SEMIKRON

MiniSKiiP 1
SEMIKRON integrated intelligent Power
SKiiP 11 NAB 063 T1

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

Case M1

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	A²s
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		

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)
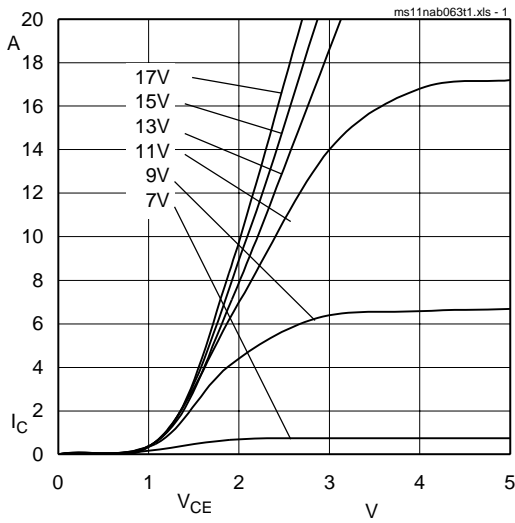[3] Limited by spring contact
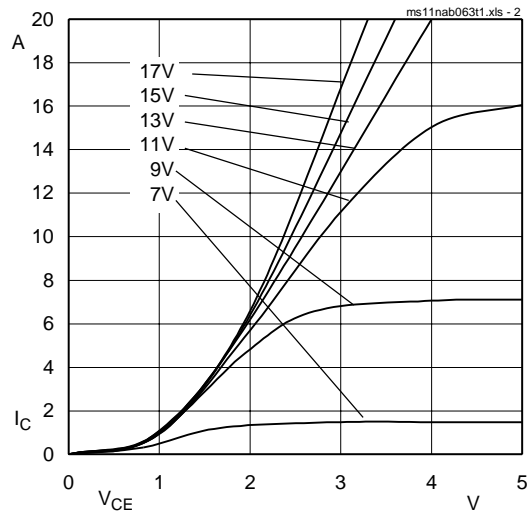
Fig. 1 Typ. output characteristic, t_p = 80 µs; 25 °C

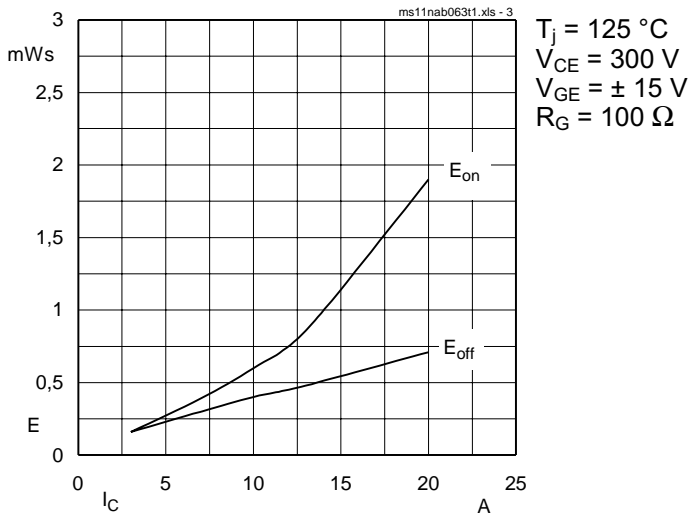Fig. 2 Typ. output characteristic, t_p = 80 µs; 125 °C

