General Description

The SN74HC/HCT366 is a hex inverting buffer/line driver with 3-state outputs controlled by the output enable inputs ($\overline{OEn}$). A HIGH on $\overline{OEn}$ causes the outputs to assume a high impedance OFF-state. Inputs include clamp diodes. This enables the use of current limiting resistors to interface inputs to voltages in excess of V_{CC}.

Features

- Input levels:
    For SN74HC366: CMOS level
    For SN74HCT366: TTL level
- Inverting outputs
- Specified from -40℃ to +125℃
- Packaging information: DIP16/SOP16/TSSOP16

Ordering Information

Product Model	Package Type	Marking	Packing	Packing Qty
XBLW SN74HC366N	DIP-16	74HC366N	Tube	1000Pcs/Box
XBLW SN74HC366DTR	SOP-16	74HC366	Tape	2500Pcs/Reel
XBLW SN74HC366TDTR	TSSOP-16	74HC366	Tape	3000Pcs/Reel
XBLW SN74HCT366N	DIP-16	74HCT366N	Tube	1000Pcs/Box
XBLW SN74HCT366DTR	SOP-16	74HCT366	Tape	2500Pcs/Reel
XBLW SN74HCT366TDTR	TSSOP-16	74HCT366	Tape	3000Pcs/Reel

# Block Diagram And Pin Description

Block Diagram
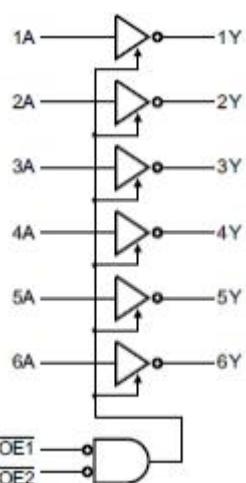
Figure 1. Logic symbol
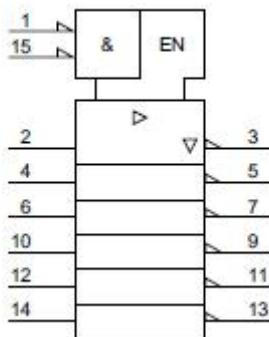
Figure 2. IEC logic symbol
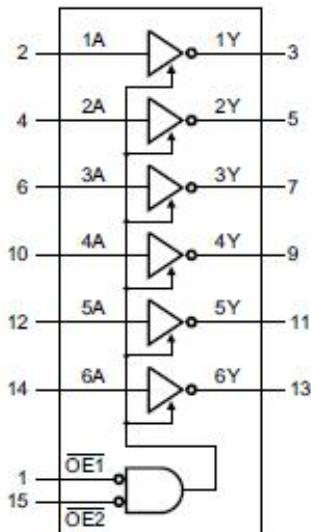
Figure 3. Functional diagram
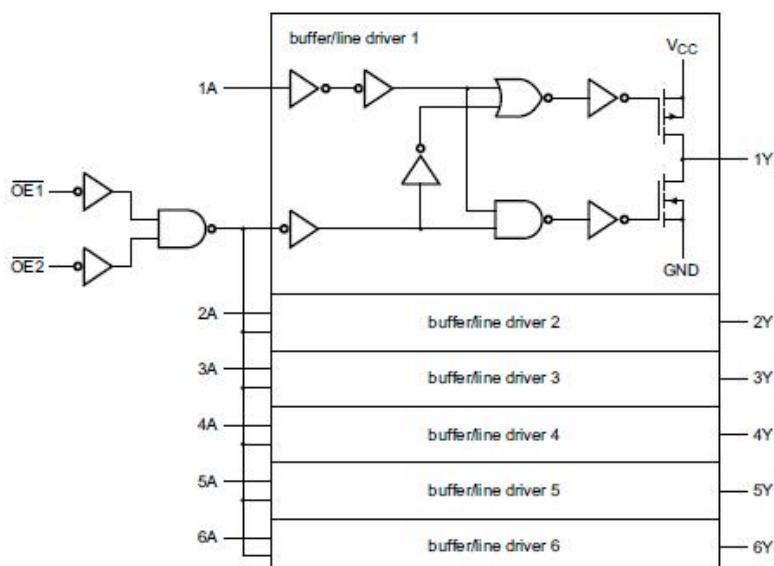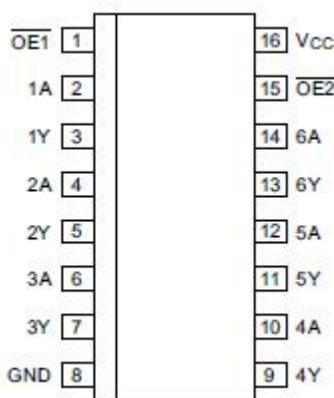
Figure 4. Logic diagram

