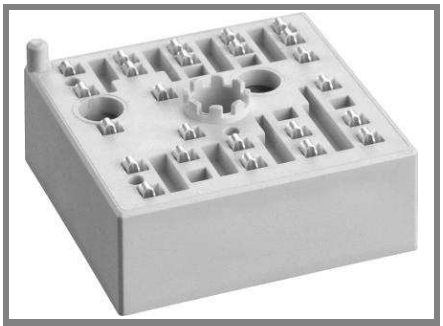


MiniSKiiP®1

3-phase bridge rectifier + brake chopper + 3-phase bridge inverter
SKiiP 13NAB066V1

Features

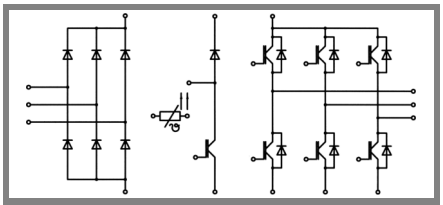
- Trench IGBTs
- Robust and soft freeweheeling diodes in CAL technology
- Highly reliable spring contacts for electrical connections
- UL recognised file no. E63532

Typical Applications*

- Inverter up to 5,6 kVA
- Typical motor power 3,0 kW

Remarks

- Case temperature limited to T_C = 125°C max.
- Product reliability results are valid for T_j=150°C
- SC data: $t_p \leq 6$ s; $V_{GE} \leq 15$ V; T_j = 150°C; V_{CC} = 360 V
- V_{CEsat}, V_F = chip level value



NAB

Absolute Maximum Ratings		T_s = 25°C, unless otherwise specified	
Symbol	**Conditions**	**Values**	**Units**
IGBT - Inverter, Chopper			
V_{CES}		600	V
I_C	T_s = 25 (70) °C, T_j = 150 °C	24 (17)	A
I_C	T_s = 25 (70) °C, T_j = 175 °C	27 (20)	A
I_{CRM}	t_p = 1 ms	30	A
V_{GES}		± 20	V
Diode - Inverter, Chopper			
I_F	T_s = 25 (70) °C, T_j = 150 °C	24 (16)	A
I_F	T_s = 25 (70) °C, T_j = 175 °C	28 (21)	A
I_{FRM}	t_p = 1 ms	30	A
Diode - Rectifier			
V_{RRM}		800	V
I_F	T_s = 70 °C	35	A
I_{FSM}	t_p = 10 ms, sin 180 °, T_j = 25 °C	220	A
i^2t	t_p = 10 ms, sin 180 °, T_j = 25 °C	240	A^2s
I_{tRMS}	per power terminal (20 A / spring)	20	A
T_j	IGBT, Diode	-40...+175	°C
T_{stg}		-40...+125	°C
V_{isol}	AC, 1 min.	2500	V

