

芯伯乐®  
X I N B O L E

# Product Specification

XBLW SN74LS151

8-input Multiplexer

WEB | [www.xinboleic.com](http://www.xinboleic.com)

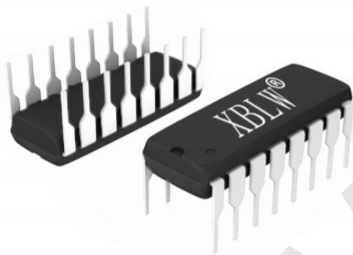


## Description

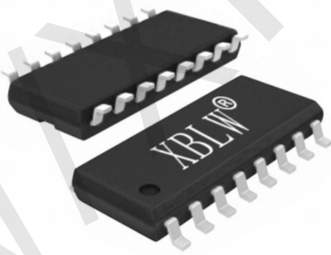
The SN74LS151 are 8-bit multiplexer with eight binary inputs (I0 to I7), three select inputs (S0 to S2) and an enable input ( $\bar{E}$ ). One of the eight binary inputs is selected by the select inputs and routed to the complementary outputs (Y and  $\bar{Y}$ ). A HIGH on  $\bar{E}$  forces the output 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

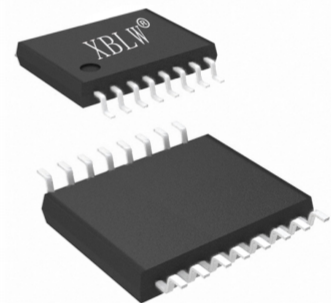
- Low-power dissipation
- Non-inverting data path
- Specified from -20°C to +85°C
- Packaging information: DIP-16/SOP-16/TSSOP-16



DIP-16



SOP-16



TSSOP-16

## ORDERING INFORMATION

Product Model	Package Type	Marking	Packing	Packing Qty
XBLW SN74LS151N	DIP-16	74LS151N	Tube	1000Pcs/Box
XBLW SN74LS151DTR	SOP-16	74LS151	Tape	2500Pcs/Reel
XBLW SN74LS151TDTR	TSSOP-16	74LS151	Tape	3000Pcs/Reel

