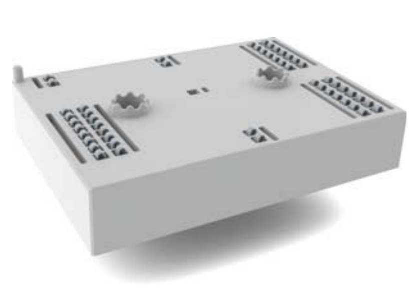
SKiiP 38GB12T7V1



MiniSKiiP® 3 Dual

Half-Bridge

SKiiP 38GB12T7V1

Features*

- 1200V Generation 7 IGBTs (T7)
- Robust and soft switching freewheeling diodes in CAL technology
- Highly reliable spring contacts for electrical connections
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Remarks

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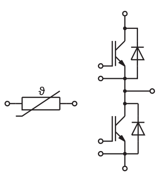

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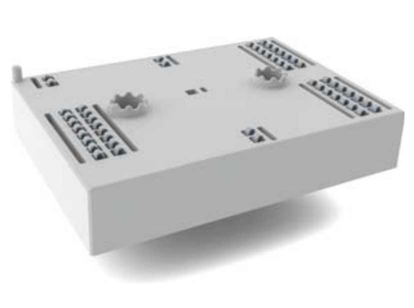
Absolute Maximum Ratings

Symbol	Conditions		Values	Unit
Inverter - IGBT				
V_{CES}	T_j = 25 °C		1200	V
I_C	λ_{paste}=0.8 W/(mK)	T_s = 70 °C	284	A
	T_j = 175 °C	T_s = 100 °C	228	A
I_C	λ_{paste}=2.5 W/(mK)	T_s = 70 °C	327	A
	T_j = 175 °C	T_s = 100 °C	264	A
I_{Cnom}			300	A
I_{CRM}			600	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	211	A
	T_j = 175 °C	T_s = 100 °C	168	A
I_F	λ_{paste}=2.5 W/(mK)	T_s = 70 °C	244	A
	T_j = 175 °C	T_s = 100 °C	195	A
I_{FRM}			600	A
I_{FSM}	t_p = 10 ms, sin 180°, T_j = 150 °C		1485	A
T_j			-40 ... 175	°C
Module				
$I_{t(RMS)}$	$T_{terminal}$ = 80 °C, 20 A per spring		280	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 = 300 A V_{GE} = 15 V chiplevel	T_j = 25 °C		1.55	1.70	V
		T_j = 150 °C		1.73	1.88	V
		T_j = 175 °C		1.77	1.92	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		1.83	2.2	mΩ
		T_j = 150 °C		3.1	3.4	mΩ
		T_j = 175 °C		3.4	3.7	mΩ
$V_{GE(th)}$	V_{GE} = V_{CE}, I_C = 6.8 mA		5.15	5.8	6.45	V
I_{CES}	V_{GE} = 0 V, V_{CE} = 1200 V, T_j = 25 °C				3.0	mA
C_{ies}	V_{CE} = 25 V V_{GE} = 0 V	f = 1 MHz		60.40		nF
C_{oes}		f = 1 MHz		0.78		nF
C_{res}		f = 1 MHz		2.16		nF
Q_G	V_{GE} = - 8V ... + 15 V			4200		nC
R_{Gint}	T_j = 25 °C			0.5		Ω



MiniSKiiP® 3 Dual

Half-Bridge

SKiiP 38GB12T7V1

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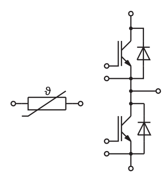

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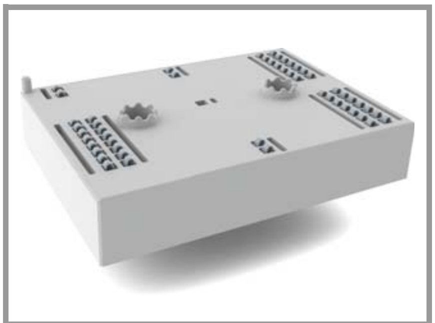
Characteristics

