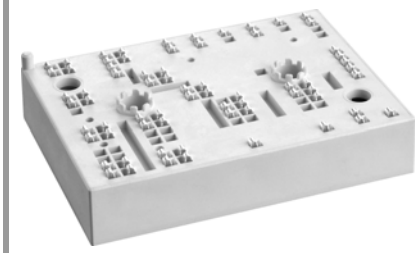
SKiiP 38AC176V2



MiniSKiiP® 3

Sixpack

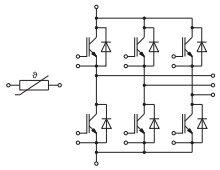
SKiiP 38AC176V2

Features*

- Trench IGBTs
- 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=125°C
- Product reliability results valid for T_j≤150°C (recommended $T_{j,op}$=-40...+150°C)
- Please refer to MiniSKiiP "Technical Explanations" and "Mounting Instructions" for further information



AC

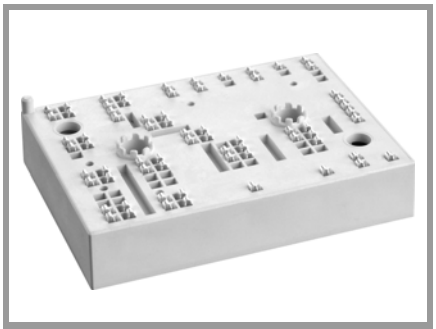
Absolute Maximum Ratings

Symbol	Conditions		Values	Unit
Inverter - IGBT				
V_{CES}	T_j = 25 °C		1700	V
I_C	λ_{paste}=0.8 W/(mK)	T_s = 25 °C	118	A
	T_j = 175 °C	T_s = 70 °C	95	A
I_C	λ_{paste}=2.5 W/(mK)	T_s = 25 °C	152	A
	T_j = 175 °C	T_s = 70 °C	123	A
I_{Cnom}			100	A
I_{CRM}			200	A
V_{GES}			-20 ... 20	V
t_{psc}	V_{CC} = 1000 V V_{GE} ≤ 20 V V_{CES} ≤ 1700 V	T_j = 150 °C	10	µs
T_j			-40 ... 175	°C
Inverse - Diode				
V_{RRM}	T_j = 25 °C		1700	V
I_F	λ_{paste}=0.8 W/(mK)	T_s = 25 °C	115	A
	T_j = 175 °C	T_s = 70 °C	89	A
I_F	λ_{paste}=2.5 W/(mK)	T_s = 25 °C	142	A
	T_j = 175 °C	T_s = 70 °C	111	A
I_{FRM}			300	A
I_{FSM}	t_p = 10 ms, sin 180°, T_j = 150 °C		860	A
T_j			-40 ... 175	°C
Module				
$I_{t(RMS)}$	$T_{terminal}$ = 80 °C, 20 A per spring		120	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 = 100 A V_{GE} = 15 V chiplevel	T_j = 25 °C		2.00	2.40	V
		T_j = 150 °C		2.45	2.90	V
V_{CE0}	chiplevel	T_j = 25 °C		1.00	1.20	V
		T_j = 150 °C		0.90	1.10	V
r_{CE}	V_{GE} = 15 V chiplevel	T_j = 25 °C		10	12	mΩ
		T_j = 150 °C		16	18	mΩ
$V_{GE(th)}$	V_{GE} = V_{CE}, I_C = 4 mA		5.2	5.8	6.4	V
I_{CES}	V_{GE} = 0 V, V_{CE} = 1700 V, T_j = 25 °C				1	mA
C_{ies}	V_{CE} = 25 V V_{GE} = 0 V	f = 1 MHz		8.82		nF
C_{oes}		f = 1 MHz		0.37		nF
C_{res}		f = 1 MHz		0.29		nF
Q_G	V_{GE} = - 8 V...+ 15 V			934		nC
R_{Gint}	T_j = 25 °C			4.8		Ω
$t_{d(on)}$	V_{CC} = 900 V I_C = 100 A $R_{G\ on}$ = 1 Ω $R_{G\ off}$ = 1 Ω di/dt$_{on}$ = 3000 A/µs di/dt$_{off}$ = 600 A/µs dv/dt = 4500 V/µs V_{GE} = +15/-15 V L_s = 40 nH	T_j = 150 °C		160		ns
t_r		T_j = 150 °C		35		ns
E_{on}		T_j = 150 °C		23.8		mJ
$t_{d(off)}$		T_j = 150 °C		580		ns
t_f		T_j = 150 °C		150		ns
E_{off}		T_j = 150 °C		32.2		mJ
$R_{th(j-s)}$	per IGBT, λ_{paste}=0.8 W/(mK)			0.38		K/W
$R_{th(j-s)}$	per IGBT, λ_{paste}=2.5 W/(mK)			0.25		K/W