### Block Diagram

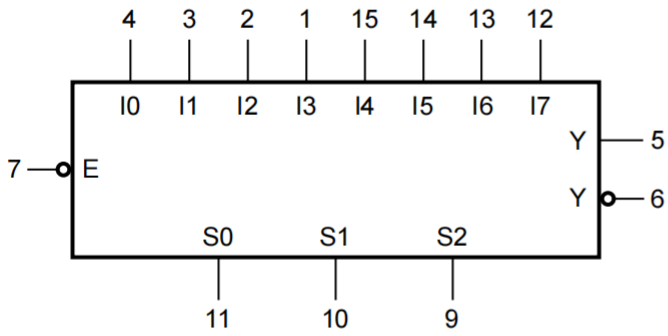


Figure 1. Logic symbol

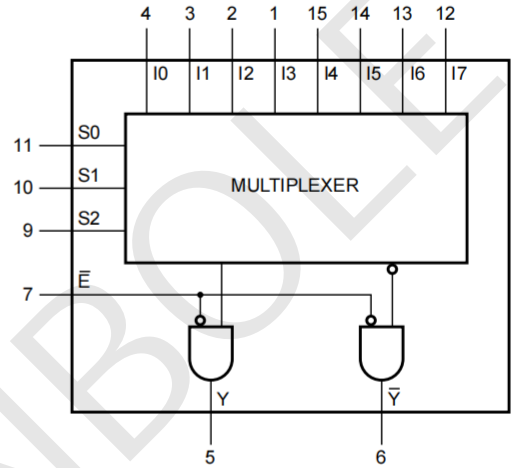


Figure 2. Functional diagram

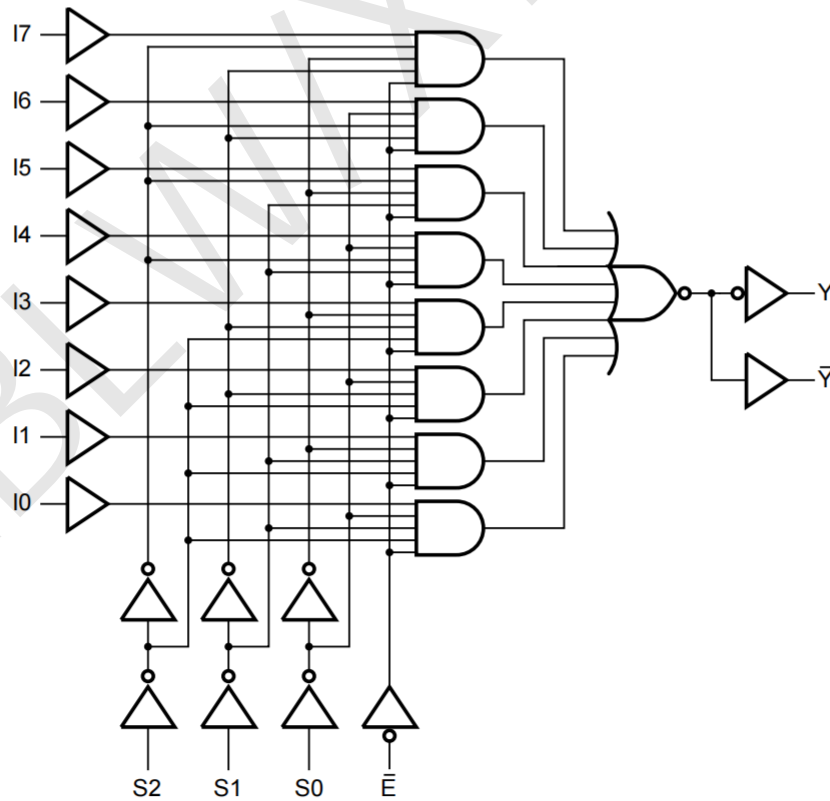
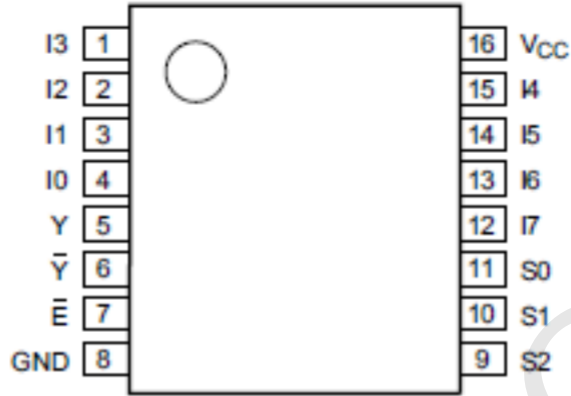


Figure 3. Logic diagram

## Pin Configurations



## Pin Description

Pin No.	Pin Name	Description
1	I3	data input
2	I2	data input
3	I1	data input
4	I0	data input
5	$\bar{Y}$	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	Vcc	supply voltage

### Function Table

Input												Output	
$\bar{E}$	S2	S1	S0	I0	I1	I2	I3	I4	I5	I6	I7	Y	$\bar{Y}$
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.

## Electrical Parameter

### 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	250	

Note:

[ 1] For DIP16 packages: above 70°C the value of  $P_{tot}$  derates linearly with 12mW/K.

[2] For SOP16 packages: above 70°C the value of  $P_{tot}$  derates linearly with 8mW/K.

[3] For (T)SSOP16 packages: above 60°C the value of  $P_{tot}$  derates linearly with 5.5mW/K.

