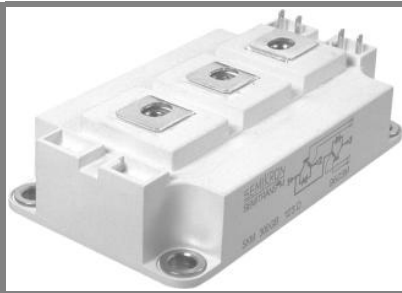


SKM 300GB126D



SEMITRANS® 3

Trench IGBT Module

SKM 300GB126D

Features

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

Typical Applications*

- Electronic welders
- AC inverter drives
- UPS

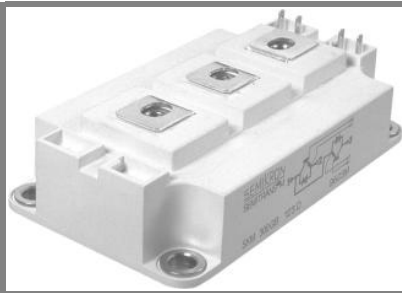


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| Absolute Maximum Ratings | | $T_c = 25^\circ\text{C}$, unless otherwise specified | | |
|--------------------------|--|---|-----|------------------|
| Symbol | Conditions | Values | | Units |
| IGBT | | | | |
| V_{CES} | $T_j = 25^\circ\text{C}$ | 1200 | | V |
| I_C | $T_j = 150^\circ\text{C}$ | $T_{case} = 25^\circ\text{C}$ | 310 | A |
| | | $T_{case} = 80^\circ\text{C}$ | 200 | 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 | | | | |
| I_F | $T_j = 150^\circ\text{C}$ | $T_{case} = 25^\circ\text{C}$ | 250 | A |
| | | $T_{case} = 80^\circ\text{C}$ | 170 | A |
| I_{FRM} | $I_{FRM} = 2 \times I_{Fnom}$ | 400 | | A |
| Module | | | | |
| $I_{t(RMS)}$ | | 500 | | A |
| T_{vj} | | - 40 ... + 150 | | $^\circ\text{C}$ |
| T_{stg} | | -40...+125 | | $^\circ\text{C}$ |
| V_{isol} | AC, 1 min. | 4000 | | V |

| Characteristics | | $T_c = 25^\circ\text{C}$, unless otherwise specified | | | |
|-----------------|---|---|------|----------|------------|
| Symbol | Conditions | min. | typ. | max. | Units |
| IGBT | | | | | |
| $V_{GE(th)}$ | $V_{GE} = V_{CE}; I_C = 8\text{ mA}$ | 5 | 5,8 | 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 | 1,2 | V |
| | | $T_j = 125^\circ\text{C}$ | 0,9 | 1,1 | V |
| r_{CE} | $V_{GE} = 15\text{ V}$ | $T_j = 25^\circ\text{C}$ | 3,5 | 4,7 | m Ω |
| | | $T_j = 125^\circ\text{C}$ | 5,5 | 6,8 | m Ω |
| $V_{CE(sat)}$ | $I_{Cnom} = 200\text{ A}, V_{GE} = 15\text{ V}$ | $T_j = 25^\circ\text{C}_{chiplev.}$ | 1,7 | 2,15 | V |
| | | $T_j = 125^\circ\text{C}_{chiplev.}$ | 2 | 2,45 | V |
| C_{ies} | $V_{CE} = 25, V_{GE} = 0\text{ V}$ | $f = 1\text{ MHz}$ | 15 | | nF |
| C_{oes} | | | 1,2 | | nF |
| C_{res} | | | 1,1 | | nF |
| Q_G | $V_{GE} = -8\text{ V} - +20\text{ V}$ | 1800 | | nC | |
| R_{Gint} | $T_j = 25^\circ\text{C}$ | 3,8 | | Ω | |
| $t_{d(on)}$ | $R_{Gon} = 1,5\ \Omega$ | $V_{CC} = 600\text{ V}$ $I_C = 200\text{ A}$ | 280 | | ns |
| t_r | | | 37 | | ns |
| E_{on} | | | 21 | | mJ |
| $t_{d(off)}$ | $R_{Goff} = 1,5\ \Omega$ | $T_j = 125^\circ\text{C}$ $V_{GE} = \pm 15\text{ V}$ | 560 | | ns |
| t_f | | | 100 | | ns |
| E_{off} | | | 33 | | mJ |
| $R_{th(j-c)}$ | per IGBT | 0,12 | | K/W | |

