



AiP74CBTLV3306

2-Bit Bus Switch

Product specification

Manual release resume:

Version	Date	Description
2023-06-A1	2023-06	New
2024-09-A2	2024-09	Add the package form
2026-03-A3	2026-03	Update marking code of XSON8; add ESD



Contents

1、General Description	3
2、Block Diagram and Pin Description	5
2.1、Block Diagram	5
2.2、Pin Configurations.....	5
2.3、Pin Description.....	5
2.4、Function Table	5
3、Electrical Parameter	6
3.1、Absolute Maximum Ratings.....	6
3.2、Recommended Operating Conditions.....	6
3.3、Electrical Characteristics	6
3.3.1、DC Characteristics 1.....	6
3.3.2、DC Characteristics 2.....	8
3.3.3、AC Characteristics 1.....	8
3.3.4、AC Characteristics 2.....	9
4、Testing circuit	9
4.1、ON Resistance Testing Waveforms	9
4.2、AC Testing Circuit.....	11
4.3、Test Data.....	11
4.4、AC Testing Waveforms	12
4.5、Measurement Points	12
5、Package Information.....	13
5.1、VSSOP8	13
5.2、XSON8.....	14
5.3、TSSOP8.....	15
6、Statements And Notes	16
6.1、The name and content of Hazardous substances or Elements in the product	16
6.2、Notes	16



1、 General Description

AiP74CBTLV3306 is a 2-bit bus switch. The circuit has a common enable control port ($\overline{OE}$), which is designed as a Schmitt trigger.

To ensure the high-impedance OFF-state during power up or power down, $\overline{OE}$ should be tied to V_{CC} through a pull-up resistor.

This device is fully specified for partial power-down applications using I_{OFF} . The I_{OFF} circuitry disables the output, preventing the damaging backflow current through the device when it is powered down.

Features:

- Supply voltage range: 2.3V to 3.6V
- On-resistance: 3.2Ω (typical)
- Rail-to-rail switching on I/O ports
- CMOS low power consumption
- I_{OFF} circuitry provides partial Power-down mode operation
- Temperature range: -40°C to $+125^{\circ}\text{C}$
- Packaging information: VSSOP8/XSON8/TSSOP8



**Ordering information:****Reel packing specifications:**

Part number	Packaging form	Marking code	Reel quantity	Boxed reel quantity	Notes
AiP74CBTLV3306YA8.TR	VSSOP8	EMXX	3000 PCS/reel	3000 PCS/box	Dimensions of plastic enclosure: 2.0mm×2.3mm Pin spacing: 0.50mm
AiP74CBTLV3306EC8.TR	XSON8	EM XX	5000 PCS/reel	25000 PCS/box	Dimensions of plastic enclosure: 1.0mm×1.95mm Pin spacing: 0.50mm
AiP74CBTLV3306TA8.TR	TSSOP8	EMXX	3000 PCS/reel	3000 PCS/box	Dimensions of plastic enclosure: 3.0mm×3.0mm Pin spacing: 0.65mm

Note 1: “XX” refers to variable content, meaning 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

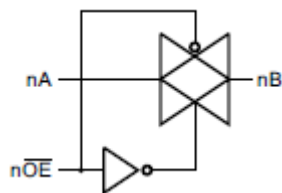
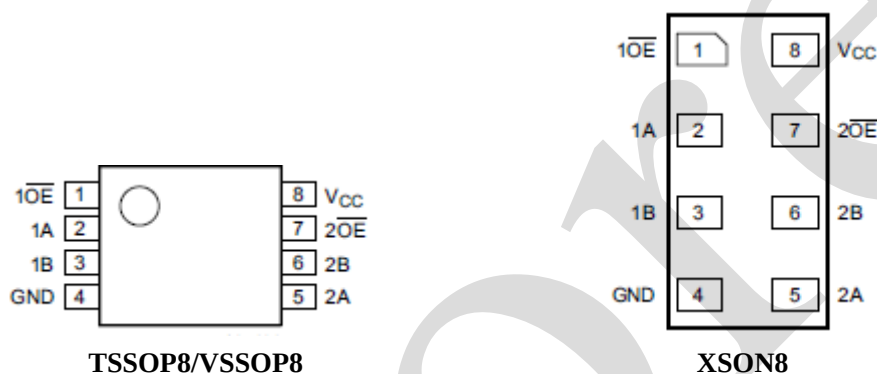


