AiP74LVC/LVCH16244
16-bit buffer/line driver;3-state

Product Specification

Specification Revision History:

Version	Date	Description
2023-06-A1	2023-06	New

Contents

1、General Description

The AiP74LVC/LVCH16244 are 16-bit non-inverting buffer/line drivers with 3-state bus compatible outputs.

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
- 5 V tolerant inputs/outputs for interfacing with 5 V logic
- All data inputs have bus hold.(AiP74LVCH16244 only)
- High-impedance when V_{CC}=0V
- Temperature range:-40℃ to +125℃
- Packaging information: TSSOP48

Ordering Information:

Tube packing specifications:

Part number	Packaging form	Marking code	Tube quantity	Boxed tube quantity	Boxed quantity	Notes
AiP74LVC16244 TA48.TB	TSSOP48	74LVC16244	38 PCS/tube	100 tube/box	3800 PCS/box	Dimensions of plastic enclosure: 12.5mm×6.1mm Pin spacing: 0.5mm
AiP74LVCH16244 TA48.TB	TSSOP48	74LVCH16244	38 PCS/tube	100 tube/box	3800 PCS/box	Dimensions of plastic enclosure: 12.5mm×6.1mm Pin spacing: 0.5mm

Reel packing specifications:

Part number	Packaging form	Marking code	Reel quantity	Boxed reel quantity	Notes
AiP74LVC16244 TA48.TR	TSSOP48	74LVC16244	2000 PCS/reel	2000 PCS/box	Dimensions of plastic enclosure: 12.5mm×6.1mm Pin spacing: 0.5mm
AiP74LVCH16244 TA48.TR	TSSOP48	74LVCH16244	2000 PCS/reel	2000 PCS/box	Dimensions of plastic enclosure: 12.5mm×6.1mm Pin spacing: 0.5mm

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

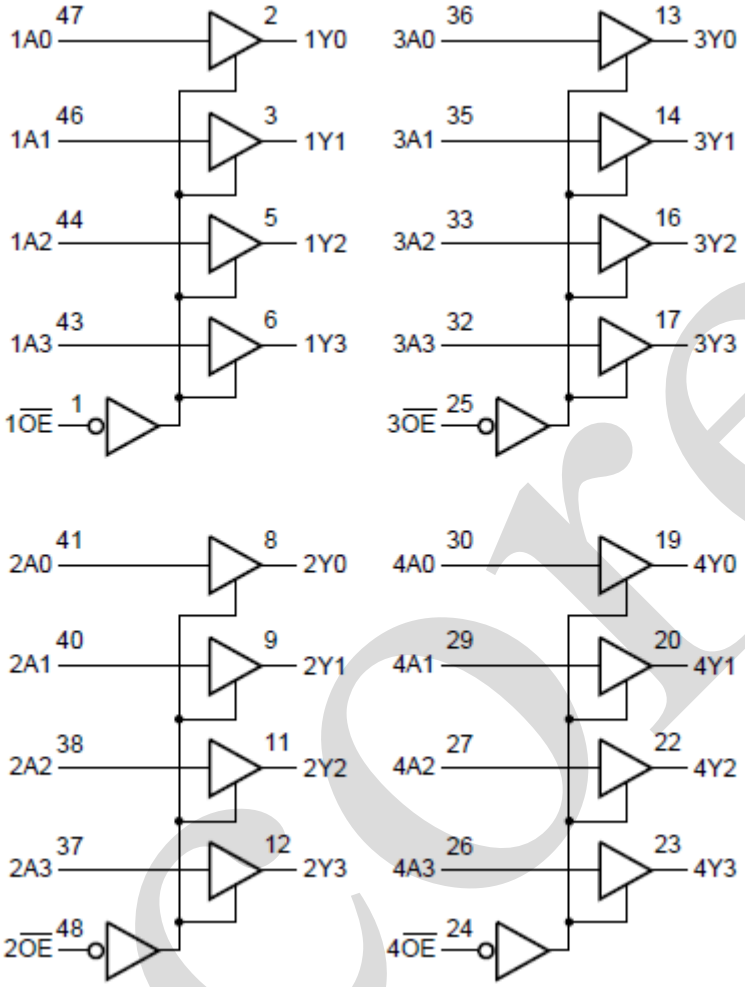
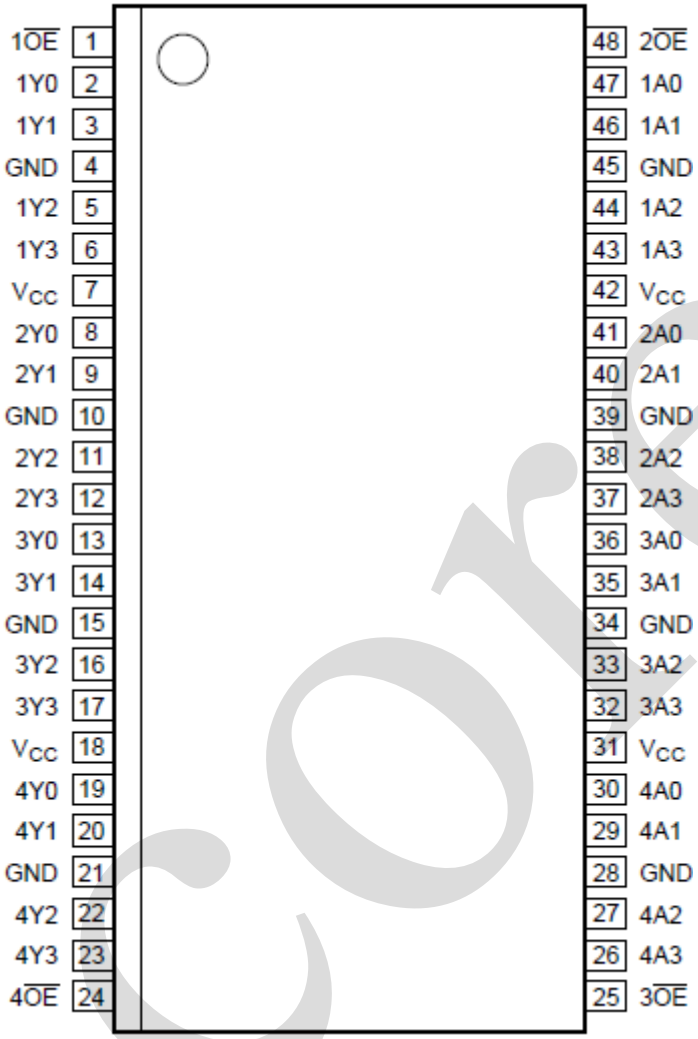


