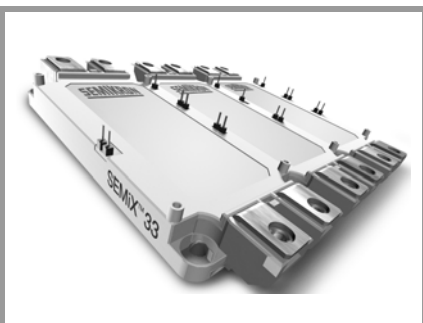


SEMiX403GD128Dc



SEMiX[®]33c

SPT IGBT Modules

SEMiX403GD128Dc

Preliminary Data

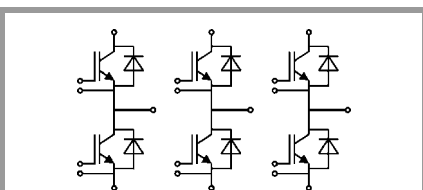
Features

- Homogeneous Si
- SPT = Soft-Punch-Through technology
- $V_{CE(sat)}$ with positive temperature coefficient
- High short circuit capability
- UL recognised file no. E63532

Typical Applications

- AC inverter drives
- UPS
- Electronic welders up to 20 kHz

Remarks

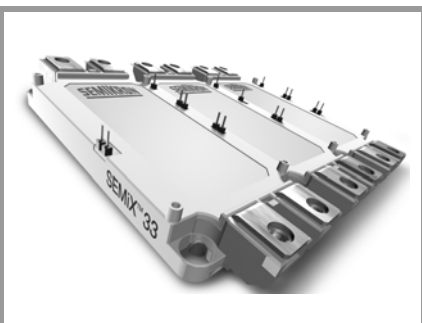


GD

| Absolute Maximum Ratings | | | | |
|--------------------------|--|--------------------------|-------------|------------------|
| Symbol | Conditions | | Values | Unit |
| IGBT | | | | |
| V_{CES} | | | 1200 | V |
| I_C | $T_j = 150^\circ\text{C}$ | $T_c = 25^\circ\text{C}$ | 418 | A |
| | | $T_c = 80^\circ\text{C}$ | 298 | A |
| I_{CRM} | $I_{CRM} = 2 \times I_{Cnom}$ | | 450 | A |
| V_{GES} | | | -20 ... 20 | V |
| t_{psc} | $V_{CC} = 600\text{V}$ $V_{GE} \leq 20\text{V}$ $T_j = 125^\circ\text{C}$ $V_{CES} \leq 1200\text{V}$ | | 10 | μs |
| | | | | |
| T_j | | | -40 ... 150 | $^\circ\text{C}$ |
| Inverse diode | | | | |
| I_F | $T_j = 150^\circ\text{C}$ | $T_c = 25^\circ\text{C}$ | 342 | A |
| | | $T_c = 80^\circ\text{C}$ | 235 | A |
| I_{FRM} | $I_{FRM} = 2 \times I_{Fnom}$ | | 450 | A |
| I_{FSM} | $t_p = 10\text{ms}$, half sine wave, $T_j = 25^\circ\text{C}$ | | 2000 | A |
| T_j | | | -40 ... 150 | $^\circ\text{C}$ |
| Module | | | | |
| $I_{t(RMS)}$ | | | 600 | A |
| T_{stg} | | | -40 ... 125 | $^\circ\text{C}$ |
| V_{isol} | AC sinus 50Hz, $t = 60\text{s}$ | | 4000 | V |

