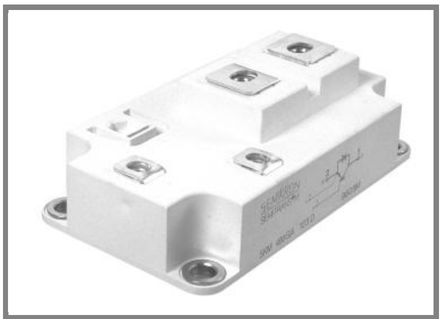
# SKM 800GA126D



**SEMITRANS 4**

## Trench IGBT Modules

**SKM 800GA126D**

Preliminary Data

### Features

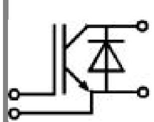
- Homogeneous Si
- Trench = Trenchgate technology
- $V_{CEsat}$ with positive temperature coefficient
- High short circuit capability, self limiting to 6 x $I_C$

### Typical Applications

- AC inverter drives
- UPS
- Electronic welders

### Remarks

- $I_{DC} \leq$ 500A limited by terminals



GA

| Absolute Maximum Ratings | | $T_c$ = 25 °C, unless otherwise specified | |
|---|---|---|---|
| **Symbol** | **Conditions** | **Values** | **Units** |
| **IGBT** | | | |
| $V_{CES}$ | | 1200 | V |
| $I_C$ | $T_c$ = 25 (80) °C | 960 (620) | A |
| $I_{CRM}$ | $T_c$ = 25 (80) °C, $t_p$ = 1 ms | 1920 (1240) | 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 (125) °C | 680 (470) | A |
| $I_{FRM}$ | $T_c$ = 25 (80) °C, $t_p$ = 1 ms | 1920 (1240) | A |
| $I_{FSM}$ | $t_p$ = 10 ms; sin.; $T_j$ = 150 °C | 3600 | A |

| Characteristics | | | $T_c$ = 25 °C, unless otherwise specified | | |
|---|---|---|---|---|---|
| **Symbol** | **Conditions** | **min.** | **typ.** | **max.** | **Units** |
| **IGBT** | | | | | |
| $V_{GE(th)}$ | $V_{GE} = V_{CE}$, $I_C$ = 16 mA | 5 | 5,8 | 6,5 | V |
| $I_{CES}$ | $V_{GE}$ = 0, $V_{CE} = V_{CES}$, $T_j$ = 25 (125) °C | | 0,2 | 0,6 | mA |
| $V_{CE(TO)}$ | $T_j$ = 25 (125) °C | | 1 (0,9) | 1,15 | V |
| $r_{CE}$ | $V_{GE}$ = 15 V, $T_j$ = 25 (125) °C | | 1,2 (1,8) | 1,7 | mΩ |
| $V_{CE(sat)}$ | $I_C$ = 600 A, $V_{GE}$ = 15 V, chip level | | 1,7 (2) | 2,15 | V |
| $C_{ies}$ | under following conditions | | 42 | | nF |
| $C_{oes}$ | $V_{GE}$ = 0, $V_{CE}$ = 25 V, f = 1 MHz | | 3,3 | | nF |
| $C_{res}$ | | | 3,1 | | nF |
| $L_{CE}$ | | | | 20 | nH |
| $R_{CC'+EE'}$ | res., terminal-chip $T_c$= 25 (125) °C | | 0,18 (0,22) | | mΩ |
| $t_{d(on)}$ | $V_{CC}$ = 600 V, $I_C$ = 600 A | | 220 | | ns |
| $t_r$ | $R_{Gon} = R_{Goff}$ = 3 Ω, $T_j$ = 125 °C | | 100 | | ns |
| $t_{d(off)}$ | $V_{GE}$ = ± 15 V | | 860 | | ns |
| $t_f$ | | | 135 | | ns |
| $E_{on}$ ($E_{off}$) | | | 65 (95) | | mJ |
| **Inverse diode** | | | | | |
| $V_F = V_{EC}$ | $I_F$ = 600 A; $V_{GE}$ = 0 V; $T_j$ = 25 (125) °C | | 1,6 (1,6) | 1,8 (1,8) | V |
| $V_{(TO)}$ | $T_j$ = 25 (125) °C | | 1 (0,8) | 1,1 (0,9) | V |
| $r_T$ | $T_j$ = 25 (125) °C | | 1 (1,3) | 1,1 (1,5) | mΩ |
| $I_{RRM}$ | $I_F$ = 600 A; $T_j$ = 125 ( ) °C | | 540 | | A |
| $Q_{rr}$ | di/dt = 6000 A/µs | | 125 | | µC |
| $E_{rr}$ | $V_{GE}$ = 0 V | | 59 | | mJ |
| **Thermal characteristics** | | | | | |
| $R_{th(j-c)}$ | per IGBT | | | 0,042 | K/W |
| $R_{th(j-c)D}$ | per Inverse Diode | | | 0,09 | 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, M4 | 2,5 | | 5 | Nm |
| w | | | | 330 | g |

