



AiP74CB3Q3257

4-Bit 1-of-2 FET Multiplexer/ Demultiplexer with Charge Pump

Product specification

Manual release resume:

Version	Date	Description
2023-04-A0	2023-04	New
2024-05-A1	2024-05	Modify the parameters
2024-09-A2	2024-09	Modify the parameters
2026-05-A3	2026-05	Add VQFN16 package form



Contents

1、General Description	3
2、Block Diagram and Pin Description	4
2.1、Block Diagram	4
2.2、Pin Configurations.....	5
2.3、Pin Description.....	6
2.4、Function Table	6
3、Electrical Parameter	6
3.1、Absolute Maximum Ratings.....	6
3.2、Recommended Operating Conditions.....	7
3.3、Electrical Characteristics	7
3.3.1、DC Characteristics.....	7
3.3.2、AC Characteristics.....	8
4、Characteristic curve	8
5、Testing Circuit	9
5.1、AC Testing Circuit.....	9
5.2、Test data.....	9
5.3、AC Testing Waveforms	9
5.4、Measurement Points	10
6、Package Information.....	11
6.1、SOP16	11
6.2、SSOP16	12
6.3、TSSOP16.....	13
6.4、DHVQFN16	14
6.5、VQFN16.....	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**

AiP74CB3Q3257 is a 4-bit 1-of-2 multiplexer/demultiplexer. The circuit has common select port (S) 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 analog switch
- temperature range: $-40^{\circ}C$ to $+125^{\circ}C$
- packaging information: SOP16/SSOP16/TSSOP16/DHVQFN16/VQFN16

Ordering information:**Reel packing specifications:**

Part number	Packaging form	Marking code	Reel quantity	Boxed reel quantity	Notes
AiP74CB3Q3257 SA16.TR	SOP16	74CB3Q3257	4000 PCS/reel	8000 PCS/box	Dimensions of plastic enclosure: 10.0mm×3.9mm Pin spacing: 1.27mm
AiP74CB3Q3257 VB16.TR	SSOP16	74CB3Q3257	4000 PCS/reel	8000 PCS/box	Dimensions of plastic enclosure: 4.9mm×3.9mm Pin spacing: 0.635mm
AiP74CB3Q3257 TA16.TR	TSSOP16	74CB3Q3257	5000 PCS/reel	10000 PCS/box	Dimensions of plastic enclosure: 5.0mm×4.4mm Pin spacing: 0.65mm
AiP74CB3Q3257 QE16.TR	DHVQFN16	3Q3257	3000 PCS/reel	3000 PCS/box	Dimensions of plastic enclosure: 3.5mm×2.5mm Pin spacing: 0.5mm
AiP74CB3Q3257 QK16.TR	VQFN16	74CB3Q3257	1500 PCS/reel	15000 PCS/box	Dimensions of plastic enclosure: 4.0mm×3.5mm 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

