

Product Specification

XBLW SN74HC374

Octal D-type flip-flop; positive edge-trigger;
3-state

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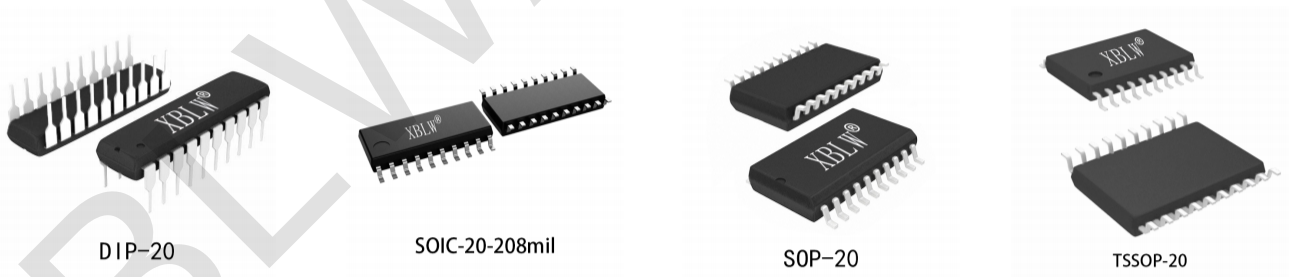


Description

The SN74HC374 is an octal positive-edge triggered D-type flip-flop with 3-state outputs. The device features a clock (CP) and output enable ($\overline{OE}$) inputs. The flip-flops will store the state of their individual D-inputs that meet the set-up and hold time requirements on the LOW-to-HIGH clock (CP) transition. A HIGH on $\overline{OE}$ causes the outputs to assume a high-impedance OFF-state. Operation of the $\overline{OE}$ input does not affect the state of the flip-flops. Inputs also include clamp diodes, this enables the use of current limiting resistors to interface inputs to voltages in excess of V_{CC} .

Features

- Octal bus interface
- Non-inverting 3-state outputs
- 8-bit positive, edge-triggered register
- Common 3-state output enable input
- Independent register and 3-state buffer operation
- Specified from -40°C to +125°C
- Packaging information: DIP-20/SOP-20/TSSOP-20/SOIC-20-208mil



Ordering Information

Product Model	Package Type	Marking	Packing	Packing Qty
XBLW SN74HC374N	DIP-20	74HC374N	Tube	720Pcs/Box
XBLW SN74HC374DTR	SOP-20	74HC374	Tape	2000Pcs/Reel
XBLW SN74HC374TDTR	TSSOP-20	74HC374	Tape	2000Pcs/Reel
XBLW SN74HC374NSDTR	SOIC-20-208mil	74HC374	Tape	2000Pcs/Reel

