SEMIKRON

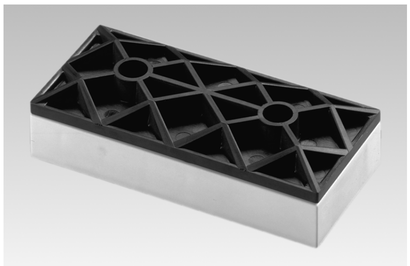
SKiiP 83 AC 06 - SKiiP 83 AC 06 I

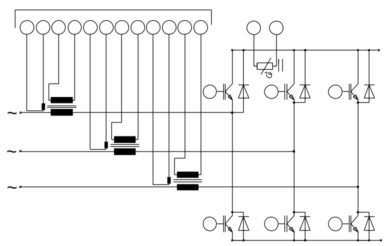
MiniSKiiP 8
SEMIKRON integrated intelligent Power
SKiiP 83 AC 06
SKiiP 83 AC 06 I 3)
IGBT
3-phase bridge inverter

Absolute Maximum Ratings			
Symbol	**Conditions** 1)	**Values**	**Units**
Inverter			
V_{CES}		600	V
V_{GES}		± 20	V
I_C	$T_{heatsink}$ = 25 / 80 °C	100 / 70	A
I_{CM}	t_p < 1 ms; $T_{heatsink}$ = 25 / 80 °C	200 / 140	A
$I_F = -I_C$	$T_{heatsink}$ = 25 / 80 °C	130 / 88	A
$I_{FM} = -I_{CM}$	t_p < 1 ms; $T_{heatsink}$ = 25 / 80 °C	260 / 186	A
T_j		– 40 . . . + 150	°C
T_{stg}		– 40 . . . + 125	°C
V_{isol}	AC, 1 min.	2500	V

Characteristics					
Symbol	**Conditions** 1)	**min.**	**typ.**	**max.**	**Units**
IGBT - Inverter					
V_{CEsat}	I_C = 100 A T_j = 25 (125) °C	–	2,1(2,2)	2,7(2,8)	V
$t_{d(on)}$	V_{CC} = 300 V; V_{GE} = ± 15 V	–	60	120	ns
t_r	I_C = 100 A; T_j = 125 °C	–	80	160	ns
$t_{d(off)}$	$R_{gon} = R_{goff}$ = 11 Ω	–	330	500	ns
t_f	inductive load	–	550	830	ns
$E_{on} + E_{off}$		–	15	–	mJ
C_{ies}	V_{CE} = 25 V; V_{GE} = 0 V, 1 MHz	–	5,6	–	nF
R_{thjh}	per IGBT	–	–	0,5	K/W
Diode 2) - Inverter					
$V_F = V_{EC}$	I_F = 100 A T_j = 25 (125) °C	–	1,5(1,45)	1,7(1,7)	V
V_{TO}	T_j = 125 °C	–	0,85	0,9	V
r_T	T_j = 125 °C	–	6	8	mΩ
I_{RRM}	I_F = 100 A, V_R = – 300 V	–	60	–	A
Q_{rr}	di_F/dt = – 800 A/µs	–	7,0	–	µC
E_{off}	V_{GE} = 0 V, T_j = 125 °C	–	3,0	–	mJ
R_{thjh}	per diode	–	–	0,75	K/W
Current sensor for three phase output ac current (SKiiP 83 AC 06 I)					
$I_{p\ RMS}$	Continuous current, T = 100 °C, V_{suppl} = ± 15 V	–	50	–	A
$I_{pmax\ RMS}$	t ≤ 2 s	–	–	80	A
$I_{p\ peak}$	t ≤ 10 µs	–	1000	–	A
R_{out}	terminating resistance	–	50	–	Ω
$I_{s\ RMS}$	rated sensor current at I_p = 50 A_{RMS}		25		mA
$I_p : I_s$	transfer ratio		1 : 2000		
Offset $_{error}$	I_P = 0 A, T = – 40 ... 100 °C	–	± 0,2	–	mA
Linearity		–	0,1	–	%
delay time	I_P = 10 % – 80 %	–	< 1	–	µs
	90 % – 20 %	–	< 1	–	µs
Bandwidth			0 – 100	(– 3dB)	kHz
Temperature Sensor					
R_{TS}	T = 25 / 100 °C		1000 / 1670		Ω
Mechanical Data					
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		

Case M8





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- more detailed characteristics of current sensors and temperature sensor please refer to part A
- common characteristics see page B 16 – 3

Options

- also available with faster IGBTs (type ... 063), data sheet on request

1) $T_{heatsink}$ = 25 °C, unless otherwise specified
2) CAL = Controlled Axial Lifetime Technology (soft and fast recovery)
3) With integrated closed loop current sensors