Pin Configurations

```
        ____
       | OE1 | 1        16 | Vcc
        1A   | 2        15 | OE2
        1Y   | 3        14 | 6A
        2A   | 4        13 | 6Y
        2Y   | 5        12 | 5A
        3A   | 6        11 | 5Y
        3Y   | 7        10 | 4A
        GND  | 8         9 | 4Y
```

Pin DescriptionFunction Table

Pin No.	Pin Name	Description
1	$\overline{OE1}$	output enable input 1 (active LOW)
2	1A	data input 1
3	1Y	data output 1
4	2A	data input 2
5	2Y	data output 2
6	3A	data input 3
7	3Y	data output 3
8	GND	ground (0V)
9	4Y	data output 4
10	4A	data input 4
11	5Y	data output 5
12	5A	data input 5
13	6Y	data output 6
14	6A	data input 6
15	$\overline{OE2}$	output enable input 2 (active LOW)
16	V_{CC}	supply voltage

Function Table

Input			Output
$\overline{OE1}$	$\overline{OE2}$	nA	nY
L	L	L	H
L	L	H	L
X	H	X	Z
H	X	X	Z

Note: H=HIGH voltage level; L=LOW voltage level; X=don't care; Z=high-impedance OFF-state.

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	-0.5V < V_O < V_{CC}+0.5V		-	±35	mA
supply current	I_{CC}	-		-	70	mA
ground current	I_{GND}	-		-70	-	mA
storage temperature	T_{stg}	-		-65	+150	℃
total power dissipation	P_{tot}	-		-	500	mW
Soldering temperature	T_L	10s	DIP	245		℃
			SOP/TSSOP	260		

Recommended Operating Conditions

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
SN74HC366						
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	℃
SN74HCT366						
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}=4.5V	-	1.67	139	ns/V
ambient temperature	T_{amb}	-	-40	-	+125	℃

DC Characteristics 1

(T_{amb}=25℃, voltages are referenced to GND (ground=0V), unless otherwise specified.)

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
SN74HC366							
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=-20uA; V_{CC}=2.0V	1.9	2.0	-	V
			I_O=-20uA; V_{CC}=4.5V	4.4	4.5	-	V
			I_O=-20uA; V_{CC}=6.0V	5.9	6.0	-	V
			I_O=-6.0mA; V_{CC}=4.5V	3.98	4.32	-	V
			I_O=-7.8mA; V_{CC}=6.0V	5.48	5.81	-	V
LOW-level output voltage	V_{OL}	V_I = V_{IH} or V_{IL}	I_O=20uA; V_{CC}=2.0V	-	0	0.1	V
			I_O=20uA; V_{CC}=4.5V	-	0	0.1	V
			I_O=20uA; V_{CC}=6.0V	-	0	0.1	V
			I_O=6.0mA; V_{CC}=4.5V	-	0.15	0.26	V
			I_O=7.8mA; V_{CC}=6.0V	-	0.16	0.26	V
input leakage current	I_I	V_I=V_{CC} or GND; V_{CC}=6.0V		-	-	±1.0	uA
OFF-state output current	I_{OZ}	V_I=V_{IH} orV_{IL}; V_{CC}=6.0V; V_O=V_{CC} or GND		-	-	±1.0	uA
supply current	I_{CC}	V_I=V_{CC} or GND; I_O=0A; V_{CC}=6.0V		-	-	8.0	uA
input capacitance	C_I	-		-	3.5	-	pF
SN74HCT366							
HIGH-level input voltage	V_{IH}	V_{CC}=4.5V to 5.5V		2.0	1.6	-	V
LOW-level input voltage	V_{IL}	V_{CC}=4.5V to 5.5V		-	1.2	0.8	V
HIGH-level output voltage	V_{OH}	V_I = V_{IH} or V_{IL}; V_{CC}=4.5V	I_O=-20uA	4.4	4.5	-	V
			I_O=-6.0mA	3.98	4.32	-	V
LOW-level output voltage	V_{OL}	V_I = V_{IH} or V_{IL}; V_{CC}=4.5V	I_O=20uA	-	0	0.1	V
			I_O=6.0mA	-	0.16	0.26	V
input leakage current	I_I	V_I=V_{CC} or GND; V_{CC}=5.5V		-	-	±1.0	uA
OFF-state output current	I_{OZ}	V_I=V_{IH} orV_{IL}; V_{CC}=5.5V; V_O=V_{CC} or GND		-	-	±1.0	uA
supply current	I_{CC}	V_I=V_{CC} or GND; I_O=0A; V_{CC}=5.5V		-	-	8.0	uA
additional supply current	ΔI_{CC}	V_I=V_{CC}-2.1V; other inputs at V_{CC} or GND; I_O=0A	pins nA	-	-	360	uA
			pin $\overline{OE1}$	-	-	360	uA
			pin $\overline{OE2}$	-	-	320	uA
input capacitance	C_I	-		-	3.5	-	pF

