



AiP74CB3Q3251

1-of-8 Multiplexer/Demultiplexer with Charge Pump

Product specification

Manual release resume:

Version	Date	Description
2024-09-A0	2024-09	New
2024-12-A1	2024-12	Modify the parameters



Contents

1、General Description	3
2、Block Diagram and Pin Description	5
2.1、Block Diagram	5
2.2、Pin Configurations.....	6
2.3、Pin Description.....	6
2.4、Function Table	7
3、Electrical Parameter	7
3.1、Absolute Maximum Ratings.....	7
3.2、Recommended Operating Conditions.....	7
3.3、Electrical Characteristics	8
3.3.1、DC Characteristics.....	8
3.3.2、AC Characteristics.....	9
4、Characteristic curve	9
5、Testing Circuit	10
5.1、AC Testing Circuit.....	10
5.2、Test data.....	10
5.3、AC Testing Waveforms	10
5.4、Measurement Points	11
6、Package Information.....	12
6.1、SOP16	12
6.2、SSOP16	13
6.3、TSSOP16.....	14
6.4、DHVQFN16	15
7、Statements And Notes	16
7.1、The name and content of Hazardous substances or Elements in the product	16
7.2、Notes	16



1、 General Description

AiP74CB3Q3251 is a 1-of-8 multiplexer/demultiplexer with charge pump. The circuit has selection port (S0 to S2) and enable control port ($\overline{OE}$). A built-in charge pump is used to increase the gate voltage of the NMOS pass transistor, enabling the circuit to transmit 5.5V switching signals when $V_{CC}=3.3V$.

Features:

- supply voltage range: 2.3V to 3.6V
- overvoltage transmission characteristics:
 $V_{CC}=2.5V$, $V_{sw}=0V$ to 5.5V
 $V_{CC}=3.3V$, $V_{sw}=0V$ to 5.5V
- low power consumption: $I_{CC}=0.5mA$ (Typical)
- rail-to-rail switching on I/O ports
- temperature range: $-40^{\circ}C$ to $+125^{\circ}C$
- packaging information: SOP16/SSOP16/TSSOP16/DHVQFN16



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

Part number	Packaging form	Marking code	Reel quantity	Boxed reel quantity	Notes
AiP74CB3Q3251 SA16.TR	SOP16	74CB3Q3251	4000 PCS/reel	8000 PCS/box	Dimensions of plastic enclosure: 10.0mm×3.9mm Pin spacing: 1.27mm
AiP74CB3Q3251 VB16.TR	SSOP16	74CB3Q3251	4000 PCS/reel	8000 PCS/box	Dimensions of plastic enclosure: 4.9mm×3.9mm Pin spacing: 0.635mm
AiP74CB3Q3251 TA16.TR	TSSOP16	74CB3Q3251	5000 PCS/reel	10000 PCS/box	Dimensions of plastic enclosure: 5.0mm×4.4mm Pin spacing: 0.65mm
AiP74CB3Q3251 QE16.TR	DHVQFN16	CB3Q3251	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

