AiP74LVC1G125
Single Buffer/Line Driver; 3-state

Product Specification

Specification Revision History：

Version	Date	Description
2017-07-A1	2017-07	New
2023-03-B1	2023-03	Update template
2023-10-B2	2023-10	Additional package
2026-03-B3	2026-03	Modify AC Testing Circuit

Contents

1、General Description

The AiP74LVC1G125 provides one non-inverting buffer/line driver with 3-state output. The 3-state output is controlled by the output enable input ($\overline{OE}$). A HIGH-level at pin $\overline{OE}$ causes the output to assume a high-impedance OFF-state.

The input can be driven from either 3.3V or 5V devices. This feature allows the use of this device in a mixed 3.3V and 5V environment.

Features:

- Supply voltage range:1.65V to 5.5V
- ±24mA output drive (V_{CC}=3.0V)
- CMOS low power consumption
- Temperature range:-40℃ to +125℃
- Packaging information: SOT-23-5/SOT-353/XSON6

Ordering Information:

Reel packing specifications:

Part number	Packaging form	Marking code	Reel quantity	Boxed reel quantity	Notes
AiP74LVC1G125GB235.TR	SOT-23-5	ACXX	3000 PCS/reel	30000 PCS/box	Dimensions of plastic enclosure: 2.9mm×1.6mm Pin spacing:0.95mm
AiP74LVC1G125GC353.TR	SOT-353	ACXX	3000 PCS/reel	30000 PCS/box	Dimensions of plastic enclosure: 2.1mm×1.3mm Pin spacing:0.65mm
AiP74LVC1G125ED6.TR	XSON6	ACXX	5000 PCS/reel	25000 PCS/box	Dimensions of plastic enclosure: 1.0mm×1.0mm Pin spacing :0.35mm

Note 1: "XX" refers to variable content, meaning year and package batch serial number.

Note 2: If the physical information is inconsistent with the ordering information, please refer to the actual product.

2、Block Diagram And Pin Description

2.1、Block Diagram

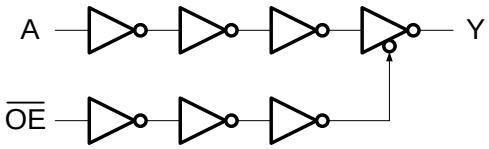
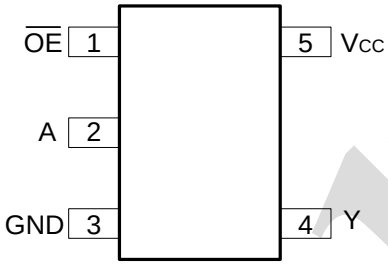
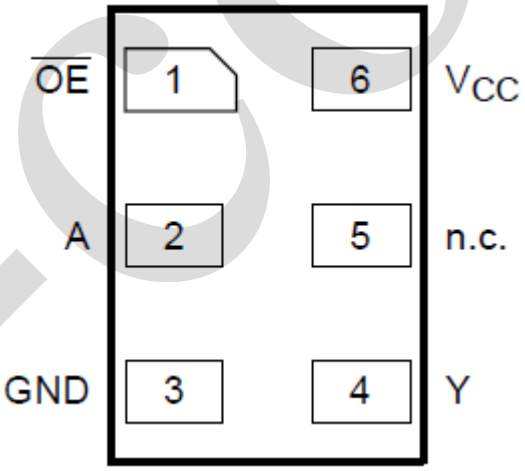


Figure 1. Logic diagram

2.2、Pin Configurations



SOT23-5/SOT353



XSON6

2.3、Pin Description

Pin No. SOT23-5/SOT353	Pin No. XSON6	Pin Name	Description
1	1	$\overline{OE}$	output enable input
2	2	A	data input
3	3	GND	ground (0V)
4	4	Y	data output
-	5	n.c.	not connected
5	6	Vcc	supply voltage

2.4、Function Table

Input		Output
$\overline{OE}$	A	Y
L	L	L
L	H	H
H	X	Z

Note: H=HIGH voltage level; L=LOW voltage level; X=don't care; Z=high-impedance OFF-state.

