



灵星芯微 芯片经营

深圳市灵星芯微电子科技有限公司

Shenzhen Lingxing Microelectronics Technology Co., Ltd.

Tab: 835-12-B4

Number: SN74LS06-AX-LJ-A083EN

# SN74LS06 (LX) Hex Inverter with Open-drain outputs

## Product Specification

### Specification Revision History:

Version	Date	Description
2023-07-A1	2023-07	New



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## 1、General Description

The SN74LS06 contains six inverters. The outputs of the SN74LS06 are open-drain. The open-drain outputs require pull-up resistors to perform correctly.

### Features:

- Specified from -40°C to +125°C
- Packaging information: DIP14/SOP14/TSSOP14

### Ordering Information:

#### Tube packing specifications:

Type number	Packaging form	Marking code	Tube quantity	Boxed tube quantity	Boxed quantity	Notes
SN74LS06N (LX)	DIP14	SN74LS06N	25 PCS/tube	40 tube/box	1000 PCS/box	Dimensions of plastic enclosure: 19.0mm×6.4mm Pin spacing: 2.54mm
SN74LS06DR (LX)	SOP14	LS06	50 PCS/tube	200 tube/box	10000 PCS/box	Dimensions of plastic enclosure: 8.7mm×3.9mm Pin spacing: 1.27mm
SN74LS06PW(LX)	TSSOP14	LS06	96 PCS/tube	200 tube/box	19200 PCS/box	Dimensions of plastic enclosure: 5.0mm×4.4mm Pin spacing: 0.65mm



**Reel packing specifications:**

Type number	Packaging form	Marking code	Reel quantity	Boxed reel quantity	Notes
SN74LS06DR(LX)	SOP14	LS06	2500 PCS/reel	5000 PCS/box	Dimensions of plastic enclosure: 8.7mm×3.9mm Pin spacing: 1.27mm
SN74LS06PW(LX)	TSSOP14	LS06	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

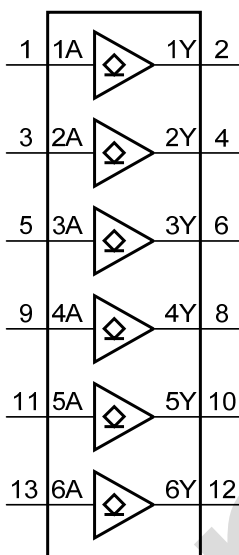


Figure 1. Logic symbol

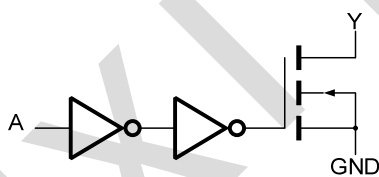
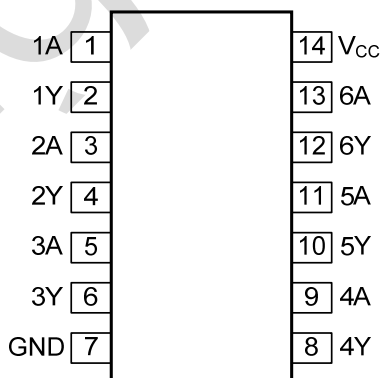


Figure 2. Logic diagram (one gate)

### 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 <sub>CC</sub>	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 <sub>CC</sub>	-	-0.5	+7.0	V
output voltage	V <sub>O</sub>	-	-0.5	+7.0	V
input clamping current	I <sub>IK</sub>	V <sub>I</sub> <-0.5V or V <sub>I</sub> >V <sub>CC</sub> +0.5V	-	±20	mA
output clamping current	I <sub>OK</sub>	V <sub>O</sub> <-0.5V	-	-20	mA
output current	I <sub>O</sub>	-0.5V<V <sub>O</sub>	-	-25	mA
supply current	I <sub>CC</sub>	-	-	+50	mA
ground current	I <sub>GND</sub>	-	-50	-	mA
storage temperature	T <sub>stg</sub>	-	-65	+150	°C
total power dissipation	P <sub>tot</sub>	-	-	500	mW
soldering temperature	T <sub>L</sub>	10s	DIP	245	°C
			SOP/TSSOP	260	