Block Diagram

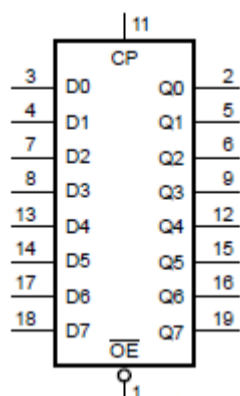


Figure 1. Logic symbol

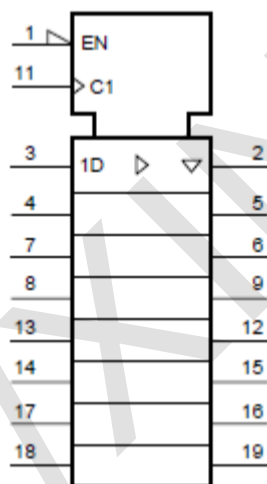


Figure 2. IEC logic symbol

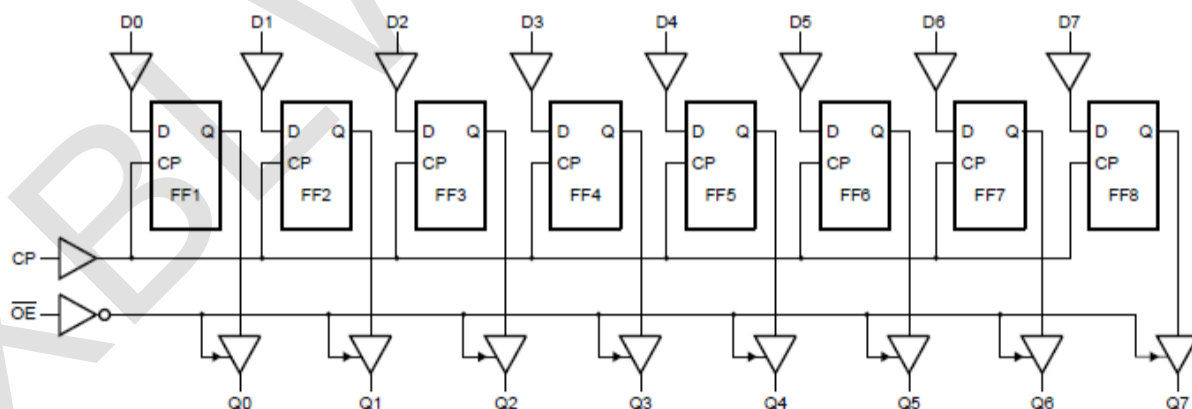


Figure 3. Logic diagram

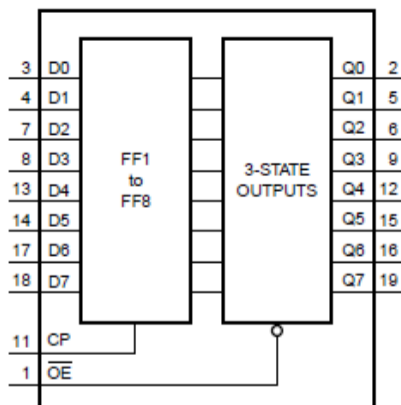
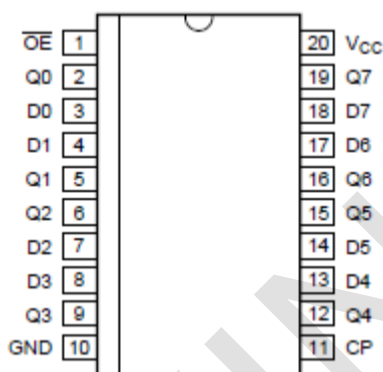


Figure 4. Functional diagram

Pin Configurations



Pin Description

Pin No.	Pin Name	Description
1	$\overline{OE}$	output enable input (active LOW)
2	Q0	data output
3	D0	data input
4	D1	data input
5	Q1	data output
6	Q2	data output
7	D2	data input
8	D3	data input
9	Q3	data output
10	GND	ground (0V)
11	CP	clock input (LOW-to-HIGH, edge-triggered)
12	Q4	data output
13	D4	data input
14	D5	data input
15	Q5	data output
16	Q6	data output
17	D6	data input
18	D7	data input
19	Q7	data output
20	V _{CC}	supply voltage

Function Table

Operating modes	Input			Internal flip-flops	Output Qn
	$\overline{OE}$	CP	Dn		
Load and read register	L	↑	l	L	L
	L	↑	h	H	H
Load register and disable outputs	H	↑	l	L	Z
	H	↑	h	H	Z

Note: H=HIGH voltage level; L=LOW voltage level; X=don't care; Z=high-impedance OFF-state; h=HIGH voltage level one set-up time prior to the LOW-to-HIGH clock transition; l=LOW voltage level one set-up time prior to the LOW-to-HIGH clock transition; ↑=LOW-to-HIGH clock transition.

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	°C
total power dissipation	P_{tot}	-	-	500	mW
Soldering temperature	T_L	10s	DIP	245	°C
			SOP/TSSOP	260	

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

Electrical Characteristics

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} =2.0V		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} or V _{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

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}	$V_I = V_{IH} \text{ or } V_{IL}$	$I_O = -20\mu\text{A}; V_{CC}=2.0\text{V}$	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
			$I_O = -6.0\text{mA}; V_{CC}=4.5\text{V}$	3.84	-	V
			$I_O = -7.8\text{mA}; V_{CC}=6.0\text{V}$	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
			$I_O = 20\mu\text{A}; V_{CC}=4.5\text{V}$	-	-	0.1
			$I_O = 20\mu\text{A}; V_{CC}=6.0\text{V}$	-	-	0.1
			$I_O = 6.0\text{mA}; V_{CC}=4.5\text{V}$	-	-	0.33
			$I_O = 7.8\text{mA}; V_{CC}=6.0\text{V}$	-	-	0.33
input leakage current	I_I	$V_I = V_{CC} \text{ or } \text{GND}; V_{CC}=6.0\text{V}$	-	-	± 1.0	μA
OFF-state output current	I_{OZ}	$V_I = V_{IH} \text{ or } V_{IL}; V_{CC}=6.0\text{V}; V_O = V_{CC} \text{ or } \text{GND}$	-	-	± 5.0	μA
supply current	I_{CC}	$V_I = V_{CC} \text{ or } \text{GND}; I_O = 0\text{A}; V_{CC}=6.0\text{V}$	-	-	80	μA

