



SN74HC/HCT145 BCD-to-Decimal Decoders/Drivers

Product Specification

Specification Revision History:

Version	Date	Description
2023-06-A1	2023-06	New



Contents

1、General Description.....	3
2、Block Diagram And Pin Description	5
2.1、Block Diagram	5
2.2、Pin Configurations.....	5
2.3、Pin Description.....	6
2.4、Function Table.....	6
3、Electrical Parameter	7
3.1、Absolute Maximum Ratings.....	7
3.2、Recommended Operating Conditions	7
3.3、Electrical Characteristics.....	8
3.3.1、DC Characteristics 1	8
3.3.2、DC Characteristics 2.....	9
3.3.3、AC Characteristics 1.....	10
3.3.4、AC Characteristics 2.....	10
4、Testing Circuit	10
4.1、AC Testing Circuit	10
4.2、Test Data	11
4.3、AC Testing Waveforms.....	11
4.4、Measurement Points	11
5、Package Information	12
5.1、DIP16	12
5.2、SOP16	13
5.3、TSSOP16.....	14
6、Statements And Notes	15
6.1、The name and content of Hazardous substances or Elements in the product.....	15
6.2、Notes	15



1、General Description

The SN74HC/HCT145 is a BCD-to-decimal decoders/drivers.

Features:

- Supply voltage range:
SN74HC145: 2V to 6V
SN74HCT145: 4.5V to 5.5V
- Input levels:
SN74HC145: CMOS level
SN74HCT145: TTL level
- Temperature range: -40°C to +125°C
- Packaging information: DIP16/SOP16/TSSOP16

Ordering Information:

Tube packing specifications:

Part number	Packaging form	Marking code	Tube quantity	Boxed tube quantity	Boxed quantity	Notes
SN74HC145N(LX)	DIP16	SN74HC145N	25 PCS/tube	40 tube/box	1000 PCS/box	Dimensions of plastic enclosure: 19.0mm×6.4mm Pin spacing: 2.54mm
SN74HCT145N(LX)	DIP16	SN74HCT145N	25 PCS/tube	40 tube/box	1000 PCS/box	Dimensions of plastic enclosure: 19.0mm×6.4mm Pin spacing: 2.54mm
SN74HC145D(LX)	SOP16	HC145	50 PCS/tube	200 tube/box	10000 PCS/box	Dimensions of plastic enclosure: 10.0mm×3.9mm Pin spacing: 1.27mm
SN74HCT145D(LX)	SOP16	HCT145	50 PCS/tube	200 tube/box	10000 PCS/box	Dimensions of plastic enclosure: 10.0mm×3.9mm Pin spacing: 1.27mm
SN74HC145P(LX)	TSSOP16	HC145	96 PCS/tube	200 tube/box	19200 PCS/box	Dimensions of plastic enclosure: 5.0mm×4.4mm Pin spacing: 0.65mm
SN74HCT145P(LX)	TSSOP16	HCT145	96 PCS/tube	200 tube/box	19200 PCS/box	Dimensions of plastic enclosure: 5.0mm×4.4mm Pin spacing: 0.65mm



Reel packing specifications:

Part number	Packaging form	Marking code	Reel quantity	Boxed reel quantity	Notes
SN74HC145DR(LX)	SOP16	HC145	2500 PCS/reel	5000 PCS/box	Dimensions of plastic enclosure: 10.0mm×3.9mm Pin spacing:1.27mm
SN74HCT145DR(LX)	SOP16	HCT145	2500 PCS/reel	5000 PCS/box	Dimensions of plastic enclosure: 10.0mm×3.9mm Pin spacing:1.27mm
SN74HC145PR(LX)	TSSOP16	HC145	5000 PCS/reel	10000 PCS/box	Dimensions of plastic enclosure: 5.0mm×4.4mm Pin spacing:0.65mm
SN74HCT145PR(LX)	TSSOP16	HCT145	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

