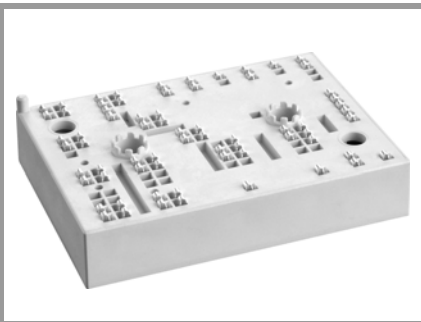


SKiiP 38AC12T4V1



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SKiiP 38AC12T4V1

Features

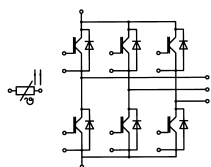
- Trench 4 IGBTs
- Robust and soft freewheeling diodes in CAL technology
- Highly reliable spring contacts for electrical connections
- UL recognised: File no. E63532

Typical Applications*

- Inverter up to 41 kVA
- Typical motor power 22 kW

Remarks

- Max. case temperature limited to $T_C=125^\circ\text{C}$
- Product reliability results valid for $T_j \leq 150^\circ\text{C}$ (recommended $T_{j,op} = -40 \dots +150^\circ\text{C}$)
- For short circuit: Soft R_{Goff} recommended
- MiniSKiiP "Technical Explanations" and "Mounting Instructions" are part of the data sheet. Please refer to both documents for further information.

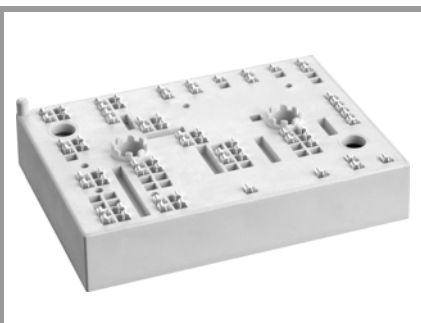


AC

Absolute Maximum Ratings				
Symbol	Conditions		Values	Unit
Inverter - IGBT				
V_{CES}	$T_j = 25^\circ\text{C}$		1200	V
I_C	$\lambda_{paste}=0.8 \text{ W/(mK)}$	$T_s = 25^\circ\text{C}$	115	A
		$T_j = 175^\circ\text{C}$	93	A
I_C	$\lambda_{paste}=2.5 \text{ W/(mK)}$	$T_s = 25^\circ\text{C}$	140	A
		$T_j = 175^\circ\text{C}$	114	A
I_{Cnom}			100	A
I_{CRM}	$I_{CRM} = 3 \times I_{Cnom}$		300	A
V_{GES}			-20 ... 20	V
t_{psc}	$V_{CC} = 800 \text{ V}$	$T_j = 150^\circ\text{C}$	10	μs
	$V_{GE} \leq 15 \text{ V}$			
	$V_{CES} \leq 1200 \text{ V}$			
T_j			-40 ... 175	$^\circ\text{C}$
Inverse - Diode				
I_F	$\lambda_{paste}=0.8 \text{ W/(mK)}$	$T_s = 25^\circ\text{C}$	100	A
		$T_j = 175^\circ\text{C}$	79	A
I_F	$\lambda_{paste}=2.5 \text{ W/(mK)}$	$T_s = 25^\circ\text{C}$	116	A
		$T_j = 175^\circ\text{C}$	93	A
I_{Fnom}			100	A
I_{FRM}	$I_{FRM} = 3 \times I_{Fnom}$		300	A
I_{FSM}	10 ms, sin 180°, $T_j = 150^\circ\text{C}$		550	A
T_j			-40 ... 175	$^\circ\text{C}$
Module				
$I_t(\text{RMS})$	$T_{terminal} = 80^\circ\text{C}$, 20 A per spring		160	A
T_{stg}			-40 ... 125	$^\circ\text{C}$
V_{isol}	AC sinus 50 Hz, $t = 1 \text{ min}$		2500	V