### 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	$T_{amb}$	-	-20	-	+85	°C

## Electrical Characteristics

### 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	
HIGH-level input voltage	$V_{IH}$	$V_{CC}=2.0V$	1.5	1.2	-	V	
		$V_{CC}=4.5V$	3.15	2.4	-	V	
		$V_{CC}=6.0V$	4.2	3.2	-	V	
LOW-level input voltage	$V_{IL}$	$V_{CC}=2.0V$	-	0.8	0.5	V	
		$V_{CC}=4.5V$	-	2.1	1.35	V	
		$V_{CC}=6.0V$	-	2.8	1.8	V	
HIGH-level output voltage	$V_{OH}$	$V_I=V_{IH}$ or $V_{IL}$	$I_O=-20\mu A; V_{CC}=2.0V$	1.9	2.0	-	V
			$I_O=-20\mu A; V_{CC}=4.5V$	4.4	4.5	-	V
			$I_O=-20\mu A; V_{CC}=6.0V$	5.9	6.0	-	V
			$I_O=-4.0mA; V_{CC}=4.5V$	3.98	4.32	-	V
			$I_O=-5.2mA; V_{CC}=6.0V$	5.48	5.81	-	V
LOW-level output voltage	$V_{OL}$	$V_I=V_{IH}$ or $V_{IL}$	$I_O=20\mu A; V_{CC}=2.0V$	-	0	0.1	V
			$I_O=20\mu A; V_{CC}=4.5V$	-	0	0.1	V
			$I_O=20\mu A; V_{CC}=6.0V$	-	0	0.1	V
			$I_O=4.0mA; V_{CC}=4.5V$	-	0.15	0.26	V
			$I_O=5.2mA; V_{CC}=6.0V$	-	0.16	0.26	V
input leakage current	$I_I$	$V_I=V_{CC}$ or GND; $V_{CC}=6.0V$	-	-	$\pm 0.1$	$\mu A$	
supply current	$I_{CC}$	$V_I=V_{CC}$ or GND; $I_O=0A; V_{CC}=6.0V$	-	-	8.0	$\mu A$	
input apacitance	$C_I$	-	-	3.5	-	pF	

**DC Characteristics 2**

( $T_{amb} = -20^{\circ}\text{C}$  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	$V_{OH}$	$V_I = V_{IH} \text{ or } V_{IL}$	$I_O = -20\mu\text{A}; V_{CC} = 2.0\text{V}$	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	$V_{OL}$	$V_I = V_{IH} \text{ or } V_{IL}$	$I_O = 20\mu\text{A}; V_{CC} = 2.0\text{V}$	-	-	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	$I_I$	$V_i = V_{CC} \text{ or } \text{GND}; V_{CC} = 6.0\text{V}$	-	-	$\pm 1.0$	$\mu\text{A}$	
supply current	$I_{CC}$	$V_i = V_{CC} \text{ or } \text{GND}; I_O = 0\text{A}; V_{CC} = 6.0\text{V}$	-	-	80	$\mu\text{A}$	



**AC Characteristics 1**

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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit	
Propagation delay	$t_{pd}$	In to Y see Figure5 <sup>[1]</sup>	$V_{CC}=2.0V$	-	52	170	ns
			$V_{CC}=4.5V$	-	19	34	ns
			$V_{CC}=5.0V; C_L= 15pF$	-	17	-	ns
			$V_{CC}=6.0V$	-	15	29	ns
		In to $\bar{Y}$ see Figure5 <sup>[1]</sup>	$V_{CC}=2.0V$	-	58	185	ns
			$V_{CC}=4.5V$	-	21	37	ns
			$V_{CC}=5.0V; C_L= 15pF$	-	17	-	ns
			$V_{CC}=6.0V$	-	17	31	ns
		Sn to Y see Figure6 <sup>[1]</sup>	$V_{CC}=2.0V$	-	61	185	ns
			$V_{CC}=4.5V$	-	22	37	ns
			$V_{CC}=5.0V; C_L= 15pF$	-	19	-	ns
			$V_{CC}=6.0V$	-	18	31	ns
		Sn to $\bar{Y}$ see Figure6 <sup>[1]</sup>	$V_{CC}=2.0V$	-	61	205	ns
			$V_{CC}=4.5V$	-	22	41	ns
			$V_{CC}=5.0V; C_L= 15pF$	-	19	-	ns
			$V_{CC}=6.0V$	-	18	35	ns
$\bar{E}$ to Y see Figure6	$V_{CC}=2.0V$	-	41	125	ns		
	$V_{CC}=4.5V$	-	15	25	ns		
	$V_{CC}=5.0V; C_L= 15pF$	-	12	-	ns		
	$V_{CC}=6.0V$	-	12	21	ns		
$\bar{E}$ to $\bar{Y}$ see Figure6	$V_{CC}=2.0V$	-	47	145	ns		
	$V_{CC}=4.5V$	-	17	29	ns		
	$V_{CC}=5.0V; C_L= 15pF$	-	14	-	ns		
	$V_{CC}=6.0V$	-	14	25	ns		
transition time	$t_t$	Y, $\bar{Y}$ see Figure5 <sup>[2]</sup>	$V_{CC}=2.0V$	-	19	75	ns
			$V_{CC}=4.5V$	-	7	15	ns
			$V_{CC}=6.0V$	-	6	13	ns
power dissipation capacitance	$C_{PD}$	$C_L=50pF; f=1MHz; V_I=GND \text{ to } V_{CC}$ <sup>[3]</sup>	-	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.

