AiP74CBTLV3257
4-Bit 1-of-2 FET Multiplexer/Demultiplexer

Product specification

Manual release resume:

version	issuing date	New system/revised content
2023-08-A1	2023-08	New

Contents

1. General Description

AiP74CBTLV3257 is a 4-Bit 1-of-2 FET Multiplexer/Demultiplexer. The circuit has a common selection port (S) and an enable control port ($\overline{OE}$).

To ensure the high-impedanceOFF-state during power upor power down, $\overline{OE}$ should be tied to Vcc through apull-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~3.6V
- On-resistance:2.8Ω(typical) at V_{CC}=3.3V.
- Rail-to-rail switching on I/O ports
- I_{OFF} circuitry provides partial Power-down mode operation
- Temperature range: -40℃~+125℃
- 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
AiP74CBTLV3257 SA16.TB	SOP16	74CBTLV3257	50 PCS/ tube	200 Tube/box	10000 PCS/ box	Size of plastic package: 10.0mm×3.9mm Pin spacing: 1.27mm
AiP74CBTLV3257 VB16.TB	SSOP16	74CBTLV3257	100 PCS/ tube	100 Tube/box	10000 PCS/ box	Size of plastic package: 4.9mm×3.9mm Pin spacing: 0.635mm
AiP74CBTLV3257 TA16.TB	TSSOP16	74CBTLV3257	96 PCS/ tube	200 Tube/box	19200 PCS/ box	Size of plastic package: 5.0mm×4.4mm Pin spacing: 0.65mm

Reel packing specifications:

Part number	Packaging form	Marking code	Reel quantity	Boxed reel quantity	Notes
AiP74CBTLV3257 SA16.TR	SOP16	74CBTLV3257	4000 PCS/ disk	8000 PCS/ box	Size of plastic package: 10.0mm×3.9mm Pin spacing: 1.27mm
AiP74CBTLV3257 VB16.TR	SSOP16	74CBTLV3257	4000 PCS/ disk	8000 PCS/ box	Size of plastic package: 4.9mm×3.9mm Pin spacing: 0.635mm
AiP74CBTLV3257 TA16.TR	TSSOP16	74CBTLV3257	5000 PCS/ disk	10000 PCS/ box	Size of plastic package: 5.0mm×4.4mm Pin spacing: 0.65mm
AiP74CBTLV3257 QE16.TR	DHVQFN16	74CBTLV3257	3000 PCS/ disk	3000 PCS/ box	Size of plastic package: 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

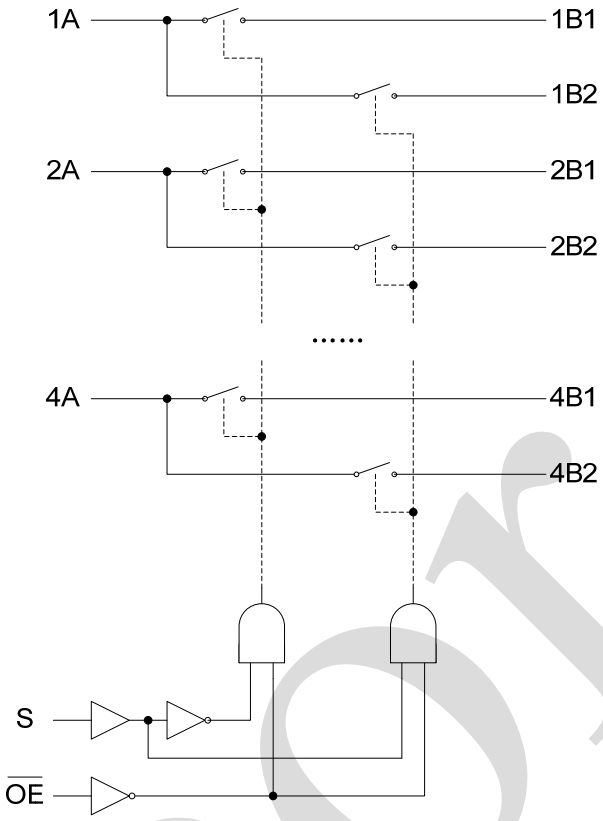
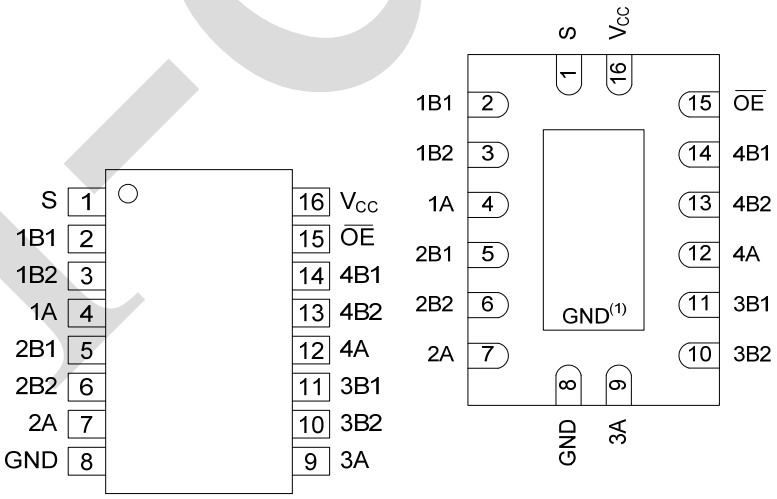


