 150 °C | 1450 | A |

| Characteristics | | | $T_{case}$ = 25°C, unless otherwise specified | | |
|---|---|---|---|---|---|
| **Symbol** | **Conditions** | **min.** | **typ.** | **max.** | **Units** |
| **IGBT** | | | | | |
| $V_{GE(th)}$ | $V_{GE} = V_{CE}$, $I_C$ = 6 mA | 5 | 5,8 | 6,5 | V |
| $I_{CES}$ | $V_{GE}$ = 0, $V_{CE} = V_{CES}$, $T_j$ = 25 () °C | | 0,1 | 0,3 | mA |
| $V_{CE(TO)}$ | $T_j$ = 25 () °C | | 1 (0,9) | 1,2 (1,1) | V |
| $r_{CE}$ | $V_{GE}$ = 0 V, $T_j$ = 25 (125) °C | | 4,7 (7,3) | 6,3 (9) | mΩ |
| $V_{CE(sat)}$ | $I_C$ = 150 A, $V_{GE}$ = 15 V, chip level | | 1,7 (2) | 2,15 (2,45) | V |
| $C_{ies}$ | under following conditions | | 10,5 | | nF |
| $C_{oes}$ | $V_{GE}$ = 0, $V_{CE}$ = 25 V, f = 1 MHz | | 0,9 | | nF |
| $C_{res}$ | | | 0,8 | | nF |
| $L_{CE}$ | | | | 30 | nH |
| $R_{CC'+EE'}$ | res., terminal-chip $T_c$= 25 (125) °C | | 0,75 (1) | | mΩ |
| $t_{d(on)}$ | $V_{CC}$ = 600 V, $I_C$ = 150 A | | | | ns |
| $t_r$ | $R_{Gon} = R_{Goff}$ = , $T_j$ = 125 °C | | | | ns |
| $t_{d(off)}$ | $V_{GE}$ ± 15 V | | | | ns |
| $t_f$ | | | | | ns |
| $E_{on}$ ($E_{off}$) | | | | | mJ |
| **Inverse diode** | | | | | |
| $V_F = V_{EC}$ | $I_F$ = 100 A; $V_{GE}$ = 0 V; $T_j$ = 25 (125) °C | | 2 (1,8) | 2,5 | V |
| $V_{(TO)}$ | $T_j$ = 25 (125) °C | | | 1,2 | V |
| $r_T$ | $T_j$ = 25 (125) °C | | 8 | 11 | mΩ |
| $I_{RRM}$ | $I_F$ = 150 A; $T_j$ = 125 ( ) °C | | | | A |
| $Q_{rr}$ | di/dt = A/µs | | | | µC |
| $E_{rr}$ | $V_{GE}$ = 0 V | | | | mJ |
| **FWD** | | | | | |
| $V_F = V_{EC}$ | $I_F$ = 100 A; $V_{GE}$ = 0 V, $T_j$ = 25 (125) °C | | 2 (1,8) | 2,5 | V |
| $V_{(TO)}$ | $T_j$ = 25 (125) °C | | | 1,2 | V |
| $r_T$ | $T_j$ = 25 (125) °C | | 8 | 11 | mΩ |
| $I_{RRM}$ | $I_F$ = 150 A; $T_j$ = 125 ( ) °C | | | | A |
| $Q_{rr}$ | di/dt = A/µs | | | | µC |
| $E_{rr}$ | $V_{GE}$ = 0 V | | | | mJ |
| **Thermal characteristics** | | | | | |
| $R_{th(j-c)}$ | per IGBT | | | 0,16 | K/W |
| $R_{th(j-c)D}$ | per Inverse Diode | | | 0,32 | K/W |
| $R_{th(j-c)FD}$ | per FWD | | | 0,32 | K/W |
| $R_{th(c-s)}$ | per module | | | 0,05 | K/W |
| **Mechanical data** | | | | | |
| $M_s$ | to heatsink M6 | 3 | | 5 | Nm |
| $M_t$ | to terminals M5 | 2,5 | | 5 | Nm |
| w | | | | 160 | g |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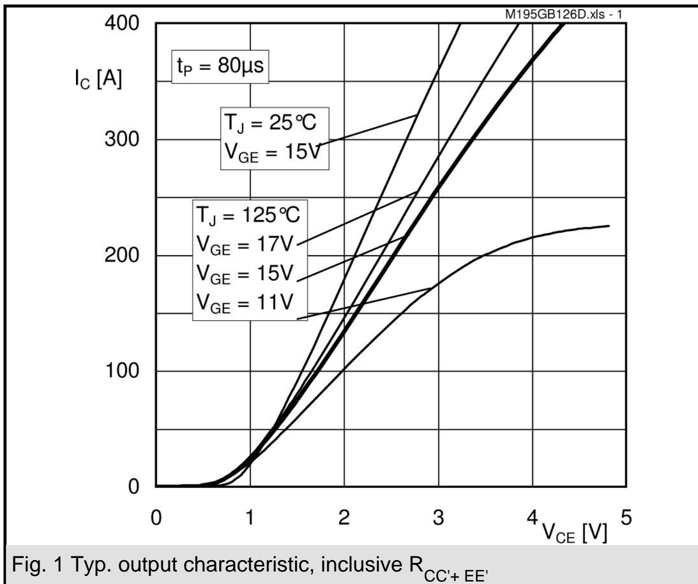


