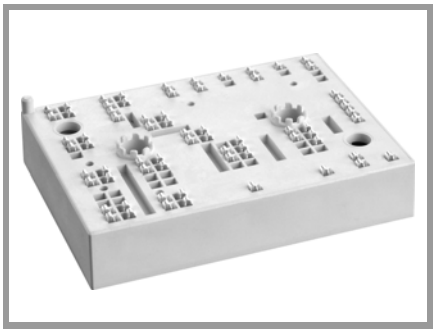
SKiiP 35ACC12F4V1



MiniSKiiP® 3

IGBT module

SKiiP 35ACC12F4V1

Features

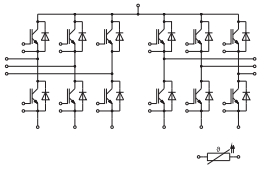
- Fast Trench 4 IGBTs
- Robust and soft freewheeling diodes in CAL technology
- Highly reliable spring contacts for electrical connections
- UL recognised: File no. E63532

Typical Applications*

- 4Q inverters

Remarks

- Case temperature limited to T_C=125°C max.; $T_C = T_S$ (for baseplateless modules)
- Product reliability results valid for T_j≤150°C (recommended T_{jop}=-40...+150°C)
- Inverter IGBT: IGBT 1 - IGBT 12
- Inverse Diode: Diode 1 – Diode 12
- The creepage distance between T-Sensor and DC- is 0,8mm (functional isolation of T-sensor only up to 200V)



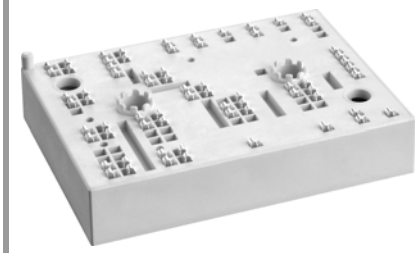
ACC

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	54	A
	T_j = 175 °C	T_s = 70 °C	43	A
I_C	λ_{paste}=2.5 W/(mK)	T_s = 25 °C	62	A
	T_j = 175 °C	T_s = 70 °C	50	A
I_{Cnom}			50	A
I_{CRM}	I_{CRM} = 3 x I_{Cnom}		150	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	58	A
	T_j = 175 °C	T_s = 70 °C	46	A
I_F	λ_{paste}=2.5 W/(mK)	T_s = 25 °C	65	A
	T_j = 175 °C	T_s = 70 °C	52	A
I_{Fnom}			50	A
I_{FRM}	I_{FRM} = 2 x I_{Fnom}		100	A
I_{FSM}	t_p = 10 ms, sin 180°, T_j = 150 °C		270	A
T_j			-40 ... 175	°C
Module				
$I_{t(RMS)}$	$T_{terminal}$ = 80 °C, 20 A per spring		40	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 = 50 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		19	23	mΩ
		T_j = 150 °C		33	37	mΩ
$V_{GE(th)}$	V_{GE} = V_{CE}, I_C = 1.7 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		2.77		nF
C_{oes}		f = 1 MHz		0.21		nF
C_{res}		f = 1 MHz		0.16		nF
Q_G	V_{GE} = - 8 V...+ 15 V			283		nC
R_{Gint}	T_j = 25 °C			4.0		Ω
$t_{d(on)}$	V_{CC} = 600 V I_C = 50 A $R_{G\ on}$ = 6.2 Ω $R_{G\ off}$ = 0 Ω di/dt$_{on}$ = 2508 A/µs di/dt$_{off}$ = 1082 A/µs	T_j = 150 °C		28		ns
t_r		T_j = 150 °C		21		ns
E_{on}		T_j = 150 °C		4.8		mJ
$t_{d(off)}$		T_j = 150 °C		234		ns
t_f		T_j = 150 °C		47		ns
E_{off}	V_{GE} = +15/-15 V	T_j = 150 °C		3.4		mJ
$R_{th(j-s)}$	per IGBT, λ_{paste}=0.8 W/(mK)			0.87		K/W
$R_{th(j-s)}$	per IGBT, λ_{paste}=2.5 W/(mK)			0.69		K/W



MiniSKiiP® 3

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SKiiP 35ACC12F4V1

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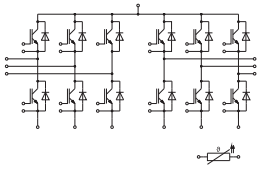
Characteristics