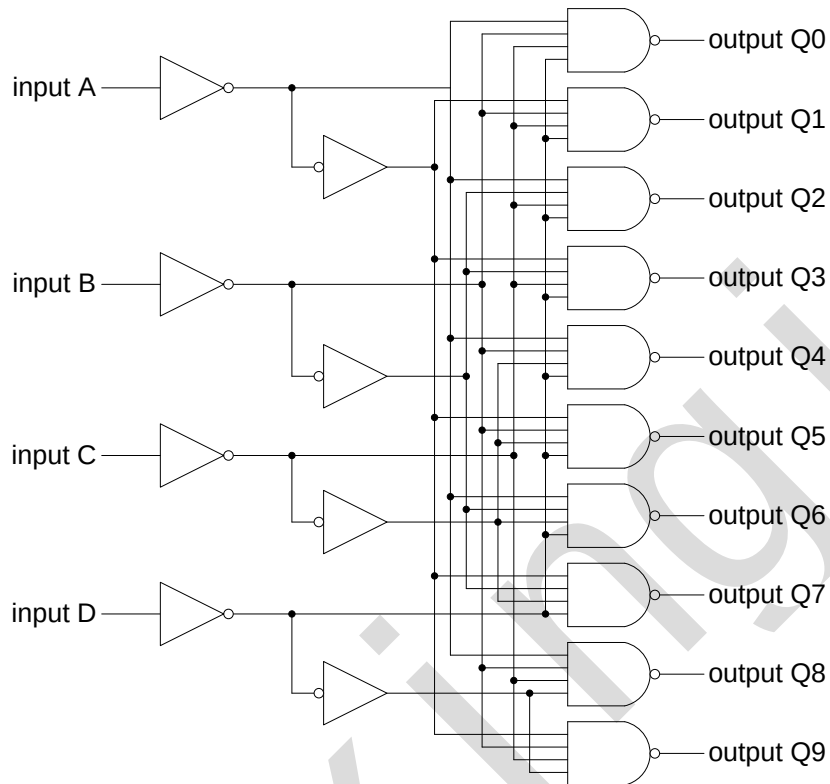
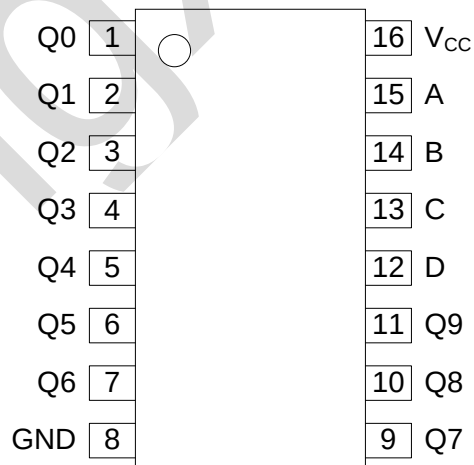


Figure 1. Logic symbol

2.2、Pin Configurations





2.3、Pin Description

Pin No.	Pin Name	Description
1	Q0	data output
2	Q1	data output
3	Q2	data output
4	Q3	data output
5	Q4	data output
6	Q5	data output
7	Q6	data output
8	GND	ground (0V)
9	Q7	data output
10	Q8	data output
11	Q9	data output
12	D	data input
13	C	data input
14	B	data input
15	A	data input
16	V _{CC}	supply voltage

2.4、Function Table

Inputs				Outputs									
D	C	B	A	Q0	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9
L	L	L	L	L	H	H	H	H	H	H	H	H	H
L	L	L	H	H	L	H	H	H	H	H	H	H	H
L	L	H	L	H	H	L	H	H	H	H	H	H	H
L	L	H	H	H	H	H	L	H	H	H	H	H	H
L	H	L	L	H	H	H	H	L	H	H	H	H	H
L	H	L	H	H	H	H	H	H	L	H	H	H	H
L	H	H	L	H	H	H	H	H	H	L	H	H	H
L	H	H	H	H	H	H	H	H	H	H	L	H	H
H	L	L	L	H	H	H	H	H	H	H	H	L	H
H	L	L	H	H	H	H	H	H	H	H	H	H	L
H	L	H	L	H	H	H	H	H	H	H	H	H	H
H	L	H	H	H	H	H	H	H	H	H	H	H	H
H	H	L	L	H	H	H	H	H	H	H	H	H	H
H	H	L	H	H	H	H	H	H	H	H	H	H	H
H	H	H	L	H	H	H	H	H	H	H	H	H	H
H	H	H	H	H	H	H	H	H	H	H	H	H	H

