AiP74LV1T00
2-Input Single Supply Translating Nand Gate

Product Specification

Specification Revision History：

Version	Date	Description
2025-02-A0	2025-02	New
2025-06-A1	2025-06	Modify the parameters

Contents

1、General Description

The AiP74LV1T00 is a single, level translating 2-input NAND gate.

Features:

- Supply voltage:1.6V to 5.5 V
- Up translation
  1.2V to 1.8V at V_{CC}=1.8V
  1.5V to 2.5V at V_{CC}=2.5V
  1.8V to 3.3V at V_{CC}=3.3V
  3.3V to 5.0V at V_{CC}=5.0V
- Down translation
  3.3V to 1.8V at V_{CC}=1.8V
  3.3V to 2.5V at V_{CC}=2.5V
  5.0V to 3.3V at V_{CC}=3.3V
- Inputs accept voltages to 5.5V
- 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
AiP74LV1T00GB235.TR	SOT23-5	AiP HR	3000 PCS/reel	30000 PCS/box	Dimensions of plastic enclosure: 2.9mm×1.6mm Pin spacing:0.95mm
AiP74LV1T00GC353.TR	SOT353	HRXX	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 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

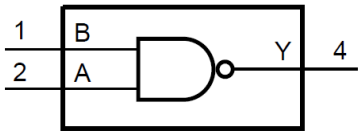


Figure 1. Logic symbol

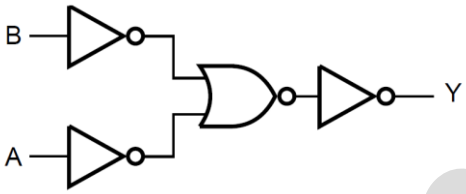
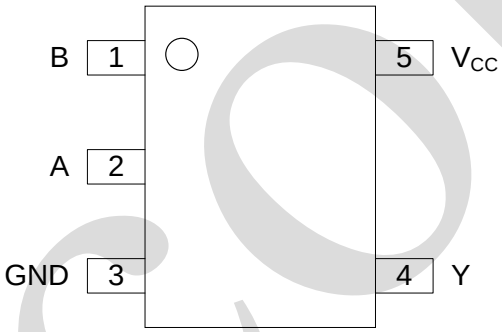


Figure 2. Logic diagram

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	H
H	L	H
H	H	L

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

3、Electrical Parameter

3.1、Absolute Maximum Ratings

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

Characteristic	Symbol	Conditions	Min.	Max.	Unit
supply voltage	V_{CC}	-	-0.5	+7.0	V
input voltage	V_I	-	-0.5	+7.0	V
output voltage	V_O	output HIGH or LOW state	-0.5	V_{CC}+0.5	V
		output in power-off state	-0.5	+4.6	V
supply current	I_{CC}	-	-	50	mA
ground current	I_{GND}	-	-50	-	mA
input clamping current	I_{IK}	V_I<0V	-20	-	mA
output current	I_O	V_O=0V to V_{CC}	-	±25	mA
output clamping current	I_{OK}	V_O<0V or V_O>V_{CC}	-	±20	mA
storage temperature	T_{stg}	-	-65	+150	℃
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
supply voltage	V_{CC}	-	1.6	5.0	5.5	V
input voltage	V_I	-	0	-	5.5	V
output voltage	V_O	output HIGH or LOW state	0	-	V_{CC}	V
ambient temperature	T_{amb}	-	-40	-	+125	℃

3.3、Electrical Characteristics

3.3.1、DC Characteristics 1

(T_{amb}=25℃, voltages are referenced to GND (ground=0V), unless otherwise specified)