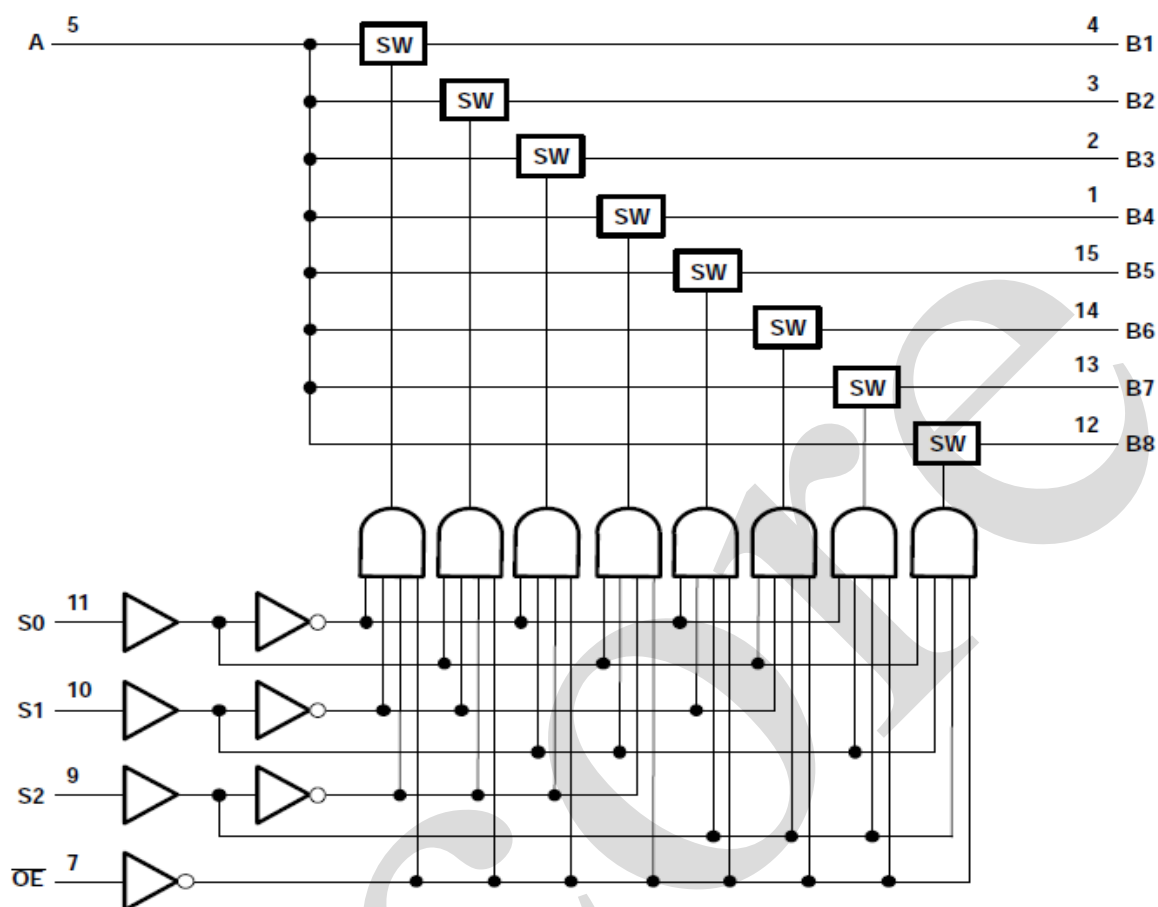
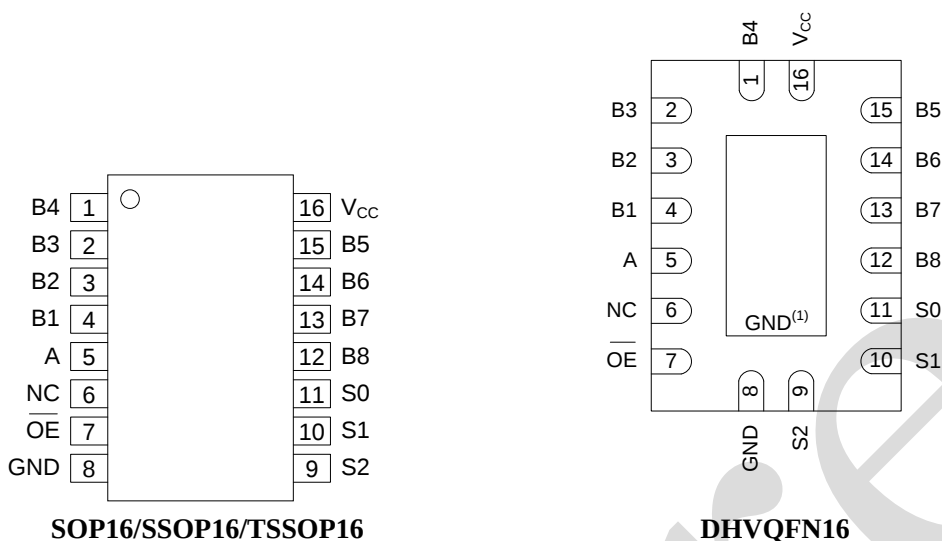


