



SN74HC/HCT06 (LX)

Hex Inverter with Open-drain outputs

Product Specification

Specification Revision History:

Version	Date	Description
2021-09-T1	2021-09	New



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1、General Description

The SN74HC/HCT06 contains six inverters. The outputs of the SN74HC/HCT06 are open-drain and can be connected to other open-drain outputs to implement active-LOW wired-OR or active-HIGH wired-AND functions. The open-drain outputs require pull-up resistors to perform correctly.

Features:

- Input levels:
For SN74HC06: CMOS level
For SN74HCT06: TTL level
- Specified from -40°C to +125°C
- Packaging information: DIP14/SOP14/TSSOP14

Ordering Information:

Tube packing specifications:

Part number	Packaging form	Markingcode	Tube quantity	Boxed tube quantity	Boxed quantity	Notes
SN74HC06N (LX)	DIP14	SN74HC06N	25 PCS/tube	40 tube/box	1000 PCS/box	Dimensions of plastic enclosure: 19.0mm×6.4mm Pin spacing: 2.54mm
SN74HCT06N (LX)	DIP14	SN74HCT06N	25 PCS/tube	40 tube/box	1000 PCS/box	Dimensions of plastic enclosure: 19.0mm×6.4mm Pin spacing: 2.54mm



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Reel packing specifications:

Part number	Packaging form	Marking code	Reel quantity	Boxed reel quantity	Notes
SN74HC06DR (LX)	SOP14	SN74HC06	4000 PCS/reel	8000 PCS/box	Dimensions of plastic enclosure: 8.7mm×3.9mm Pin spacing: 1.27mm
SN74HCT06DR (LX)	SOP14	SN74HCT06	4000 PCS/reel	8000 PCS/box	Dimensions of plastic enclosure: 8.7mm×3.9mm Pin spacing: 1.27mm
SN74HC06PWR (LX)	TSSOP14	SN74HC06	5000 PCS/reel	10000 PCS/box	Dimensions of plastic enclosure: 5.0mm×4.4mm Pin spacing: 0.65mm
SN74HCT06PWR (LX)	TSSOP14	SN74HCT06	5000 PCS/reel	10000 PCS/box	Dimensions of plastic enclosure: 5.0mm×4.4mm Pin spacing: 0.65mm

Note: 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

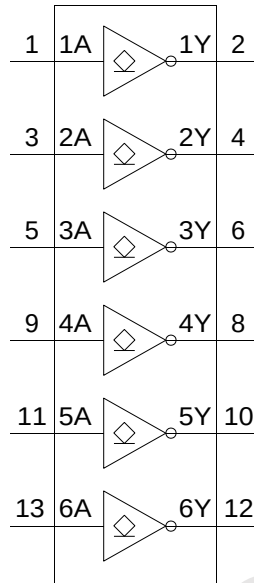


Figure 1. Logic symbol

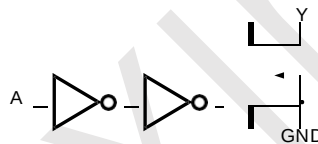
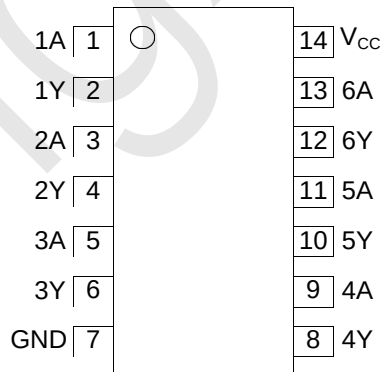


Figure 2. Logic diagram (one gate)

2.2、Pin Configurations



**2.3、Pin Description**

Pin No.	Pin Name	Description
1	1A	data input
2	1Y	data output
3	2A	data input
4	2Y	data output
5	3A	data input
6	3Y	data output
7	GND	ground (0V)
8	4Y	data output
9	4A	data input
10	5Y	data output
11	5A	data input
12	6Y	data output
13	6A	data input
14	V _{CC}	supply voltage

2.4、Function Table

Input	Output
nA	nY
L	Z
H	L

Note: H=HIGH voltage level; L=LOW voltage level; Z=high-impedance OFF-state.

