MiniSKiiP® 2

3-phase bridge rectifier + brake chopper

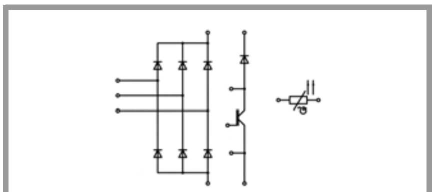
SKiiP 28ANB18V3

Features

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

Remarks

- Max. case temperature limited to T_C=125°C
- Product reliability results valid for T_j≤150°C (recommended $T_{j,op}$=-40...+150°C)
- IGBT 1: brake chopper IGBT
- Diode 1: brake chopper diode
- Diode 4: rectifier diode
- The distance between terminals of temperature sensor and –rect is not sufficient for basic insulation



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Absolute Maximum Ratings

Symbol	Conditions		Values	Unit
IGBT 1				
V_{CES}	T_j = 25 °C		1700	V
I_C	T_j = 150 °C	T_s = 25 °C	115	A
		T_s = 70 °C	88	A
I_C	T_j = 175 °C	T_s = 25 °C	128	A
		T_s = 70 °C	104	A
I_{Cnom}			100	A
I_{CRM}	I_{CRM} = 2 x I_{Cnom}		200	A
V_{GES}			-20 ... 20	V
t_{psc}	V_{CC} = 1200 V V_{GE} ≤ 20 V V_{CES} ≤ 1700 V	T_j = 150 °C	10	µs
T_j			-40 ... 175	°C

Absolute Maximum Ratings

Symbol	Conditions		Values	Unit
Diode 1				
V_{RRM}	T_j = 25 °C		1700	V
I_F	T_j = 150 °C	T_s = 25 °C	105	A
		T_s = 70 °C	76	A
I_F	T_j = 175 °C	T_s = 25 °C	119	A
		T_s = 70 °C	93	A
I_{Fnom}			150	A
I_{FRM}	I_{FRM} = 2 x I_{Fnom}		300	A
I_{FSM}	10 ms, sin 180°, T_j = 150 °C		860	A
T_j			-40 ... 175	°C

Absolute Maximum Ratings

Symbol	Conditions		Values	Unit
Diode 4				
V_{RRM}			1800	V
I_F	T_j = 150 °C	T_s = 25 °C	139	A
		T_s = 70 °C	98	A
I_{Fnom}	DC current		88	A
I_{FSM}	10 ms, sin 180°, T_j = 150 °C		890	A
I^2t	10 ms, sin. 180°, T_j = 150 °C		3900	A^2s
T_j			-40 ... 150	°C

Absolute Maximum Ratings

Symbol	Conditions	Values	Unit
Module			
$I_{t(RMS)}$	$T_{terminal}$ = 80 °C, 20 A per spring	80	A
T_{stg}		-40 ... 125	°C
V_{isol}	AC sinus 50 Hz, t = 1 min	2500	V

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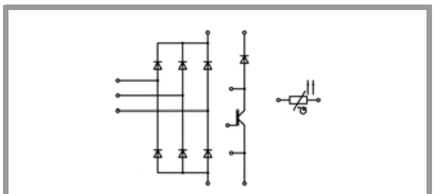

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Characteristics

Symbol	Conditions		min.	typ.	max.	Unit
IGBT 1						
$V_{CE(sat)}$	I_C = 100 A, V_{GE} = 15 V, chiplevel	T_j = 25 °C		2.00	2.40	V
		T_j = 150 °C		2.45	2.90	V
V_{CE0}	chiplevel	T_j = 25 °C		1	1.2	V
		T_j = 150 °C		0.9	1.1	V
r_{CE}	V_{GE} = 15 V, chiplevel	T_j = 25 °C		10	12	mΩ
		T_j = 150 °C		16	18	mΩ
$V_{GE(th)}$	V_{GE} = V_{CE} V, I_C = 4 mA		5.2	5.8	6.4	V
I_{CES}	V_{GE} = 0 V, V_{CE} = 1700 V	T_j = 25 °C		0.1	0.3	mA
						mA
C_{ies}	V_{CE} = 25 V, V_{GE} = 0 V	f = 1 MHz		8.82		nF
C_{oes}		f = 1 MHz		0.37		nF
C_{res}		f = 1 MHz		0.29		nF
Q_G	- 8 V...+ 15 V			934		nC
R_{Gint}	T_j = 25 °C			4.8		Ω
$t_{d(on)}$	V_{CC} = 900 V, I_C = 100 A, $R_{G\,on}$ = 1 Ω, $R_{G\,off}$ = 1 Ω, di/dt_{on} = 3000 A/µs, di/dt_{off} = 600 A/µs, $V_{GE\,neg}$ = -15 V, $V_{GE\,pos}$ = 15 V	T_j = 150 °C		160		ns
t_r		T_j = 150 °C		35		ns
E_{on}		T_j = 150 °C		23		mJ
$t_{d(off)}$		T_j = 150 °C		580		ns
t_f		T_j = 150 °C		150		ns
E_{off}		T_j = 150 °C		32.7		mJ
$R_{th(j-s)}$	per IGBT, λ_{paste}=0.8 W/K*m			0.33		K/W

