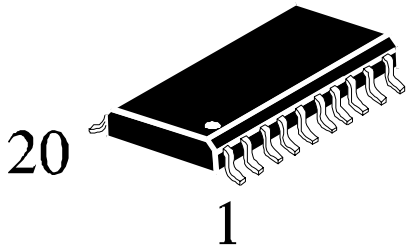
OCTAL BUFFER/LINE DRIVER (3-STATE)



IN74VHCT241D is high-speed logic IC made by CMOS technology and designed for use in high-performance computing systems.

As for operation speed, IN74VHCT241D can be compared with equivalent bipolar ICs based on Schottky TTL and two times surpasses ICs of IN74HCT series.

IN74VHCT241D tolerate operation under conditions when voltage on input and output is exceeded up to 7V without affecting characteristics and IC reliability. This possibility allows to use IN74VHCT241D in radio-electronic devices for interfacing with supply voltages 3V and 5V, eliminate IC failure under supply voltage source emergency outage.

Use of output edge shaping block in the microcircuit allows to reduce noise amplitude of noises when switching outputs into the same state simultaneously.

Input levels of IN74VHCT241D are compatible with TTL levels, output - CMOS logic levels.

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.
- Latch-up 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 range from minus 40 tu 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).
- For pins and functions, compatible with IN74HCT241.

INTEGRAL

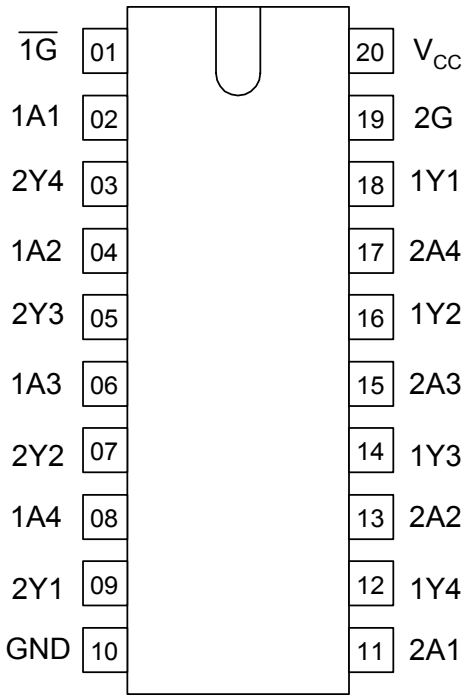
IN74VHCT241D truth table

Input		Output
$\overline{1G}$	1A	1Y
L	L	L
L	H	H
H	X	Z
Input		Output
2G	2A	2Y
H	L	L
H	H	H
L	X	Z

Note –

H - high voltage level;
L - low voltage level;
X - any voltage level (low or high);
Z - output in third state

Pinout



Pins description in IN74VHCT241D

Pin No.	Symbol	Description
01	$\overline{1G}$	Output enable input
02	1A1	Data input
03	2Y4	Data output
04	1A2	Data input
05	2Y3	Data output
06	1A3	Data input
07	2Y2	Data output
08	1A4	Data input
09	2Y1	Data output
10	GND	Common output
11	2A1	Data input
12	1Y4	Data output
13	2A2	Data input
14	1Y3	Data output
15	2A3	Data input
16	1Y2	Data output
17	2A4	Data input
18	1Y1	Data output
19	2G	Output enabling input
20	V_{CC}	Supply output from voltage source

Absolute maximum ratings*

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	Vcc+0.5V
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 ratings

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
** Outputs should be in the 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	–	4.5 – 5.5	2.0	–	2.0	–	V
V_{IL}	Low input voltage	–	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 = 2.0 V V_{out} = V_{CC} or 0V	5.5	-	±0.25	-	±2.5	mkA
I_I	Input current	V_I = V_{CC} or 0V	5.5	-	±0.1	-	±1.0	
I_{IH1}	High input current	V_I = 5.5V	0	-	±0.1	-	±1.0	
I_{CC}	Consumption current	V_I =V_{CC} or 0 V	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)

