



AiP74CBTLV3861

10-Bit Bus Switch with Output Enable

Product Specification

Specification Revision History:

Version	Date	Description
2023-06-A1	2023-06	New
2023-11-A2	2023-11	Modify ordering information
2025-10-A3	2025-10	Add SSOP24 and SOP24 package form; update package information
2026-06-A4	2026-06	Modify the marking code of DHVQFN24



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1、General Description

AiP74CBTLV3861 is a 10-bit bus switch with output enable. The circuit has a common enable control port ($\overline{OE}$), which is Schmitt designed.

To ensure the high-impedance OFF-state during power-up or power-down, it is recommended that $\overline{OE}$ 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: 3.2Ω
- Rail-to-rail analog switch
- CMOS low power consumption
- Power down ($V_{CC}=0V$) anti-backflow function
- Specified from -40°C to $+125^{\circ}\text{C}$
- Package information: SOP24/SSOP24/TSSOP24/DHVQFN24

**Ordering Information:****Reel packing specifications:**

Part number	Packaging form	Marking code	Reel quantity	Boxed reel quantity	Notes
AiP74CBTLV3861 QE24.TR	DHVQFN24	CBTLV3861	3000 PCS/reel	3000 PCS/box	Dimensions of plastic enclosure: 5.5mm×3.5mm Pin spacing: 0.50mm
AiP74CBTLV3861 TA24.TR	TSSOP24	74CBTLV3861	4000 PCS/reel	8000 PCS/box	Dimensions of plastic enclosure: 7.8mm×4.4mm Pin spacing: 0.65mm
AiP74CBTLV3861 VB24.TR	SSOP24	CBTLV3861	4000 PCS/reel	8000 PCS/box	Dimensions of plastic enclosure: 8.7mm×3.9mm Pin spacing: 0.635mm
AiP74CBTLV3861 SA24.TR	SOP24	74CBTLV3861	1250 PCS/reel	1250 PCS/box	Dimensions of plastic enclosure: 15.4mm×7.5mm Pin spacing: 1.27mm

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

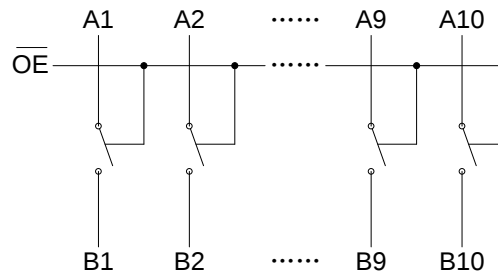
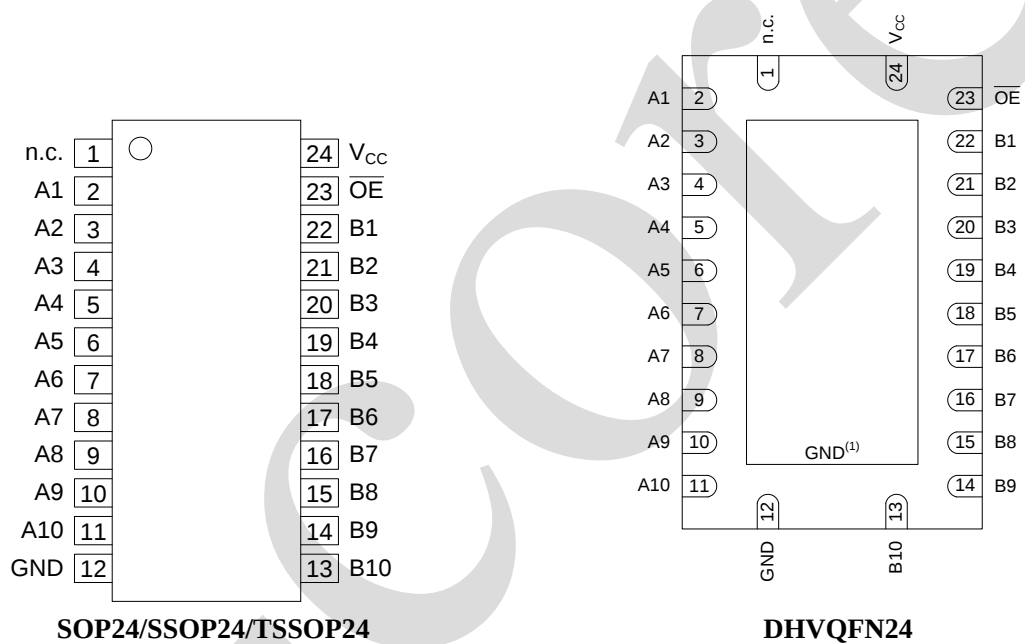