### 3.2、Recommended Operating Conditions

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
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

### 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	Conditions	Min.	Typ.	Max.	Unit	
HIGH-level input voltage	$V_{IH}$	$V_{CC}=2.0\text{V}$	1.5	1.2	-	V	
		$V_{CC}=4.5\text{V}$	3.15	2.4	-	V	
		$V_{CC}=6.0\text{V}$	4.2	3.2	-	V	
LOW-level input voltage	$V_{IL}$	$V_{CC}=2.0\text{V}$	-	0.8	0.5	V	
		$V_{CC}=4.5\text{V}$	-	2.1	1.35	V	
		$V_{CC}=6.0\text{V}$	-	2.8	1.8	V	
LOW-level output voltage	$V_{OL}$	$V_I=V_{IH}$ or $V_{IL}$	$I_O=20\mu\text{A}; V_{CC}=2.0\text{V}$	-	0	0.1	V
			$I_O=20\mu\text{A}; V_{CC}=4.5\text{V}$	-	0	0.1	V
			$I_O=20\mu\text{A}; V_{CC}=6.0\text{V}$	-	0	0.1	V
			$I_O=4.0\text{mA}; V_{CC}=4.5\text{V}$	-	0.15	0.33	V
			$I_O=5.2\text{mA}; V_{CC}=6.0\text{V}$	-	0.16	0.33	V
input leakage current	$I_I$	$V_I=V_{CC}$ or GND; $V_{CC}=6.0\text{V}$	-	-	$\pm 2$	$\mu\text{A}$	
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; $V_{CC}=6.0\text{V}$ ; $I_O=0\text{A}$	-	-	$\pm 2$	$\mu\text{A}$	
supply current	$I_{CC}$	$V_I=V_{CC}$ or GND; $I_O=0\text{A}$ ; $V_{CC}=6.0\text{V}$	-	-	2	$\mu\text{A}$	



### 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	Conditions	Min.	Typ.	Max.	Unit	
HIGH-level input voltage	$V_{IH}$	$V_{CC}=2.0\text{V}$	1.5	-	-	V	
		$V_{CC}=4.5\text{V}$	3.15	-	-	V	
		$V_{CC}=6.0\text{V}$	4.2	-	-	V	
LOW-level input voltage	$V_{IL}$	$V_{CC}=2.0\text{V}$	-	-	0.5	V	
		$V_{CC}=4.5\text{V}$	-	-	1.35	V	
		$V_{CC}=6.0\text{V}$	-	-	1.8	V	
LOW-level output voltage	$V_{OL}$	$V_I=V_{IH}$ or $V_{IL}$	$I_O=20\mu\text{A}; V_{CC}=2.0\text{V}$	-	-	0.1	V
			$I_O=20\mu\text{A}; V_{CC}=4.5\text{V}$	-	-	0.1	V
			$I_O=20\mu\text{A}; V_{CC}=6.0\text{V}$	-	-	0.1	V
			$I_O=4.0\text{mA}; V_{CC}=4.5\text{V}$	-	-	0.4	V
			$I_O=5.2\text{mA}; V_{CC}=6.0\text{V}$	-	-	0.4	V
input leakage current	$I_I$	$V_I=V_{CC}$ or GND; $V_{CC}=6.0\text{V}$	-	-	$\pm 4$	$\mu\text{A}$	
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; $V_{CC}=6.0\text{V}$ ; $I_O=0\text{A}$	-	-	$\pm 4$	$\mu\text{A}$	
supply current	$I_{CC}$	$V_I=V_{CC}$ or GND; $I_O=0\text{A}$ ; $V_{CC}=6.0\text{V}$	-	-	4	$\mu\text{A}$	





