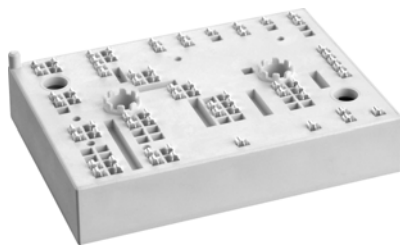


SKiiP 37AC12F4V1



MiniSKiiP® 3

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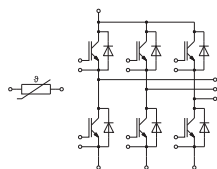
SKiiP 37AC12F4V1

Features*

- IGBT4 Fast
- Robust and soft diodes in CAL technology
- Highly reliable spring contacts for electrical connections
- UL recognised: File no. E63532

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 $T_{J,op} = -40 \dots +150^\circ\text{C}$)
- Please refer to MiniSKiiP "Technical Explanations" and "Mounting Instructions" for further information



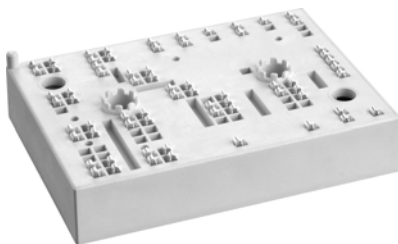
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Absolute Maximum Ratings

Symbol	Conditions		Values	Unit
Inverter - IGBT				
V _{CES}	T _j = 25 °C		1200	V
I _C	λ _{paste} =0.8 W/(mK)	T _s = 25 °C	83	A
	T _j = 175 °C	T _s = 70 °C	67	A
I _C	λ _{paste} =2.5 W/(mK)	T _s = 25 °C	98	A
	T _j = 175 °C	T _s = 70 °C	79	A
I _{Cnom}			75	A
I _{CRM}			225	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				
V _{RRM}	T _j = 25 °C		1200	V
I _F	λ _{paste} =0.8 W/(mK)	T _s = 25 °C	82	A
	T _j = 175 °C	T _s = 70 °C	65	A
I _F	λ _{paste} =2.5 W/(mK)	T _s = 25 °C	95	A
	T _j = 175 °C	T _s = 70 °C	76	A
I _{FRM}			150	A
I _{FSM}	t _p = 10 ms, sin 180°, T _j = 150 °C		430	A
T _j			-40 ... 175	°C
Module				
I _{t(RMS)}	T _{terminal} = 80 °C, 20 A per spring		80	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					
$V_{CE(sat)}$	$I_C = 75 \text{ A}$ $V_{GE} = 15 \text{ V}$ chipelevel	$T_J = 25^\circ\text{C}$	2.05	2.42	V
		$T_J = 150^\circ\text{C}$	2.59	2.96	V
V_{CE0}	chipelevel	$T_J = 25^\circ\text{C}$	1.10	1.28	V
		$T_J = 150^\circ\text{C}$	0.95	1.13	V
r_{CE}	$V_{GE} = 15 \text{ V}$ chipelevel	$T_J = 25^\circ\text{C}$	13	15	m Ω
		$T_J = 150^\circ\text{C}$	22	24	m Ω
$V_{GE(th)}$	$V_{GE} = V_{CE}, I_C = 2.6 \text{ mA}$	5.2	5.8	6.4	V
I_{CES}	$V_{GE} = 0 \text{ V}, V_{CE} = 1200 \text{ V}, T_J = 25^\circ\text{C}$			1	mA
C_{ies}	$V_{CE} = 25 \text{ V}$	$f = 1 \text{ MHz}$	4.40		nF
C_{oes}	$V_{GE} = 0 \text{ V}$	$f = 1 \text{ MHz}$	0.29		nF
C_{res}		$f = 1 \text{ MHz}$	0.24		nF
Q_G	$V_{GE} = -8 \text{ V} \dots +15 \text{ V}$		425		nC
R_{Gint}	$T_J = 25^\circ\text{C}$		0		Ω
$t_{d(on)}$	$V_{CC} = 600 \text{ V}$	$T_J = 150^\circ\text{C}$	32		ns
t_r	$I_C = 75 \text{ A}$ $R_{G on} = 12 \Omega$	$T_J = 150^\circ\text{C}$	46		ns
		$T_J = 150^\circ\text{C}$	10		mJ
E_{on}	$R_{G off} = 12 \Omega$	$T_J = 150^\circ\text{C}$			
$t_{d(off)}$	$di/dt_{on} = 1493 \text{ A}/\mu\text{s}$	$T_J = 150^\circ\text{C}$	314		ns
t_f	$di/dt_{off} = 1220 \text{ A}/\mu\text{s}$	$T_J = 150^\circ\text{C}$	49		ns
E_{off}	$V_{GE} = +15/-15 \text{ V}$	$T_J = 150^\circ\text{C}$	5.4		mJ
$R_{th(j-s)}$	per IGBT, $\lambda_{paste}=0.8 \text{ W/(mK)}$		0.55		K/W
$R_{th(j-s)}$	per IGBT, $\lambda_{paste}=2.5 \text{ W/(mK)}$		0.42		K/W