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
output voltage	V _O	-	-0.5	+7.0	V
input clamping current	I _{IK}	V _I <-0.5V or V _I >V _{CC} +0.5V	-	±20	mA
output clamping current	I _{OK}	V _O <-0.5V	-	-20	mA
output current	I _O	-0.5V<V _O	-	-25	mA
supply current	I _{CC}	-	-	+50	mA
ground current	I _{GND}	-	-50	-	mA
storage temperature	T _{stg}	-	-65	+150	°C
total power dissipation	P _{tot}	-	-	500	mW
soldering temperature	T _L	10s	DIP	245	°C
			SOP	250	



3.2、Recommended Operating Conditions

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
SN74HC06						
supply voltage	V_{CC}	-	2.0	5.0	6.0	V
input voltage	V_I	-	0	-	V_{CC}	V
output voltage	V_O	-	0	-	V_{CC}	V
input transition rise and fall rate	$\Delta t/\Delta V$	$V_{CC}=2.0V$	-	-	625	ns/V
		$V_{CC}=4.5V$	-	1.67	139	ns/V
		$V_{CC}=6.0V$	-	-	83	ns/V
ambient temperature	T_{amb}	-	-40	-	+125	°C
SN74HCT06						
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
input transition rise and fall rate	$\Delta t/\Delta V$	$V_{CC}=2.0V$	-	-	-	ns/V
		$V_{CC}=4.5V$	-	1.67	139	ns/V
		$V_{CC}=6.0V$	-	-	-	ns/V
ambient temperature	T_{amb}	-	-40	-	+125	°C

3.3、Electrical Characteristics

3.3.1、DC Characteristics 1

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

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
SN74HC06							
HIGH-level input voltage	V _{IH}	V _{CC} =2.0V		1.5	-	-	V
		V _{CC} =4.5V		3.15	-	-	V
		V _{CC} =6.0V		4.2	-	-	V
LOW-level input voltage	V _{IL}	V _{CC} =2.0V		-	-	0.5	V
		V _{CC} =4.5V		-	-	1.35	V
		V _{CC} =6.0V		-	-	1.8	V
LOW-level output voltage	V _{OL}	V _I =V _{IH} or V _{IL}	I _O =20uA; V _{CC} =2.0V	-	-	0.1	V
			I _O =20uA; V _{CC} =4.5V	-	-	0.1	V
			I _O =20uA; V _{CC} =6.0V	-	-	0.1	V
			I _O =4.0mA; V _{CC} =4.5V	-	-	0.26	V
			I _O =5.2mA; V _{CC} =6.0V	-	-	0.26	V
input leakage current	I _I	V _I =V _{CC} or GND; V _{CC} =6.0V		-	-	±1	uA
OFF-state output current	I _{OZ}	per input pin; V _I =V _{IL} ; V _O =V _{CC} or GND; other inputs at V _{CC} or GND; V _{CC} =6.0V; I _O =0A		-	-	±1	uA
supply current	I _{CC}	V _I =V _{CC} or GND; I _O =0A; V _{CC} =6.0V		-	-	2	uA
SN74HCT06							
HIGH-level input voltage	V _{IH}	V _{CC} =4.5V to 5.5V		2.0	-	-	V



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LOW-level input voltage	V _{IL}	V _{CC} =4.5V to 5.5V		-	-	0.8	V
LOW-level output voltage	V _{OL}	V _I =V _{IH} or V _{IL} ; V _{CC} =4.5V	I _O =20uA	-	-	0.1	V
			I _O =4.0mA	-	-	0.26	V
input leakage current	I _I	V _I =V _{CC} or GND; V _{CC} =5.5V		-	-	±1	uA
OFF-state output current	I _{OZ}	per input pin; V _I =V _{IL} ; V _O =V _{CC} or GND; other inputs at V _{CC} or GND; V _{CC} =5.5V; I _O =0A		-	-	±1	uA
supply current	I _{CC}	V _I =V _{CC} or GND; I _O =0A; V _{CC} =5.5V		-	-	2	uA
additional supply current	ΔI _{CC}	per input pin; V _I =V _{CC} -2.1V; other inputs at V _{CC} or GND; I _O =0A; V _{CC} =4.5V to 5.5V		-	-	360	uA