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Typical Applications*

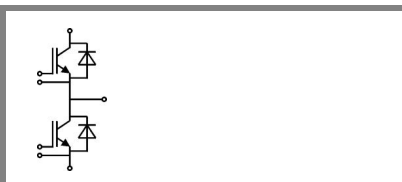
- Electronic welders
- AC inverter drives
- UPS

Characteristics

| Symbol | Conditions | min. | typ. | max. | Units |
|----------------------|--|---|------|-------|---------------|
| Inverse diode | | | | | |
| $V_F = V_{EC}$ | $I_{Fnom} = 200 \text{ A}; V_{GE} = 0 \text{ V}$ | $T_j = 25 \text{ }^\circ\text{C}_{chiplev.}$ | 1,6 | 1,8 | V |
| | | $T_j = 125 \text{ }^\circ\text{C}_{chiplev.}$ | 1,6 | 1,8 | V |
| V_{F0} | | $T_j = 25 \text{ }^\circ\text{C}$ | 1 | 1,1 | V |
| | | $T_j = 125 \text{ }^\circ\text{C}$ | 0,8 | 0,9 | V |
| r_F | | $T_j = 25 \text{ }^\circ\text{C}$ | 3 | 3,5 | m Ω |
| | | $T_j = 125 \text{ }^\circ\text{C}$ | 4 | 4,5 | m Ω |
| I_{RRM} | $I_F = 200 \text{ A}$ | $T_j = 125 \text{ }^\circ\text{C}$ | 290 | | A |
| Q_{rr} | $di/dt = 6200 \text{ A}/\mu\text{s}$ | | 44 | | μC |
| E_{rr} | $V_{GE} = -15 \text{ V}; V_{CC} = 600 \text{ V}$ | | 18 | | mJ |
| $R_{th(j-c)D}$ | per diode | | | 0,25 | 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 |

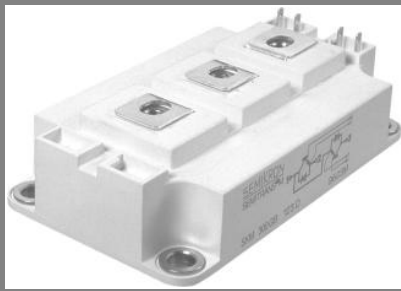
This is an electrostatic discharge sensitive device (ESDS), international standard IEC 60747-1, Chapter IX.

* The specifications of our components may not be considered as an assurance of component characteristics. Components have to be tested for the respective application. Adjustments may be necessary. The use of SEMIKRON products in life support appliances and systems is subject to prior specification and written approval by SEMIKRON. We therefore strongly recommend prior consultation of our personal.



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Typical Applications*

- Electronic welders
- AC inverter drives
- UPS

| Z_{th} | | Values | Units |
|-------------------|------------|--------|-------|
| Symbol | Conditions | | |
| $Z_{th(j-c)I}$ | | | |
| $R_{\theta i}$ | $i = 1$ | 80 | mk/W |
| $R_{\theta i}$ | $i = 2$ | 30 | mk/W |
| $R_{\theta i}$ | $i = 3$ | 8,5 | mk/W |
| $R_{\theta i}$ | $i = 4$ | 1,5 | mk/W |
| $\tau_{\theta i}$ | $i = 1$ | 0,0576 | s |
| $\tau_{\theta i}$ | $i = 2$ | 0,01 | s |
| $\tau_{\theta i}$ | $i = 3$ | 0,002 | s |
| $\tau_{\theta i}$ | $i = 4$ | 0,0002 | s |
| $Z_{th(j-c)D}$ | | | |
| $R_{\theta i}$ | $i = 1$ | 150 | mk/W |
| $R_{\theta i}$ | $i = 2$ | 75 | mk/W |
| $R_{\theta i}$ | $i = 3$ | 22 | mk/W |
| $R_{\theta i}$ | $i = 4$ | 3 | mk/W |
| $\tau_{\theta i}$ | $i = 1$ | 0,0331 | s |
| $\tau_{\theta i}$ | $i = 2$ | 0,0113 | s |
| $\tau_{\theta i}$ | $i = 3$ | 0,0012 | s |
| $\tau_{\theta i}$ | $i = 4$ | 0,001 | s |