Figure 1 Logic diagram

2.2. Pin Configurations



SOP16/SSOP16/TSSOP16 **DHVQFN16**

Note:

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

2.3. Pin Description

pin	Symbol	Work energy
1	S	Select input
2	1B1	1B1 input/output
3	1B2	1B2 input/output
4	1A	1A input/output
5	2B1	2B1 input/output
6	2B2	2B2 input/output
7	2A	2A input/output
8	GND	Ground (0V)
9	3A	3A input/output
10	3B2	3B2 input/output
11	3B1	3B1 input/output
12	4A	4A input/output
13	4B2	4B2 input/output
14	4B1	4B1 input/output
15	$\overline{OE}$	Output Enable Input (Active Low)
16	V_{CC}	supply voltage

2.4. Function Table

input		Function switch
$\overline{OE}$	S	
L	L	nA=nB1
L	H	nA=nB2
H	X	NA and nB are not connected.

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

3. Electrical characteristics

3.1. Limit parameters

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～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	10 seconds	260		℃

3.2. Recommended operating conditions

Parameter name	Symbol	Strip	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	℃

3.3. Electrical characteristics

3.3.1. DC Characteristics 1

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

Parameter	Symbol	supply voltage	Conditions	Min	Typ	Max	Unit
High-level input voltage	V_{IH}	2.3V～2.7V	—	1.7	—	—	V
		3.0V～3.6V	—	2.0	—	—	V
Low-level input voltage	V_{IL}	2.3V～2.7V	—	—	—	0.7	V
		3.0V～3.6V	—	—	—	0.9	V
Input leakage current	I_I	3.6V	$\overline{OE}$, S pin; V_I=GND～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~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	$\overline{OE}$, S pin; V_I=V_{CC}-0.6V; Vsw=GND or V_{CC}	—	—	300	uA
On resistance	R_{ON}	2.3V～2.7V See Figure 2-4	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～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 ℃.

3.3.2. DC Characteristics 2

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

Parameter	Symbol	supply voltage	Conditions	Min	Typ	Max	Unit
High-level input voltage	V_{IH}	2.3V～2.7V	—	1.7	—	—	V
		3.0V～3.6V	—	2.0	—	—	V
Low-level input voltage	V_{IL}	2.3V～2.7V	—	—	—	0.7	V
		3.0V～3.6V	—	—	—	0.9	V
Input leakage current	I_I	3.6V	$\overline{OE}$, S pin; V_I=GND～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~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	$\overline{OE}$, S pin; V_I=V_{CC}-0.6V; Vsw=GND or V_{CC}	—	—	2000	uA
On resistance	R_{ON}	2.3V～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～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.ACCharacteristics 1

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

Parameter	Symbol	supply voltage	Conditions	Min	Typ	Max	Unit
Propagation delay	t_{PLH}, t_{PHL}	2.3V～2.7V	nA to nBn nBn to nA See Figure 9	—	—	0.15	ns
		3.0V～3.6V		—	—	0.15	ns
		2.3V～2.7V	S to nA See Figure 9	—	3.8	6.1	ns
		3.0V～3.6V		—	3.2	5.3	ns
Enable time	t_{PZH}, t_{PZL}	2.3V～2.7V	$\overline{OE}$ to nA/nBn See Figure 10	—	2.2	5.6	ns
		3.0V～3.6V		—	2.0	5.0	ns
		2.3V～2.7V	Sn to nBn See Figure 10	—	3.5	6.1	ns
		3.0V～3.6V		—	3.0	5.3	ns
Disable time	t_{PLZ}, t_{PHZ}	2.3V～2.7V	$\overline{OE}$ to nA/nBn See Figure 10	—	2.6	5.5	ns
		3.0V～3.6V		—	3.1	5.5	ns
		2.3V～2.7V	S to nBn See Figure 10	—	2.6	4.8	ns
		3.0V～3.6V		—	3.2	4.5	ns

