



AiP74AHC/AHCT1G04 Single Inverter

Product Specification

Specification Revision History:

Version	Date	Description
2018-10-A1	2018-10	New
2023-04-B1	2023-04	Update the template



Contents

1、General Description.....	3
2、Block Diagram And Pin Description	4
2.1、Block Diagram	4
2.2、Pin Configurations.....	4
2.3、Pin Description.....	4
2.4、Function Table.....	5
3、Electrical Parameter	5
3.1、Absolute Maximum Ratings.....	5
3.2、Recommended Operating Conditions	5
3.3、Electrical Characteristics.....	6
3.3.1、DC Characteristics 1	6
3.3.2、DC Characteristics 2.....	7
3.3.3、DC Characteristics 3.....	8
3.3.4、AC Characteristics 1	9
3.3.5、AC Characteristics 2.....	10
3.3.6、AC Characteristics 3.....	10
4、Testing Circuit	11
4.1、AC Testing Circuit	11
4.2、AC Testing Waveforms.....	11
4.3、Measurement Points	11
4.4、Test Data	11
5、Package Information.....	12
5.1、SOT23-5.....	12
5.2、SOT353.....	13
6、Statements And Notes	14
6.1、The name and content of Hazardous substances or Elements in the product.....	14
6.2、Notes	14



1、General Description

AiP74AHC1G04 and AiP74AHCT1G04 are high-speed Si-gate CMOS devices. They provide an inverting buffer.

The AHC device has CMOS input switching levels and supply voltage range 2 V to 5.5 V.

The AHCT device has TTL input switching levels and supply voltage range 4.5 V to 5.5 V.

Features:

- Low power consumption
- Specified from -40°C to +125°C
- Packaging information: SOT-23-5/SOT-353

Ordering Information:

Reel packing specifications:

Part number	Packaging form	Marking code	Reel quantity	Boxed reel quantity	Notes
AiP74AHC1G04GB235.TR	SOT-23-5	CBXX	3000 PCS/reel	30000 PCS/box	Dimensions of plastic enclosure: 2.9mm×1.6mm Pin spacing:0.95mm
AiP74AHC1G04GC353.TR	SOT-353	CBXX	3000 PCS/reel	30000 PCS/box	Dimensions of plastic enclosure: 2.1mm×1.3mm Pin spacing:0.65mm
AiP74AHCT1G04GB235.TR	SOT-23-5	CCXX	3000 PCS/reel	30000 PCS/box	Dimensions of plastic enclosure: 2.9mm×1.6mm Pin spacing:0.95mm
AiP74AHCT1G04GC353.TR	SOT-353	CCXX	3000 PCS/reel	30000 PCS/box	Dimensions of plastic enclosure: 2.1mm×1.3mm Pin spacing:0.65mm

Note: “XX” refers to variable content, meaning year and month.

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

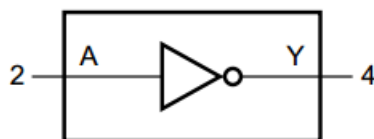


Figure 1. Logic symbol

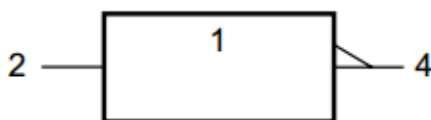
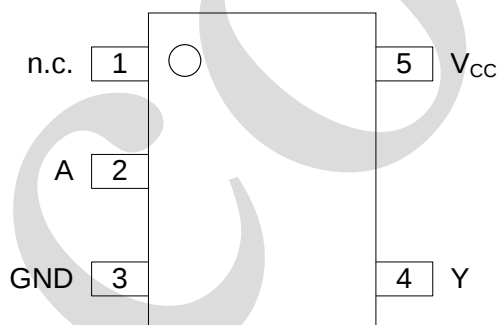


Figure 2. IEC logic symbol



Figure 3. Logic diagram

2.2、Pin Configurations



2.3、Pin Description

Pin No.	Pin Name	Description
1	n.c.	not connected
2	A	data input
3	GND	ground (0V)
4	Y	data output
5	V _{CC}	supply voltage



2.4、Function Table

Input	Output
A	Y
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	+7.0	V
input voltage	V_I	-	-0.5	+7.0	V
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
supply current	I_{CC}	-	-	75	mA
ground current	I_{GND}	-	-75	-	mA
storage temperature	T_{stg}	-	-65	+150	°C
total power dissipation	P_{tot}	-	-	250	mW
Soldering temperature	T_L	10s	260		°C