DC Characteristics 2

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

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
SN74HC366							
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
HIGH-level output voltage	V_{OH}	$V_I = V_{IH}$ or V_{IL}	I_O=-20uA; V_{CC}=2.0V	1.9	-	-	V
			I_O=-20uA; V_{CC}=4.5V	4.4	-	-	V
			I_O=-20uA; V_{CC}=6.0V	5.9	-	-	V
			I_O=-6.0mA; V_{CC}=4.5V	3.84	-	-	V
			I_O=-7.8mA; V_{CC}=6.0V	5.34	-	-	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=6.0mA; V_{CC}=4.5V	-	-	0.33	V
			I_O=7.8mA; V_{CC}=6.0V	-	-	0.33	V
input leakage current	I_I	V_I=V_{CC} or GND; V_{CC}=6.0V		-	-	±1.0	uA
OFF-state output current	I_{OZ}	V_I=V_{IH} orV_{IL}; V_{CC}=6.0V; V_O=V_{CC} or GND		-	-	±5.0	uA
supply current	I_{CC}	V_I=V_{CC} or GND; I_O=0A; V_{CC}=6.0V		-	-	80	uA
SN74HCT366							
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
HIGH-level output voltage	V_{OH}	$V_I = V_{IH}$ or V_{IL}; V_{CC}=4.5V	I_O=-20uA	4.4	-	-	V
			I_O=-6.0mA	3.84	-	-	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=6.0mA	-	-	0.33	V
input leakage current	I_I	V_I=V_{CC} or GND; V_{CC}=5.5V		-	-	±1.0	uA
OFF-state output current	I_{OZ}	V_I=V_{IH} orV_{IL}; V_{CC}=5.5V; V_O=V_{CC} or GND		-	-	±5.0	uA
supply current	I_{CC}	V_I=V_{CC} or GND; I_O=0A; V_{CC}=5.5V		-	-	80	uA
additional supply current	ΔI_{CC}	V_I=V_{CC}-2.1V; other inputs at V_{CC} or GND; I_O=0A	pins nA	-	-	450	uA
			pin OE1	-	-	450	uA
			pin $\overline{OE2}$	-	-	400	uA

