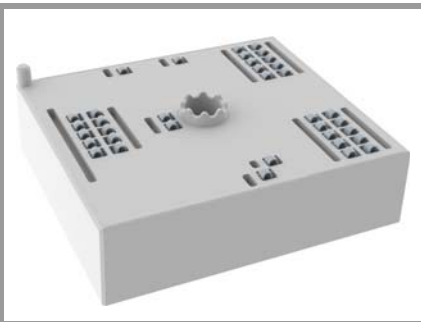


SKiiP 26GB12T4V1



MiniSKiiP® 2 Dual

IGBT module

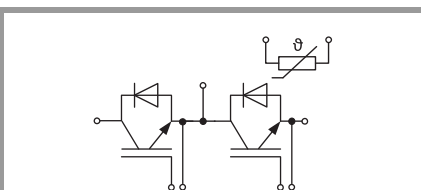
SKiiP 26GB12T4V1

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

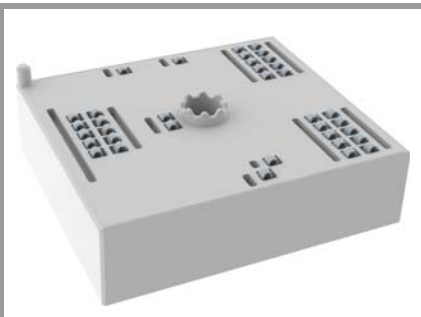
Absolute Maximum Ratings

Symbol	Conditions	Values	Unit	
Inverter - IGBT				
V_{CES}	$T_j = 25^\circ\text{C}$	1200	V	
I_C	$\lambda_{paste} = 0.8 \text{ W/(mK)}$	$T_s = 25^\circ\text{C}$	224	A
	$T_j = 175^\circ\text{C}$	$T_s = 70^\circ\text{C}$	182	A
I_C	$\lambda_{paste} = 2.5 \text{ W/(mK)}$	$T_s = 25^\circ\text{C}$	290	A
	$T_j = 175^\circ\text{C}$	$T_s = 70^\circ\text{C}$	236	A
I_{Cnom}		200	A	
I_{CRM}	$I_{CRM} = 3 \times I_{Cnom}$	600	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	$\lambda_{paste} = 0.8 \text{ W/(mK)}$	$T_s = 25^\circ\text{C}$	194	A
	$T_j = 175^\circ\text{C}$	$T_s = 70^\circ\text{C}$	154	A
I_F	$\lambda_{paste} = 2.5 \text{ W/(mK)}$	$T_s = 25^\circ\text{C}$	219	A
	$T_j = 175^\circ\text{C}$	$T_s = 70^\circ\text{C}$	174	A
I_{Fnom}		200	A	
I_{FRM}	$I_{FRM} = 2 \times I_{Fnom}$	400	A	
I_{FSM}	10 ms, sin 180°, $T_j = 150^\circ\text{C}$	990	A	
T_j		-40 ... 175	$^\circ\text{C}$	
Module				
$I_{t(RMS)}$	$T_{terminal} = 80^\circ\text{C}$, 20 A per spring	200	A	
T_{stg}		-40 ... 125	$^\circ\text{C}$	
V_{isol}	AC sinus 50 Hz, t = 1 min	2500	V	

