

MiniSKiiP® 3

SKiiP 39ATB16V2

Features*

- Fast Trench IGBTs
- Robust and soft switching freewheeling diodes in CAL technology
- Highly reliable spring contacts for electrical connections
- UL recognized file no. E63532

Remarks

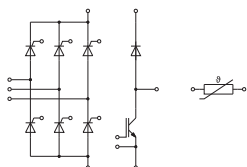
- V_{CEsat} , V_F = chip level value
- Case temp. limited to $T_C = 125^\circ\text{C}$ max. (for baseplateless modules $T_C = T_S$)
- Product rel. results valid for $T_J \leq 150^\circ\text{C}$ (recomm. $T_{op} = -40 \dots +150^\circ\text{C}$)
- -B is limited to $I_{trms} = 60\text{A}$ (3 springs)

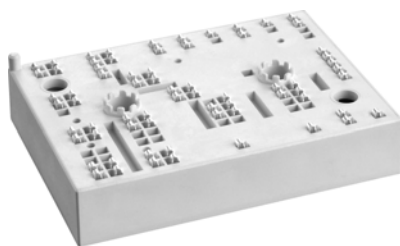
Absolute Maximum Ratings				
Symbol	Conditions		Values	Unit
IGBT 1				
V _{CES}	T _j = 25 °C		1200	V
I _C	λ _{paste} =0.8 W/(mK)	T _s = 25 °C	181	A
	T _j = 175 °C	T _s = 70 °C	147	A
I _C	λ _{paste} =2.5 W/(mK)	T _s = 25 °C	214	A
	T _j = 175 °C	T _s = 70 °C	174	A
I _{Chom}			150	A
I _{CRM}			450	A
V _{GES}			-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

Absolute Maximum Ratings				
Symbol	Conditions		Values	Unit
Diode 1				
V _{RRM}	T _j = 25 °C		1200	V
I _F	λ _{paste} =0.8 W/(mK)	T _s = 25 °C	162	A
		T _j = 175 °C	129	A
I _F	λ _{paste} =2.5 W/(mK)	T _s = 25 °C	187	A
		T _j = 175 °C	149	A
I _{FRM}			300	A
I _{FSM}	10 ms	T _j = 25 °C	774	A
	sin 180°	T _j = 150 °C	774	A
T _j			-40 ... 175	°C

Absolute Maximum Ratings			
Symbol	Conditions	Values	Unit
Thyristor 1			
V_{RRM}	$T_J = 25^\circ\text{C}$	1600	V
$I_{T(AV)}$	$T_J = 130^\circ\text{C}$	81	A
	$T_S = 70^\circ\text{C}$ sin. 180°	107	A
I_{TSM}	10 ms, sin 180°, $T_J = 130^\circ\text{C}$	1250	A
i^2t	10 ms, sin 180°, $T_J = 130^\circ\text{C}$	7813	A^2s
T_J		-40 ... 130	$^\circ\text{C}$

Absolute Maximum Ratings			
Symbol	Conditions	Values	Unit
Module			
$I_{t(RMS)}$	20 A per spring	100	A
T_{stg}	module without TIM	-40 ... 125	$^\circ\text{C}$
V_{isol}	AC sinus 50 Hz, $t = 1 \text{ min}$	2500	V





