AiP74LVC132
Quad 2-input Nand Schmitt Trigger

Product Specification

Specification Revision History：

Version	Date	Description
2023-12-A0	2023-12	New
2024-02-A1	2024-02	Parameter modification

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1、General Description

The AiP74LVC132 provides four 2-input NAND gates with Schmitt trigger inputs.
Inputs 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 3.6V
- 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: SO14/TSSOP14

Ordering Information:

Tube packing specifications:

Part number	Packaging form	Marking code	Tube quantity	Boxed tube quantity	Boxed quantity	Notes
AiP74LVC132SA14.TB	SOP14	74LVC132	50 PCS/tube	200 tube/box	10000 PCS/box	Dimensions of plastic enclosure: 8.7mm×3.9mm Pin spacing: 1.27mm
AiP74LVC132TA14.TB	TSSOP14	74LVC132	96 PCS/tube	200 tube/box	19200 PCS/box	Dimensions of plastic enclosure: 5.0mm×4.4mm Pin spacing: 0.65mm

Reel packing specifications:

Part number	Packaging form	Marking code	Reel quantity	Boxed reel quantity	Notes
AiP74LVC132SA14.TR	SOP14	74LVC132	4000 PCS/reel	8000 PCS/box	Dimensions of plastic enclosure: 8.7mm×3.9mm Pin spacing: 1.27mm
AiP74LVC132TA14.TR	TSSOP14	74LVC132	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

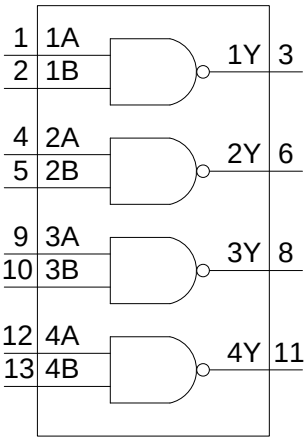


Figure 1. Functional diagram

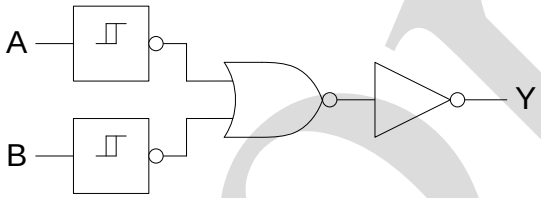
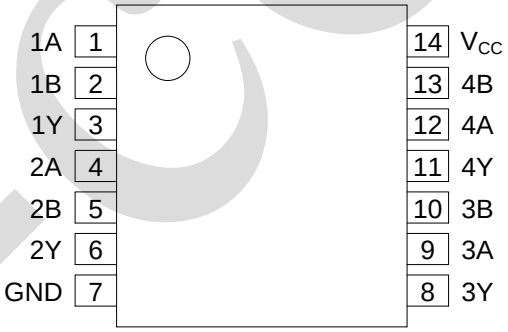


Figure 2. Logic diagram (one gate)

2.2、Pin Configurations



2.3、Pin Description

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

2.4、Function Table

Input		Output
nA	**nB**	**Y**
L	L	H
L	H	H
H	L	H
H	H	L

Note:

H = HIGH voltage level;

L = LOW voltage level.

3、Electrical Parameter

3.1、Absolute Maximum Ratings

(T_{amb}=25℃, All voltage referenced to GND (ground = 0 V), 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	-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	260		℃

3.2、Recommended Operating Conditions

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
supply voltage	V_{CC}	-	1.2	-	3.6	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.[1]	Max.	Unit
positive-going threshold voltage	V_{T+}	1.2V	-	0.2	-	1.0	V
		1.65V	-	0.4	-	1.3	V
		1.95V	-	0.6	-	1.5	V
		2.3V	-	0.8	-	1.7	V
		2.5V	-	0.9	-	1.7	V
		2.7V	-	1.1	-	2	V
		3V	-	1.2	-	2	V
		3.6V	-	1.2	-	2	V
negative-going threshold voltage	V_{T-}	1.2V	-	0.12	-	0.75	V
		1.65V	-	0.15	-	0.85	V
		1.95V	-	0.25	-	0.95	V
		2.3V	-	0.4	-	1.1	V
		2.5V	-	0.4	-	1.2	V
		2.7V	-	0.8	-	1.4	V
		3V	-	0.8	-	1.5	V

