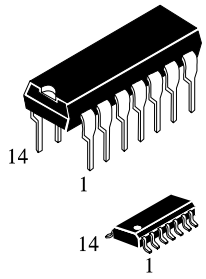
Quad 2-Input NOR Gate

IN74LV02

The IN74LV02 is a low-voltage Si-gate CMOS device that is pin and function compatible with 74HC/HCT02A, 74ALS02



N SUFFIX
PLASTIC

D SUFFIX
SOIC

ORDERING INFORMATION

IN74LV02N DIP
IN74LV02D SOIC
T_A = -40° to 125° C for all packages

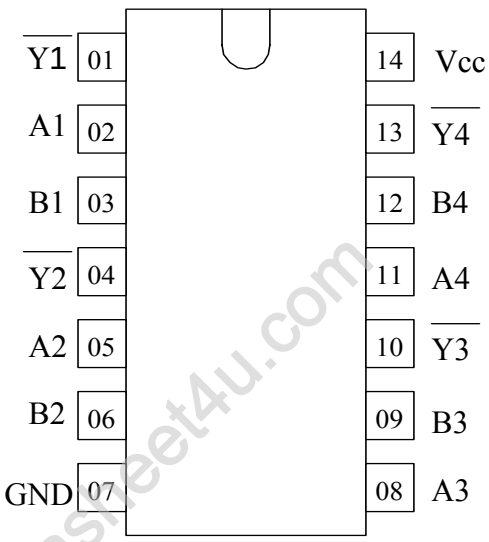
Features:

- Wide Operating Voltage: 1.0~5.5 V
- Input voltage levels are compatible with standard C-MOS levels
- Accepts TTL input levels between V_{CC} =2.7 V and V_{CC} =3.6 V
- Output voltage levels are compatible with input levels C-MOS, N-MOS and TTL microcircuits.
- Maximum input current : 1.0 mA
- Consumption current : 8 mA.

IN74LV02 truth table

Input		Output
A	B	$Y=\overline{A+B}$
L	L	H
L	H	L
H	L	L
H	H	L
Note – H - high voltage level; L - low voltage level;		

Pinout



Pins description in IN74LV02

Pin No.	Symbol	Pin description
01	$\overline{Y1}$	Output
02	A1	Input
03	B1	Input
04	$\overline{Y2}$	Output
05	A2	Input
06	B2	Input
07	GND	Common output
08	A3	Input
09	B3	Input
10	$\overline{Y3}$	Output
11	A4	Input
12	B4	Input
13	$\overline{Y4}$	Output
14	V_{CC}	Supply output from voltage source

Absolute Maximum Ratings

Symbol	Parameter	Value	Unit
V_{CC}	Supply voltage	-0.5 ~ +5.5	V
I_{IK} *[1]	Input diode current	±20	mA
I_{OK} *[2]	Output diode current	±50	mA
I_O *[3]	Output current source-drain	±25	mA
I_{CC}	Supply output current	±50	mA
I_{GND}	Common output current	±50	mA
P_D	Dissipation power at free air change, Plastic DIP *[4] SOIC *[4]	 750 500	mW
Tstg	Storage temperature	-65 ~ +150	°C
T_L		260	°C

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

*[1] If $V_I < -0.5V$ or $V_I > V_{CC} + 0.5$ V.

*[2] If $V_O < -0.5V$ or $V_O > V_{CC} + 0.5$ V.

*[3] If $-0.5V < V_O < V_{CC} + 0.5$ V.

*[4] Under operation in the temperature range from 65°C to 125°C value of dissipation power drops down - to 12 mW/°C for Plastic DIP

- to 8 mW/°C for SOIC

Maximum conditions

Symbol	Parameter		Min	Max	Unit
V_{CC}	Supply voltage		1.2	5.5	V
V_{IN}	Input voltage		0	V_{CC}	V
V_{OUT}	Output voltage		0	V_{CC}	V
T_A	Operation temperature. For all packages		-40	125	°C
t_{LH}, t_{HL}	Period of signal rise and fall edges (Figure 1)	$1.0 \le V_{CC} < 1.2$ B	0	500	ns
		$2.0 \le V_{CC} < 2.7$ B		200	
		$2.7 \le V_{CC} < 3.6$ B		100	
		$3.6 \le V_{CC} \le 5.5$ B		50	