Characteristics		T_s = 25°C, unless otherwise specified			
Symbol	**Conditions**	**min.**	**typ.**	**max.**	**Units**
IGBT - Inverter, Chopper					
$V_{CE(sat)}$	I_{Cnom} = 15 A, T_j = 25 (150) °C		1,45 (1,65)	1,85 (2,05)	V
$V_{GE(th)}$	V_{GE} = V_{CE}, I_C = 1 mA		5,8		V
$V_{CE(TO)}$	T_j = 25 (150) °C		0,9 (0,7)	1,1 (1)	V
r_{CE}	T_j = 25 (150) °C		37 (63)	50 (70)	mΩ
C_{ies}	V_{CE} = 25 V, V_{GE} = 0 V, f = 1 MHz		0,86		nF
C_{oes}	V_{CE} = 25 V, V_{GE} = 0 V, f = 1 MHz		0,18		nF
C_{res}	V_{CE} = 25 V, V_{GE} = 0 V, f = 1 MHz		0,12		nF
$R_{CC'+EE'}$	spring contact-chip T_s = 25 (150)°C				mΩ
$R_{th(j-s)}$	per IGBT		1,8		K/W
$t_{d(on)}$	under following conditions		20		ns
t_r	V_{CC} = 300 V, V_{GE} = ±15V		30		ns
$t_{d(off)}$	I_{Cnom} = 15 A, T_j = 150 °C		155		ns
t_f	R_{Gon} = R_{Goff} = 22 Ω		45		ns
E_{on} (E_{off})	inductive load		0,6 (0,5)		mJ
Diode - Inverter, Chopper					
V_F = V_{EC}	I_F = 15 A, T_j = 25 (150) °C		1,4 (1,4)	1,7 (1,7)	V
$V_{(TO)}$	T_j = 25 (150) °C		0,9 (0,8)	1 (0,9)	V
r_T	T_j = 25 (150) °C		33 (40)	47 (53)	mΩ
$R_{th(j-s)}$	per diode		2,5		K/W
I_{RRM}	under following conditions		19,8		A
Q_{rr}	I_{Fnom} = 15 A, V_R = 300 V		1,9		C
E_{rr}	V_{GE} = 0 V, T_j = 150°C		0,5		mJ
	di_F/dt = 930 A/ s				
Diode - Rectifier					
V_F	I_{Fnom} = 15 A, T_j = 25 °C		1,1		V
$V_{(TO)}$	T_j = 150 °C		0,8		V
r_T	T_j = 150 °C		20		mΩ
$R_{th(j-s)}$	per diode		1,5		K/W
Temperature Sensor					
R_{ts}	3 %, T_r = 25 (100) °C		1000(1670)		Ω
Mechanical Data					
w			35		g
M_s	Mounting torque	2		2,5	Nm

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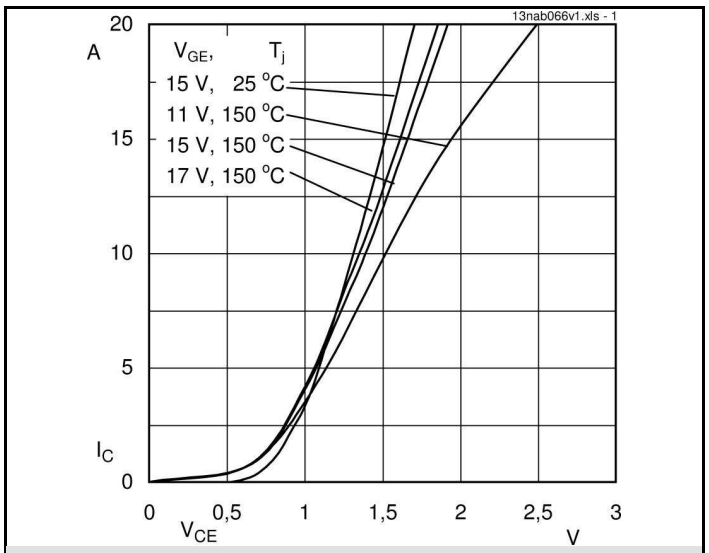

