AiP74AHC/AHCT1G02
Single 2-Input Nor Gate

Product Specification

Specification Revision History：

Version	Date	Description
2023-09-A0	2023-09	New
2024-04-A1	2024-04	Modify the parameters

Contents

1、General Description

AiP74AHC1G02 and AiP74AHCT1G02 are single 2-input nor gates.

Features:

- Power supply voltage range:
  AiP74AHC1G02: 2V to 5.5V
  AiP74AHCT1G02: 4.5V to 5.5V
- Low power dissipation
- Specified from -40℃ to +125℃
- Packaging information: SOT23-5/SOT353

Ordering Information:

Reel packing specifications:

Part number	Packaging form	Marking code	Reel quantity	Boxed reel quantity	Notes
AiP74AHC1G02GB235.TR	SOT23-5	ESXX	3000 PCS/reel	30000 PCS/box	Dimensions of plastic enclosure: 2.9mm×1.6mm Pin spacing:0.95mm
AiP74AHC1G02GC353.TR	SOT353	ESXX	3000 PCS/reel	30000 PCS/box	Dimensions of plastic enclosure: 2.1mm×1.3mm Pin spacing:0.65mm
AiP74AHCT1G02GB235.TR	SOT23-5	GHXX	3000 PCS/reel	30000 PCS/box	Dimensions of plastic enclosure: 2.9mm×1.6mm Pin spacing:0.95mm
AiP74AHCT1G02GC353.TR	SOT353	GHXX	3000 PCS/reel	30000 PCS/box	Dimensions of plastic enclosure: 2.1mm×1.3mm Pin spacing:0.65mm

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

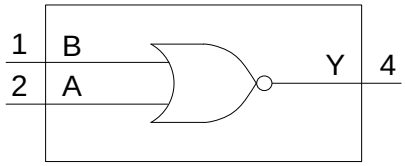


Figure 1. Logic symbol

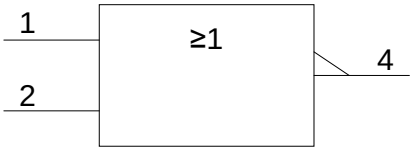


Figure 2. IEC logic symbol

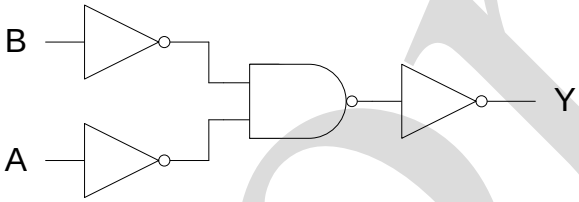
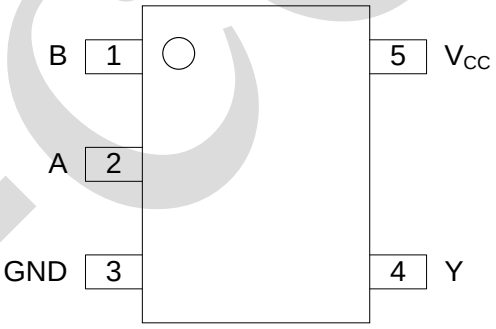


Figure 3. Logic diagram

2.2、Pin Configurations



2.3、Pin Description

Pin No.	Pin Name	Description
1	B	data input
2	A	data input
3	GND	ground (0V)
4	Y	data output
5	V_{CC}	supply voltage

2.4、Function Table

Input		Output
A	**B**	**Y**
L	L	H
L	H	L
H	L	L
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	+7.0	V
input voltage	V_I	-	-0.5	+7.0	V
input clamping current	I_{IK}	V_I<-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
supply current	I_{CC}	-	-	75	mA
ground current	I_{GND}	-	-75	-	mA
storage temperature	T_{stg}	-	-65	+150	℃
total power dissipation	P_{tot}	-	-	250	mW
Soldering temperature	T_L	10s	260		℃