Symbol	Conditions		min.	typ.	max.	Unit
Inverter - IGBT						
$t_{d(on)}$	V_{CC} = 600 V I_C = 300 A $R_{G\,on}$ = 1.3 Ω $R_{G\,off}$ = 1.3 Ω V_{GE} = +15/-15 V @ T_j = 150 °C: di/dt$_{on}$ = 5920 A/µs di/dt$_{off}$ = 2550 A/µs dv/dt = 3680 V/µs	T_j = 25 °C		145		ns
		T_j = 150 °C		155		ns
		T_j = 175 °C		152		ns
t_r		T_j = 25 °C		52		ns
		T_j = 150 °C		61		ns
		T_j = 175 °C		65		ns
E_{on}		T_j = 25 °C		15		mJ
		T_j = 150 °C		23		mJ
		T_j = 175 °C		25		mJ
$t_{d(off)}$		T_j = 25 °C		393		ns
		T_j = 150 °C		483		ns
		T_j = 175 °C		508		ns
t_f		T_j = 25 °C		72		ns
		T_j = 150 °C		111		ns
		T_j = 175 °C		137		ns
E_{off}		T_j = 25 °C		22		mJ
		T_j = 150 °C		36		mJ
		T_j = 175 °C		38		mJ
$R_{th(j-s)}$	per IGBT, λ_{paste}=0.8 W/(mK)			0.2		K/W
$R_{th(j-s)}$	per IGBT, λ_{paste}=2.5 W/(mK)			0.16		K/W

Characteristics

Symbol	Conditions		min.	typ.	max.	Unit
Inverse - Diode						
$V_F = V_{EC}$	I_F = 300 A V_{GE} = 0 V chiplevel	T_j = 25 °C		2.20	2.52	V
		T_j = 150 °C		2.15	2.47	V
		T_j = 175 °C		2.00	2.31	V
V_{F0}	chiplevel	T_j = 25 °C		1.30	1.50	V
		T_j = 150 °C		0.90	1.10	V
		T_j = 175 °C		0.82	0.98	V
r_F	chiplevel	T_j = 25 °C		3.0	3.4	mΩ
		T_j = 150 °C		4.2	4.6	mΩ
		T_j = 175 °C		3.9	4.4	mΩ
I_{RRM}	I_F = 300 A V_{GE} = +15/-15 V V_{CC} = 600 V @ T_j = 150 °C: di/dt$_{off}$ = 5830 A/µs	T_j = 25 °C		199		A
		T_j = 150 °C		278		A
		T_j = 175 °C		338		A
Q_{rr}		T_j = 25 °C		14		µC
		T_j = 150 °C		46		µC
		T_j = 175 °C		47		µC
E_{rr}		T_j = 25 °C		6.4		mJ
		T_j = 150 °C		18		mJ
		T_j = 175 °C		23		mJ
$R_{th(j-s)}$	per Diode, λ_{paste}=0.8 W/(mK)			0.26		K/W
$R_{th(j-s)}$	per Diode, λ_{paste}=2.5 W/(mK)			0.21		K/W
Module						
L_{CE}				15		nH
M_s	to heat sink		2		2.5	Nm
w				76		g



MiniSKiiP® 3 Dual

Half-Bridge

SKiiP 38GB12T7V1

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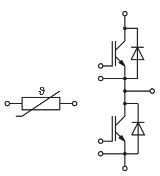

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Characteristics					
Symbol	**Conditions**	**min.**	**typ.**	**max.**	**Unit**
Temperature Sensor					
R_{100}	T_c=100°C (R_{25}=5 kΩ)		493 ± 5%		Ω
$B_{100/125}$	$R_{(T)}=R_{100}exp[B_{100/125}(1/T-1/T_{100})]$; T[K];		3550 ±2%		K