Symbol	Conditions		min.	typ.	max.	Unit
Inverse - Diode						
$V_F = V_{EC}$	I_F = 50 A V_{GE} = 0 V chiplevel	T_j = 25 °C		2.22	2.54	V
		T_j = 150 °C		2.18	2.50	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		18	21	mΩ
		T_j = 150 °C		26	28	mΩ
I_{RRM}	I_F = 50 A di/dt_{off} = 2426 A/µs V_{GE} = +15/-15 V V_{CC} = 600 V	T_j = 150 °C		90.1		A
Q_{rr}		T_j = 150 °C		8.25		µC
E_{rr}		T_j = 150 °C		3		mJ
$R_{th(j-s)}$	per Diode, λ_{paste}=0.8 W/(mK)			1.02		K/W
$R_{th(j-s)}$	per Diode, λ_{paste}=2.5 W/(mK)			0.84		K/W
Module						
L_{CE}				-		nH
M_s	to heat sink		2		2.5	Nm
w				55		g
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}					



ACC

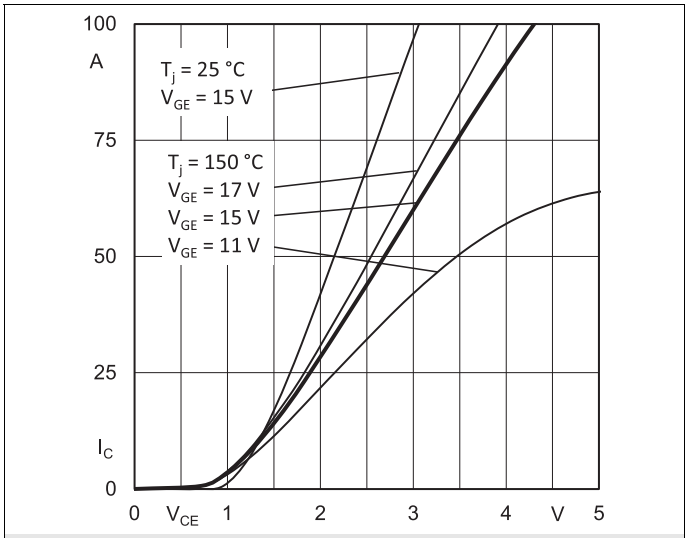


Fig. 1: Typ. output characteristic, inclusive $R_{CC'+EE'}$

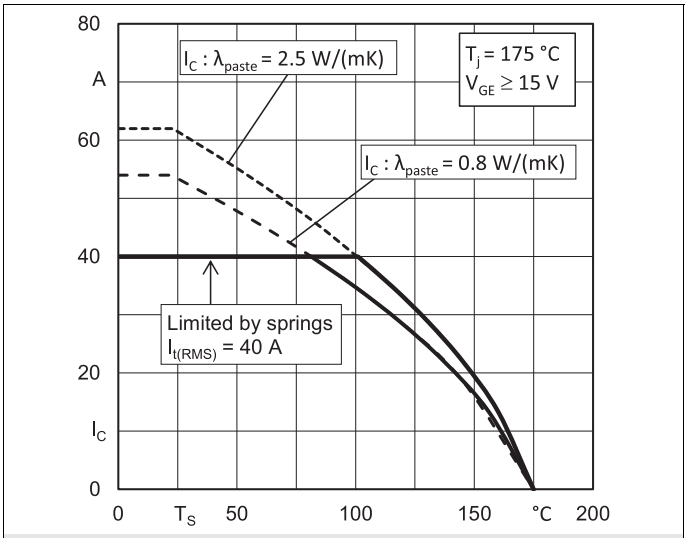


Fig. 2: Rated current vs. temperature $I_C = f(T_S)$

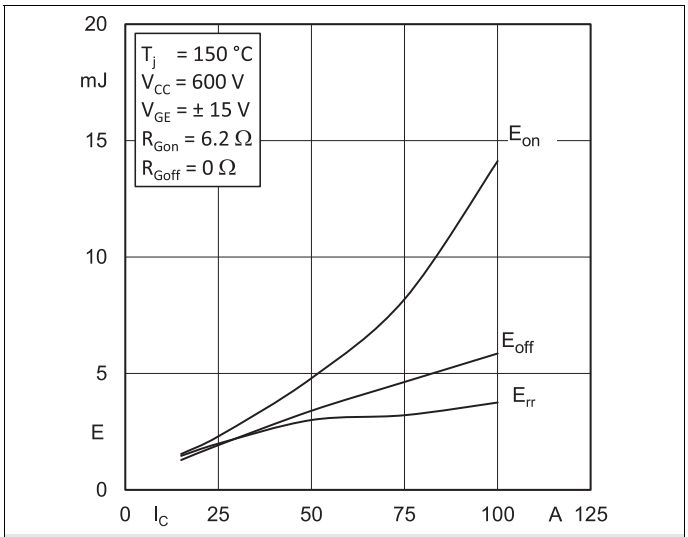


Fig. 3: Typ. turn-on /-off energy = f (I_C)