Figure 1. Logic diagram

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	1OE	output enable input (active LOW)
2	1A	A1 input/output
3	1B	B1 input/output
4	GND	ground (0V)
5	2A	A2 input/output
6	2B	B2 input/output
7	2OE	output enable input (active LOW)
8	V _{CC}	supply voltage

2.4、Function Table

Input	Function switch
OE	A, B
L	A _n =B _n
H	Z

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



3、Electrical Parameter

3.1、Absolute Maximum Ratings

Parameter	Symbol	Conditions	Min	Max	Unit
supply voltage	V_{CC}	-	-0.5	+4.6	V
input voltage	V_I	control input port	-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	$^{\circ}C$
soldering temperature	T_L	10s	260		$^{\circ}C$
electrostatics 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
ambient temperature	T_{amb}	-	-40	-	+125	$^{\circ}C$

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	supply voltage	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	$\overline{OE}$ pin; $V_I = GND$ 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	$\overline{OE}$ pin; $V_I = V_{CC} - 0.6V$; $V_{SW} = GND$ or V_{CC}	-	-	300	μA
ON resistance	R_{ON}	2.3V to 2.7V See Figure 2-4	$I_{SW} = 64mA$; $V_I = 0V$	-	3.3	8	Ω
			$I_{SW} = 24mA$; $V_I = 0V$	-	3.2	8	Ω



		3.0V to 3.6V See Figure 5-7	Isw=15mA; V _I =1.7V	-	10.8	40	Ω
			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 typical values are measured at V_{CC}=2.5V, 3.3V (unless otherwise specified) and T_{amb}=25 °C.

i-core



3.3.2、DC Characteristics 2

($T_{amb} = -40^{\circ}\text{C}$ to $+125^{\circ}\text{C}$, 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 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	$\overline{OE}$ pin; $V_I = \text{GND to } V_{CC}$	-	-	± 20	μA
OFF-state leakage current	$I_S(\text{OFF})$	3.6V	-	-	-	± 20	μA
ON-state leakage current	$I_S(\text{ON})$	3.6V	-	-	-	± 20	μA
power-off leakage current	I_{OFF}	0V	V_I or $V_O = 0\text{V to } 3.6\text{V}$	-	-	± 50	μA
supply current	I_{CC}	3.6V	$V_I = V_{CC}$ or GND; $I_O = 0\text{A}$; $V_{sw} = \text{GND or } V_{CC}$	-	-	50	μA
additional supply current	ΔI_{CC}	3.6V	$\overline{OE}$ pin; $V_I = V_{CC} - 0.6\text{V}$; $V_{sw} = \text{GND or } V_{CC}$	-	-	2000	μA
ON resistance	R_{ON}	2.3V to 2.7V see Figure 2-4	$I_{sw} = 64\text{mA}$; $V_I = 0\text{V}$	-	-	15	Ω
			$I_{sw} = 24\text{mA}$; $V_I = 0\text{V}$	-	-	15	Ω
			$I_{sw} = 15\text{mA}$; $V_I = 1.7\text{V}$	-	-	60	Ω
		3.0V to 3.6V see Figure 5-7	$I_{sw} = 64\text{mA}$; $V_I = 0\text{V}$	-	-	11	Ω
			$I_{sw} = 24\text{mA}$; $V_I = 0\text{V}$	-	-	11	Ω
			$I_{sw} = 15\text{mA}$; $V_I = 2.4\text{V}$	-	-	25.5	Ω

