



**SEMITRANS® 3**

## Trench IGBT Modules

**SKM 200GB126D**

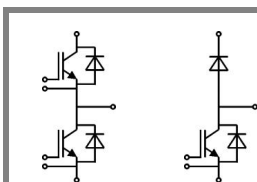
**SKM 200GAL126D**

### 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



**GB**

**GAL**

| Absolute Maximum Ratings  |                                                                                                        |                           |  | $T_{case} = 25^\circ\text{C}$ , unless otherwise specified |                  |
|---------------------------|--------------------------------------------------------------------------------------------------------|---------------------------|--|------------------------------------------------------------|------------------|
| Symbol                    | Conditions                                                                                             |                           |  | Values                                                     | Units            |
| <b>IGBT</b>               |                                                                                                        |                           |  |                                                            |                  |
| $V_{CES}$                 | $T_j = 25^\circ\text{C}$                                                                               |                           |  | 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                |
| $V_{GES}$                 |                                                                                                        |                           |  | $\pm 20$                                                   | V                |
| $t_{psc}$                 | $V_{CC} = 600\text{ V}; V_{GE} \leq 20\text{ V}; T_j = 125^\circ\text{C}$<br>$V_{CES} < 1200\text{ V}$ |                           |  | 10                                                         | $\mu\text{s}$    |
| <b>Inverse Diode</b>      |                                                                                                        |                           |  |                                                            |                  |
| $I_F$                     | $T_j = 150^\circ\text{C}$                                                                              | $T_c = 25^\circ\text{C}$  |  | 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                |
| <b>Freewheeling Diode</b> |                                                                                                        |                           |  |                                                            |                  |
| $I_F$                     | $T_j = 150^\circ\text{C}$                                                                              | $T_c = 25^\circ\text{C}$  |  | 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                |
| <b>Module</b>             |                                                                                                        |                           |  |                                                            |                  |
| $I_{t(RMS)}$              |                                                                                                        |                           |  | 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 <sub>case</sub> = 25°C, unless otherwise specified |                    |              |                |
|-----------------------------------------------------------|-----------------------------------------------------------|-----------------------------------------------------------------------------------------|------------------------------------------------------|--------------------|--------------|----------------|
| Symbol                                                    | Conditions                                                |                                                                                         | min.                                                 | typ.               | max.         | Units          |
| IGBT                                                      |                                                           |                                                                                         |                                                      |                    |              |                |
| V <sub>GE(th)</sub>                                       | V <sub>GE</sub> = V <sub>CE</sub> , I <sub>C</sub> = 6 mA |                                                                                         | 5                                                    | 5,8                | 6,5          | V              |
| I <sub>CES</sub>                                          | V <sub>GE</sub> = 0 V, V <sub>CE</sub> = V <sub>CES</sub> | T <sub>J</sub> = 25 °C<br>T <sub>J</sub> = 125 °C                                       |                                                      | 0,1                | 0,3          | mA<br>mA       |
| V <sub>CE0</sub>                                          |                                                           | T <sub>J</sub> = 25 °C<br>T <sub>J</sub> = 125 °C                                       |                                                      | 1<br>0,9           | 1,2<br>1,1   | V<br>V         |
| r <sub>CE</sub>                                           | V <sub>GE</sub> = 15 V                                    | T <sub>J</sub> = 25°C<br>T <sub>J</sub> = 125°C                                         |                                                      | 4,7<br>7,3         | 6,3<br>9     | mΩ<br>mΩ       |
| V <sub>CE(sat)</sub>                                      | I <sub>Cnom</sub> = 150 A, V <sub>GE</sub> = 15 V         | T <sub>J</sub> = 25°C <sub>chiplev.</sub><br>T <sub>J</sub> = 125°C <sub>chiplev.</sub> |                                                      | 1,7<br>2           | 2,15<br>2,45 | V<br>V         |
| C <sub>ies</sub><br>C <sub>oes</sub><br>C <sub>res</sub>  | V <sub>CE</sub> = 25, V <sub>GE</sub> = 0 V               | f = 1 MHz                                                                               |                                                      | 10,8<br>0,9<br>0,9 |              | nF<br>nF<br>nF |
| Q <sub>G</sub>                                            | V <sub>GE</sub> = -8V - +20V                              |                                                                                         |                                                      | 1530               |              | nC             |
| R <sub>Gint</sub>                                         | T <sub>J</sub> = 25 °C                                    |                                                                                         |                                                      | 5                  |              | Ω              |
| t <sub>d(on)</sub><br>t <sub>r</sub><br>E <sub>on</sub>   | R <sub>Gon</sub> = 1,5 Ω                                  | V <sub>CC</sub> = 600V<br>I <sub>C</sub> = 150A                                         |                                                      | 260<br>40<br>18    |              | ns<br>ns<br>mJ |
| t <sub>d(off)</sub><br>t <sub>f</sub><br>E <sub>off</sub> | R <sub>Goff</sub> = 1,5 Ω                                 | T <sub>J</sub> = 125 °C<br>V <sub>GE</sub> = ±15V                                       |                                                      | 540<br>110         |              | ns<br>ns<br>mJ |
| R <sub>th(j-c)</sub>                                      | per IGBT                                                  |                                                                                         |                                                      |                    | 0,13         | K/W            |



