SKiiP 21 NAB 06 - SKiiP 21 NAB 06 I

Absolute Maximum Ratings Symbol	Conditions [1]	Values	Units
Inverter & Chopper			
V_{CES}		600	V
V_{GES}		± 20	V
I_C	$T_{heatsink}$ = 25 / 80 °C	27 / 19	A
I_{CM}	t_p < 1 ms; $T_{heatsink}$ = 25 / 80 °C	54 / 38	A
$I_F = -I_C$	$T_{heatsink}$ = 25 / 80 °C	36 / 24	A
$I_{FM} = -I_{CM}$	t_p < 1 ms; $T_{heatsink}$ = 25 / 80 °C	72 / 48	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

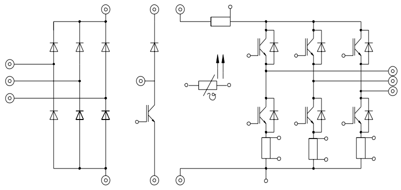
Characteristics Symbol	Conditions [1]	min.	typ.	max.	Units
IGBT - Inverter & Chopper					
V_{CEsat}	I_C = 20 A T_j = 25 (125) °C	–	2,1(2,2)	2,7(2,8)	V
$t_{d(on)}$	V_{CC} = 300 V; V_{GE} = ± 15 V	–	40	80	ns
t_r	I_C = 20 A; T_j = 125 °C	–	70	140	ns
$t_{d(off)}$	$R_{gon} = R_{goff}$ = 47 Ω	–	250	370	ns
t_f	inductive load	–	500	750	ns
$E_{on} + E_{off}$		–	2,5	–	mJ
C_{ies}	V_{CE} = 25 V; V_{GE} = 0 V, 1 MHz	–	1,1	–	nF
R_{thjh}	per IGBT	–	–	1,7	K/W
Diode [2] - Inverter & Chopper					
$V_F = V_{EC}$	I_F = 25 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	–	22	32	mΩ
I_{RRM}	I_F = 25 A, V_R = – 300 V	–	25	–	A
Q_{rr}	di_F/dt = – 500 A/µs	–	2,5	–	µC
E_{off}	V_{GE} = 0 V, T_j = 125 °C	–	0,75	–	mJ
R_{thjh}	per diode	–	–	1,7	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
Shunts (SKiiP 21 NAB 06 I)					
$R_{cs(dc)}$	5 % [4]		16,5		mΩ
$R_{cs(ac)}$	1 %		10		mΩ
Mechanical Data					
M_1	case to heatsink, SI Units	2	–	2,5	Nm
Case	mechanical outline see page B 16 – 8		M2		

MiniSKiiP 2 SEMIKRON integrated intelligent Power

SKiiP 21 NAB 06
SKiiP 21 NAB 06 I [3]

3-phase bridge rectifier + braking chopper + 3-phase bridge inverter

Case M2



UL recognized file no. E63532

- specification of shunts and temperature sensor see part A
- common characteristics see page B16–3

Options

- also available with single phase rectifier (called 21 NEB 06 or 21 NEB 06 I[3])
- also available with faster IGBTs (type ... 063), data sheet on request

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[1] $T_{heatsink}$ = 25 °C, unless otherwise specified

[2] CAL = Controlled Axial Lifetime Technology (soft and fast recovery)

[3] With integrated DC and/or AC shunts

[4] accuracy of pure shunt, please note that for DC shunt no separate sensing contact is used.