3.2、Recommended Operating Conditions

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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
AiP74AHC1G02						
supply voltage	V_{CC}	-	2.0	5.0	5.5	V
input voltage	V_I	-	0	-	5.5	V
output voltage	V_O	-	0	-	V_{CC}	V
ambient temperature	T_{amb}	-	-40	-	+125	℃
AiP74AHCT1G02						
supply voltage	V_{CC}	-	4.5	5.0	5.5	V
input voltage	V_I	-	0	-	5.5	V
output voltage	V_O	-	0	-	V_{CC}	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	Vcc	Conditions	Min.	Typ.	Max.	Unit
AiP74AHC1G02							
HIGH-level input voltage	V_{IH}	2.0V	-	1.5	-	-	V
		3.0V	-	2.1	-	-	V
		5.5V	-	3.85	-	-	V
LOW-level input voltage	V_{IL}	2.0V	-	-	-	0.5	V
		3.0V	-	-	-	0.9	V
		5.5V	-	-	-	1.65	V
HIGH-level output voltage	V_{OH}	2.0V	I_O=-50uA	1.9	2.0	-	V
		3.0V	I_O=-50uA	2.9	3.0	-	V
		4.5V	I_O=-50uA	4.4	4.5	-	V
		3.0V	I_O=-4mA	2.48	-	-	V
		4.5V	I_O=-8mA	3.8	-	-	V
LOW-level output voltage	V_{OL}	2.0V	I_O=50uA	-	0	0.1	V
		3.0V	I_O=50uA	-	0	0.1	V
		4.5V	I_O=50uA	-	0	0.1	V
		3.0V	I_O=4mA	-	-	0.44	V
		4.5V	I_O=8mA	-	-	0.44	V
input leakage current	I_I	0V to 5.5V	V_I=5.5V or GND	-	-	1.0	uA
supply current	I_{CC}	5.5V	V_I=V_{CC} or GND	-	-	10	uA
AiP74AHCT1G02							
HIGH-level input voltage	V_{IH}	4.5V to 5.5V	-	2.0	-	-	V
LOW-level input voltage	V_{IL}	4.5V to 5.5V	-	-	-	0.8	V
HIGH-level output voltage	V_{OH}	4.5V	I_O=-50uA	4.4	4.5	-	V
		4.5V	I_O=-8mA	3.8	-	-	V
LOW-level output voltage	V_{OL}	4.5V	I_O=50uA	-	0	0.1	V
		4.5V	I_O=8mA	-	-	0.44	V
input leakage current	I_I	0V to 5.5V	V_I=5.5V or GND	-	-	1.0	uA
supply current	I_{CC}	5.5V	V_I=V_{CC} or GND; Io=0A	-	-	10	uA
additional supply current	ΔI_{CC}	5.5V	V_{CC}= per input pin; V_I=3.4V; other inputs at V_{CC} or GND	-	-	1.5	mA

3.3.2、DC Characteristics 2

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

Parameter	Symbol	Vcc	Conditions	Min.	Typ.	Max.	Unit
AiP74AHC1G02							
HIGH-level input voltage	V_{IH}	2.0V	-	1.5	-	-	V
		3.0V	-	2.1	-	-	V
		5.5V	-	3.85	-	-	V
LOW-level input voltage	V_{IL}	2.0V	-	-	-	0.5	V
		3.0V	-	-	-	0.9	V
		5.5V	-	-	-	1.65	V
HIGH-level output voltage	V_{OH}	2.0V	I_O=-50uA	1.9	-	-	V
		3.0V	I_O=-50uA	2.9	-	-	V
		4.5V	I_O=-50uA	4.4	-	-	V
		3.0V	I_O=-4mA	2.40	-	-	V
		4.5V	I_O=-8mA	3.70	-	-	V
LOW-level output voltage	V_{OL}	2.0V	I_O=50uA	-	-	0.1	V
		3.0V	I_O=50uA	-	-	0.1	V
		4.5V	I_O=50uA	-	-	0.1	V
		3.0V	I_O=4mA	-	-	0.55	V
		4.5V	I_O=8mA	-	-	0.55	V
input leakage current	I_I	0V to 5.5V	V_I=5.5V or GND	-	-	2.0	uA
supply current	I_{CC}	5.5V	V_I=V_{CC} or GND	-	-	40	uA
AiP74AHCT1G02							
HIGH-level input voltage	V_{IH}	4.5V to 5.5V	-	2.0	-	-	V
LOW-level input voltage	V_{IL}	4.5V to 5.5V	-	-	-	0.8	V
HIGH-level output voltage	V_{OH}	4.5V	I_O=-50uA	4.4	4.5	-	V
		4.5V	I_O=-8mA	3.8	-	-	V
LOW-level output voltage	V_{OL}	4.5V	I_O=50uA	-	0	0.1	V
		4.5V	I_O=8mA	-	-	0.55	V
input leakage current	I_I	0V to 5.5V	V_I=5.5V or GND	-	-	2.0	uA
supply current	I_{CC}	5.5V	V_I=V_{CC} or GND; Io=0A	-	-	40	uA
additional supply current	ΔI_{CC}	5.5V	V_{CC}= per input pin; V_I=3.4V; other inputs at V_{CC} or GND	-	-	1.5	mA

3.3.3、AC Characteristics 1

(T_{amb}=-40℃ to +85℃, GND=0V, t_r=t_f=≤3.0ns, unless otherwise specified.)