3.3.3、AC Characteristics 1

($T_{amb} = -40^{\circ}\text{C}$ to $+85^{\circ}\text{C}$, 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	A to B	-	-	0.13	ns
		3.0V to 3.6V	B to A see Figure 9	-	-	0.20	ns
enable time	t_{PZH}, t_{PZL}	2.3V to 2.7V	$\overline{OE}$ to A/B	-	2.7	4.6	ns
		3.0V to 3.6V	see Figure 10	-	2.4	4.4	ns
disable time	t_{PLZ}, t_{PHZ}	2.3V to 2.7V	$\overline{OE}$ to A/B	-	2.2	3.9	ns
		3.0V to 3.6V	see Figure 10	-	2.9	4.2	ns

Note:

[1] All typical values are measured at $V_{CC} = 2.5\text{V}, 3.3\text{V}$ (unless otherwise specified) and $T_{amb} = 25^{\circ}\text{C}$.



3.3.4、AC Characteristics 2

($T_{amb} = -40^{\circ}\text{C}$ to $+125^{\circ}\text{C}$, 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	A to B B to A see Figure 9	-	-	0.2	ns
		3.0V to 3.6V		-	-	0.31	ns
enable time	t_{PZH} , t_{PZL}	2.3V to 2.7V	$\overline{\text{OE}}$ to A/B 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	$\overline{\text{OE}}$ to A/B see Figure 10	-	-	5.5	ns
		3.0V to 3.6V		-	-	5.5	ns

4、Testing circuit

4.1、ON Resistance Testing Waveforms

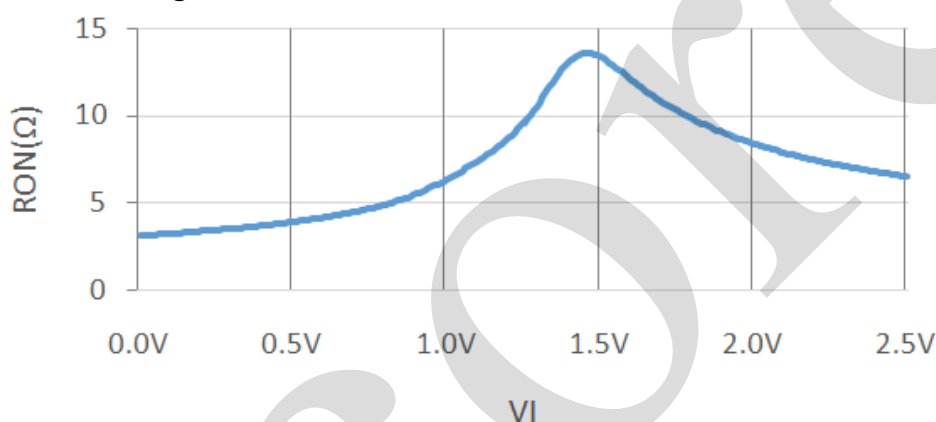


Figure 2. ON resistance as a function of input voltage ($V_{CC}=2.5\text{V}$, $I_{SW}=15\text{mA}$, $T_{amb}=25^{\circ}\text{C}$)

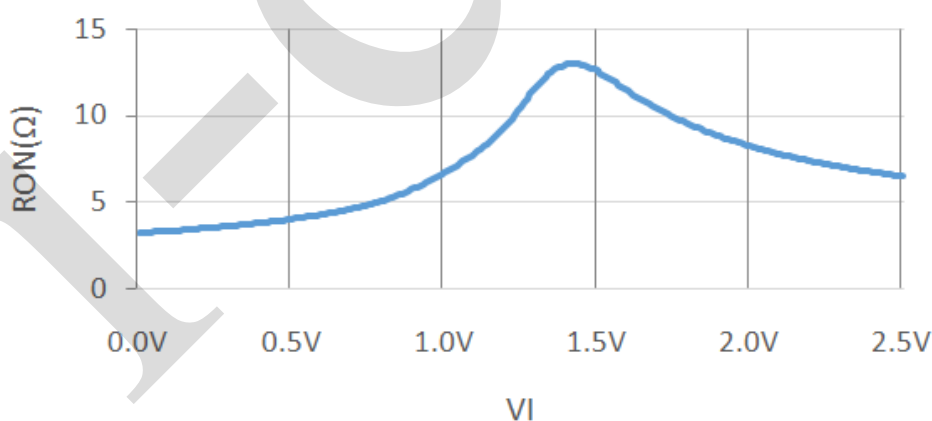


Figure 3. ON resistance as a function of input voltage ($V_{CC}=2.5\text{V}$, $I_{SW}=24\text{mA}$, $T_{amb}=25^{\circ}\text{C}$)