Figure 1. Block Diagram

2.2、Pin Configurations



Note: (1) If it is soldered, the solder land should remain floating or be connected to GND.



2.3、Pin Description

Pin No.	Pin Name	Description
1	n.c.	not connected
2	A1	A1 input/output
3	A2	A2 input/output
4	A3	A3 input/output
5	A4	A4 input/output
6	A5	A5 input/output
7	A6	A6 input/output
8	A7	A7 input/output
9	A8	A8 input/output
10	A9	A9 input/output
11	A10	A10 input/output
12	GND	ground (0V)
13	B10	B10 input/output
14	B9	B9 input/output
15	B8	B8 input/output
16	B7	B7 input/output
17	B6	B6 input/output
18	B5	B5 input/output
19	B4	B4 input/output
20	B3	B3 input/output
21	B2	B2 input/output
22	B1	B1 input/output
23	OE	output enable input (active LOW)
24	V _{CC}	power supply voltage

2.4、Function Table

Input	Input/Output
OE	An, Bn
L	An=Bn
H	Z

Note: H=HIGH voltage level; L=LOW voltage level; Z=high-impedance OFF-state.



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	°C
soldering temperature	T_L	10s	260		°C

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	°C

3.3、Electrical Characteristics

3.3.1、DC Characteristics 1

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

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



		see Figure 5 to 7	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°C.

3.3.2、DC Characteristics 2

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

Parameter	Symbol	V _{CC}	Conditions	Min.	Typ.	Max.	Unit
HIGH-level input Voltage	V _{IH}	2.3V to 2.7V	-	1.7	-	-	V
		3.0V to 3.6V	-	2.0	-	-	V
LOW-level input voltage	V _{IL}	2.3V to 2.7V	-	-	-	0.7	V
		3.0V to 3.6V	-	-	-	0.9	V
input leakage current	I _I	3.6V	pin OE; 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; V _{sw} =GND or V _{CC}	-	-	50	uA
additional supply current	ΔI _{CC}	3.6V	pin OE; V _I =V _{CC} -0.6V; V _{sw} =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°C to +85°C, GND=0V, unless otherwise specified)

Parameter	Symbol	V _{CC}	Conditions	Min.	Typ.	Max.	Unit
propagation delay	t _{PLH} , t _{PHL}	2.3V to 2.7V	An to Bn; Bn to An 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	OE to An/Bn see Figure 10	-	2.9	5.5	ns
		3.0V to 3.6V		-	2.4	4.9	ns
disable time	t _{PLZ} , t _{PHZ}	2.3V to 2.7V	OE to An/Bn see Figure 10	-	2.6	5.5	ns
		3.0V to 3.6V		-	3.1	5.8	ns

Note:

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



3.3.4、AC Characteristics 2

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

Parameter	Symbol	V_{CC}	Conditions	Min.	Typ.	Max.	Unit
propagation delay	t_{PLH} , t_{PHL}	2.3V to 2.7V	An to Bn; Bn to An 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	$\overline{OE}$ to An/Bn see Figure 10	-	-	8.0	ns
		3.0V to 3.6V		-	-	7.0	ns
disable time	t_{PLZ} , t_{PHZ}	2.3V to 2.7V	$\overline{OE}$ to An/Bn see Figure 10	-	-	8.0	ns
		3.0V to 3.6V		-	-	8.5	ns