Characteristics

Symbol	Conditions		min.	typ.	max.	Unit
Diode 1						
$V_F = V_{EC}$	I_F = 100 A, V_{GE} = 0 V, chiplevel	T_j = 25 °C		1.8	2.1	V
		T_j = 150 °C		1.8	2.1	V
V_{F0}	chiplevel	T_j = 25 °C		1.3	1.6	V
		T_j = 150 °C		1.1	1.2	V
r_F	chiplevel	T_j = 25 °C		4.4	5.4	mΩ
		T_j = 150 °C		6.9	8.7	mΩ
I_{RRM}	I_F = 100 A, di/dt_{off} = 4000 A/µs, V_{GE} = -15 V	T_j = 150 °C		226		A
Q_{rr}		T_j = 150 °C		38.5		µC
E_{rr}		T_j = 150 °C		26.4		mJ
$R_{th(j-s)}$	per Diode, λ_{paste}=0.8 W/K*m			0.58		K/W

Characteristics

Symbol	Conditions		min.	typ.	max.	Unit
Diode 4						
$V_F = V_{EC}$	I_F = 88 A, V_{GE} = 0 V, chiplevel	T_j = 25 °C		1.1	1.3	V
		T_j = 125 °C		1	1.3	V
V_{F0}	chiplevel	T_j = 25 °C	0.6	0.9	1.1	V
		T_j = 125 °C		0.7	1	V
r_F	chiplevel	T_j = 25 °C		2.3	2.6	mΩ
		T_j = 125 °C		3	3.3	mΩ
$R_{th(j-s)}$	per Diode, λ_{paste}=0.8 W/K*m			0.64		K/W

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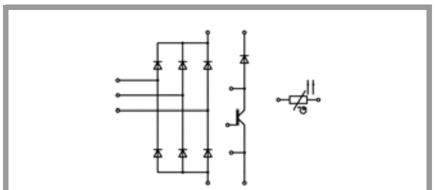

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Characteristics					
Symbol	**Conditions**	**min.**	**typ.**	**max.**	**Unit**
Temperature Sensor					
R_{100}	T_r=100°C (R_{25}=1000Ω)		1670 ± 3%		Ω
R(T)	R(T)=1000Ω[1+A(T-25°C)+B(T-25°C)^2], A = 7.635*10^{-3} °C^{-1}, B = 1.731*10^{-5} °C^{-2}				

Characteristics					
Symbol	**Conditions**	**min.**	**typ.**	**max.**	**Unit**
Module					
M_s	to heat sink	2		2.5	Nm
w	weight		55		g