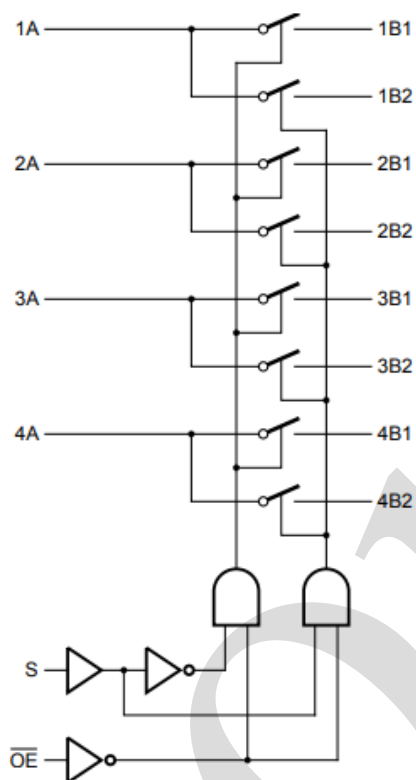
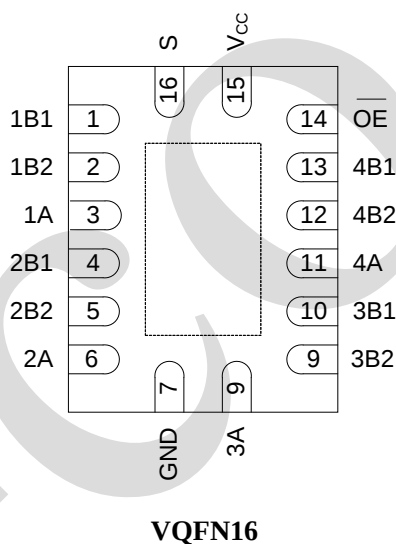
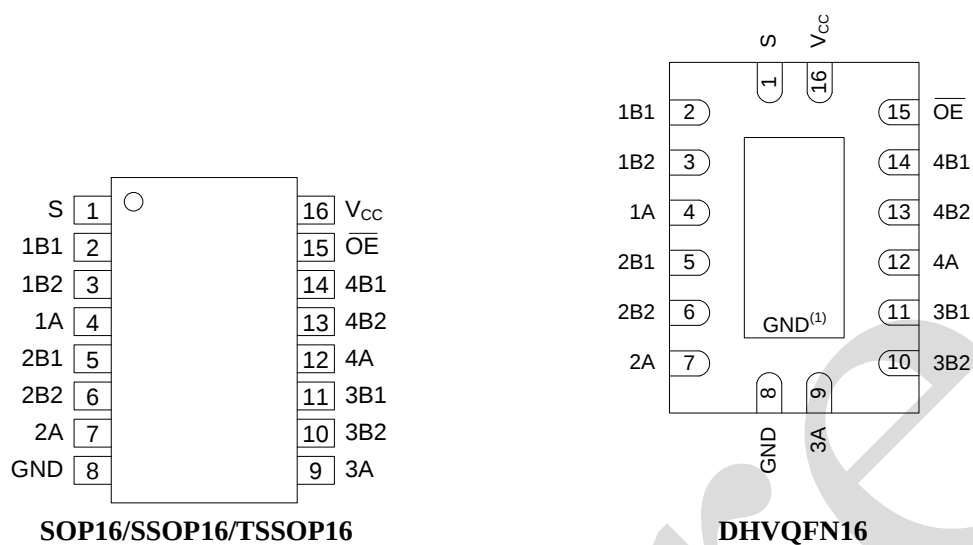


Figure 1. Logic diagram

**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
SOP16/SSOP16/TSSOP16/ DHVQFN16	VQFN16		
1	16	S	select input
2	1	1B1	independent input/output
3	2	1B2	independent input/output
4	3	1A	common input/output
5	4	2B1	independent input/output
6	5	2B2	independent input/output
7	6	2A	common input/output
8	7	GND	ground (0V)
9	8	3A	common input/output
10	9	3B2	independent input/output
11	10	3B1	independent input/output
12	11	4A	common input/output
13	12	4B2	independent input/output
14	13	4B1	independent input/output
15	14	$\overline{\text{OE}}$	output enable input (active LOW)
16	15	V _{CC}	supply voltage

2.4、Function Table

input		Function switch
$\overline{\text{OE}}$	S	
L	L	nA=nB1
L	H	nA=nB2
H	X	nA and nB 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	Input ports S, $\overline{\text{OE}}$	-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 S, $\overline{OE}$	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 S, $\overline{OE}$; $V_{CC}=2.3V$ to $2.7V$	0	-	20	ns/V
		Input ports S, $\overline{OE}$; $V_{CC}=2.7V$ to $3.6V$	0	-	10	ns/V

