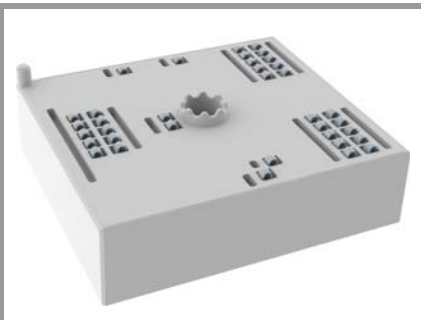


SKiiP 27GB12T7V1



MiniSKiiP® 2 Dual

Half-Bridge

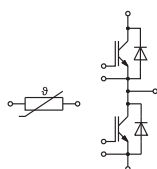
SKiiP 27GB12T7V1

Features*

- 1200V Generation 7 IGBTs (T7)
- Robust and soft switching freewheeling diodes in CAL technology
- Highly reliable spring contacts for electrical connections
- UL recognized: File no. E63532
- NTC T-Sensor

Remarks

-)Max. case temperature limited to $T_C = T_S = 125\text{ °C}$
- Product reliability results valid for $T_j \leq 150\text{ °C}$; $T_{j,op} > 150\text{ °C}$ during overload (Details see AN19-002)
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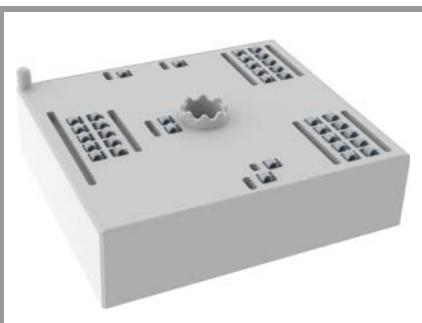


GB

| Absolute Maximum Ratings | | | | |
|--------------------------|--|-----------------------|-------------|--------------------|
| Symbol | Conditions | | Values | Unit |
| Inverter - IGBT | | | | |
| V_{CES} | $T_j = 25\text{ °C}$ | | 1200 | V |
| I_C | $\lambda_{paste} = 0.8\text{ W/(mK)}$ | $T_s = 70\text{ °C}$ | 228 | A |
| | | $T_j = 175\text{ °C}$ | 182 | A |
| I_C | $\lambda_{paste} = 2.5\text{ W/(mK)}$ | $T_s = 70\text{ °C}$ | 303 | A |
| | | $T_j = 175\text{ °C}$ | 244 | A |
| I_{Chom} | | | 300 | A |
| I_{CRM} | | | 600 | A |
| V_{GES} | | | -20 ... 20 | V |
| t_{psc} | $V_{CC} = 800\text{ V}$ $V_{GE} \leq 15\text{ V}$ $V_{CES} \leq 1200\text{ V}$ | $T_j = 175\text{ °C}$ | 7 | μs |
| | | | | |
| T_j | | | -40 ... 175 | $^{\circ}\text{C}$ |
| Inverse - Diode | | | | |
| V_{RRM} | $T_j = 25\text{ °C}$ | | 1200 | V |
| I_F | $\lambda_{paste} = 0.8\text{ W/(mK)}$ | $T_s = 70\text{ °C}$ | 168 | A |
| | | $T_j = 175\text{ °C}$ | 132 | A |
| I_F | $\lambda_{paste} = 2.5\text{ W/(mK)}$ | $T_s = 70\text{ °C}$ | 209 | A |
| | | $T_j = 175\text{ °C}$ | 166 | A |
| I_{FRM} | | | 600 | A |
| I_{FSM} | $t_p = 10\text{ ms, sin } 180^{\circ}, T_j = 150\text{ °C}$ | | 1620 | A |
| T_j | | | -40 ... 175 | $^{\circ}\text{C}$ |
| Module | | | | |
| $I_{t(RMS)}$ | $T_{terminal} = 80\text{ °C}, 20\text{ A per spring}$ | | 200 | A |
| T_{stg} | module without TIM | | -40 ... 125 | $^{\circ}\text{C}$ |
| V_{isol} | AC sinus 50 Hz, $t = 1\text{ min}$ | | 2500 | V |

