



SN74LS151 (LX) 8-input Multiplexer

Product Specification

Specification Revision History:

Version	Date	Description
2021-06-A1	2021-06	New
2023-04-B1	2023-04	Update the template



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1、General Description

The SN74LS151 are 8-bit multiplexer with eight binary inputs (I_0 to I_7), three select inputs (S_0 to S_2) and an enable input (\bar{E}). One of the eight binary inputs is selected by the select inputs and routed to the complementary outputs (Y and \bar{Y}). A HIGH on \bar{E} forces the output Y LOW and output \bar{Y} HIGH. Inputs also include clamp diodes that enable the use of current limiting resistors to interface inputs to voltages in excess of V_{CC} .

Features:

- Low-power dissipation
- Non-inverting data path
- Specified from -40°C to $+125^{\circ}\text{C}$
- Packaging information: DIP16/SOP16/TSSOP16

**Ordering Information:****Tube packing specifications:**

Part number	Packaging form	Marking code	Tube quantity	Boxed tube quantity	Boxed quantity	Notes
SN74LS151N(LX)	DIP16	SN74LS151N	25 PCS/tube	40 tube/box	1000 PCS/box	Dimensions of plastic enclosure: 19.0mm×6.4mm Pin spacing: 2.54mm
SN74LS151DR(LX)	SOP16	LS151	50 PCS/tube	200 tube/box	10000 PCS/box	Dimensions of plastic enclosure: 10.0mm×3.9mm Pin spacing: 1.27mm
SN74LS151PW(LX)	TSSOP16	LS151	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
SN74LS151DR(LX)	SOP16	LS151	2500 PCS/reel	5000 PCS/box	Dimensions of plastic enclosure: 10.0mm×3.9mm Pin spacing:1.27mm
SN74LS151PW(LX)	TSSOP16	LS151	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

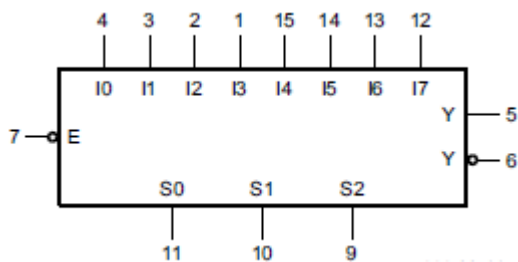


Figure 1. Logic symbol

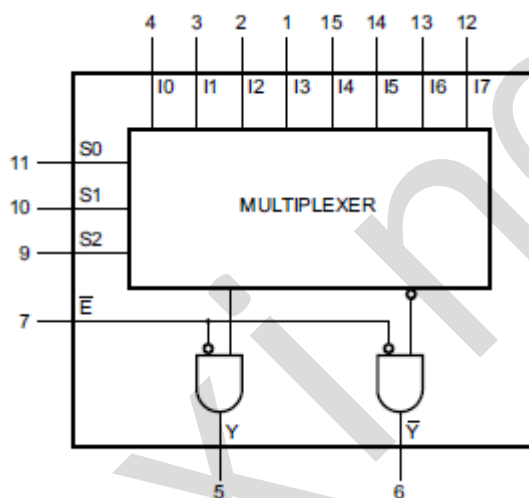


Figure 2. Functional diagram

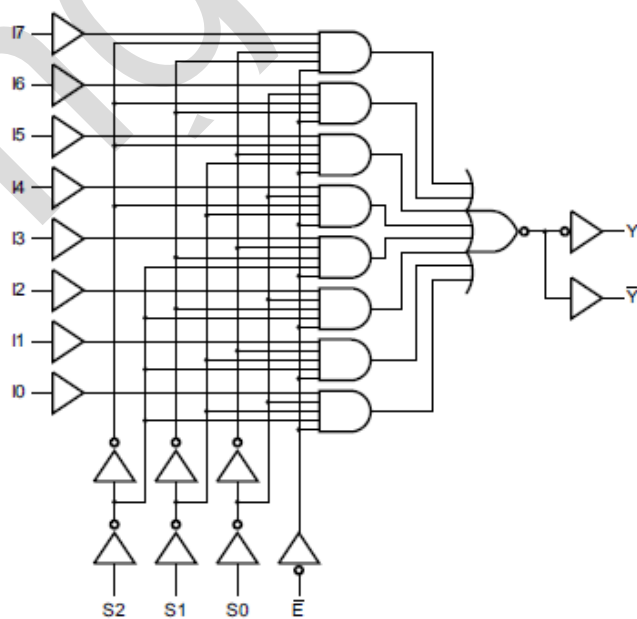
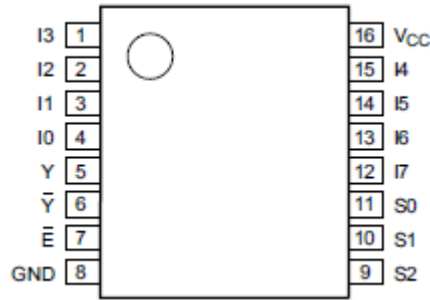


