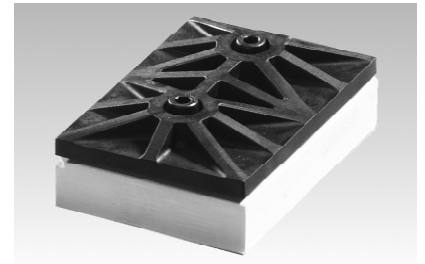


**SKiiP 31 NAB 12**

Absolute Maximum Ratings		
Symbol	Conditions <sup>1)</sup>	Units
Inverter	(Chopper see SKiiP 22 NAB 12)	
V <sub>CES</sub>		1200 V
V <sub>GES</sub>		± 20 V
I <sub>C</sub>	T <sub>heatsink</sub> = 25 / 80 °C	45 / 30 A
I <sub>CM</sub>	t <sub>p</sub> < 1 ms; T <sub>heatsink</sub> = 25 / 80 °C	90 / 60 A
I <sub>F</sub> = -I <sub>C</sub>	T <sub>heatsink</sub> = 25 / 80 °C	38 / 26 A
I <sub>FM</sub> = -I <sub>CM</sub>	t <sub>p</sub> < 1 ms; T <sub>heatsink</sub> = 25 / 80 °C	76 / 52 A
Bridge Rectifier		
V <sub>RRM</sub>		1500 V
I <sub>D</sub>	T <sub>heatsink</sub> = 80 °C	35 A
I <sub>FSM</sub>	t <sub>p</sub> = 10 ms; sin. 180°, T <sub>j</sub> = 25 °C	700 A
I <sup>2</sup> t	t <sub>p</sub> = 10 ms; sin. 180°, T <sub>j</sub> = 25 °C	2400 A <sup>2</sup> s
T <sub>j</sub>		- 40 ... + 150 °C
T <sub>stg</sub>		- 40 ... + 125 °C
V <sub>isol</sub>	AC, 1 min.	2500 V

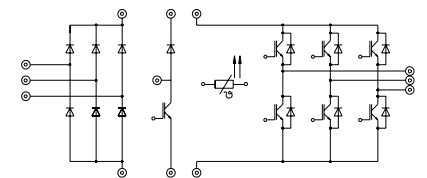
**MiniSKiiP 3**  
**SEMIKRON integrated intelligent Power**  
**SKiiP 31 NAB 12**  
**3-phase bridge rectifier +**  
**braking chopper +**  
**3-phase bridge inverter**

Case M3



Characteristics			min.	typ.	max.	Units
Symbol	Conditions <sup>1)</sup>					
<b>IGBT - Inverter</b>						
V <sub>CESat</sub>	I <sub>C</sub> = 30 A T <sub>j</sub> = 25 (125) °C		-	2,5(3,1)	3,0(3,7)	V
t <sub>d(on)</sub>	V <sub>CC</sub> = 600 V; V <sub>GE</sub> = ± 15 V		-	55	110	ns
t <sub>r</sub>		I <sub>C</sub> = 30 A; T <sub>j</sub> = 125 °C	-	55	110	ns
t <sub>d(off)</sub>	R <sub>gon</sub> = R <sub>goff</sub> = 39 Ω inductive load		-	400	600	ns
t <sub>f</sub>			-	45	90	ns
E <sub>on</sub> + E <sub>off</sub>			-	7,8	-	mJ
C <sub>ies</sub>	V <sub>CE</sub> = 25 V; V <sub>GE</sub> = 0 V, 1 MHz		-	2,0	-	nF
R <sub>thjh</sub>	per IGBT		-	-	0,7	K/W
<b>IGBT - Chopper *</b>						
V <sub>CESat</sub>	I <sub>C</sub> = 15 A T <sub>j</sub> = 25 (125) °C		-	2,5(3,1)	3,0(3,7)	V
t <sub>d(on)</sub>	V <sub>CC</sub> = 600 V; V <sub>GE</sub> = ± 15 V		-	55	110	ns
t <sub>r</sub>		I <sub>C</sub> = 15 A; T <sub>j</sub> = 125 °C	-	45	90	ns
t <sub>d(off)</sub>	R <sub>gon</sub> = R <sub>goff</sub> = 82 Ω inductive load		-	400	600	ns
t <sub>f</sub>			-	70	100	ns
E <sub>on</sub> + E <sub>off</sub>			-	4,0	-	mJ
C <sub>ies</sub>	V <sub>CE</sub> = 25 V; V <sub>GE</sub> = 0 V, 1 MHz		-	1,0	-	nF
R <sub>thjh</sub>	per IGBT		-	-	1,4	K/W
<b>Diode <sup>2)</sup> - Inverter (Diode <sup>2)</sup> - Chopper see SKiiP 22 NAB 12)</b>						
V <sub>F</sub> = V <sub>EC</sub>	I <sub>F</sub> = 25 A T <sub>j</sub> = 25 (125) °C		-	2,0(1,8)	2,5(2,3)	V
V <sub>TO</sub>	T <sub>j</sub> = 125 °C		-	1,0	1,2	V
r <sub>T</sub>	T <sub>j</sub> = 125 °C		-	32	44	mΩ
I <sub>RRM</sub>	I <sub>F</sub> = 25 A, V <sub>R</sub> = - 600 V		-	25	-	A
Q <sub>rr</sub>		di <sub>F</sub> /dt = - 500 A/μs	-	4,5	-	μC
E <sub>off</sub>	V <sub>GE</sub> = 0 V, T <sub>j</sub> = 125 °C		-	1,0	-	mJ
R <sub>thjh</sub>	per diode		-	-	1,2	K/W
<b>Diode - Rectifier</b>						
V <sub>F</sub>	I <sub>F</sub> = 35 A, T <sub>j</sub> = 25 °C		-	1,2	-	V
R <sub>thjh</sub>	per diode		-	-	1,6	K/W
<b>Temperature Sensor</b>						
R <sub>TS</sub>	T = 25 / 100 °C			1000 / 1670		Ω
<b>Mechanical Data</b>						
M <sub>1</sub>	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