DC Characteristics 3

($T_{amb} = -40^{\circ}\text{C}$ 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}	$V_{CC}=2.0V$		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}	$V_I = V_{IH} \text{ or } V_{IL}$	$I_O=-20\mu A; V_{CC}=2.0V$	1.9	-	-	V
			$I_O=-20\mu A; V_{CC}=4.5V$	4.4	-	-	V
			$I_O=-20\mu A; V_{CC}=6.0V$	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}	$V_I = V_{IH} \text{ or } V_{IL}$	$I_O=20\mu A; V_{CC}=2.0V$	-	-	0.1	V
			$I_O=20\mu A; V_{CC}=4.5V$	-	-	0.1	V
			$I_O=20\mu A; V_{CC}=6.0V$	-	-	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	$V_I=V_{CC} \text{ or } GND; V_{CC}=6.0V$		-	-	± 1.0	μA
OFF-state output current	I_{OZ}	$V_I=V_{IH} \text{ or } V_{IL}; V_{CC}=6.0V; V_O=V_{CC} \text{ or } GND$		-	-	± 10	μA
supply current	I_{CC}	$V_I=V_{CC} \text{ or } GND; I_O=0A; V_{CC}=6.0V$		-	-	160	μA

AC 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
CP to Qn propagation delay	t_{pd}	see Figure 6	$V_{CC}=2.0\text{V}$	-	50	165 ns
			$V_{CC}=4.5\text{V}$	-	18	33 ns
			$V_{CC}=5.0\text{V}; C_L=15\text{pF}$	-	15	- ns
			$V_{CC}=6.0\text{V}$	-	14	18 ns
$\overline{\text{OE}}$ to Qn enable time	t_{en}	see Figure 7	$V_{CC}=2.0\text{V}$	-	41	150 ns
			$V_{CC}=4.5\text{V}$	-	15	30 ns
			$V_{CC}=6.0\text{V}$	-	12	26 ns
$\overline{\text{OE}}$ to Qn disable time	t_{dis}	see Figure 7	$V_{CC}=2.0\text{V}$	-	50	150 ns
			$V_{CC}=4.5\text{V}$	-	18	30 ns
			$V_{CC}=6.0\text{V}$	-	14	26 ns
transition time	t_t	Qn output; see Figure 6	$V_{CC}=2.0\text{V}$	-	14	60 ns
			$V_{CC}=4.5\text{V}$	-	5	12 ns
			$V_{CC}=6.0\text{V}$	-	4	10 ns
pulse width	t_w	CP; HIGH or LOW; see Figure 6	$V_{CC}=2.0\text{V}$	80	19	- ns
			$V_{CC}=4.5\text{V}$	16	7	- ns
			$V_{CC}=6.0\text{V}$	14	6	- ns
Dn to CP set-up time	t_{su}	see Figure 6	$V_{CC}=2.0\text{V}$	60	14	- ns
			$V_{CC}=4.5\text{V}$	12	5	- ns
			$V_{CC}=6.0\text{V}$	10	4	- ns
Dn to CP hold time	t_h	see Figure 6	$V_{CC}=2.0\text{V}$	5	-6	- ns
			$V_{CC}=4.5\text{V}$	5	-2	- ns
			$V_{CC}=6.0\text{V}$	5	-2	- ns
maximum frequency	f_{max}	CP input; see Figure 6	$V_{CC}=2.0\text{V}$	6.0	23	- MHz
			$V_{CC}=4.5\text{V}$	30	70	- MHz
			$V_{CC}=5.0\text{V}; C_L=15\text{pF}$	-	77	- MHz
			$V_{CC}=6.0\text{V}$	35	83	- MHz
power dissipation capacitance	C_{PD}	per flip-flop; $V_I=\text{GND to } V_{CC}$	-	17	-	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 same as t_{PLZ} and t_{PHZ} .