Fig. 1 Typ. output characteristics

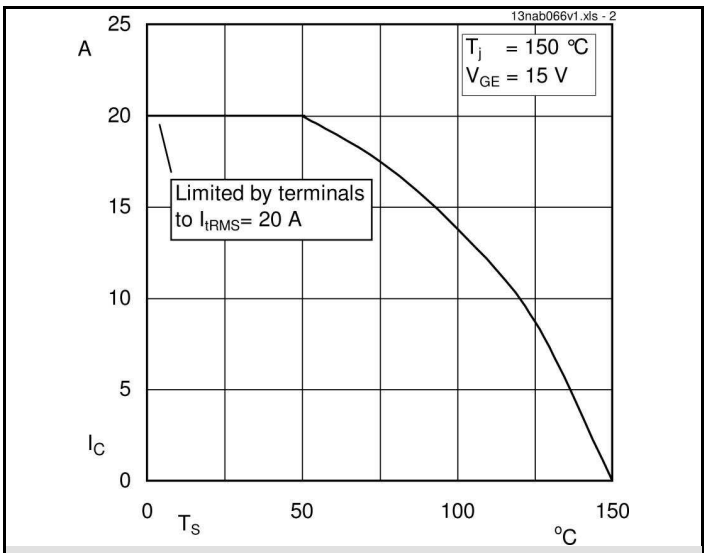

Fig. 2 Typ. rated current vs. temperature

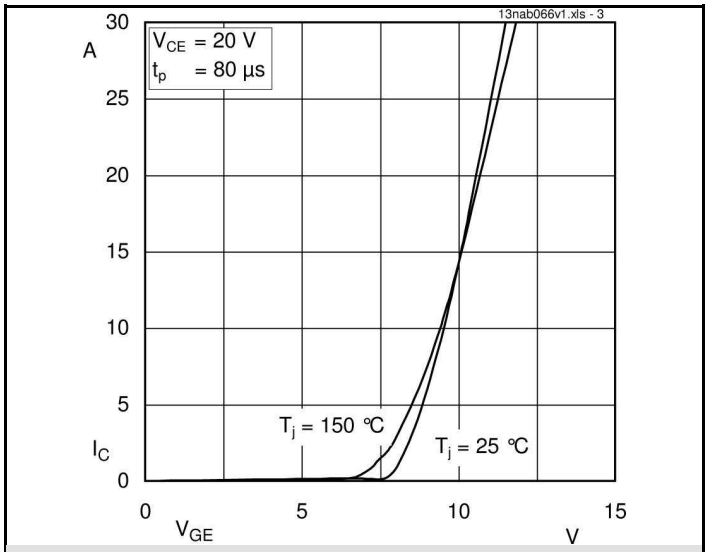

Fig. 3 Typ. transfer characteristic

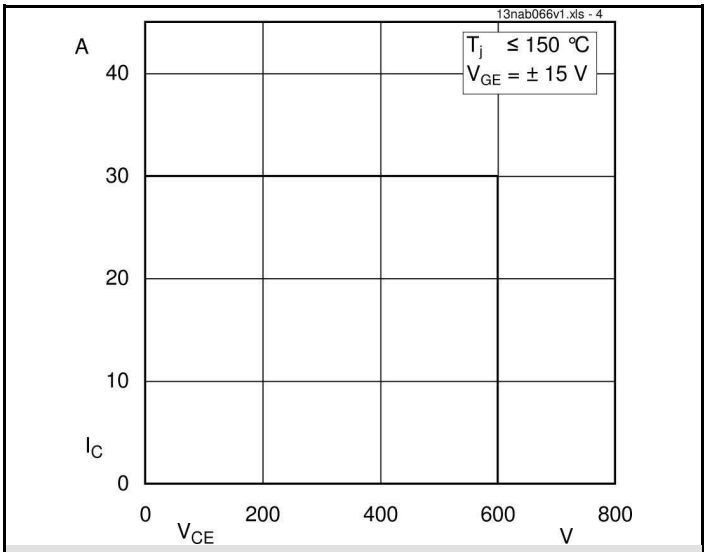

Fig. 4 Reverse bias safe operating area

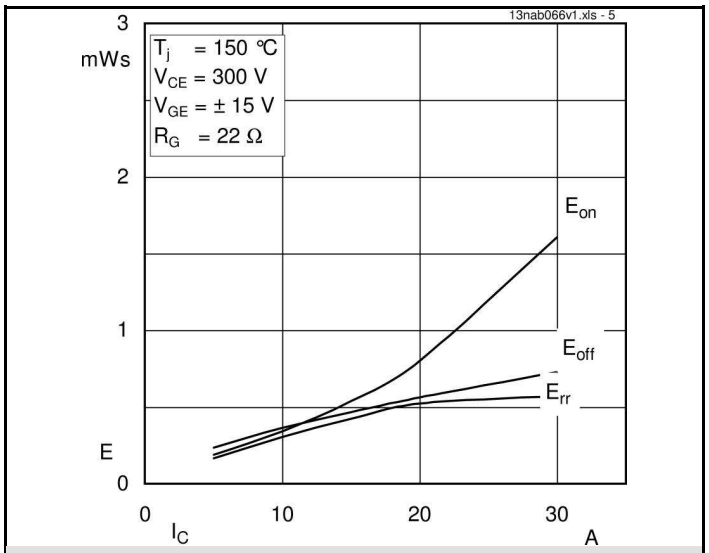

Fig. 5 Typ. Turn-on/-off energy = f (I_C)