3.3、Electrical Characteristics

3.3.1、DC Characteristics

($T_{amb}=-40^{\circ}C$ to $+125^{\circ}C$, 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
		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	nA, nBn pins; $I_I=-18mA$	-	-	-1.8	V
input leakage current	I_I	3.6V	$\overline{OE}$, S pins; $V_I=GND$ to 5.5V	-	-	± 1	μA
OFF-state leakage current	$I_S(OFF)$	3.6V	nA, nBn pins	-	-	± 1	μA
power-off leakage current	I_{OFF}	0V	V_{SW} or $V_I=0V$ to 5.5V	-	-	± 1	μA
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	$\overline{OE}$, S pins; one input at $V_I=3V$; other inputs at V_{CC} or GND	-	-	30	μA
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 $T_{amb}=25^{\circ}C$.



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	nA to nBn	-	0.12	ns
		3.0V to 3.6V	nBn to nA see Figure 4	-	0.20	ns
		2.3V to 2.7V	S to nA	1.5	9.0	ns
		3.0V to 3.6V	see Figure 4	1.5	7.5	ns
enable time	t_{pZH} , t_{pZL}	2.3V to 2.7V	$\overline{OE}$ to nA/nBn	1.5	9.0	ns
		3.0V to 3.6V	see Figure 5	1.5	7.5	ns
		2.3V to 2.7V	S to nBn	1.5	9.0	ns
		3.0V to 3.6V	see Figure 5	1.5	7.5	ns
disable time	t_{pLZ} , t_{pHZ}	2.3V to 2.7V	$\overline{OE}$ to nA/nBn	1.5	9.0	ns
		3.0V to 3.6V	see Figure 5	1.5	7.5	ns
		2.3V to 2.7V	S to nBn	1.5	9.0	ns
		3.0V to 3.6V	see Figure 5	1.5	7.5	ns
maximum frequency	f_{max}	2.3V to 2.7V	$\overline{OE}$, Sn 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