3.3.2 、DC Characteristics 2

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

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
SN74HC06							
HIGH-level input voltage	V _{IH}	V _{CC} =2.0V		1.5	-	-	V
		V _{CC} =4.5V		3.15	-	-	V
		V _{CC} =6.0V		4.2	-	-	V
LOW-level input voltage	V _{IL}	V _{CC} =2.0V		-	-	0.5	V
		V _{CC} =4.5V		-	-	1.35	V
		V _{CC} =6.0V		-	-	1.8	V
LOW-level output voltage	V _{OL}	V _I =V _{IH} or V _{IL}	I _O =20uA; V _{CC} =2.0V	-	-	0.1	V
			I _O =20uA; V _{CC} =4.5V	-	-	0.1	V
			I _O =20uA; V _{CC} =6.0V	-	-	0.1	V
			I _O =4.0mA; V _{CC} =4.5V	-	-	0.33	V
			I _O =5.2mA; V _{CC} =6.0V	-	-	0.33	V
input leakage current	I _I	V _I =V _{CC} or GND; V _{CC} =6.0V		-	-	±10	uA
OFF-state output current	I _{OZ}	per input pin; V _I =V _{IL} ; V _O =V _{CC} or GND; other inputs at V _{CC} or GND; V _{CC} =6.0V; I _O =0A		-	-	±10	uA
supply current	I _{CC}	V _I =V _{CC} or GND; I _O =0A; V _{CC} =6.0V		-	-	20	uA
SN74HCT06							
HIGH-level input voltage	V _{IH}	V _{CC} =4.5V to 5.5V		2.0	-	-	V
LOW-level input voltage	V _{IL}	V _{CC} =4.5V to 5.5V		-	-	0.8	V
LOW-level output voltage	V _{OL}	V _I = V _{IH} or V _{IL} ; V _{CC} =4.5V	I _O =20uA	-	-	0.1	V
			I _O =4.0mA	-	-	0.33	V
input leakage current	I _I	V _I =V _{CC} or GND; V _{CC} =5.5V		-	-	±10	uA



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OFF-state output current	I_{OZ}	per input pin; $V_I=V_{IL}$; $V_O=V_{CC}$ or GND; other inputs at V_{CC} or GND; $V_{CC}=5.5V$; $I_O=0A$	-	-	± 10	μA
supply current	I_{CC}	$V_I=V_{CC}$ or GND; $I_O=0A$; $V_{CC}=5.5V$	-	-	20	μA
additional supply current	ΔI_{CC}	per input pin; $V_I=V_{CC}-2.1V$; other inputs at V_{CC} or GND; $I_O=0A$; $V_{CC}=4.5V$ to $5.5V$	-	-	450	μA

3.3.3 、DC Characteristics 3

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

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
SN74HC06							
HIGH-level input voltage	V _{IH}	V _{CC} =2.0V		1.5	-	-	V
		V _{CC} =4.5V		3.15	-	-	V
		V _{CC} =6.0V		4.2	-	-	V
LOW-level input voltage	V _{IL}	V _{CC} =2.0V		-	-	0.5	V
		V _{CC} =4.5V		-	-	1.35	V
		V _{CC} =6.0V		-	-	1.8	V
LOW-level output voltage	V _{OL}	V _I =V _{IH} or V _{IL}	I _O =20uA; V _{CC} =2.0V	-	-	0.1	V
			I _O =20uA; V _{CC} =4.5V	-	-	0.1	V
			I _O =20uA; V _{CC} =6.0V	-	-	0.1	V
			I _O =4.0mA; V _{CC} =4.5V	-	-	0.4	V
			I _O =5.2mA; V _{CC} =6.0V	-	-	0.4	V
input leakage current	I _I	V _I =V _{CC} or GND; V _{CC} =6.0V		-	-	±20	uA
OFF-state output current	I _{OZ}	per input pin; V _I =V _{IL} ; V _O =V _{CC} or GND; other inputs at V _{CC} or GND; V _{CC} =6.0V; I _O =0A		-	-	±20	uA
supply current	I _{CC}	V _I =V _{CC} or GND; I _O =0A; V _{CC} =6.0V		-	-	40	uA
SN74HCT06							
HIGH-level input voltage	V _{IH}	V _{CC} =4.5V to 5.5V		2.0	-	-	V
LOW-level input voltage	V _{IL}	V _{CC} =4.5V to 5.5V		-	-	0.8	V
LOW-level output voltage	V _{OL}	V _I = V _{IH} or V _{IL} ; V _{CC} =4.5V	I _O =20uA	-	-	0.1	V
			I _O =4.0mA	-	-	0.4	V
input leakage current	I _I	V _I =V _{CC} or GND; V _{CC} =5.5V		-	-	±20	uA
OFF-state output current	I _{OZ}	per input pin; V _I =V _{IL} ; V _O =V _{CC} or GND; other inputs at V _{CC} or GND; V _{CC} =5.5V; I _O =0A		-	-	±20	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 =V _{CC} -2.1V; other inputs at V _{CC} or GND; I _O =0A; V _{CC} =4.5V to 5.5V		-	-	490	uA