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<sub>heatsink</sub> = 25 °C, unless otherwise specified  
 2) CAL = Controlled Axial Lifetime Technology (soft and fast recovery)

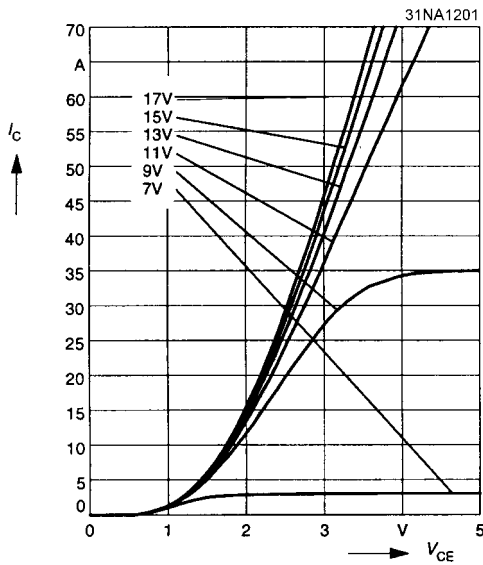


Fig. 1 Typ. output characteristic,  $t_p = 80 \mu s$ ;  $25^\circ C$

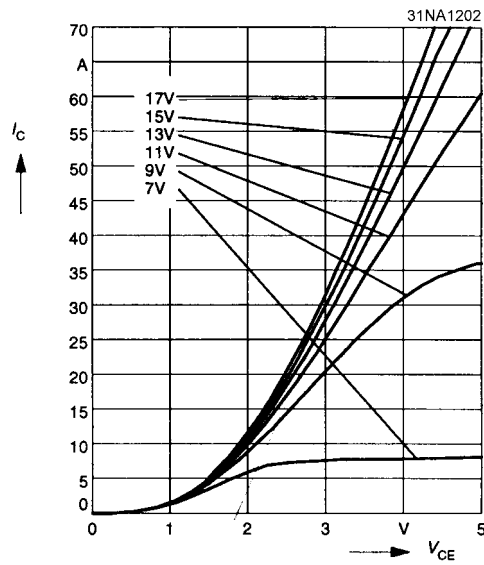


Fig. 2 Typ. output characteristic,  $t_p = 80 \mu s$ ;  $125^\circ C$