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

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

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

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

AC 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
CP to Qn propagation delay	t_{pd}	see Figure 6	$V_{CC}=2.0\text{V}$	-	-	205 ns
			$V_{CC}=4.5\text{V}$	-	-	41 ns
			$V_{CC}=6.0\text{V}$	-	-	35 ns
$\bar{OE}$ to Qn enable time	t_{en}	see Figure 7	$V_{CC}=2.0\text{V}$	-	-	190 ns
			$V_{CC}=4.5\text{V}$	-	-	38 ns
			$V_{CC}=6.0\text{V}$	-	-	33 ns
$\bar{OE}$ to Qn disable time	t_{dis}	see Figure 7	$V_{CC}=2.0\text{V}$	-	-	190 ns
			$V_{CC}=4.5\text{V}$	-	-	38 ns
			$V_{CC}=6.0\text{V}$	-	-	33 ns
transition time	t_t	Qn output; see Figure 6	$V_{CC}=2.0\text{V}$	-	-	75 ns
			$V_{CC}=4.5\text{V}$	-	-	15 ns
			$V_{CC}=6.0\text{V}$	-	-	13 ns
pulse width	t_w	CP; HIGH or LOW; see Figure 6	$V_{CC}=2.0\text{V}$	100	-	- ns
			$V_{CC}=4.5\text{V}$	20	-	- ns
			$V_{CC}=6.0\text{V}$	17	-	- ns
Dn to CP set-up time	t_{su}	see Figure 6	$V_{CC}=2.0\text{V}$	75	-	- ns
			$V_{CC}=4.5\text{V}$	15	-	- ns
			$V_{CC}=6.0\text{V}$	13	-	- ns
Dn to CP hold time	t_h	see Figure 6	$V_{CC}=2.0\text{V}$	5	-	- ns
			$V_{CC}=4.5\text{V}$	5	-	- ns
			$V_{CC}=6.0\text{V}$	5	-	- ns
maximum frequency	f_{max}	CP input; see Figure 6	$V_{CC}=2.0\text{V}$	4.8	-	- MHz
			$V_{CC}=4.5\text{V}$	24	-	- MHz
			$V_{CC}=6.0\text{V}$	28	-	- MHz

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 same as t_{PLZ} and t_{PHZ} .

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

AC Characteristics 3

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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
CP to Qn propagation delay	t_{pd}	see Figure 6	$V_{CC}=2.0\text{V}$	-	250	ns
			$V_{CC}=4.5\text{V}$	-	50	ns
			$V_{CC}=6.0\text{V}$	-	43	ns
$\bar{OE}$ to Qn enable time	t_{en}	see Figure 7	$V_{CC}=2.0\text{V}$	-	225	ns
			$V_{CC}=4.5\text{V}$	-	45	ns
			$V_{CC}=6.0\text{V}$	-	38	ns
$\bar{OE}$ to Qn disable time	t_{dis}	see Figure 7	$V_{CC}=2.0\text{V}$	-	225	ns
			$V_{CC}=4.5\text{V}$	-	45	ns
			$V_{CC}=6.0\text{V}$	-	38	ns
transition time	t_t	Qn output; see Figure 6	$V_{CC}=2.0\text{V}$	-	90	ns
			$V_{CC}=4.5\text{V}$	-	18	ns
			$V_{CC}=6.0\text{V}$	-	15	ns
pulse width	t_w	CP; HIGH or LOW; see Figure 6	$V_{CC}=2.0\text{V}$	120	-	ns
			$V_{CC}=4.5\text{V}$	24	-	ns
			$V_{CC}=6.0\text{V}$	20	-	ns
Dn to CP set-up time	t_{su}	see Figure 6	$V_{CC}=2.0\text{V}$	90	-	ns
			$V_{CC}=4.5\text{V}$	18	-	ns
			$V_{CC}=6.0\text{V}$	15	-	ns
Dn to CP hold time	t_h	see Figure 6	$V_{CC}=2.0\text{V}$	5	-	ns
			$V_{CC}=4.5\text{V}$	5	-	ns
			$V_{CC}=6.0\text{V}$	5	-	ns
maximum frequency	f_{max}	CP input; see Figure 6	$V_{CC}=2.0\text{V}$	4.0	-	MHz
			$V_{CC}=4.5\text{V}$	20	-	MHz
			$V_{CC}=6.0\text{V}$	24	-	MHz

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 same as t_{PLZ} and t_{PHZ} .