DC Characteristics 3

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

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
SN74HC366							
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
HIGH-level output voltage	V_{OH}	$V_I = V_{IH}$ or V_{IL}	I_O=-20uA; V_{CC}=2.0V	1.9	-	-	V
			I_O=-20uA; V_{CC}=4.5V	4.4	-	-	V
			I_O=-20uA; V_{CC}=6.0V	5.9	-	-	V
			I_O=-6.0mA; V_{CC}=4.5V	3.7	-	-	V
			I_O=-7.8mA; V_{CC}=6.0V	5.2	-	-	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=6.0mA; V_{CC}=4.5V	-	-	0.4	V
			I_O=7.8mA; V_{CC}=6.0V	-	-	0.4	V
input leakage current	I_I	V_I=V_{CC} or GND; V_{CC}=6.0V		-	-	±1.0	uA
OFF-state output current	I_{OZ}	V_I=V_{IH} or V_{IL}; V_{CC}=6.0V; V_O=V_{CC} or GND		-	-	±10	uA
supply current	I_{CC}	V_I=V_{CC} or GND; I_O=0A; V_{CC}=6.0V		-	-	160	uA
SN74HCT366							
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
HIGH-level output voltage	V_{OH}	$V_I = V_{IH}$ or V_{IL}; V_{CC}=4.5V	I_O=-20uA	4.4	-	-	V
			I_O=-6.0mA	3.7	-	-	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=6.0mA	-	-	0.4	V
input leakage current	I_I	V_I=V_{CC} or GND; V_{CC}=5.5V		-	-	±1.0	uA
OFF-state output current	I_{OZ}	V_I=V_{IH} or V_{IL}; V_{CC}=5.5V; V_O=V_{CC} or GND		-	-	±10	uA
supply current	I_{CC}	V_I=V_{CC} or GND; I_O=0A; V_{CC}=5.5V		-	-	160	uA
additional supply current	ΔI_{CC}	V_I=V_{CC}-2.1V; other inputs at V_{CC} or GND; I_O=0A	pins nA	-	-	490	uA
			pin $\overline{OE}$1	-	-	490	uA
			pin $\overline{OE}$2	-	-	441	uA

AC Characteristics 1

(T_{amb}=25℃, GND =0V, C_L=50pF, unless otherwise specified.)

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
SN74HC366							
nA tonY propagation delay	t_{pd}	see Figure 6	V_{CC}=2.0V	-	33	100	ns
			V_{CC}=4.5V	-	12	20	ns
			V_{CC}=5.0V; C_L=15pF	-	10	-	ns
			V_{CC}=6.0V	-	10	17	ns
$\overline{OE}$n to nY enable time	t_{en}	see Figure 7	V_{CC}=2.0V	-	44	150	ns
			V_{CC}=4.5V	-	16	30	ns
			V_{CC}=6.0V	-	13	16	ns
$\overline{OE}$n to nY disable time	t_{dis}	see Figure 7	V_{CC}=2.0V	-	55	150	ns
			V_{CC}=4.5V	-	20	30	ns
			V_{CC}=6.0V	-	16	26	ns
transition time	t_t	see Figure 6	V_{CC}=2.0V	-	14	60	ns
			V_{CC}=4.5V	-	5	12	ns
			V_{CC}=6.0V	-	4	10	ns
power dissipation capacitance	C_{PD}	per buffer; V_I=GND to V_{CC}		-	30	-	pF
SN74HCT366							
nA tonY propagation delay	t_{pd}	see Figure 6	V_{CC}=4.5V	-	13	24	ns
			V_{CC}=5.0V; C_L=15pF	-	11	-	ns
$\overline{OE}$n to nY enable time	t_{en}	V_{CC}=4.5V; see Figure 7		-	16	35	ns
$\overline{OE}$n to nY disable time	t_{dis}	V_{CC}=4.5V; see Figure 7		-	20	35	ns
transition time	t_t	V_{CC}=4.5V; see Figure 6		-	5	12	ns
power dissipation capacitance	C_{PD}	per buffer; V_I=GND to V_{CC}- 1.5V		-	30	-	pF

Note:

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

[2] t_{en} is the same as t_{PZL} and t_{PZH}.

[3] t_{dis} is the sameast_{PLZ} and t_{PHZ}.

[4] t_t is the sameast_{THL} and t_{TLH}.

[5] C_{PD} isused to determine the dynamic power dissipation (P_D in uW).

P_D=$C_{PD}\times V_{CC}^2\times f_i\times N+\Sigma(C_L\times V_{CC}^2\times f_o)$ 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;

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

AC Characteristics 2

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

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
SN74HC366							
nA tonY propagation delay	t_{pd}	see Figure 6	V_{CC}=2.0V	-	-	125	ns
			V_{CC}=4.5V	-	-	25	ns
			V_{CC}=6.0V	-	-	21	ns
$\overline{OE}$n to nY enable time	t_{en}	see Figure 7	V_{CC}=2.0V	-	-	190	ns
			V_{CC}=4.5V	-	-	38	ns
			V_{CC}=6.0V	-	-	33	ns
$\overline{OE}$n to nY disable time	t_{dis}	see Figure 7	V_{CC}=2.0V	-	-	190	ns
			V_{CC}=4.5V	-	-	38	ns
			V_{CC}=6.0V	-	-	33	ns
transition time	t_t	see Figure 6	V_{CC}=2.0V	-	-	75	ns
			V_{CC}=4.5V	-	-	15	ns
			V_{CC}=6.0V	-	-	13	ns
SN74HCT366							
nA tonY propagation delay	t_{pd}	see Figure 6	V_{CC}=4.5V	-	-	30	ns
$\overline{OE}$n to nY enable time	t_{en}	V_{CC}=4.5V; see Figure 7		-	-	44	ns
$\overline{OE}$n to nY disable time	t_{dis}	V_{CC}=4.5V; see Figure 7		-	-	44	ns
transition time	t_t	V_{CC}=4.5V; see Figure 6		-	-	15	ns