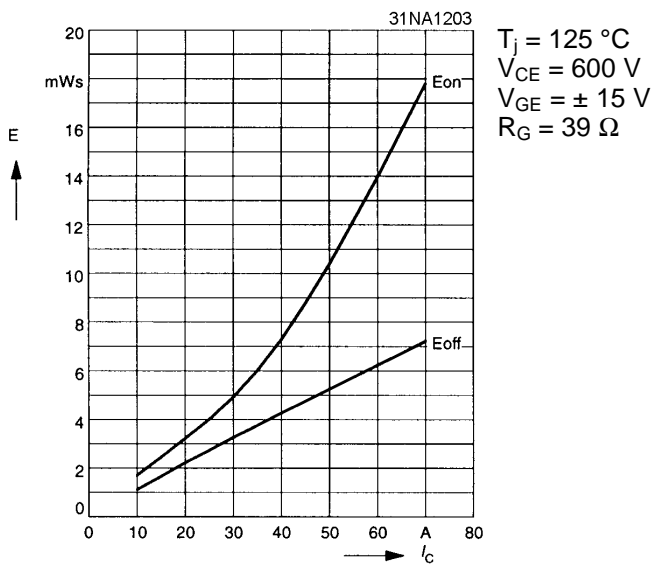


Fig. 3 Turn-on /-off energy =  $f(I_c)$

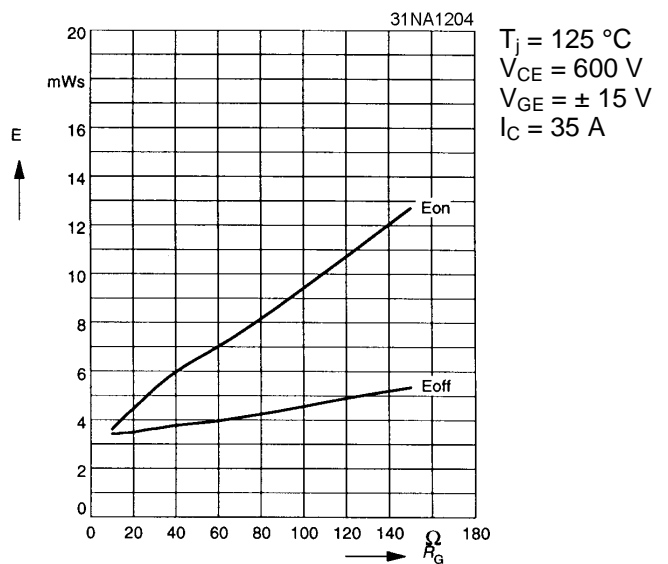


Fig. 4 Turn-on /-off energy =  $f(R_G)$

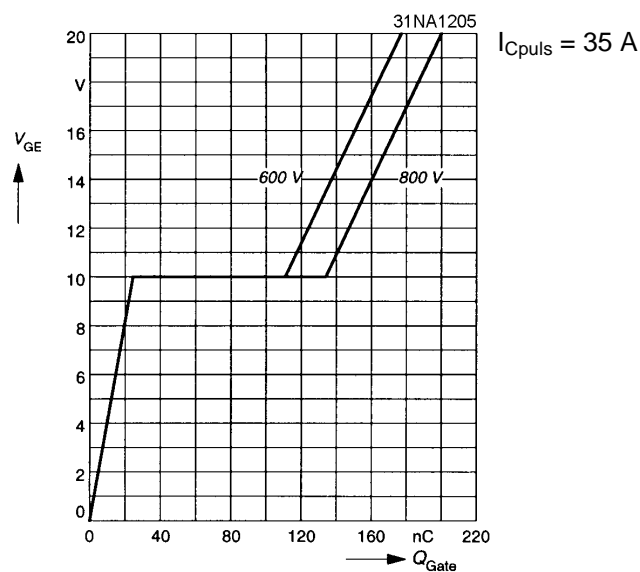


Fig. 5 Typ. gate charge characteristic

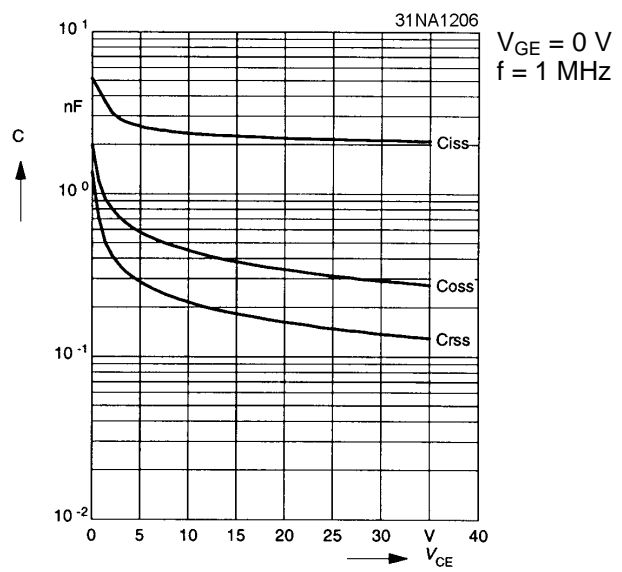


Fig. 6 Typ. capacitances vs.  $V_{CE}$

# MiniSKiiP 1200 V

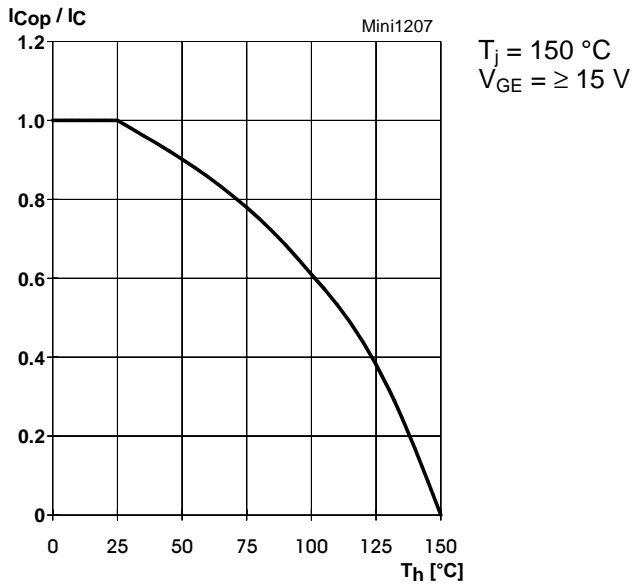


Fig. 7 Rated current of the IGBT  $I_{COp} / I_C = f(T_h)$

