



# **AiP74LVC/LVCH16245**

## **16-bit Bus Transceiver; 3-state**

### **Product Specification**

**Specification Revision History:**

<b>Version</b>	<b>Date</b>	<b>Description</b>
2017-12-A1	2017-12	New
2023-04-B1	2023-04	Update the template



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## 1、 General Description

The AiP74LVC/LVCH16245 are 16-bit transceivers featuring non-inverting 3-state bus compatible outputs in both send and receive directions. The device features two output enable ( $\overline{\text{nOE}}$ ) inputs for easy cascading and two send/receive ( $\overline{\text{nDIR}}$ ) inputs for direction control.  $\overline{\text{nOE}}$  controls the outputs so that the buses are effectively isolated.

This device can be used as two 8-bit transceivers or one 16-bit transceiver. Inputs can be driven from either 3.3V or 5V devices. When disabled, up to 5.5V can be applied to the outputs. These features allow the use of these devices in mixed 3.3V and 5V applications.

The AiP74LVCH16245 bus hold on data inputs eliminates the need for external pull-up resistors to hold unused inputs.

### Features:

- 5V tolerant inputs/outputs for interfacing with 5V logic
- Wide supply voltage range from 1.2V to 3.6V
- CMOS low power consumption
- MULTIBYTE flow-through standard pin-out architecture
- Low inductance multiple power and ground pins for minimum noise and ground bounce
- Direct interface with TTL levels
- High-impedance when  $V_{CC}=0V$
- All data inputs have bus hold (AiP74LVCH16245 only)
- Specified from  $-40^{\circ}\text{C}$  to  $+125^{\circ}\text{C}$
- Packaging information: TSSOP48

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

Type number	Packaging form	Marking code	Tube quantity	Boxed tube quantity	Boxed quantity	Notes
AiP74LVC16245 TA48.TB	TSSOP48	74LVC16245	38 PCS/tube	100 tube/box	3800 PCS/box	Dimensions of plastic enclosure: 12.5mm×6.1mm Pin spacing: 0.5mm
AiP74LVCH16245 TA48.TB	TSSOP48	74LVCH16245	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
AiP74LVC16245 TA48.TR	TSSOP48	74LVC16245	2000 PCS/reel	2000 PCS/box	Dimensions of plastic enclosure: 12.5mm×6.1mm Pin spacing: 0.5mm
AiP74LVCH16245 TA48.TR	TSSOP48	74LVCH16245	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

