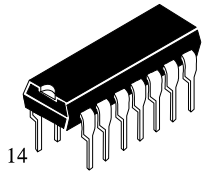
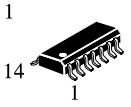
IN74LS86

Quad 2-Input Exclusive OR Gate

This device contains four independent 2-input Exclusive-OR gates. It performs the Boolean functions Y=A ⊕ B=AB+AB in positive logic.



N SUFFIX
PLASTIC

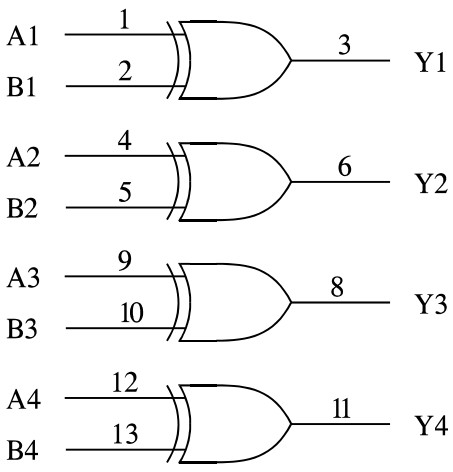


D SUFFIX
SOIC

ORDERING INFORMATION

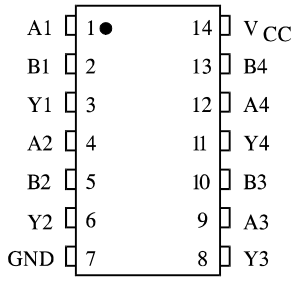
IN74LS86N Plastic
IN74LS86D SOIC
T_A = 0° to 70° C for all packages

LOGIC DIAGRAM



PIN 14 =V_{CC}
PIN 7 = GND

PIN ASSIGNMENT



FUNCTION TABLE

Inputs		Output
A	B	Y
L	L	L
L	H	H
H	L	H
H	H	L

MAXIMUM RATINGS*

Symbol	Parameter	Value	Unit
V_{CC}	Supply Voltage	7.0	V
V_{IN}	Input Voltage	7.0	V
V_{OUT}	Output Voltage	5.5	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
I_{OH}	High Level Output Current		-0.4	mA
I_{OL}	Low Level Output Current		8.0	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} = min, I_{IN} = -18 mA		-1.5	V
V_{OH}	High Level Output Voltage		V_{CC} = min, I_{OH} = -0.4 mA	2.7		V
V_{OL}	Low Level Output Voltage		V_{CC} = min, I_{OL} = 4 mA		0.4	V
			V_{CC} = min, I_{OL} = 8 mA		0.5	
I_{IH}	High Level Input Current		V_{CC} = max, V_{IN} = 2.7 V		40	μA
			V_{CC} = max, V_{IN} = 7.0 V		0.2	mA
I_{IL}	Low Level Input Current		V_{CC} = max, V_{IN} = 0.4 V		-0.8	mA
I_O	Output Short Circuit Current		V_{CC} = max, V_O = 0 V (Note 1)	-20	-100	mA
I_{CC}	Supply Current	Total with outputs high	V_{CC} = max		10	mA
		Total with outputs low			15	

Note 1: Not more than one output should be shorted at a time, and duration should not exceed one second.

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

Symbol	Parameter	Min	Max	Unit
t_{PLH}	Propagation Delay, Input A or B to Output Y (Other input low)		23	ns
t_{PHL}	Propagation Delay, Input A or B to Output Y (Other input low)		17	ns
t_{PLH}	Propagation Delay, Input A or B to Output Y (Other input high)		30	ns
t_{PHL}	Propagation Delay, Input A or B to Output Y (Other input high)		22	ns