4、Characteristic Curve

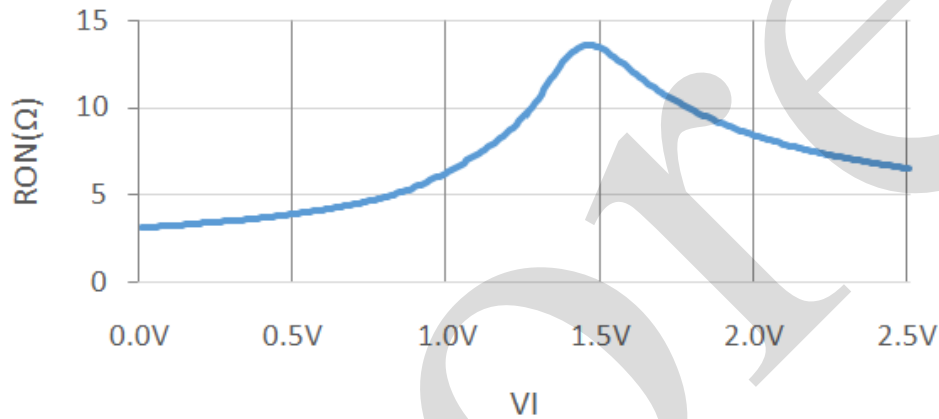


Figure 2. The Relation between ON resistance and input voltage
($V_{CC}=2.5\text{V}$, $I_{SW}=15\text{mA}$, $T_{amb}=25^{\circ}\text{C}$)

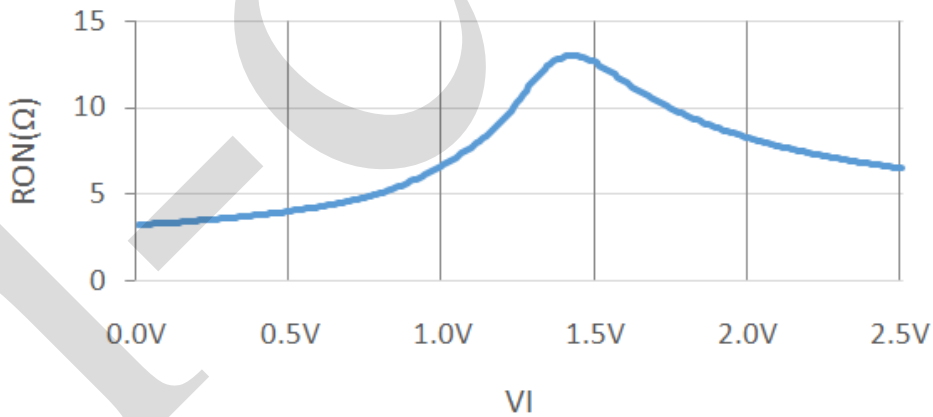


Figure 3. The Relation between ON resistance and input voltage
($V_{CC}=2.5\text{V}$, $I_{SW}=24\text{mA}$, $T_{amb}=25^{\circ}\text{C}$)

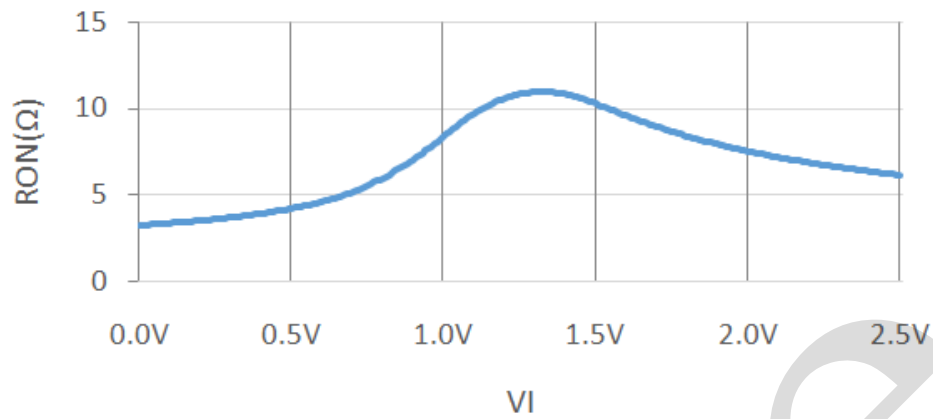


Figure 4. The Relation between ON resistance and input voltage
($V_{CC}=2.5V$, $I_{SW}=64mA$, $T_{amb}=25^{\circ}C$)

