AiP74LVC17
Hex Buffer Schmitt Trigger

Product Specification

Specification Revision History：

Version	Date	Description
2017-06-A1	2017-06	New
2024-11-B1	2024-11	Update the template; Modify the content

Contents

1、General Description

The AiP74LVC17 provides six non-inverting buffers with Schmitt trigger input.

The inputs switch at different points for positive and negative-going signals. The difference between the positive voltage V_{T+} and the negative voltage V_{T-} is defined as the input hysteresis voltage V_H.

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:1.2V to 5.5V
- Inputs accept voltages up to 5.5V
- ±24mA output drive at 3.0V
- High-impedance when V_{CC}=0V
- Temperature range:-40℃ to +125℃
- Packaging information: DIP14/SOP14/TSSOP14

Ordering Information:

Tube packing specifications:

Part number	Packaging form	Marking code	Tube quantity	Boxed tube quantity	Boxed quantity	Notes
AiP74LVC17DA14.TB	DIP14	74LVC17	25 PCS/tube	40 tube/box	1000 PCS/box	Dimensions of plastic enclosure: 19.0mm×6.4mm Pin spacing: 2.54mm

Reel packing specifications:

Part number	Packaging form	Marking code	Reel quantity	Boxed reel quantity	Notes
AiP74LVC17SA14.TR	SOP14	74LVC17	4000 PCS/reel	8000 PCS/box	Dimensions of plastic enclosure: 8.7mm×3.9mm Pin spacing: 1.27mm
AiP74LVC17TA14.TR	TSSOP14	74LVC17	5000 PCS/reel	10000 PCS/box	Dimensions of plastic enclosure: 5.0mm×4.4mm Pin spacing: 0.65mm

Note: 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

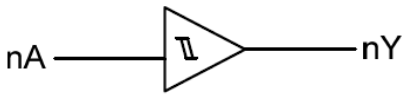


Figure 1. Logic symbol (each gate)

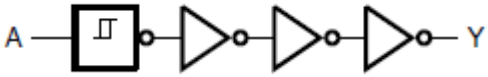
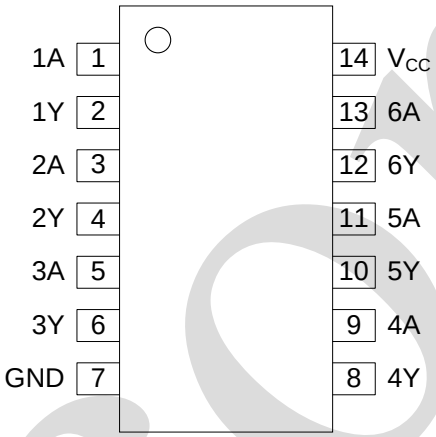


Figure 2. Logic diagram (each gate)

2.2、Pin Configurations



2.3、Pin Description

Pin No.	Pin Name	Description
1	1A	data input
2	1Y	data output
3	2A	data input
4	2Y	data output
5	3A	data input
6	3Y	data output
7	GND	ground (0 V)
8	4Y	data output
9	4A	data input
10	5Y	data output
11	5A	data input
12	6Y	data output
13	6A	data input
14	V_{CC}	supply voltage

2.4、Function Table

Input	Outputs
nA	**nY**
L	L
H	H

Note: H=HIGH voltage level; L=LOW voltage level.

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 voltage	V_I	-		-0.5	+6.5	V
output voltage	V_O	Active mode		-0.5	V_{CC}+0.5	V
		Power-down mode; V_{CC}=0V		-0.5	+6.5	V
supply current	I_{CC}	-		-	100	mA
ground current	I_{GND}	-		-100	-	mA
input clamping current	I_{IK}	V_I < 0V		-50	-	mA
output current	I_O	V_O=0V to V_{CC}		-	±50	mA
output clamping current	I_{OK}	V_O > V_{CC} or V_O < 0V		-	±50	mA
storage temperature	T_{stg}	-		-65	+150	℃
soldering temperature	T_L	10s	DIP14	245		℃
			SOP14/TSSOP14	260		℃

