SKiiP 31 NAB 06

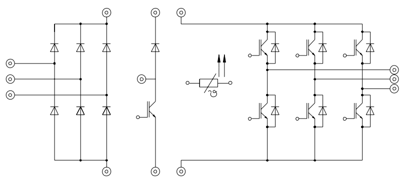
Absolute Maximum Ratings			
Symbol	**Conditions** [1]	**Values**	**Units**
Inverter			
V_{CES}		600	V
V_{GES}		± 20	V
I_C	$T_{heatsink}$ = 25 / 80 °C	50 / 35	A
I_{CM}	t_p < 1 ms; $T_{heatsink}$ = 25 / 80 °C	100 / 70	A
$I_F = -I_C$	$T_{heatsink}$ = 25 / 80 °C	57 / 38	A
$I_{FM} = -I_{CM}$	t_p < 1 ms; $T_{heatsink}$ = 25 / 80 °C	114 / 76	A
Bridge Rectifier			
V_{RRM}		800	V
I_D	$T_{heatsink}$ = 80 °C	25	A
I_{FSM}	t_p = 10 ms; sin. 180 °, T_j = 25 °C	370	A
I^2t	t_p = 10 ms; sin. 180 °, T_j = 25 °C	680	A^2s
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 = 50 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 = 50 A; T_j = 125 °C	–	80	160	ns
$t_{d(off)}$	$R_{gon} = R_{goff}$ = 22 Ω	–	330	500	ns
t_f	inductive load	–	550	830	ns
$E_{on} + E_{off}$		–	7,3	–	mJ
C_{ies}	V_{CE} = 25 V; V_{GE} = 0 V, 1 MHz	–	2,8	–	nF
R_{thjh}	per IGBT	–	–	1,0	K/W
IGBT - Chopper *					
V_{CEsat}	I_C = 30 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	–	50	100	ns
t_r	I_C = 30 A; T_j = 125 °C	–	80	160	ns
$t_{d(off)}$	$R_{gon} = R_{goff}$ = 33 Ω	–	250	370	ns
t_f	inductive load	–	500	750	ns
$E_{on} + E_{off}$		–	4,0	–	mJ
C_{ies}	V_{CE} = 25 V; V_{GE} = 0 V, 1 MHz	–	1,6	–	nF
R_{thjh}	per IGBT	–	–	1,4	K/W
Diode [2] - Inverter & Chopper					
$V_F = V_{EC}$	I_F = 50 A T_j = 25 (125) °C	–	1,45(1,4)	1,7(1,7)	V
V_{TO}	T_j = 125 °C	–	0,85	0,9	V
r_T	T_j = 125 °C	–	11	16	mΩ
I_{RRM}	I_F = 50 A, V_R = – 300 V	–	50	–	A
Q_{rr}	di_F/dt = – 800 A/µs	–	5,0	–	µC
E_{off}	V_{GE} = 0 V, T_j = 125 °C	–	1,5	–	mJ
R_{thjh}	per diode	–	–	1,2	K/W
Diode - Rectifier					
V_F	I_F = 25 A, T_j = 25 °C	–	1,2	–	V
R_{thjh}	per diode	–	–	2,6	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 06

MiniSKiiP 3
SEMIKRON integrated intelligent Power
SKiiP 31 NAB 06
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 see page B16–3

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)