### 3.3.3、AC Characteristics 1

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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit	
nA to nY propagation delay	$t_{pd}$	see Figure 4 <sup>[1]</sup>	$V_{CC}=2.0\text{V}$	-	28	120	ns
			$V_{CC}=4.5\text{V}$	-	10	24	ns
			$V_{CC}=5.0\text{V}; C_L=15\text{pF}$	-	8	-	ns
			$V_{CC}=6.0\text{V}$	-	8	20	ns
transition time	$t_t$	see Figure 4 <sup>[2]</sup>	$V_{CC}=2.0\text{V}$	-	19	95	ns
			$V_{CC}=4.5\text{V}$	-	7	19	ns
			$V_{CC}=6.0\text{V}$	-	6	16	ns

Note:

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

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

### 3.3.4、AC Characteristics 2

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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit	
nA to nY propagation delay	$t_{pd}$	see Figure 4 <sup>[1]</sup>	$V_{CC}=2.0\text{V}$	-	-	145	ns
			$V_{CC}=4.5\text{V}$	-	-	29	ns
			$V_{CC}=6.0\text{V}$	-	-	25	ns
transition time	$t_t$	see Figure 4 <sup>[2]</sup>	$V_{CC}=2.0\text{V}$	-	-	110	ns
			$V_{CC}=4.5\text{V}$	-	-	22	ns
			$V_{CC}=6.0\text{V}$	-	-	19	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

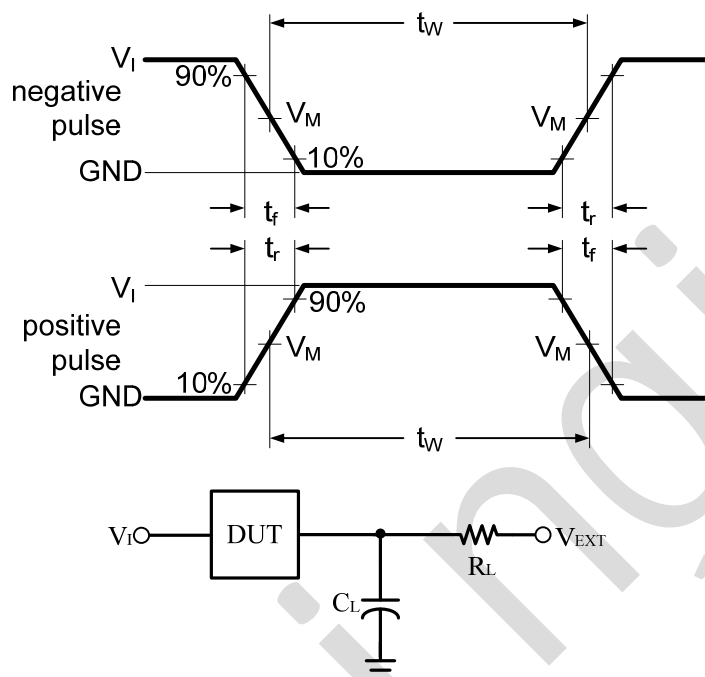


Figure 3. Test circuit for measuring switching times

$C_L$  includes probe and jig capacitance.

### 4.2、AC Testing Waveforms

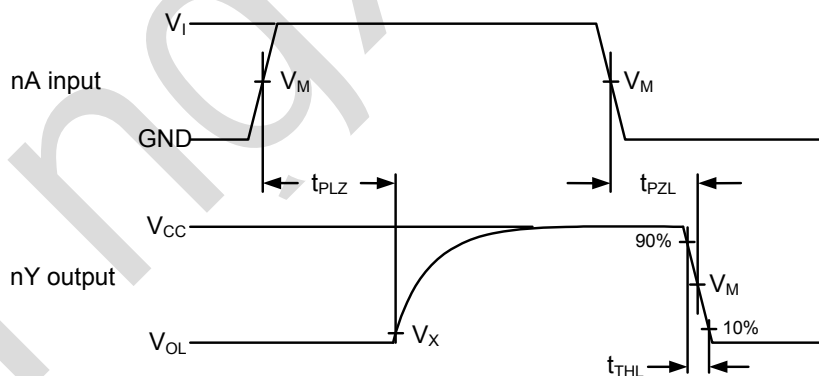


Figure 4. The input nA to output nY propagation delays and output transition times



