



# AiP74LVC2G125

## Dual Buffer/Line Driver; 3-state

### Product Specification

**Specification Revision History:**

Version	Date	Description
2017-05-A1	2017-05	New
2021-12-A2	2021-12	Modify ordering information
2022-02-A3	2022-02	Modify ambient temperature to -40°C~+105°C and add electrical characteristics of -40°C~+105°C
2022-03-A4	2022-03	Modify ordering information note 1
2023-03-B1	2023-03	Update template



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## 1、 General Description

The AiP74LVC2G125 provides a dual non-inverting buffer/line driver with 3-state output. The 3-state output is controlled by the output enable input (pin nOE). A HIGH-level at pin nOE causes the output to assume a high-impedance OFF-state.

### Features:

- Wide supply voltage range from 1.65V to 5.5V
- 5V tolerant input/output for interfacing with 5V logic
- $\pm 24\text{mA}$  output drive ( $V_{CC}=3.0\text{V}$ )
- CMOS low power consumption
- Latch-up performance exceeds 250mA
- Direct interface with TTL levels
- Inputs accept voltages up to 5V
- Specified from  $-40^{\circ}\text{C}$  to  $+125^{\circ}\text{C}$
- Packaging information: TSSOP8/VSSOP8

### Ordering Information:

#### Tube packing specifications:

Part number	Packaging form	Marking code	Tube quantity	Boxed tube quantity	Boxed quantity	Notes
AiP74LVC2G125TA8.TB	TSSOP8	BRXX	100 PCS/tube	200 tube/box	20000 PCS/box	Dimensions of plastic enclosure: 3.0mm×3.0mm Pin spacing: 0.65mm

#### Reel packing specifications:

Part number	Packaging form	Marking code	Reel quantity	Boxed reel quantity	Notes
AiP74LVC2G125TA8.TR	TSSOP8	BRXX	3000 PCS/reel	3000 PCS/box	Dimensions of plastic enclosure: 3.0mm×3.0mm Pin spacing: 0.65mm
AiP74LVC2G125YA8.TR	VSSOP8	BRXX	3000 PCS/reel	3000 PCS/box	Dimensions of plastic enclosure: 2.0mm×2.3mm 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

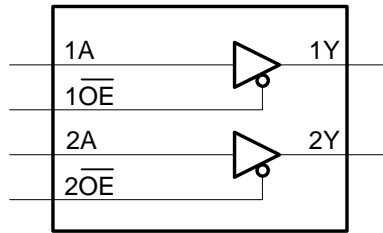


Figure 1. Logic symbol

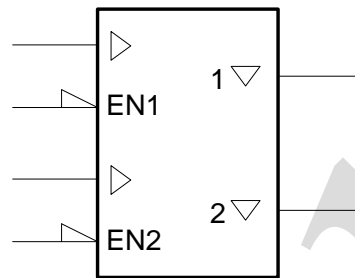
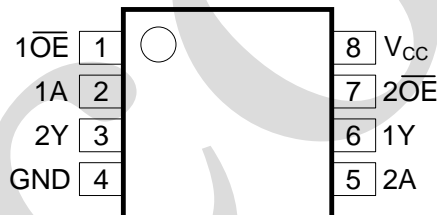


Figure 2. IEC logic symbol

### 2.2、Pin Configurations



### 2.3、Pin Description

Pin No.	Pin Name	Description
1	$\overline{1OE}$	output enable input (active LOW)
2	1A	data input
3	2Y	data output
4	GND	ground (0V)
5	2A	data input
6	1Y	data output
7	$\overline{2OE}$	output enable input (active LOW)
8	$V_{CC}$	supply voltage