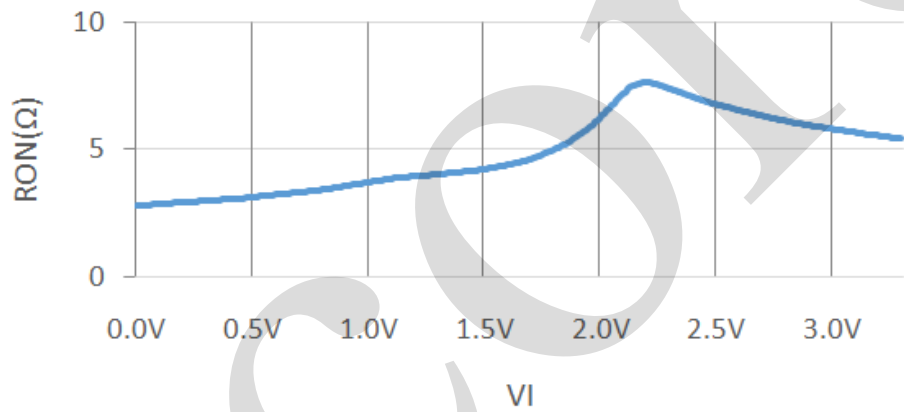


Figure 5. The Relation between ON resistance and input voltage
($V_{CC}=3.3V$, $I_{SW}=15mA$, $T_{amb}=25^{\circ}C$)

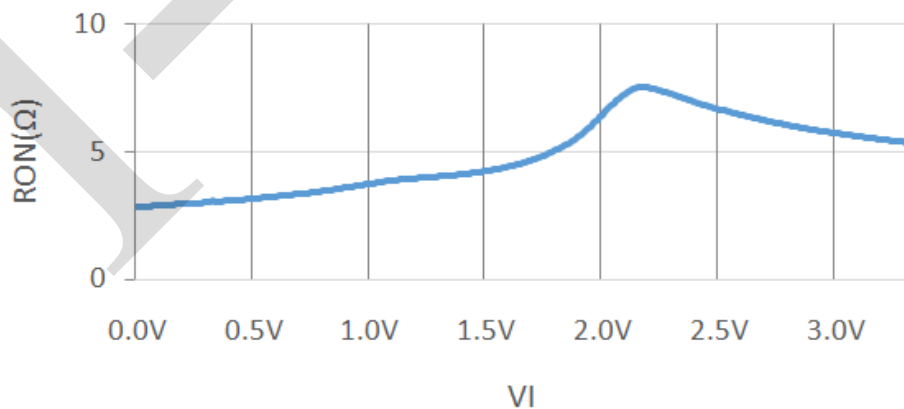


Figure 6. The Relation between ON resistance and input voltage
($V_{CC}=3.3V$, $I_{SW}=24mA$, $T_{amb}=25^{\circ}C$)