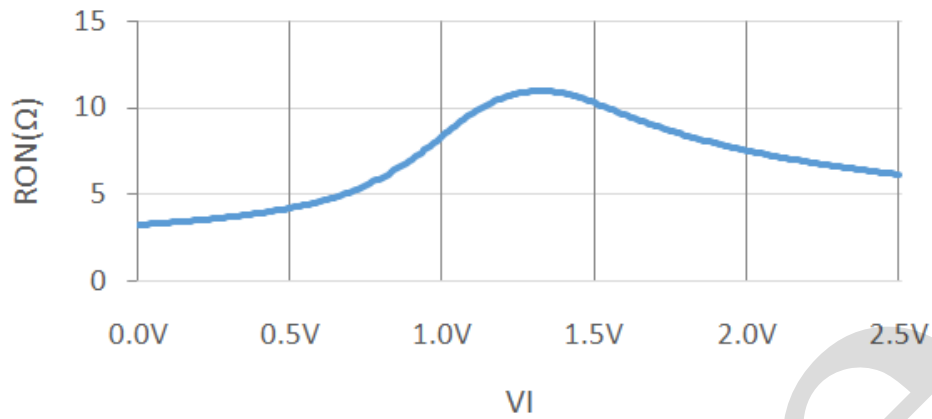


Figure 4. ON resistance as a function of input voltage ($V_{CC}=2.5V$, $I_{SW}=64mA$, $T_{amb}=25^{\circ}C$)

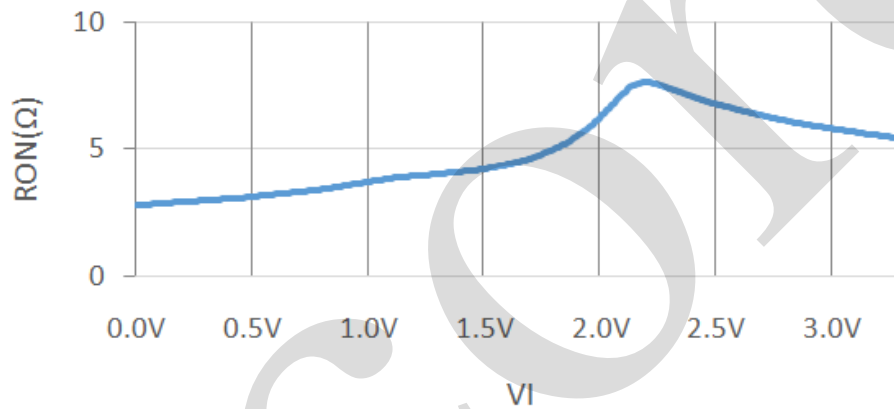


Figure 5. ON resistance as a function of input voltage ($V_{CC}=3.3V$, $I_{SW}=15mA$, $T_{amb}=25^{\circ}C$)