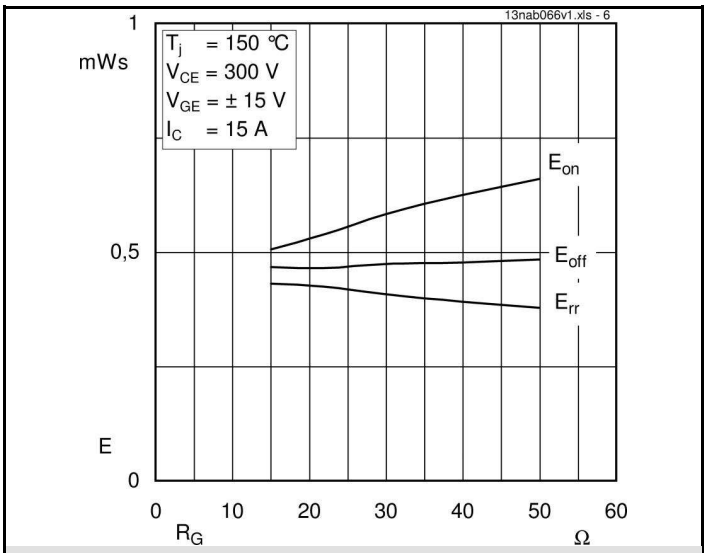

Fig. 6 Typ. Turn-on/-off energy = f (R_G)

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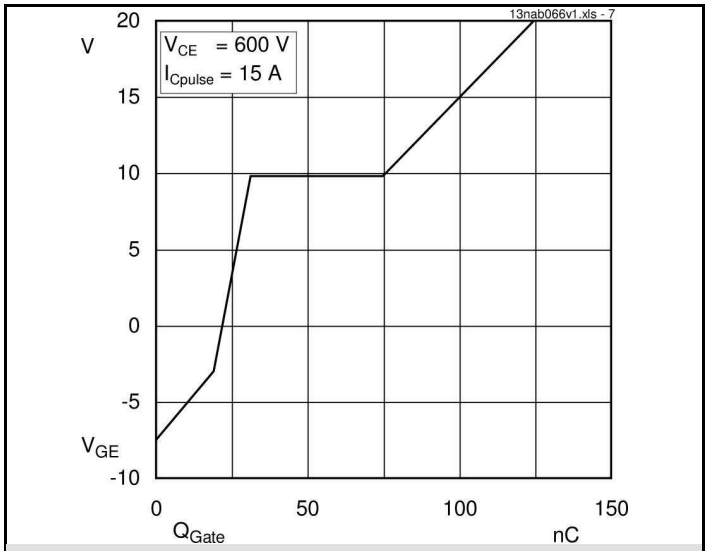