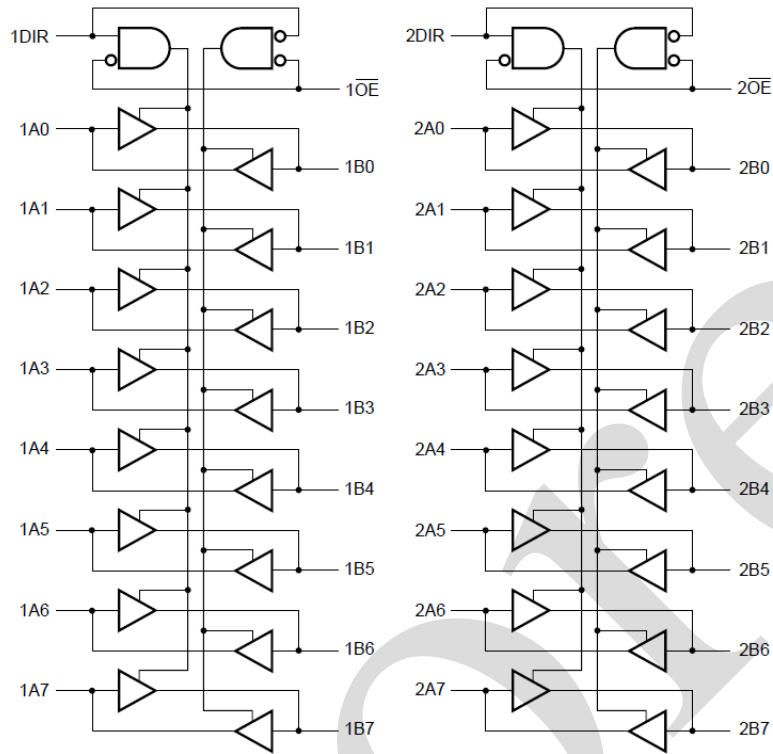


Figure 1. Logic symbol

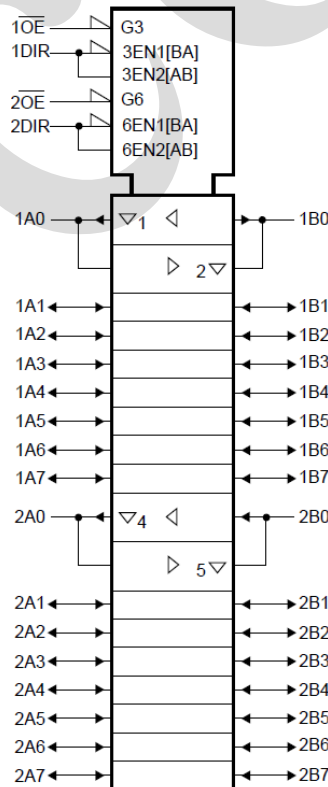


Figure 2. IEC logic symbol





## 2.4、Function Table

Input		Output	
$\overline{nOE}$	nDIR	nAn	nBn
L	L	nAn = nBn	inputs
L	H	inputs	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	+6.5	V
input clamping current	$I_{IK}$	$V_I < 0V$	-50	-	mA
input voltage	$V_I$	<sup>[1]</sup>	-0.5	+6.5	V
output clamping current	$I_{OK}$	$V_O > V_{CC}$ or $V_O < 0V$	-	$\pm 50$	mA
output voltage	$V_O$	output HIGH or LOW state <sup>[2]</sup>	-0.5	$V_{CC} + 0.5$	V
		output 3-state <sup>[2]</sup>	-0.5	+6.5	V
output current	$I_O$	$V_O = 0V$ to $V_{CC}$	-	$\pm 50$	mA
supply current	$I_{CC}$	-	-	100	mA
ground current	$I_{GND}$	-	-100	-	mA
storage temperature	$T_{stg}$	-	-65	+150	°C
total power dissipation	$P_{tot}$	-	-	500	mW
Soldering temperature	$T_L$	10s	260		°C

Note:

[1] The minimum input voltage ratings may be exceeded if the input current ratings are observed.

[2] The output voltage ratings may be exceeded if the output current ratings are observed.

### 3.2、Recommended Operating Conditions

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
supply voltage	$V_{CC}$	-	1.65	-	3.6	V
		functional	1.2	-	3.6	V
input voltage	$V_I$	-	0	-	5.5	V
output voltage	$V_O$	output HIGH or LOW state	0	-	$V_{CC}$	V
		output 3-state	0	-	5.5	V
ambient temperature	$T_{amb}$	in free air	-40	-	+125	°C
input transition rise and fall rate	$\Delta t/\Delta V$	$V_{CC} = 1.2V$ to $2.7V$	0	-	20	ns/V
		$V_{CC} = 2.7V$ to $3.6V$	0	-	10	ns/V