T_j = 125 °C
V_{CE} = 300 V
V_{GE} = ± 15 V
R_G = 100 Ω

T_j = 125 °C
V_{CE} = 300 V
V_{GE} = ± 15 V
I_C = 10 A

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

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

I_{Cpuls} = 10 A

V_{GE} = 0 V
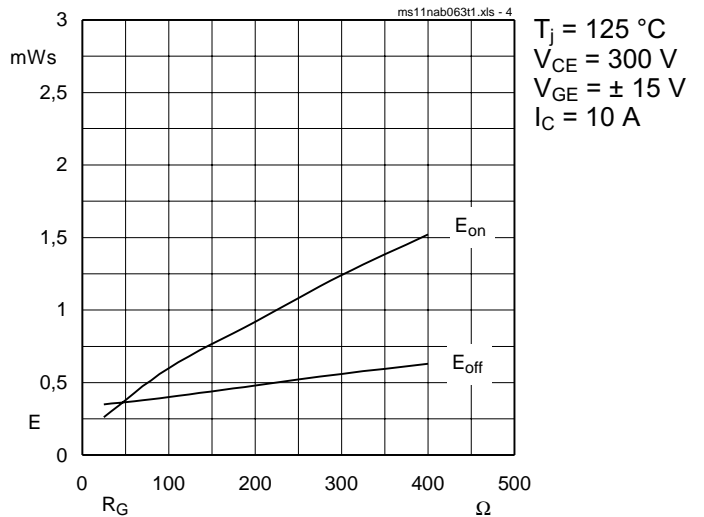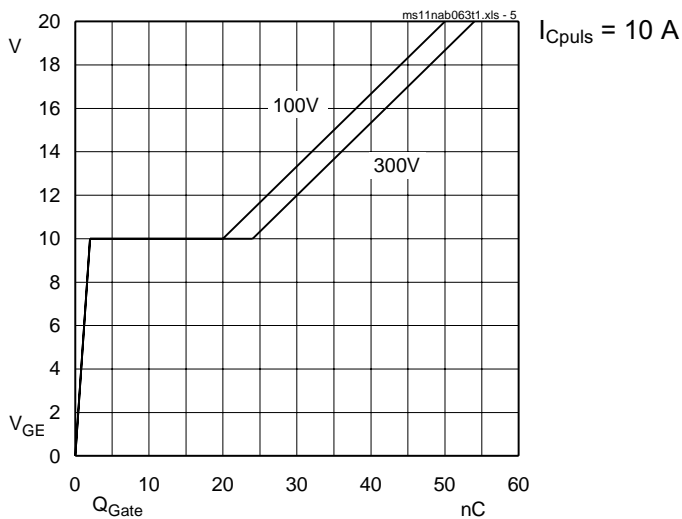f = 1 MHz

Fig. 5 Typ. gate charge characteristic
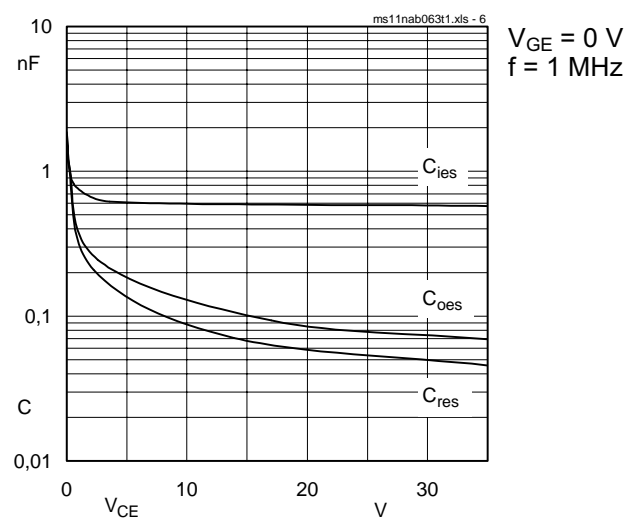
Fig. 6 Typ. capacitances vs. V_{CE}

