# SKM 22GD123D

**SEMITRANS® 6**

## IGBT modules

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### Features

- MOS input (voltage controlled)
- N channel, homogeneous Si
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- Very low tail current with low temperature dependence
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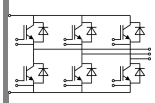

**GD**

| **Absolute Maximum Ratings** | | | $T_c$ = 25 °C, unless otherwise specified | |
|---|---|---|---|---|
| **Symbol** | **Conditions** | | **Values** | **Units** |
| **IGBT** | | | | |
| $V_{CES}$ | $T_j$ = 25 °C | | 1200 | V |
| $I_C$ | $T_j$ = 150 °C | $T_{case}$ = 25 °C | 25 | A |
| | | $T_{case}$ = 80 °C | 15 | A |
| $I_{CRM}$ | $I_{CRM}$=2x$I_{Cnom}$ | | 50 | A |
| $V_{GES}$ | | | ± 20 | V |
| $t_{psc}$ | $V_{CC}$ = 600 V; $V_{GE} \leq$ 20 V; $V_{CES}$ < 1200 V | $T_j$ = 125 °C | 10 | µs |
| **Inverse Diode** | | | | |
| $I_F$ | $T_j$ = 150 °C | $T_{case}$ = 25 °C | 25 | A |
| | | $T_{case}$ = 80 °C | 15 | A |
| $I_{FRM}$ | $I_{FRM}$=2x$I_{Fnom}$ | | 50 | A |
| $I_{FSM}$ | $t_p$ = 10 ms; sin. | $T_j$ = 150 °C | 200 | A |
| **Module** | | | | |
| $I_{t(RMS)}$ | | | 100 | A |
| $T_{vj}$ | | | - 40 ... + 175 | °C |
| $T_{stg}$ | | | - 40...+ 125 | °C |
| $V_{isol}$ | AC, 1 min. | | 2500 | V |

| **Characteristics** | | | $T_c$ = 25 °C, unless otherwise specified | | | |
|---|---|---|---|---|---|---|
| **Symbol** | **Conditions** | | **min.** | **typ.** | **max.** | **Units** |
| **IGBT** | | | | | | |
| $V_{GE(th)}$ | $V_{GE}$ = $V_{CE}$, $I_C$ = 1 mA | | 4,5 | 5,5 | 6,5 | V |
| $I_{CES}$ | $V_{GE}$ = 0 V, $V_{CE}$ = $V_{CES}$ | $T_j$ = 25 °C | | 0,3 | 0,9 | mA |
| $V_{CE0}$ | | $T_j$ = 25 °C | | 1,4 | 1,6 | V |
| | | $T_j$ = 125 °C | | 1,6 | 1,8 | V |
| $r_{CE}$ | $V_{GE}$ = 15 V | $T_j$ = 25°C | | 73,33 | 93,33 | mΩ |
| | | $T_j$ = 125°C | | 100 | 126,66 | mΩ |
| $V_{CE(sat)}$ | $I_{Cnom}$ = 15 A, $V_{GE}$ = 15 V | $T_j$ = °$C_{chiplev.}$ | | 2,5 | 3 | V |
| $C_{ies}$ | $V_{CE}$ = 25, $V_{GE}$ = 0 V | f = 1 MHz | | 1 | | nF |
| $C_{oes}$ | | | | 0,15 | | nF |
| $C_{res}$ | | | | 0,07 | | nF |
| $t_{d(on)}$ | $R_{Gon}$ = 52 Ω | $V_{CC}$ = 600V | | 40 | | ns |
| $t_r$ | | $I_C$= 25A | | 35 | | ns |
| $E_{on}$ | | $T_j$ = 125 °C | | 2 | | mJ |
| $t_{d(off)}$ | $R_{Goff}$ = 52 Ω | $V_{GE}$ = -15V | | 350 | | ns |
| $t_f$ | | | | 70 | | ns |
| $E_{off}$ | | | | 1,4 | | mJ |
| $R_{th(j-c)}$ | per IGBT | | | | 0,86 | K/W |

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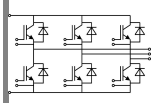

