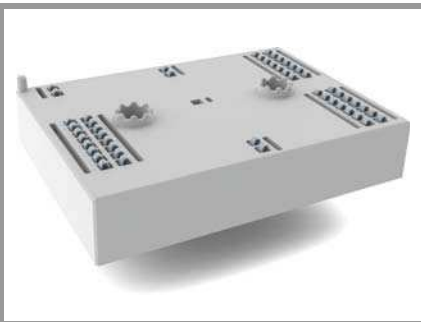


SKiIP38GB12E4V1



MiniSKiIP® 3 Dual

SKiIP38GB12E4V1

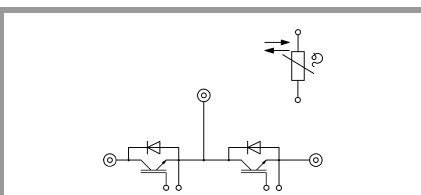
Features

- 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 $T_C = 125^\circ\text{C}$

Product reliability results valid for $T_j \leq 150^\circ\text{C}$ (recommended $T_{j,op} = -40 \dots +150^\circ\text{C}$)



GB

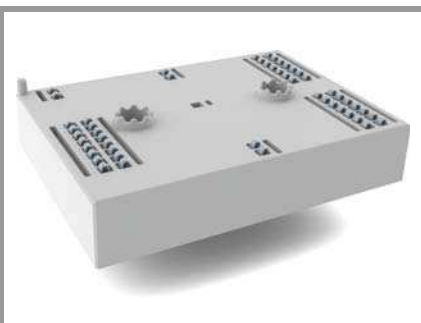
Absolute Maximum Ratings

Symbol	Conditions	Values	Unit	
Inverter - IGBT				
V_{CES}	$T_j = 25^\circ\text{C}$	1200	V	
I_C	$T_j = 175^\circ\text{C}$	$T_s = 25^\circ\text{C}$	329	A
		$T_s = 70^\circ\text{C}$	266	A
I_{Cnom}		300	A	
I_{CRM}	$I_{CRM} = 3 \times I_{Cnom}$	900	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	$T_j = 175^\circ\text{C}$	$T_s = 25^\circ\text{C}$	267	A
		$T_s = 70^\circ\text{C}$	211	A
I_{Fnom}		300	A	
I_{FRM}	$I_{FRM} = 3 \times I_{Fnom}$	900	A	
I_{FSM}	10 ms, sin 180° , $T_j = 150^\circ\text{C}$	1485	A	
T_j		-40 ... 175	$^\circ\text{C}$	
Module				
$I_{t(RMS)}$	$T_{terminal} = 80^\circ\text{C}$, 20 A per spring	280	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					
$V_{CE(sat)}$	$I_C = 300\text{ A}$ $V_{GE} = 15\text{ V}$ chipelevel	$T_j = 25^\circ\text{C}$	1.85	2.10	V
		$T_j = 150^\circ\text{C}$	2.25	2.45	V
V_{CE0}	chipelevel	$T_j = 25^\circ\text{C}$	0.8	0.9	V
		$T_j = 150^\circ\text{C}$	0.7	0.8	V
r_{CE}	$V_{GE} = 15\text{ V}$ chipelevel	$T_j = 25^\circ\text{C}$	3.5	4	$\text{m}\Omega$
		$T_j = 150^\circ\text{C}$	5.2	5.5	$\text{m}\Omega$
$V_{GE(th)}$	$V_{GE} = V_{CE}$, $I_C = 12\text{ mA}$	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
					mA
C_{ies}	$V_{CE} = 25\text{ V}$		17.60		nF
C_{oes}	$V_{GE} = 0\text{ V}$		1.16		nF
C_{res}			0.94		nF
Q_G	- 8 V...+ 15 V		1700		nC
R_{Gint}	$T_j = 25^\circ\text{C}$		2.5		Ω
$t_{d(on)}$	$V_{CC} = 600\text{ V}$ $I_C = 300\text{ A}$	$T_j = 150^\circ\text{C}$	180		ns
t_r	$R_{Gon} = 2\ \Omega$	$T_j = 150^\circ\text{C}$	51		ns
E_{on}	$R_{Goff} = 2\ \Omega$	$T_j = 150^\circ\text{C}$	19.1		mJ
$t_{d(off)}$	$di/dt_{on} = 6995\text{ A}/\mu\text{s}$	$T_j = 150^\circ\text{C}$	455		ns
t_f	$di/dt_{off} = 3030\text{ A}/\mu\text{s}$	$T_j = 150^\circ\text{C}$	96		ns
E_{off}	$du/dt = 5280\text{ V}/\mu\text{s}$ $V_{GE} = +15/-15\text{ V}$ $L_s = 25\text{ nH}$	$T_j = 150^\circ\text{C}$	34.6		mJ
$R_{th(j-s)}$	per IGBT, $\lambda_{paste} = 0.8\text{ W/K}\cdot\text{m}$		0.17		K/W