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
HIGH-level input voltage	V_{IH}	V_{CC}=1.65V to 1.8V		0.94	-	-	V
		V_{CC}=2.0V		0.99	-	-	V
		V_{CC}=2.25V to 2.5V		1.135	-	-	V
		V_{CC}=2.75V		1.21	-	-	V
		V_{CC}=3.0V to 3.3V		1.35	-	-	V
		V_{CC}=3.6V		1.47	-	-	V
		V_{CC}=4.5V to 5.0V		2.02	-	-	V
		V_{CC}=5.5V		2.10	-	-	V
LOW-level input voltage	V_{IL}	V_{CC}=1.65V to 2.0V		-	-	0.58	V
		V_{CC}=2.25V to 2.75V		-	-	0.75	V
		V_{CC}=3.0V to 3.6V		-	-	0.80	V
		V_{CC}=4.5V to 5.5V		-	-	0.80	V
HIGH-level output voltage	V_{OH}	V_I=V_{IH} or V_{IL}	V_{CC}=1.65V to 5.5V; I_O=-20uA	V_{CC} -0.1	-	-	V
			V_{CC}=1.65V; I_O=-2mA	1.28	-	-	V
			V_{CC}=1.8V; I_O=-2mA	1.5	-	-	V
			V_{CC}=2.3V; I_O=-2.3mA	2.0	-	-	V
			V_{CC}=2.3V; I_O=-3mA	2.0	-	-	V
			V_{CC}=2.5V; I_O=-3mA	2.25	-	-	V
			V_{CC}=3.0V; I_O=-3mA	2.78	-	-	V
			V_{CC}=3.0V; I_O=-5.5mA	2.6	-	-	V
			V_{CC}=3.3V; I_O=-5.5mA	2.9	-	-	V
			V_{CC}=4.5V; I_O=-4mA	4.2	-	-	V
			V_{CC}=4.5V; I_O=-8mA	4.1	-	-	V
			V_{CC}=5.0V; I_O=-8mA	4.6	-	-	V
LOW-level output voltage	V_{OL}	V_I=V_{IH} or V_{IL}	V_{CC}=1.65V to 5.5V; I_O=20uA	-	-	0.1	V
			V_{CC}=1.65V; I_O=2mA	-	-	0.2	V
			V_{CC}=2.3V; I_O=2.3mA	-	-	0.1	V
			V_{CC}=2.3V; I_O=3mA	-	-	0.15	V
			V_{CC}=3.0V; I_O=3mA	-	-	0.1	V
			V_{CC}=3.0V; I_O=5.5mA	-	-	0.2	V
			V_{CC}=4.5V; I_O=4mA	-	-	0.15	V
			V_{CC}=4.5V; I_O=8mA	-	-	0.3	V
input leakage current	I_I	V_I=V_{CC} or GND; V_{CC}=0V to 5.5V		-	-	±1	uA
supply current	I_{CC}	V_I=V_{CC} or GND; I_O=0A; V_{CC}=1.8V, 2.5V, 3.3V, 5.0V		-	-	1	uA
additional supply current	ΔI_{CC}	per input pin; V_{CC}=1.8V; V_I=0.3V or 1.1V; I_O=0A; other pins at V_{CC} or GND		-	-	10	uA

		per input pin; V_{CC}=5.5V; V_I=0.3V or 3.4V; I_O=0A; other pins at V_{CC} or GND	-	-	1.35	mA