3.2、Recommended Operating Conditions

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
AiP74AHC1G04						
supply voltage	V _{CC}	-	2.0	5.0	5.5	V
input voltage	V _I	-	0	-	5.5	V
output voltage	V _O	-	0	-	V _{CC}	V
ambient temperature	T _{amb}	-	-40	-	+125	°C
input transition rise and fall rate	Δt/ΔV	V _{CC} =3.0V to 3.6V	-	-	100	ns/V
		V _{CC} =4.5V to 5.5V	-	-	20	ns/V
AiP74AHCT1G04						
supply voltage	V _{CC}	-	4.5	5.0	5.5	V
input voltage	V _I	-	0	-	5.5	V
output voltage	V _O	-	0	-	V _{CC}	V
ambient temperature	T _{amb}	-	-40	-	+125	°C
input transition rise and fall rate	Δt/ΔV	V _{CC} =4.5V to 5.5V	-	-	20	ns/V



3.3、Electrical Characteristics

3.3.1、DC Characteristics 1

($T_{amb}=25^{\circ}\text{C}$, voltages are referenced to GND (ground=0V), unless otherwise specified.)

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
AiP74AHC1G04							
HIGH-level input voltage	V _{IH}	V _{CC} =2.0V		1.5	-	-	V
		V _{CC} =3.0V		2.1	-	-	V
		V _{CC} =5.5V		3.85	-	-	V
LOW-level input voltage	V _{IL}	V _{CC} =2.0V		-	-	0.5	V
		V _{CC} =3.0V		-	-	0.9	V
		V _{CC} =5.5V		-	-	1.65	V
HIGH-level output voltage	V _{OH}	V _I = V _{IH} or V _{IL}	I _O =-50uA; V _{CC} =2.0V	1.9	2.0	-	V
			I _O =-50uA; V _{CC} =3.0V	2.9	3.0	-	V
			I _O =-50uA; V _{CC} =4.5V	4.4	4.5	-	V
			I _O =-4mA; V _{CC} =3.0V	2.58	-	-	V
			I _O =-8mA; V _{CC} =4.5V	3.94	-	-	V
LOW-level output voltage	V _{OL}	V _I = V _{IH} or V _{IL}	I _O =50uA; V _{CC} =2.0V	-	0	0.1	V
			I _O =50uA; V _{CC} =3.0V	-	0	0.1	V
			I _O =50uA; V _{CC} =4.5V	-	0	0.1	V
			I _O =4mA; V _{CC} =3.0V	-	-	0.36	V
			I _O =8mA; V _{CC} =4.5V	-	-	0.36	V
input leakage current	I _I	V _I =5.5V or GND; V _{CC} =0V to 5.5V		-	-	1.0	uA
supply current	I _{CC}	V _I =V _{CC} or GND; I _O =0A; V _{CC} = 5.5V		-	-	1.0	uA
input capacitance	C _I	-		-	1.5	10	pF
AiP74AHCT1G04							
HIGH-level input voltage	V _{IH}	V _{CC} =4.5V~5.5V		2.0	-	-	V
LOW-level input voltage	V _{IL}	V _{CC} =4.5V~5.5V		-	-	0.8	V
HIGH-level output voltage	V _{OH}	V _I = V _{IH} or V _{IL}	I _O =-50uA; V _{CC} =4.5V	4.4	4.5	-	V
			I _O =-8mA; V _{CC} =4.5V	3.94	-	-	V
LOW-level output voltage	V _{OL}	V _I = V _{IH} or V _{IL}	I _O =50uA; V _{CC} =4.5V	-	0	0.1	V
			I _O =8mA; V _{CC} =4.5V	-	-	0.36	V
input leakage current	I _I	V _I =5.5V or GND; V _{CC} =0V to 5.5V		-	-	1.0	uA
supply current	I _{CC}	V _I =V _{CC} or GND; I _O =0A; V _{CC} = 5.5V		-	-	1.0	uA
additional supply current	ΔI _{CC}	per input pin; V _I =3.4V; other inputs at V _{CC} or GND; I _O =0A; V _{CC} =5.5V		-	-	1.35	mA
input capacitance	C _I	-		-	1.5	10	pF



3.3.2、DC Characteristics 2

($T_{amb} = -40^{\circ}\text{C}$ to $+85^{\circ}\text{C}$, voltages are referenced to GND (ground=0V), unless otherwise specified.)