**AC Characteristics 2**

( $T_{amb} = -20^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$ ,  $GND = 0V$ ,  $C_L = 50\text{pF}$ , unless otherwise specified.)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit	
Propagation delay	$t_{pd}$	In to Y see Figure5 <sup>[1]</sup>	$V_{CC} = 2.0V$	-	-	215	ns
			$V_{CC} = 4.5V$	-	-	43	ns
			$V_{CC} = 6.0V$	-	-	37	ns
		In to $\bar{Y}$ see Figure5 <sup>[1]</sup>	$V_{CC} = 2.0V$	-	-	230	ns
			$V_{CC} = 4.5V$	-	-	46	ns
			$V_{CC} = 6.0V$	-	-	39	ns
		Sn to Y see Figure6 <sup>[1]</sup>	$V_{CC} = 2.0V$	-	-	230	ns
			$V_{CC} = 4.5V$	-	-	46	ns
			$V_{CC} = 6.0V$	-	-	39	ns
		Sn to $\bar{Y}$ see Figure6 <sup>[1]</sup>	$V_{CC} = 2.0V$	-	-	255	ns
			$V_{CC} = 4.5V$	-	-	51	ns
			$V_{CC} = 6.0V$	-	-	43	ns
		$\bar{E}$ to Y see Figure6	$V_{CC} = 2.0V$	-	-	155	ns
			$V_{CC} = 4.5V$	-	-	31	ns
			$V_{CC} = 6.0V$	-	-	26	ns
$\bar{E}$ to $\bar{Y}$ see Figure6	$V_{CC} = 2.0V$	-	-	180	ns		
	$V_{CC} = 4.5V$	-	-	36	ns		
	$V_{CC} = 6.0V$	-	-	31	ns		
transition time	$t_t$	Y, $\bar{Y}$ see Figure5 <sup>[2]</sup>	$V_{CC} = 2.0V$	-	-	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  $t_{TLH}$ .

## Testing Circuit

### AC Testing Circuit

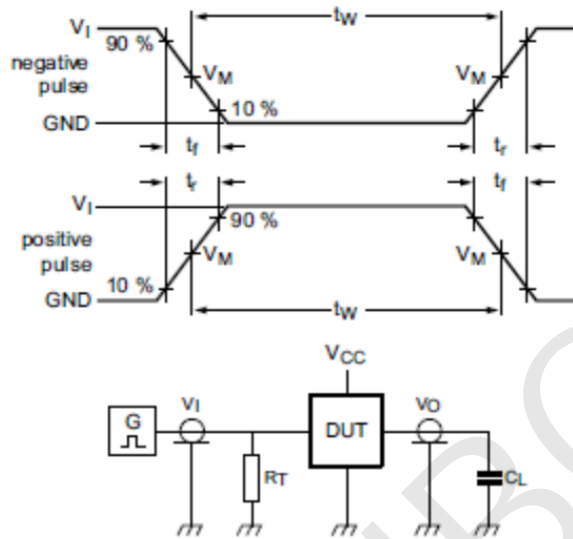


Figure 4. Test circuit for measuring switching times

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.