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**SKM 200GAL126D**

### Features

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

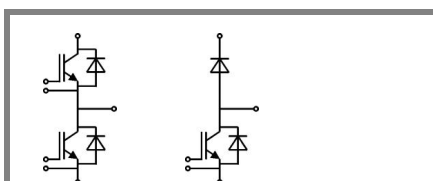
### Typical Applications\*

- Electronic welders
- AC inverter drives
- UPS

| Characteristics      |                                                  |      |      |       |       |
|----------------------|--------------------------------------------------|------|------|-------|-------|
| Symbol               | Conditions                                       | min. | typ. | max.  | Units |
| <b>Inverse diode</b> |                                                  |      |      |       |       |
| $V_F = V_{EC}$       | $I_{Fnom} = 150 \text{ A}; V_{GE} = 0 \text{ V}$ |      |      |       |       |
|                      | $T_j = 25 \text{ }^\circ\text{C}_{chiplev.}$     |      | 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    |
| $I_{RRM}$            | $I_F = 150 \text{ A}$                            |      | 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   |
| <b>FWD</b>           |                                                  |      |      |       |       |
| $V_F = V_{EC}$       | $I_{Fnom} = 150 \text{ A}; V_{GE} = 0 \text{ V}$ |      |      |       |       |
|                      | $T_j = 25 \text{ }^\circ\text{C}_{chiplev.}$     |      | 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     |
| $I_{RRM}$            | $I_F = 150 \text{ A}$                            |      | 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   |
| <b>Module</b>        |                                                  |      |      |       |       |
| $L_{CE}$             |                                                  |      | 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.



**GB**

**GAL**



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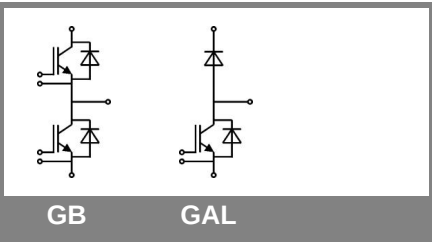
Features

