

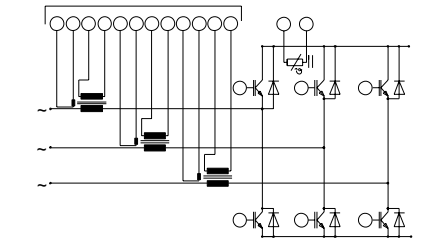
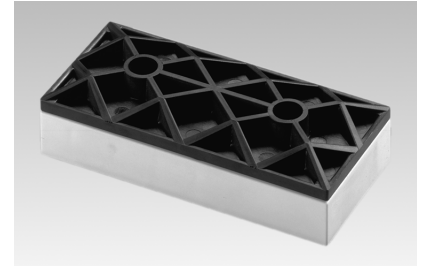
## SKiiP 83 AC 12 - SKiiP 83 AC 12 I

Absolute Maximum Ratings			
Symbol	Conditions <sup>1)</sup>	Values	Units
$V_{CES}$		1200	V
$V_{GES}$		$\pm 20$	V
$I_C$	$T_{heatsink} = 25 / 80 \text{ }^\circ\text{C}$	125 / 85	A
$I_{CM}$	$t_p < 1 \text{ ms}; T_{heatsink} = 25 / 80 \text{ }^\circ\text{C}$	250 / 170	A
$T_j$		$-40 \dots +150$	$^\circ\text{C}$
$T_{stg}$		$-40 \dots +125$	$^\circ\text{C}$
$V_{isol}$	AC, 1 min.	2500	V
Inverse Diode			
$I_F = -I_C$	$T_{heatsink} = 25 / 80 \text{ }^\circ\text{C}$	80 / 53	A
$I_{FM} = -I_{CM}$	$t_p < 1 \text{ ms}; T_{heatsink} = 25 / 80 \text{ }^\circ\text{C}$	160 / 106	A
$I_{FSM}$	$t_p = 10 \text{ ms}; \text{sin.}, T_j = 25 \text{ }^\circ\text{C}$	720	A
$I^2t$	$t_p = 10 \text{ ms}; \text{sin.}, T_j = 25 \text{ }^\circ\text{C}$	2600	$\text{A}^2\text{s}$

