AiP74CBTLV3125
4-Bit Bus Switch

Product Specification

Specification Revision History：

Version	Date	Description
2023-10-A1	2023-10	New
2025-10-A2	2025-10	Add DHVQFN14 package form; modify the marking code of SOP14
2026-03-A3	2026-03	Add VQFN14 package form; add ESD

Contents

1、General Description

AiP74CBTLV3125 is a 4-bit bus single-channel analog switch circuit. Each bit is controlled by the separate enable port ($1\overline{OE}$ to $4\overline{OE}$) and enable ports are all Schmitt designed. To ensure the high-impedance OFF-state during power-up or power-down, it is recommended that $n\overline{OE}$ connect an external pull-up resistor to V_{CC}. When the circuit is in power down state (V_{CC}=0V), the control port and the switch port are in high resistance state, which can effectively prevent backflow and circuit damage.

Features:

- Power supply voltage: 2.3V to 3.6V
- ON resistance typical: 2.8Ω (V_{CC}=3.3V)
- Rail-to-rail analog switch
- Power down (V_{CC}=0V) anti-backflow function
- Specified from -40℃ to +125℃
- Package information: SOP14/TSSOP14/SSOP16/DHVQFN14/VQFN14

Ordering Information:

Tube packing specifications:

Part number	Packaging form	Marking code	Tube quantity	Boxed tube quantity	Boxed quantity	Notes
AiP74CBTLV3125 SA14.TB	SOP14	CBTLV3125	50 PCS/tube	200 tube/box	10000 PCS/box	Dimensions of plastic enclosure: 8.7mm×3.9mm Pin spacing: 1.27mm
AiP74CBTLV3125 TA14.TB	TSSOP14	74CBTLV3125	96 PCS/tube	200 tube/box	19200 PCS/box	Dimensions of plastic enclosure: 5.0mm×4.4mm Pin spacing: 0.65mm
AiP74CBTLV3125 VB16.TB	SSOP16	74CBTLV3125	100 PCS/tube	100 tube/box	10000 PCS/box	Dimensions of plastic enclosure: 4.9mm×3.9mm Pin spacing: 0.635mm

Reel packing specifications:

Part number	Packaging form	Marking code	Reel quantity	Boxed reel quantity	Notes
AiP74CBTLV3125 SA14.TR	SOP14	CBTLV3125	4000PCS/reel	8000PCS/box	Dimensions of plastic enclosure: 8.7mm×3.9mm Pin spacing: 1.27mm
AiP74CBTLV3125 TA14.TR	TSSOP14	74CBTLV3125	5000PCS/reel	10000PCS/box	Dimensions of plastic enclosure: 5.0mm×4.4mm Pin spacing: 0.65mm
AiP74CBTLV3125 VB16.TR	SSOP16	74CBTLV3125	4000PCS/reel	8000PCS/box	Dimensions of plastic enclosure: 4.9mm×3.9mm Pin spacing: 0.635mm
AiP74CBTLV3125 QE14.TR	DHVQFN14	TLV3125	3000PCS/reel	3000PCS/box	Dimensions of plastic enclosure: 3.0mm×2.5mm Pin spacing: 0.5mm
AiP74CBTLV3125 QK14.TR	VQFN14	BTLV3125	5000PCS/reel	10000PCS/box	Dimensions of plastic enclosure: 3.5mm×3.5mm 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

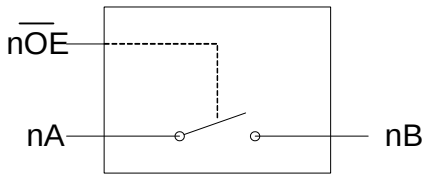
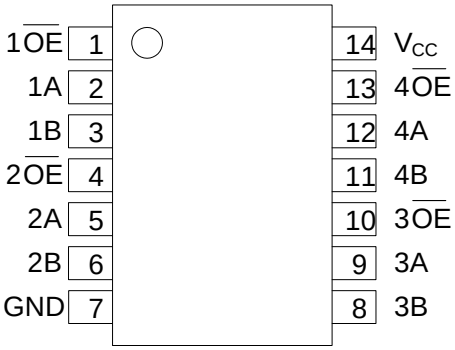
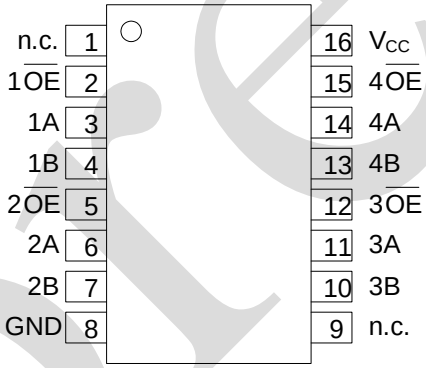