Figure 1. Logic diagram



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	B4	independent input/output
2	B3	independent input/output
3	B2	independent input/output
4	B1	independent input/output
5	A	common input/output
6	NC	not connected
7	OE	output enable input (active LOW)
8	GND	ground (0V)
9	S2	select input
10	S1	select input
11	S0	select input
12	B8	independent input/output
13	B7	independent input/output
14	B6	independent input/output
15	B5	independent input/output
16	VCC	supply voltage



2.4、Function Table

Input				Function switch
OE	S2	S1	S0	
L	L	L	L	A=B1
L	L	L	H	A=B2
L	L	H	L	A=B3
L	L	H	H	A=B4
L	H	L	L	A=B5
L	H	L	H	A=B6
L	H	H	L	A=B7
L	H	H	H	A=B8
H	X	X	X	Disconnect

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	Input ports S0 to S2, OE	-0.5	+7.0	V
switch voltage	V_{SW}	-	-0.5	+7.0	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}	-	-	± 120	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	Input ports S0 to S2, OE	0	-	5.5	V
switch voltage	V_{SW}	-	0	-	5.5	V
ambient temperature	T_{amb}	-	-40	-	+125	°C
input transition rise and fall rate	$\Delta t / \Delta V$	Input ports S0 to S2, OE; $V_{CC}=2.3V$ to $2.7V$	0	-	20	ns/V
		Input ports S0 to S2, OE; $V_{CC}=2.7V$ to $3.6V$	0	-	10	ns/V

**3.3、Electrical Characteristics****3.3.1、DC Characteristics**(T_{amb}=-40℃ to +125℃, 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
		2.7V to 3.6V	-	2.0	-	-	V
LOW-level input voltage	V _{IL}	2.3V to 2.7V	-	-	-	0.7	V
		2.7V to 3.6V	-	-	-	0.8	V
input clamping voltage	V _{IK}	3.6V	A, nBn pins; I _I =-18mA	-	-	-1.8	V
input leakage current	I _I	3.6V	OE, S0 to S2 pins; V _I =GND to 5.5V	-	-	±1	uA
OFF-state leakage current	I _S (OFF)	3.6V	A, nBn pins	-	-	±1	uA
power-off leakage current	I _{OFF}	0V	V _{SW} or V _I =0V to 5.5V	-	-	±1	uA
supply current	I _{CC}	3.6V	V _I =V _{CC} or GND; I _O =0A; V _{SW} =GND or V _{CC}	-	0.5	0.8	mA
additional supply current	ΔI _{CC}	3.6V	OE, S0 to S2 pins; one input at V _I =3V; other inputs at V _{CC} or GND	-	-	30	uA
On resistance	R _{ON}	2.3V	I _{sw} =30mA; V _I =0V	-	2.7	6	Ω
			I _{sw} =-15mA; V _I =1.7V	-	2.9	6	Ω
		3.0V	I _{sw} =30mA; V _I =0V	-	2.7	6	Ω
			I _{sw} =-15mA; V _I =2.4V	-	3.1	6	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、AC Characteristics