SKiiP38GB12E4V1



MiniSKiiP® 3 Dual

SKiiP38GB12E4V1

Features

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- Highly reliable spring contacts for electrical connections
- UL recognised: File no. E63532
- NTC T-Sensor

Remarks

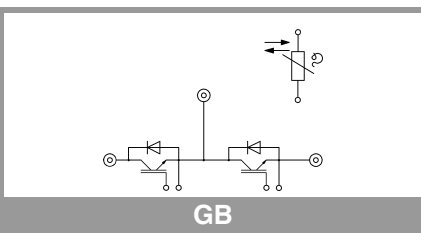
Max. case temperature limited to $T_C = 125^\circ\text{C}$

Product reliability results valid for

$T_j \leq 150^\circ\text{C}$ (recommended)

$T_{j,op} = -40 \dots +150^\circ\text{C}$

Characteristics						
Symbol	Conditions		min.	typ.	max.	Unit
Inverse - Diode						
$V_F = V_{EC}$	$I_F = 300\text{ A}$ $V_{GE} = 0\text{ V}$ chipllevel	$T_j = 25^\circ\text{C}$		2.2	2.5	V
		$T_j = 150^\circ\text{C}$		2.2	2.5	V
V_{F0}	chipllevel	$T_j = 25^\circ\text{C}$		1.3	1.5	V
		$T_j = 150^\circ\text{C}$		0.9	1.1	V
r_F	chipllevel	$T_j = 25^\circ\text{C}$		3	3.4	m Ω
		$T_j = 150^\circ\text{C}$		4.2	4.6	m Ω
I_{RRM}	$I_F = 300\text{ A}$	$T_j = 150^\circ\text{C}$		353		A
Q_{rr}	$di/dt_{off} = 7005\text{ A}/\mu\text{s}$	$T_j = 150^\circ\text{C}$		49		μC
E_{rr}	$V_{GE} = -15\text{ V}$ $V_{CC} = 600\text{ V}$	$T_j = 150^\circ\text{C}$		21.5		mJ
$R_{th(j-s)}$	per Diode, $\lambda_{paste} = 0.8\text{ W/K}\cdot\text{m}$			0.26		K/W
Module						
L_{CE}				15		nH
M_s	to heat sink		2		2.5	Nm
w				76		g
Temperature Sensor						
R_{100}	$T_c = 100^\circ\text{C}$ ($R_{25} = 5\text{ k}\Omega$)			$493 \pm 5\%$		Ω
$B_{25/85}$	$R_{(T)} = R_{25} \cdot \exp[B_{25/85} \cdot (1/T - 1/298)]$, [T]=K			3420		K



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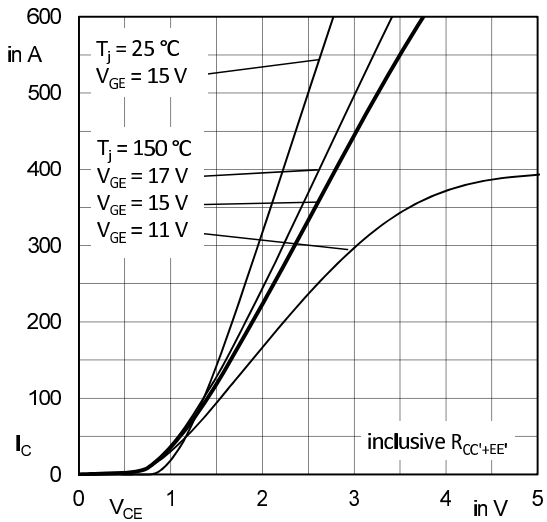