3.2、Recommended Operating Conditions

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
supply voltage	V_{CC}	-	1.2	-	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	V_{CC}	Conditions	Min.	Typ.	Max.	Unit
positive-going threshold voltage	V_{T+}	1.65V	-	0.7	-	1.4	V
		2.3V	-	1.0	-	1.7	V
		3V	-	1.3	-	2.2	V
		4.5V	-	1.9	-	3.1	V
		5.5V	-	2.2		3.7	V
negative-going threshold voltage	V_{T-}	1.65V	-	0.3	-	0.7	V
		2.3V	-	0.4	-	1.0	V
		3V	-	0.6	-	1.3	V
		4.5V	-	1.1	-	2.0	V
		5.5V	-	1.4	-	2.5	V
hysteresis voltage	V_H	1.65V	-	0.3	-	0.8	V
		2.3V	-	0.4	-	0.9	V
		3V	-	0.4	-	1.1	V
		4.5V	-	0.6	-	1.3	V
		5.5V	-	0.7	-	1.4	V
HIGH-level output voltage	V_{OH}	1.2V to 5.5V	I_O=-100uA	V_{CC}-0.1	-	-	V
		1.65V	I_O=-4mA	1.2	-	-	V
		2.3V	I_O=-8mA	1.9	-	-	V
		3.0V	I_O=-16mA	2.4	-	-	V
		3.0V	I_O=-24mA	2.3	-	-	V
		4.5V	I_O=-32mA	3.8	-	-	V
LOW-level output voltage	V_{OL}	1.2V to 5.5V	I_O=100uA	-	-	0.1	V
		1.65V	I_O=4mA	-	-	0.45	V
		2.3V	I_O=8mA	-	-	0.3	V
		3.0V	I_O=12mA	-	-	0.4	V
		3.0V	I_O=24mA	-	-	0.55	V
		4.5V	I_O=32mA	-	-	0.55	V
input leakage current	I_I	0V to 5.5V	V_I=5.5V or GND	-	-	±5	uA
power-off leakage current	I_{OFF}	0V	V_I or V_O=5.5V	-	-	±10	uA
supply current	I_{CC}	1.2V to 5.5V	V_I=V_{CC} or GND; I_O=0A	-	-	10	uA
additional supply current	ΔI_{CC}	3V to 5.5V	per input pin; V_I= V_{CC}-0.6V; I_O=0A	-	-	500	uA

3.3.2、DC Characteristics 2

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

Parameter	Symbol	V_{CC}	Conditions	Min.	Typ.	Max.	Unit
positive-going threshold voltage	V_{T+}	1.65V	-	-	-	1.4	V
		2.3V	-	-	-	1.7	V
		3V	-	-	-	2.2	V
		4.5V	-	-	-	3.1	V
		5.5V	-			3.7	V
negative-going threshold voltage	V_{T-}	1.65V	-	-	-	0.7	V
		2.3V	-	-	-	1.0	V
		3V	-	-	-	1.3	V
		4.5V	-	-	-	2.0	V
		5.5V	-	-	-	2.5	V
hysteresis voltage	V_H	1.65V	-	-	-	0.8	V
		2.3V	-	-	-	0.9	V
		3V	-	-	-	1.1	V
		4.5V	-	-	-	1.3	V
		5.5V	-	-	-	1.4	V
HIGH-level output voltage	V_{OH}	1.2V to 5.5V	I_O=-100uA	V_{CC}-0.2	-	-	V
		1.65V	I_O=-4mA	1.05	-	-	V
		2.3V	I_O=-8mA	1.65	-	-	V
		3.0V	I_O=-16mA	2.1	-	-	V
		3.0V	I_O=-24mA	2.0	-	-	V
		4.5V	I_O=-32mA	3.3	-	-	V
LOW-level output voltage	V_{OL}	1.2V to 5.5V	I_O=100uA	-	-	0.2	V
		1.65V	I_O=4mA	-	-	0.65	V
		2.3V	I_O=8mA	-	-	0.8	V
		3.0V	I_O=12mA	-	-	0.6	V
		3.0V	I_O=24mA		-	0.8	V
		4.5V	I_O=32mA	-	-	0.8	V
input leakage current	I_I	0V to 5.5V	V_I=5.5V or GND	-	-	±5	uA
power-off leakage current	I_{OFF}	0V	V_I or V_O=5.5V	-	-	±20	uA
supply current	I_{CC}	1.2V to 5.5V	V_I=V_{CC} or GND; I_O=0A	-	-	40	uA
additional supply current	ΔI_{CC}	3V to 5.5V	per input pin; V_I= V_{CC}-0.6V; I_O=0A	-	-	500	uA