### 3.3、Electrical Characteristics

#### 3.3.1、DC Characteristics 1

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

Parameter	Symbol	Conditions	Min.	Typ. <sup>[1]</sup>	Max.	Unit	
HIGH-level input voltage	$V_{IH}$	$V_{CC}=1.2\text{V}$	1.08	-	-	V	
		$V_{CC}=1.65\text{V}$ to $1.95\text{V}$	$0.65 \times V_{CC}$	-	-	V	
		$V_{CC}=2.3\text{V}$ to $2.7\text{V}$	1.7	-	-	V	
		$V_{CC}=2.7\text{V}$ to $3.6\text{V}$	2.0	-	-	V	
LOW-level input voltage	$V_{IL}$	$V_{CC}=1.2\text{V}$	-	-	0.12	V	
		$V_{CC}=1.65\text{V}$ to $1.95\text{V}$	-	-	$0.35 \times V_{CC}$	V	
		$V_{CC}=2.3\text{V}$ to $2.7\text{V}$	-	-	0.7	V	
		$V_{CC}=2.7\text{V}$ to $3.6\text{V}$	-	-	0.8	V	
HIGH-level output voltage	$V_{OH}$	$V_I = V_{IH}$ or $V_{IL}$	$I_O = -100\mu\text{A}; V_{CC} = 1.65\text{V}$ to $3.6\text{V}$	$V_{CC} - 0.2$	-	-	V
			$I_O = -4\text{mA}; V_{CC} = 1.65\text{V}$	1.2	-	-	V
			$I_O = -8\text{mA}; V_{CC} = 2.3\text{V}$	1.8	-	-	V
			$I_O = -12\text{mA}; V_{CC} = 2.7\text{V}$	2.2	-	-	V
			$I_O = -18\text{mA}; V_{CC} = 3.0\text{V}$	2.4	-	-	V
			$I_O = -24\text{mA}; V_{CC} = 3.0\text{V}$	2.2	-	-	V
LOW-level output voltage	$V_{OL}$	$V_I = V_{IH}$ or $V_{IL}$	$I_O = 100\mu\text{A}; V_{CC} = 1.65\text{V}$ to $3.6\text{V}$	-	-	0.2	V
			$I_O = 4\text{mA}; V_{CC} = 1.65\text{V}$	-	-	0.45	V
			$I_O = 8\text{mA}; V_{CC} = 2.3\text{V}$	-	-	0.6	V
			$I_O = 12\text{mA}; V_{CC} = 2.7\text{V}$	-	-	0.4	V
			$I_O = 24\text{mA}; V_{CC} = 3.0\text{V}$	-	-	0.55	V
input leakage current <sup>[2]</sup>	$I_I$	$V_I = 5.5\text{V}$ or GND; $V_{CC} = 3.6\text{V}$	-	-	$\pm 5$	$\mu\text{A}$	
OFF-state output current <sup>[2][3]</sup>	$I_{OZ}$	$V_I = V_{IH}$ or $V_{IL}; V_O = 5.5\text{V}$ or GND; $V_{CC} = 3.6\text{V}$	-	-	$\pm 5$	$\mu\text{A}$	
power-off leakage current	$I_{OFF}$	$V_I$ or $V_O = 5.5\text{V}; V_{CC} = 0\text{V}$	-	-	$\pm 10$	$\mu\text{A}$	
supply current	$I_{CC}$	$V_I = V_{CC}$ or GND; $I_O = 0\text{A}; V_{CC} = 3.6\text{V}$	-	-	20	$\mu\text{A}$	
additional supply current	$\Delta I_{CC}$	per input pin; $V_I = V_{CC} - 0.6\text{V}; I_O = 0\text{A}; V_{CC} = 2.7\text{V}$ to $3.6\text{V};$	-	-	500	$\mu\text{A}$	
input capacitance	$C_I$	$V_{CC} = 0\text{V}$ to $3.6\text{V}; V_I = \text{GND}$ to $V_{CC}$	-	5.0	-	pF	
input/output capacitance	$C_{I/O}$	$V_{CC} = 0\text{V}$ to $3.6\text{V}; V_I = \text{GND}$ to $V_{CC}$	-	10	-	pF	
bus hold LOW current <sup>[4][5]</sup>	$I_{BHL}$	$V_{CC} = 1.65\text{V}; V_I = 0.58\text{V}$	10	-	-	$\mu\text{A}$	
		$V_{CC} = 2.3\text{V}; V_I = 0.7\text{V}$	30	-	-	$\mu\text{A}$	
		$V_{CC} = 3.0\text{V}; V_I = 0.8\text{V}$	75	-	-	$\mu\text{A}$	
bus hold HIGH current <sup>[4][5]</sup>	$I_{BHH}$	$V_{CC} = 1.65\text{V}; V_I = 1.07\text{V}$	-10	-	-	$\mu\text{A}$	
		$V_{CC} = 2.3\text{V}; V_I = 1.7\text{V}$	-30	-	-	$\mu\text{A}$	
		$V_{CC} = 3.0\text{V}; V_I = 2.0\text{V}$	-75	-	-	$\mu\text{A}$	



bus hold LOW overdrive current <sup>[4][6]</sup>	I <sub>BHLO</sub>	V <sub>CC</sub> =1.95V	200	-	-	uA
		V <sub>CC</sub> =2.7V	300	-	-	uA
		V <sub>CC</sub> =3.6V	500	-	-	uA
bus hold HIGH overdrive current <sup>[4][6]</sup>	I <sub>BHHO</sub>	V <sub>CC</sub> =1.95V	-200	-	-	uA
		V <sub>CC</sub> =2.7V	-300	-	-	uA
		V <sub>CC</sub> =3.6V	-500	-	-	uA

Note:

[1] All typical values are measured at V<sub>CC</sub>=3.3V (unless stated otherwise) and T<sub>amb</sub>=25°C.