Figure 2. Logic diagram

2.2、Pin Configurations



2.3、Pin Description

Pin No.	Pin Name	Description
1,48,25,24	1$\overline{OE}$,2$\overline{OE}$,3$\overline{OE}$,4$\overline{OE}$	output enable input (active LOW)
2,3,5,6	1Y0 to 1Y3	data output
8, 9, 11, 12	2Y0 to 2Y3	data output
13, 14, 16, 17	3Y0 to 3Y3	data output
19, 20, 22, 23	4Y0 to 4Y3	data output
4, 10, 15, 21, 28, 34, 39, 45	GND	ground (0V)
7,18,31,42	V_{CC}	supply voltage
47, 46, 44, 43	1A0 to 1A3	data input
41, 40, 38, 37	2A0 to 2A3	data input
36, 35, 33, 32	3A0 to 3A3	data input
30, 29, 27, 26	4A0 to 4A3	data input

2.4、Function Table

Control	Input	Output
$n\overline{OE}$	**nAn**	**nYn**
L	L	L
L	H	H
H	X	Z

Note:

H = HIGH voltage level; L = LOW voltage level; X = don't care; Z = high-impedance OFF-state.

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	+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; V_{CC}=0V	-0.5	+6.5	V
		output 3-state	-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
		output 3-state	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	Conditions		Min.	Typ.	Max.	Unit
HIGH-level input voltage	V_{IH}	V_{CC}=1.2V		1.08	-	-	V
		V_{CC}=1.65V to 1.95V		0.65× V_{CC}	-	-	V
		V_{CC}=2.3V to 2.7V		1.7	-	-	V
		V_{CC}=2.7V to 3.6V		2.0	-	-	V
LOW-level input voltage	V_{IL}	V_{CC}=1.2V		-	-	0.12	V
		V_{CC}=1.65V to 1.95V		-	-	0.35× V_{CC}	V
		V_{CC}=2.3V to 2.7V		-	-	0.7	V
		V_{CC}=2.7V to 3.6V		-	-	0.8	V
HIGH-level output voltage	V_{OH}	V_I = V_{IH} or V_{IL}	I_O=-100uA; V_{CC}=1.65V to 3.6V	V_{CC}-0.2	-	-	V
			I_O=-4mA;V_{CC}=1.65V	1.2	-	-	V
			I_O=-8mA;V_{CC}=2.3V	1.8	-	-	V
			I_O=-12mA;V_{CC}= 2.7V	2.2	-	-	V
			I_O=-18mA;V_{CC}= 3.0V	2.4	-	-	V
			I_O=-24mA;V_{CC}= 3.0V	2.2	-	-	V
LOW-level output voltage	V_{OL}	V_I = V_{IH} or V_{IL}	I_O=100uA; V_{CC}=1.65V to 3.6V	-	-	0.2	V
			I_O=4mA;V_{CC}=1.65V	-	-	0.45	V
			I_O=8mA;V_{CC}=2.3V	-	-	0.6	V
			I_O=12mA;V_{CC}=2.7V	-	-	0.4	V
			I_O=24mA;V_{CC}=3.0V	-	-	0.55	V
input leakage current	I_I	V_{CC}=3.6V; V_I=5.5V or GND			-	±5	uA
OFF-state output current	I_{OZ}	V_{CC}=3.6V; V_I=V_{IH} or V_{IL}; V_O=5.5V or GND			-	±10	uA
power-off leakage current	I_{OFF}	V_{CC}=0V; V_I or V_O=5.5V			-	10	uA
supply current	I_{CC}	V_{CC}=3.6V; V_I=V_{CC} or GND; I_O=0A			-	20	uA
additional supply current	ΔI_{CC}	per input pin; V_{CC}=2.7V to 3.6V; V_I=V_{CC}-0.6V; I_O=0A			-	500	uA
