

# 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

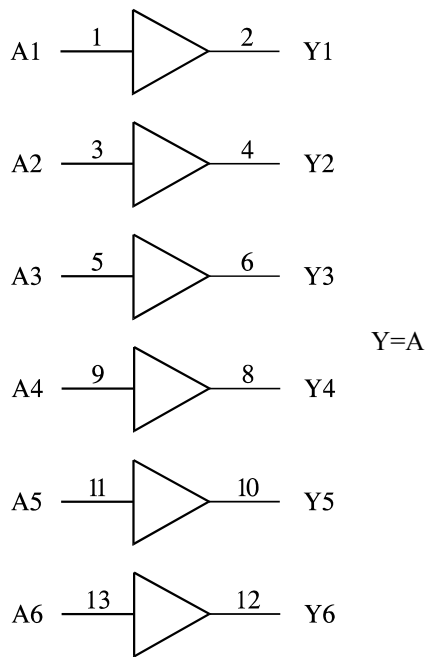
N SUFFIX  
PLASTIC

D SUFFIX  
SOIC

**ORDERING INFORMATION**

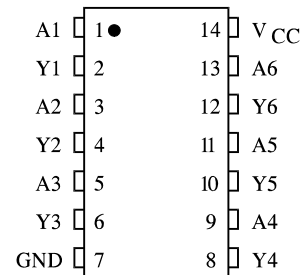
IN74LS07N Plastic  
IN74LS07D SOIC  
 $T_A = 0^\circ$  to  $70^\circ$  C for all packages

## LOGIC DIAGRAM



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 <sub>CC</sub>	Supply Voltage	7.0	V
V <sub>IN</sub>	Input Voltage	5.5	V
V <sub>OUT</sub>	Output Voltage	30	V
T <sub>stg</sub>	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 <sub>CC</sub>	Supply Voltage	4.75	5.25	V
V <sub>IH</sub>	High Level Input Voltage	2.0		V
V <sub>IL</sub>	Low Level Input Voltage		0.8	V
V <sub>OH</sub>	High Level Output Voltage		30	V
I <sub>OL</sub>	Low Level Output Current		40	mA
T <sub>A</sub>	Ambient Temperature Range	0	+70	°C

**DC ELECTRICAL CHARACTERISTICS** over full operating conditions

Symbol	Parameter	Test Conditions	Guaranteed Limit		Unit
			Min	Max	
V <sub>IK</sub>	Input Clamp Voltage	V <sub>CC</sub> = 4.75, I <sub>IN</sub> = -18 mA		-1.5	V
I <sub>OH</sub>	High Level Output Current	V <sub>CC</sub> = 4.75, V <sub>OH</sub> = 5.25		250	μA
V <sub>OL</sub>	Low Level Output Voltage	V <sub>CC</sub> = 4.75, I <sub>OL</sub> = 16 mA		0.4	V
		V <sub>CC</sub> = 4.75, I <sub>OL</sub> = 40 mA		0.7	
I <sub>IH</sub>	High Level Input Current	V <sub>CC</sub> = 5.25, V <sub>IN</sub> = 2.7 V		20	μA
		V <sub>CC</sub> = 5.25, V <sub>IN</sub> = 5.5 V		1	mA
I <sub>IL</sub>	Low Level Input Current	V <sub>CC</sub> = 5.25, V <sub>IN</sub> = 0.4 V		-0.2	mA
I <sub>CC</sub>	Supply Current	V <sub>CC</sub> = 5.25	Total with outputs high	14	mA
			Total with outputs low	45	