Figure 1. Block Diagram

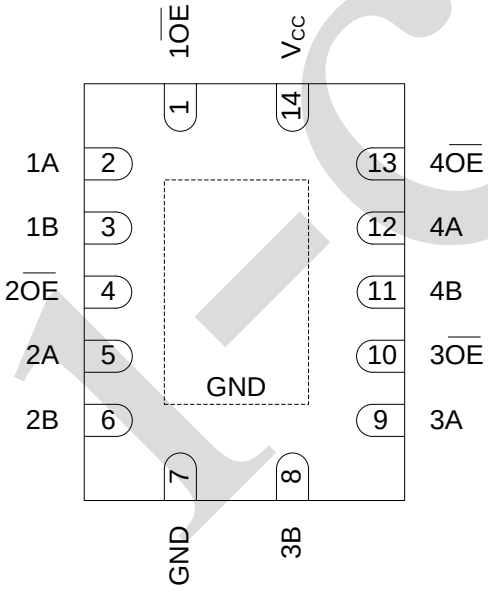
2.2、Pin Configurations



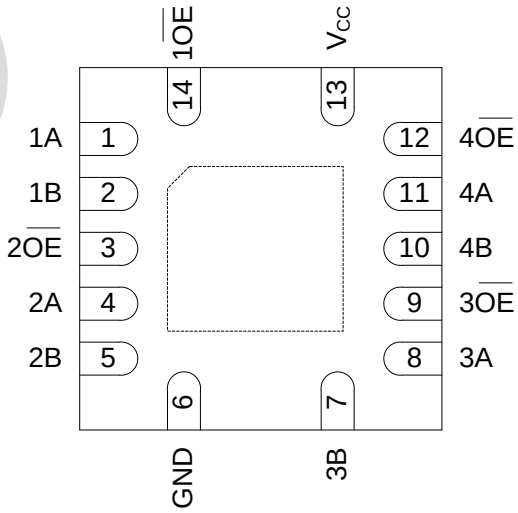
SOP14/TSSOP14



SSOP16



DHVQFN14



VQFN14

2.3、Pin Description

Symbol	Pin			Function
	SOP14/TSSOP14/DHVQFN14	VQFN14	SSOP16	
n.c.	-	-	1	not connected
$1\overline{OE}$	1	14	2	output enable input
1A	2	1	3	A input/output
1B	3	2	4	B output/input
$2\overline{OE}$	4	3	5	output enable input
2A	5	4	6	A input/output
2B	6	5	7	B output/input
GND	7	6	8	ground (0V)
n.c.	-	-	9	not connected
3B	8	7	10	B output/input
3A	9	8	11	A input/output
$3\overline{OE}$	10	9	12	output enable input
4B	11	10	13	B output/input
4A	12	11	14	A input/output
$4\overline{OE}$	13	12	15	output enable input
V_{CC}	14	13	16	power supply voltage

2.4、Function Table

Output enable input $n\overline{OE}$	Function switch
L	ON-state
H	OFF-state

Note: H=HIGH voltage level; L=LOW voltage level.

3、Electrical Parameter

3.1、Absolute Maximum Ratings

Characteristic	Symbol	Conditions	Min.	Max.	Unit
supply voltage	V_{CC}	-	-0.5	+4.6	V
input voltage	V_I	control input	-0.5	+4.6	V
switch voltage	V_{SW}	enable and disable mode	-0.5	V_{CC}+0.5	V
input clamping current	I_{IK}	V_I<-0.5V	-50	-	mA
switch clamping current	I_{SK}	V_I<-0.5V	-50	-	mA
switch current	I_{SW}	V_{SW}=0 to V_{CC}	-	±128	mA
supply current	I_{CC}	-	-	±100	mA
ground current	I_{GND}	-	-100	-	mA
storage temperature	T_{stg}	-	-65	150	℃
soldering temperature	T_L	10s	260		℃
electrostatic discharge	ESD	HBM	2000		V

3.2、Recommended Operating Conditions

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
supply voltage	V_{CC}	-	2.3	-	3.6	V
input voltage	V_I	-	0	-	3.6	V
switch voltage	V_{SW}	enable and disable mode	0	-	V_{CC}	V
operating temperature	T_{amb}	-	-40	-	+125	℃

3.3、Electrical Characteristics

3.3.1、DC Characteristics 1

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

Parameter	Symbol	Supply Voltage	Conditions	Min.	Typ.	Max.	Unit
HIGH-level input Voltage	V_{IH}	2.3V to 2.7V	-	1.7	-	-	V
		3.0V to 6V	-	2.0	-	-	V
LOW-level input voltage	V_{IL}	2.3V to 2.7V	-	-	-	0.7	V
		3.0V to 6V	-	-	-	0.9	V
input leakage current	I_I	3.6V	$\overline{nOE}$ pin; V_I=GND to V_{CC}	-	-	±1	uA
OFF-state leakage current	I_S(OFF)	3.6V	-	-	-	±1	uA
ON-state leakage current	I_S(ON)	3.6V	-	-	-	±1	uA
power-off leakage current	I_{OFF}	0V	V_I or V_O=0V to 3.6V	-	-	±10	uA
supply current	I_{CC}	3.6V	V_I=V_{CC} or GND; I_O=0A; Vsw=GND or V_{CC}	-	-	10	uA
additional supply current	ΔI_{CC}	3.6V	$\overline{nOE}$ pin; V_I=V_{CC}-0.6V; Vsw=GND or V_{CC}	-	-	300	uA
ON resistance	R_{ON}	2.3V to 2.7V see Figure 2 to 4	Isw=64mA; V_I=0V	-	3.3	8	Ω
			Isw=24mA; V_I=0V	-	3.2	8	Ω
			Isw=15mA; V_I=1.7V	-	10.8	40	Ω
		3.0V to 3.6V see Figure 5 to 7	Isw=64mA; V_I=0V	-	2.8	7	Ω
			Isw=24mA; V_I=0V	-	2.8	7	Ω
			Isw=15mA; V_I=2.4V	-	7.1	15	Ω