Note:

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

3.3.4.ACCharacteristics 2

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

Parameter	Symbol	supply voltage	Conditions	Min	Typ	Max	Unit
Propagation delay	t_{PLH}, t_{PHL}	2.3V～2.7V	nA to nBn nBn to nA See Figure 9	—	—	0.25	ns
		3.0V～3.6V		—	—	0.25	ns
		2.3V～2.7V	S to nA See Figure 9	—	—	6.7	ns
		3.0V～3.6V		—	—	5.8	ns
Enable time	t_{PZH}, t_{PZL}	2.3V～2.7V	$\overline{OE}$ to nA/nBn See Figure 10	—	—	6.2	ns
		3.0V～3.6V		—	—	5.5	ns
		2.3V～2.7V	Sn to nBn See Figure 10	—	—	6.7	ns
		3.0V～3.6V		—	—	5.8	ns
Disable time	t_{PLZ}, t_{PHZ}	2.3V～2.7V	$\overline{OE}$ to nA/nBn See Figure 10	—	—	6.1	ns
		3.0V～3.6V		—	—	6.1	ns
		2.3V～2.7V	S to nBn See Figure 10	—	—	5.3	ns
		3.0V～3.6V		—	—	5.0	ns

4. Characteristic curve

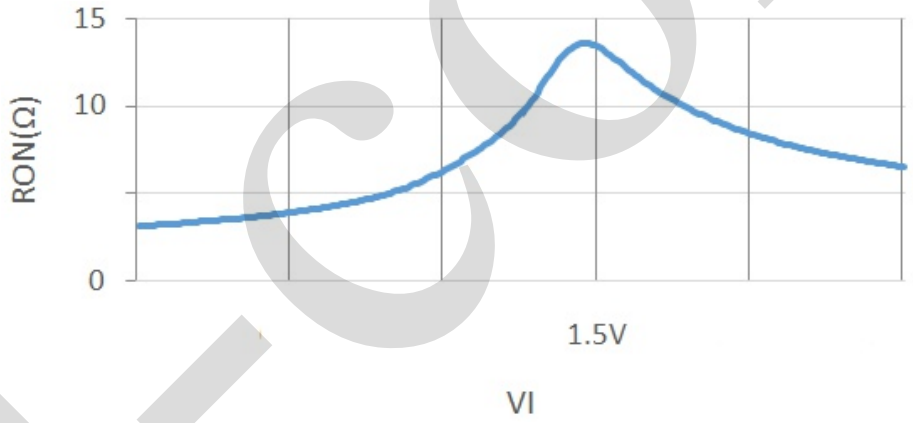


Fig. 2 On resistance as a function of input voltage (V_{CC}=2.5V, I_{SW}=15mA, Tamb=25 ℃)

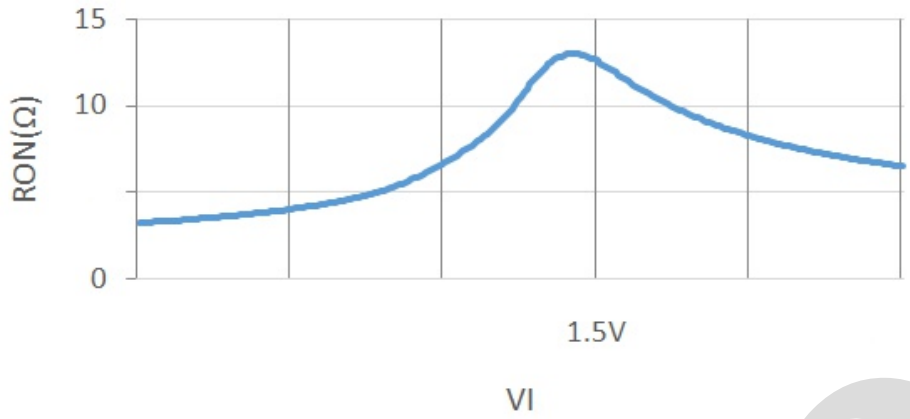


Figure 3 On resistance as a function of input voltage (V_{CC}=2.5V, I_{SW}=24mA, Tamb=25 ℃)