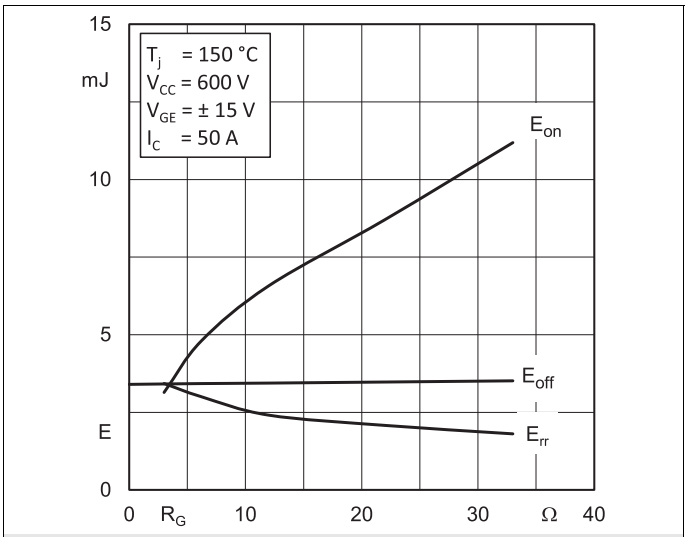


Fig. 4: Typ. turn-on /-off energy = f (R_G)