3、Electrical Parameter

3.1、Absolute Maximum Ratings

(Voltages are referenced to GND (ground=0V), unless otherwise specified.)

Parameter	Symbol	Conditions	Min.	Max.	Unit
supply voltage	V_{CC}	-	-0.5	+6.5	V
input clamping current	I_{IK}	$V_I < 0V$	-50	-	mA
input voltage	V_I	-	-0.5	+6.5	V
Output clamping current	I_{OK}	$V_O > V_{CC}$ or $V_O < 0V$	-	±50	mA
output voltage	V_O	Active mode	-0.5	V_{CC}+0.5	V
		Power-down mode	-0.5	+6.5	V
output current	I_O	V_O=0V to V_{CC}	-	±50	mA
supply current	I_{CC}	-	-	100	mA
ground current	I_{GND}	-	-100	-	mA
storage temperature	T_{stg}	-	-65	+150	℃
soldering temperature	T_L	10s	260		℃

3.2、Recommended Operating Conditions

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
supply voltage	V_{CC}	-	1.65	-	5.5	V
input voltage	V_I	-	0	-	5.5	V

output voltage	V_O	Active mode	0	-	V_{CC}	V
		Power-down mode; V_{CC}=0V	0	-	5.5	V
ambient temperature	T_{amb}	-	-40	-	+125	℃

3.3、Electrical Characteristics

3.3.1、DC Characteristics 1

(T_{amb}=-40℃ to +85℃, voltages are referenced to GND (ground=0V), unless otherwise specified.)

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
HIGH-level input voltage	V_{IH}	V_{CC}=1.65V to 1.95V		0.65× V_{CC}	-	-	V
		V_{CC}=2.3V to 2.7V		1.7	-	-	V
		V_{CC}=2.7V to 3.6V		2.0	-	-	V
		V_{CC}=4.5V to 5.5V		0.7× V_{CC}	-	-	V
LOW-level input voltage	V_{IL}	V_{CC}=1.65V to 1.95V		-	-	0.35× V_{CC}	V
		V_{CC}=2.3V to 2.7V		-	-	0.7	V
		V_{CC}=2.7V to 3.6V		-	-	0.8	V
		V_{CC}=4.5V to 5.5V		-	-	0.3× V_{CC}	V
HIGH-level output voltage	V_{OH}	V_I = V_{IH} or V_{IL}	I_O=-100uA; V_{CC}=1.65V to 5.5V	V_{CC} - 0.1	-	-	V
			I_O=-4mA; V_{CC}=1.65V	1.2	-	-	V
			I_O=-8mA; V_{CC}=2.3V	1.9	-	-	V
			I_O=-12mA; V_{CC}=2.7V	2.2	-	-	V
			I_O=-24mA; V_{CC}=3.0V	2.3	-	-	V
			I_O=-32mA; V_{CC}=4.5V	3.8	-	-	V
LOW-level output voltage	V_{OL}	V_I = V_{IH} or V_{IL}	I_O=100uA; V_{CC}=1.65V to 5.5V	-	-	0.10	V
			I_O=4mA; V_{CC}=1.65V	-	-	0.45	V
			I_O=8mA; V_{CC}=2.3V	-	-	0.30	V
			I_O=12mA; V_{CC}=2.7V	-	-	0.40	V
			I_O=24mA; V_{CC}=3.0V	-	-	0.55	V
			I_O=32mA; V_{CC}=4.5V	-	-	0.55	V
input leakage current	I_I	V_I=5.5V or GND; V_{CC}=0V to 5.5V		-	-	±2	uA
OFF-state output current	I_{OZ}	V_I=V_{IH} or V_{IL}; V_O=5.5V or GND; V_{CC}=3.6V		-	-	±2	uA
power-off leakage current	I_{OFF}	V_I or V_O=5.5V; V_{CC}=0V		-	-	±2	uA
supply current	I_{CC}	V_I=5.5V or GND; I_O=0A; V_{CC}=1.65V to 5.5V		-	-	2	uA
additional supply current	ΔI_{CC}	per pin; V_I=V_{CC}-0.6V; I_O=0A; V_{CC}=2.3V to 5.5V		-	-	500	uA