Characteristics						
Symbol	Conditions		min.	typ.	max.	Unit
Inverter - IGBT						
$V_{CE(sat)}$	$I_C = 100 \text{ A}$ $V_{GE} = 15 \text{ V}$ chipelevel	$T_j = 25^\circ\text{C}$		1.80	2.05	V
		$T_j = 150^\circ\text{C}$		2.20	2.40	V
V_{CE0}	chipelevel	$T_j = 25^\circ\text{C}$		0.80	0.90	V
		$T_j = 150^\circ\text{C}$		0.70	0.80	V
r_{CE}	$V_{GE} = 15 \text{ V}$ chipelevel	$T_j = 25^\circ\text{C}$		10	12	m Ω
		$T_j = 150^\circ\text{C}$		15	16	m Ω
$V_{GE(th)}$	$V_{GE} = V_{CE}$, $I_C = 4 \text{ mA}$		5	5.8	6.5	V
I_{CES}	$V_{GE} = 0 \text{ V}$, $V_{CE} = 1200 \text{ V}$, $T_j = 25^\circ\text{C}$			0.1	0.3	mA
C_{ies}	$V_{CE} = 25 \text{ V}$ $V_{GE} = 0 \text{ V}$	$f = 1 \text{ MHz}$		6.15		nF
C_{oes}		$f = 1 \text{ MHz}$		0.41		nF
C_{res}		$f = 1 \text{ MHz}$		0.35		nF
Q_G	- 8 V...+ 15 V			565		nC
R_{Gint}	$T_j = 25^\circ\text{C}$			7.5		Ω
$t_{d(on)}$	$V_{CC} = 600 \text{ V}$	$T_j = 150^\circ\text{C}$		160		ns
t_r	$I_C = 100 \text{ A}$ $R_{Gon} = 1 \Omega$	$T_j = 150^\circ\text{C}$		45		ns
		$T_j = 150^\circ\text{C}$		13.7		mJ
E_{on}	$R_{Goff} = 1 \Omega$	$T_j = 150^\circ\text{C}$		13.7		mJ
$t_{d(off)}$	$di/dt_{on} = 2080 \text{ A}/\mu\text{s}$	$T_j = 150^\circ\text{C}$		395		ns
t_f	$di/dt_{off} = 1240 \text{ A}/\mu\text{s}$	$T_j = 150^\circ\text{C}$		73		ns
E_{off}	$V_{GE} = +15/-15 \text{ V}$	$T_j = 150^\circ\text{C}$		9.7		mJ
$R_{th(j-s)}$	per IGBT, $\lambda_{paste}=0.8 \text{ W/(mK)}$			0.48		K/W
$R_{th(j-s)}$	per IGBT, $\lambda_{paste}=2.5 \text{ W/(mK)}$			0.34		K/W

SKiiP 38AC12T4V1



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Features

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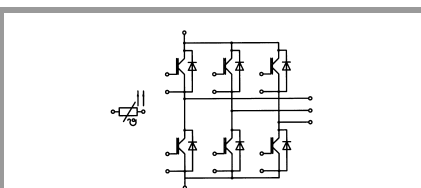
Typical Applications*

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Remarks

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Characteristics						
Symbol	Conditions		min.	typ.	max.	Unit
Inverse - Diode						
$V_F = V_{EC}$	$I_F = 100 \text{ A}$ $V_{GE} = 0 \text{ V}$ chipelevel	$T_j = 25^\circ\text{C}$		2.20	2.52	V
		$T_j = 150^\circ\text{C}$		2.15	2.47	V
V_{F0}	chipelevel	$T_j = 25^\circ\text{C}$		1.30	1.50	V
		$T_j = 150^\circ\text{C}$		0.90	1.10	V
r_F	chipelevel	$T_j = 25^\circ\text{C}$		9.0	10	m Ω
		$T_j = 150^\circ\text{C}$		13	14	m Ω
I_{RRM}	$I_F = 100 \text{ A}$	$T_j = 150^\circ\text{C}$		112		A
Q_{rr}	$di/dt_{off} = 2680 \text{ A}/\mu\text{s}$ +15/-15	$T_j = 150^\circ\text{C}$		16		μC
E_{rr}	$V_{CC} = 600 \text{ V}$	$T_j = 150^\circ\text{C}$		6.5		mJ
$R_{th(j-s)}$	per Diode, $\lambda_{paste}=0.8 \text{ W}/(\text{mK})$			0.66		K/W
$R_{th(j-s)}$	per Diode, $\lambda_{paste}=2.5 \text{ W}/(\text{mK})$			0.52		K/W
Module						
L_{CE}						nH
M_s	to heat sink		2		2.5	Nm
w				82		g
Temperature Sensor						
R_{100}	$T_r=100^\circ\text{C}$ ($R_{25}=1000\Omega$)			$1670 \pm 3\%$		Ω
$R(T)$	$R(T)=1000\Omega[1+A(T-25^\circ\text{C})+B(T-25^\circ\text{C})^2]$], $A = 7.635 \cdot 10^{-3} \text{ }^\circ\text{C}^{-1}$, $B = 1.731 \cdot 10^{-5} \text{ }^\circ\text{C}^{-2}$					