3.3.4 、 AC Characteristics 1

($T_{amb}=25^{\circ}\text{C}$, $GND=0\text{V}$, $C_L=50\text{pF}$, unless otherwise specified.)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit	
SN74HC06							
nA to nY propagation delay	t _{pd}	see Figure 4 ^[1]	V _{CC} =2.0V	-	-	95	ns
			V _{CC} =4.5V	-	-	19	ns
			V _{CC} =5.0V; C _L =15pF	-	-	-	ns
			V _{CC} =6.0V	-	-	16	ns
transition time	t _t	see Figure 4 ^[2]	V _{CC} =2.0V	-	-	75	ns
			V _{CC} =4.5V	-	-	15	ns
			V _{CC} =6.0V	-	-	13	ns
SN74HCT06							
nA to nY propagation delay	t _{pd}	see Figure 4 ^[1]	V _{CC} =4.5V	-	-	24	ns
			V _{CC} =5.0V; C _L =15pF	-	-	-	ns
transition time	t _t	V _{CC} =4.5V; see Figure 4 ^[2]		-	-	15	ns

Note:

[1] t_{pd} is the same as t_{PLZ} and t_{PZL} .

[2] t_t is the same as t_{THL} .

3.3.5 、 AC Characteristics 2

($T_{amb}=-40^{\circ}\text{C}$ to $+85^{\circ}\text{C}$, $GND=0\text{V}$, $C_L=50\text{pF}$, unless otherwise specified.)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit	
SN74HC06							
nA to nY propagation delay	t _{pd}	see Figure 4 ^[1]	V _{CC} =2.0V	-	-	120	ns
			V _{CC} =4.5V	-	-	24	ns
			V _{CC} =6.0V	-	-	20	ns
transition time	t _t	see Figure 4 ^[2]	V _{CC} =2.0V	-	-	95	ns
			V _{CC} =4.5V	-	-	19	ns
			V _{CC} =6.0V	-	-	16	ns
SN74HCT06							
nA to nY propagation delay	t _{pd}	see Figure 4 ^[1]	V _{CC} =4.5V	-	-	30	ns
transition time	t _t	V _{CC} =4.5V; see Figure 4 ^[2]		-	-	19	ns

Note:

[1] t_{pd} is the same as t_{PLZ} and t_{PZL} .

[2] t_t is the same as t_{THL} .



3.3.6 、 AC Characteristics 3

($T_{amb} = -40^{\circ}\text{C}$ to $+125^{\circ}\text{C}$, $GND = 0\text{V}$, $C_L = 50\text{pF}$, unless otherwise specified.)

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
SN74HC06							
nA to nY propagation delay	t _{pd}	see Figure 4 ^[1]	V _{CC} =2.0V	-	-	145	ns
			V _{CC} =4.5V	-	-	29	ns
			V _{CC} =6.0V	-	-	25	ns
transition time	t _t	see Figure 4 ^[2]	V _{CC} =2.0V	-	-	110	ns
			V _{CC} =4.5V	-	-	22	ns
			V _{CC} =6.0V	-	-	19	ns
SN74HCT06							
nA to nY propagation delay	t _{pd}	see Figure 4 ^[1]	V _{CC} =4.5V	-	-	36	ns
transition time	t _t	V _{CC} =4.5V; see Figure 4 ^[2]		-	-	22	ns

Note:

[1] t_{pd} is the same as t_{PLZ} and t_{PZL} .