### AC Testing Waveforms

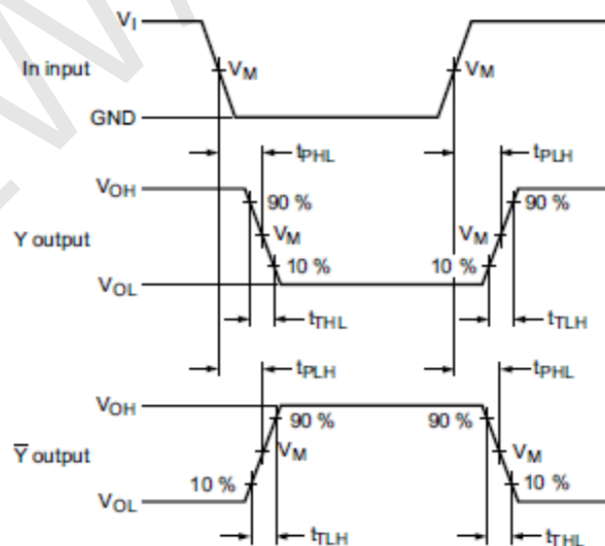


Figure 5. Propagation delay input (In) to output (Y,  $\bar{Y}$ ) and the output (Y,  $\bar{Y}$ ) transition time

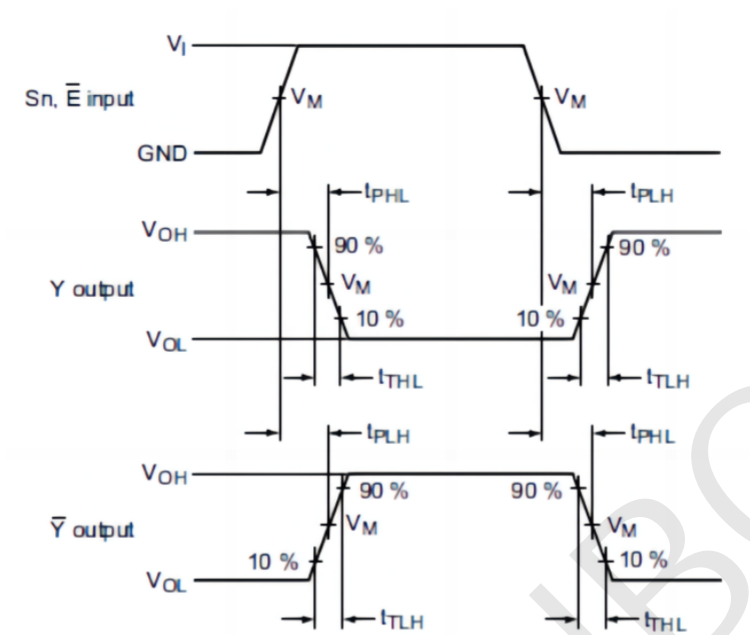


Figure 6. Propagation delay input ( $S_n, \bar{E}$ ) to output ( $Y, \bar{Y}$ ) and output ( $Y, \bar{Y}$ ) transitions time