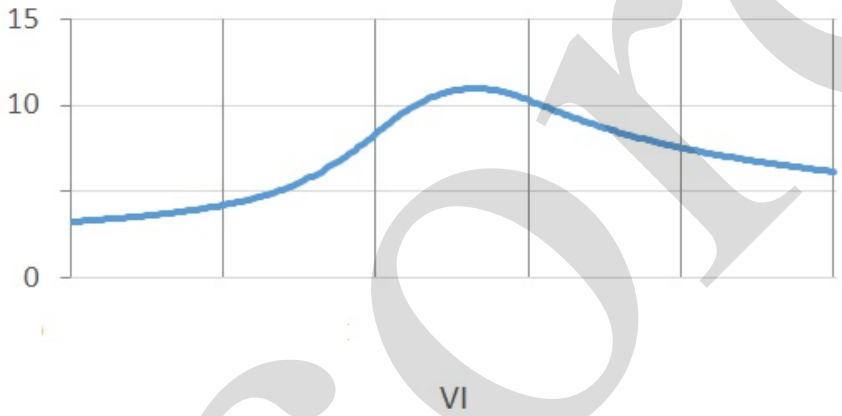


Figure 4 On resistance as a function of input voltage (V_{CC}=2.5V, I_{SW}=64mA, Tamb=25 ℃)

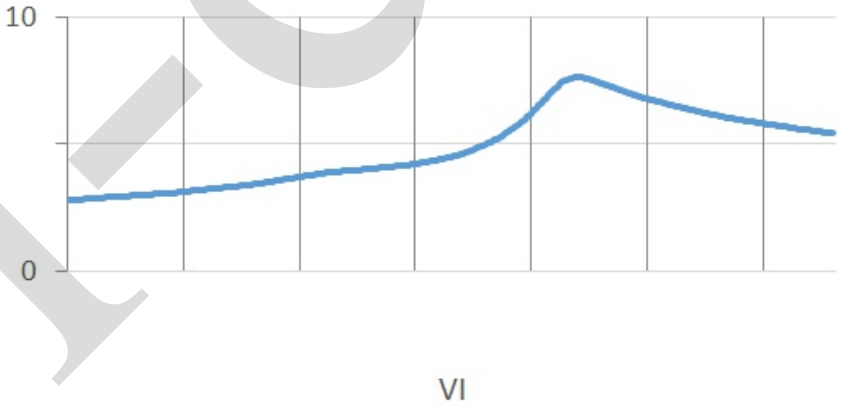


Fig. 5 On resistance as a function of input voltage (V_{CC}=3.3V, I_{SW}=15mA, Tamb=25 ℃)

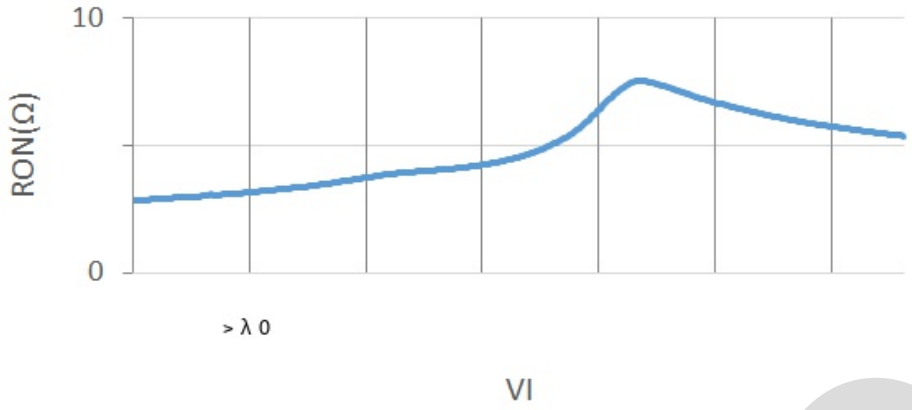


Fig. 6 On resistance as a function of input voltage (V_{CC}=3.3V, I_{SW}=24mA, Tamb=25 ℃)