		3.6V	-	0.8	-	1.5	V
hysteresis voltage	V_H	1.2V	-	0.1	-	1.0	V
		1.65V	-	0.2	-	1.15	V
		1.95V	-	0.2	-	1.25	V
		2.3V	-	0.3	-	1.3	V
		2.5V	-	0.3	-	1.3	V
		2.7V	-	0.3	-	1.1	V
		3V	-	0.3	-	1.2	V
		3.6V	-	0.3	-	1.2	V
HIGH-level output voltage	V_{OH}	1.65V to 3.6V	I_O=-100uA	V_{CC}-0.2	-	-	V
		1.65V	I_O =-4mA	V_{CC}-0.45	-	-	V
		2.3V	I_O =-8mA	V_{CC}-0.5	-	-	V
		2.7V	I_O =-12mA	V_{CC}-0.5	-	-	V
		3.0V	I_O =-18mA	V_{CC}-0.6	-	-	V
		3.0V	I_O =-24mA	V_{CC}-0.8	-	-	V
LOW-level output voltage	V_{OL}	1.65V to 5.5V	I_O=100uA	-	-	0.2	V
		1.65V	I_O =4mA	-	-	0.45	V
		2.3V	I_O =8mA	-	-	0.6	V
		2.7V	I_O =12mA	-	-	0.4	V
		3.0V	I_O =24mA	-	-	0.55	V
input leakage current	I_I	3.6V	V_I=5.5V or GND	-	-	±5	uA
supply current	I_{CC}	3.6V	V_I= V_{CC} or GND; I_O=0A	-	-	10	uA
additional supply current	ΔI_{CC}	2.7V to 3.6V	per input pin; V_I= V_{CC}-0.6V; I_O=0A	-	5	500	uA

Note:

[1] Typical values are measured at T_{amb}=25℃ and V_{CC}=3.3V (unless stated otherwise)

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+}	1.2V	-	0.2	-	1.0	V
		1.65V	-	0.4	-	1.3	V
		1.95V	-	0.6	-	1.5	V
		2.3V	-	0.8	-	1.7	V
		2.5V	-	0.9	-	1.7	V
		2.7V	-	1.1	-	2	V
		3V	-	1.2	-	2	V
		3.6V	-	1.2	-	2	V
negative-going threshold voltage	V_{T-}	1.2V	-	0.12	-	0.75	V
		1.65V	-	0.15	-	0.85	V
		1.95V	-	0.25	-	0.95	V
		2.3V	-	0.4	-	1.1	V
		2.5V	-	0.4	-	1.2	V
		2.7V	-	0.8	-	1.4	V
		3V	-	0.8	-	1.5	V
		3.6V	-	0.8	-	1.5	V
hysteresis voltage	V_H	1.2V	-	0.1	-	1.0	V
		1.65V	-	0.2	-	1.15	V
		1.95V	-	0.2	-	1.25	V
		2.3V	-	0.3	-	1.3	V
		2.5V	-	0.3	-	1.3	V
		2.7V	-	0.3	-	1.1	V
		3V	-	0.3	-	1.2	V
		3.6V	-	0.3	-	1.2	V
HIGH-level output voltage	V_{OH}	1.65V to 3.6V	I_O=-100uA	V_{CC}-0.3	-	-	V
		1.65V	I_O =-4mA	V_{CC}-0.6	-	-	V
		2.3V	I_O =-8mA	V_{CC}-0.65	-	-	V
		2.7V	I_O =-12mA	V_{CC}-0.65	-	-	V
		3.0V	I_O =-18mA	V_{CC}-0.75	-	-	V
		3.0V	I_O =-24mA	V_{CC}-1	-	-	V
LOW-level output voltage	V_{OL}	1.65V to 5.5V	I_O=100uA	-	-	0.3	V
		1.65V	I_O =4mA	-	-	0.65	V
		2.3V	I_O =8mA	-	-	0.8	V
		2.7V	I_O =12mA	-	-	0.6	V
		3.0V	I_O =24mA	-	-	0.8	V
input leakage current	I_I	3.6V	V_I=5.5V or GND	-	-	±20	uA
supply current	I_{CC}	3.6V	V_I= V_{CC} or GND;	-	-	40	uA