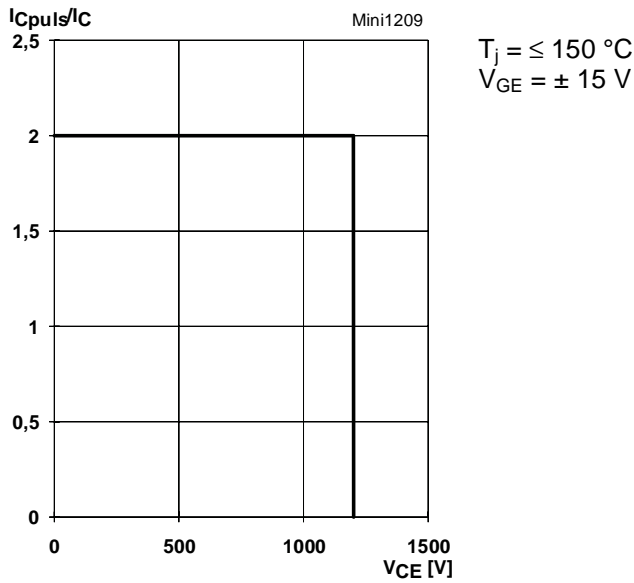


Fig. 9 Turn-off safe operating area (RBSOA) of the IGBT

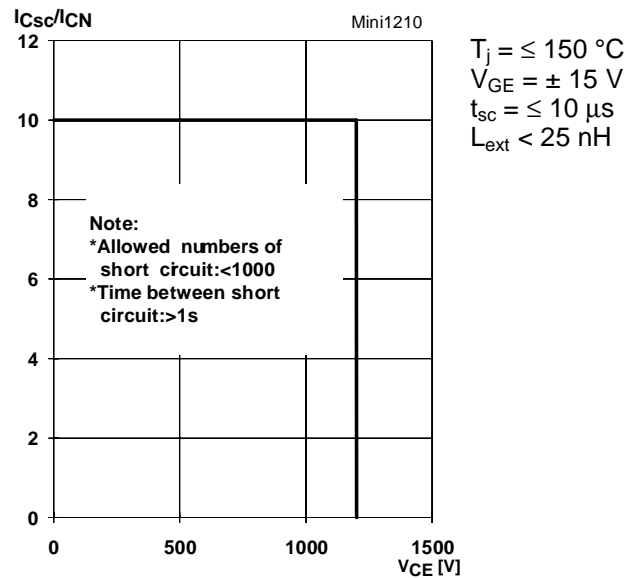


Fig. 10 Safe operating area at short circuit of the IGBT

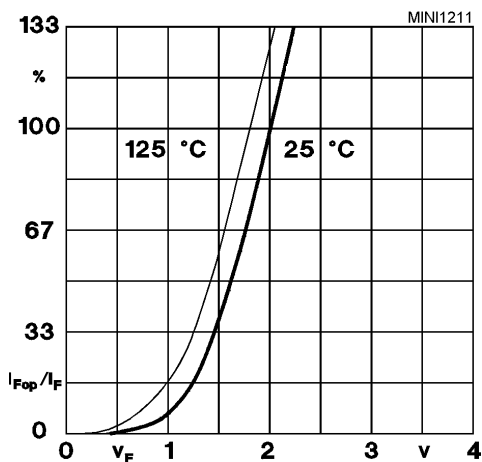


Fig. 11 Typ. freewheeling diode forward characteristic

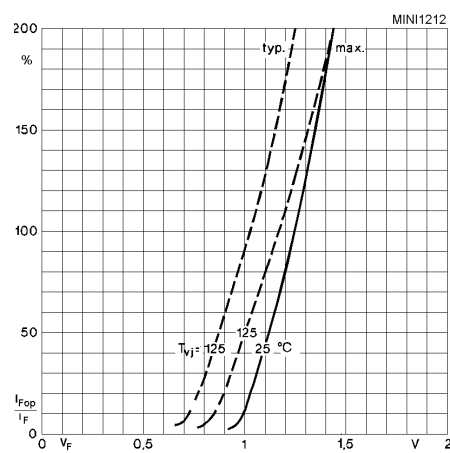


Fig. 12 Forward characteristic of the input bridge diode

