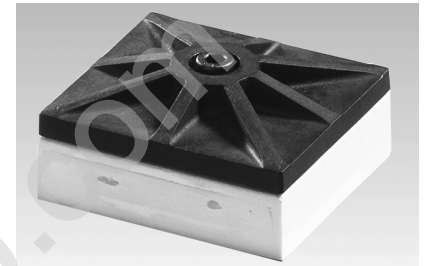


SKiiP 21 NAB 12 - SKiiP 21 NAB 12 I

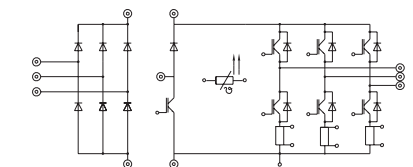
| Absolute Maximum Ratings | | |
|------------------------------------|--|-----------------------|
| Symbol | Conditions ¹⁾ | Units |
| Inverter | (Chopper see SKiiP 22 NAB 12) | |
| V _{CES} | | 1200 V |
| V _{GES} | | ± 20 V |
| I _C | T _{heatsink} = 25 / 80 °C | 16 / 11 A |
| I _{CM} | t _p < 1 ms; T _{heatsink} = 25 / 80 °C | 32 / 22 A |
| I _F = -I _C | T _{heatsink} = 25 / 80 °C | 24 / 17 A |
| I _{FM} = -I _{CM} | t _p < 1 ms; T _{heatsink} = 25 / 80 °C | 48 / 34 A |
| Bridge Rectifier | | |
| V _{RRM} | | 1500 V |
| I _D | T _{heatsink} = 80 °C | 25 A |
| I _{FSM} | t _p = 10 ms; sin. 180 °, T _j = 25 °C | 700 A |
| I ² t | t _p = 10 ms; sin. 180 °, T _j = 25 °C | 2400 A ² s |
| T _j | | - 40 ... + 150 °C |
| T _{stg} | | - 40 ... + 125 °C |
| V _{isol} | AC, 1 min. | 2500 V |

MiniSKiiP 2
SEMIKRON integrated intelligent Power
SKiiP 21 NAB 12
SKiiP 21 NAB 12 I ³⁾
3-phase bridge rectifier +
braking chopper +
3-phase bridge inverter

Case M2



| Characteristics | | | min. | typ. | max. | Units |
|---|---|-----------|-------------|----------|------|-------|
| Symbol | Conditions ¹⁾ | | | | | |
| IGBT - Inverter | | | | | | |
| V _{CESat} | I _C = 10 A T _j = 25 (125) °C | - | 2,7(3,3) | 3,2(3,9) | | V |
| t _{d(on)} | V _{CC} = 600 V; V _{GE} = ± 15 V I _C = 10 A; T _j = 125 °C R _{gon} = R _{goff} = 150 Ω inductive load | - | 55 | 110 | | ns |
| t _r | | - | 50 | 100 | | ns |
| t _{d(off)} | | - | 380 | 570 | | ns |
| t _f | | - | 80 | 120 | | ns |
| E _{on} + E _{off} | | - | 2,7 | - | | |
| C _{ies} | V _{CE} = 25 V; V _{GE} = 0 V, 1 MHz | - | 0,53 | - | | nF |
| R _{thjh} | per IGBT | - | - | 1,8 | | K/W |
| IGBT - Chopper * | | | | | | |
| V _{CESat} | I _C = 15 A T _j = 25 (125) °C | - | 2,5(3,1) | 3,0(3,7) | | V |
| t _{d(on)} | V _{CC} = 600 V; V _{GE} = ± 15 V I _C = 15 A; T _j = 125 °C R _{gon} = R _{goff} = 82 Ω inductive load | - | 55 | 110 | | ns |
| t _r | | - | 45 | 90 | | ns |
| t _{d(off)} | | - | 400 | 600 | | ns |
| t _f | | - | 70 | 100 | | ns |
| E _{on} + E _{off} | | - | 4,0 | - | | |
| C _{ies} | V _{CE} = 25 V; V _{GE} = 0 V, 1 MHz | - | 1,0 | - | | nF |
| R _{thjh} | per IGBT | - | - | 1,4 | | K/W |
| Diode ²⁾ - Inverter & Chopper | | | | | | |
| V _F = V _{EC} | I _F = 15 A T _j = 25 (125) °C | - | 2,0(1,8) | 2,5(2,3) | | V |
| V _{TO} | T _j = 125 °C | - | 1,0 | 1,2 | | V |
| r _T | T _j = 125 °C | - | 53 | 73 | | mΩ |
| I _{RRM} | I _F = 15 A, V _R = - 600 V di _F /dt = - 400 A/μs V _{GE} = 0 V, T _j = 125 °C | - | 16 | - | | A |
| Q _{rr} | | - | 2,7 | - | | μC |
| E _{off} | | - | 0,6 | - | | mJ |
| R _{thjh} | | per diode | - | - | 1,7 | |
| Diode - Rectifier | | | | | | |
| V _F | I _F = 35 A, T _j = 25 °C | - | 1,2 | - | | V |
| R _{thjh} | per diode | - | - | 1,6 | | K/W |
| Temperature Sensor | | | | | | |
| R _{TS} | T = 25 / 100 °C | | 1000 / 1670 | | | Ω |
| Mechanical Data | | | | | | |
| M ₁ | case to heatsink, SI Units | 2 | - | 2,5 | | Nm |
| Case | mechanical outline see page B 16 - 7 | | M2 | | | |