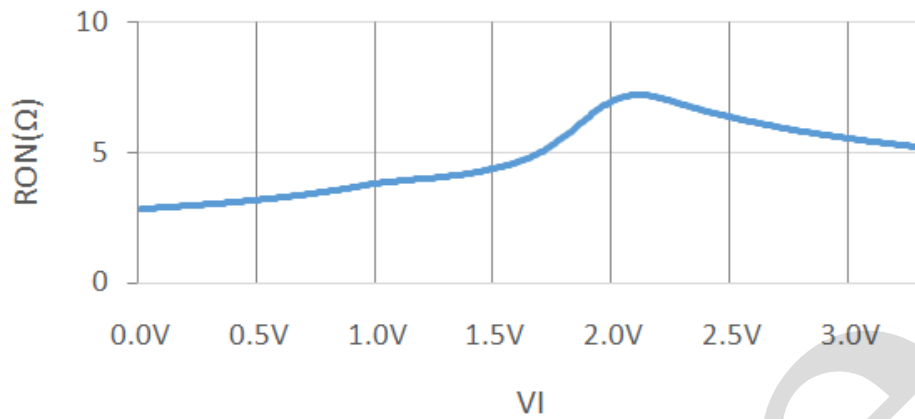


Figure 7. The Relation between ON resistance and input voltage
($V_{CC}=3.3V$, $I_{SW}=64mA$, $T_{amb}=25^{\circ}C$)

5、Testing Circuit

5.1、AC Testing Circuit

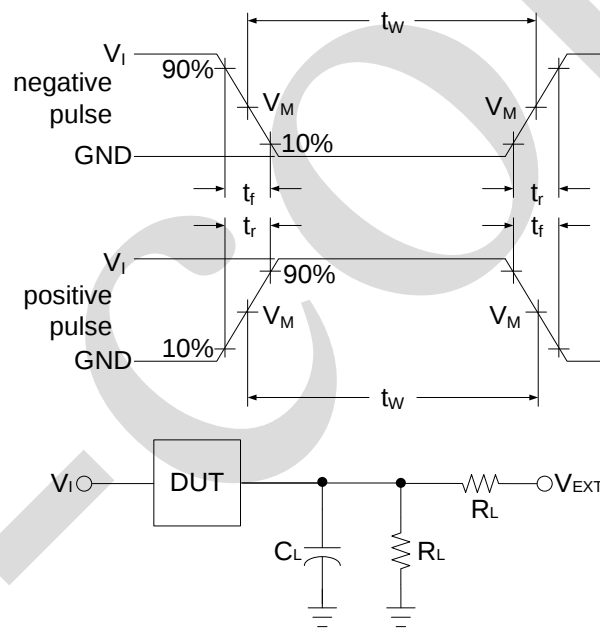


Figure 8. Test circuit for measuring switching times

Definitions for test circuit:

R_L =Load resistance.

C_L =Load capacitance including jig and probe capacitance.

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}	$\leq 3.0ns$	30pF	500Ω	open	GND	$2 \times V_{CC}$
3.0V to 3.6V	V_{CC}	$\leq 3.0ns$	50pF	500Ω	open	GND	$2 \times V_{CC}$