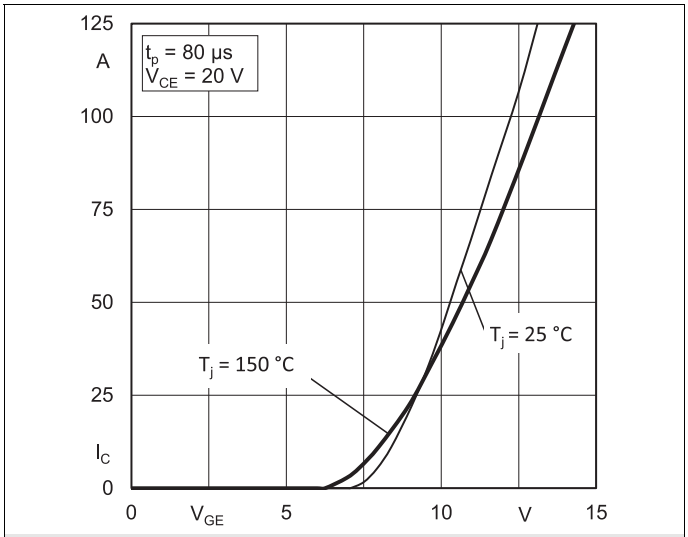


Fig. 5: Typ. transfer characteristic

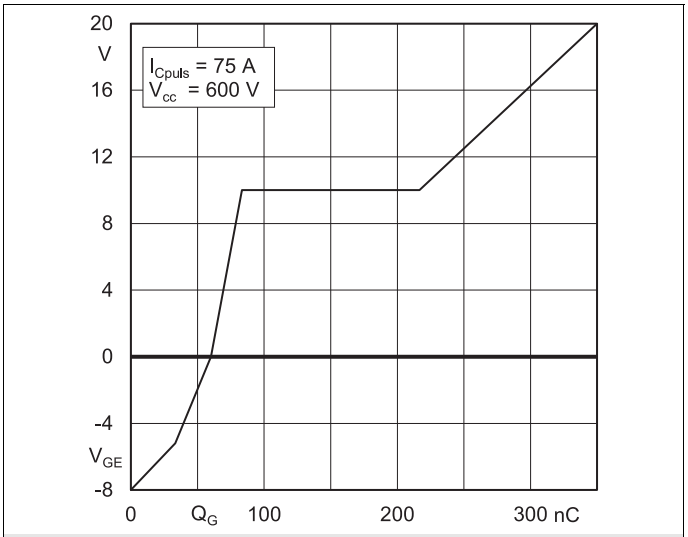


Fig. 6: Typ. gate charge characteristic

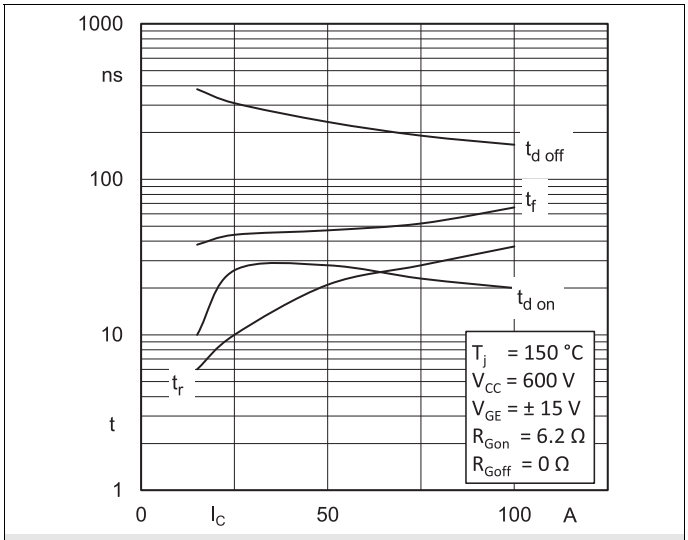


Fig. 7: Typ. switching times vs. I_C

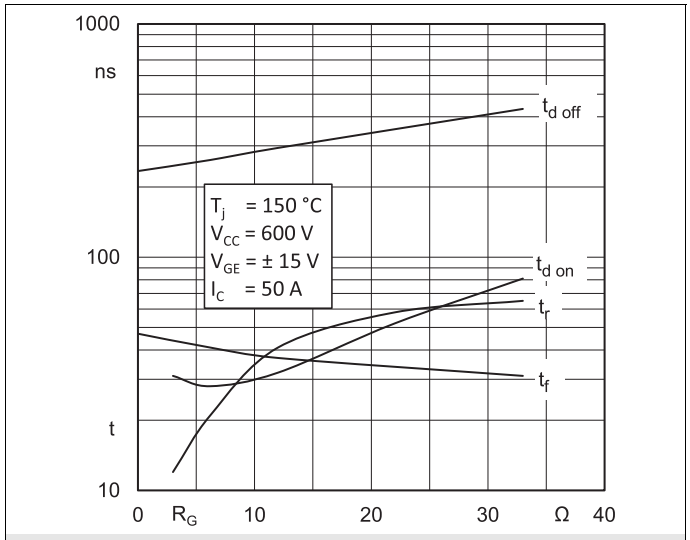


Fig. 8: Typ. switching times vs. gate resistor R_G