[2] t_t is the same as t_{THL} .

4、 Testing Circuit

4.1 、 AC Testing Circuit

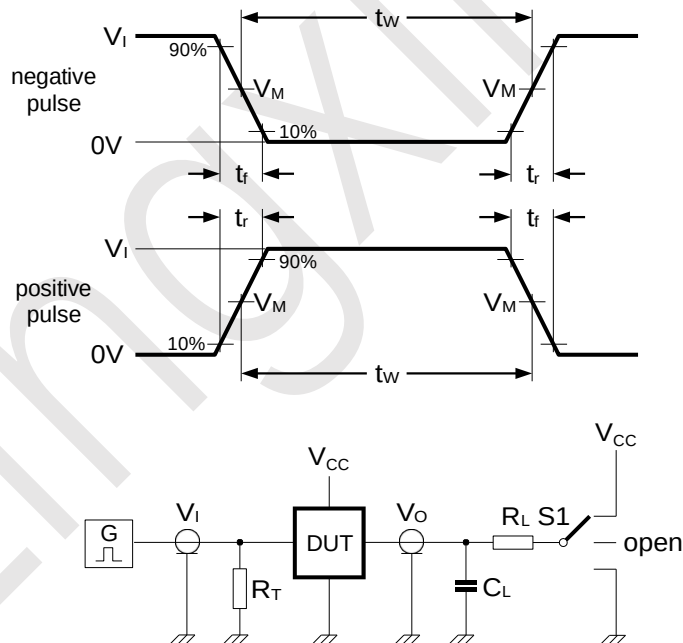


Figure 3. Test circuit for measuring switching times

Definitions for test circuit:

C_L =Load capacitance including jig and probe capacitance.

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

R_L =Load resistance.

$S1$ =Test selection switch.



4.2 、 AC Testing Waveforms

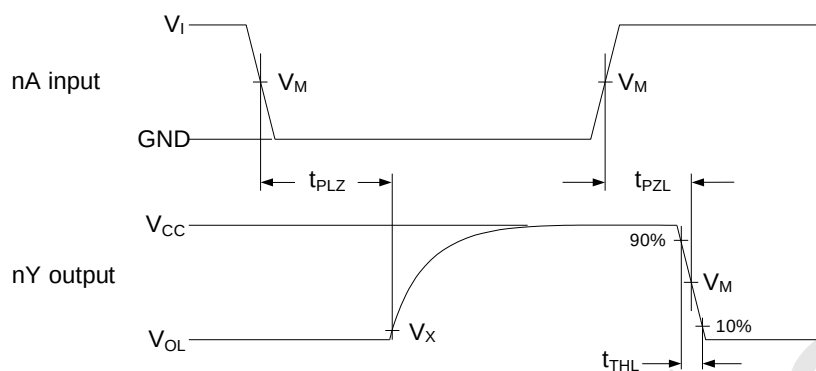


Figure 4. The input nA to output nY propagation delays and output transition times

4.3 、 Measurement Points

Type	Input	Output	
	V_M	V_M	V_X
SN74HC06	$0.5 \times V_{CC}$	$0.5 \times V_{CC}$	$0.1 \times V_{CC}$
SN74HCT06	1.3V	1.3V	$0.1 \times V_{CC}$