**GD**

| Characteristics | | | | | | |
|---|---|---|---|---|---|---|
| **Symbol** | **Conditions** | | **min.** | **typ.** | **max.** | **Units** |
| **Inverse Diode** | | | | | | |
| $V_F = V_{EC}$ | $I_{Fnom}$ = 15 A; $V_{GE}$ = 0 V | $T_j$ = 25 °$C_{chiplev.}$ | | 2 | 2,5 | V |
| | | $T_j$ = 125 °$C_{chiplev.}$ | | 1,8 | | V |
| $V_{F0}$ | | $T_j$ = 25 °C | | 1,1 | 1,2 | V |
| | | $T_j$ = 125 °C | | | | V |
| $r_F$ | | $T_j$ = 25 °C | | 60 | 87 | mΩ |
| | | $T_j$ = 125 °C | | | | mΩ |
| $I_{RRM}$ | $I_F$ = 15 A | $T_j$ = 125 °C | | 16 | | A |
| $Q_{rr}$ | | | | 2,7 | | µC |
| $E_{rr}$ | $V_{GE}$ = 0 V; $V_{CC}$ = 600 V | | | 0,95 | | mJ |
| $R_{th(j-c)D}$ | per diode | | | | 1,5 | K/W |
| **Module** | | | | | | |
| $L_{CE}$ | | | | | 60 | nH |
| $R_{th(c-s)}$ | per module | | | | 0,05 | K/W |
| $M_s$ | to heat sink M5 | | 4 | | 5 | Nm |
| w | | | | | 175 | 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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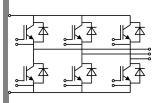

**GD**

| $Z_{th}$ Symbol | Conditions | Values | Units |
|---|---|---|---|
| **$Z_{th(j-c)I}$** | | | |
| $R_i$ | i = 1 | 560 | mk/W |
| $R_i$ | i = 2 | 220 | mk/W |
| $R_i$ | i = 3 | 67 | mk/W |
| $R_i$ | i = 4 | 13 | mk/W |
| $tau_i$ | i = 1 | 0,056 | s |
| $tau_i$ | i = 2 | 0,0078 | s |
| $tau_i$ | i = 3 | 0,017 | s |
| $tau_i$ | i = 4 | 0,0001 | s |
| **$Z_{th(j-c)D}$** | | | |
| $R_i$ | i = 1 | 800 | mk/W |
| $R_i$ | i = 2 | 400 | mk/W |
| $R_i$ | i = 3 | 270 | mk/W |
| $R_i$ | i = 4 | 30 | mk/W |
| $tau_i$ | i = 1 | 0,0761 | s |
| $tau_i$ | i = 2 | 0,0013 | s |
| $tau_i$ | i = 3 | 0,011 | s |
| $tau_i$ | i = 4 | 0,002 | s |

