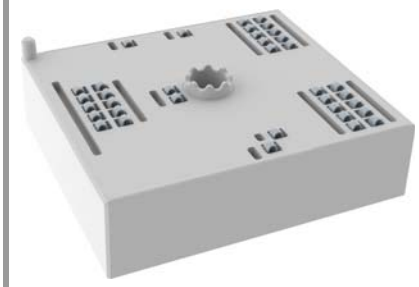
SKiiP 24GB12T4V1



MiniSKiiP® 2 Dual

Half-Bridge

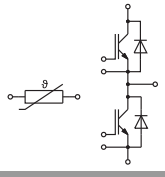
SKiiP 24GB12T4V1

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°C
- Product reliability results valid for T_j≤150°C (recommended $T_{j,op}$=-40...+150°C)
- MiniSKiiP “Technical Explanations” and “Mounting Instructions” are part of the data sheet. Please refer to both documents for further information



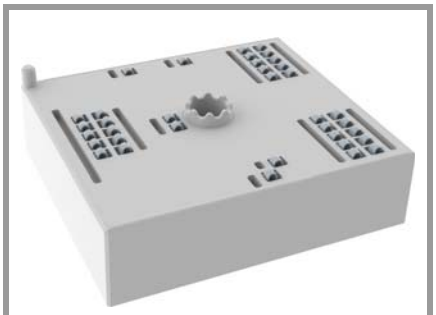
GB

Absolute Maximum Ratings

Symbol	Conditions		Values	Unit
Inverter - IGBT				
V_{CES}	T_j = 25 °C		1200	V
I_C	T_j = 175 °C	T_s = 25 °C	168	A
		T_s = 70 °C	136	A
I_{Cnom}			150	A
I_{CRM}			450	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	T_j = 175 °C	T_s = 25 °C	157	A
		T_s = 70 °C	125	A
I_{FRM}			300	A
I_{FSM}	10 ms, sin 180°, T_j = 150 °C		774	A
T_j			-40 ... 175	°C
Module				
$I_{t(RMS)}$	$T_{terminal}$ = 80 °C, 20 A per spring		200	A
T_{stg}	module without TIM		-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 = 150 A V_{GE} = 15 V chiplevel	T_j = 25 °C		1.85	2.10	V
		T_j = 150 °C		2.25	2.45	V
V_{CE0}	chiplevel	T_j = 25 °C		0.80	0.90	V
		T_j = 150 °C		0.70	0.80	V
r_{CE}	V_{GE} = 15 V chiplevel	T_j = 25 °C		7.0	8.0	mΩ
		T_j = 150 °C		10	11	mΩ
$V_{GE(th)}$	V_{GE} = V_{CE}, I_C = 6 mA		5	5.8	6.5	V
I_{CES}	V_{GE} = 0 V	T_j = 25 °C			1.5	mA
	V_{CE} = 1200 V			-		mA
C_{ies}	V_{CE} = 25 V V_{GE} = 0 V	f = 1 MHz		8.80		nF
C_{oes}		f = 1 MHz		0.58		nF
C_{res}		f = 1 MHz		0.47		nF
Q_G	- 8 V...+ 15 V			850		nC
R_{Gint}	T_j = 25 °C			5.0		Ω
$t_{d(on)}$	V_{CC} = 600 V I_C = 150 A $R_{G\ on}$ = 2 Ω $R_{G\ off}$ = 2 Ω di/dt$_{on}$ = 4700 A/µs di/dt$_{off}$ = 1600 A/µs dv/dt = 6000 V/µs V_{GE} = +15/-15 V L_s = 25 nH	T_j = 150 °C		136		ns
t_r		T_j = 150 °C		39		ns
E_{on}		T_j = 150 °C		10.8		mJ
$t_{d(off)}$		T_j = 150 °C		391		ns
t_f		T_j = 150 °C		82		ns
E_{off}		T_j = 150 °C		15.6		mJ
$R_{th(j-s)}$	per IGBT, λ_{paste}=0.8 W/(K*m)			0.32		K/W