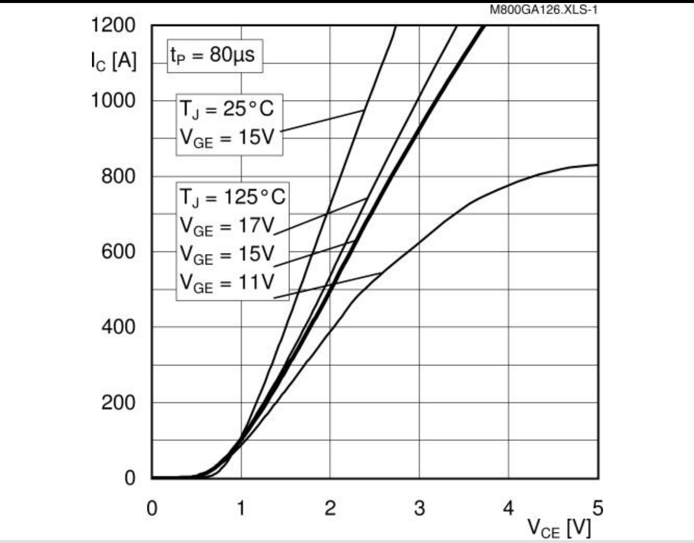



Fig. 1 Typ. output characteristic, inclusive $R_{CC'+ EE'}$

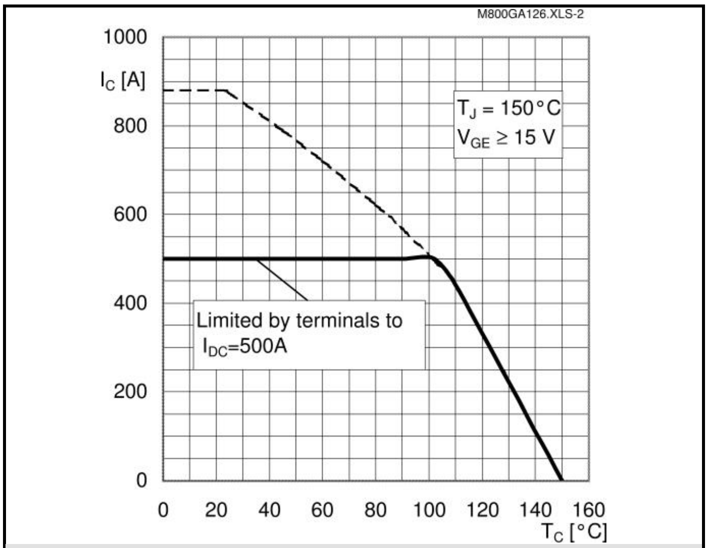



Fig. 2 Rated current vs. temperature $I_C = f(T_C)$

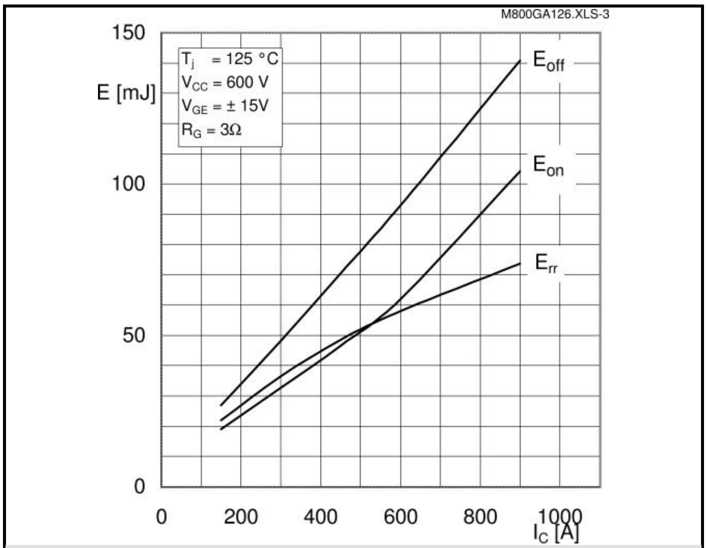



Fig. 3 Typ. turn-on /-off energy = f ($I_C$)

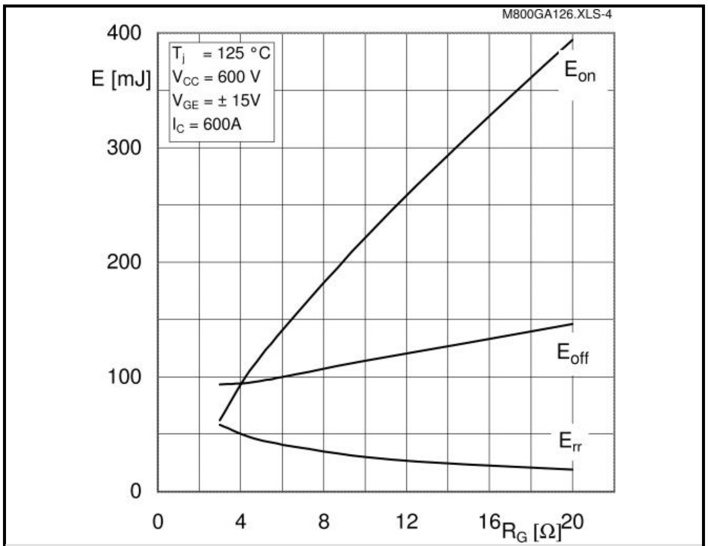



Fig. 4 Typ. turn-on /-off energy = f ($R_G$)

