

SKiiP 31 NAB 12

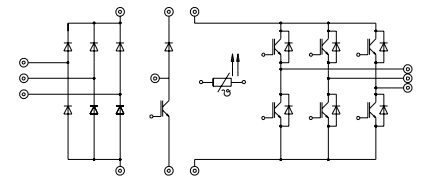
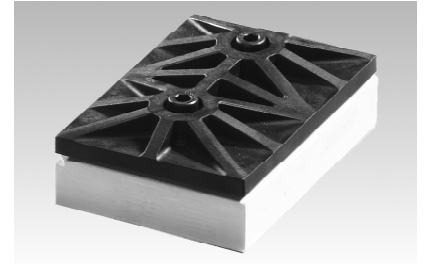
Absolute Maximum Ratings		Values	Units
Symbol	Conditions ¹⁾		
Inverter	(Chopper see SKiiP 22 NAB 12)		
V_{CES}		1200	V
V_{GES}		± 20	V
I_C	$T_{\text{heatsink}} = 25 / 80 \text{ }^\circ\text{C}$	45 / 30	A
I_{CM}	$t_p < 1 \text{ ms}; T_{\text{heatsink}} = 25 / 80 \text{ }^\circ\text{C}$	90 / 60	A
$I_F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

Characteristics		min.	typ.	max.	Units
Symbol	Conditions ¹⁾				
IGBT - Inverter					
V_{CEsat}	$I_C = 30 \text{ A}$ $T_j = 25 (125) \text{ }^\circ\text{C}$	-	2,5(3,1)	3,0(3,7)	V
$t_{d(on)}$	$V_{CC} = 600 \text{ V}; V_{GE} = \pm 15 \text{ V}$	-	55	110	ns
t_r	$I_C = 30 \text{ A}; T_j = 125 \text{ }^\circ\text{C}$	-	55	110	ns
$t_{d(off)}$	$R_{gon} = R_{goff} = 39 \text{ }^\Omega$	-	400	600	ns
t_f	inductive load	-	45	90	ns
$E_{on} + E_{off}$		-	7,8	-	mJ
C_{ies}	$V_{CE} = 25 \text{ V}; V_{GE} = 0 \text{ V}, 1 \text{ MHz}$	-	2,0	-	nF
R_{thjh}	per IGBT	-	-	0,7	K/W
IGBT - Chopper *					
V_{CEsat}	$I_C = 15 \text{ A}$ $T_j = 25 (125) \text{ }^\circ\text{C}$	-	2,5(3,1)	3,0(3,7)	V
$t_{d(on)}$	$V_{CC} = 600 \text{ V}; V_{GE} = \pm 15 \text{ V}$	-	55	110	ns
t_r	$I_C = 15 \text{ A}; T_j = 125 \text{ }^\circ\text{C}$	-	45	90	ns
$t_{d(off)}$	$R_{gon} = R_{goff} = 82 \text{ }^\Omega$	-	400	600	ns
t_f	inductive load	-	70	100	ns
$E_{on} + E_{off}$		-	4,0	-	mJ
C_{ies}	$V_{CE} = 25 \text{ V}; V_{GE} = 0 \text{ V}, 1 \text{ MHz}$	-	1,0	-	nF
R_{thjh}	per IGBT	-	-	1,4	K/W
Diode ²⁾ - Inverter (Diode ²⁾ - Chopper see SKiiP 22 NAB 12)					
$V_F = V_{EC}$	$I_F = 25 \text{ A}$ $T_j = 25 (125) \text{ }^\circ\text{C}$	-	2,0(1,8)	2,5(2,3)	V
V_{TO}	$T_j = 125 \text{ }^\circ\text{C}$	-	1,0	1,2	V
r_T	$T_j = 125 \text{ }^\circ\text{C}$	-	32	44	m Ω
I_{RRM}	$I_F = 25 \text{ A}, V_R = - 600 \text{ V}$	-	25	-	A
Q_{rr}	$di_F/dt = - 500 \text{ A}/\mu\text{s}$	-	4,5	-	μC
E_{off}	$V_{GE} = 0 \text{ V}, T_j = 125 \text{ }^\circ\text{C}$	-	1,0	-	mJ
R_{thjh}	per diode	-	-	1,2	K/W
Diode - Rectifier					
V_F	$I_F = 35 \text{ A}, T_j = 25 \text{ }^\circ\text{C}$	-	1,2	-	V
R_{thjh}	per diode	-	-	1,6	K/W
Temperature Sensor					
R_{TS}	$T = 25 / 100 \text{ }^\circ\text{C}$		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⁾ $T_{\text{heatsink}} = 25 \text{ }^\circ\text{C}$, unless otherwise specified
- ²⁾ CAL = Controlled Axial Lifetime Technology (soft and fast recovery)