Figure 3. Logic diagram



2.2、Pin Configurations



2.3、Pin Description

Pin No.	Pin Name	Description
1	I3	data input
2	I2	data input
3	I1	data input
4	I0	data input
5	Y	multiplexer output
6	\bar{Y}	complementary multiplexer output
7	\bar{E}	enable input (active LOW)
8	GND	ground (0V)
9	S2	common data select input
10	S1	common data select input
11	S0	common data select input
12	I7	data input
13	I6	data input
14	I5	data input
15	I4	data input
16	V _{CC}	supply voltage

2.4、Function Table

Input												Output	
\bar{E}	S2	S1	S0	I0	I1	I2	I3	I4	I5	I6	I7	\bar{Y}	Y
H	X	X	X	X	X	X	X	X	X	X	X	H	L
L	L	L	L	L	X	X	X	X	X	X	X	H	L
L	L	L	L	H	X	X	X	X	X	X	X	L	H
L	L	L	H	X	L	X	X	X	X	X	X	H	L
L	L	L	H	X	H	X	X	X	X	X	X	L	H
L	L	H	L	X	X	L	X	X	X	X	X	H	L
L	L	H	L	X	X	H	X	X	X	X	X	L	H
L	L	H	H	X	X	X	L	X	X	X	X	H	L
L	L	H	H	X	X	X	H	X	X	X	X	L	H
L	H	L	L	X	X	X	X	L	X	X	X	H	L
L	H	L	L	X	X	X	X	H	X	X	X	L	H
L	H	L	H	X	X	X	X	X	L	X	X	H	L



L	H	L	H	X	X	X	X	X	H	X	X	L	H
L	H	H	L	X	X	X	X	X	X	L	X	H	L
L	H	H	L	X	X	X	X	X	X	H	X	L	H
L	H	H	H	X	X	X	X	X	X	X	L	H	L
L	H	H	H	X	X	X	X	X	X	X	H	L	H

Note: H=HIGH voltage level; L=LOW voltage level; X=don't care.

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 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	$V_O = -0.5V$ to $(V_{CC}+0.5V)$	-	± 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/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
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



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	
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	
HIGH-level output voltage	V_{OH}	$V_I=V_{IH}$ or V_{IL}	$I_O=-20\mu\text{A}; V_{CC}=2.0\text{V}$	1.9	2.0	-	V
			$I_O=-20\mu\text{A}; V_{CC}=4.5\text{V}$	4.4	4.5	-	V
			$I_O=-20\mu\text{A}; V_{CC}=6.0\text{V}$	5.9	6.0	-	V
			$I_O=-4.0\text{mA}; V_{CC}=4.5\text{V}$	3.98	4.32	-	V
			$I_O=-5.2\text{mA}; V_{CC}=6.0\text{V}$	5.48	5.81	-	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	0.26	V
			$I_O=5.2\text{mA}; V_{CC}=6.0\text{V}$	-	0.16	0.26	V
input leakage current	I_I	$V_I=V_{CC}$ or GND; $V_{CC}=6.0\text{V}$	-	-	± 1.0	μA	
supply current	I_{CC}	$V_I=V_{CC}$ or GND; $I_O=0\text{A}; V_{CC}=6.0\text{V}$	-	-	8.0	μA	
input capacitance	C_I	-	-	3.5	-	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	
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	
HIGH-level output voltage	V_{OH}	$V_I=V_{IH}$ or V_{IL}	$I_O=-20\mu\text{A}; V_{CC}=2.0\text{V}$	1.9	-	-	V
			$I_O=-20\mu\text{A}; V_{CC}=4.5\text{V}$	4.4	-	-	V
			$I_O=-20\mu\text{A}; V_{CC}=6.0\text{V}$	5.9	-	-	V
			$I_O=-4.0\text{mA}; V_{CC}=4.5\text{V}$	3.84	-	-	V
			$I_O=-5.2\text{mA}; V_{CC}=6.0\text{V}$	5.34	-	-	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
			$I_O=4.0\text{mA}; V_{CC}=4.5\text{V}$	-	-	0.33	V
			$I_O=5.2\text{mA}; V_{CC}=6.0\text{V}$	-	-	0.33	V
input leakage current	I_I	$V_I=V_{CC}$ or GND; $V_{CC}=6.0\text{V}$	-	-	± 1.0	μA	
supply current	I_{CC}	$V_I=V_{CC}$ or GND; $I_O=0\text{A}; V_{CC}=6.0\text{V}$	-	-	80	μA	