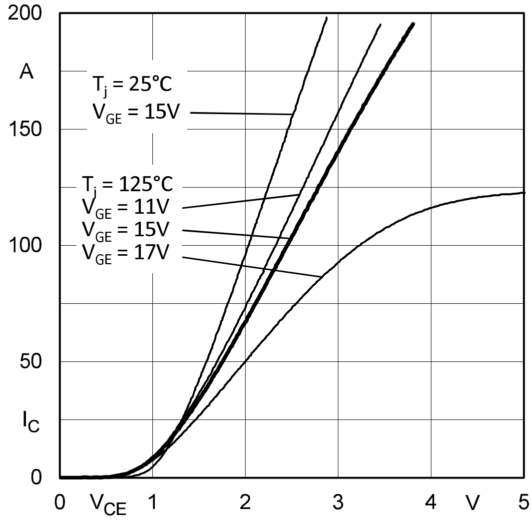


Fig. 1: Typ. output characteristic, inclusive $R_{CC'+EE'}$

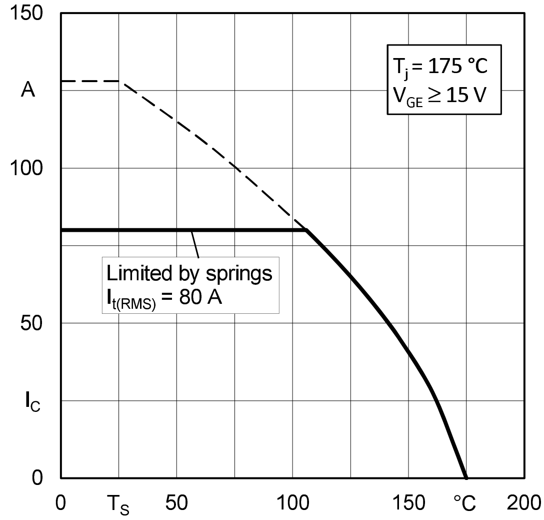


Fig. 2: Typ. rated current vs. temperature $I_C = f(T_S)$

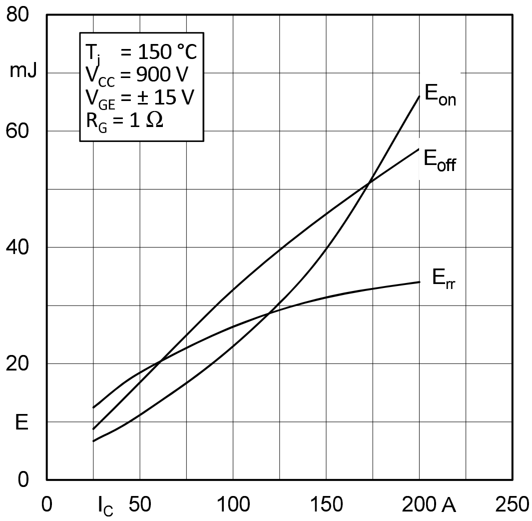


Fig. 3: Typ. turn-on /-off energy = f (I_C)

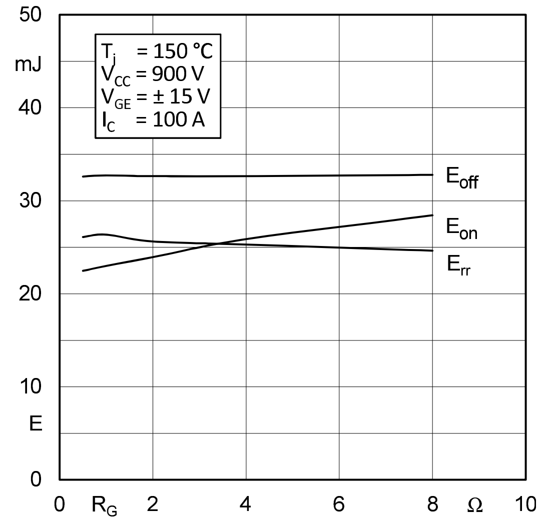


Fig. 4: Typ. turn-on /-off energy = f (R_G)