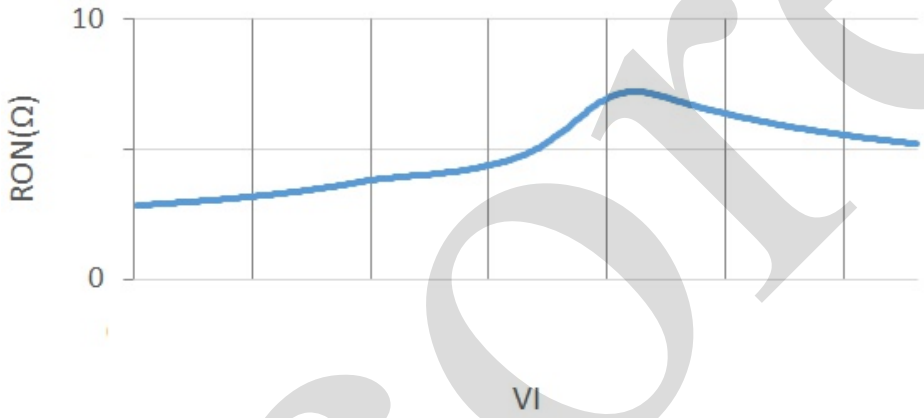


Figure On resistance as a function of input voltage (V_{CC}=3.3V, I_{SW}=64mA, Tamb=25 ℃)

5. Testing circuit

5.1. AC testing circuit

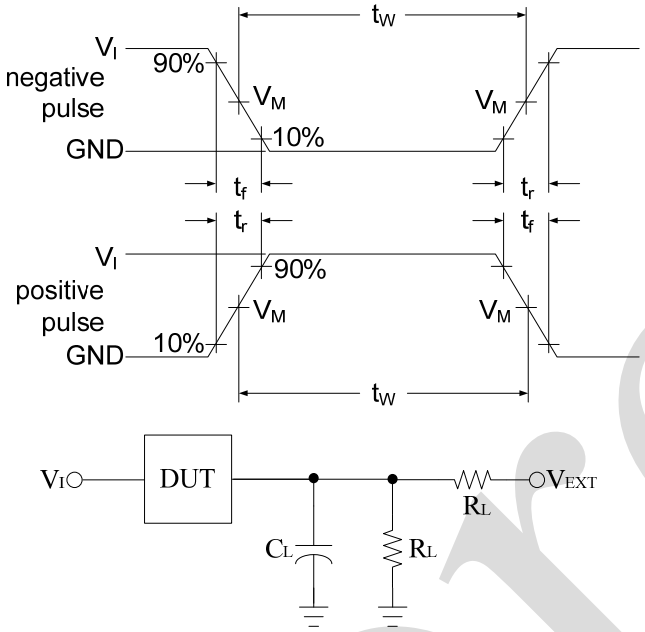


Figure 8 Test circuit for measuring switching times

Definitions for test circuit:

R_L=Load resistance.

C_L=Load capacitance including jig and probe capacitance.

5.2. 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～2.7V	V_{CC}	≤3.0ns	30pF	500Ω	open	GND	2×V_{CC}
3.0V～3.6V	V_{CC}	≤3.0ns	50pF	500Ω	open	GND	2×V_{CC}

5.3.AC Testing Waveforms

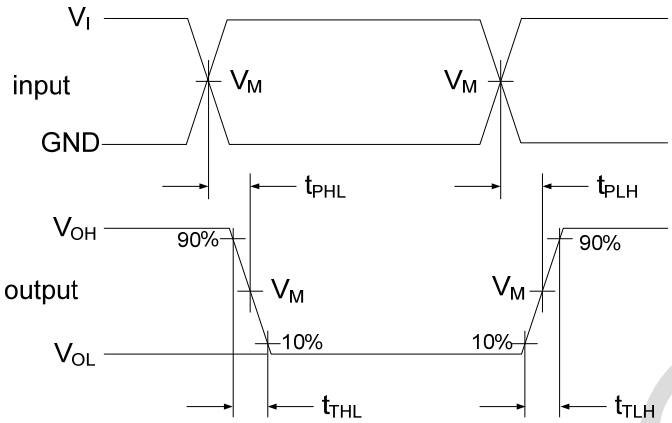


Fig. 9 Testing waveforms of propagation delay from input (nA/nBn) to output (nBn/nA) and propagation delay from input (S) to output (nA)

