AiP74AHC3G04/AHCT3G04
Triple Inverter

Product Specification

Specification Revision History：

Version	Date	Description
2024-12-A0	2024-12	New
2025-04-A1	2025-04	Modify the parameters

Contents

1、General Description

The AiP74AHC3G04/AiP74AHCT3G04 provides three inverters.

Features:

- Supply voltage range:
  AiP74AHC3G04: 2.0V to 5.5V
  AiP74AHCT3G04: 4.5V to 5.5V
- Input levels:
  AiP74AHC3G04: CMOS level
  AiP74AHCT3G04: TTL level
- Temperature range:-40℃ to +125℃
- Packaging information: TSSOP8/VSSOP8/XSON8

Ordering Information:

Reel packing specifications:

Part number	Packaging form	Marking code	Reel quantity	Boxed reel quantity	Notes
AiP74AHC3G04 TA8.TR	TSSOP8	AiPHB 3G04	3000 PCS/reel	3000 PCS/box	Dimensions of plastic enclosure: 3.0mm×3.0mm Pin spacing:0.65mm
AiP74AHCT3G04 TA8.TR	TSSOP8	AiPHP 3G04	3000 PCS/reel	3000 PCS/box	Dimensions of plastic enclosure: 3.0mm×3.0mm Pin spacing:0.65mm
AiP74AHC3G04 YA8.TR	VSSOP8	AiP HBXX	3000 PCS/reel	3000 PCS/box	Dimensions of plastic enclosure: 2.0mm×2.3mm Pin spacing:0.50mm
AiP74AHCT3G04 YA8.TR	VSSOP8	AiP HPXX	3000 PCS/reel	3000 PCS/box	Dimensions of plastic enclosure: 2.0mm×2.3mm Pin spacing:0.50mm
AiP74AHC3G04 EC8.TR	XSON8	HB XX	5000 PCS/reel	25000 PCS/box	Dimensions of plastic enclosure: 1.0mm×1.95mm Pin spacing:0.5mm
AiP74AHCT3G04 EC8.TR	XSON8	HP XX	5000 PCS/reel	25000 PCS/box	Dimensions of plastic enclosure: 1.0mm×1.95mm Pin spacing:0.5mm
AiP74AHC3G04 EB8.TR	XSON8	HB XX	5000 PCS/reel	25000 PCS/box	Dimensions of plastic enclosure: 1.0mm×1.35mm Pin spacing:0.35mm
AiP74AHCT3G04 EB8.TR	XSON8	HP XX	5000 PCS/reel	25000 PCS/box	Dimensions of plastic enclosure: 1.0mm×1.35mm Pin spacing:0.35mm

Note 1: “XX” refers to variable content, meaning year and package batch serial number.

Note 2: If the physical information is inconsistent with the ordering information, please refer to the actual product.

2、Block Diagram And Pin Description

2.1、Block Diagram

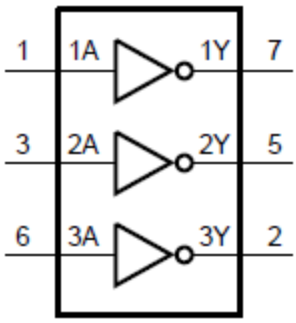
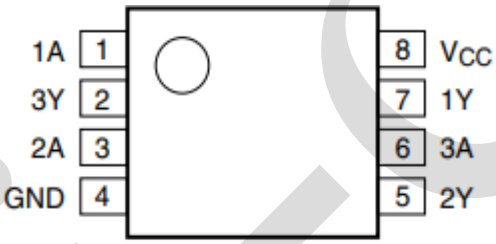


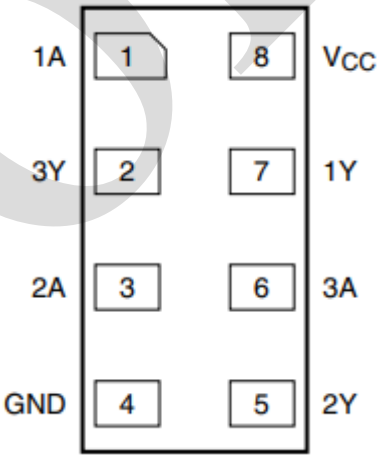
Figure 1. Logic symbol

Figure 2. Logic diagram (one gate)