| Characteristics | | | | | | |
|------------------------|---|-----------------------|------|-------|------|------------------|
| Symbol | Conditions | | min. | typ. | max. | Unit |
| Inverter - IGBT | | | | | | |
| $V_{CE(sat)}$ | $I_C = 300\text{ A}$ $V_{GE} = 15\text{ V}$ chiplevel | $T_j = 25\text{ °C}$ | 1.55 | 1.70 | | V |
| | | $T_j = 150\text{ °C}$ | 1.73 | 1.88 | | V |
| | | $T_j = 175\text{ °C}$ | 1.77 | 1.92 | | V |
| V_{CE0} | chiplevel | $T_j = 25\text{ °C}$ | 1.00 | 1.05 | | V |
| | | $T_j = 150\text{ °C}$ | 0.80 | 0.85 | | V |
| | | $T_j = 175\text{ °C}$ | 0.75 | 0.80 | | V |
| r_{CE} | $V_{GE} = 15\text{ V}$ chiplevel | $T_j = 25\text{ °C}$ | 1.83 | 2.2 | | $\text{m}\Omega$ |
| | | $T_j = 150\text{ °C}$ | 3.1 | 3.4 | | $\text{m}\Omega$ |
| | | $T_j = 175\text{ °C}$ | 3.4 | 3.7 | | $\text{m}\Omega$ |
| $V_{GE(th)}$ | $V_{GE} = V_{CE}, I_C = 7\text{ mA}$ | | 5.15 | 5.8 | 6.45 | V |
| I_{CES} | $V_{GE} = 0\text{ V}, V_{CE} = 1200\text{ V}, T_j = 25\text{ °C}$ | | | | 3.0 | mA |
| C_{ies} | $V_{CE} = 25\text{ V}$ | | | 60.00 | | nF |
| C_{oes} | $V_{GE} = 0\text{ V}$ | | | 0.78 | | nF |
| C_{res} | $f = 1\text{ MHz}$ | | | 0.21 | | nF |
| Q_G | $V_{GE} = -8\text{ V} \dots +15\text{ V}$ | | | 4200 | | nC |
| R_{Gint} | $T_j = 25\text{ °C}$ | | | 0.5 | | Ω |

SKiiP 27GB12T7V1



MiniSKiiP® 2 Dual

Half-Bridge

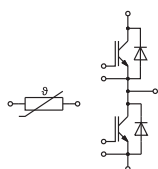
SKiiP 27GB12T7V1

Features*

- 1200V Generation 7 IGBTs (T7)
- Robust and soft switching freewheeling diodes in CAL technology
- Highly reliable spring contacts for electrical connections
- UL recognized: File no. E63532
- NTC T-Sensor

Remarks

-)Max. case temperature limited to $T_C = T_S = 125\text{ °C}$
- Product reliability results valid for $T_j \leq 150\text{ °C}$; $T_{j,op} > 150\text{ °C}$ during overload (Details see AN19-002)
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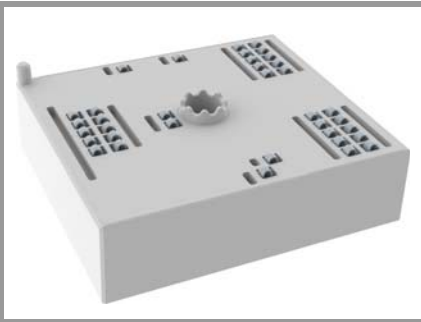