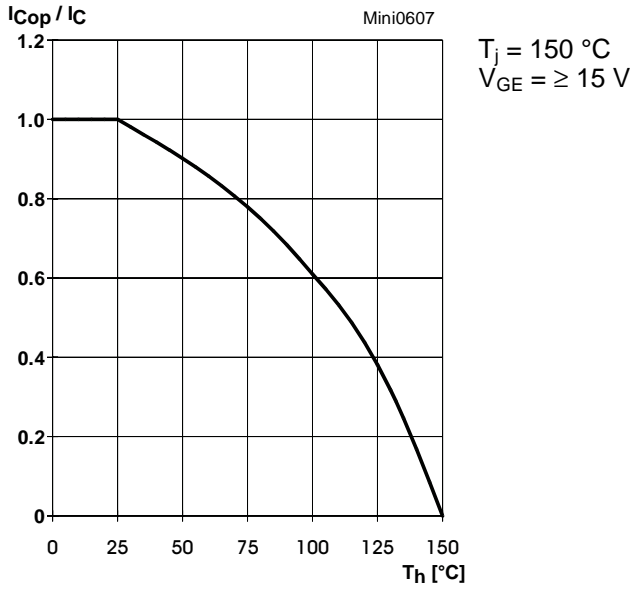# 2. Common characteristics of MiniSKiiP

MiniSKiiP 600 V

$T_j = 150\ °C$
$V_{GE} = \geq 15\ V$

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

$T_j = \leq 150\ °C$
$V_{GE} = \pm 15\ V$
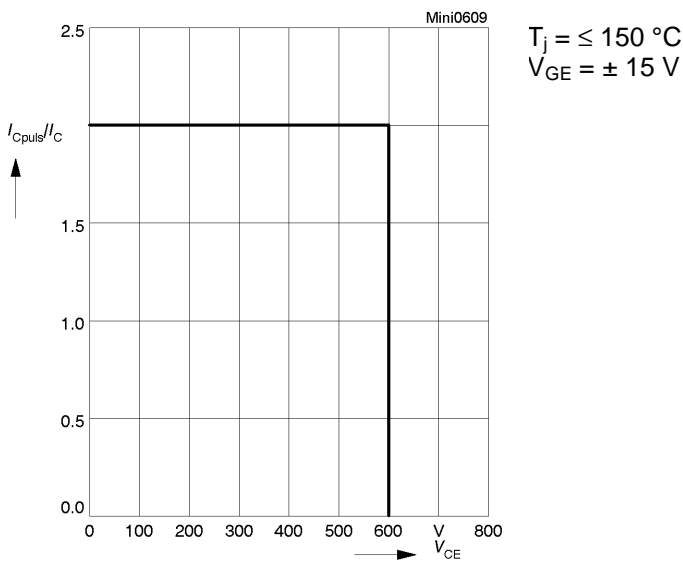
Fig. 9 Turn-off safe operating area (RBSOA) of the IGBT

$T_j = \leq 150\ °C$
$V_{GE} = \pm 15\ V$
$t_{sc} = \leq 10\ \mu s$
$L_{ext} < 25\ nH$
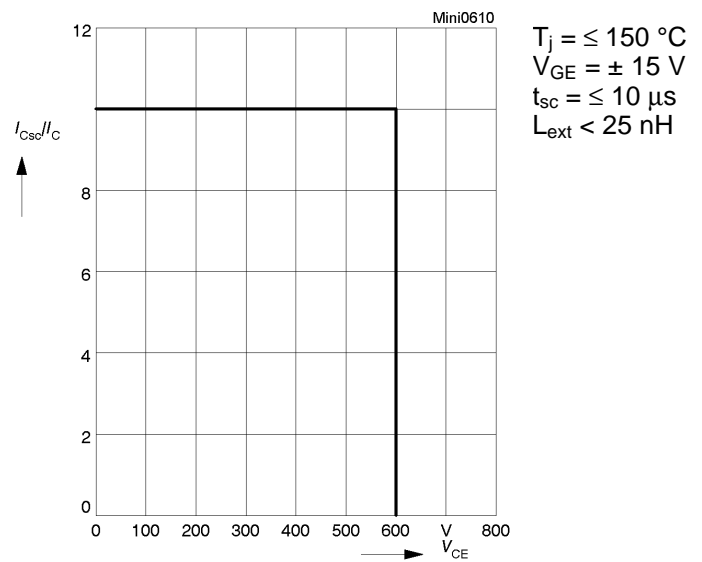
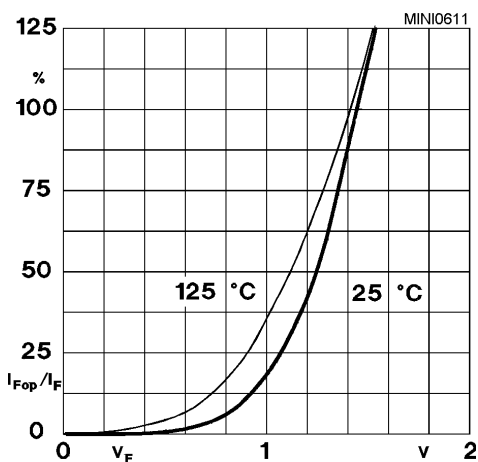Fig. 10 Safe operating area at short circuit of the IGBT