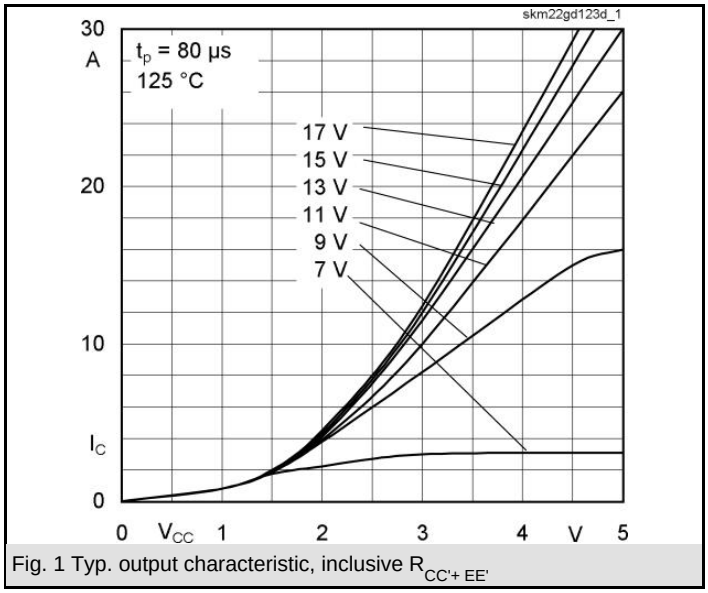


Fig. 1 Typ. output characteristic, inclusive $R_{CC'+EE'}$

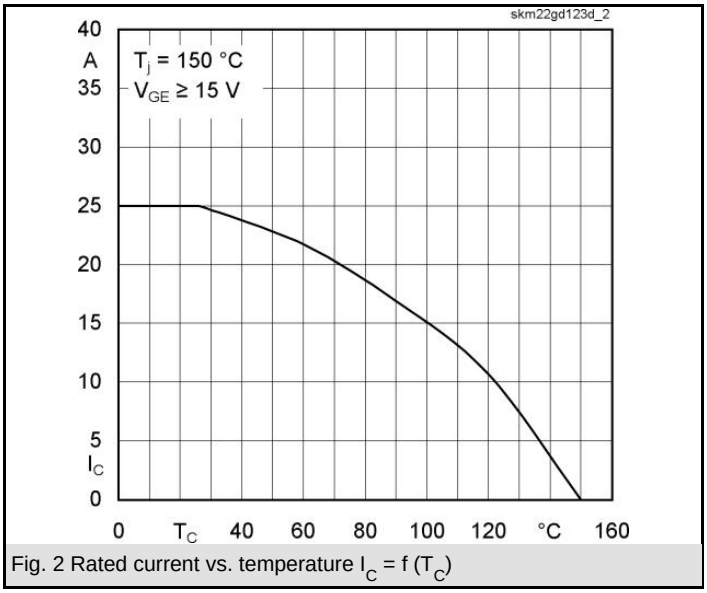


Fig. 2 Rated current vs. temperature $I_C = f(T_C)$

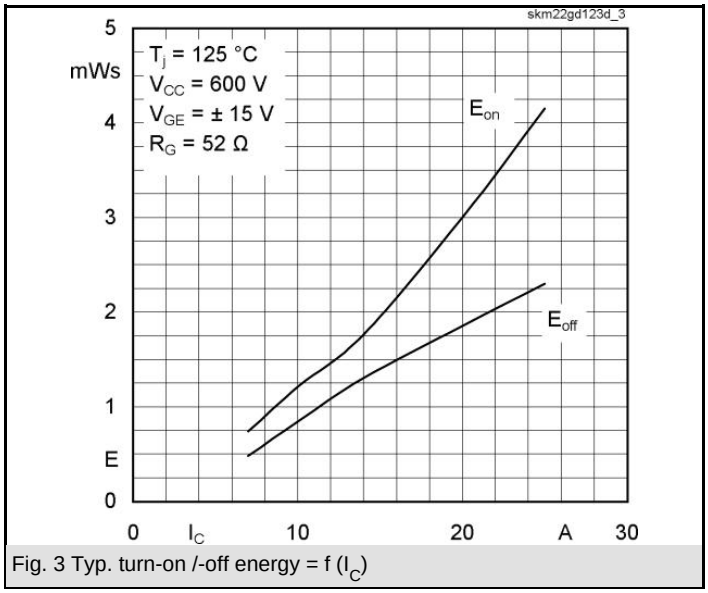


Fig. 3 Typ. turn-on /-off energy = f ($I_C$)

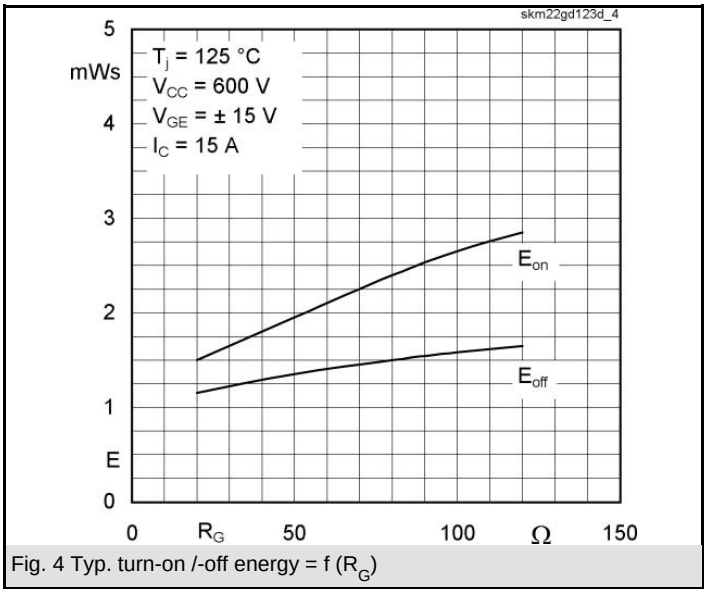


Fig. 4 Typ. turn-on /-off energy = f ($R_G$)