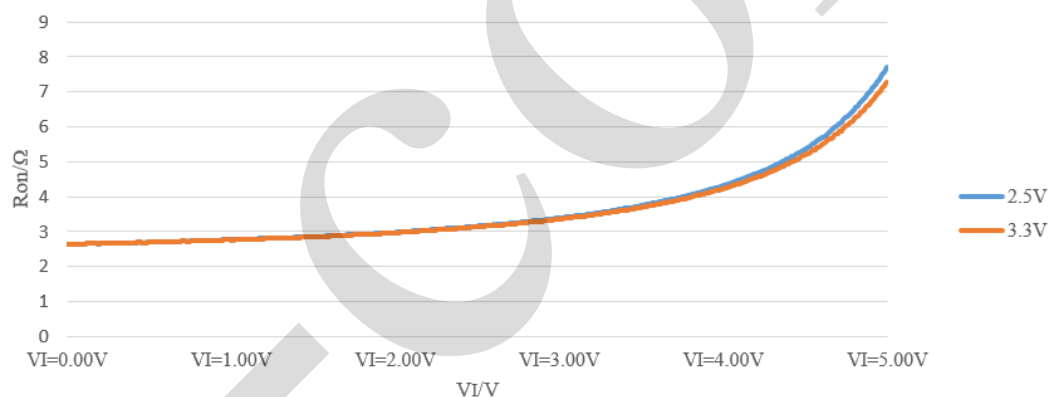


Figure 2. ON resistance as a function of input voltage

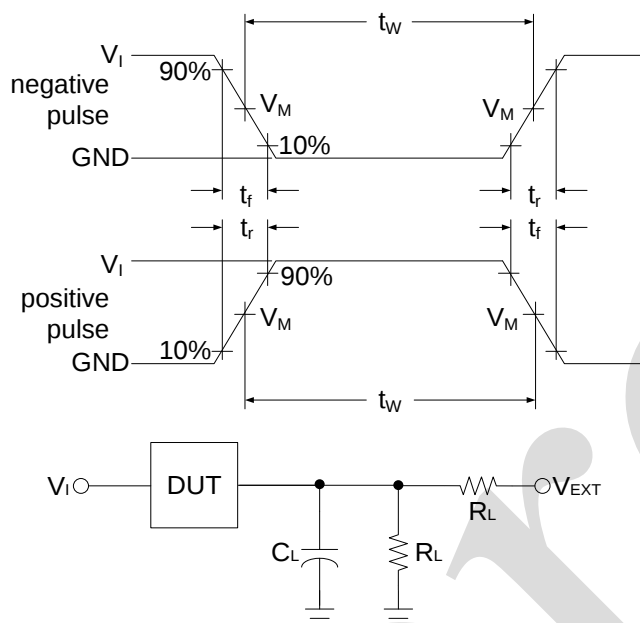
**5、Testing Circuit****5.1、AC Testing Circuit**

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	$2 \times V_{CC}$

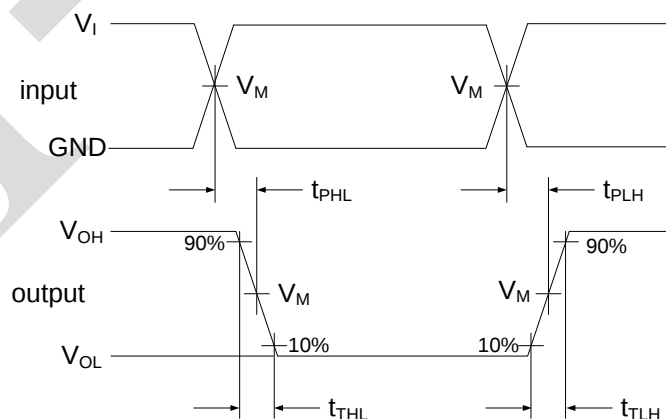
5.3、AC Testing Waveforms

Figure 4. Input (nA/nBn) to output (nBn/nA) propagation delays and
input (S) to output (nA) propagation delays

