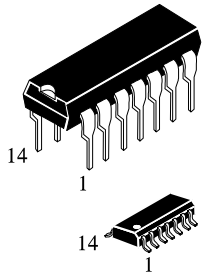
IN74LS04

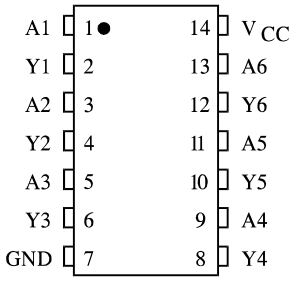
Hex Inverters

This device contains six independent inverts. It performs the Boolean function $Y=\overline{A}$.

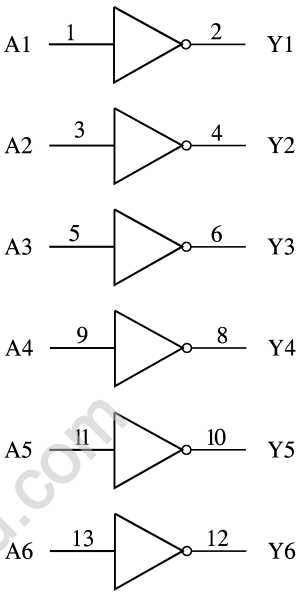


ORDERING INFORMATION
IN74LS04N Plastic
IN74LS04D SOIC
T_A = -0° to 70° C for all packages

PIN ASSIGNMENT



LOGIC DIAGRAM



PIN 14 =V_{CC}
PIN 7 = GND

FUNCTION TABLE

Inputs	Output
A	Y
H	L
L	H

MAXIMUM RATINGS*

Symbol	Parameter	Value	Unit
V_{CC}	Supply Voltage	7.0	V
V_{IN}	Input Voltage	7.0	V
V_{OUT}	Output Voltage	7.0	V
Tstg	Storage Temperature Range	-65 to +150	°C

*Maximum Ratings are those values beyond which damage to the device may occur.
Functional operation should be restricted to the Recommended Operating Conditions.

RECOMMENDED OPERATING CONDITIONS

Symbol	Parameter	Min	Max	Unit
V_{CC}	Supply Voltage	4.75	5.25	V
I_{OH}	High Level Output Current		-400	V
I_{OL}	Low Level Output Current		8.0	V
T_A	Ambient Temperature Range	0	+70	°C

DC ELECTRICAL CHARACTERISTICS over full operating conditions

Symbol	Parameter	Test Conditions		Guaranteed Limit		Unit
				Min	Max	
V_{IH}	High Level Input Voltage			2		V
V_{IL}	Low Level Input Voltage				0.8	V
V_{IK}	Input Clamp Voltage	V_{CC} = min, I_I = -18 mA			-1.5	V
V_{OH}	High Level Output Current	V_{CC} = min, V_{IL} =max I_{OH} = max		2.7		V
V_{OL}	Low Level Output Voltage	V_{CC} = min, V_{IH} =min, I_{OL} = 8 mA			0.5	V
I_I	Input Current at maximum input voltage	V_{CC} = max, V_I = -7V			0.1	mA
I_{IH}	High Level Input Current	V_{CC} = max, V_{IN} = 2.7 V			20	µA
I_{IL}	Low Level Input Current	V_{CC} = max, V_{IN} = 0.4 V			-0.4	mA
I_{OS}	Short-circuit output current	V_{CC} = max (Note)		-20	-100	mA
I_{CC}	Supply Current	V_{CC} = max	Total with outputs high		2.4	mA
			Total with outputs low		6.6	

Note: Not more than one output should be shorted at a time, and duration should not exceed one second.

