



# AiP74LVC08 Quad 2-input And Gate

## Product Specification

### Specification Revision History:

Version	Date	Description
2017-05-A1	2017-05	New
2023-04-B1	2023-04	Update the template
2025-05-B2	2025-05	Add VQFN14 package form
2025-12-B3	2025-12	Modify the supply voltage range; add the parameters at the condition of $V_{CC}=4.5V$ to $5.5V$ ; add DHVQFN14 package form; add ESD



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## 1、General Description

The AiP74LVC08 provides four 2-input AND gates.

Inputs can be driven from either 3.3V or 5V devices. This feature allows the use of these devices as translators in mixed 3.3V and 5V applications.

### Features:

- 5V tolerant inputs for interfacing with 5V logic
- Wide supply voltage range from 1.2V to 5.5V
- CMOS low power consumption
- Direct interface with TTL levels
- Specified from -40°C to +125°C
- Packaging information: DIP14/SOP14/TSSOP14/VQFN14/DHVQFN14

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

Part number	Packaging form	Marking code	Tube quantity	Boxed tube quantity	Boxed quantity	Notes
AiP74LVC08DA14.TB	DIP14	74LVC08	25 PCS/tube	40 tube/box	1000 PCS/box	Dimensions of plastic enclosure: 19.0mm×6.4mm Pin spacing: 2.54mm
AiP74LVC08SA14.TB	SOP14	74LVC08	50 PCS/tube	200 tube/box	10000 PCS/box	Dimensions of plastic enclosure: 8.7mm×3.9mm Pin spacing: 1.27mm
AiP74LVC08TA14.TB	TSSOP14	74LVC08	96 PCS/tube	200 tube/box	19200 PCS/box	Dimensions of plastic enclosure: 5.0mm×4.4mm Pin spacing: 0.65mm

**Reel packing specifications:**

Part number	Packaging form	Marking code	Reel quantity	Boxed reel quantity	Notes
AiP74LVC08SA14.TR	SOP14	74LVC08	4000 PCS/reel	8000 PCS/box	Dimensions of plastic enclosure: 8.7mm×3.9mm Pin spacing: 1.27mm
AiP74LVC08TA14.TR	TSSOP14	74LVC08	5000 PCS/reel	10000 PCS/box	Dimensions of plastic enclosure: 5.0mm×4.4mm Pin spacing: 0.65mm
AiP74LVC08QK14.TR	VQFN14	74LVC08	5000 PCS/reel	10000 PCS/box	Dimensions of plastic enclosure: 3.5mm×3.5mm 3in spacing: 0.50mm
AiP74LVC08QE14.TR	DHVQFN14	74LVC08	3000 PCS/reel	3000 PCS/box	Dimensions of plastic enclosure: 3.0mm×2.5mm 3in spacing: 0.50mm