## 2.4、Function Table

Input		Output
$\overline{\text{nOE}}$	nA	nY
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 clamping current	$I_{IK}$	$V_I < 0V$	-50	-	mA
input voltage	$V_I$	-	-0.5	+6.5	V
output clamping current	$I_{OK}$	$V_O > V_{CC}$ or $V_O < 0V$	-	$\pm 50$	mA
output voltage	$V_O$	Enable mode	-0.5	$V_{CC}+0.5$	V
		Disable mode	-0.5	+6.5	V
		Power-down mode; $V_{CC}=0V$	-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	$^{\circ}C$
total power dissipation	$P_{tot}$	-	-	300	mW
soldering temperature	$T_L$	10s	260		$^{\circ}C$

### 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	$V_O$	$V_{CC}=1.65V$ to $5.5V$ ; Enable mode	0	-	$V_{CC}$	V
		$V_{CC}=1.65V$ to $5.5V$ ; Disable mode	0	-	5.5	V
		$V_{CC}=0V$ ; Power-down mode	0	-	5.5	V
ambient temperature	$T_{amb}$	-	-40	-	+125	$^{\circ}C$



### 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.	Max.	Unit	
HIGH-level input voltage	$V_{IH}$	$V_{CC}=1.65\text{V}$ 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	
		$V_{CC}=4.5\text{V}$ to $5.5\text{V}$	$0.7 \times V_{CC}$	-	-	V	
LOW-level input voltage	$V_{IL}$	$V_{CC}=1.65\text{V}$ 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	
		$V_{CC}=4.5\text{V}$ to $5.5\text{V}$	-	-	$0.3 \times V_{CC}$	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 $5.5\text{V}$	$V_{CC} - 0.1$	-	-	V
			$I_O = -4\text{mA}$ ; $V_{CC}=1.65\text{V}$	1.2	-	-	V
			$I_O = -8\text{mA}$ ; $V_{CC}=2.3\text{V}$	1.9	-	-	V
			$I_O = -12\text{mA}$ ; $V_{CC}=2.7\text{V}$	2.2	-	-	V
			$I_O = -24\text{mA}$ ; $V_{CC}=3.0\text{V}$	2.3	-	-	V
			$I_O = -32\text{mA}$ ; $V_{CC}=4.5\text{V}$	3.8	-	-	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 $5.5\text{V}$	-	-	0.10	V
			$I_O = 4\text{mA}$ ; $V_{CC}=1.65\text{V}$	-	-	0.45	V
			$I_O = 8\text{mA}$ ; $V_{CC}=2.3\text{V}$	-	-	0.30	V
			$I_O = 12\text{mA}$ ; $V_{CC}=2.7\text{V}$	-	-	0.40	V
			$I_O = 24\text{mA}$ ; $V_{CC}=3.0\text{V}$	-	-	0.55	V
			$I_O = 32\text{mA}$ ; $V_{CC}=4.5\text{V}$	-	-	0.55	V
input leakage current	$I_I$	$V_I = 5.5\text{V}$ or GND; $V_{CC} = 0\text{V}$ to $5.5\text{V}$	-	$\pm 0.1$	$\pm 1$	$\mu\text{A}$	
OFF-state output current	$I_{OZ}$	$V_I = V_{IH}$ or $V_{IL}$ ; $V_O = 5.5\text{V}$ or GND; $V_{CC} = 3.6\text{V}$	-	$\pm 0.1$	$\pm 2$	$\mu\text{A}$	
power-off leakage current	$I_{OFF}$	$V_I$ or $V_O = 5.5\text{V}$ ; $V_{CC} = 0\text{V}$	-	$\pm 0.1$	$\pm 2$	$\mu\text{A}$	
supply current	$I_{CC}$	$V_I = 5.5\text{V}$ or GND; $V_{CC} = 1.65\text{V}$ to $5.5\text{V}$ ; $I_O = 0\text{A}$	-	0.1	4	$\mu\text{A}$	
additional supply current	$\Delta I_{CC}$	per pin; $V_I = V_{CC} - 0.6\text{V}$ ; $I_O = 0\text{A}$ ; $V_{CC} = 2.3\text{V}$ to $5.5\text{V}$	-	5	500	$\mu\text{A}$	

Note: All typical values are measured at  $V_{CC} = 3.3\text{V}$  and  $T_{amb} = 25^{\circ}\text{C}$ .



