

SKiiP 11ACC12T7V1



MiniSKiiP® 1

Twelvepack

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Features*

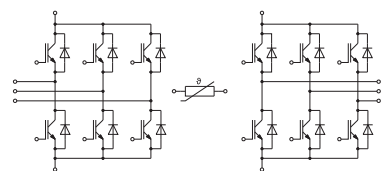
- 1200V Generation 7 IGBTs (T7)
- Robust and soft switching freewheeling diodes in CAL technology
- Highly reliable spring contacts for electrical connections
- UL recognized: File no. E63532

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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- Inverter-IGBT: T1-T12
- Inverse-Diode: D1-D12

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	20	A
	T _j = 175 °C	T _s = 100 °C	16	A
I _C	λ _{paste} =2.5 W/(mK)	T _s = 70 °C	22	A
	T _j = 175 °C	T _s = 100 °C	18	A
I _{Cnom}			10	A
I _{CRM}			20	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	13	A
	T _j = 175 °C	T _s = 100 °C	11	A
I _F	λ _{paste} =2.5 W/(mK)	T _s = 70 °C	14	A
	T _j = 175 °C	T _s = 100 °C	12	A
I _{FRM}			20	A
I _{FSM}	t _p = 10 ms, sin 180°, T _j = 150 °C		36	A
T _j			-40 ... 175	°C
Module				
I _{t(RMS)}	T _{terminal} = 80 °C, 20 A per spring		20	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 = 10 A	T _j = 25 °C		1.60	1.75	V
	V _{GE} = 15 V	T _j = 150 °C		1.78	1.93	V
	chiplevel	T _j = 175 °C		1.82	1.97	V
V _{CE0}	chiplevel	T _j = 25 °C		1.00	1.05	V
		T _j = 150 °C		0.80	0.85	V
		T _j = 175 °C		0.75	0.80	V
r _{CE}	V _{GE} = 15 V chiplevel	T _j = 25 °C		60	70	mΩ
		T _j = 150 °C		98	108	mΩ
		T _j = 175 °C		107	117	mΩ
V _{GE(th)}	V _{GE} = V _{CE} , I _C = 0.22 mA		5.15	5.8	6.45	V
I _{CES}	V _{GE} = 0 V, V _{CE} = 1200 V, T _j = 25 °C				1	mA
C _{ies}	V _{CE} = 25 V V _{GE} = 0 V	f = 1 MHz		1.90		nF
C _{oes}		f = 1 MHz		0.02		nF
C _{res}		f = 1 MHz		0.01		nF
Q _G	V _{GE} = - 8V ... + 15 V			140		nC
R _{Gint}	T _j = 25 °C			0		Ω



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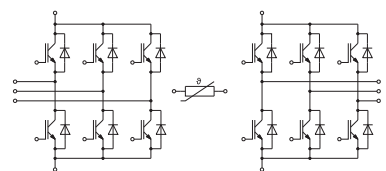
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Characteristics					
Symbol	Conditions	min.	typ.	max.	Unit
Inverter - IGBT					
$t_{d(on)}$	$V_{CC} = 600\text{ V}$ $I_C = 10\text{ A}$ $R_{G\ on} = 32\ \Omega$ $R_{G\ off} = 32\ \Omega$ $V_{GE} = +15/-15\text{ V}$	$T_j = 25^\circ\text{C}$	44		ns
		$T_j = 150^\circ\text{C}$	46		ns
		$T_j = 175^\circ\text{C}$	47		ns
t_r		$T_j = 25^\circ\text{C}$	39		ns
		$T_j = 150^\circ\text{C}$	44		ns
		$T_j = 175^\circ\text{C}$	47		ns
E_{on}	$R_{G\ on} = 32\ \Omega$ $R_{G\ off} = 32\ \Omega$ $V_{GE} = +15/-15\text{ V}$	$T_j = 25^\circ\text{C}$	0.8		mJ
		$T_j = 150^\circ\text{C}$	1.1		mJ
		$T_j = 175^\circ\text{C}$	1.2		mJ
$t_{d(off)}$		$T_j = 25^\circ\text{C}$	198		ns
		$T_j = 150^\circ\text{C}$	288		ns
		$T_j = 175^\circ\text{C}$	313		ns
t_f	$@ T_j = 150^\circ\text{C}$: $di/dt_{on} = 190\text{ A}/\mu\text{s}$ $di/dt_{off} = 130\text{ A}/\mu\text{s}$ $dv/dt = 3580\text{ V}/\mu\text{s}$	$T_j = 25^\circ\text{C}$	42		ns
		$T_j = 150^\circ\text{C}$	63		ns
		$T_j = 175^\circ\text{C}$	85		ns
E_{off}		$T_j = 25^\circ\text{C}$	0.65		mJ
		$T_j = 150^\circ\text{C}$	1.1		mJ
		$T_j = 175^\circ\text{C}$	1.2		mJ
$R_{th(j-s)}$	per IGBT, $\lambda_{paste} = 0.8\text{ W}/(\text{mK})$		1.7		K/W
$R_{th(j-s)}$	per IGBT, $\lambda_{paste} = 2.5\text{ W}/(\text{mK})$		1.46		K/W

