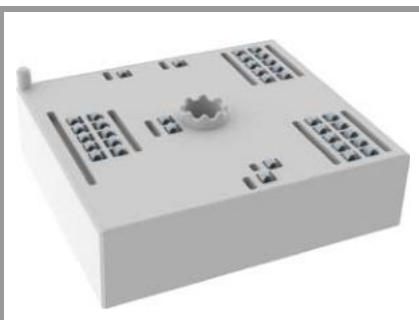




MiniSKiiP® 2 Dual

Half-Bridge

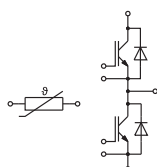
SKiiP 24GB12T7V1

Features*

- 1200V Generation 7 IGBTs (T7)
- Robust and soft switching freewheeling diodes in CAL technology
- Highly reliable spring contacts for electrical connections
- UL recognized: File no. E63532
- NTC T-Sensor

Remarks

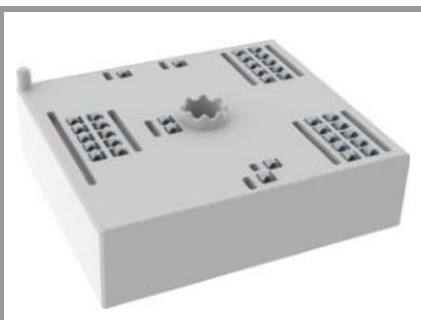
-)Max. case temperature limited to $T_C = T_S = 125^\circ\text{C}$
- Product reliability results valid for $T_j \leq 150^\circ\text{C}$; $T_{j,op} > 150^\circ\text{C}$ during overload (Details see AN19-002)
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GB

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 = 70 °C	141	A
	T _j = 175 °C	T _s = 100 °C	114	A
I _C	λ _{paste} =2.5 W/(mK)	T _s = 70 °C	163	A
	T _j = 175 °C	T _s = 100 °C	131	A
I _{Cnom}			150	A
I _{CRM}			300	A
V _{GES}			-20 ... 20	V
t _{psc}	V _{CC} = 800 V V _{GE} ≤ 15 V V _{CES} ≤ 1200 V	T _j = 175 °C	7	μs
T _j			-40 ... 175	°C
Inverse - Diode				
V _{RRM}	T _j = 25 °C		1200	V
I _F	λ _{paste} =0.8 W/(mK)	T _s = 70 °C	109	A
	T _j = 175 °C	T _s = 100 °C	87	A
I _F	λ _{paste} =2.5 W/(mK)	T _s = 70 °C	127	A
	T _j = 175 °C	T _s = 100 °C	101	A
I _{FRM}			300	A
I _{FSM}	t _p = 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	T _j = 25 °C		1.55	1.70	V
	V _{GE} = 15 V	T _j = 150 °C		1.73	1.88	V
	chiplevel	T _j = 175 °C		1.77	1.92	V
V _{CE0}		T _j = 25 °C		1.00	1.05	V
	chiplevel	T _j = 150 °C		0.80	0.85	V
		T _j = 175 °C		0.75	0.80	V
r _{CE}		T _j = 25 °C		3.7	4.3	mΩ
	V _{GE} = 15 V	T _j = 150 °C		6.2	6.9	mΩ
	chiplevel	T _j = 175 °C		6.8	7.5	mΩ
V _{GE(th)}	V _{GE} = V _{CE} , I _C = 3.4 mA		5.15	5.8	6.45	V
I _{CES}	V _{GE} = 0 V, V _{CE} = 1200 V, T _j = 25 °C				1.5	mA
C _{ies}	V _{CE} = 25 V V _{GE} = 0 V	f = 1 MHz		30.20		nF
C _{oes}		f = 1 MHz		0.39		nF
C _{res}		f = 1 MHz		1.08		nF
Q _G	V _{GE} = - 8V ... + 15 V			2100		nC
R _{Gint}	T _j = 25 °C			1.0		Ω



MiniSKiiP® 2 Dual

Half-Bridge

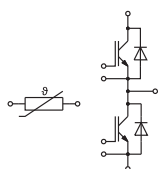
SKiiP 24GB12T7V1

Features*

- 1200V Generation 7 IGBTs (T7)
- Robust and soft switching freewheeling diodes in CAL technology
- Highly reliable spring contacts for electrical connections
- UL recognized: File no. E63532
- NTC T-Sensor