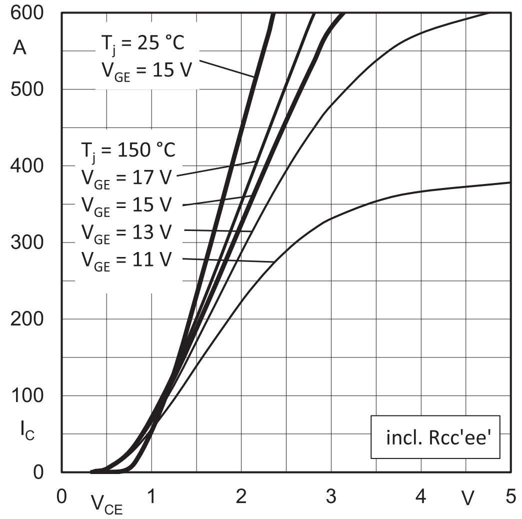


Fig. 1: Typ. output characteristic

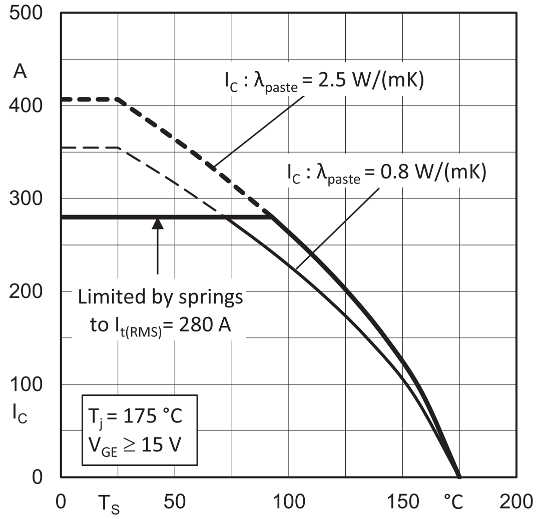


Fig. 2: Rated current vs. temperature $I_C = f(T_S)$

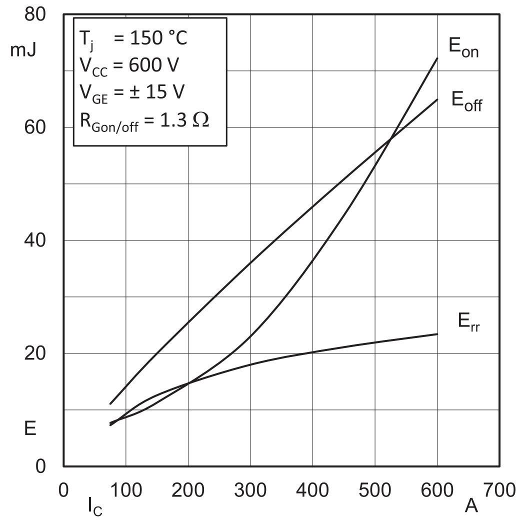


Fig. 3: Typ. turn-on /-off energy = f (I_C)

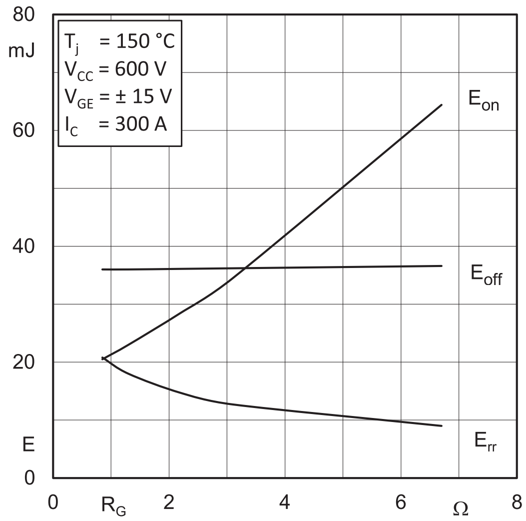


Fig. 4: Typ. turn-on /-off energy = f (R_G)