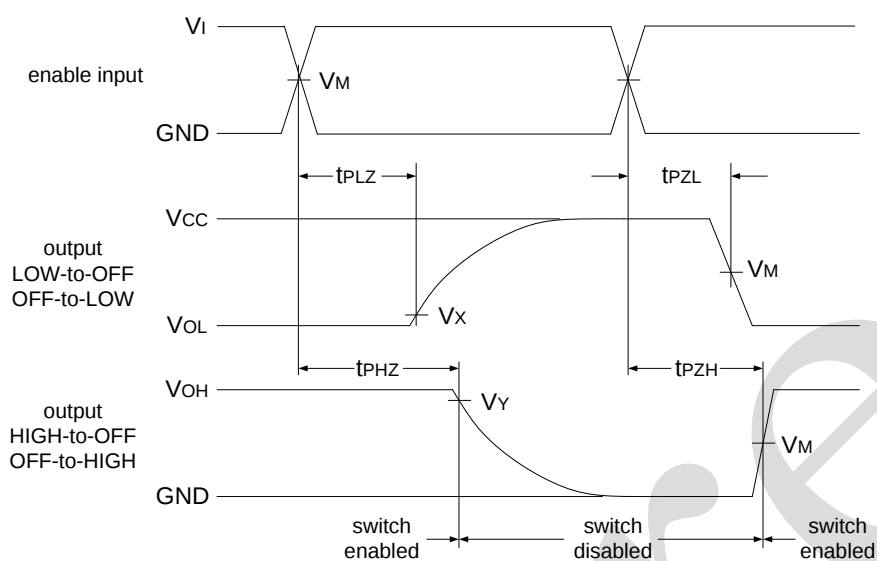


Figure 5. Enable and disable times

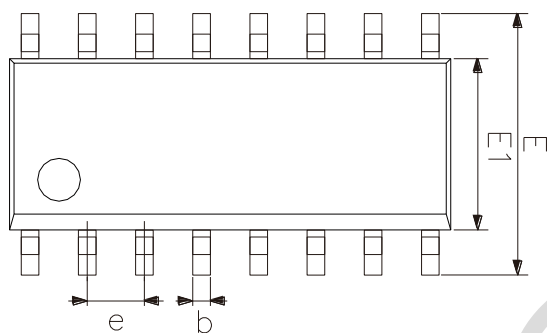
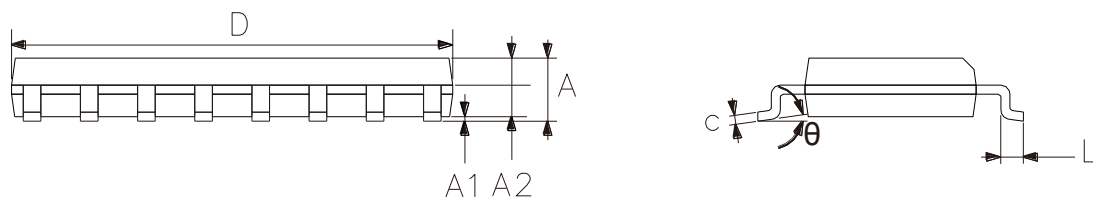
5.4、Measurement Points