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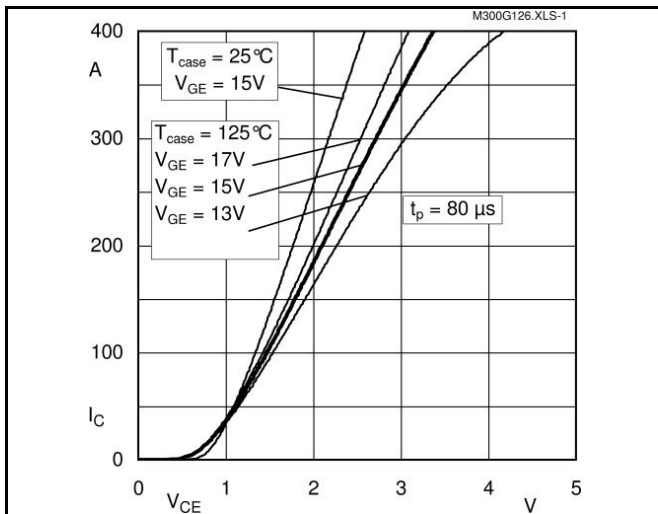


Fig. 1 Typ. output characteristic, inclusive $R_{CC+EE'}$

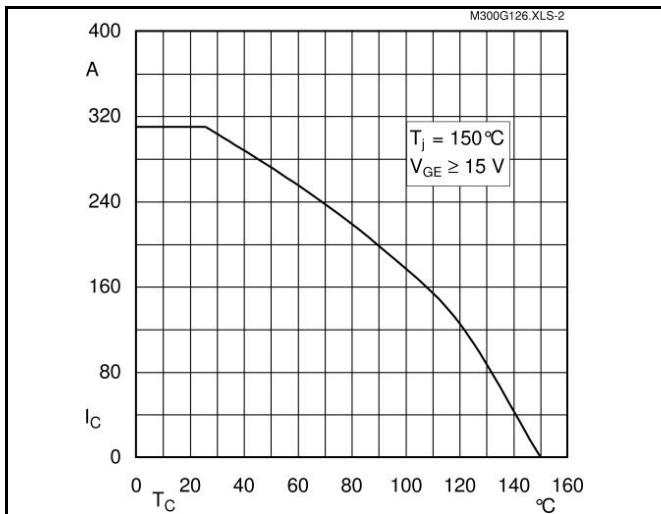


Fig. 2 Rated current vs. temperature $I_C = f(T_C)$

