



AiP74LVT/LVTH16245

16-bit Bus Transceiver; 3-state

Product Specification

Specification Revision History:

Version	Date	Description
2017-12-A1	2017-12	New
2021-12-A2	2021-12	Modify Ordering Information



1、 General Description

The AiP74LVT16245; AiP74LVTH16245 is a high-performance BiCMOS product designed for V_{CC} operation at 3.3V.

This device is a 16-bit transceiver featuring non-inverting 3-state bus compatible outputs in both send and receive directions. The control function implementation minimizes external timing requirements. The device features an output enable input ($\overline{nOE}$) for easy cascading and a direction input ($nDIR$) for direction control.

Features:

- 16-bit bidirectional bus interface
- 3-state buffers
- Output capability: +64mA and -32mA
- TTL input and output switching levels
- Input and output interface capability to systems at 5V supply
- Bus hold data inputs eliminate need for external pull-up resistors to hold unused inputs
- Live insertion and extraction permitted
- Power-up 3-state
- No bus current loading when output is tied to 5V bus
- Specified from -40°C to +85°C
- Packaging information: TSSOP48

**Ordering Information:****Tube packing specifications:**

Part number	Packaging form	Marking code	Tube quantity	Boxed tube quantity	Boxed quantity	Notes
AiP74LVT16245 TA48.TB	TSSOP48(1)	74LVT16245	38 PCS/tube	200 tube/box	7600 PCS/box	Dimensions of plastic enclosure: 12.5mm×6.1mm Pin spacing: 0.5mm
AiP74LVTH16245 TA48.TB	TSSOP48(1)	74LVTH16245	38 PCS/tube	200 tube/box	7600 PCS/box	Dimensions of plastic enclosure: 12.5mm×6.1mm Pin spacing: 0.5mm
AiP74LVT16245 TA48.TB	TSSOP48(2)	74LVT16245	38 PCS/tube	100 tube/box	3800 PCS/box	Dimensions of plastic enclosure: 12.5mm×6.1mm Pin spacing: 0.5mm
AiP74LVTH16245 TA48.TB	TSSOP48(2)	74LVTH16245	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
AiP74LVT16245 TA48.TR	TSSOP48	74LVT16245	3000 PCS/reel	6000 PCS/box	Dimensions of plastic enclosure: 12.5mm×6.1mm Pin spacing: 0.5mm
AiP74LVTH16245 TA48.TR	TSSOP48	74LVTH16245	3000 PCS/reel	6000 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

