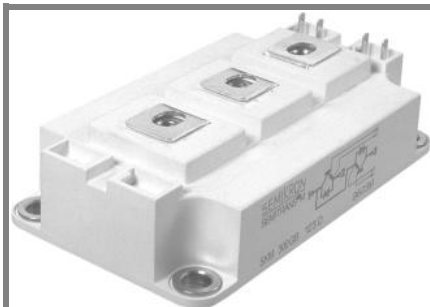


# SKM 300GB126D



**SEMITRANS® 3**

## Trench IGBT Module

**SKM 300GB126D**

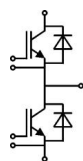
Preliminary Data

### 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

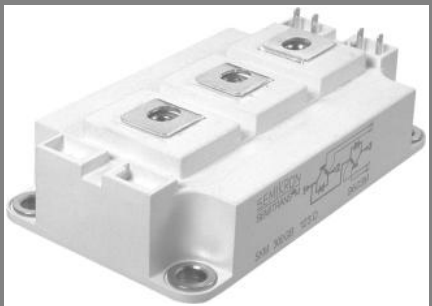


**GB**

| Absolute Maximum Ratings |                                                                                                       |                           | T <sub>c</sub> = 25 °C, unless otherwise specified |       |
|--------------------------|-------------------------------------------------------------------------------------------------------|---------------------------|----------------------------------------------------|-------|
| Symbol                   | Conditions                                                                                            |                           | Values                                             | Units |
| IGBT                     |                                                                                                       |                           |                                                    |       |
| V <sub>CES</sub>         | T <sub>j</sub> = 25 °C                                                                                |                           | 1200                                               | V     |
| I <sub>C</sub>           | T <sub>j</sub> = 150 °C                                                                               | T <sub>case</sub> = 25 °C | 310                                                | A     |
|                          |                                                                                                       | T <sub>case</sub> = 80 °C | 200                                                | A     |
| I <sub>CRM</sub>         | I <sub>CRM</sub> =2xI <sub>Cnom</sub>                                                                 |                           | 400                                                | A     |
| V <sub>GES</sub>         |                                                                                                       |                           | ± 20                                               | V     |
| t <sub>psc</sub>         | V <sub>CC</sub> = 600 V; V <sub>GE</sub> ≤ 20 V; T <sub>j</sub> = 125 °C<br>V <sub>CES</sub> < 1200 V |                           | 10                                                 | µs    |
| Inverse Diode            |                                                                                                       |                           |                                                    |       |
| I <sub>F</sub>           | T <sub>j</sub> = 150 °C                                                                               | T <sub>case</sub> = 25 °C | 250                                                | A     |
|                          |                                                                                                       | T <sub>case</sub> = 80 °C | 170                                                | A     |
| I <sub>FRM</sub>         | I <sub>FRM</sub> =2xI <sub>Fnom</sub>                                                                 |                           | 400                                                | A     |
| Module                   |                                                                                                       |                           |                                                    |       |
| I <sub>t(RMS)</sub>      |                                                                                                       |                           | 500                                                | A     |
| T <sub>vj</sub>          |                                                                                                       |                           | - 40 ... + 150                                     | °C    |
| T <sub>stg</sub>         |                                                                                                       |                           | -40....+125                                        | °C    |
| V <sub>isol</sub>        | AC, 1 min.                                                                                            |                           | 4000                                               | V     |

