SEMIKRON

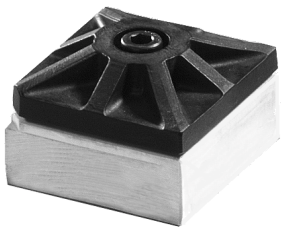
Absolute Maximum Ratings			
Symbol	**Conditions** [1]	**Values**	**Units**
Inverter & Chopper			
V_{CES}		600	V
V_{GES}		± 20	V
I_C	$T_{heatsink}$ = 25 / 80 °C	17 / 12	A
I_{CM}	t_p < 1 ms; $T_{heatsink}$ = 25 / 80 °C	34 / 24	A
$I_F = -I_C$	$T_{heatsink}$ = 25 / 80 °C	20 / 15	A
$I_{FM} = -I_{CM}$	t_p < 1 ms; $T_{heatsink}$ = 25 / 80 °C	40 / 30	A
Bridge Rectifier			
V_{RRM}		800	V
I_D	$T_{heatsink}$ = 80 °C	12 [3]	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

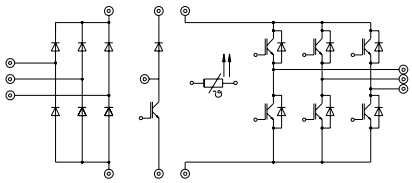
Characteristics					
Symbol	**Conditions** [1]	**min.**	**typ.**	**max.**	**Units**
IGBT - Inverter & Chopper					
V_{CEsat}	I_C = 10 A T_j = 25 (125) °C	–	2,1(2,4)	2,6(2,9)	V
$t_{d(on)}$	V_{CC} = 300 V; V_{GE} = ± 15 V	–	55	–	ns
t_r	I_C = 10 A; T_j = 125 °C	–	40	–	ns
$t_{d(off)}$	$R_{gon} = R_{goff}$ = 100 Ω	–	270	–	ns
t_f	inductive load	–	25	–	ns
$E_{on} + E_{off}$		–	1,0	–	mJ
C_{ies}	V_{CE} = 25 V; V_{GE} = 0 V, 1 MHz	–	0,57	–	nF
R_{thjh}	per IGBT	–	–	2,3	K/W
Diode [2] - Inverter & Chopper					
$V_F = V_{EC}$	I_F = 10 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	–	55	80	mΩ
I_{RRM}	I_F = 10 A, V_R = – 300 V	–	6,5	–	A
Q_{rr}	di_F/dt = – 200 A/µs	–	1	–	µC
E_{off}	V_{GE} = 0 V, T_j = 125°C	–	0,1	–	mJ
R_{thjh}	per diode	–	–	2,7	K/W
Diode - Rectifier					
V_F	I_F = 25 A T_j = 25 °C	–	1,2	–	V
R_{thjh}	per diode	–	–	1,7	K/W
Temperature Sensor					
R_{TS}	T = 25 / 100 °C		1000 / 1670		Ω
Mechanical Data					
M_1	Mounting torque	2	–	2,5	Nm
Case			M1		

MiniSKiiP 1
SEMIKRON integrated intelligent Power
SKiiP 11 NAB 063 T1

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

Case M1





UL recognized file no. E63532

- fast NPT IGBTs

[1] $T_{heatsink}$ = 25 °C, unless otherwise specified
[2] CAL = Controlled Axial Lifetime Technology (soft and fast recovery)
[3] Limited by spring contact