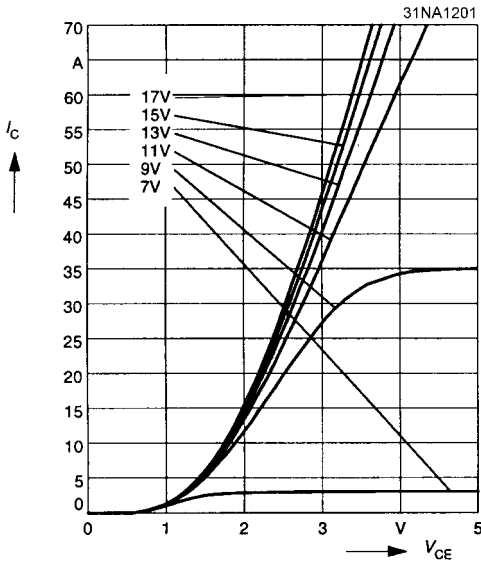


Fig. 1 Typ. output characteristic, $t_p = 80 \mu s$; $25^\circ C$

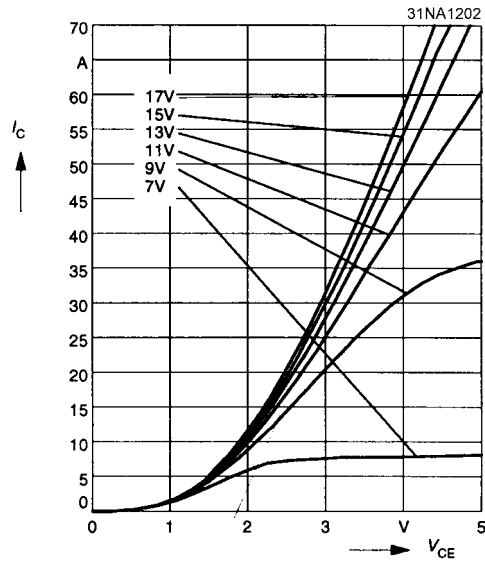


Fig. 2 Typ. output characteristic, $t_p = 80 \mu s$; $125^\circ C$

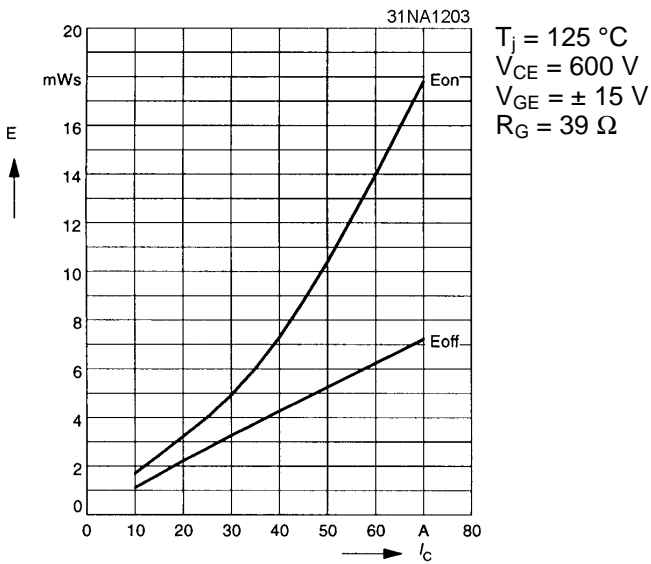


Fig. 3 Turn-on /-off energy = $f(I_c)$

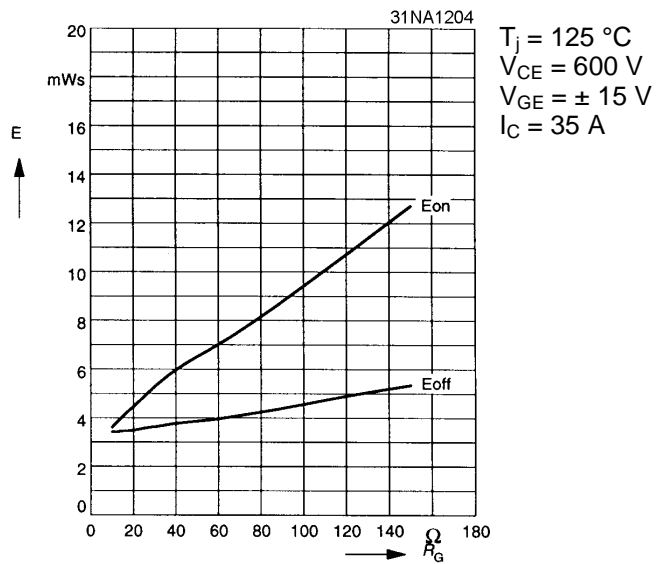


Fig. 4 Turn-on /-off energy = $f(R_g)$