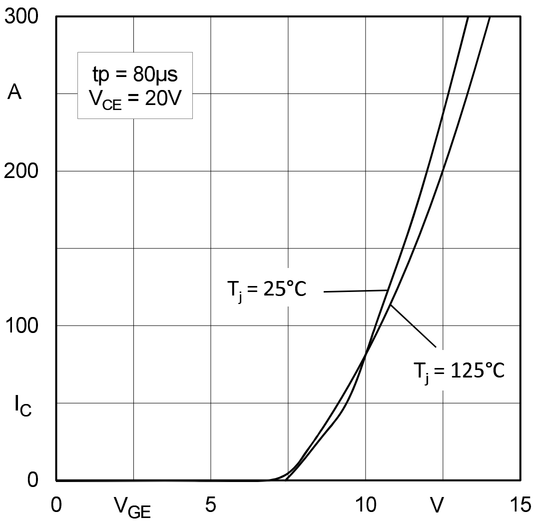


Fig. 5: Typ. transfer characteristic

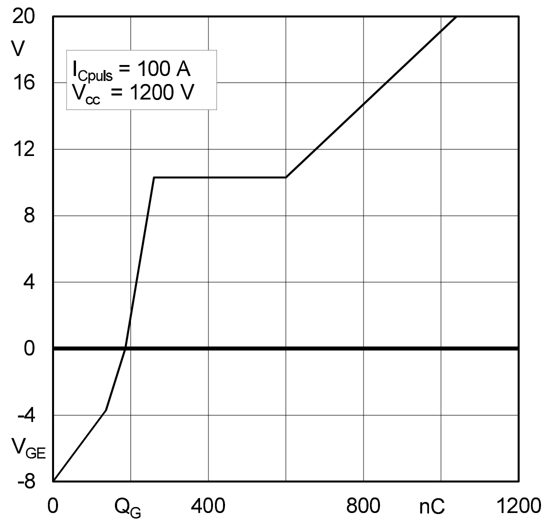


Fig. 6: Typ. gate charge characteristic

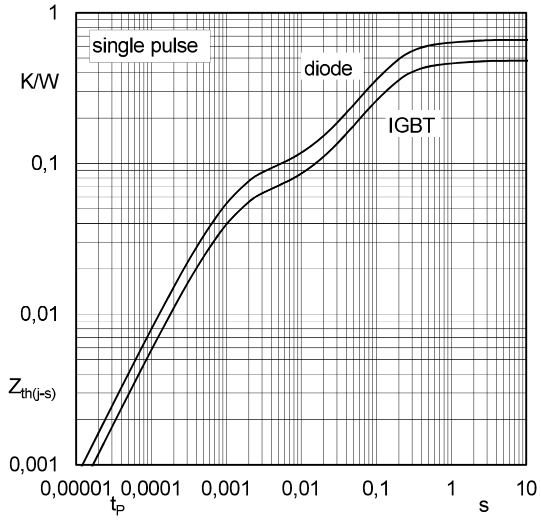


Fig. 7: Transient thermal impedance of IGBT and Diode

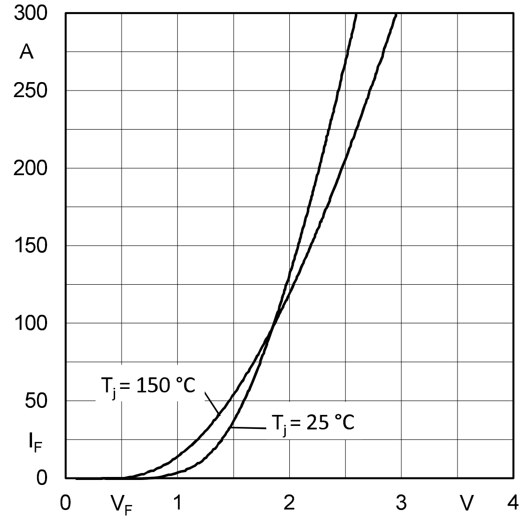