[2] The bus hold circuit is switched off when V<sub>I</sub>>V<sub>CC</sub> allowing 5.5V on the input terminal.

[3] For I/O ports the parameter I<sub>OZ</sub> includes the input leakage current.

[4] Valid for data inputs (AiP74LVCH16245). Note that control inputs do not have a bus hold circuit.

[5] The specified sustaining current at the data input holds the input below the specified V<sub>I</sub> level.

[6] The specified overdrive current at the data input forces the data input to the opposite logic input state.

### 3.3.2、DC Characteristics 2

(T<sub>amb</sub>=-40°C to +125°C, voltages are referenced to GND (ground=0V), unless otherwise specified.)

Parameter	Symbol	Conditions	Min.	Typ. <sup>[1]</sup>	Max.	Unit	
HIGH-level input voltage	V <sub>IH</sub>	V <sub>CC</sub> =1.2V	1.08	-	-	V	
		V <sub>CC</sub> =1.65V to 1.95V	0.65×V <sub>CC</sub>	-	-	V	
		V <sub>CC</sub> =2.3V to 2.7V	1.7	-	-	V	
		V <sub>CC</sub> =2.7V to 3.6V	2.0	-	-	V	
LOW-level input voltage	V <sub>IL</sub>	V <sub>CC</sub> =1.2V	-	-	0.12	V	
		V <sub>CC</sub> =1.65V to 1.95V	-	-	0.35×V <sub>CC</sub>	V	
		V <sub>CC</sub> =2.3V to 2.7V	-	-	0.7	V	
		V <sub>CC</sub> =2.7V to 3.6V	-	-	0.8	V	
HIGH-level output voltage	V <sub>OH</sub>	V <sub>I</sub> =V <sub>IH</sub> or V <sub>IL</sub>	I <sub>O</sub> =-100uA; V <sub>CC</sub> =1.65V to 3.6V	V <sub>CC</sub> -0.3	-	-	V
			I <sub>O</sub> =-4mA; V <sub>CC</sub> =1.65V	1.05	-	-	V
			I <sub>O</sub> =-8mA; V <sub>CC</sub> =2.3V	1.65	-	-	V
			I <sub>O</sub> =-12mA; V <sub>CC</sub> =2.7V	2.05	-	-	V
			I <sub>O</sub> =-18mA; V <sub>CC</sub> =3.0V	2.25	-	-	V
			I <sub>O</sub> =-24mA; V <sub>CC</sub> =3.0V	2.0	-	-	V
LOW-level output voltage	V <sub>OL</sub>	V <sub>I</sub> =V <sub>IH</sub> or V <sub>IL</sub>	I <sub>O</sub> =100uA; V <sub>CC</sub> =1.65V to 3.6V	-	-	0.3	V
			I <sub>O</sub> =4mA; V <sub>CC</sub> =1.65V	-	-	0.65	V
			I <sub>O</sub> =8mA; V <sub>CC</sub> =2.3V	-	-	0.8	V
			I <sub>O</sub> =12mA; V <sub>CC</sub> =2.7V	-	-	0.6	V
			I <sub>O</sub> =24mA; V <sub>CC</sub> =3.0V	-	-	0.8	V
input leakage current <sup>[2]</sup>	I <sub>I</sub>	V <sub>I</sub> =5.5V or GND; V <sub>CC</sub> =3.6V	-	-	±20	uA	
OFF-state output current <sup>[2][3]</sup>	I <sub>OZ</sub>	V <sub>I</sub> =V <sub>IH</sub> or V <sub>IL</sub> ; V <sub>O</sub> =5.5V or GND; V <sub>CC</sub> =3.6V	-	-	±20	uA	
power-off leakage current	I <sub>OFF</sub>	V <sub>I</sub> or V <sub>O</sub> =5.5V; V <sub>CC</sub> =0V	-	-	±20	uA	