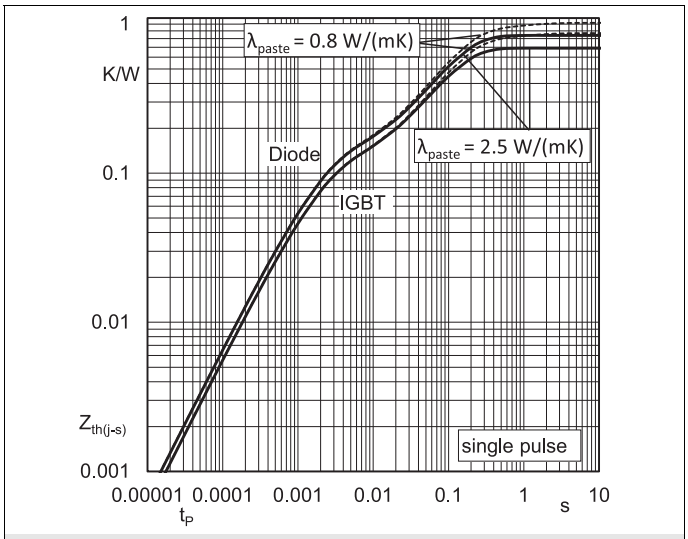


Fig. 9: Transient thermal impedance of IGBT and Diode

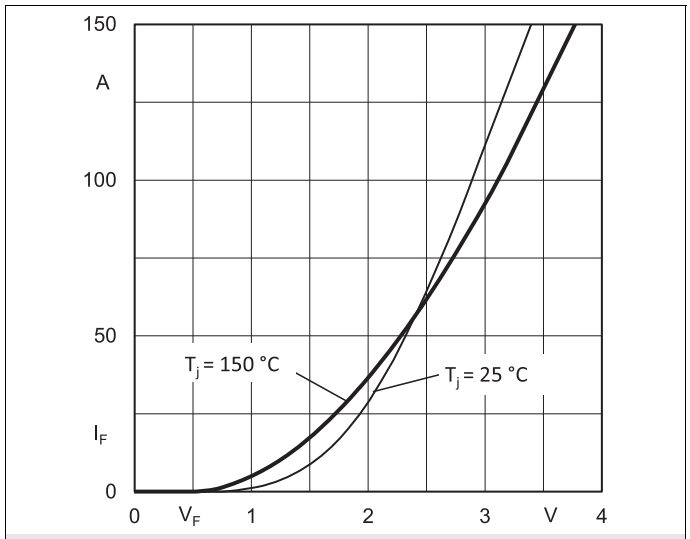


Fig. 10: Typ. CAL diode forward charact., incl. $R_{CC'+EE'}$

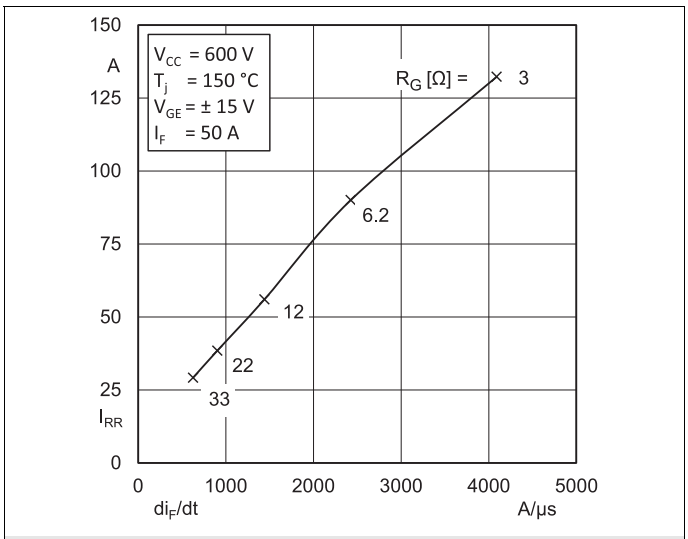


Fig. 11: Typ. CAL diode peak reverse recovery current