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

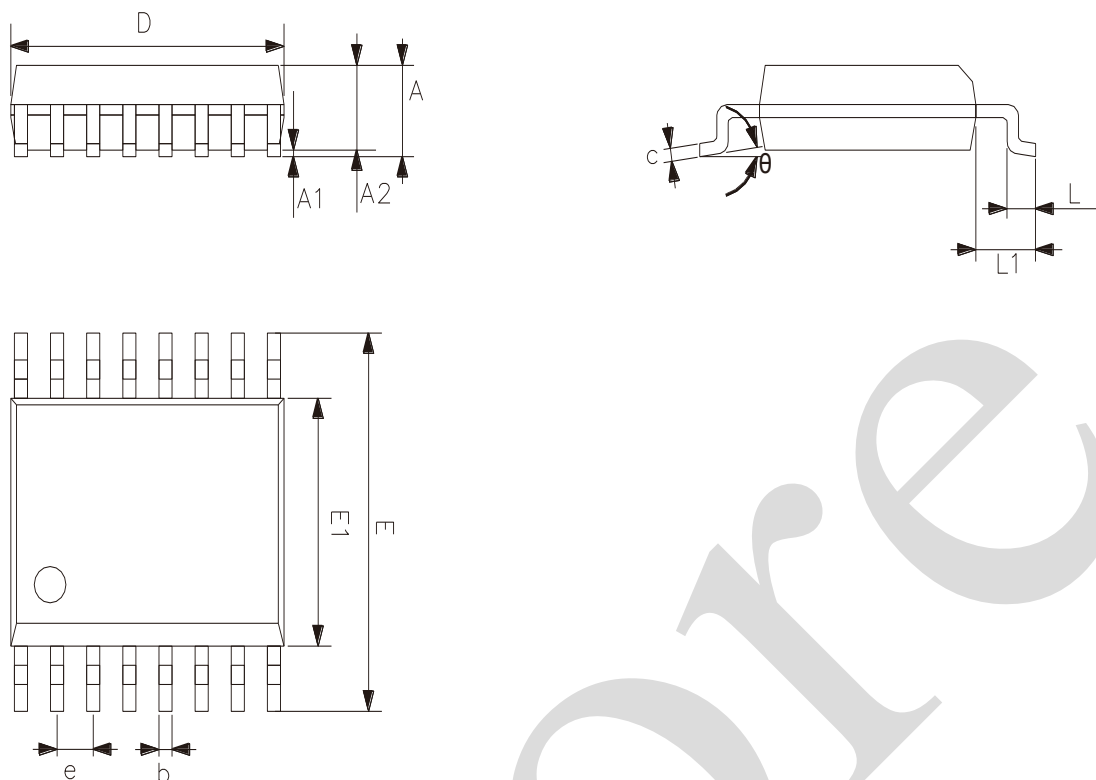
6.1、SOP16



2023/12/A 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°



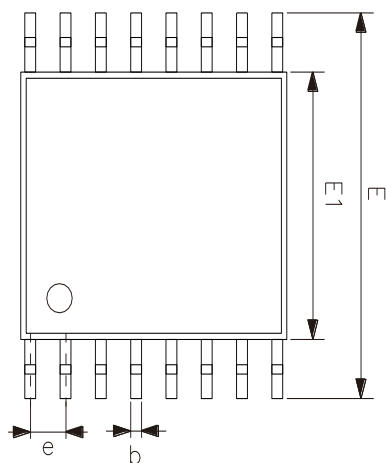
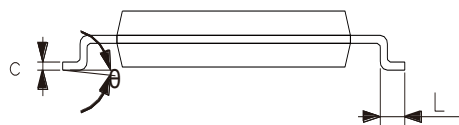
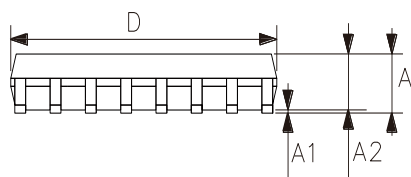
6.2、SSOP16