Note: All typical values are measured at V_{CC}=3.3V and T_{amb}=25℃.

3.3.2、DC Characteristics 2

(T_{amb}=-40℃ to +125℃, voltages are referenced to GND (ground=0V), unless otherwise specified.)

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
HIGH-level input voltage	V_{IH}	V_{CC}=1.65V to 1.95V		0.65× V_{CC}	-	-	V
		V_{CC}=2.3V to 2.7V		1.7	-	-	V
		V_{CC}=2.7V to 3.6V		2.0	-	-	V
		V_{CC}=4.5V to 5.5V		0.7× V_{CC}	-	-	V
LOW-level input voltage	V_{IL}	V_{CC}=1.65V to 1.95V		-	-	0.35× V_{CC}	V
		V_{CC}=2.3V to 2.7V		-	-	0.7	V
		V_{CC}=2.7V to 3.6V		-	-	0.8	V
		V_{CC}=4.5V to 5.5V		-	-	0.3× V_{CC}	V
HIGH-level output voltage	V_{OH}	V_I = V_{IH} or V_{IL}	I_O=-100uA; V_{CC}=1.65V to 5.5V	V_{CC} - 0.1	-	-	V
			I_O=-4mA; V_{CC}=1.65V	0.95	-	-	V
			I_O=-8mA; V_{CC}=2.3V	1.7	-	-	V
			I_O=-12mA; V_{CC}=2.7V	1.9	-	-	V
			I_O=-24mA; V_{CC}=3.0V	2.0	-	-	V
			I_O=-32mA; V_{CC}=4.5V	3.4	-	-	V
LOW-level output voltage	V_{OL}	V_I = V_{IH} or V_{IL}	I_O=100uA; V_{CC}=1.65V to 5.5V	-	-	0.10	V
			I_O=4mA; V_{CC}=1.65V	-	-	0.70	V
			I_O=8mA; V_{CC}=2.3V	-	-	0.45	V
			I_O=12mA; V_{CC}=2.7V	-	-	0.60	V
			I_O=24mA; V_{CC}=3.0V	-	-	0.80	V
			I_O=32mA; V_{CC}=4.5V	-	-	0.80	V
input leakage current	I_I	V_I=5.5V or GND; V_{CC}=0V to 5.5V		-	-	±4	uA
OFF-state output current	I_{OZ}	V_I=V_{IH} or V_{IL}; V_O=5.5V or GND; V_{CC}=3.6V		-	-	±4	uA
power-off leakage current	I_{OFF}	V_I or V_O=5.5V; V_{CC}=0V		-	-	±4	uA
supply current	I_{CC}	V_I=5.5V or GND; I_O=0A; V_{CC}=1.65V to 5.5V		-	-	4	uA
additional supply current	ΔI_{CC}	per pin; V_I=V_{CC}-0.6V; I_O=0A; V_{CC}=2.3V to 5.5V		-	-	500	uA

Note: All typical values are measured at V_{CC}=3.3V and T_{amb}=25℃.

3.3.3、AC Characteristics 1

(T_{amb}=-40℃ to +85℃, voltages are referenced to GND (ground=0V), unless otherwise specified.)