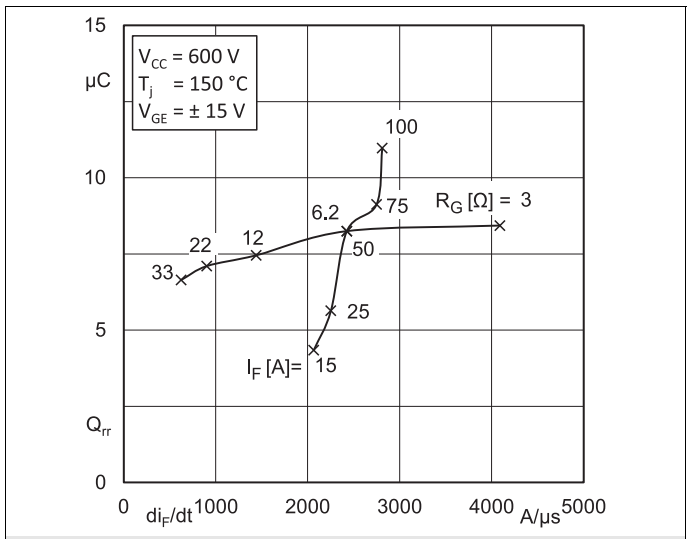
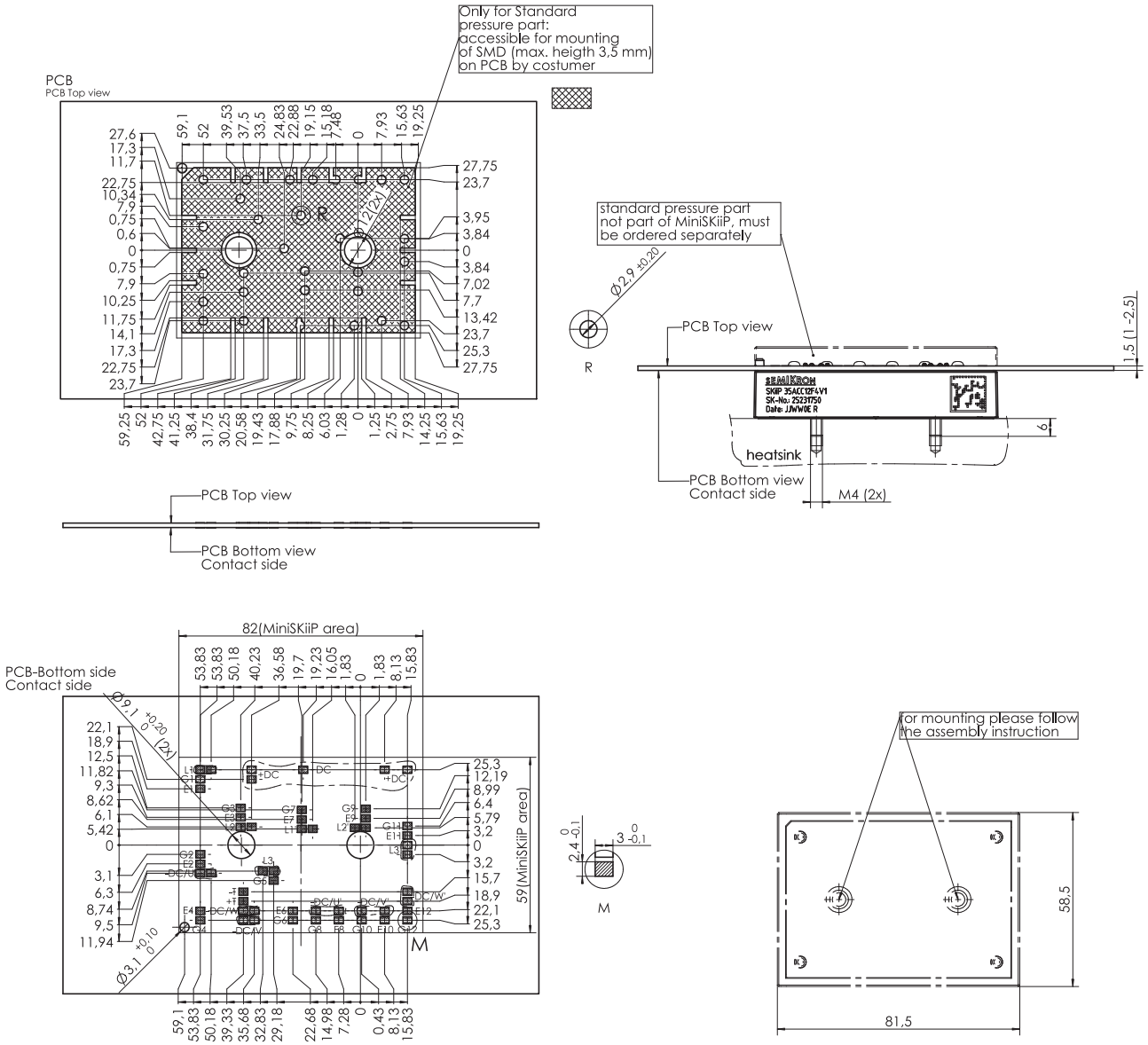
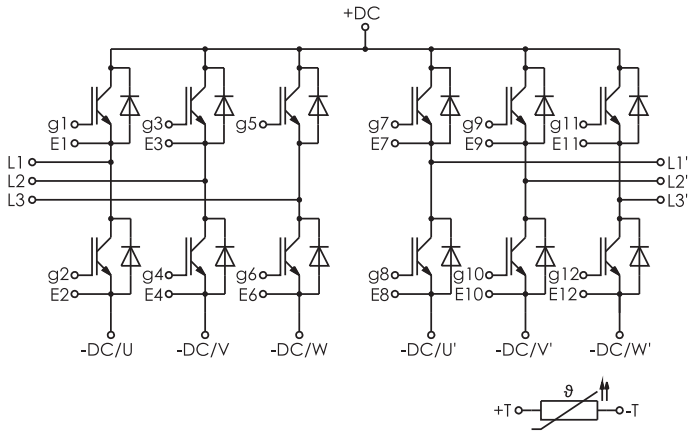


Fig. 12: Typ. CAL diode recovery charge



pinout, dimensions



pinout

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

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