AC

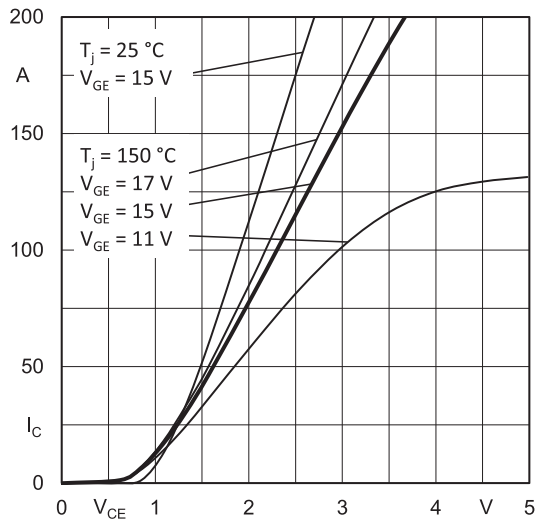


Fig. 1: Typ. output characteristic, inclusive $R_{CC'+EE'}$

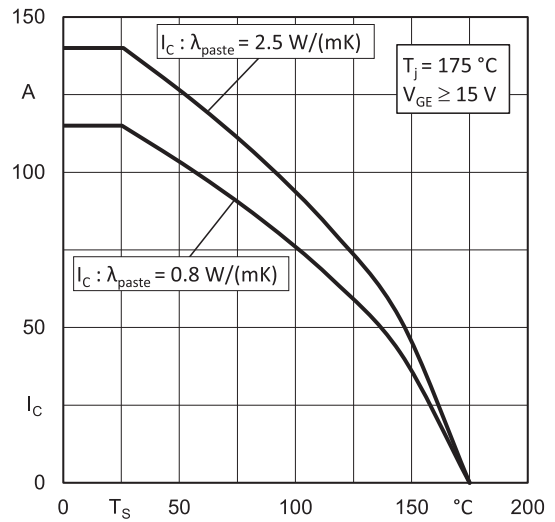


Fig. 2: Rated current vs. temperature $I_C = f(T_S)$

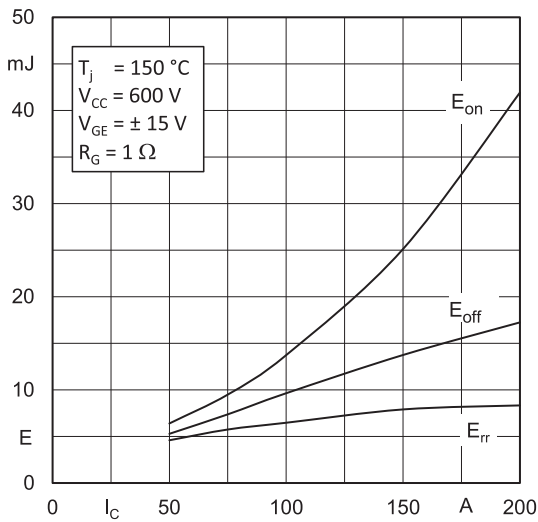


Fig. 3: Typ. turn-on /-off energy = $f(I_C)$