GB

| Characteristics | | | | | | |
|------------------------|---|---|-----------------------|------|------|----|
| Symbol | Conditions | min. | typ. | max. | Unit | |
| Inverter - IGBT | | | | | | |
| $t_{d(on)}$ | | $T_j = 25\text{ °C}$ | 159 | | ns | |
| | | $T_j = 150\text{ °C}$ | 170 | | ns | |
| | | $T_j = 175\text{ °C}$ | 166 | | ns | |
| t_r | | $T_j = 25\text{ °C}$ | 44 | | ns | |
| | | $T_j = 150\text{ °C}$ | 51 | | ns | |
| | | $T_j = 175\text{ °C}$ | 54 | | ns | |
| E_{on} | $V_{CC} = 600\text{ V}$ $I_C = 300\text{ A}$ $R_{G, on} = 1.1\ \Omega$ $R_{G, off} = 1.1\ \Omega$ $V_{GE} = +15/-15\text{ V}$ | $T_j = 25\text{ °C}$ | 14 | | mJ | |
| | | $T_j = 150\text{ °C}$ | 21 | | mJ | |
| | | $T_j = 175\text{ °C}$ | 23 | | mJ | |
| $t_{d(off)}$ | | $T_j = 25\text{ °C}$ | 423 | | ns | |
| | | @ $T_j = 150\text{ °C}$: $dI/dt_{on} = 6800\text{ A}/\mu\text{s}$ | $T_j = 150\text{ °C}$ | 513 | | ns |
| | | $T_j = 175\text{ °C}$ | 538 | | ns | |
| t_f | $dI/dt_{off} = 2660\text{ A}/\mu\text{s}$ $dv/dt = 3710\text{ V}/\mu\text{s}$ | $T_j = 25\text{ °C}$ | 75 | | ns | |
| | | $T_j = 150\text{ °C}$ | 115 | | ns | |
| | | $T_j = 175\text{ °C}$ | 147 | | ns | |
| E_{off} | | $T_j = 25\text{ °C}$ | 22 | | mJ | |
| | | $T_j = 150\text{ °C}$ | 36 | | mJ | |
| | | $T_j = 175\text{ °C}$ | 38 | | mJ | |
| $R_{th(j-s)}$ | per IGBT, $\lambda_{paste} = 0.8\text{ W}/(\text{mK})$ | | 0.28 | | K/W | |
| $R_{th(j-s)}$ | per IGBT, $\lambda_{paste} = 2.5\text{ W}/(\text{mK})$ | | 0.18 | | K/W | |

| Characteristics | | | | | |
|------------------------|--|--|-----------------------|------|---------------|
| Symbol | Conditions | min. | typ. | max. | Unit |
| Inverse - Diode | | | | | |
| $V_F = V_{EC}$ | $I_F = 300\text{ A}$ $V_{GE} = 0\text{ V}$ chipelevel | $T_j = 25\text{ °C}$ | 2.14 | 2.46 | V |
| | | $T_j = 150\text{ °C}$ | 2.07 | 2.38 | V |
| | | $T_j = 175\text{ °C}$ | 1.93 | 2.24 | V |
| V_{F0} | chipelevel | $T_j = 25\text{ °C}$ | 1.30 | 1.50 | V |
| | | $T_j = 150\text{ °C}$ | 0.90 | 1.10 | V |
| | | $T_j = 175\text{ °C}$ | 0.82 | 0.98 | V |
| r_F | chipelevel | $T_j = 25\text{ °C}$ | 2.8 | 3.2 | m Ω |
| | | $T_j = 150\text{ °C}$ | 3.9 | 4.3 | m Ω |
| | | $T_j = 175\text{ °C}$ | 3.7 | 4.2 | m Ω |
| I_{RRM} | | $T_j = 25\text{ °C}$ | 234 | | A |
| | | $T_j = 150\text{ °C}$ | 316 | | A |
| | | $T_j = 175\text{ °C}$ | 379 | | A |
| Q_{rr} | $I_F = 300\text{ A}$ $V_{GE} = +15/-15\text{ V}$ $V_{CC} = 600\text{ V}$ | $T_j = 25\text{ °C}$ | 16 | | μC |
| | | $T_j = 150\text{ °C}$ | 48 | | μC |
| | | @ $T_j = 150\text{ °C}$: $dI/dt_{off} = 6680\text{ A}/\mu\text{s}$ | $T_j = 175\text{ °C}$ | 47 | |
| E_{rr} | | $T_j = 25\text{ °C}$ | 7.2 | | mJ |
| | | $T_j = 150\text{ °C}$ | 19 | | mJ |
| | | $T_j = 175\text{ °C}$ | 23 | | mJ |
| $R_{th(j-s)}$ | per Diode, $\lambda_{paste} = 0.8\text{ W}/(\text{mK})$ | | 0.37 | | K/W |
| $R_{th(j-s)}$ | per Diode, $\lambda_{paste} = 2.5\text{ W}/(\text{mK})$ | | 0.27 | | K/W |
| Module | | | | | |
| L_{CE} | | | 20 | | nH |
| M_s | to heat sink | 2 | | 2.5 | Nm |
| w | | | 50 | | g |