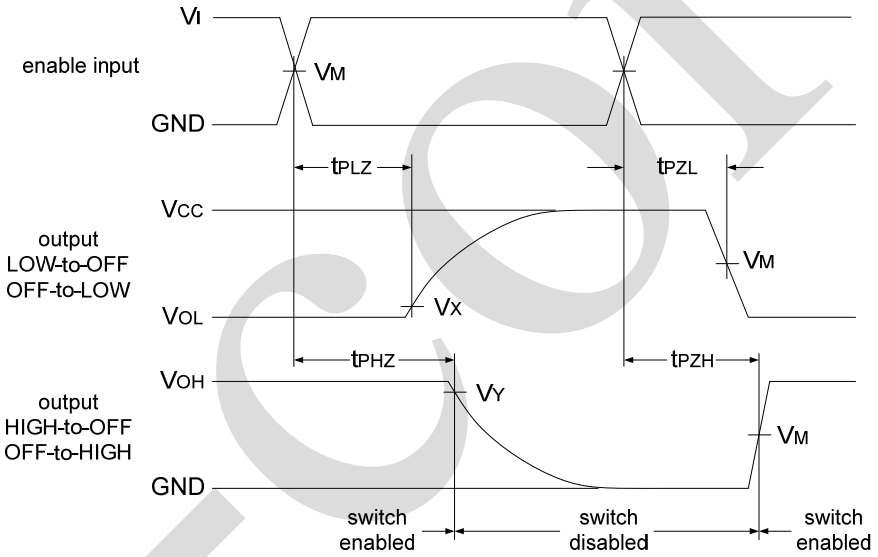


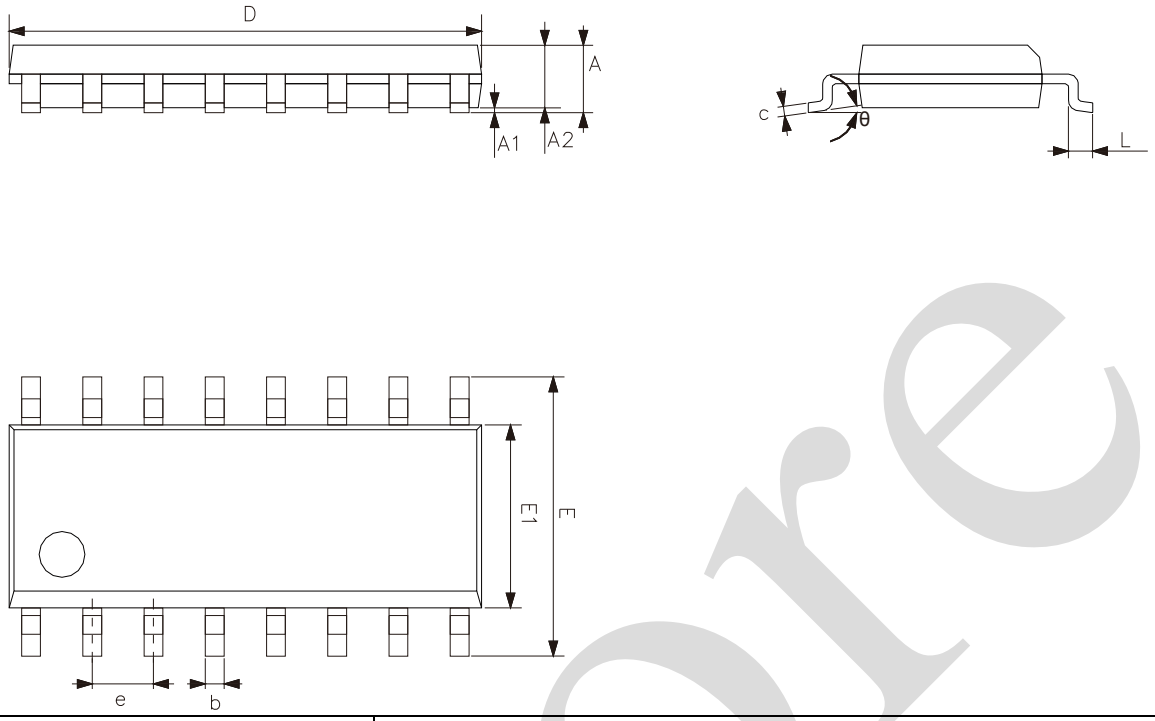
Figure 10 Testing Waveforms of Enable and Disable Time

