



SEMITRANS® 3

Trench IGBT Modules

SKM 200GB126D

SKM 200GAL126D

Features

- Trench = Trenchgate technology
- $V_{CE(sat)}$ 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 | | $T_{case} = 25^\circ\text{C}$, unless otherwise specified | | |
|---------------------------|--|--|------|------------------|
| Symbol | Conditions | Values | | Units |
| IGBT | | | | |
| V_{CES} | $T_j = 25^\circ\text{C}$ | 1200 | | V |
| I_C | $T_j = 150^\circ\text{C}$ | $T_c = 25^\circ\text{C}$ | 260 | A |
| | | $T_c = 80^\circ\text{C}$ | 190 | A |
| I_{CRM} | $I_{CRM} = 2 \times I_{Cnom}$ | 300 | | 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 | $T_j = 150^\circ\text{C}$ | $T_c = 25^\circ\text{C}$ | 200 | A |
| | | $T_c = 80^\circ\text{C}$ | 140 | A |
| I_{FRM} | $I_{FRM} = 2 \times I_{Fnom}$ | 300 | | A |
| I_{FSM} | $t_p = 10\text{ ms}; \sin.$ | $T_j = 150^\circ\text{C}$ | 1100 | A |
| Freewheeling Diode | | | | |
| I_F | $T_j = 150^\circ\text{C}$ | $T_c = 25^\circ\text{C}$ | 200 | A |
| | | $T_c = 80^\circ\text{C}$ | 140 | A |
| I_{FRM} | $I_{FRM} = 2 \times I_{Fnom}$ | 300 | | A |
| I_{FSM} | $t_p = 10\text{ ms}; \sin.$ | $T_j = 150^\circ\text{C}$ | 1100 | 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 | | $T_{case} = 25^\circ\text{C}$, unless otherwise specified | | | |
|-----------------|---|--|---------------------------|----------|------------------|
| Symbol | Conditions | min. | typ. | max. | Units |
| IGBT | | | | | |
| $V_{GE(th)}$ | $V_{GE} = V_{CE}, I_C = 6\text{ mA}$ | 5 | 5,8 | 6,5 | V |
| I_{CES} | $V_{GE} = 0\text{ V}, V_{CE} = V_{CES}$ | $T_j = 25^\circ\text{C}$ | 0,1 | 0,3 | mA |
| | | $T_j = 125^\circ\text{C}$ | | | 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} | $V_{GE} = 15\text{ V}$ | $T_j = 25^\circ\text{C}$ | 4,7 | 6,3 | $\text{m}\Omega$ |
| | | $T_j = 125^\circ\text{C}$ | 7,3 | 9 | $\text{m}\Omega$ |
| $V_{CE(sat)}$ | $I_{Cnom} = 150\text{ A}, V_{GE} = 15\text{ V}$ | $T_j = 25^\circ\text{C}_{chiplev.}$ | 1,7 | 2,15 | V |
| | | $T_j = 125^\circ\text{C}_{chiplev.}$ | 2 | 2,45 | V |
| C_{ies} | $V_{CE} = 25, V_{GE} = 0\text{ V}$ | $f = 1\text{ MHz}$ | 10,8 | | nF |
| C_{oes} | | | 0,9 | | nF |
| C_{res} | | | 0,9 | | nF |
| Q_G | $V_{GE} = -8\text{ V} - +20\text{ V}$ | 1530 | | nC | |
| R_{Gint} | $T_j = 25^\circ\text{C}$ | 5 | | Ω | |
| $t_{d(on)}$ | $R_{Gon} = 1,5\ \Omega$ | $V_{CC} = 600\text{ V}$ $I_C = 150\text{ A}$ | 260 | | ns |
| | | | $T_j = 125^\circ\text{C}$ | 40 | ns |
| t_r | $R_{Goff} = 1,5\ \Omega$ | $V_{GE} = \pm 15\text{ V}$ | 18 | | mJ |
| E_{on} | | | 540 | | ns |
| $t_{d(off)}$ | $R_{Goff} = 1,5\ \Omega$ | $V_{GE} = \pm 15\text{ V}$ | 110 | | ns |
| t_f | | | 110 | | ns |
| E_{off} | | | | | mJ |
| $R_{th(j-c)}$ | per IGBT | 0,13 | | K/W | |