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

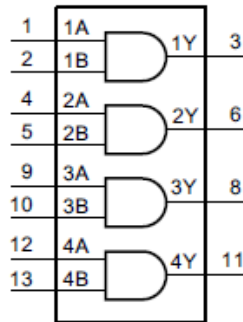


Figure 1. Logic symbol

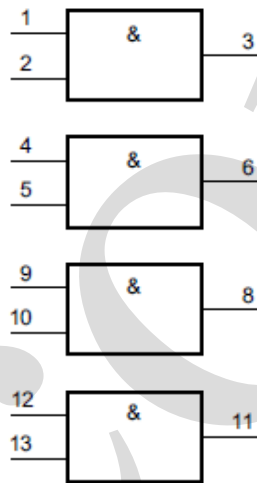


Figure 2. IEC logic symbol

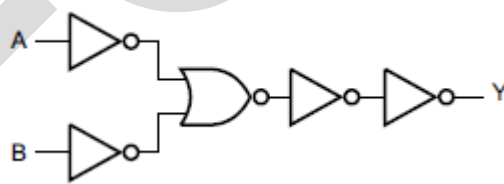
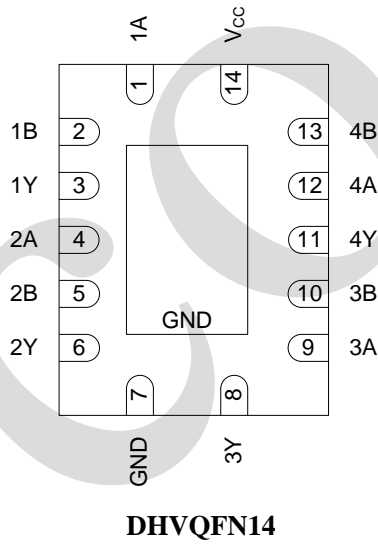
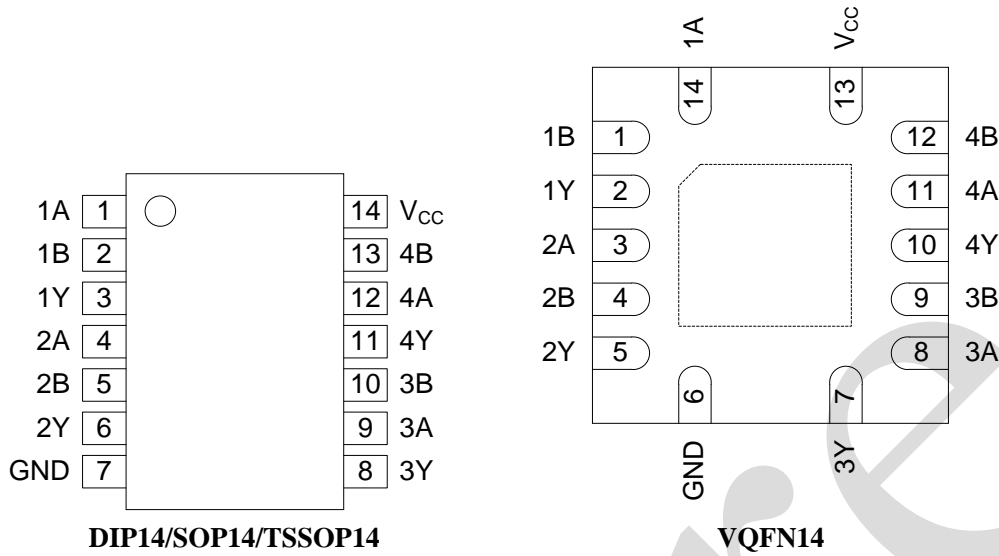


Figure 3. Logic diagram for one gate



## 2.2、Pin Configurations





## 2.3、Pin Description

Pin No.		Pin Name	Description
DIP14/SOP14/TSSOP14/DHVQFN14	VQFN14		
1	14	1A	data input
2	1	1B	data input
3	2	1Y	data output
4	3	2A	data input
5	4	2B	data input
6	5	2Y	data output
7	6	GND	ground (0V)
8	7	3Y	data output
9	8	3A	data input
10	9	3B	data input
11	10	4Y	data output
12	11	4A	data input
13	12	4B	data input
14	13	V <sub>CC</sub>	supply voltage

## 2.4、Function Table

Input		Output
nA	nB	nY
L	X	L
X	L	L
H	H	H

Note: H=HIGH voltage level; L=LOW voltage level; X=don't care.



## 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	$V_O$	output in HIGH or LOW-state	-0.5	$V_{CC}+0.5$	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	
total power dissipation	$P_{tot}$	-	-	500	mW	
storage temperature	$T_{stg}$	-	-65	+150	°C	
soldering temperature	$T_L$	10s	DIP		245	°C
			SOP/TSSOP/VQFN		260	°C
electrostatic discharge	ESD	HBM	2000		V	

