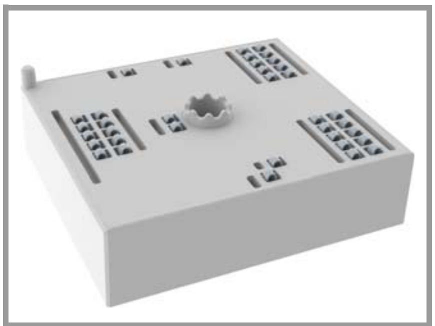
SKiiP 26GB12F4V1



MiniSKiiP® 2 Dual

IGBT module

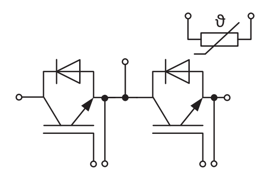
SKiiP 26GB12F4V1

Features

- Fast Trench 4 IGBTs
- Robust and soft freewheeling diodes in CAL technology
- Highly reliable spring contacts for electrical connections
- UL recognised: File no. E63532
- NTC T-Sensor

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)



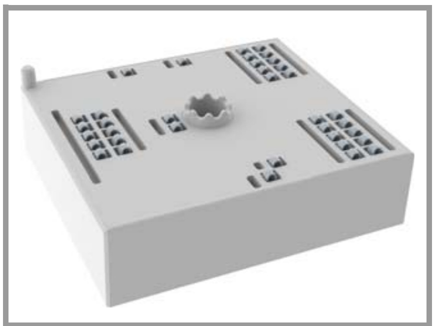
GB

Absolute Maximum Ratings

Symbol	Conditions		Values	Unit
Inverter - IGBT				
V_{CES}	T_j = 25 °C		1200	V
I_C	λ_{paste}=0.8 W/(mK)	T_s = 25 °C	197	A
	T_j = 175 °C	T_s = 70 °C	158	A
I_C	λ_{paste}=2.5 W/(mK)	T_s = 25 °C	258	A
	T_j = 175 °C	T_s = 70 °C	208	A
I_{Cnom}			200	A
I_{CRM}	I_{CRM} = 2 x I_{Cnom}		400	A
V_{GES}			-20 ... 20	V
t_{psc}	V_{CC} = 800 V V_{GE} ≤ 15 V V_{CES} ≤ 1200 V	T_j = 150 °C	10	µs
T_j			-40 ... 175	°C
Inverse - Diode				
I_F	λ_{paste}=0.8 W/(mK)	T_s = 25 °C	194	A
	T_j = 175 °C	T_s = 70 °C	154	A
I_F	λ_{paste}=2.5 W/(mK)	T_s = 25 °C	219	A
	T_j = 175 °C	T_s = 70 °C	174	A
I_{Fnom}			200	A
I_{FRM}	I_{FRM} = 2 x I_{Fnom}		400	A
I_{FSM}	10 ms, sin 180°, T_j = 150 °C		990	A
T_j			-40 ... 175	°C
Module				
$I_{t(RMS)}$	$T_{terminal}$ = 80 °C, 20 A per spring		200	A
T_{stg}			-40 ... 125	°C
V_{isol}	AC sinus 50 Hz, t = 1 min		2500	V