3.3.2、DC Characteristics 2

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

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
HIGH-level input voltage	V_{IH}	V_{CC}=1.65V to 1.8V		1.0	-	-	V
		V_{CC}=2.0V		1.03	-	-	V
		V_{CC}=2.25V to 2.5V		1.18	-	-	V
		V_{CC}=2.75V		1.23	-	-	V
		V_{CC}=3.0V to 3.3V		1.37	-	-	V
		V_{CC}=3.6V		1.48	-	-	V
		V_{CC}=4.5V to 5.0V		2.03	-	-	V
		V_{CC}=5.5V		2.11	-	-	V
LOW-level input voltage	V_{IL}	V_{CC}=1.65V to 2.0V		-	-	0.55	V
		V_{CC}=2.25V to 2.75V		-	-	0.71	V
		V_{CC}=3.0V to 3.6V		-	-	0.65	V
		V_{CC}=4.5V to 5.5V		-	-	0.80	V
HIGH-level output voltage	V_{OH}	V_I=V_{IH} or V_{IL}	V_{CC}=1.65V to 5.5V; I_O=-20uA	V_{CC} -0.1	-	-	V
			V_{CC}=1.65V; I_O=-2mA	1.21	-	-	V
			V_{CC}=1.8V; I_O=-2mA	1.45	-	-	V
			V_{CC}=2.3V; I_O=-2.3mA	2.0	-	-	V
			V_{CC}=2.3V; I_O=-3mA	1.93	-	-	V
			V_{CC}=2.5V; I_O=-3mA	2.15	-	-	V
			V_{CC}=3.0V; I_O=-3mA	2.7	-	-	V
			V_{CC}=3.0V; I_O=-5.5mA	2.49	-	-	V
			V_{CC}=3.3V; I_O=-5.5mA	2.8	-	-	V
			V_{CC}=4.5V; I_O=-4mA	4.1	-	-	V
			V_{CC}=4.5V; I_O=-8mA	3.95	-	-	V
			V_{CC}=5.0V; I_O=-8mA	4.5	-	-	V
LOW-level output voltage	V_{OL}	V_I=V_{IH} or V_{IL}	V_{CC}=1.65V to 5.5V; I_O=20uA	-	-	0.1	V
			V_{CC}=1.65V; I_O=2mA	-	-	0.25	V
			V_{CC}=2.3V; I_O=2.3mA	-	-	0.15	V
			V_{CC}=2.3V; I_O=3mA	-	-	0.2	V
			V_{CC}=3.0V; I_O=3mA	-	-	0.15	V
			V_{CC}=3.0V; I_O=5.5mA	-	-	0.252	V
			V_{CC}=4.5V; I_O=4mA	-	-	0.2	V
			V_{CC}=4.5V; I_O=8mA	-	-	0.35	V
input leakage current	I_I	V_I=V_{CC} or GND; V_{CC}=0V to 5.5V		-	-	±1	uA
supply current	I_{CC}	V_I=V_{CC} or GND; I_O=0A; V_{CC}=1.8V, 2.5V, 3.3V, 5.0V		-	-	10	uA

additional supply current	ΔI_{CC}	per input pin; V_{CC}=1.8V; V_I=0.3V or 1.1V; I_O=0A; other pins at V_{CC} or GND	-	-	10	uA
		per input pin; V_{CC}=5.5V; V_I=0.3V or 3.4V; I_O=0A; other pins at V_{CC} or GND	-	-	1.5	mA

3.3.3、DC Characteristics 3

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

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
HIGH-level input voltage	V_{IH}	V_{CC}=1.65V to 1.8V		1.0	-	-	V
		V_{CC}=2.0V		1.03	-	-	V
		V_{CC}=2.25V to 2.5V		1.18	-	-	V
		V_{CC}=2.75V		1.23	-	-	V
		V_{CC}=3.0V to 3.3V		1.37	-	-	V
		V_{CC}=3.6V		1.48	-	-	V
		V_{CC}=4.5V to 5.0V		2.03	-	-	V
		V_{CC}=5.5V		2.11	-	-	V
LOW-level input voltage	V_{IL}	V_{CC}=1.65V to 2.0V		-	-	0.55	V
		V_{CC}=2.25V to 2.75V		-	-	0.71	V
		V_{CC}=3.0V to 3.6V		-	-	0.65	V
		V_{CC}=4.5V to 5.5V		-	-	0.80	V
HIGH-level output voltage	V_{OH}	V_I=V_{IH} or V_{IL}	V_{CC}=1.65V to 5.5V; I_O=-20uA	V_{CC} -0.1	-	-	V
			V_{CC}=1.65V; I_O=-2mA	1.21	-	-	V
			V_{CC}=1.8V; I_O=-2mA	1.45	-	-	V
			V_{CC}=2.3V; I_O=-2.3mA	2.0	-	-	V
			V_{CC}=2.3V; I_O=-3mA	1.93	-	-	V
			V_{CC}=2.5V; I_O=-3mA	2.15	-	-	V
			V_{CC}=3.0V; I_O=-3mA	2.7	-	-	V
			V_{CC}=3.0V; I_O=-5.5mA	2.49	-	-	V
			V_{CC}=3.3V; I_O=-5.5mA	2.8	-	-	V
			V_{CC}=4.5V; I_O=-4mA	4.1	-	-	V
			V_{CC}=4.5V; I_O=-8mA	3.95	-	-	V
			V_{CC}=5.0V; I_O=-8mA	4.5	-	-	V
LOW-level output voltage	V_{OL}	V_I=V_{IH} or V_{IL}	V_{CC}=1.65V to 5.5V; I_O=20uA	-	-	0.1	V
			V_{CC}=1.65V; I_O=2mA	-	-	0.25	V
			V_{CC}=2.3V; I_O=2.3mA	-	-	0.15	V
			V_{CC}=2.3V; I_O=3mA	-	-	0.2	V
			V_{CC}=3.0V; I_O=3mA	-	-	0.15	V
			V_{CC}=3.0V; I_O=5.5mA	-	-	0.252	V
			V_{CC}=4.5V; I_O=4mA	-	-	0.2	V
			V_{CC}=4.5V; I_O=8mA	-	-	0.35	V
input leakage current	I_I	V_I=V_{CC} or GND; V_{CC}=0V to 5.5V		-	-	±1	uA