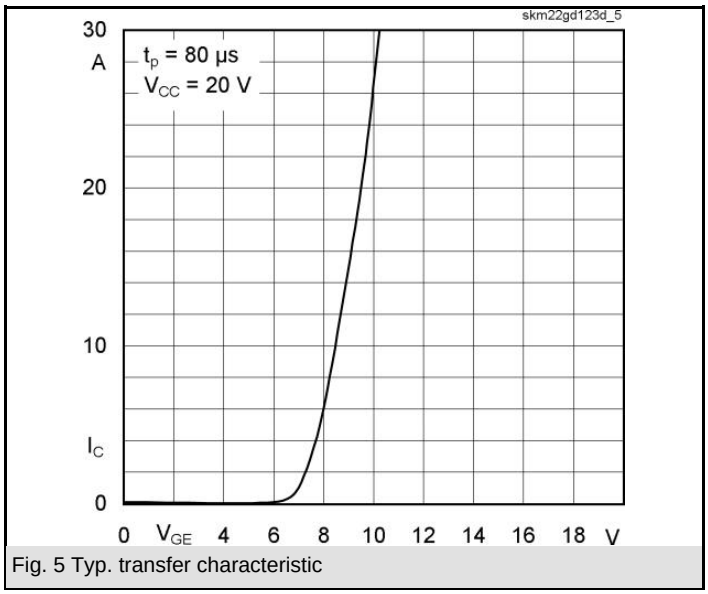


Fig. 5 Typ. transfer characteristic

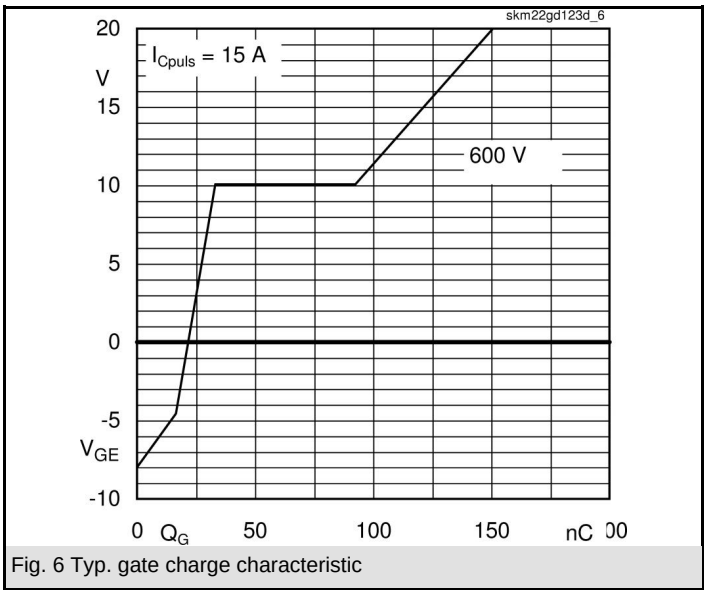


Fig. 6 Typ. gate charge characteristic

 

