SEMIKRON

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| Absolute Maximum Ratings Symbol | Conditions [1] | Values | Units |
|---|---|---|---|
| $V_{DS}$ | | 100 | V |
| $V_{DGR}$ | $R_{GE}$ = 20 kΩ | 100 | V |
| $I_D$ | $T_{case}$ = 25 °C / 80 °C | 400 / 300 | A |
| | $T_{case}$ = 100 °C | 250 | A |
| $I_{DM}$ | 1 ms | 1140 | A |
| $V_{GS}$ | | ± 20 | V |
| $P_D$ | | 1040 | W |
| $T_j$, ($T_{stg}$) | | –40 ... +150 (125) | °C |
| $V_{isol}$ | AC, 1 min., 200 µA | 2 500 | V |
| humidity | DIN 40 040 | Class F | |
| climate | DIN IEC 68 T.1 | 40/125/56 | |
| Inverse Diode | | | |
| $I_F = –I_D$ | | 380 | A |
| $I_{FM} = –I_{DM}$ | 10 µs | 1140 | A |

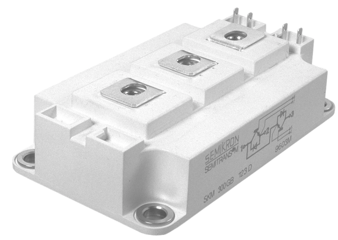
| Characteristics Symbol | Conditions [1] | min. | typ. | max. | Units |
|---|---|---|---|---|---|
| $V_{(BR)DSS}$ | $V_{GS}$ = 0, $I_D$ = 0,5 mA | 100 | – | – | V |
| $V_{GS(th)}$ | $V_{GS}$ = $V_{DS}$, $I_D$ = 5 mA | 2,1 | 3,0 | 4,0 | V |
| $I_{DSS}$ | $V_{GS}$ = 0, $V_{DS}$ = 100 V; $T_j$ = 25 °C | – | – | 100 | µA |
| | $V_{GS}$ = 0, $V_{DS}$ = 100 V; $T_j$ = 125 °C | – | – | 1000 | µA |
| $I_{GSS}$ [3] | $V_{GS}$ = 20 V, $V_{DS}$ = 0 | – | – | 100 | nA |
| $R_{DS(on)}$ | $V_{GS}$ = 10 V, $I_D$ = 300 A | – | 3 | 3,5 | mΩ |
| $g_{fs}$ | $V_{DS}$ = 25 V, $I_D$ = 300 A | 150 | 200 | – | S |
| $C_{CHC}$ | | – | – | 700 | pF |
| $C_{iss}$ | $V_{GS}$ = 0, $V_{DS}$ = 25 V, f = 1 MHz | – | 24 | 32 | nF |
| $C_{oss}$ | $V_{GS}$ = 0, $V_{DS}$ = 25 V, f = 1 MHz | – | 7,3 | 11 | nF |
| $C_{rss}$ | $V_{GS}$ = 0, $V_{DS}$ = 25 V, f = 1 MHz | – | 4,3 | 6,5 | nF |
| $L_{DS}$ | | – | – | 20 | nH |
| $t_{d(on)}$ | $V_{DD}$ = 30 V, $I_D$ = 250 A, $V_{GS}$ = ± 10 V, $R_G$ = 4,7 Ω | – | 100 | – | ns |
| $t_r$ | $V_{DD}$ = 30 V, $I_D$ = 250 A, $V_{GS}$ = ± 10 V, $R_G$ = 4,7 Ω | – | 100 | – | ns |
| $t_{d(off)}$ | $V_{DD}$ = 30 V, $I_D$ = 250 A, $V_{GS}$ = ± 10 V, $R_G$ = 4,7 Ω | – | 700 | – | ns |
| $t_f$ | $V_{DD}$ = 30 V, $I_D$ = 250 A, $V_{GS}$ = ± 10 V, $R_G$ = 4,7 Ω | – | 250 | – | ns |
| Inverse Diode | | | | | |
| $V_{SD}$ | $I_F$ = 300 A, $V_{GS}$ = 0 V | – | 1,2 | 1,5 | V |
| $t_{rr}$ | $T_j$ = 25 °C [3] | – | 160 | – | ns |
| | $T_j$ = 150 °C [3] | – | – | – | ns |
| $Q_{rr}$ | $T_j$ = 25 °C [3] | – | 10 | – | µC |
| $I_{RR}$ | $T_j$ = 150 °C [3] | – | – | – | A |
| Thermal characteristics | | | | | |
| $R_{thjc}$ | per MOSFET | – | – | 0,12 | °C/W |
| $R_{thch}$ | $M_1$, surface 10 µm, per module | – | – | 0,038 | °C/W |

| Mechanical Data | | | | | |
|---|---|---|---|---|---|
| $M_1$ | to heatsink, SI Units (M6) | 3 | – | 5 | Nm |
| | to heatsink, US Units | 27 | – | 44 | lb.in. |
| $M_2$ | for terminals, SI Units (M6) | 2,5 | – | 5 | Nm |
| | for terminals, US Units | 22 | – | 44 | lb.in. |
| a | | – | – | 5x9,81 | $m/s^2$ |
| w | | – | – | 325 | g |
| Case | → B 5 – 46 | | | D 56 | |