supply current	I_{CC}	$V_I=V_{CC}$ or GND; $I_O=0A$; $V_{CC}=1.8V, 2.5V, 3.3V, 5.0V$	-	-	10	uA
additional supply current	ΔI_{CC}	per input pin; $V_{CC}=1.8V$; $V_I=0.3V$ or $1.1V$; $I_O=0A$; other pins at V_{CC} or GND	-	-	10	uA
		per input pin; $V_{CC}=5.5V$; $V_I=0.3V$ or $3.4V$; $I_O=0A$; other pins at V_{CC} or GND	-	-	1.5	mA

3.3.4、AC Characteristics 1

(T_{amb}=25℃, GND=0V, unless otherwise specified)

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
propagation delay	t_{pd}	A B to Y; see Figure 4[1]	$V_{CC}=1.8V$; $C_L=15pF$	-	6.4	10.2	ns
			$V_{CC}=1.8V$; $C_L=30pF$	-	7.5	12.0	ns
			$V_{CC}=2.5V$; $C_L=15pF$	-	4.5	6.9	ns
			$V_{CC}=2.5V$; $C_L=30pF$	-	5.3	8.0	ns
			$V_{CC}=3.3V$; $C_L=15pF$	-	3.7	5.6	ns
			$V_{CC}=3.3V$; $C_L=30pF$	-	4.3	6.4	ns
			$V_{CC}=5.0V$; $C_L=15pF$	-	3.1	4.2	ns
			$V_{CC}=5.0V$; $C_L=30pF$	-	3.6	4.8	ns

Note:

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

3.3.5、AC Characteristics 2

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

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
propagation delay	t_{pd}	A B to Y; see Figure 4[1]	$V_{CC}=1.8V$; $C_L=15pF$	-	-	11.5	ns
			$V_{CC}=1.8V$; $C_L=30pF$	-	-	13.4	ns
			$V_{CC}=2.5V$; $C_L=15pF$	-	-	7.8	ns
			$V_{CC}=2.5V$; $C_L=30pF$	-	-	9.1	ns
			$V_{CC}=3.3V$; $C_L=15pF$	-	-	6.2	ns
			$V_{CC}=3.3V$; $C_L=30pF$	-	-	7.1	ns
			$V_{CC}=5.0V$; $C_L=15pF$	-	-	4.6	ns
			$V_{CC}=5.0V$; $C_L=30pF$	-	-	5.2	ns

Note:

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

3.3.6、AC Characteristics 3

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

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
propagation delay	t_{pd}	A B to Y; see Figure 4[1]	V_{CC}=1.8V; C_L=15pF	-	-	12.3	ns
			V_{CC}=1.8V; C_L=30pF	-	-	14.4	ns
			V_{CC}=2.5V; C_L=15pF	-	-	8.4	ns
			V_{CC}=2.5V; C_L=30pF	-	-	9.7	ns
			V_{CC}=3.3V; C_L=15pF	-	-	6.6	ns
			V_{CC}=3.3V; C_L=30pF	-	-	7.6	ns
			V_{CC}=5.0V; C_L=15pF	-	-	4.8	ns
			V_{CC}=5.0V; C_L=30pF	-	-	5.5	ns

Note:

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

4、Testing Circuit

4.1、AC Testing Circuit

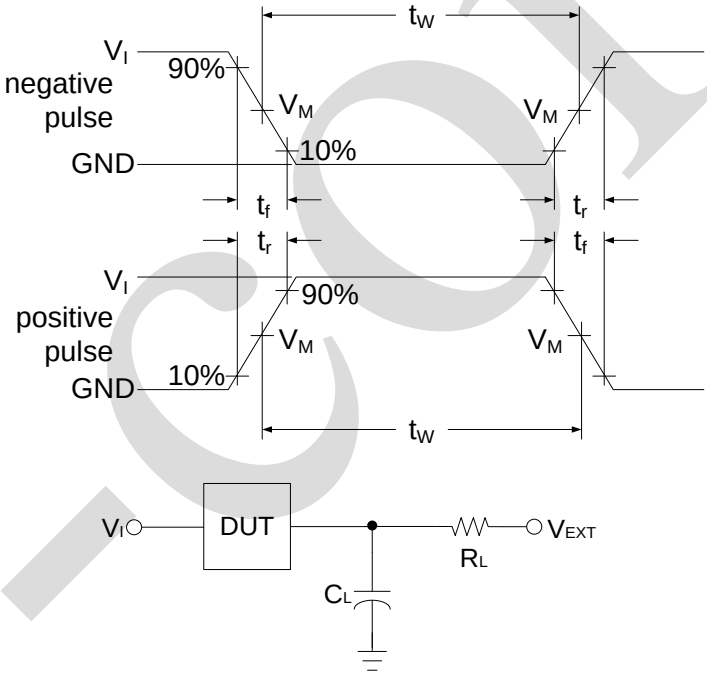


Figure 3. Test circuit for measuring switching time

Definitions test 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	$\Delta t/\Delta V$[1]	C_L	R_L	t_{PLH}, t_{PHL}	t_{PZH}, t_{PHZ}	t_{PZL}, t_{PLZ}
1.8V	V_{CC}	≤1.0ns/V	15pF, 30pF	1KΩ	Open	GND	V_{CC}
2.5V	V_{CC}	≤1.0ns/V	15pF, 30pF	1KΩ	Open	GND	V_{CC}
3.3V	3V	≤1.0ns/V	15pF, 30pF	1KΩ	Open	GND	V_{CC}
5.0V	3V	≤1.0ns/V	15pF, 30pF	1KΩ	Open	GND	V_{CC}