| Characteristics | | | | | | |
|-----------------|--|---------------------------|------|------|-------|------------------|
| Symbol | Conditions | | min. | typ. | max. | Unit |
| IGBT | | | | | | |
| $V_{CE(sat)}$ | $I_{Cnom} = 225\text{A}$ $V_{GE} = 15\text{V}$ chiplevel | $T_j = 25^\circ\text{C}$ | 1.9 | 2.3 | | V |
| | | $T_j = 125^\circ\text{C}$ | 2.10 | 2.55 | | V |
| V_{CE0} | | $T_j = 25^\circ\text{C}$ | 1 | 1.15 | | V |
| | | $T_j = 125^\circ\text{C}$ | 0.9 | 1.05 | | V |
| r_{CE} | $V_{GE} = 15\text{V}$ | $T_j = 25^\circ\text{C}$ | 4.0 | 5.1 | | $\text{m}\Omega$ |
| | | $T_j = 125^\circ\text{C}$ | 5.3 | 6.7 | | $\text{m}\Omega$ |
| $V_{GE(th)}$ | $V_{GE} = V_{CE}$, $I_C = 9\text{mA}$ | | 4.5 | 5 | 6.5 | V |
| I_{CES} | $V_{GE} = 0\text{V}$ $V_{CE} = 1200\text{V}$ | $T_j = 25^\circ\text{C}$ | 0.1 | 0.3 | | mA |
| | | $T_j = 125^\circ\text{C}$ | | | | mA |
| C_{ies} | $V_{CE} = 25\text{V}$ $V_{GE} = 0\text{V}$ | $f = 1\text{MHz}$ | 20.8 | | | nF |
| C_{oes} | | $f = 1\text{MHz}$ | 1.38 | | | nF |
| C_{res} | | $f = 1\text{MHz}$ | 0.87 | | | nF |
| Q_G | $V_{GE} = -8\text{V} \dots +15\text{V}$ | | 2130 | | | nC |
| R_{Gint} | $T_j = 25^\circ\text{C}$ | | 1.67 | | | Ω |
| $t_{d(on)}$ | $V_{CC} = 600\text{V}$ | | 145 | | | ns |
| t_r | $I_{Cnom} = 225\text{A}$ $T_j = 125^\circ\text{C}$ | | 60 | | | ns |
| | | | 20 | | | mJ |
| E_{on} | $R_{G on} = 4\Omega$ | | | | | mJ |
| $t_{d(off)}$ | $R_{G off} = 4\Omega$ | | 575 | | | ns |
| t_f | | | 70 | | | ns |
| E_{off} | | | 23 | | | mJ |
| $R_{th(j-c)}$ | per IGBT | | | | 0.075 | K/W |

SEMiX403GD128Dc



SEMiX[®]33c

SPT IGBT Modules

SEMiX403GD128Dc

Preliminary Data

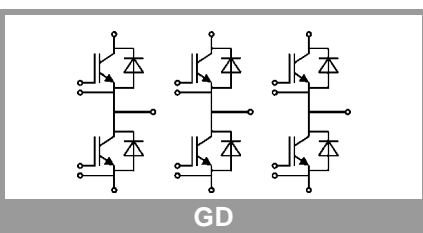
Features

- Homogeneous Si
- SPT = Soft-Punch-Through technology
- $V_{CE(sat)}$ with positive temperature coefficient
- High short circuit capability
- UL recognised file no. E63532