Fig. 8: CAL diode forward characteristic

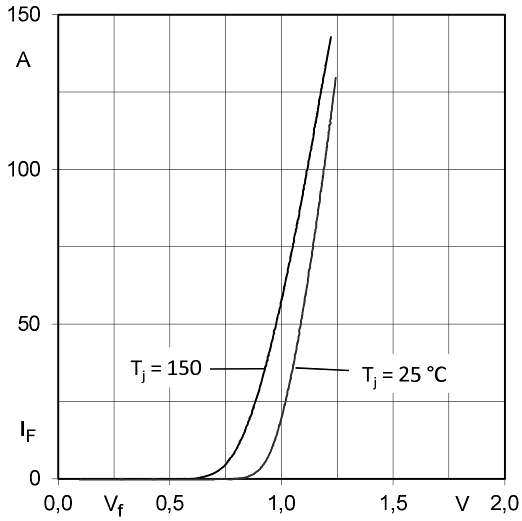
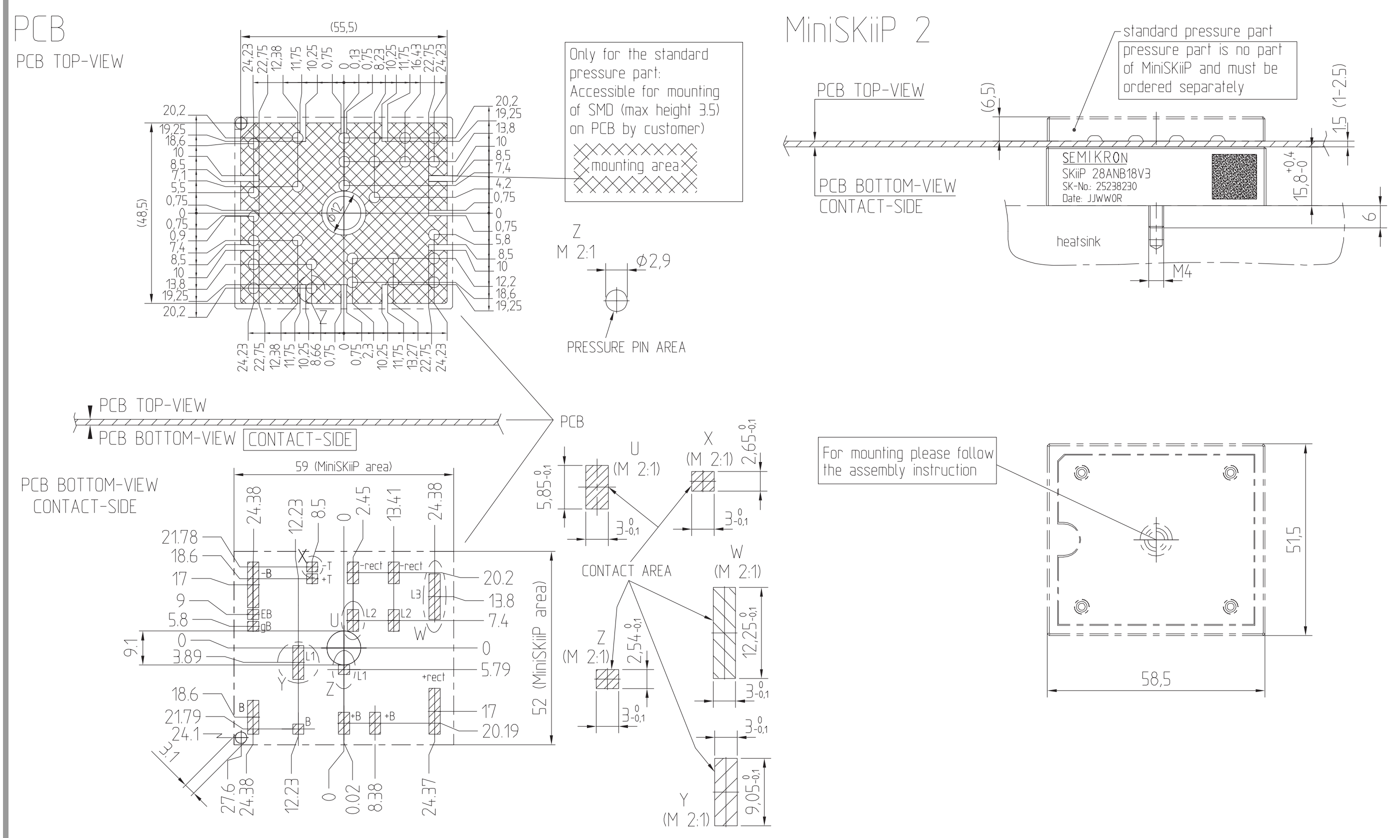
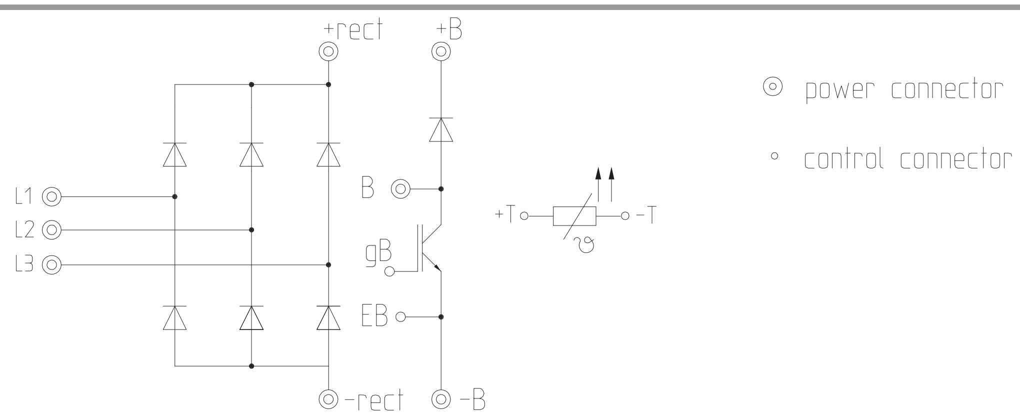


Fig. 9: Typ. input bridge forward characteristic



pinout, dimensions



pinout

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 staff.

