AiP74LVC1G10
Single 3-input NAND gate

Product Specification

Specification Revision History:

Version	Date	Description
2023-10-A0	2023-10	New
2023-11-A1	2023-11	Parameter modification

Contents

1、General Description 1
2、Block Diagram And Pin Description 2
2.1、Block Diagram 2
2.2、Pin Configurations 2
2.3、Pin Description 2
2.4、Function Table 3
3、Electrical Parameter 3
3.1、Absolute Maximum Ratings 3
3.2、Recommended Operating Conditions 3
3.3、Electrical Characteristics 4
3.3.1、DC Characteristics 1 4
3.3.2、DC Characteristics 2 5
3.3.3、AC Characteristics 1 6
3.3.4、AC Characteristics 2 6
4、Testing Circuit 7
4.1、AC Testing Circuit 7
4.2、Test Data 7
4.3、AC Testing Waveforms 8
4.4、Measurement Points 8
5、Package Information 9
5.1、SOT-23-6 9
5.2、SOT-363 10
5.3、XSON6 11
6、Statements And Notes 12
6.1、The name and content of Hazardous substances or Elements in the product 12
6.2、Notes 12

1、General Description

The AiP74LVC1G10 provides a low-power, low-voltage single 3-input NAND gate.

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 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: SOT-23-6/SOT-363/XSON6

Ordering Information:

Reel packing specifications:

Part number	Packaging form	Marking code	Reel quantity	Boxed reel quantity	Notes
AiP74LVC1G10GB236.TR	SOT-23-6	BBXX	3000 PCS/reel	30000 PCS/box	Dimensions of plastic enclosure: 2.9mm×1.6mm Pin spacing: 0.95mm
AiP74LVC1G10GC363.TR	SOT-363	BBXX	3000 PCS/reel	30000 PCS/box	Dimensions of plastic enclosure: 2.1mm×1.3mm Pin spacing: 0.65mm
AiP74LVC1G10ED6.TR	XSON6	BBXX	5000 PCS/reel	25000 PCS/box	Dimensions of plastic enclosure: 1.0mm×1.45mm Pin spacing:0.50mm

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

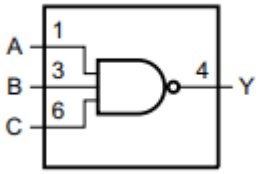


Figure 1. Functional diagram

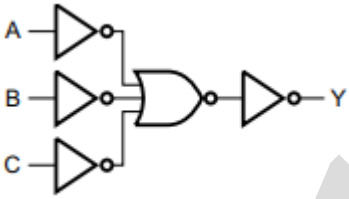
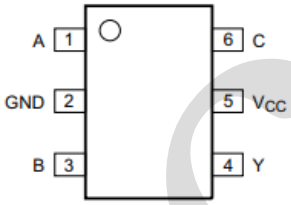
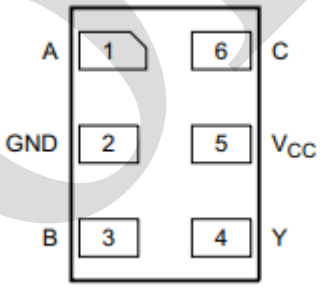