2.2、Pin Configurations



TSSOP8/VSSOP8



XSON8

2.3、Pin Description

Pin No.	Pin Name	Description
1	1A	data input
2	3Y	data output
3	2A	data input
4	GND	ground (0 V)
5	2Y	data output
6	3A	data input
7	1Y	data output
8	V_{CC}	supply voltage

2.4、Function Table

Input	Output
nA	**nY**
L	H
H	L

Note: H=HIGH voltage level; L=LOW voltage level.

3、Electrical Parameter

3.1、Absolute Maximum Ratings

(Voltages are referenced to GND (ground=0V), unless otherwise specified.)

Parameter	Symbol	Conditions	Min.	Max.	Unit
supply voltage	V_{CC}	-	-0.5	+7	V
supply current	I_{CC}	-	-	50	mA
ground current	I_{GND}	-	-50	-	mA
input clamping current	I_{IK}	V_I < -0.5V	-	±20	mA
output clamping current	I_{OK}	V_O < -0.5V or V_O > V_{CC}+0.5V	-	±20	mA
output current	I_O	-0.5V < V_O < V_{CC}+0.5V	-	±25	mA
storage temperature	T_{stg}	-	-65	+150	℃
soldering temperature	T_L	10s	260		℃

3.2、Recommended Operating Conditions

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
AiP74AHC3G04						
supply voltage	V_{CC}	-	2.0	5.0	5.5	V
input voltage	V_I	-	0	-	V_{CC}	V
output voltage	V_O	-	0	-	V_{CC}	V
ambient temperature	T_{amb}	-	-40	+25	+125	℃
AiP74AHCT3G04						
supply voltage	V_{CC}	-	4.5	5.0	5.5	V
input voltage	V_I	-	0	-	V_{CC}	V
output voltage	V_O	-	0	-	V_{CC}	V
ambient temperature	T_{amb}	-	-40	+25	+125	℃

3.3、Electrical Characteristics

3.3.1、DC Characteristics 1

(T_{amb}=-40℃ to +85℃, voltages are referenced to GND (ground=0V), unless otherwise specified.)

Parameter	Symbol	V_{CC}	Conditions	Min.	Typ.	Max.	Unit
AiP74AHC3G04							
HIGH-level input voltage	V_{IH}	2.0V	-	1.5	-	-	V
		3.0V	-	2.1	-	-	V
		5.5V	-	3.85	-	-	V
LOW-level input voltage	V_{IL}	2.0V	-	-	-	0.5	V
		3.0V	-	-	-	0.9	V
		5.5V	-	-	-	1.65	V
HIGH-level output voltage	V_{OH}	2.0V	I_O=-50uA	1.9	2.0	-	V
		3.0V	I_O=-50uA	2.9	3.0	-	V
		4.5V	I_O=-50uA	4.4	4.5	-	V
		3.0V	I_O=-4.0mA	2.48	-	-	V
		4.5V	I_O=-8.0mA	3.8	-	-	V
LOW-level output voltage	V_{OL}	2.0V	I_O=50uA	-	0	0.1	V
		3.0V	I_O=50uA	-	0	0.1	V
		4.5V	I_O=50uA	-	0	0.1	V
		3.0V	I_O=4.0mA	-	-	0.44	V
		4.5V	I_O=8.0mA	-	-	0.44	V
input leakage current	I_I	0V to 5.5V	V_I=5.5V or GND	-	-	±1	uA
supply current	I_{CC}	5.5V	V_I=V_{CC} or GND;I_O=0A	-	-	10	uA
AiP74AHCT3G04							
HIGH-level input voltage	V_{IH}	4.5V to 5.5V	-	2.0	-	-	V
LOW-level input voltage	V_{IL}	4.5V to 5.5V	-	-	-	0.8	V
HIGH-level output voltage	V_{OH}	4.5V	I_O=-50uA	4.4	4.5	-	V
			I_O=-8.0mA	3.8	-	-	V
LOW-level output voltage	V_{OL}	4.5V	I_O=50uA	-	0	0.1	V
			I_O=8.0mA	-	-	0.44	V
input leakage current	I_I	0V to 5.5V	V_I=V_{CC} or GND	-	-	±1	uA
supply current	I_{CC}	5.5V	V_I=V_{CC} or GND;I_O=0A	-	-	10	uA
additional supply current	ΔI_{CC}	4.5V to 5.5V	One input at 3.4V; Other inputs at V_{CC} or GND; I_O=0A	-	-	1.35	mA