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#### 4.3、Measurement Points

Input		Output	
$V_M$		$V_M$	$V_X$
$0.5 \times V_{CC}$		$0.5 \times V_{CC}$	$0.1 \times V_{CC}$

#### 4.4、Test Data

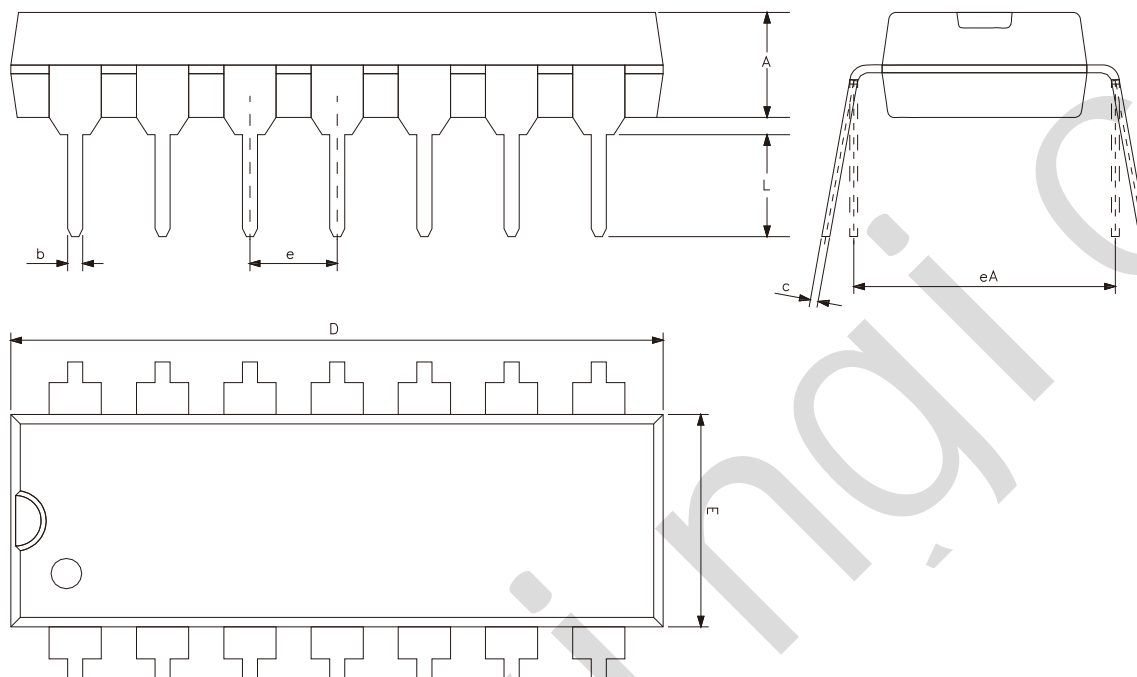
Input		Load		S1 position
$V_I$	$t_r, t_f$	$C_L$	$R_L$	$t_{pZL}, t_{pLZ}$
$V_{CC}$	6ns	15pF, 50pF	1k $\Omega$	$V_{CC}$