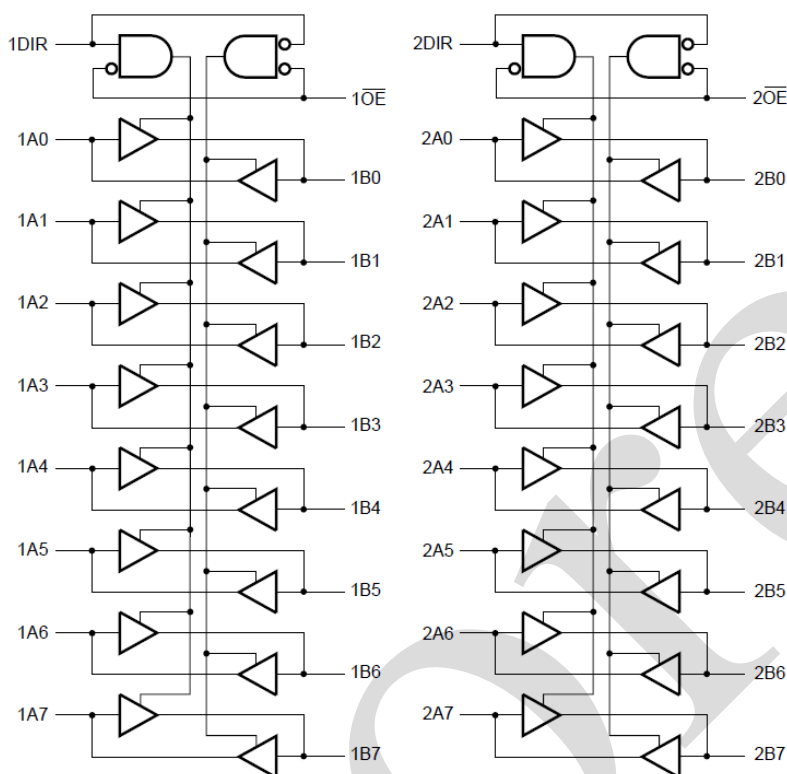


Figure 1. Logic symbol

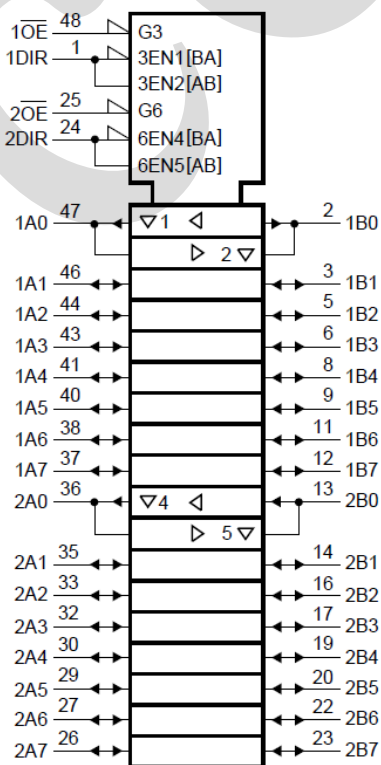
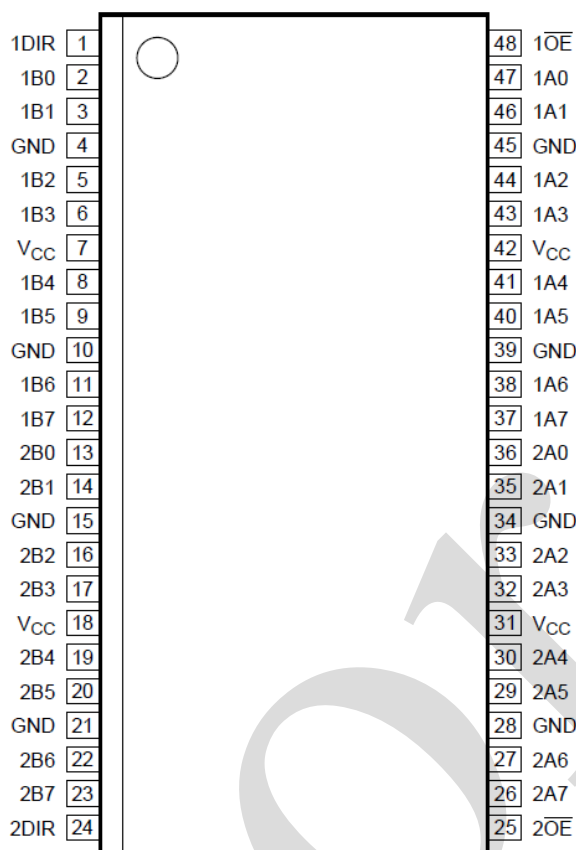


Figure 2. IEC logic symbol



2.2、Pin Configurations



2.3、Pin Description

Pin No.	Pin Name	Description
1,24	1DIR,2DIR	direction control inputs
2,3,5,6,8,9,11,12	1B0,1B1,1B2,1B3,1B4,1B5,1B6,1B7	data inputs/outputs
13,14,16,17,19,20,22,23	2B0,2B1,2B2,2B3,2B4,2B5,2B6,2B7	data inputs/outputs
4,10,15,21,28,34,39,45	GND	ground (0V)
7,18,31,42	V _{CC}	supply voltage
48,25	1 OE, 2 OE	output enable inputs (active LOW)
36,35,33,32,30,29,27,26	2A0,2A1,2A2,2A3,2A4,2A5,2A6,2A7	data inputs/outputs
47,46,44,43,41,40,38,37	1A0,1A1,1A2,1A3,1A4,1A5,1A6,1A7	data inputs/outputs

