AiP74HC132-Q1
Quad 2-Input Nand Schmitt Trigger

Product Specification

Specification Revision History：

Version	Date	Description
2023-08-A0	2023-08	New
2024-03-A1	2024-03	Modify parameters
2024-04-A2	2024-04	Modify the content

Contents

1、General Description

The AiP74HC132-Q1 is a quad 2-input NAND gate with Schmitt-trigger inputs.
This product has been qualified to the Automotive Electronics Council (AEC) standard Q100 (Grade 1) and is suitable for use in automotive applications.

Features:

- Automotive product qualification in accordance with AEC-Q100 (Grade 1)
- Supply voltage range: 2~6V
- ESD-HBM: 2000V(AEC-Q100-002)
- ESD-CDM: All pins 750V(AEC-Q100-011)
- LATCH-UP: ±100mA,Ta=125℃(AEC-Q100-004)
- Specified from -40℃ to +125℃
- Packaging information: TSSOP14

Ordering Information:

Tube packing specifications:

Part number	Packaging form	Marking code	Tube quantity	Boxed tube quantity	Boxed quantity	Notes
AiP74HC132-Q1TA14.TB	TSSOP14	74HC132Q	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
AiP74HC132-Q1TA14.TR	TSSOP14	74HC132Q	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

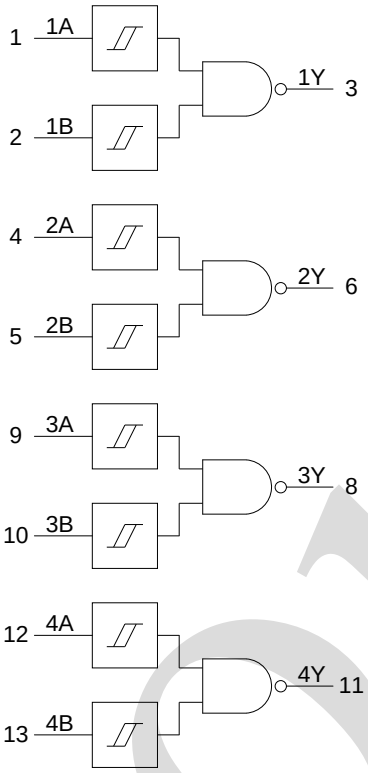
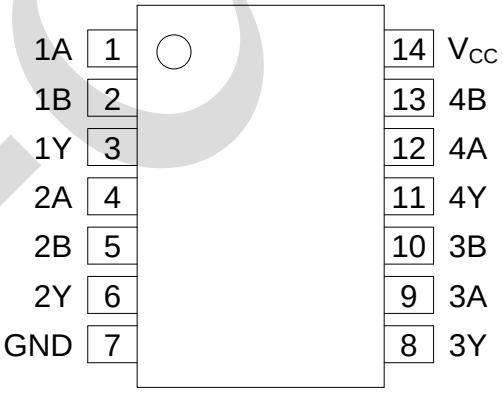


Figure 1. Logic symbol

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**	**nY**
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

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

Parameter	Symbol	Conditions	Min.	Max.	Unit
supply voltage	V_{CC}	-	-0.5	+7	V
supply current	I_{CC}	-	-	50	mA
ground current	I_{GND}	-	-50	-	mA
input clamping current	I_{IK}	$V_I < -0.5V$ or $V_I > V_{CC}+0.5V$	-	±20	mA
output clamping current	I_{OK}	$V_O < -0.5V$ or $V_O > V_{CC}+0.5V$	-	±20	mA
output current	I_O	$-0.5V < V_O < V_{CC}+0.5V$	-	±25	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}	-	2.0	5.0	6.0	V
input voltage	V_I	-	0	-	V_{CC}	V
output voltage	V_O	-	0	-	V_{CC}	V
ambient temperature	T_{amb}	-	-40	-	+125	℃

