

SKiiP 31 NAB 12

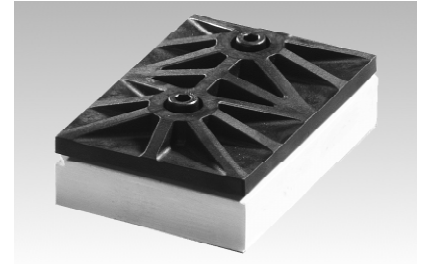
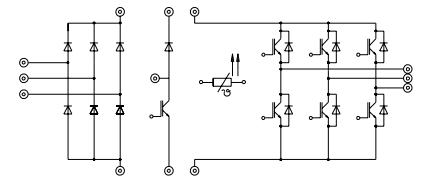
Absolute Maximum Ratings		Values	Units
Symbol	Conditions ¹⁾		
Inverter	(Chopper see SKiiP 22 NAB 12)		
V_{CES}		1200	V
V_{GES}		± 20	V
I_C	$T_{heatsink} = 25 / 80 \text{ }^\circ\text{C}$	45 / 30	A
I_{CM}	$t_p < 1 \text{ ms}; T_{heatsink} = 25 / 80 \text{ }^\circ\text{C}$	90 / 60	A
$I_F = -I_C$	$T_{heatsink} = 25 / 80 \text{ }^\circ\text{C}$	38 / 26	A
$I_{FM} = -I_{CM}$	$t_p < 1 \text{ ms}; T_{heatsink} = 25 / 80 \text{ }^\circ\text{C}$	76 / 52	A
Bridge Rectifier			
V_{RRM}		1500	V
I_D	$T_{heatsink} = 80 \text{ }^\circ\text{C}$	35	A
I_{FSM}	$t_p = 10 \text{ ms}; \sin. 180^\circ, T_j = 25 \text{ }^\circ\text{C}$	700	A
I^2t	$t_p = 10 \text{ ms}; \sin. 180^\circ, T_j = 25 \text{ }^\circ\text{C}$	2400	A ² s
T_j		$-40 \dots +150$	$^\circ\text{C}$
T_{stg}		$-40 \dots +125$	$^\circ\text{C}$
V_{isol}	AC, 1 min.	2500	V

Characteristics		min.	typ.	max.	Units
Symbol	Conditions ¹⁾				
IGBT - Inverter					
V _{CEsat}	$I_C = 30\text{ A}$ $T_j = 25\text{ (125)}\text{ }^\circ\text{C}$ $V_{CC} = 600\text{ V}; V_{GE} = \pm 15\text{ V}$ $I_C = 30\text{ A}; T_j = 125\text{ }^\circ\text{C}$ $R_{gon} = R_{goff} = 39\text{ }\Omega$ inductive load	–	2,5(3,1)	3,0(3,7)	V
t _{d(on)}		–	55	110	ns
t _r		–	55	110	ns
t _{d(off)}		–	400	600	ns
t _f		–	45	90	ns
E _{on} + E _{off}		–	7,8	–	mJ
C _{ies}	V _{CE} = 25 V; V _{GE} = 0 V, 1 MHz	–	2,0	–	nF
R _{thjh}	per IGBT	–	–	0,7	K/W
IGBT - Chopper *					
V _{CEsat}	$I_C = 15\text{ A}$ $T_j = 25\text{ (125)}\text{ }^\circ\text{C}$ $V_{CC} = 600\text{ V}; V_{GE} = \pm 15\text{ V}$ $I_C = 15\text{ A}; T_j = 125\text{ }^\circ\text{C}$ $R_{gon} = R_{goff} = 82\text{ }\Omega$ inductive load	–	2,5(3,1)	3,0(3,7)	V
t _{d(on)}		–	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	–	mJ
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 (Diode ²⁾ - Chopper see SKiiP 22 NAB 12)					
V _F = V _{EC}	$I_F = 25\text{ A}$ $T_j = 25\text{ (125)}\text{ }^\circ\text{C}$ $T_j = 125\text{ }^\circ\text{C}$ $T_j = 125\text{ }^\circ\text{C}$ $I_F = 25\text{ A}, V_R = -600\text{ V}$ $dI_F/dt = -500\text{ A}/\mu\text{s}$ $V_{GE} = 0\text{ V}, T_j = 125\text{ }^\circ\text{C}$ per diode	–	2,0(1,8)	2,5(2,3)	V
V _{TO}		–	1,0	1,2	V
r _T		–	32	44	mΩ
I _{RRM}		–	25	–	A
Q _{rr}		–	4,5	–	μC
E _{off}		–	1,0	–	mJ
R _{thjh}		–	–	1,2	K/W
Diode - Rectifier					
V _F	$I_F = 35\text{ A}, T_j = 25\text{ }^\circ\text{C}$ per diode	–	1,2	–	V
R _{thjh}		–	–	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 – 9		M3		