Fig. 1: Typ. output characteristic, inclusive $R_{CC'+EE'}$

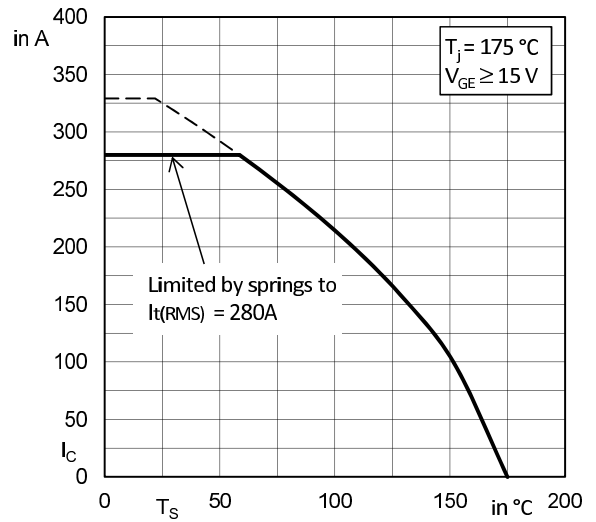


Fig. 2: Rated current vs. temperature $I_C = f(T_S)$

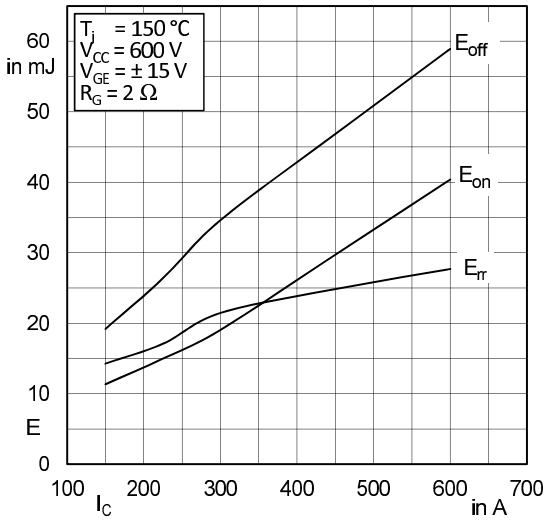


Fig. 3: Typ. turn-on /-off energy = $f(I_C)$

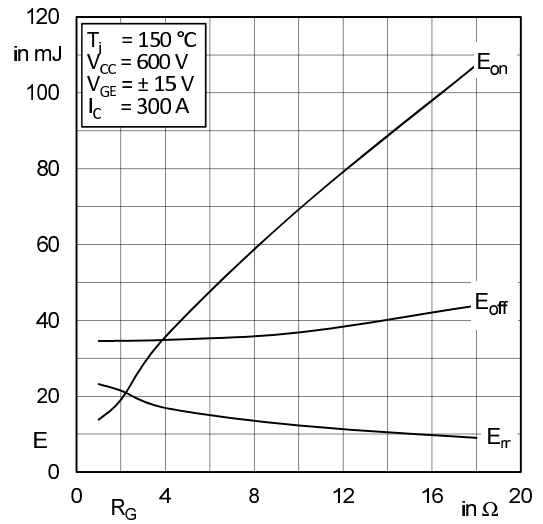


Fig. 4: Typ. turn-on /-off energy = $f(R_G)$