Note:

[1] All the typical values are measured at V_{CC}=2.5V, 3.3V (unless otherwise specified) and T_{amb}=25℃.

3.3.2、DC Characteristics 2

(T_{amb}=-40℃ to +125℃, GND=0V, unless otherwise specified)

Parameter	Symbol	Supply Voltage	Conditions	Min.	Typ.	Max.	Unit
HIGH-level input Voltage	V_{IH}	2.3V to 2.7V	-	1.7	-	-	V
		3.0V to 6V	-	2.0	-	-	V
LOW-level input voltage	V_{IL}	2.3V to 2.7V	-	-	-	0.7	V
		3.0V to 6V	-	-	-	0.9	V
input leakage current	I_I	3.6V	nOE pin; V_I=GND to V_{CC}	-	-	±20	uA
OFF-state leakage current	I_S(OFF)	3.6V	-	-	-	±20	uA
ON-state leakage current	I_S(ON)	3.6V	-	-	-	±20	uA
power-off leakage current	I_{OFF}	0V	V_I or V_O=0V to 3.6V	-	-	±50	uA
supply current	I_{CC}	3.6V	V_I=V_{CC} or GND; I_O=0A; Vsw=GND or V_{CC}	-	-	50	uA
additional supply current	ΔI_{CC}	3.6V	nOE pin; V_I=V_{CC}-0.6V; Vsw=GND or V_{CC}	-	-	2000	uA
ON resistance	R_{ON}	2.3V to 2.7V see Figure 2 to 4	Isw=64mA; V_I=0V	-	-	15	Ω
			Isw=24mA; V_I=0V	-	-	15	Ω
			Isw=15mA; V_I=1.7V	-	-	60	Ω
		3.0V to 3.6V see Figure 5 to 7	Isw=64mA; V_I=0V	-	-	11	Ω
			Isw=24mA; V_I=0V	-	-	11	Ω
			Isw=15mA; V_I=2.4V	-	-	25.5	Ω

3.3.3、AC Characteristics 1

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

Parameter	Symbol	Supply Voltage	Conditions	Min.	Typ.	Max.	Unit
propagation delay	t_{PLH}, t_{PHL}	2.3V to 2.7V	nA to nB nB to nA see Figure 9	-	-	0.13	ns
		3.0V to 3.6V		-	-	0.20	ns
enable time	t_{PZH}, t_{PZL}	2.3V to 2.7V	$\overline{nOE}$ to nA/nB see Figure 10	-	2.7	4.6	ns
		3.0V to 3.6V		-	2.4	4.4	ns
disable time	t_{PLZ}, t_{PHZ}	2.3V to 2.7V	$\overline{nOE}$ to nA/nB see Figure 10	-	2.2	3.9	ns
		3.0V to 3.6V		-	2.9	4.2	ns

Note:

[1] All the typical values are measured at V_{CC}=2.5V/3.3V (unless otherwise specified) and T_{amb}=25℃.

3.3.4、AC Characteristics 2

(T_{amb}=-40℃ to +125℃, GND=0V, unless otherwise specified)

Parameter	Symbol	Supply Voltage	Conditions	Min.	Typ.	Max.	Unit
propagation delay	t_{PLH}, t_{PHL}	2.3V to 2.7V	nA to nB nB to nA see Figure 9	-	-	0.20	ns
		3.0V to 3.6V		-	-	0.31	ns
enable time	t_{PZH}, t_{PZL}	2.3V to 2.7V	$n\overline{OE}$ to nA/nB see Figure 10	-	-	6.0	ns
		3.0V to 3.6V		-	-	6.0	ns
disable time	t_{PLZ}, t_{PHZ}	2.3V to 2.7V	$n\overline{OE}$ to nA/nB see Figure 10	-	-	5.5	ns
		3.0V to 3.6V		-	-	5.5	ns