Characteristics

Symbol	Conditions		min.	typ.	max.	Unit
Inverter - IGBT						
$V_{CE(sat)}$	I_C = 200 A V_{GE} = 15 V chiplevel	T_j = 25 °C		2.05	2.42	V
		T_j = 150 °C		2.59	2.96	V
V_{CE0}	chiplevel	T_j = 25 °C		1.10	1.28	V
		T_j = 150 °C		0.95	1.13	V
r_{CE}	V_{GE} = 15 V chiplevel	T_j = 25 °C		4.8	5.7	mΩ
		T_j = 150 °C		8.2	9.2	mΩ
$V_{GE(th)}$	V_{GE} = V_{CE}, I_C = 7.6 mA		5.2	5.8	6.4	V
I_{CES}	V_{GE} = 0 V, V_{CE} = 1200 V, T_j = 25 °C			0.1	0.3	mA
C_{ies}	V_{CE} = 25 V V_{GE} = 0 V	f = 1 MHz		12.30		nF
C_{oes}		f = 1 MHz		0.81		nF
C_{res}		f = 1 MHz		0.69		nF
Q_G	V_{GE} = - 8 V...+ 15 V			1134		nC
R_{Gint}	T_j = 25 °C			3.8		Ω
$t_{d(on)}$	V_{CC} = 600 V I_C = 200 A $R_{G\ on}$ = 2 Ω $R_{G\ off}$ = 2 Ω di/dt_{on} = 4100 A/µs di/dt_{off} = 2500 A/µs V_{GE} = +15/-15 V	T_j = 150 °C		167		ns
t_r		T_j = 150 °C		52		ns
E_{on}		T_j = 150 °C		16.8		mJ
$t_{d(off)}$		T_j = 150 °C		414		ns
t_f		T_j = 150 °C		52		ns
E_{off}		T_j = 150 °C		16.3		mJ
$R_{th(j-s)}$	per IGBT, λ_{paste}=0.8 W/(mK)			0.25		K/W
$R_{th(j-s)}$	per IGBT, λ_{paste}=2.5 W/(mK)			0.16		K/W



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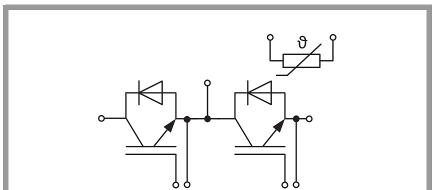


GB

Characteristics						
Symbol	**Conditions**		**min.**	**typ.**	**max.**	**Unit**
Inverse - Diode						
$V_F = V_{EC}$	I_F = 200 A V_{GE} = 0 V chiplevel	T_j = 25 °C		2.20	2.52	V
		T_j = 150 °C		2.15	2.47	V
V_{F0}	chiplevel	T_j = 25 °C		1.30	1.50	V
		T_j = 150 °C		0.90	1.10	V
r_F	chiplevel	T_j = 25 °C		4.5	5.1	mΩ
		T_j = 150 °C		6.3	6.9	mΩ
I_{RRM}	I_F = 200 A di/dt_{off} = 3840 A/µs V_{GE} = -15 V V_{CC} = 600 V	T_j = 150 °C		189		A
Q_{rr}		T_j = 150 °C		28.7		µC
E_{rr}		T_j = 150 °C		11.7		mJ
$R_{th(j-s)}$	per Diode, λ_{paste}=0.8 W/(mK)			0.34		K/W
$R_{th(j-s)}$	per Diode, λ_{paste}=2.5 W/(mK)			0.28		K/W
Module						
L_{CE}				20		nH
M_s	to heat sink		2		2.5	Nm
w				50		g
Temperature Sensor						
R_{100}	T_c=100°C (R_{25}=5 kΩ)			493 ± 5%		Ω
$B_{25/85}$	$R_{(T)}=R_{25}$*exp[$B_{25/85}$*(1/T-1/298)], [T]=K			3420		K