Characteristics					
Symbol	Conditions	min.	typ.	max.	Unit
Inverse - Diode					
$V_F = V_{EC}$	$I_F = 10\text{ A}$ $V_{GE} = 0\text{ V}$ chiplevel	$T_j = 25^\circ\text{C}$	2.59	2.94	V
		$T_j = 150^\circ\text{C}$	2.71	3.08	V
		$T_j = 175^\circ\text{C}$	2.53	2.89	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	$T_j = 25^\circ\text{C}$	129	144	m Ω
		$T_j = 150^\circ\text{C}$	181	198	m Ω
		$T_j = 175^\circ\text{C}$	171	191	m Ω
I_{RRM}	$I_F = 10\text{ A}$ $V_{GE} = +15/-15\text{ V}$ $V_{CC} = 600\text{ V}$	$T_j = 25^\circ\text{C}$	6		A
		$T_j = 150^\circ\text{C}$	7		A
		$T_j = 175^\circ\text{C}$	8		A
Q_{rr}		$T_j = 25^\circ\text{C}$	0.7		μC
		$T_j = 150^\circ\text{C}$	1.4		μC
		$T_j = 175^\circ\text{C}$	1.6		μC
E_{rr}	$@ T_j = 150^\circ\text{C}$: $di/dt_{off} = 210\text{ A}/\mu\text{s}$	$T_j = 25^\circ\text{C}$	0.2		mJ
		$T_j = 150^\circ\text{C}$	0.56		mJ
		$T_j = 175^\circ\text{C}$	0.73		mJ
$R_{th(j-s)}$	per Diode, $\lambda_{paste} = 0.8\text{ W}/(\text{mK})$		2.33		K/W
$R_{th(j-s)}$	per Diode, $\lambda_{paste} = 2.5\text{ W}/(\text{mK})$		2		K/W
Module					
L_{CE}			-		nH
M_s	to heat sink	2		2.5	Nm
w			30		g

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Characteristics					
Symbol	Conditions	min.	typ.	max.	Unit
Temperature Sensor					
R_{100}	$T_r=100^{\circ}\text{C}$ ($R_{25}=1000\Omega$)		$1670 \pm 3\%$		Ω
$R_{(T)}$	$R_{(T)}=1000\Omega[1+A(T-25^{\circ}\text{C})+B(T-25^{\circ}\text{C})^2]$ $A = 7.635 \cdot 10^{-3}^{\circ}\text{C}^{-1}$, $B = 1.731 \cdot 10^{-5}^{\circ}\text{C}^{-2}$				