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}	$V_I < -0.5V$ or $V_I > V_{CC}+0.5V$	-	± 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	°C
soldering temperature	T_L	10s	DIP	245	°C
			SOP/TSSOP	260	

3.2、Recommended Operating Conditions

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
SN74HC145						
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
ambient temperature	T_{amb}	-	-40	-	+125	°C
SN74HCT145						
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	-	+125	°C



3.3、Electrical Characteristics

3.3.1、DC Characteristics 1

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

Parameter	Symbol	V_{CC}	Conditions	Min.	Typ.	Max.	Unit
SN74HC145							
HIGH-level input voltage	V_{IH}	2.0V	-	1.5	1.2	-	V
		4.5V	-	3.15	2.4	-	V
		6.0V	-	4.2	3.2	-	V
LOW-level input voltage	V_{IL}	2.0V	-	-	0.8	0.5	V
		4.5V	-	-	2.1	1.35	V
		6.0V	-	-	2.8	1.8	V
HIGH-level output voltage	V_{OH}	2.0V	$I_O = -20\mu\text{A}$	1.9	2.0	-	V
		4.5V	$I_O = -20\mu\text{A}$	4.4	4.5	-	V
		6.0V	$I_O = -20\mu\text{A}$	5.9	6.0	-	V
		4.5V	$I_O = -4.0\text{mA}$	3.84	4.32	-	V
		6.0V	$I_O = -5.2\text{mA}$	5.34	5.81	-	V
LOW-level output voltage	V_{OL}	2.0V	$I_O = 20\mu\text{A}$	-	0	0.1	V
		4.5V	$I_O = 20\mu\text{A}$	-	0	0.1	V
		6.0V	$I_O = 20\mu\text{A}$	-	0	0.1	V
		4.5V	$I_O = 4.0\text{mA}$	-	0.15	0.33	V
		6.0V	$I_O = 5.2\text{mA}$	-	0.16	0.33	V
input leakage current	I_I	6.0V	$V_I = V_{CC}$ or GND	-	-	± 2	μA
supply current	I_{CC}	6.0V	$V_I = V_{CC}$ or GND; $I_O = 0\text{A}$	-	-	2	μA
SN74HCT145							
HIGH-level input voltage	V_{IH}	4.5V to 5.5V	-	2.0	1.6	-	V
LOW-level input voltage	V_{IL}	4.5V to 5.5V	-	-	1.2	0.8	V
HIGH-level output voltage	V_{OH}	4.5V	$I_O = -20\mu\text{A}$	4.4	4.5	-	V
			$I_O = -4.0\text{mA}$	3.84	4.32	-	V
LOW-level output voltage	V_{OL}	4.5V	$I_O = 20\mu\text{A}$	-	0	0.1	V
			$I_O = 4.0\text{mA}$	-	0.15	0.33	V
input leakage current	I_I	5.5V	$V_I = V_{CC}$ or GND	-	-	± 2	μA
supply current	I_{CC}	6.0V	$V_I = V_{CC}$ or GND; $I_O = 0\text{A}$	-	-	2	μA
additional supply current	ΔI_{CC}	4.5V to 5.5V	One input at $V_I = V_{CC} - 2.1\text{V}$; Other inputs at V_{CC} or GND; $I_O = 0\text{A}$	-	-	135	μA