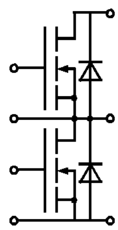
[1] $T_{case}$ = 25 °C, unless otherwise specified
[3] $I_F$ = 300 A, $V_R$ = 100 V, $–di_F/dt$ = 100 A/µs

## SEMITRANS® M Power MOSFET Modules 300 A, 100 V, 3,5 mΩ

## SKM 313 B 010



**SEMITRANS M3**



### Features

- N Channel, enhancement mode
- Short internal connections and low inductance case avoid oscillations
- Isolated copper baseplate using $Al_2O_3$ ceramic Direct Copper Bonding Technology (DCB)
- All electrical connections on top for easy busbaring
- Large clearance (13 mm) and creepage distances (20 mm)
- UL recognized file no. E63 532

### Typical Applications

- DC servo and robot drives
- DC choppers
- Battery vehicles
- UPS equipment
- Plasma cutting
- Not suitable for linear amplification

**This is an electrostatic discharge sensitive device (ESDS). Please observe the international standard IEC 747-1, Chapter IX.**

Suitable mounting hardware:
Ident No. 33321100
(for 10 SEMITRANS 3)
Screws → B 6 – 4

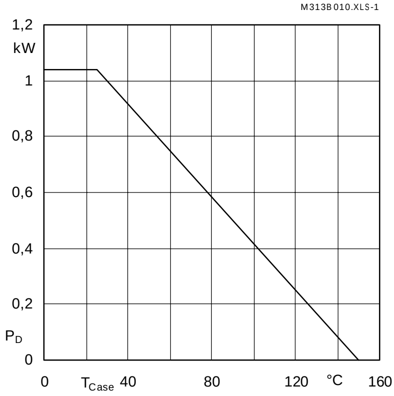



Fig. 1 Rated power dissipation vs. temperature

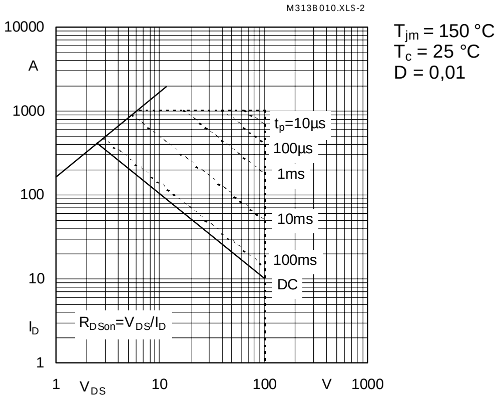



Fig. 2 Maximum safe operating area, single pulse

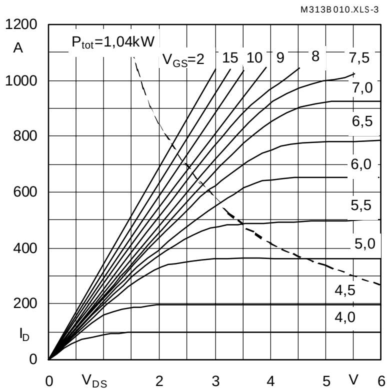



Fig. 3 Output characteristic, $t_p$ = 80 µs, $T_j$ = 25 °C

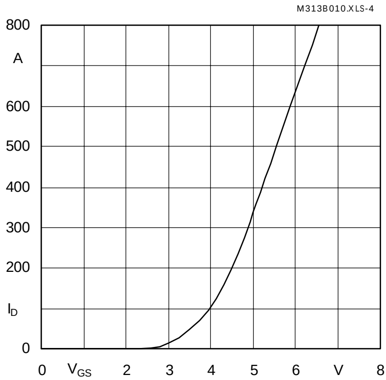



Fig. 4 Transfer characteristic, $t_p$ = 80 µs, $V_{DS}$ = 25 V

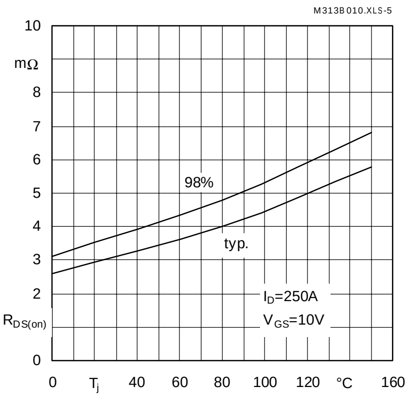



Fig. 5 On-resistance vs. temperature

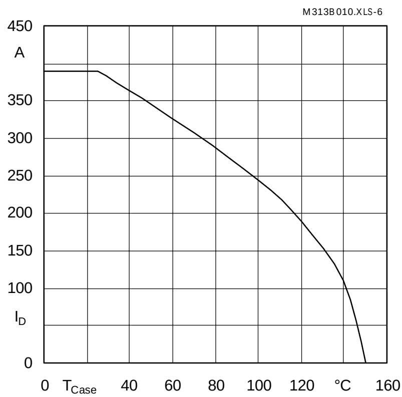



Fig. 6 Rated current vs. temperature

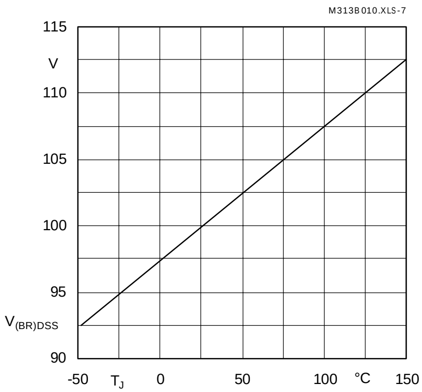



Fig. 7 Breakdown voltage vs. temperature

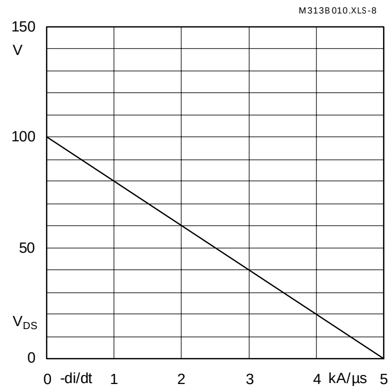



Fig. 8 Drain-source voltage derating ($L_{DS}$)