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
AiP74AHC1G04							
HIGH-level input voltage	V _{IH}	V _{CC} =2.0V		1.5	-	-	V
		V _{CC} =3.0V		2.1	-	-	V
		V _{CC} =5.5V		3.85	-	-	V
LOW-level input voltage	V _{IL}	V _{CC} =2.0V		-	-	0.5	V
		V _{CC} =3.0V		-	-	0.9	V
		V _{CC} =5.5V		-	-	1.65	V
HIGH-level output voltage	V _{OH}	V _I = V _{IH} or V _{IL}	I _O =-50uA; V _{CC} =2.0V	1.9	-	-	V
			I _O =-50uA; V _{CC} =3.0V	2.9	-	-	V
			I _O =-50uA; V _{CC} =4.5V	4.4	-	-	V
			I _O =-4mA; V _{CC} =3.0V	2.48	-	-	V
			I _O =-8mA; V _{CC} =4.5V	3.8	-	-	V
LOW-level output voltage	V _{OL}	V _I = V _{IH} or V _{IL}	I _O =50uA; V _{CC} =2.0V	-	-	0.1	V
			I _O =50uA; V _{CC} =3.0V	-	-	0.1	V
			I _O =50uA; V _{CC} =4.5V	-	-	0.1	V
			I _O =4mA; V _{CC} =3.0V	-	-	0.44	V
			I _O =8mA; V _{CC} =4.5V	-	-	0.44	V
input leakage current	I _I	V _I =5.5V or GND; V _{CC} =0V to 5.5V		-	-	1.0	uA
supply current	I _{CC}	V _I =V _{CC} or GND; I _O =0A; V _{CC} = 5.5V		-	-	10	uA
input capacitance	C _I	-		-	-	10	pF
AiP74AHCT1G04							
HIGH-level input voltage	V _{IH}	V _{CC} =4.5V~5.5V		2.0	-	-	V
LOW-level input voltage	V _{IL}	V _{CC} =4.5V~5.5V		-	-	0.8	V
HIGH-level output voltage	V _{OH}	V _I = V _{IH} or V _{IL}	I _O =-50uA; V _{CC} =4.5V	4.4	-	-	V
			I _O =-8mA; V _{CC} =4.5V	3.8	-	-	V
LOW-level output voltage	V _{OL}	V _I = V _{IH} or V _{IL}	I _O =50uA; V _{CC} =4.5V	-	-	0.1	V
			I _O =8mA; V _{CC} =4.5V	-	-	0.44	V
input leakage current	I _I	V _I =5.5V or GND; V _{CC} =0V to 5.5V		-	-	1.0	uA
supply current	I _{CC}	V _I =V _{CC} or GND; I _O =0A; V _{CC} = 5.5V		-	-	10	uA
additional supply current	ΔI _{CC}	per input pin; V _I =3.4V; other inputs at V _{CC} or GND; I _O =0A; V _{CC} =5.5V		-	-	1.5	mA
input capacitance	C _I	-		-	-	10	pF



