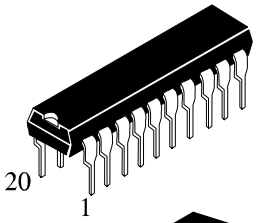
IN74VHCT374

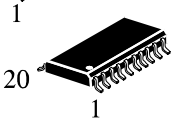
Octal D-type flip-flop (3-state)

IN74VHCT374 is designed for using in up-to-date high performance computers, high-level electronic equipment for mass application.
IN74VHCT374 is identical in pinout to the series IN74HC374A, IN74HCT374A, IN74AC374A, IN74ACT374A.

Input voltage levels are compatible with standard TTL-levels. Output voltage levels are compatible with input levels of C-MOS, N-MOS and TTL ICs.



N SUFFIX
PLASTIC



DW SUFFIX
SOIC

ORDERING INFORMATION

IN74VHCT374N Plastic

IN74VHCT374DW SOIC

T_A = -40° to 85° C for all packages

Features :

- Supply voltage range 4.5 to 5.5 V.
- Output current 8 mA.
- Low consumption current: 0.2 mkA (typical value) at Ta = 25 °C.
- Latchup current not less than 300 mA at Ta = 85 °C.
- Tolerable value of static potential not less than 2000 V as per human body model (HBM) and not less than 200 V as per machine model (MM).
- Ambient operation temperature minus 40 to plus 85 °C.
- Balanced signal propagation delay.
- Ensures voltage exceeding mode on input
- Low noise level at the simultaneous switching of outputs in the same state: V_{OLP} = 0.8 V (max).

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IN74VHCT374 truth table

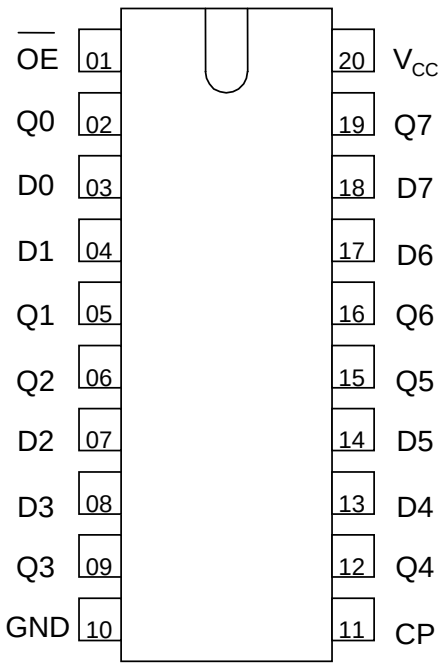
Input			Output
$\overline{OE}$	CP	D	Q
L	⎍	H	H
L	⎍	L	L
L	L, H, ⎎	X	Qo
H	X	X	Z

Note –

H - high voltage level;
L – low voltage level;
X - any voltage level (low or high);
Qo - storage of the previous state;
Z - output in the third
⎍ - transition from low into high level;
⎎ - transition from high into low level

Pins description in IN74VHC374

Pinout



Pin No.	Symbol	Description
01	$\overline{OE}$	Input ***OUTPUT ENABLE***
02	Q0	Data output
03	D0	Data input
04	D1	Data input
05	Q1	Data output
06	Q2	Data output
07	D2	Data input
08	D3	Data input
09	Q3	Data output
10	GND	Common output
11	**CP**	Input of clock signal
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	Vcc	Supply output from voltage source

Absolute maximum conditions*

Parameter, unit	Symbol	Value	
		min	max
Supply voltage, V	V_{CC}	-0.5	7.0
Input voltage, V	Vin	-0.5	7.0
Output voltage, V	Vout	-0.5	V_{CC} + 0.5B
Output voltage, V	Vout1	-0.5	7.0
Input diode current, mA	Iik	-	-20
Current of common output and supply output, mA	Icc		±75
Output current, mA	Iout		±25
Output diode current, mA	Iok		±20
Dissipated power, mW	Pd		180

*Under absolute maximum conditions operation of microcircuit is not guaranteed. Operation is guaranteed under maximum conditions

Maximum conditions

Parameter, unit	Symbol	Value	
		min	max
Supply voltage, V	V_{CC}	4.5	5.5
Input voltage,V	Vin	0	V_{CC}
Output voltage, V	Vout	0	V_{CC}
Output voltage, V	Vout1	0	5.5*
Output current, mA	Iout	-	±8.0
Input rise and fall time, ns/V	t_{LH}, t_{HL}	0	20
* - For ICs without third state on outputs – Vcc = 0V, for ICs with third state on outputs – outputs should be in third state			