Fig. 11 Typ. freewheeling diode forward characteristic

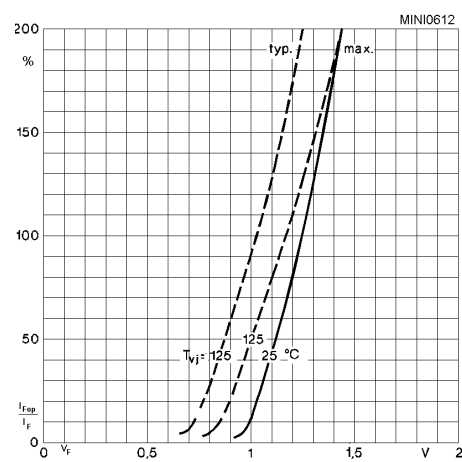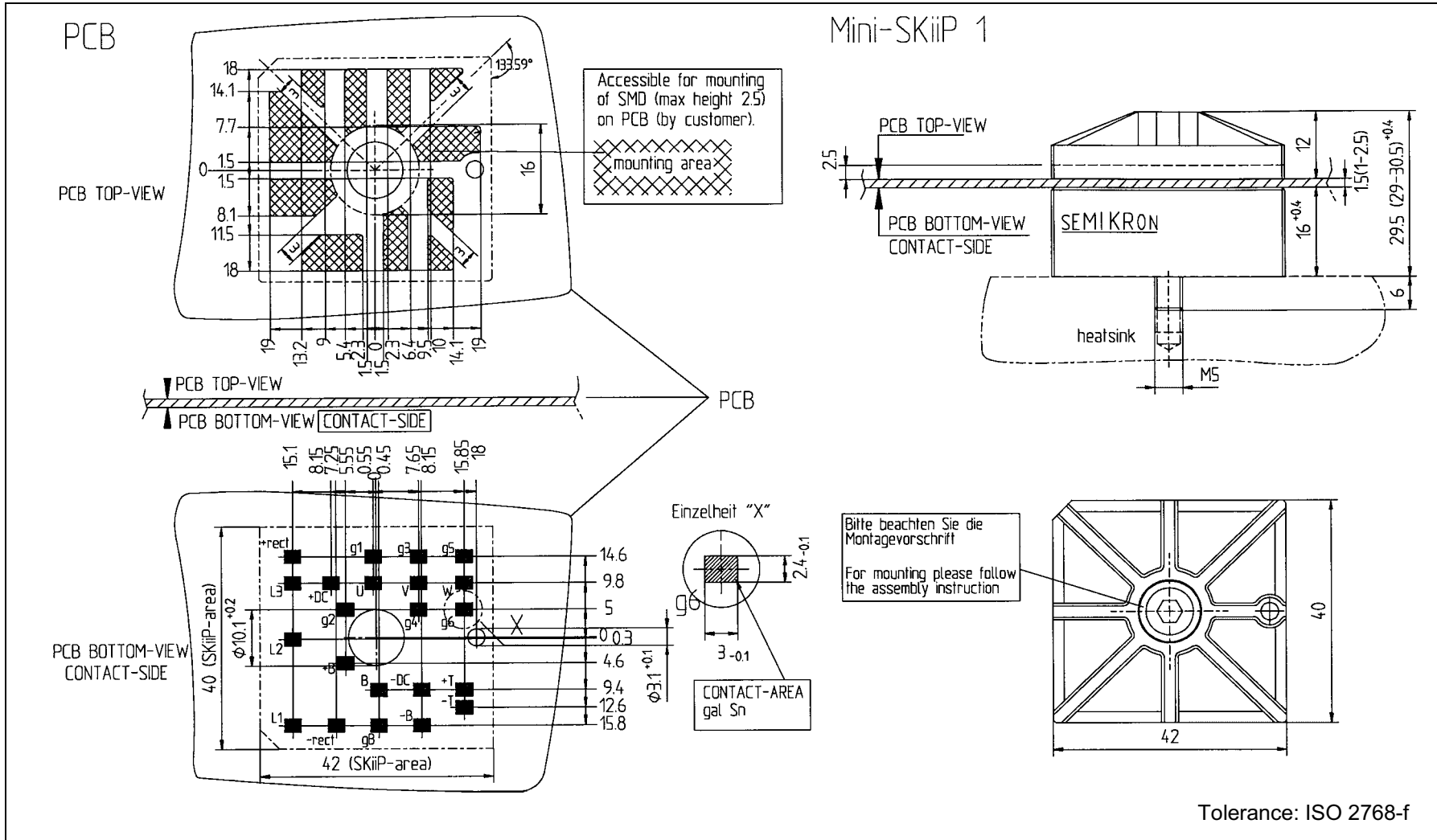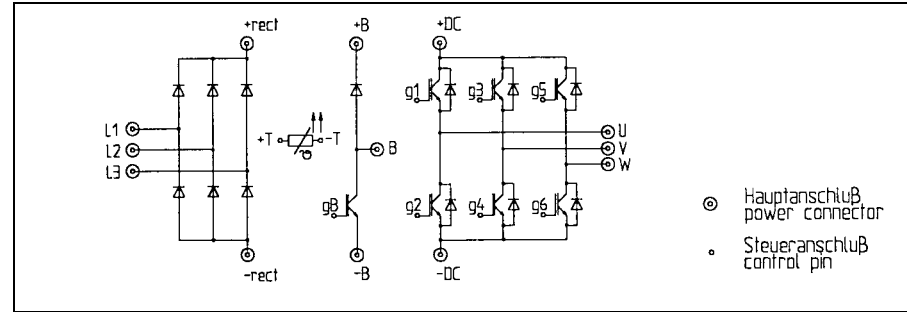Fig. 12 Forward characteristic of the input bridge diode

