



AiP74CBTLV3253

Dual 1-of-4 Multiplexer/Demultiplexer

Product specification

Manual release resume:

Version	Date	Description
2023-06-A1	2023-06	New
2023-08-A2	2023-08	Modify general description
2025-03-A3	2025-03	Modify the content



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1、 General Description

AiP74CBTLV3253 is a dual 1-of-4 multiplexer/demultiplexer. The circuit has two common selection ports (S0, S1) and two enable control ports ($1\overline{OE}$, $2\overline{OE}$).

To ensure the high-impedance OFF-state during power up or power down, $1\overline{OE}$ and $2\overline{OE}$ should be tied to Vcc 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: SOP16/SSOP16/TSSOP16/DHVQFN16

**Ordering information:****Tube packing specifications:**

Part number	Packaging form	Marking code	Tube quantity	Boxed tube quantity	Boxed quantity	Notes
AiP74CBTLV3253 SA16.TB	SOP16	74CBTLV3253	50 PCS/tube	200 Tube/box	10000 PCS/ box	Dimensions of plastic enclosure: 10.0mm×3.9mm Pin spacing: 1.27mm
AiP74CBTLV3253 VB16.TB	SSOP16	74CBTLV3253	100 PCS/tube	100 Tube/box	10000 PCS/ box	Dimensions of plastic enclosure: 4.9mm×3.9mm Pin spacing: 0.635mm
AiP74CBTLV3253 TA16.TB	TSSOP16	74CBTLV3253	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
AiP74CBTLV3253 SA16.TR	SOP16	74CBTLV3253	4000 PCS/reel	8000 PCS/box	Dimensions of plastic enclosure: 10.0mm×3.9mm Pin spacing: 1.27mm
AiP74CBTLV3253 VB16.TR	SSOP16	74CBTLV3253	4000 PCS/reel	8000 PCS/box	Dimensions of plastic enclosure: 4.9mm×3.9mm Pin spacing: 0.635mm
AiP74CBTLV3253 TA16.TR	TSSOP16	74CBTLV3253	5000 PCS/reel	10000 PCS/box	Dimensions of plastic enclosure: 5.0mm×4.4mm Pin spacing: 0.65mm
AiP74CBTLV3253 QE16.TR	DHVQFN16	CBTLV3253	3000 PCS/reel	3000 PCS/box	Dimensions of plastic enclosure: 3.5mm×2.5mm Pin spacing: 0.5mm

Note: If the material object is inconsistent with the ordering information, please take the material object as the standard.