			I_O=0A				
additional supply current	ΔI_{CC}	2.7V to 3.6V	per input pin; V_I= V_{CC}-0.6V; I_O=0A	-	-	5	mA

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.[1]	Max.	Unit
nA and nB to nY propagation delay	t_{PLH}, t_{PHL}	1.2V	see Figure 4	-	18.0	-	ns
		1.65V to 1.95V		2.0	7.2	12.8	ns
		2.3V to 2.7V		1.5	4.0	7.6	ns
		2.7V		1.5	3.8	7.6	ns
		3.0V to 3.6V		1.5	3.4	6.4	ns

Note:

[1] Typical values are measured at T_{amb}=25℃ and V_{CC}=1.2V, 1.8V, 2.5V, 2.7V, and 3.3V respectively.

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.[1]	Max.	Unit
nA and nB to nY propagation delay	t_{PLH}, t_{PHL}	1.65V to 1.95V	see Figure 4	2.0	-	16.0	ns
		2.3V to 2.7V		1.5	-	9.6	ns
		2.7V		1.5	-	9.6	ns
		3.0V to 3.6V		1.5	-	8.0	ns

4、Testing Circuit

4.1、AC Testing Circuit

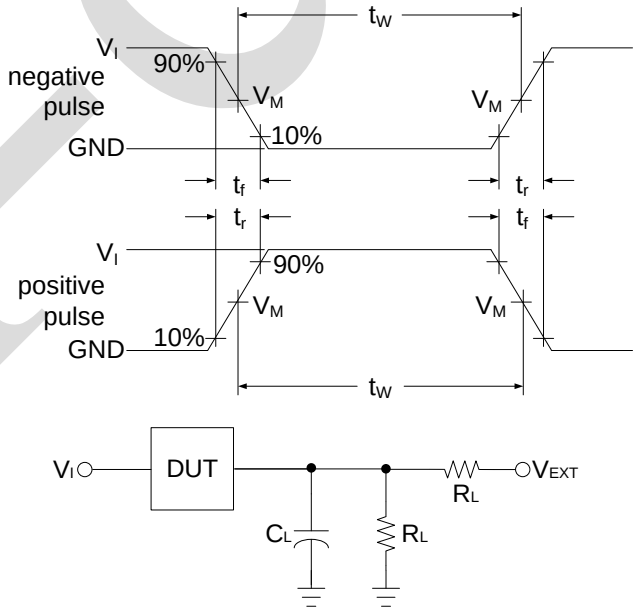


Figure 3. Test circuit for measuring switching times

Definitions for test circuit:

R_L=Load resistance.

C_L=Load capacitance including jig and probe capacitance.

4.2、Test Data

Supply voltage	Input		Load	
V_{CC}	V_I	t_r, t_f	C_L	R_L
1.2V	V_{CC}	≤3ns	30pF	1kΩ
1.65V to 1.95V	V_{CC}	≤3ns	30pF	1kΩ
2.3V to 2.7V	V_{CC}	≤3ns	30pF	500Ω
2.7V	2.7V	≤3ns	50pF	500Ω
3.0V to 3.6V	2.7V	≤3ns	50pF	500Ω