Remarks

-)Max. case temperature limited to $T_C = T_S = 125^\circ\text{C}$
- Product reliability results valid for $T_j \leq 150^\circ\text{C}$; $T_{j,op} > 150^\circ\text{C}$ during overload (Details see AN19-002)
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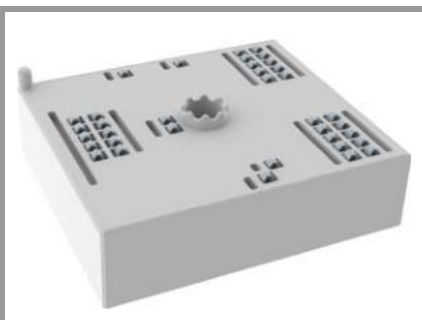


GB

Characteristics					
Symbol	Conditions	min.	typ.	max.	Unit
Inverter - IGBT					
$t_{d(on)}$	$V_{CC} = 600\text{ V}$ $I_C = 150\text{ A}$ $R_{G on} = 1.1\ \Omega$ $R_{G off} = 1.1\ \Omega$ $V_{GE} = +15/-15\text{ V}$	$T_j = 25^\circ\text{C}$	173		ns
		$T_j = 150^\circ\text{C}$	181		ns
		$T_j = 175^\circ\text{C}$	179		ns
t_r		$T_j = 25^\circ\text{C}$	32		ns
		$T_j = 150^\circ\text{C}$	37		ns
		$T_j = 175^\circ\text{C}$	39		ns
E_{on}	$R_{G on} = 1.1\ \Omega$ $R_{G off} = 1.1\ \Omega$ $V_{GE} = +15/-15\text{ V}$	$T_j = 25^\circ\text{C}$	6.3		mJ
		$T_j = 150^\circ\text{C}$	11		mJ
		$T_j = 175^\circ\text{C}$	12		mJ
$t_{d(off)}$		$T_j = 25^\circ\text{C}$	347		ns
		$T_j = 150^\circ\text{C}$	437		ns
		$T_j = 175^\circ\text{C}$	462		ns
t_f	$@ T_j = 150^\circ\text{C}$: $di/dt_{on} = 5650\text{ A}/\mu\text{s}$ $di/dt_{off} = 1530\text{ A}/\mu\text{s}$ $dv/dt = 3730\text{ V}/\mu\text{s}$	$T_j = 25^\circ\text{C}$	67		ns
		$T_j = 150^\circ\text{C}$	103		ns
		$T_j = 175^\circ\text{C}$	130		ns
E_{off}		$T_j = 25^\circ\text{C}$	10		mJ
		$T_j = 150^\circ\text{C}$	17		mJ
		$T_j = 175^\circ\text{C}$	18		mJ
$R_{th(j-s)}$	per IGBT, $\lambda_{paste} = 0.8\text{ W}/(\text{mK})$		0.4		K/W
$R_{th(j-s)}$	per IGBT, $\lambda_{paste} = 2.5\text{ W}/(\text{mK})$		0.32		K/W

Characteristics					
Symbol	Conditions	min.	typ.	max.	Unit
Inverse - Diode					
$V_F = V_{EC}$	$I_F = 150\text{ A}$ $V_{GE} = 0\text{ V}$ chiplevel	$T_j = 25^\circ\text{C}$	2.17	2.49	V
		$T_j = 150^\circ\text{C}$	2.11	2.42	V
		$T_j = 175^\circ\text{C}$	1.96	2.27	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
		$T_j = 175^\circ\text{C}$	0.82	0.98	V
r_F	chiplevel	$T_j = 25^\circ\text{C}$	5.8	6.6	m Ω
		$T_j = 150^\circ\text{C}$	8.1	8.8	m Ω
		$T_j = 175^\circ\text{C}$	7.6	8.6	m Ω
I_{RRM}	$I_F = 150\text{ A}$ $V_{GE} = +15/-15\text{ V}$ $V_{CC} = 600\text{ V}$	$T_j = 25^\circ\text{C}$	197		A
		$T_j = 150^\circ\text{C}$	228		A
		$T_j = 175^\circ\text{C}$	256		A
Q_{rr}		$T_j = 25^\circ\text{C}$	13		μC
		$T_j = 150^\circ\text{C}$	26		μC
		$T_j = 175^\circ\text{C}$	25		μC
E_{rr}	$@ T_j = 150^\circ\text{C}$: $di/dt_{off} = 5550\text{ A}/\mu\text{s}$	$T_j = 25^\circ\text{C}$	5		mJ
		$T_j = 150^\circ\text{C}$	11		mJ
		$T_j = 175^\circ\text{C}$	12		mJ
$R_{th(j-s)}$	per Diode, $\lambda_{paste} = 0.8\text{ W}/(\text{mK})$		0.5		K/W
$R_{th(j-s)}$	per Diode, $\lambda_{paste} = 2.5\text{ W}/(\text{mK})$		0.4		K/W
Module					
L_{CE}			20		nH
M_s	to heat sink	2		2.5	Nm
w			50		g