| Characteristics      |                                                                                                                                                |  | T <sub>c</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> = 8 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                                                               |  |                                                    | 0,1  | 0,3  | mA    |
| V <sub>CE0</sub>     | T <sub>j</sub> = 25 °C<br>T <sub>j</sub> = 125 °C                                                                                              |  |                                                    | 1    | 1,2  | V     |
|                      |                                                                                                                                                |  |                                                    | 0,9  | 1,1  | V     |
| r <sub>CE</sub>      | V <sub>GE</sub> = 15 V      T <sub>j</sub> = 25°C<br>T <sub>j</sub> = 125°C                                                                    |  |                                                    | 3,5  | 4,7  | mΩ    |
|                      |                                                                                                                                                |  |                                                    | 5,5  | 6,8  | mΩ    |
| V <sub>CE(sat)</sub> | I <sub>Cnom</sub> = 200 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  | 2,15 | V     |
|                      |                                                                                                                                                |  |                                                    | 2    | 2,45 | V     |
| C <sub>ies</sub>     | V <sub>CE</sub> = 25, V <sub>GE</sub> = 0 V      f = 1 MHz                                                                                     |  |                                                    | 15   |      | nF    |
| C <sub>oes</sub>     |                                                                                                                                                |  |                                                    | 1,2  |      | nF    |
| C <sub>res</sub>     |                                                                                                                                                |  |                                                    | 1,1  |      | nF    |
| Q <sub>G</sub>       | V <sub>GE</sub> = -8V - +20V                                                                                                                   |  |                                                    | 1800 |      | nC    |
| R <sub>Gint</sub>    | T <sub>j</sub> = 25 °C                                                                                                                         |  |                                                    | 3,8  |      | Ω     |
| t <sub>d(on)</sub>   | R <sub>Gon</sub> = 1,5 Ω      V <sub>CC</sub> = 600V<br>I <sub>Cnom</sub> = 200A                                                               |  |                                                    | 280  |      | ns    |
| t <sub>r</sub>       |                                                                                                                                                |  |                                                    | 37   |      | ns    |
| E <sub>on</sub>      |                                                                                                                                                |  |                                                    | 21   |      | mJ    |
| t <sub>d(off)</sub>  | R <sub>Goff</sub> = 1,5 Ω      T <sub>j</sub> = 125 °C<br>V <sub>GE</sub> = ± 15V                                                              |  |                                                    | 560  |      | ns    |
| t <sub>f</sub>       |                                                                                                                                                |  |                                                    | 100  |      | ns    |
| E <sub>off</sub>     |                                                                                                                                                |  |                                                    | 33   |      | mJ    |
| R <sub>th(j-c)</sub> | per IGBT                                                                                                                                       |  |                                                    |      | 0,12 | K/W   |

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Preliminary Data

Features

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Typical Applications

- Electronic welders
- AC inverter drives
- UPS



GB

| 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   | mΩ    |
|                 | $T_j = 125\text{ }^{\circ}\text{C}$            |      | 4    | 4,5   | mΩ    |
| $I_{RRM}$       | $I_{Fnom} = 200\text{ A}$                      |      | 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 |       | 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 M6                                | 2,5  |      | 5     | Nm    |
| w               |                                                |      |      | 325   | g     |

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

This technical information specifies semiconductor devices but promises no characteristics. No warranty or guarantee expressed or implied is made regarding delivery, performance or suitability.