MiniSKiiP® 2 Dual

Half-Bridge

SKiiP 24GB12T4V1

Features*

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Remarks

- Max. case temperature limited to T_C=125°C
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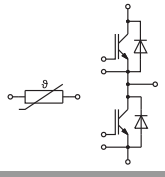
Characteristics

Symbol	Conditions		min.	typ.	max.	Unit
Inverse - Diode						
$V_F = V_{EC}$	I_F = 150 A V_{GE} = 0 V chiplevel	T_j = 25 °C		2.17	2.49	V
		T_j = 150 °C		2.11	2.42	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		5.8	6.6	mΩ
		T_j = 150 °C		8.1	8.8	mΩ
I_{RRM}	I_F = 150 A di/dt_{off} = 5000 A/µs V_{GE} = -15 V V_{CC} = 600 V	T_j = 150 °C		191		A
Q_{rr}		T_j = 150 °C		25		µC
E_{rr}		T_j = 150 °C		10.3		mJ
$R_{th(j-s)}$	per Diode, λ_{paste}=0.8 W/(K*m)			0.41		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



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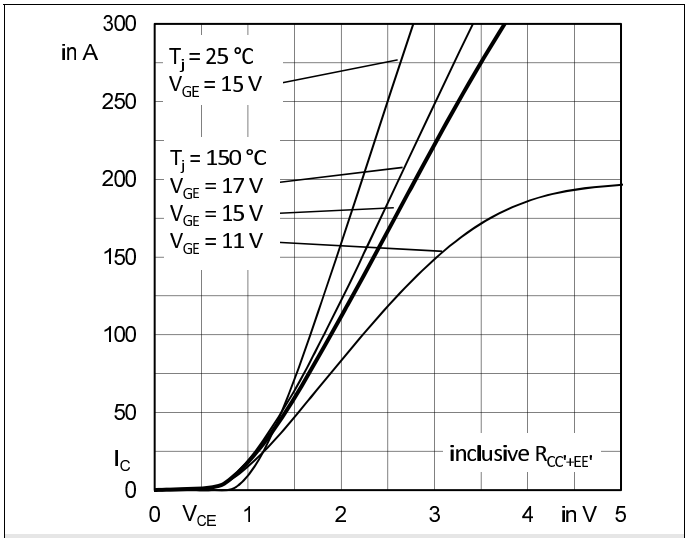