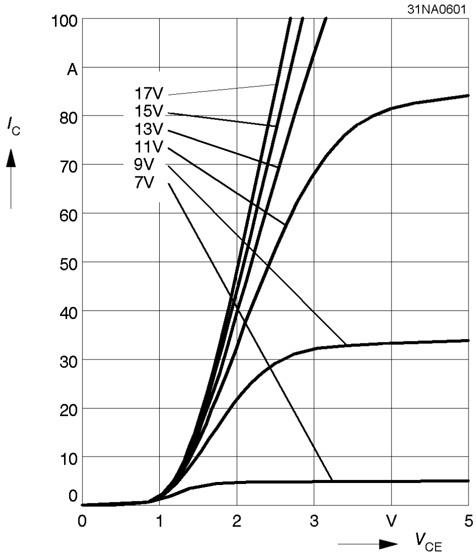


Fig. 1 Typ. output characteristic, t_p = 80 µs; 25 °C

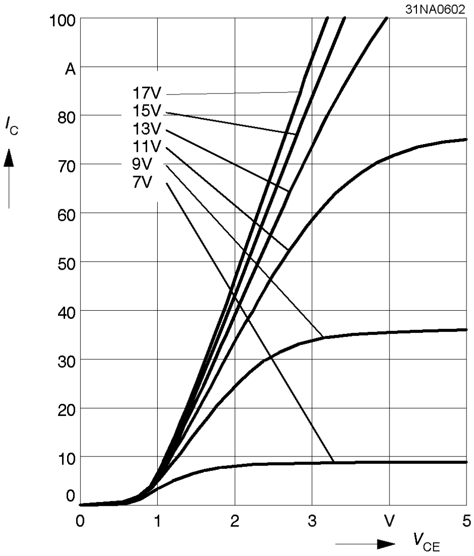
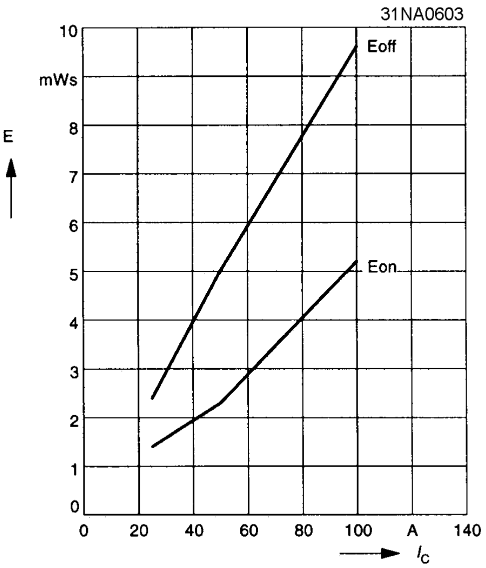
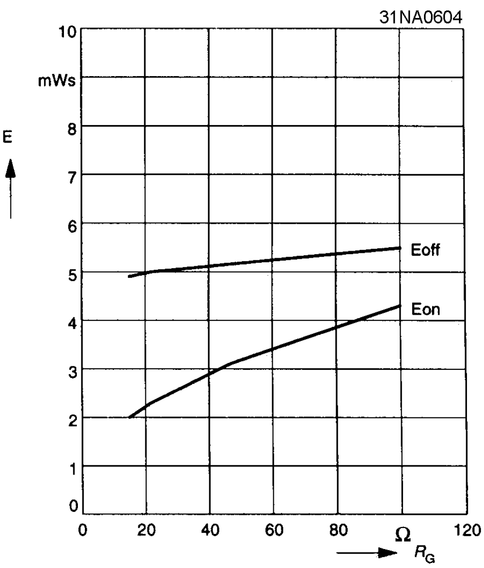


Fig. 2 Typ. output characteristic, t_p = 80 µs; 125 °C



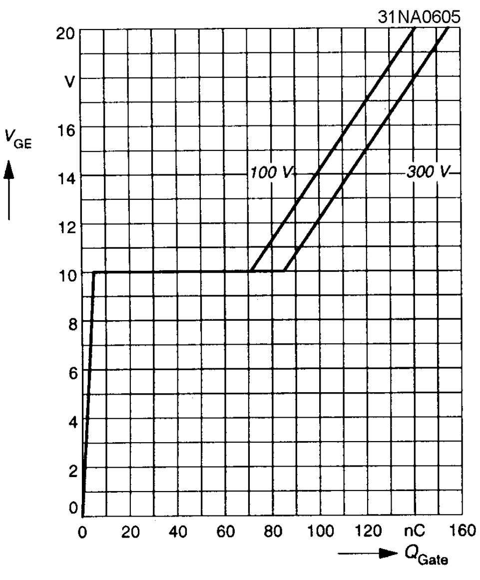
T_j = 125 °C
V_{CE} = 300 V
V_{GE} = ± 15 V
R_G = 22 Ω

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



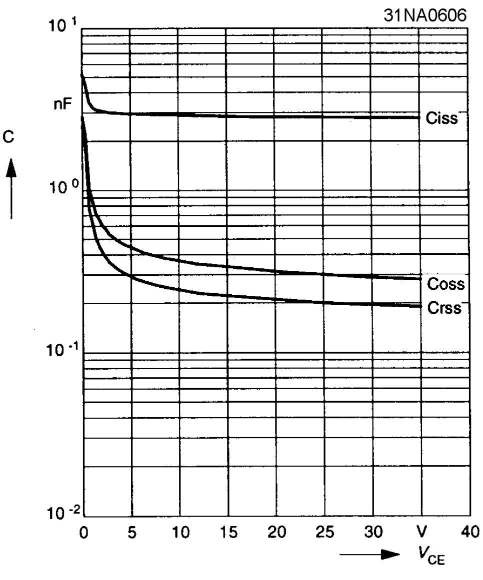
T_j = 125 °C
V_{CE} = 300 V
V_{GE} = ± 15 V
I_C = 50 A