### Measurement Points

Type	Input	Output
	$V_M$	$V_M$
SN74LS151	$0.5 \times V_{CC}$	$0.5 \times V_{CC}$

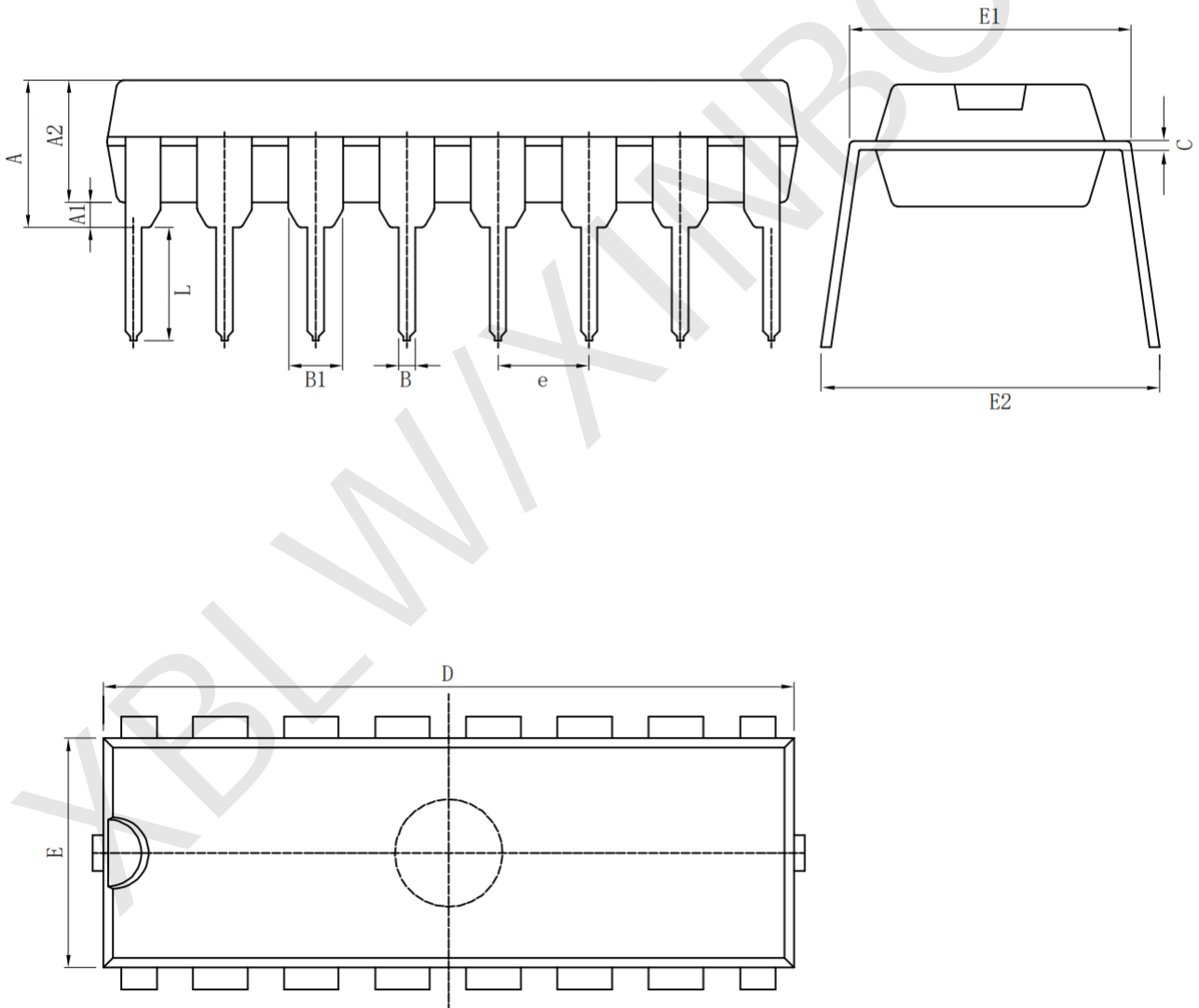
### Test Data

Type	Input		Load	Test
	$V_I$	$t_r, t_f$	$C_L$	
SN74LS151	$V_{CC}$	6.0ns	15pF, 50pF	$t_{PHL}, t_{PLH}$