Parameter	Symbol	Conditions		Min.	Typ. [1]	Max.	Unit
A to Y propagation delay	t_{PLH}, t_{PHL}	see Figure 3	V_{CC}=1.65V to 1.95V	-	9.9	14.9	ns
			V_{CC}=2.3V to 2.7V	-	6.6	9.9	ns
			V_{CC}=2.7V	-	7.5	11.3	ns
			V_{CC}=3.0V to 3.6V	-	6.3	9.5	ns
			V_{CC}=4.5V to 5.5V	-	5.1	7.7	ns
$\overline{OE}$ to Y enable time	t_{PZH}, t_{PZL}	see Figure 4	V_{CC}=1.65V to 1.95V	-	12.3	18.5	ns
			V_{CC}=2.3V to 2.7V	-	8.4	12.6	ns
			V_{CC}=2.7V	-	9.9	14.9	ns
			V_{CC}=3.0V to 3.6V	-	7.2	10.8	ns
			V_{CC}=4.5V to 5.5V	-	6.3	9.5	ns
$\overline{OE}$ to Y disable time	t_{PLZ}, t_{PHZ}	see Figure 4	V_{CC}=1.65V to 1.95V	-	12.9	19.4	ns
			V_{CC}=2.3V to 2.7V	-	8.1	12.2	ns
			V_{CC}=2.7V	-	9.0	13.5	ns
			V_{CC}=3.0V to 3.6V	-	9.3	14.0	ns
			V_{CC}=4.5V to 5.5V	-	6.6	9.9	ns

Note:

[1] Typical values are measured at T_{amb}=25℃ and V_{CC}=1.8V, 2.5V, 2.7V, 3.3V and 5.0V respectively.

3.3.4、AC Characteristics 2

(T_{amb}=-40℃ to +125℃, voltages are referenced to GND (ground=0V), unless otherwise specified.)

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
A to Y propagation delay	t_{PLH}, t_{PHL}	see Figure 3	V_{CC}=1.65V to 1.95V	-	-	19.5	ns
			V_{CC}=2.3V to 2.7V	-	-	12.6	ns
			V_{CC}=2.7V	-	-	14.3	ns
			V_{CC}=3.0V to 3.6V	-	-	12.6	ns
			V_{CC}=4.5V to 5.5V	-	-	10.5	ns
$\overline{OE}$ to Y enable time	t_{PZH}, t_{PZL}	see Figure 4	V_{CC}=1.65V to 1.95V	-	-	23.6	ns
			V_{CC}=2.3V to 2.7V	-	-	16.2	ns
			V_{CC}=2.7V	-	-	19.1	ns
			V_{CC}=3.0V to 3.6V	-	-	14.3	ns
			V_{CC}=4.5V to 5.5V	-	-	12.3	ns
$\overline{OE}$ to Y disable time	t_{PLZ}, t_{PHZ}	see Figure 4	V_{CC}=1.65V to 1.95V	-	-	25.2	ns
			V_{CC}=2.3V to 2.7V	-	-	15.8	ns
			V_{CC}=2.7V	-	-	17.6	ns
			V_{CC}=3.0V to 3.6V	-	-	18.1	ns
			V_{CC}=4.5V to 5.5V	-	-	13.0	ns