### 3.3.2、DC Characteristics 2

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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit	
HIGH-level input voltage	$V_{IH}$	$V_{CC}=1.65\text{V}$ 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	
		$V_{CC}=4.5\text{V}$ to $5.5\text{V}$	$0.7 \times V_{CC}$	-	-	V	
LOW-level input voltage	$V_{IL}$	$V_{CC}=1.65\text{V}$ 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	
		$V_{CC}=4.5\text{V}$ to $5.5\text{V}$	-	-	$0.3 \times V_{CC}$	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 $5.5\text{V}$	$V_{CC}-0.1$	-	-	V
			$I_O = -4\text{mA}$ ; $V_{CC}=1.65\text{V}$	0.95	-	-	V
			$I_O = -8\text{mA}$ ; $V_{CC}=2.3\text{V}$	1.7	-	-	V
			$I_O = -12\text{mA}$ ; $V_{CC}=2.7\text{V}$	1.9	-	-	V
			$I_O = -24\text{mA}$ ; $V_{CC}=3.0\text{V}$	2.0	-	-	V
			$I_O = -32\text{mA}$ ; $V_{CC}=4.5\text{V}$	3.4	-	-	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 $5.5\text{V}$	-	-	0.10	V
			$I_O = 4\text{mA}$ ; $V_{CC}=1.65\text{V}$	-	-	0.70	V
			$I_O = 8\text{mA}$ ; $V_{CC}=2.3\text{V}$	-	-	0.45	V
			$I_O = 12\text{mA}$ ; $V_{CC}=2.7\text{V}$	-	-	0.60	V
			$I_O = 24\text{mA}$ ; $V_{CC}=3.0\text{V}$	-	-	0.80	V
			$I_O = 32\text{mA}$ ; $V_{CC}=4.5\text{V}$	-	-	0.80	V
input leakage current	$I_I$	$V_I = 5.5\text{V}$ or GND; $V_{CC} = 0\text{V}$ to $5.5\text{V}$	-	-	$\pm 1$	$\mu\text{A}$	
OFF-state output current	$I_{OZ}$	$V_I = V_{IH}$ or $V_{IL}$ ; $V_O = 5.5\text{V}$ or GND; $V_{CC} = 3.6\text{V}$	-	-	$\pm 2$	$\mu\text{A}$	
power-off leakage current	$I_{OFF}$	$V_I$ or $V_O = 5.5\text{V}$ ; $V_{CC} = 0\text{V}$	-	-	$\pm 2$	$\mu\text{A}$	
supply current	$I_{CC}$	$V_I = 5.5\text{V}$ or GND; $V_{CC} = 1.65\text{V}$ to $5.5\text{V}$ ; $I_O = 0\text{A}$	-	-	4	$\mu\text{A}$	
additional supply current	$\Delta I_{CC}$	per pin; $V_I = V_{CC} - 0.6\text{V}$ ; $I_O = 0\text{A}$ ; $V_{CC} = 2.3\text{V}$ to $5.5\text{V}$	-	-	500	$\mu\text{A}$	

Note: All typical values are measured at  $V_{CC} = 3.3\text{V}$  and  $T_{amb} = 25^{\circ}\text{C}$ .