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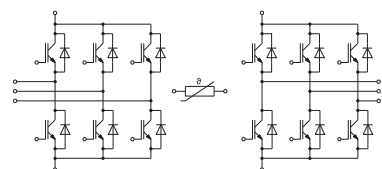
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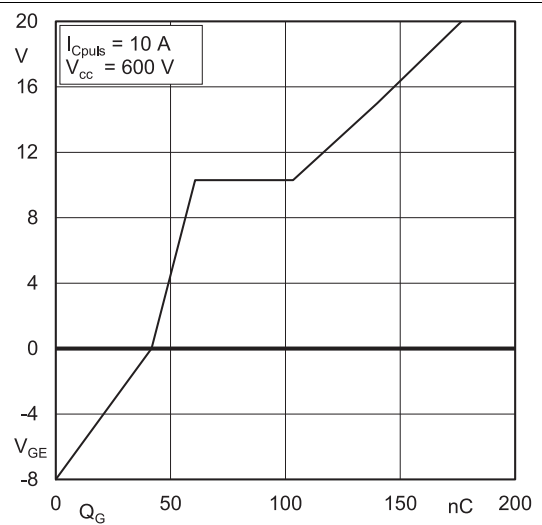
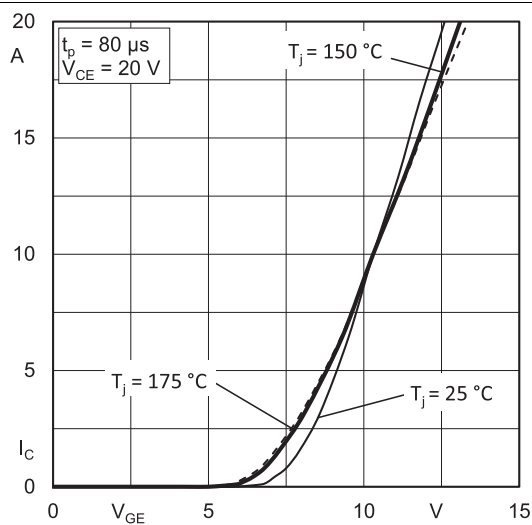