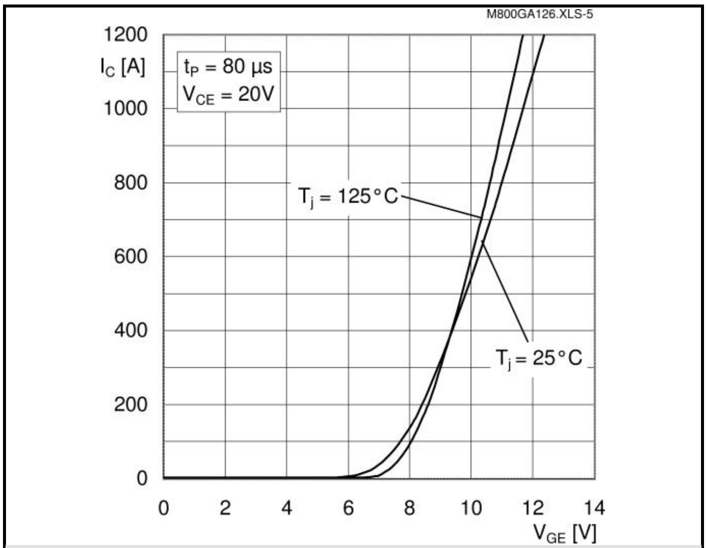



Fig. 5 Typ. transfer characteristic

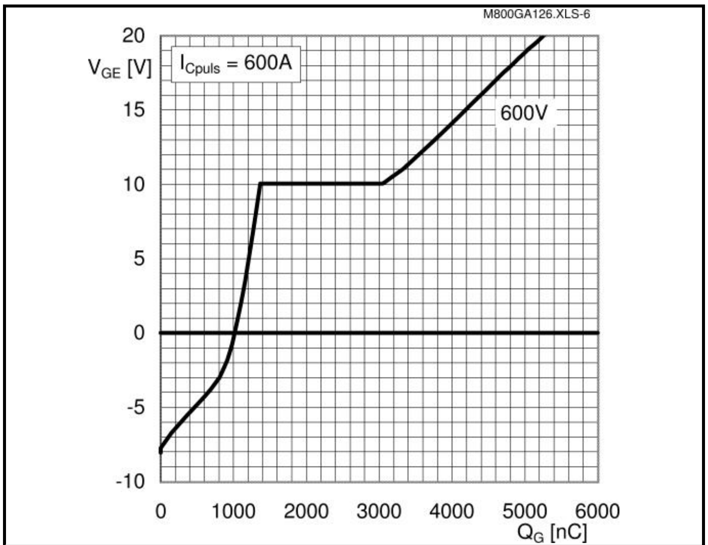



Fig. 6 Typ. gate charge characteristic

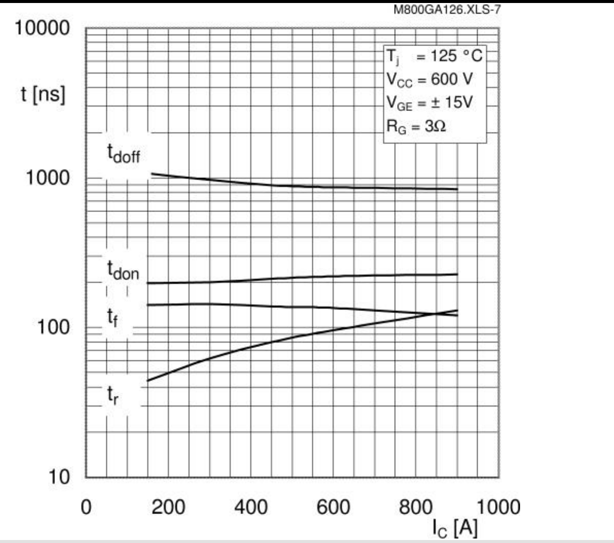



Fig. 7 Typ. switching times vs. $I_C$

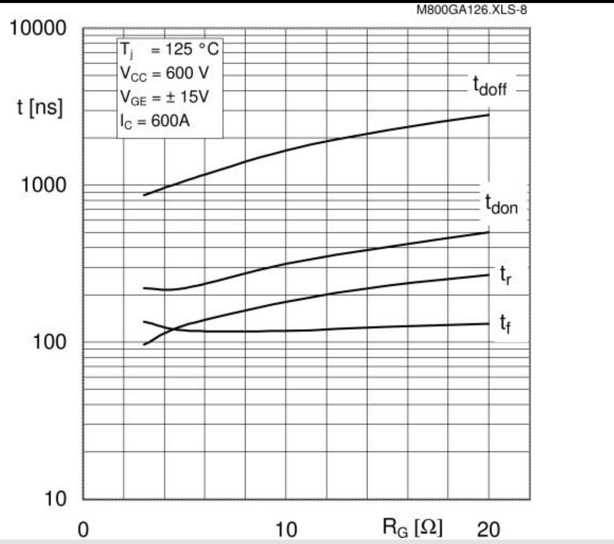