### 3.3.3、AC 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.	Max.	Unit	
nA to nY propagation delay	$t_{PLH}, t_{PHL}$	see Figure 4	$V_{CC}=1.65\text{V}$ to $1.95\text{V}$	-	11.1	16.7	ns
			$V_{CC}=2.3\text{V}$ to $2.7\text{V}$	-	7.5	11.3	ns
			$V_{CC}=2.7\text{V}$	-	8.1	12.2	ns
			$V_{CC}=3.0\text{V}$ to $3.6\text{V}$	-	6.9	10.4	ns
			$V_{CC}=4.5\text{V}$ to $5.5\text{V}$	-	5.7	8.6	ns
$\bar{n}\text{OE}$ to nY enable time	$t_{PZH}, t_{PZL}$	see Figure 5	$V_{CC}=1.65\text{V}$ to $1.95\text{V}$	-	12.9	19.4	ns
			$V_{CC}=2.3\text{V}$ to $2.7\text{V}$	-	8.4	12.6	ns
			$V_{CC}=2.7\text{V}$	-	9.9	14.9	ns
			$V_{CC}=3.0\text{V}$ to $3.6\text{V}$	-	7.2	10.8	ns
			$V_{CC}=4.5\text{V}$ to $5.5\text{V}$	-	6	9.0	ns
$\bar{n}\text{OE}$ to nY disable time	$t_{PLZ}, t_{PHZ}$	see Figure 5	$V_{CC}=1.65\text{V}$ to $1.95\text{V}$	-	10.5	15.8	ns
			$V_{CC}=2.3\text{V}$ to $2.7\text{V}$	-	5.4	8.1	ns
			$V_{CC}=2.7\text{V}$	-	8.1	12.2	ns
			$V_{CC}=3.0\text{V}$ to $3.6\text{V}$	-	8.1	12.2	ns
			$V_{CC}=4.5\text{V}$ to $5.5\text{V}$	-	5.4	8.1	ns

### 3.3.4、AC Characteristics 2

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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit	
nA to nY propagation delay	$t_{PLH}, t_{PHL}$	see Figure 4	$V_{CC}=1.65\text{V}$ to $1.95\text{V}$	-	-	20.9	ns
			$V_{CC}=2.3\text{V}$ to $2.7\text{V}$	-	-	14.1	ns
			$V_{CC}=2.7\text{V}$	-	-	15.2	ns
			$V_{CC}=3.0\text{V}$ to $3.6\text{V}$	-	-	13.2	ns
			$V_{CC}=4.5\text{V}$ to $5.5\text{V}$	-	-	10.6	ns
$\bar{n}\text{OE}$ to nY enable time	$t_{PZH}, t_{PZL}$	see Figure 5	$V_{CC}=1.65\text{V}$ to $1.95\text{V}$	-	-	24.2	ns
			$V_{CC}=2.3\text{V}$ to $2.7\text{V}$	-	-	15.8	ns
			$V_{CC}=2.7\text{V}$	-	-	18.5	ns
			$V_{CC}=3.0\text{V}$ to $3.6\text{V}$	-	-	13.6	ns
			$V_{CC}=4.5\text{V}$ to $5.5\text{V}$	-	-	11.4	ns
$\bar{n}\text{OE}$ to nY disable time	$t_{PLZ}, t_{PHZ}$	see Figure 5	$V_{CC}=1.65\text{V}$ to $1.95\text{V}$	-	-	19.1	ns
			$V_{CC}=2.3\text{V}$ to $2.7\text{V}$	-	-	10.6	ns
			$V_{CC}=2.7\text{V}$	-	-	15.7	ns
			$V_{CC}=3.0\text{V}$ to $3.6\text{V}$	-	-	15.6	ns
			$V_{CC}=4.5\text{V}$ to $5.5\text{V}$	-	-	11.0	ns



