

SKM 145GB066D



SEMITRANS® 2

Trench IGBT Modules

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Features

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

Typical Applications*

- AC inverter Drives
- UPS
- Electronic welders

Remarks

- Case temperature limited to $T_C = 125^\circ\text{C}$ max, recomm. $T_{op} = -40 \dots +150^\circ\text{C}$, product rel. results valid for $T_j \leq 150^\circ\text{C}$
- SC data: $t_p \leq 6\mu\text{s}$; $V_{GE} \leq 15\text{V}$; $T_j = 150^\circ\text{C}$; $V_{CC} \leq 360\text{V}$, use of soft R_G necessary!
- Take care of over-voltage caused by stray induct.



GB

| Absolute Maximum Ratings | | $T_{case} = 25^\circ\text{C}$, unless otherwise specified | | |
|--------------------------|--|--|------------------|---|
| Symbol | Conditions | Values | Units | |
| IGBT | | | | |
| V_{CES} | $T_j = 25^\circ\text{C}$ | 600 | V | |
| I_C | $T_j = 175^\circ\text{C}$ | $T_c = 25^\circ\text{C}$ | 195 | A |
| | | $T_c = 80^\circ\text{C}$ | 150 | A |
| I_{CRM} | $I_{CRM} = 2 \times I_{Cnom}$ | 300 | A | |
| V_{GES} | | ± 20 | V | |
| t_{psc} | $V_{CC} = 360\text{V}$; $V_{GE} \leq 15\text{V}$; $T_j = 150^\circ\text{C}$ $V_{CES} < 600\text{V}$ | 6 | μs | |
| Inverse Diode | | | | |
| I_F | $T_j = 175^\circ\text{C}$ | $T_c = 25^\circ\text{C}$ | 150 | A |
| | | $T_c = 80^\circ\text{C}$ | 100 | A |
| I_{FRM} | $I_{FRM} = 2 \times I_{Fnom}$ | 300 | A | |
| I_{FSM} | $t_p = 10\text{ms}$; sin. | $T_j = 175^\circ\text{C}$ | 880 | A |
| Module | | | | |
| $I_{t(RMS)}$ | | 200 | A | |
| T_{vj} | | -40 ... +175 | $^\circ\text{C}$ | |
| T_{stg} | | -40 ... +125 | $^\circ\text{C}$ | |
| V_{isol} | AC, 1 min. | 4000 | V | |

| Characteristics | | $T_{case} = 25^\circ\text{C}$, unless otherwise specified | | | |
|-----------------|--|--|------|------|------------|
| Symbol | Conditions | min. | typ. | max. | Units |
| IGBT | | | | | |
| $V_{GE(th)}$ | $V_{GE} = V_{CE}$; $I_C = 2,4\text{mA}$ | 5 | 5,8 | 6,5 | V |
| I_{CES} | $V_{GE} = 0\text{V}$; $V_{CE} = V_{CES}$ | | 0,08 | 0,25 | mA |
| V_{CE0} | | $T_j = 25^\circ\text{C}$ | 0,9 | 1 | V |
| | | $T_j = 150^\circ\text{C}$ | 0,85 | 0,9 | V |
| r_{CE} | $V_{GE} = 15\text{V}$ | $T_j = 25^\circ\text{C}$ | 3,7 | 6 | m Ω |
| | | $T_j = 150^\circ\text{C}$ | 5,7 | 8 | m Ω |
| $V_{CE(sat)}$ | $I_{Cnom} = 150\text{A}$; $V_{GE} = 15\text{V}$ | $T_j = 25^\circ\text{C}_{chiplev.}$ | 1,45 | 1,9 | V |
| | | $T_j = 150^\circ\text{C}_{chiplev.}$ | 1,7 | 2,1 | V |
| C_{res} | $V_{CE} = 25$; $V_{GE} = 0\text{V}$ | $f = 1\text{MHz}$ | 9,25 | | nF |
| C_{oes} | | | 0,6 | | nF |
| C_{res} | | | 0,28 | | nF |
| Q_G | $V_{GE} = -8\text{V} \dots +15\text{V}$ | | 1100 | | nC |
| R_{Gint} | $T_j = ^\circ\text{C}$ | | 2 | | Ω |
| $t_{d(on)}$ | $R_{Gon} = 4,3\ \Omega$ | $V_{CC} = 300\text{V}$ $I_C = 150\text{A}$ | 150 | | ns |
| t_r | | | 52 | | ns |
| E_{on} | $R_{Goff} = 4,3\ \Omega$ | $T_j = 150^\circ\text{C}$ $V_{GE} = -8/+15\text{V}$ | 8,5 | | mJ |
| $t_{d(off)}$ | | | 490 | | ns |
| t_f | | | 46 | | ns |
| E_{off} | | | 5,5 | | mJ |
| $R_{th(j-c)}$ | per IGBT | | | 0,3 | K/W |



