Hex Non-Inverted Buffers with Open-Collector Outputs

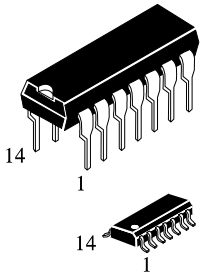
IN74LS07

These hex buffers feature high-voltage open-collector outputs to interface with high-level circuits or for driving high-current loads. They are also characterized for use as buffers for driving TTL inputs. The 'LS07 devices have a rated output voltage of 30 V. The maximum sink current is 40 mA.

This circuit are compatible with most TTL families. Inputs are diode-clamped to minimize transmission-line effects, which simplifies design.

This device contains hex non inverted buffers with open-collector.

- High Output Voltage 30 V
- High Speed t_{PD} = 12 ns
- Low Power Dissipation P_D = 13 mW per Gate

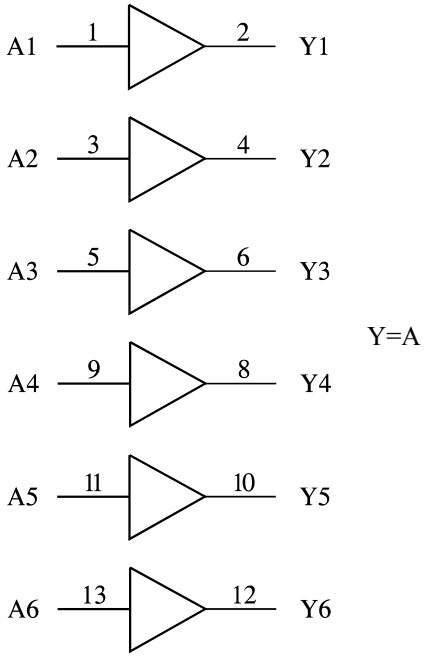


ORDERING INFORMATION

IN74LS07N	Plastic
IN74LS07D	SOIC

T_A = 0° to 70° C for all packages

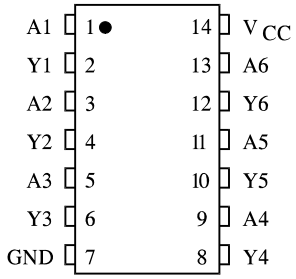
LOGIC DIAGRAM



Y=A

PIN 14 =V_{CC}
PIN 7 = GND

PIN ASSIGNMENT



FUNCTION TABLE

Inputs	Output
A	Y
H	Z
L	L

MAXIMUM RATINGS*

Symbol	Parameter	Value	Unit
V_{CC}	Supply Voltage	7.0	V
V_{IN}	Input Voltage	5.5	V
V_{OUT}	Output Voltage	30	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
V_{IH}	High Level Input Voltage	2.0		V
V_{IL}	Low Level Input Voltage		0.8	V
V_{OH}	High Level Output Voltage		30	V
I_{OL}	Low Level Output Current		40	mA
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_{IK}	Input Clamp Voltage	V_{CC} = 4.75, I_{IN} = -18 mA			-1.5	V
I_{OH}	High Level Output Current	V_{CC} = 4.75, V_{OH}= 5.25			250	μA
V_{OL}	Low Level Output Voltage	V_{CC} = 4.75, I_{OL} = 16 mA			0.4	V
		V_{CC} = 4.75, I_{OL} = 40 mA			0.7	
I_{IH}	High Level Input Current	V_{CC} = 5.25, V_{IN} = 2.7 V			20	μA
		V_{CC} = 5.25, V_{IN} = 5.5 V			1	mA
I_{IL}	Low Level Input Current	V_{CC} = 5.25, V_{IN} = 0.4 V			-0.2	mA
I_{CC}	Supply Current	V_{CC} = 5.25	Total with outputs high		14	mA
			Total with outputs low		45	

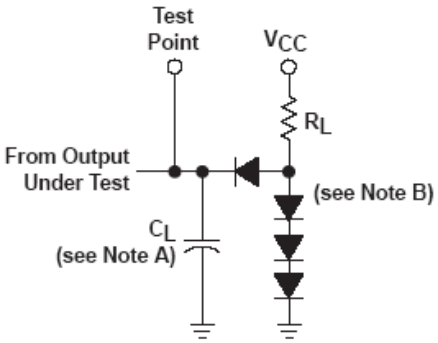
AC ELECTRICAL CHARACTERISTICS

(T_A = 25°C, V_{CC} = 5.0 V, C_L = 15 pF, R_L = 100 Ω,t_r = 15 ns, t_f = 6.0 ns)