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

Parameter	Symbol	V_{CC}	Conditions	Min.	Max.	Unit
propagation delay	t_{PLH} , t_{PHL}	2.3V to 2.7V	A to Bn Bn to A see Figure 4	-	0.12	ns
		3.0V to 3.6V		-	0.20	ns
		2.3V to 2.7V	S0 to S2 to A see Figure 4	1.5	9.0	ns
		3.0V to 3.6V		1.5	7.5	ns
enable time	t_{PZH} , t_{PZL}	2.3V to 2.7V	$\overline{OE}$ to A/Bn see Figure 5	1.5	9.0	ns
		3.0V to 3.6V		1.5	7.5	ns
		2.3V to 2.7V	S0 to S2 to Bn see Figure 5	1.5	9.0	ns
		3.0V to 3.6V		1.5	7.5	ns
disable time	t_{PLZ} , t_{PHZ}	2.3V to 2.7V	$\overline{OE}$ to A/Bn see Figure 5	1.5	9.0	ns
		3.0V to 3.6V		1.5	7.5	ns
		2.3V to 2.7V	S0 to S2 to Bn see Figure 5	1.5	9.0	ns
		3.0V to 3.6V		1.5	7.5	ns
maximum frequency	f_{max}	2.3V to 2.7V	$\overline{OE}$, S0 to S2 pins; $V_O > V_{CC}$; $V_I = 5V$; $R_L \geq 1M\Omega$; $C_L = 0pF$	-	5	MHz
		3.0V to 3.6V		-	18	MHz

4、Characteristic curve

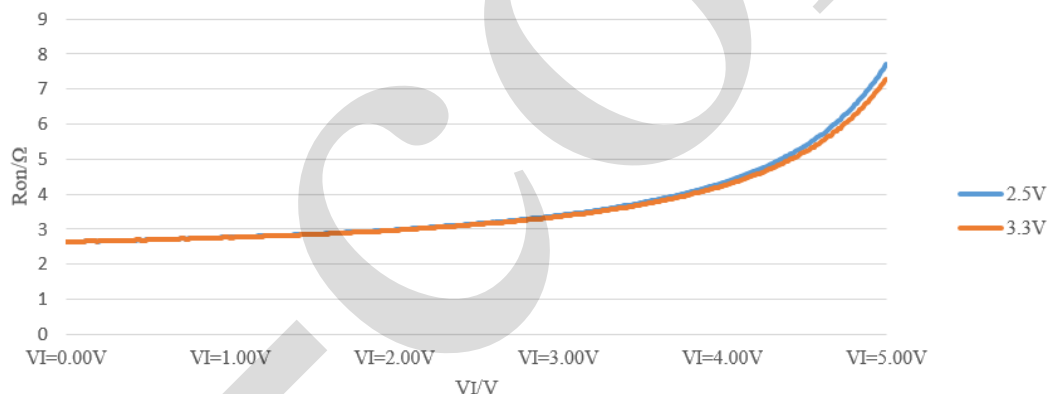


Figure 2. ON resistance as a function of input voltage



5、Testing Circuit

5.1、AC Testing Circuit

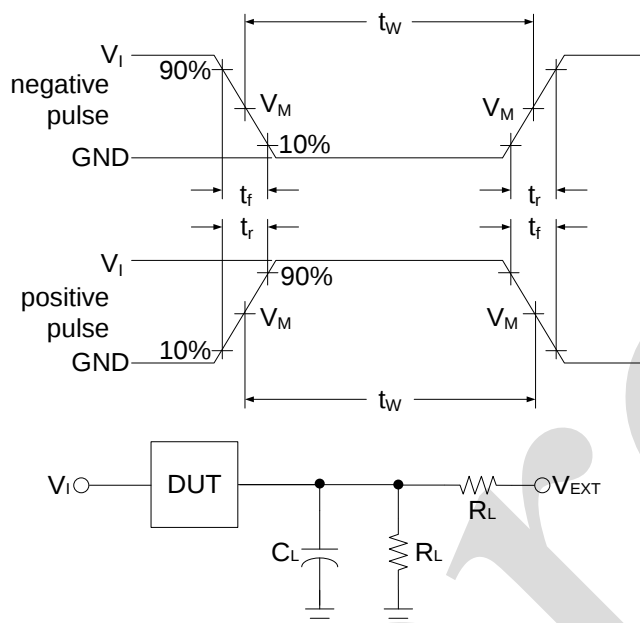


Figure 3. Load circuit

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 to 2.7V	V_{CC}	$\leq 2.5ns$	30pF	500 Ω	open	GND	$2 \times V_{CC}$
3.0V to 3.6V	V_{CC}	$\leq 2.5ns$	50pF	500 Ω	open	GND	$2 \times V_{CC}$