Fig. 1 Typ. output characteristic, inclusive $R_{CC'+ EE'}$

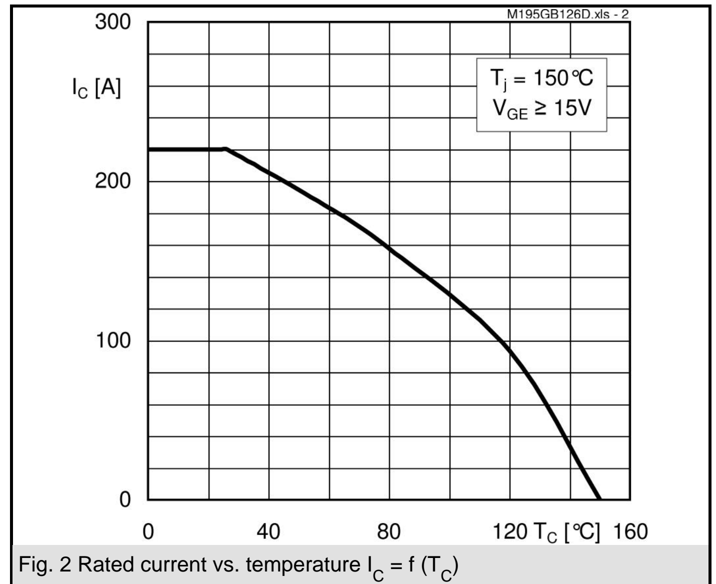


Fig. 2 Rated current vs. temperature $I_C = f(T_C)$

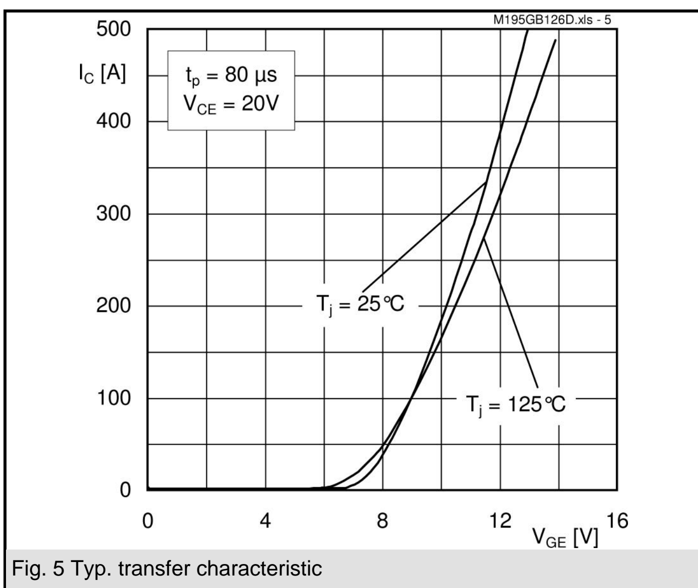


Fig. 5 Typ. transfer characteristic

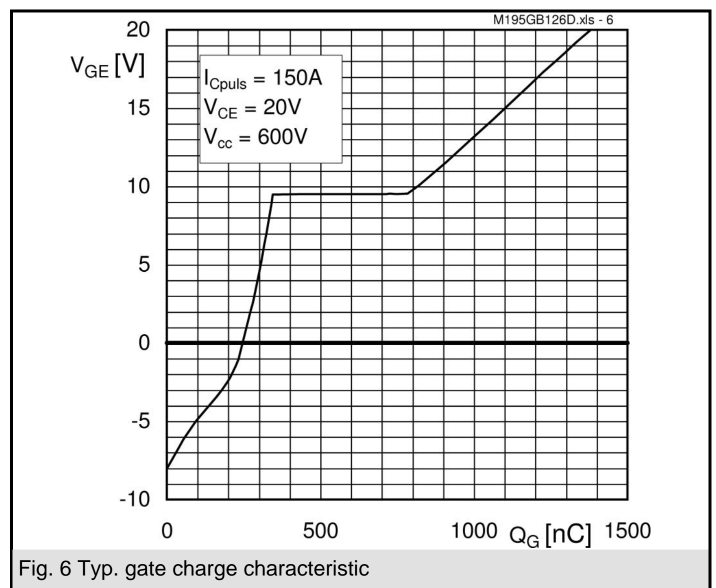


Fig. 6 Typ. gate charge characteristic

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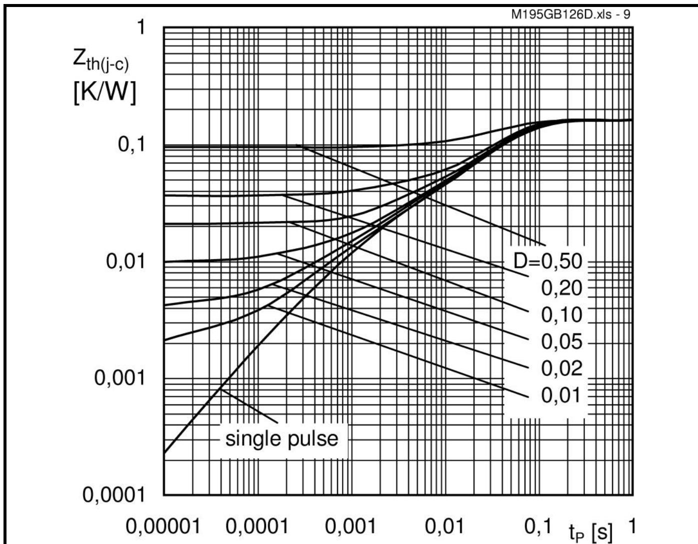