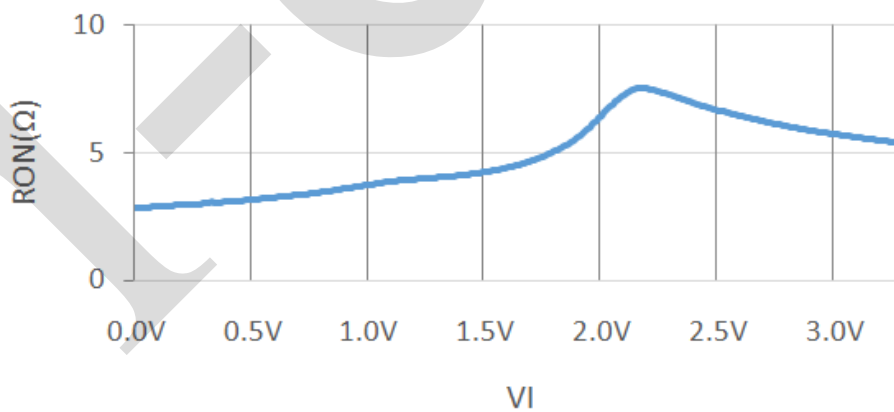


Figure 6. ON resistance as a function of input voltage ($V_{CC}=3.3V$, $I_{SW}=24mA$, $T_{amb}=25^{\circ}C$)

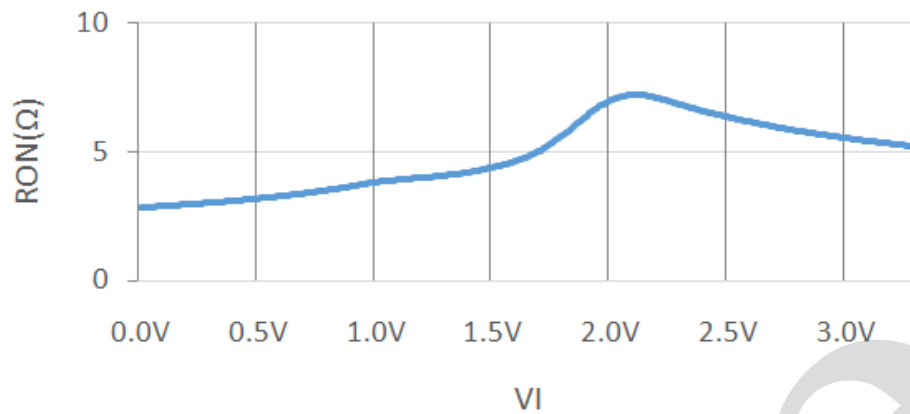


Figure 7. ON resistance as a function of input voltage ($V_{CC}=3.3V$, $I_{SW}=64mA$, $T_{amb}=25^{\circ}C$)

4.2、AC Testing Circuit

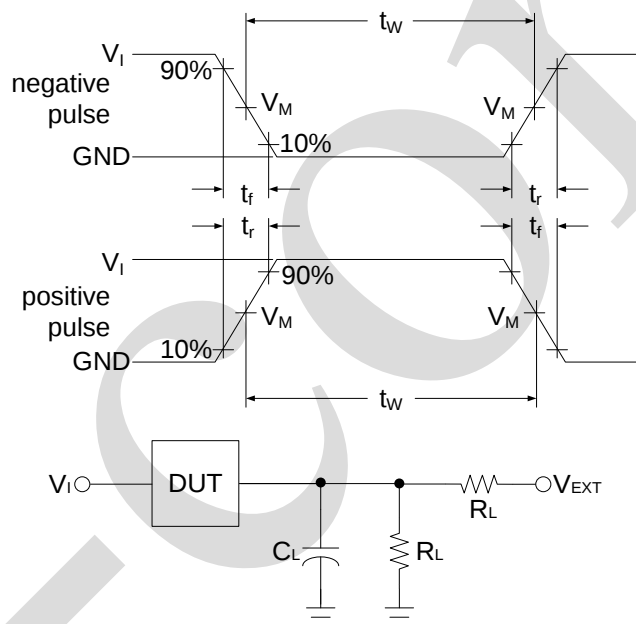


Figure 8. Test circuit for measuring switching times

Definitions for test circuit:

R_L =Load resistance.

C_L =Load capacitance including jig and probe capacitance.