MiniSKiiP® 3

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SKiiP 37AC12F4V1

Features*

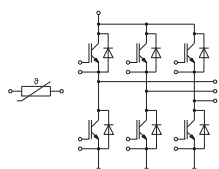
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- Robust and soft diodes in CAL technology
- Highly reliable spring contacts for electrical connections
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- Max. case temperature limited to $T_C=125^{\circ}\text{C}$
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- Please refer to MiniSKiiP "Technical Explanations" and "Mounting Instructions" for further information

Characteristics

Symbol	Conditions		min.	typ.	max.	Unit
Inverse - Diode						
$V_F = V_{EC}$	$I_F = 75 \text{ A}$ $V_{GE} = 0 \text{ V}$ chipllevel	$T_J = 25^{\circ}\text{C}$		2.17	2.49	V
		$T_J = 150^{\circ}\text{C}$		2.11	2.42	V
V_{F0}	chipllevel	$T_J = 25^{\circ}\text{C}$		1.30	1.50	V
		$T_J = 150^{\circ}\text{C}$		0.90	1.10	V
r_F	chipllevel	$T_J = 25^{\circ}\text{C}$		12	13	mΩ
		$T_J = 150^{\circ}\text{C}$		16	18	mΩ
I_{RRM}	$I_F = 75 \text{ A}$	$T_J = 150^{\circ}\text{C}$		69		A
Q_{rr}	$di/dt_{off} = 1830 \text{ A}/\mu\text{s}$ $V_{GE} = +15/-15 \text{ V}$	$T_J = 150^{\circ}\text{C}$		12		μC
E_{rr}	$V_{CC} = 600 \text{ V}$	$T_J = 150^{\circ}\text{C}$		4.4		mJ
$R_{th(j-s)}$	per Diode, $\lambda_{paste}=0.8 \text{ W}/(\text{mK})$			0.77		K/W
$R_{th(j-s)}$	per Diode, $\lambda_{paste}=2.5 \text{ W}/(\text{mK})$			0.61		K/W
Module						
L_{CE}				-		nH
M_s	to heat sink		2		2.5	Nm
w				82		g
Temperature Sensor						
R_{100}	$T_r=100^{\circ}\text{C}$ ($R_{25}=1000\Omega$)			$1670 \pm 3\%$		Ω
$R_{(T)}$	$R_{(T)}=1000\Omega[1+A(T-25^{\circ}\text{C})+B(T-25^{\circ}\text{C})^2]$, $A = 7.635 \cdot 10^{-3} \text{ }^{\circ}\text{C}^{-1}$, $B = 1.731 \cdot 10^{-5} \text{ }^{\circ}\text{C}^{-2}$					