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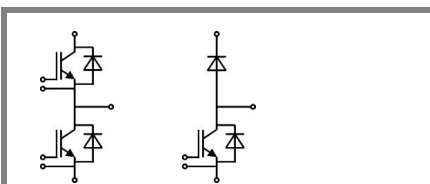
Typical Applications*

- Electronic welders
- AC inverter drives
- UPS

| Characteristics | | | | | |
|----------------------|--|---|------|-------|-------|
| Symbol | Conditions | min. | typ. | max. | Units |
| Inverse diode | | | | | |
| $V_F = V_{EC}$ | $I_{Fnom} = 150 \text{ A}; V_{GE} = 0 \text{ V}$ | $T_j = 25 \text{ }^\circ\text{C}_{chiplev.}$ | 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 | | $T_j = 25 \text{ }^\circ\text{C}$ | 4 | 4,7 | mΩ |
| | | $T_j = 125 \text{ }^\circ\text{C}$ | 5,3 | 6 | mΩ |
| I_{RRM} | $I_F = 150 \text{ A}$ | $T_j = 125 \text{ }^\circ\text{C}$ | 240 | | A |
| Q_{rr} | $di/dt = 5000 \text{ A}/\mu\text{s}$ | | 42 | | μC |
| E_{rr} | $V_{GE} = -15 \text{ V}; V_{CC} = 600 \text{ V}$ | | | | mJ |
| $R_{th(j-c)D}$ | per diode | | | 0,3 | K/W |
| FWD | | | | | |
| $V_F = V_{EC}$ | $I_{Fnom} = 150 \text{ A}; V_{GE} = 0 \text{ V}$ | $T_j = 25 \text{ }^\circ\text{C}_{chiplev.}$ | 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 | | $T_j = 25 \text{ }^\circ\text{C}$ | 4 | 4,7 | V |
| | | $T_j = 125 \text{ }^\circ\text{C}$ | 5,3 | 6 | V |
| I_{RRM} | $I_F = 150 \text{ A}$ | $T_j = 125 \text{ }^\circ\text{C}$ | 240 | | A |
| Q_{rr} | $di/dt = 5000 \text{ A}/\mu\text{s}$ | | 42 | | μC |
| E_{rr} | $V_{GE} = -15 \text{ V}; V_{CC} = 600 \text{ V}$ | | | | mJ |
| $R_{th(j-c)FD}$ | per diode | | | 0,3 | K/W |
| Module | | | | | |
| L_{CE} | | | 15 | 20 | nH |
| $R_{CC'+EE'}$ | res., terminal-chip | $T_{case} = 25 \text{ }^\circ\text{C}$ | 0,35 | | mΩ |
| | | $T_{case} = 125 \text{ }^\circ\text{C}$ | 0,5 | | mΩ |
| $R_{th(c-s)}$ | per module | | | 0,038 | K/W |
| M_s | to heat sink M6 | | 3 | 5 | Nm |
| M_t | to terminals M5 | | 2,5 | 5 | Nm |
| w | | | | 325 | g |

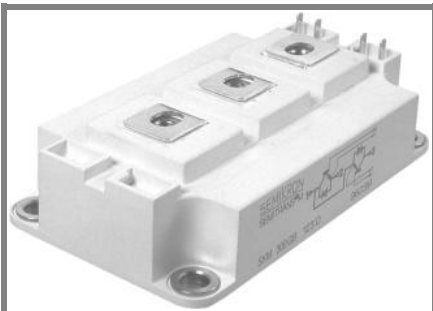
This is an electrostatic discharge sensitive device (ESDS), international standard IEC 60747-1, Chapter IX.

* 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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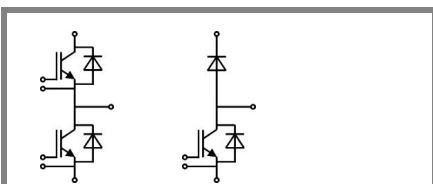
Features