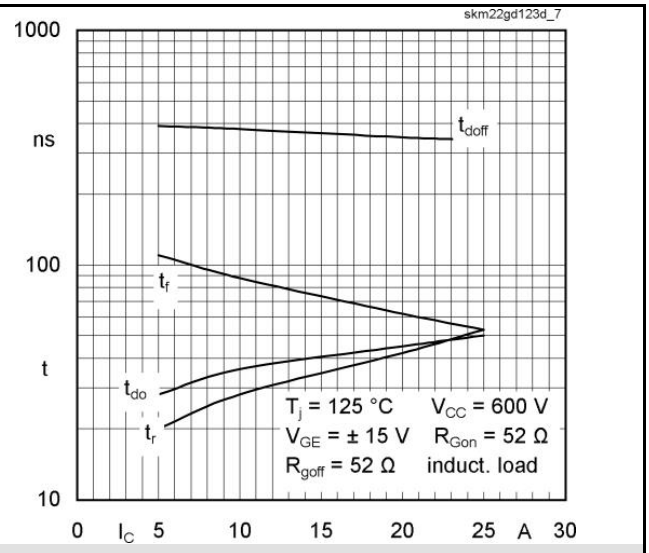


Fig. 7 Typ. switching times vs. $I_C$

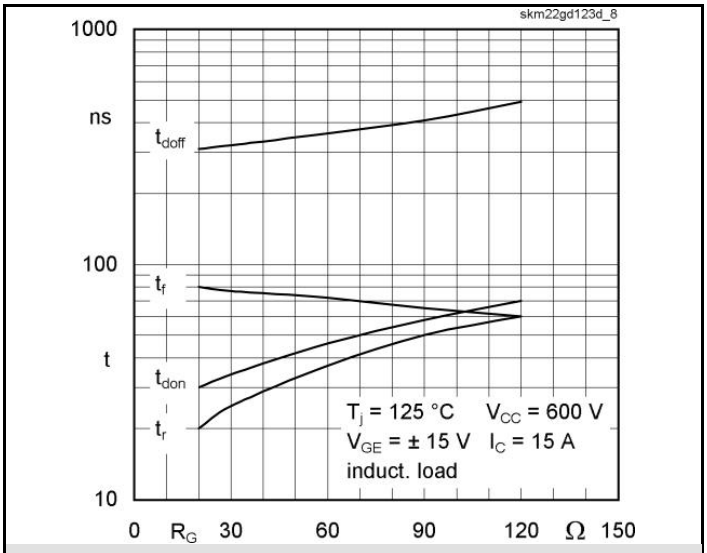


Fig. 8 Typ. switching times vs. gate resistor $R_G$

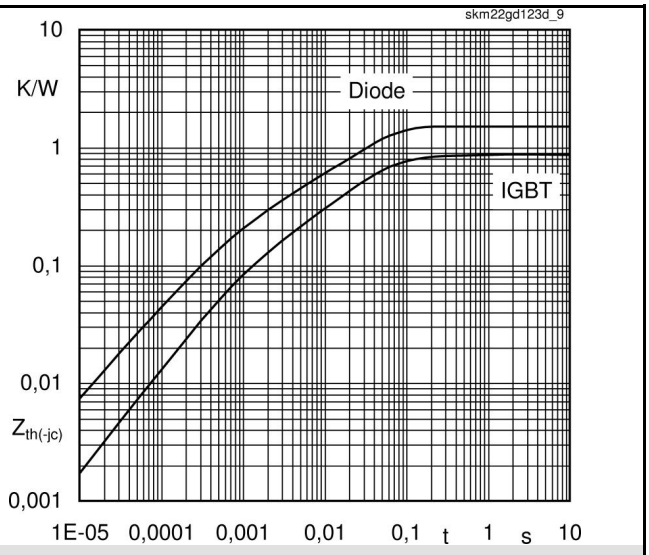


Fig. 9 Transient thermal impedance

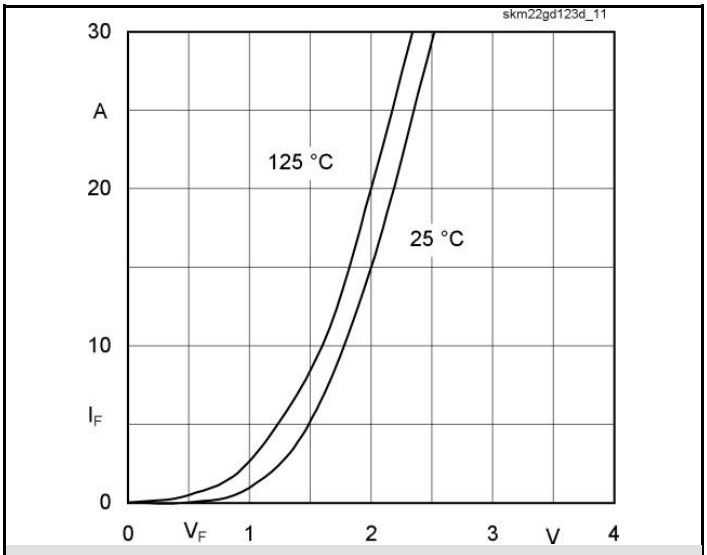


Fig. 10 CAL diode forward characteristic

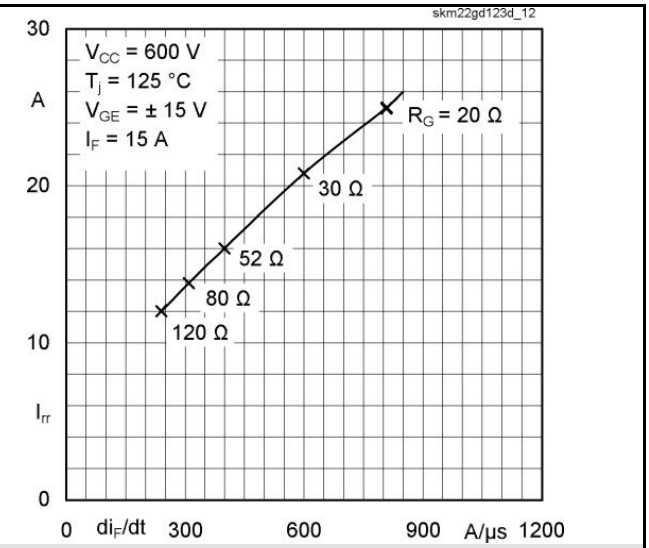