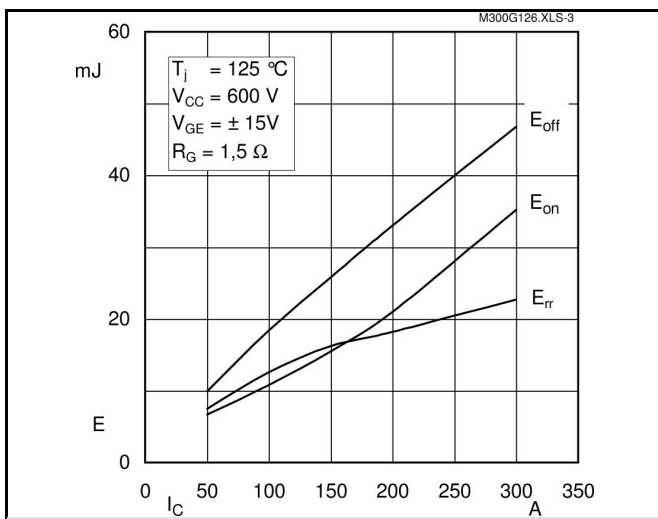


Fig. 3 Typ. turn-on /-off energy = $f(I_C)$

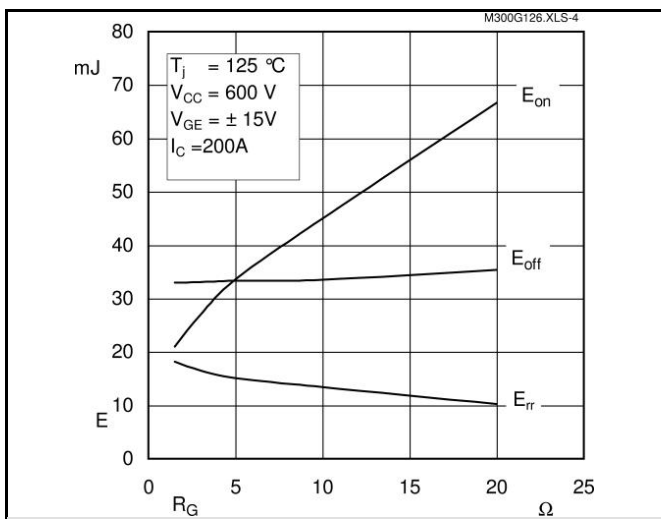


Fig. 4 Typ. turn-on /-off energy = $f(R_G)$

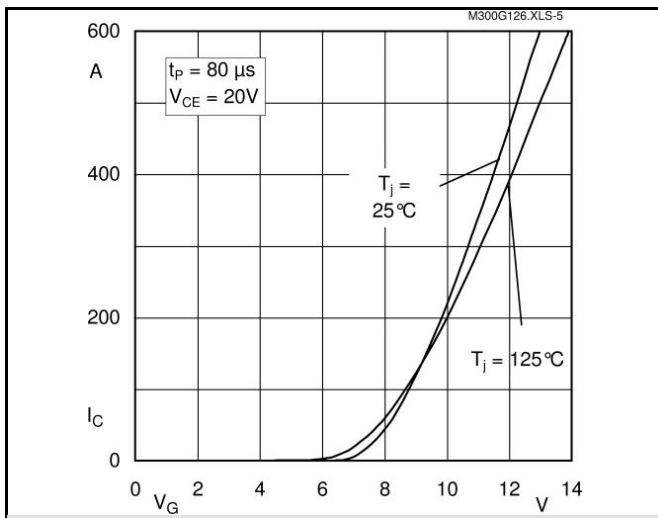


Fig. 5 Typ. transfer characteristic

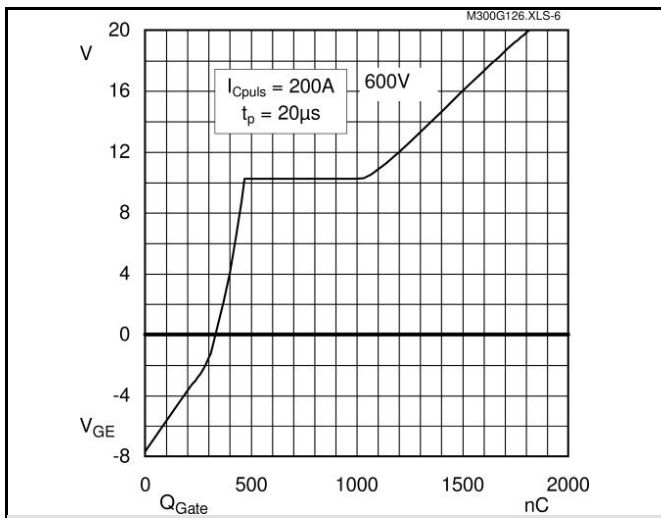