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Typical Applications*

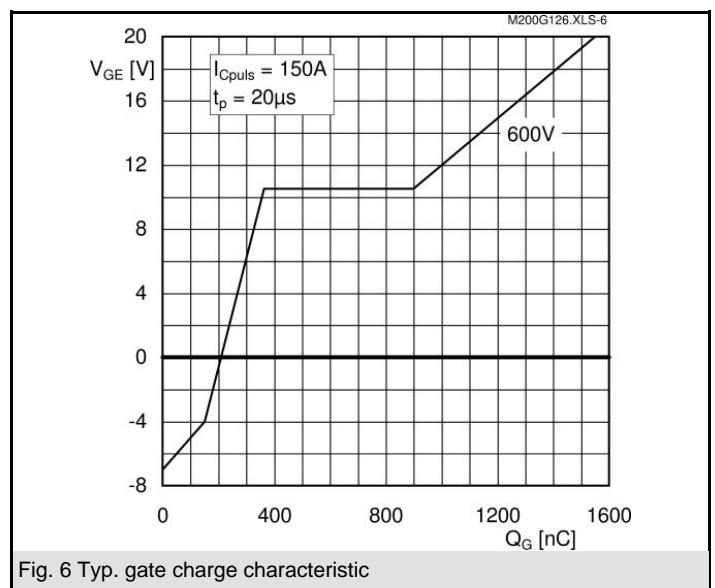
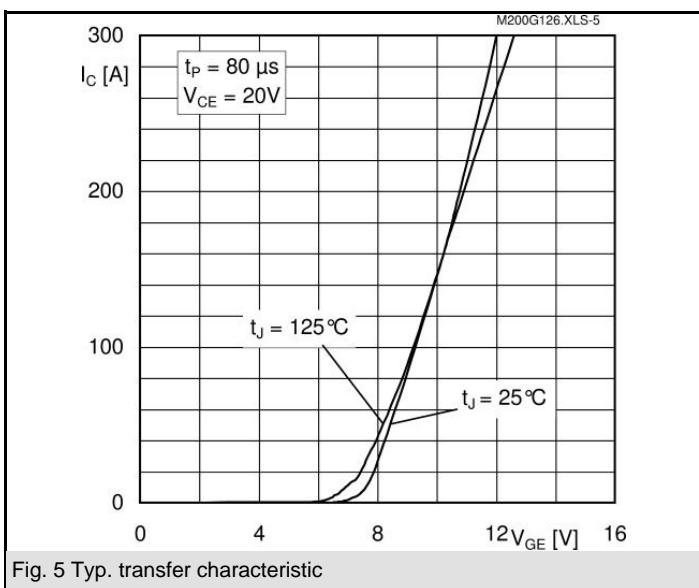
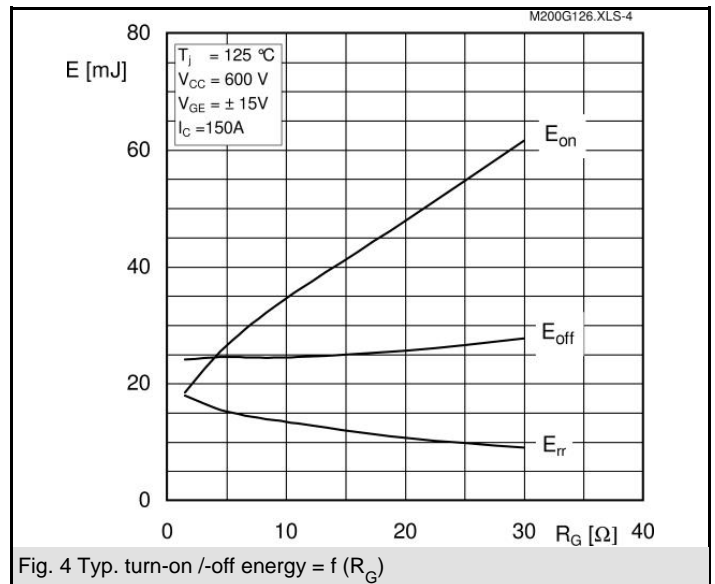