2、Block Diagram and Pin Description

2.1、Block Diagram

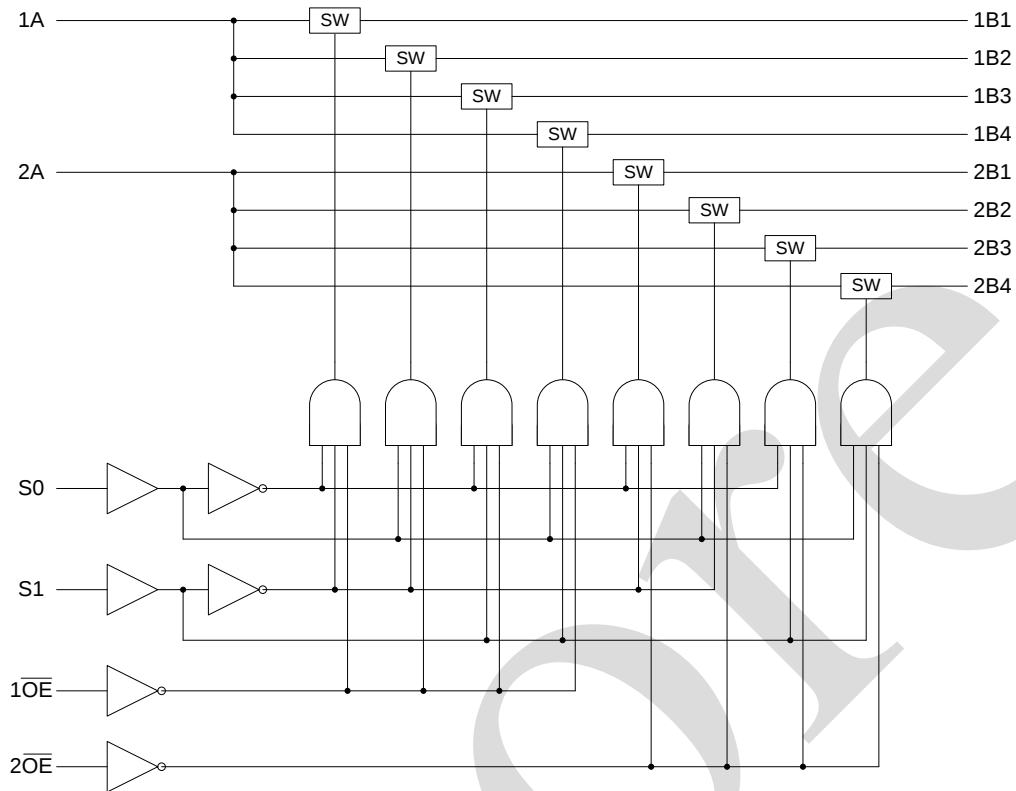
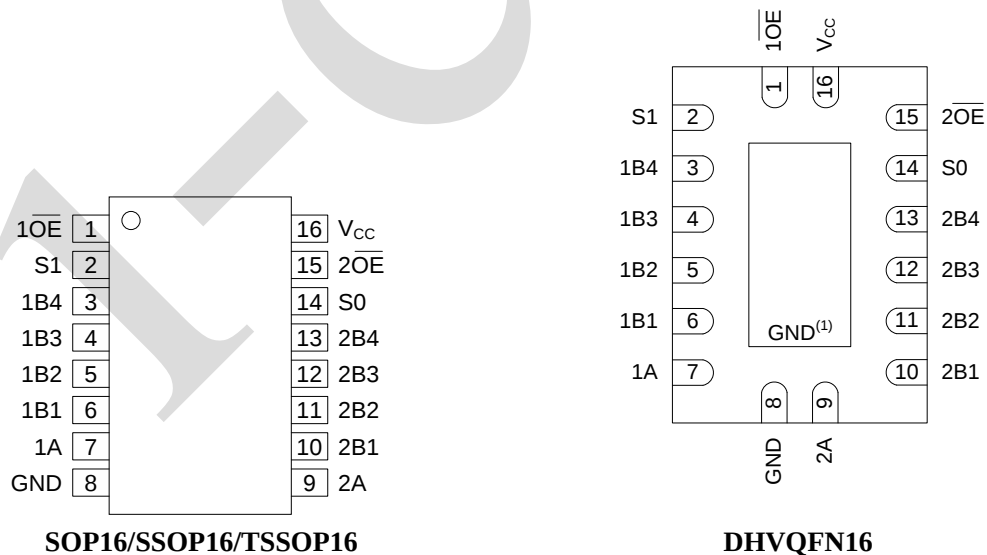


Figure 1. Logic diagram

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	$\overline{1OE}$	Output Enable Input (Active Low)
2	S1	Select input
3	1B4	B4 input/output
4	1B3	B3 input/output
5	1B2	B1 input/output
6	1B1	B2 input/output
7	1A	A1 input/output
8	GND	Ground (0V)
9	2A	A2 input/output
10	2B1	B1 input/output
11	2B2	B2 input/output
12	2B3	B3 input/output
13	2B4	B4 input/output
14	S0	Select input
15	$\overline{2OE}$	Output Enable Input (Active Low)
16	V _{CC}	supply voltage

2.4、Function Table

input				Function switch
$\overline{1OE}$	$\overline{2OE}$	S1	S0	
L	L	L	L	nA=nB1
L	L	L	H	nA=nB2
L	L	H	L	nA=nB3
L	L	H	H	nA=nB4
X	H	X	X	2A and 2Bn are not connected
H	X	X	X	1A and 1Bn are not connected

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 inputs	-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		$^{\circ}C$

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	$\overline{OE}$, S 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		2.3V to 2.7V	$I_{sw} = 64mA$; $V_I = 0V$	-	3.3	8	Ω



	R_{ON}	See Figure 2-4	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 5-7	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 typical values are measured at $V_{CC}=2.5V, 3.3V$ (unless otherwise specified) and $T_{amb}=25^{\circ}C$.