4、Characteristic Curve

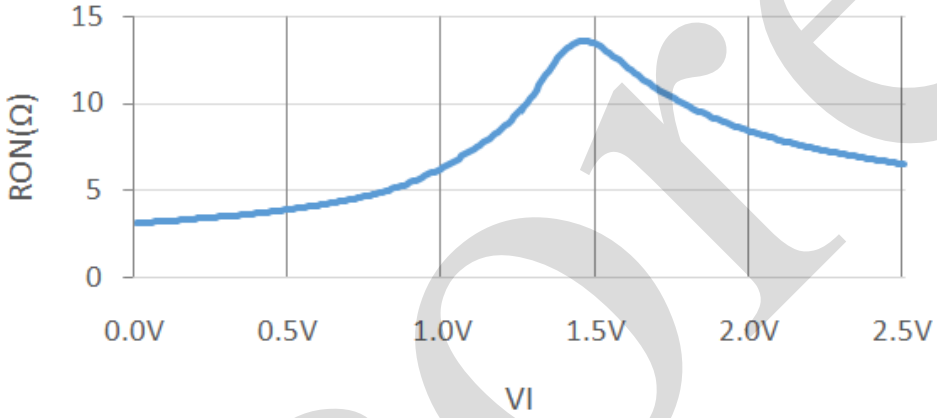


Figure 2. The Relation between ON resistance and input voltage
(V_{CC}=2.5V, I_{SW}=15mA, T_{amb}=25℃)

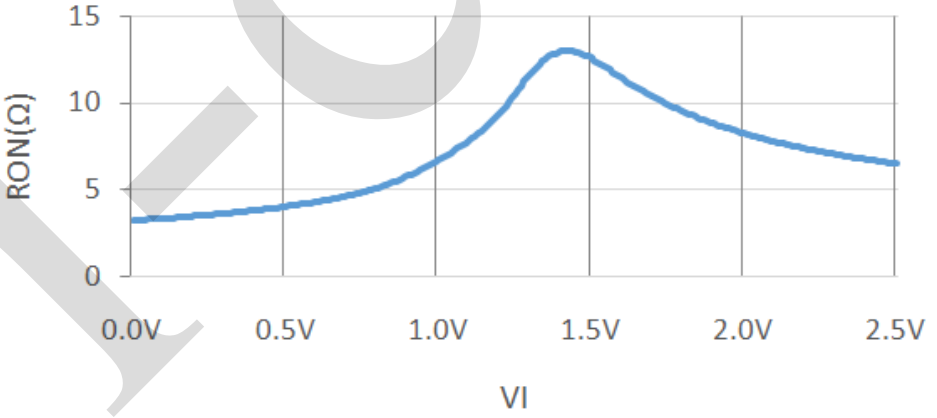


Figure 3. The Relation between ON resistance and input voltage
(V_{CC}=2.5V, I_{SW}=24mA, T_{amb}=25℃)

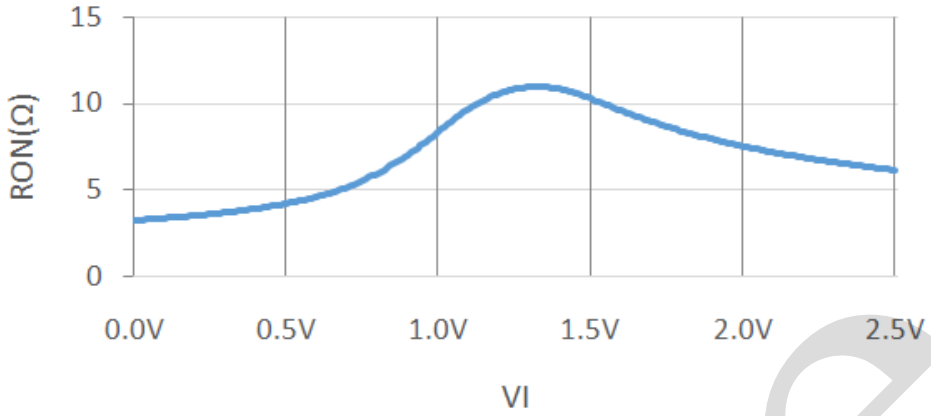


Figure 4. The Relation between ON resistance and input voltage
(V_{CC}=2.5V, I_{SW}=64mA, T_{amb}=25℃)

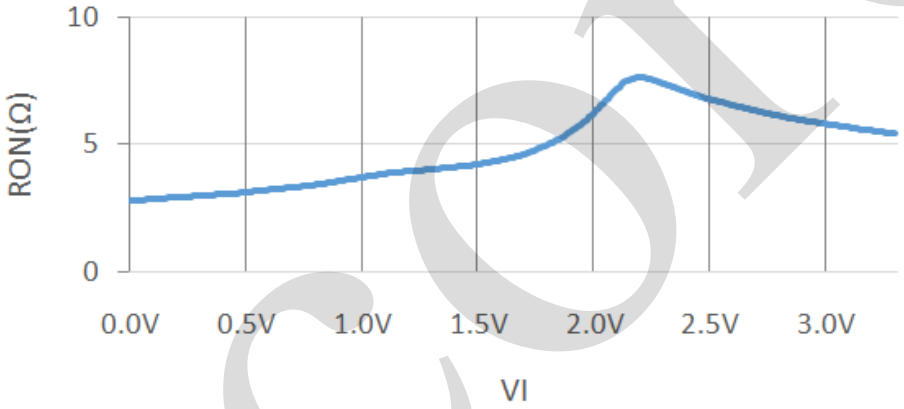


Figure 5. The Relation between ON resistance and input voltage
(V_{CC}=3.3V, I_{SW}=15mA, T_{amb}=25℃)