Fig. 1: Typ. output characteristic

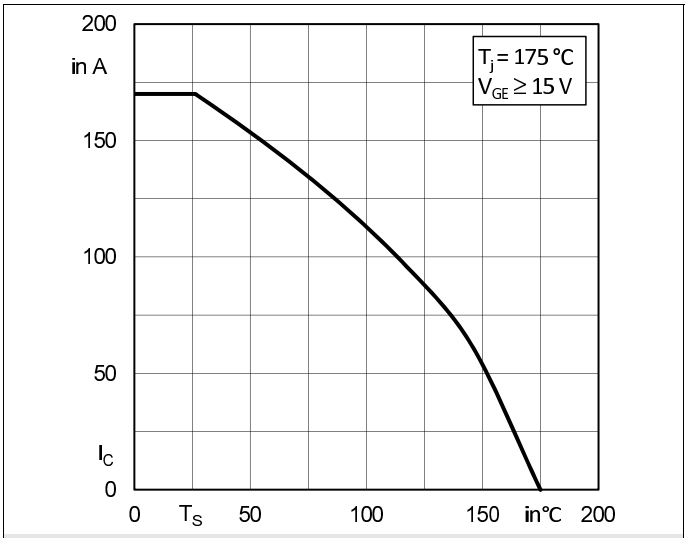


Fig. 2: Rated current vs. temperature $I_C = f(T_S)$

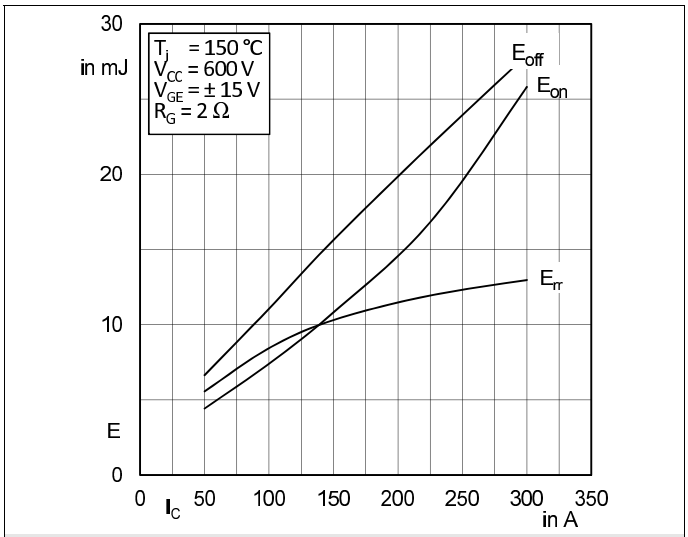


Fig. 3: Typ. turn-on /-off energy = f (I_C)

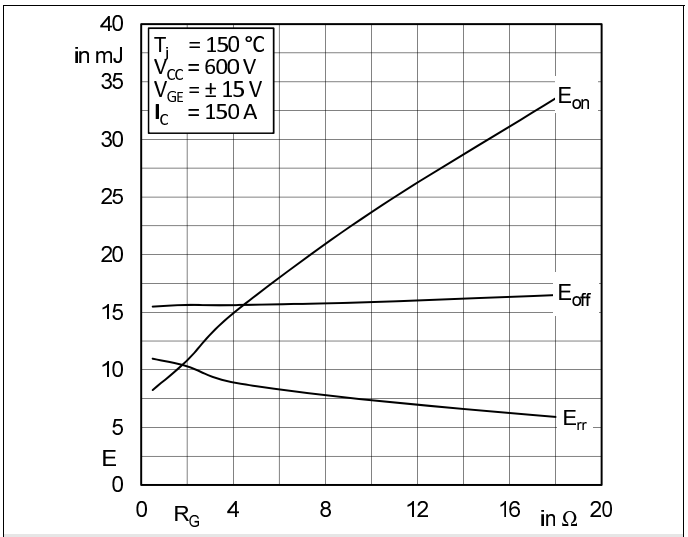


Fig. 4: Typ. turn-on /-off energy = f (R_G)