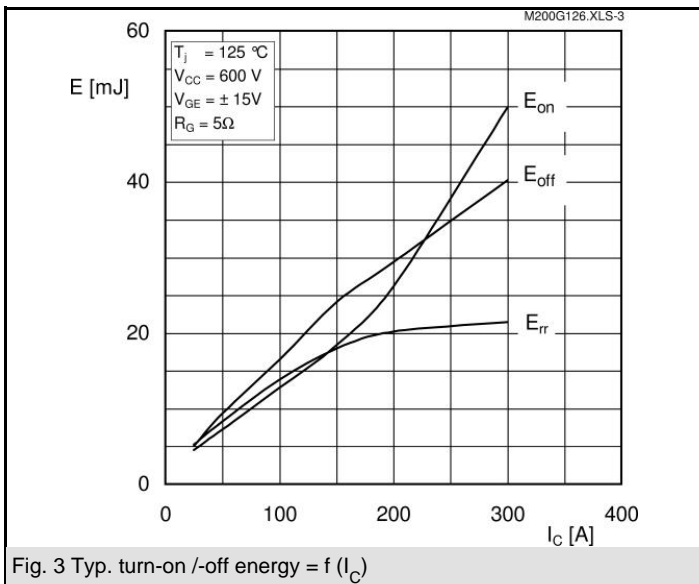
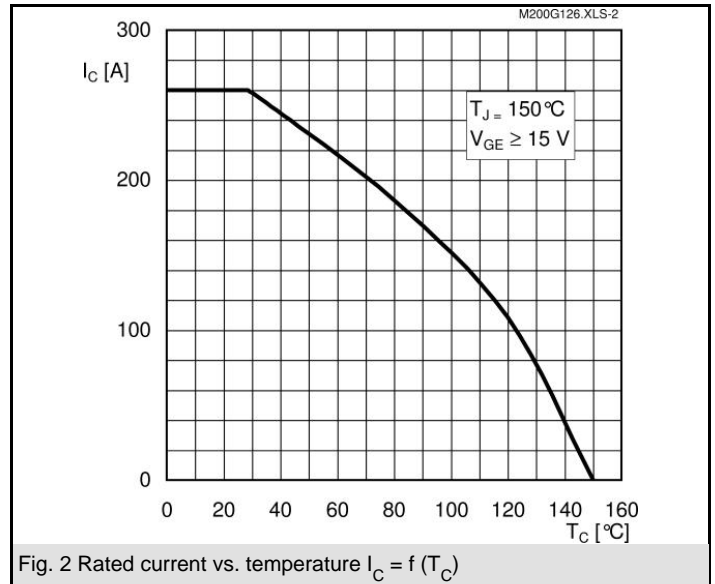
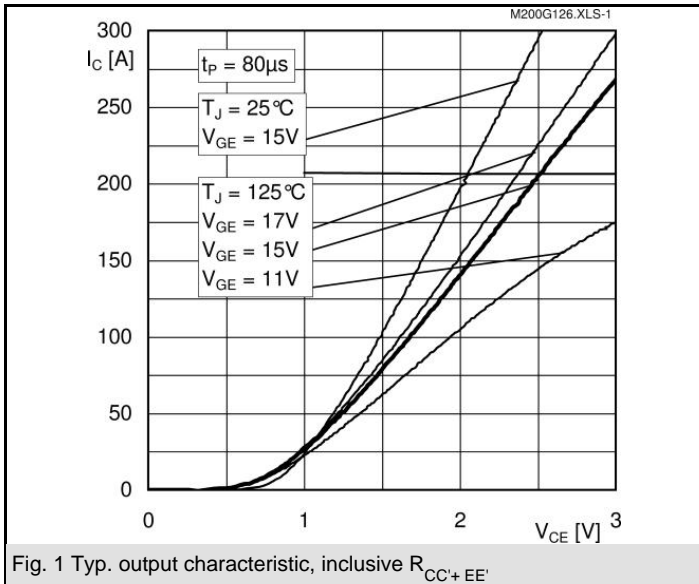
- Electronic welders
- AC inverter drives
- UPS