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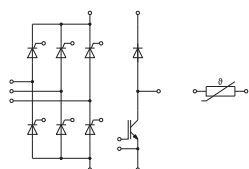
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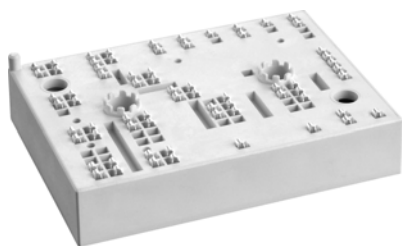
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Characteristics						
Symbol	Conditions		min.	typ.	max.	Unit
IGBT 1						
V _{CE(sat)}	I _C = 150 A	T _j = 25 °C		1.85	2.10	V
	V _{GE} = 15 V chiplevel	T _j = 150 °C		2.25	2.45	V
V _{CE0}	chiplevel	T _j = 25 °C		0.80	0.90	V
		T _j = 150 °C		0.70	0.80	V
r _{CE}	V _{GE} = 15 V chiplevel	T _j = 25 °C		7.0	8.0	mΩ
		T _j = 150 °C		10	11	mΩ
V _{GE(th)}	V _{GE} = V _{CE} , I _C = 6 mA		5	5.8	6.5	V
I _{CES}	V _{GE} = 0 V, V _{CE} = 1200 V, T _j = 25 °C				0.3	mA
C _{ies}	V _{CE} = 25 V V _{GE} = 0 V	f = 1 MHz		8.80		nF
C _{oes}		f = 1 MHz		0.58		nF
C _{res}		f = 1 MHz		0.47		nF
Q _G	V _{GE} = - 8 V...+ 15 V			850		nC
R _{Gint}	T _j = 25 °C			5.0		Ω
t _{d(on)}	V _{CC} = 600 V	T _j = 150 °C		135		ns
t _r	I _C = 150 A	T _j = 150 °C		42		ns
E _{on}	V _{GE} = +15/-15 V	T _j = 150 °C		17.7		mJ
	R _{G on} = 1 Ω	T _j = 150 °C				
t _{d(off)}	R _{G off} = 1 Ω	T _j = 150 °C		372		ns
t _f	di/dt _{on} = 3400 A/μs	T _j = 150 °C		79		ns
	di/dt _{off} = 1340 A/μs					
E _{off}	dv/dt = 3670 V/μs L _s = 25 nH	T _j = 150 °C		16.2		mJ
R _{th(j-s)}	per IGBT, λ _{paste} =0.8 W/(mK)			0.28		K/W
R _{th(j-s)}	per IGBT, λ _{paste} =2.5 W/(mK)			0.21		K/W

Characteristics						
Symbol	Conditions		min.	typ.	max.	Unit
Diode 1						
V _F	I _F = 150 A	T _j = 25 °C		2.17	2.49	V
	V _{GE} = 0 V chiplevel	T _j = 150 °C		2.11	2.42	V
V _{F0}	chiplevel	T _j = 25 °C		1.30	1.50	V
		T _j = 150 °C		0.90	1.10	V
r _F	chiplevel	T _j = 25 °C		5.8	6.6	mΩ
		T _j = 150 °C		8.1	8.8	mΩ
I _{RRM}	I _F = 150 A	T _j = 150 °C		137		A
Q _{rr}	di/dt _{off} = 3320 A/μs	T _j = 150 °C		25		μC
E _{rr}	V _{GE} = -15 V V _{CC} = 600 V	T _j = 150 °C		9.2		mJ
R _{th(j-s)}	per Diode, λ _{paste} =0.8 W/(mK)			0.39		K/W
R _{th(j-s)}	per Diode, λ _{paste} =2.5 W/(mK)			0.31		K/W





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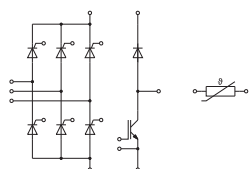
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Characteristics						
Symbol	Conditions		min.	typ.	max.	Unit
Thyristor 1						
V _T	I _T = 110 A	T _j = 25 °C			1.26	V
	chiplevel	T _j = 130 °C			1.19	V
V _{T(TO)}	T _j = 130 °C, chiplevel				0.85	V
r _T	T _j = 130 °C, chiplevel				3.2	mΩ
V _{GT}	T _j = 25 °C		1.65			V
I _{GT}	T _j = 25 °C		100			mA
I _H	T _j = 25 °C		220			mA
I _L	T _j = 25 °C		550			mA
dv/dt _{cr}	T _j = 130 °C				1000	V/μs
di/dt _{cr}	T _j = 130 °C				100	A/μs
R _{th(j-s)}	per Thyristor, λ _{paste} =0.8 W/(mK), sin. 180°		0.5			K/W
R _{th(j-s)}	per Thyristor, λ _{paste} =2.5 W/(mK), sin. 180°		0.33			K/W

Characteristics					
Symbol	Conditions	min.	typ.	max.	Unit
Module					
M _s	to heat sink	2		2.5	Nm
w	weight		82		g

Characteristics					
Symbol	Conditions	min.	typ.	max.	Unit
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				