3.3、Electrical Characteristics

3.3.1、DC Characteristics

(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+}	2.0V	-	0.7	1.18	1.5	V
		4.5V	-	1.7	2.38	3.15	V
		6.0V	-	2.1	3.14	4.2	V
negative-going threshold voltage	V_{T-}	2.0V	-	0.3	0.63	1.0	V
		4.5V	-	0.9	1.67	2.2	V
		6.0V	-	1.2	2.26	3.0	V
hysteresis voltage	V_H	2.0V	-	0.2	0.55	1.0	V
		4.5V	-	0.4	0.71	1.4	V
		6.0V	-	0.6	0.88	1.6	V
HIGH-level output voltage	V_{OH}	2.0V	I_O=-20uA	1.9	2.0	-	V
		4.5V	I_O=-20uA	4.4	4.5	-	V
		6.0V	I_O=-20uA	5.9	6.0	-	V
		4.5V	I_O=-4.0mA	3.7	4.32	-	V
		6.0V	I_O=-5.2mA	5.2	5.81	-	V
LOW-level output voltage	V_{OL}	2.0V	I_O=20uA	-	0	0.1	V
		4.5V	I_O=20uA	-	0	0.1	V
		6.0V	I_O=20uA	-	0	0.1	V
		4.5V	I_O=4.0mA	-	0.15	0.4	V
		6.0V	I_O=5.2mA	-	0.16	0.4	V
input leakage current	I_I	6.0V	V_I=V_{CC} or GND	-	-	±2	uA
supply current	I_{CC}	6.0V	V_I=V_{CC} or GND;I_O=0A	-	-	40	uA

Note: All typical values are measured at T_{amb}=25℃.

3.3.2、AC Characteristics

(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}	2.0V	C_L=50pF	see Figure 3	-	12.7	38.1	ns
		4.5V	C_L=50pF		-	4.3	12.9	ns
		5.0V	C_L=15pF		-	4.2	-	ns
		6.0V	C_L=50pF		-	3.9	11.7	ns
transition time	t_{THL}, t_{TLH}	2.0V	C_L=50pF	see Figure 3	-	9.3	27.9	ns
		4.5V	C_L=50pF		-	2.9	8.7	ns
		6.0V	C_L=50pF		-	2.4	7.2	ns

Note: All typical values are measured at T_{amb}=25℃.

4、Testing Circuit

4.1、AC Testing Circuit

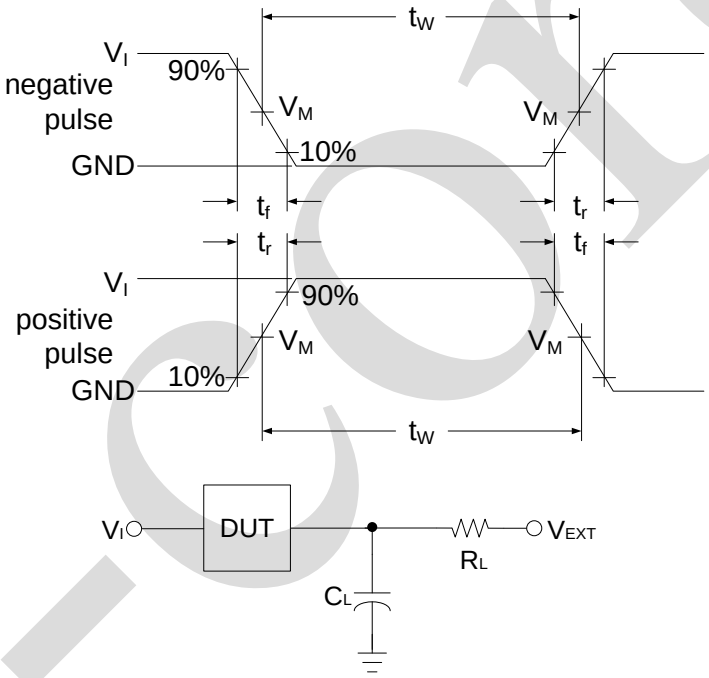


Figure 2. AC Testing Circuit

Definitions for test circuit:

C_L=load capacitance including jig and probe capacitance.