bus hold LOW current	I_{BHL}	V_{CC}=1.65V; V_I=0.58V[1]		10	-	-	uA
		V_{CC}=2.3V; V_I=0.7V		30	-	-	uA
		V_{CC}=3.0V; V_I=0.8V		75	-	-	uA
bus hold HIGH current	I_{BHH}	V_{CC}=1.65V; V_I=1.07V[1]		-10	-	-	uA
		V_{CC}=2.3V; V_I=1.7V		-30	-	-	uA
		V_{CC}=3.0V; V_I=2.0V		-75	-	-	uA
bus hold LOW overdrive current	I_{BHLO}	V_{CC}=1.95V[1]		200	-	-	uA
		V_{CC}=2.7V		300	-	-	uA
		V_{CC}=3.6V		500	-	-	uA
bus hold HIGH	I_{BHHO}	V_{CC}=1.95V[1]		-200	-	-	uA
		V_{CC}=2.7V		-300	-	-	uA

overdrive current		V_{CC}=3.6V	-500	-	-	uA

Note:

[1] Valid for data inputs (AiP74LVCH162373) only; control inputs do not have a bus hold circuit.

3.3.2、DC Characteristics 2

(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}=1.2V		1.08	-	-	V
		V_{CC}=1.65V to 1.95V		0.65× V_{CC}	-	-	V
		V_{CC}=2.3V to 2.7V		1.7	-	-	V
		V_{CC}=2.7V to 3.6V		2.0	-	-	V
LOW-level input voltage	V_{IL}	V_{CC}=1.2V		-	-	0.12	V
		V_{CC}=1.65V to 1.95V		-	-	0.35× V_{CC}	V
		V_{CC}=2.3V to 2.7V		-	-	0.7	V
		V_{CC}=2.7V to 3.6V		-	-	0.8	V
HIGH-level output voltage	V_{OH}	V_I = V_{IH} or V_{IL}	I_O=-100uA; V_{CC}=1.65V to 3.6V	V_{CC}-0.3	-	-	V
			I_O=-4mA;V_{CC}=1.65V	1.2	-	-	V
			I_O=-8mA;V_{CC}=2.3V		-	-	V
			I_O=-12mA;V_{CC}= 2.7V		-	-	V
			I_O=-18mA;V_{CC}= 3.0V		-	-	V
			I_O=-24mA;V_{CC}= 3.0V				
LOW-level output voltage	V_{OL}	V_I = V_{IH} or V_{IL}	I_O=100uA; V_{CC}=1.65V to 3.6V	-	-	0.3	V
			I_O=4mA;V_{CC}=1.65V	-	-	0.65	V
			I_O=8mA;V_{CC}=2.3V	-	-	0.8	V
			I_O=12mA;V_{CC}=2.7V	-	-	0.6	V
			I_O=24mA;V_{CC}=3.0V	-	-	0.8	V
input leakage current	I_I	V_{CC}=3.6V; V_I=5.5V or GND		-	-	±20	uA
OFF-state output current	I_{OZ}	V_{CC}=3.6V; V_I=V_{IH} or V_{IL}; V_O=5.5V or GND		-	-	±20	uA
power-off leakage current	I_{OFF}	V_{CC}=0V; V_I or V_O=5.5V		-	-	±20	uA
supply current	I_{CC}	V_{CC}=3.6V; V_I=V_{CC} or GND; I_O=0A		-	-	80	uA
additional supply current	ΔI_{CC}	per input pin; V_{CC}=2.7V to 3.6V; V_I=V_{CC}-0.6V; I_O=0A		-	-	5000	uA
bus hold LOW current	I_{BHL}	V_{CC}=1.65V; V_I=0.58V[1]		10	-	-	uA
		V_{CC}=2.3V; V_I=0.7V		25	-	-	uA
		V_{CC}=3.0V; V_I=0.8V		60	-	-	uA
bus hold HIGH current	I_{BHH}	V_{CC}=1.65V; V_I=1.07V[1]		-10	-	-	uA
		V_{CC}=2.3V; V_I=1.7V		-25	-	-	uA
		V_{CC}=3.0V; V_I=2.0V		-60	-	-	uA
bus hold LOW	I_{BHLO}	V_{CC}=1.95V[1]		200	-	-	uA
		V_{CC}=2.7V		300	-	-	uA