4.3、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_{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	$2 \times V_{CC}$

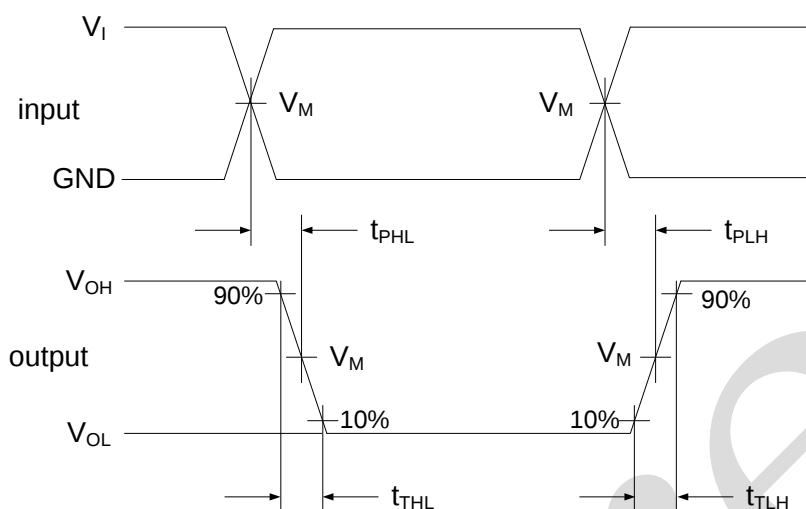
**4.4、 AC Testing Waveforms**

Figure 9. Input (nA/nB) to output (nB/nA) propagation delay

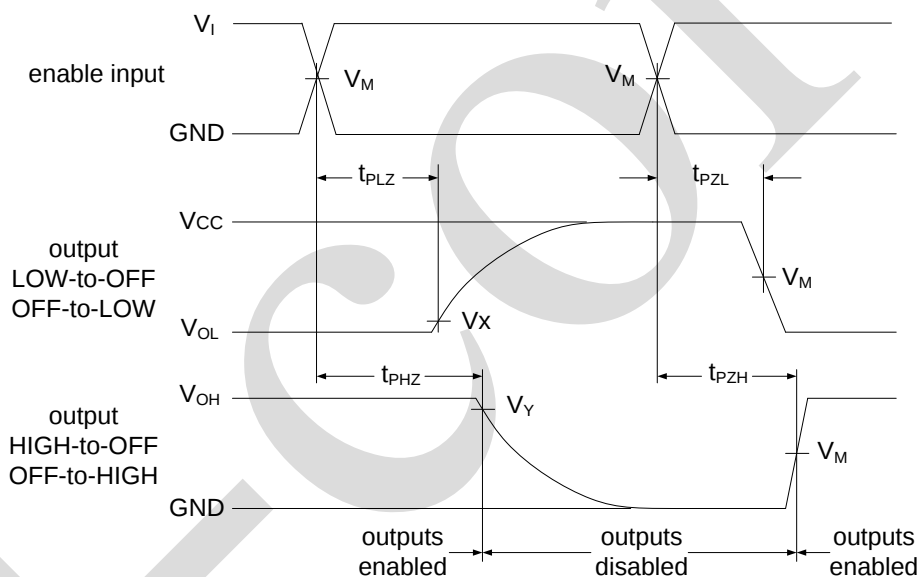
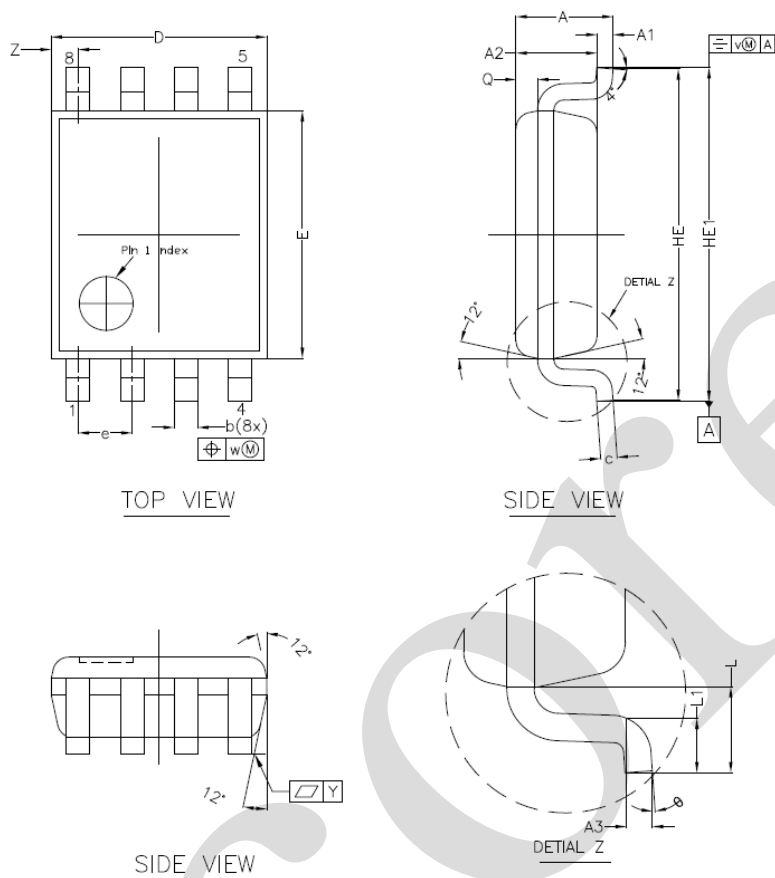