Note:

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

[2] t_{en} is the same as t_{PZL} and t_{PZH}.

[3] t_{dis} is the sameast_{PLZ} and t_{PHZ}.

[4] t_t is the sameast_{THL} and t_{TLH}.

AC Characteristics 3

(T_{amb}=-40℃ to +125℃, GND=0V, C_L=50pF, unless otherwise specified.)

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
SN74HC366							
nA tonY propagation delay	t_{pd}	see Figure 6	V_{CC}=2.0V	-	-	150	ns
			V_{CC}=4.5V	-	-	30	ns
			V_{CC}=6.0V	-	-	26	ns
$\overline{OEn}$ to nY enable time	t_{en}	see Figure 7	V_{CC}=2.0V	-	-	225	ns
			V_{CC}=4.5V	-	-	45	ns
			V_{CC}=6.0V	-	-	38	ns
$\overline{OEn}$ to nY disable time	t_{dis}	see Figure 7	V_{CC}=2.0V	-	-	225	ns
			V_{CC}=4.5V	-	-	45	ns
			V_{CC}=6.0V	-	-	38	ns
transition time	t_t	see Figure 6	V_{CC}=2.0V	-	-	90	ns
			V_{CC}=4.5V	-	-	18	ns
			V_{CC}=6.0V	-	-	15	ns
SN74HCT366							
nA tonY propagation delay	t_{pd}	see Figure 6	V_{CC}=4.5V	-	-	36	ns
$\overline{OEn}$ to nY enable time	t_{en}	V_{CC}=4.5V; see Figure 7		-	-	53	ns
$\overline{OEn}$ to nY disable time	t_{dis}	V_{CC}=4.5V; see Figure 7		-	-	53	ns
transition time	t_t	V_{CC}=4.5V; see Figure 6		-	-	18	ns

Note:

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

[2] t_{en} is the same as t_{PZL} and t_{PZH}.

[3] t_{dis} is the sameas t_{PLZ} and t_{PHZ}.

[4] t_t is the sameas t_{THL} and t_{TLH}.

Testing Circuit

AC Testing Circuit
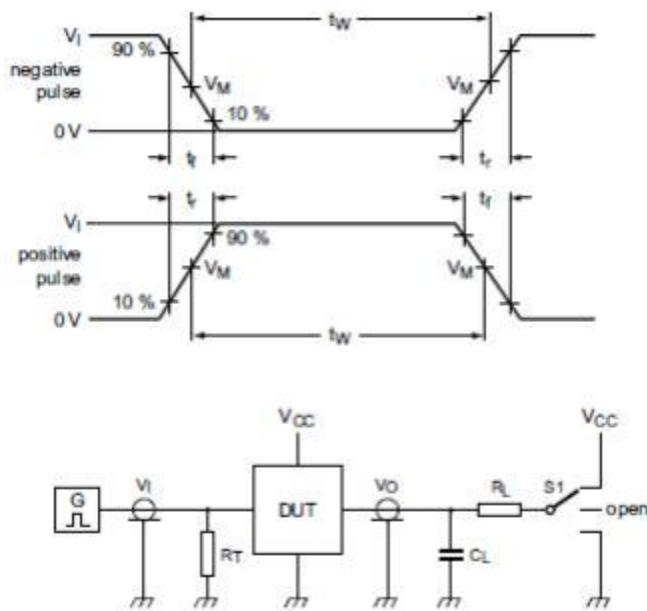
Figure 5. Test circuit for measuring switching times

Definitions for test circuit:

R_L=Load resistance.

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. S1=Test selection switch.