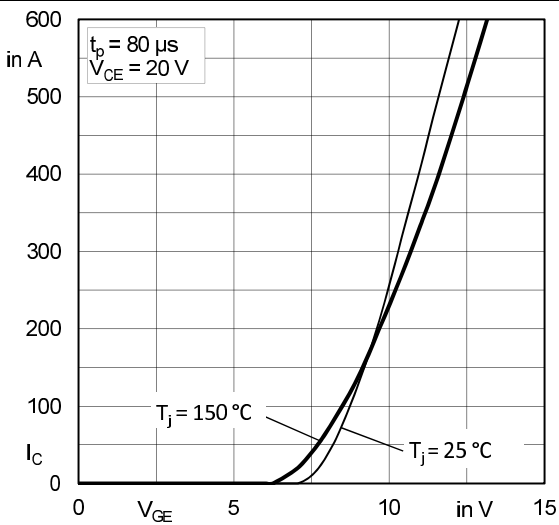


Fig. 5: Typ. transfer characteristic

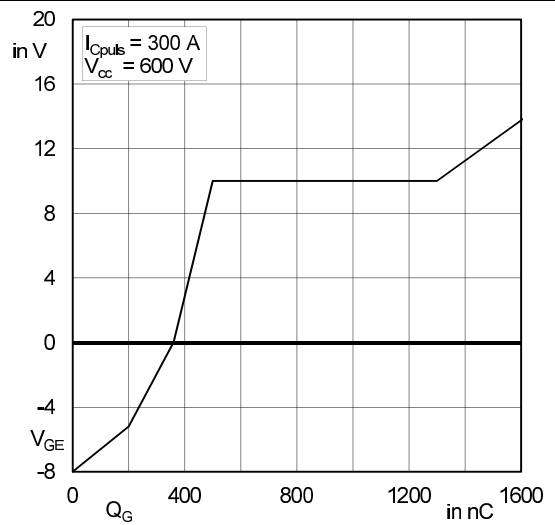


Fig. 6: Typ. gate charge characteristic

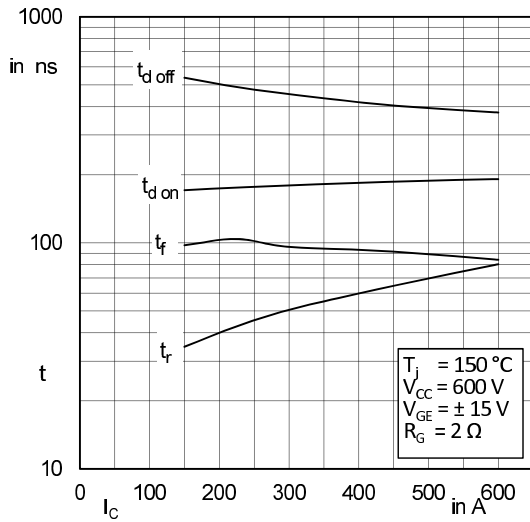


Fig. 7: Typ. switching times vs. I_C

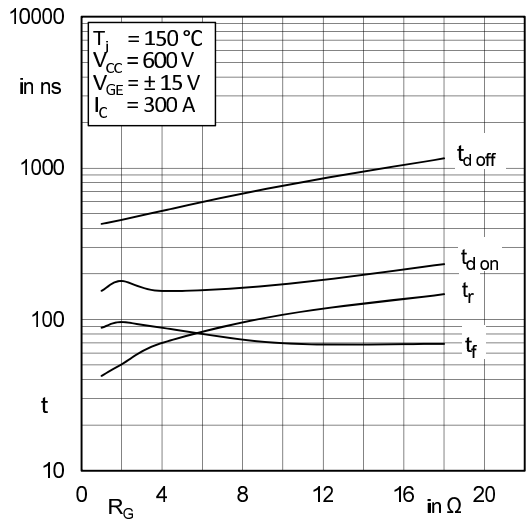


Fig. 8: Typ. switching times vs. gate resistor R_G