Characteristics						
Symbol	Conditions <sup>1)</sup>	min.	typ.	max.	Units	
<b>IGBT - Inverter</b>						
$V_{CEsat}$	$I_C = 100 \text{ A}, T_j = 25 (125) \text{ }^\circ\text{C}$	–	2,5(3,1)	3,0(3,7)	V	
$t_{d(on)}$	$V_{CC} = 600 \text{ V}; V_{GE} = \pm 15 \text{ V}$ $I_C = 100 \text{ A}; T_j = 125 \text{ }^\circ\text{C}$ $R_{gon} = R_{goff} = 11 \text{ }^\Omega$ inductive load	–	50	100	ns	
$t_r$		–	55	110	ns	
$t_{d(off)}$		–	400	600	ns	
$t_f$		–	70	100	ns	
$E_{on} + E_{off}$		–	27	–	mJ	
$C_{ies}$	$V_{CE} = 25 \text{ V}; V_{GE} = 0 \text{ V}, 1 \text{ MHz}$	–	6,6	–	nF	
$R_{thjh}$	per IGBT	–	–	0,25	K/W	
<b>Diode <sup>2)</sup> - Inverter</b>						
$V_F = V_{EC}$	$I_F = 75 \text{ A}, T_j = 25 (125) \text{ }^\circ\text{C}$	–	2,0(1,8)	2,5(2,3)	V	
$V_{TO}$	$T_j = 125 \text{ }^\circ\text{C}$	–	1,0	1,2	V	
$r_T$	$T_j = 125 \text{ }^\circ\text{C}$	–	11	15	m $\Omega$	
$I_{RRM}$	$I_F = 75 \text{ A}, V_R = -600 \text{ V}$ $di_F/dt = -800 \text{ A}/\mu\text{s}$ $V_{GE} = 0 \text{ V}, T_j = 125 \text{ }^\circ\text{C}$	–	45	–	A	
$Q_{rr}$		–	11	–	$\mu\text{C}$	
$E_{off}$		–	3,0	–	mJ	
$R_{thjh}$	per diode	–	–	0,8	K/W	
<b>Current sensor for three phase output ac current (SKiiP 83 AC 12 I)</b>						
$I_{p \text{ RMS}}$	Continuous current, $T = 100 \text{ }^\circ\text{C}, V_{suppl} = \pm 15 \text{ V}$	–	50	–	A	
$I_{pmax \text{ RMS}}$	$t \leq 2 \text{ s}$	–	–	80	A	
$I_{p \text{ peak}}$	$t \leq 10 \text{ } \mu\text{s}$	–	1000	–	A	
$R_{out}$	terminating resistance	–	50	–	$\Omega$	
$I_s \text{ RMS}$	rated sensor current at $I_p = 50 \text{ A}_{RMS}$	–	25	–	mA	
$I_p : I_s$	transfer ratio	–	1 : 2000	–		
Offset <sub>error</sub>	$I_p = 0 \text{ A}, T = -40 \dots 100 \text{ }^\circ\text{C}$	–	$\pm 0,2$	–	mA	
Linearity		–	0,1	–	%	
delay time	$I_p =$	–	$< 1$	–	$\mu\text{s}$	
		10 % – 80 %	–	$< 1$	–	$\mu\text{s}$
Bandwidth	90 % – 20 %	–	$< 1$	–	$\mu\text{s}$	
		–	0 – 100	(–3dB)	kHz	
<b>Temperature Sensor</b>						
$R_{TS}$	$T = 25 / 100 \text{ }^\circ\text{C}$	–	1000 / 1670	–	$\Omega$	
<b>Mechanical Data</b>						
$M_1$	case to heatsink, SI Units	2,5	–	3,5	Nm	
Case	mechanical outline see pages B 16 – 11 and B 16 – 12	–	M8	–		

## MiniSKiiP 8 SEMIKRON integrated intelligent Power SKiiP 83 AC 12 SKiiP 83 AC 12 I <sup>3)</sup> SKiiP 83 AC 12 IS <sup>4)</sup> IGBT 3-phase bridge inverter

Case M8



UL recognized file no. E63532

- more detailed characteristics of current sensors and temperature sensor please refer to part A
- common characteristics see page B 16 – 4

### Options

- also available with powerful free-wheeling diodes. Data sheet on request

- <sup>1)</sup>  $T_{heatsink} = 25 \text{ }^\circ\text{C}$ , unless otherwise specified
- <sup>2)</sup> CAL = Controlled Axial Lifetime Technology (soft and fast recovery)
- <sup>3)</sup> With integrated closed loop current sensors
- <sup>4)</sup> Extended current range, data sheet on request

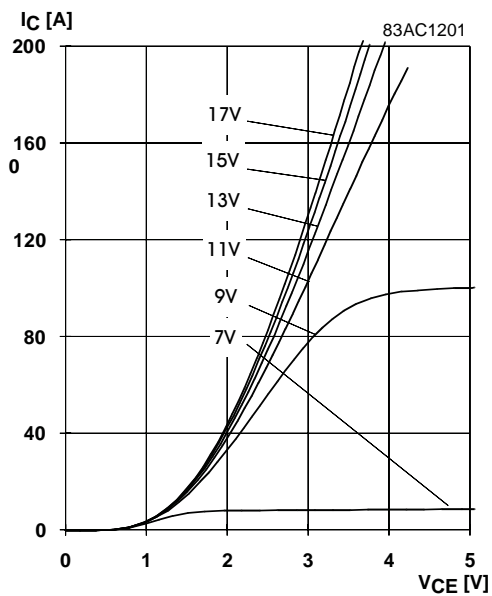


Fig. 1 Typ. output characteristic,  $t_p = 80 \mu s$ ;  $25 \text{ }^\circ\text{C}$