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



I_{Cpuls} = 50 A

Fig. 5 Typ. gate charge characteristic

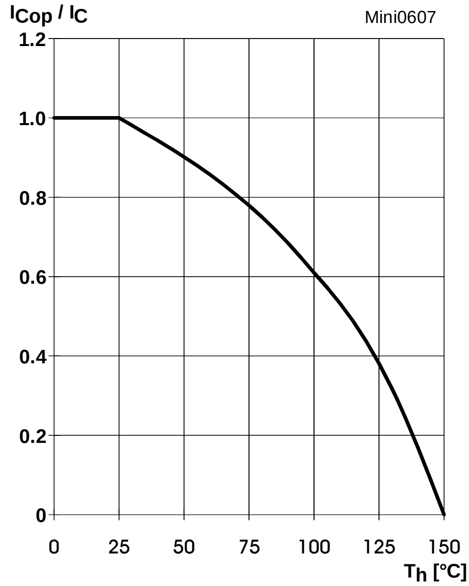


V_{GE} = 0 V
f = 1 MHz

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

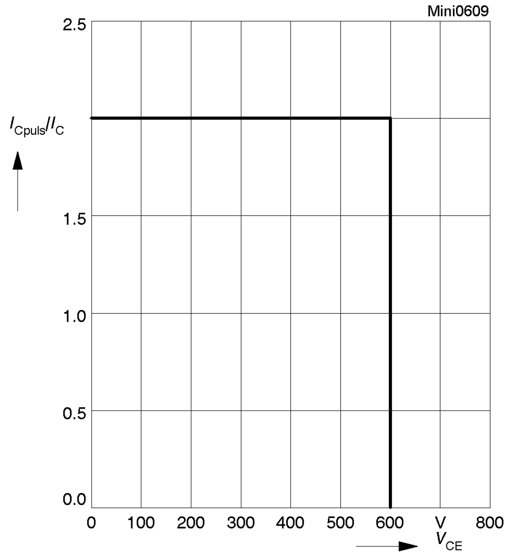
2. Common characteristics of MiniSKiiP

MiniSKiiP 600 V

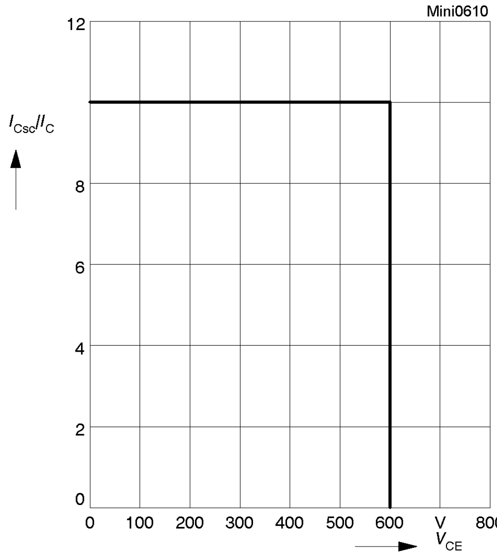


T_j = 150 °C
V_{GE} = ≥ 15 V

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



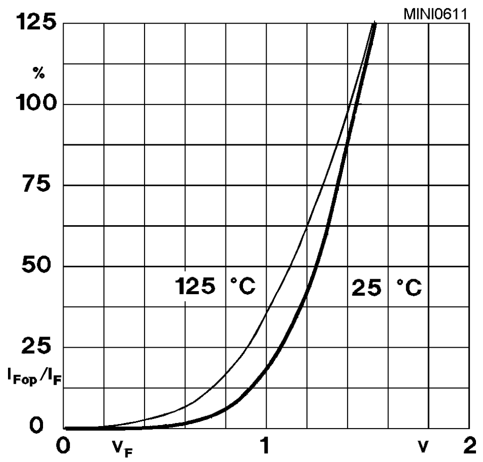
T_j = ≤ 150 °C
V_{GE} = ± 15 V



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

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

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



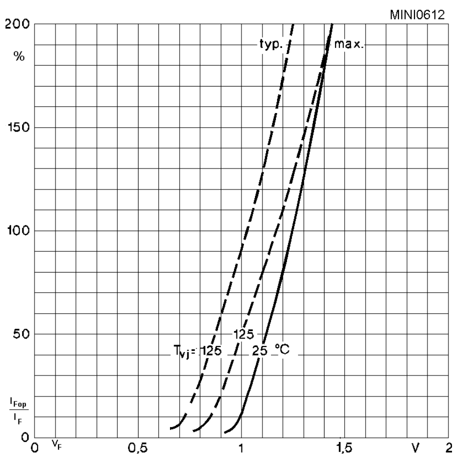


Fig. 11 Typ. freewheeling diode forward characteristic

Fig. 12 Forward characteristic of the input bridge diode

MiniSKiiP 3

SKiiP 30 NAB 06	Circuit
SKiiP 31 NAB 06	Case M3
SKiiP 32 NAB 06	Layout and connections for the
SKiiP 30 NAB 12	customer's printed circuit board
SKiiP 31 NAB 12	
SKiiP 32 NAB 12