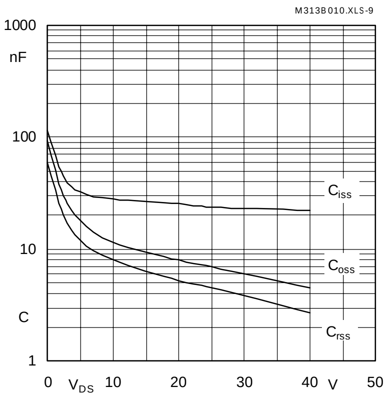



Fig. 9 Typ. capacitances vs. drain-source voltage

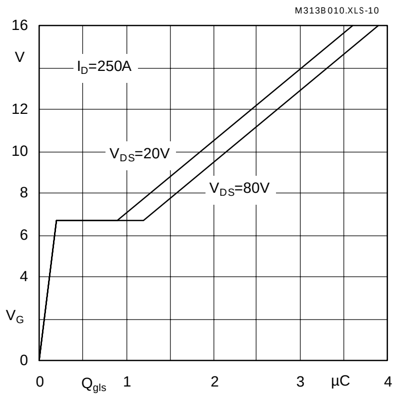



Fig. 10 Gate charge characteristic, $I_{Dp}$ = 250 A

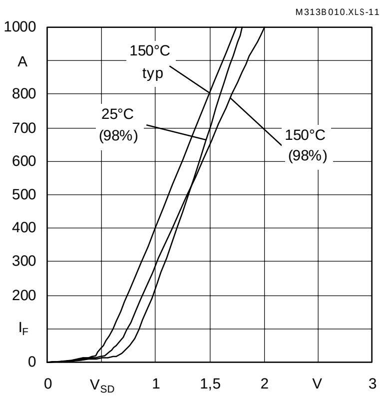



Fig. 11 Typ. Diode forward characteristic, $t_p$ = 80 µs