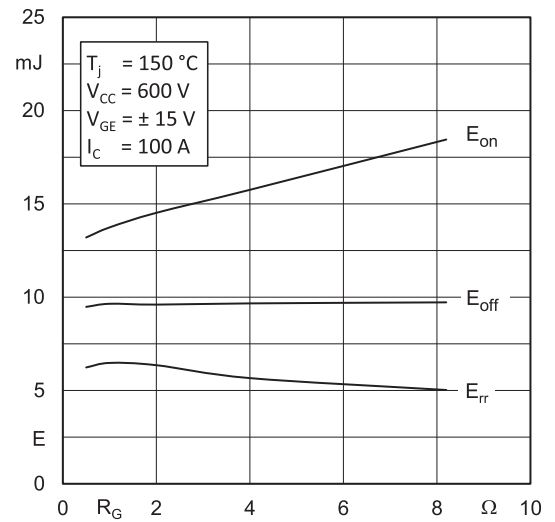


Fig. 4: Typ. turn-on /-off energy = $f(R_G)$

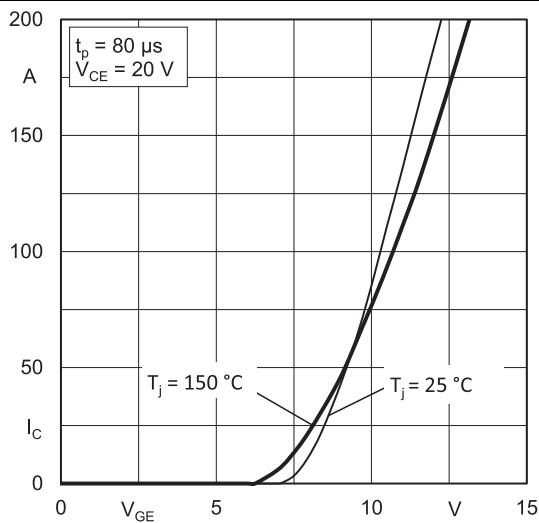


Fig. 5: Typ. transfer characteristic

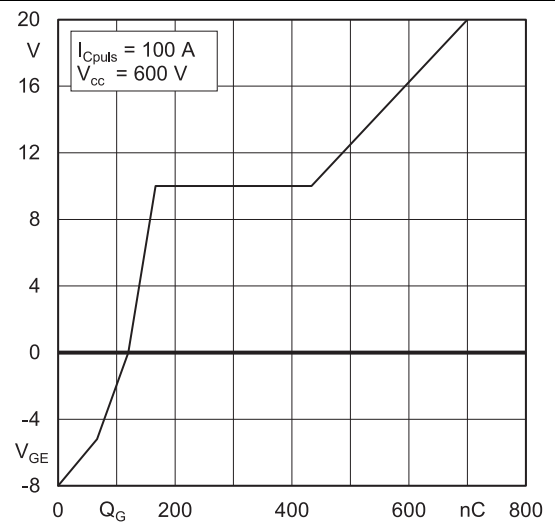


Fig. 6: Typ. gate charge characteristic