2.4、Function Table

Control		Input/Output	
n OE	nDIR	nAn	nBn
L	L	output nAn=nBn	input
L	H	input	output nBn=nAn
H	X	Z	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	+4.6	V
input voltage	V_I	^[1]	-0.5	+7.0	V
output voltage	V_O	output in OFF-state or HIGH-state ^[1]	-0.5	+7.0	V
input clamping current	I_{IK}	$V_I < 0V$	-50	-	mA
output clamping current	I_{OK}	$V_O < 0V$	-50	-	mA
output current	I_O	output in LOW-state	-	128	mA
		output in HIGH-state	-64	-	mA
storage temperature	T_{stg}	-	-65	+150	°C
junction temperature	T_j	^[2]	-	150	°C
total power dissipation	P_{tot}	$T_{amb} = -40^{\circ}C$ to $+85^{\circ}C$ ^[3]	-	500	mW
Soldering temperature	T_L	10s		250	°C

Note:

[1] The input and output negative voltage ratings may be exceeded if the input and output clamp current ratings are observed.

[2] The performance capability of a high-performance integrated circuit in conjunction with its thermal environment can create junction temperatures which are detrimental to reliability.

[3] For TSSOP48 packages: above 60°C the value of P_{tot} derates linearly with 5.5mW/K.

3.2、Recommended Operating Conditions

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
supply voltage	V_{CC}	-	2.7	-	3.6	V
input voltage	V_I	-	0	-	5.5	V
HIGH-level input voltage	V_{IH}	-	2.0	-	-	V
LOW-level input voltage	V_{IL}	-	-	-	0.8	V
HIGH-level output current	I_{OH}	-	-32	-	-	mA
LOW-level output current	I_{OL}	none	-	-	32	mA
		current duty cycle $\leq 50\%$; $f_i \geq 1kHz$	-	-	64	mA
ambient temperature	T_{amb}	in free-air	-40	-	+85	°C
input transition rise and fall rate	$\Delta t/\Delta V$	outputs enabled	-	-	10	ns/V



3.3、Electrical Characteristics

3.3.1、DC Characteristics

($T_{amb} = -40^{\circ}\text{C}$ to $+85^{\circ}\text{C}$, voltages are referenced to GND (ground=0V), unless otherwise specified.)