5.4.Measurement Points

supply voltage	input		output		
V_{CC}	V_I	V_M	V_M	V_X	V_Y
2.3V～2.7V	V_{CC}	0.5×V_{CC}	0.5×V_{CC}	V_{OL}+0.15V	V_{OH}-0.15V
3.0V～3.6V	V_{CC}	0.5×V_{CC}	0.5×V_{CC}	V_{OL}+0.3V	V_{OH}-0.3V

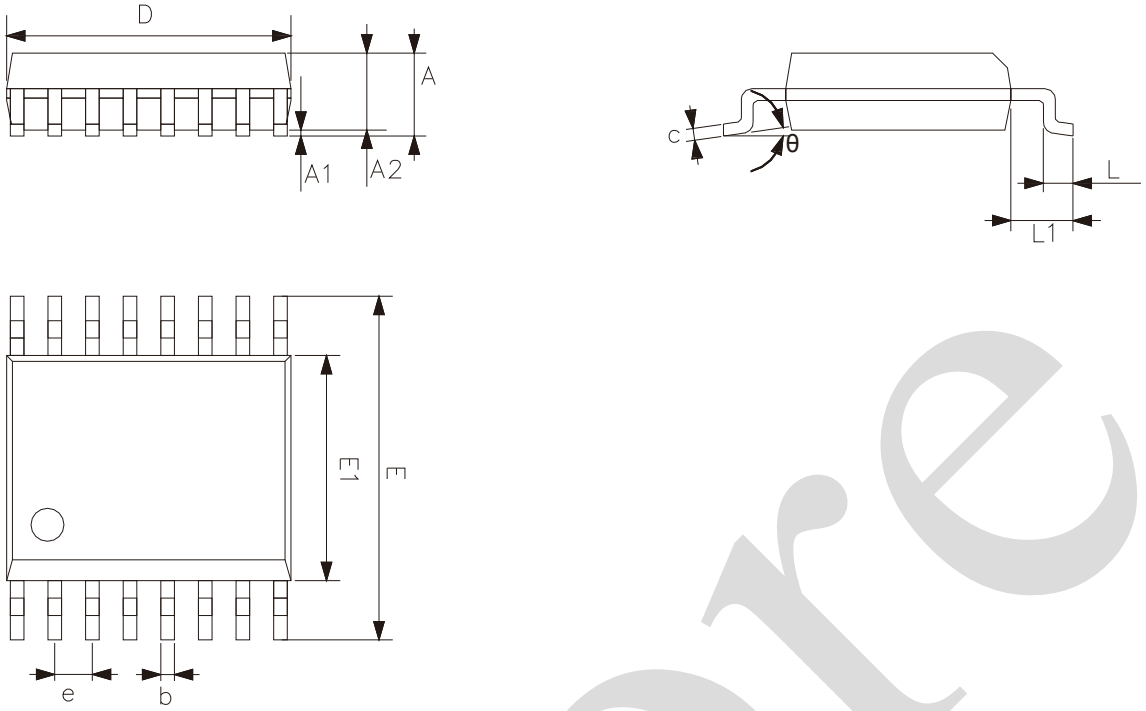
6. Package Information

6.1. SOP16



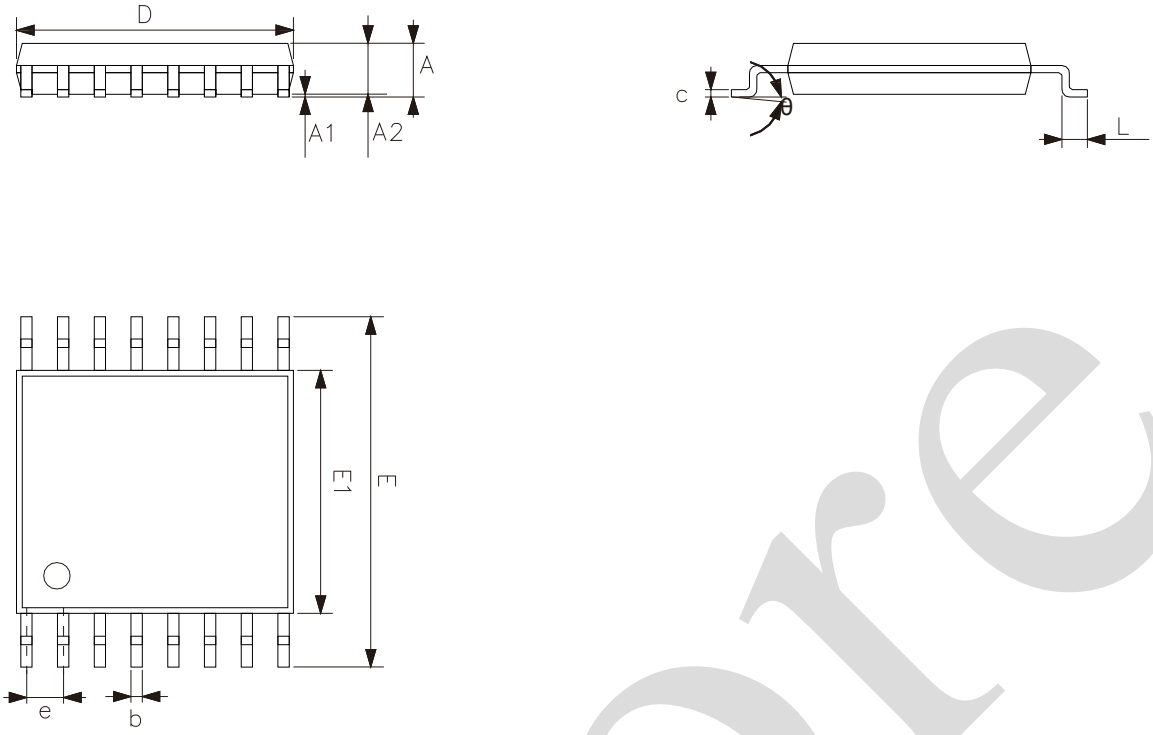
Symbol	Size（mm）	
	Min.	Max.
A	1.35	1.80
A1	0.10	0.25
A2	1.25	1.55
b	0.33	0.51
c	0.19	0.25
D	9.50	10.10
E	5.80	6.30
E1	3.70	4.10
e	1.27	
L	0.35	0.89
θ	0°	8°

6.2. SSOP16