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

MiniSKiiP 3 SEMIKRON integrated intelligent Power SKiiP 31 NAB 12 3-phase bridge rectifier + braking chopper + 3-phase bridge inverter

Case M3



UL recognized file no. E63532

- specification of temperature sensor see part A
- common characteristics B 16 – 4

Options

- also available with powerful chopper. For characteristics please refer to Inverter IGBT

- 1) $T_{heatsink} = 25 \text{ }^\circ\text{C}$, unless otherwise specified
- 2) CAL = Controlled Axial Lifetime Technology (soft and fast recovery)

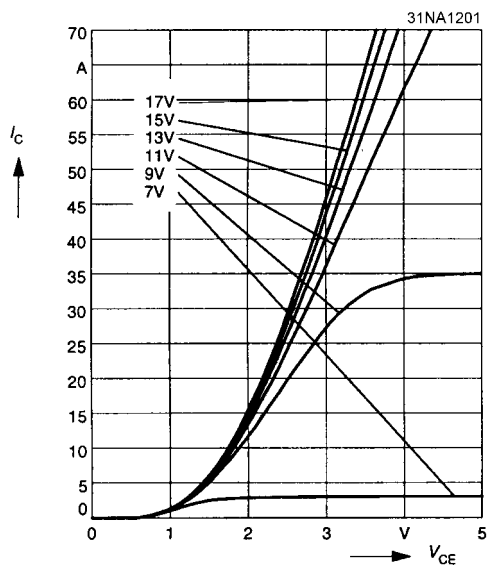