UL recognized file no. E63532

- specification of shunts and temperature sensor see part A
- common characteristics see page B 16 - 4

- 1) T_{heatsink} = 25 °C, unless otherwise specified
- 2) CAL = Controlled Axial Lifetime Technology (soft and fast recovery)
- 3) With integrated AC shunts

| | | |
|---------------------|-----|-------|
| R _{cs(ac)} | 1 % | 22 mΩ |
|---------------------|-----|-------|

* For diagrams of the Chopper please refer to SKiiP 22 NAB 12

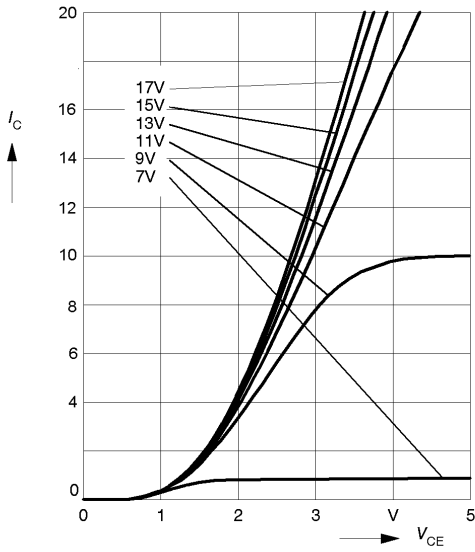


Fig. 1 Typ. output characteristic, $t_p = 80 \mu s$; $25 \text{ }^\circ\text{C}$

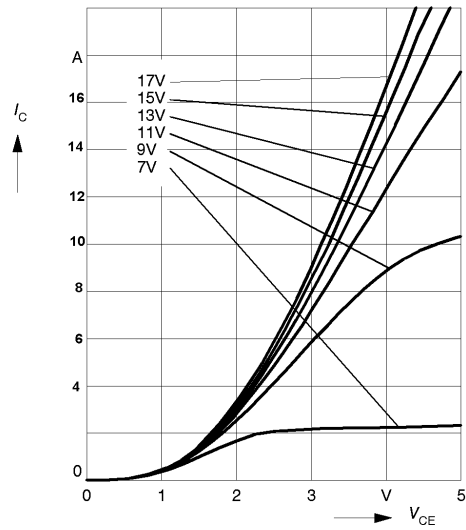


Fig. 2 Typ. output characteristic, $t_p = 80 \mu s$; $125 \text{ }^\circ\text{C}$