Fig. 8 Typ. switching times vs. gate resistor $R_G$

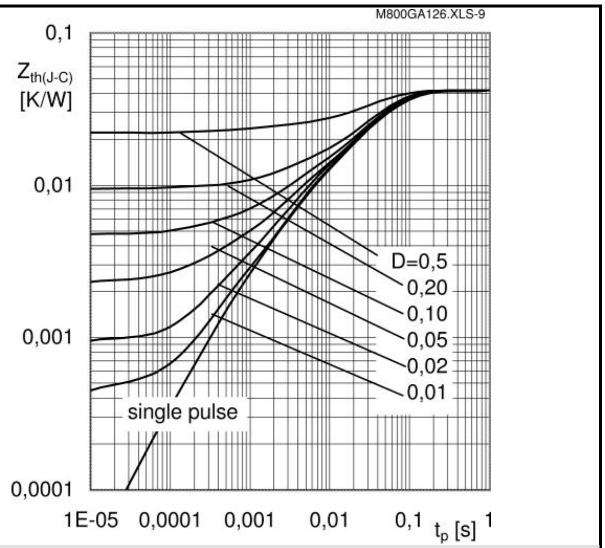



Fig. 9 Transient thermal impedance of IGBT

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

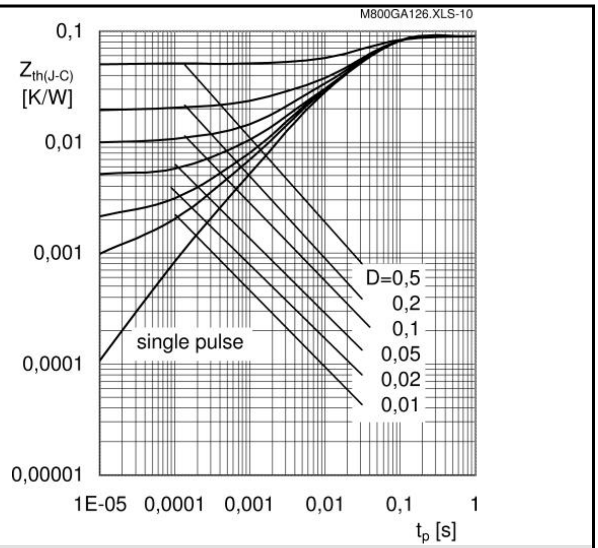



Fig. 10 Transient thermal impedance of Inverse CAL Diode