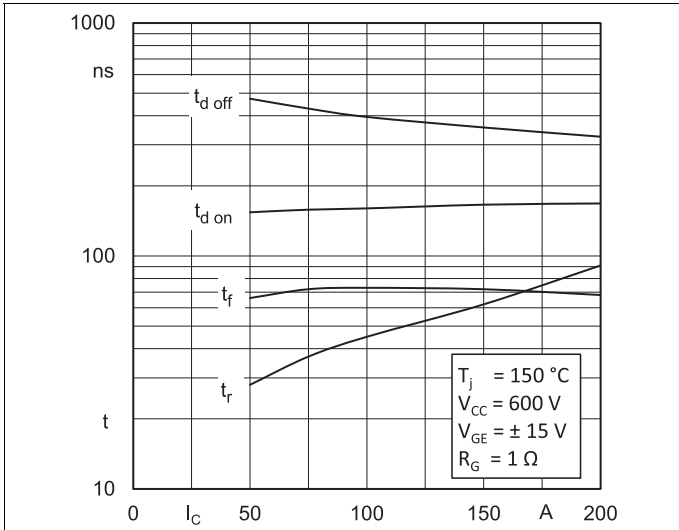


Fig. 7: Typ. switching times vs. I_C

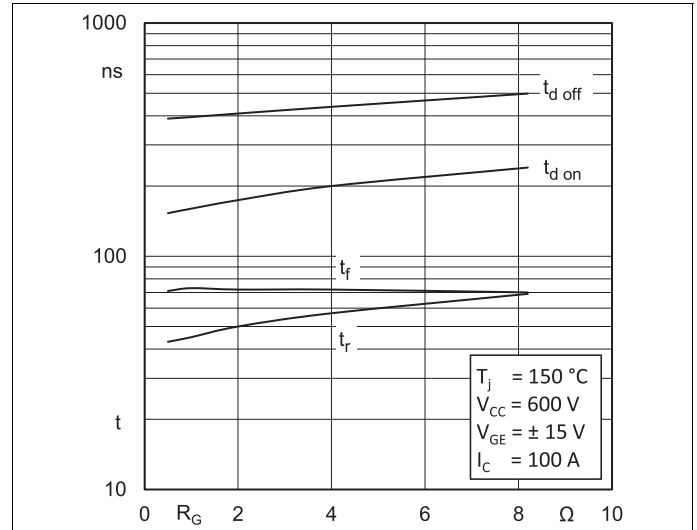


Fig. 8: Typ. switching times vs. gate resistor R_G

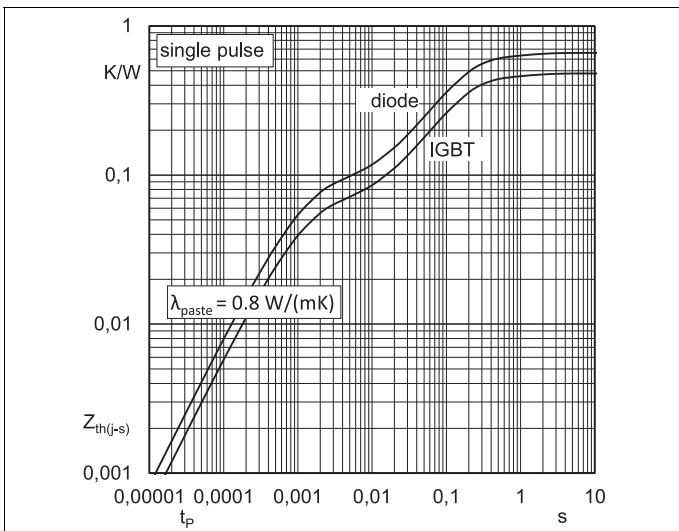


Fig. 9: Transient thermal impedance of IGBT and Diode