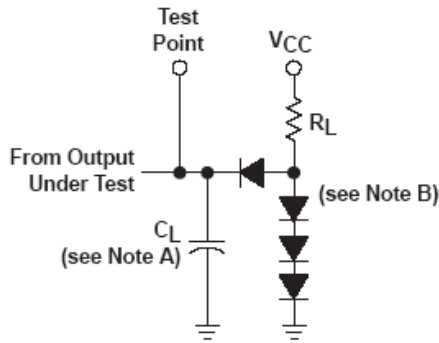
**AC ELECTRICAL CHARACTERISTICS**

(T<sub>A</sub> = 25°C, V<sub>CC</sub> = 5.0 V, C<sub>L</sub> = 15 pF, R<sub>L</sub> = 100 Ω, t<sub>r</sub> = 15 ns, t<sub>f</sub> = 6.0 ns)

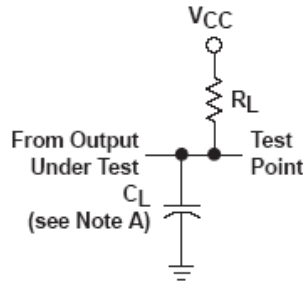
Symbol	Parameter	Min	Max	Unit
t <sub>PLH</sub>	Propagation Delay, Input A to Output Y		10	ns
t <sub>PHL</sub>	Propagation Delay, Input A to Output Y		30	ns