AC

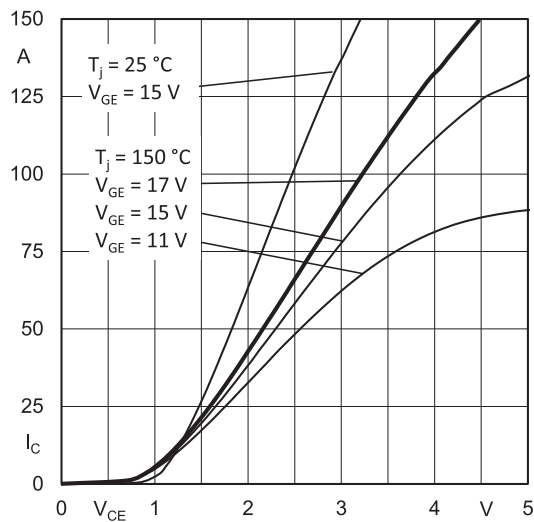


Fig. 1: Typ. output characteristic

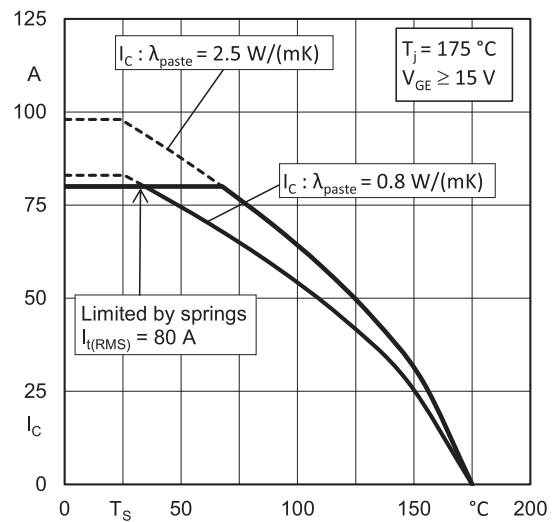


Fig. 2: Rated current vs. temperature $I_C = f(T_s)$

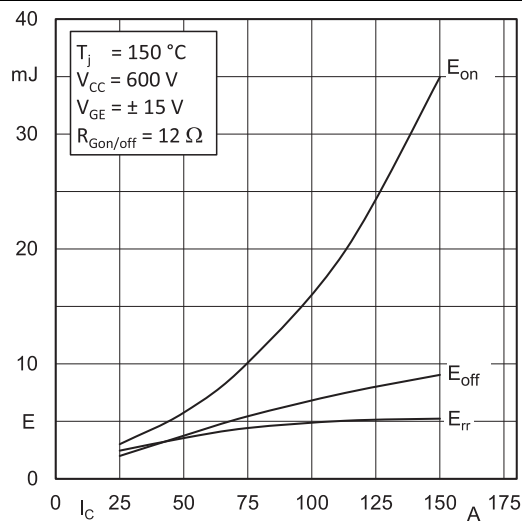


Fig. 3: Typ. turn-on /-off energy = $f(I_C)$

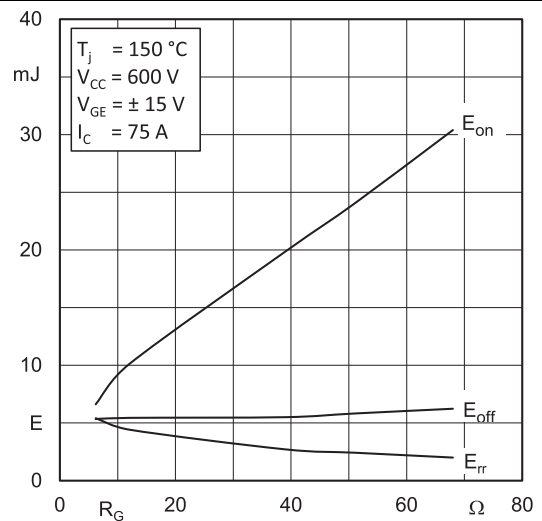


Fig. 4: Typ. turn-on /-off energy = $f(R_G)$

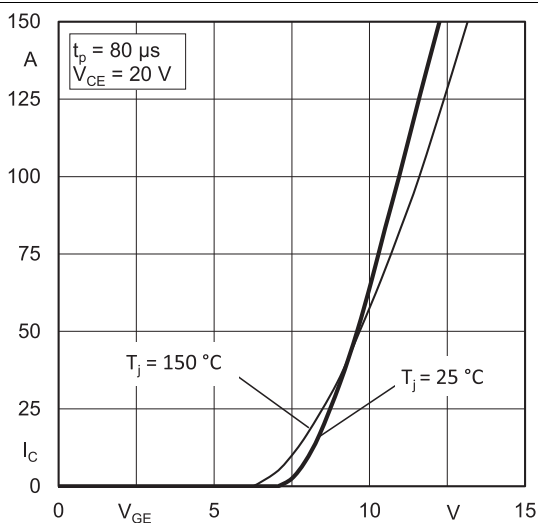


Fig. 5: Typ. transfer characteristic