3.3.3、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	
HIGH-level output voltage	V_{OH}	$V_I=V_{IH}$ or V_{IL}	$I_O=-20\mu\text{A}; V_{CC}=2.0\text{V}$	1.9	-	-	V
			$I_O=-20\mu\text{A}; V_{CC}=4.5\text{V}$	4.4	-	-	V
			$I_O=-20\mu\text{A}; V_{CC}=6.0\text{V}$	5.9	-	-	V
			$I_O=-4.0\text{mA}; V_{CC}=4.5\text{V}$	3.7	-	-	V
			$I_O=-5.2\text{mA}; V_{CC}=6.0\text{V}$	5.2	-	-	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; $V_{CC}=6.0\text{V}$	-	-	± 1.0	μA	
supply current	I_{CC}	$V_I=V_{CC}$ or GND; $I_O=0\text{A}; V_{CC}=6.0\text{V}$	-	-	160	μA	



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	
propagation delay	t_{pd}	In to Y; see Figure 5 ^[1]	$V_{CC}=2.0\text{V}$	-	52	170	ns
			$V_{CC}=4.5\text{V}$	-	19	34	ns
			$V_{CC}=5.0\text{V}; C_L=15\text{pF}$	-	17	-	ns
			$V_{CC}=6.0\text{V}$	-	15	29	ns
		In to \bar{Y} ; see Figure 5 ^[1]	$V_{CC}=2.0\text{V}$	-	58	185	ns
			$V_{CC}=4.5\text{V}$	-	21	37	ns
			$V_{CC}=5.0\text{V}; C_L=15\text{pF}$	-	17	-	ns
			$V_{CC}=6.0\text{V}$	-	17	31	ns
		Sn to Y; see Figure 6 ^[1]	$V_{CC}=2.0\text{V}$	-	61	185	ns
			$V_{CC}=4.5\text{V}$	-	22	37	ns
			$V_{CC}=5.0\text{V}; C_L=15\text{pF}$	-	19	-	ns
			$V_{CC}=6.0\text{V}$	-	18	31	ns
		Sn to \bar{Y} ; see Figure 6 ^[1]	$V_{CC}=2.0\text{V}$	-	61	205	ns
			$V_{CC}=4.5\text{V}$	-	22	41	ns
			$V_{CC}=5.0\text{V}; C_L=15\text{pF}$	-	19	-	ns
			$V_{CC}=6.0\text{V}$	-	18	35	ns
		\bar{E} to Y; see Figure 6	$V_{CC}=2.0\text{V}$	-	41	125	ns
			$V_{CC}=4.5\text{V}$	-	15	25	ns
			$V_{CC}=5.0\text{V}; C_L=15\text{pF}$	-	12	-	ns
			$V_{CC}=6.0\text{V}$	-	12	21	ns
\bar{E} to \bar{Y} ; see Figure 6	$V_{CC}=2.0\text{V}$	-	47	145	ns		
	$V_{CC}=4.5\text{V}$	-	17	29	ns		
	$V_{CC}=5.0\text{V}; C_L=15\text{pF}$	-	14	-	ns		
	$V_{CC}=6.0\text{V}$	-	14	25	ns		
transition time	t_t	Y, \bar{Y} ; see Figure 5 ^[2]	$V_{CC}=2.0\text{V}$	-	19	75	ns
			$V_{CC}=4.5\text{V}$	-	7	15	ns
			$V_{CC}=6.0\text{V}$	-	6	13	ns
power dissipation capacitance	C_{PD}	$C_L=50\text{pF}; f=1\text{MHz}; V_I=GND \text{ to } V_{CC}$ ^[3]	-	40	-	pF	