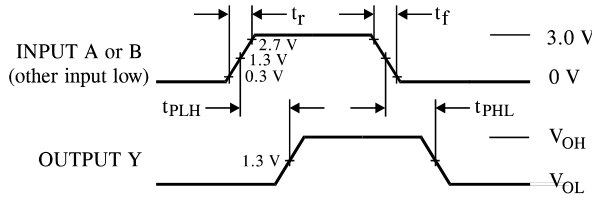


Figure 1. Switching Waveforms

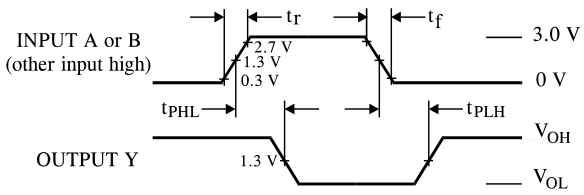
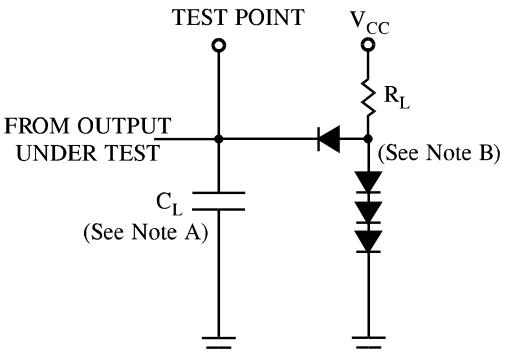


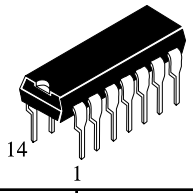
Figure 2. Switching Waveforms

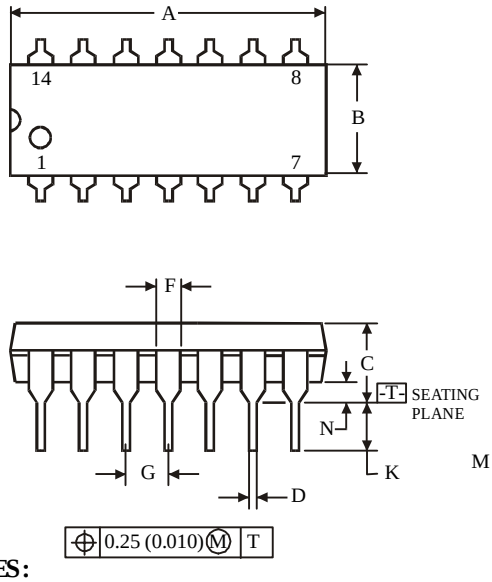


NOTES A. C_L includes probe and jig capacitance.
B. All diodes are 1N916 or 1N3064.

Figure 3. Test Circuit

N SUFFIX PLASTIC DIP
(MS - 001AA)



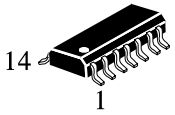


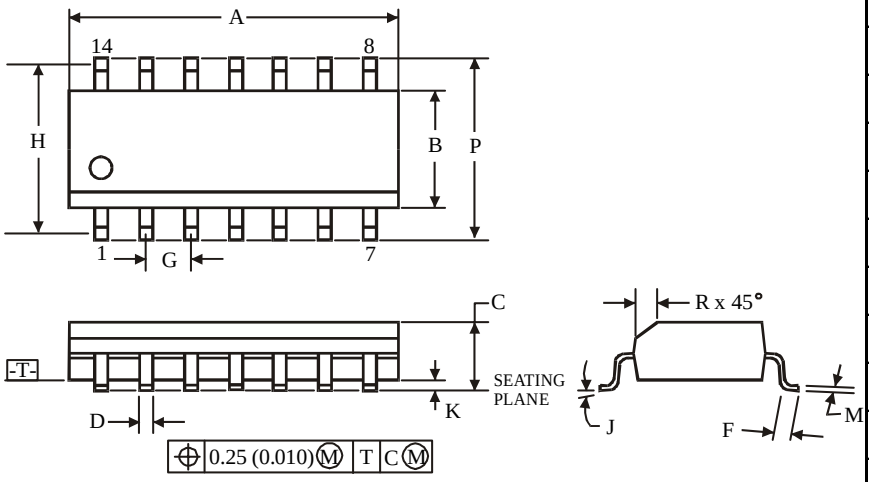
	Dimension, mm	
Symbol	**MIN**	**MAX**
A	18.67	19.69
B	6.1	7.11
C		5.33
D	0.36	0.56
F	1.14	1.78
G	2.54	
H	7.62	
J	0°	10°
K	2.92	3.81
L	7.62	8.26
M	0.2	0.36
N	0.38	

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.