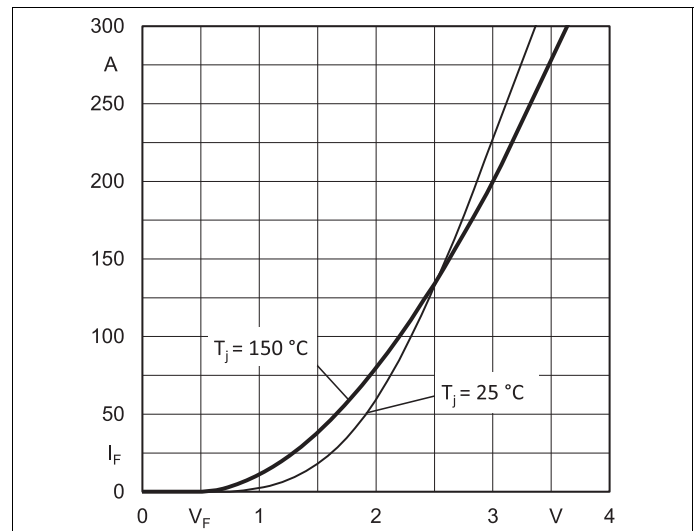


Fig. 10: CAL diode forward characteristic

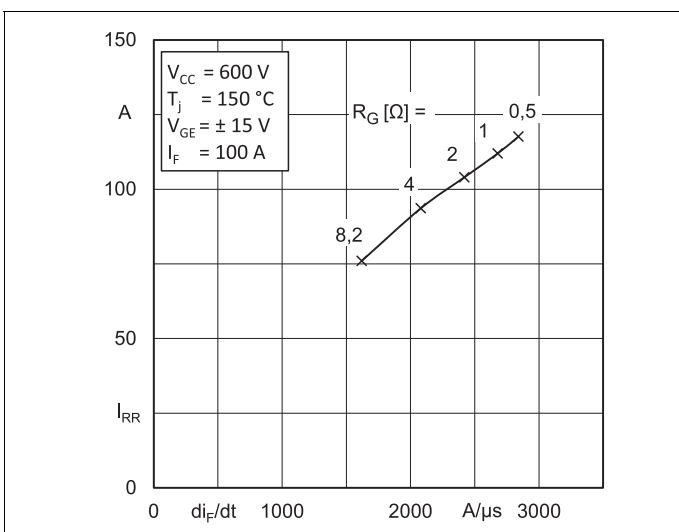


Fig. 11: Typ. CAL diode peak reverse recovery current

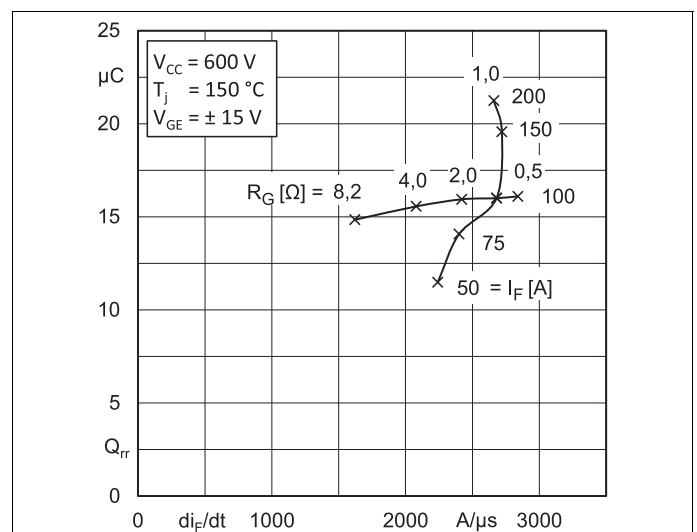
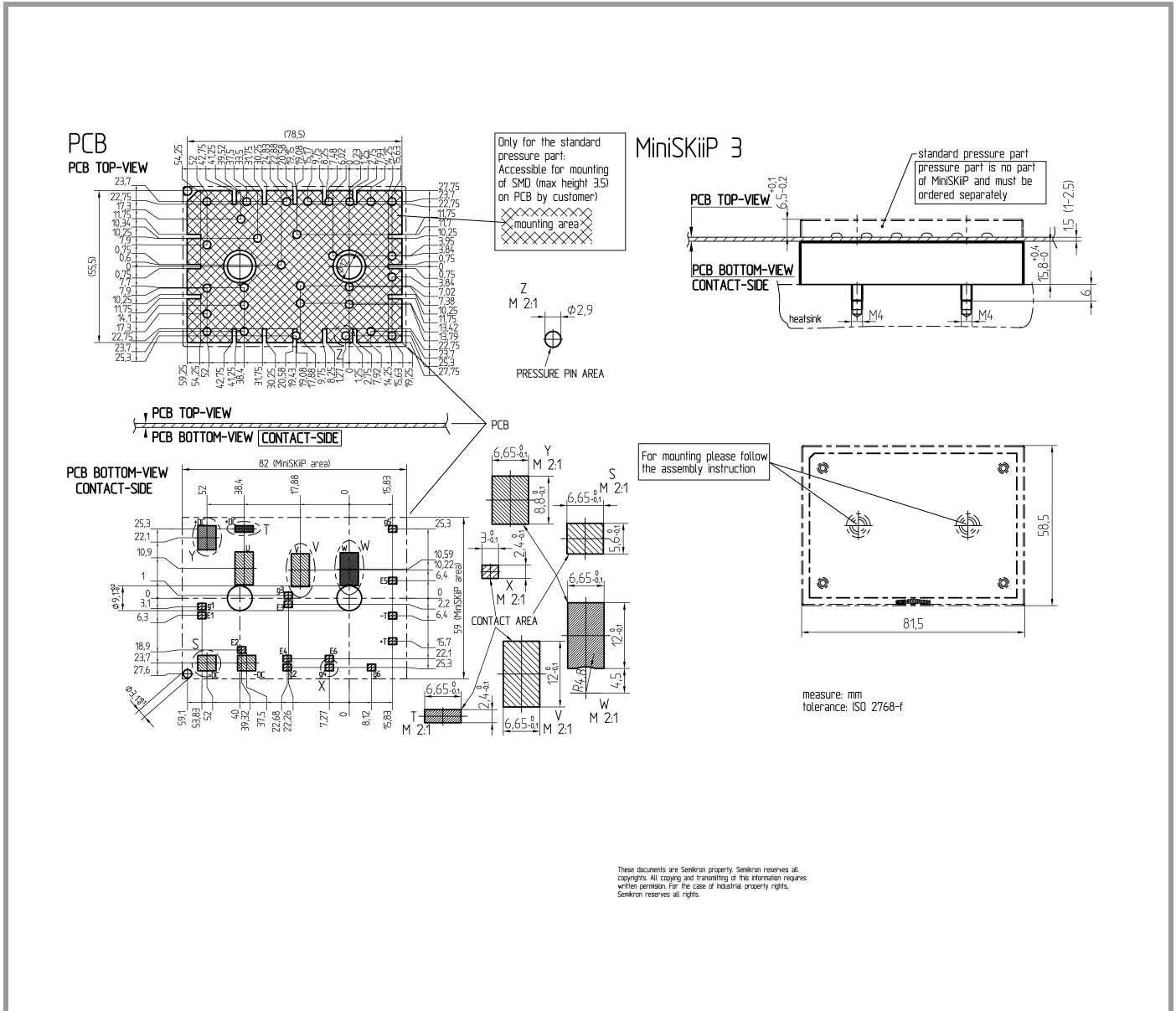
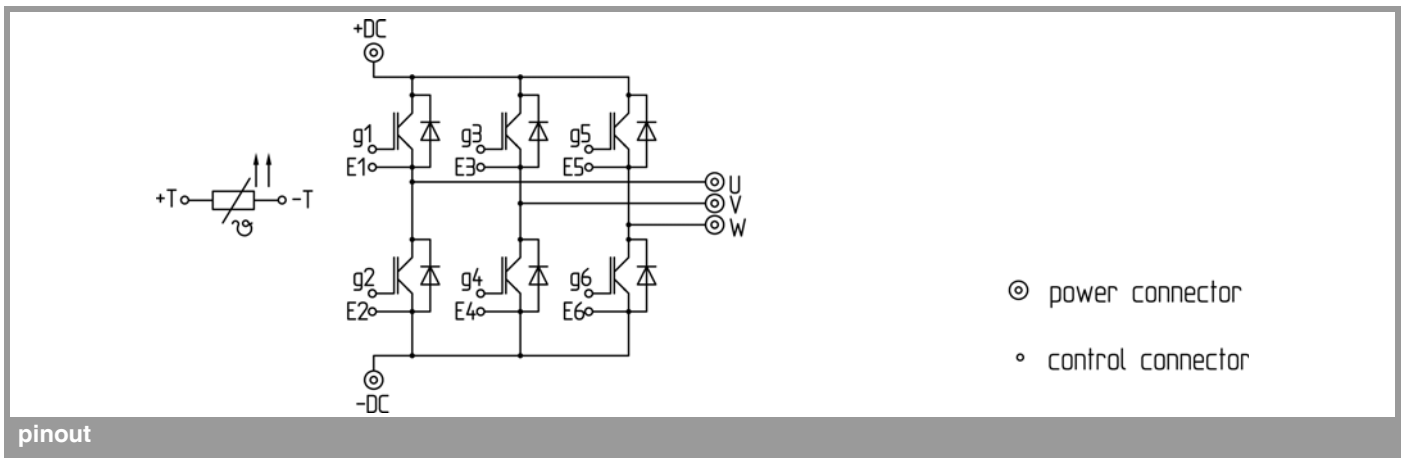


Fig. 12: Typ. CAL diode recovery charge

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pinout, dimensions



pinout

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

*IMPORTANT INFORMATION AND WARNINGS

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