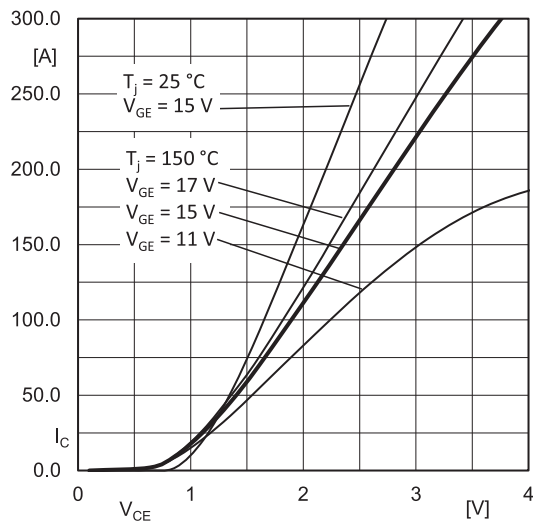


Fig. 1: Typ. output characteristic, inclusive $R_{CC} + EE'$

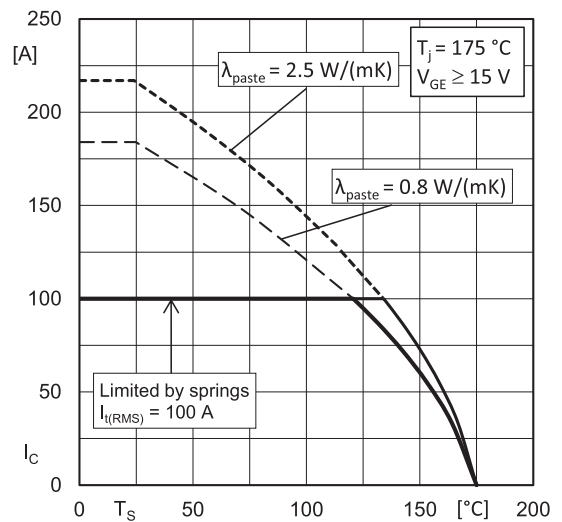


Fig. 2: Rated current vs. temperature $I_C = f(T_s)$

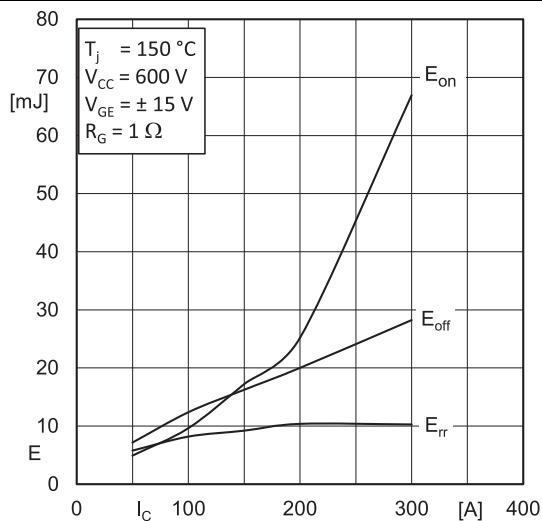