SKiiP 24GB12T7V1



MiniSKiiP® 2 Dual

Characteristics					
Symbol	Conditions	min.	typ.	max.	Unit
Temperature Sensor					
R_{100}	$T_c=100^{\circ}\text{C}$ ($R_{25}=5\text{ k}\Omega$)		$493 \pm 5\%$		Ω
$B_{100/125}$	$R(T)=R_{100}\exp[B_{100/125}(1/T-1/T_{100})]$; $T[\text{K}]$		$3550 \pm 2\%$		K

Half-Bridge

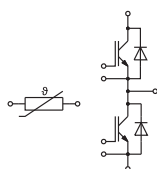
SKiiP 24GB12T7V1

Features*

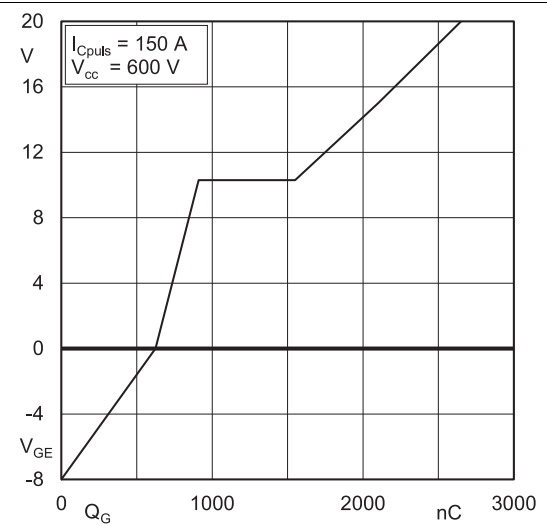
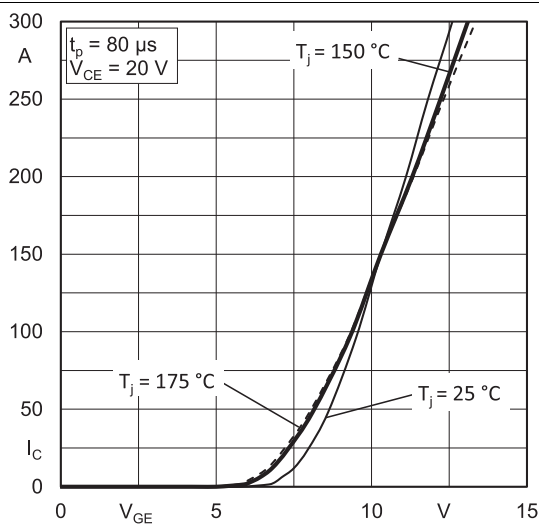
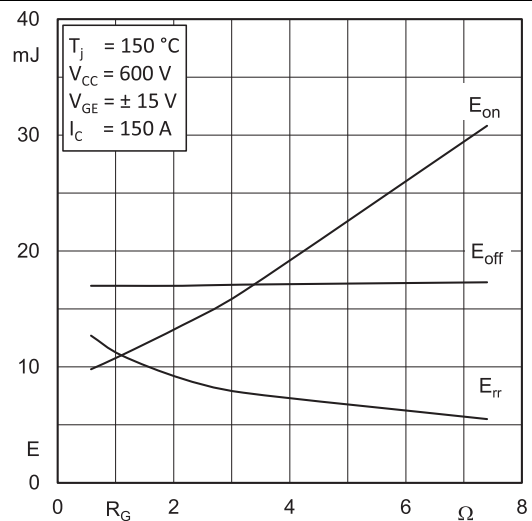
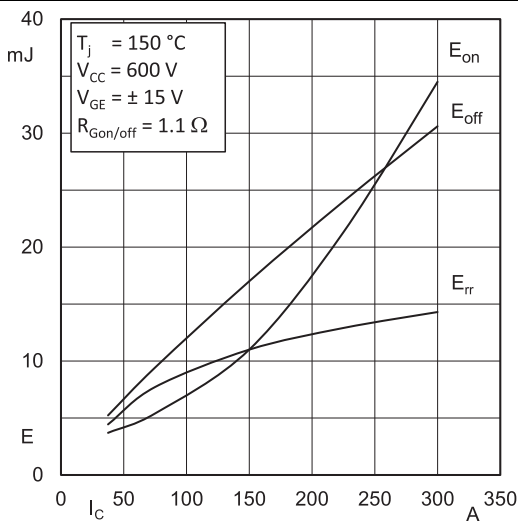
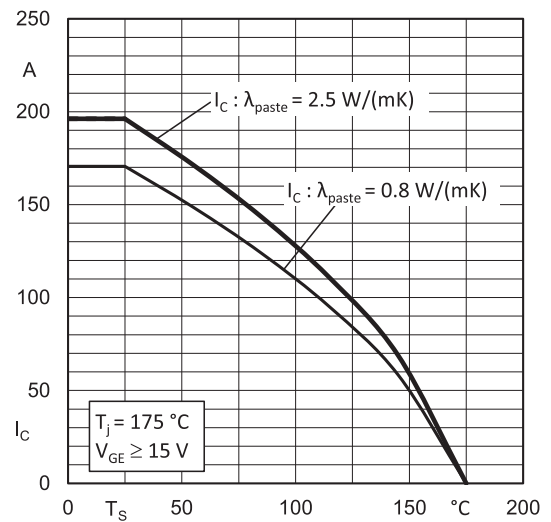
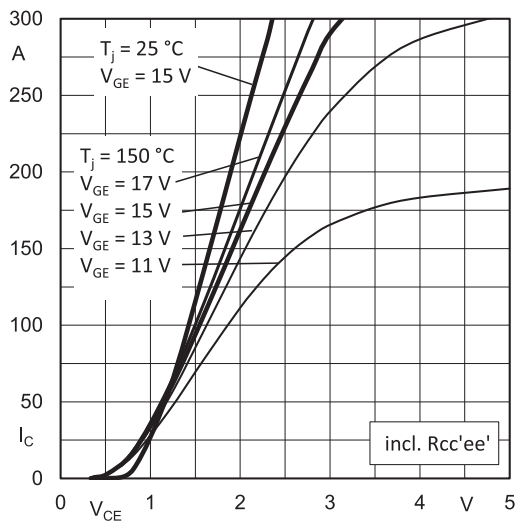
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Remarks