3.3.3、AC Characteristics 1

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

Parameter	Symbol	V_{CC}	Conditions	Min.	Typ.	Max.	Unit
nA to nY propagation delay	t_{PLH}, t_{PHL}	1.65V to 1.95V	see Figure 4	-	-	9.3	ns
		2.3V to 2.7V		-	-	5.7	ns
		3.0V to 3.6V		-	-	5.4	ns
		4.4V to 5.5V		-	-	4.3	ns

3.3.4、AC Characteristics 2

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

Parameter	Symbol	V_{CC}	Conditions	Min.	Typ.	Max.	Unit
nA to nY propagation delay	t_{PLH}, t_{PHL}	1.65V to 1.95V	see Figure 4	-	-	10.2	ns
		2.3V to 2.7V		-	-	6.3	ns
		3.0V to 3.6V		-	-	5.9	ns
		4.4V to 5.5V		-	-	4.7	ns

4、Testing Circuit

4.1、AC Testing Circuit

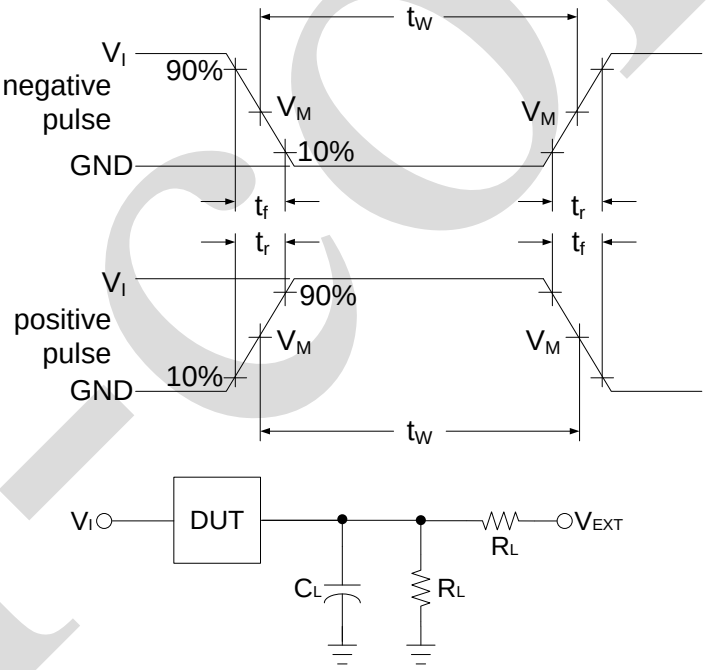


Figure 3. Load circuit

C_L=Load capacitance including jig and probe capacitance.

R_L=Load resistance.

4.2、Test Data

Supply voltage	Input		Load		V_{EXT}
V_{CC}	V_I	t_r, t_f	C_L	R_L	t_{PLH}, t_{PHL}
1.65V to 1.95V	V_{CC}	≤ 2ns	30pF	1kΩ	open
2.3V to 2.7V	V_{CC}	≤ 2ns	30pF	500Ω	open
3.0V to 3.6V	V_{CC}	≤ 2.5ns	50pF	500Ω	open
4.4V to 5.5V	V_{CC}	≤ 2.5ns	50pF	500Ω	open