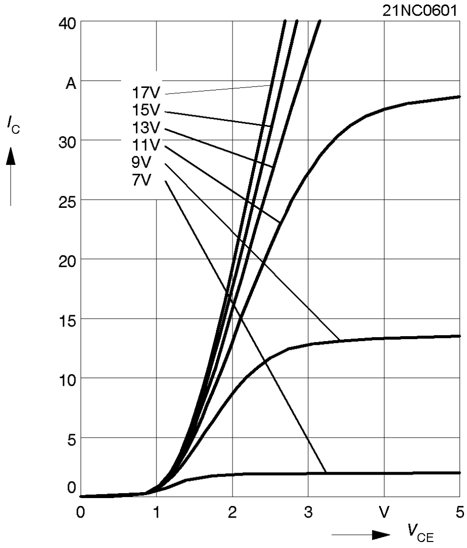


Fig. 1 Typ. output characteristic, t_p = 80 µs; 25 °C

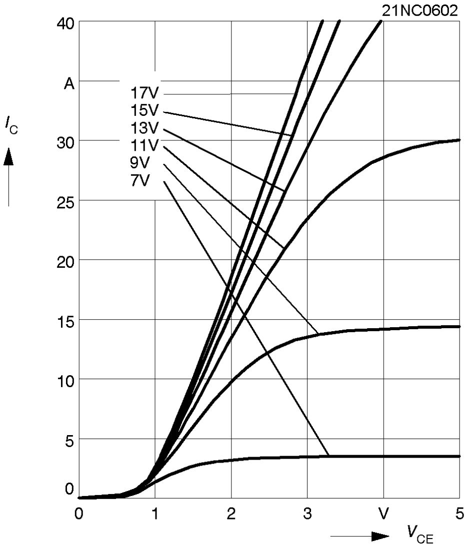
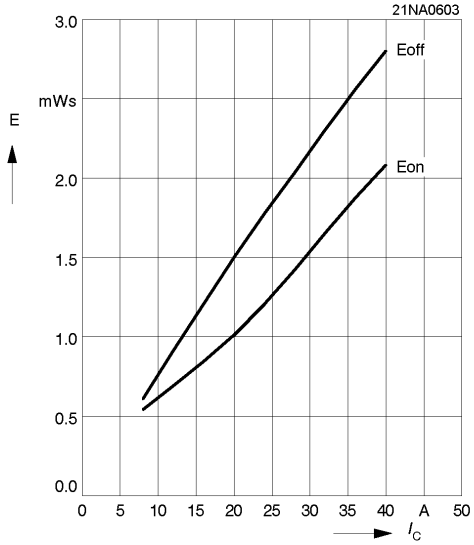
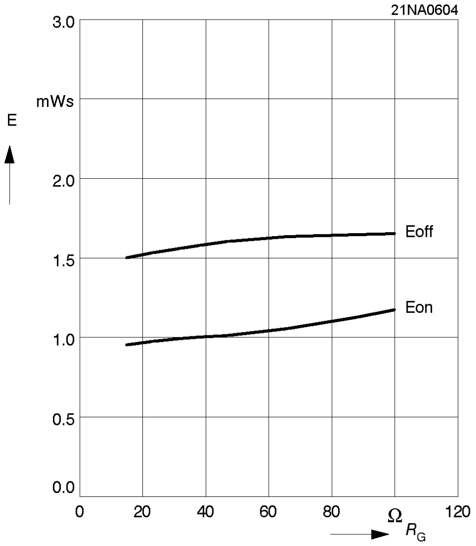


Fig. 2 Typ. output characteristic, t_p = 80 µs; 125 °C



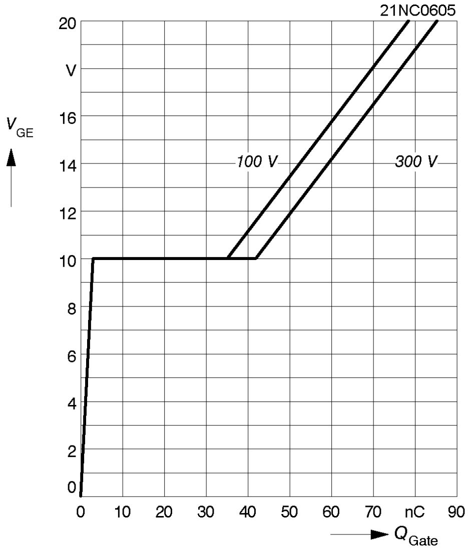
T_j = 125 °C
V_{CE} = 300 V
V_{GE} = ± 15 V
R_G = 47 Ω

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



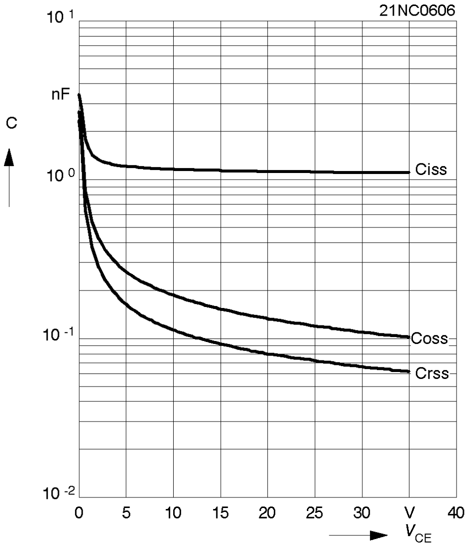
T_j = 125 °C
V_{CE} = 300 V
V_{GE} = ± 15 V
I_C = 20 A