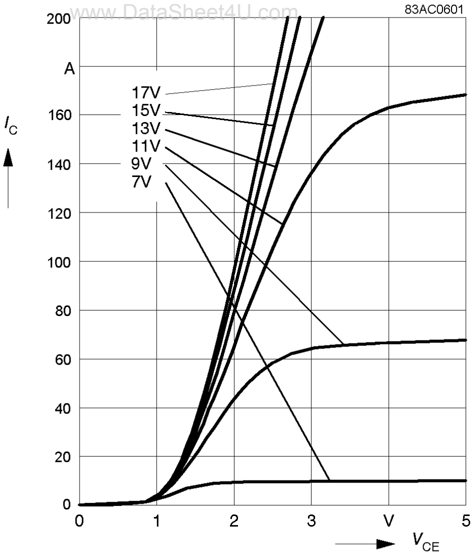


Fig. 1 Typ. output characteristic, t_p = 80 µs; 25 °C

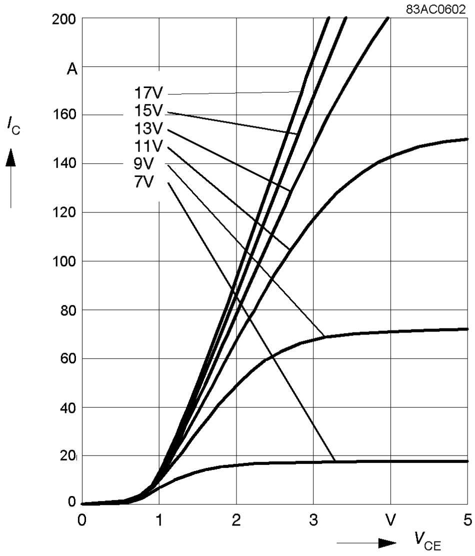
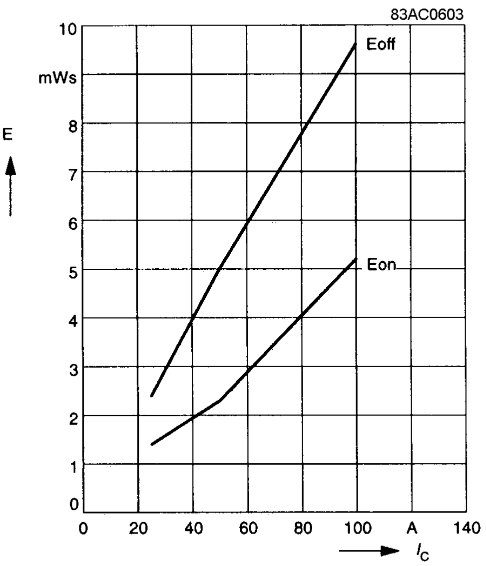
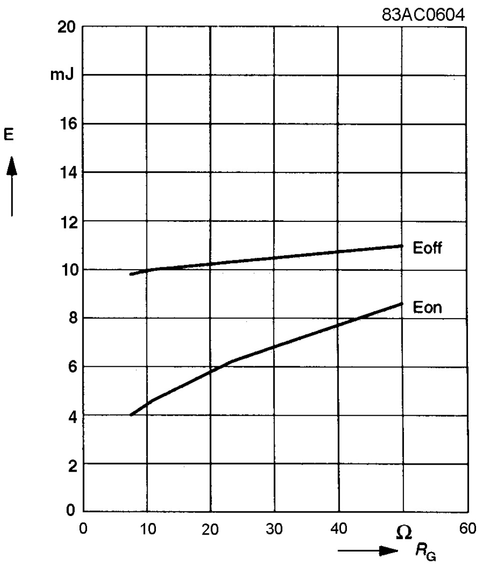


Fig. 2 Typ. output characteristic, t_p = 80 µs; 125 °C



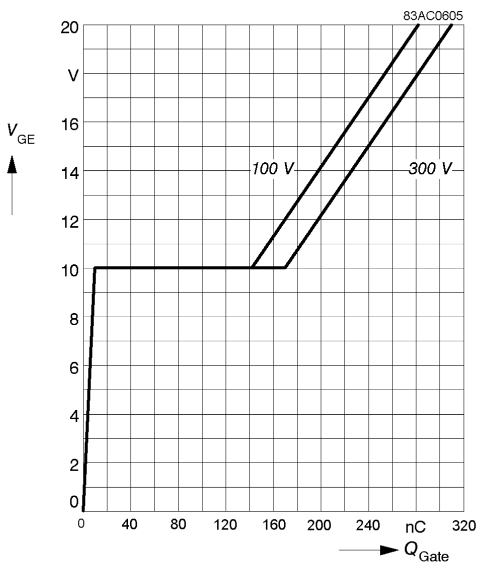
T_j = 125 °C
V_{CE} = 300 V
V_{GE} = ± 15 V
R_G = 11 Ω