SKiiP 38AC176V2



MiniSKiiP® 3

Sixpack

SKiiP 38AC176V2

Features*

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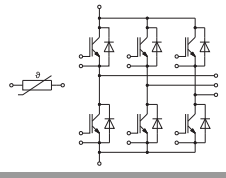


AC

Characteristics

Symbol	Conditions		min.	typ.	max.	Unit
Inverse - Diode						
$V_F = V_{EC}$	I_F = 100 A V_{GE} = 0 V chiplevel	T_j = 25 °C		1.76	2.10	V
		T_j = 150 °C		1.77	2.09	V
V_{F0}	chiplevel	T_j = 25 °C		1.32	1.56	V
		T_j = 150 °C		1.08	1.22	V
r_F	chiplevel	T_j = 25 °C		4.4	5.4	mΩ
		T_j = 150 °C		6.9	8.7	mΩ
I_{RRM}	I_F = 100 A di/dt_{off} = 4000 A/µs V_{GE} = +15/-15 V V_{CC} = 900 V	T_j = 150 °C		226		A
Q_{rr}		T_j = 150 °C		38.5		µC
E_{rr}		T_j = 150 °C		26.2		mJ
$R_{th(j-s)}$	per Diode, λ_{paste}=0.8 W/(mK)			0.61		K/W
$R_{th(j-s)}$	per Diode, λ_{paste}=2.5 W/(mK)			0.45		K/W
Module						
L_{CE}				20		nH
M_s	to heat sink		2		2.5	Nm
w				82		g
Temperature Sensor						
R_{100}	T_r=100°C (R_{25}=1000Ω)			1670 ± 3%		Ω
$R_{(T)}$	$R_{(T)}$=1000Ω[1+A(T-25°C)+B(T-25°C)^2] , A = 7.635*10^{-3}°C^{-1}, B = 1.731*10^{-5}°C^{-2}					