#### 4、 Testing Circuit

##### 4.1、 AC Testing Circuit

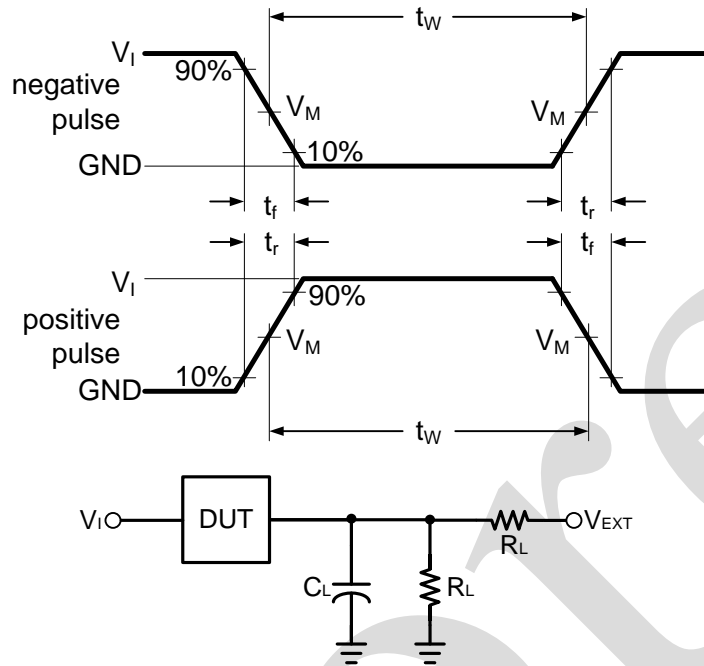


Figure 3. Test circuit for measuring switching times

Definitions for test circuit:

$R_L$ =Load resistance.

$C_L$ =Load capacitance including jig and probe capacitance.

##### 4.2、 AC Testing Waveforms

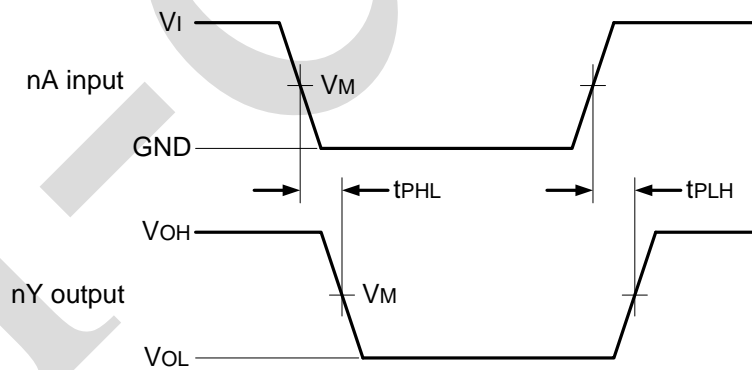


Figure 4. The input (nA) to output (nY) propagation delay times

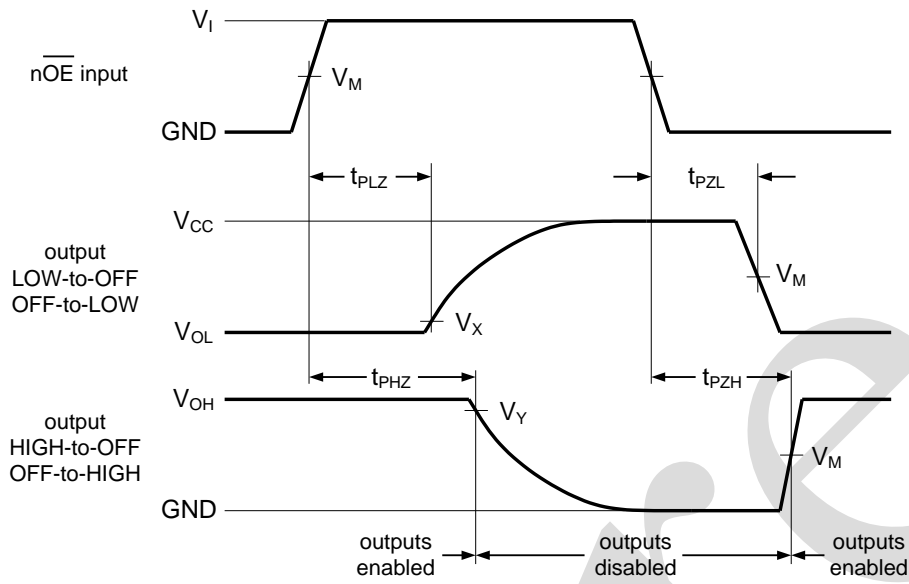


Figure 5. 3-state enable and disable times

### 4.3. Measurement Points

Supply voltage	Input	Output		
$V_{CC}$	$V_M$	$V_M$	$V_X$	$V_Y$
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	1.5V	1.5V	$V_{OL} + 0.3V$	$V_{OH} - 0.3V$
3.0V to 3.6V	1.5V	1.5V	$V_{OL} + 0.3V$	$V_{OH} - 0.3V$
4.5V to 5.5V	$0.5 \times V_{CC}$	$0.5 \times V_{CC}$	$V_{OL} + 0.3V$	$V_{OH} - 0.3V$