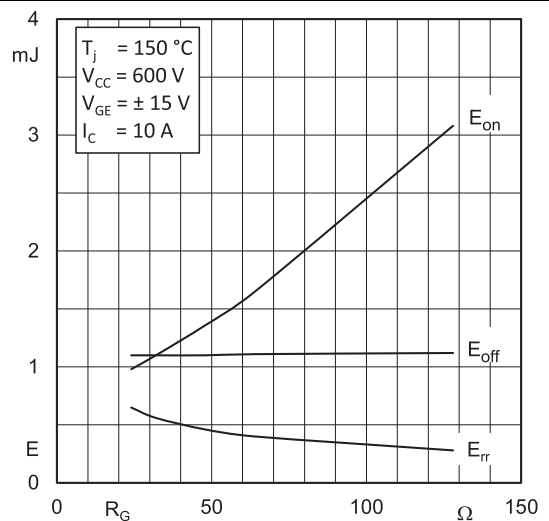
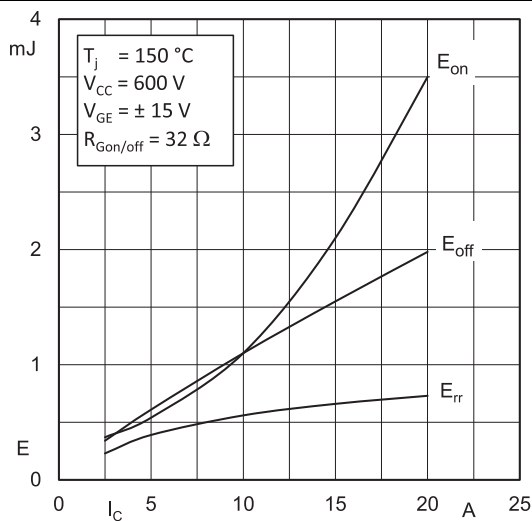
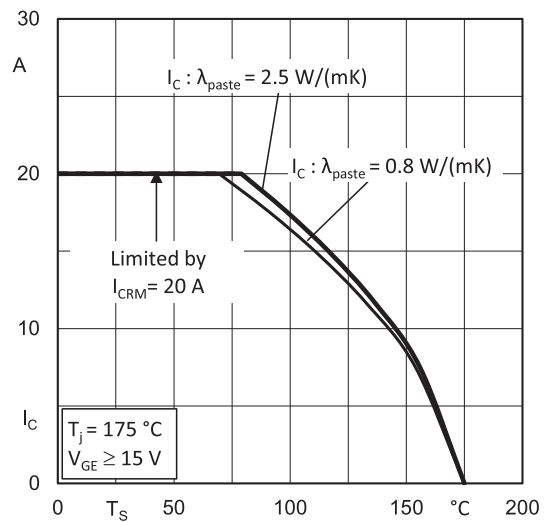
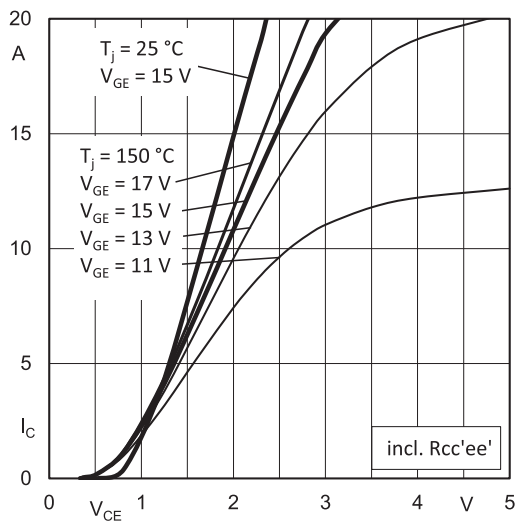
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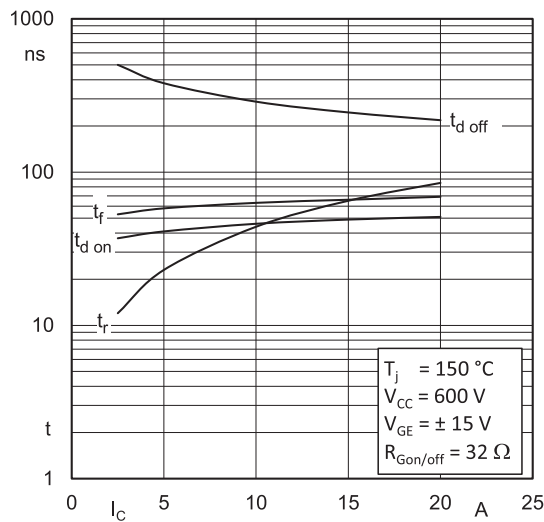