3.3.2、DC Characteristics 2

(T_{amb}=-40℃ to +125℃, voltages are referenced to GND (ground=0V), unless otherwise specified.)

Parameter	Symbol	V_{CC}	Conditions	Min.	Typ.	Max.	Unit
AiP74AHC3G04							
HIGH-level input voltage	V_{IH}	2.0V	-	1.5	-	-	V
		3.0V	-	2.1	-	-	V
		5.5V	-	3.85	-	-	V
LOW-level input voltage	V_{IL}	2.0V	-	-	-	0.5	V
		3.0V	-	-	-	0.9	V
		5.5V	-	-	-	1.65	V
HIGH-level output voltage	V_{OH}	2.0V	I_O=-50uA	1.9	-	-	V
		3.0V	I_O=-50uA	2.9	-	-	V
		4.5V	I_O=-50uA	4.4	-	-	V
		3.0V	I_O=-4.0mA	2.4	-	-	V
		4.5V	I_O=-8.0mA	3.7	-	-	V
LOW-level output voltage	V_{OL}	2.0V	I_O=50uA	-	-	0.1	V
		3.0V	I_O=50uA	-	-	0.1	V
		4.5V	I_O=50uA	-	-	0.1	V
		3.0V	I_O=4.0mA	-	-	0.55	V
		4.5V	I_O=8.0mA	-	-	0.55	V
input leakage current	I_I	0V to 5.5V	V_I=5.5V or GND	-	-	±2	uA
supply current	I_{CC}	5.5V	V_I=V_{CC} or GND;I_O=0A	-	-	40	uA
AiP74AHCT3G04							
HIGH-level input voltage	V_{IH}	4.5V to 5.5V	-	2.0	-	-	V
LOW-level input voltage	V_{IL}	4.5V to 5.5V	-	-	-	0.8	V
HIGH-level output voltage	V_{OH}	4.5V	I_O=-50uA	4.4	-	-	V
			I_O=-8.0mA	3.7	-	-	V
LOW-level output voltage	V_{OL}	4.5V	I_O=50uA	-	-	0.1	V
			I_O=8.0mA	-	-	0.55	V
input leakage current	I_I	0V to 5.5V	V_I=V_{CC} or GND	-	-	±2	uA
supply current	I_{CC}	5.5V	V_I=V_{CC} or GND;I_O=0A	-	-	40	uA
additional supply current	ΔI_{CC}	4.5V to 5.5V	One input at 3.4V; Other inputs at V_{CC} or GND; I_O=0A	-	-	1.35	mA

3.3.3、AC Characteristics 1

(T_{amb}=-40℃ to +85℃, voltages are referenced to GND (ground=0V), unless otherwise specified.)

Parameter	Symbol	V_{CC}	Conditions		Min.	Typ.	Max.	Unit
AiP74AHC3G04								
nA to nY propagation delay	t_{PLH}, t_{PHL}	3.0V to 3.6V	C_L=15pF	see Figure 4	-	4.3	8.5	ns
			C_L=50pF		-	6.1	12.0	ns
		4.5V to 4.5V	C_L=15pF		-	3.1	6.5	ns
			C_L=50pF		-	4.5	8.5	ns
AiP74AHCT3G04								
nAn to nYn propagation delay	t_{PLH}, t_{PHL}	5.5V	C_L=15pF	see Figure 4	-	3.4	7.5	ns
			C_L=50pF		-	4.9	8.5	ns

3.3.4、AC Characteristics 2

(T_{amb}=-40℃ to +125℃, voltages are referenced to GND (ground=0V), unless otherwise specified.)