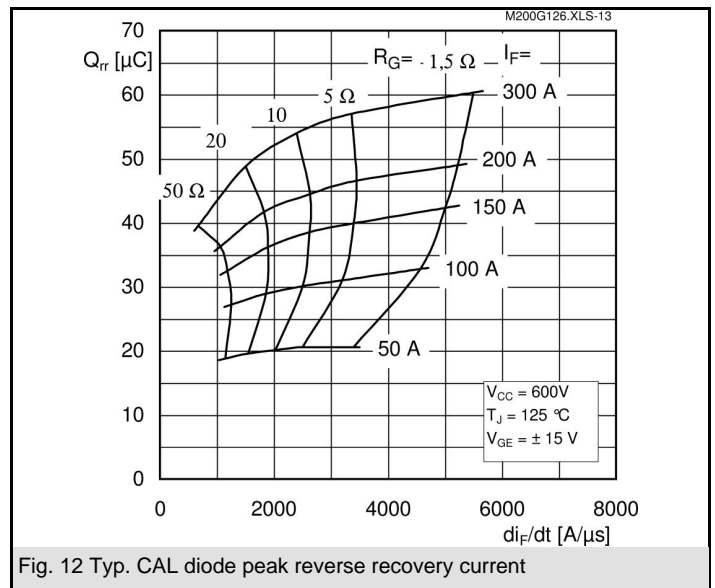
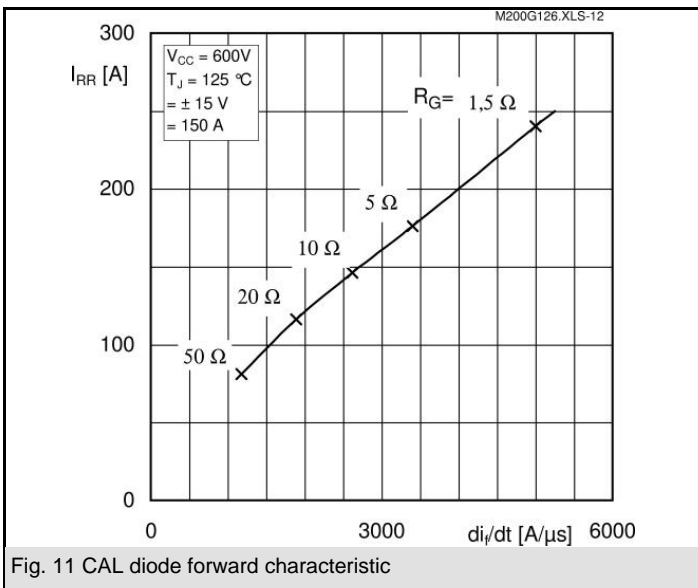
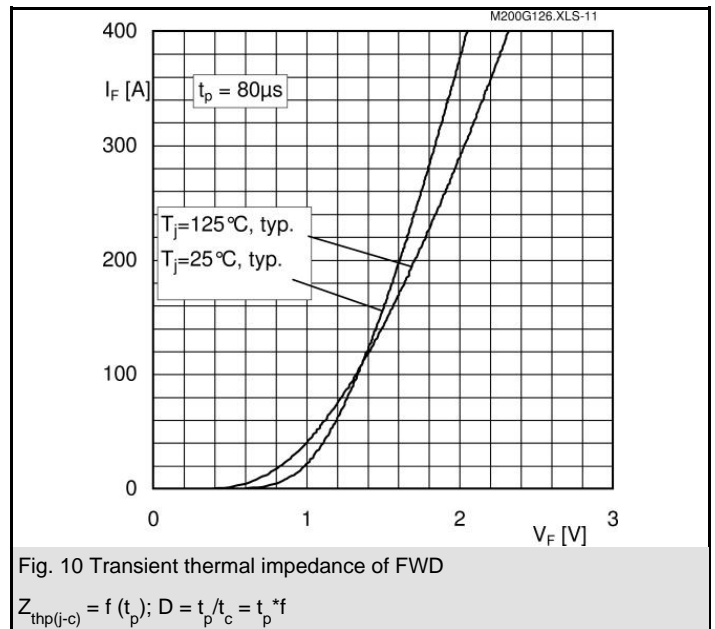
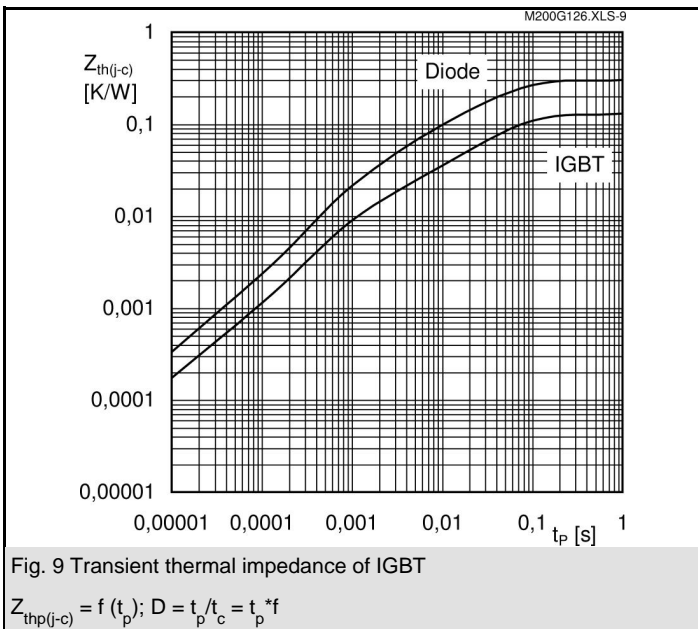
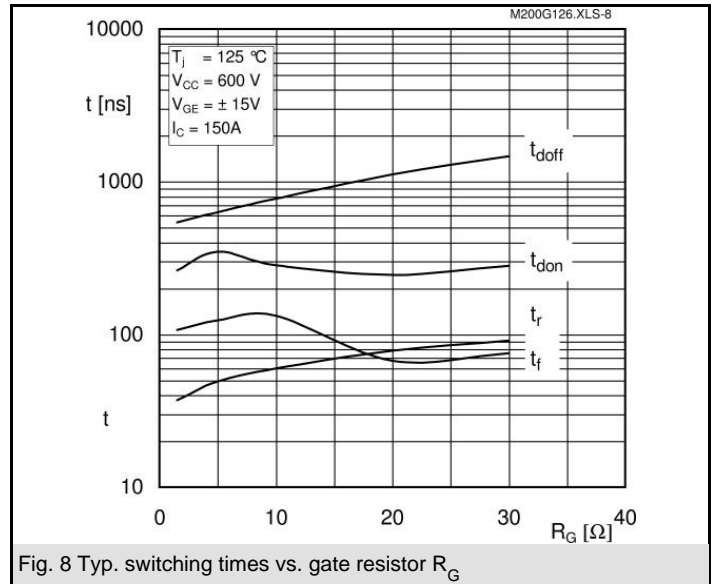
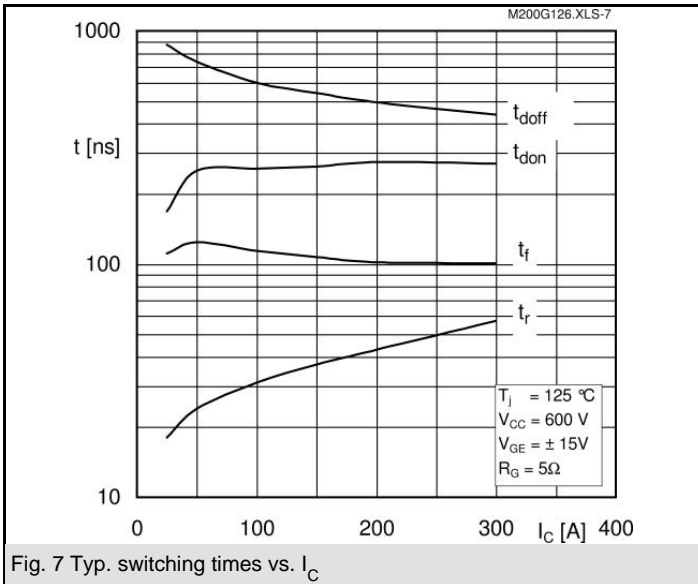
| Z_{th} | | Conditions | Values | Units |
|---------------------|---------|------------|--------|-------|
| Symbol | | | | |
| $Z_{th(j-c)I}$ | | | | |
| $R_{\theta j-c}$ | $i = 1$ | | 95 | mk/W |
| $R_{\theta j-c}$ | $i = 2$ | | 27 | mk/W |
| $R_{\theta j-c}$ | $i = 3$ | | 6,7 | mk/W |
| $R_{\theta j-c}$ | $i = 4$ | | 1,3 | mk/W |
| $\tau_{\theta j-c}$ | $i = 1$ | | 0,0744 | s |
| $\tau_{\theta j-c}$ | $i = 2$ | | 0,0087 | s |
| $\tau_{\theta j-c}$ | $i = 3$ | | 0,002 | s |
| $\tau_{\theta j-c}$ | $i = 4$ | | 0,0001 | s |
| $Z_{th(j-c)D}$ | | | | |
| $R_{\theta j-c}$ | $i = 1$ | | 200 | mk/W |
| $R_{\theta j-c}$ | $i = 2$ | | 80 | mk/W |
| $R_{\theta j-c}$ | $i = 3$ | | 17 | mk/W |
| $R_{\theta j-c}$ | $i = 4$ | | 3 | mk/W |
| $\tau_{\theta j-c}$ | $i = 1$ | | 0,0536 | s |
| $\tau_{\theta j-c}$ | $i = 2$ | | 0,0056 | s |
| $\tau_{\theta j-c}$ | $i = 3$ | | 0,09 | s |
| $\tau_{\theta j-c}$ | $i = 4$ | | 0,0002 | s |



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Case D 56



Case D56

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Case D57

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