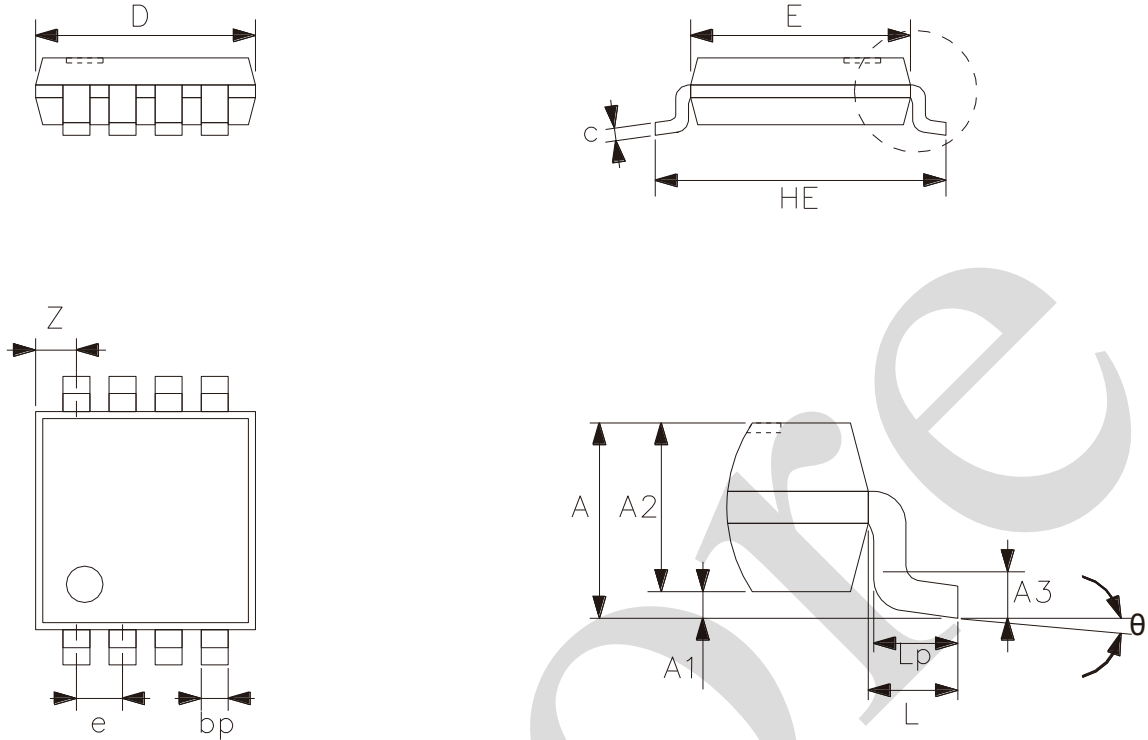
### 4.4. Test Data

Supply voltage	Input		Load		$V_{EXT}$		
$V_{CC}$	$V_I$	$t_r = t_f$	$C_L$	$R_L$	$t_{PLH}, t_{PHL}$	$t_{PZH}, t_{PHZ}$	$t_{PZL}, t_{PLZ}$
1.65V to 1.95V	$V_{CC}$	$\leq 3ns$	30pF	1k $\Omega$	open	GND	$2 \times V_{CC}$
2.3V to 2.7V	$V_{CC}$	$\leq 3ns$	30pF	500 $\Omega$	open	GND	$2 \times V_{CC}$
2.7V	2.7V	$\leq 3ns$	50pF	500 $\Omega$	open	GND	6V
3.0V to 3.6V	2.7V	$\leq 3ns$	50pF	500 $\Omega$	open	GND	6V
4.5V to 5.5V	$V_{CC}$	$\leq 3ns$	50pF	500 $\Omega$	open	GND	$2 \times V_{CC}$