3.3.2、DC Characteristics 2

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

Parameter	Symbol	V_{CC}	Conditions	Min.	Typ.	Max.	Unit
SN74HC145							
HIGH-level input voltage	V_{IH}	2.0V	-	1.5	-	-	V
		4.5V	-	3.15	-	-	V
		6.0V	-	4.2	-	-	V
LOW-level input voltage	V_{IL}	2.0V	-	-	-	0.5	V
		4.5V	-	-	-	1.35	V
		6.0V	-	-	-	1.8	V
HIGH-level output voltage	V_{OH}	2.0V	$I_O = -20\mu\text{A}$	1.9	-	-	V
		4.5V	$I_O = -20\mu\text{A}$	4.4	-	-	V
		6.0V	$I_O = -20\mu\text{A}$	5.9	-	-	V
		4.5V	$I_O = -4.0\text{mA}$	3.7	-	-	V
		6.0V	$I_O = -5.2\text{mA}$	5.2	-	-	V
LOW-level output voltage	V_{OL}	2.0V	$I_O = 20\mu\text{A}$	-	-	0.1	V
		4.5V	$I_O = 20\mu\text{A}$	-	-	0.1	V
		6.0V	$I_O = 20\mu\text{A}$	-	-	0.1	V
		4.5V	$I_O = 4.0\text{mA}$	-	-	0.4	V
		6.0V	$I_O = 5.2\text{mA}$	-	-	0.4	V
input leakage current	I_I	6.0V	$V_I = V_{CC}$ or GND	-	-	± 4	μA
supply current	I_{CC}	6.0V	$V_I = V_{CC}$ or GND; $I_O = 0\text{A}$	-	-	4	μA
SN74HCT145							
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	$I_O = -20\mu\text{A}$	4.4	-	-	V
			$I_O = -4.0\text{mA}$	3.7	-	-	V
LOW-level output voltage	V_{OL}	4.5V	$I_O = 20\mu\text{A}$	-	-	0.1	V
			$I_O = 4.0\text{mA}$	-	-	0.4	V
input leakage current	I_I	5.5V	$V_I = V_{CC}$ or GND	-	-	± 4	μA
supply current	I_{CC}	6.0V	$V_I = V_{CC}$ or GND; $I_O = 0\text{A}$	-	-	4	μA
additional supply current	ΔI_{CC}	4.5V to 5.5V	One input at $V_I = V_{CC} - 2.1\text{V}$; Other inputs at V_{CC} or GND; $I_O = 0\text{A}$	-	-	147	μA



3.3.3、AC Characteristics 1

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

Parameter	Symbol	V _{CC}	Conditions		Min.	Typ.	Max.	Unit
SN74HC145								
propagation delay	t _{PLH} , t _{PHL}	5.0V	C _L =45pF	see Figure 3	-	-	50	ns
SN74HCT145								
propagation delay	t _{PLH} , t _{PHL}	5.0V	C _L =45pF	see Figure 3	-	-	50	ns

3.3.4、AC Characteristics 2

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

Parameter	Symbol	V _{CC}	Conditions		Min.	Typ.	Max.	Unit
SN74HC145								
propagation delay	t _{PLH} , t _{PHL}	5.0V	C _L =45pF	see Figure 3	-	-	60	ns
SN74HCT145								
propagation delay	t _{PLH} , t _{PHL}	5.0V	C _L =45pF	see Figure 3	-	-	60	ns