Parameter	Symbol	Conditions		Min.	Typ. ^[1]	Max.	Unit
input clamping voltage	V _{IK}	V _{CC} =2.7V; I _{IK} =-18mA		-1.2	-0.85	-	V
HIGH-level output voltage	V _{OH}	I _{OH} =-100uA; V _{CC} =2.7V to 3.6V		V _{CC} -0.2	V _{CC}	-	V
		I _{OH} =-8mA; V _{CC} =2.7V		2.4	2.5	-	V
		I _{OH} =-32mA; V _{CC} =3.0V		2.0	2.3	-	V
LOW-level output voltage	V _{OL}	V _{CC} =2.7V	I _{OL} =100uA	-	0.07	0.2	V
			I _{OL} =24mA	-	0.3	0.5	V
		V _{CC} =3.0V	I _{OL} =16mA	-	0.25	0.4	V
			I _{OL} =32mA	-	0.3	0.5	V
			I _{OL} =64mA	-	0.4	0.55	V
input leakage current	I _I	control pins	V _{CC} =3.6V; V _I =V _{CC} or GND	-	0.1	±1	uA
			V _{CC} =0V or 3.6V; V _I =5.5V	-	0.1	10	uA
		Input/output data pins; V _{CC} =3.6V ^[2]	V _I =5.5V	-	0.1	20	uA
			V _I = V _{CC}	-	0.5	10	uA
			V _I =0V	-5	-0.1	-	uA
power-off leakage current	I _{OFF}	V _{CC} =0V; V _I or V _O =0V to 4.5V		-	0.1	±100	uA
bus hold LOW current	I _{BHL}	V _{CC} =3V; V _I =0.8V		75	135	-	uA
bus hold HIGH current	I _{BHH}	V _{CC} =3V; V _I =2.0V		-	-135	-75	uA
bus hold LOW overdrive current	I _{BHLO}	nAn input; V _{CC} =0V to 3.6V; V _{CC} =3.6V ^[3]		500	-	-	uA
bus hold HIGH overdrive current	I _{BHHO}	nAn input; V _{CC} =0V to 3.6V; V _{CC} =3.6V ^[3]		-	-	-500	uA
output leakage current	I _{LO}	output in HIGH-state when V _O >V _{CC} ; V _O =5.5V; V _{CC} =3.0V		-	75	125	uA
power-up/ power-down output current	I _{O(pu/pd)}	V _{CC} ≤1.2V; V _O =0.5V to V _{CC} ; V _I =GND or V _{CC} ; n OE = don't care ^[4]		-	40	±100	uA
supply current	I _{CC}	V _{CC} =3.6V; V _I =GND or V _{CC} ; I _O =0A	output HIGH	-	0.07	0.12	mA
			output LOW	-	0.07	0.12	mA
			outputs disabled ^[5]	-	0.07	0.12	mA
additional supply current	ΔI _{CC}	per input pin; V _{CC} =3.0V to 3.6V; one input at V _{CC} -0.6V, other inputs at V _{CC} or GND ^[6]		-	0.1	0.2	mA



input capacitance	C_I	pins nDIR and $\overline{\text{nOE}}$, $V_O=0V$ or $3.0V$	-	3	-	pF
off-state input/output capacitance	$C_{io(off)}$	pins nAn and nBn, outputs disabled; $V_O=GND$ or V_{CC}	-	9	-	pF

Note:

[1] Typical values are measured at $V_{CC}=3.3V$ and at $T_{amb}=25^\circ C$.

[2] Unused pins at V_{CC} or GND.

[3] This is the bus hold overdrive current required to force the input to the opposite logic state.

[4] This parameter is valid for any V_{CC} between $0V$ and $1.2V$ with a transition time of up to $10ms$. From $V_{CC}=1.2V$ to $V_{CC}=3.3V \pm 0.3V$ a transition time of $100\mu s$ is permitted. This parameter is valid for $T_{amb}=25^\circ C$ only.

[5] I_{CC} is measured with outputs pulled to V_{CC} or GND.

[6] This is the increase in supply current for each input at the specified voltage level other than V_{CC} or GND.

3.3.2、AC Characteristics

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

Parameter	Symbol	Conditions	Min.	Typ. ^[1]	Max.	Unit
LOW to HIGH propagation delay	t_{PLH}	nAn to nBn or nBn to nAn; see Figure 4	$V_{CC}=2.7V$	-	-	3.5 ns
			$V_{CC}=3.0V$ to $3.6V$	1.0	1.9	3.3 ns
HIGH to LOW propagation delay	t_{PHL}	nAn to nBn or nBn to nAn; see Figure 4	$V_{CC}=2.7V$	-	-	3.5 ns
			$V_{CC}=3.0V$ to $3.6V$	1.0	1.7	3.3 ns
OFF-state to HIGH propagation delay	t_{PZH}	$\overline{\text{nOE}}$ to nAn or nBn; see Figure 5	$V_{CC}=2.7V$	-	-	5.3 ns
			$V_{CC}=3.0V$ to $3.6V$	1.0	2.8	4.5 ns
OFF-state to LOW propagation delay	t_{PZL}	$\overline{\text{nOE}}$ to nAn or nBn; see Figure 5	$V_{CC}=2.7V$	-	-	5.1 ns
			$V_{CC}=3.0V$ to $3.6V$	1.0	2.8	4.1 ns
HIGH to OFF-state propagation delay	t_{PHZ}	$\overline{\text{nOE}}$ to nAn or nBn; see Figure 5	$V_{CC}=2.7V$	-	-	5.7 ns
			$V_{CC}=3.0V$ to $3.6V$	1.5	3.2	5.1 ns
LOW to OFF-state propagation delay	t_{PLZ}	$\overline{\text{nOE}}$ to nAn or nBn; see Figure 5	$V_{CC}=2.7V$	-	-	4.6 ns
			$V_{CC}=3.0V$ to $3.6V$	1.5	3.0	4.6 ns