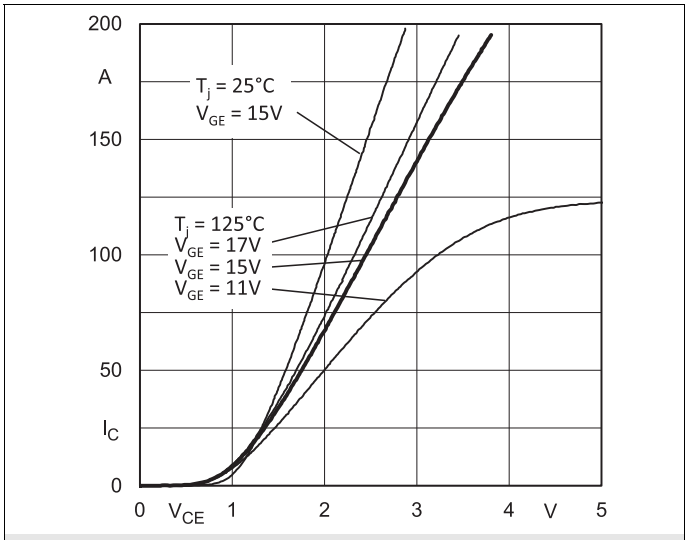


Fig. 1:Typ. output characteristic

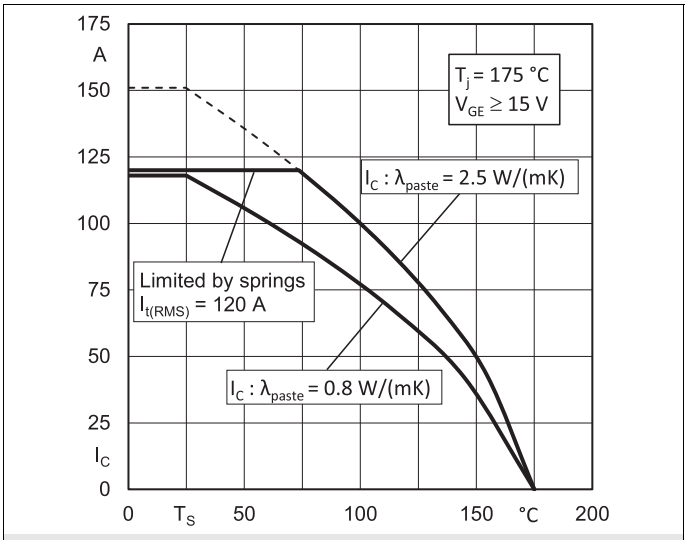


Fig. 2: Typ. rated current vs. temperature $I_C = f(T_S)$

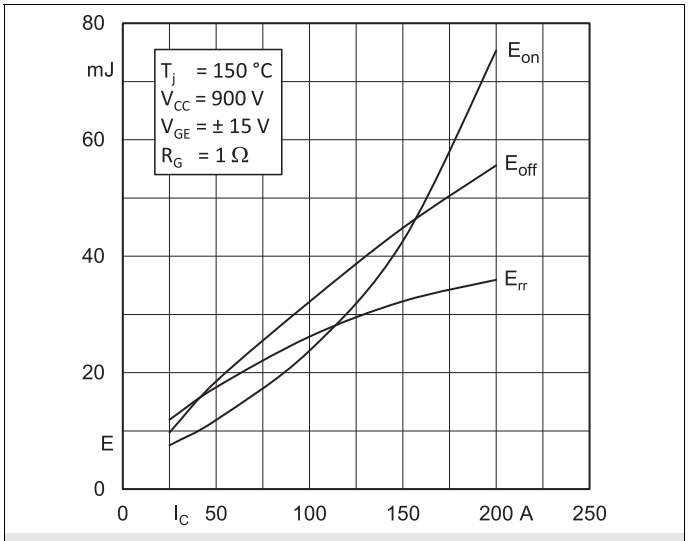


Fig. 3: Typ. turn-on /-off energy = f (I_C)

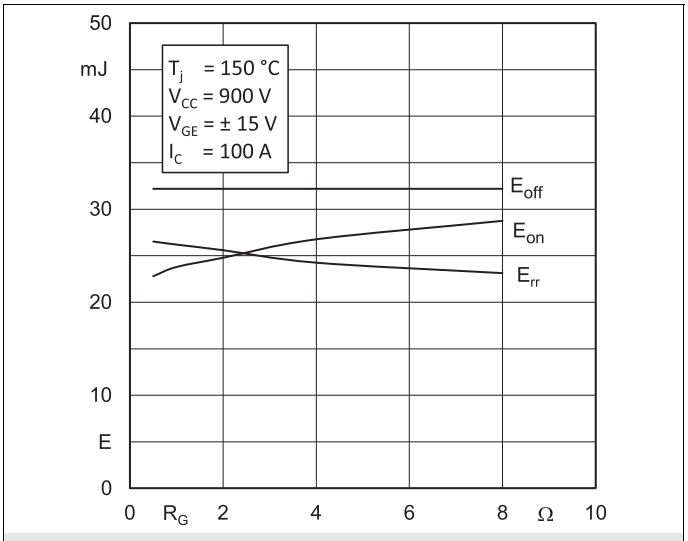


Fig. 4: Typ. turn-on /-off energy = f (R_G)