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

Testing Circuit

AC Testing Circuit

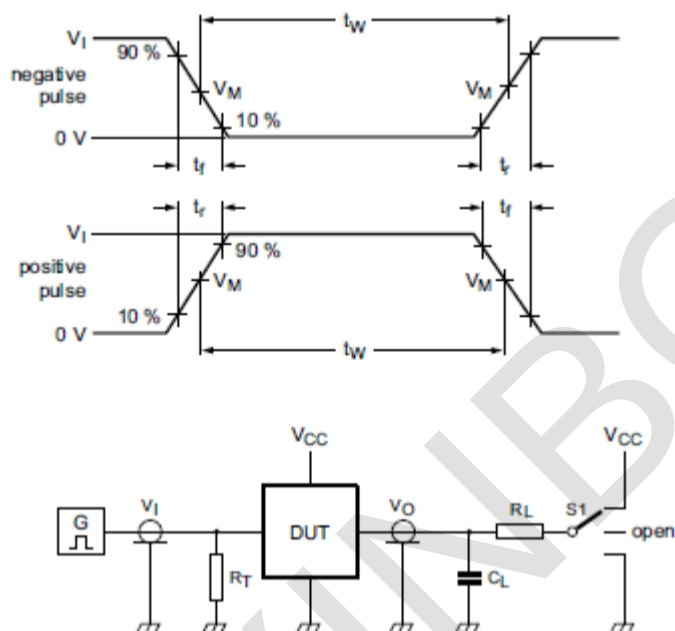


Figure 5. Test circuit for measuring switching times

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

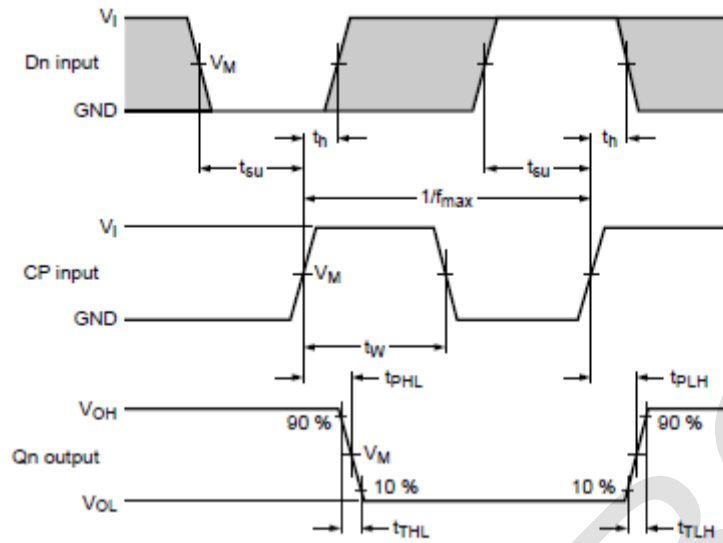


Figure 6. Clock input (CP) to output (Qn) propagation delay, clock pulse width, data (Dn) to clock (CP) set-up and hold times, output transition times (Qn) and maximum clock frequency

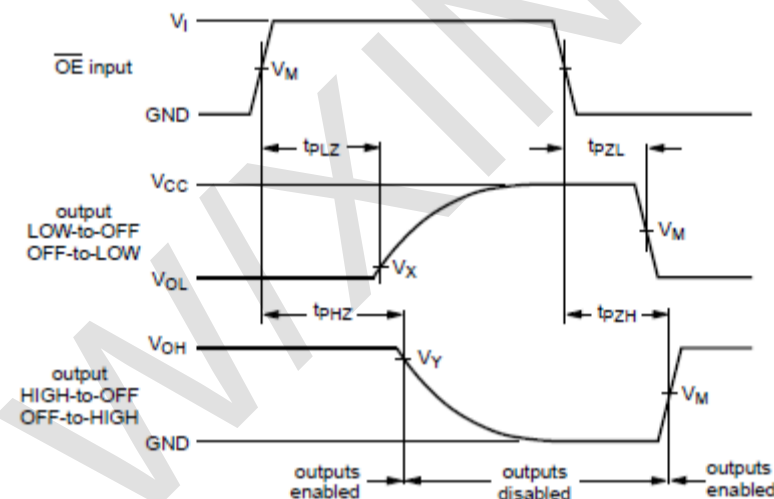


Figure 7. 3-state enable and disable times

Measurement Points

Type	Input		Output		
	V_I	V_M	V_M	V_X	V_Y
SN74HC374	GND to V_{CC}	$0.5 \times V_{CC}$	$0.5 \times V_{CC}$	$0.1 \times V_{CC}$	$0.9 \times V_{CC}$