DC electrical characteristics

Symbol	Parameter	Test conditions	V_{CC}, V	Value				Unit
				25 °C		–40 to 85 °C		
				min	max	min	max	
V_{IH}	High input voltage	$V_O \le 0.1$ V or $V_O \ge V_{CC} - 0.1$	4.5 – 5.5	2.0	-	2.0	-	V
V_{IL}	Low input voltage	$V_O \le 0.1$ V or $V_O \ge V_{CC} - 0.1$	4.5 – 5.5	–	0.8	–	0.8	
V_{OH}	High output voltage	$V_I = V_{IH}$ or V_{IL} I_O = -50 mkA	4.5	4.42	–	4.4	–	
			5.5	5.42	–	5.4	–	
		$V_I = V_{IH}$ or V_{IL}; I_O = -8 mA	4.5	3.94	–	3.80	–	
V_{OL}	Low output voltage	$V_I = V_{IH}$ or V_{IL} I_O = 50 mkA	4.5	–	0.09	–	0.1	
			5.5	–	0.09	–	0.1	
		$V_I = V_{IH}$ or V_{IL} I_O = 8 mA	4.5	–	0.36	–	0.44	
I_{OZ}	Output current in "off" state	V_I = 2.0V $V_O = V_{CC}$ or 0V	5.5	-	±0.25	-	±2.5	uA
I_I	Input current	V_I = 0 V or V_{CC}	5.5		±0.1		±1.0	
I_{IH1}	High level input current	V_I = 5.5V	0	-	±0.1	-	±1.0	
I_{CC}	Consumption current	$V_I = V_{CC}$ or 0V	5.5	-	4.0	-	40.0	
I_{CCT}	TTL-input consumption current	V_I = 3.4 V	5.5	-	1.35	-	1.5	mA

AC electrical characteristics ($t_{LH} = t_{HL}$ = 3.0 ns, R_L = 1 kOhm)

Symbol	Parameter	Test conditions	V_{CC}, V	C_L, pF	Value				Unit
					25 °C		–40 to 85 °C		
					min	max	min	max	
t_{PHL}, t_{PLH}	Propagation delay time when switching "on", "off" from input CP to output Q	Fig 1	5.0 ± 0.5	15	–	9.4	–	10.5	ns
				50	–	10.4	–	11.5	
t_{PHZ} , t_{PLZ}	Propagation delay time under transition from high , low level into "off" state	Fig 2	5.0 ± 0.5	50	–	11.2	–	12.0	ns
t_{PZH} , t_{PZL}	Propagation delay time under transition from «off» state into high, low level	Fig 2	5.0 ± 0.5	15	–	10.2	–	11.5	ns
				50	–	11.4	–	13.0	
t_{SU}	Time of setting signal D to CP	Fig 3	5.0 ± 0.5	15	2.5	–	2.5	–	ns
				50	2.5	–	2.5	–	
t_H	Retention time, D signal to CP	Fig 3	5.0 ± 0.5	15	2.5	–	2.5	–	
				50	2.5	–	2.5	–	
t_W	Pulse duration of CP signal	Fig 3	5.0 ± 0.5	15	6.5	–	8.5	–	
				50	6.5	–	8.5	–	
t_{OSLH}, t_{OSHL}	Propagation delays difference between outputs	–	5.5 ± 0.5	50	–	1.0	–	1.0	
f_C	Clock pulses maximum frequency	Fig 4	5.0 ± 0.5	15	–	90	–	80	MHz
				50	–	85	–	75	

Capacitance characteristics

Symbol	Parameter	Test conditions	V_{CC}, V	Value		Unit
				25 °C		
				min	max	
C_I	Input capacity	-	5.0		10	pF
C_O	Output capacity	-	5.0		18	pF
C_{PD}	Dynamic capacity	V_I = 0 V orV_{CC}	5.0		64	pF

Noise characteristics (C_L = 50 pF)

Symbol	Parameter	V_{CC}, V	Value		Unit
			min	max	
V_{OLP}	Positive noise of low output voltage	5.0	-	0.9	V
V_{OLV}	Negative noise of low output voltage	5.0	-0.9	-	
V_{IHD}	Input dynamic high voltage	5.0	3.5		
V_{ILD}	Input dynamic low voltage	5.0		1.5	