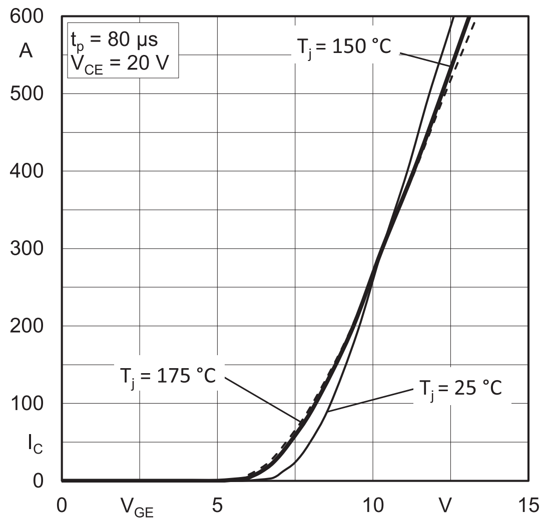


Fig. 5: Typ. transfer characteristic

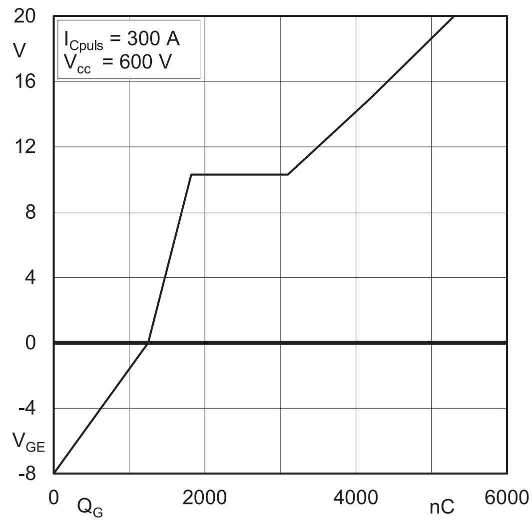


Fig. 6: Typ. gate charge characteristic

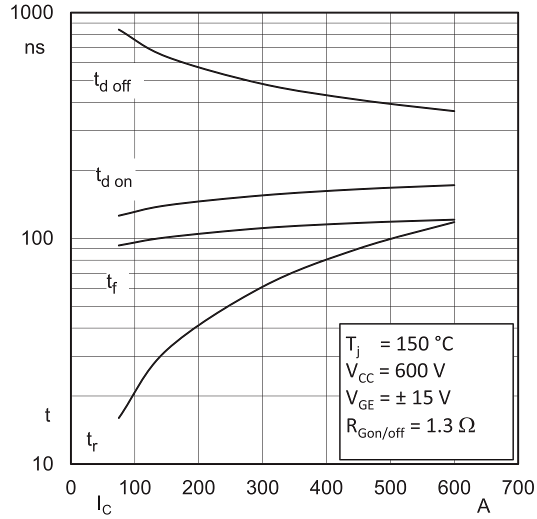


Fig. 7: Typ. switching times vs. I_C

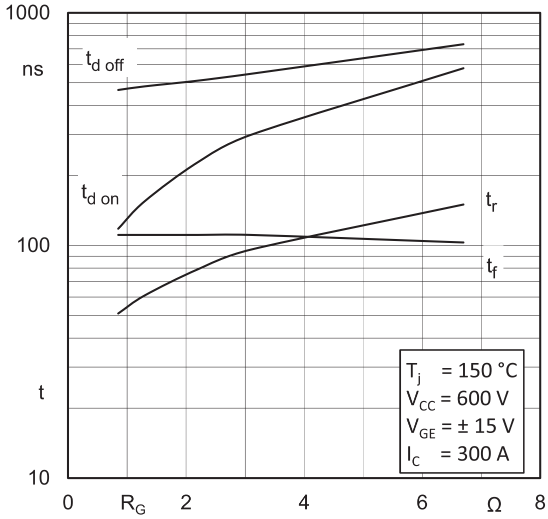


Fig. 8: Typ. switching times vs. gate resistor R_G