3.3.2、DC Characteristics 2

($T_{amb}=-40^{\circ}C$ to $+125^{\circ}C$, 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	OE, S pin; $V_I=GND$ to V_{CC}	-	-	± 20	μA
Off-state leakage current	$I_S(OFF)$	3.6V	-	-	-	± 20	μA
ON-state leakage current	$I_S(ON)$	3.6V	-	-	-	± 20	μA
Power-off leakage current	I_{OFF}	0V	V_I or $V_O=0V$ to 3.6V	-	-	± 50	μA
Supply current	I_{CC}	3.6V	$V_I=V_{CC}$ or GND; $I_O=0A$; $V_{sw}=GND$ or V_{CC}	-	-	50	μA
Additional supply current	ΔI_{CC}	3.6V	OE pin; $V_I=V_{CC}-0.6V$; $V_{sw}=GND$ or V_{CC}	-	-	2000	μA
On resistance	R_{ON}	2.3V to 2.7V See Figure 2-4	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 5-7	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

($T_{amb} = -40^{\circ}\text{C}$ 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	nA to nBn; nBn to nA	-	-	0.15	ns
		3.0V to 3.6V	See Figure 9	-	-	0.15	ns
		2.3V to 2.7V	S to nA	-	2.2	6.8	ns
		3.0V to 3.6V	See Figure 9	-	2.0	5.5	ns
Enable time	t_{PZH}, t_{PZL}	2.3V to 2.7V	$\overline{\text{OE}}$ to nA/nBn	-	2.1	5.0	ns
		3.0V to 3.6V	See Figure 10	-	1.9	4.8	ns
		2.3V to 2.7V	Sn to nBn	-	2.1	4.3	ns
		3.0V to 3.6V	See Figure 10	-	1.9	4.0	ns
Disable time	t_{PLZ}, t_{PHZ}	2.3V to 2.7V	$\overline{\text{OE}}$ to nA/nBn	-	2.6	5.5	ns
		3.0V to 3.6V	See Figure 10	-	3.2	5.4	ns
		2.3V to 2.7V	S to nBn	-	2.0	4.8	ns
		3.0V to 3.6V	See Figure 10	-	2.0	4.5	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	nA to nBn; nBn to nA	-	-	0.25	ns
		3.0V to 3.6V	See Figure 9	-	-	0.25	ns
		2.3V to 2.7V	S to nA	-	-	7.5	ns
		3.0V to 3.6V	See Figure 9	-	-	6.1	ns
Enable time	t_{PZH}, t_{PZL}	2.3V to 2.7V	$\overline{\text{OE}}$ to nA/nBn	-	-	5.5	ns
		3.0V to 3.6V	See Figure 10	-	-	5.3	ns
		2.3V to 2.7V	Sn to nBn	-	-	4.7	ns
		3.0V to 3.6V	See Figure 10	-	-	4.4	ns
Disable time	t_{PLZ}, t_{PHZ}	2.3V to 2.7V	$\overline{\text{OE}}$ to nA/nBn	-	-	6.1	ns
		3.0V to 3.6V	See Figure 10	-	-	5.9	ns
		2.3V to 2.7V	S to nBn	-	-	5.3	ns
		3.0V to 3.6V	See Figure 10	-	-	5.0	ns



4、Characteristic curve

4.1、On resistance testing waveform

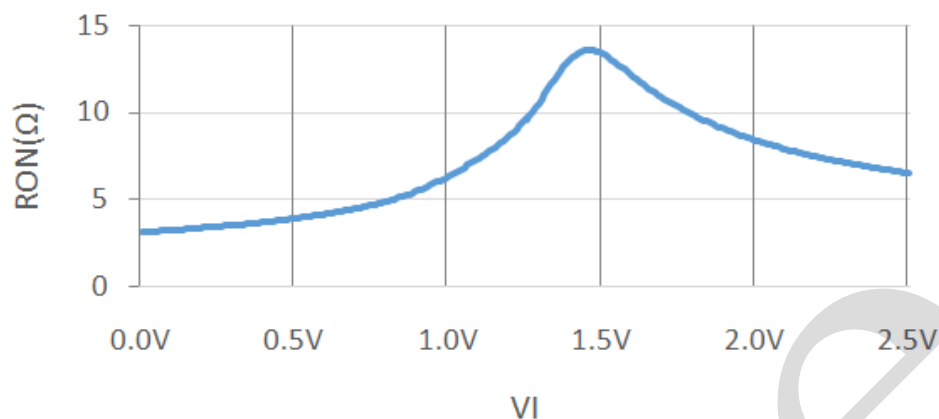


Figure 2. ON resistance as a function of input voltage ($V_{CC}=2.5V$, $I_{SW}=15mA$, $T_{amb}=25^{\circ}C$)