Parameter	Symbol	V_{CC}	Conditions		Min.	Typ.	Max.	Unit
AiP74AHC3G04								
nA to nY propagation delay	t_{PLH}, t_{PHL}	3.0V to 3.6V	C_L=15pF	see Figure 4	-	-	11.0	ns
			C_L=50pF		-	-	14.5	ns
		4.5V to 4.5V	C_L=15pF		-	-	7.0	ns
			C_L=50pF		-	-	9.5	ns
AiP74AHCT3G04								
nAn to nYn propagation delay	t_{PLH}, t_{PHL}	5.5V	C_L=15pF	see Figure 4	-	-	8.5	ns
			C_L=50pF		-	-	10.0	ns

4、Testing Circuit

4.1、AC Testing Circuit

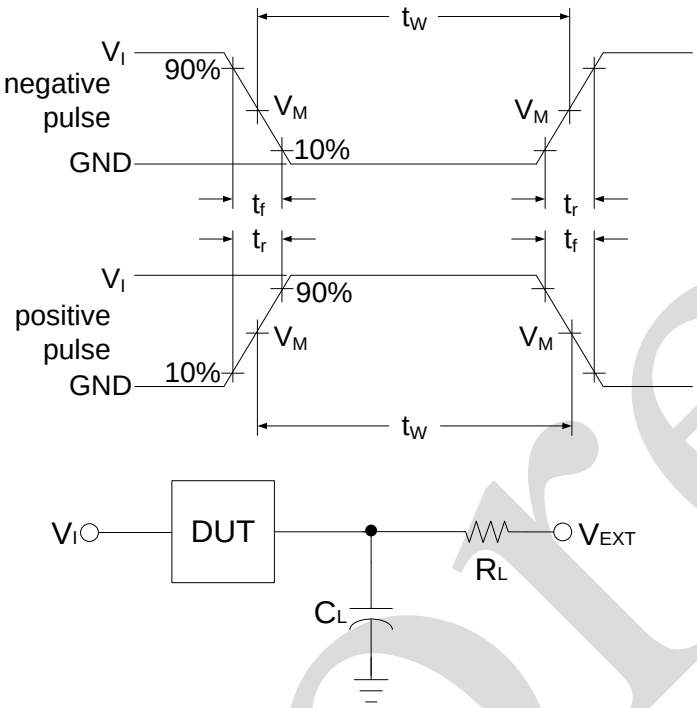


Figure 3. Test circuit for measuring switching times

C_L includes probe and jig capacitance.

4.2、Test Data

Type	Input		Load		V_{EXT}		
	V_I	$t_r = t_f$	C_L	R_L	t_{PLH}/t_{PHL}	t_{PLZ}/t_{PZL}	t_{PHZ}/t_{PZH}
AiP74AHC3G04	V_{CC}	3.0ns	15pF, 50pF	1kΩ	Open	V_{CC}	GND
AiP74AHCT3G04	3.0V	3.0ns	15pF, 50pF	1kΩ	Open	V_{CC}	GND