Typical Applications

- AC inverter drives
- UPS
- Electronic welders up to 20 kHz

Remarks



| Characteristics | | | | | | |
|---------------------------|---|---------------------|------|--------------------|------|------------|
| Symbol | Conditions | | min. | typ. | max. | Unit |
| Inverse diode | | | | | | |
| $V_F = V_{EC}$ | $I_{Fnom} = 225A$ $V_{GE} = 0V$ chipllevel | $T_j = 25^\circ C$ | | 2.0 | 2.5 | V |
| | | $T_j = 125^\circ C$ | | 1.8 | 2.3 | V |
| V_{F0} | | $T_j = 25^\circ C$ | 0.75 | 1.1 | 1.45 | V |
| | | $T_j = 125^\circ C$ | 0.5 | 0.85 | 1.2 | V |
| r_F | | $T_j = 25^\circ C$ | 3.3 | 4.0 | 4.7 | m Ω |
| | | $T_j = 125^\circ C$ | 3.6 | 4.2 | 4.9 | m Ω |
| I_{RRM} | $I_{Fnom} = 225A$ | $T_j = 125^\circ C$ | | 260 | | A |
| Q_{rr} | $di/dt_{off} = 4950A/\mu s$ | $T_j = 125^\circ C$ | | 29 | | μC |
| E_{rr} | $V_{GE} = -15V$ $V_{CC} = 600V$ | $T_j = 125^\circ C$ | | 10 | | mJ |
| $R_{th(j-c)D}$ | per diode | | | | 0.13 | K/W |
| Module | | | | | | |
| L_{CE} | | | | 20 | | nH |
| $R_{CC'+EE'}$ | res., terminal-chip | $T_C = 25^\circ C$ | | 0.7 | | m Ω |
| | | $T_C = 125^\circ C$ | | 1 | | m Ω |
| $R_{th(c-s)}$ | per module | | | 0.014 | | K/W |
| M_s | to heat sink (M5) | | 3 | | 5 | Nm |
| M_t | to terminals (M6) | | 2.5 | | 5 | Nm |
| w | | | | | 900 | g |
| Temperature sensor | | | | | | |
| R_{100} | $T_c=100^\circ C$ ($R_{25}=5 k\Omega$) | | | 0,493 $\pm 5\%$ | | k Ω |
| $B_{100/125}$ | $R_{(T)}=R_{100}\exp[B_{100/125}(1/T-1/T_{100})]$; $T[K]$; | | | 3550 $\pm 2\%$ | | K |