5.3、AC Testing Waveforms

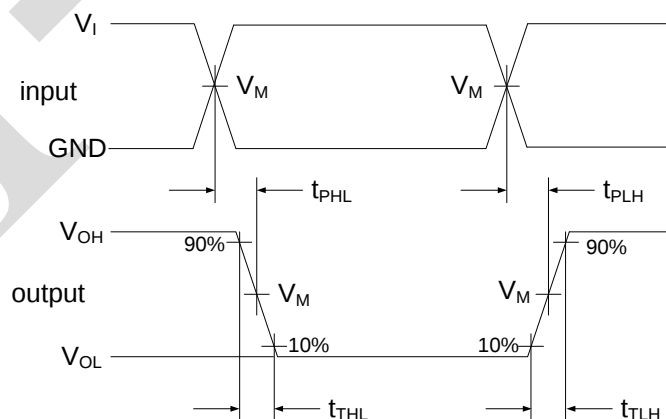


Figure 4. Input (A/Bn) to output (Bn/A) propagation delays and input (S0 to S2) to output (A) propagation delays

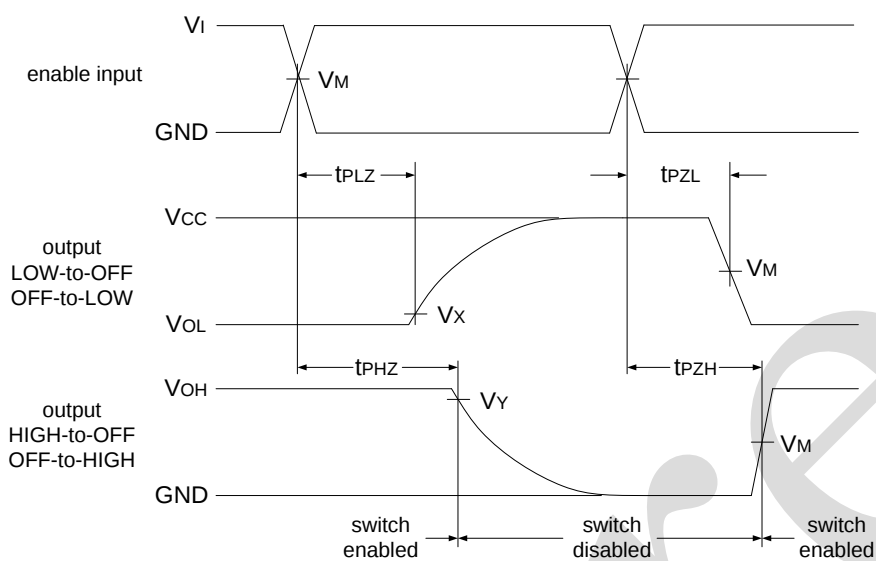


Figure 5. Enable and disable times

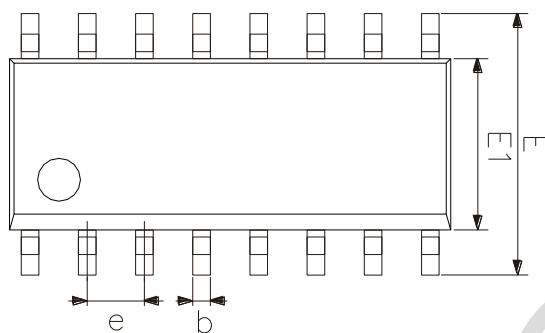
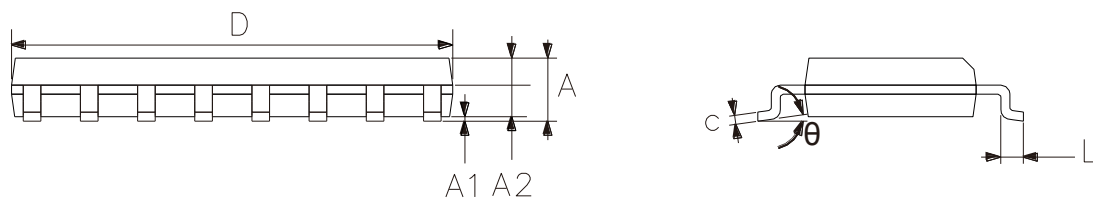
5.4、Measurement Points