DC electrical characteristics

Symbol	Parameter	Test conditions	V_{CC}, V	Value						Unit
				25°C		-40°C to 85°C		-40°C to 125°C		
				min	max	min	max	min	max	
V_{IH}	High level input voltage	$V_O = V_{CC}$-0.1 V	1.2	0.9	-	0.9	-	0.9	-	V
			2.0	1.4	-	1.4	-	1.4	-	
			2.7	2.0	-	2.0	-	2.0	-	
			3.0	2.0	-	2.0	-	2.0	-	
			3.6	2.0	-	2.0	-	2.0	-	
			4.5	3.15	-	3.15	-	3.15	-	
			5.5	3.85	-	3.85	-	3.85	-	
V_{IL}	Low level input voltage	V_O =0.1 B	1.2	-	0.3	-	0.3	-	0.3	V
			2.0	-	0.6	-	0.6	-	0.6	
			2.7	-	0.8	-	0.8	-	0.8	
			3.0	-	0.8	-	0.8	-	0.8	
			3.6	-	0.8	-	0.8	-	0.8	
			4.5	-	4.35	-	4.35	-	4.35	
			5.5	-	5.35	-	5.35	-	5.35	
V_{OH}	High level output voltage	$V_I = V_{IH}$ or V_{IL} I_O = -100 uA	1.2	1.05	-	1.0	-	1.0	-	V
			2.0	1.85	-	1.8	-	1.8	-	
			2.7	2.55	-	2.5	-	2.5	-	
			3.0	2.85	-	2.8	-	2.8	-	
			3.6	3.45	-	3.4	-	3.4	-	
			4.5	4.35	-	4.3	-	4.3	-	
			5.5	5.35	-	5.3	-	5.3	-	
		$V_I = V_{IH}$ or V_{IL}; I_O = -6 mA	3.0	2.48	-	2.40	-	2.20	-	V
		$V_I = V_{IH}$ or V_{IL}; I_O = -12 mA	4.5	3.70	-	3.60	-	3.50	-	V
V_{OL}	Low level output voltage	$V_I = V_{IH}$ or V_{IL} I_O = 100 uA	1.2	-	0.15	-	0.2	-	0.2	V
			2.0	-	0.15	-	0.2	-	0.2	
			2.7	-	0.15	-	0.2	-	0.2	
			3.0	-	0.15	-	0.2	-	0.2	
			3.6	-	0.15	-	0.2	-	0.2	
			4.5	-	0.15	-	0.2	-	0.2	
			5.5	-	0.15	-	0.2	-	0.2	
		$V_I = V_{IH}$ or V_{IL}; I_O = 6 mA	3.0	-	0.33	-	0.4	-	0.5	V
		$V_I = V_{IH}$ or V_{IL}; I_O = 12 mA	4.5	-	0.40	-	0.55	-	0.65	V
I_I	Input current	$V_I = V_{CC}$ or 0 V	5.5	-	±0.1	-	±1.0	-	±1.0	uA
I_{CC}	Consumption current	V_I =V_{CC} or 0 V I_O = 0 uA	5.5	-	8.0	-	80	-	160	uA
I_{CC1}	Additional input consumption current	V_I =V_{CC} –0.6 V; I_O = 0 uA	5.5	-	8.0	-	80	-	160	uA

AC electrical characteristics ($t_{LH} = t_{HL}$ = 2.5 ns, C_L=50 pF, R_L = 1 KOhm ,)

Symbol	Parameter	Test conditions	V_{CC}, V	Value						Unit
				25 °C		–40 to 85 °C		–40 to 125 °C		
				min	max	min	max	min	max	
t_{PHL}, t_{PLH}	Propagation delay time when switching "on", "off"	Fig.1	1.2	-	80	-	85	-	95	ns
			2.0	-	17	-	21	-	26	
			2.7	-	12	-	15	-	19	
			3.0	-	10	-	12	-	15	
			4.5	-	8	-	10	-	13	
C_I	Input capacity	-	3.0	-	7	-	-	-	-	pF
C_{PD}	Dynamic capacity	V_I = 0 V or V_{CC}	3.0	-	44	-	-	-	-	