4、Testing Circuit

4.1、AC Testing Circuit

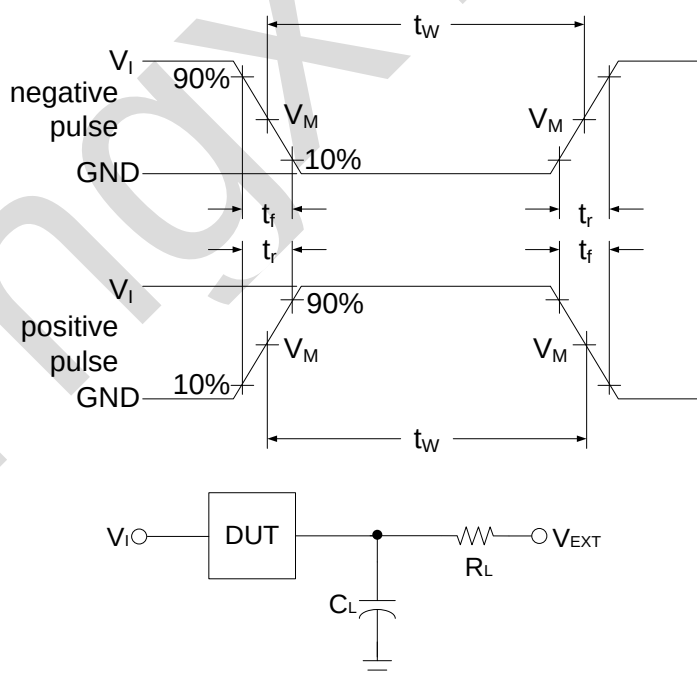


Figure 2. Test circuit for measuring switching times

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}
SN74HC145	V _{CC}	3.0ns	45pF	665Ω	Open	V _{CC}	GND
SN74HCT145	3.0V	3.0ns	45pF	665Ω	Open	V _{CC}	GND