Figure 10. Enable and disable time

4.5、 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}	$0.5 \times V_{CC}$	$0.5 \times V_{CC}$	$V_{OL} + 0.3V$	$V_{OH} - 0.3V$

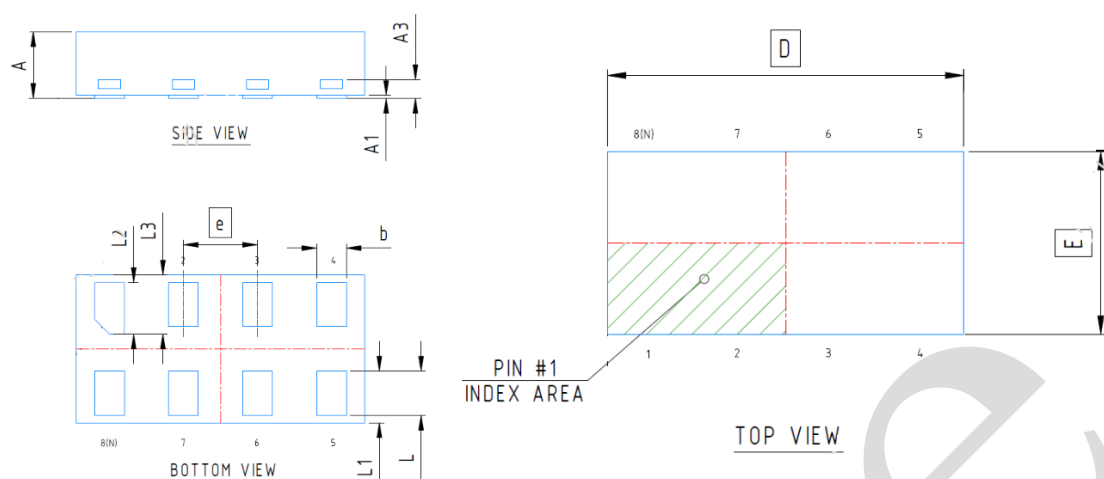
**5、Package Information****5.1、VSSOP8**

NOTES
1.0 COP
DIE ATTA
2.0 D E

2023/12/A	Dimensions In Millimeters	
Symbol	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°