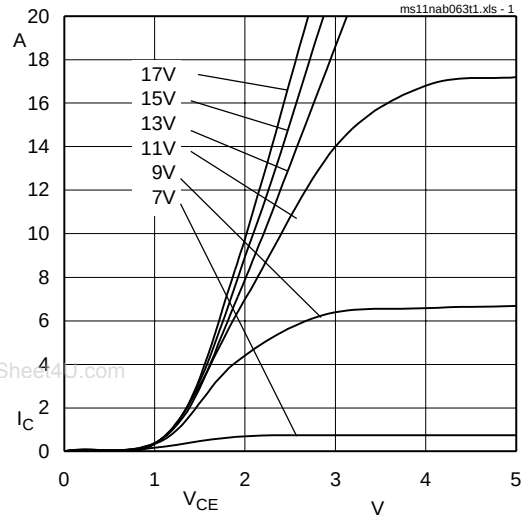


Fig. 1 Typ. output characteristic, t_p = 80 µs; 25 °C

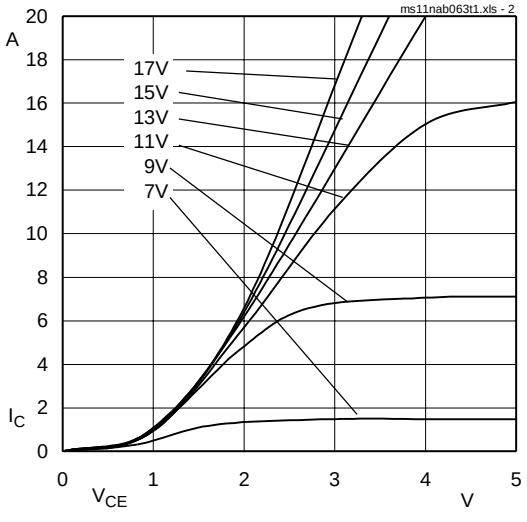


Fig. 2 Typ. output characteristic, t_p = 80 µs; 125 °C

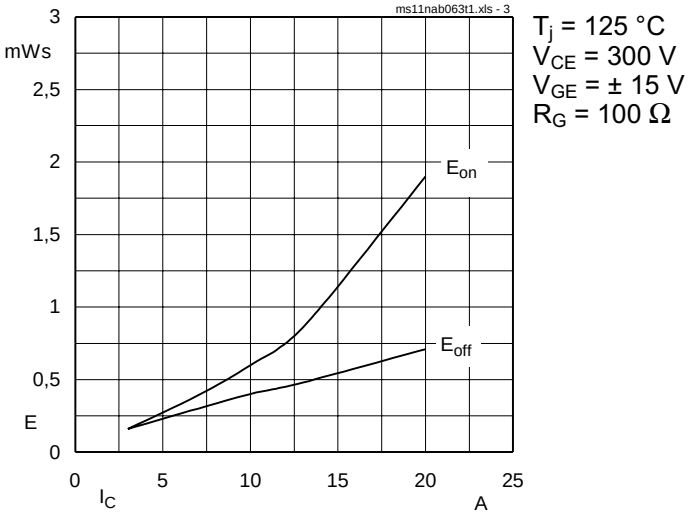


Fig. 3 Turn-on /-off energy = f (I_C)

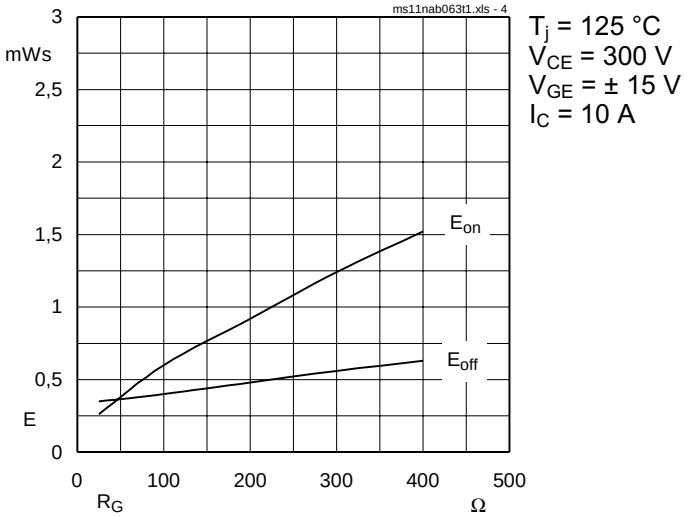


Fig. 4 Turn-on /-off energy = f (R_G)