### 3.2、Recommended Operating Conditions

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
supply voltage	$V_{CC}$	-	1.65	-	5.5	V
		functional	1.2	-	-	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	°C
input transition rise and fall rate	$\Delta t/\Delta V$	$V_{CC}=1.65V$ 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.	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	
		$V_{CC}=4.5\text{V}$ to $5.5\text{V}$	$0.7 \times V_{CC}$	-	-	V	
LOW-level input voltage	$V_{IL}$	$V_{CC}=1.2\text{V}$	-	-	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	
		$V_{CC}=4.5\text{V}$ 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 $5.5\text{V}$	$V_{CC} - 0.2$	-	-	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
			$I_O = -32\text{mA}; V_{CC} = 4.5\text{V}$	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 $5.5\text{V}$	-	-	0.2	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
			$I_O = 32\text{mA}; V_{CC} = 4.5\text{V}$	-	-	0.55	V
input leakage current	$I_I$	$V_I = 5.5\text{V}$ or GND; $V_{CC} = 3.6\text{V}$	-	-	$\pm 5$	$\mu\text{A}$	
supply current	$I_{CC}$	$V_I = V_{CC}$ or GND; $I_O = 0\text{A}; V_{CC} = 3.6\text{V}$	-	-	15	$\mu\text{A}$	
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 $V_{CC}$	-	4.0	-	pF	

Note: All typical values are measured at  $V_{CC} = 3.3\text{V}$  (unless stated otherwise) 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	$V_{IH}$	$V_{CC}=1.2\text{V}$	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	
		$V_{CC}=4.5\text{V}$ to $5.5\text{V}$	$0.7 \times V_{CC}$	-	-	V	
LOW-level input voltage	$V_{IL}$	$V_{CC}=1.2\text{V}$	-	-	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	
		$V_{CC}=4.5\text{V}$ 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 $5.5\text{V}$	$V_{CC} - 0.3$	-	-	V
			$I_O=-4\text{mA}$ ; $V_{CC}=1.65\text{V}$	1.05	-	-	V
			$I_O=-8\text{mA}$ ; $V_{CC}=2.3\text{V}$	1.65	-	-	V
			$I_O=-12\text{mA}$ ; $V_{CC}=2.7\text{V}$	2.05	-	-	V
			$I_O=-18\text{mA}$ ; $V_{CC}=3.0\text{V}$	2.25	-	-	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 $5.5\text{V}$	-	-	0.3	V
			$I_O=4\text{mA}$ ; $V_{CC}=1.65\text{V}$	-	-	0.65	V
			$I_O=8\text{mA}$ ; $V_{CC}=2.3\text{V}$	-	-	0.8	V
			$I_O=12\text{mA}$ ; $V_{CC}=2.7\text{V}$	-	-	0.6	V
			$I_O=24\text{mA}$ ; $V_{CC}=3.0\text{V}$	-	-	0.8	V
			$I_O=32\text{mA}$ ; $V_{CC}=4.5\text{V}$	-	-	0.8	V
input leakage current	$I_I$	$V_I=5.5\text{V}$ or GND; $V_{CC}=3.6\text{V}$	-	-	$\pm 20$	$\mu\text{A}$	
supply current	$I_{CC}$	$V_I=V_{CC}$ or GND; $I_O=0\text{A}$ ; $V_{CC}=3.6\text{V}$	-	-	200	$\mu\text{A}$	
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 $3.6\text{V}$	-	-	5000	$\mu\text{A}$	

Note: All typical values are measured at  $V_{CC}=3.3\text{V}$  (unless stated otherwise) 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, nB to nY propagation delay	$t_{pd}$	see Figure 5	$V_{CC}=1.2\text{V}$	-	11.0	-	ns
			$V_{CC}=1.65\text{V}$ to $1.95\text{V}$	0.5	4.2	9.0	ns
			$V_{CC}=2.3\text{V}$ to $2.7\text{V}$	1.0	2.5	6.9	ns
			$V_{CC}=2.7\text{V}$	1.5	2.5	4.8	ns
			$V_{CC}=3.0\text{V}$ to $3.6\text{V}$	1.0	2.3	4.1	ns
			$V_{CC}=4.5\text{V}$ to $5.5\text{V}$	1.0	2.0	3.6	ns
output skew time	$t_{sk(o)}$	$V_{CC}=3.0\text{V}$ to $3.6\text{V}$	-	-	1.0	ns	
Power dissipation capacitance	$C_{PD}$	per gate; $V_I=\text{GND}$ to $V_{CC}$	$V_{CC}=1.65\text{V}$ to $1.95\text{V}$	-	4.4	-	pF
			$V_{CC}=2.3\text{V}$ to $2.7\text{V}$	-	7.7	-	pF
			$V_{CC}=3.0\text{V}$ to $3.6\text{V}$	-	10.5	-	pF