4.3、AC Testing Waveforms

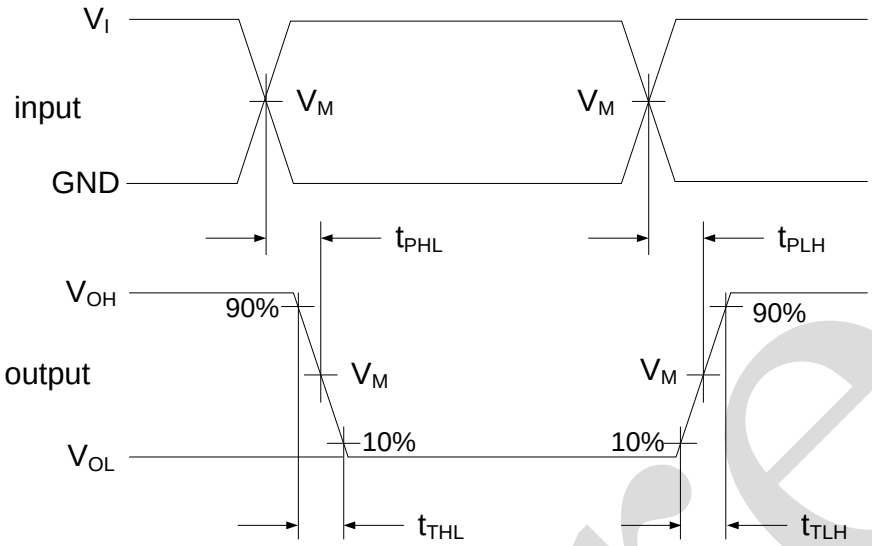


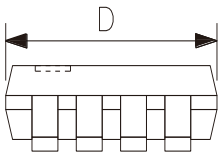
Figure 4. Propagation delay, output transition time

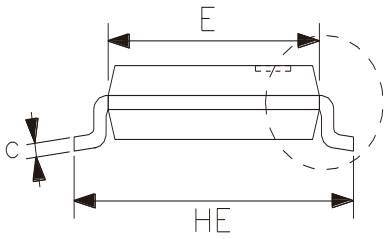
4.4、Measurement Points

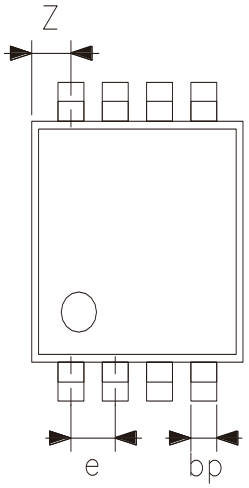
Type	Input	Output
	V_M	V_M
AiP74AHC3G04	$0.5\times V_{CC}$	$0.5\times V_{CC}$
AiP74AHCT3G04	1.5V	$0.5\times V_{CC}$