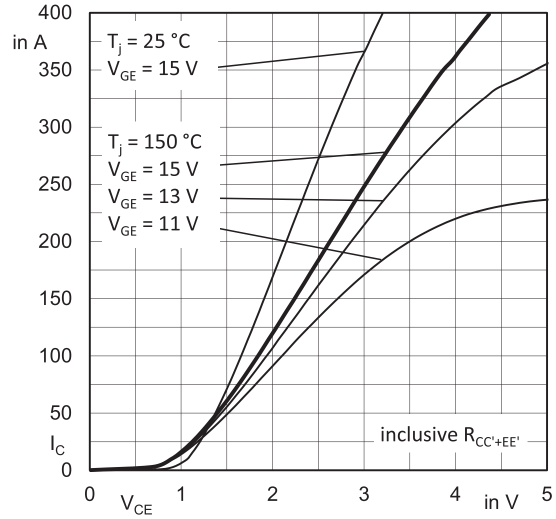


Fig. 1: Typ. output characteristic, inclusive $R_{CC'+EE'}$

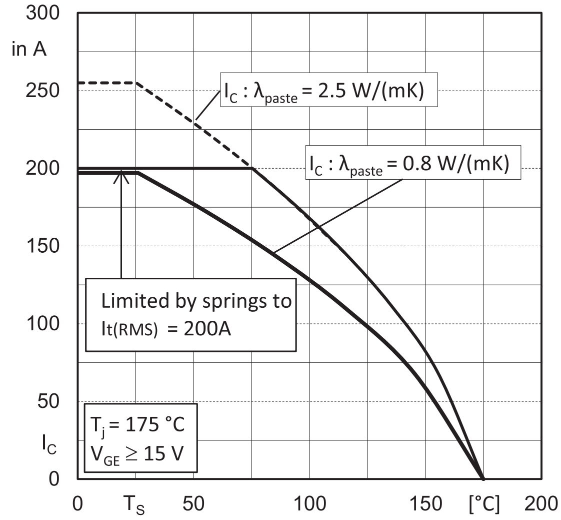


Fig. 2: Rated current vs. temperature I_C = f (T_S)

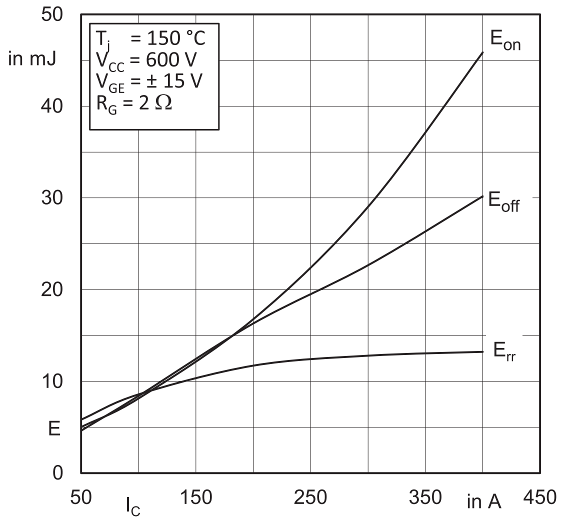


Fig. 3: Typ. turn-on /-off energy = f (I_C)

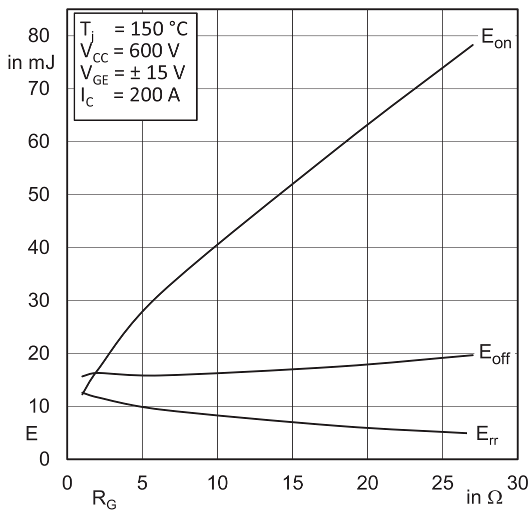


Fig. 4: Typ. turn-on /-off energy = f (R_G)