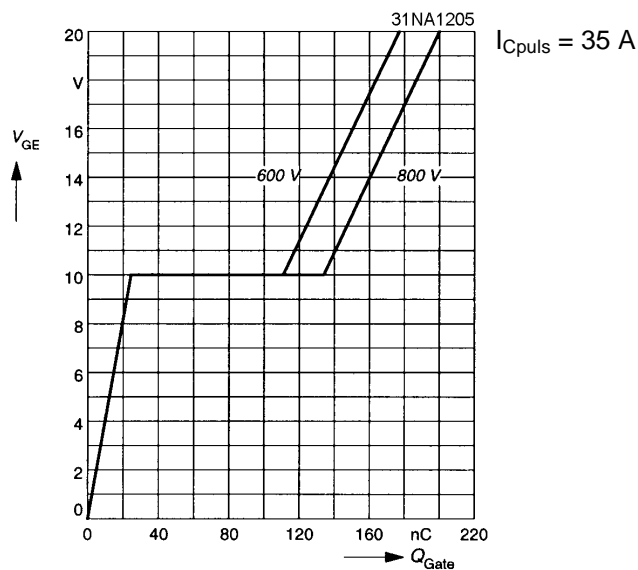


Fig. 5 Typ. gate charge characteristic

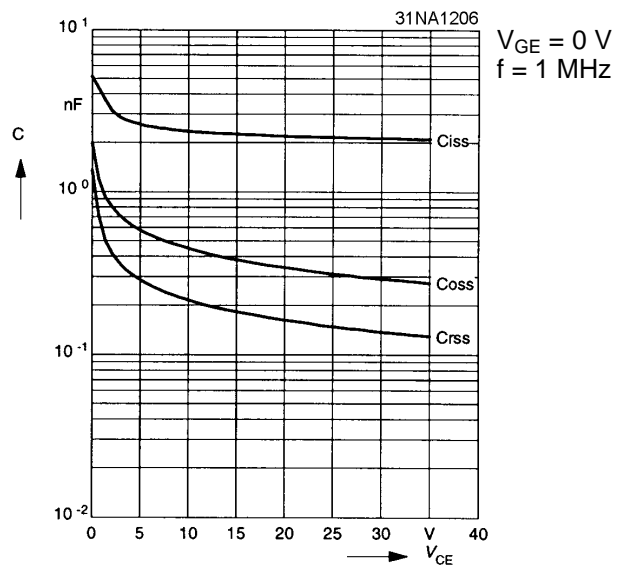


Fig. 6 Typ. capacitances vs. V_{CE}

MiniSKiiP 1200 V

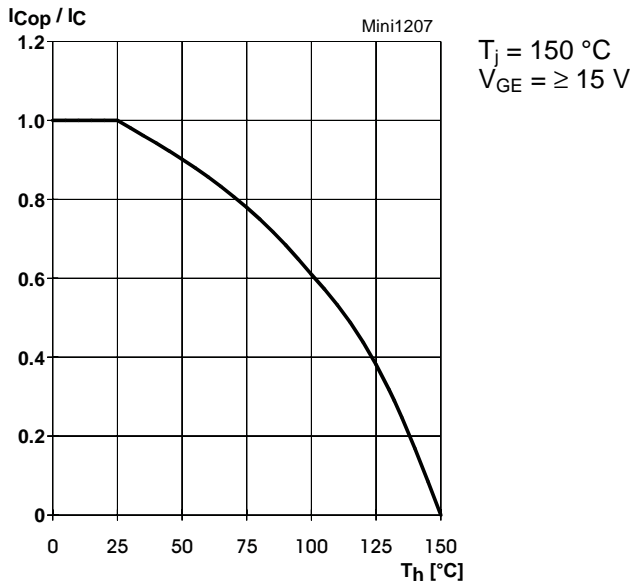


Fig. 7 Rated current of the IGBT $I_{C_{op}} / I_C = f(T_h)$

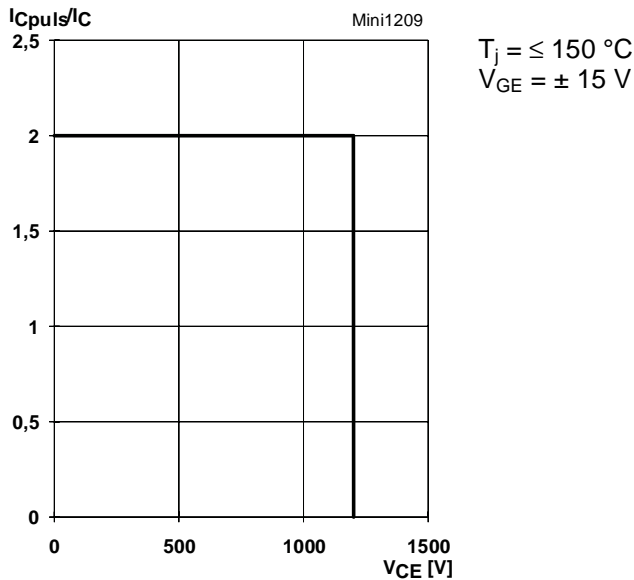


Fig. 9 Turn-off safe operating area (RBSOA) of the IGBT