supply voltage	input	output		
V_{CC}	V_M	V_M	V_X	V_Y
2.3V to 2.7V	$0.5 \times V_{CC}$	$0.5 \times V_{CC}$	$V_{OL} + 0.15V$	$V_{OH} - 0.15V$
3.0V to 3.6V	$0.5 \times V_{CC}$	$0.5 \times V_{CC}$	$V_{OL} + 0.3V$	$V_{OH} - 0.3V$



6、Package Information

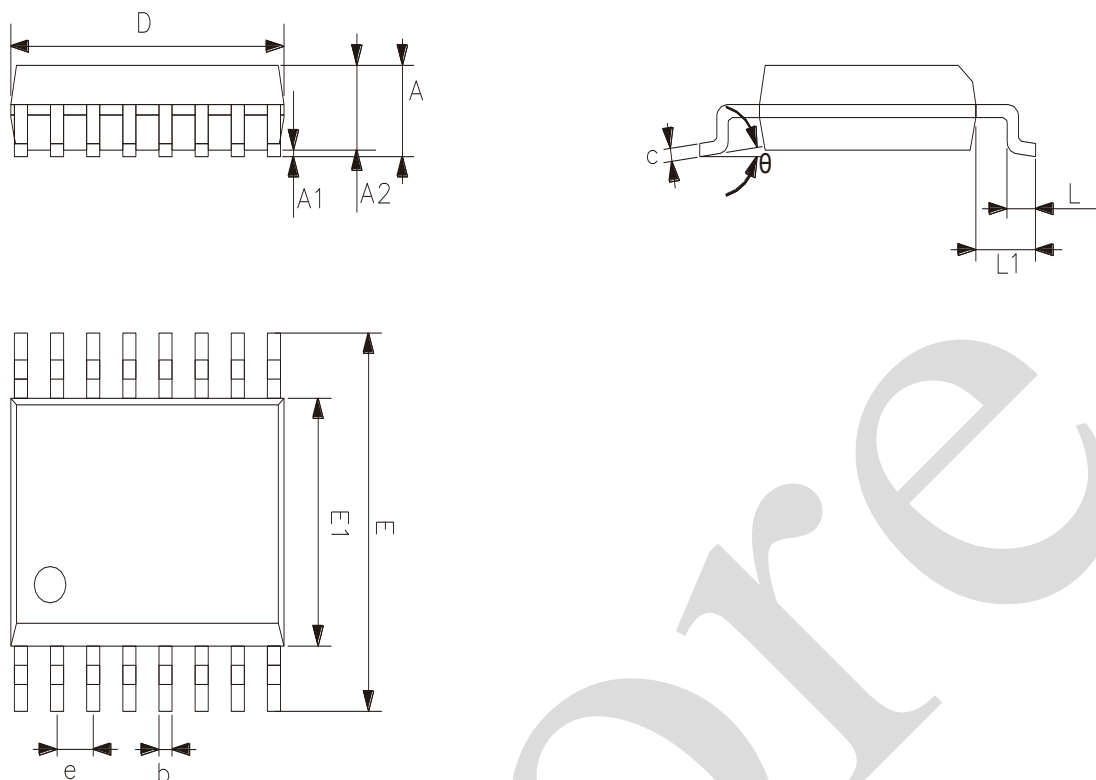
6.1、SOP16



2023/12/A	Dimensions In Millimeters	
Symbol	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°