supply current	$I_{CC}$	$V_I=V_{CC}$ or GND; $I_O=0A$ ; $V_{CC}=3.6V$	-	-	80	$\mu A$
additional supply current	$\Delta I_{CC}$	per input pin; $V_I=V_{CC}-0.6V$ ; $I_O=0A$ ; $V_{CC}=2.7V$ to $3.6V$ ;	-	5	5000	$\mu A$
bus hold LOW current <sup>[4][5]</sup>	$I_{BHL}$	$V_{CC}=1.65V$ ; $V_I=0.58V$	10	-	-	$\mu A$
		$V_{CC}=2.3V$ ; $V_I=0.7V$	25	-	-	$\mu A$
		$V_{CC}=3.0V$ ; $V_I=0.8V$	60	-	-	$\mu A$
bus hold HIGH current <sup>[4][5]</sup>	$I_{BHH}$	$V_{CC}=1.65V$ ; $V_I=1.07V$	-10	-	-	$\mu A$
		$V_{CC}=2.3V$ ; $V_I=1.7V$	-25	-	-	$\mu A$
		$V_{CC}=3.0V$ ; $V_I=2.0V$	-60	-	-	$\mu A$
bus hold LOW overdrive current <sup>[4][6]</sup>	$I_{BHLO}$	$V_{CC}=1.95V$	200	-	-	$\mu A$
		$V_{CC}=2.7V$	300	-	-	$\mu A$
		$V_{CC}=3.6V$	500	-	-	$\mu A$
bus hold HIGH overdrive current <sup>[4][6]</sup>	$I_{BHHO}$	$V_{CC}=1.95V$	-200	-	-	$\mu A$
		$V_{CC}=2.7V$	-300	-	-	$\mu A$
		$V_{CC}=3.6V$	-500	-	-	$\mu A$

Note:

- [1] All typical values are measured at  $V_{CC}=3.3V$  (unless stated otherwise) and  $T_{amb}=25^{\circ}C$ .  
 [2] The bus hold circuit is switched off when  $V_I > V_{CC}$  allowing 5.5V on the input terminal.  
 [3] For I/O ports the parameter  $I_{OZ}$  includes the input leakage current.  
 [4] Valid for data inputs (AiP74LVCH16245). Note that control inputs do not have a bus hold circuit.  
 [5] The specified sustaining current at the data input holds the input below the specified  $V_I$  level.  
 [6] The specified overdrive current at the data input forces the data input to the opposite logic input state.

### 3.3.3、AC Characteristics 1

(T<sub>amb</sub> = -40°C to +85°C, voltages are referenced to GND (ground=0V), unless otherwise specified.)

Parameter	Symbol	Conditions	Min.	Typ. <sup>[2]</sup>	Max.	Unit	
propagation delay	$t_{pd}$	$V_{CC}=1.2V$	-	18.2	-	ns	
		$V_{CC}=1.65V$ to $1.95V$	1.5	7.3	17.1	ns	
		$V_{CC}=2.3V$ to $2.7V$	1.0	3.9	8.4	ns	
		$V_{CC}=2.7V$	1.0	3.8	6.6	ns	
		$V_{CC}=3.0V$ to $3.6V$	1.0	3.4	6.3	ns	
enable time	$t_{en}$	$V_{CC}=1.2V$	-	21.0	-	ns	
		$V_{CC}=1.65V$ to $1.95V$	1.5	8.3	21.0	ns	
		$V_{CC}=2.3V$ to $2.7V$	1.0	4.6	11.1	ns	
		$V_{CC}=2.7V$	1.5	4.9	9.4	ns	
		$V_{CC}=3.0V$ to $3.6V$	1.0	3.8	7.7	ns	
disable time	$t_{dis}$	$V_{CC}=1.2V$	-	15.4	-	ns	
		$V_{CC}=1.65V$ to $1.95V$	1.0	6.9	18.3	ns	
		$V_{CC}=2.3V$ to $2.7V$	0.5	3.8	9.9	ns	
		$V_{CC}=2.7V$	1.5	4.8	9.2	ns	
		$V_{CC}=3.0V$ to $3.6V$	1.5	4.6	7.8	ns	
power dissipation	$C_{PD}$	per input; $V_I=GND$ to $V_{CC}$ <sup>[3]</sup>	$V_{CC}=1.65V$ to $1.95V$	-	16.1	-	pF
		$V_{CC}=2.3V$ to $2.7V$	-	21.3	-	pF	



capacitance			$V_{CC}=3.0V$ to $3.6V$	-	25.9	-	pF
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Note:

[1]  $t_{pd}$  is the same as  $t_{PLH}$  and  $t_{PHL}$ . $t_{en}$  is the same as  $t_{PZL}$  and  $t_{PZH}$ . $t_{dis}$  is the same as  $t_{PLZ}$  and  $t_{PHZ}$ .[2] Typical values are measured at  $T_{amb}=25^{\circ}C$  and  $V_{CC}=1.2V, 1.8V, 2.5V, 2.7V$  and  $3.3V$  respectively.[3]  $C_{PD}$  is used to determine the dynamic power dissipation ( $P_D$  in uW). $P_D=C_{PD}\times V_{CC}^2\times f_i\times N+\sum(C_L\times V_{CC}^2\times f_o)$  where: $f_i$ =input frequency in MHz;  $f_o$ =output frequency in MHz $C_L$ =output load capacitance in pF $V_{CC}$ =supply voltage in Volts $N$ =number of inputs switching $\sum(C_L\times V_{CC}^2\times f_o)$ =sum of the outputs

### 3.3.4、 AC Characteristics 2

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

Parameter	Symbol	Conditions	Min.	Typ. <sup>[2]</sup>	Max.	Unit	
propagation delay	$t_{pd}$	nAn to nBn; nBn to nAn; see Figure 4 <sup>[1]</sup>	$V_{CC}=1.65V$ to $1.95V$	1.5	-	19.3	ns
			$V_{CC}=2.3V$ to $2.7V$	1.0	-	9.4	ns
			$V_{CC}=2.7V$	1.0	-	8.4	ns
			$V_{CC}=3.0V$ to $3.6V$	1.0	-	8.4	ns
enable time	$t_{en}$	OE to nAn,nBn; see Figure 5 <sup>[1]</sup>	$V_{CC}=1.65V$ to $1.95V$	1.5	-	23.7	ns
			$V_{CC}=2.3V$ to $2.7V$	1.0	-	12.3	ns
			$V_{CC}=2.7V$	1.5	-	11.9	ns
			$V_{CC}=3.0V$ to $3.6V$	1.0	-	9.8	ns
disable time	$t_{dis}$	OE to nAn,nBn; see Figure 5 <sup>[1]</sup>	$V_{CC}=1.65V$ to $1.95V$	1.0	-	20.6	ns
			$V_{CC}=2.3V$ to $2.7V$	0.5	-	11.1	ns
			$V_{CC}=2.7V$	1.5	-	11.9	ns
			$V_{CC}=3.0V$ to $3.6V$	1.5	-	9.8	ns

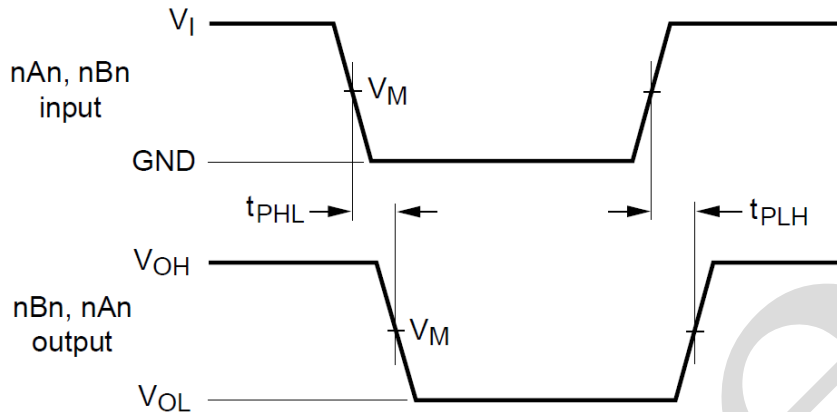
Note:

[1]  $t_{pd}$  is the same as  $t_{PLH}$  and  $t_{PHL}$ . $t_{en}$  is the same as  $t_{PZL}$  and  $t_{PZH}$ . $t_{dis}$  is the same as  $t_{PLZ}$  and  $t_{PHZ}$ .[2] Typical values are measured at  $T_{amb}=25^{\circ}C$  and  $V_{CC}=1.2V, 1.8V, 2.5V, 2.7V$  and  $3.3V$  respectively.