Parameter	Symbol	Vcc	Conditions	Min.	Typ.	Max.	Unit
AiP74AHC1G02							
propagation delay	t_{pd}	3.0V to 3.6V[2]	A and B to Y C_L=15pF see Figure 5[1]	-	4.4	9.5	ns
		3.0V to 3.6V[2]	A and B to Y C_L=50pF see Figure 5[1]	-	6.3	13	ns
		4.5V to 5.5V[3]	A and B to Y C_L=15pF see Figure 5[1]	-	3.2	6.5	ns
		4.5V to 5.5V[3]	A and B to Y C_L=50pF see Figure 5[1]	-	4.6	8.5	ns
AiP74AHCT1G02							
propagation delay	t_{pd}	4.5V to 5.5V[3]	A and B to Y C_L=15pF see Figure 5[1]	-	3.5	6.5	ns
		4.5V to 5.5V[3]	A and B to Y C_L=50pF see Figure 5[1]	-	4.9	8.5	ns

Note:

[1] t_{pd} is the same as t_{PLH} and t_{PHL}.

[2] Typical values are measured at V_{CC}=3.3V.

[3] Typical values are measured at V_{CC}=5V.

3.3.4、AC Characteristics 2

(T_{amb}=-40℃ to +125℃, GND=0V, t_r=t_f=≤3.0ns, unless otherwise specified.)

Parameter	Symbol	Vcc	Conditions	Min.	Typ.	Max.	Unit
AiP74AHC1G02							
propagation delay	t_{pd}	3.0V to 3.6V[2]	A and B to Y C_L=15pF see Figure 5[1]	1.0	-	10.5	ns
		3.0V to 3.6V[2]	A and B to Y C_L=50pF see Figure 5[1]	1.0	-	14.5	ns
		4.5V to 5.5V[3]	A and B to Y C_L=15pF see Figure 5[1]	1.0	-	7.0	ns
		4.5V to 5.5V[3]	A and B to Y C_L=50pF see Figure 5[1]	1.0	-	9.5	ns
AiP74AHCT1G02							
propagation delay	t_{pd}	4.5V to 5.5V[3]	A and B to Y C_L=15pF see Figure 5[1]	1.0	-	7.0	ns
		4.5V to 5.5V[3]	A and B to Y C_L=50pF see Figure 5[1]	1.0	-	9.5	ns

Note:

[1] t_{pd} is the same as t_{PLH} and t_{PHL}.

[2] Typical values are measured at V_{CC}=3.3V.

[3] Typical values are measured at V_{CC}=5V.

4、Testing Circuit

4.1、AC Testing Circuit

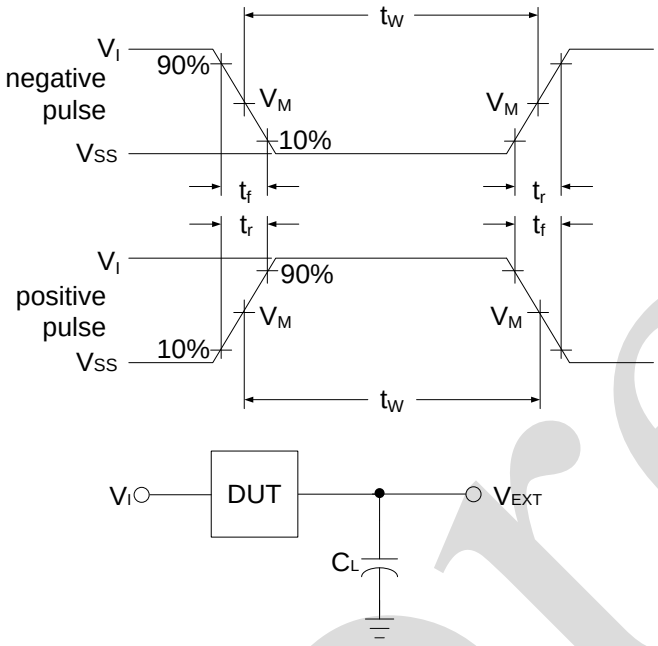


Figure 4. Test circuit for measuring switching times

Definitions for test circuit:

C_L=Load capacitance including jig and probe capacitance.