4.3、AC Testing Waveforms

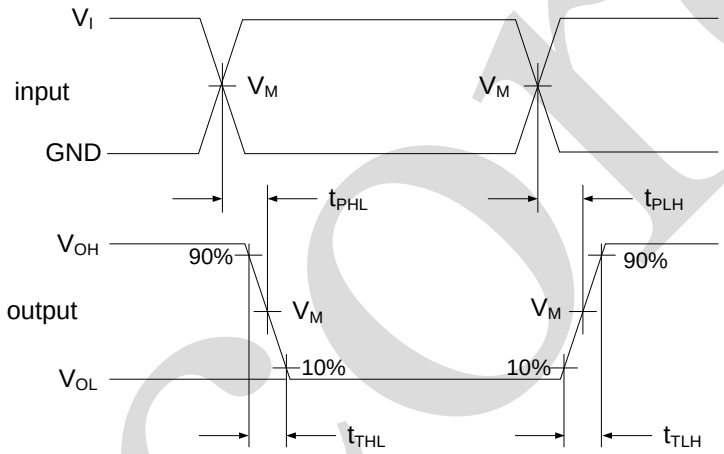


Figure 4. Input to output propagation delays

4.4、Measurement Points

Supply voltage	Input	Output
V_{CC}	V_M	V_M
1.2V	0.5×V_{CC}	0.5×V_{CC}
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}
2.7V	1.5V	1.5V
3.0V to 3.6V	1.5V	1.5V

4.5、Transfer characteristics

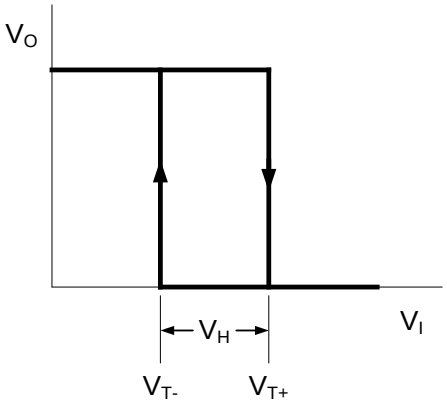


Figure 5. Transfer characteristic

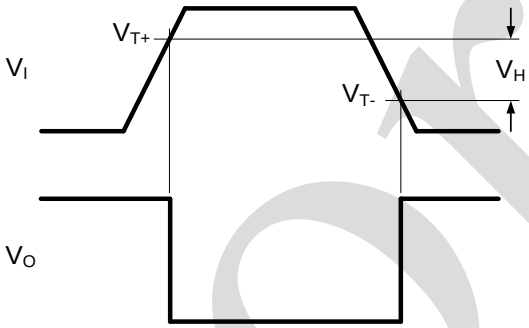
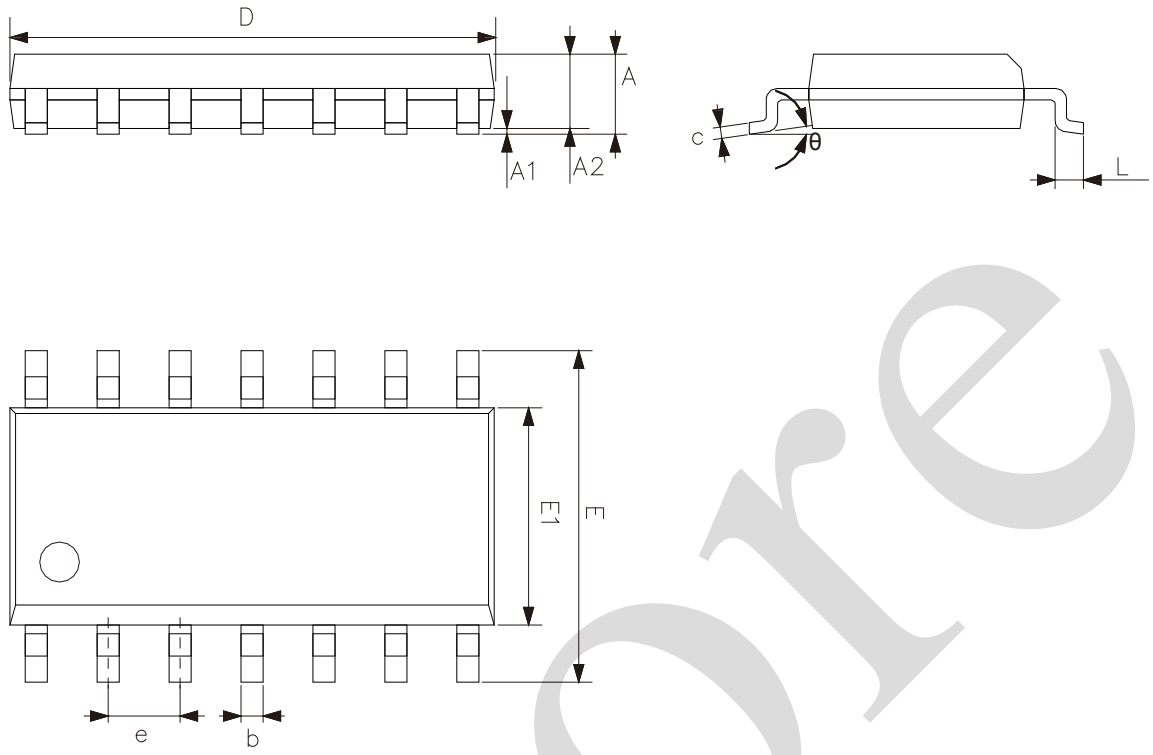