001218

MiniSKiiP 1

SKiiP 10 NAB 063 T1
SKiiP 11 NAB 063 T1

Hauptanschluß
power connector

Steueranschluß
control pin

PCB

Mini-SKiiP 1

PCB TOP-VIEW

Accessible for mounting
of SMD (max height 2.5)
on PCB (by customer).

mounting area

PCB TOP-VIEW

18
14.1
7.7
0 1.5
1.5
8.1
11.5
18

16

133.59°

PCB TOP-VIEW
PCB BOTTOM-VIEW CONTACT-SIDE

PCB

PCB TOP-VIEW

2.5

PCB BOTTOM-VIEW
CONTACT-SIDE

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12

19 +0.4

1.5 (1-2.5)

29.5 (29) 30.3 (30) +0.4

6

heatsink

M5

PCB BOTTOM-VIEW
CONTACT-SIDE

15.1
8.15
7.25
5.55
0.55
0.45
7.65
8.15
15.85
18

+rect   g1   g3   g5
L3   +DC   U   V   W
      g2   g4   g6
L2
+B   B   -DC   +T
           -B   -T
L1   -rect   g8

40 (SKiiP-area)

Ø10.1 +0.2
40 (SKiiP-area)

42 (SKiiP-area)

Einzelheit "X"

g6

X

14.6
9.8
5
0 0.3
4.6
9.4
12.6
15.8

2.4 -0.1

3 -0.1

Ø3.1 +0.1

CONTACT-AREA
gal Sn

Bitte beachten Sie die
Montagevorschrift

For mounting please follow
the assembly instruction

40

42

Tolerance: ISO 2768-f

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