Fig. 1 Typ. output characteristic, $t_p = 80 \mu s$; $25^\circ C$

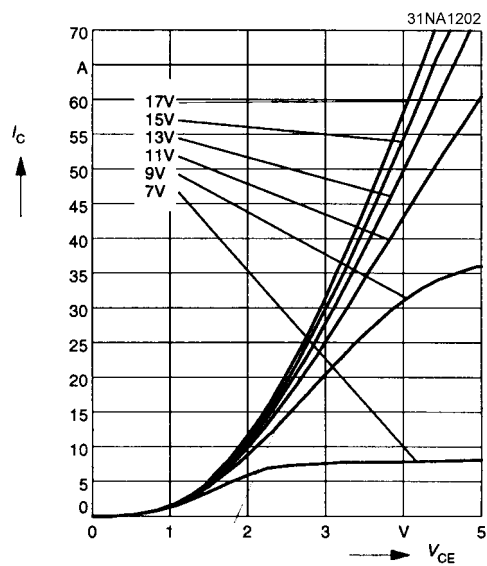


Fig. 2 Typ. output characteristic, $t_p = 80 \mu s$; $125^\circ C$

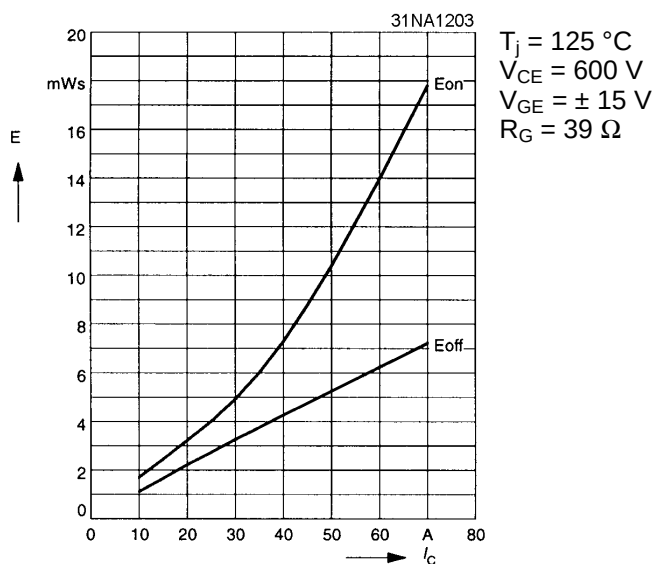


Fig. 3 Turn-on /-off energy = $f(I_C)$

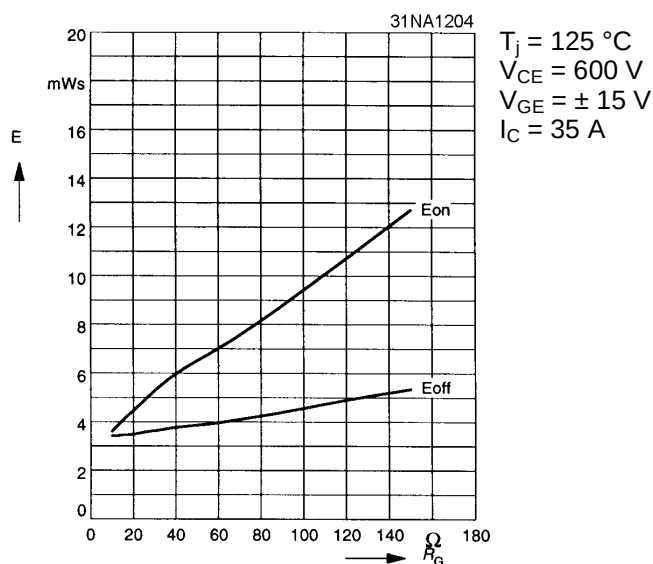


Fig. 4 Turn-on /-off energy = $f(R_G)$

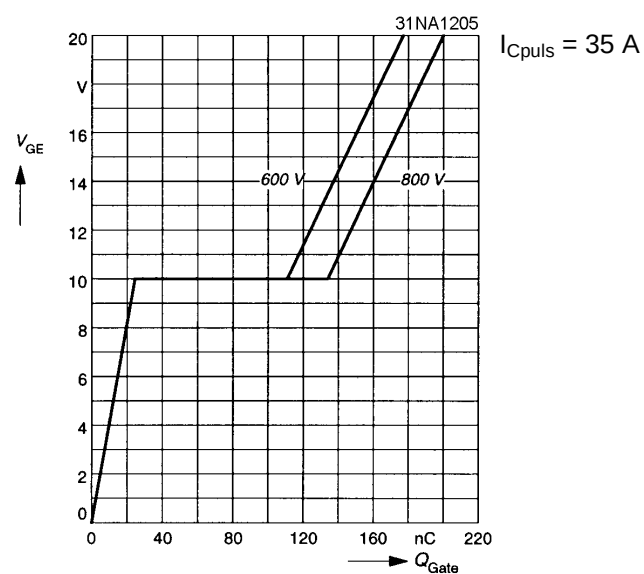


Fig. 5 Typ. gate charge characteristic

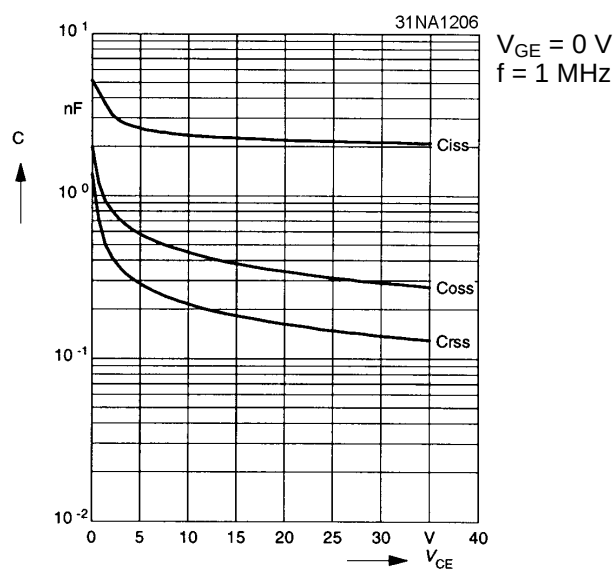


Fig. 6 Typ. capacitances vs. V_{CE}

MiniSKiiP 1200 V

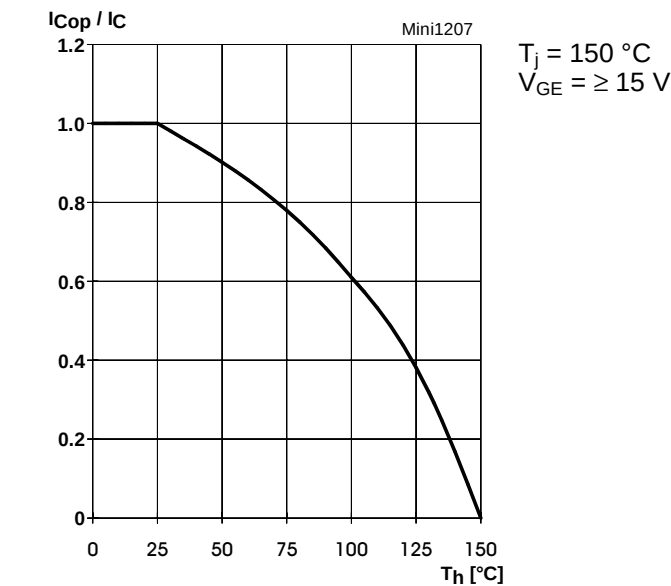


Fig. 7 Rated current of the IGBT $I_{COP} / I_C = f(T_h)$