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SEMITRANS® 3

## Trench IGBT Module

SKM 300GB126D

Preliminary Data

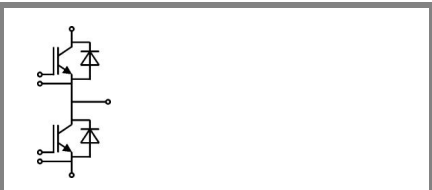
### Features

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

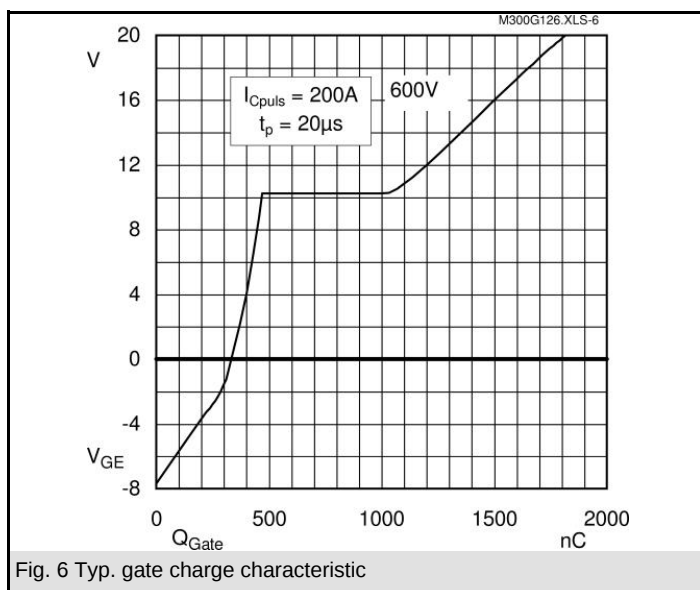
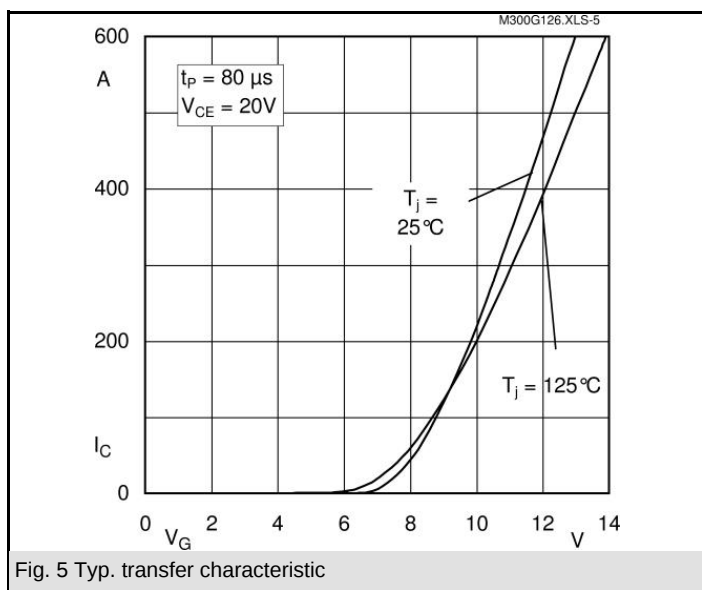
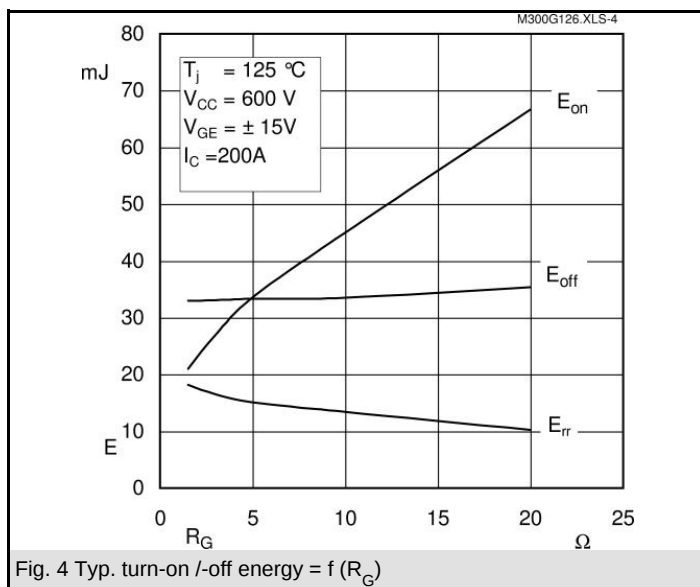
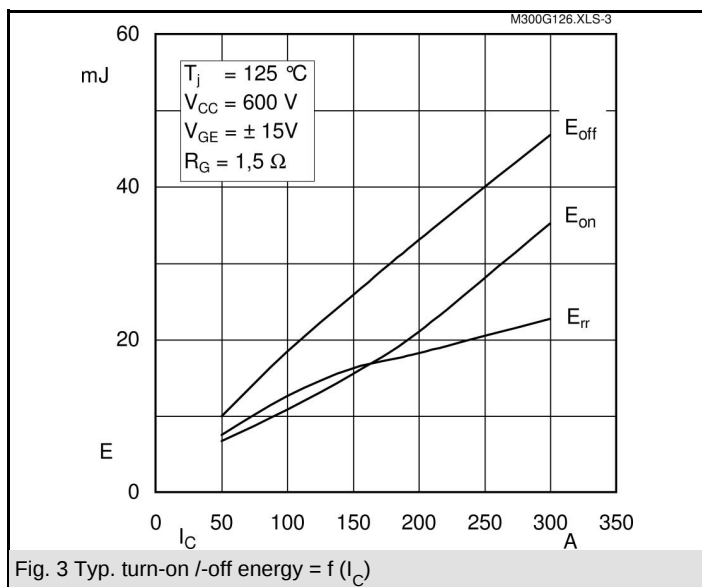
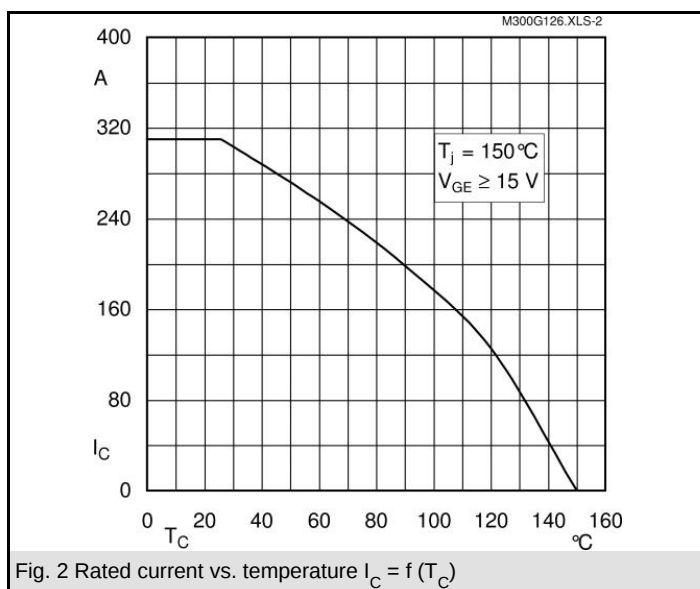
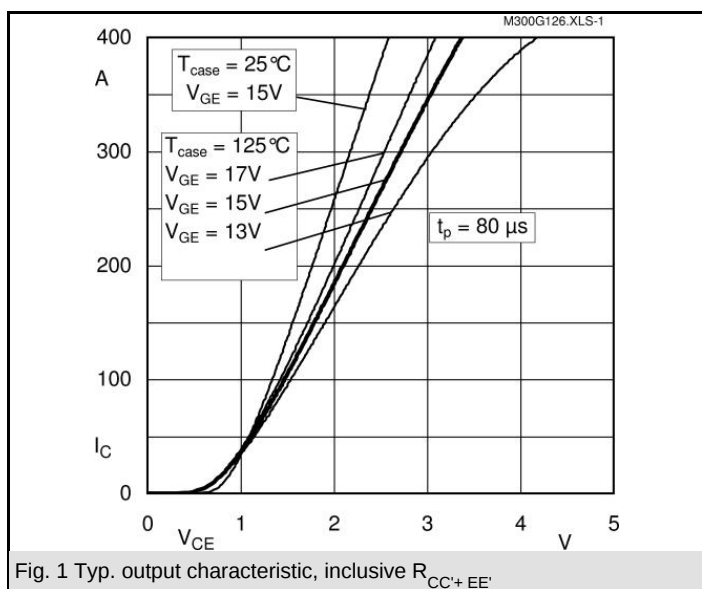
### Typical Applications

