



AiP74CB3Q3253

Dual 1-of-4 FET Multiplexer/ Demultiplexer with Charge Pump

Product specification

Manual release resume:

Version	Date	Description
2024-09-A0	2024-09	New
2025-01-A1	2025-01	Modify the parameters



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1、 General Description

AiP74CB3Q3253 is a dual 1-of-4 multiplexer/demultiplexer. The circuit has selection port (Sn) and enable control port ($\overline{\text{nOE}}$). 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

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

Part number	Packaging form	Marking code	Reel quantity	Boxed reel quantity	Notes
AiP74CB3Q3253 SA16.TR	SOP16	74CB3Q3253	4000 PCS/reel	8000 PCS/box	Dimensions of plastic enclosure: 10.0mm×3.9mm Pin spacing: 1.27mm
AiP74CB3Q3253 VB16.TR	SSOP16	74CB3Q3253	4000 PCS/reel	8000 PCS/box	Dimensions of plastic enclosure: 4.9mm×3.9mm Pin spacing: 0.635mm
AiP74CB3Q3253 TA16.TR	TSSOP16	74CB3Q3253	5000 PCS/reel	10000 PCS/box	Dimensions of plastic enclosure: 5.0mm×4.4mm Pin spacing: 0.65mm
AiP74CB3Q3253 QE16.TR	DHVQFN16	3Q3253	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

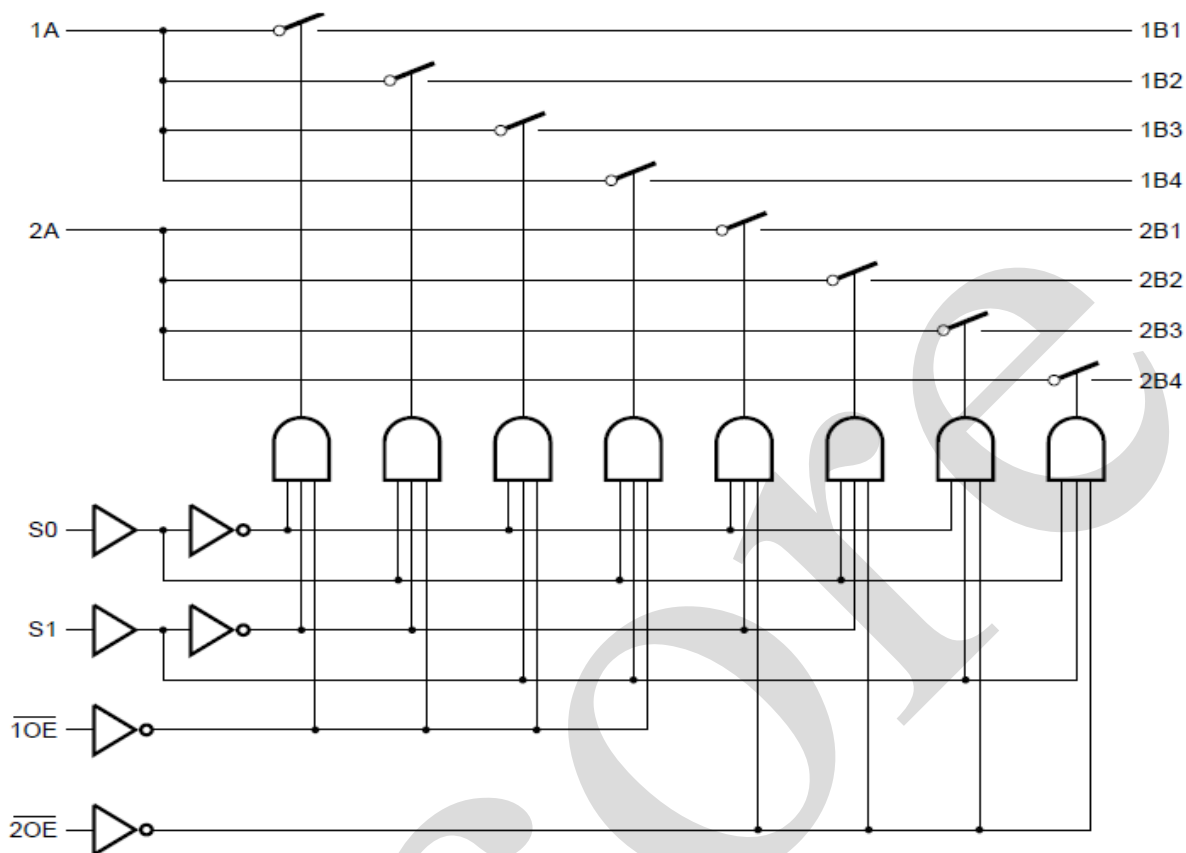
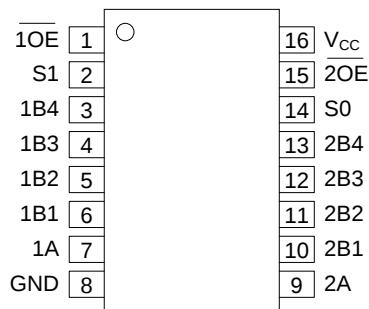
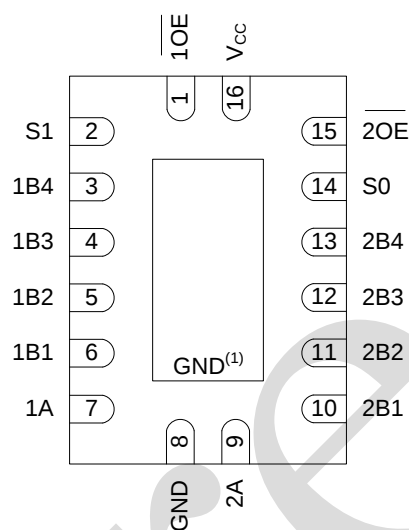