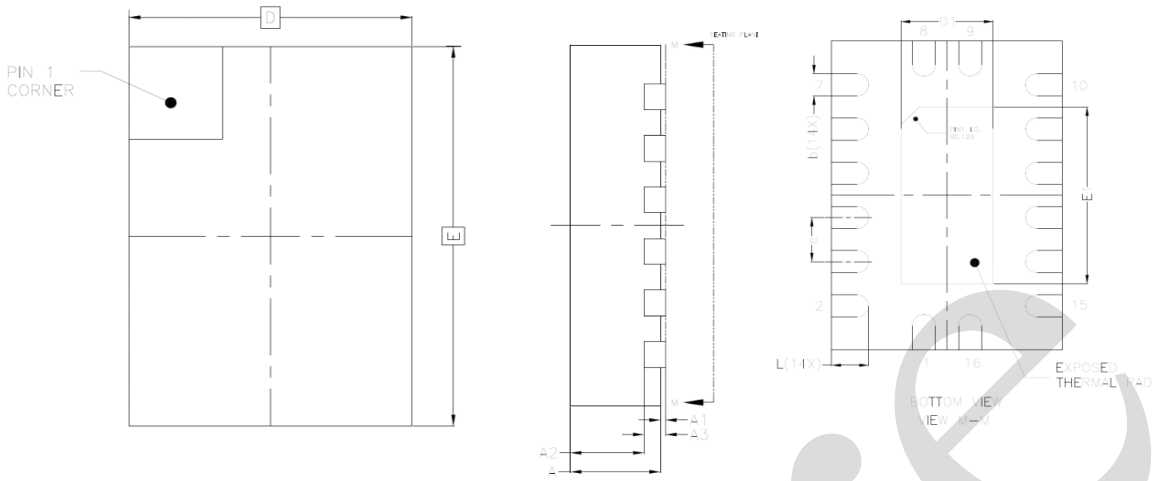
Symbol	Size（mm）	
	Min.	Max.
A	—	1.75
A1	0.02	0.23
A2	1.30	1.50
b	0.23	0.31
c	0.20	0.24
D	4.70	5.10
E	5.80	6.25
E1	3.80	4.02
e	0.635	
L	0.45	0.80
L1	1.05	
θ	0°	8°

6.3. TSSOP16



Symbol	Size（mm）	
	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°

6.4. DHVQFN16



Symbol	Size（mm）	
	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

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. Notion

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