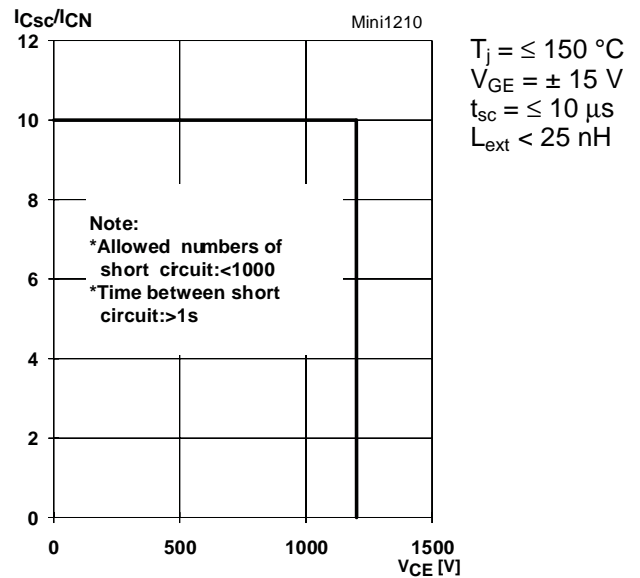


Fig. 10 Safe operating area at short circuit of the IGBT

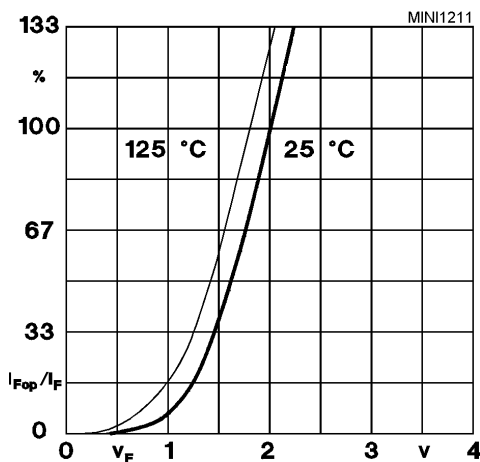


Fig. 11 Typ. freewheeling diode forward characteristic

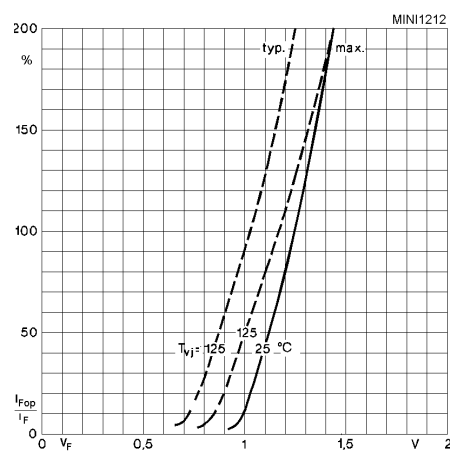


Fig. 12 Forward characteristic of the input bridge diode

MiniSKiiP 3

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