AC Testing Waveforms
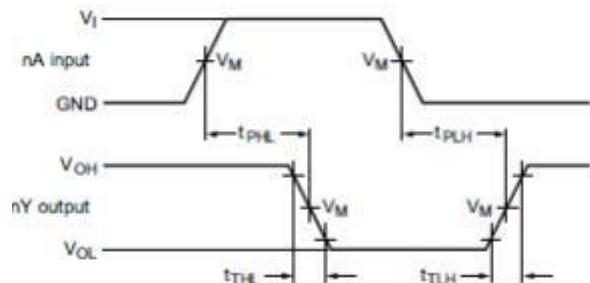
Figure 6. Input (nA) to output (nY) propagation delays and output transition times
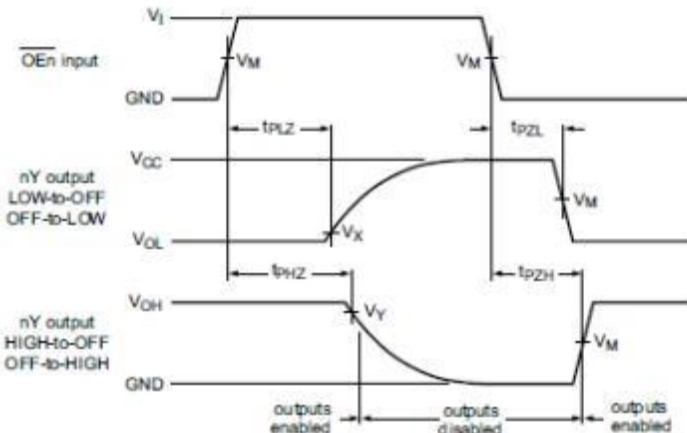
Figure 7. 3-state enable and disable times

Measurement Points

Type	Input	Output		
	V_M	V_M	V_X	V_Y
SN74HC366	$0.5 \times V_{CC}$	$0.5 \times V_{CC}$	$0.1 \times V_{CC}$	$0.9 \times V_{CC}$
SN74HCT366	1.3V	1.3V	$0.1 \times V_{CC}$	$0.9 \times V_{CC}$
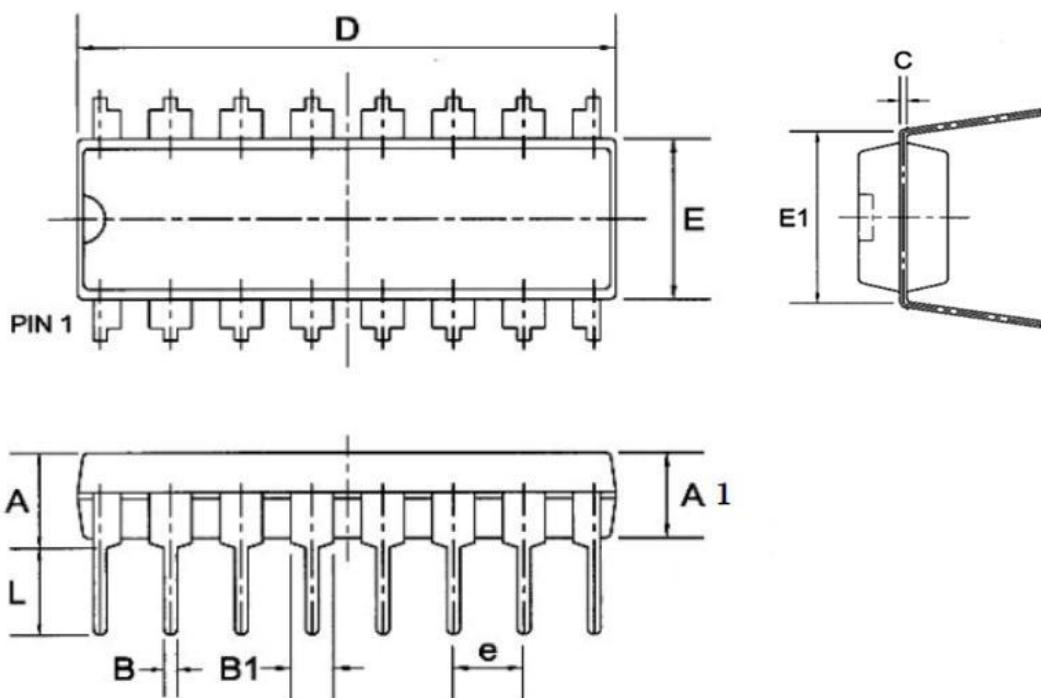
Test Data