4、Testing Circuit

4.1、AC Testing Circuit

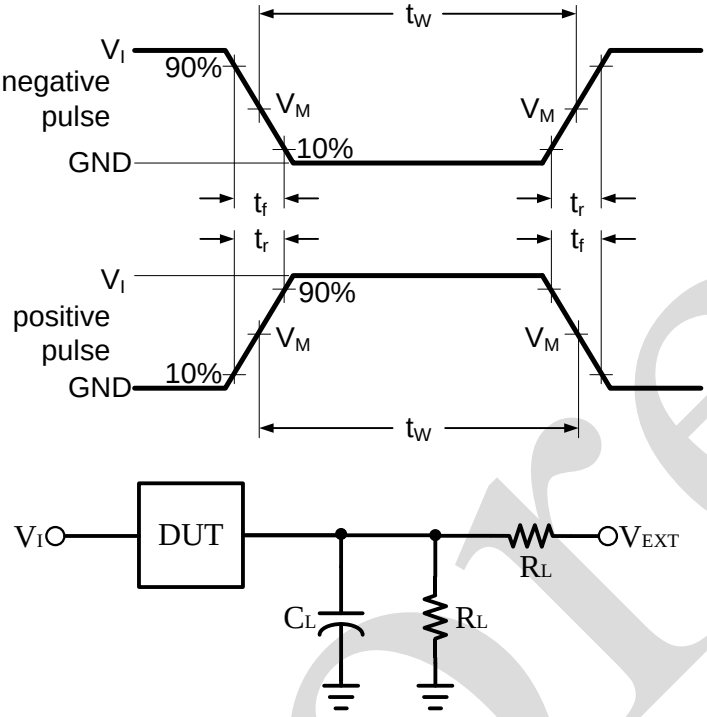


Figure 2. Load circuit

C_L includes probe and jig capacitance.