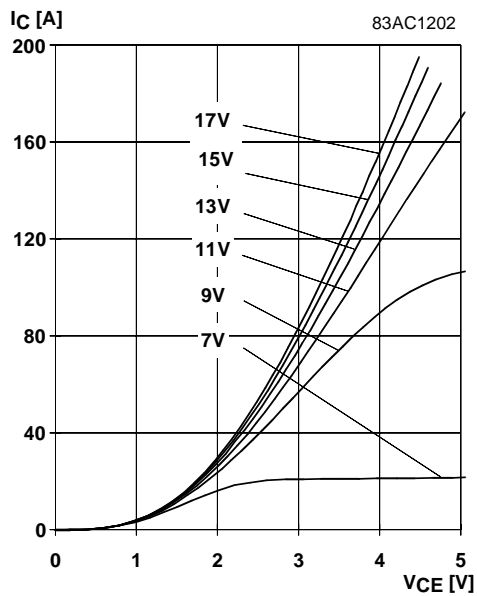


Fig. 2 Typ. output characteristic,  $t_p = 80 \mu s$ ;  $125 \text{ }^\circ\text{C}$

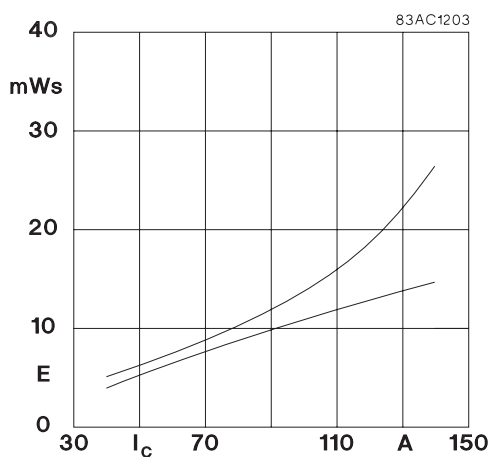


Fig. 3 Turn-on /-off energy =  $f(I_C)$

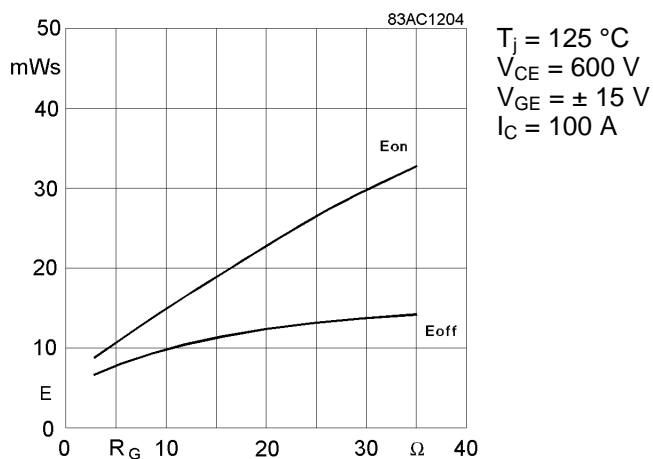


Fig. 4 Turn-on /-off energy =  $f(R_G)$

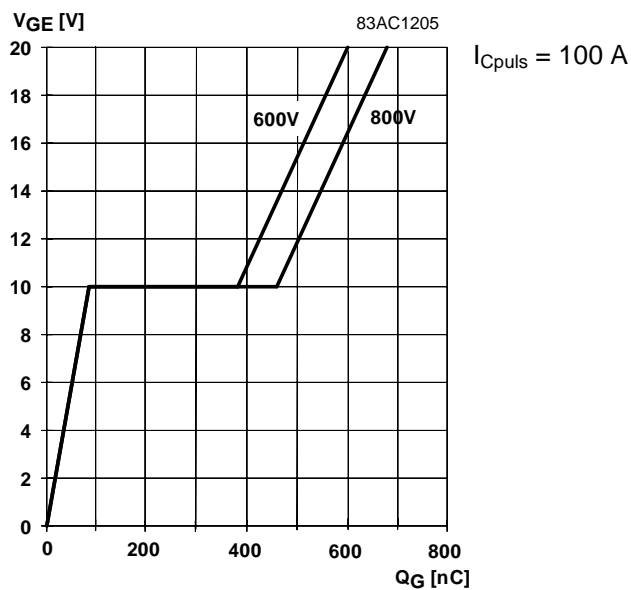