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

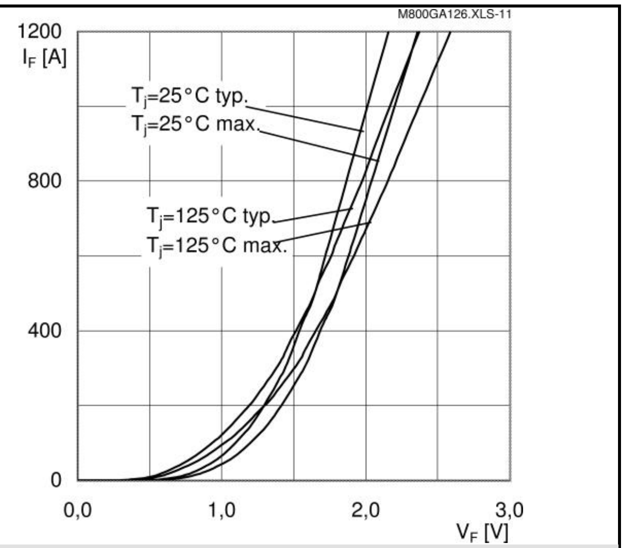



Fig. 11 CAL diode forward characteristic

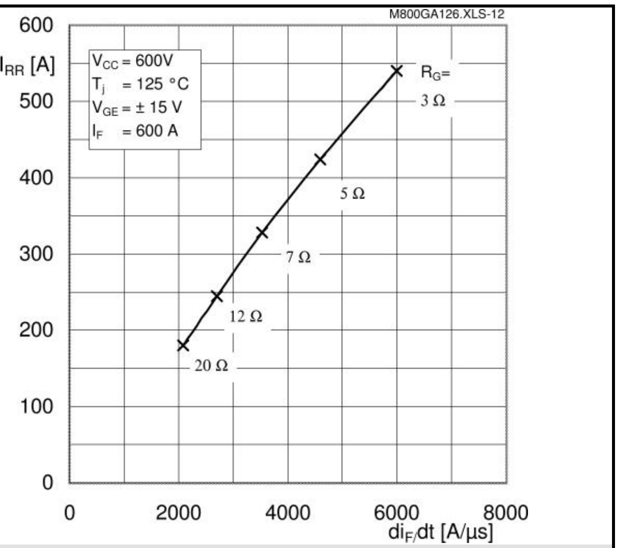



Fig. 12 Typ. CAL diode peak reverse recovery current

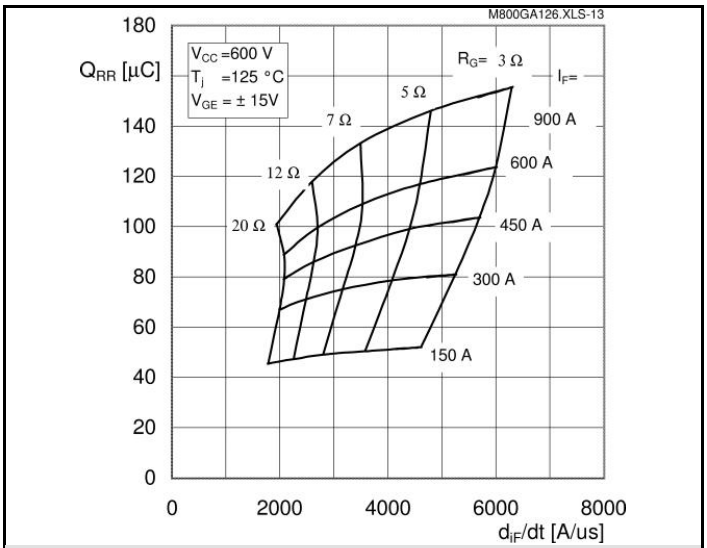