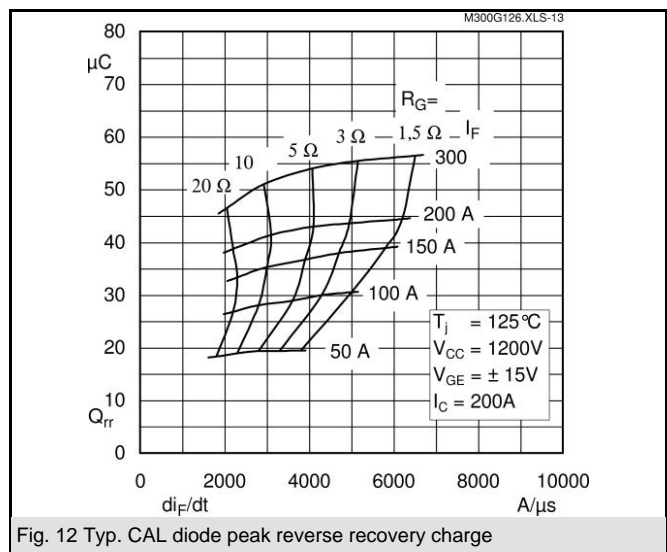
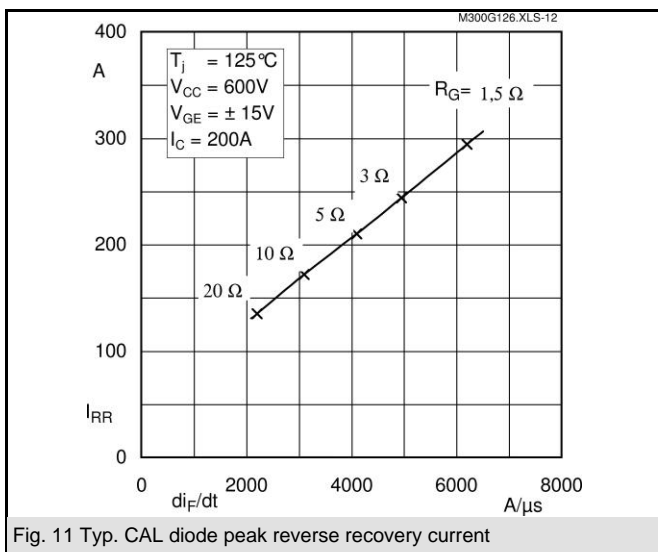
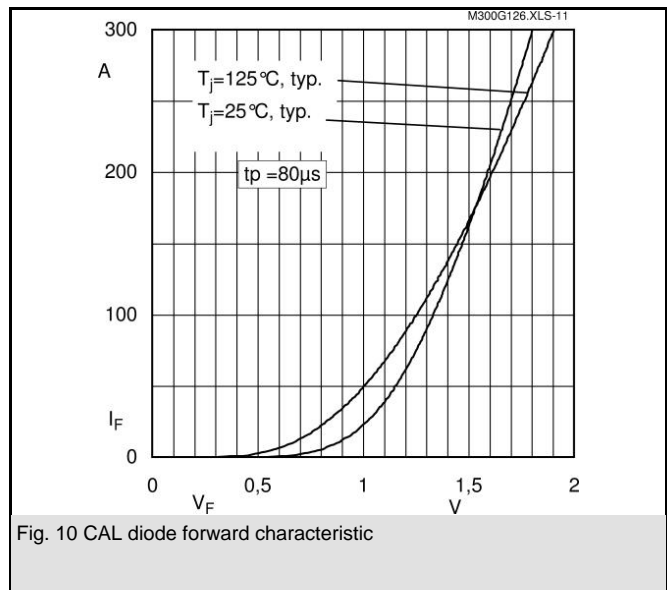
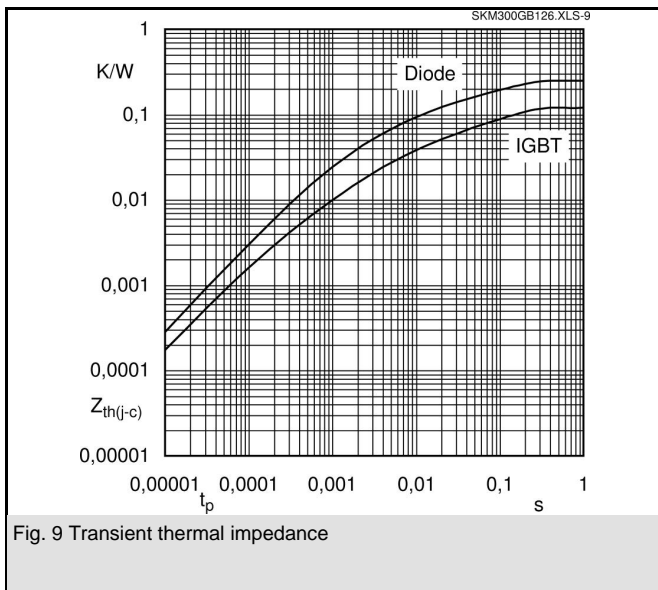
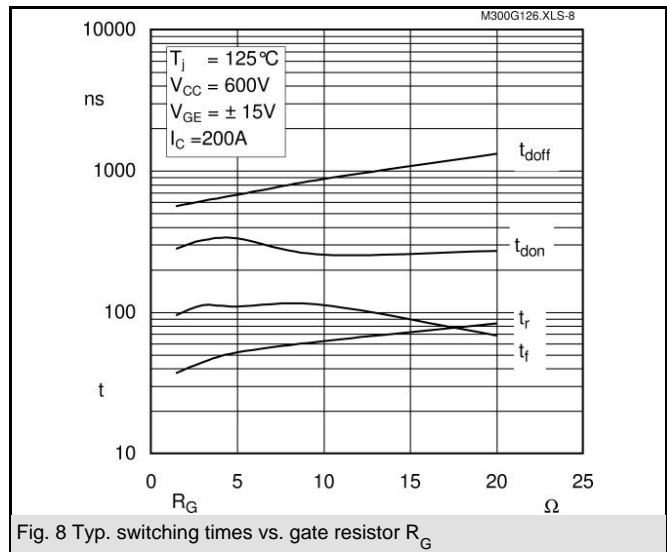
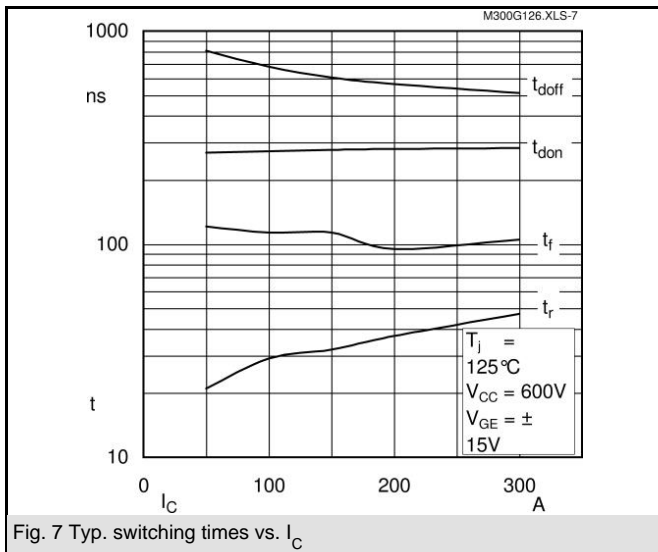