Fig. 5 Typ. gate charge characteristic

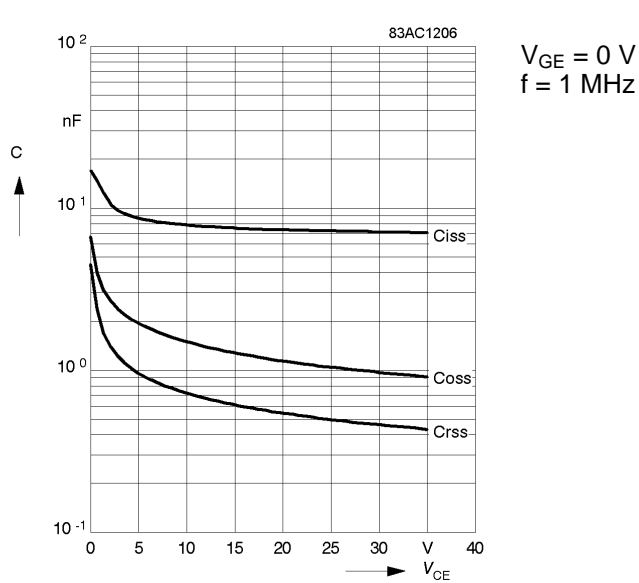


Fig. 6 Typ. capacitances vs.  $V_{CE}$

# MiniSKiiP 1200 V

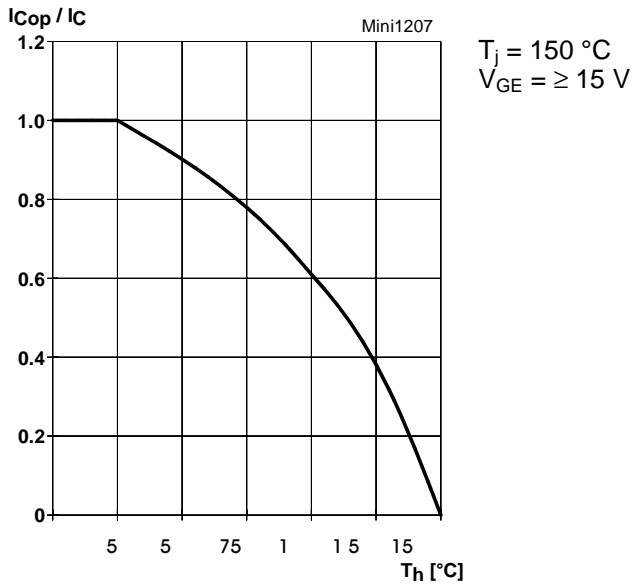


Fig. 7 Rated current of the IGBT  $I_{COp} / I_C = f(T_h)$

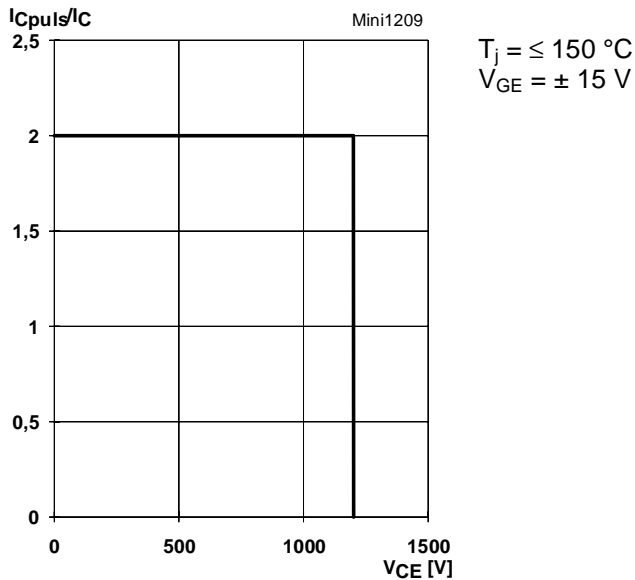


Fig. 9 Turn-off safe operating area (RBSOA) of the IGBT