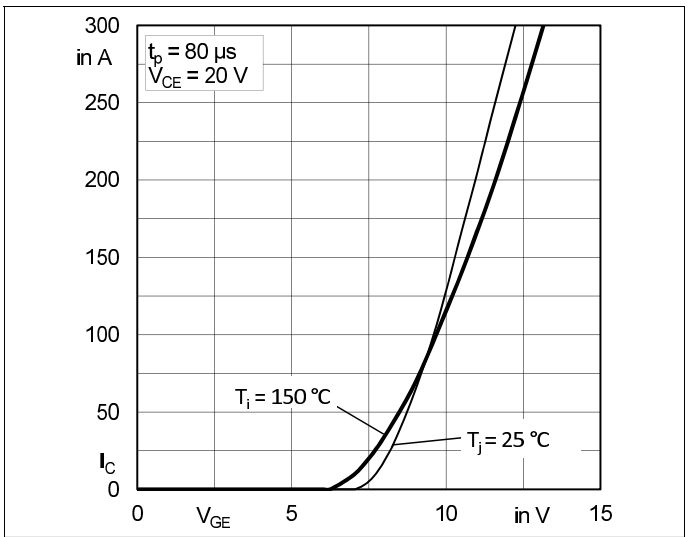


Fig. 5: Typ. transfer characteristic

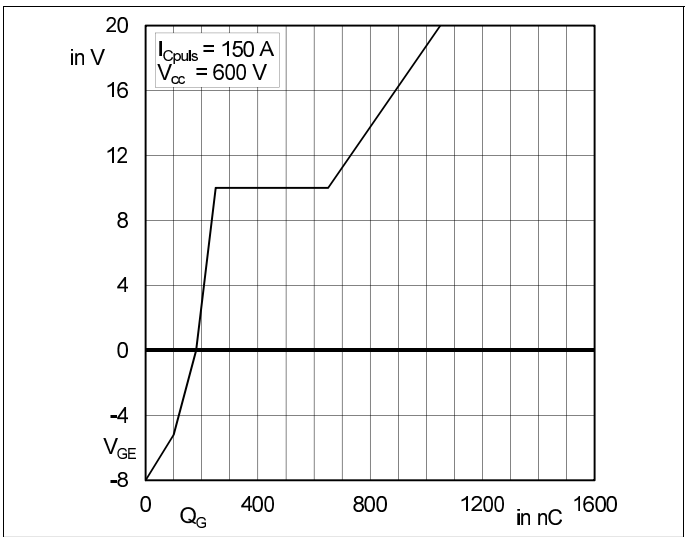


Fig. 6: Typ. gate charge characteristic

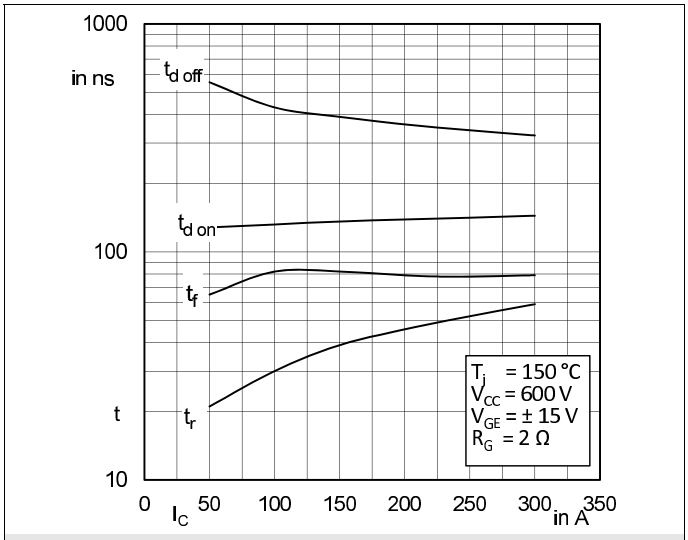


Fig. 7: Typ. switching times vs. I_C

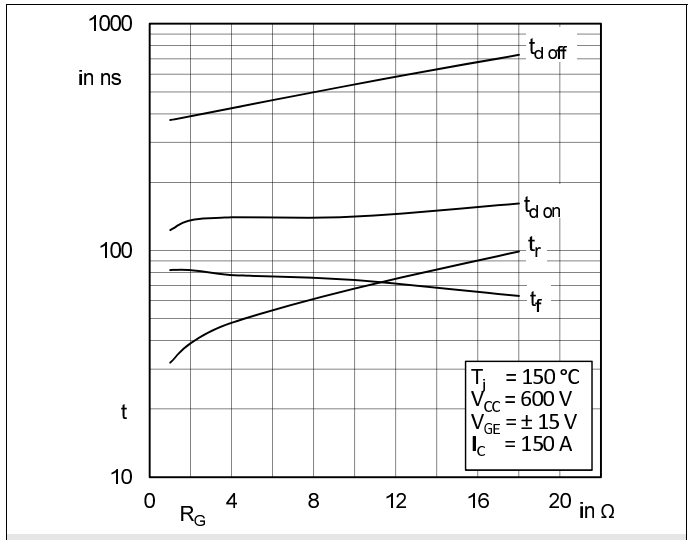


Fig. 8: Typ. switching times vs. gate resistor R_G

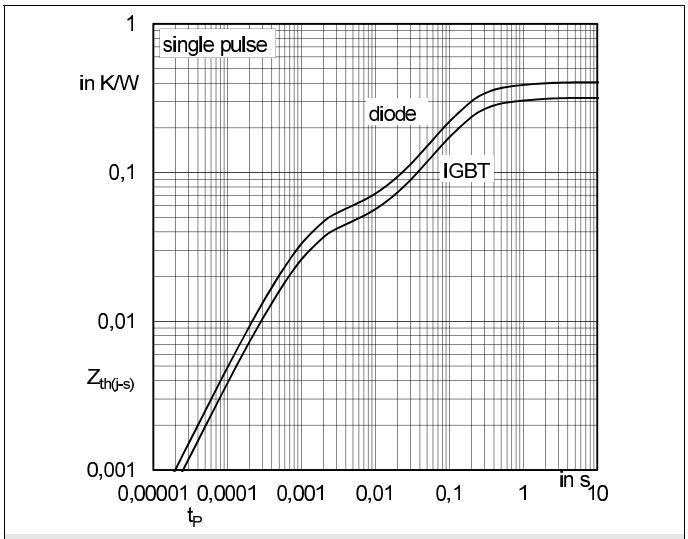


Fig. 9: Typ. transient thermal impedance

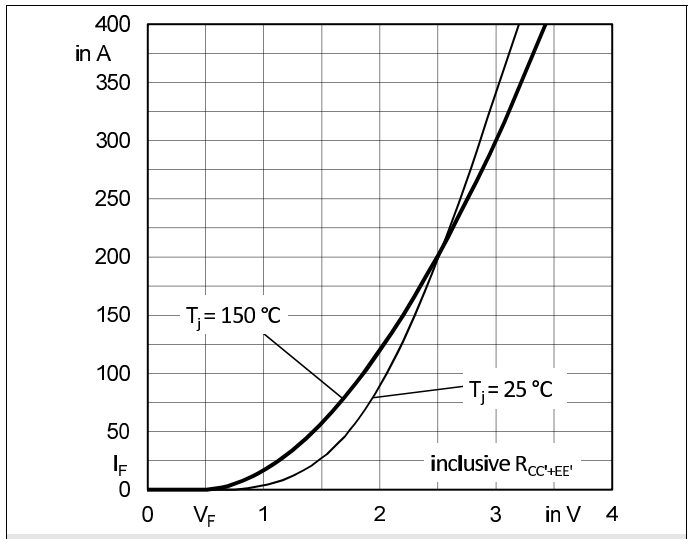


Fig. 10: Typ. CAL diode forward characteristic

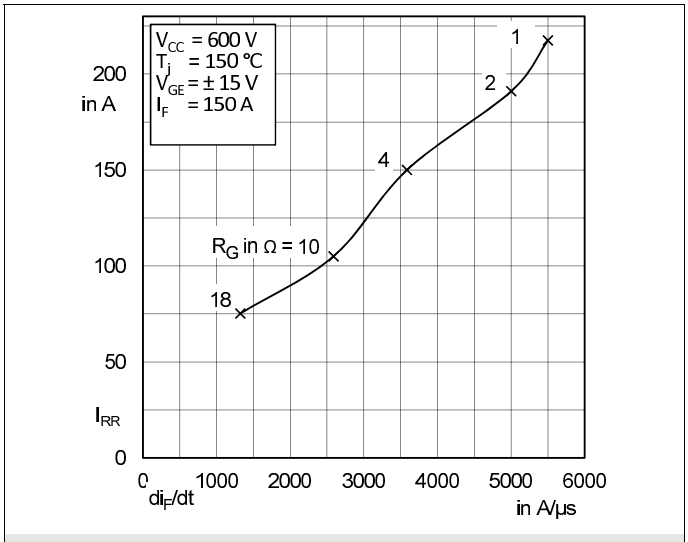