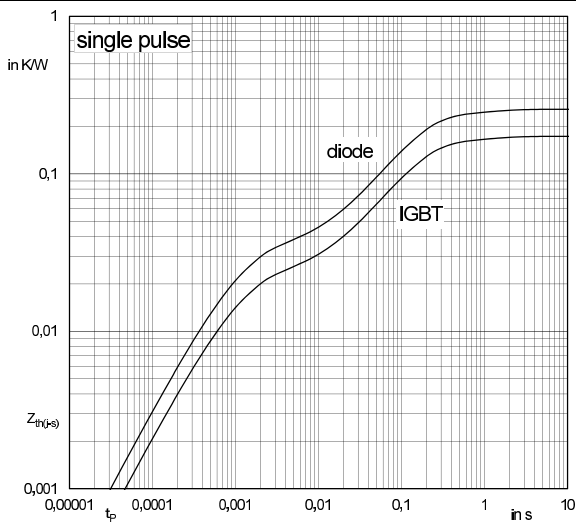


Fig. 9: Transient thermal impedance of IGBT and Diode

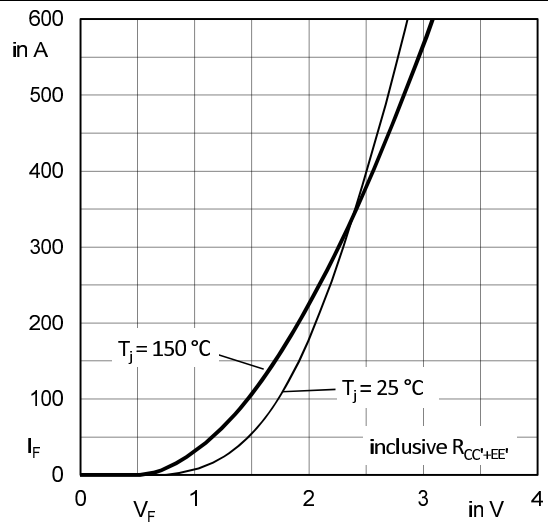


Fig. 10: CAL diode forward characteristic

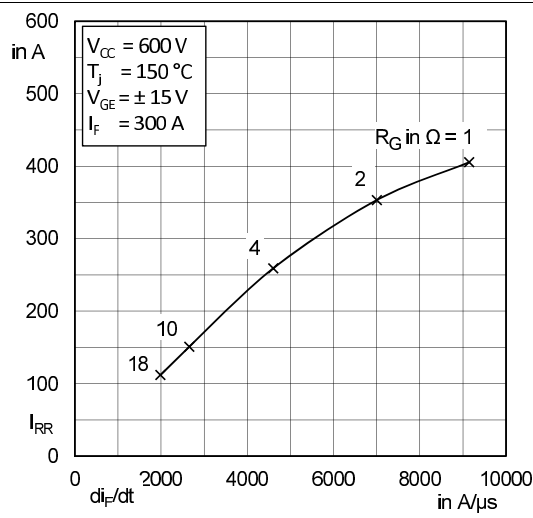


Fig. 11: Typ. CAL diode peak reverse recovery current

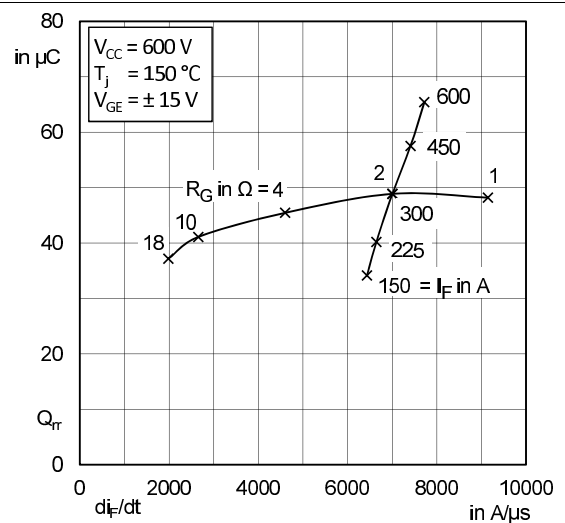