| Type	Input		Load		S1 position		
	V_I	t_r , t_f	C_L	R_L	t_{PHL}, t_{PLH}	t_{PZH}, t_{PHZ}	t_{PZL}, t_{PLZ}
SN74HC366	V_{CC}	6ns	15pF, 50pF	1kΩ	open	GND	V_{CC}
SN74HCT366	3V	6ns	15pF, 50pF	1kΩ	open	GND	V_{CC}
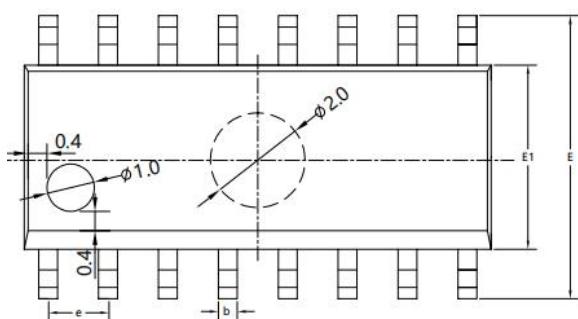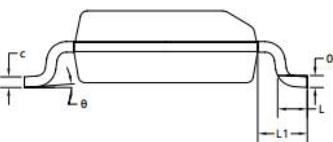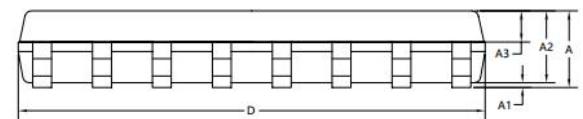
Package Information

DIP16
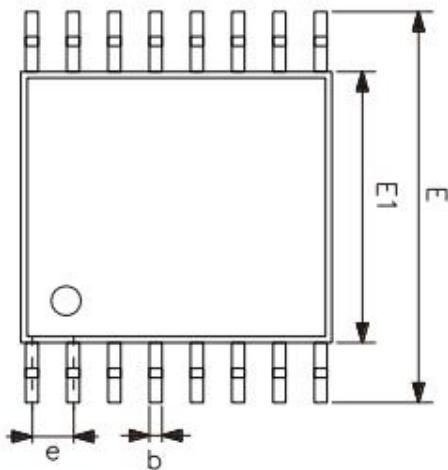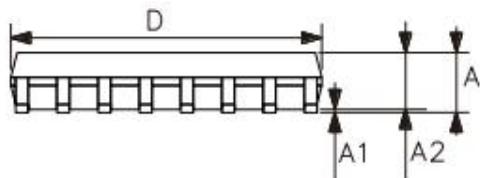
Symbol	Dimensions in Millimeters		
	Min	Nom	Max
A	--	--	4.31
A1	3.15	3.30	3.65
B	--	0.50	--
B1	--	1.6	--
C	--	0.27	--
D	19.00	19.20	19.60
E	6.20	6.50	6.60
E1	--	8.0	--
e	--	2.3	--
L	3.00	3.20	3.60

SOP16

SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	1.50	1.60	1.70
A1	0.10	0.15	0.25
A2	1.40	1.45	1.50
A3	0.60	0.65	0.70
b	0.30	0.40	0.50
c	0.15	0.20	0.25
D	9.80	9.90	10.00
E	5.80	6.00	6.20
E1	3.85	3.90	3.95
e	1.27BSC		
L	0.50	0.60	0.70
L1	1.05BSC		
θ	0°	4°	8°

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°

Statement：

✧ Shenzhen xinbole electronics co., ltd. reserves the right to change the product specifications, without notice! Before placing an order, the customer needs to confirm whether the information obtained is the latest version, and verify the integrity of the relevant information.

✧ Any semiconductor product is liable to fail or malfunction under certain conditions, and the buyer shall be responsible for complying with safety standards in the system design and whole machine manufacturing using Shenzhen xinbole electronics co., ltd products, and take appropriate security measures to avoid the potential risk of failure may result in personal injury or property losses of the situation occurred!

✧ This document is for referenceonly,and the actual use should be based on the application test results.

✧ Product performance is never ending, Shenzhen xinbole electronics co., ltd will be dedicated to provide customers with better performance, better quality of integrated circuit products.