Fig. 3: Typ. turn-on /-off energy = $f(I_C)$

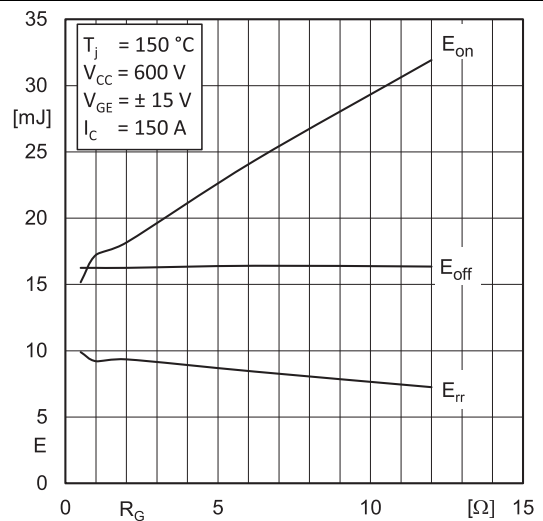


Fig. 4: Typ. turn-on /-off energy = $f(R_G)$

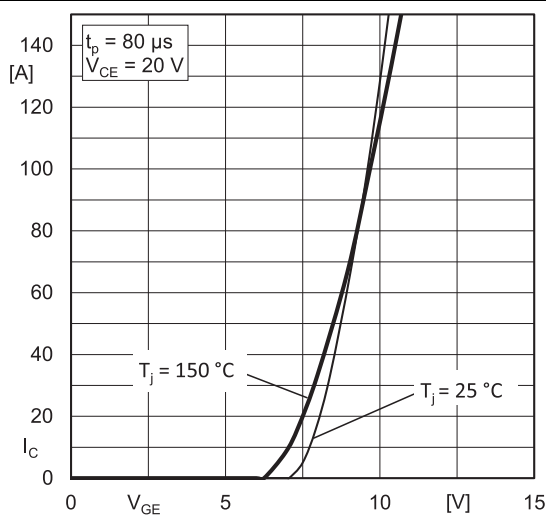


Fig. 5: Typ. transfer characteristic

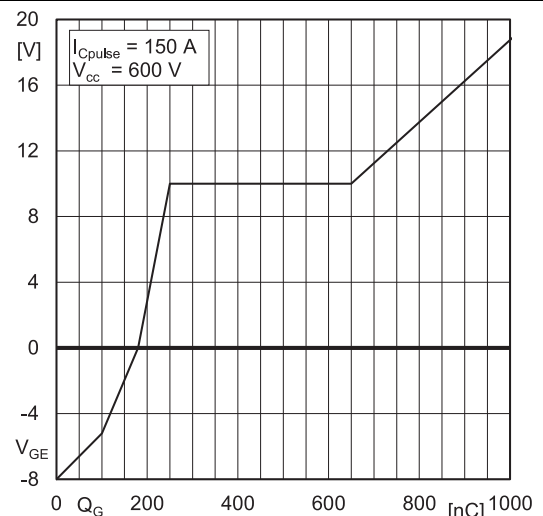
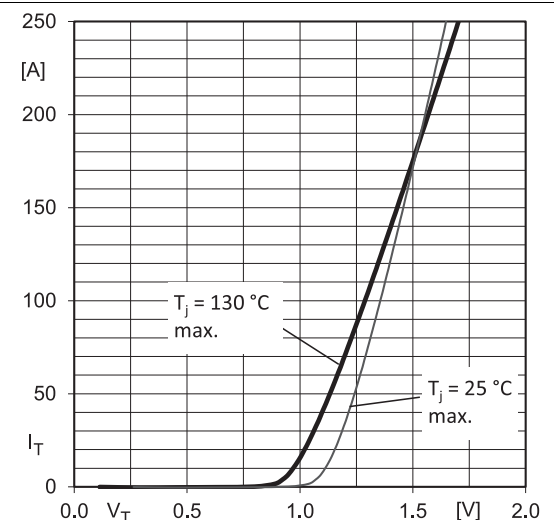