4.3、AC Testing Waveforms

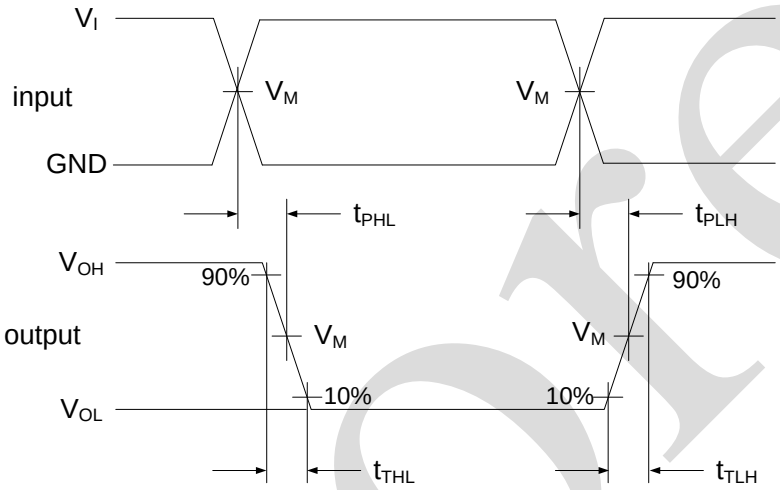


Figure 4. The data input (A) to output (Y) propagation delays

4.4、Measurement Points

Supply voltage	Input	Output
V_{CC}	V_M	V_M
1.65V to 1.95V	0.5×V_{CC}	0.5×V_{CC}
2.3V to 2.7V	0.5×V_{CC}	0.5×V_{CC}
3.0V to 3.6V	0.5×V_{CC}	0.5×V_{CC}
4.4V to 5.5V	0.5×V_{CC}	0.5×V_{CC}

4.5、Transfer characteristics Waveforms

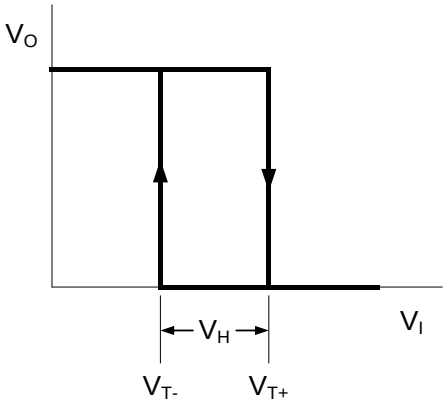


Figure 5. Transfer characteristic

V_{T-} at 20% and V_{T+} at 70%:

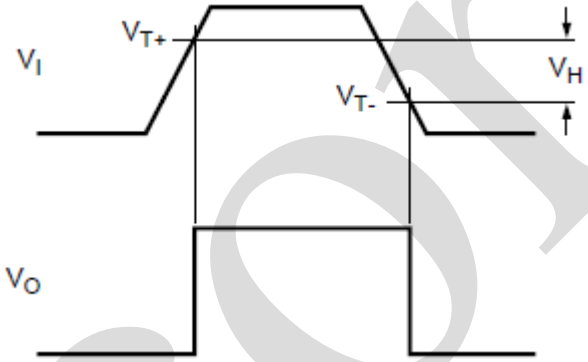
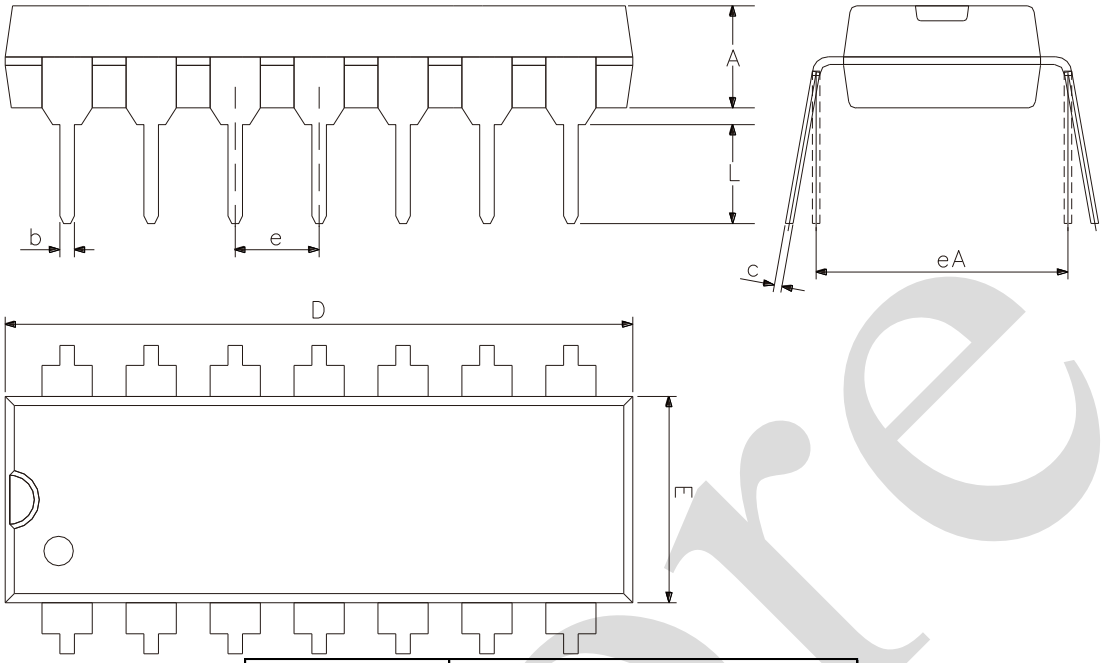