4.2、Test Data

Type	Input		Load		V_{EXT}
	V_I	t_r , t_f	C_L	R_L	t_{PHL}, t_{PLH}
AiP74HC132-Q1	V_{CC}	6.0ns	15pF, 50pF	1kΩ	open

4.3、AC Testing Waveforms

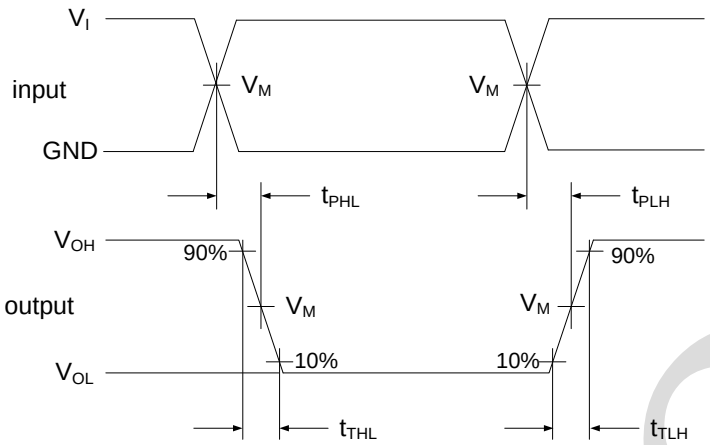


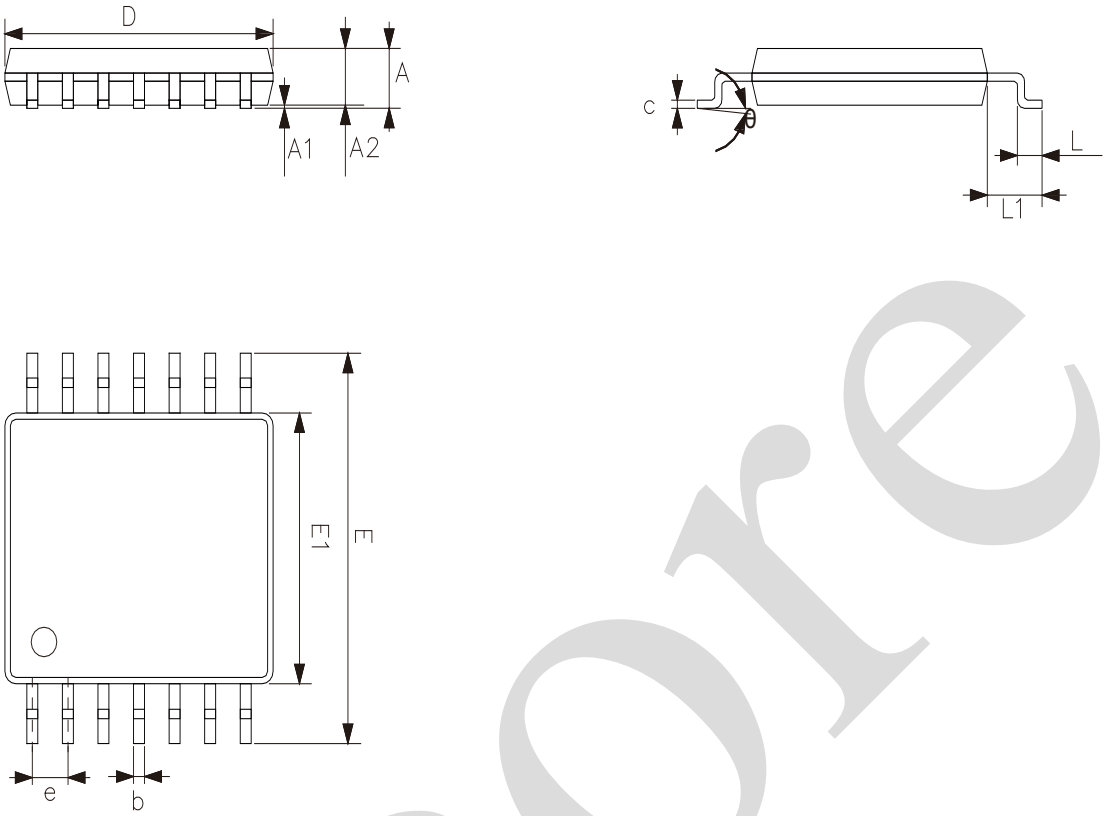
Figure 3. Input to output propagation delays

4.4、Measurement Points

Type	Input	Output		
	V_M	V_M	V_X	V_Y
AiP74HC132-Q1	$0.5\times V_{CC}$	$0.5\times V_{CC}$	$0.1\times V_{CC}$	$0.9\times V_{CC}$

5、Package Information

5.1、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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