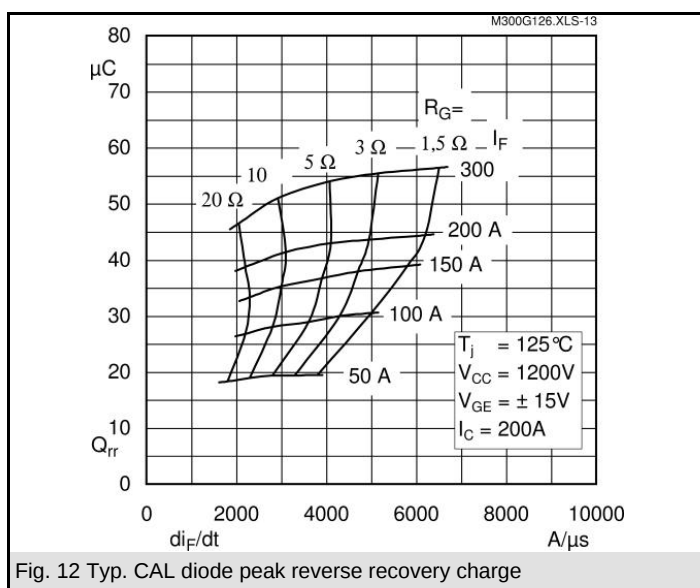
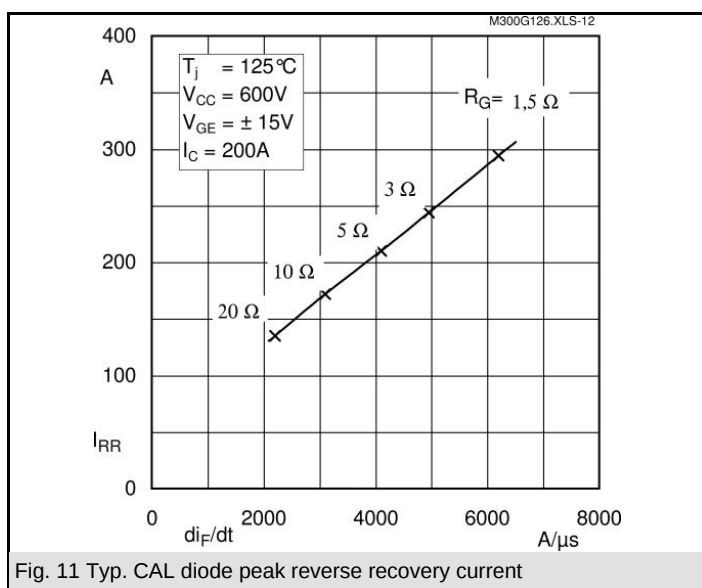
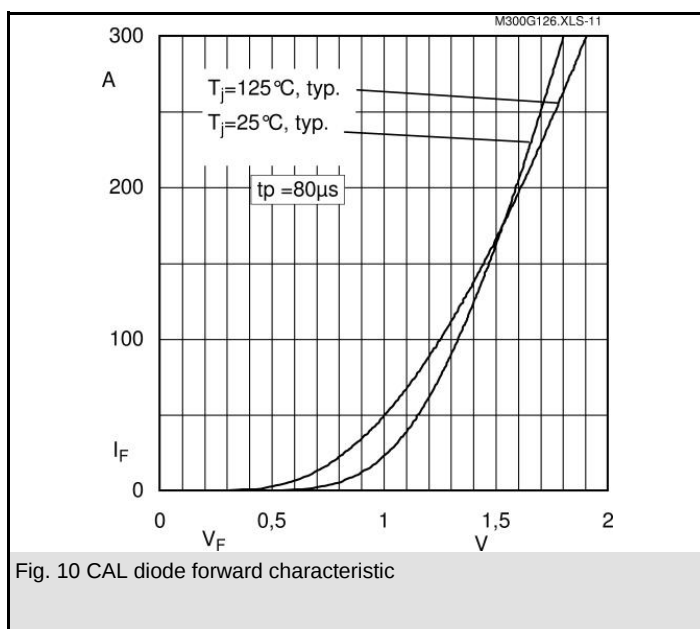
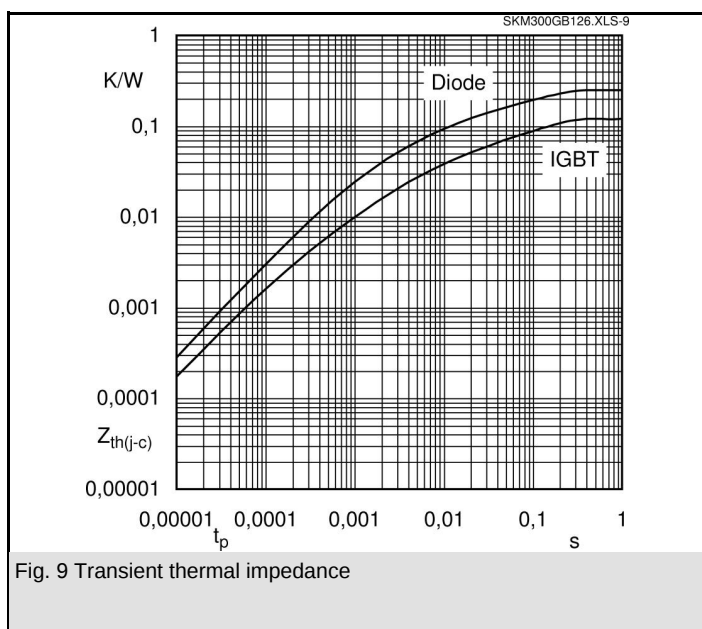
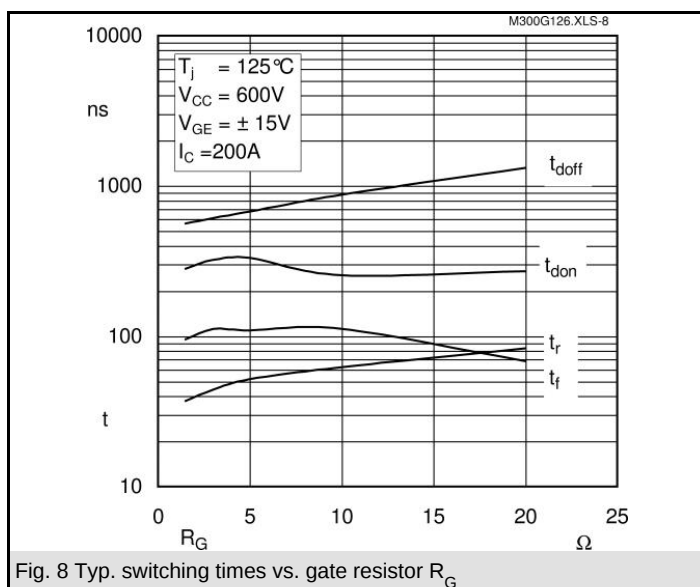
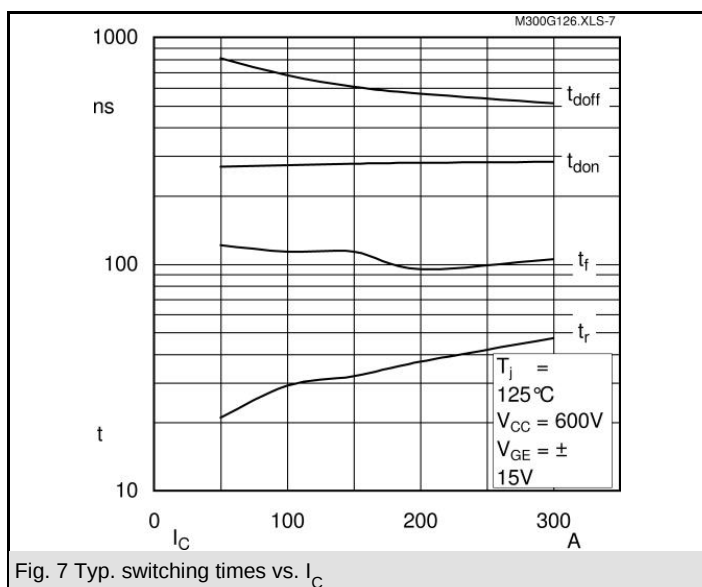
- Electronic welders
- AC inverter drives
- UPS

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



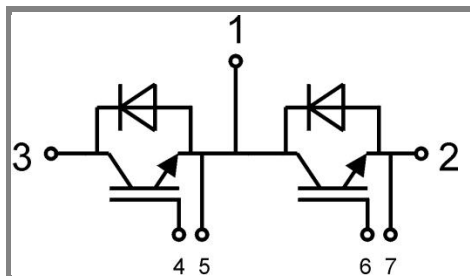
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Case D 56



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Case D 56