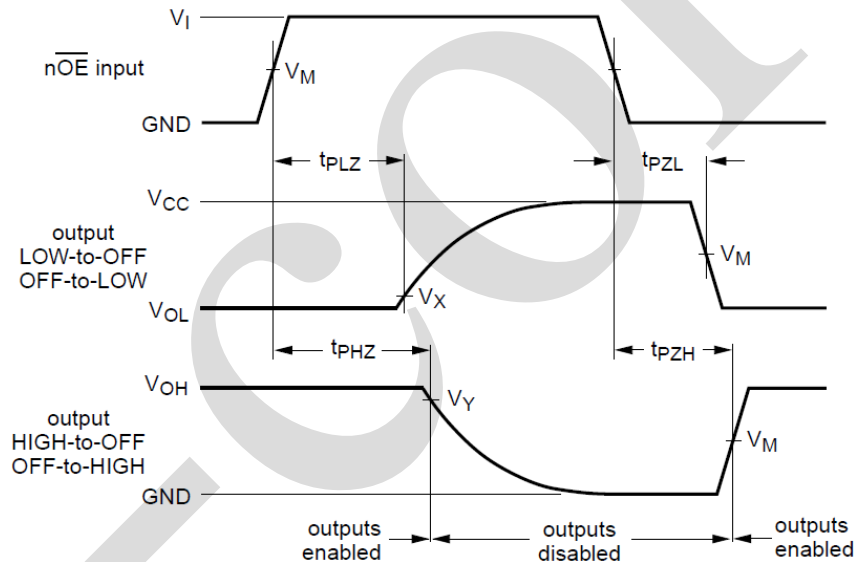
## 4、Testing Circuit

### 4.1、AC Testing Waveforms



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

Figure 4. The input (nAn, nBn) to output (nBn, nAn) propagation delays



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

Figure 5. 3-state enable and disable times



**4.2、 Measurement Points**

Supply voltage $V_{CC}$	$V_M$	Input			
		$V_I$	$t_r=t_f$	$V_X$	$V_Y$
1.2V	$0.5 \times V_{CC}$	$V_{CC}$	$\leq 2.5\text{ns}$	$V_{OL}+0.15\text{V}$	$V_{OH}-0.15\text{V}$
1.65V to 1.95V	$0.5 \times V_{CC}$	$V_{CC}$	$\leq 2.5\text{ns}$	$V_{OL}+0.15\text{V}$	$V_{OH}-0.15\text{V}$
2.3V to 2.7V	$0.5 \times V_{CC}$	$V_{CC}$	$\leq 2.5\text{ns}$	$V_{OL}+0.15\text{V}$	$V_{OH}-0.15\text{V}$
2.7V	1.5V	2.7V	$\leq 2.5\text{ns}$	$V_{OL}+0.3\text{V}$	$V_{OH}-0.3\text{V}$
3.0V to 3.6V	1.5V	2.7V	$\leq 2.5\text{ns}$	$V_{OL}+0.3\text{V}$	$V_{OH}-0.3\text{V}$