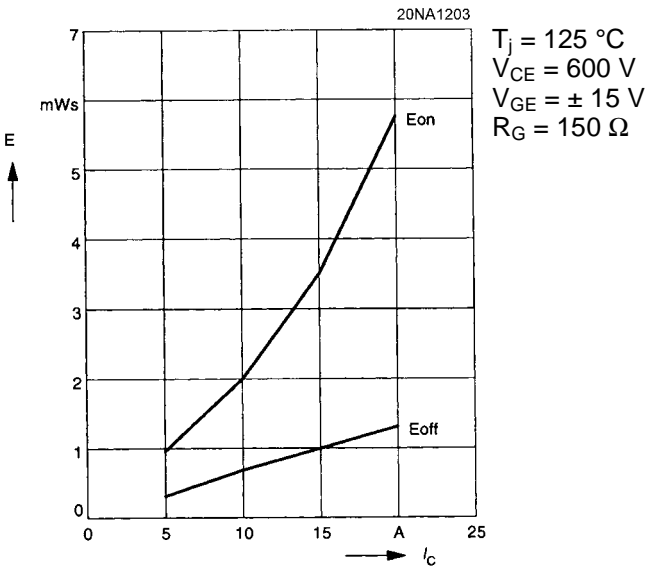


Fig. 3 Turn-on /-off energy = $f(I_c)$

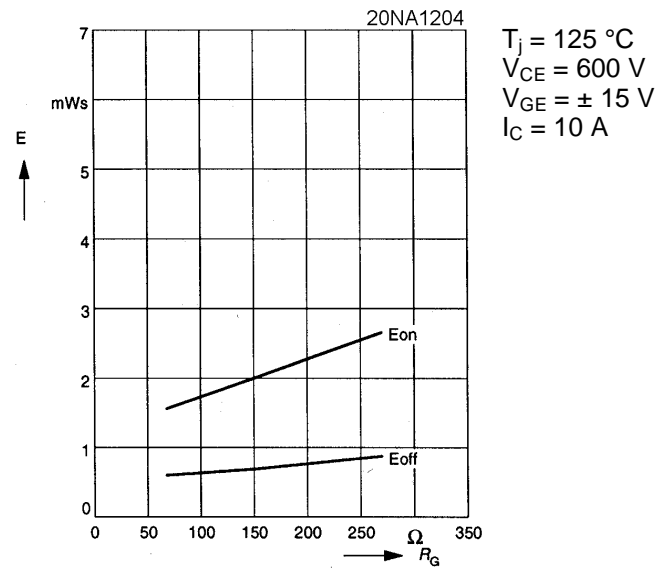


Fig. 4 Turn-on /-off energy = $f(R_g)$

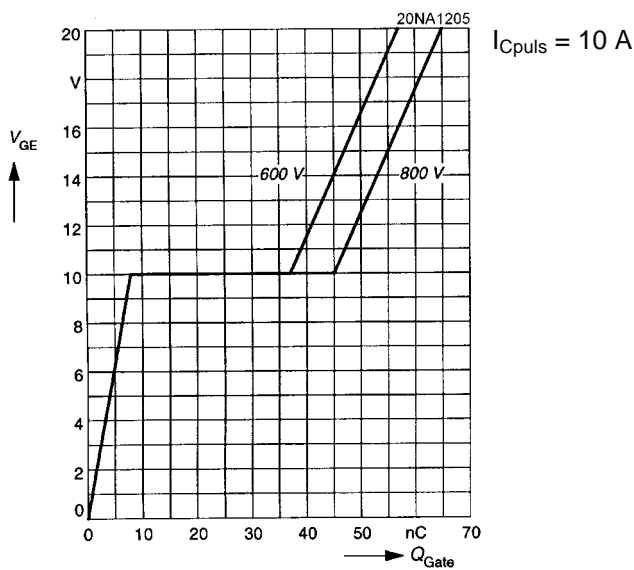


Fig. 5 Typ. gate charge characteristic

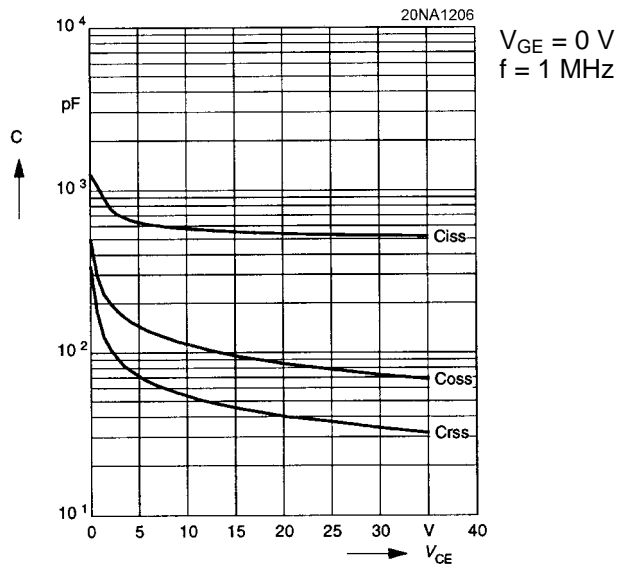


Fig. 6 Typ. capacitances vs. V_{CE}

MiniSKiiP 1200 V

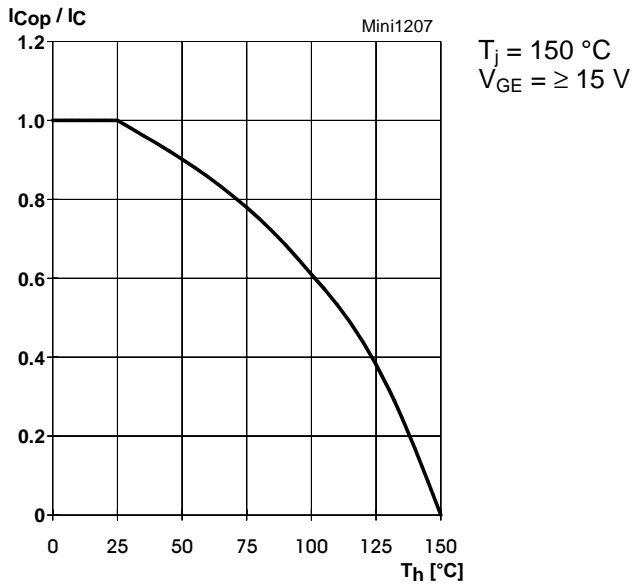


Fig. 7 Rated current of the IGBT $I_{COp} / I_C = f(T_h)$

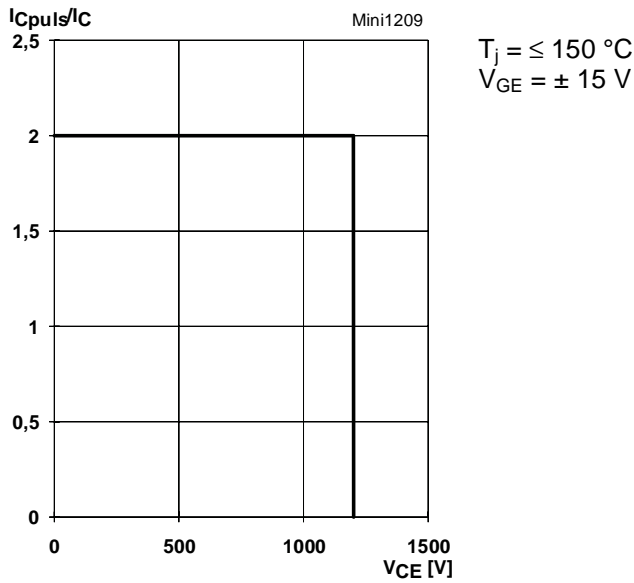