Note:

[1] Typical values are measured at  $T_{amb}=25^{\circ}\text{C}$  and  $V_{CC}=1.2\text{V}$ ,  $1.8\text{V}$ ,  $2.5\text{V}$ ,  $2.7\text{V}$  and  $3.3\text{V}$  respectively.

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

[3] Skew between any two outputs of the same package switching in the same direction. This parameter is guaranteed by design.

[4]  $C_{PD}$  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 V;

$N$ =number of inputs switching;

$\sum(C_L\times V_{CC}^2\times f_o)$ =sum of outputs.

### 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, nB to nY propagation delay	$t_{pd}$	see Figure 5	$V_{CC}=1.65\text{V}$ to $1.95\text{V}$	0.5	-	10.4	ns
			$V_{CC}=2.3\text{V}$ to $2.7\text{V}$	1.0	-	8.0	ns
			$V_{CC}=2.7\text{V}$	1.5	-	5.6	ns
			$V_{CC}=3.0\text{V}$ to $3.6\text{V}$	1.0	-	4.8	ns
			$V_{CC}=4.5\text{V}$ to $5.5\text{V}$	1.0	-	4.2	ns
output skew time	$t_{sk(o)}$	$V_{CC}=3.0\text{V}$ to $3.6\text{V}$	-	-	1.5	ns	

Note:

[1] Typical values are measured at  $T_{amb}=25^{\circ}\text{C}$  and  $V_{CC}=1.2\text{V}$ ,  $1.8\text{V}$ ,  $2.5\text{V}$ ,  $2.7\text{V}$  and  $3.3\text{V}$  respectively.

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

[3] Skew between any two outputs of the same package switching in the same direction. This parameter is guaranteed by design.



## 4、Testing Circuit

### 4.1、AC Testing Circuit

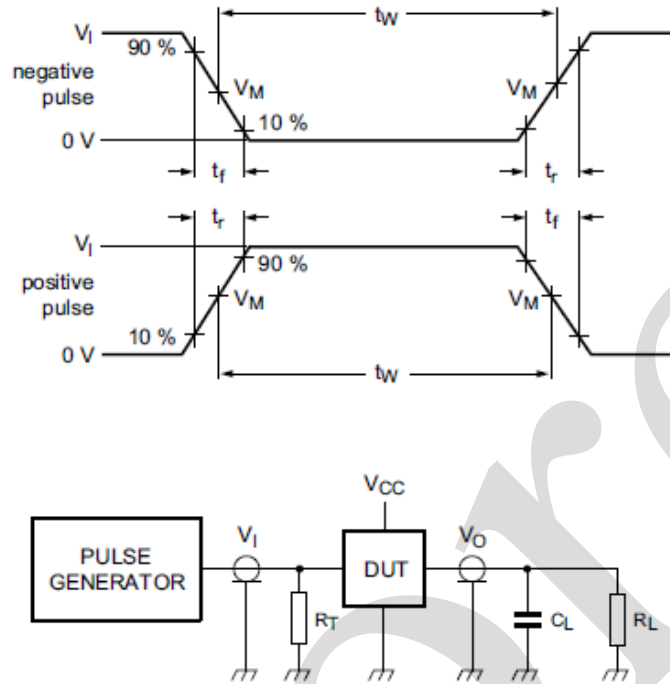


Figure 4. Test circuit for measuring switching times

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 the output impedance  $Z_o$  of the pulse generator.