Figure 1. Logic diagram



2.2、Pin Configurations

**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 No.	Pin Name	Description
1	1OE	output enable input (active LOW)
2	S1	select input
3	1B4	independent input/output
4	1B3	independent input/output
5	1B2	independent input/output
6	1B1	independent input/output
7	1A	common input/output
8	GND	ground (0V)
9	2A	common input/output
10	2B1	independent input/output
11	2B2	independent input/output
12	2B3	independent input/output
13	2B4	independent input/output
14	S0	select input
15	2OE	output enable input (active LOW)
16	VCC	supply voltage



2.4、Function Table

input			Function switch
$\overline{\text{nOE}}$	S1	S0	
L	L	L	nA=nB1
L	L	H	nA=nB2
L	H	L	nA=nB3
L	H	H	nA=nB4
H	X	X	Z (switch off)

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 Sn, $\overline{\text{nOE}}$	-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 Sn, $\overline{\text{nOE}}$	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 Sn, $\overline{\text{nOE}}$; $V_{CC}=2.3V$ to $2.7V$	0	-	20	ns/V
		Input ports Sn, $\overline{\text{nOE}}$; $V_{CC}=2.7V$ to $3.6V$	0	-	10	ns/V



3.3、Electrical Characteristics

3.3.1、DC Characteristics

($T_{amb} = -40^{\circ}\text{C}$ to $+125^{\circ}\text{C}$, 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	nOE, Sn pins; V _I =GND to 5.5V	-	-	±1	uA
OFF-state leakage current	I _S (OFF)	3.6V	nA, 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	nOE, Sn 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°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 nBn to nA see Figure 4	-	0.12	ns
		3.0V to 3.6V		-	0.20	ns
		2.3V to 2.7V	Sn to nA 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	$\overline{nOE}$ to nA/nBn see Figure 5	1.5	9.0	ns
		3.0V to 3.6V		1.5	7.5	ns
		2.3V to 2.7V	Sn to nBn 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	$\overline{nOE}$ to nA/nBn see Figure 5	1.5	9.0	ns
		3.0V to 3.6V		1.5	7.5	ns
		2.3V to 2.7V	Sn to nBn 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	$\overline{nOE}$, 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