4.2、AC Testing Waveforms

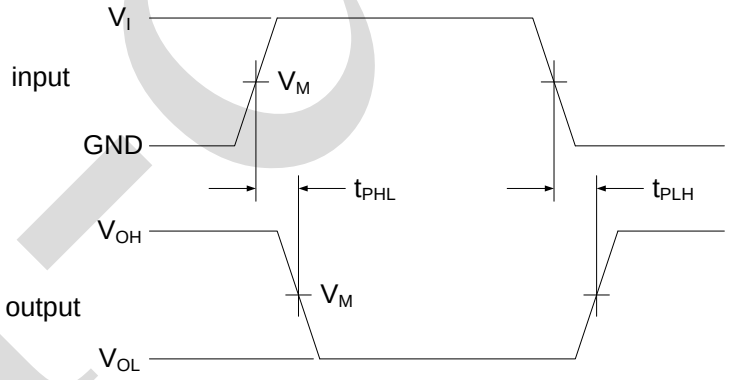


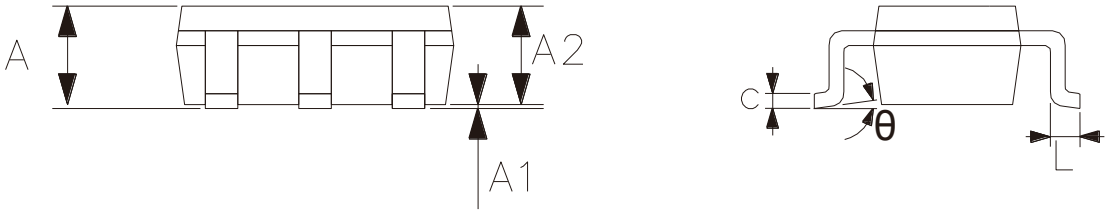
Figure 5. The inputs (A and B) to output (Y) propagation delays

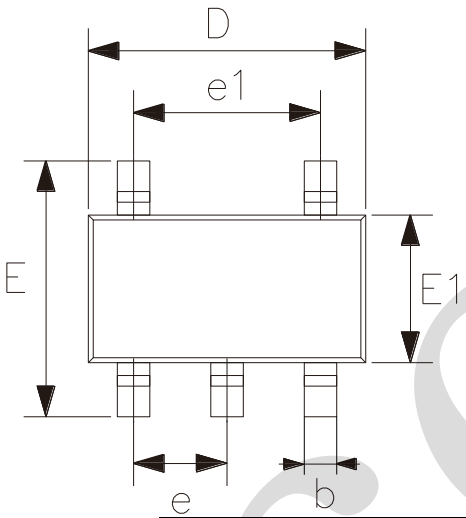
4.3、Measurement Points

Type	Input		Output
	V_I	V_M	V_M
AiP74AHC1G02	GND to V_{CC}	0.5×V_{CC}	0.5×V_{CC}
AiP74AHCT1G02	GND to 3.0V	1.5V	0.5×V_{CC}

5、Package Information

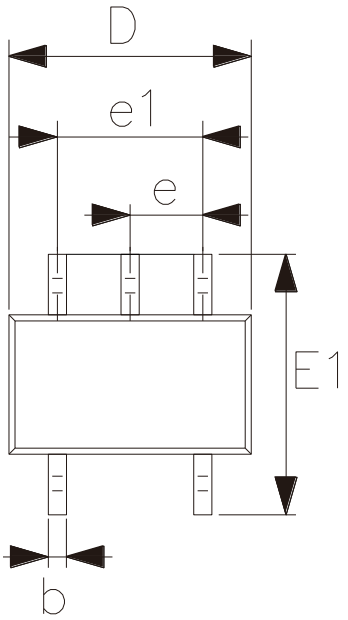
5.1、SOT23-5

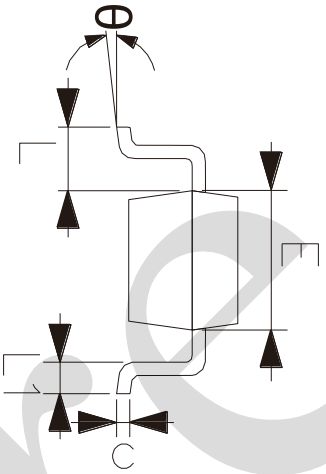


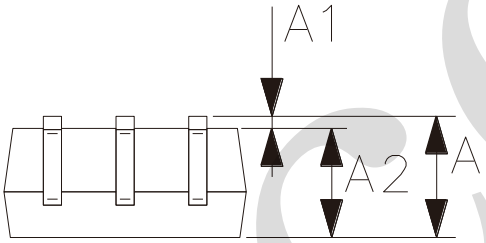


2023/12/A	Dimensions In Millimeters	
Symbol	Min.	Max.
A	—	1.26
A1	0.00	0.12
A2	1.00	1.20
b	0.30	0.50
c	0.10	0.20
D	2.82	3.02
E	2.60	3.00
E1	1.50	1.70
e	0.95	
e1	1.80	2.00
L	0.30	0.60
θ	0°	8°

5.2、SOT353







2023/12/A	Dimensions In Millimeters	
Symbol	**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°

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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