overdrive current		V_{CC}=3.6V	500	-	-	uA
bus hold HIGH overdrive current	I_{BHHO}	V_{CC}=1.95V[1]	-200	-	-	uA
		V_{CC}=2.7V	-300	-	-	uA
		V_{CC}=3.6V	-500	-	-	uA

Note:

[1] Valid for data inputs (AiP74LVCH162373) only; control inputs do not have a bus hold circuit.

3.3.3、AC Characteristics 1

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

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
nAn to nYn propagation delay	t_{PLH}, t_{PHL}	see Figure 4	V_{CC}=1.2V	-	15.4	-	ns
			V_{CC}=1.65V to 1.95V	-	6.7	15.0	ns
			V_{CC}=2.3V to 2.7V	-	3.6	7.4	ns
			V_{CC}=2.7V	-	3.6	6.6	ns
			V_{CC}=3.0V to 3.6V	-	3.1	5.7	ns
$\overline{nOE}$ to nYn enable time	t_{PZH}, t_{PZL}	see Figure 5	V_{CC}=1.2V	-	21	-	ns
			V_{CC}=1.65V to 1.95V	-	8.7	16.9	ns
			V_{CC}=2.3V to 2.7V	-	4.9	8.9	ns
			V_{CC}=2.7V	-	4.6	8.1	ns
			V_{CC}=3.0V to 3.6V	-	3.9	6.4	ns
$\overline{nOE}$ to nQn disable time	t_{PLZ}, t_{PHZ}	see Figure 5	V_{CC}=1.2V	-	14.0	-	ns
			V_{CC}=1.65V to 1.95V	-	6.2	12.2	ns
			V_{CC}=2.3V to 2.7V	-	3.4	6.9	ns
			V_{CC}=2.7V	-	4.5	8.7	ns
			V_{CC}=3.0V to 3.6V	-	4.3	7.3	ns

Note:Typical values are measured at T_{amb}=25℃ and V_{CC}=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	Conditions		Min.	Typ.	Max.	Unit
nDn to nQn propagation delay	t_{PLH}, t_{PHL}	see Figure 4	V_{CC}=1.65V to 1.95V	-	-	15.8	ns
			V_{CC}=2.3V to 2.7V	-	-	8.2	ns
			V_{CC}=2.7V	-	-	8.4	ns
			V_{CC}=3.0V to 3.6V	-	-	7.7	ns
$\overline{nOE}$ to nQn enable time	t_{PZH}, t_{PZL}	see Figure 5	V_{CC}=1.65V to 1.95V	-	-	17.8	ns
			V_{CC}=2.3V to 2.7V	-	-	9.9	ns
			V_{CC}=2.7V	-	-	10.5	ns
			V_{CC}=3.0V to 3.6V	-	-	8.4	ns
$\overline{nOE}$ to nQn disable time	t_{PLZ}, t_{PHZ}	see Figure 5	V_{CC}=1.65V to 1.95V	-	-	13.2	ns
			V_{CC}=2.3V to 2.7V	-	-	7.4	ns
			V_{CC}=2.7V	-	-	11.2	ns
			V_{CC}=3.0V to 3.6V	-	-	9.1	ns