Characteristics

Symbol	Conditions	min.	typ.	max.	Unit
Inverter - IGBT					
$V_{CE(sat)}$	$I_C = 200 \text{ A}$ $V_{GE} = 15 \text{ V}$ chiplevel	$T_j = 25^\circ\text{C}$	1.80	2.05	V
		$T_j = 150^\circ\text{C}$	2.20	2.40	V
V_{CE0}	chiplevel	$T_j = 25^\circ\text{C}$	0.80	0.90	V
		$T_j = 150^\circ\text{C}$	0.70	0.80	V
r_{CE}	$V_{GE} = 15 \text{ V}$ chiplevel	$T_j = 25^\circ\text{C}$	5.0	5.8	m Ω
		$T_j = 150^\circ\text{C}$	7.5	8.0	m Ω
$V_{GE(th)}$	$V_{GE} = V_{CE}$, $I_C = 12 \text{ mA}$	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
C_{ies}	$V_{CE} = 25 \text{ V}$ $V_{GE} = 0 \text{ V}$	$f = 1 \text{ MHz}$	12.30		nF
C_{oes}		$f = 1 \text{ MHz}$	0.81		nF
C_{res}		$f = 1 \text{ MHz}$	0.69		nF
Q_G	$V_{GE} = -8 \text{ V} \dots +15 \text{ V}$		1130		nC
R_{Gint}	$T_j = 25^\circ\text{C}$		3.8		Ω
$t_{d(on)}$	$V_{CC} = 600 \text{ V}$	$T_j = 150^\circ\text{C}$	170		ns
t_r	$I_C = 200 \text{ A}$ $R_{Gon} = 2 \Omega$	$T_j = 150^\circ\text{C}$	45		ns
		$T_j = 150^\circ\text{C}$	13.6		mJ
E_{on}	$R_{Goff} = 2 \Omega$	$T_j = 150^\circ\text{C}$	13.6		mJ
$t_{d(off)}$	$di/dt_{on} = 5500 \text{ A}/\mu\text{s}$	$T_j = 150^\circ\text{C}$	440		ns
t_f	$di/dt_{off} = 2000 \text{ A}/\mu\text{s}$	$T_j = 150^\circ\text{C}$	91		ns
E_{off}	$du/dt = 7000 \text{ V}/\mu\text{s}$ $V_{GE} = +15/-15 \text{ V}$ $L_s = 25 \text{ nH}$	$T_j = 150^\circ\text{C}$	22.1		mJ
$R_{th(j-s)}$	per IGBT, $\lambda_{paste} = 0.8 \text{ W/(mK)}$		0.25		K/W
$R_{th(j-s)}$	per IGBT, $\lambda_{paste} = 2.5 \text{ W/(mK)}$		0.16		K/W

SKiiP 26GB12T4V1



MiniSKiiP® 2 Dual

IGBT module

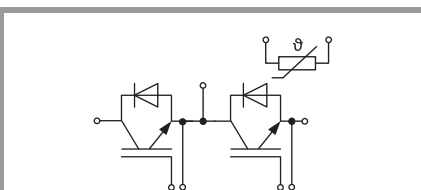
SKiiP 26GB12T4V1

Features

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

Characteristics						
Symbol	Conditions		min.	typ.	max.	Unit
Inverse - Diode						
$V_F = V_{EC}$	$I_F = 200\text{ A}$ $V_{GE} = 0\text{ V}$ chiplevel	$T_j = 25^\circ\text{C}$		2.20	2.52	V
		$T_j = 150^\circ\text{C}$		2.15	2.47	V
V_{F0}	chiplevel	$T_j = 25^\circ\text{C}$		1.30	1.50	V
		$T_j = 150^\circ\text{C}$		0.90	1.10	V
r_F	chiplevel	$T_j = 25^\circ\text{C}$		4.5	5.1	m Ω
		$T_j = 150^\circ\text{C}$		6.3	6.9	m Ω
I_{RRM}	$I_F = 200\text{ A}$	$T_j = 150^\circ\text{C}$		228		A
Q_{rr}	$di/dt_{off} = 5215\text{ A}/\mu\text{s}$	$T_j = 150^\circ\text{C}$		32		μC
E_{rr}	$V_{GE} = -15\text{ V}$ $V_{CC} = 600\text{ V}$	$T_j = 150^\circ\text{C}$		13.4		mJ
$R_{th(j-s)}$	per Diode, $\lambda_{paste} = 0.8\text{ W}/(\text{mK})$			0.34		K/W
$R_{th(j-s)}$	per Diode, $\lambda_{paste} = 2.5\text{ W}/(\text{mK})$			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}	$T_c = 100^\circ\text{C}$ ($R_{25} = 5\text{ k}\Omega$)			$493 \pm 5\%$		Ω
$B_{25/85}$	$R_{(T)} = R_{25} \cdot \exp[B_{25/85} \cdot (1/T - 1/298)]$, [T]=K			3420		K