SKiiP 27GB12T7V1



MiniSKiiP® 2 Dual

| Characteristics | | | | | |
|---------------------------|---|------|-------------|------|------|
| Symbol | Conditions | min. | typ. | max. | Unit |
| Temperature Sensor | | | | | |
| R ₁₀₀ | T _c =100°C (R ₂₅ =5 kΩ) | | 493 ± 5% | | Ω |
| B _{100/125} | R _(T) =R ₁₀₀ exp[B _{100/125} (1/T-1/T ₁₀₀)]; T[K]; | | 3550 ±2% | | K |

Half-Bridge

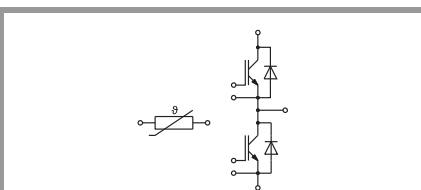
SKiiP 27GB12T7V1

Features*

- 1200V Generation 7 IGBTs (T7)
- Robust and soft switching freewheeling diodes in CAL technology
- Highly reliable spring contacts for electrical connections
- UL recognized: File no. E63532
- NTC T-Sensor

Remarks

-)Max. case temperature limited to T_C=T_S=125 °C
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GB

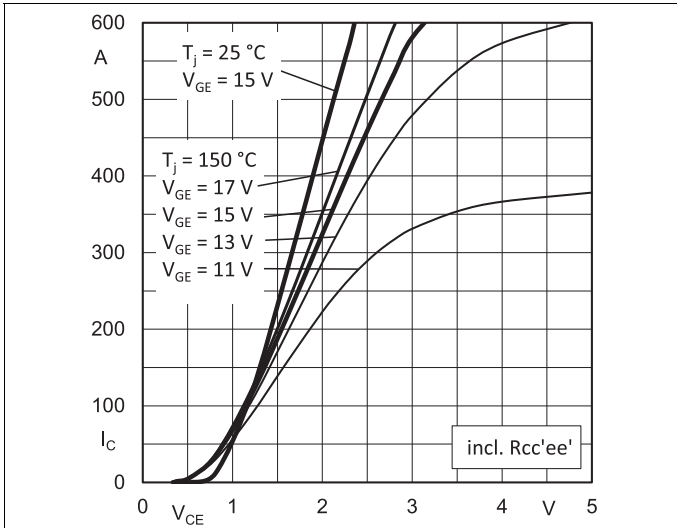


Fig. 1: Typ. output characteristic

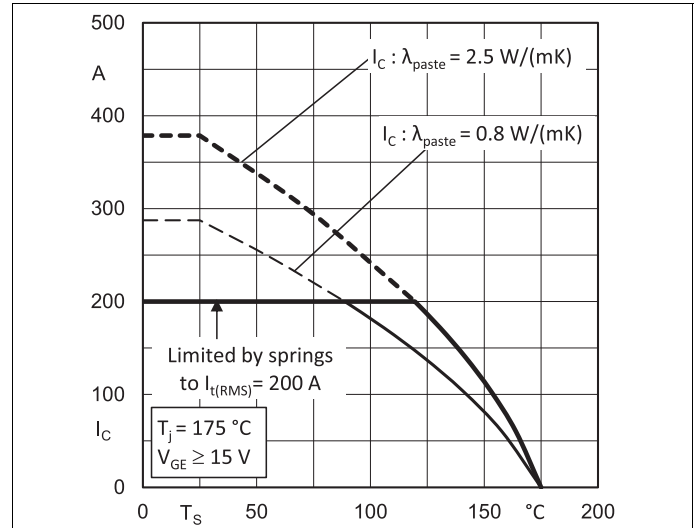