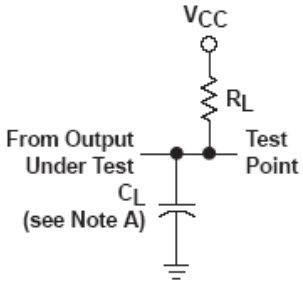
Symbol	Parameter	Min	Max	Unit
t_{PLH}	Propagation Delay, Input A to Output Y		10	ns
t_{PHL}	Propagation Delay, Input A to Output Y		30	ns

PARAMETER MEASUREMENT INFORMATION

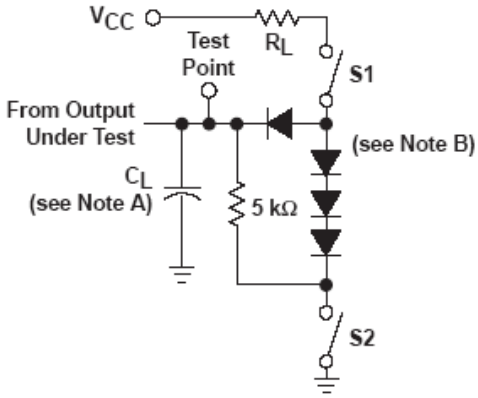
Load Circuits



LOAD CIRCUIT
FOR 2-STATE TOTEM-POLE OUTPUTS

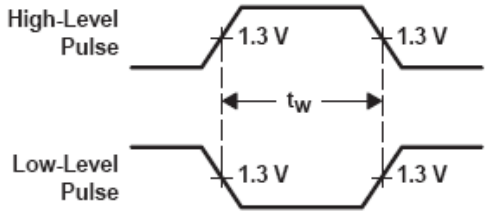


LOAD CIRCUIT
FOR OPEN-COLLECTOR
OUTPUTS

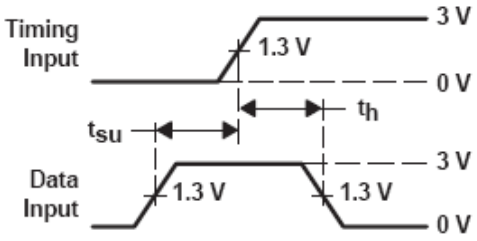


LOAD CIRCUIT
FOR 3-STATE OUTPUTS

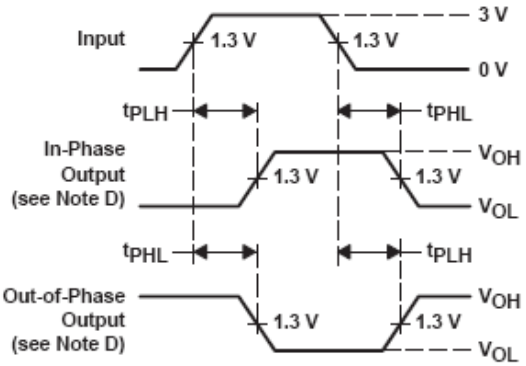
Voltage Waveforms



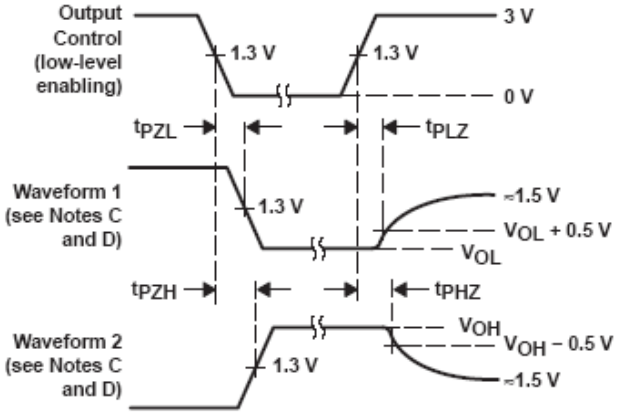
VOLTAGE WAVEFORMS PULSE DURATIONS



VOLTAGE WAVEFORMS SETUP AND HOLD TIMES



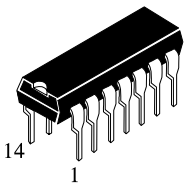
VOLTAGE WAVEFORMS PROPAGATION DELAY TIMES