4.3、AC Testing Waveforms

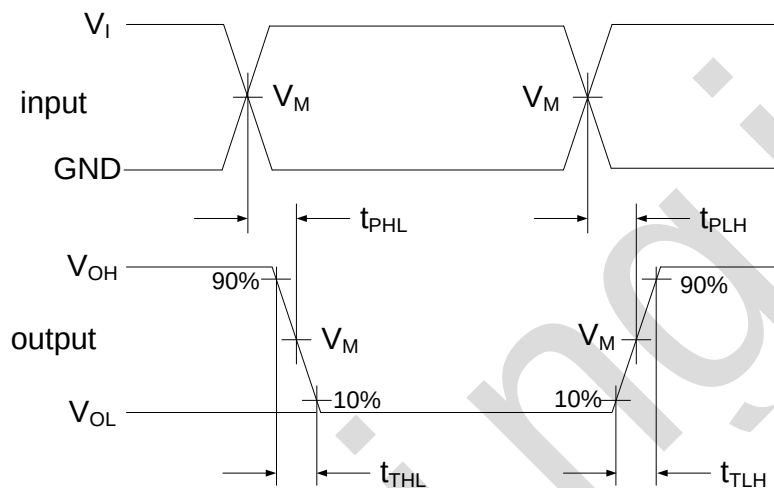


Figure 3. The data input to output propagation delays

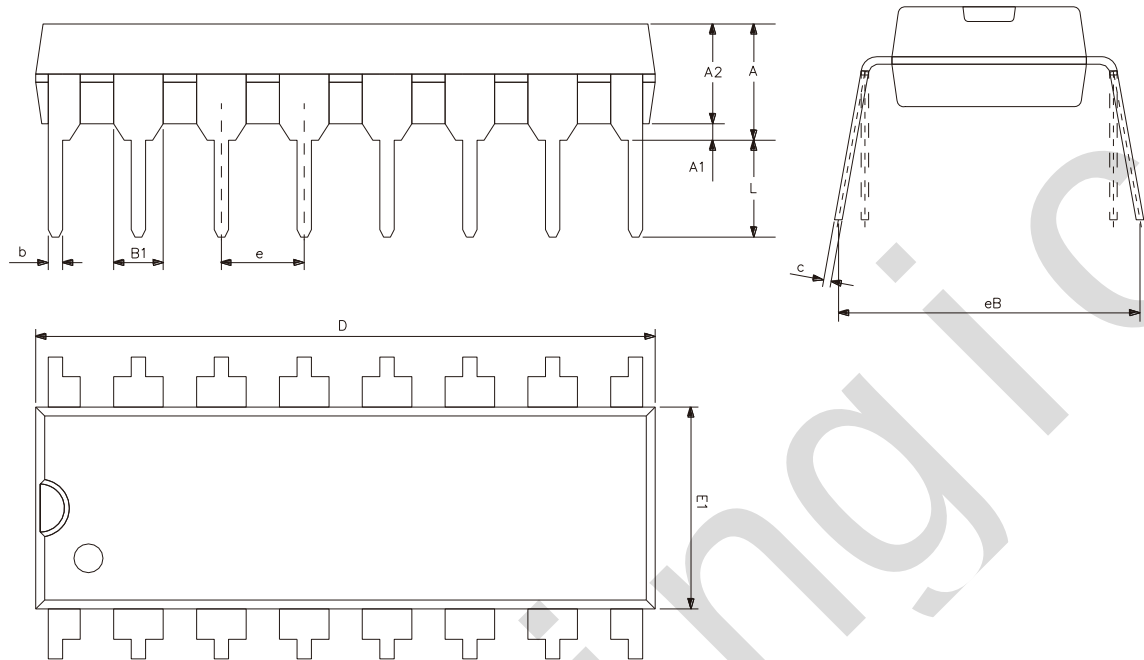
4.4、Measurement Points

Type	Input	Output
	V _M	V _M
SN74HC145	0.5×V _{CC}	0.5×V _{CC}
SN74HCT145	1.3V	1.3V



5、Package Information

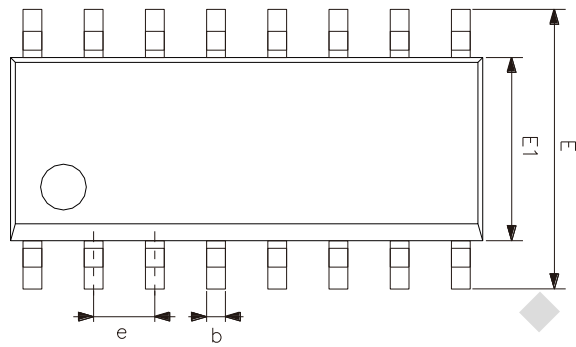
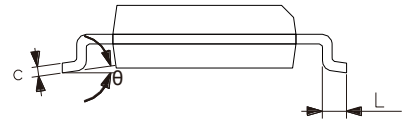
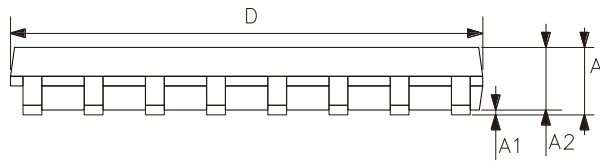
5.1、DIP16



Symbol	Dimensions (mm)	
	Min.	Max.
A2	3.20	3.60
A1	0.51	-
A	3.60	5.33
L	3.00	3.60
b	0.36	0.56
B1	1.52	
D	18.80	19.94
E1	6.20	6.60
e	2.54	
c	0.20	0.36
eB	7.62	9.30



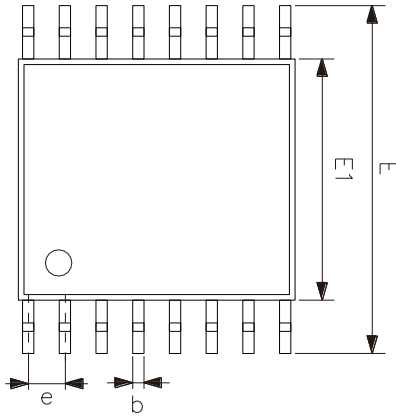
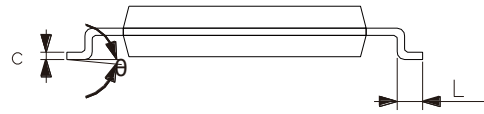
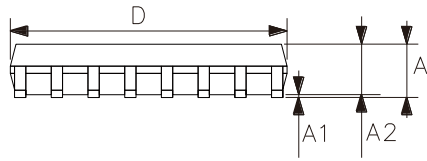
5.2、SOP16



Symbol	Dimensions (mm)	
	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°



5.3、TSSOP16



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
E1	4.30	4.50
E	6.20	6.60
e	0.65	
L	0.45	0.75
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 Lingxing 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. Lingxing 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 Lingxing's application to avoid failure in the application or the application of the customer's third party users. Lingxing 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 Lingxing'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.