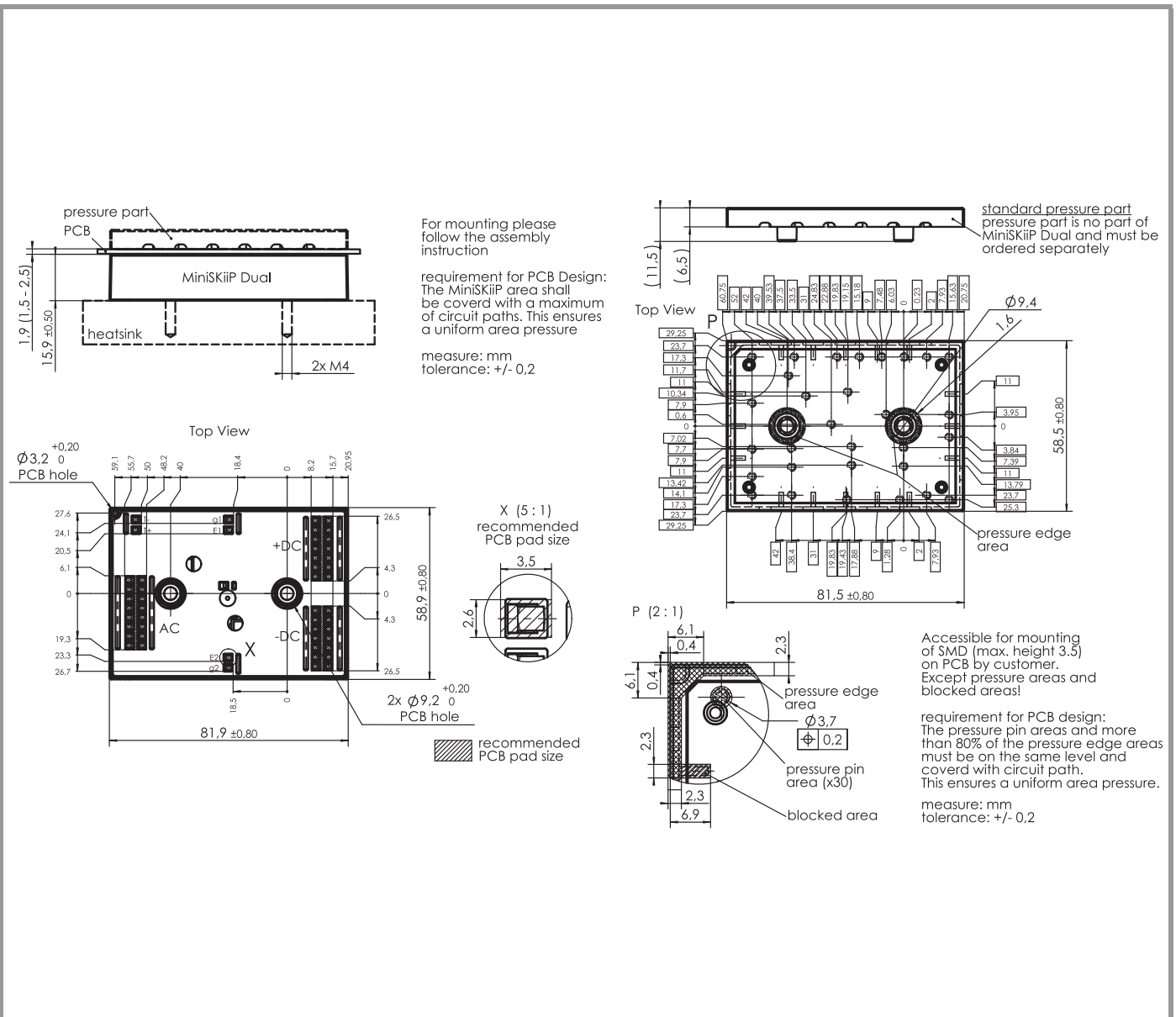
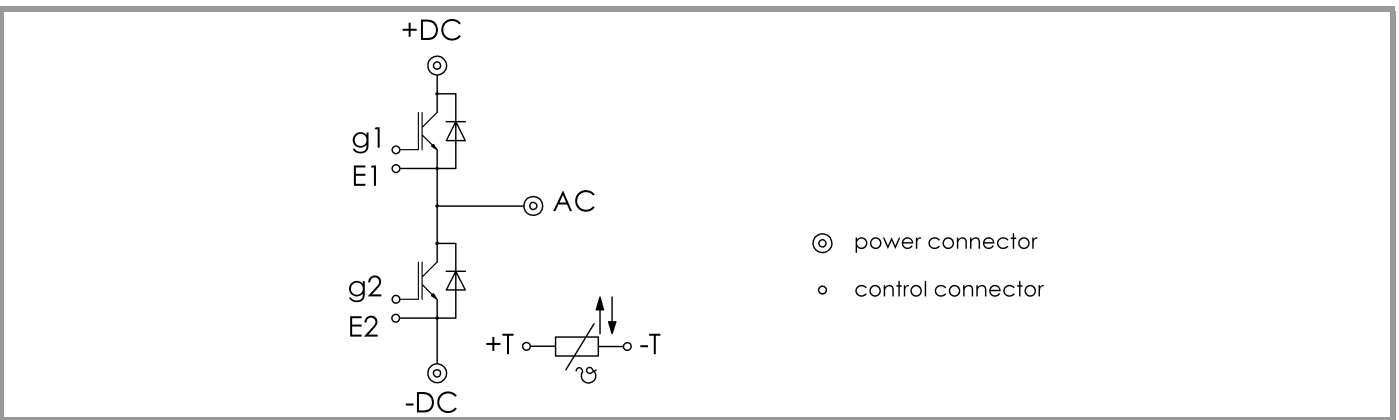


Fig. 12: Typ. CAL diode recovery charge

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pinout, dimensions



pinout

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

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