Figure 6. Definition of V_{T+}, V_{T-} and V_H

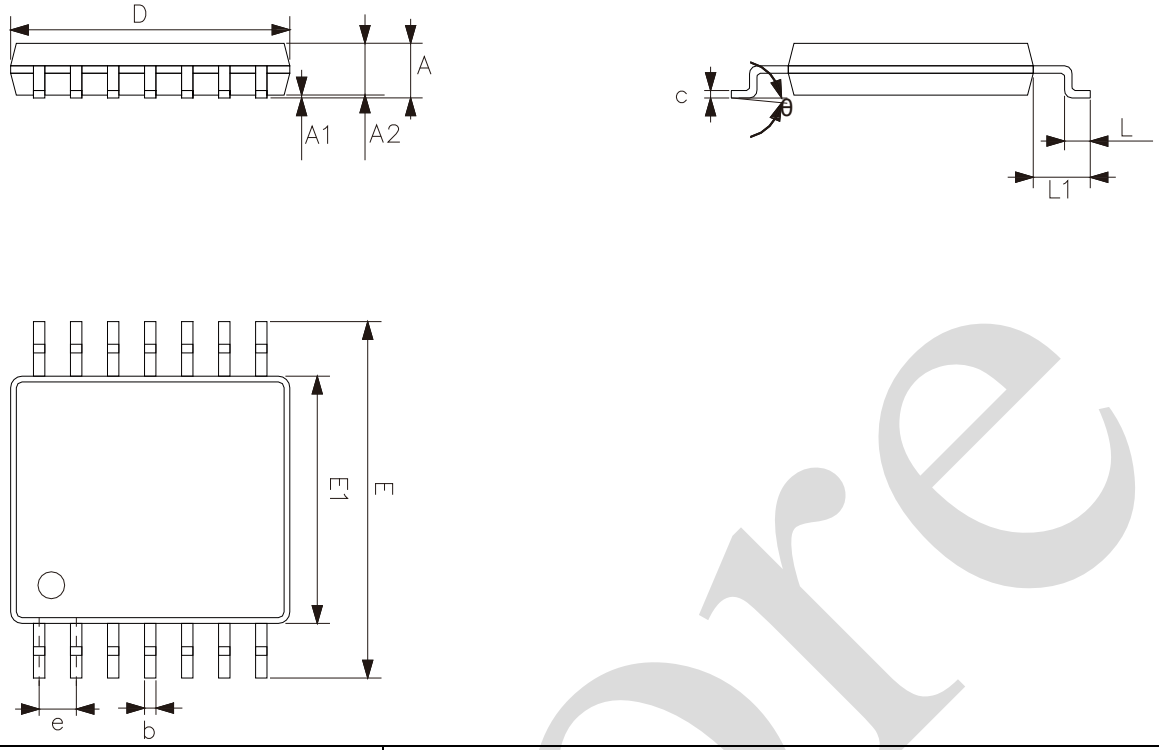
5、Package Information

5.1、SOP14



Symbol	Dimensions (mm)	
	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°

5.2、TSSOP14



Symbol	Dimensions (mm)	
	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
E	6.20	6.60
E1	4.30	4.50
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

We recommend you to read this chapter carefully before using this product.

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