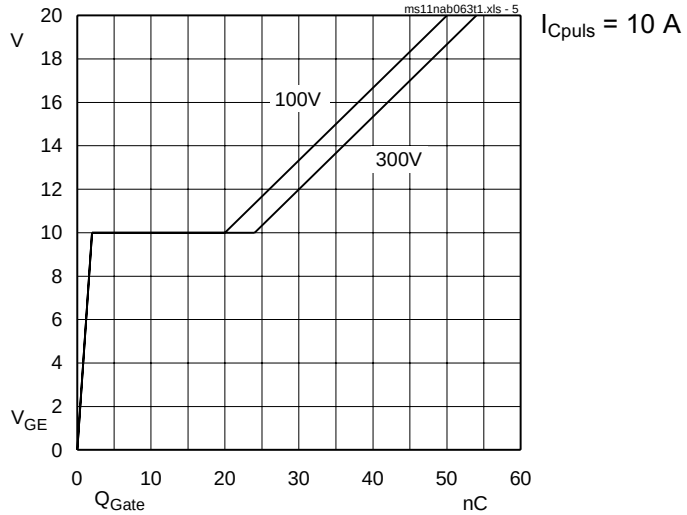


Fig. 5 Typ. gate charge characteristic

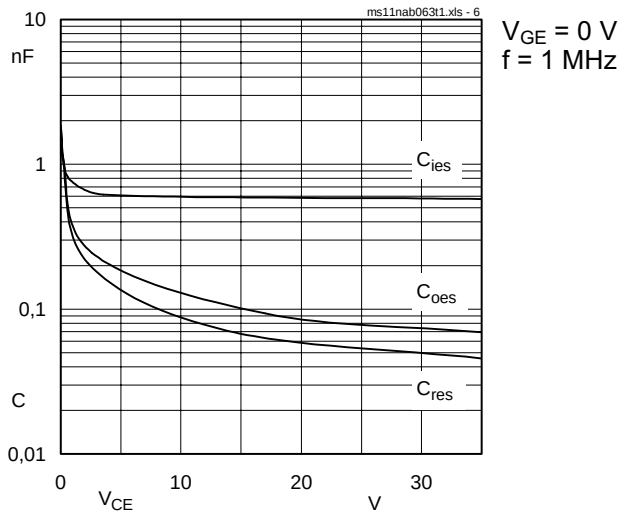
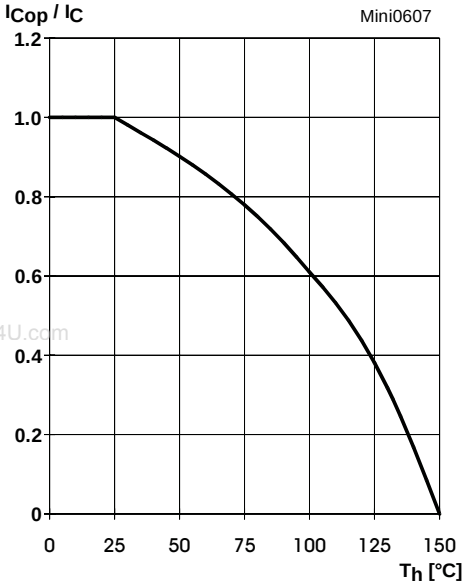