## 5、Package Information

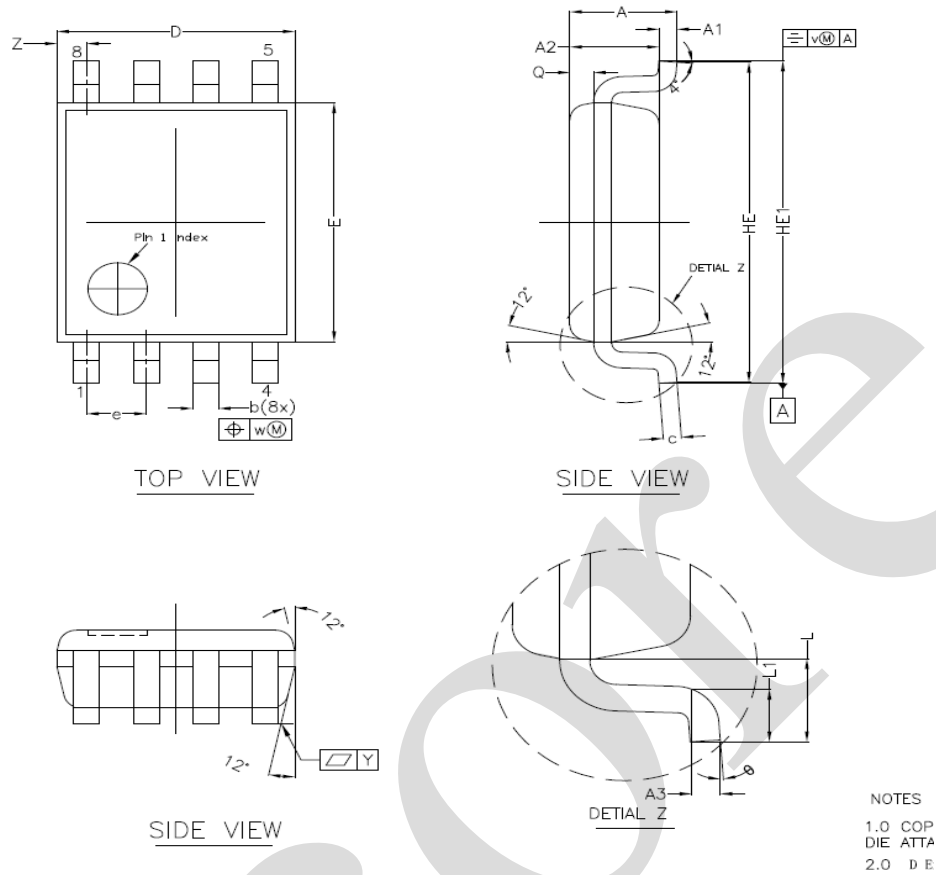
### 5.1、TSSOP8



Symbol	Dimensions (mm)	
	Min.	Max.
A	-	1.10
A1	0	0.15
A2	0.75	0.95
A3	0.25	
bp	0.22	0.38
c	0.08	0.18
D	2.90	3.10
E	2.90	3.10
HE	3.90	4.10
L	0.50	
Lp	0.33	0.47
e	0.65	
Z	0.35	0.70
$\theta$	0°	8°



## 5.2、VSSOP8



Symbol	Dimensions (mm)	
	Min.	Max.
A	-	1.00
A1	0.00	0.15
A2	0.60	0.85
A3	0.12	
Q	0.19	0.21
b	0.17	0.27
c	0.08	0.23
D	1.90	2.10
E	2.20	2.40
HE	3.00	3.20
HE1	3.00	3.40
e	0.50	
L	0.40	
L1	0.15	0.40
Y	0.10	
Z	0.10	0.40
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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