Note:

[1] Typical values are measured at $V_{CC}=3.3V$ and $T_{amb}=25^\circ C$.



4、Testing Circuit

4.1、AC Testing Circuit

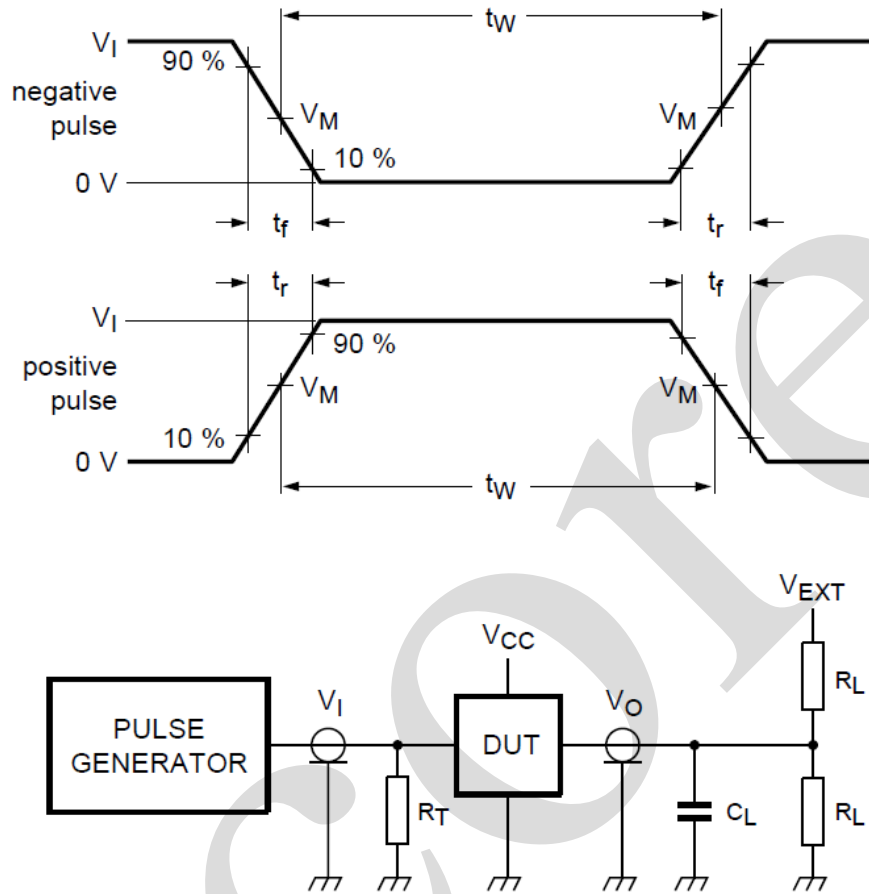


Figure 3. Test circuit for measuring switching times

Definitions test circuit:

R_L =Load resistance.

C_L =Load capacitance including jig and probe capacitance.

R_T =Termination resistance should be equal to output impedance Z_o of the pulse generator.