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



I_{Cpuls} = 20 A

Fig. 5 Typ. gate charge characteristic

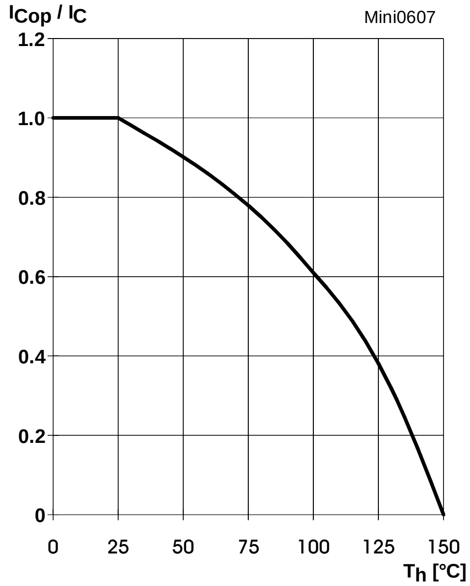


V_{GE} = 0 V
f = 1 MHz

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

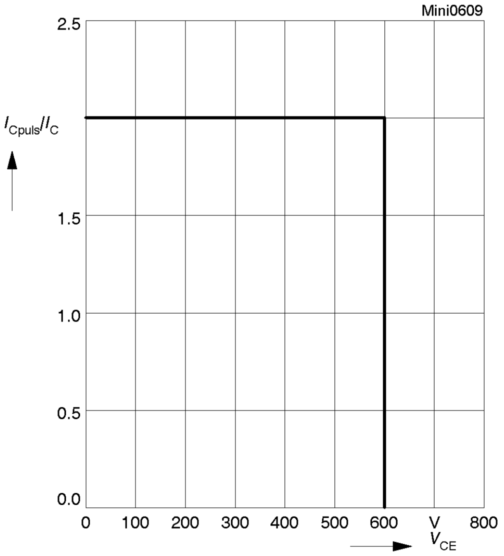
2. Common characteristics of MiniSKiiP

MiniSKiiP 600 V



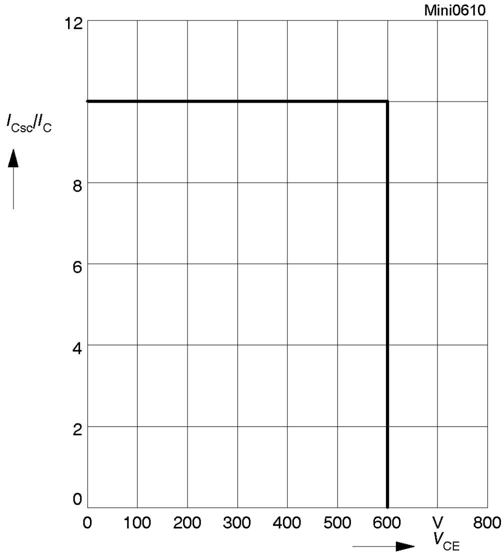
T_j = 150 °C
V_{GE} = ≥ 15 V

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

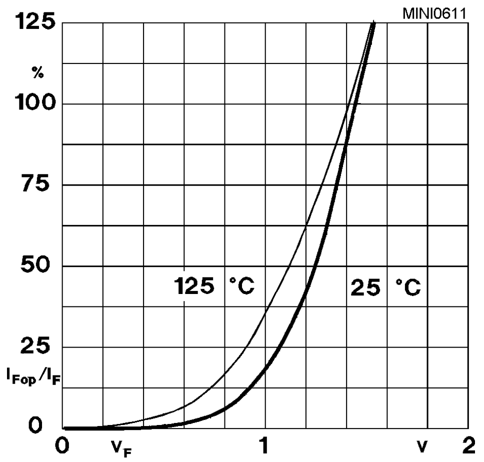


Fig. 11 Typ. freewheeling diode forward characteristic

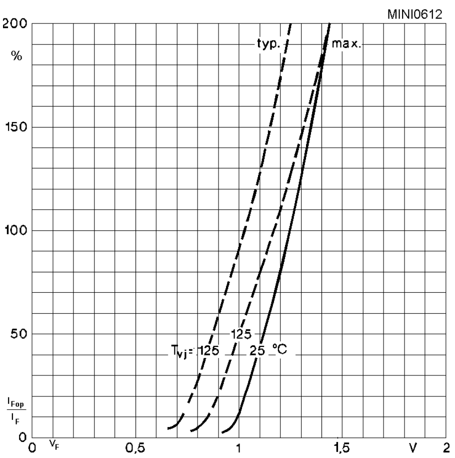


Fig. 12 Forward characteristic of the input bridge diode

MiniSKiiP 2

SKiiP 20 NAB 06 ... Circuit
SKiiP 21 NAB 06 ... Case M2
SKiiP 20 NAB 12 ... Layout and connections for the
SKiiP 22 NAB 12 ... customer's printed circuit board

Note: The shunts are available
only by option I