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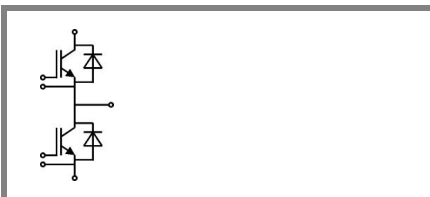
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GB

Characteristics

| Symbol | Conditions | min. | typ. | max. | Units |
|----------------------|---|--------------------------------|------|------|--------------------------------------|
| Inverse Diode | | | | | |
| $V_F = V_{EC}$ | $I_{Fnom} = 150\text{ A}$; $V_{GE} = 0\text{ V}$ | | 1,4 | 1,6 | V |
| | | | | | $T_j = 25^\circ\text{C}_{chiplev.}$ |
| | | | | | $T_j = 150^\circ\text{C}_{chiplev.}$ |
| V_{F0} | | | 0,95 | 1 | V |
| r_F | | | 3 | 4 | mΩ |
| I_{RRM} | $I_F = 150\text{ A}$ | | 90 | | A |
| Q_{rr} | $di/dt = 2100\text{ A}/\mu\text{s}$ | | 20 | | μC |
| E_{rr} | $V_{GE} = -8\text{ V}$; $V_{CC} = 300\text{ V}$ | | 3,5 | | mJ |
| $R_{th(j-c)D}$ | per diode | | | 0,5 | K/W |
| Module | | | | | |
| L_{CE} | | | | 30 | nH |
| R_{CC+EE} | res., terminal-chip | $T_{case} = 25^\circ\text{C}$ | 0,75 | | mΩ |
| | | $T_{case} = 125^\circ\text{C}$ | 1 | | mΩ |