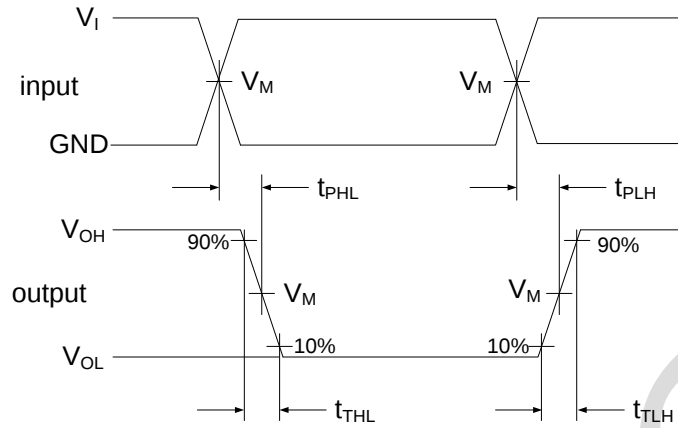
**5.3、AC Testing Waveforms**

Figure 9. Input (An/Bn) to output (Bn/An) propagation delays

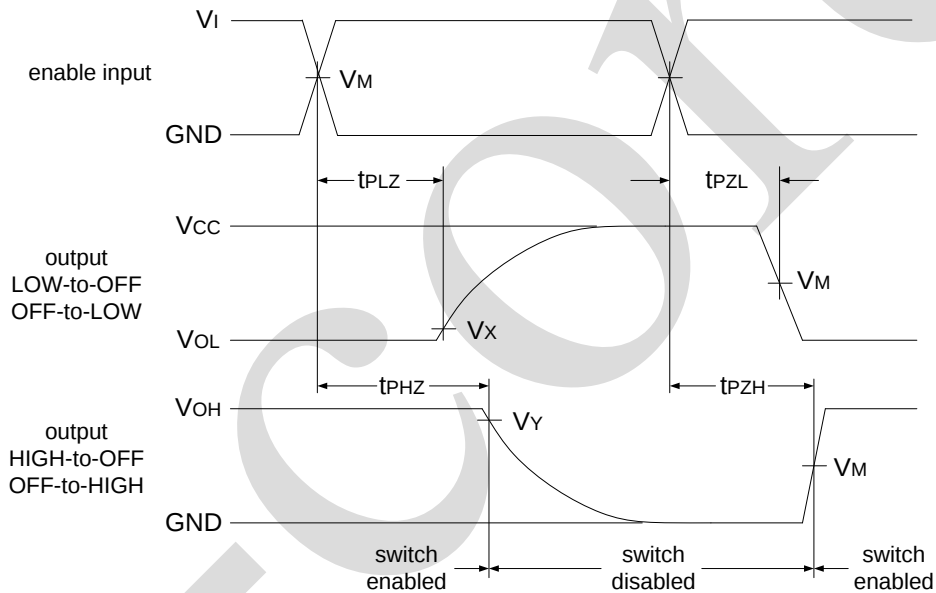


Figure 10. Enable and disable times

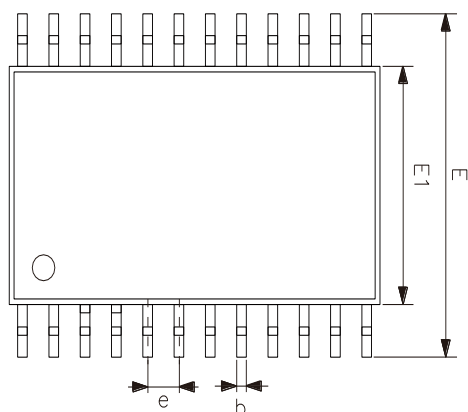
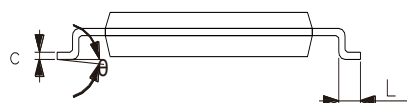
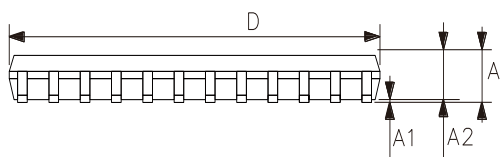
5.4、Measurement Points

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

5.1、TSSOP24



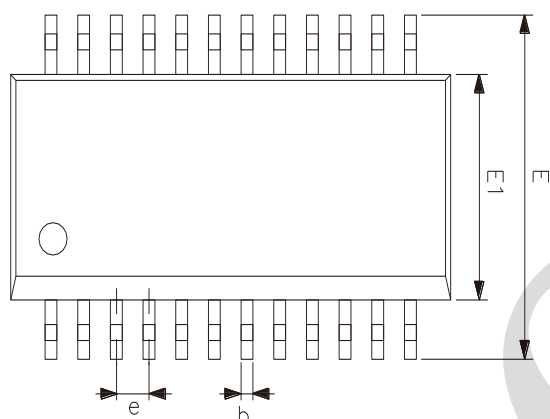
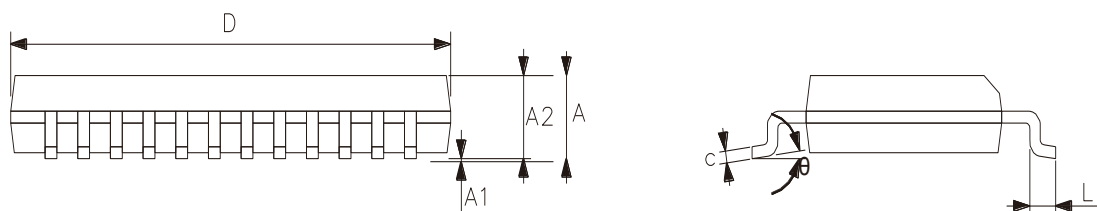
2023/12/A	Dimensions In Millimeters	
Symbol	Min	Max
A	—	1.20
A1	0.05	0.15
A2	0.80	1.05
b	0.19	0.30
c	0.09	0.20
D	7.70	7.90
E	6.20	6.60
E1	4.30	4.50
e	0.65	
L	0.45	0.75
θ	0°	8°