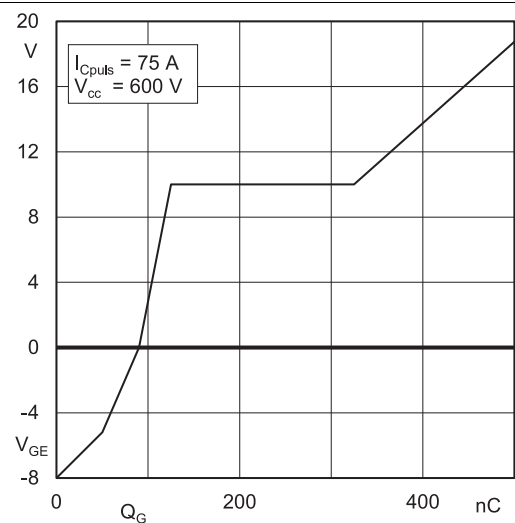


Fig. 6: Typ. gate charge characteristic

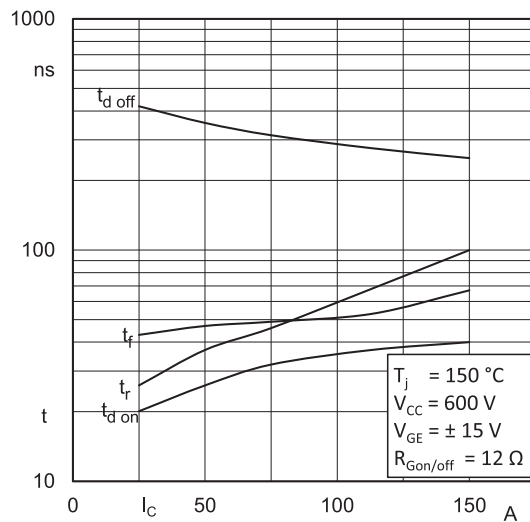


Fig. 7: Typ. switching times vs. I_C

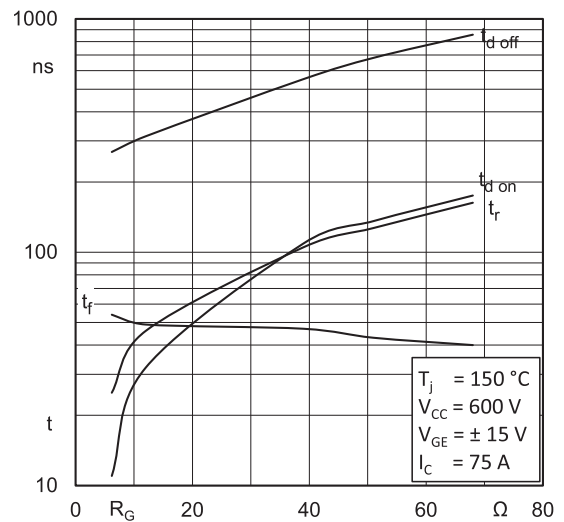


Fig. 8: Typ. switching times vs. gate resistor R_G

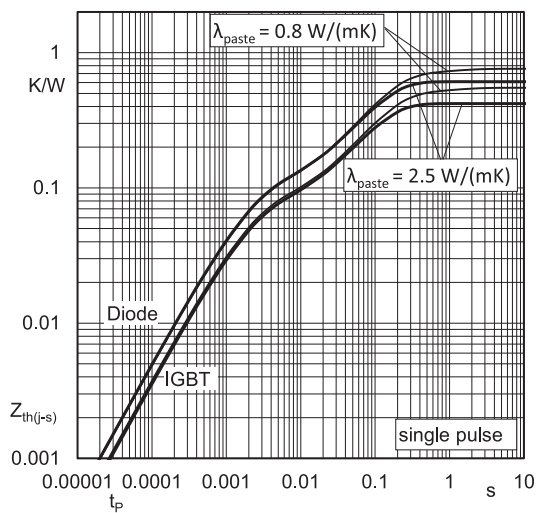


Fig. 9: Typ. transient thermal impedance of IGBT and Diode

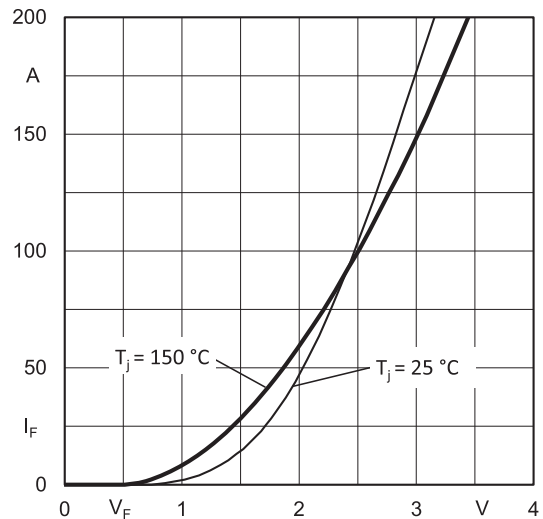


Fig. 10: Typ. CAL diode forward characteristic