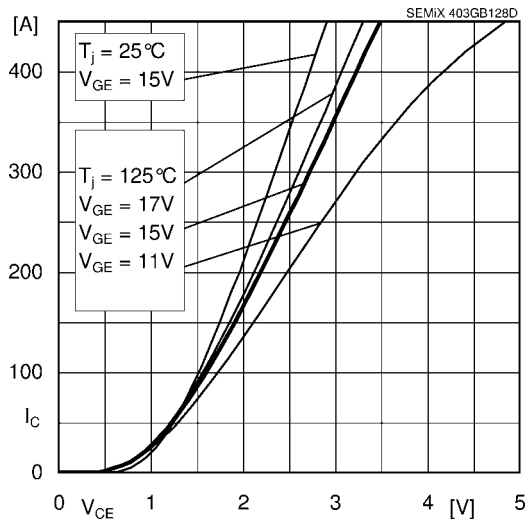


Fig. 1 Typ. output characteristic, inclusive $R_{CC'+EE'}$

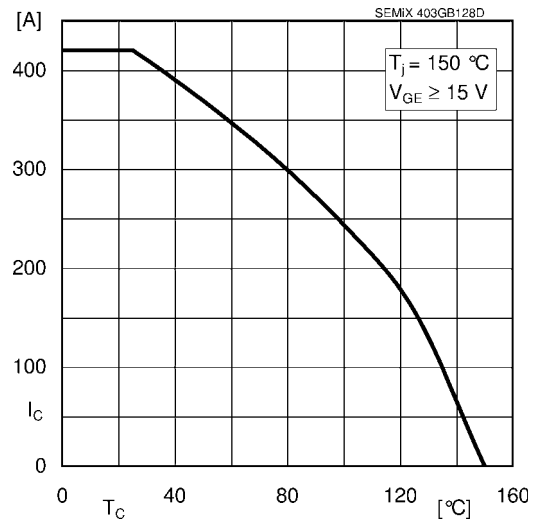


Fig. 2 Rated current vs. temperature $I_C = f(T_C)$

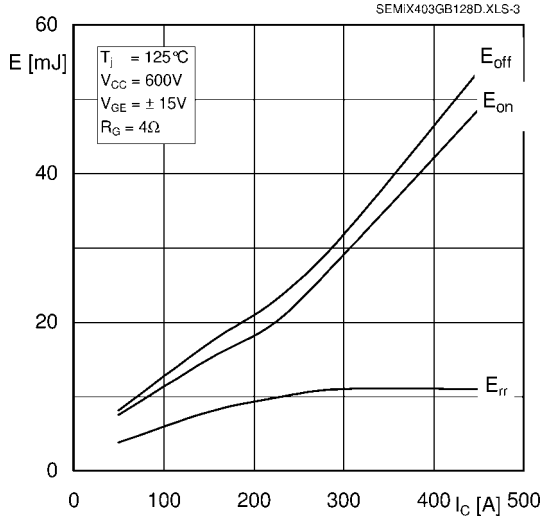


Fig. 3 Typ. turn-on /-off energy = $f(I_C)$

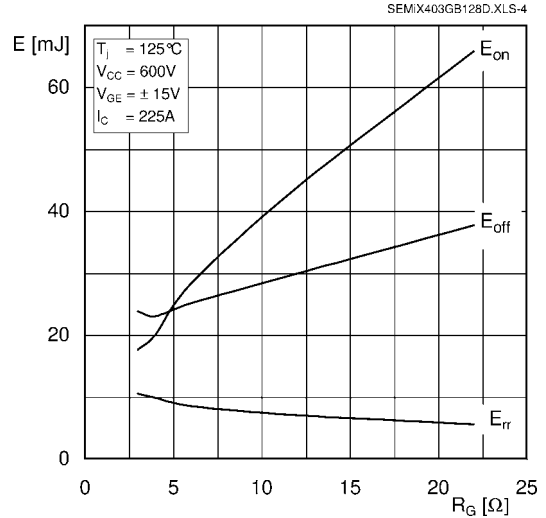