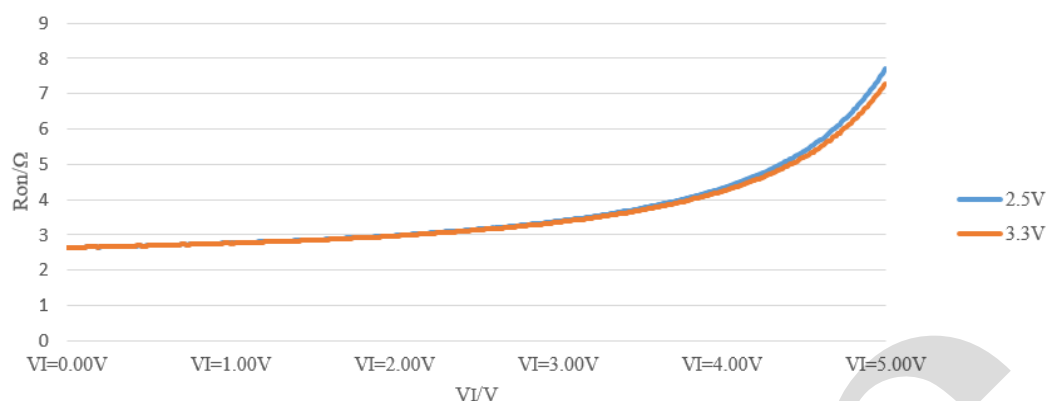


Figure 2. ON resistance as a function of input voltage

5、Testing Circuit

5.1、AC Testing Circuit

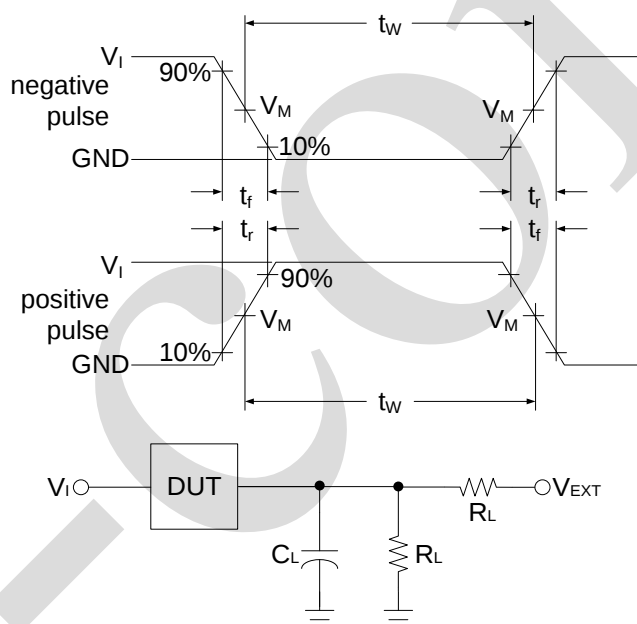


Figure 3. Load circuit

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



5.3、AC Testing Waveforms

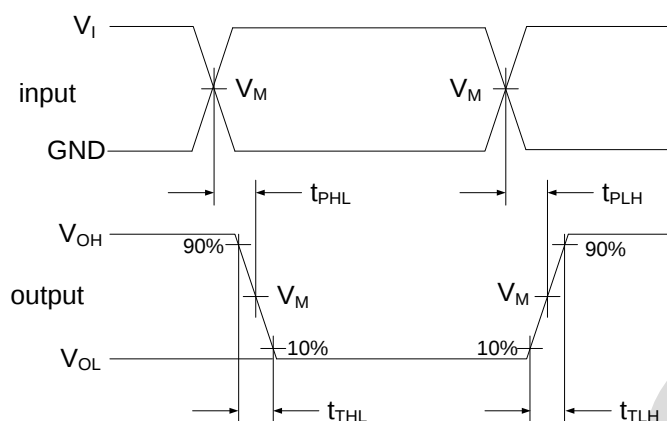


Figure 4. Input (nA/nBn) to output (nBn/nA) propagation delays and input (Sn) to output (nA) propagation delays