Fig. 7 Typ. gate charge characteristic

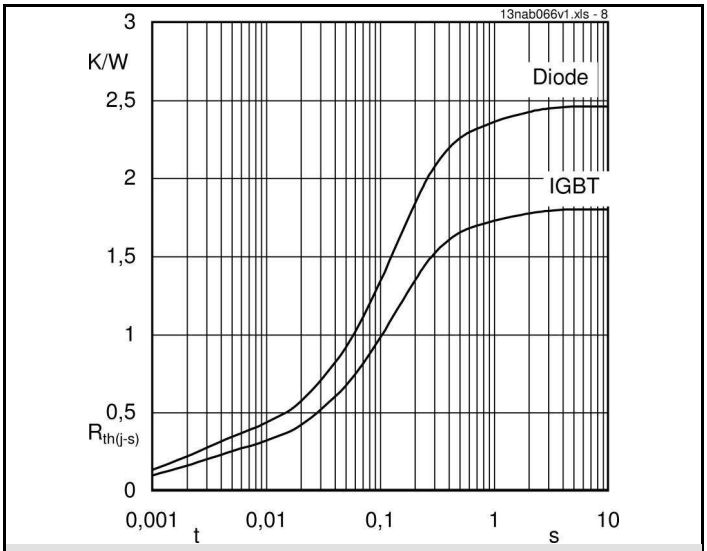

Fig. 8 Typ. thermal impedance

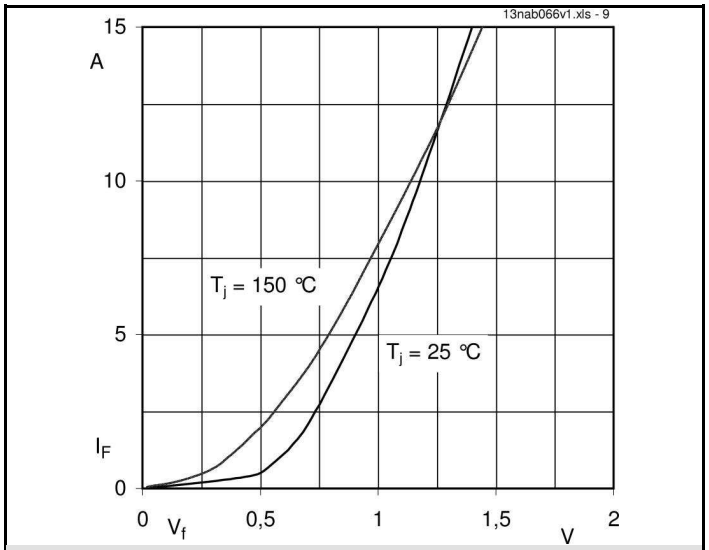

Fig. 9 Typ. freewheeling diode forward characteristic

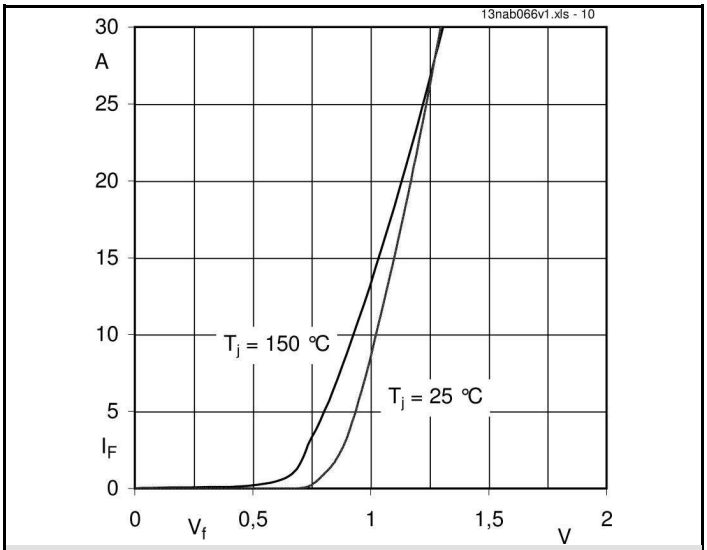

Fig. 10 Typ. input bridge forward characteristic

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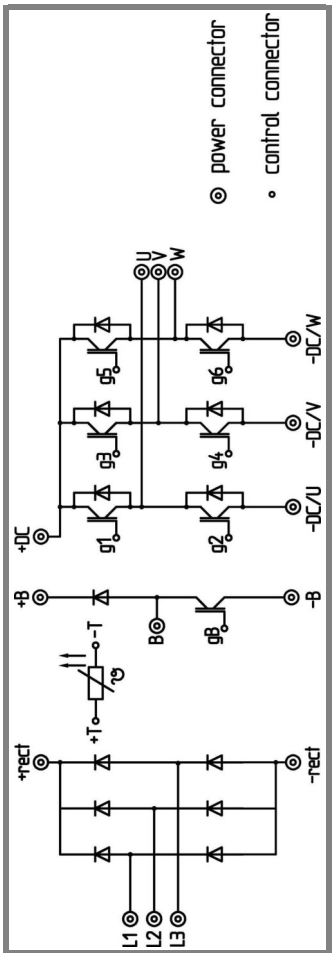
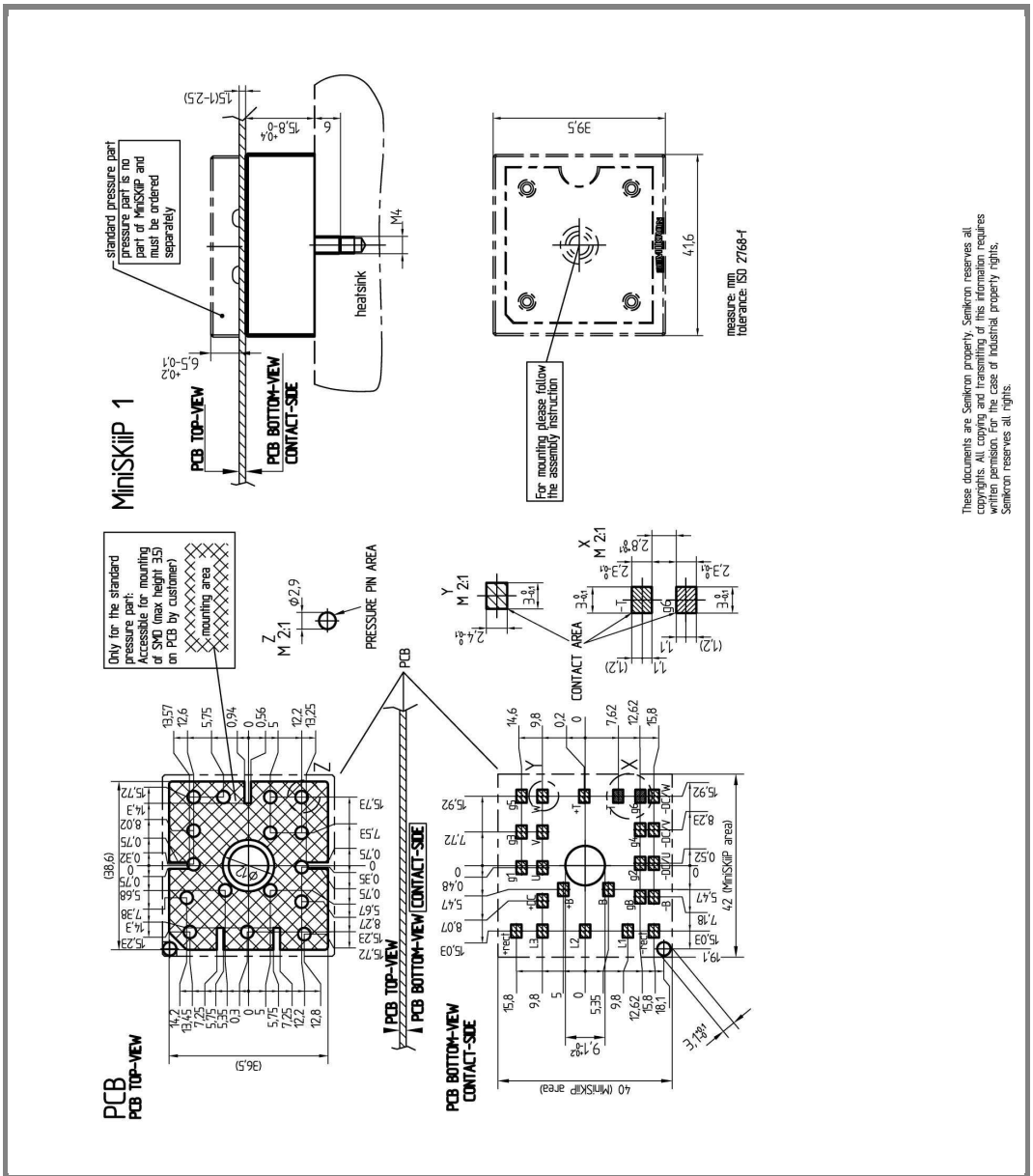


circuit



pinout, dimensions

This is an electrostatic discharge sensitive device (ESDS), international standard IEC 60747-1, Chapter IX.

* The specifications of our components may not be considered as an assurance of component characteristics. Components have to be tested for the respective application. Adjustments may be necessary. The use of SEMIKRON products in life support appliances and systems is subject to prior specification and written approval by SEMIKRON. We therefore strongly recommend prior consultation of our personal.