Fig. 9 Turn-off safe operating area (RBSOA) of the IGBT

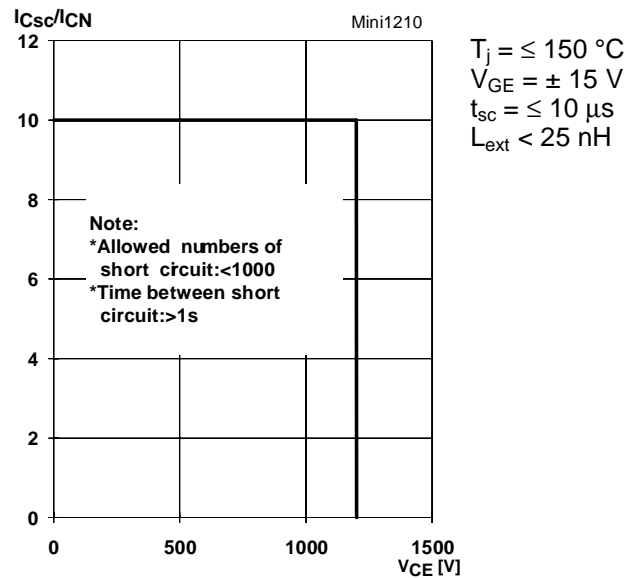


Fig. 10 Safe operating area at short circuit of the IGBT

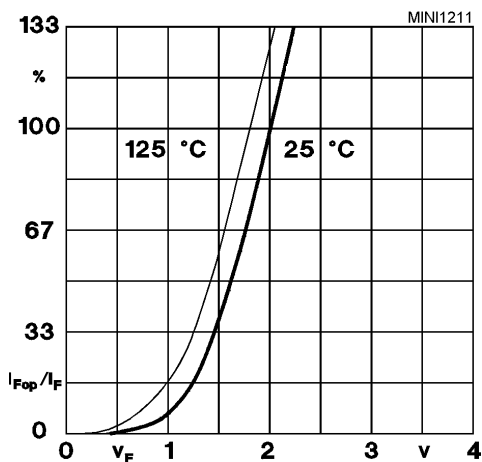


Fig. 11 Typ. freewheeling diode forward characteristic

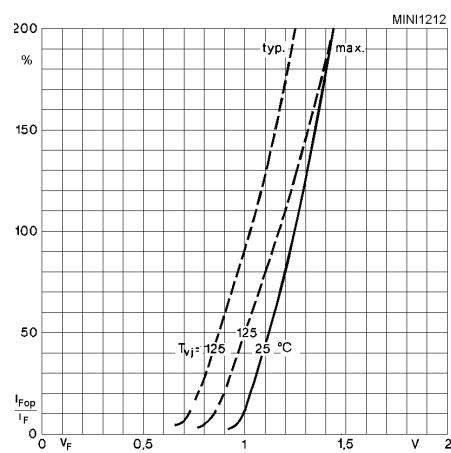


Fig. 12 Forward characteristic of the input bridge diode

MiniSKiiP 2

SKiiP 22 NAB 06 ...
SKiiP 21 NAB 12...

Circuit
Case M2
Layout and connections for the
customer's printed circuit board
Note: The shunts are available
only by option I

