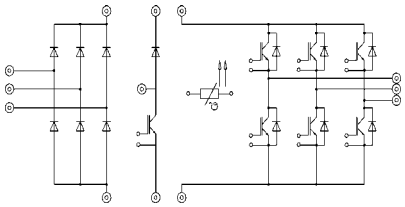
SEMIKRON

Absolute Maximum Ratings			
Symbol	**Conditions** [1]	**Values**	**Units**
Inverter			
V_{CES}		600	V
V_{GES}		± 20	V
I_C	$T_{heatsink}$ = 25 / 80 °C	45 / 32	A
I_{CM}	t_p < 1 ms; $T_{heatsink}$ = 25 / 80 °C	90 / 64	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	35	A
I_{FSM}	t_p = 10 ms; sin. 180 °, T_j = 25 °C	700	A
I^2t	t_p = 10 ms; sin. 180 °, T_j = 25 °C	2400	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 = 50 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	–	45	–	ns
t_r	I_C = 30 A; T_j = 125 °C	–	35	–	ns
$t_{d(off)}$	$R_{gon} = R_{goff}$ = 22 Ω	–	250	–	ns
t_f	inductive load	–	25	–	ns
$E_{on} + E_{off}$		–	2,65	–	mJ
C_{ies}	V_{CE} = 25 V; V_{GE} = 0 V, 1 MHz	–	2,8	–	nF
R_{thjh}	per IGBT	–	–	1,0	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	–	31	–	A
Q_{rr}	di_F/dt = – 800 A/µs	–	3,3	–	µC
E_{off}	V_{GE} = 0 V, T_j = 125°C	–	0,36	–	mJ
R_{thjh}	per diode	–	–	1,2	K/W
Diode - Rectifier					
V_F	I_F = 35 A T_j = 25 °C	–	1,2	–	V
R_{thjh}	per diode	–	–	1,2	K/W
Temperature Sensor					
R_{TS}	T = 25 / 100 °C		1000 / 1670		Ω
Mechanical Data					
M_1	Mounting torque	2	–	2,5	Nm
Case			M3		

MiniSKiiP 3
SEMIKRON integrated intelligent Power
SKiiP 31 NAB 063 T1
3-phase bridge rectifier + braking chopper + 3-phase bridge inverter

Case M3



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)