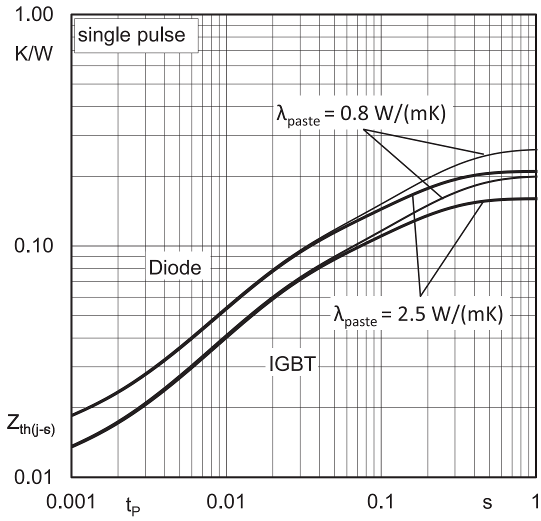


Fig. 9: Typ. transient thermal impedance

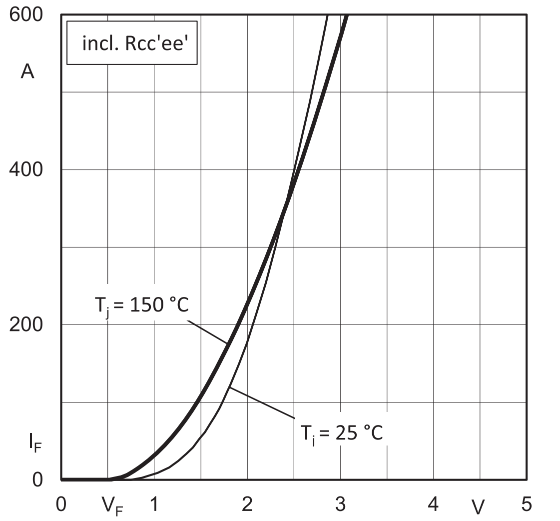


Fig. 10: Typ. CAL diode forward characteristic

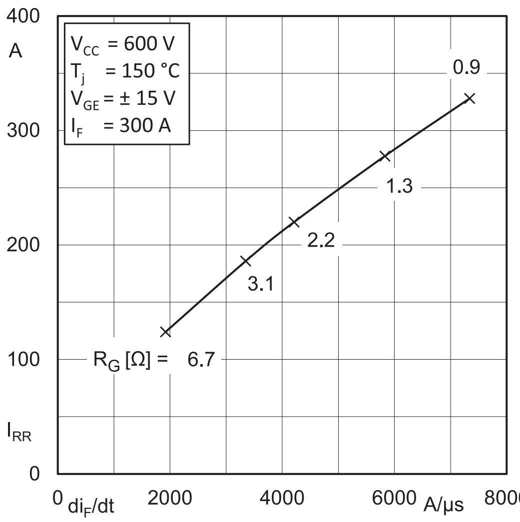


Fig. 11: Typ. CAL diode peak reverse recovery current

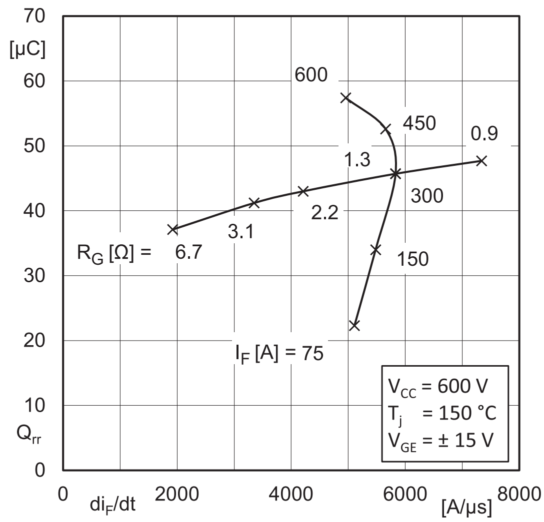
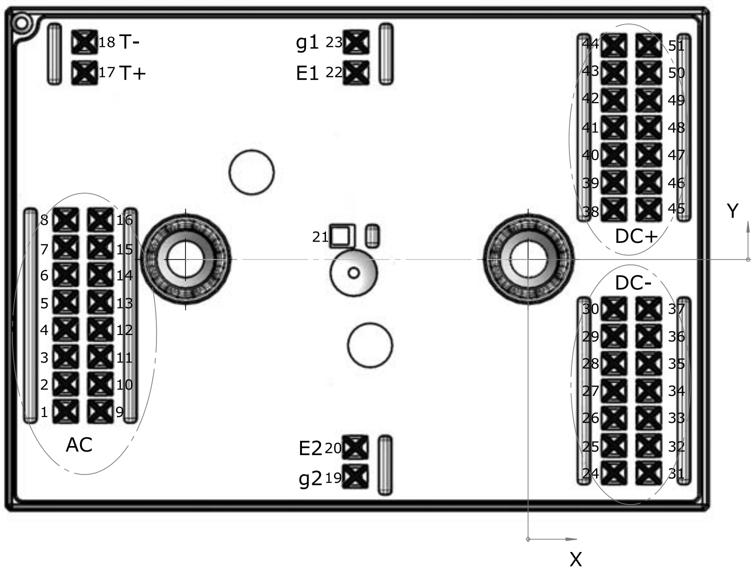