4.2、AC Testing Waveforms

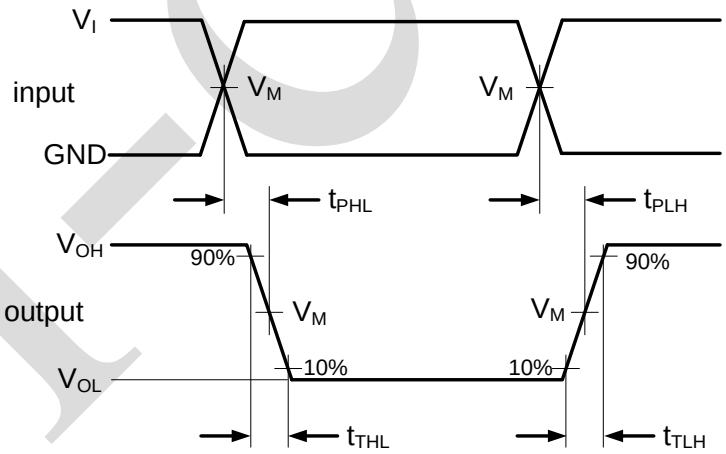


Figure 3. The input A to output Y propagation delay times

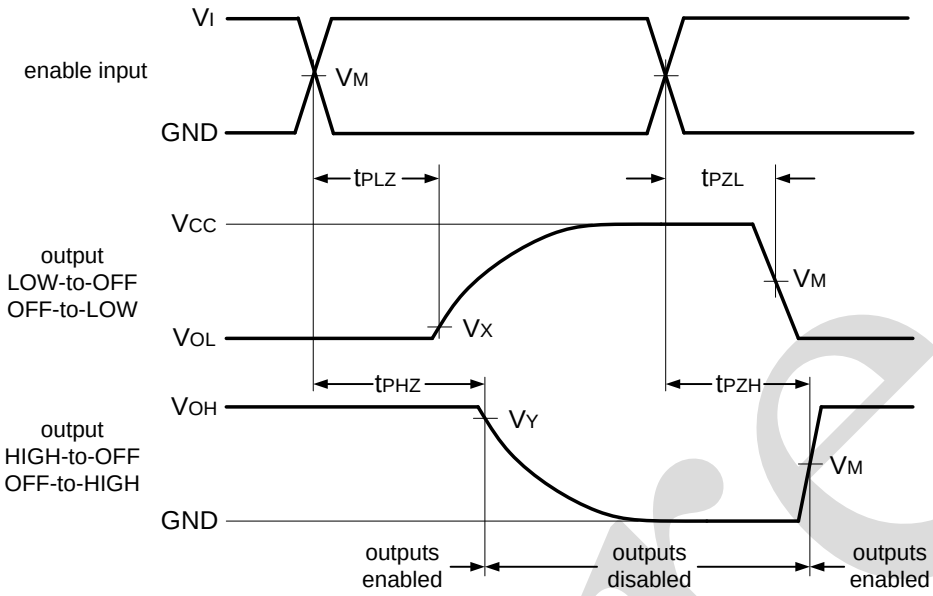


Figure 4. 3-state enable and disable times

4.3、Measurement Points

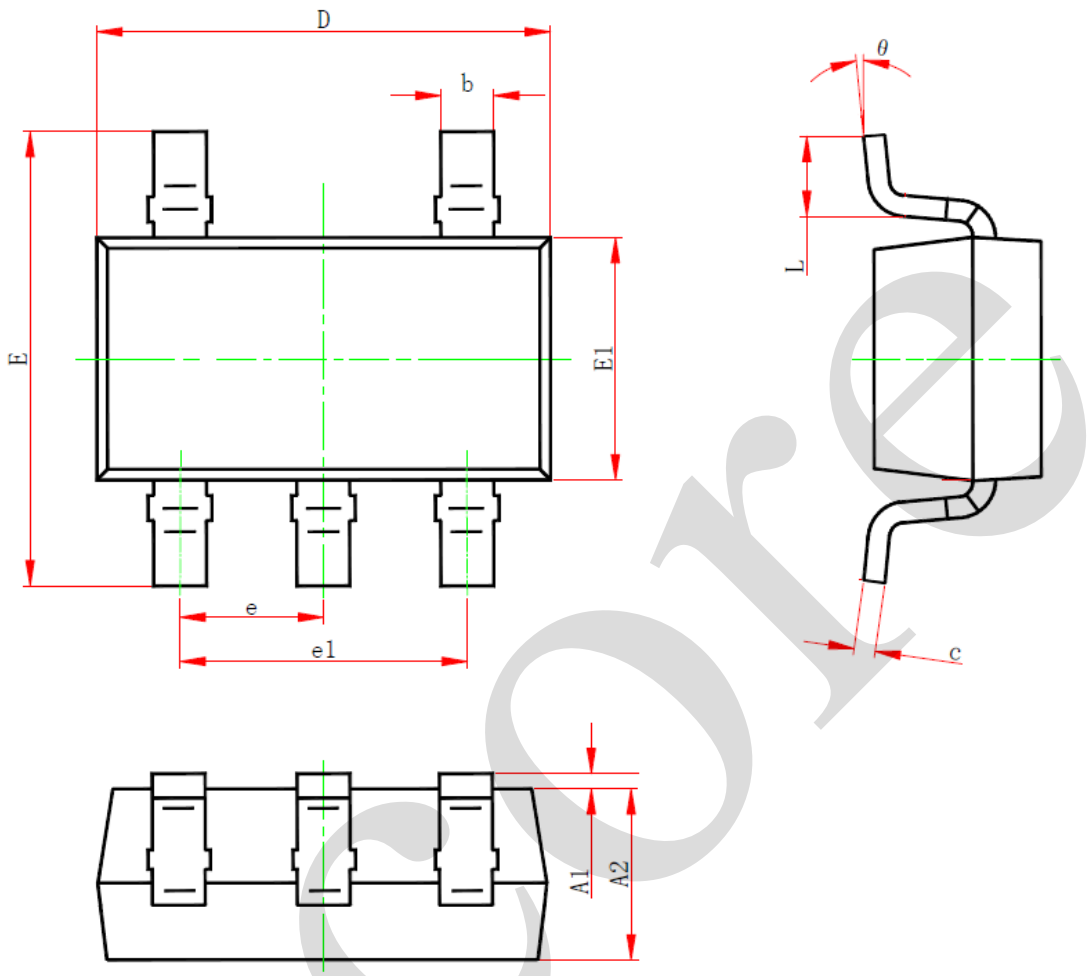
Supply voltage	Input	Output		
V_{CC}	V_M	V_M	V_X	V_Y
1.65V to 1.95V	$0.5\times V_{CC}$	$0.5\times V_{CC}$	V_{OL}+0.15V	V_{OH}-0.15V
2.3V to 2.7V	$0.5\times V_{CC}$	$0.5\times V_{CC}$	V_{OL}+0.15V	V_{OH}-0.15V
2.7V	1.5V	1.5V	V_{OL}+0.3V	V_{OH}-0.3V
3.0V to 3.6V	1.5V	1.5V	V_{OL}+0.3V	V_{OH}-0.3V
4.5V to 5.5V	$0.5\times V_{CC}$	$0.5\times V_{CC}$	V_{OL}+0.3V	V_{OH}-0.3V