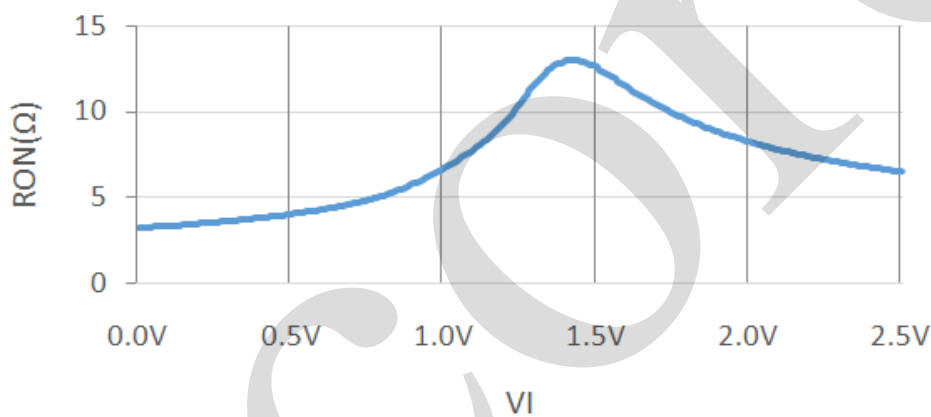


Figure 3. ON resistance as a function of input voltage ($V_{CC}=2.5V$, $I_{SW}=24mA$, $T_{amb}=25^{\circ}C$)

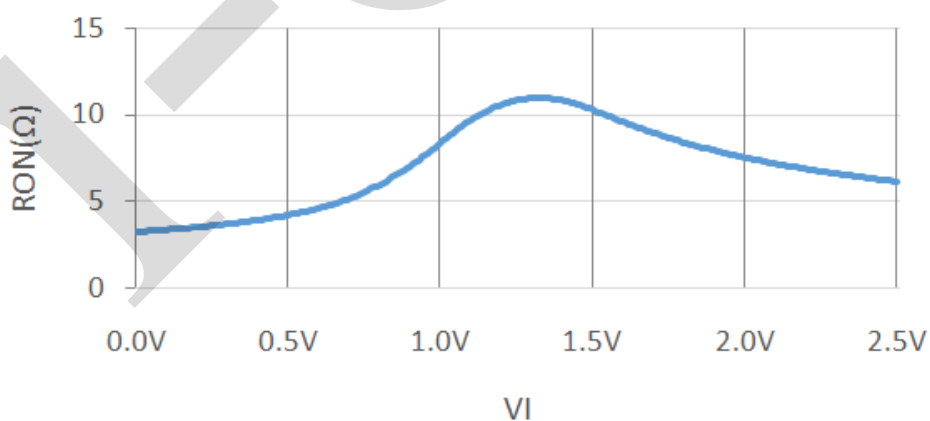


Figure 4. ON resistance as a function of input voltage ($V_{CC}=2.5V$, $I_{SW}=64mA$, $T_{amb}=25^{\circ}C$)