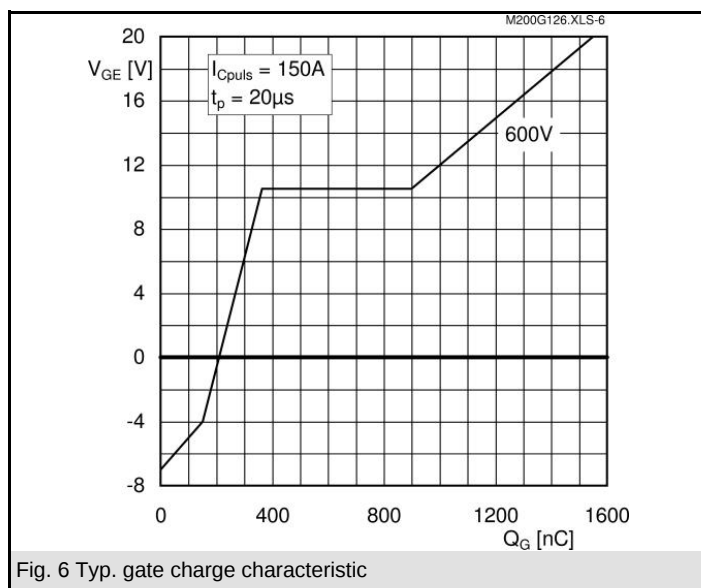
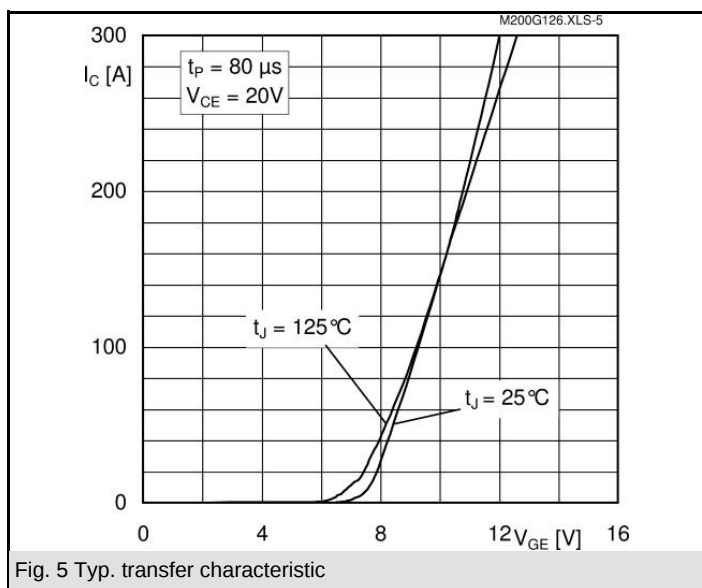
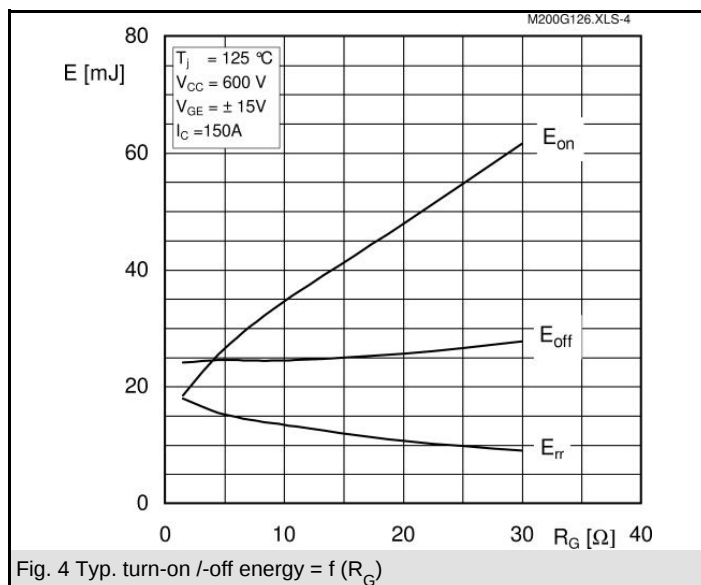
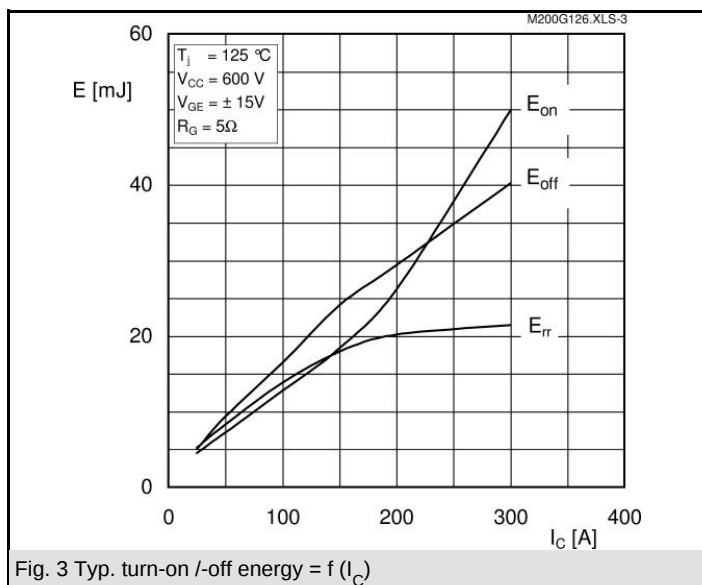
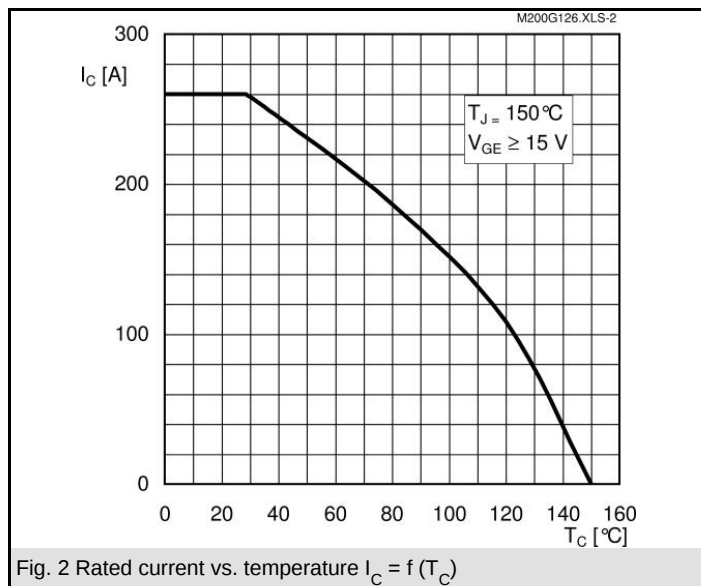
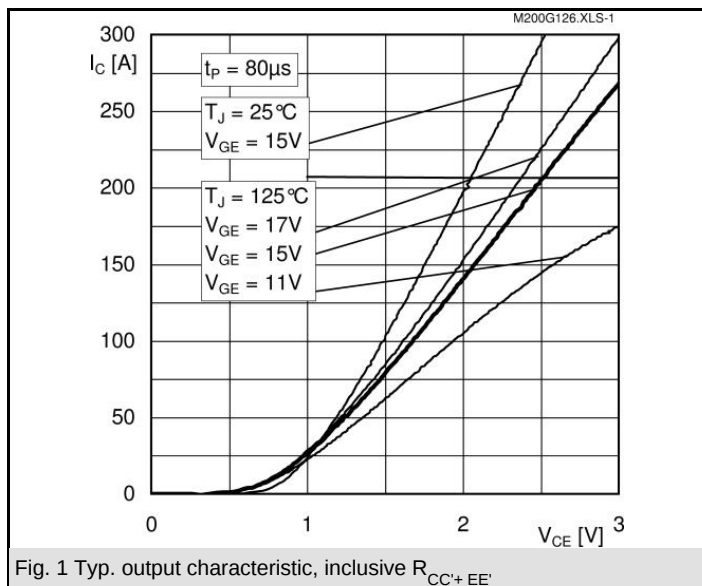