Fig. 6 Typ. capacitances vs. V_{CE}

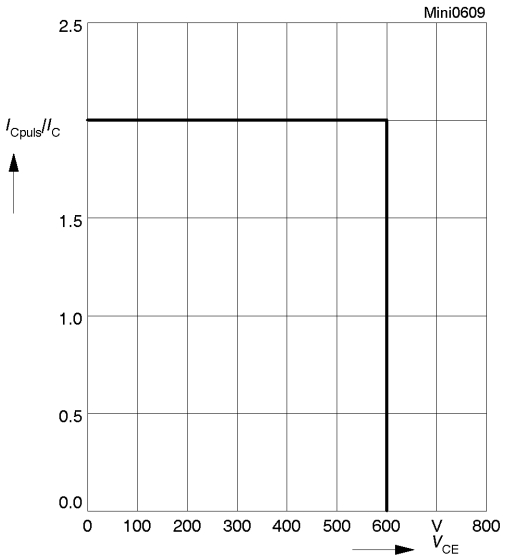
2. Common characteristics of MiniSKiiP

MiniSKiiP 600 V



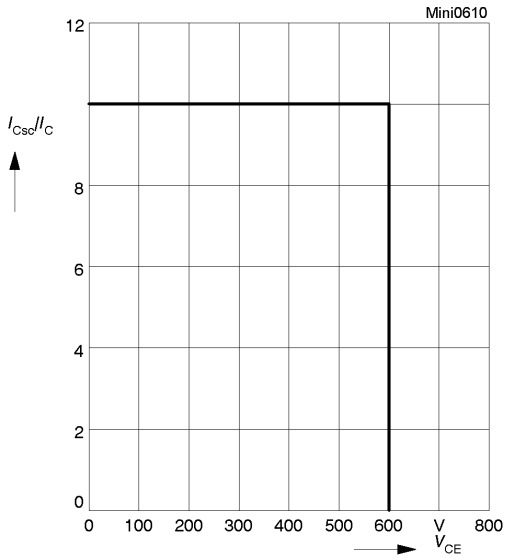
T_j = 150 °C
V_{GE} = ≥ 15 V

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

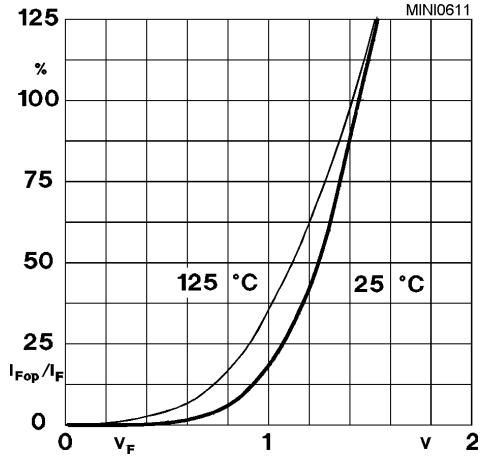


Fig. 11 Typ. freewheeling diode forward characteristic