### 4.2、AC Testing Waveforms

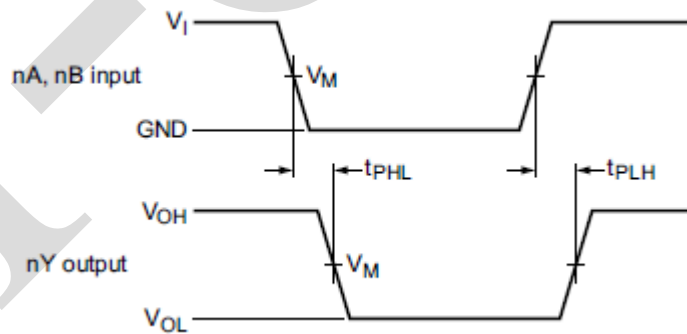


Figure 5. The input (nA, nB) to output (nY) propagation delays



## 4.3、Measurement Points

Supply voltage	Input	Output
$V_{CC}$	$V_M$	$V_M$
$< 2.7V$	$0.5 \times V_{CC}$	$0.5 \times V_{CC}$
$\geq 2.7V$	1.5V	1.5V

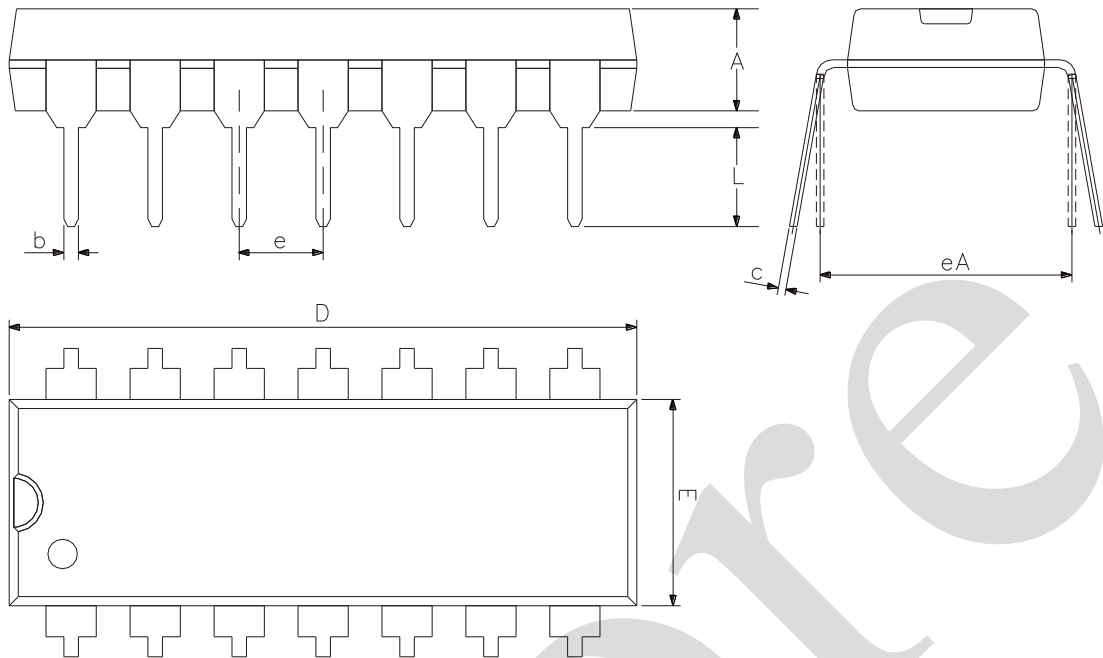
## 4.4、Test Data

Supply voltage	Input		Load	
$V_{CC}$	$V_I$	$t_r, t_f$	$C_L$	$R_L$
1.2V	$V_{CC}$	$\leq 2.0ns$	30pF	1k $\Omega$
1.65V to 1.95V	$V_{CC}$	$\leq 2.0ns$	30pF	1k $\Omega$
2.3V to 2.7V	$V_{CC}$	$\leq 2.0ns$	30pF	500 $\Omega$
2.7V	2.7V	$\leq 2.5ns$	50pF	500 $\Omega$
3.0V to 3.6V	2.7V	$\leq 2.5ns$	50pF	500 $\Omega$