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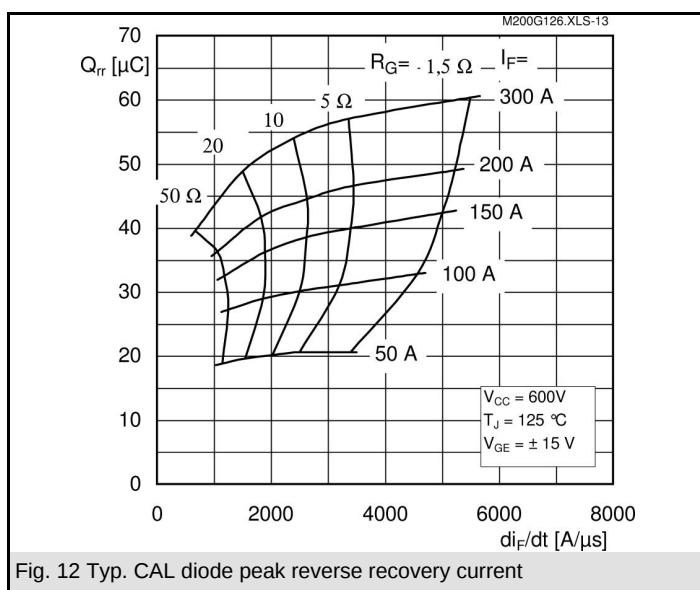
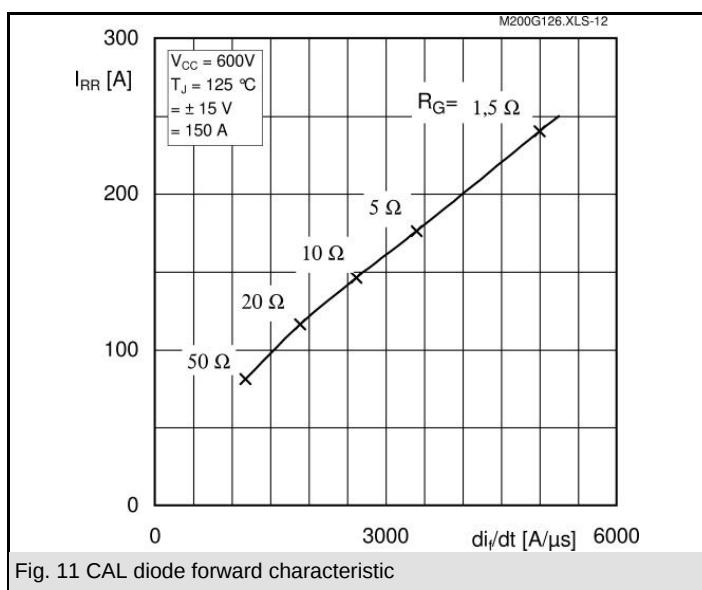
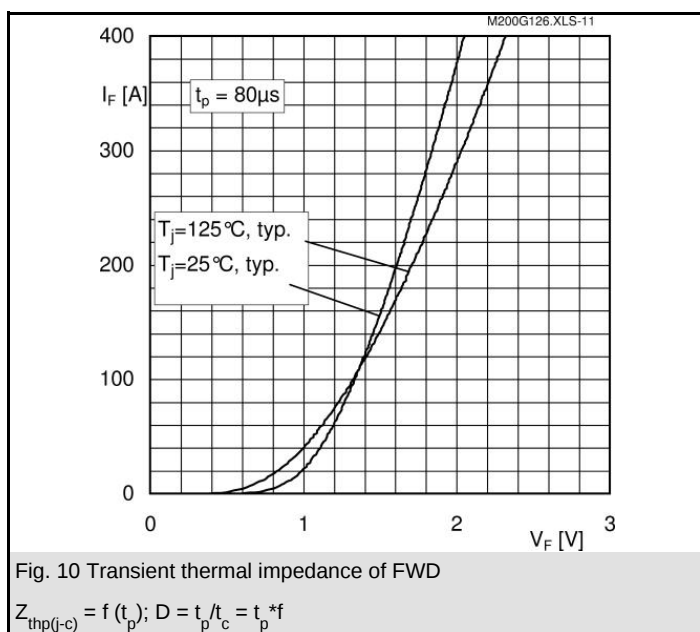
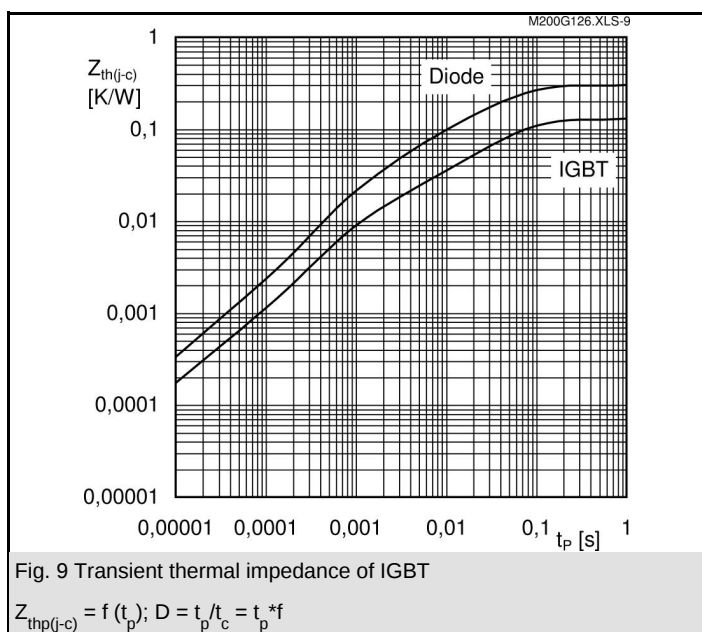