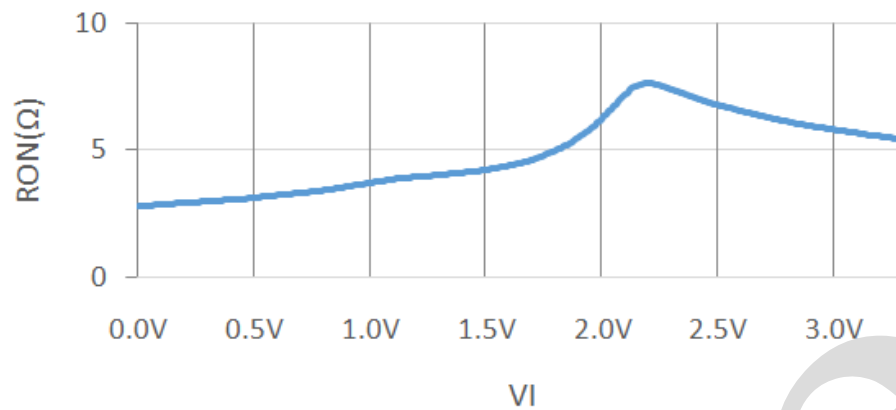


Figure 5. ON resistance as a function of input voltage ($V_{CC}=3.3V$, $I_{SW}=15mA$, $T_{amb}=25^{\circ}C$)

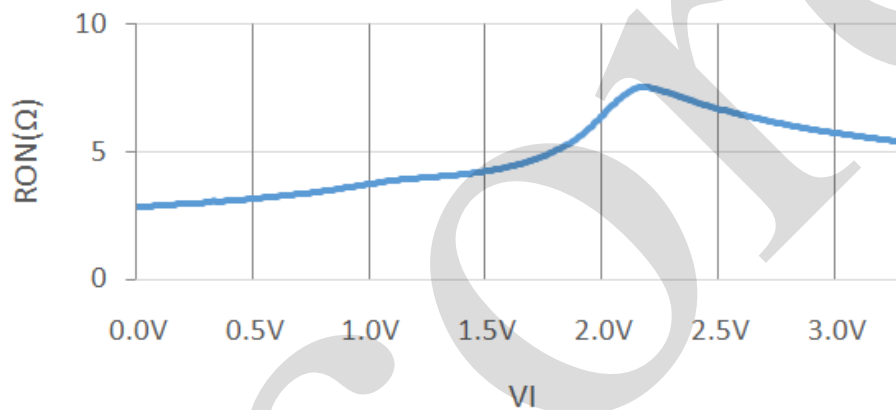


Figure 6. ON resistance as a function of input voltage ($V_{CC}=3.3V$, $I_{SW}=24mA$, $T_{amb}=25^{\circ}C$)

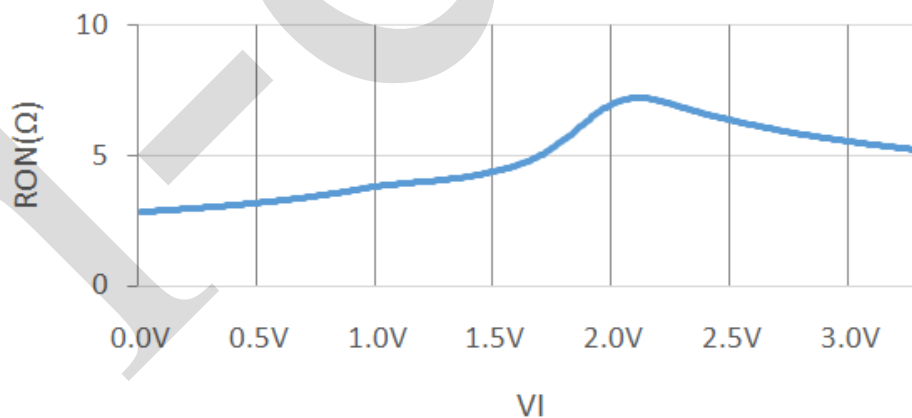


Figure 7. ON resistance as a function of input voltage ($V_{CC}=3.3V$, $I_{SW}=64mA$, $T_{amb}=25^{\circ}C$)