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"	Fig. 1	5.0 ± 0.5	15	–	7.4	–	8.5	ns
				50	–	8.4	–	9.5	
t_{PHZ} , t_{PLZ}	Propagation delay time under transition from high , low level into "off" state	Fig. 2	5.0 ± 0.5	50	–	11.4	–	13.0	
t_{PZH} , t_{PZL}	Propagation delay time under transition from «off» state into high, low level	Fig. 2	5.0 ± 0.5	15	–	10.4	–	12.0	
				50	–	11.4	–	13.0	
t_{OSLH}, t_{OSHL}	Propagation delays difference between outputs	–	5.5 ± 0.5	50	–	1.0	–	1.0	

Capacitance characteristics

Symbol	Parameter	Test conditions	V_{CC}, V	Value		Unit
				25 °C		
				min	max	
C_I	Input capacitance	–	5.0	–	10	pF
C_O	Output capacitance		5.0	–	18	
C_{PD}	Dynamic capacitance (per one output)	V_I = 0 V or V_{CC}	5.0	–	36	

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	–	1.1	V
V_{OLV}	Negative noise of low output voltage	5.0	– 1.1	–	
V_{IHD}	Input high dynamic voltage	5.0	2.0	–	
V_{ILD}	Input low dynamic voltage	5.0	–	0.8	