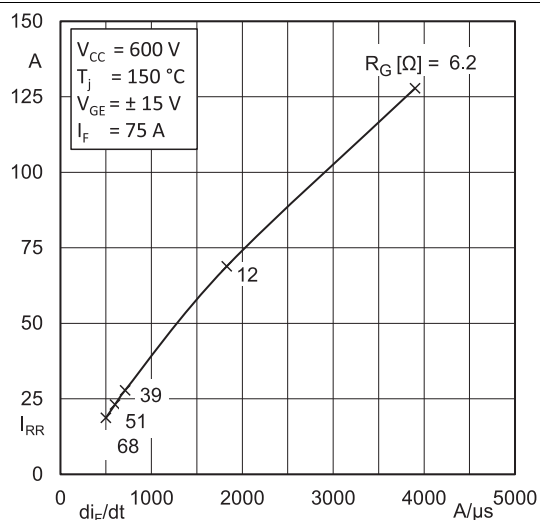


Fig. 11: Typ. CAL diode peak reverse recovery current

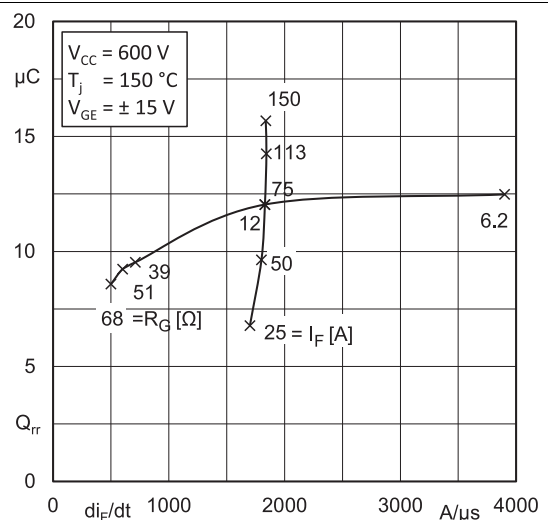
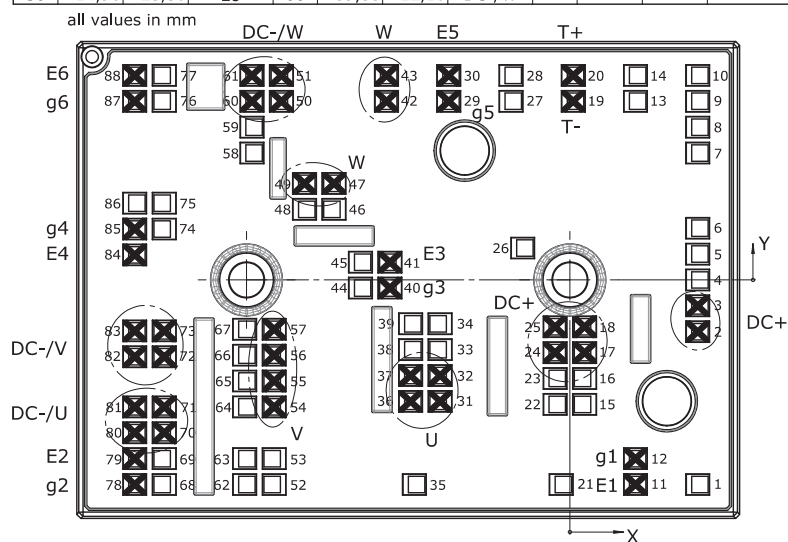
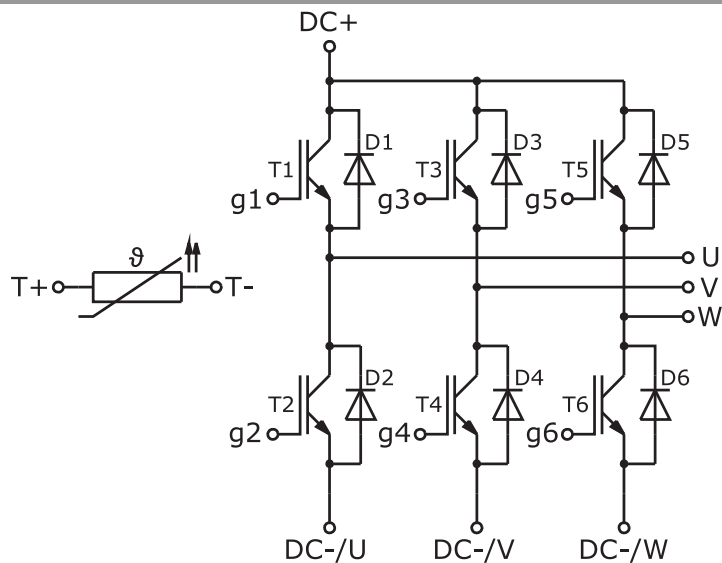


Fig. 12: Typ. CAL diode recovery charge

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



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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