4.2、AC testing circuit

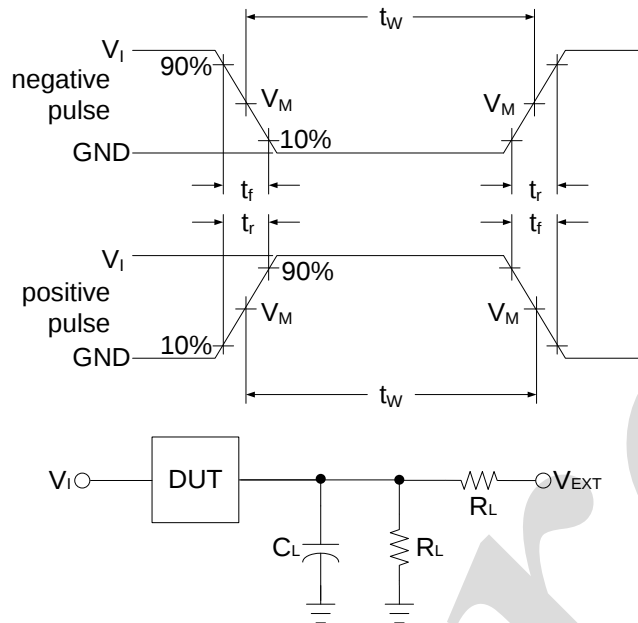


Figure 8. Test circuit for measuring switching times

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

4.4、AC Testing Waveforms

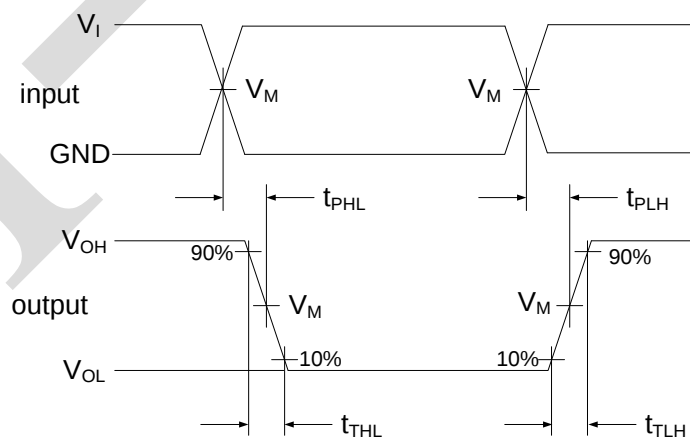


Figure 9. Testing waveforms of propagation delay from input (nA/nBn) to output (nBn/nA) and propagation delay from input (S) to output (nA)