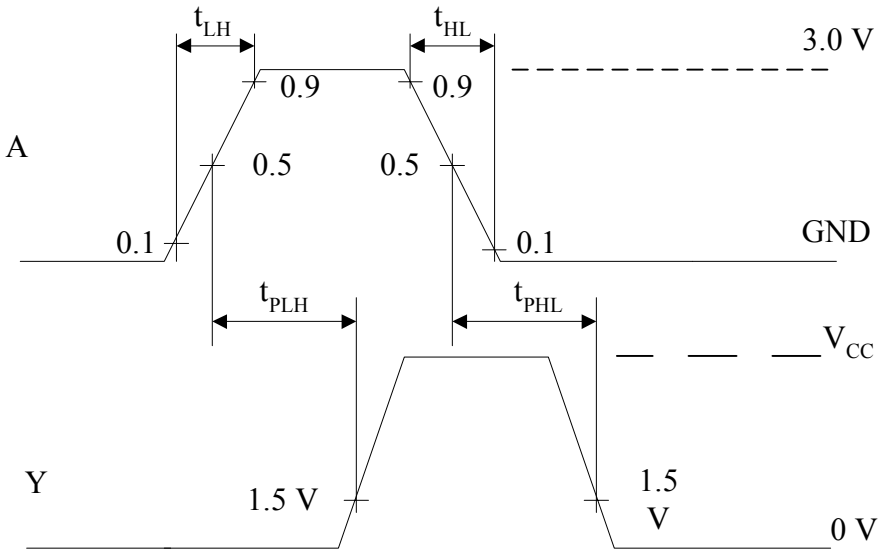


Figure 1 - Time diagram of input and output pulses

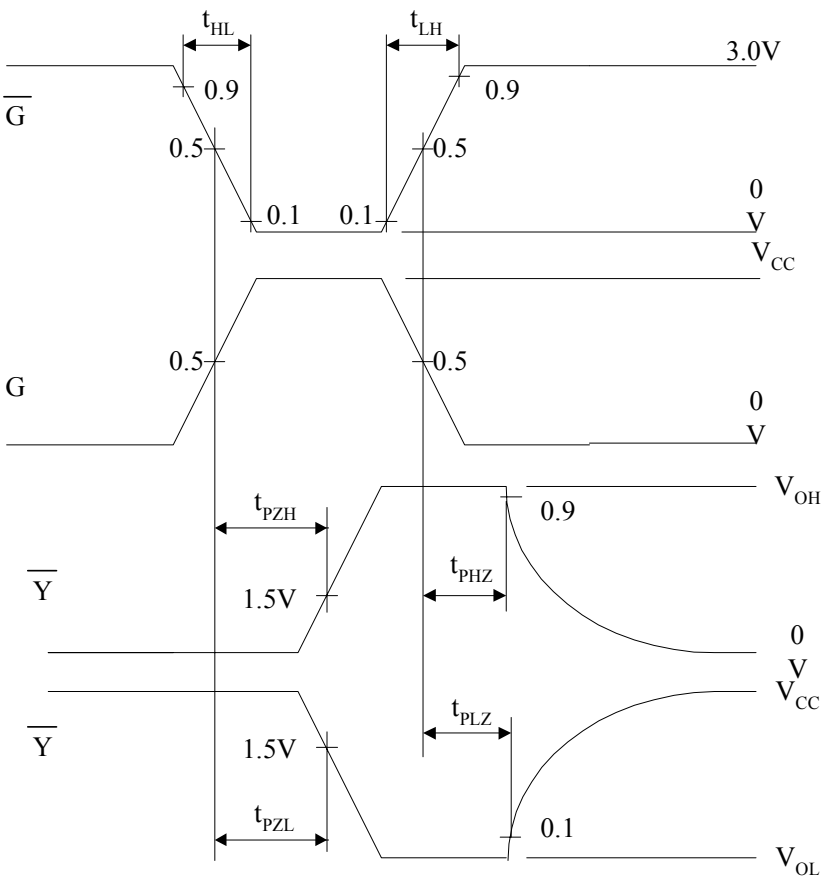
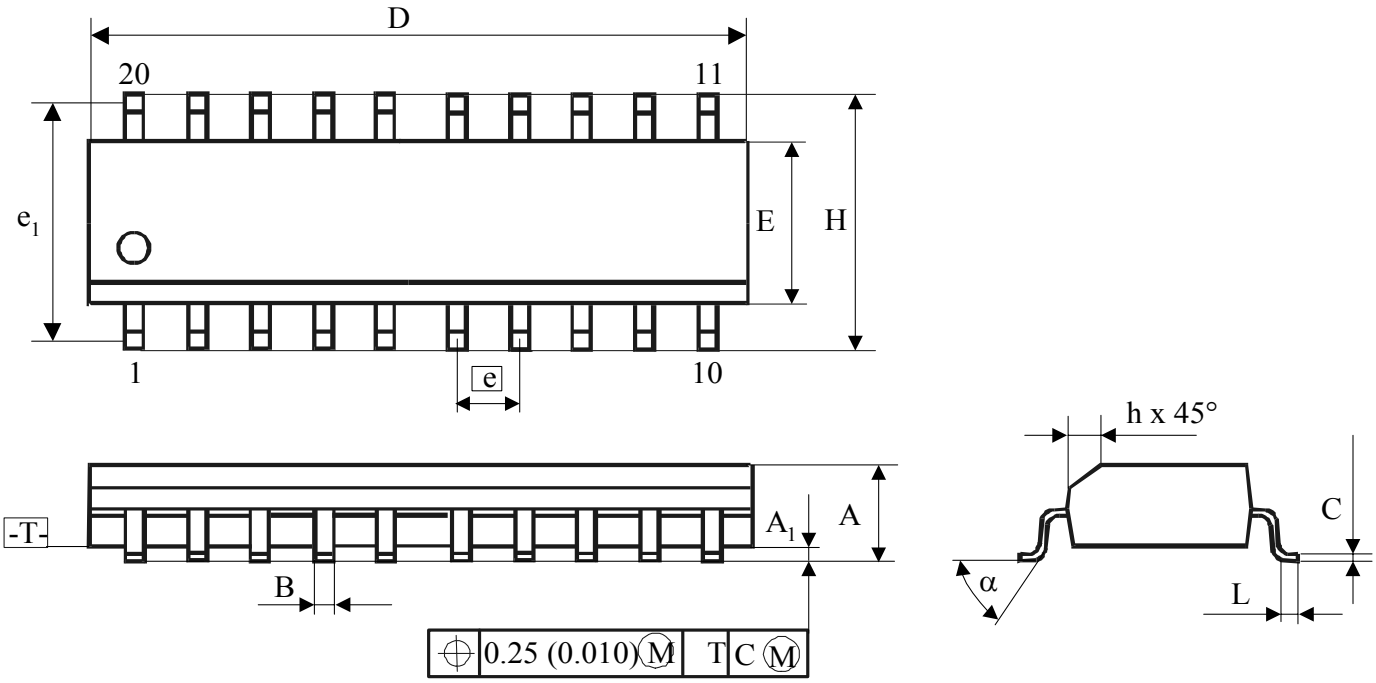


Figure 2 - Time diagram of input and output pulses

Package dimensions



	A	A_1	**B**	C	D	E	e	e_1	H	h	L	α
	mm											°
min	2.35	0.10	0.33	0.23	12.60	7.40	1.27	9.53	10.00	0.25	0.40	0
max	2.65	0.30	0.51	0.32	13.00	7.60	(nom)	(nom)	10.65	0.75	1.27	8