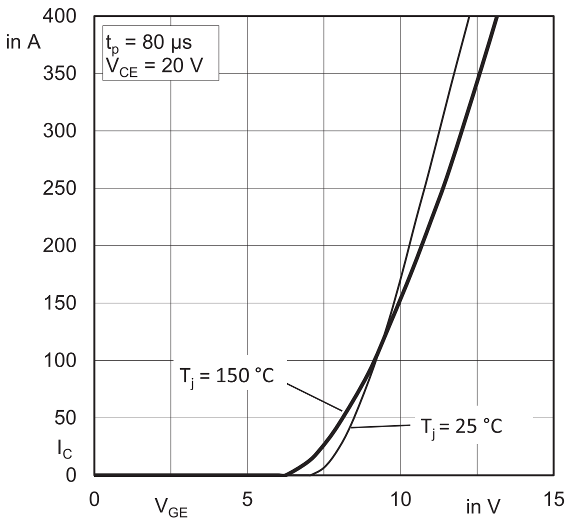


Fig. 5: Typ. transfer characteristic

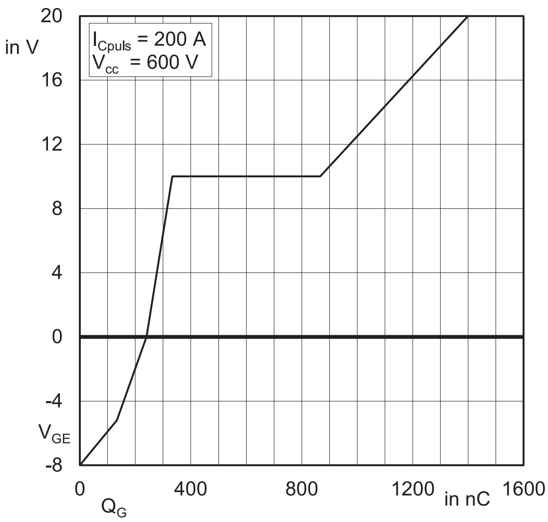


Fig. 6: Typ. gate charge characteristic

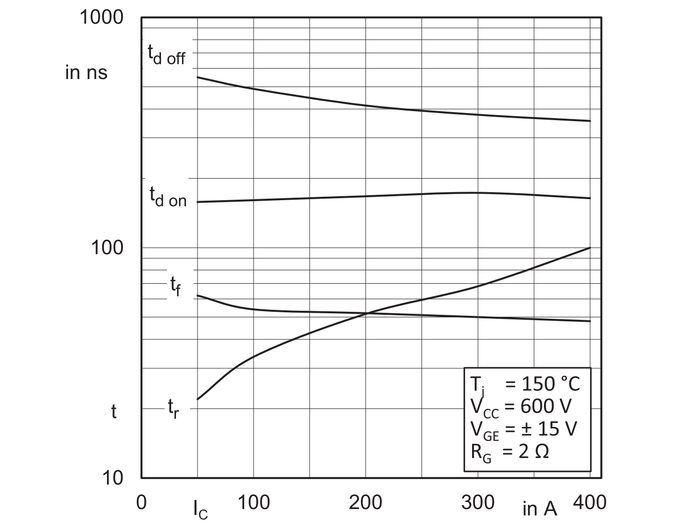


Fig. 7: Typ. switching times vs. I_C

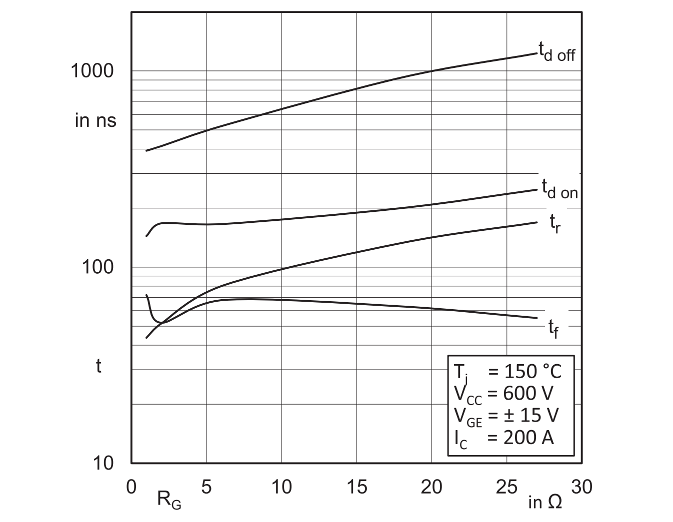


Fig. 8: Typ. switching times vs. gate resistor R_G

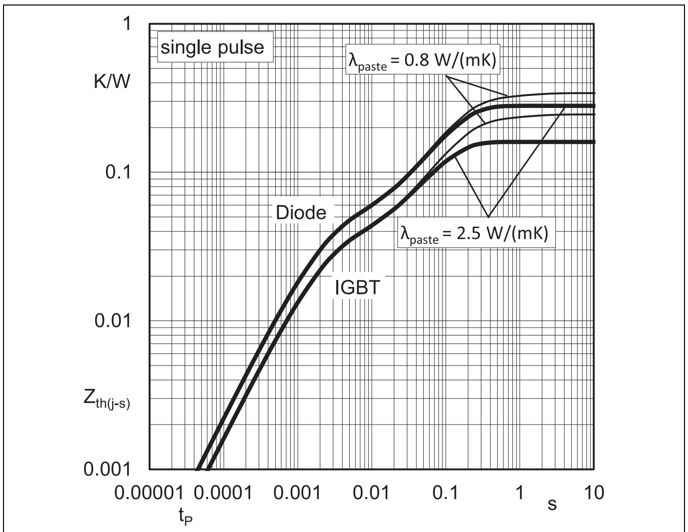


Fig. 9: Transient thermal impedance of IGBT and Diode

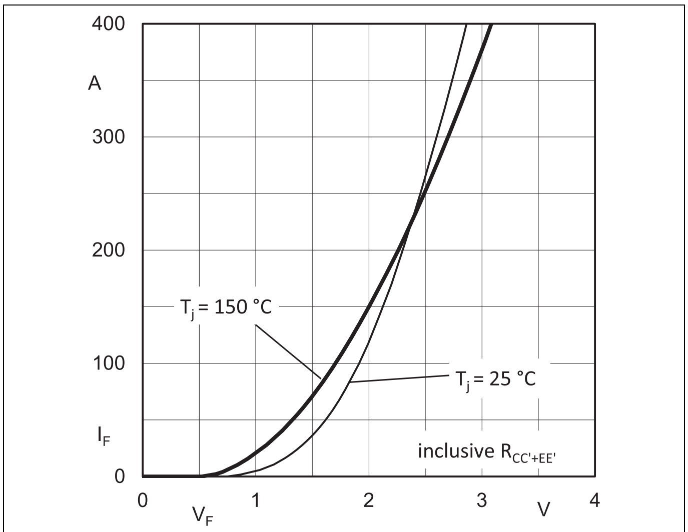


Fig. 10: Typ. CAL diode forward charact., incl. $R_{CC'+EE'}$

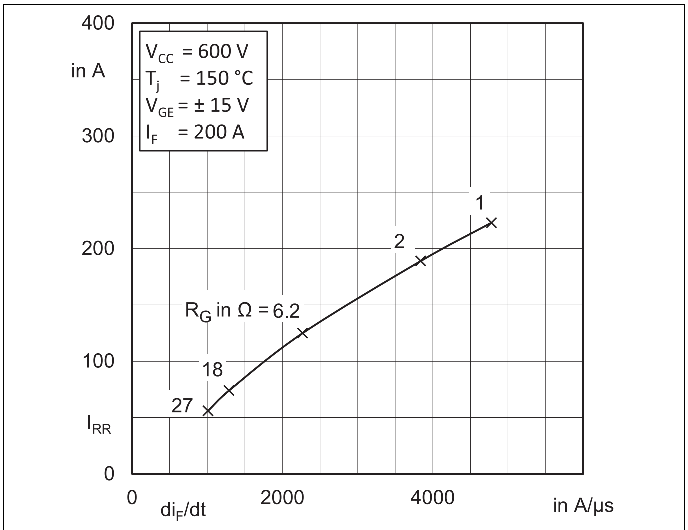