4.4、Test Data

Supply voltage	Input		Load		V_{EXT}		
V_{CC}	V_I	t_r, t_f	C_L	R_L	t_{PLH}, t_{PHL}	t_{PZH}, t_{PHZ}	t_{PZL}, t_{PLZ}
1.65V to 1.95V	V_{CC}	≤ 3ns	30pF	1kΩ	open	GND	$2\times V_{CC}$
2.3V to 2.7V	V_{CC}	≤ 3ns	30pF	500Ω	open	GND	$2\times V_{CC}$
2.7V	2.7V	≤ 3ns	50pF	500Ω	open	GND	6V
3.0V to 3.6V	2.7V	≤ 3ns	50pF	500Ω	open	GND	6V
4.5V to 5.5V	V_{CC}	≤ 3ns	50pF	500Ω	open	GND	$2\times V_{CC}$

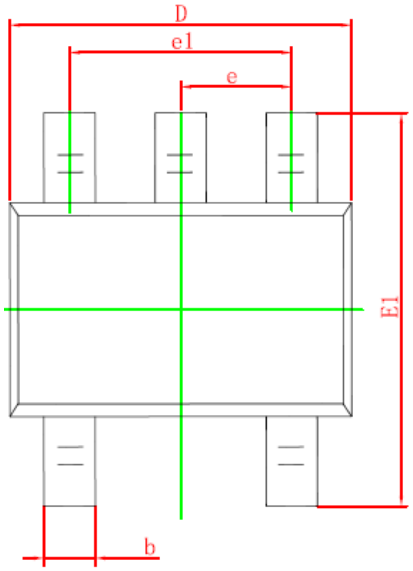
5、Package Information

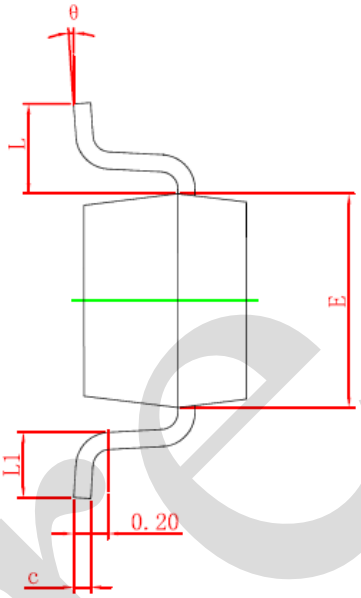
5.1、SOT-23-5

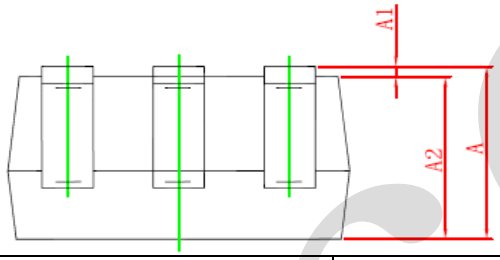


Symbol	Dimensions (mm)	
	Min.	Max.
A1	0.00	0.12
A2	1.00	1.20
b	0.30	0.50
c	0.10	0.20
D	2.82	3.02
E	2.60	3.00
E1	1.50	1.70
e	0.95	
e1	1.80	2.00
L	0.30	0.60
θ	0°	8°