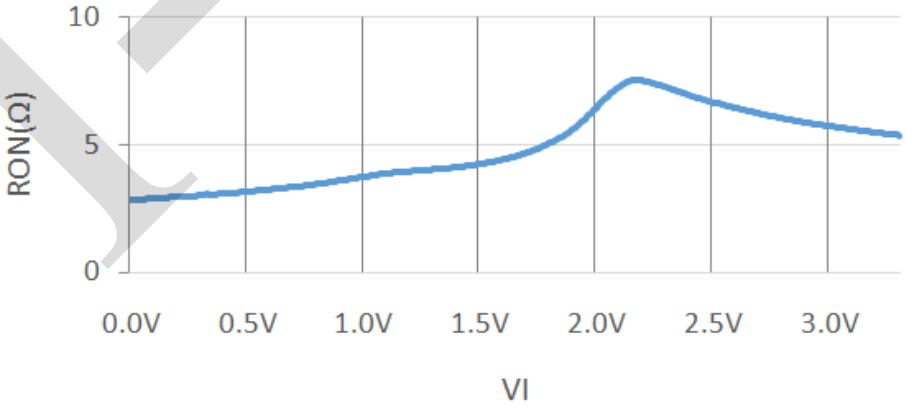


Figure 6. The Relation between ON resistance and input voltage
(V_{CC}=3.3V, I_{SW}=24mA, T_{amb}=25℃)

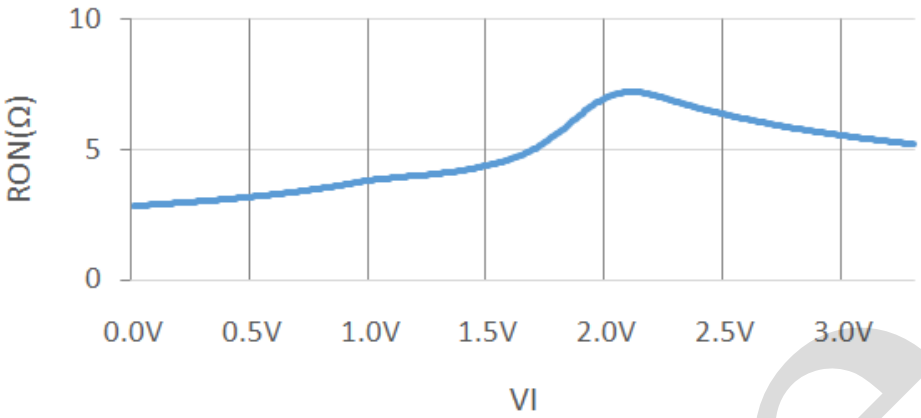


Figure 7. The Relation between ON resistance and input voltage
(V_{CC}=3.3V, I_{SW}=64mA, T_{amb}=25℃)

5、Testing Information

5.1、AC Testing Circuit

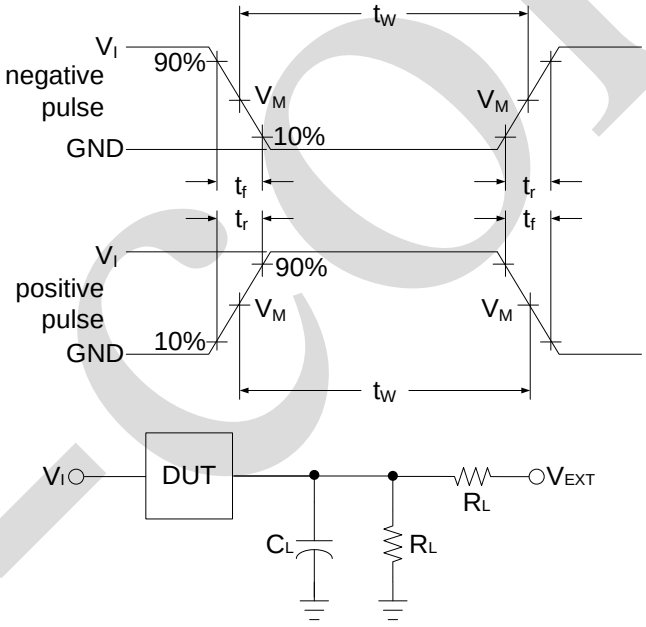


Figure 8. Test circuit for measuring switching times

The Definition of Testing Circuit:

R_L=Load Resistance

C_L=Load Capacitance, including capacitors on the probe and clip.