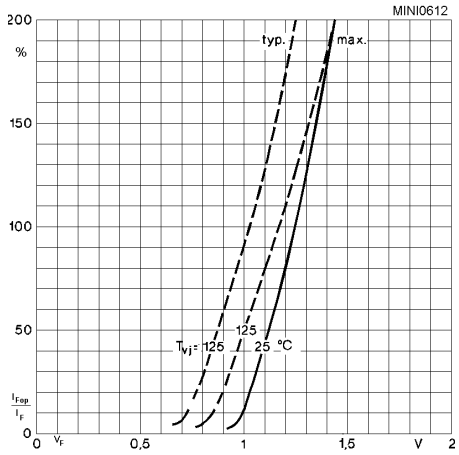
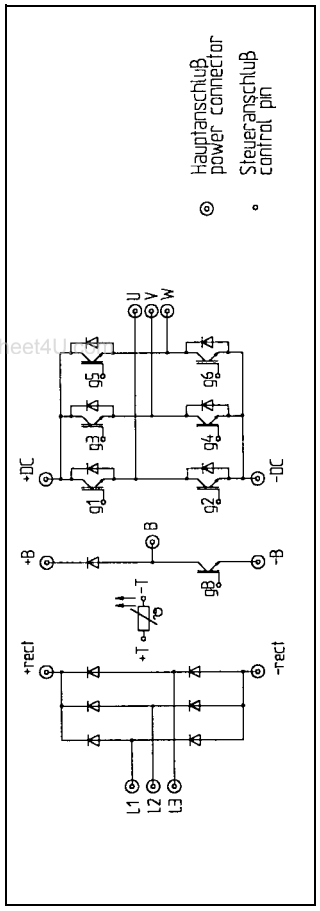
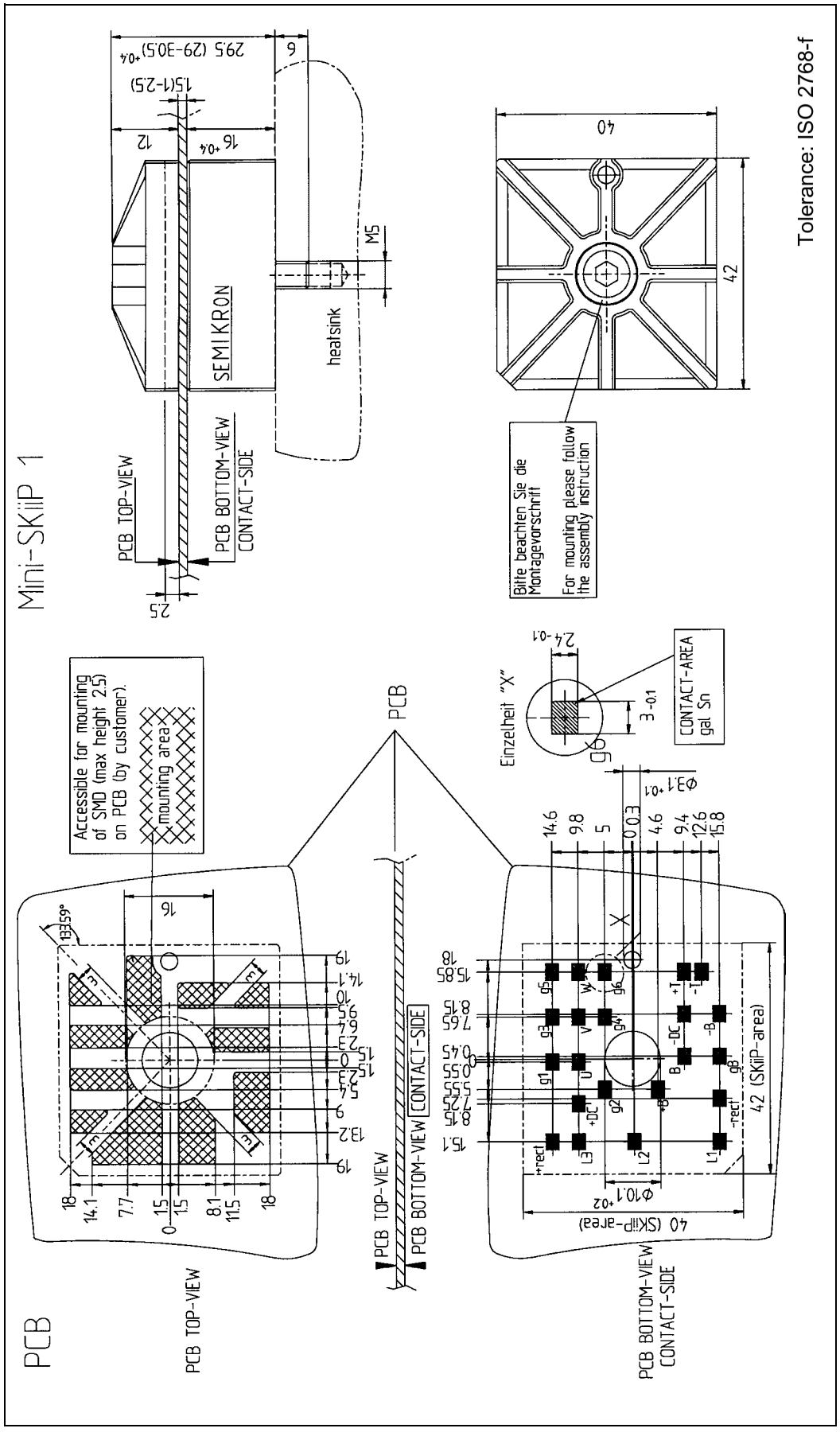


Fig. 12 Forward characteristic of the input bridge diode

3. Circuits, Cases, Layout fo the Printed Circuit Board





MiniSKiiP 1

SKiiP 10 NAB 063 T1
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