AC ELECTRICAL CHARACTERISTICS (V_{CC} = 5.0 V, C_L = 15 pF, T_A=25 °C, R_L = 2 kΩ, t_r =15 ns, t_f = 6.0 ns)

Symbol	Parameter	Min	Max	Unit
t_{PLH}	Propagation Delay Time		15	ns
t_{PHL}	Propagation Delay Time		15	ns

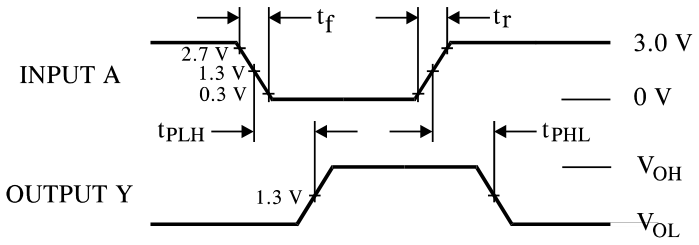
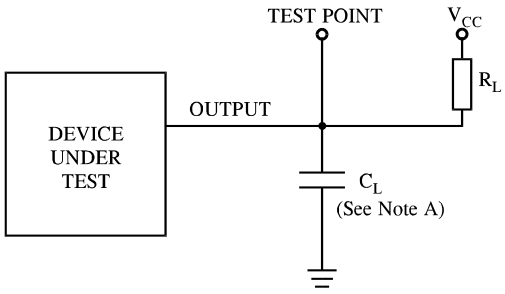


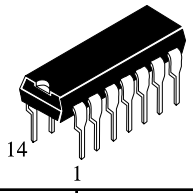
Figure 1. Switching Waveforms

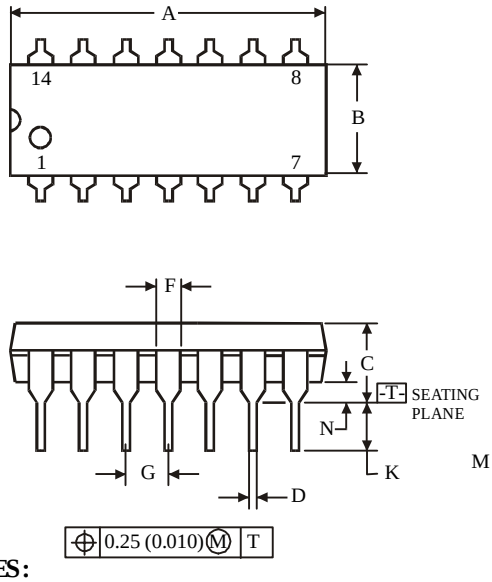


NOTE A. C_L includes probe and jig capacitance.

Figure 2. Test Circuit

N SUFFIX PLASTIC DIP
(MS - 001AA)



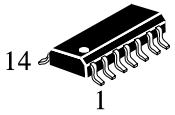


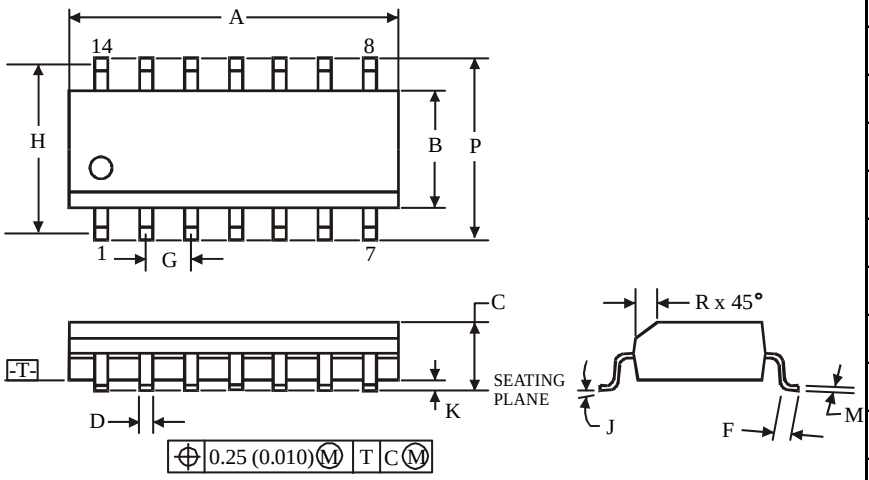
	Dimension, mm	
Symbol	**MIN**	**MAX**
A	18.67	19.69
B	6.1	7.11
C		5.33
D	0.36	0.56
F	1.14	1.78
G	2.54	
H	7.62	
J	0°	10°
K	2.92	3.81
L	7.62	8.26
M	0.2	0.36
N	0.38	

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.