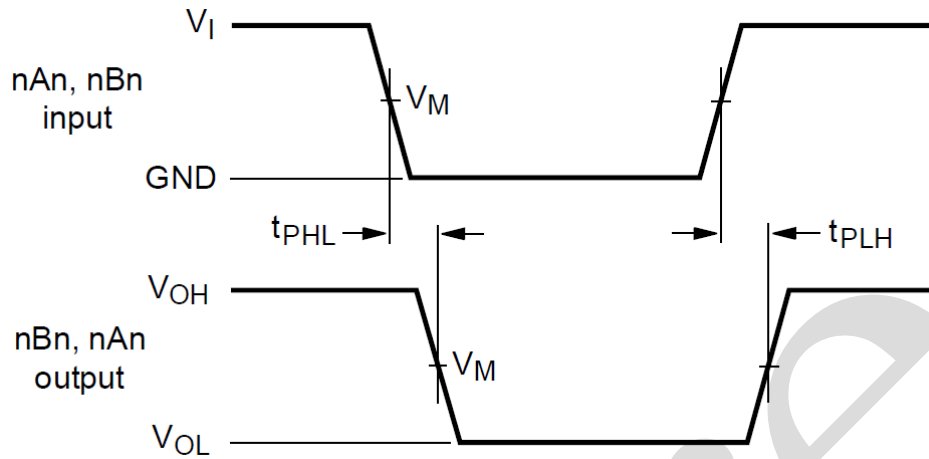
V_{EXT} =External voltage for measuring switching times.

4.2、Test Data

Input				Load		V_{EXT}		
V_I	f_i	t_W	t_r, t_f	C_L	R_L	t_{PHZ}, t_{PZH}	t_{PLZ}, t_{PZL}	t_{PLH}, t_{PHL}
2.7V	$\leq 10\text{MHz}$	500ns	$\leq 2.5\text{ns}$	50pF	500 Ω	GND	6V	open

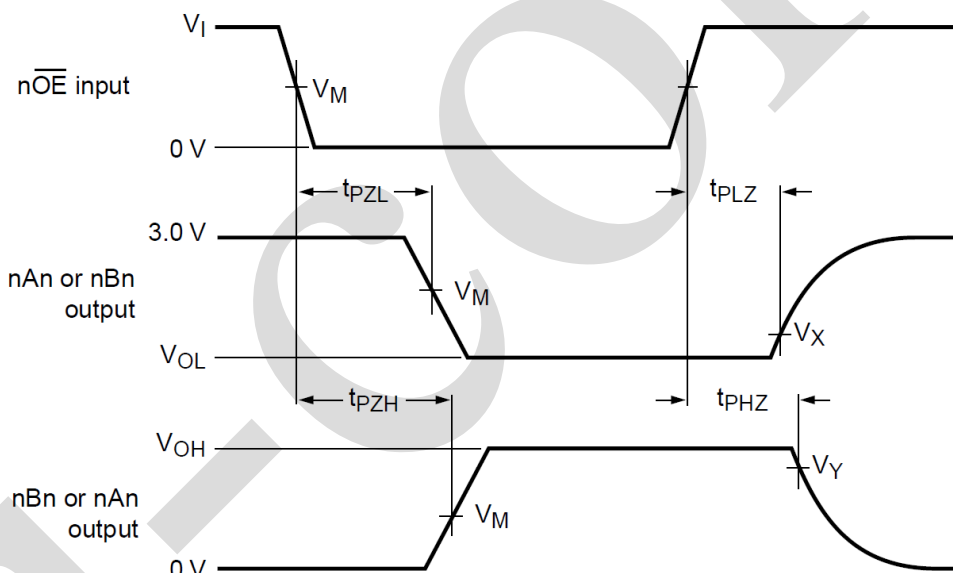


4.3、AC Testing Waveforms



V_{OL} and V_{OH} are typical voltage output levels that occur with the output load.

Figure 4. Propagation delay input (nAn, nBn) to output (nBn, nAn)



V_{OL} and V_{OH} are typical voltage output levels that occur with the output load.