## 5、Package Information

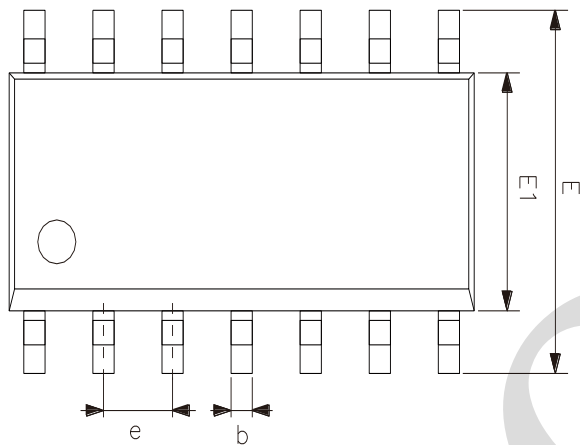
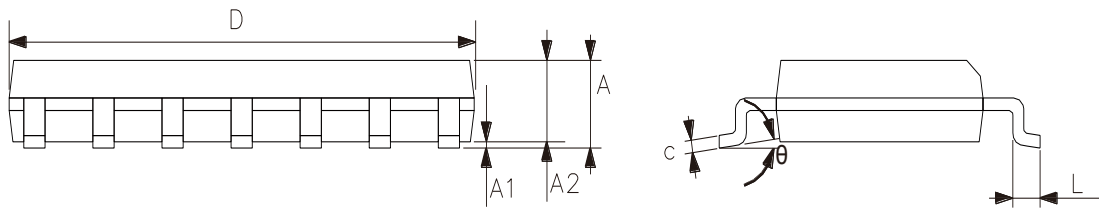
### 5.1、DIP14



2023/12/A	Dimensions In Millimeters	
Symbol	Min	Max
A	3.05	3.60
b	0.33	0.56
c	0.20	0.36
D	18.80	19.40
E	6.20	6.60
e	2.54	
eA	7.62	10.90
L	2.92	—



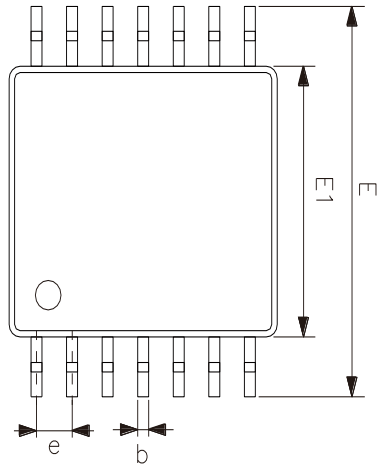
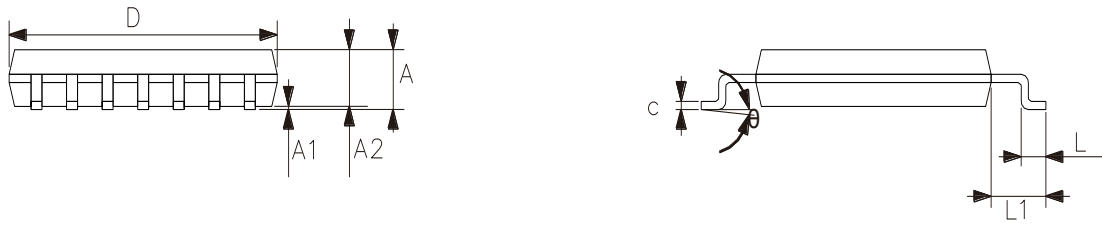
## 5.2、SOP14



2023/12/A	Dimensions In Millimeters	
Symbol	Min.	Max.
A	1.50	1.75
A1	0.05	0.25
A2	1.30	—
b	0.33	0.50
c	0.19	0.25
D	8.43	8.76
E	5.80	6.25
E1	3.75	4.00
e	1.27	
L	0.40	0.89
θ	0°	8°