Fig. 11: Typ. CAL diode peak reverse recovery current

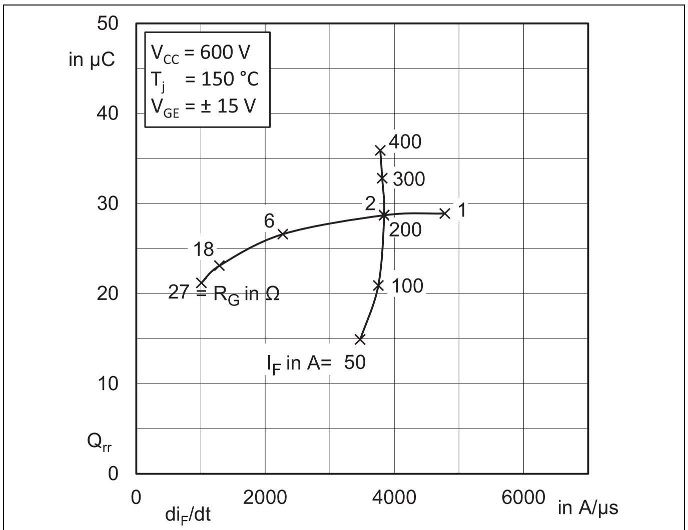
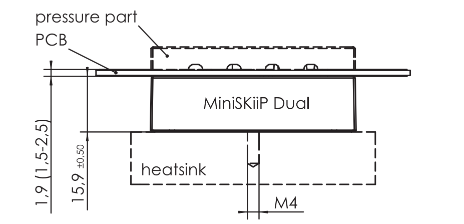


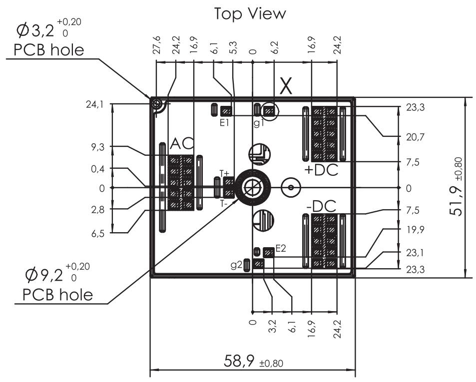
Fig. 12: Typ. CAL diode recovery charge

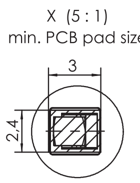


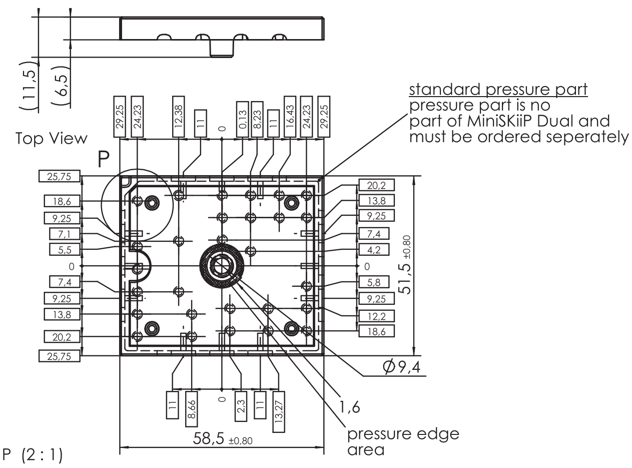
For mounting please follow the assembly instruction

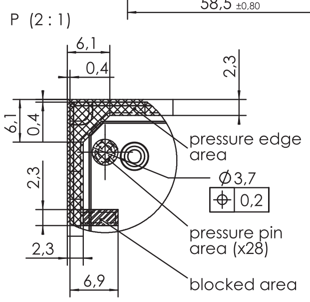
requirement for PCB Design: The MiniSKiiP area shall be coverd with a maximum of circuit paths. This ensures a uniform area pressure

measure: mm
tolerance: +/- 0,2







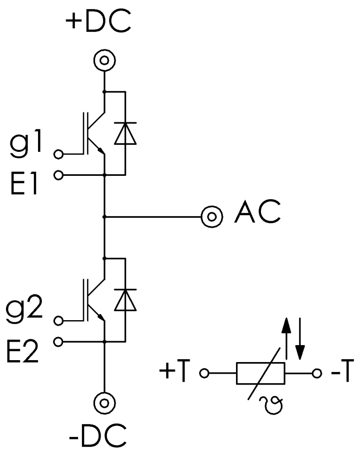


Accessible for mounting of SMD (max. height 3.5) on PCB by customer. Except pressure areas and blocked areas!

requirement for PCB design: The pressure pin areas and more than 80% of the pressure edge areas must be on the same level and coverd with circuit path. This ensures a uniform area pressure.

measure: mm
tolerance: +/- 0,2

pinout, dimensions



◎ power connector

○ control connector

pinout

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

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