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## 5、Package Information

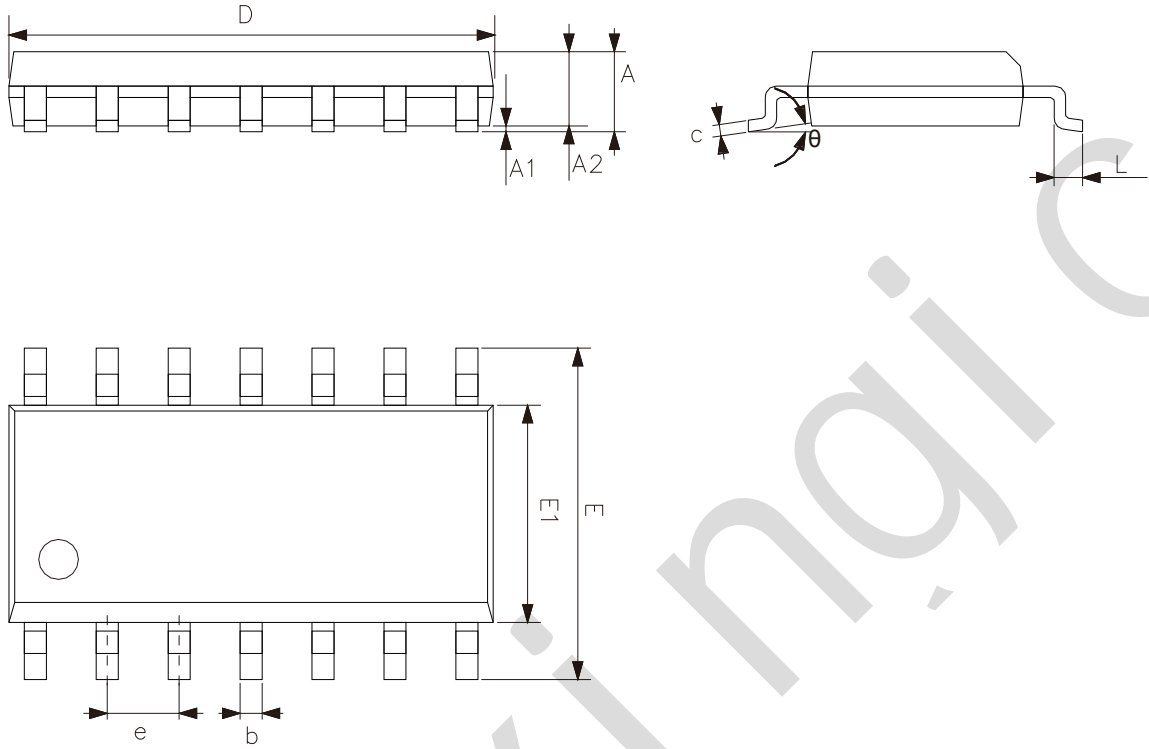
### 5.1、DIP14



Symbol	Dimensions (mm)	
	Min.	Max.
A	3.05	3.60
b	0.33	0.56
c	0.20	0.36
D	18.80	19.40
E	6.20	6.60
e	2.54	
eA	7.62	10.90
L	2.92	-



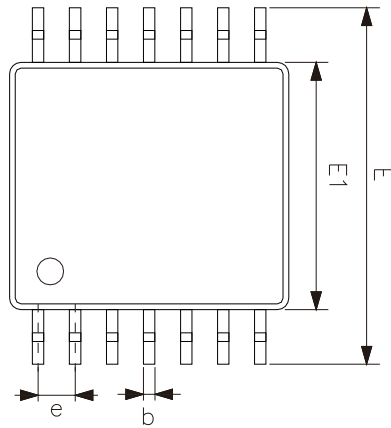
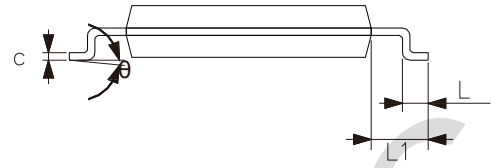
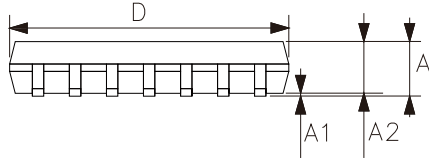
## 5.2、SOP14



Symbol	Dimensions (mm)	
	Min.	Max.
A	1.50	1.75
A1	0.05	0.25
A2	1.30	-
b	0.33	0.50
c	0.19	0.25
D	8.43	8.76
E	5.80	6.25
E1	3.75	4.00
e	1.27	
L	0.40	0.89
$\theta$	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
E1	4.30	4.50
E	6.20	6.60
e	0.65	
L	0.45	0.75
L1	1.00	
$\theta$	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

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