2023/12/A	Dimensions In Millimeters	
Symbol	Min	Max
A	0.80	1.00
A1	0.00	0.05
A2	0.60	0.70
A3	0.20	
D	5.40	5.60
E	3.40	3.60
e	0.50	
e1	1.50	
b	0.18	0.30
L	0.30	0.50
D1	3.95	4.25
E1	1.95	2.25



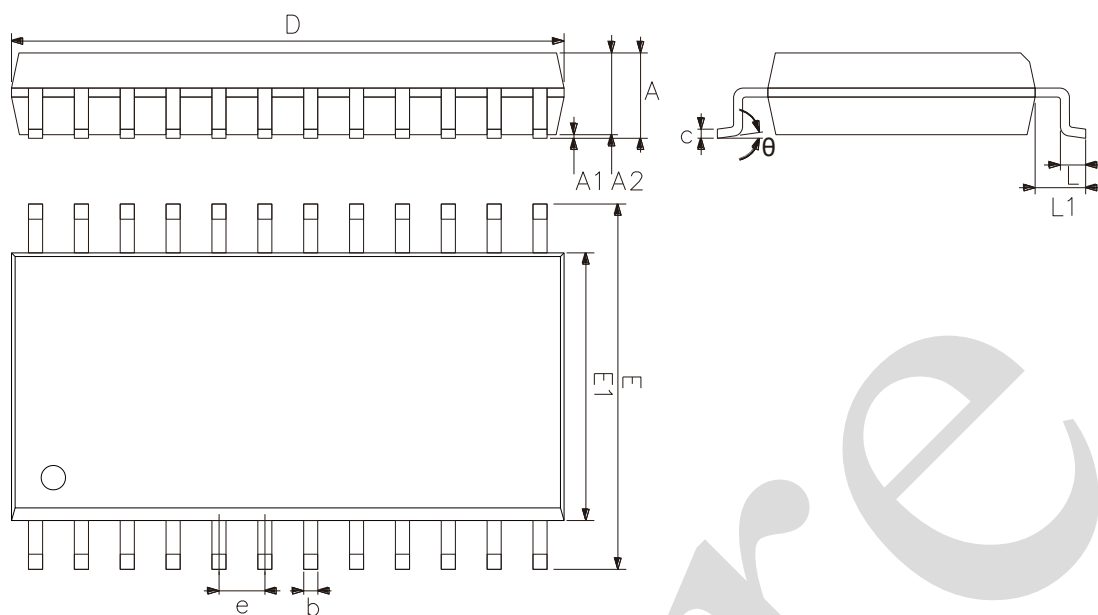
5.3、SSOP24



2023/12/A	Dimensions In Millimeters	
Symbol	Min	Max
A	1.35	1.75
A1	0.10	0.25
A2	1.30	1.55
b	0.23	0.47
c	0.19	0.26
D	8.45	8.85
E	5.80	6.20
E1	3.70	4.10
e	0.635	
L	0.40	0.80
θ	0°	8°



5.4、SOP24



2023/12/A	Dimensions In Millimeters	
Symbol	Min.	Max.
A	2.35	2.65
A1	0.10	0.30
A2	2.13	2.44
b	0.39	0.47
c	0.25	0.30
D	15.19	15.55
E	10.10	10.57
E1	7.40	7.62
e	1.27	
L	0.41	1.00
L1	1.30	1.50
θ	0°	8°



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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