5.2、Testing Data

Supply Voltage	Input		Load		V_{EXT}		
V_{CC}	V_I	t_r, t_f	C_L	R_L	t_{PLH}, t_{PHL}	t_{PHZ}, t_{PZH}	t_{PLZ}, t_{PZL}
2.3V to 2.7V	V_{CC}	≤3.0ns	30pF	500Ω	open	GND	2×V_{CC}
3.0V to 3.6V	V_{CC}	≤3.0ns	50pF	500Ω	open	GND	2×V_{CC}

5.3、AC Tasting Waveform

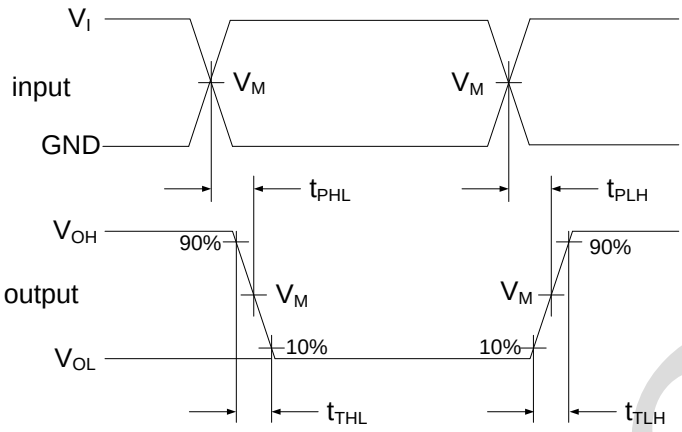


Figure 9. The data input (nA/nB) to output (nB/nA) propagation delays

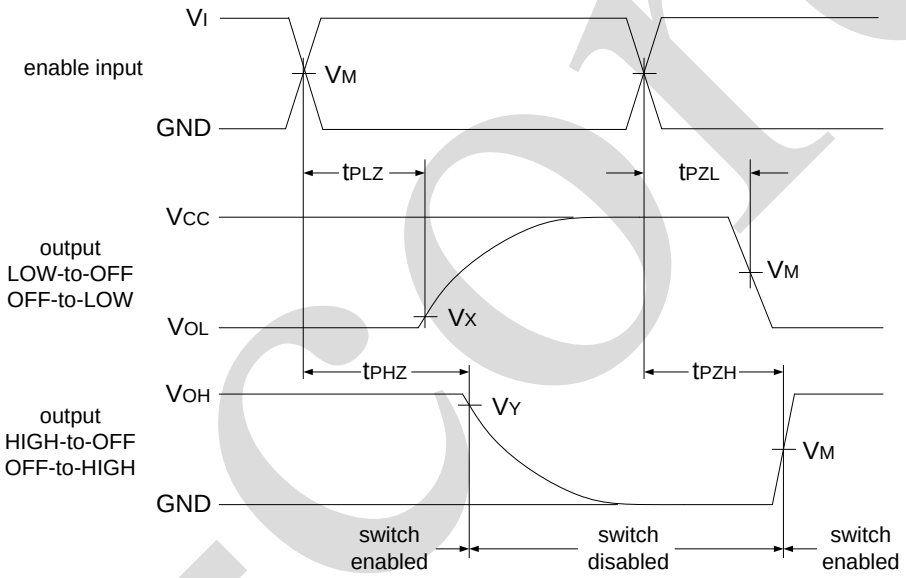