3.3.3、DC Characteristics 3

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

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
AiP74AHC1G04							
HIGH-level input voltage	V _{IH}	V _{CC} =2.0V		1.5	-	-	V
		V _{CC} =3.0V		2.1	-	-	V
		V _{CC} =5.5V		3.85	-	-	V
LOW-level input voltage	V _{IL}	V _{CC} =2.0V		-	-	0.5	V
		V _{CC} =3.0V		-	-	0.9	V
		V _{CC} =5.5V		-	-	1.65	V
HIGH-level output voltage	V _{OH}	V _I = V _{IH} or V _{IL}	I _O =-50uA; V _{CC} =2.0V	1.9	-	-	V
			I _O =-50uA; V _{CC} =3.0V	2.9	-	-	V
			I _O =-50uA; V _{CC} =4.5V	4.4	-	-	V
			I _O =-4mA; V _{CC} =3.0V	2.4	-	-	V
			I _O =-8mA; V _{CC} =4.5V	3.7	-	-	V
LOW-level output voltage	V _{OL}	V _I = V _{IH} or V _{IL}	I _O =50uA; V _{CC} =2.0V	-	-	0.1	V
			I _O =50uA; V _{CC} =3.0V	-	-	0.1	V
			I _O =50uA; V _{CC} =4.5V	-	-	0.1	V
			I _O =4mA; V _{CC} =3.0V	-	-	0.55	V
			I _O =8mA; V _{CC} =4.5V	-	-	0.55	V
input leakage current	I _I	V _I =5.5V or GND; V _{CC} =0V to 5.5V		-	-	2.0	uA
supply current	I _{CC}	V _I =V _{CC} or GND; I _O =0A; V _{CC} = 5.5V		-	-	40	uA
input capacitance	C _I	-		-	-	10	pF
AiP74AHCT1G04							
HIGH-level input voltage	V _{IH}	V _{CC} =4.5V~5.5V		2.0	-	-	V
LOW-level input voltage	V _{IL}	V _{CC} =4.5V~5.5V		-	-	0.8	V
HIGH-level output voltage	V _{OH}	V _I = V _{IH} or V _{IL}	I _O =-50uA; V _{CC} =4.5V	4.4	-	-	V
			I _O =-8mA; V _{CC} =4.5V	3.7	-	-	V
LOW-level output voltage	V _{OL}	V _I = V _{IH} or V _{IL}	I _O =50uA; V _{CC} =4.5V	-	-	0.1	V
			I _O =8mA; V _{CC} =4.5V	-	-	0.55	V
input leakage current	I _I	V _I =5.5V or GND; V _{CC} =0V to 5.5V		-	-	2.0	uA
supply current	I _{CC}	V _I =V _{CC} or GND; I _O =0A; V _{CC} = 5.5V		-	-	40	uA
additional supply current	ΔI _{CC}	per input pin; V _I =3.4V; other inputs at V _{CC} or GND; I _O =0A; V _{CC} =5.5V		-	-	1.5	mA
input capacitance	C _I	-		-	-	10	pF



3.3.4、AC Characteristics 1

($T_{amb}=25^{\circ}\text{C}$, voltages are referenced to GND (ground=0V), unless otherwise specified.)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
AiP74AHC1G04						
A to Y propagation delay	t_{pd}	see Figure 5	$V_{CC}=3.0\text{V to }3.6\text{V}$			
			$C_L=15\text{pF}$	-	4.3	7.1 ns
			$C_L=50\text{pF}$	-	6.1	10.6 ns
			$V_{CC}=4.5\text{V to }5.5\text{V}$			
			$C_L=15\text{pF}$	-	3.1	5.5 ns
			$C_L=50\text{pF}$	-	4.5	7.5 ns
Power dissipation capacitance	C_{PD}	$C_L=50\text{pF}; f_i=1\text{MHz}; V_I=\text{GND to }V_{CC}$	-	15	-	pF
AiP74AHCT1G04						
A to Y propagation delay	t_{pd}	see Figure 5	$V_{CC}=4.5\text{V to }5.5\text{V}$			
			$C_L=15\text{pF}$	-	3.4	6.7 ns
			$C_L=50\text{pF}$	-	4.9	7.7 ns
Power dissipation capacitance	C_{PD}	$C_L=50\text{pF}; f_i=1\text{MHz}; V_I=\text{GND to }V_{CC}$	-	16	-	pF

Note:

[1] t_{pd} is the same as t_{PHL} and t_{PLH} .

[2] Typical values are measured at $V_{CC}=3.3\text{V}$ or 5V .

[3] C_{PD} is used to determine the dynamic power dissipation (P_D in μW).

$P_D=C_{PD}\times V_{CC}^2\times f_i+\sum(C_L\times V_{CC}^2\times f_o)$ where:

f_i =input frequency in MHz;

f_o =output frequency in MHz;

C_L =output load capacitance in pF;

V_{CC} =supply voltage in V;

$\sum(C_L\times V_{CC}^2\times f_o)$ =sum of outputs.



3.3.5、AC Characteristics 2

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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit	
AiP74AHC1G04							
A to Y propagation delay	t _{pd}	see Figure 5	V _{CC} =3.0V to 3.6V				
			C _L =15pF	1.0	-	8.5	ns
			C _L =50pF	1.0	-	12	ns
			V _{CC} =4.5V to 5.5V				
			C _L =15pF	1.0	-	6.5	ns
			C _L =50pF	1.0	-	8.5	ns
AiP74AHCT1G04							
A to Y propagation delay	t _{pd}	see Figure 5	V _{CC} =4.5V to 5.5V				
			C _L =15pF	1.0	-	7.5	ns
			C _L =50pF	1.0	-	8.5	ns

Note:

[1] t_{pd} is the same as t_{PHL} and t_{PLH} .