Fig. 2: Rated current vs. temperature $I_C = f(T_s)$

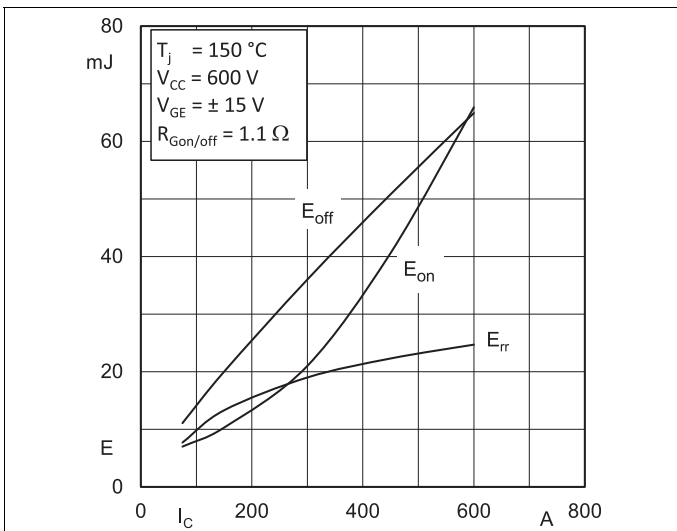


Fig. 3: Typ. turn-on /-off energy = $f(I_C)$

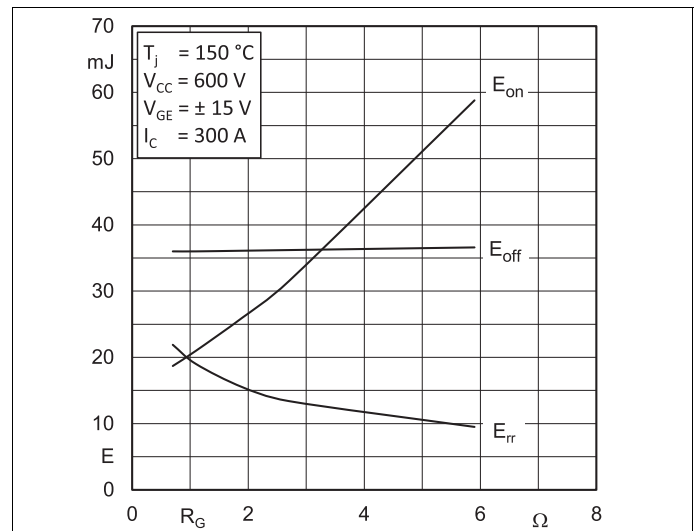


Fig. 4: Typ. turn-on /-off energy = $f(R_G)$

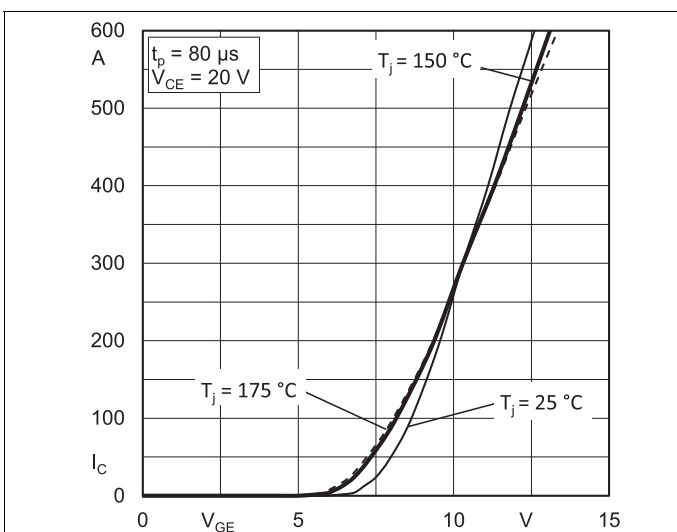


Fig. 5: Typ. transfer characteristic

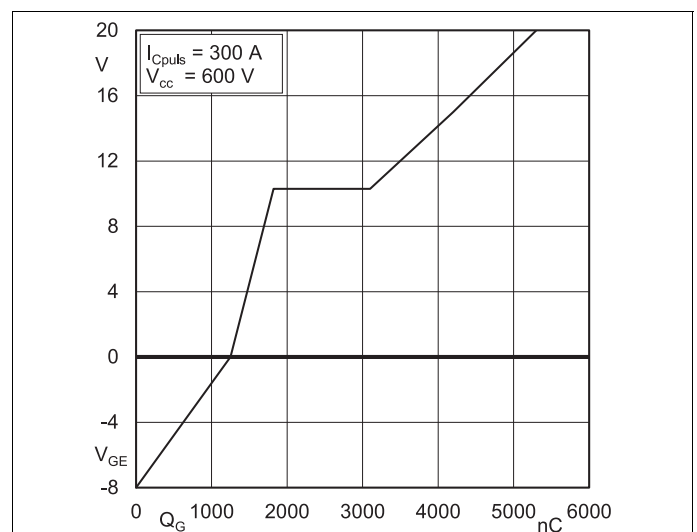


Fig. 6: Typ. gate charge characteristic

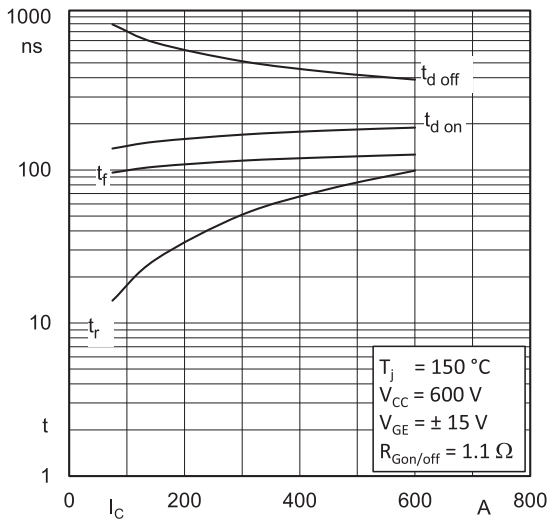


Fig. 7: Typ. switching times vs. I_C