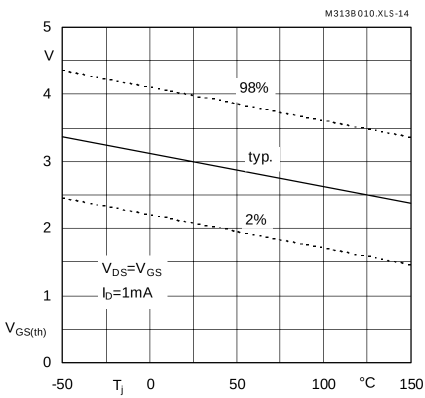



Fig. 14 Gate-source threshold voltage

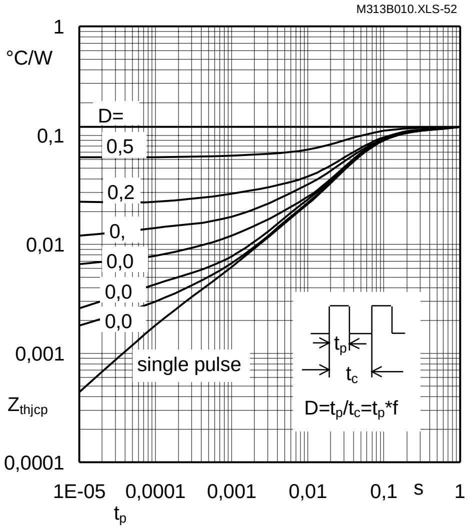
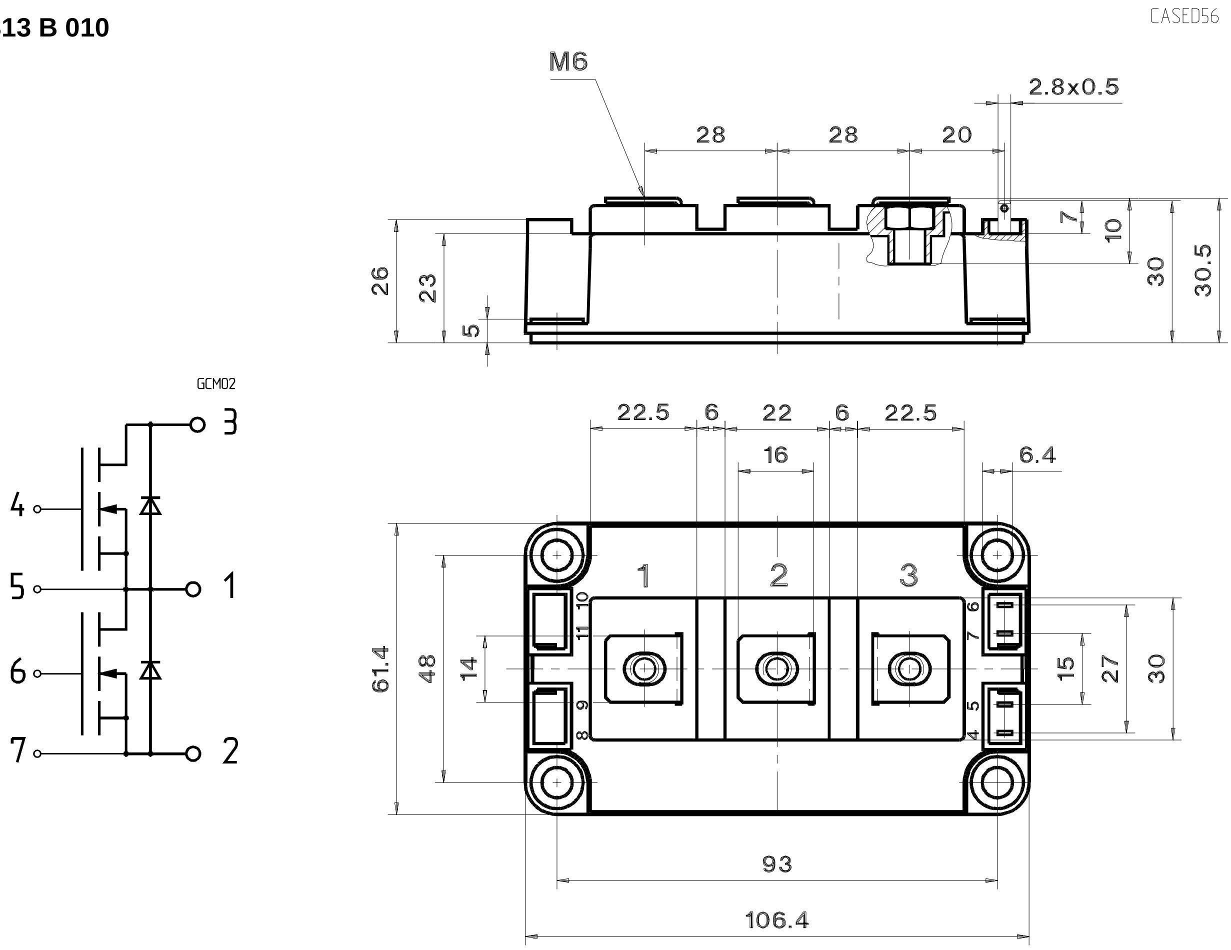



Fig. 52 Thermal impedance under pulse conditions

**SEMITRANS M 3**

Case D 56

**SKM 313 B 010**




Dimensions in mm