[2] Typical values are measured at $V_{CC}=3.3V$ or $5V$.

3.3.6、AC Characteristics 3

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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit	
AiP74AHC1G04							
A to Y propagation delay	t _{pd}	see Figure 5	V _{CC} =3.0V to 3.6V				
			C _L =15pF	1.0	-	11	ns
			C _L =50pF	1.0	-	14.5	ns
			V _{CC} =4.5V to 5.5V				
			C _L =15pF	1.0	-	7.0	ns
			C _L =50pF	1.0	-	9.5	ns
AiP74AHCT1G04							
A to Y propagation delay	t _{pd}	see Figure 5	V _{CC} =4.5V to 5.5V				
			C _L =15pF	1.0	-	8.5	ns
			C _L =50pF	1.0	-	10.0	ns

Note:

[1] t_{pd} is the same as t_{PHL} and t_{PLH} .

[2] Typical values are measured at $V_{CC}=3.3V$ or $5V$.



4、Testing Circuit

4.1、AC Testing Circuit

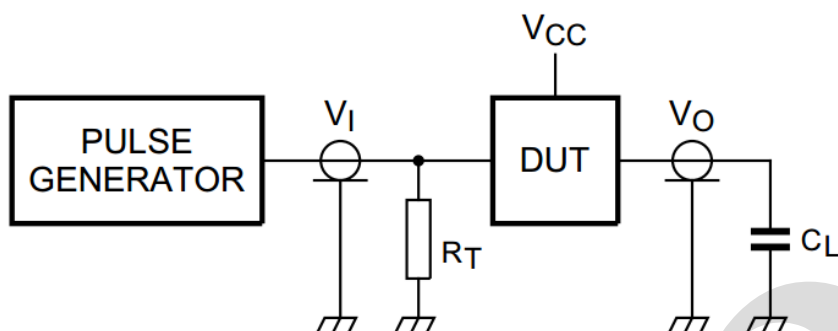


Figure 4. Load circuitry for switching times

Definitions for test circuit:

C_L =Load capacitance including jig and probe capacitance.

R_T =Termination resistance should be equal to output impedance Z_o of the pulse generator.

4.2、AC Testing Waveforms

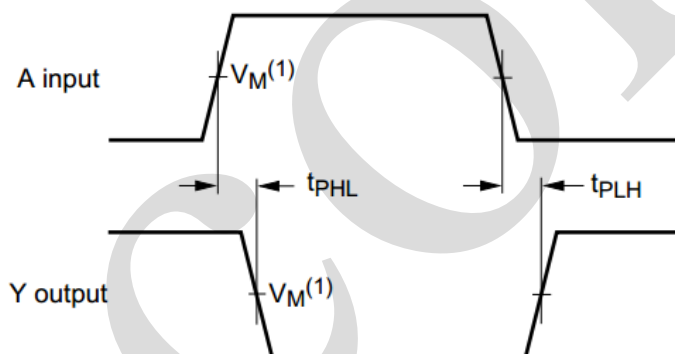


Figure 5. The input (A) to output (Y) propagation delay times

4.3、Measurement Points

Type	Input		Output
	V_I	V_M	V_M
AiP74AHC1G04	GND to V_{CC}	$0.5 \times V_{CC}$	$0.5 \times V_{CC}$
AiP74AHCT1G04	GND to 3.0V	1.5V	$0.5 \times V_{CC}$