**Package Information**

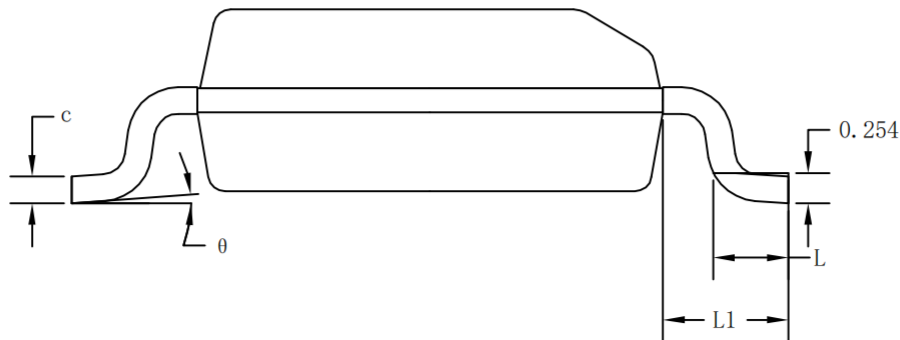
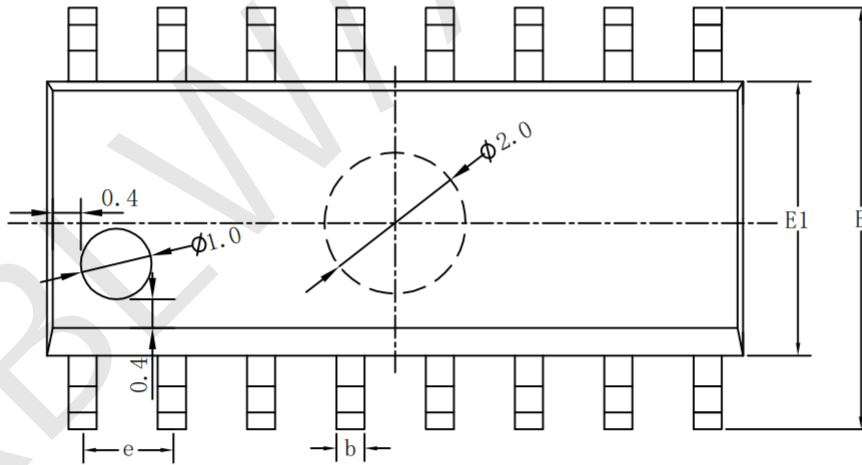
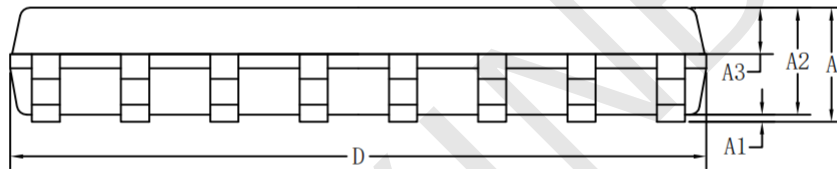
· DIP-16

Size Symbol	Dimensions In Millimeters		Size Symbol	Dimensions In Inches	
	Min( mm)	Max( mm)		Min( in)	Max( in)
A	3.710	4.310	A	0.146	0.170
A1	0.510		A1	0.020	
A2	3.200	3.600	A2	0.126	0.142
B	0.380	0.570	B	0.015	0.022
B1	1.524 (BSC)		B1	0.060 (BSC)	
C	0.204	0.360	C	0.008	0.014
D	18.80	19.20	D	0.740	0.756
E	6.200	6.600	E	0.244	0.260
E1	7.320	7.920	E1	0.288	0.312
e	2.540 (BSC)		e	0.100 (BSC)	
L	3.000	3.600	L	0.118	0.142
E2	8.400	9.000	E2	0.331	0.354