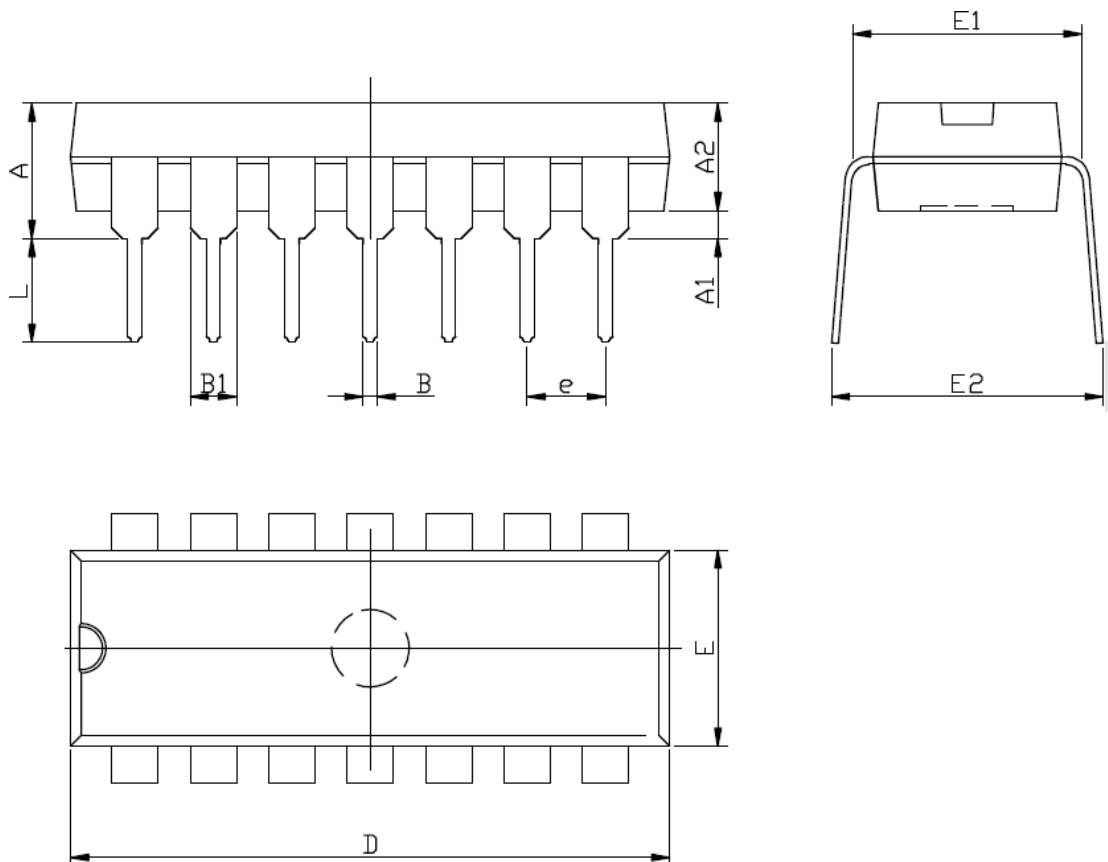
4.4 、 Test Data

Type	Input		Load		S1 position
	V_I	t_r, t_f	C_L	R_L	t_{PZL}, t_{PLZ}
SN74HC06	V_{CC}	6ns	15pF, 50pF	1k Ω	V_{CC}
SN74HCT06	3V	6ns	15pF, 50pF	1k Ω	V_{CC}



5、Package Information

5.1、DIP14

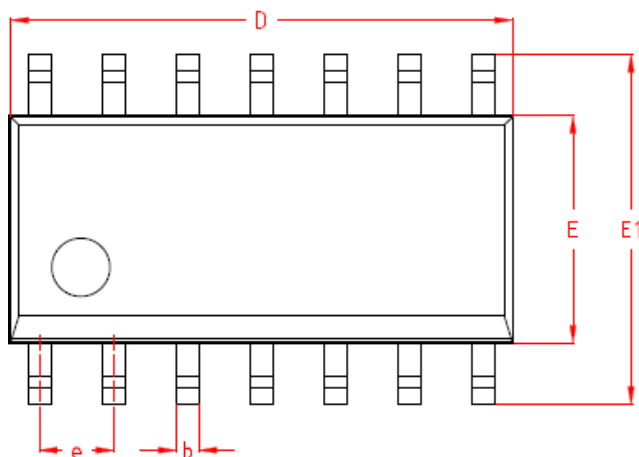


Symbol	Dimensions (mm)	
	Min.	Max.
A	3.71	4.31
A1	0.51	-
A2	3.20	3.60
B	0.33	0.51
B1	1.524 (BSC)	
C	0.204	0.36
D	18.80	19.20
E	6.20	6.60
E1	7.32	7.92
E2	8.40	9.00
e	2.54 (BSC)	
L	3.00	3.60