Fig. 7: Typ. switching times vs. I_C

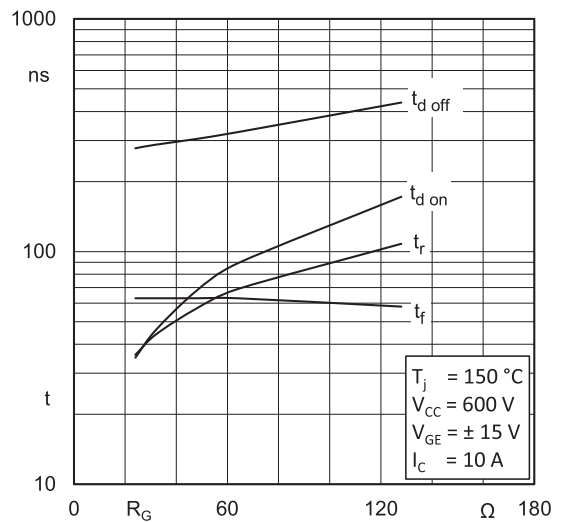


Fig. 8: Typ. switching times vs. gate resistor R_G

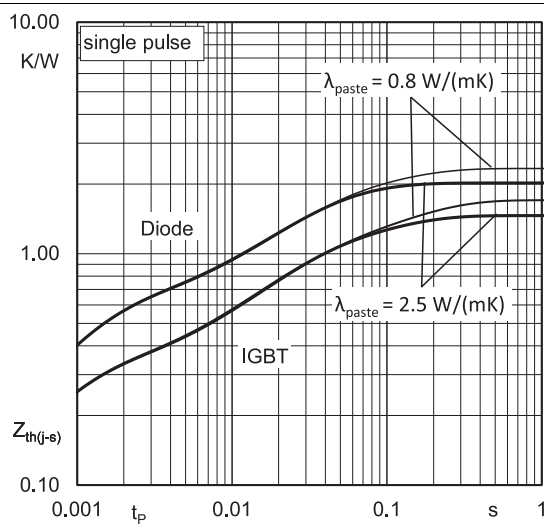


Fig. 9: Typ. transient thermal impedance

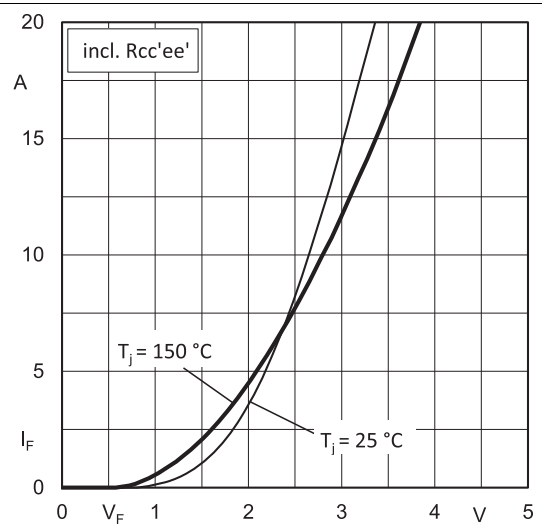


Fig. 10: Typ. CAL diode forward characteristic

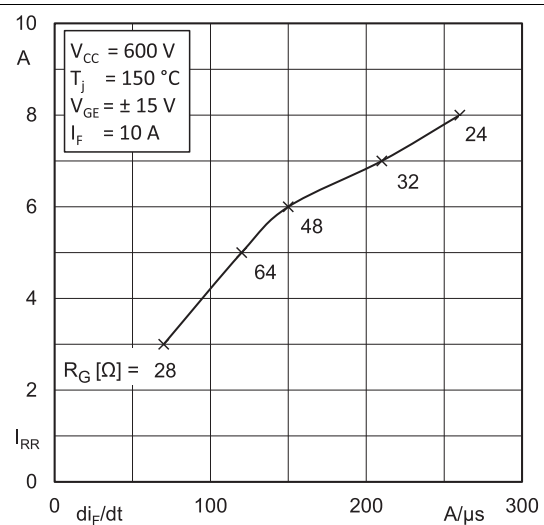


Fig. 11: Typ. CAL diode peak reverse recovery current

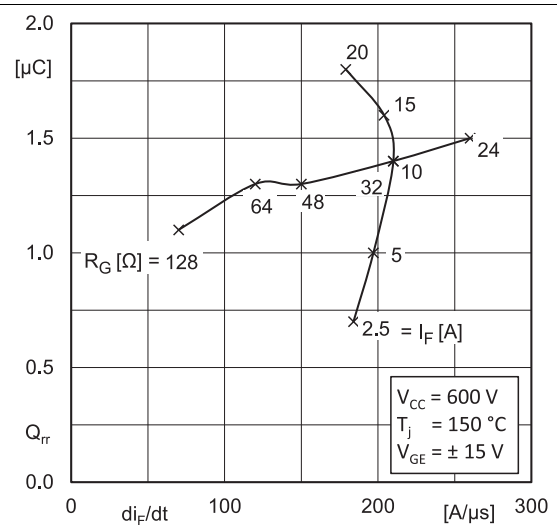
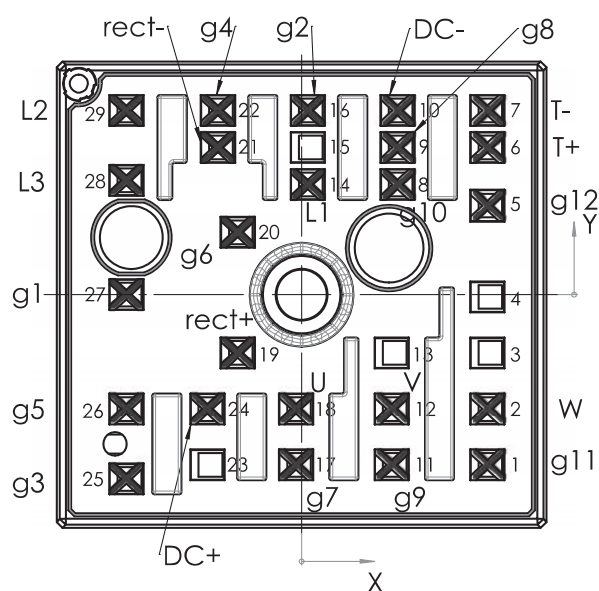