4、Testing Circuit

4.1、AC Testing Circuit

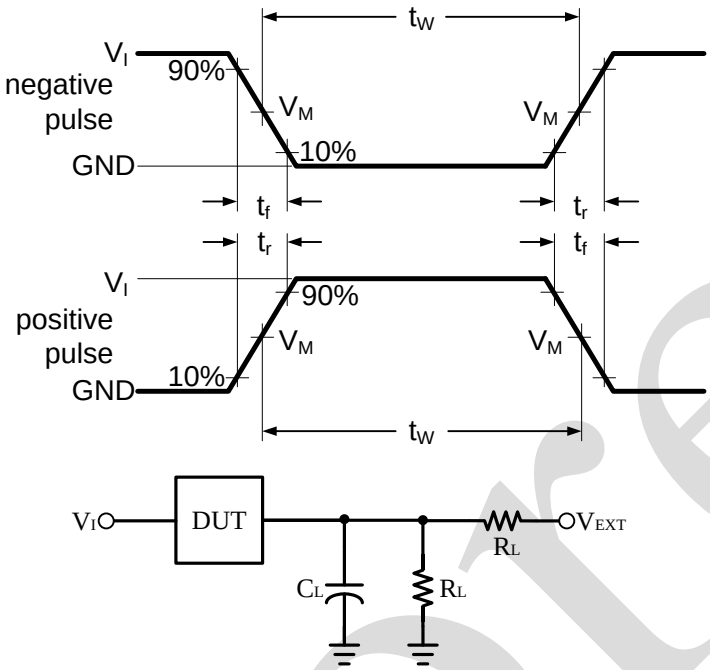


Figure 3. Load circuit

C_L includes probe and jig capacitance.

R_L=Load resistance.

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}
1.2V	V_{CC}	≤ 3ns	30pF	1kΩ	Open	2×V_{CC}	GND
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