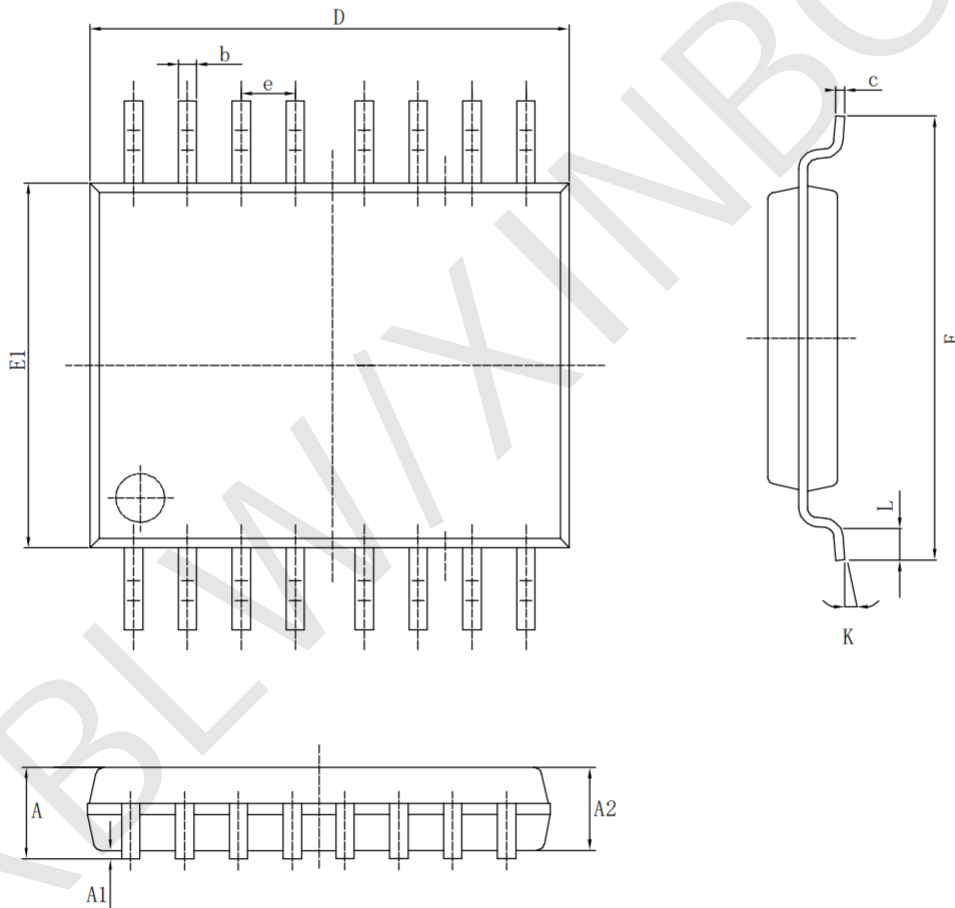
· SOP-16

Symbol	Dimensions In Millimeters			Symbol	Dimensions In Inches		
	Min (mm)	Nom (mm)	Max (mm)		Min (in)	Nom (in)	Max (in)
A	1.500	1.600	1.700	A	0.059	0.063	0.067
A1	0.100	0.150	0.250	A1	0.004	0.006	0.010
A2	1.400	1.450	1.500	A2	0.055	0.057	0.059
A3	0.600	0.650	0.700	A3	0.024	0.026	0.028
b	0.300	0.400	0.500	b	0.012	0.016	0.020
c	0.150	0.200	0.250	c	0.006	0.008	0.010
D	9.800	9.900	10.00	D	0.386	0.390	0.394
E	5.800	6.000	6.200	E	0.228	0.236	0.244
E1	3.850	3.900	3.950	E1	0.152	0.154	0.156
e	1.27 (BSC)			e	0.050 (BSC)		
L	0.500	0.600	0.700	L	0.020	0.024	0.028
L1	1.05 (BSC)			L1	0.041 (BSC)		
θ	0°	4°	8°	θ	0°	4°	8°



· TSSOP-16

Symbol	Dimensions In Millimeters		Symbol	Dimensions In Inches	
	Min (mm)	Max (mm)		Min (in)	Max (in)
A		1.200	A		0.047
A1	0.050	0.150	A1	0.002	0.006
A2	0.800	1.050	A2	0.031	0.041
b	0.190	0.300	b	0.007	0.012
c	0.090	0.200	c	0.004	0.0089
D	4.900	5.100	D	0.193	0.201
E	6.200	6.600	E	0.244	0.260
E1	4.300	4.480	E1	0.169	0.176
e	0.65 (BSC)		e	0.0256 (BSC)	
K	0°	8°	K	0°	8°
L	0.450	0.750	L	0.018	0.030



## Statement

- XBLW reserves the right to modify the product manual without prior notice! Before placing an order, customers need to confirm whether the obtained information is the latest version and verify the completeness of the relevant information.
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