Fig. 11: Typ. CAL diode peak reverse recovery current

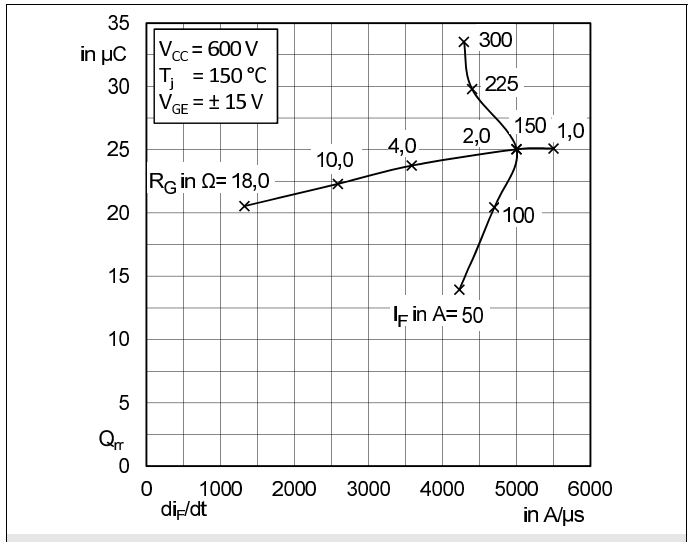
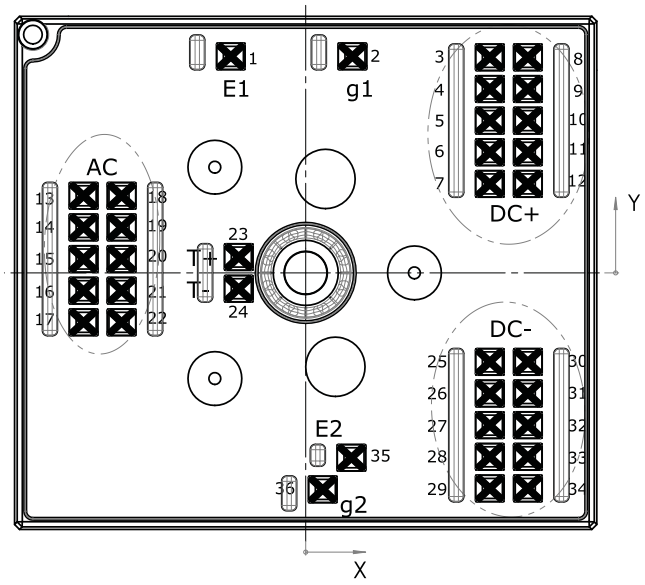


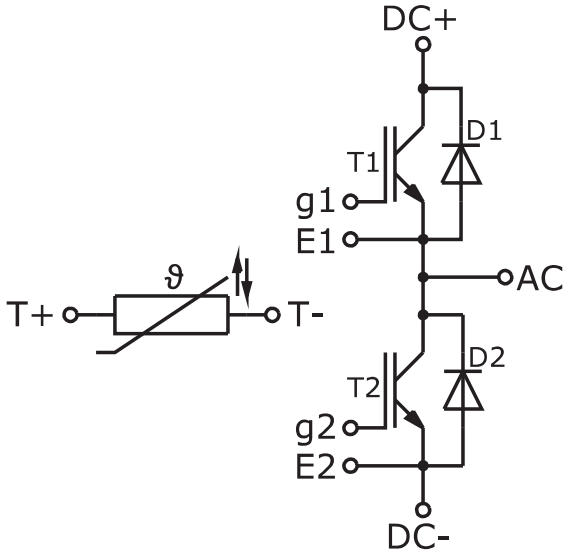
Fig. 12: Typ. CAL diode recovery charge

Pin out							
Pin	*X*	*Y*	*Function*	*Pin*	*X*	*Y*	*Function*
1	-7,58	21,9	E1	19	-18,63	4,6	AC
2	4,73	21,9	g1	20	-18,63	1,4	AC
3	18,63	21,8	DC+	21	-18,63	-1,8	AC
4	18,63	18,6	DC+	22	-18,63	-5	AC
5	18,63	15,4	DC+	23	-6,78	1,6	T+
6	18,63	12,2	DC+	24	-6,78	-1,6	T-
7	18,63	9	DC+	25	18,63	-9	DC-
8	22,48	21,8	DC+	26	18,63	-12,2	DC-
9	22,48	18,6	DC+	27	18,63	-15,4	DC-
10	22,48	15,4	DC+	28	18,63	-18,6	DC-
11	22,48	12,2	DC+	29	18,63	-21,8	DC-
12	22,48	9	DC+	30	22,48	-9	DC-
13	-22,48	7,8	AC	31	22,48	-12,2	DC-
14	-22,48	4,6	AC	32	22,48	-15,4	DC-
15	-22,48	1,4	AC	33	22,48	-18,6	DC-
16	-22,48	-1,8	AC	34	22,48	-21,8	DC-
17	-22,48	-5	AC	35	4,63	-18,7	E2
18	-18,63	7,8	AC	36	1,73	-21,9	g2

all values in [mm]



Pinout and Dimensions



Pinout

This is an electrostatic discharge sensitive device (ESDS) due to international standard IEC 61340.

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