4.3、AC Testing Waveforms

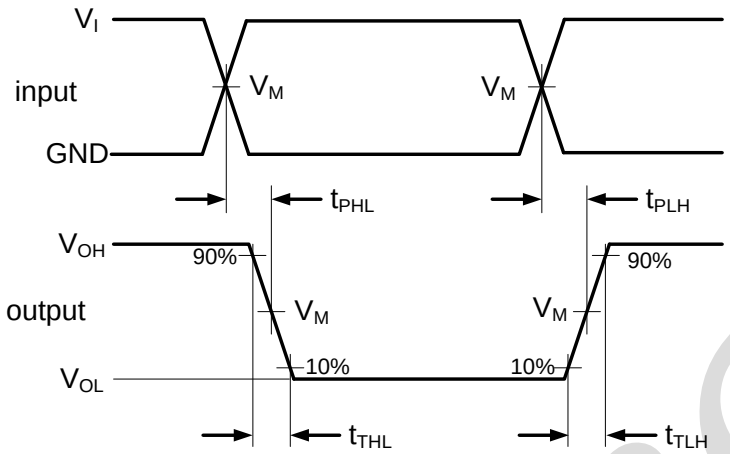


Figure 4. The data input (An) to output (Yn) propagation delays

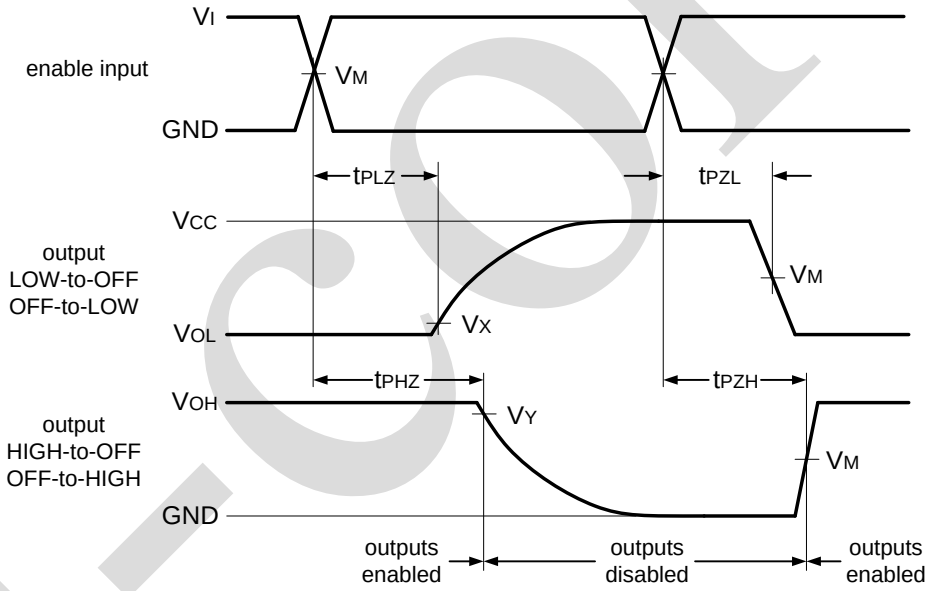


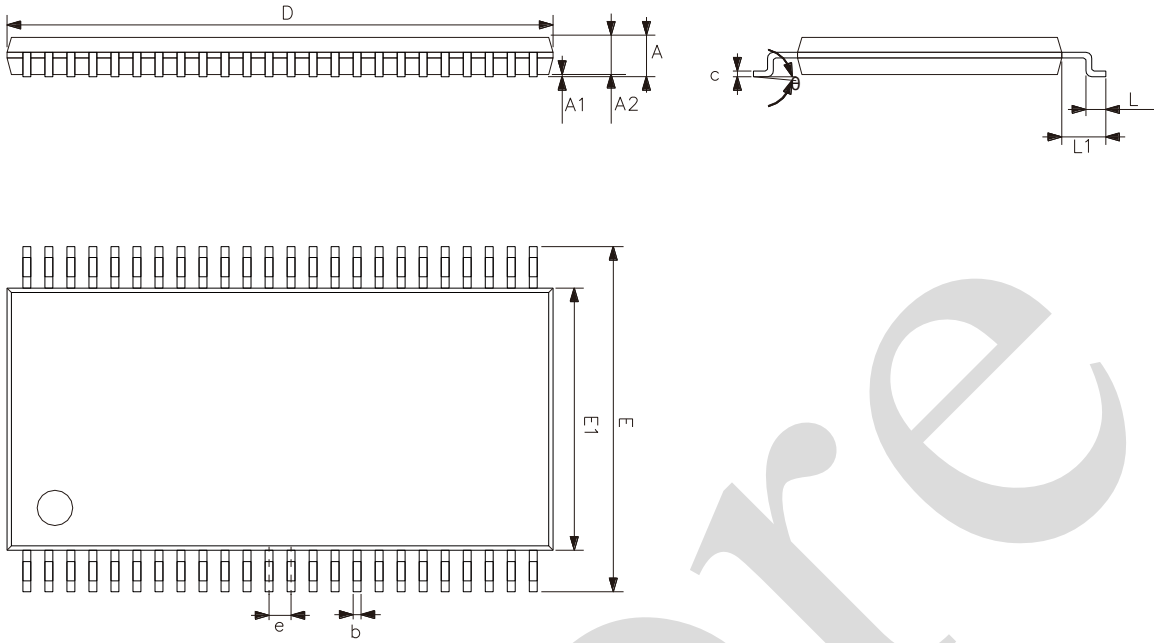
Figure 5. 3-state enable and disable times

4.4、Measurement Points

Supply voltage	Input	Output		
V_{CC}	V_M	V_M	V_X	V_Y
1.2V	$0.5\times V_{CC}$	$0.5\times V_{CC}$	V_{OL}+0.15V	V_{OH}-0.15V
1.65V to 1.95V	$0.5\times V_{CC}$	$0.5\times V_{CC}$	V_{OL}+0.15V	V_{OH}-0.15V
2.3V to 2.7V	$0.5\times V_{CC}$	$0.5\times V_{CC}$	V_{OL}+0.15V	V_{OH}-0.15V
2.7V	$0.5\times V_{CC}$	$0.5\times V_{CC}$	V_{OL}+0.3V	V_{OH}-0.3V
3.0V to 3.6V	$0.5\times V_{CC}$	$0.5\times V_{CC}$	V_{OL}+0.3V	V_{OH}-0.3V

5、Package Information

5.1、TSSOP48



Symbol	Dimensions (mm)	
	Min.	Max.
A	-	1.20
A1	0.03	0.15
A2	0.82	1.05
b	0.17	0.27
c	0.12	0.22
D	12.40	12.60
E	7.90	8.30
E1	6.00	6.20
e	0.50	
L	0.35	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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