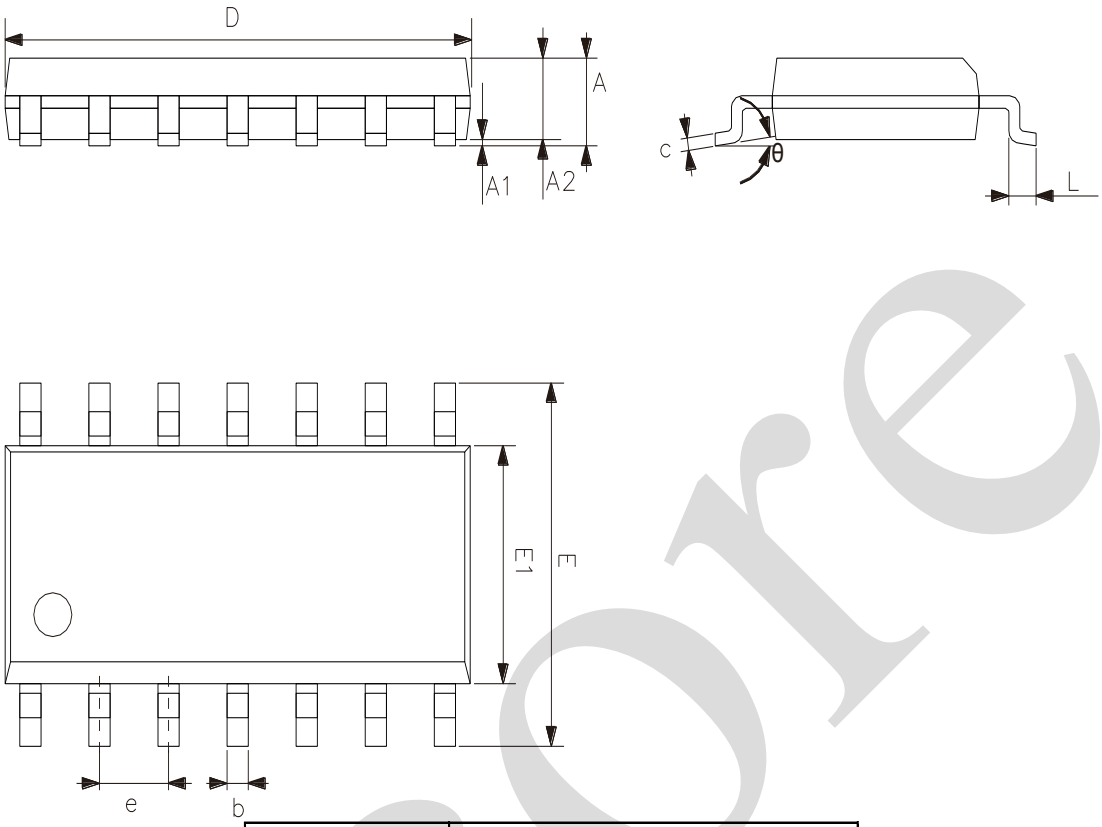
Figure 10. Enable and disable times

5.4、Testing Point

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

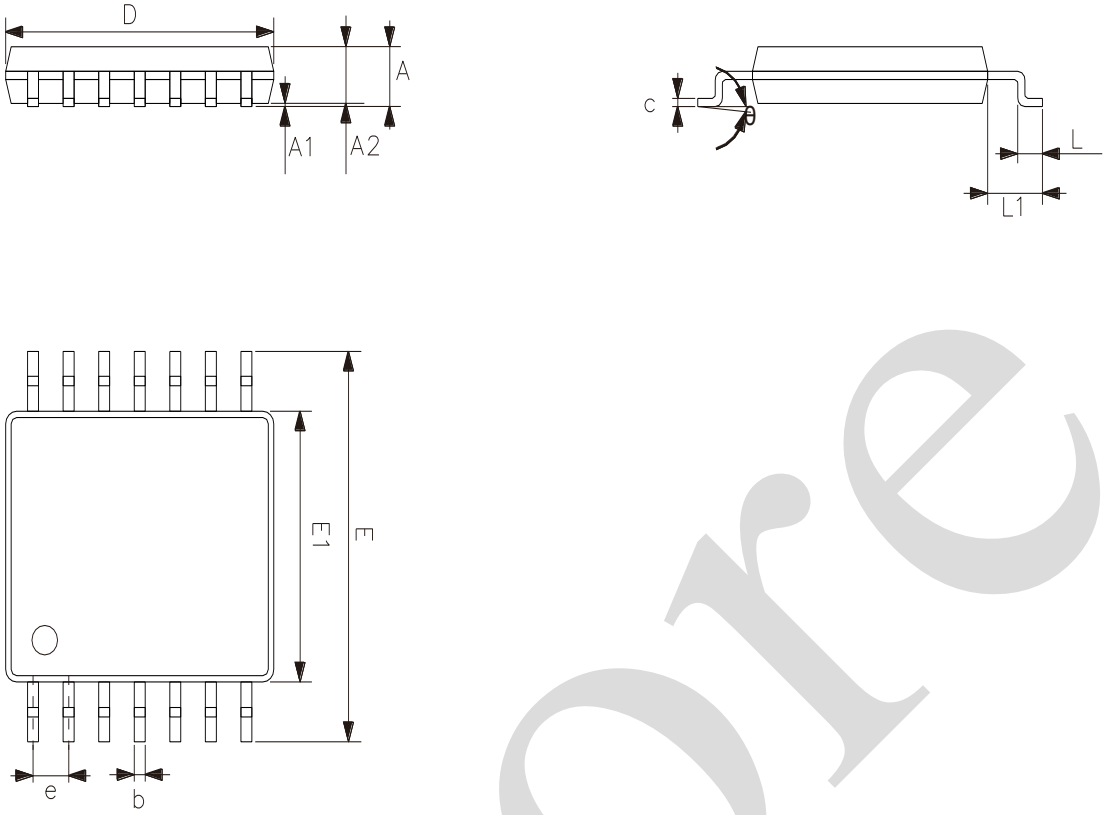
6、Package Information

6.1、SOP14



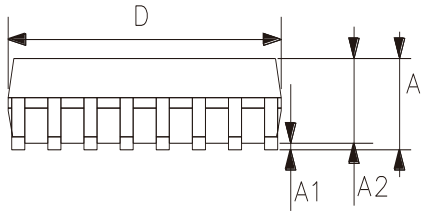
2023/12/A	Dimensions In Millimeters	
Symbol	Min.	Max.
A	1.50	1.75
A1	0.05	0.25
A2	1.30	—
b	0.33	0.50
c	0.19	0.25
D	8.43	8.76
E	5.80	6.25
E1	3.75	4.00
e	1.27	
L	0.40	0.89
θ	0°	8°