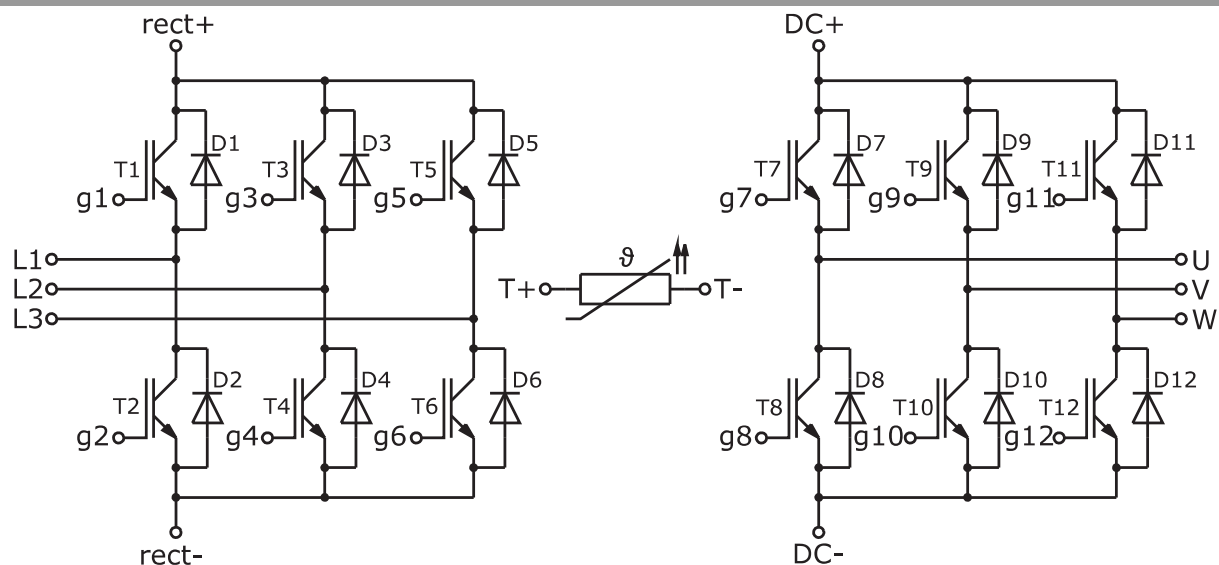
Fig. 12: Typ. CAL diode recovery charge

Pin out							
Pin	X	Y	Function	Pin	X	Y	Function
1	15,93	-14,6	g11	16	0,53	15,8	g2
2	15,93	-9,8	W	17	-0,48	-14,6	g7
3				18	-0,48	-9,8	U
4				19	-5,48	-5	rect+
5	15,93	7,63	g12	20	-5,48	5,35	g6
6	15,93	12,63	T+	21	-7,18	12,63	rect-
7	15,93	15,8	T-	22	-7,18	15,8	g4
8	8,23	9,45	g10	23			
9	8,23	12,63	g8	24	-8,08	-9,8	DC+
10	8,23	15,8	DC-	25	-15,03	-15,8	g3
11	7,73	-14,6	g9	26	-15,03	-9,8	g5
12	7,73	-9,8	V	27	-15,03	0	g1
13				28	-15,03	9,8	L3
14	0,53	9,45	L1	29	-15,03	15,8	L2
15							

all values in mm



Pinout



Pinout

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

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