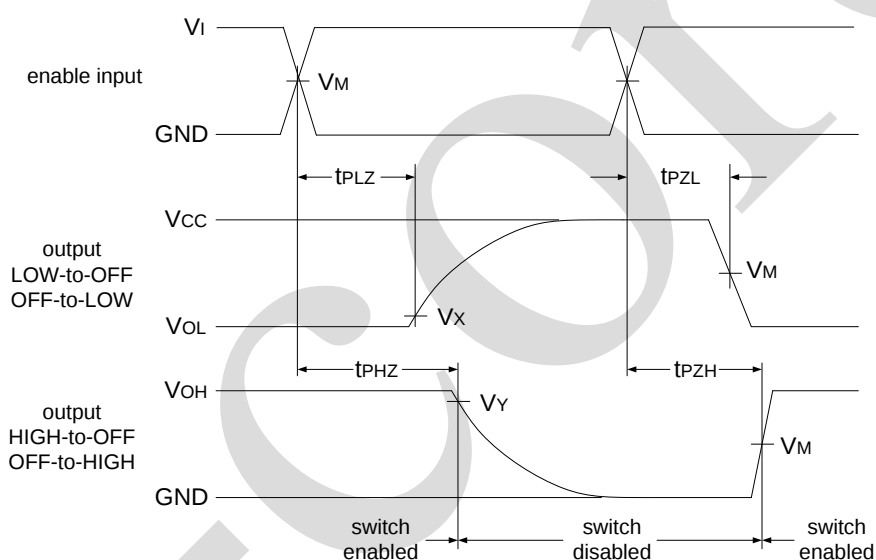
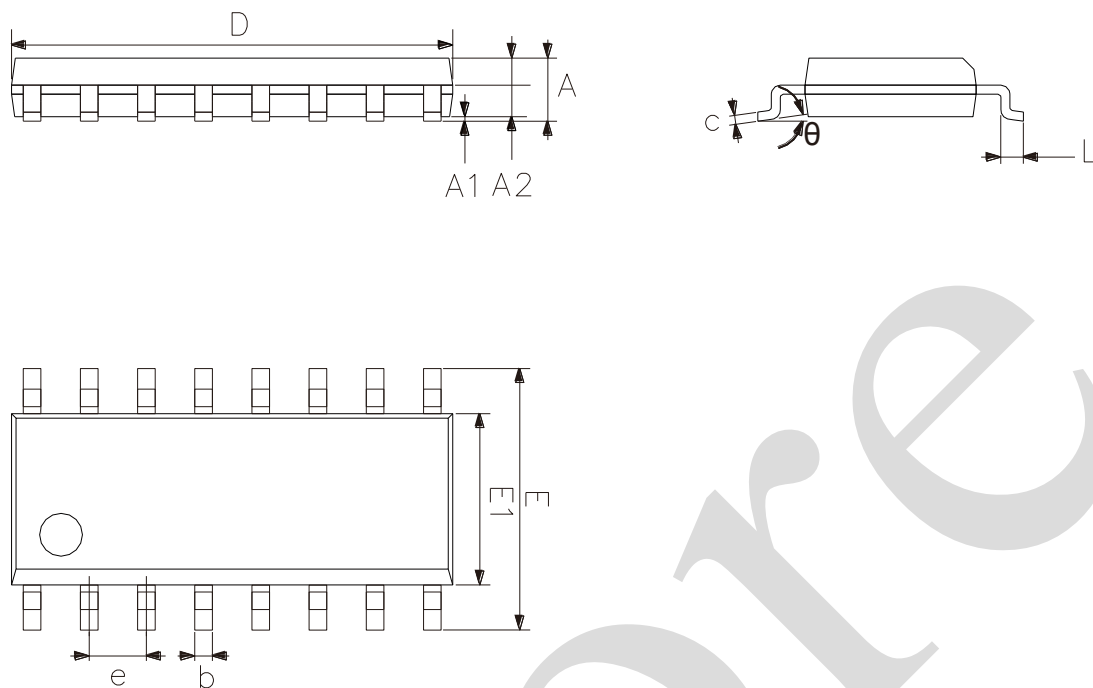


Figure 5. Enable and disable times

5.4、Measurement Points

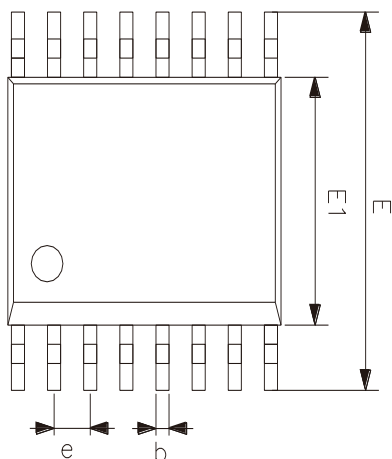
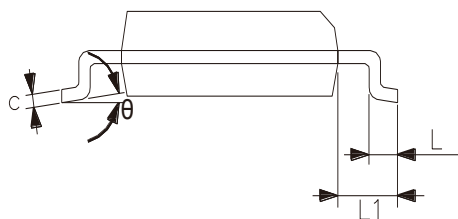
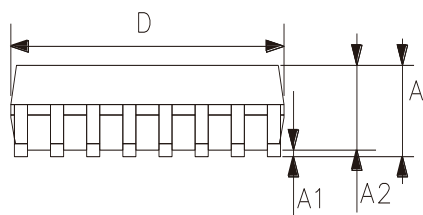
supply voltage	input	output		
V_{CC}	V_M	V_M	V_X	V_Y
2.3V to 2.7V	$0.5 \times V_{CC}$	$0.5 \times V_{CC}$	$V_{OL} + 0.15V$	$V_{OH} - 0.15V$
3.0V to 3.6V	$0.5 \times V_{CC}$	$0.5 \times V_{CC}$	$V_{OL} + 0.3V$	$V_{OH} - 0.3V$