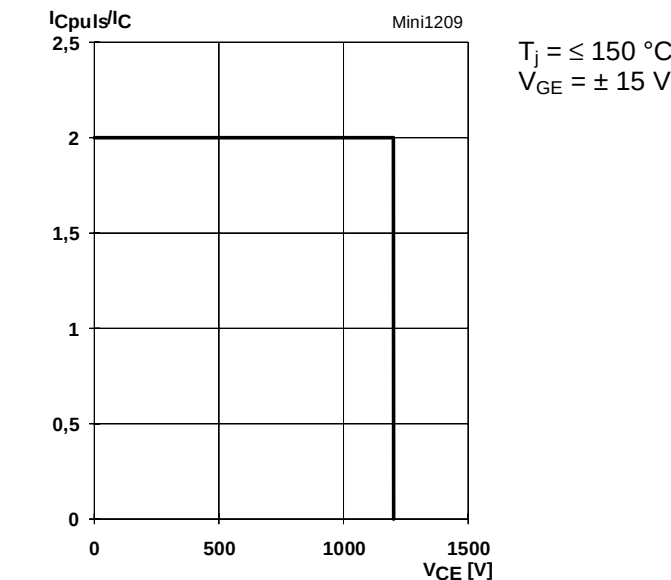


Fig. 9 Turn-off safe operating area (RBSOA) of the IGBT

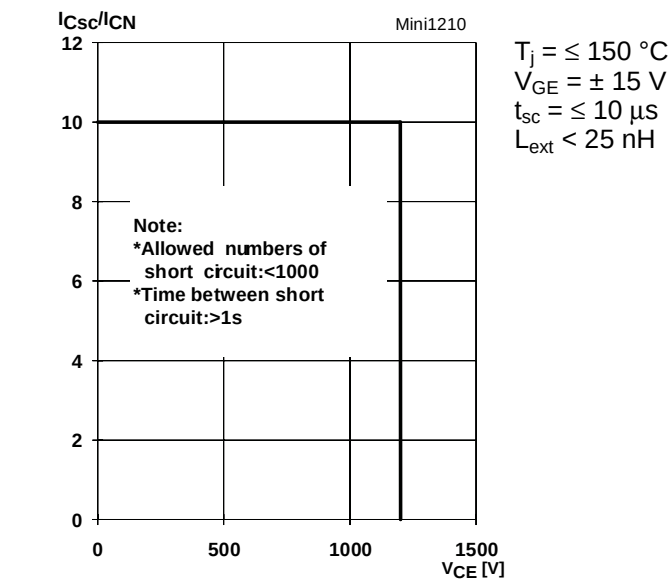


Fig. 10 Safe operating area at short circuit of the IGBT

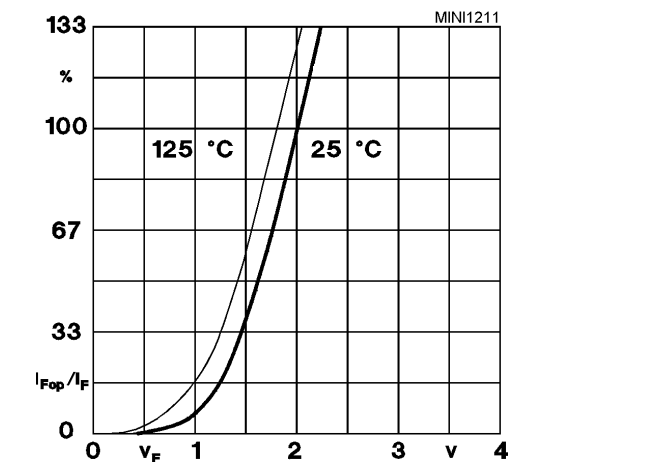


Fig. 11 Typ. freewheeling diode forward characteristic

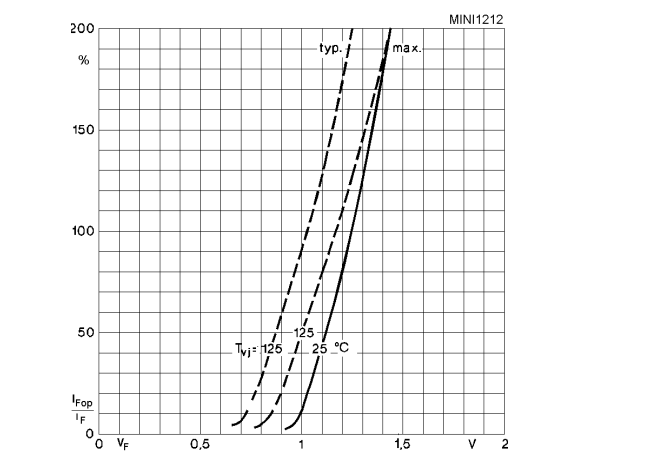


Fig. 12 Forward characteristic of the input bridge diode

SKiiP 30 NAB 06
SKiiP 31 NAB 06
SKiiP 32 NAB 06
SKiiP 30 NAB 12
SKiiP 31 NAB 12
SKiiP 32 NAB 12

Circuit
Case M3
Layout and connections for the
customer's printed circuit board