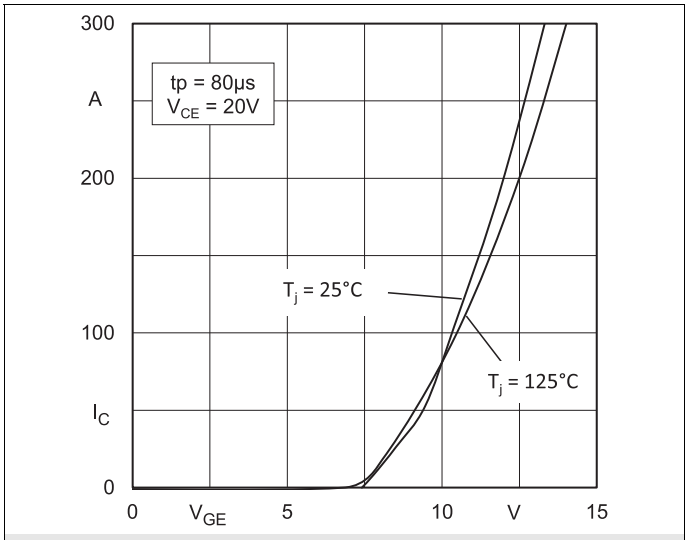


Fig. 5: Typ. transfer characteristic

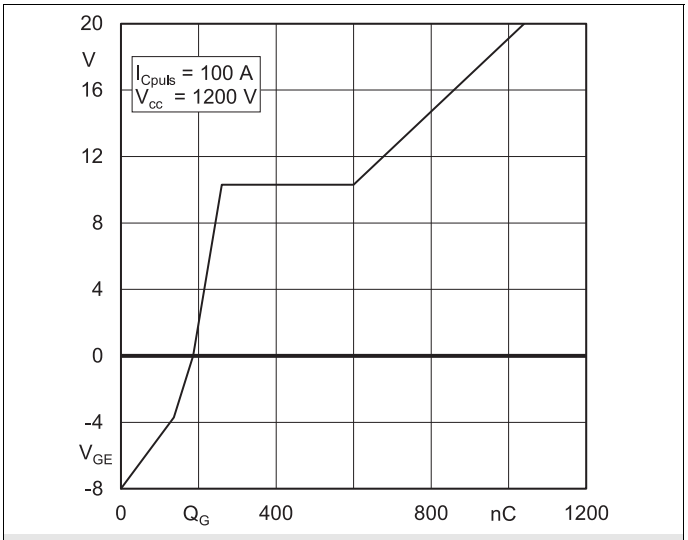


Fig. 6: Typ. gate charge characteristic

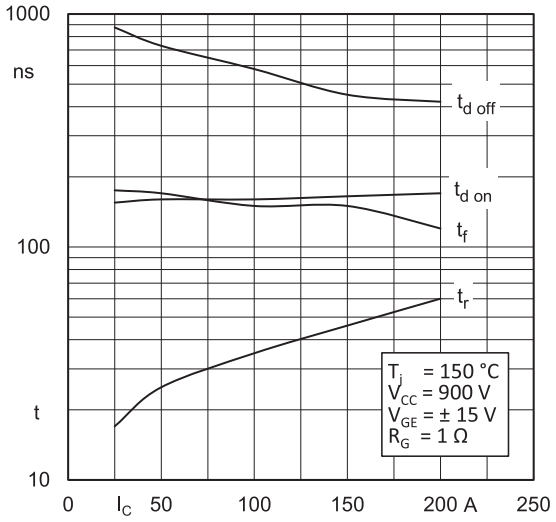


Fig. 7: Typ. switching times vs. I_C

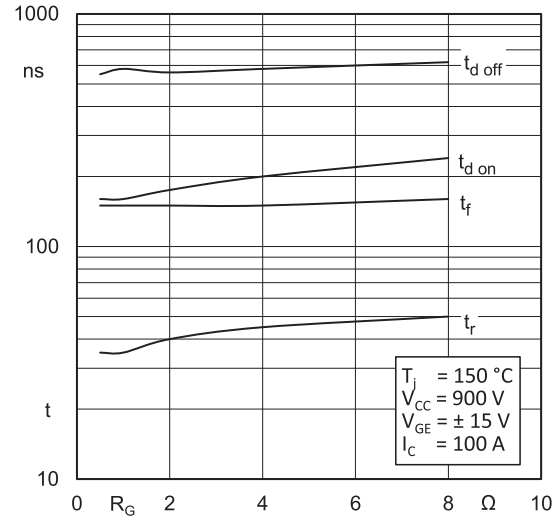


Fig. 8: Typ. switching times vs. gate resistor R_G