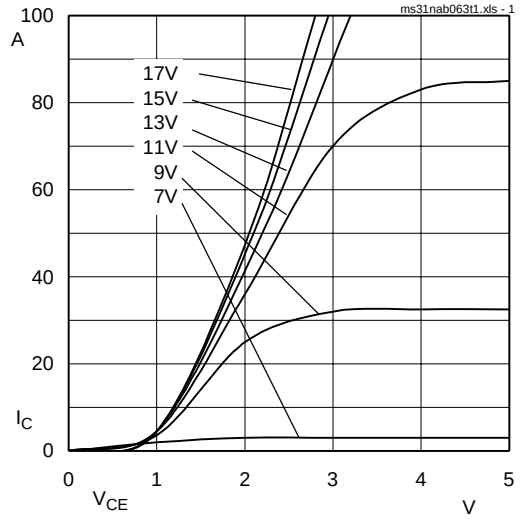


Fig. 1 Typ. output characteristic, t_p = 80 µs; 25 °C

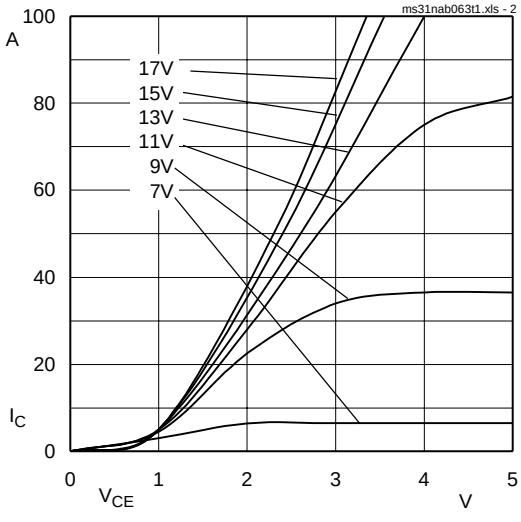
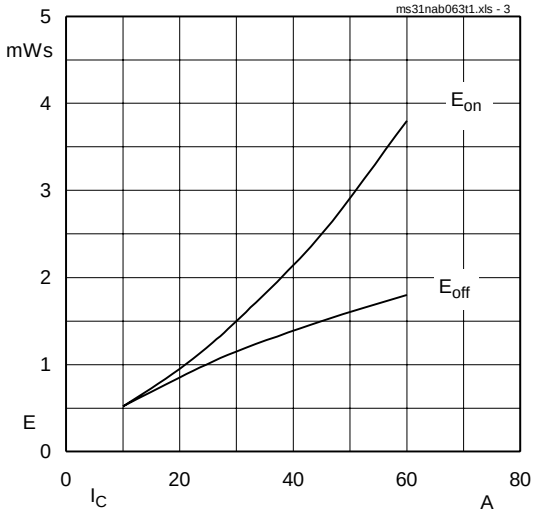
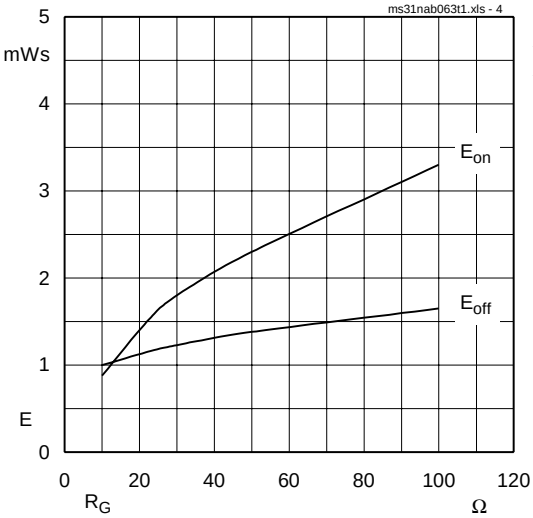


Fig. 2 Typ. output characteristic, t_p = 80 µs; 125 °C



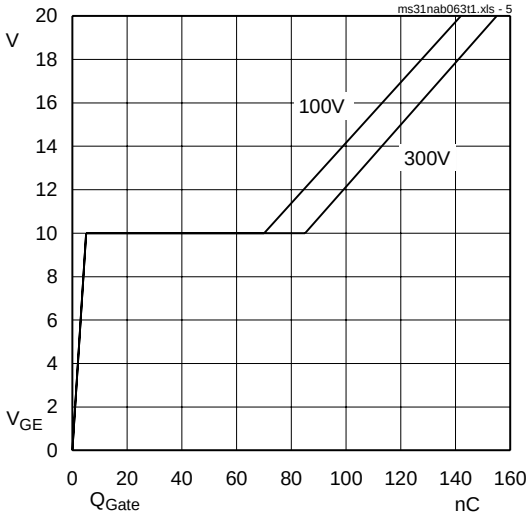
T_j = 125 °C
V_{CE} = 300 V
V_{GE} = ± 15 V
R_G = 22 Ω

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



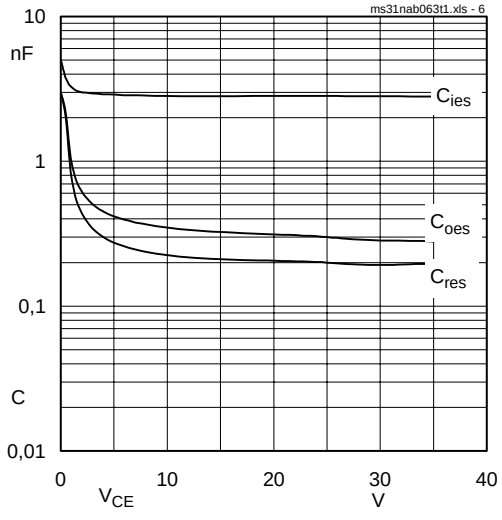
T_j = 125 °C
V_{CE} = 300 V
V_{GE} = ± 15 V
I_C = 30 A