Fig. 4 Typ. turn-on /-off energy = $f(R_G)$

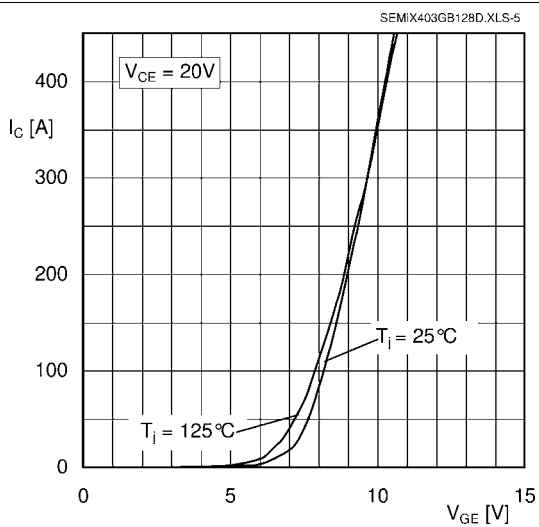


Fig. 5 Typ. transfer characteristic

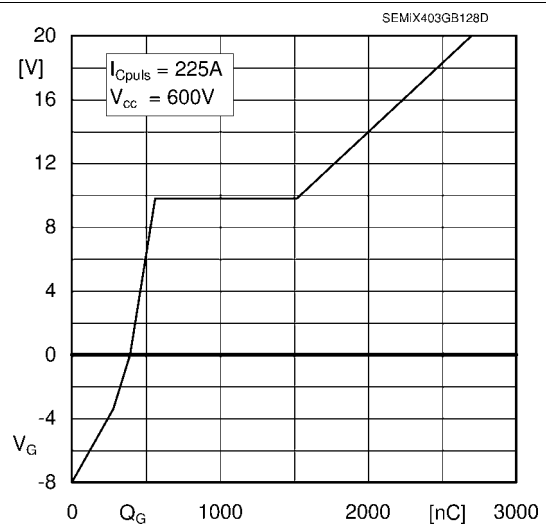


Fig. 6 Typ. gate charge characteristic

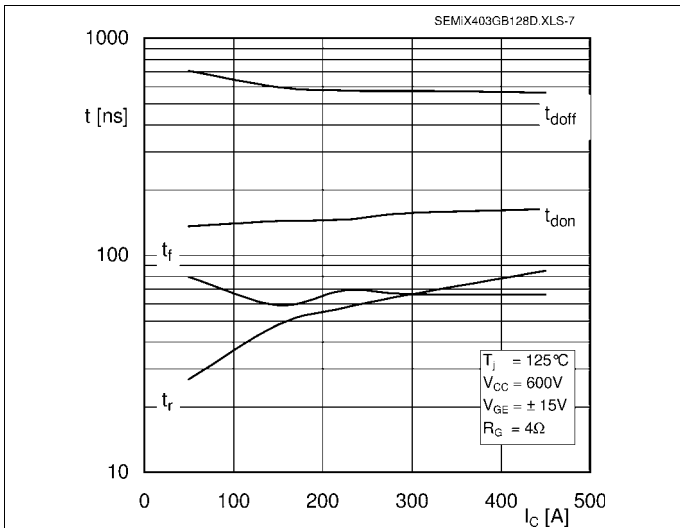


Fig. 7 Typ. switching times vs. I_C

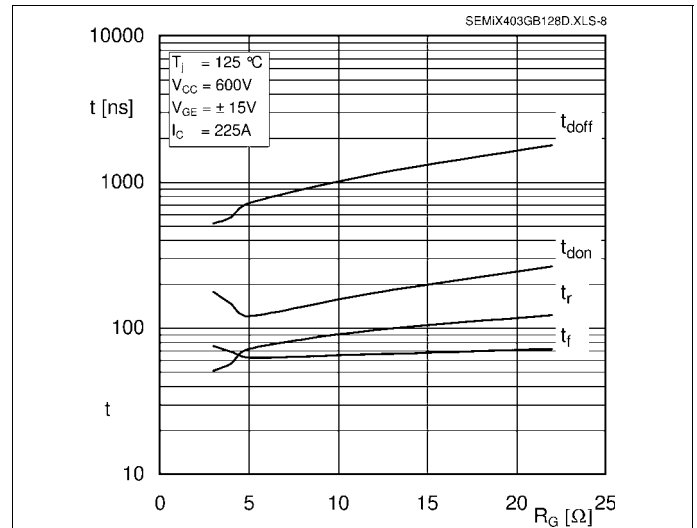