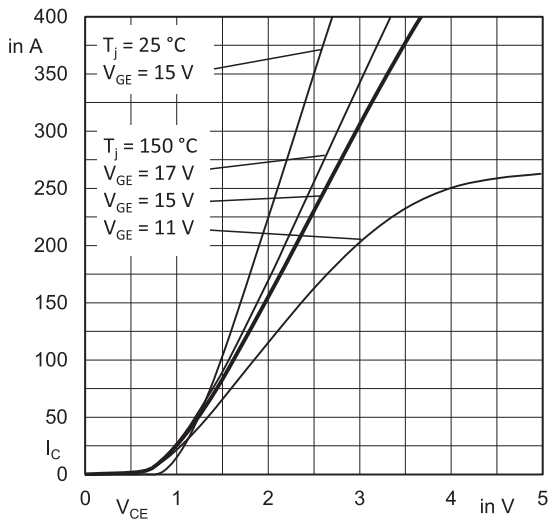


Fig. 1: Typ. output characteristic, inclusive $R_{CC'+EE'}$

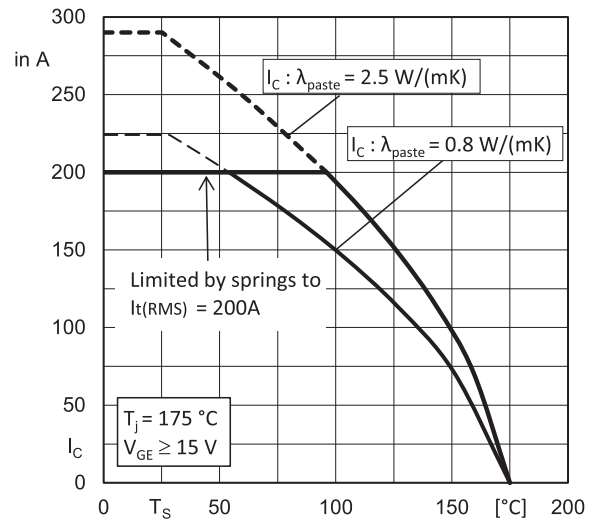


Fig. 2: Rated current vs. temperature $I_C = f(T_s)$

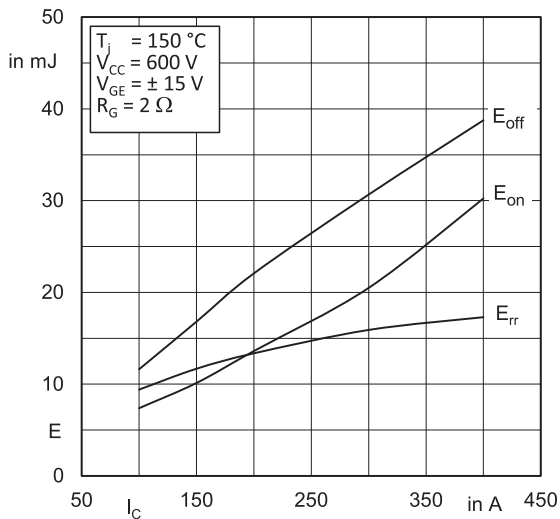


Fig. 3: Typ. turn-on /-off energy = $f(I_C)$

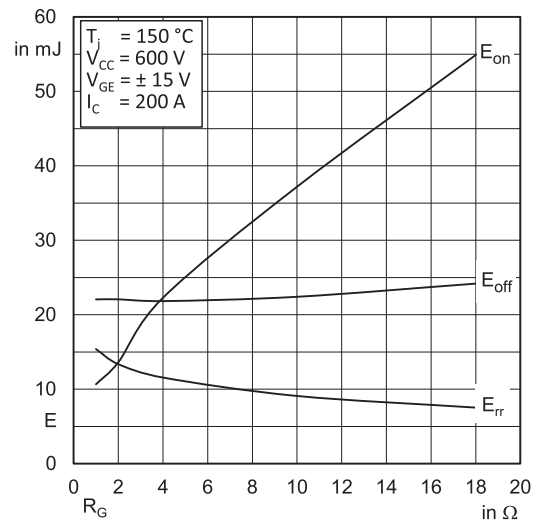


Fig. 4: Typ. turn-on /-off energy = $f(R_G)$

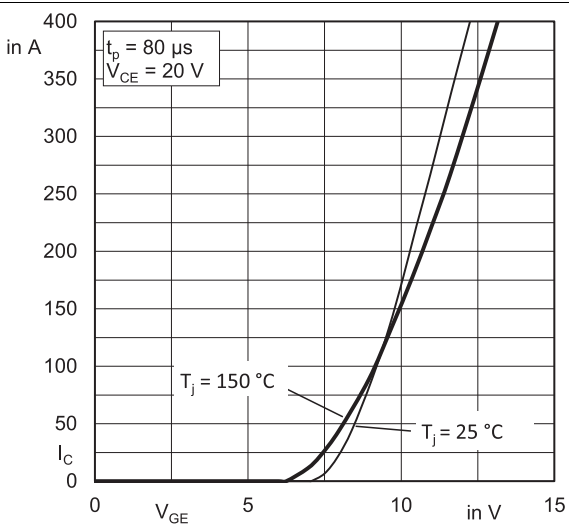


Fig. 5: Typ. transfer characteristic