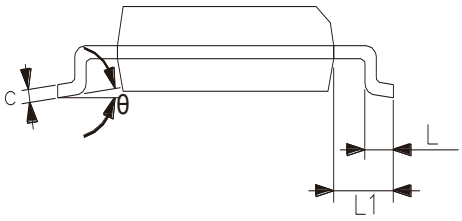
6.2、TSSOP14

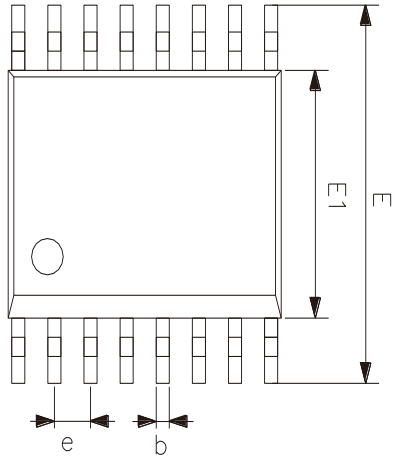


2023/12/A	Dimensions In Millimeters	
Symbol	**Min**	**Max**
A	—	1.20
A1	0.05	0.15
A2	0.80	1.05
b	0.19	0.30
c	0.09	0.20
D	4.90	5.10
E1	4.30	4.50
E	6.20	6.60
e	0.65	
L	0.45	0.75
L1	1.00	
θ	0°	8°

6.3、SSOP16

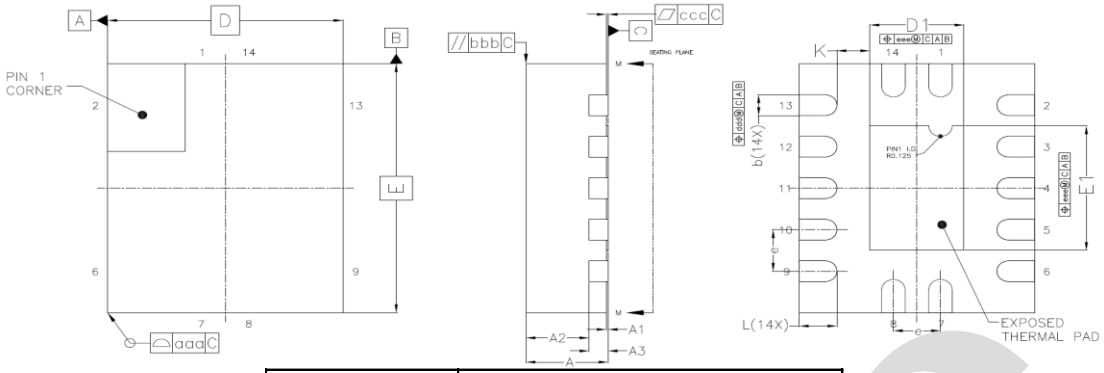






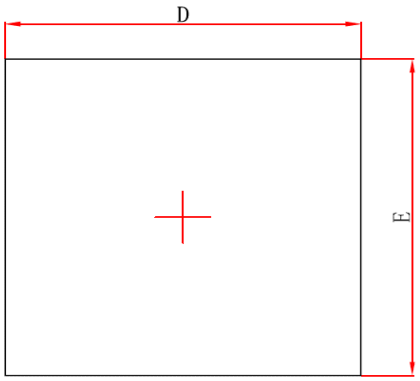
2023/12/A	Dimensions In Millimeters	
Symbol	**Min**	**Max**
A	—	1.75
A1	0.02	0.23
A2	1.30	1.50
b	0.23	0.31
c	0.20	0.24
D	4.70	5.10
E	5.80	6.25
E1	3.80	4.02
e	0.635	
L	0.45	0.80
L1	1.05	
θ	0°	8°

6.4、DHVQFN14

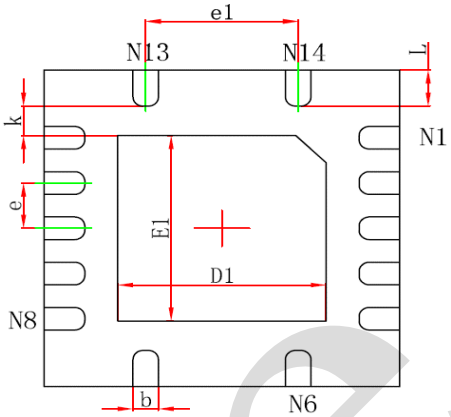


2024/10/A	Dimensions In Millimeters	
Symbol	**Min**	**Max**
A	0.80	1.00
A1	0	0.05
A2	0.60	0.70
A3	0.203 REF	
D	2.40	2.60
E	2.90	3.10
e	0.50	
b	0.18	0.30
L	0.30	0.50
D1	0.85	1.15
E1	1.35	1.65
K	0.35	

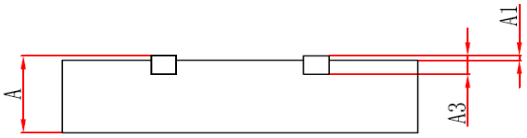
6.5、VQFN14



Top View



Bottom View



Side View

2024/08/A	Dimensions In Millimeters	
Symbol	Min	Max
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

7、Statements and Notes

7.1、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.									

7.2、Notes

We recommend you to read this chapter carefully before using this product.

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