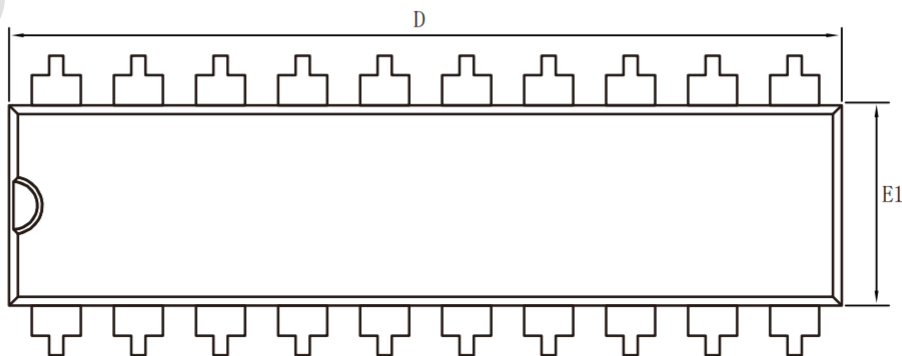
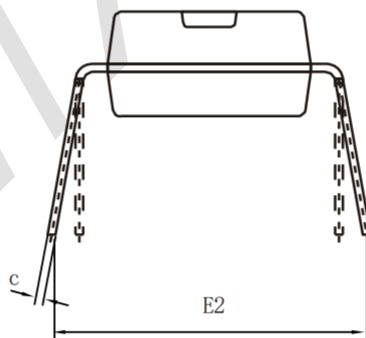
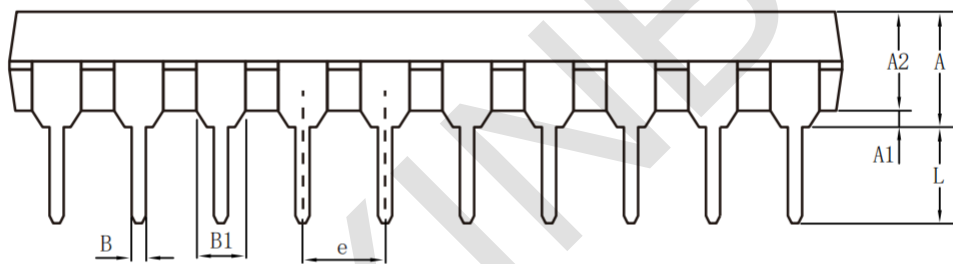
Test Data

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}
SN74HC374	GND to V_{CC}	6ns	15pF, 50pF	1k Ω	open	GND	V_{CC}

Package Information

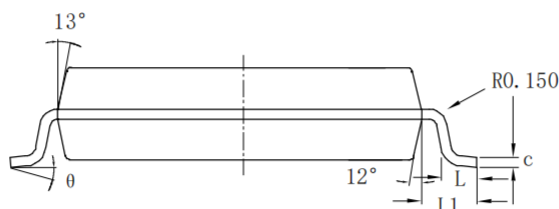
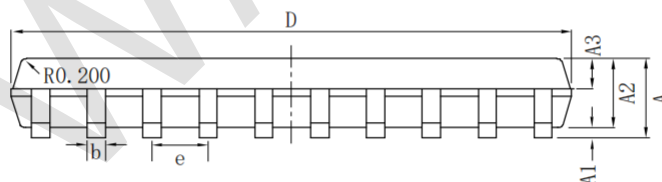
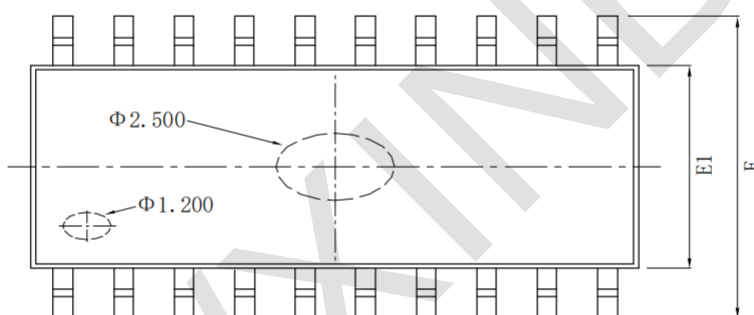
· DIP-20

Symbol	Size	Dimensions In Millimeters		Symbol	Size	Dimensions In Inches	
		Min (mm)	Max (mm)			Min (in)	Max (in)
A		3.600	5.330	A		0.142	0.210
A1		0.510		A1		0.020	
A2		3.200	3.600	A2		0.126	0.142
B		0.360	0.530	B		0.014	0.021
B1		1.52 (BSC)		B1		0.060 (BSC)	
c		0.204	0.360	c		0.008	0.014
D		25.70	26.54	D		1.010	1.040
E1		6.200	6.750	E1		0.244	0.260
E2		7.620	9.300	E2		0.300	0.366
e		2.54 (BSC)		e		0.100 (BSC)	
L		3.000	3.600	L		0.118	0.142