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GB



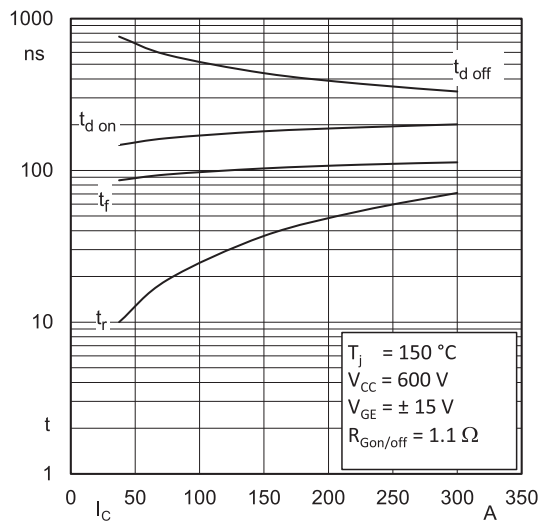


Fig. 7: Typ. switching times vs. I_C

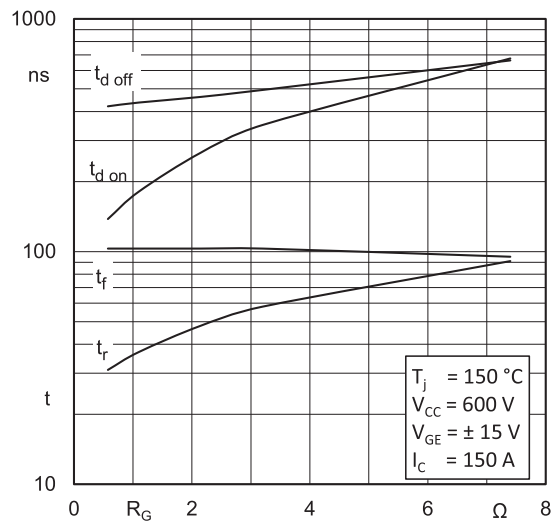


Fig. 8: Typ. switching times vs. gate resistor R_G

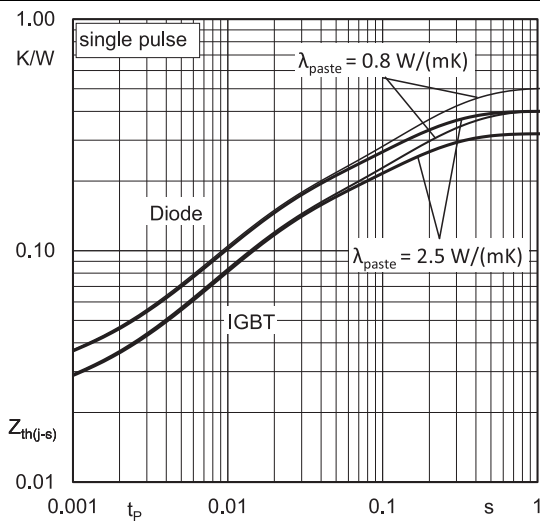


Fig. 9: Typ. transient thermal impedance

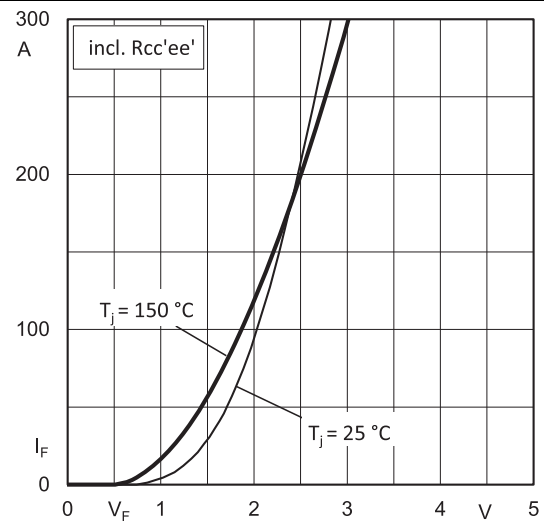


Fig. 10: Typ. CAL diode forward characteristic

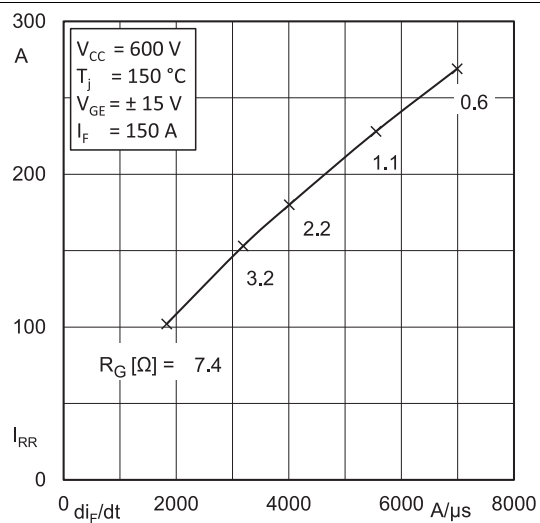


Fig. 11: Typ. CAL diode peak reverse recovery current

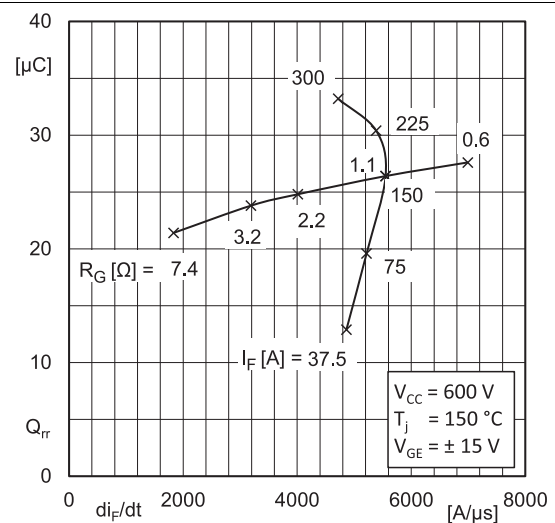
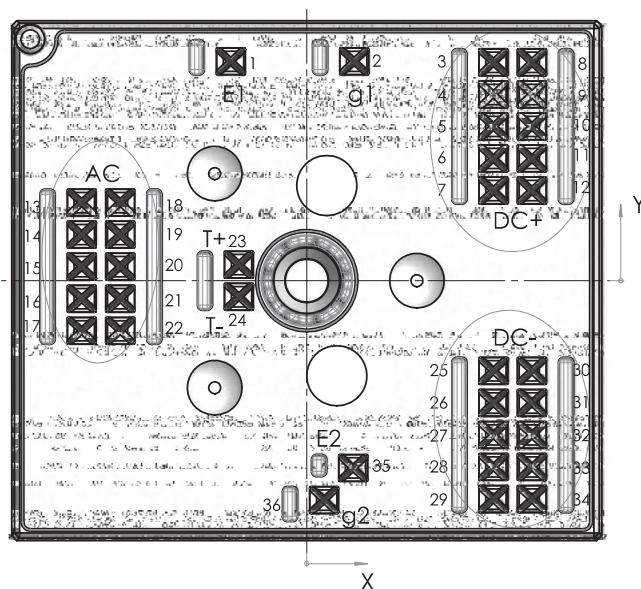


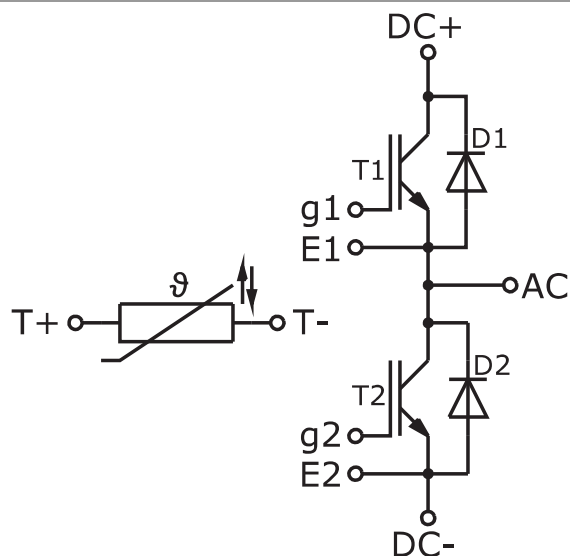
Fig. 12: Typ. CAL diode recovery charge

Pin out							
Pin	X	Y	Function	Pin	X	Y	Function
1	-7,58	21,9	E1	19	-18,62	4,6	AC
2	4,72	21,9	g1	20	-18,62	1,4	AC
3	18,62	21,8	DC+	21	-18,62	-1,8	AC
4	18,62	18,6	DC+	22	-18,62	-5	AC
5	18,62	15,4	DC+	23	-6,78	1,6	T+
6	18,62	12,2	DC+	24	-6,78	-1,6	T-
7	18,62	9	DC+	25	18,62	-9	DC-
8	22,48	21,8	DC+	26	18,62	-12,2	DC-
9	22,48	18,6	DC+	27	18,62	-15,4	DC-
10	22,48	15,4	DC+	28	18,62	-18,6	DC-
11	22,48	12,2	DC+	29	18,62	-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	4,62	-18,7	E2
18	-18,62	7,8	AC	36	1,72	-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.

***IMPORTANT INFORMATION AND WARNINGS**

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