Note:

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

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

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

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

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;

N =number of inputs switching;

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

3.3.5、AC Characteristics 2

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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit	
propagation delay	t_{pd}	In to Y; see Figure 5 ^[1]	$V_{CC}=2.0V$	-	-	215	ns
			$V_{CC}=4.5V$	-	-	43	ns
			$V_{CC}=6.0V$	-	-	37	ns
		In to \bar{Y} ; see Figure 5 ^[1]	$V_{CC}=2.0V$	-	-	230	ns
			$V_{CC}=4.5V$	-	-	46	ns
			$V_{CC}=6.0V$	-	-	39	ns
		Sn to Y; see Figure 6 ^[1]	$V_{CC}=2.0V$	-	-	230	ns
			$V_{CC}=4.5V$	-	-	46	ns
			$V_{CC}=6.0V$	-	-	39	ns
		Sn to \bar{Y} ; see Figure 6 ^[1]	$V_{CC}=2.0V$	-	-	255	ns
			$V_{CC}=4.5V$	-	-	51	ns
			$V_{CC}=6.0V$	-	-	43	ns
		\bar{E} to Y; see Figure 6	$V_{CC}=2.0V$	-	-	155	ns
			$V_{CC}=4.5V$	-	-	31	ns
			$V_{CC}=6.0V$	-	-	26	ns
\bar{E} to \bar{Y} ; see Figure 6	$V_{CC}=2.0V$	-	-	180	ns		
	$V_{CC}=4.5V$	-	-	36	ns		
	$V_{CC}=6.0V$	-	-	31	ns		
transition time	t_t	Y, \bar{Y} ; see Figure 5 ^[2]	$V_{CC}=2.0V$	-	-	95	ns
			$V_{CC}=4.5V$	-	-	19	ns
			$V_{CC}=6.0V$	-	-	16	ns



Note:

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

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

3.3.6、AC Characteristics 3

($T_{amb}=-40^{\circ}\text{C}$ 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	
propagation delay	t_{pd}	In to Y; see Figure 5 ^[1]	$V_{CC}=2.0\text{V}$	-	-	255	ns
			$V_{CC}=4.5\text{V}$	-	-	51	ns
			$V_{CC}=6.0\text{V}$	-	-	43	ns
		In to \bar{Y} ; see Figure 5 ^[1]	$V_{CC}=2.0\text{V}$	-	-	280	ns
			$V_{CC}=4.5\text{V}$	-	-	56	ns
			$V_{CC}=6.0\text{V}$	-	-	48	ns
		Sn to Y; see Figure 6 ^[1]	$V_{CC}=2.0\text{V}$	-	-	280	ns
			$V_{CC}=4.5\text{V}$	-	-	56	ns
			$V_{CC}=6.0\text{V}$	-	-	48	ns
		Sn to \bar{Y} ; see Figure 6 ^[1]	$V_{CC}=2.0\text{V}$	-	-	310	ns
			$V_{CC}=4.5\text{V}$	-	-	62	ns
			$V_{CC}=6.0\text{V}$	-	-	53	ns
		\bar{E} to Y; see Figure 6	$V_{CC}=2.0\text{V}$	-	-	190	ns
			$V_{CC}=4.5\text{V}$	-	-	38	ns
			$V_{CC}=6.0\text{V}$	-	-	32	ns
\bar{E} to \bar{Y} ; see Figure 6	$V_{CC}=2.0\text{V}$	-	-	220	ns		
	$V_{CC}=4.5\text{V}$	-	-	44	ns		
	$V_{CC}=6.0\text{V}$	-	-	38	ns		
transition time	t_t	Y, \bar{Y} ; see Figure 5 ^[2]	$V_{CC}=2.0\text{V}$	-	-	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_{PLH} and t_{PHL} .

[2] t_i is the same as t_{THL} and t_{TLH} .