Fig. 9 Transient thermal impedance of IGBT

$Z_{thp(j-c)} = f(t_p)$; $D = t_p/t_c = t_p{*}f$

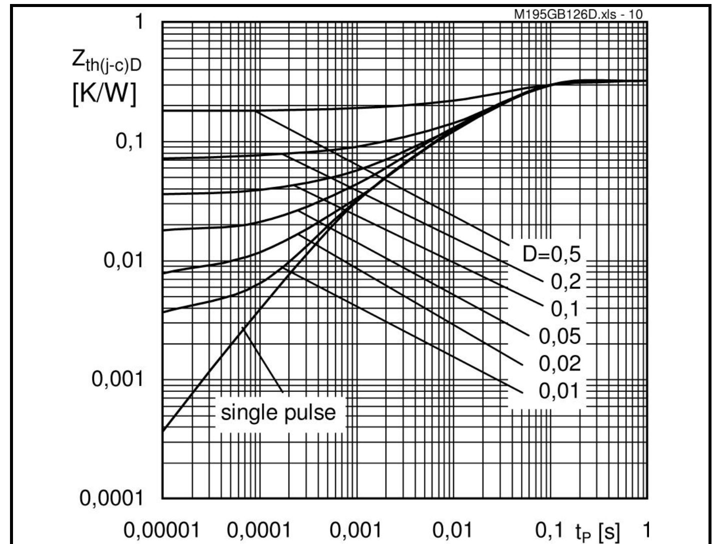



Fig. 10 Transient thermal impedance of FWD

$Z_{thp(j-c)} = f(t_p)$; $D = t_p/t_c = t_p{*}f$

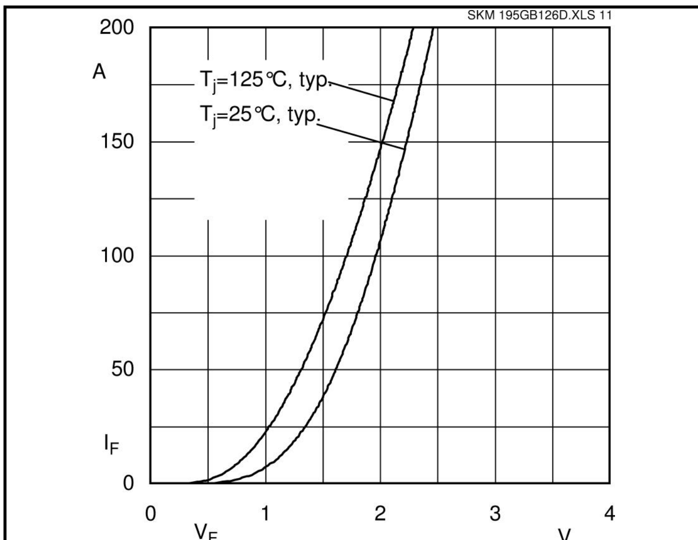
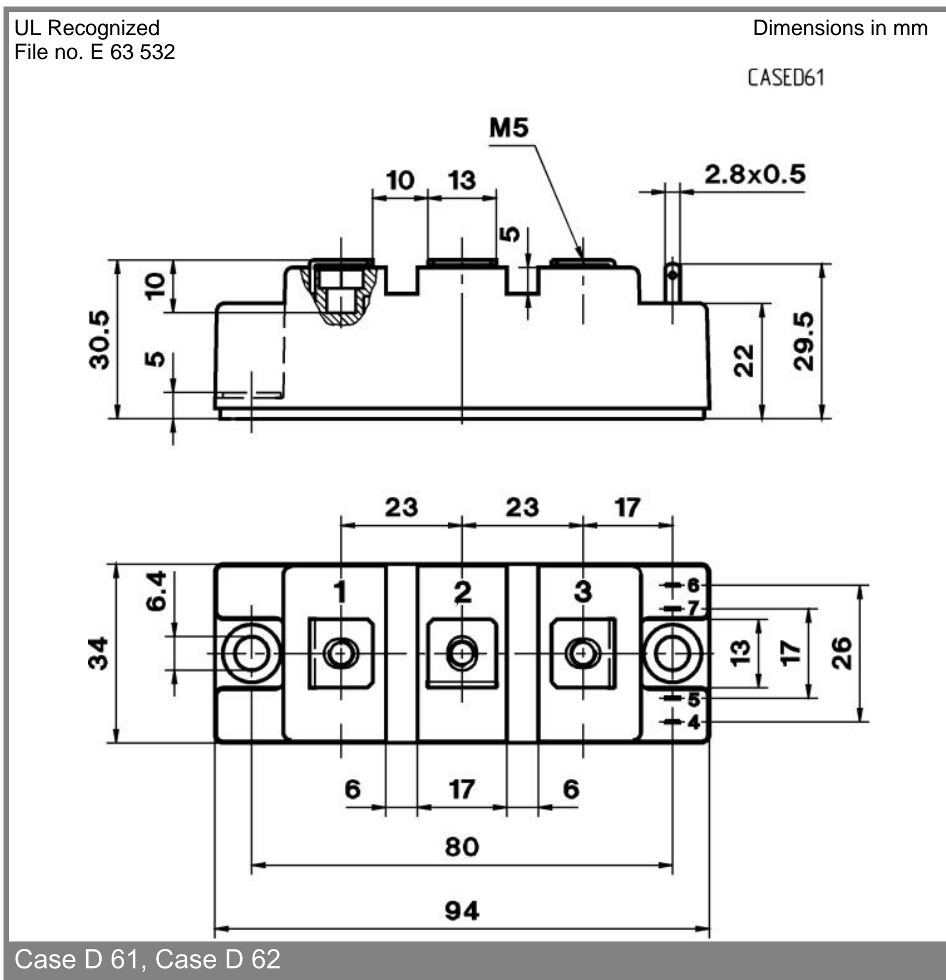
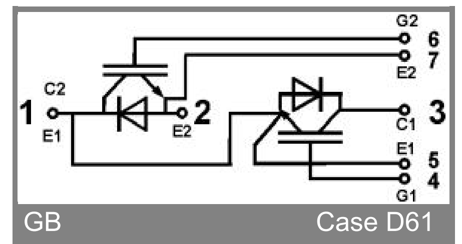


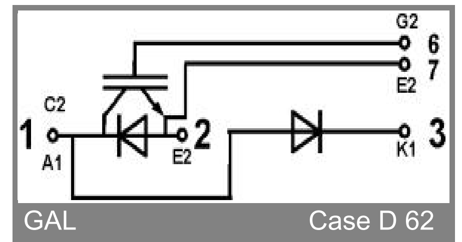

Fig. 11 CAL diode forward characteristic




Case D 61, Case D 62




GB Case D61




GAL Case D 62

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

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