[1] dV/dt ≥1.0 V/ns

4.3、AC Testing Waveforms

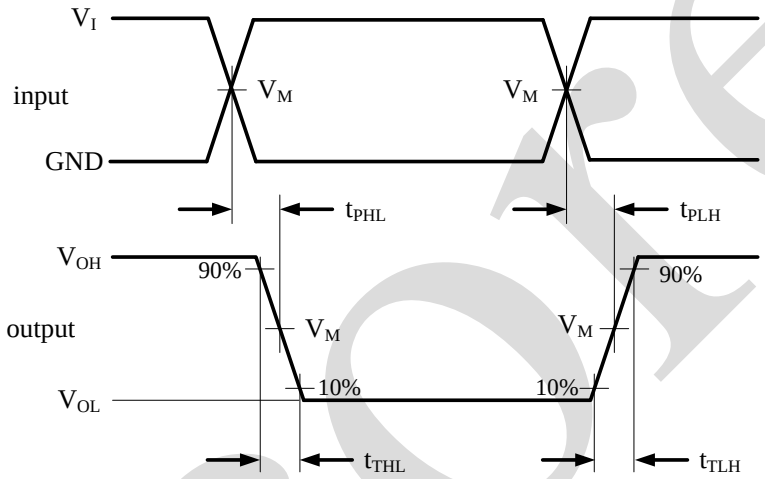


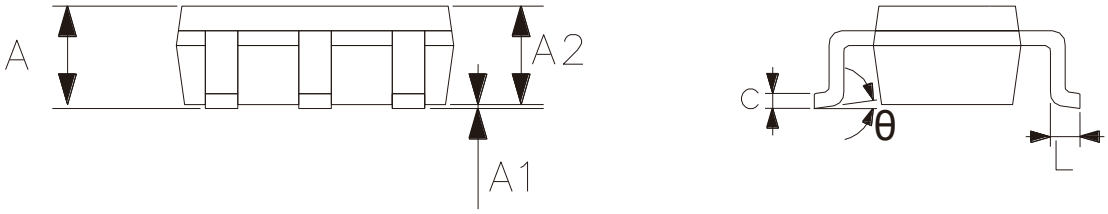
Figure 4. The input A,B to output Y propagation delays

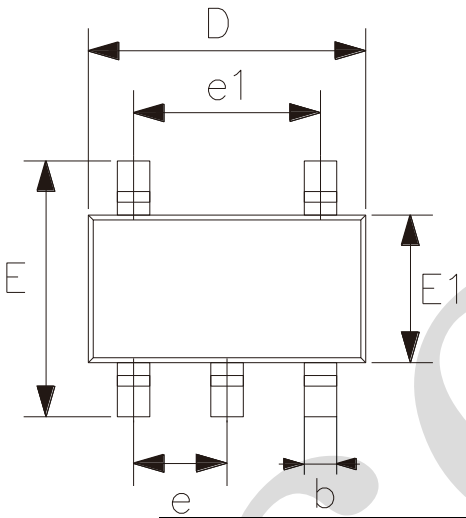
4.4、Measurement Points

Input	Output
V_M	V_M
$0.5V_I$	$0.5V_{CC}$

5、Package Information

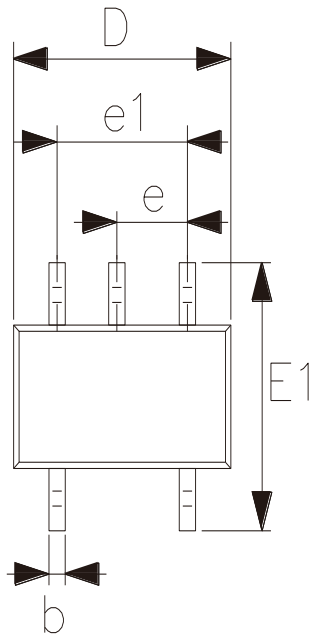
5.1、SOT23-5

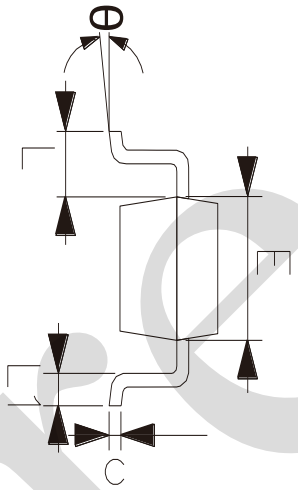


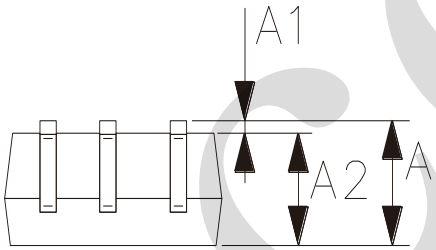


2023/12/A	Dimensions In Millimeters	
Symbol	Min.	Max.
A	—	1.26
A1	0.00	0.12
A2	1.00	1.20
b	0.30	0.50
c	0.10	0.20
D	2.82	3.02
E	2.60	3.00
E1	1.50	1.70
e	0.95	
e1	1.80	2.00
L	0.30	0.60
θ	0°	8°

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

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

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