4、Testing Circuit

4.1、AC Testing Circuit

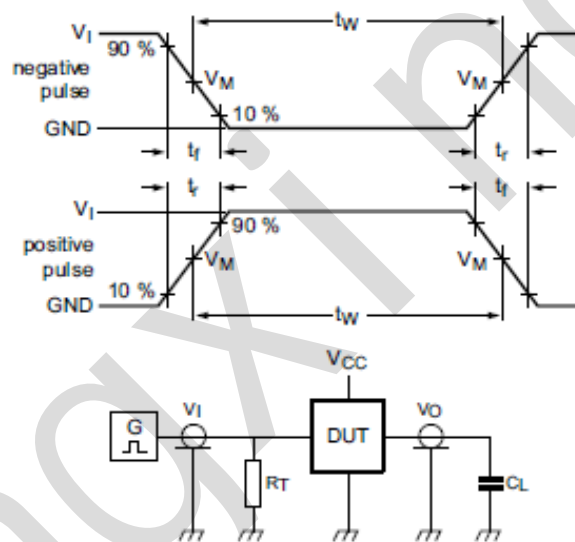


Figure 4. Test circuit for measuring switching times

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.



4.2、AC Testing Waveforms

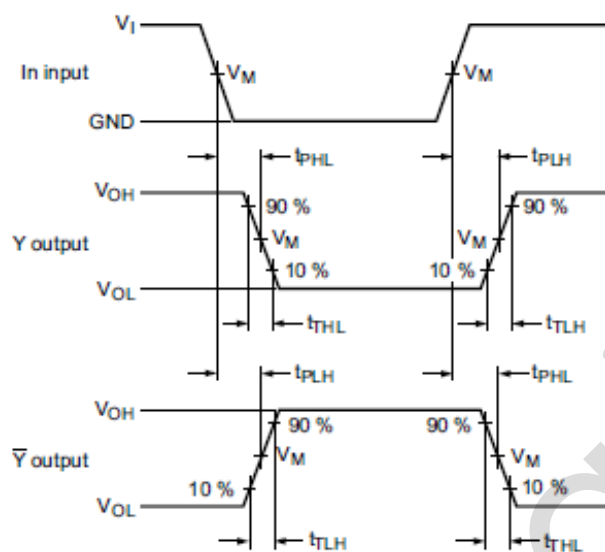


Figure 5. Propagation delay input (In) to output (Y, \bar{Y}) and the output (Y, \bar{Y}) transition time

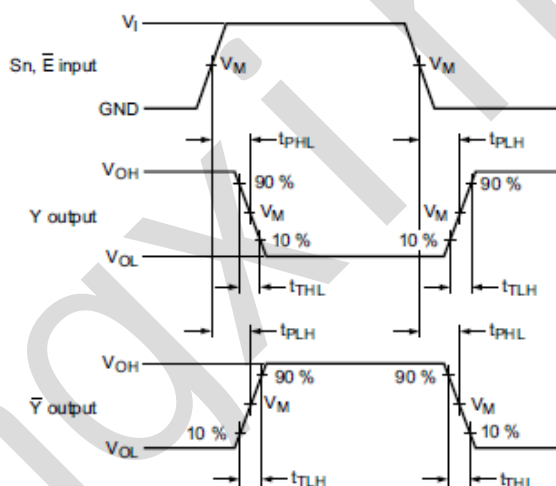


Figure 6. Propagation delay input (Sn, \bar{E}) to output (Y, \bar{Y}) and output (Y, \bar{Y}) transitions time