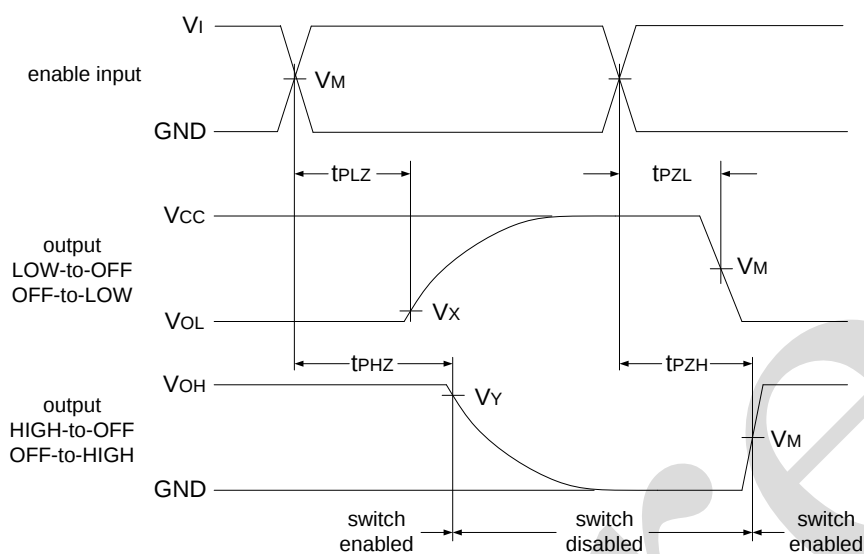


Figure 10. Testing waveform of enable and disable time

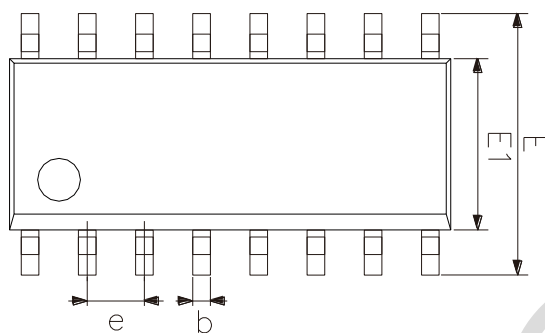
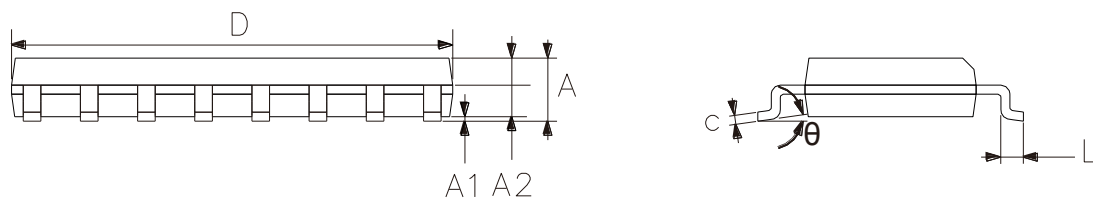
4.5、Measurement Points