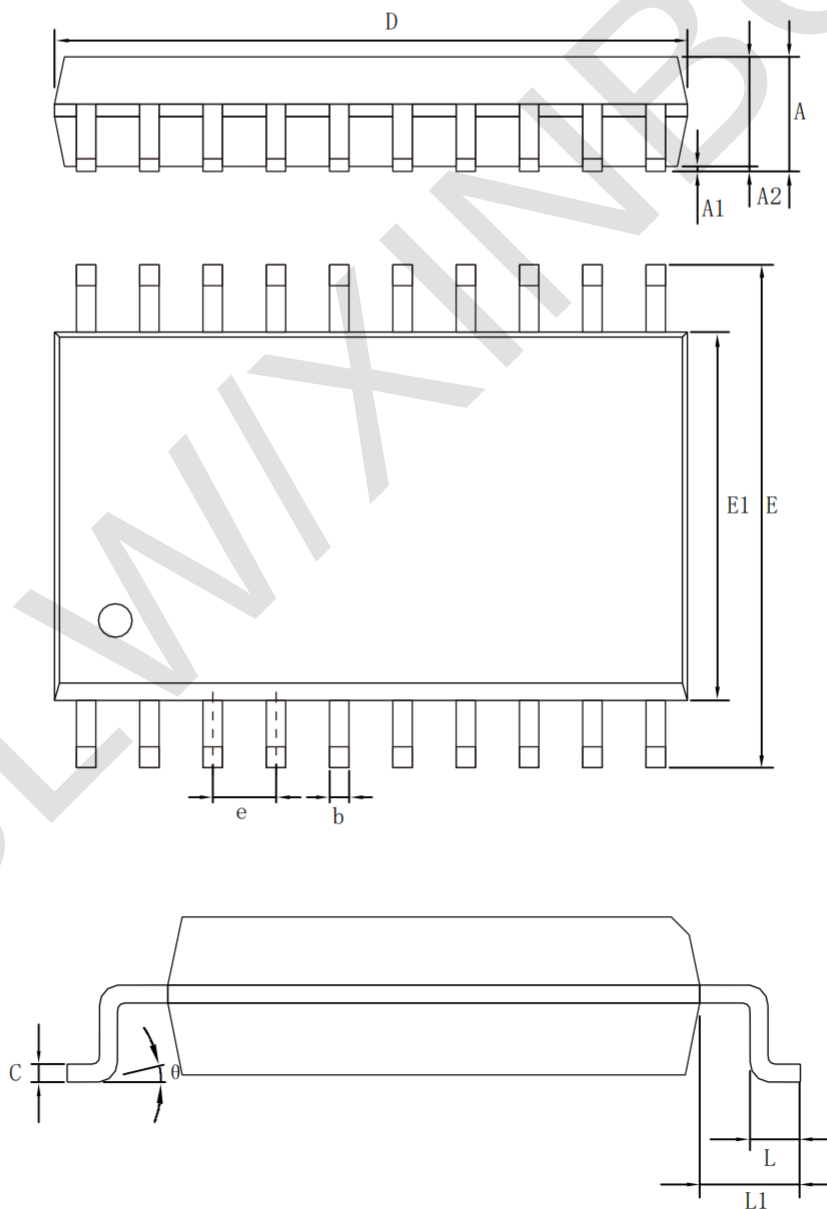
▪ S01C-20-208mil

Symbol	Size	Dimensions In Millimeters		Symbol	Size	Dimensions In Inches	
		Min (mm)	Max (mm)			Min (in)	Max (in)
	A		2.000		A		0.079
	A1	0.050	0.250		A1	0.002	0.010
	A2	1.650	1.850		A2	0.065	0.073
	b	0.350	0.550		b	0.014	0.022
	c	0.150	0.200		c	0.006	0.008
	D	12.25	12.65		D	0.482	0.498
	E	7.600	8.000		E	0.299	0.315
	E1	5.100	5.500		E1	0.201	0.217
	e	1.270			e	0.050	
	L	0.550	0.950		L	0.022	0.037
	L1	1.250			L1	0.049	
	θ	0°	8°		θ	0°	8°