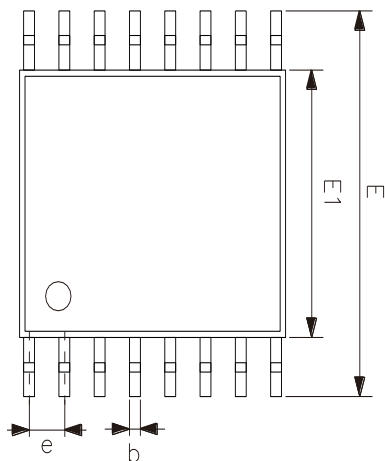
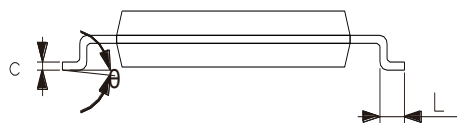
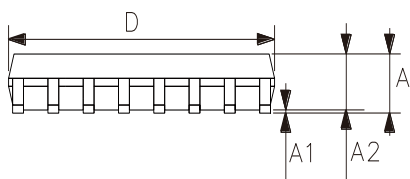
6.2、SSOP16



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°



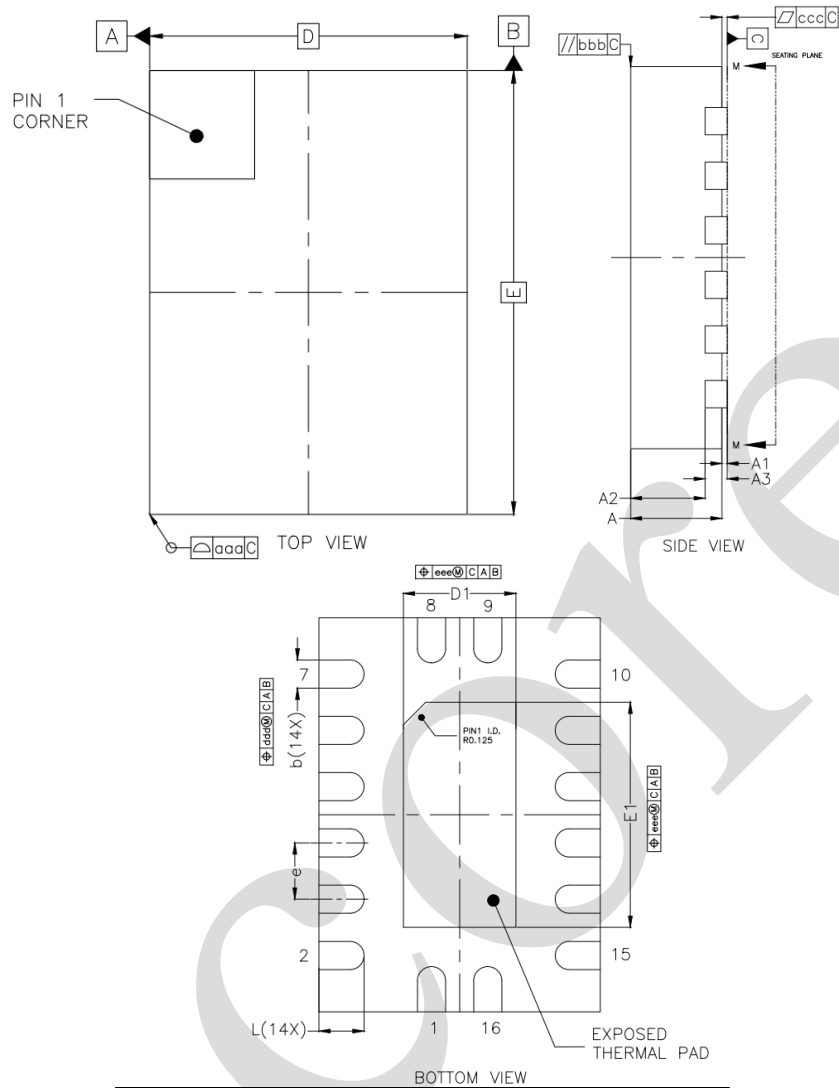
6.3、TSSOP16



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°



6.4、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



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.

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.