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



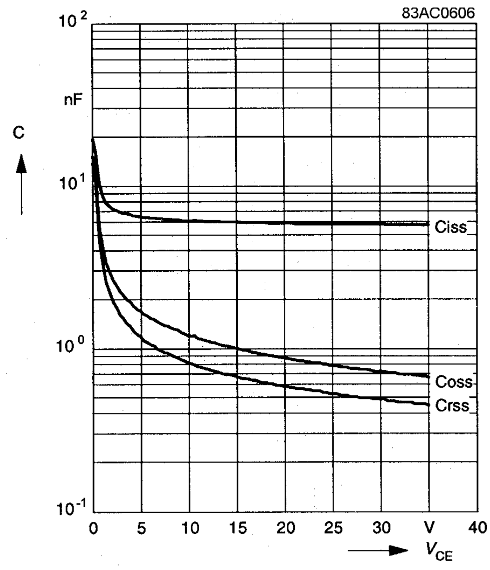
T_j = 125 °C
V_{CE} = 300 V
V_{GE} = ± 15 V
I_C = 100 A

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



I_{Cpuls} = 100 A

Fig. 5 Typ. gate charge characteristic

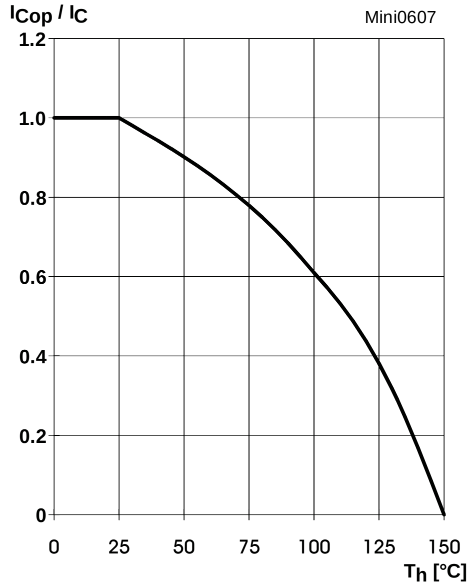


V_{GE} = 0 V
f = 1 MHz

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

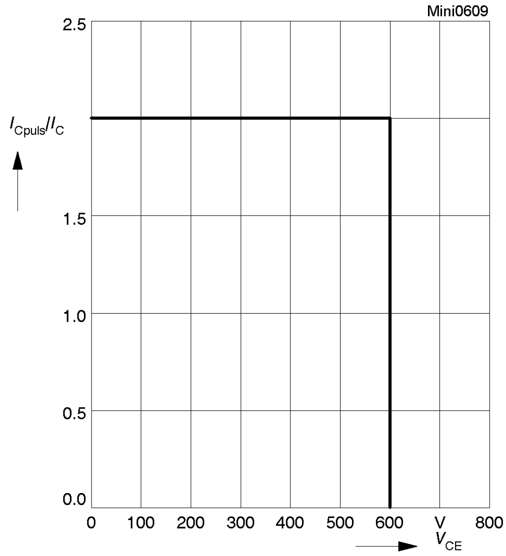
2. Common characteristics of MiniSKiiP

MiniSKiiP 600 V



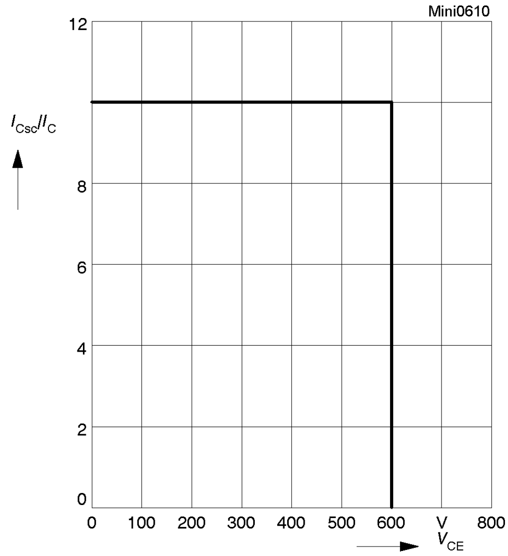
T_j = 150 °C
V_{GE} = ≥ 15 V

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



T_j = ≤ 150 °C
V_{GE} = ± 15 V