Fig. 6 Typ. gate charge characteristic

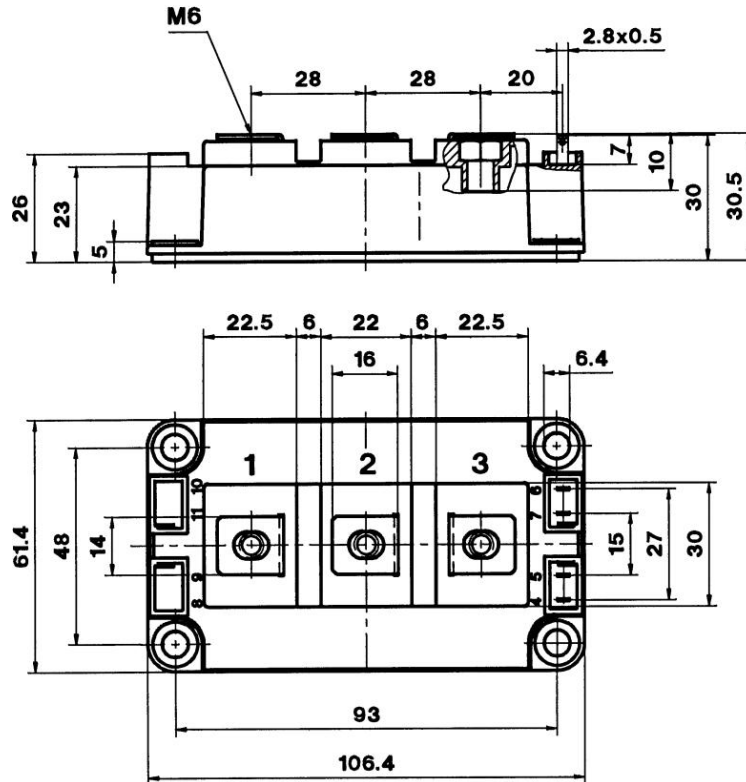


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