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

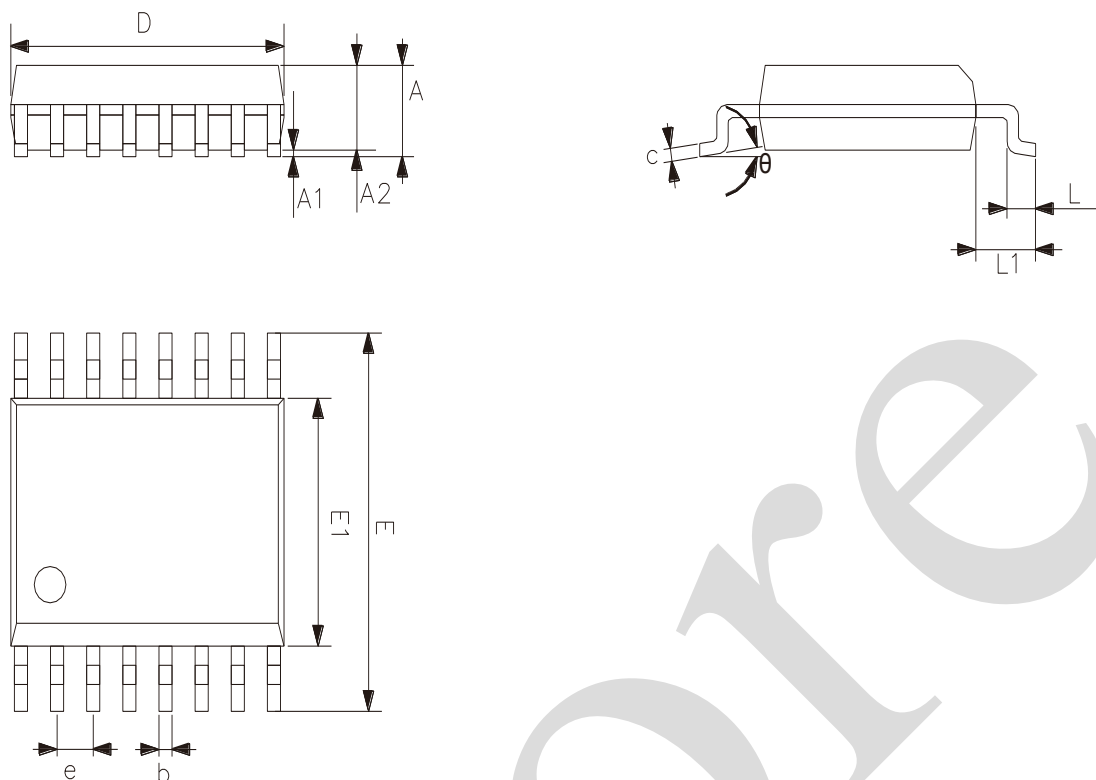


5、Package Information

5.1、SOP16



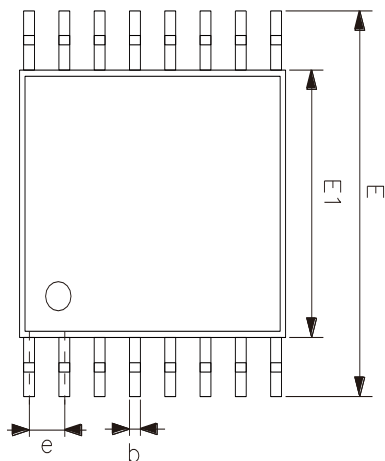
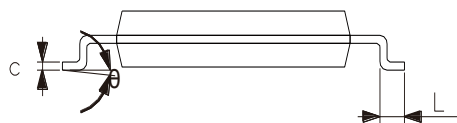
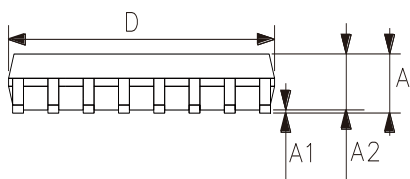
2023/12/A Symbol	Dimensions In Millimeters	
	Min.	Max.
A	1.35	1.80
A1	0.10	0.25
A2	1.25	1.55
b	0.33	0.51
c	0.19	0.25
D	9.50	10.10
E	5.80	6.30
E1	3.70	4.10
e	1.27	
L	0.35	0.89
θ	0°	8°

**5.2、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°



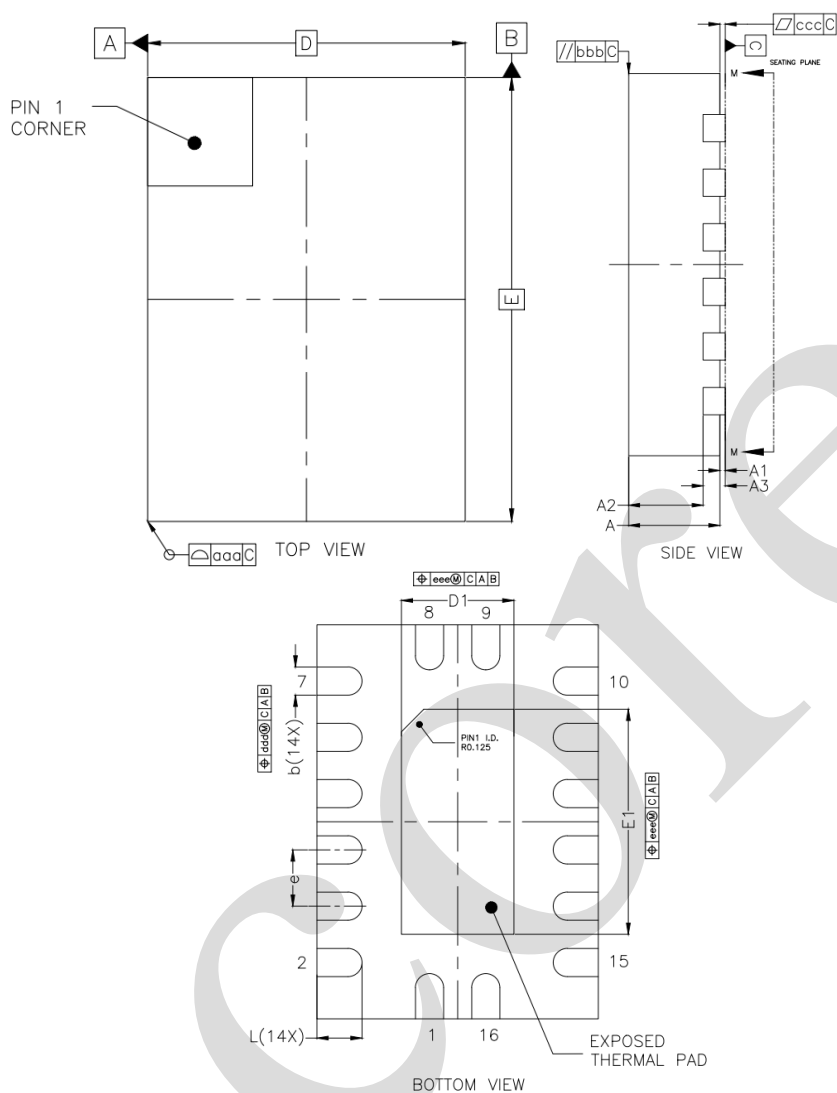
5.3、TSSOP16



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
θ	0°	8°



5.4、DHVQFN16



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	2.40	2.60
E	3.40	3.60
e	0.50	
b	0.18	0.30
L	0.30	0.50
D1	0.85	1.15
E1	1.85	2.15



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.

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