Fig. 8 Typ. switching times vs. gate resistor R_G

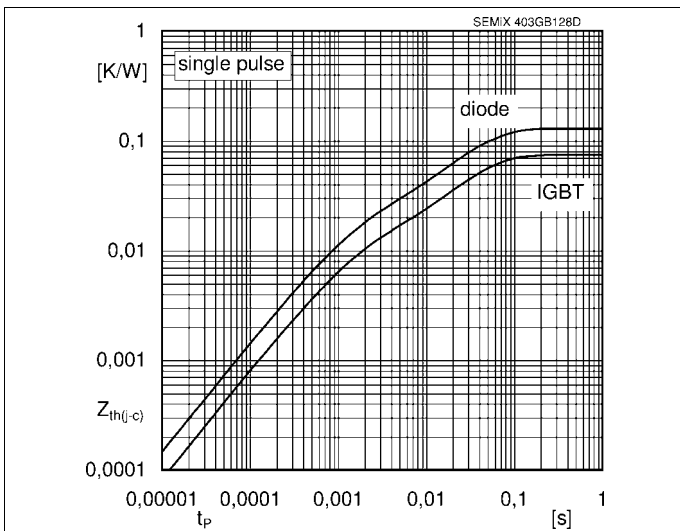


Fig. 9 Typ. transient thermal impedance

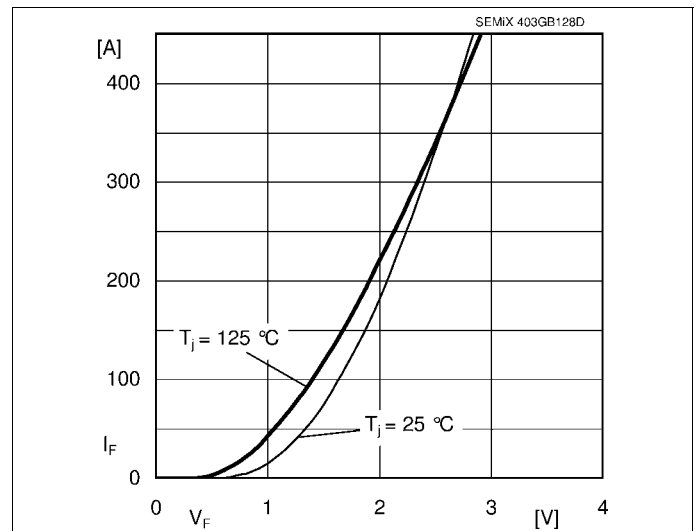


Fig. 10 Typ. CAL diode forward charact., incl. R_{CC+EE}

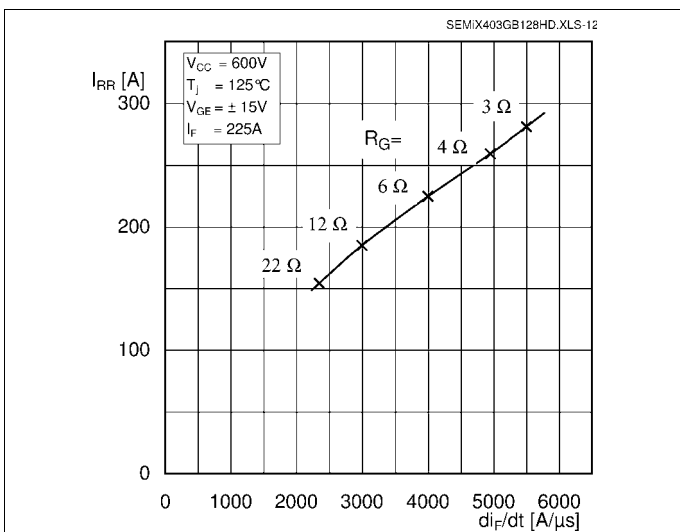


Fig. 11 Typ. CAL diode peak reverse recovery current