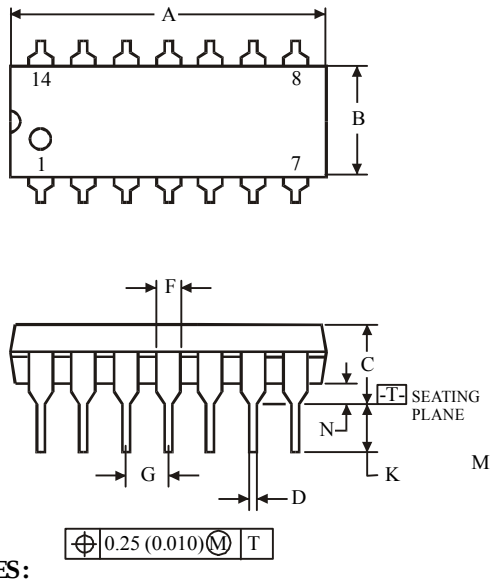


VOLTAGE WAVEFORMS
ENABLE AND DISABLE TIMES, 3-STATE OUTPUTS

NOTES: A. CL includes probe and jig capacitance.
B. All diodes are 1N3064 or equivalent.
C. Waveform 1 is for an output with internal conditions such that the output is low, except when disabled by the output control.
Waveform 2 is for an output with internal conditions such that the output is high, except when disabled by the output control.
D. S1 and S2 are closed for t_{PLH}, t_{PHL}, t_{PHZ}, and t_{PLZ}; S1 is open and S2 is closed for t_{PZH}; S1 is closed and S2 is open for t_{PZL}.
E. Phase relationships between inputs and outputs have been chosen arbitrarily for these examples.
F. All input pulses are supplied by generators having the following characteristics: PRR ≤ 1 MHz, Z_O = 50 Ω, tr ≤1.5 ns, tf ≤ 2.6 ns.
G. The outputs are measured one at a time, with one input transition per measurement.

N SUFFIX PLASTIC DIP
(MS - 001AA)



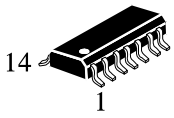


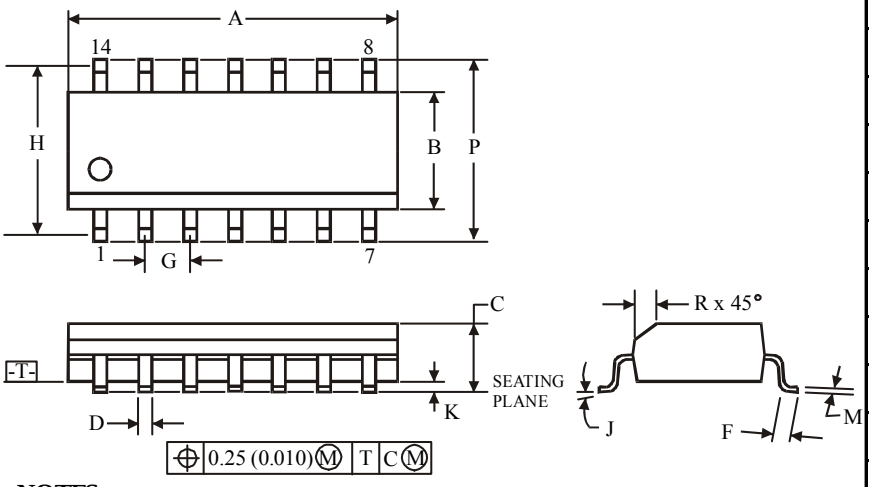
	Dimension, mm	
Symbol	**MIN**	**MAX**
A	18.67	19.69
B	6.1	7.11
C		5.33
D	0.36	0.56
F	1.14	1.78
G	2.54	
H	7.62	
J	0°	10°
K	2.92	3.81
L	7.62	8.26
M	0.2	0.36
N	0.38	

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.