Fig. 11 Typ. CAL diode peak reverse recovery current

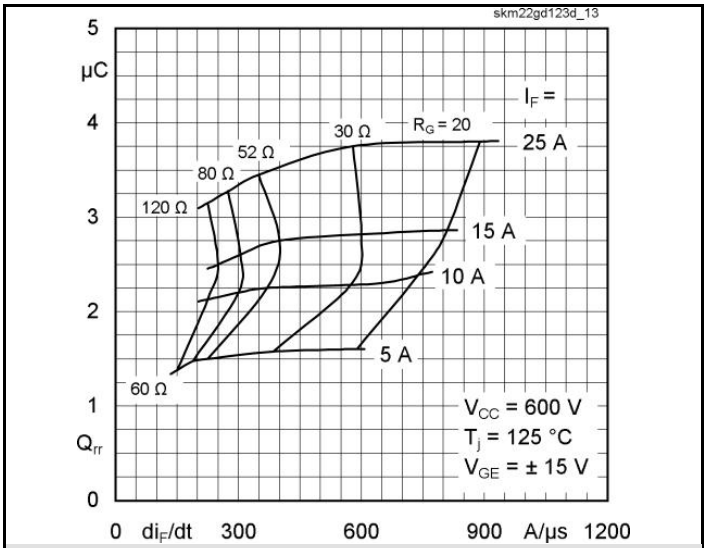


Fig. 12 Typ. CAL diode peak reverse recovery charge

 

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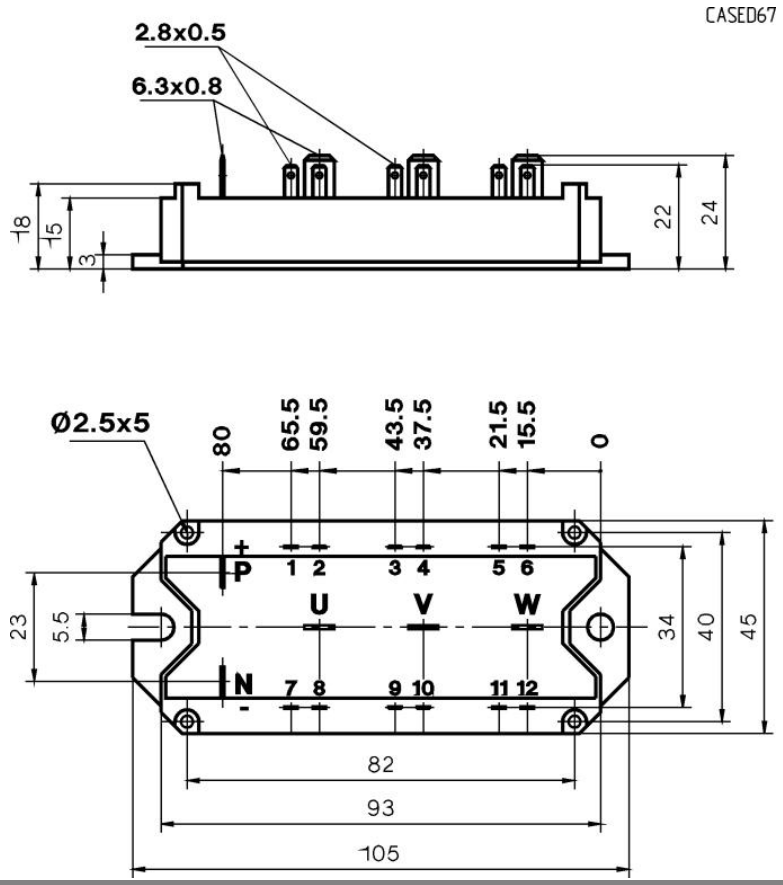
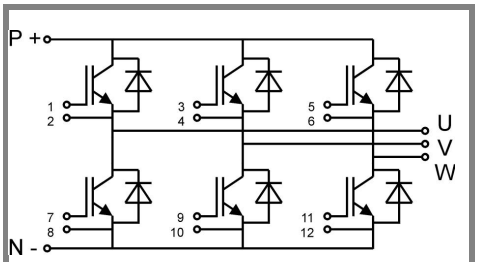
UL Recognized File 63 532




Case D 67




GD Case D 67