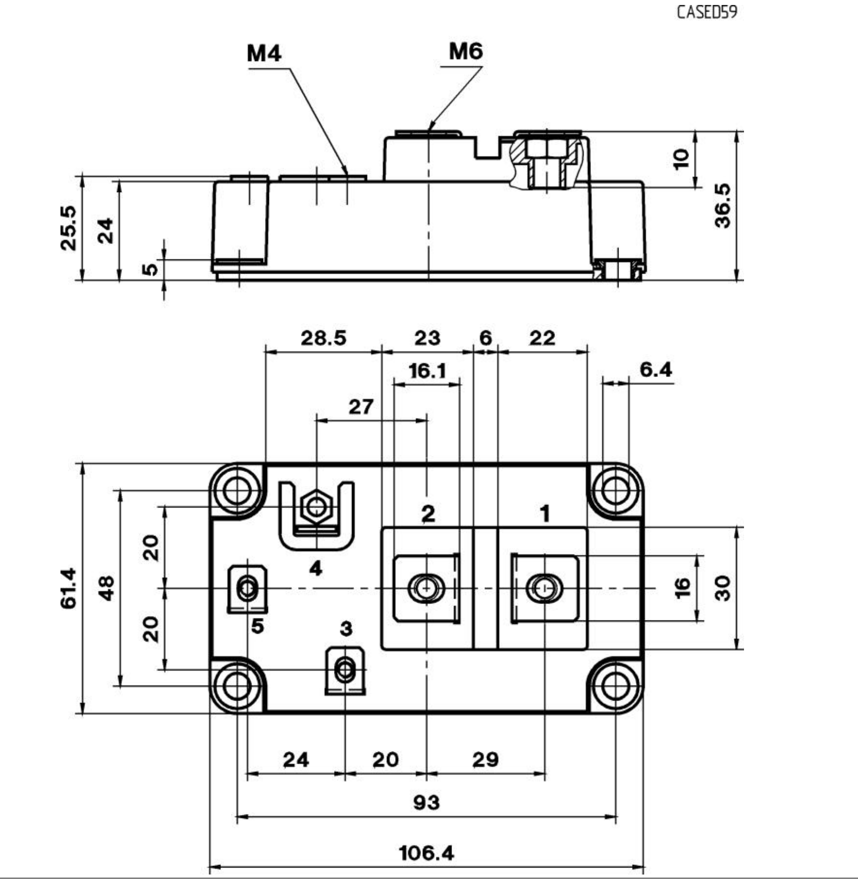


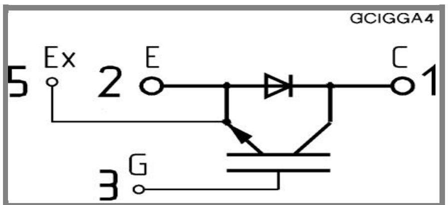

Fig. 13 Typ. CAL diode recovered charge

UL Recognized
File no. E 63 532

Dimensions in mm




Case D 59




Case D59 GA

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

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