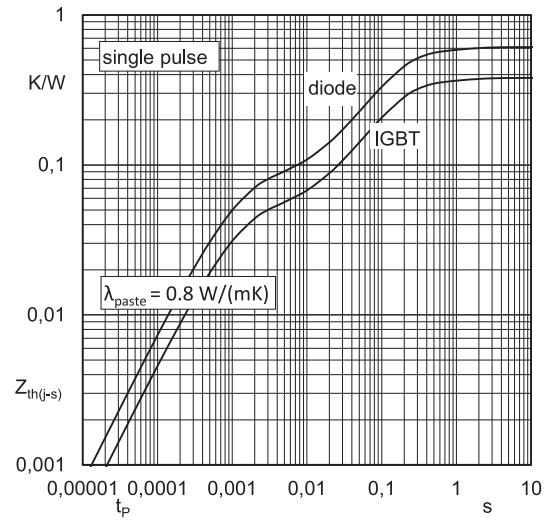


Fig. 9: Typ. transient thermal impedance

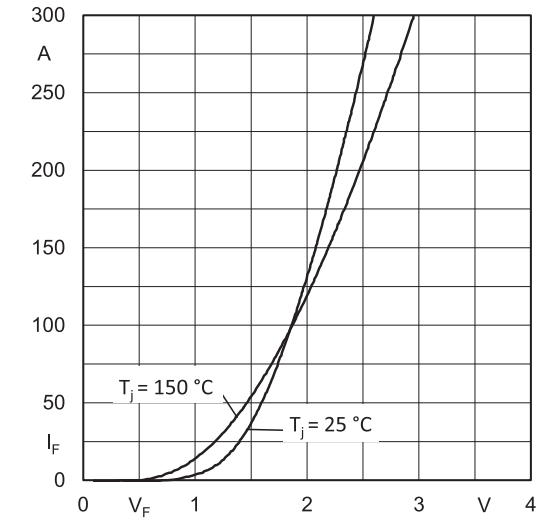


Fig. 10: Typ. CAL diode forward characteristic

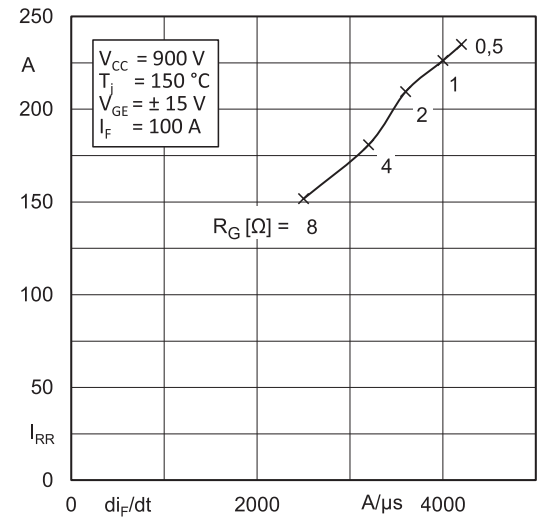


Fig. 11: Typ. CAL diode peak reverse recovery current

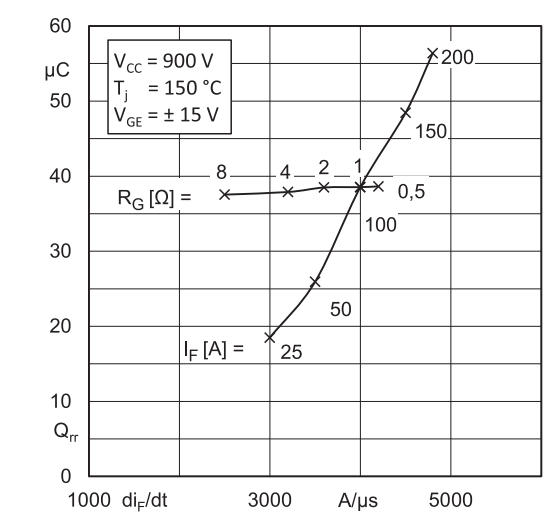
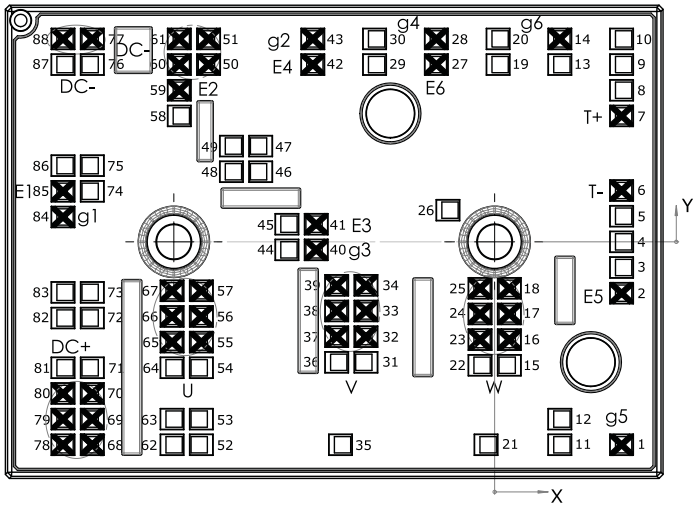