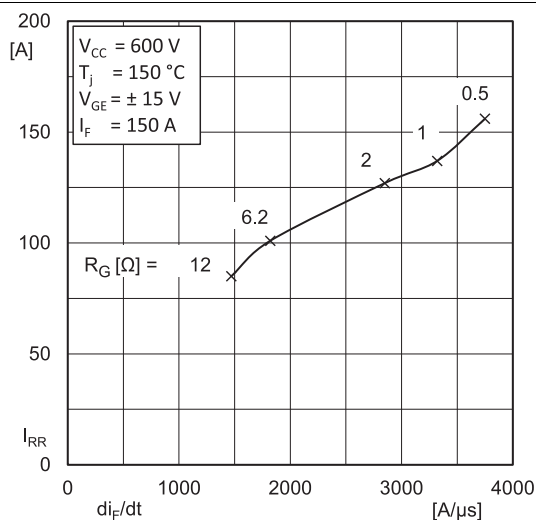
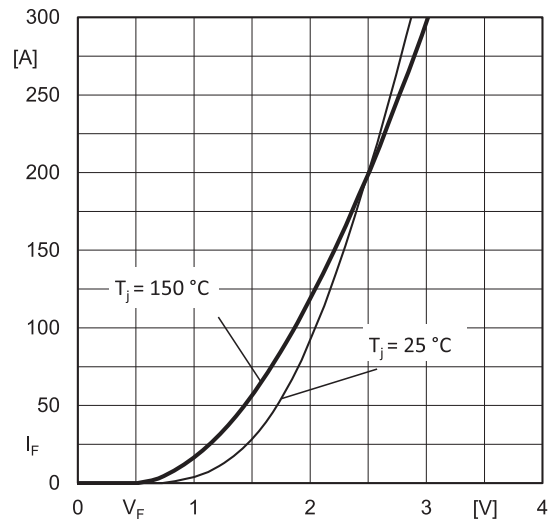
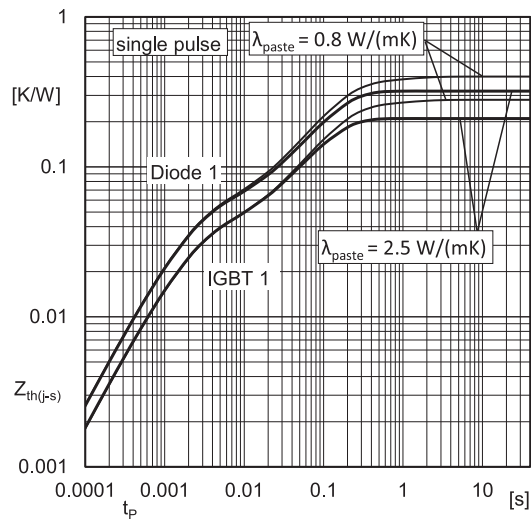
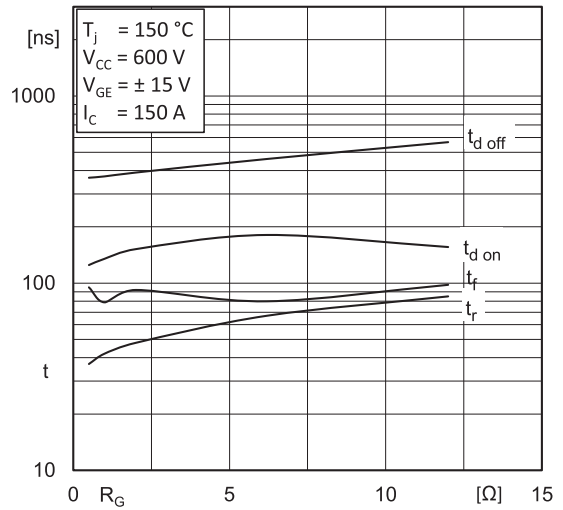
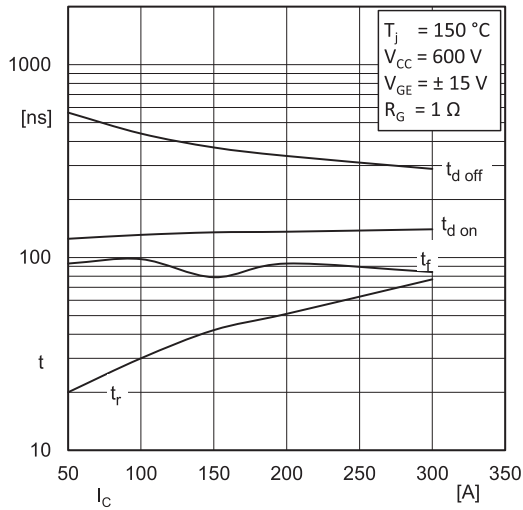
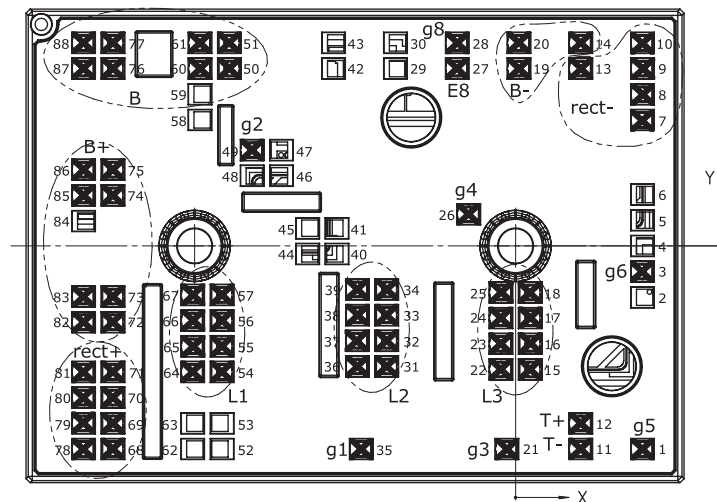