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



T_j = ≤ 150 °C
V_{GE} = ± 15 V
t_{sc} = ≤ 10 µs
L_{ext} < 25 nH

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

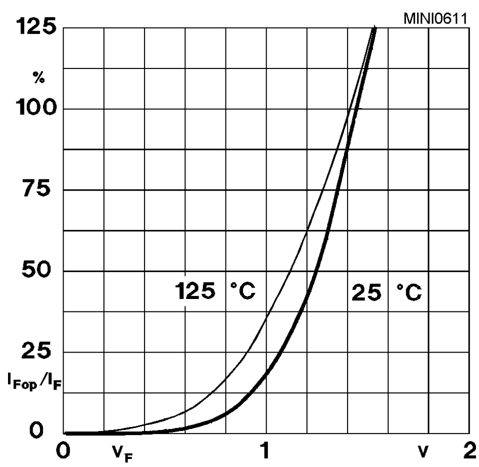


Fig. 11 Typ. freewheeling diode forward characteristic

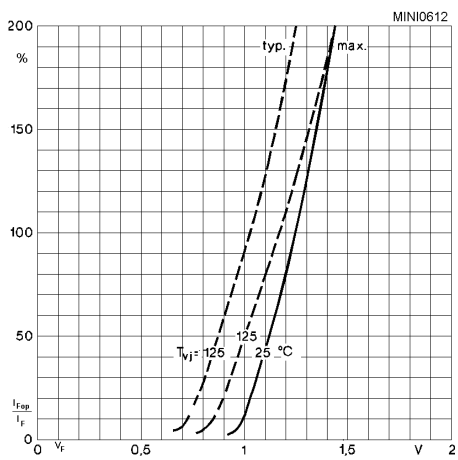


Fig. 12 Forward characteristic of the input bridge diode

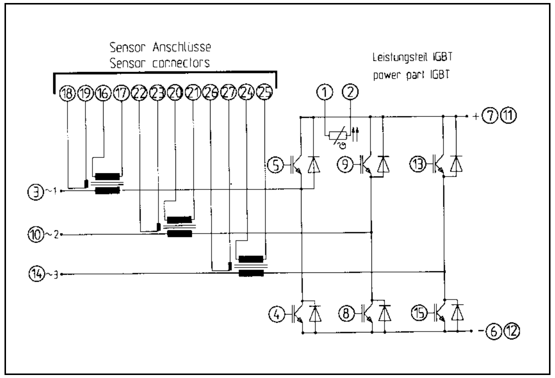
MiniSKiiP 8

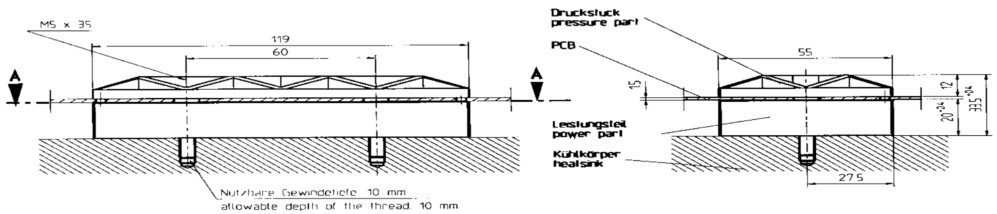
Inverter part

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

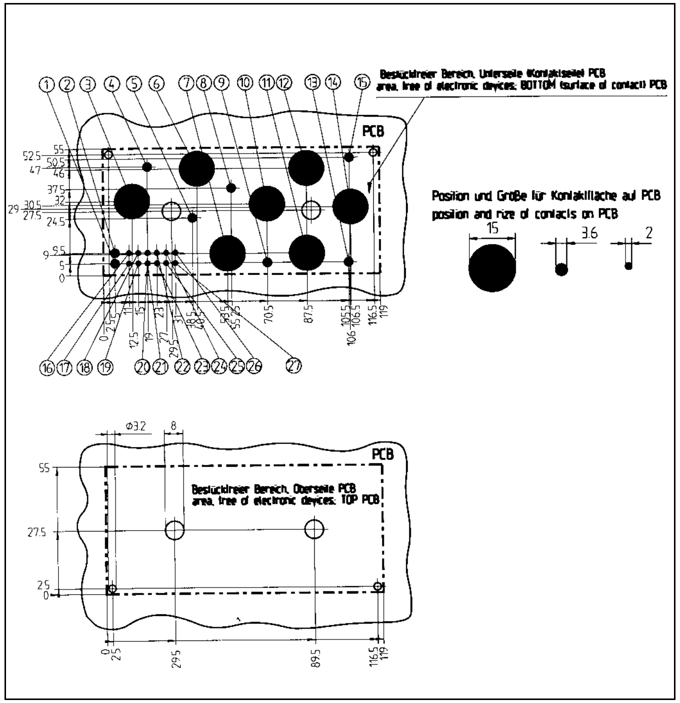




MiniSKiiP 8

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