- Time diagram of input and output pulses

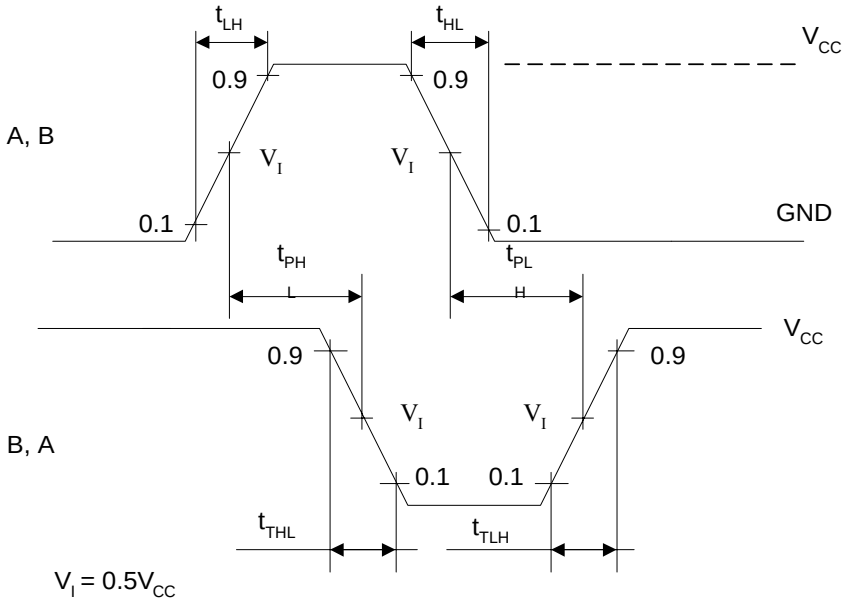
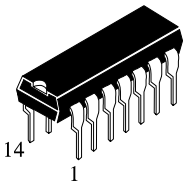
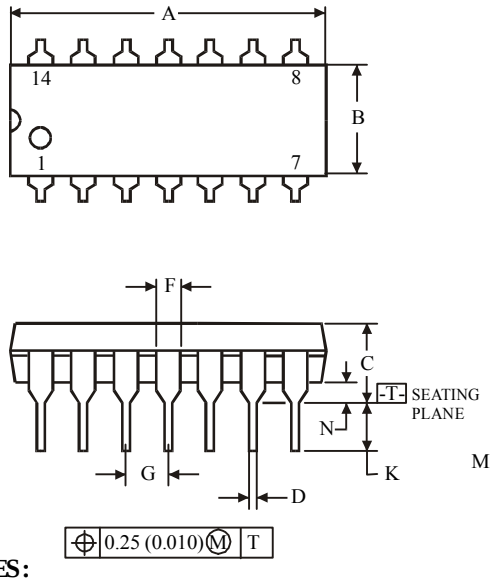


Fig.1

N SUFFIX PLASTIC DIP
(MS - 001AA)



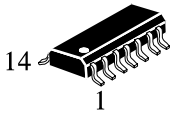


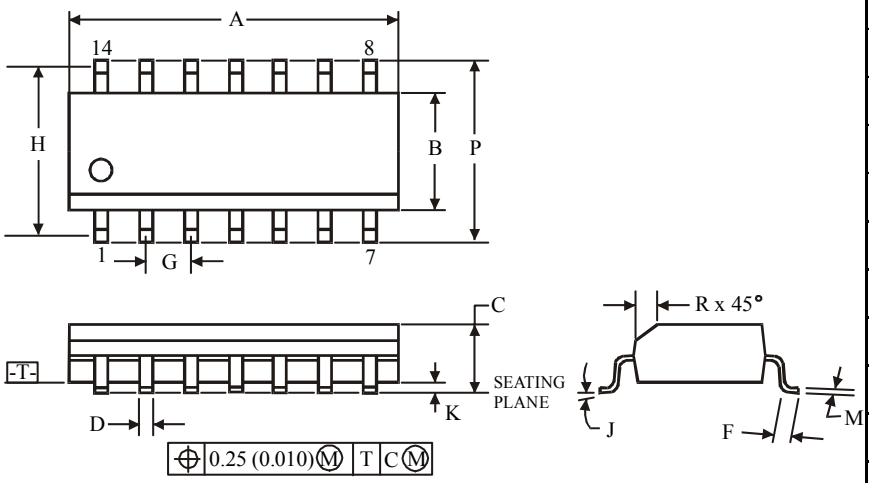
	Dimension, mm	
Symbol	**MIN**	**MAX**
A	18.67	19.69
B	6.1	7.11
C		5.33
D	0.36	0.56
F	1.14	1.78
G	2.54	
H	7.62	
J	0°	10°
K	2.92	3.81
L	7.62	8.26
M	0.2	0.36
N	0.38	

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 - 012AB)





	Dimension, mm	
Symbol	**MIN**	**MAX**
A	8.55	8.75
B	3.8	4
C	1.35	1.75
D	0.33	0.51
F	0.4	1.27
G	1.27	
H	5.27	
J	0°	8°
K	0.1	0.25
M	0.19	0.25
P	5.8	6.2
R	0.25	0.5

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.