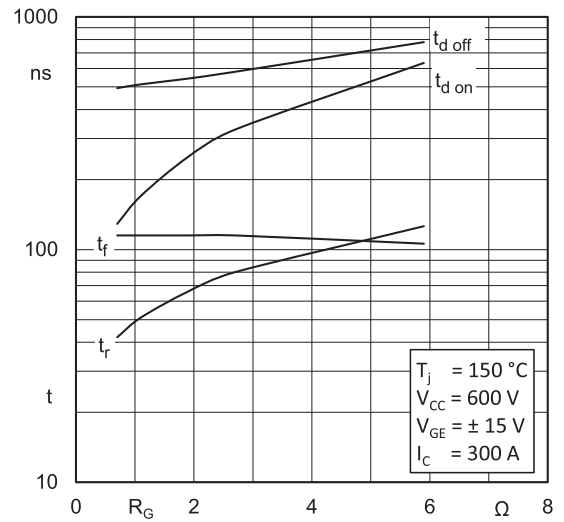


Fig. 8: Typ. switching times vs. gate resistor R_G

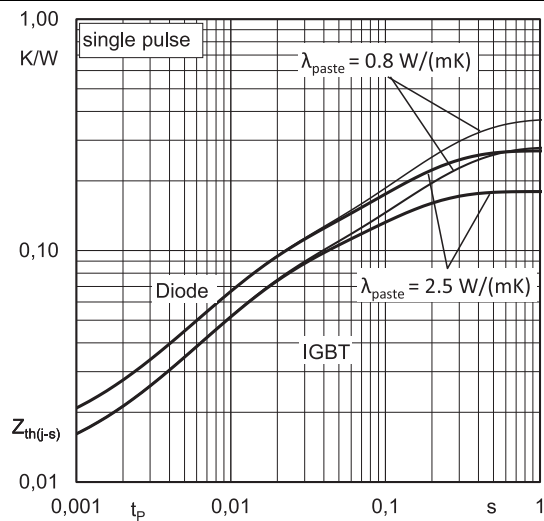


Fig. 9: Typ. transient thermal impedance

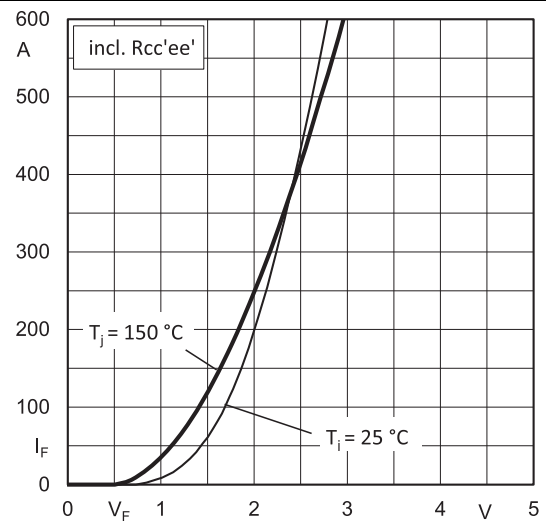


Fig. 10: Typ. CAL diode forward characteristic

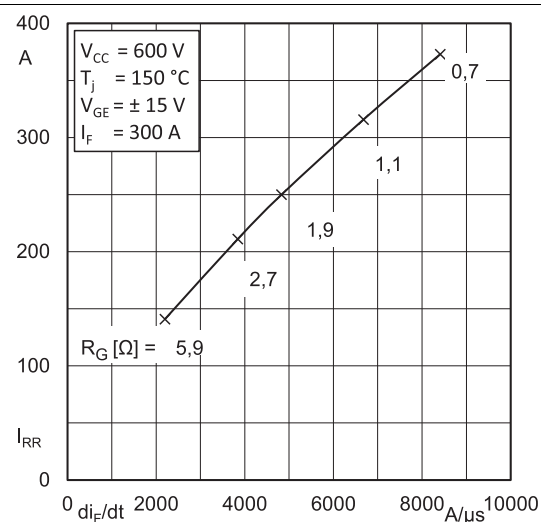


Fig. 11: Typ. CAL diode peak reverse recovery current

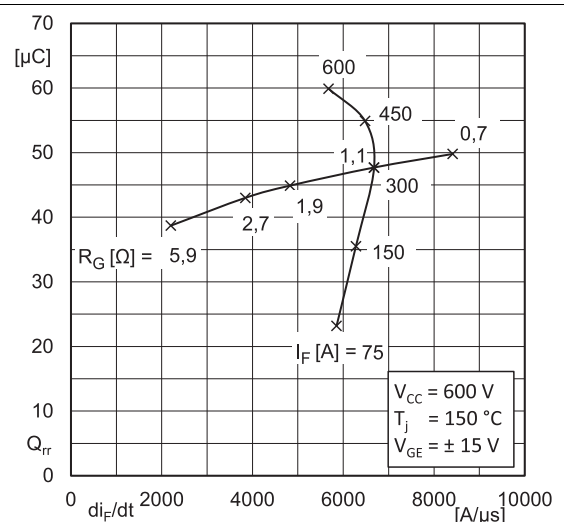
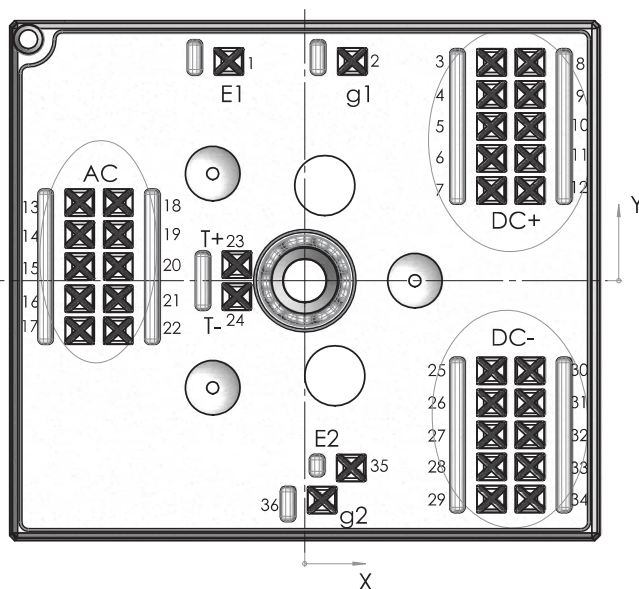