Figure 2. Logic diagram

2.2、Pin Configurations



SOT-23-6/SOT-363



XSON6

2.3、Pin Description

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

2.4、Function Table

Input			Output
A	**B**	**C**	**Y**
H	H	H	L
L	X	X	H
X	L	X	H
X	X	L	H

Note:
H = HIGH voltage level;
L = LOW voltage level;
X = Don't care

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}	-	1.65	-	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	V_{CC}	Conditions	Min.	Typ.[1]	Max.	Unit
HIGH-level input voltage	V_{IH}	1.65V to 1.95V	-	0.65× V_{CC}	-	-	V
		2.3V to 2.7V	-	1.7	-	-	V
		2.7V to 3.6V	-	2.0	-	-	V
		4.5V to 5.5V	-	0.70× V_{CC}	-	-	V
LOW-level input voltage	V_{IL}	1.65V to 1.95V	-	-	-	0.35× V_{CC}	V
		2.3V to 2.7V	-	-	-	0.7	V
		2.7V to 3.6V	-	-	-	0.8	V
		4.5V to 5.5V	-	-	-	0.30× V_{CC}	V
HIGH-level output voltage	V_{OH}	1.65V 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
		2.7V	I_O =-12mA	2.2	-	-	V
		3.0V	I_O =-24mA	2.3	-	-	V
		4.5V	I_O =-32mA	3.8	-	-	V
LOW-level output voltage	V_{OL}	1.65V to 5.5V	I_O=100uA	-	-	0.10	V
		1.65V	I_O =4mA	-	-	0.45	V
		2.3V	I_O =8mA	-	-	0.30	V
		2.7V	I_O =12mA	-	-	0.40	V
		3.0V	I_O =24mA	-	-	0.55	V
		4.5V	I_O =32mA	-	-	0.55	V
input leakage	I_I	0V to5.5V	V_I=5.5V or GND	-	-	±1	uA
power-off leakage current	I_{OFF}	0V	V_I or V_O =5.5V	-	-	±2	uA
supply current	I_{CC}	1.65V to 5.5V	V_I=5.5V or GND; I_O=0A	-	-	4	uA
additional supply current	ΔI_{CC}	2.3V to 5.5V	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}=1.2V, 1.8V, 2.5V, 2.7V, and 3.3V respectively.

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
HIGH-level input voltage	V_{IH}	1.65V to 1.95V	-	0.65× V_{CC}	-	-	V
		2.3V to 2.7V	-	1.7	-	-	V
		2.7V to 3.6V	-	2.0	-	-	V
		4.5V to 5.5V	-	0.70× V_{CC}	-	-	V
LOW-level input voltage	V_{IL}	1.65V to 1.95V	-	-	-	0.35× V_{CC}	V
		2.3V to 2.7V	-	-	-	0.7	V
		2.7V to 3.6V	-	-	-	0.8	V
		4.5V to 5.5V	-	-	-	0.30× V_{CC}	V
HIGH-level output voltage	V_{OH}	1.65V to 5.5V	I_O=-100uA	V_{CC}-0.1	-	-	V
		1.65V	I_O =-4mA	0.95	-	-	V
		2.3V	I_O =-8mA	1.7	-	-	V
		2.7V	I_O =-12mA	1.9	-	-	V
		3.0V	I_O =-24mA	2.0	-	-	V
		4.5V	I_O =-32mA	3.4	-	-	V
LOW-level output voltage	V_{OL}	1.65V to 5.5V	I_O=100uA	-	-	0.10	V
		1.65V	I_O =4mA	-	-	0.70	V
		2.3V	I_O =8mA	-	-	0.45	V
		2.7V	I_O =12mA	-	-	0.60	V
		3.0V	I_O =24mA	-	-	0.80	V
		4.5V	I_O =32mA	-	-	0.80	V
input leakage	I_I	0V to5.5V	V_I=5.5V or GND	-	-	±1	uA
power-off leakage current	I_{OFF}	0V	V_I or V_O =5.5V	-	-	±2	uA
supply current	I_{CC}	1.65V to 5.5V	V_I=5.5V or GND; I_O=0A	-	-	4	uA
additional supply current	ΔI_{CC}	2.3V 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.[1]	Max.	Unit
A, B and C to Y propagation delay	t_{PLH}, t_{PHL}	1.65V to 1.95V	see Figure 4	-	4.7	18.0	ns
		2.3V to 2.7V		-	3.0	6.5	ns
		2.7V		-	3.0	6.0	ns
		3.0V to 3.6V		-	2.6	5.0	ns
		4.5V to 5.5V		-	1.9	3.6	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.	Max.	Unit
A, B and C to Y propagation delay	t_{PLH}, t_{PHL}	1.65V to 1.95V	see Figure 4	-	-	21.5	ns
		2.3V to 2.7V		-	-	7.8	ns
		2.7V		-	-	7.5	ns
		3.0V to 3.6V		-	-	6.2	ns
		4.5V to 5.5V		-	-	4.4	ns