4.3、Measurement Points

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

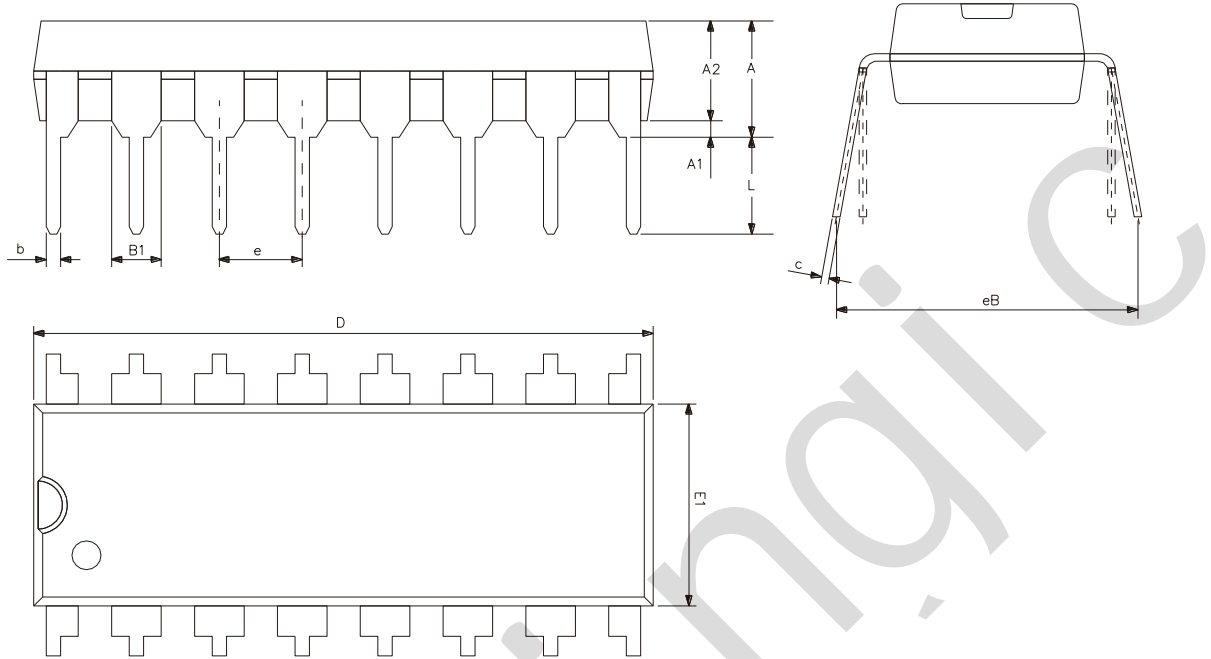
4.4、Test Data

Input		Load	Test
V_I	t_r, t_f	C_L	
V_{CC}	6ns	15pF, 50pF	t_{PHL}, t_{PLH}



5、Package Information

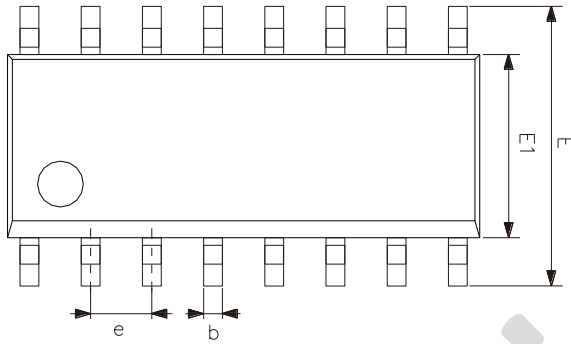
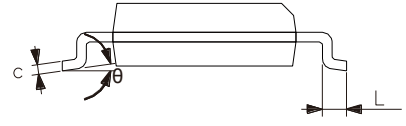
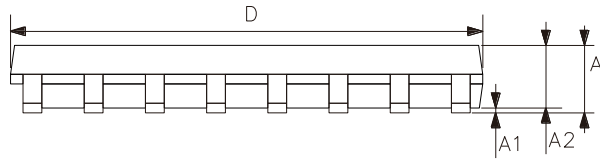
5.1、DIP16



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



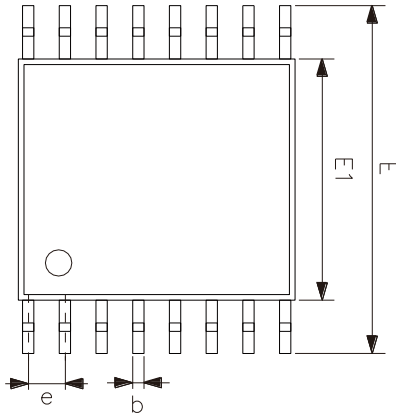
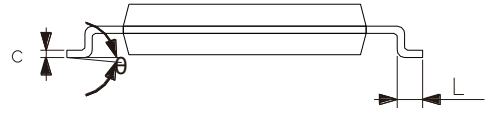
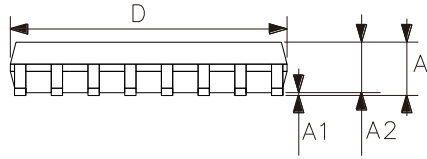
5.2、SOP16



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

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