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°



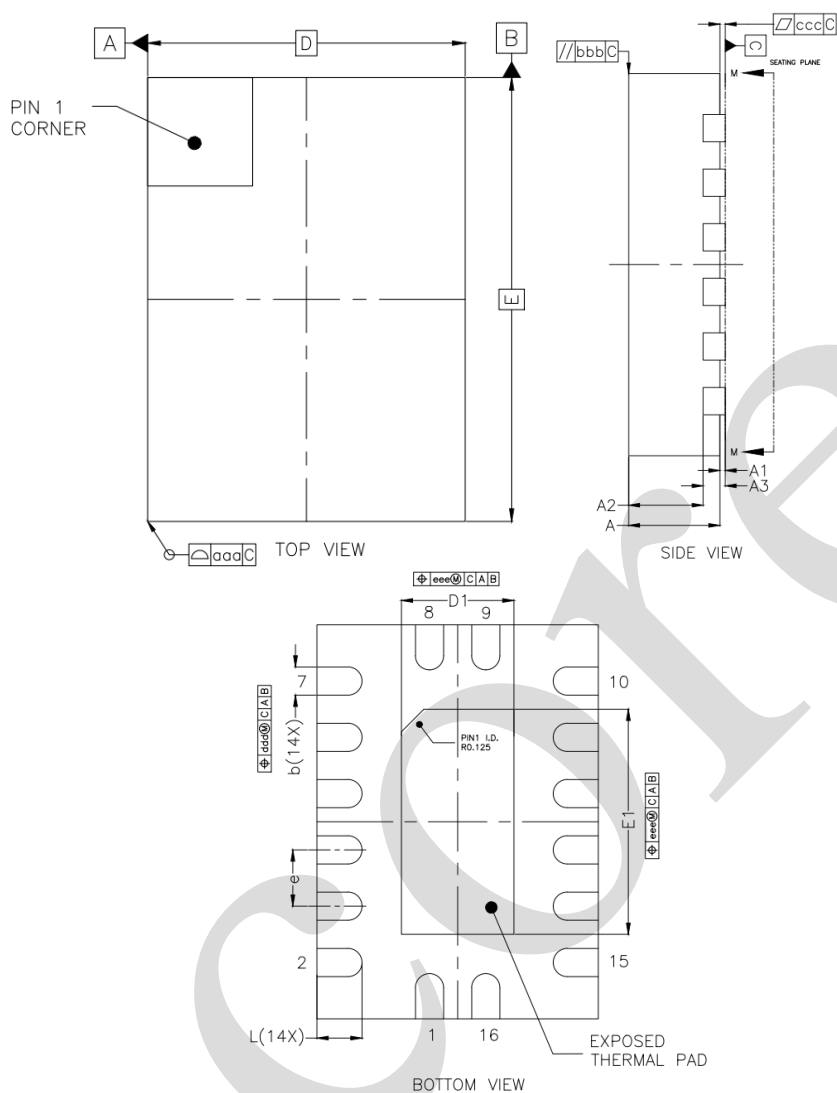
6.3、TSSOP16



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°



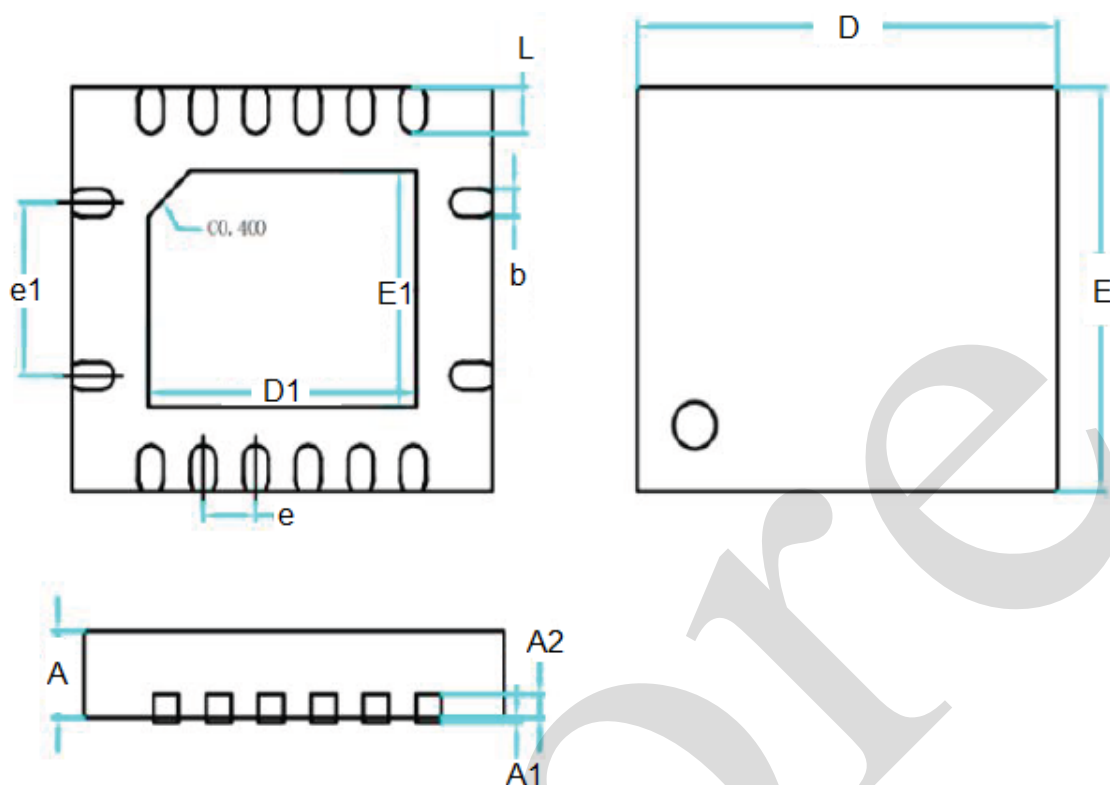
6.4、DHVQFN16



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



6.5、VQFN16



2023/12/A	Dimensions In Millimeters	
Symbol	Min	Max
A	0.75	
A1	0.05	
A2	0.203	
b	0.215	0.265
D	4.00	
D1	2.525	2.575
E	3.50	
E1	2.025	2.075
e	0.475	0.525
e1	1.475	1.525
L	0.40	



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.