5.2、SOT-353

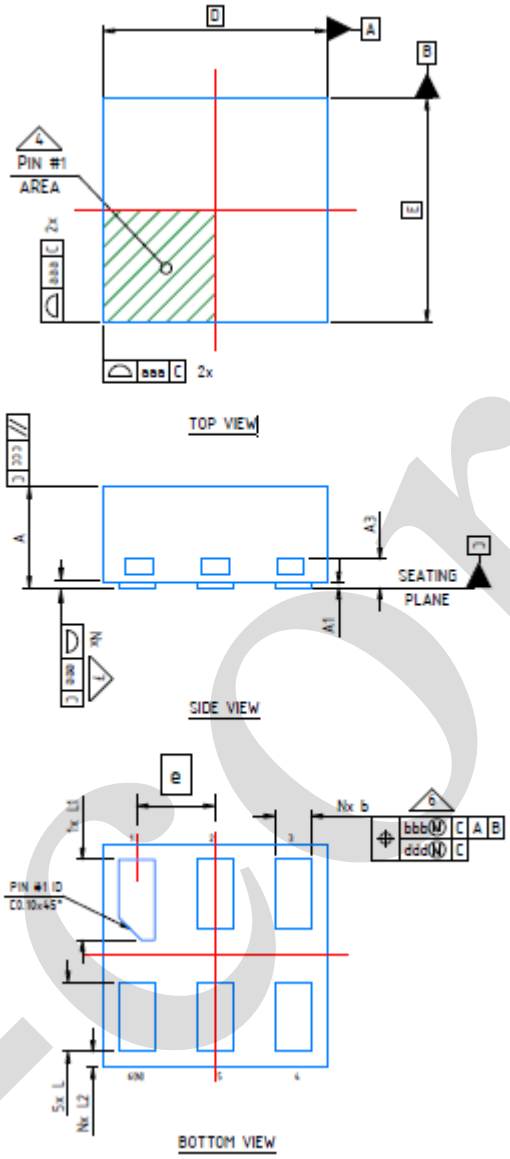






Symbol	Dimensions (mm)	
	Min.	Max.
A	0.90	1.10
A1	0.00	0.10
A2	0.90	1.00
b	0.15	0.35
c	0.11	0.175
D	2.00	2.20
E	1.15	1.35
E1	2.15	2.45
e	0.65	
e1	1.20	1.40
L	0.525	
L1	0.26	0.46
θ	0°	8°

5.3、XSON6(1*1*0.45-0.35)



Symbol	Dimensions (mm)	
	Min.	Max.
A	0.41	0.50
A1	0.00	0.05
A3	0.127	
b	0.11	0.21
D	1.00	
E	1.00	
e	0.35	
L	0.26	0.36

L1	0.31	0.41
L2	0.02	0.12

6、Statements And Notes

6.1、The name and content of Hazardous substances or Elements in the product

Part name	Hazardous substances or Elements									
	Lead and lead compounds	Mercury and mercury compounds	Cadmium and cadmium compounds	Hexavalent chromium compounds	Polybrominated biphenyls	Polybrominated biphenyl ethers	Dibutyl phthalate	Butylbenzyl phthalate	Di-2-ethylhexyl phthalate	Diisobutyl phthalate
Lead frame	○	○	○	○	○	○	○	○	○	○
Plastic resin	○	○	○	○	○	○	○	○	○	○
Chip	○	○	○	○	○	○	○	○	○	○
The lead	○	○	○	○	○	○	○	○	○	○
Plastic sheet installed	○	○	○	○	○	○	○	○	○	○
explanation	○：Indicates that the content of hazardous substances or elements in the detection limit of the following the SJ/T11363-2006 standard. ×：Indicates that the content of hazardous substances or elements exceeding the SJ/T11363-2006 Standard limit requirements.									

6.2、Notes

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