4、Testing Circuit

4.1、AC Testing Circuit

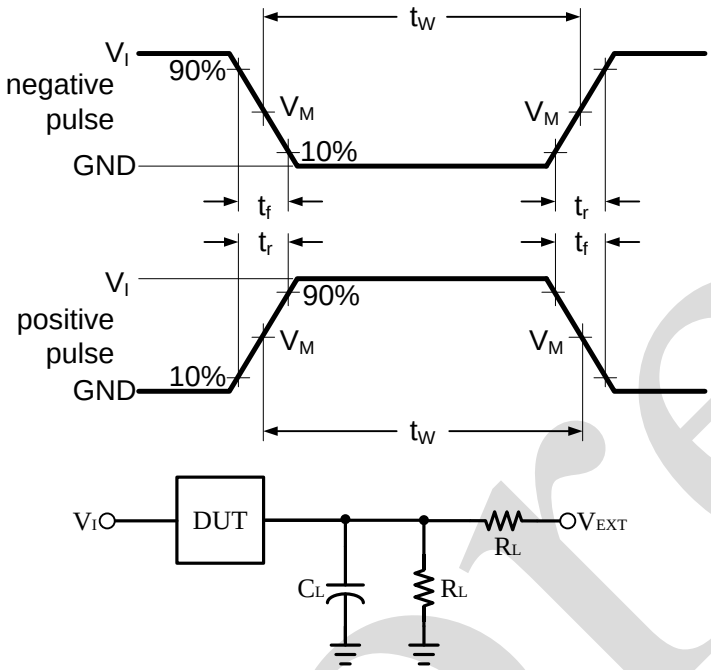


Figure 3. Test circuit for measuring switching times

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_{EXT}		
V_{CC}	V_I	$t_r = t_f$	C_L	R_L	t_{PLH}/t_{PHL}	t_{PLZ}/t_{PZL}	t_{PHZ}/t_{PZH}
1.65V to 1.95V	V_{CC}	≤ 3ns	30pF	1kΩ	Open	2×V_{CC}	GND
2.3V to 2.7V	V_{CC}	≤ 3ns	30pF	500Ω	Open	2×V_{CC}	GND
2.7V	V_{CC}	≤ 3ns	50pF	500Ω	Open	2×V_{CC}	GND
3.0V to 3.6V	V_{CC}	≤ 3ns	50pF	500Ω	Open	2×V_{CC}	GND
4.5V to 5.5V	V_{CC}	≤ 3ns	50pF	500Ω	Open	2×V_{CC}	GND