- - Time diagram of input and output pulses

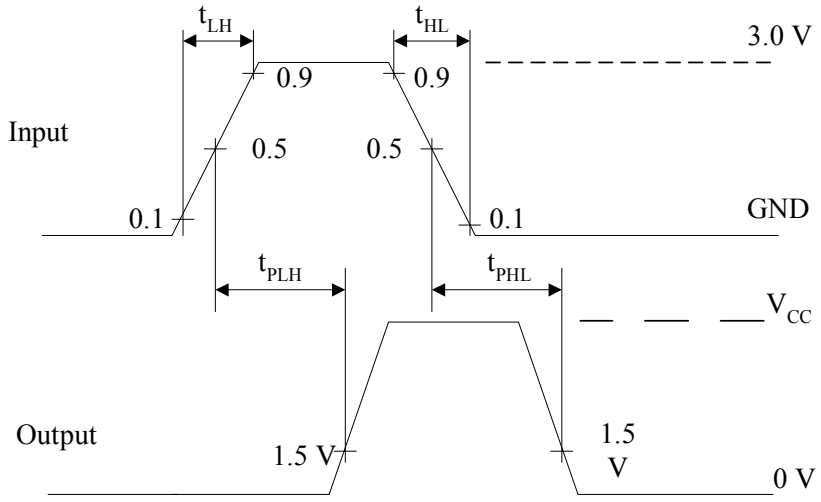


Fig. 1

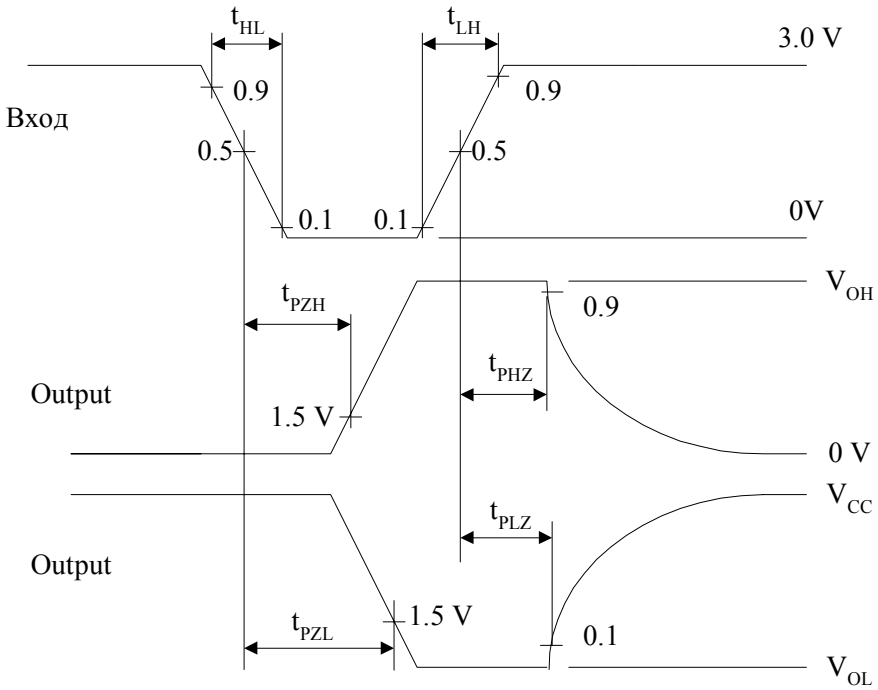


Fig.2

Time diagram of input pulses

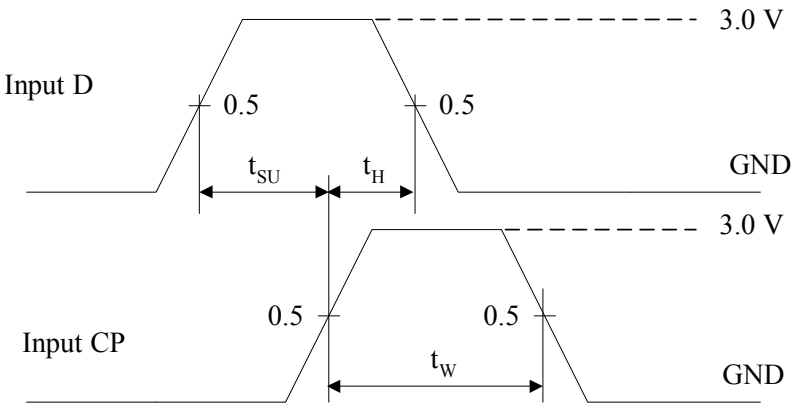


Fig. 3

Time diagram of clock pulses

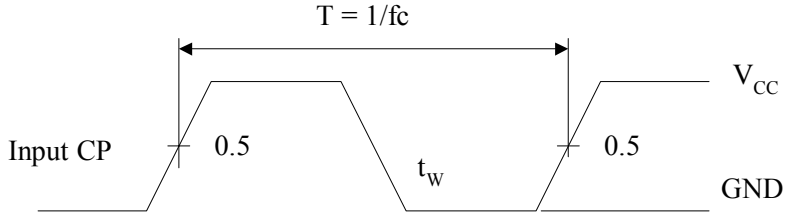
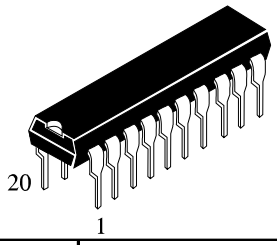
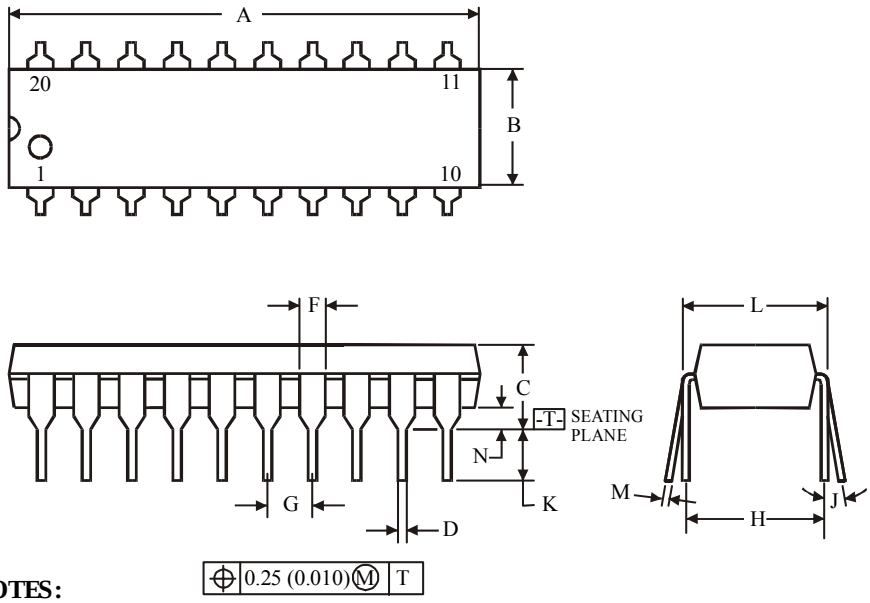


Fig.4

N SUFFIX PLASTIC DIP
(MS - 001AD)



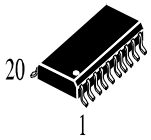


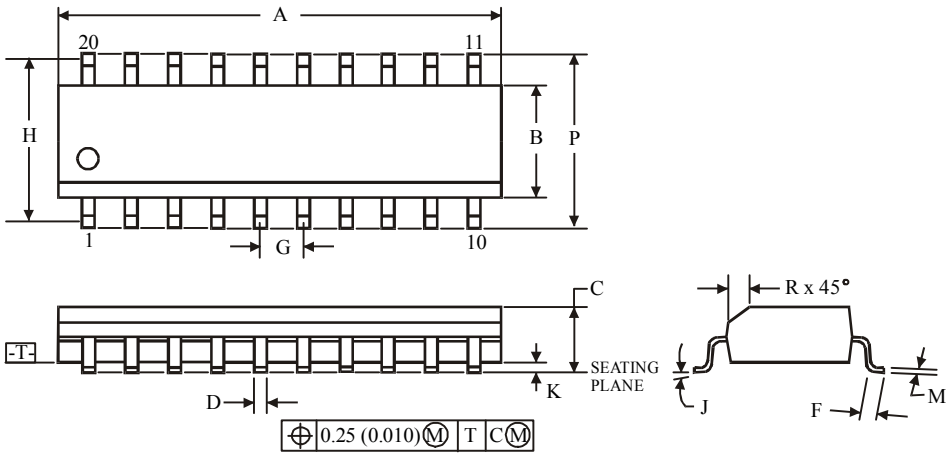
	Dimension, mm	
Symbol	**MIN**	**MAX**
A	24.89	26.92
B	6.1	7.11
C		5.33
D	0.36	0.56
F	1.14	1.78
G	2.54	
H	7.62	
J	0°	10°
K	2.92	3.81
L	7.62	8.26
M	0.2	0.36
N	0.38	

NOTES:

1. Dimensions “A”, “B” do not include mold flash or protrusions.
   Maximum mold flash or protrusions 0.25 mm (0.010) per side.

D SUFFIX SOIC
(MS - 013AC)





	Dimension, mm	
Symbol	**MIN**	**MAX**
A	12.6	13
B	7.4	7.6
C	2.35	2.65
D	0.33	0.51
F	0.4	1.27
G	1.27	
H	9.53	
J	0°	8°
K	0.1	0.3
M	0.23	0.32
P	10	10.65
R	0.25	0.75

NOTES:

1. Dimensions A and B do not include mold flash or protrusion.
2. Maximum mold flash or protrusion 0.15 mm (0.006) per side
   for A; for B – 0.25 mm (0.010) per side.