Figure 6. Definition of V_{T+}, V_{T-} and V_H

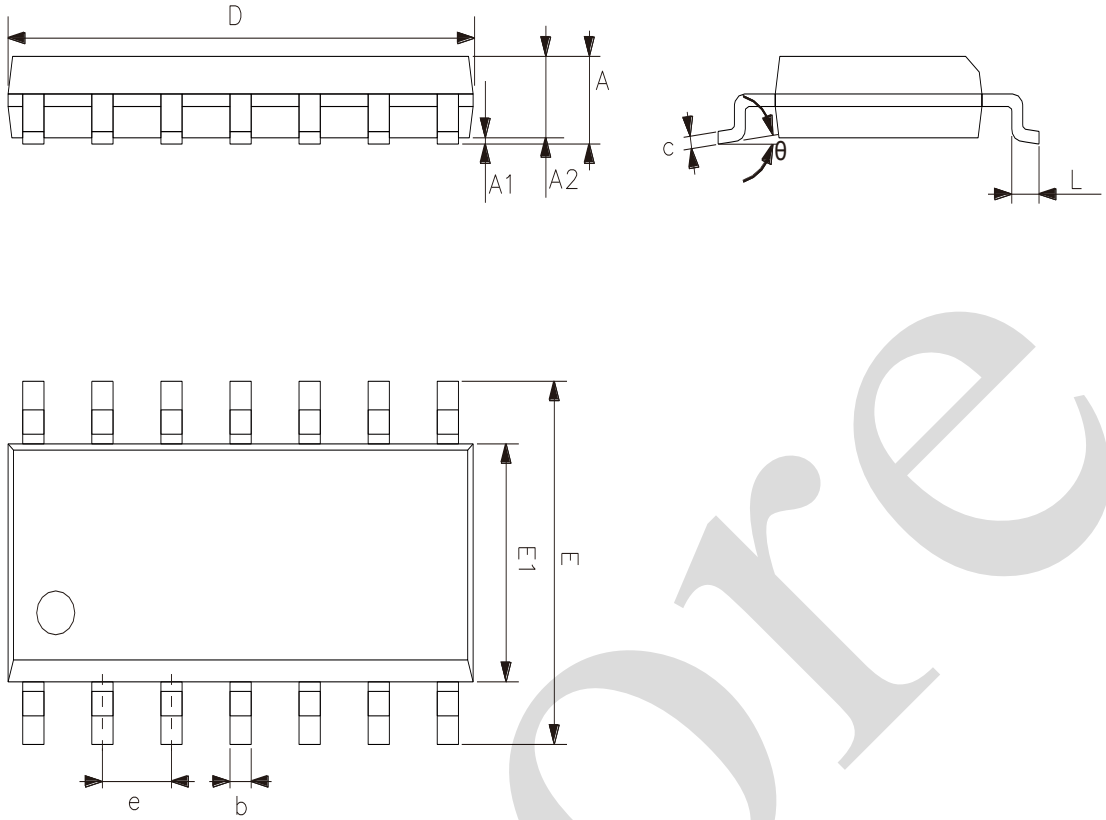
5、Package Information

5.1、DIP14



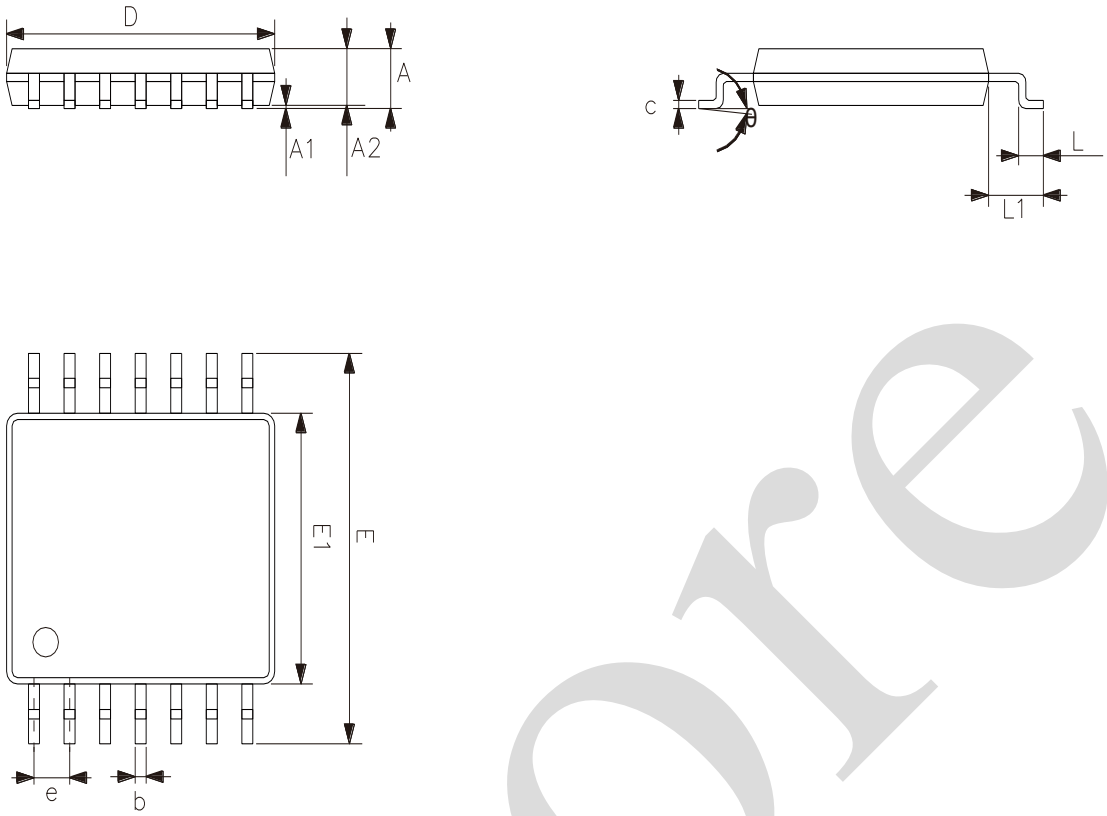
2023/12/A	Dimensions In Millimeters	
Symbol	**Min**	**Max**
A	3.05	3.60
b	0.33	0.56
c	0.20	0.36
D	18.80	19.40
E	6.20	6.60
e	2.54	
eA	7.62	10.90
L	2.92	—

5.2、SOP14



2023/12/A	Dimensions In Millimeters	
Symbol	**Min.**	**Max.**
A	1.50	1.75
A1	0.05	0.25
A2	1.30	—
b	0.33	0.50
c	0.19	0.25
D	8.43	8.76
E	5.80	6.25
E1	3.75	4.00
e	1.27	
L	0.40	0.89
θ	0°	8°

5.3、TSSOP14



2023/12/A	Dimensions In Millimeters	
Symbol	**Min**	**Max**
A	—	1.20
A1	0.05	0.15
A2	0.80	1.05
b	0.19	0.30
c	0.09	0.20
D	4.90	5.10
E1	4.30	4.50
E	6.20	6.60
e	0.65	
L	0.45	0.75
L1	1.00	
θ	0°	8°

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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