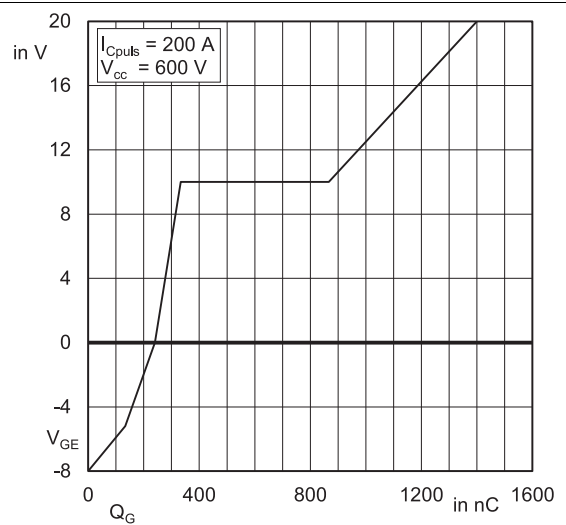


Fig. 6: Typ. gate charge characteristic

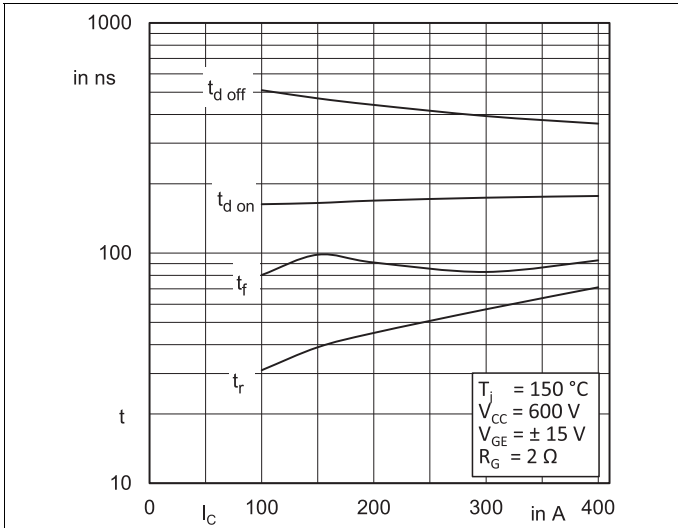


Fig. 7: Typ. switching times vs. I_C

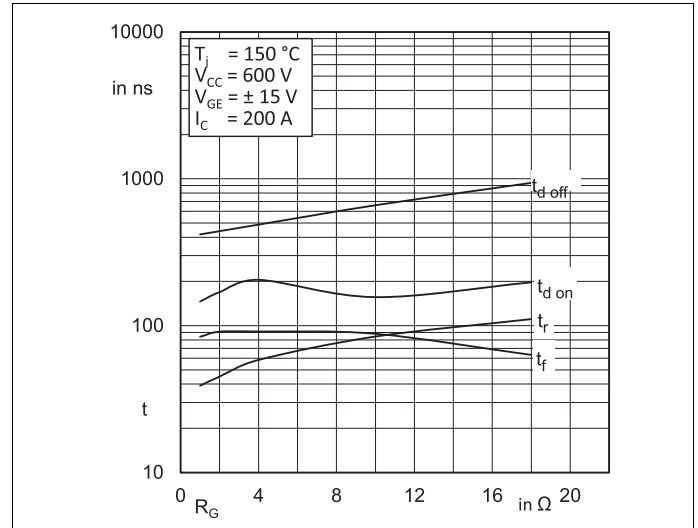


Fig. 8: Typ. switching times vs. gate resistor R_G

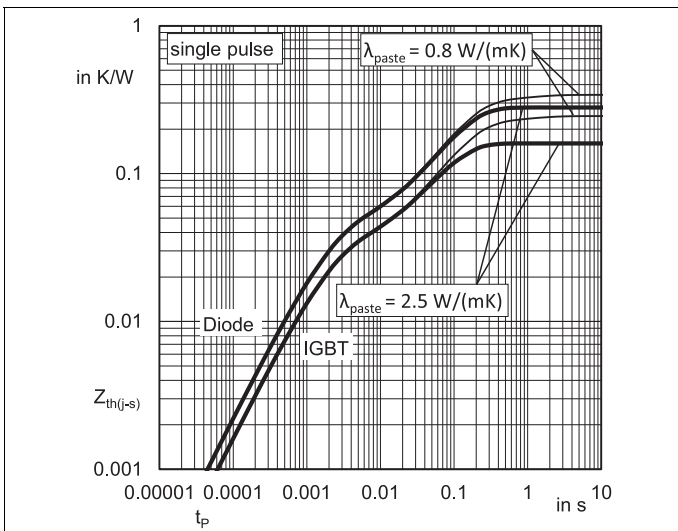


Fig. 9: Transient thermal impedance of IGBT and Diode

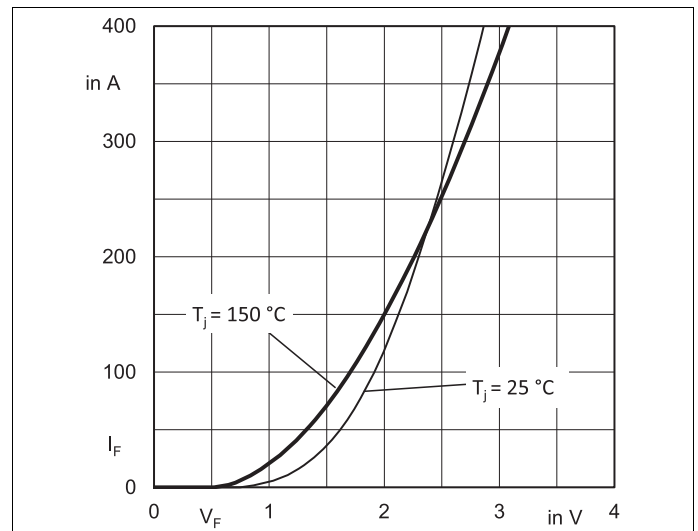


Fig. 10: Typ. CAL diode forward charact., incl. $R_{CC'+EE}$