Fig. 6: Typ. gate charge characteristic

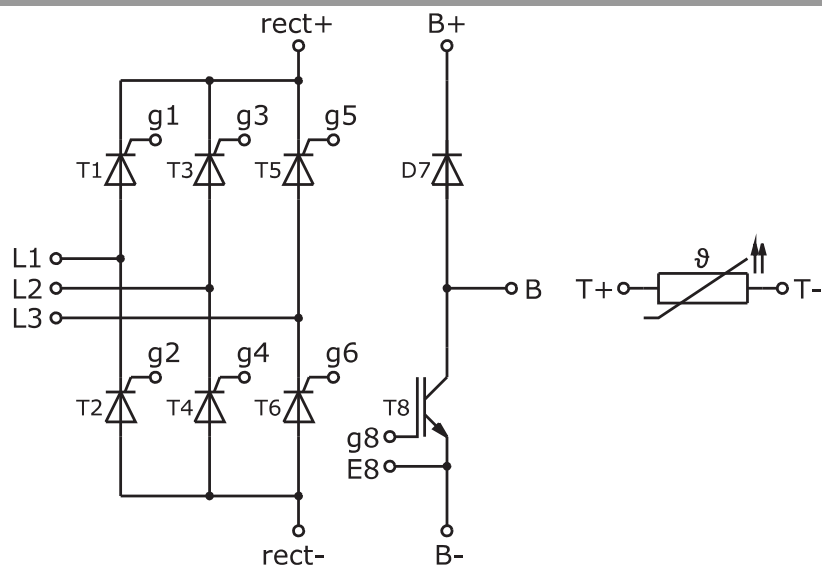


Pin out											
Pin	X	Y	Function	Pin	X	Y	Function	Pin	X	Y	Function
1	15,83	-25,30	g5	31	-16,05	-15,02	L2	61	-39,33	25,30	B
2	15,83	-6,40		32	-16,05	-11,82	L2	62	-40,23	-25,30	
3	15,83	-3,20	g6	33	-16,05	-8,62	L2	63	-40,23	-22,10	
4	15,83	0		34	-16,05	-5,42	L2	64	-40,23	-15,70	L1
5	15,83	3,20		35	-19,23	-25,30	g1	65	-40,23	-12,50	L1
6	15,83	6,40		36	-19,70	-15,02	L2	66	-40,23	-9,30	L1
7	15,83	15,70	rect-	37	-19,70	-11,82	L2	67	-40,23	-6,10	L1
8	15,83	18,90	rect-	38	-19,70	-8,62	L2	68	-50,18	-25,30	rect+
9	15,83	22,10	rect-	39	-19,70	-5,42	L2	69	-50,18	-22,10	rect+
10	15,83	25,30	rect-	40	-22,26	-1,00		70	-50,18	-18,90	rect+
11	8,13	-25,30	T-	41	-22,26	2,20		71	-50,18	-15,70	rect+
12	8,13	-22,10	T+	42	-22,68	22,10		72	-50,18	-9,50	B+
13	8,13	22,10	rect-	43	-22,68	25,30		73	-50,18	-6,30	B+
14	8,13	25,30	B-	44	-25,91	-1,00		74	-50,18	6,30	B+
15	1,83	-15,39	L3	45	-25,91	2,20		75	-50,18	9,50	B+
16	1,83	-12,19	L3	46	-29,18	8,74		76	-50,18	22,10	B
17	1,83	-8,99	L3	47	-29,18	11,94		77	-50,18	25,30	B
18	1,83	-5,79	L3	48	-32,83	8,74		78	-53,83	-25,30	rect+
19	0,43	22,10	B-	49	-32,83	11,94	g2	79	-53,83	-22,10	rect+
20	0,43	25,30	B-	50	-35,68	22,10	B	80	-53,83	-18,90	rect+
21	-1,08	-25,30	g3	51	-35,68	25,30	B	81	-53,83	-15,70	rect+
22	-1,83	-15,39	L3	52	-36,58	-25,30		82	-53,83	-9,50	B+
23	-1,83	-12,19	L3	53	-36,58	-22,10		83	-53,83	-6,30	B+
24	-1,83	-8,99	L3	54	-36,58	-15,70	L1	84	-53,83	3,10	
25	-1,83	-5,79	L3	55	-36,58	-12,50	L1	85	-53,83	6,30	B+
26	-5,83	3,95	g4	56	-36,58	-9,30	L1	86	-53,83	9,50	B+
27	-7,28	22,10	E8	57	-36,58	-6,10	L1	87	-53,83	22,10	B
28	-7,28	25,30	g8	58	-39,33	15,70		88	-53,83	25,30	B
29	-14,98	22,10		59	-39,33	18,90					
30	-14,98	25,30		60	-39,33	22,10	B				

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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