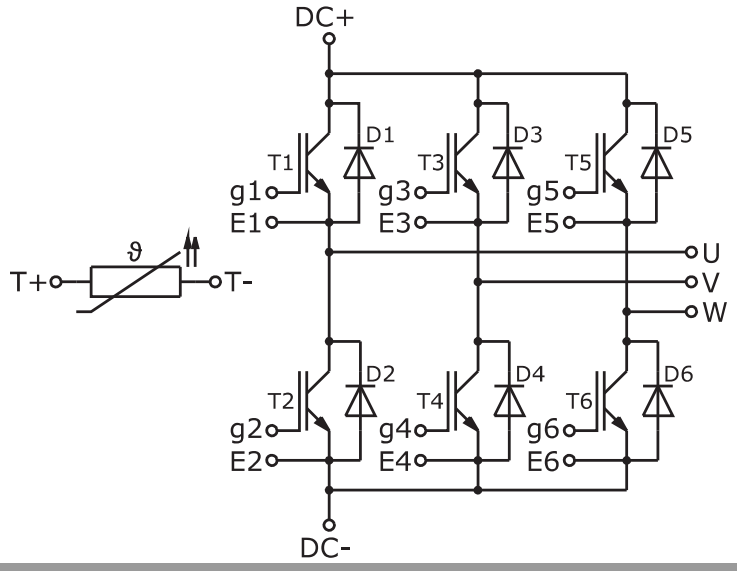
Fig. 12: Typ. CAL diode recovery charge

Pin out											
Pin	*X*	*Y*	*Function*	*Pin*	*X*	*Y*	*Function*	*Pin*	*X*	*Y*	*Function*
1	15,83	-25,30	g5	31	-16,05	-15,02		61	-39,33	25,30	DC-
2	15,83	-6,40	E5	32	-16,05	-11,82	V	62	-40,23	-25,30	
3	15,83	-3,20		33	-16,05	-8,62	V	63	-40,23	-22,10	
4	15,83	0		34	-16,05	-5,42	V	64	-40,23	-15,70	
5	15,83	3,20		35	-19,23	-25,30		65	-40,23	-12,50	U
6	15,83	6,40	T-	36	-19,70	-15,02		66	-40,23	-9,30	U
7	15,83	15,70	T+	37	-19,70	-11,82	V	67	-40,23	-6,10	U
8	15,83	18,90		38	-19,70	-8,62	V	68	-50,18	-25,30	DC+
9	15,83	22,10		39	-19,70	-5,42	V	69	-50,18	-22,10	DC+
10	15,83	25,30		40	-22,26	-1,00	g3	70	-50,18	-18,90	DC+
11	8,13	-25,30		41	-22,26	2,20	E3	71	-50,18	-15,70	
12	8,13	-22,10		42	-22,68	22,10	E4	72	-50,18	-9,50	
13	8,13	22,10		43	-22,68	25,30	g2	73	-50,18	-6,30	
14	8,13	25,30	g6	44	-25,91	-1,00		74	-50,18	6,30	
15	1,83	-15,39		45	-25,91	2,20		75	-50,18	9,50	
16	1,83	-12,19	W	46	-29,18	8,74		76	-50,18	22,10	
17	1,83	-8,99	W	47	-29,18	11,94		77	-50,18	25,30	DC-
18	1,83	-5,79	W	48	-32,83	8,74		78	-53,83	-25,30	DC+
19	0,43	22,10		49	-32,83	11,94		79	-53,83	-22,10	DC+
20	0,43	25,30		50	-35,68	22,10	DC-	80	-53,83	-18,90	DC+
21	-1,08	-25,30		51	-35,68	25,30	DC-	81	-53,83	-15,70	
22	-1,83	-15,39		52	-36,58	-25,30		82	-53,83	-9,50	
23	-1,83	-12,19	W	53	-36,58	-22,10		83	-53,83	-6,30	
24	-1,83	-8,99	W	54	-36,58	-15,70		84	-53,83	3,10	g1
25	-1,83	-5,79	W	55	-36,58	-12,50	U	85	-53,83	6,30	E1
26	-5,83	3,95		56	-36,58	-9,30	U	86	-53,83	9,50	
27	-7,28	22,10	E6	57	-36,58	-6,10	U	87	-53,83	22,10	
28	-7,28	25,30	g4	58	-39,33	15,70		88	-53,83	25,30	DC-
29	-14,98	22,10		59	-39,33	18,90	E2				
30	-14,98	25,30		60	-39,33	22,10	DC-				

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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