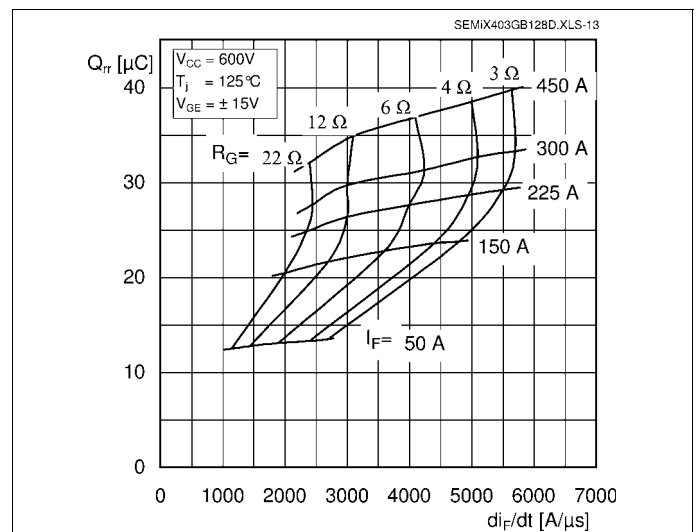
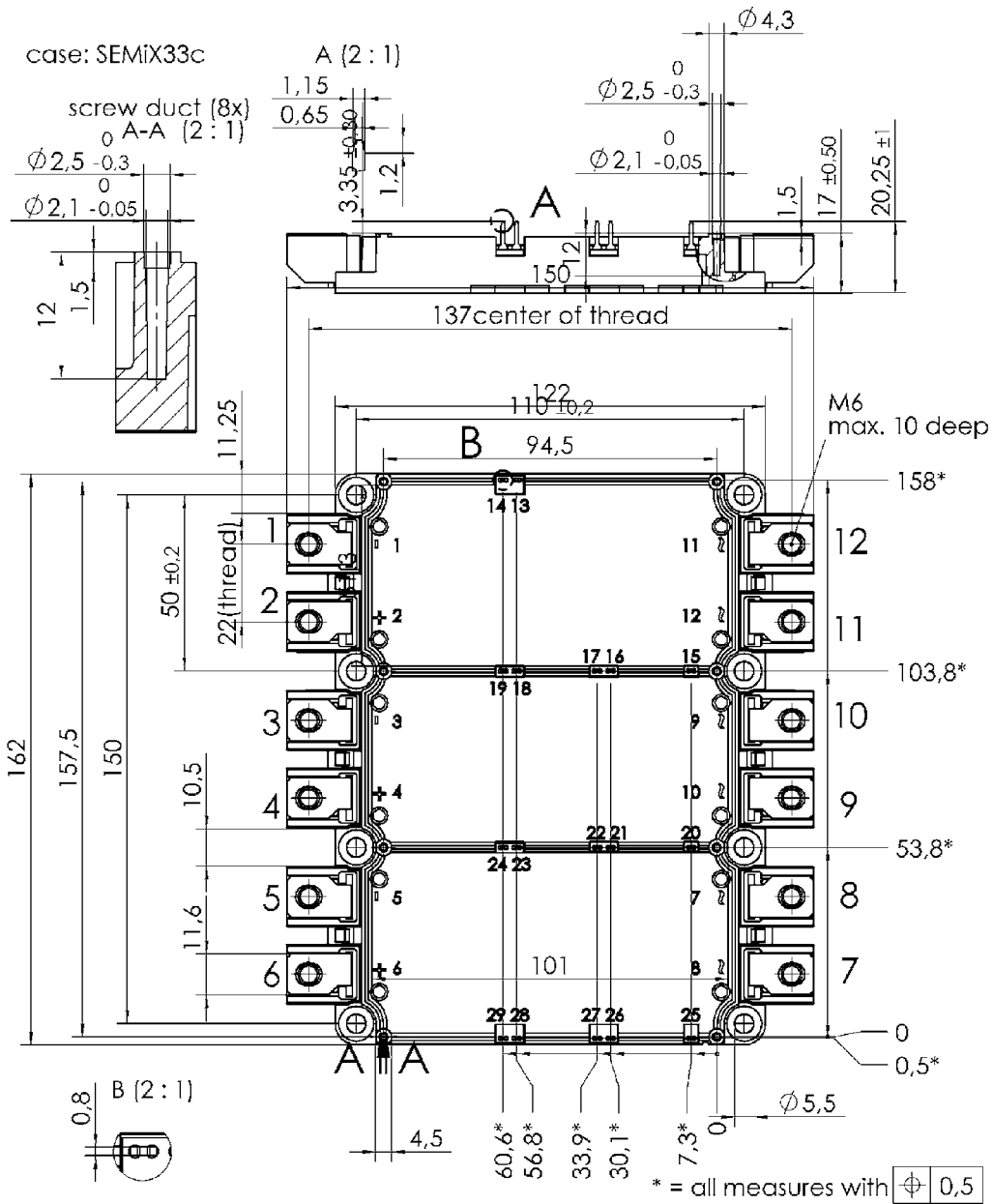
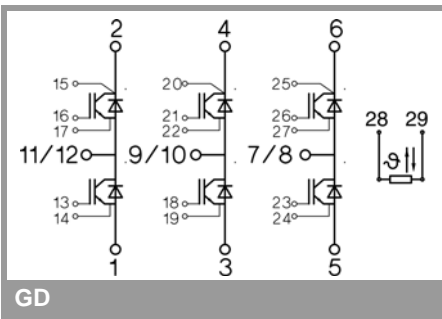


Fig. 12 Typ. CAL diode recovery charge

SEMiX403GD128Dc



SEMIX 33c



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

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