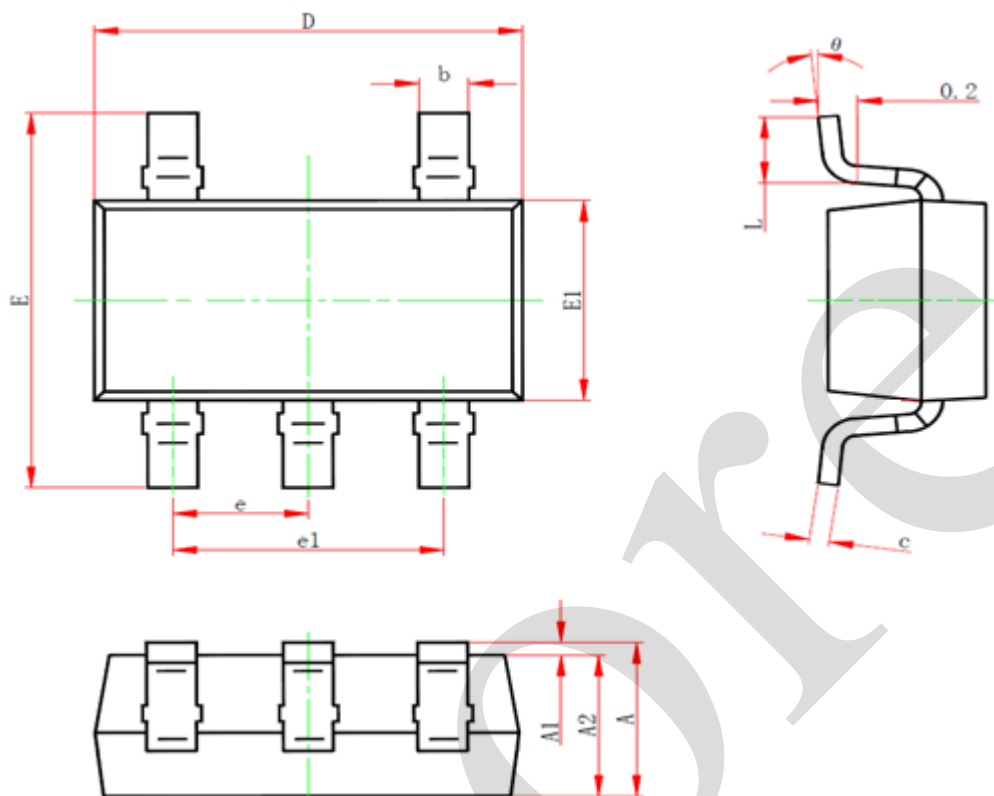
4.4、Test Data

Input		Load
V_I	t_r, t_f	C_L
GND to V_{CC}	$\leq 3.0\text{ns}$	15pF
GND to V_{CC}	$\leq 3.0\text{ns}$	50pF



5、Package Information

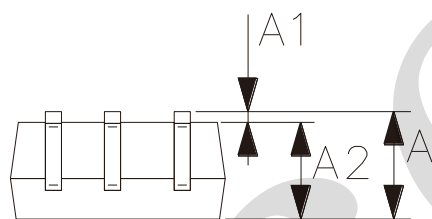
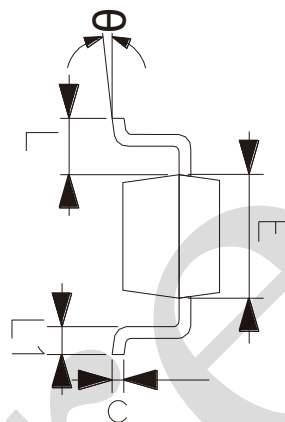
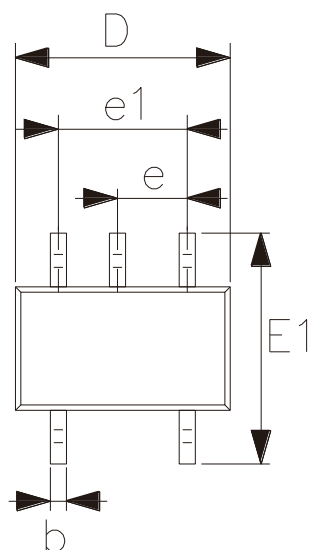
5.1、SOT23-5



Symbol	Dimensions (mm)	
	Min.	Max.
A	-	1.26
A1	0.00	0.12
A2	1.00	1.20
b	0.30	0.50
c	0.10	0.20
D	2.82	3.02
E	2.60	3.00
E1	1.50	1.70
e	0.95	
e1	1.80	2.00
L	0.30	0.60
θ	0°	8°



5.2、SOT353



Symbol	Dimensions (mm)	
	Min.	Max.
A	0.90	1.10
A1	0.00	0.10
A2	0.90	1.00
b	0.15	0.35
c	0.11	0.175
D	2.00	2.20
E	1.15	1.35
E1	2.15	2.45
e	0.65	
e1	1.20	1.40
L	0.525	
L1	0.26	0.46
θ	0°	8°



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.