4.3、AC Testing Waveforms

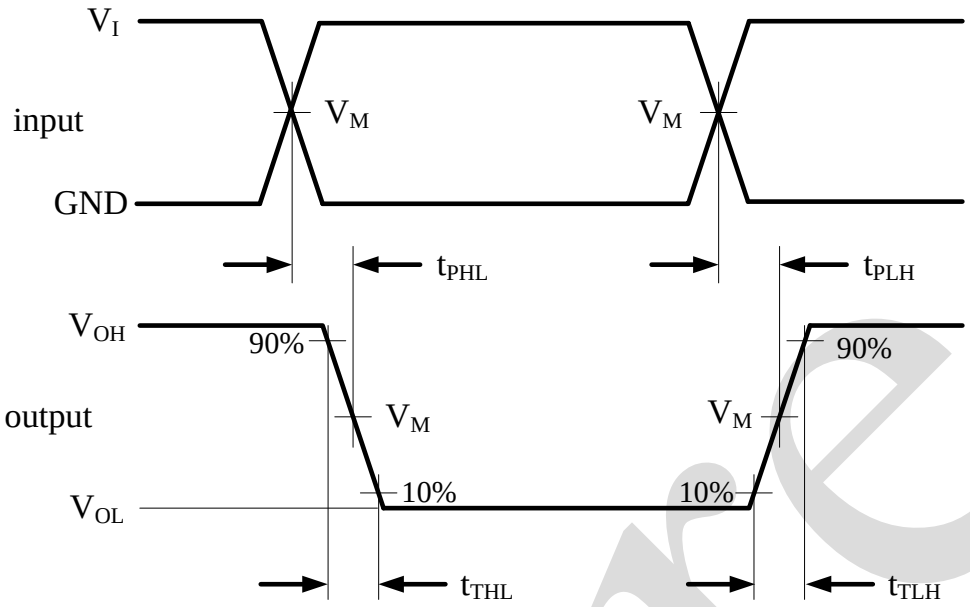


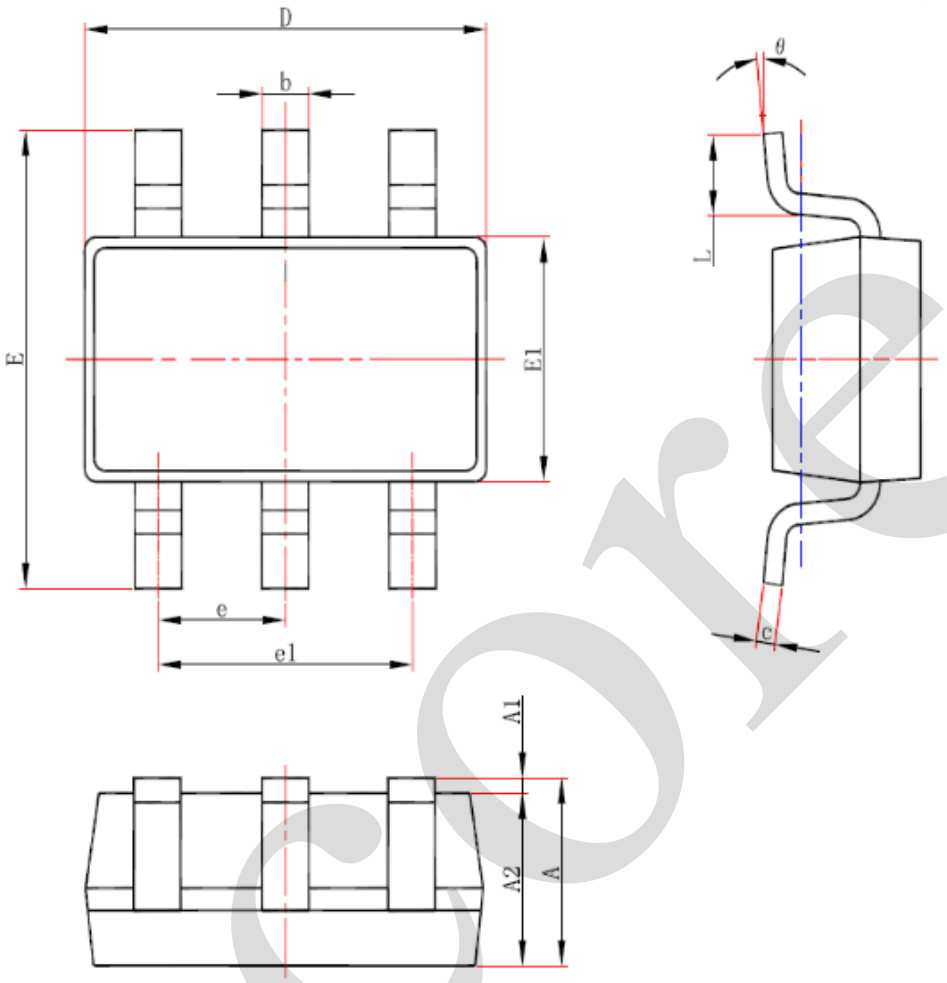
Figure 4. Input to output propagation delays

4.4、Measurement Points

Supply voltage	Input	Output
V_{CC}	V_M	V_M
1.65V to 1.95V	$0.5\times V_{CC}$	$0.5\times V_{CC}$
2.3V to 2.7V	$0.5\times V_{CC}$	$0.5\times V_{CC}$
2.7V	$0.5\times V_{CC}$	$0.5\times V_{CC}$
3.0V to 3.6V	$0.5\times V_{CC}$	$0.5\times V_{CC}$
4.5V to 5.5V	$0.5\times V_{CC}$	$0.5\times V_{CC}$