Figure 5. 3-state output enable and disable times

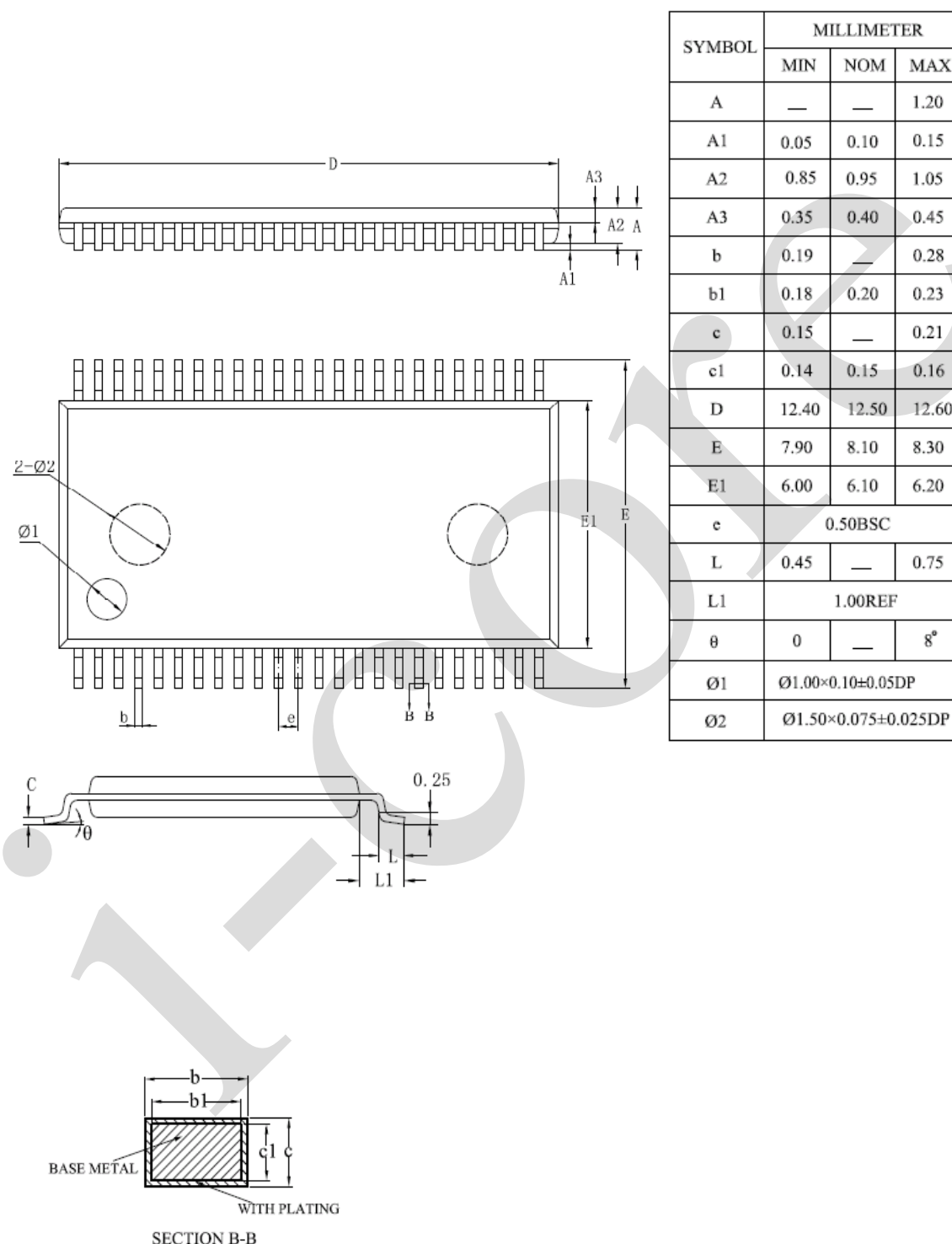
4.4、Measurement Points

Input	Output		
V_M	V_M	V_X	V_Y
1.5V	1.5V	$V_{OL}+0.3V$	$V_{OH}-0.3V$



5、Package Information

5.1、TSSOP48





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、Notion

Recommended carefully reading this information before the use of this product;

The information in this document are subject to change without notice;

This information is using to the reference only, the company is not responsible for any loss;

The company is not responsible for the any infringement of the third party patents or other rights of the responsibility.