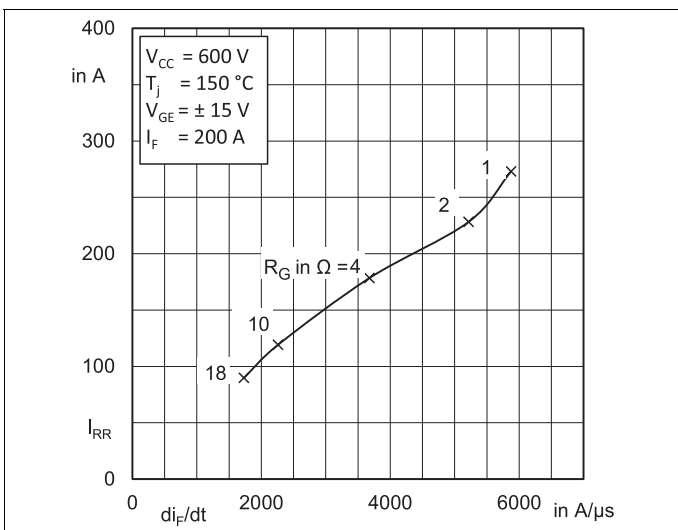


Fig. 11: Typ. CAL diode peak reverse recovery current

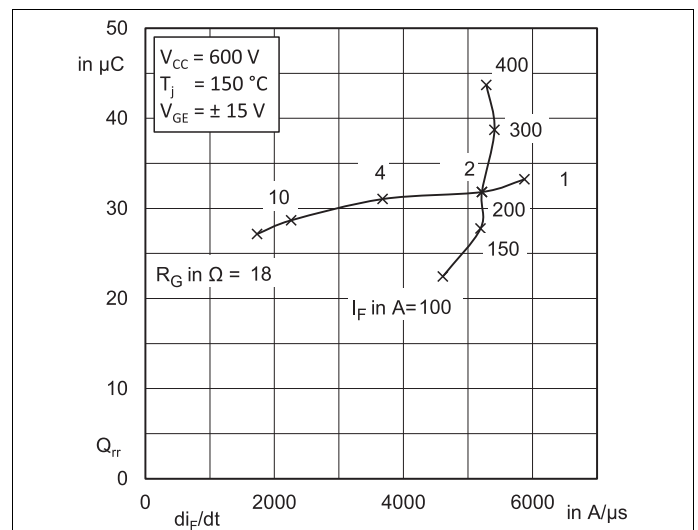
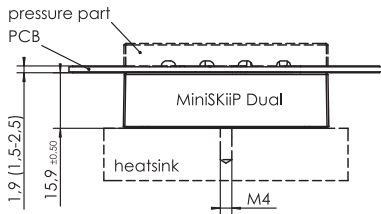


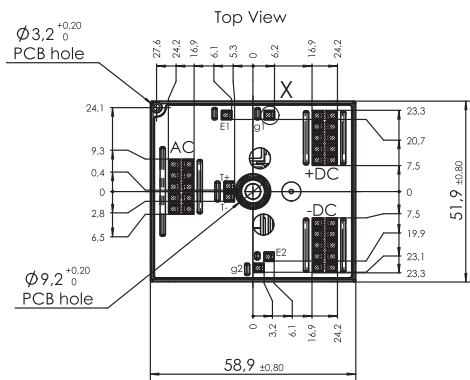
Fig. 12: Typ. CAL diode recovery charge



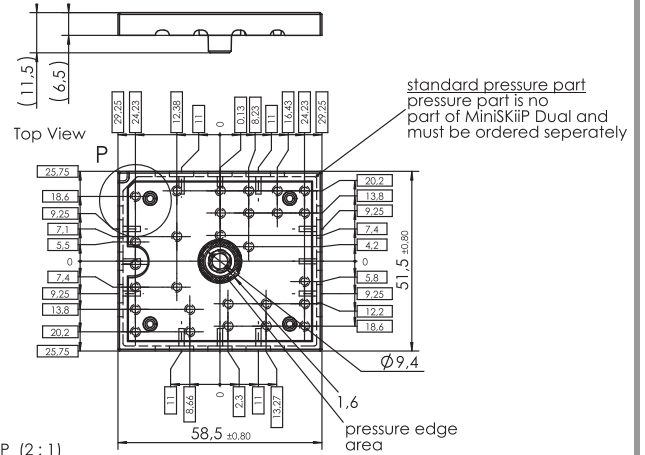
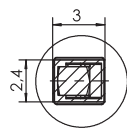
For mounting please follow the assembly instruction

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

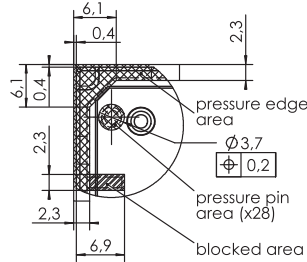
measure: mm
tolerance: +/- 0.2



X (5:1)
min. PCB pad size



P (2:1)

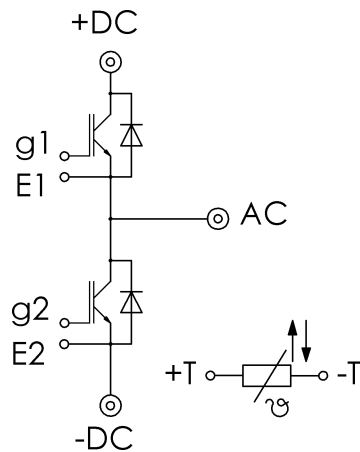


Accessible for mounting of SMD (max. height 3.5) on PCB by customer. Except pressure areas and blocked areas!

requirement for PCB design: The pressure pin areas and more than 80% of the pressure edge areas must be on the same level and covered 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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