PARAMETER MEASUREMENT INFORMATION

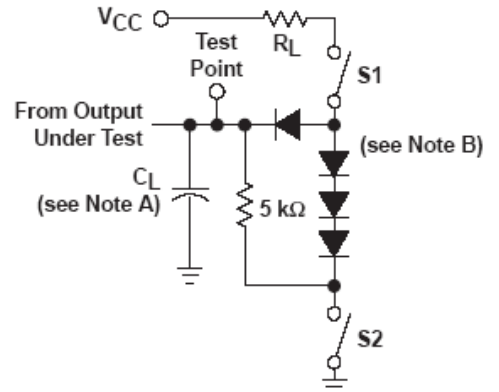
Load Circuits



LOAD CIRCUIT FOR 2-STATE TOTEM-POLE OUTPUTS

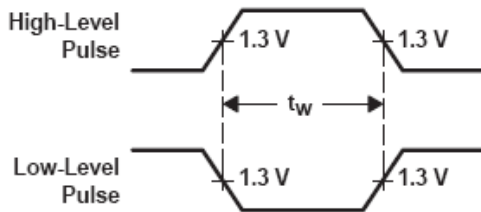


LOAD CIRCUIT FOR OPEN-COLLECTOR OUTPUTS

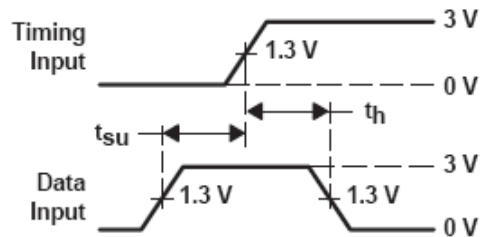


LOAD CIRCUIT FOR 3-STATE OUTPUTS

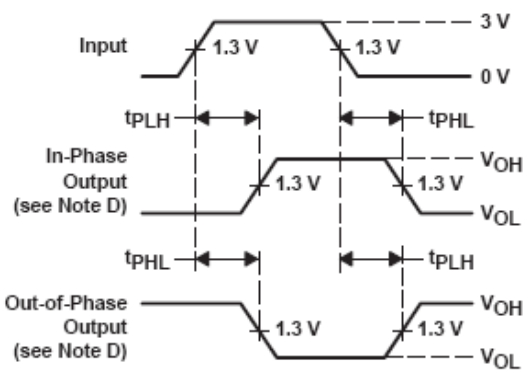
Voltage Waveforms



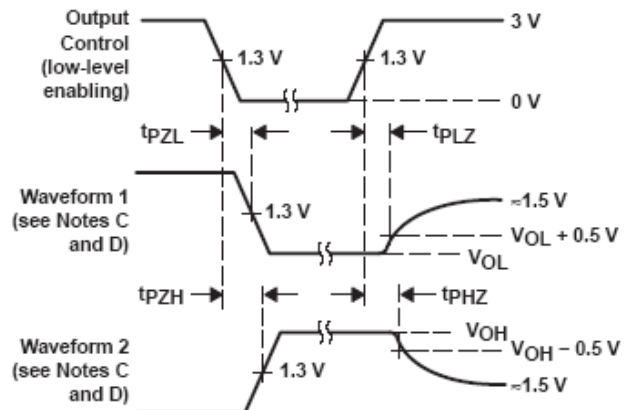
VOLTAGE WAVEFORMS PULSE DURATIONS



VOLTAGE WAVEFORMS SETUP AND HOLD TIMES



VOLTAGE WAVEFORMS PROPAGATION DELAY TIMES



VOLTAGE WAVEFORMS ENABLE AND DISABLE TIMES, 3-STATE OUTPUTS

NOTES: A.  $C_L$  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.

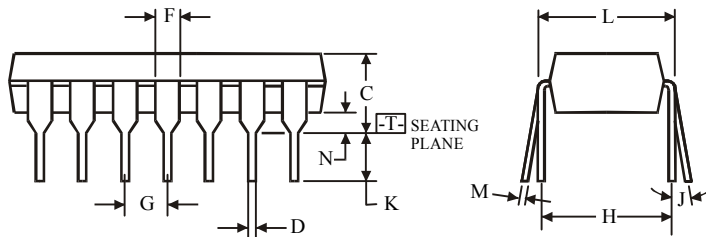
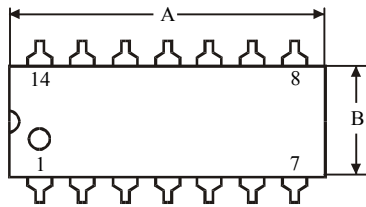
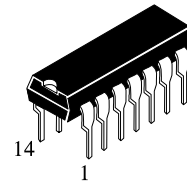
D. S1 and S2 are closed for  $t_{PLH}$ ,  $t_{PHL}$ ,  $t_{PHZ}$ , and  $t_{PLZ}$ ; S1 is open and S2 is closed for  $t_{PZH}$ ; S1 is closed and S2 is open for  $t_{PZL}$ .

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:  $PRR \leq 1$  MHz,  $Z_0 = 50 \Omega$ ,  $t_r \leq 1.5$  ns,  $t_f \leq 2.6$  ns.

G. The outputs are measured one at a time, with one input transition per measurement.

**N SUFFIX PLASTIC DIP  
(MS - 001AA)**



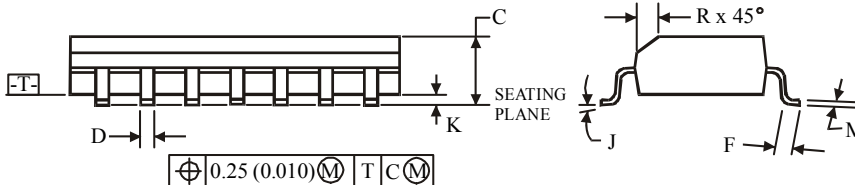
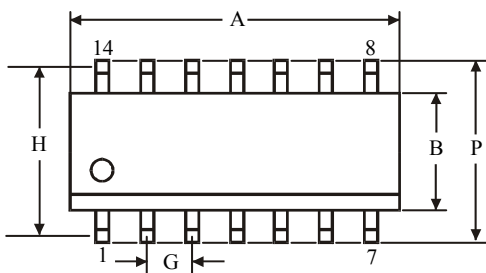
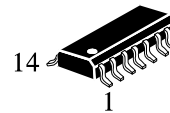
$\oplus 0.25 (0.010) \text{ (M) T}$

**NOTES:**

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

Symbol	Dimension, mm	
	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	

**D SUFFIX SOIC  
(MS - 012AB)**



$\oplus 0.25 (0.010) \text{ (M) T C (M)}$

**NOTES:**

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

Symbol	Dimension, mm	
	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