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

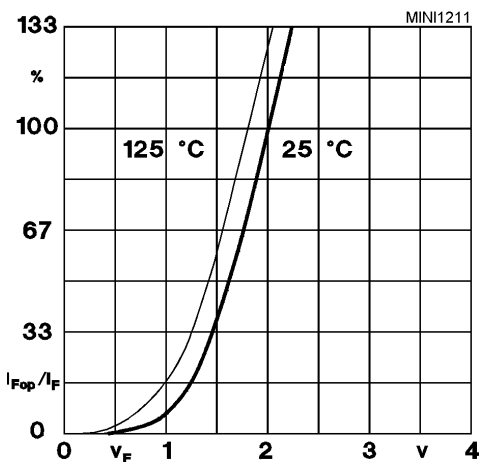


Fig. 11 Typ. freewheeling diode forward characteristic

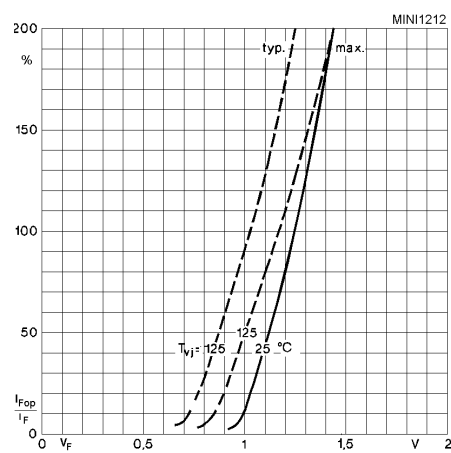


Fig. 12 Forward characteristic of the input bridge diode

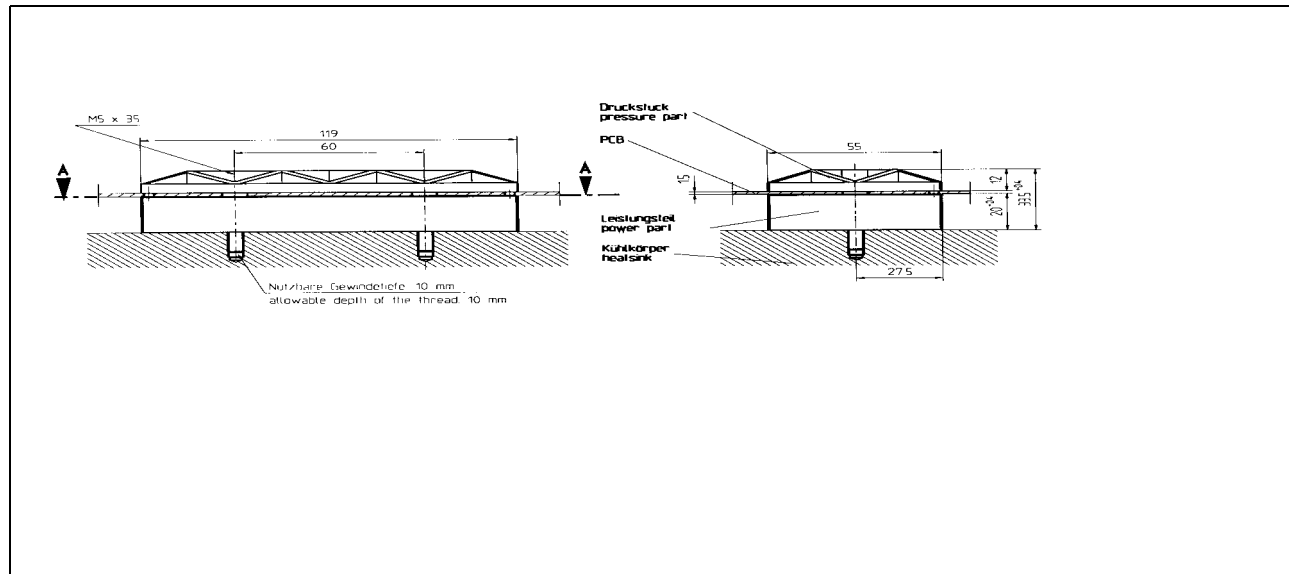
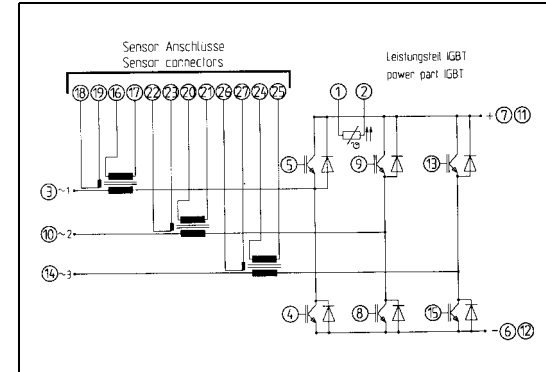
### MiniSKiiP 8