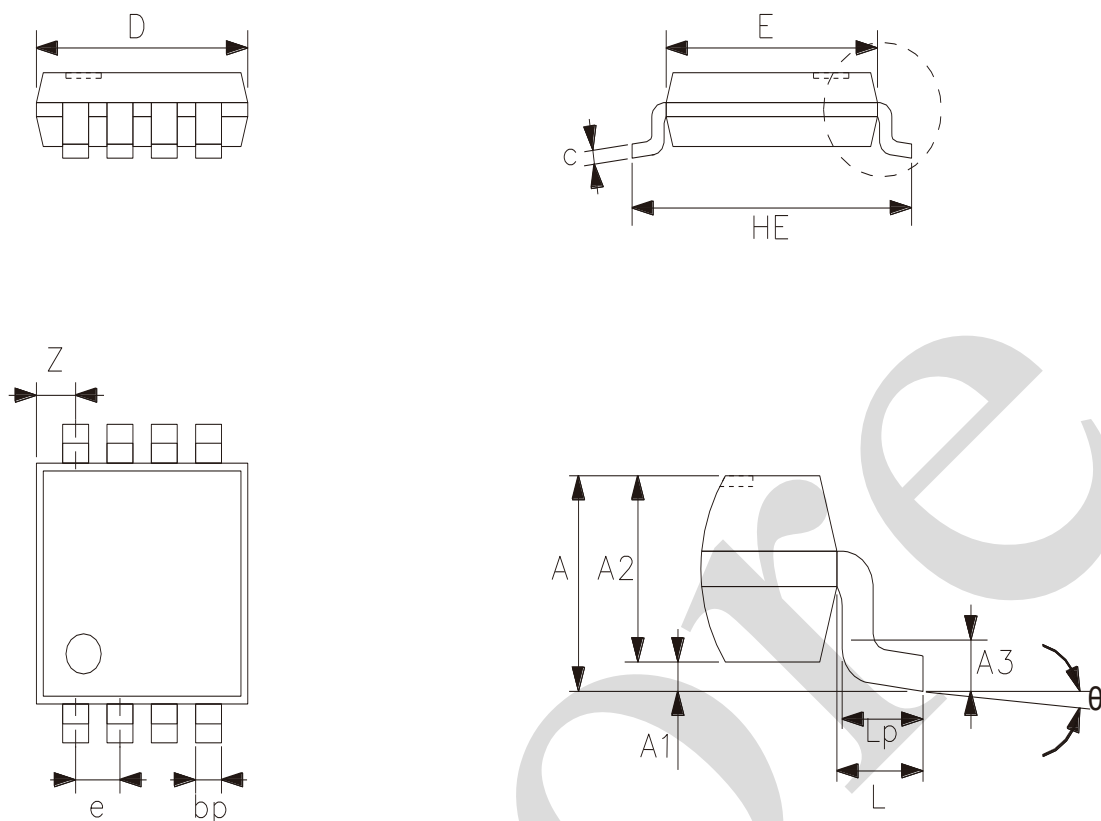
5.2、XSON8



2023/12/A	Dimensions In Millimeters	
Symbol	Min	Max
A	0.45	0.55
A1	0	0.05
A3	0.127	
b	0.15	0.25
D	1.95	
E	1.00	
e	0.50	
L	0.25	0.35
L1	0.25	0.45
L2	0.30	0.40
L3	0.30	0.50



5.3、TSSOP8



2023/12/A	Dimensions In Millimeters	
Symbol	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
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

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

The information in this chapter is provided for reference only and i-Core disclaims any express or implied warranties, including but not limited to applicability, special application or non-infringement of third party rights.

This product is not suitable for critical equipment such as life-saving, life-sustaining or safety equipment. It is also not suitable for applications that may result in personal injury, death, or serious property or environmental damage due to product malfunction or failure. I-Core will not be liable for any damages incurred by the customers at their own risk for such applications.

The customer is responsible for conducting all necessary tests i-Core's application to avoid failure in the application or the application of the customer's third party users. I-Core does not accept any liability.

The Company reserves the right to change or improve the information published in this chapter at any time. The information in this chapter are subject to change without notice. We recommend the customer to consult our sales staff before purchasing.

Please obtain related materials from i-Core's regular channels and we are not responsible for its content if it is provided by sources other than our company.

In case of any conflict between the Chinese and English version, the version is subject to the Chinese one.