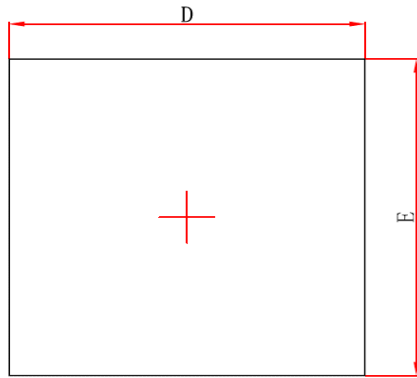
5.3、TSSOP14



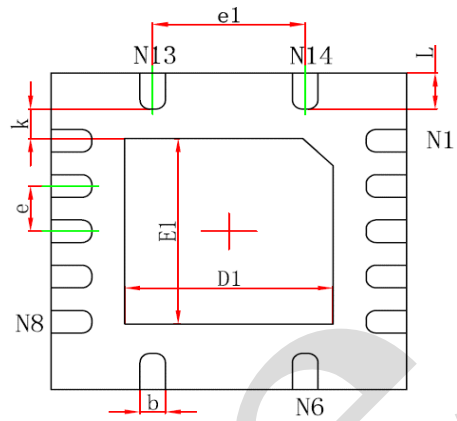
2023/12/A	Dimensions In Millimeters	
Symbol	Min	Max
A	—	1.20
A1	0.05	0.15
A2	0.80	1.05
b	0.19	0.30
c	0.09	0.20
D	4.90	5.10
E1	4.30	4.50
E	6.20	6.60
e	0.65	
L	0.45	0.75
L1	1.00	
$\theta$	0°	8°



## 5.4、VQFN14



Top View



Bottom View

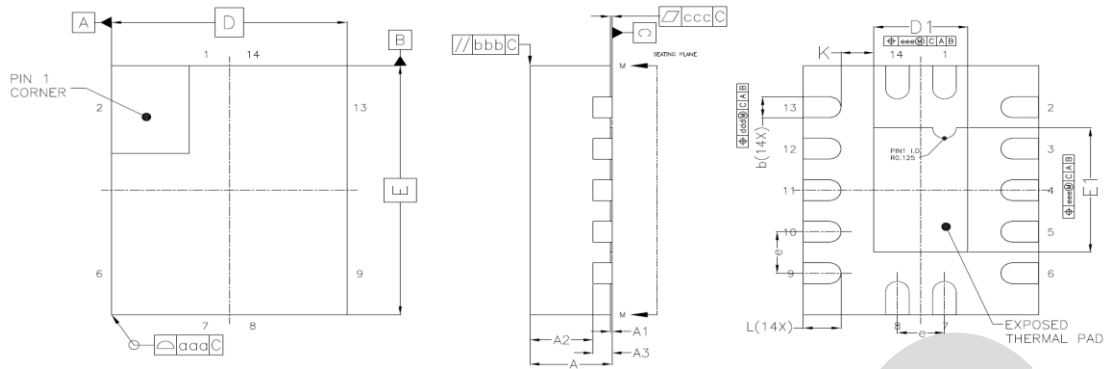


Side View

2024/08/A	Dimensions In Millimeters	
	Symbol	Min
A	0.70	0.90
A1	0	0.05
A3	0.203 REF	
D	3.424	3.576
E	3.424	3.576
D1	1.95	2.15
E1	1.95	2.15
k	0.20	—
b	0.20	0.30
e	0.50	
e1	1.50	
L	0.324	0.476



## 5.5、DHVQFN14



2024/10/A	Dimensions In Millimeters	
Symbol	Min	Max
A	0.80	1.00
A1	0	0.05
A2	0.60	0.70
A3	0.203 REF	
D	2.40	2.60
E	2.90	3.10
e	0.50	
b	0.18	0.30
L	0.30	0.50
D1	0.85	1.15
E1	1.35	1.65
K	0.35	



## 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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