**4.3、 AC Testing Circuit**

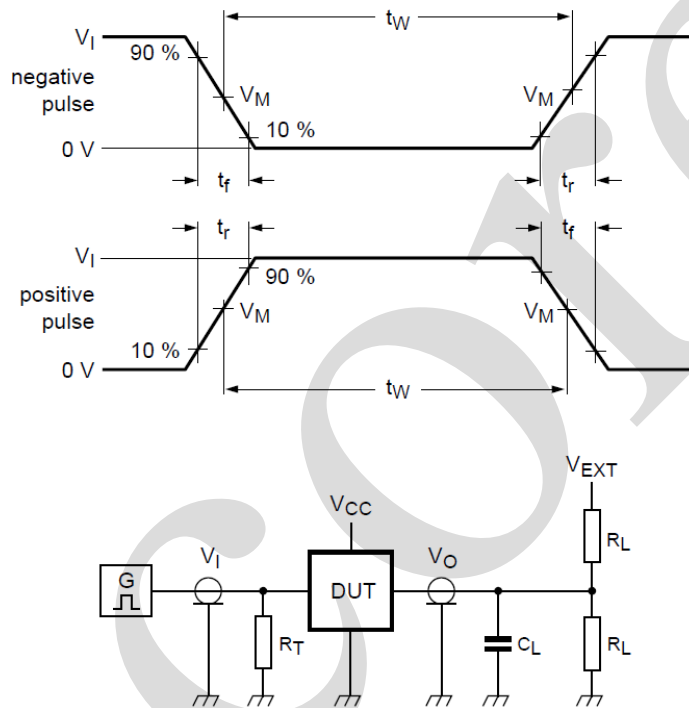


Figure 6. Test circuit for measuring switching times

Definitions for 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.

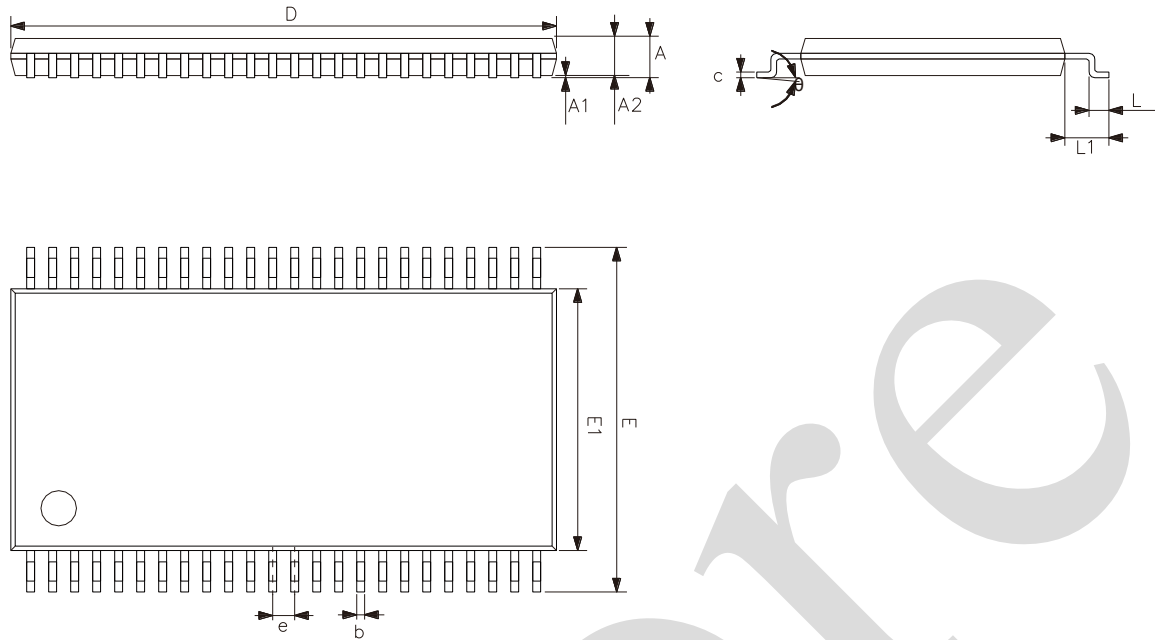
**4.4、 Test Data**

Supply voltage	Input		Load		$V_{EXT}$		
	$V_I$	$t_r, t_f$	$C_L$	$R_L$	$t_{PLH}, t_{PHL}$	$t_{PLZ}, t_{PZL}$	$t_{PHZ}, t_{PZH}$
1.2V	$V_{CC}$	$\leq 2\text{ns}$	30pF	1k $\Omega$	open	$2 \times V_{CC}$	GND
1.65V to 1.95V	$V_{CC}$	$\leq 2\text{ns}$	30pF	1k $\Omega$	open	$2 \times V_{CC}$	GND
2.3V to 2.7V	$V_{CC}$	$\leq 2\text{ns}$	30pF	500 $\Omega$	open	$2 \times V_{CC}$	GND
2.7V	2.7V	$\leq 2.5\text{ns}$	50pF	500 $\Omega$	open	$2 \times V_{CC}$	GND
3.0V to 3.6V	2.7V	$\leq 2.5\text{ns}$	50pF	500 $\Omega$	open	$2 \times V_{CC}$	GND



## 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	
$\theta$	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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