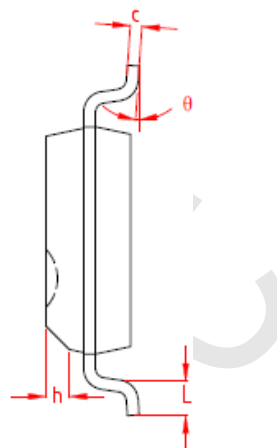


5.2、SOP14

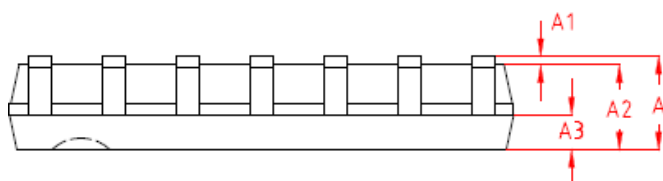
TOP VIEW
正视图



SIDE VIEW
侧视图



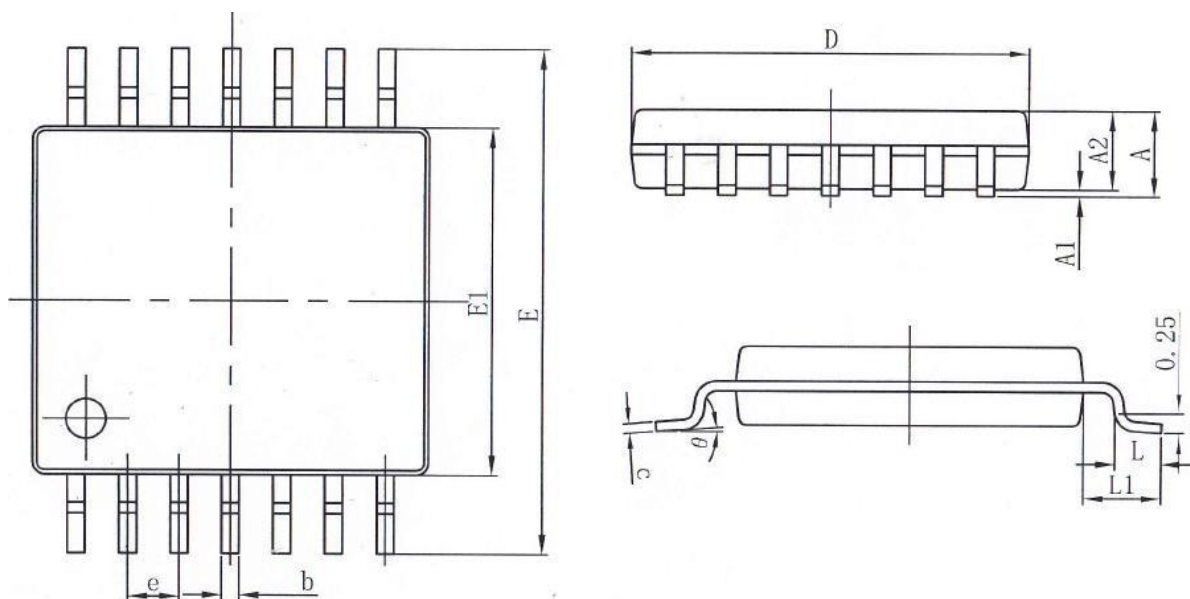
SIDE VIEW
侧视图



Symbol	Dimensions (mm)	
	Min.	Max.
A	-	1.75
A1	0.10	0.25
A2	1.30	1.55
A3	0.60	0.70
b	0.35	0.50
c	0.19	0.25
D	8.50	8.75
E	3.80	4.00
E1	5.80	6.20
e	1.27 (BSC)	
h	0.25	0.50
L	0.40	0.80
θ	0°	8°



5.3、TSSOP14



Symbol	Dimensions (mm)	
	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
E	6.20	6.60
E1	4.30	4.50
e	0.65 (BSC)	
L	0.45	0.75
L1	-	1.00
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

Recommended carefully reading this information before the use of this product ;

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