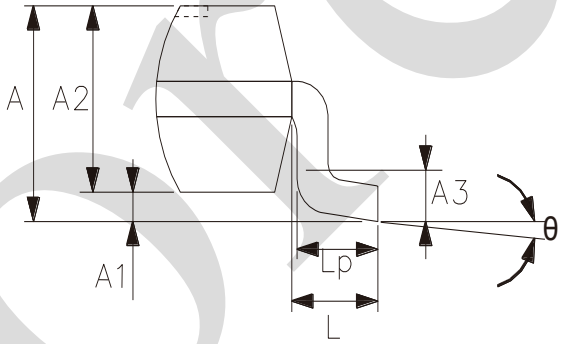
5、Package Information

5.1、TSSOP8



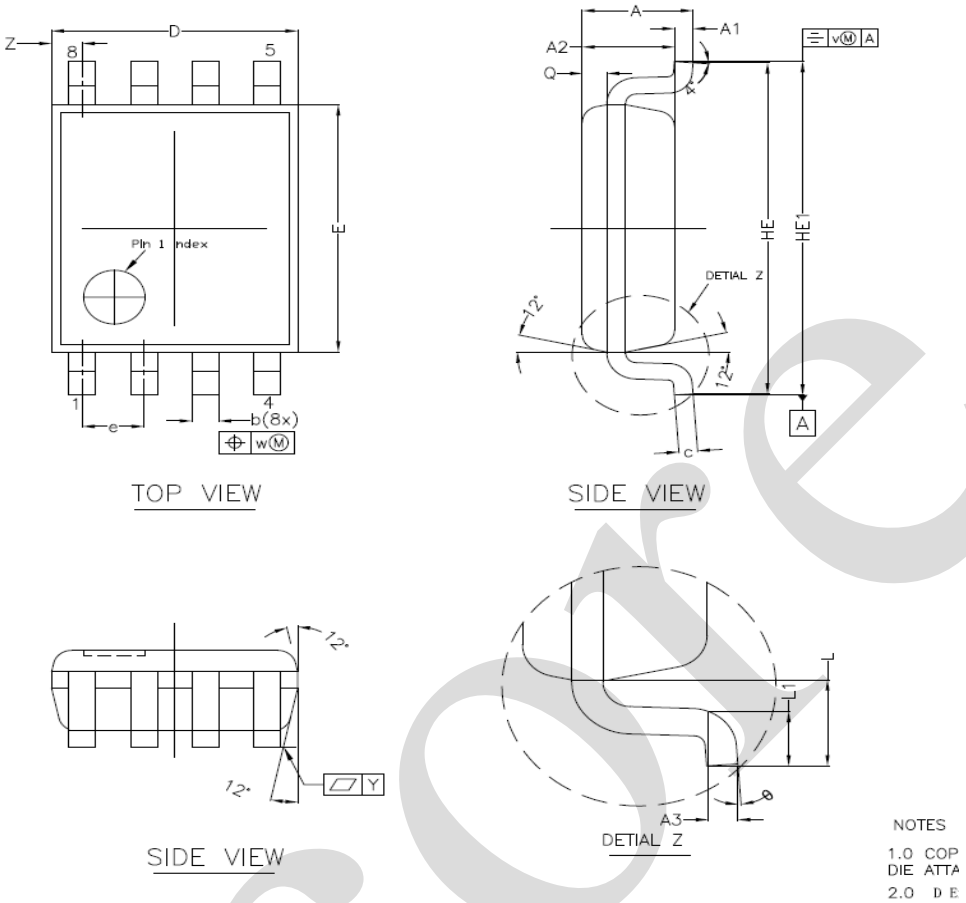






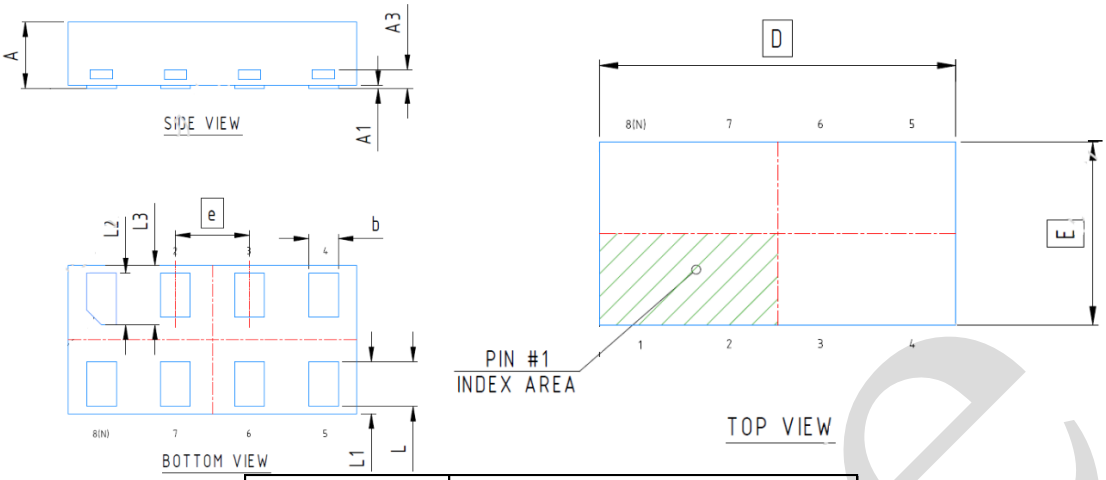
2023/12/A	Dimensions In Millimeters	
Symbol	**Min**	**Max**
A	—	1.10
A1	0	0.15
A2	0.75	0.95
A3	0.25	
bp	0.22	0.38
c	0.08	0.18
D	2.90	3.10
E	2.90	3.10
HE	3.90	4.10
L	0.50	
Lp	0.33	0.47
e	0.65	
Z	0.35	0.70
θ	0°	8°