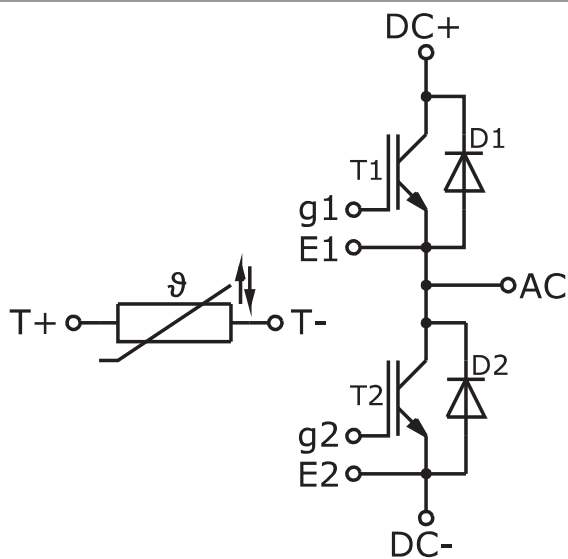
Fig. 12: Typ. CAL diode recovery charge

| Pin out | | | | | | | |
|---------|--------|------|----------|-----|--------|-------|----------|
| Pin | X | Y | Function | Pin | X | Y | Function |
| 1 | -7,58 | 21,9 | E1 | 19 | -18,62 | 4,6 | AC |
| 2 | 4,72 | 21,9 | g1 | 20 | -18,62 | 1,4 | AC |
| 3 | 18,62 | 21,8 | DC+ | 21 | -18,62 | -1,8 | AC |
| 4 | 18,62 | 18,6 | DC+ | 22 | -18,62 | -5 | AC |
| 5 | 18,62 | 15,4 | DC+ | 23 | -6,78 | 1,6 | T+ |
| 6 | 18,62 | 12,2 | DC+ | 24 | -6,78 | -1,6 | T- |
| 7 | 18,62 | 9 | DC+ | 25 | 18,62 | -9 | DC- |
| 8 | 22,48 | 21,8 | DC+ | 26 | 18,62 | -12,2 | DC- |
| 9 | 22,48 | 18,6 | DC+ | 27 | 18,62 | -15,4 | DC- |
| 10 | 22,48 | 15,4 | DC+ | 28 | 18,62 | -18,6 | DC- |
| 11 | 22,48 | 12,2 | DC+ | 29 | 18,62 | -21,8 | DC- |
| 12 | 22,48 | 9 | DC+ | 30 | 22,48 | -9 | DC- |
| 13 | -22,48 | 7,8 | AC | 31 | 22,48 | -12,2 | DC- |
| 14 | -22,48 | 4,6 | AC | 32 | 22,48 | -15,4 | DC- |
| 15 | -22,48 | 1,4 | AC | 33 | 22,48 | -18,6 | DC- |
| 16 | -22,48 | -1,8 | AC | 34 | 22,48 | -21,8 | DC- |
| 17 | -22,48 | -5 | AC | 35 | 4,62 | -18,7 | E2 |
| 18 | -18,62 | 7,8 | AC | 36 | 1,72 | -21,9 | g2 |

all values in mm



Pinout and Dimensions



Pinout

This is an electrostatic discharge sensitive device (ESDS) due to international standard IEC 61340.

***IMPORTANT INFORMATION AND WARNINGS**

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