Inverter part

SKiiP 82 AC 06 ...  
 SKiiP 83 AC 06 ...  
 SKiiP 81 AC 12 ...  
 SKiiP 82 AC 12 ...  
 SKiiP 83 AC 12 ...

Circuit  
 Case M8

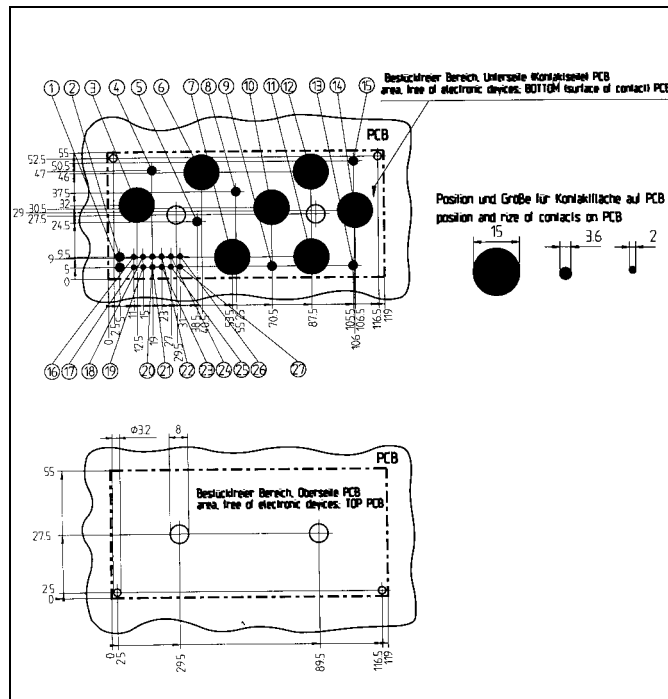
Note: The current sensors are available only by option I



## MiniSKiiP 8

Inverter part

SKiiP 82 AC 06 ... Case M8  
 SKiiP 83 AC 06 ... Layout and connections for the  
 SKiiP 81 AC 12 ... customer's printed circuit board  
 SKiiP 82 AC 12 ...  
 SKiiP 83 AC 12 ...



pin	connection	optional
1	T +	
2	T -	
3	~1 ET1 CB1	
4	GB1	
5	GT1	
6	- EB1 EB2 EB3	
7	+ CT1 CT2 CT3	
8	GB2	
9	GT2	
10	~2 ET2 CB2	
11	+ CT1 CT2 CT3	
12	- EB1 EB2 EB3	
13	GT3	
14	~3 ET3 CB3	
15	GB3	
16	K1 for ~1	X
17	K2 for ~1	X
18	S1 for ~1	X
19	S2 for ~1	X
20	K1 for ~2	X
21	K2 for ~2	X
22	S1 for ~2	X
23	S2 for ~2	X
24	K1 for ~3	X
25	K2 for ~3	X
26	S1 for ~3	X
27	S2 for ~3	X