| $R_{th(c-s)}$ | per module | | | 0,05 | K/W |
| M_s | to heat sink M6 | | 3 | 5 | Nm |
| M_t | to terminals M5 | | 2,5 | 5 | Nm |
| w | | | | 150 | 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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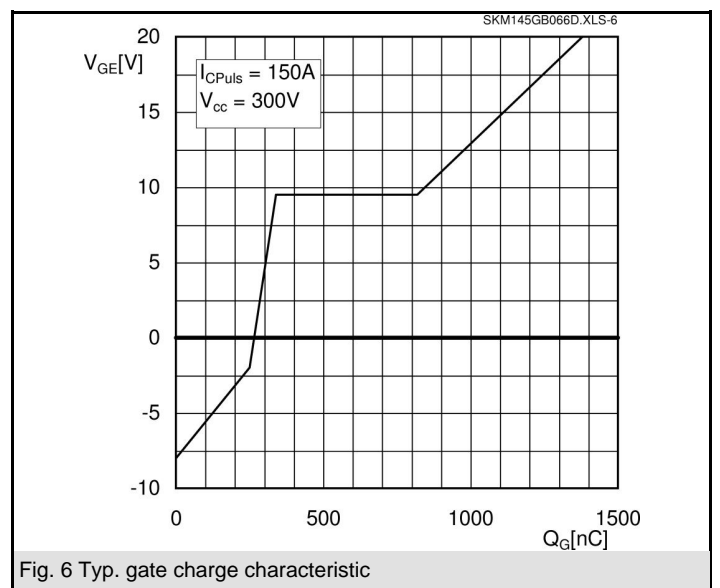
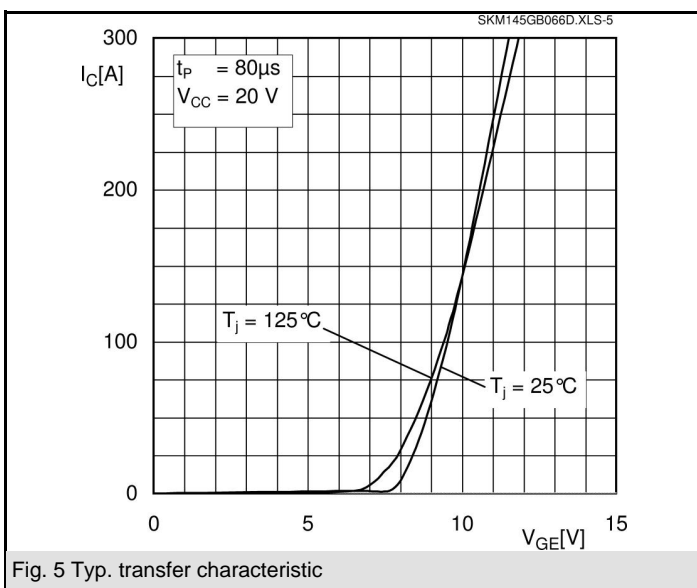
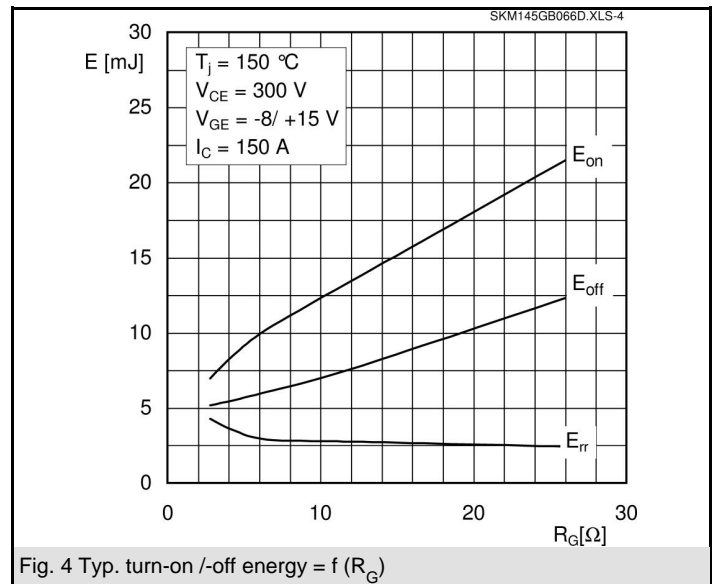
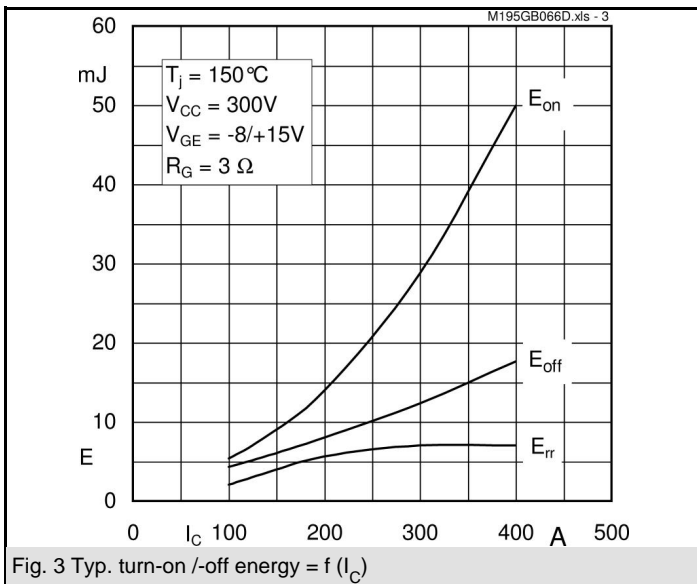
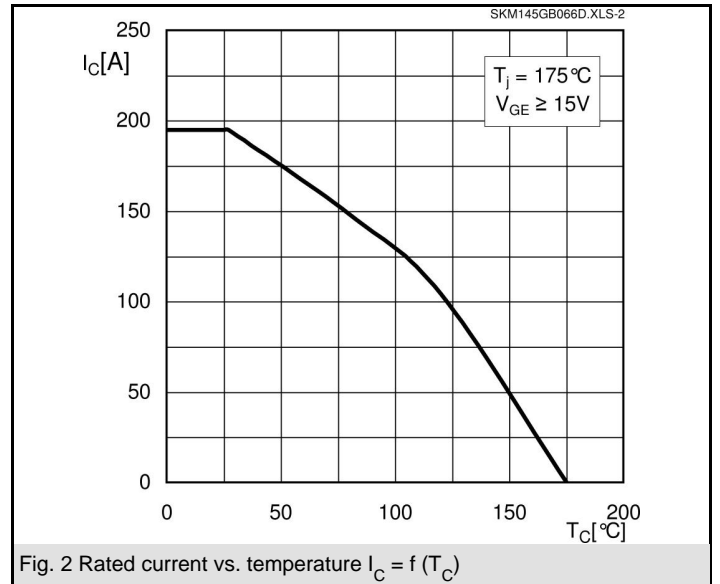
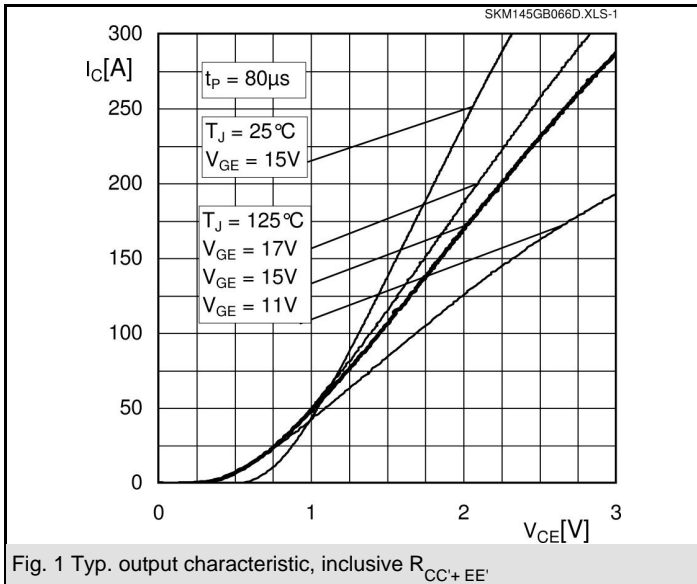
Remarks