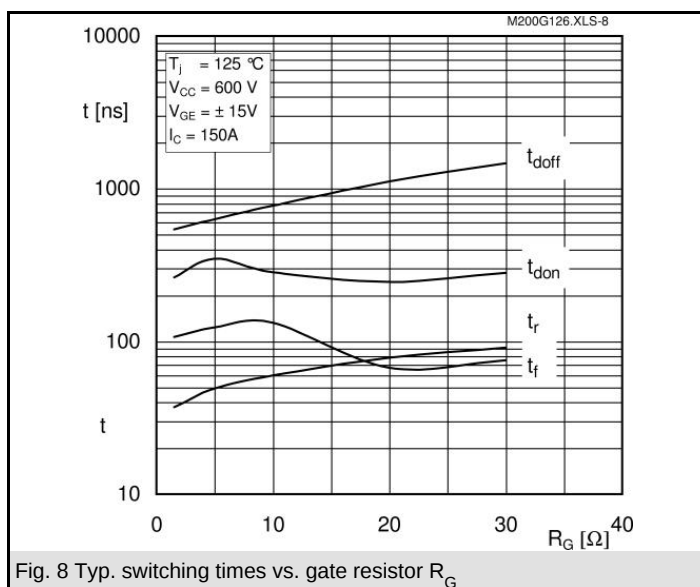
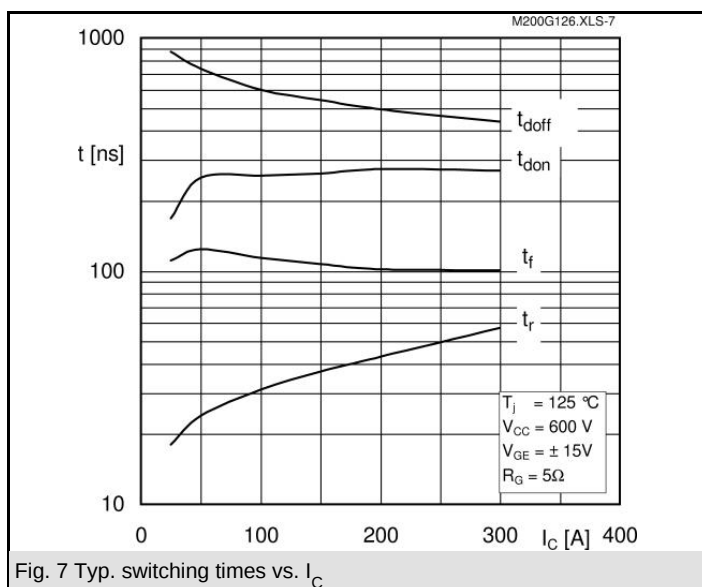
Typical Applications\*

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- UPS

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

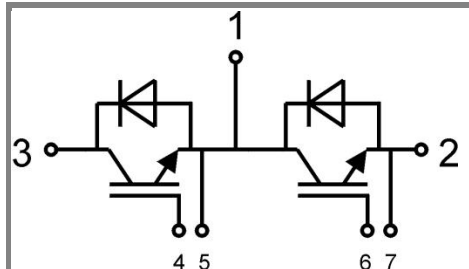






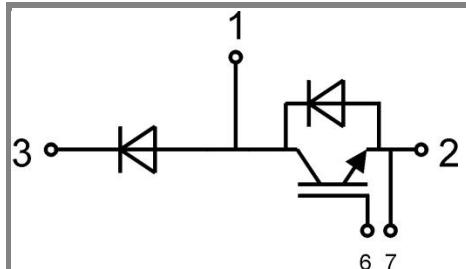


Case D 56



Case D56

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Case D57

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