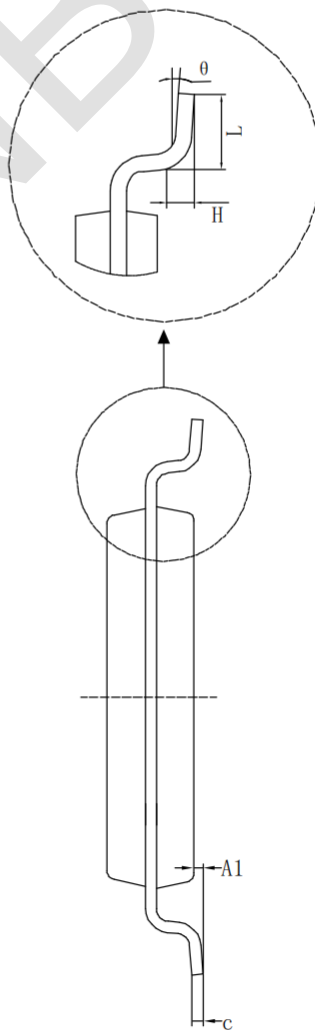
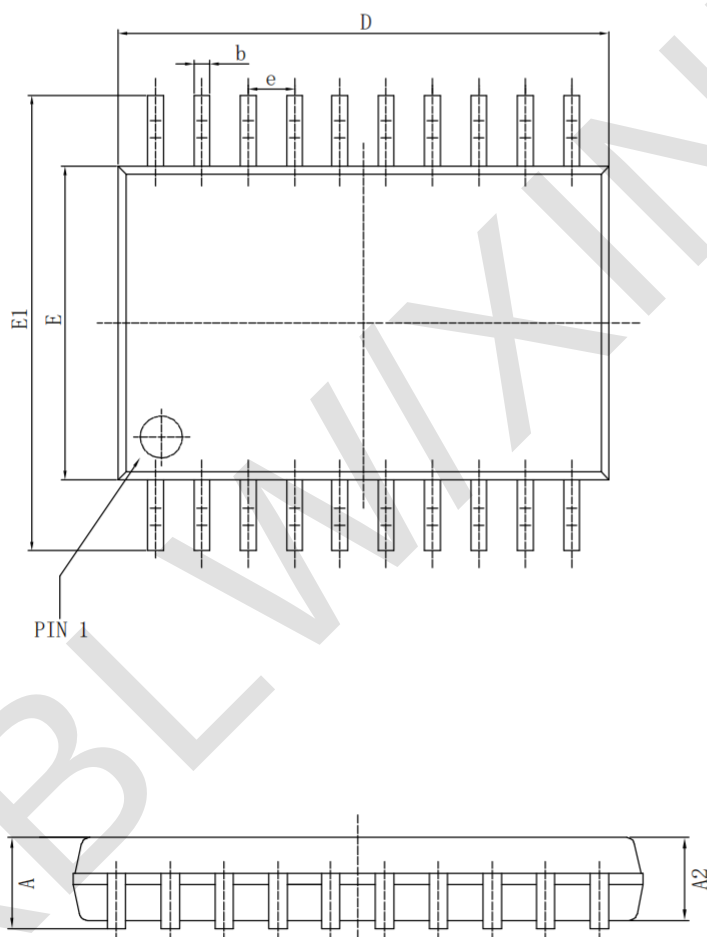
▪ SOP-20

Symbol \ Size	Dimensions In Millimeters		Symbol \ Size	Dimensions In Inches	
	Min(mm)	Max(mm)		Min(in)	Max(in)
A	2.470	2.650	A	0.097	0.104
A1	0.050	0.300	A1	0.002	0.012
A2	2.200	2.440	A2	0.087	0.096
b	0.350	0.500	b	0.014	0.020
c	0.150	0.300	c	0.006	0.012
D	12.54	12.94	D	0.494	0.509
E	10.00	10.60	E	0.394	0.417
E1	7.300	7.700	E1	0.287	0.303
e	1.270 (BSC)		e	0.050 (BSC)	
L	0.400	1.050	L	0.016	0.041
L1	1.300	1.500	L1	0.051	0.059
θ	0°	8°	θ	0°	8°



· TSSOP-20

Size Symbol	Dimensions In Millimeters		Size Symbol	Dimensions In Inches	
	Min(mm)	Max(mm)		Min(in)	Max(in)
D	6.400	6.600	D	0.252	0.259
E	4.300	4.500	E	0.169	0.177
b	0.190	0.300	b	0.007	0.012
c	0.090	0.200	c	0.004	0.008
E1	6.250	6.550	E1	0.246	0.258
A		1.200	A		0.047
A2	0.800	1.000	A2	0.031	0.039
A1	0.050	0.150	A1	0.002	0.006
e	0.65 (BSC)		e	0.026 (BSC)	
L	0.500	0.700	L	0.020	0.028
H	0.25 (TYP)		H	0.01 (TYP)	
θ	1°	7°	θ	1°	7°



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