5.2、VSSOP8



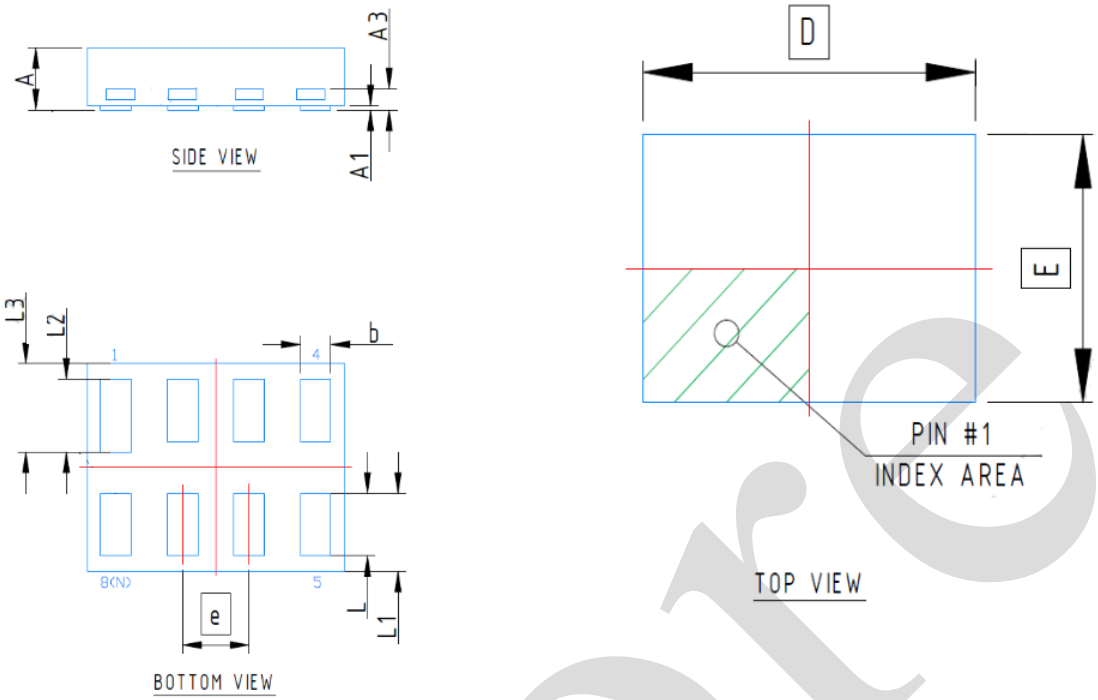
2023/12/A	Dimensions In Millimeters	
Symbol	**Min**	**Max**
A	—	1.00
A1	0.00	0.15
A2	0.60	0.85
A3	0.12	
Q	0.19	0.21
b	0.17	0.27
c	0.08	0.23
D	1.90	2.10
E	2.20	2.40
HE	3.00	3.20
HE1	3.00	3.40
e	0.50	
L	0.40	
L1	0.15	0.40
Y	0.10	
Z	0.10	0.40
θ	0 °	8 °

5.3、XSON8 (1*1.95)



2023/12/A	Dimensions In Millimeters	
Symbol	**Min**	**Max**
A	0.45	0.55
A1	0	0.05
A3	0.127	
b	0.15	0.25
D	1.95	
E	1.00	
e	0.50	
L	0.25	0.35
L1	0.25	0.45
L2	0.30	0.40
L3	0.30	0.50

5.4、XSON8 (1*1.35)



2023/12/A	Dimensions In Millimeters	
Symbol	**Min**	**Max**
A	0.28	0.32
A1	0.00	0.05
A3	0.10	
b	0.11	0.21
D	1.35	
E	1.00	
e	0.35	
L	0.25	0.35
L1	0.275	0.475
L2	0.30	0.40
L3	0.325	0.525

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.

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 form 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.