**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°



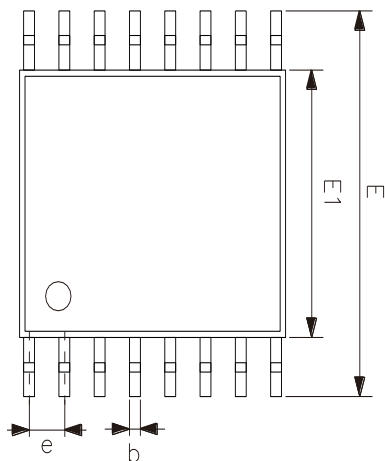
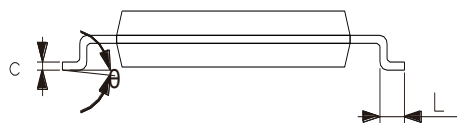
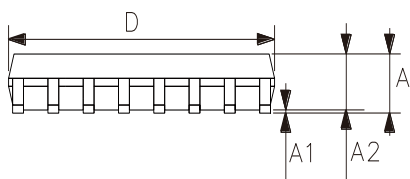
6.2、SSOP16



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°



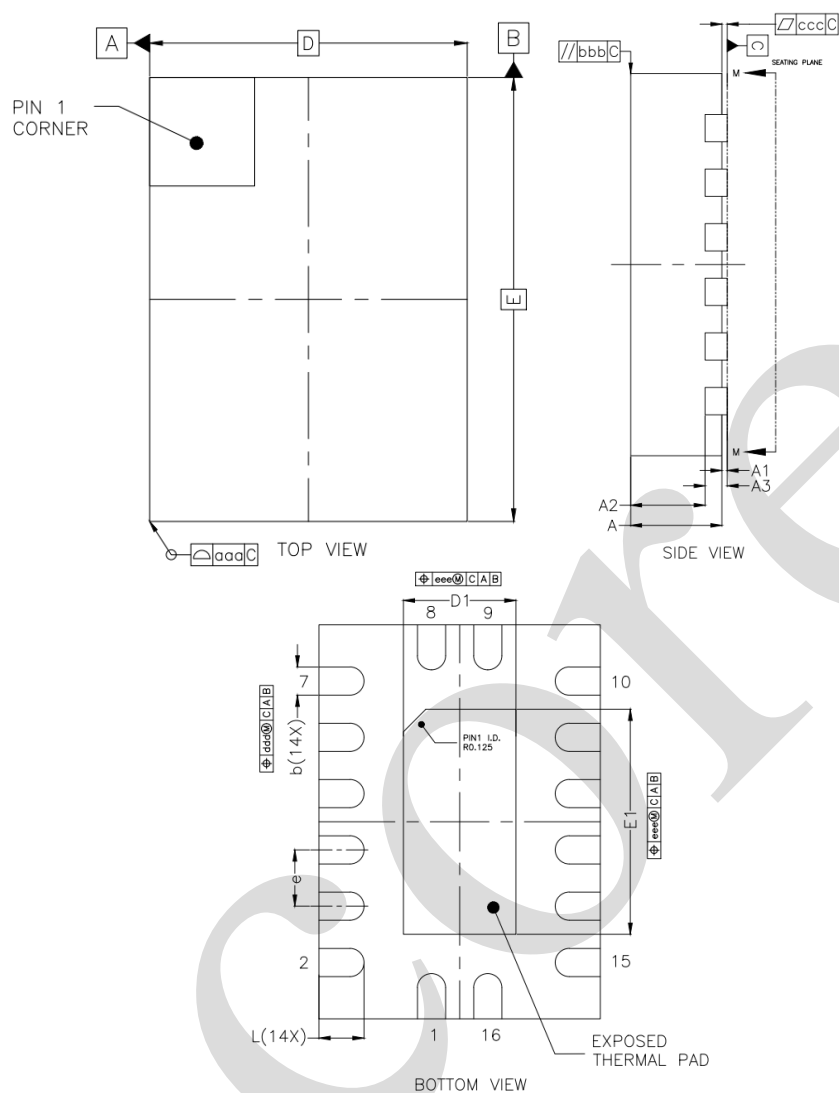
6.3、TSSOP16



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



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

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