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



I_{Cpuls} = 50 A

Fig. 5 Typ. gate charge characteristic

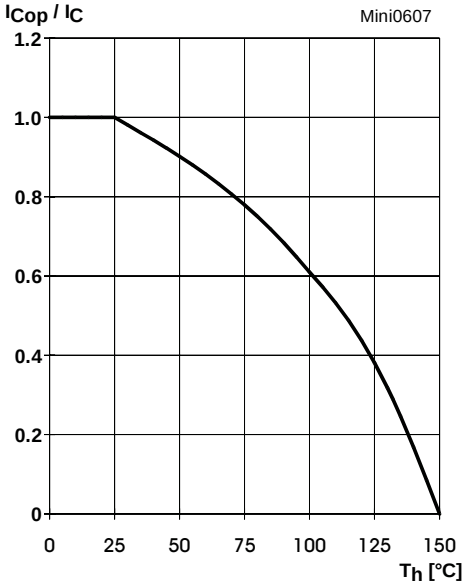


V_{GE} = 0 V
f = 1 MHz

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

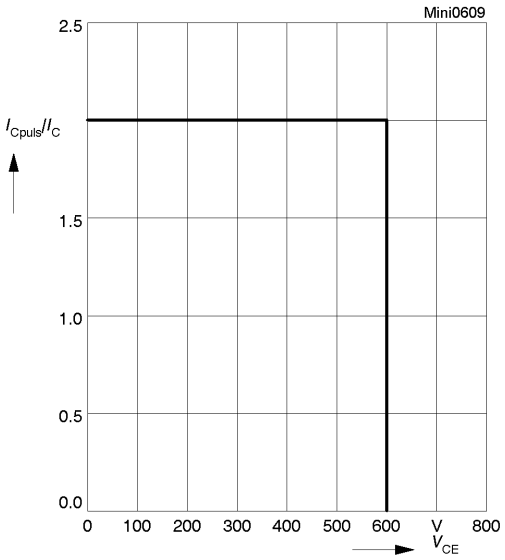
2. Common characteristics of MiniSKiiP

MiniSKiiP 600 V



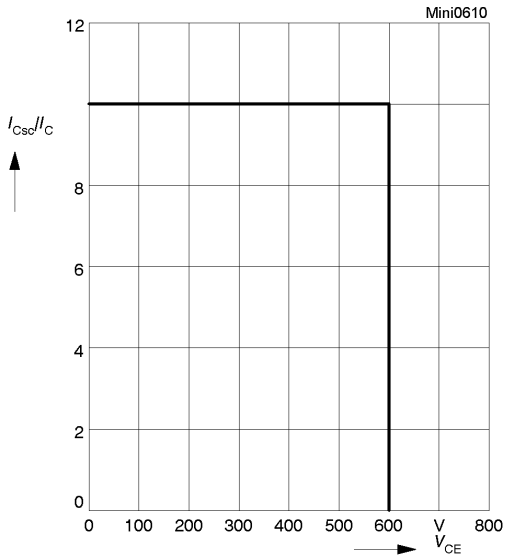
T_j = 150 °C
V_{GE} = ≥ 15 V

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



T_j = ≤ 150 °C
V_{GE} = ± 15 V

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

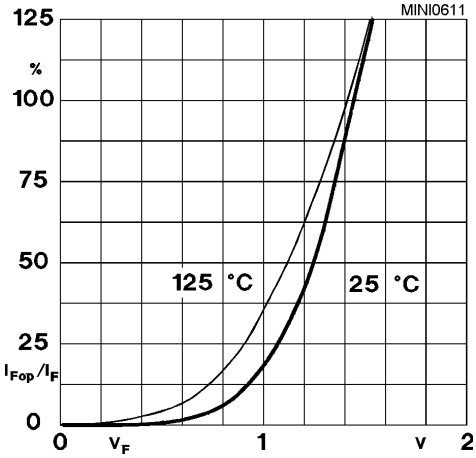


Fig. 11 Typ. freewheeling diode forward characteristic

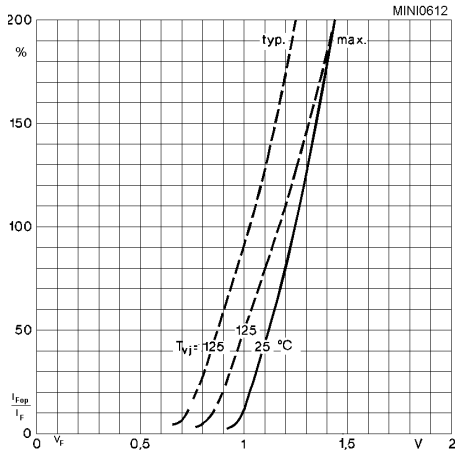


Fig. 12 Forward characteristic of the input bridge diode

MiniSKiiP 3

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