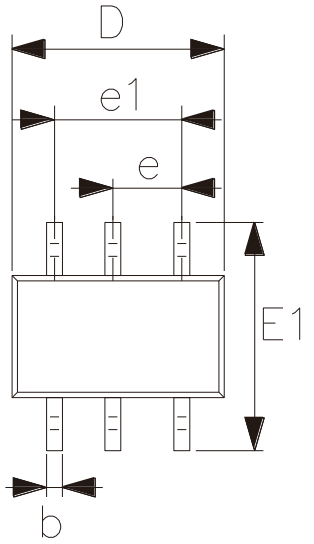
5、Package Information

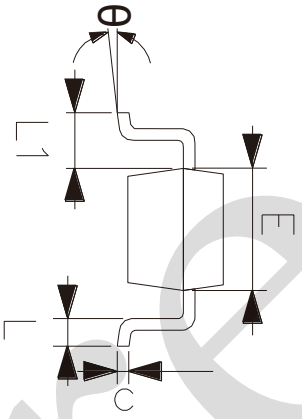
5.1、SOT-23-6

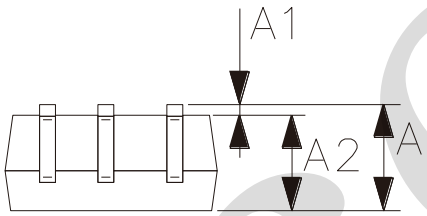


Symbol	Dimensions (mm)	
	Min.	Max.
A	-	1.25
A1	0.00	0.12
A2	1.00	1.20
b	0.30	0.50
c	0.10	0.20
D	2.82	3.02
E	2.60	3.00
E1	1.50	1.70
e	0.95	
e1	1.80	2.00
L	0.30	0.60
θ	0°	8°

5.2、SOT-363

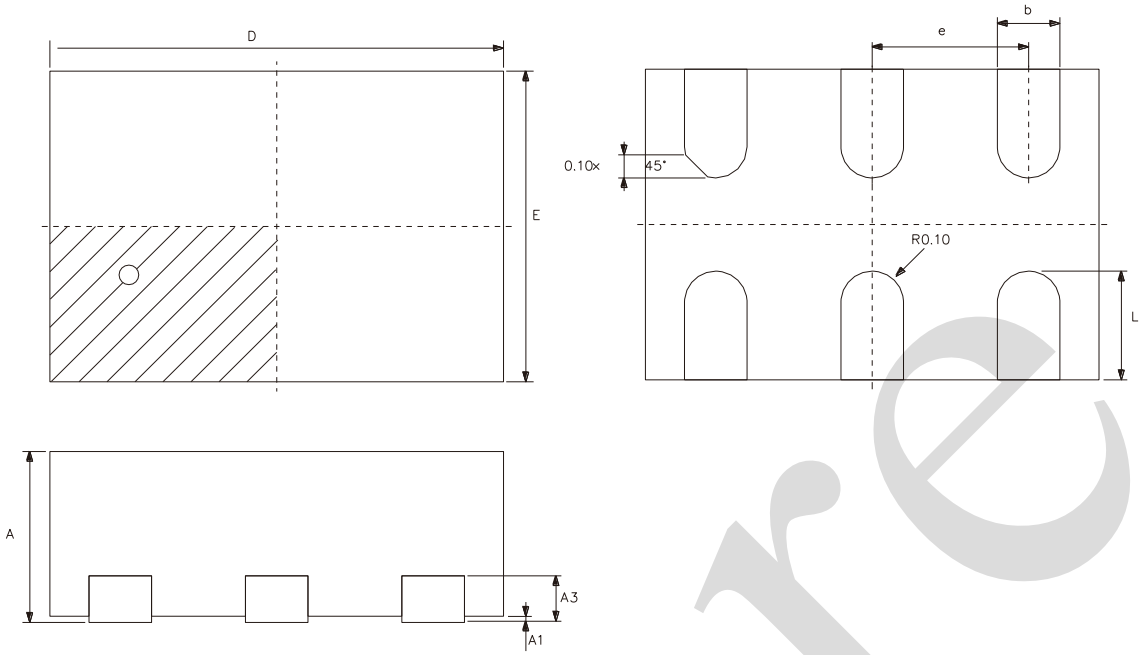






Symbol	Dimensions (mm)	
	Min.	Max.
A	0.90	1.10
A1	0.00	0.10
A2	0.90	1.00
b	0.15	0.35
c	0.11	0.175
D	2.00	2.20
E1	2.15	2.45
E	1.15	1.35
e	0.65	
e1	1.20	1.40
L	0.26	0.46
L1	0.525	
θ	0°	8°

5.3、XSON6



Symbol	Dimensions (mm)	
	Min.	Max.
A	0.51	0.60
A1	0.00	0.05
A3	0.15	
b	0.15	0.25
D	1.45	
E	1.00	
e	0.50	
L	0.25	0.45

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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