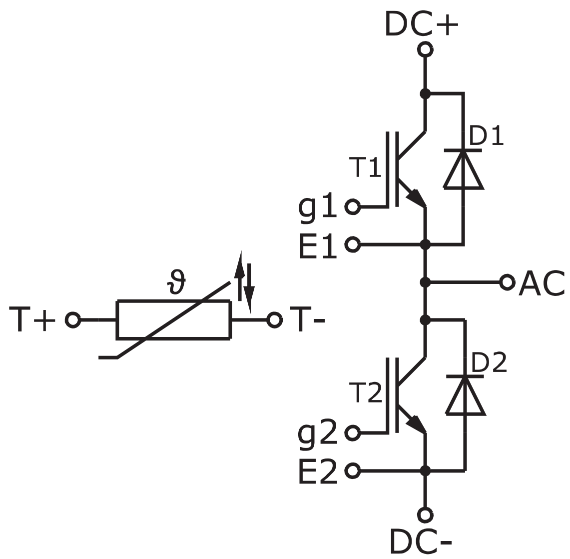
Fig. 12: Typ. CAL diode recovery charge

Pin out											
Pin	*X*	*Y*	*Function*	*Pin*	*X*	*Y*	*Function*	*Pin*	*X*	*Y*	*Function*
1	-53,98	-17,8	AC	18	-51,78	25,4	T-	35	13,98	-12,2	DC-
2	-53,98	-14,6	AC	19	-20,23	-25,4	g2	36	13,98	-9	DC-
3	-53,98	-11,4	AC	20	-20,23	-22	E2	37	13,98	-5,8	DC-
4	-53,98	-8,2	AC	21				38	9,93	5,8	DC+
5	-53,98	-5	AC	22	-20,13	21,8	E1	39	9,93	9	DC+
6	-53,98	-1,8	AC	23	-20,13	25,4	g1	40	9,93	12,2	DC+
7	-53,98	1,4	AC	24	9,93	-25	DC-	41	9,93	15,4	DC+
8	-53,98	4,6	AC	25	9,93	-21,8	DC-	42	9,93	18,6	DC+
9	-49,93	-17,8	AC	26	9,93	-18,6	DC-	43	9,93	21,8	DC+
10	-49,93	-14,6	AC	27	9,93	-15,4	DC-	44	9,93	25	DC+
11	-49,93	-11,4	AC	28	9,93	-12,2	DC-	45	13,98	5,8	DC+
12	-49,93	-8,2	AC	29	9,93	-9	DC-	46	13,98	9	DC+
13	-49,93	-5	AC	30	9,93	-5,8	DC-	47	13,98	12,2	DC+
14	-49,93	-1,8	AC	31	13,98	-25	DC-	48	13,98	15,4	DC+
15	-49,93	1,4	AC	32	13,98	-21,8	DC-	49	13,98	18,6	DC+
16	-49,93	4,6	AC	33	13,98	-18,6	DC-	50	13,98	21,8	DC+
17	-51,78	21,8	T+	34	13,98	-15,4	DC-	51	13,98	25	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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