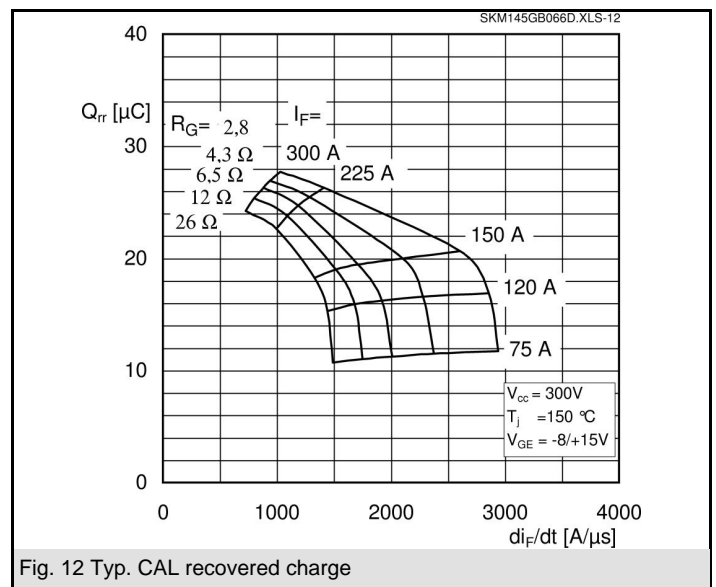
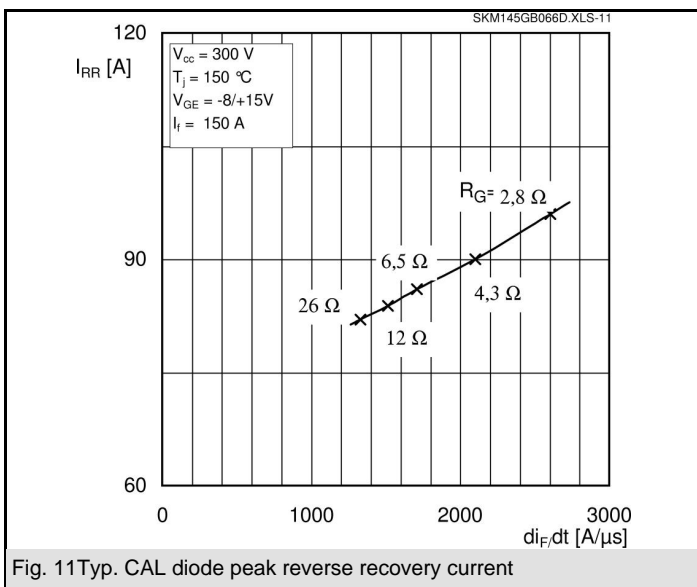
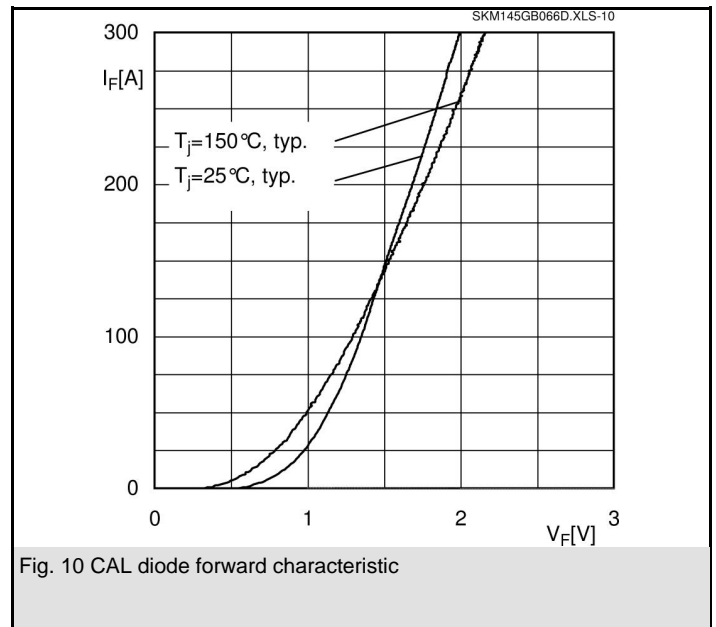
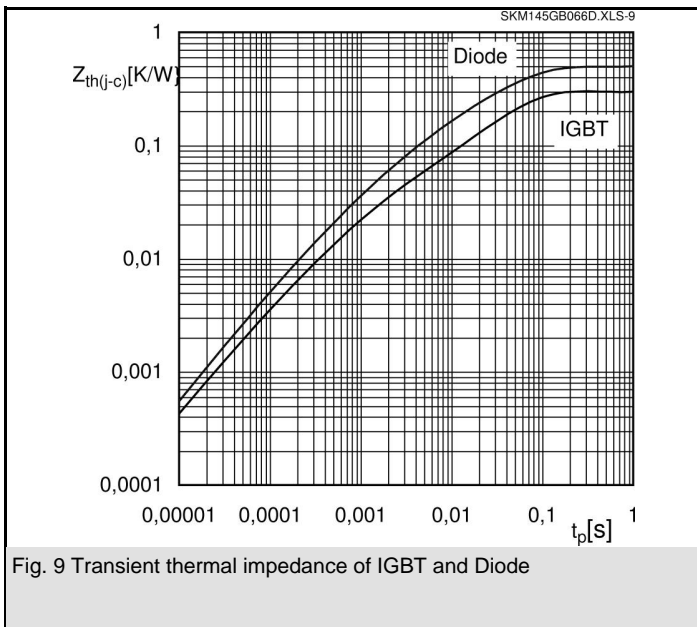
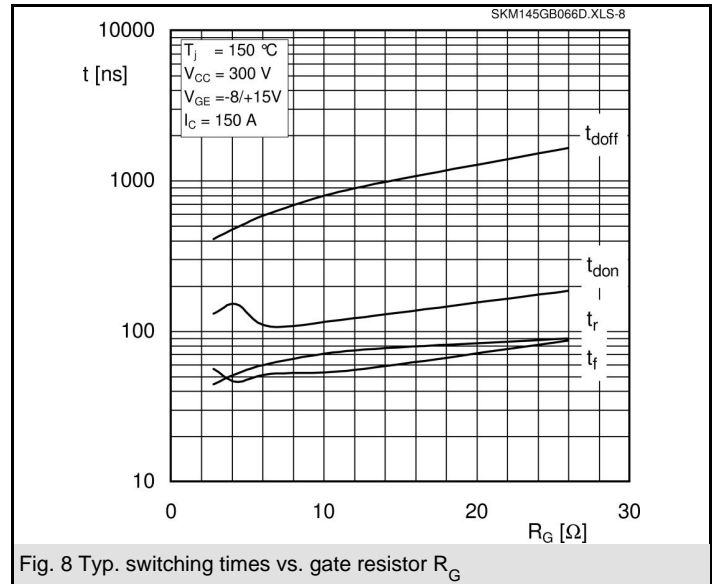
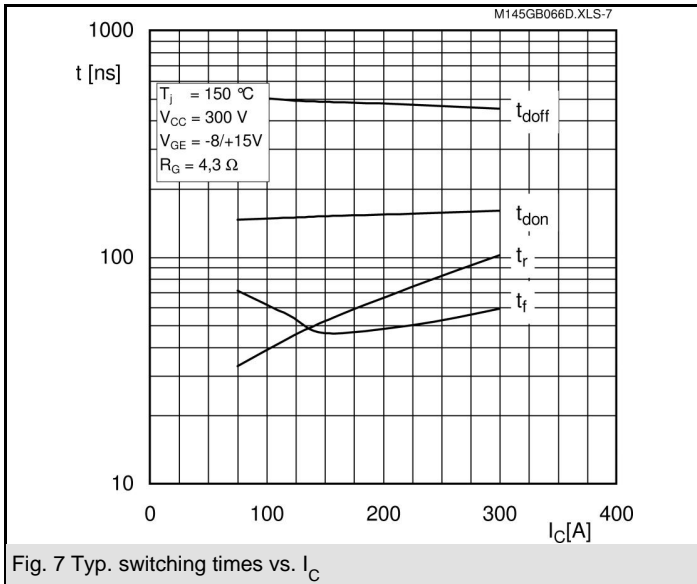
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| Z_{th} Symbol | Conditions | Values | Units |
|----------------------------------|------------|--------|-------|
| $Z_{th(j-c)I}$ | | | |
| $R_{\theta i}$ | $i = 1$ | 220 | mk/W |
| $R_{\theta i}$ | $i = 2$ | 60 | mk/W |
| $R_{\theta i}$ | $i = 3$ | 16,5 | mk/W |
| $R_{\theta i}$ | $i = 4$ | 3,5 | mk/W |
| $\tau_{\theta i}$ | $i = 1$ | 0,0447 | s |
| $\tau_{\theta i}$ | $i = 2$ | 0,0223 | s |
| $\tau_{\theta i}$ | $i = 3$ | 0,0015 | s |
| $\tau_{\theta i}$ | $i = 4$ | 0,0002 | s |
| $Z_{th(j-c)D}$ | | | |
| $R_{\theta i}$ | $i = 1$ | 330 | mk/W |
| $R_{\theta i}$ | $i = 2$ | 137 | mk/W |
| $R_{\theta i}$ | $i = 3$ | 28 | mk/W |
| $R_{\theta i}$ | $i = 4$ | 5 | mk/W |
| $\tau_{\theta i}$ | $i = 1$ | 0,05 | s |
| $\tau_{\theta i}$ | $i = 2$ | 0,0129 | s |
| $\tau_{\theta i}$ | $i = 3$ | 0,002 | s |
| $\tau_{\theta i}$ | $i = 4$ | 0,0002 | s |



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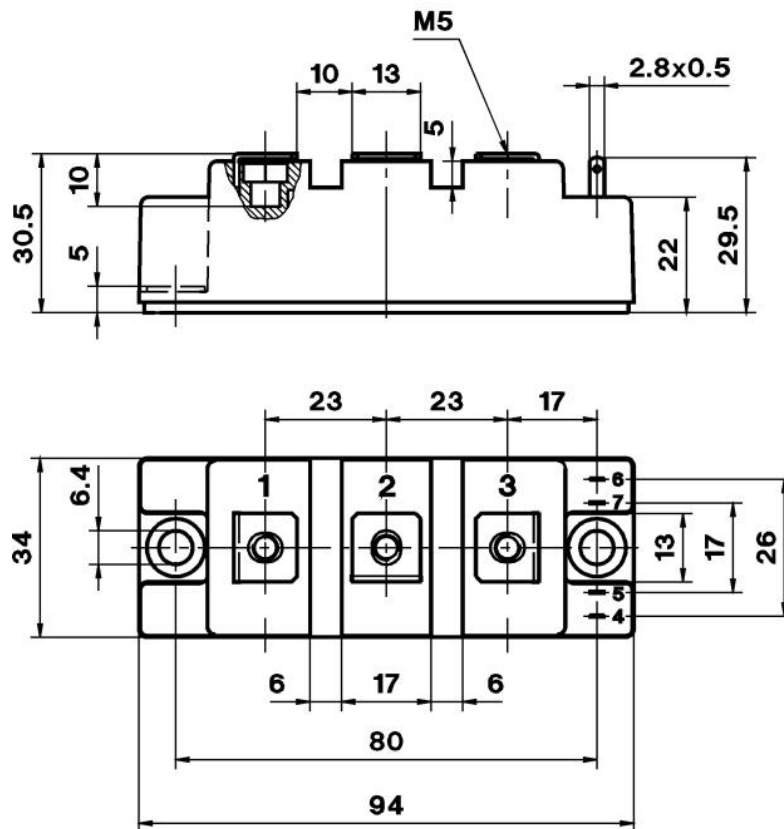




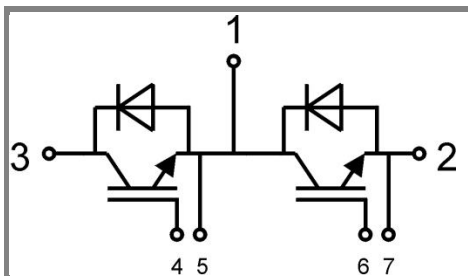
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Case D 61



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Case D61