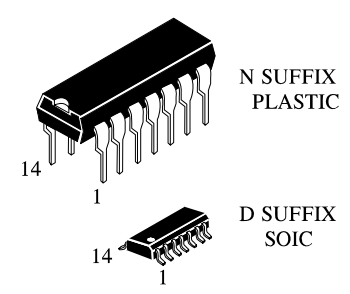


IN74LS86

Quad 2-Input Exclusive OR Gate

This device contains four independent 2-input Exclusive-OR gates. It performs the Boolean functions $Y = A \oplus B = \overline{A}B + A\overline{B}$ in positive logic.

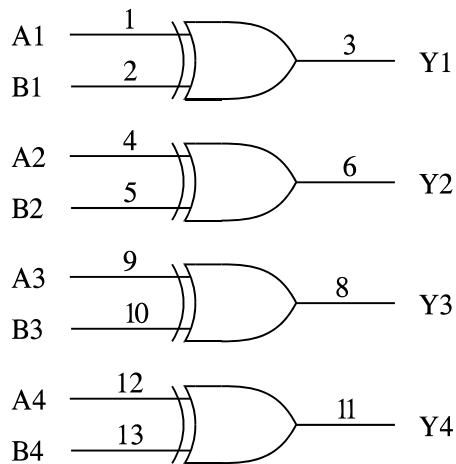


N SUFFIX
PLASTIC

D SUFFIX
SOIC

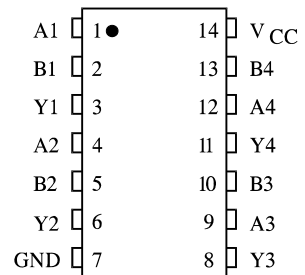
ORDERING INFORMATION
 IN74LS86N Plastic
 IN74LS86D SOIC
 T_A = 0° to 70° C for all packages

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 |
| T _{stg} | 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 | |

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

AC ELECTRICAL CHARACTERISTICS ($T_A=25^\circ\text{C}$, $V_{CC} = 5.0\text{ V}$, $C_L = 15\text{ pF}$, $R_L = 2\text{ k}\Omega$, $t_r = 15\text{ ns}$, $t_f = 6.0\text{ ns}$)

| 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 |

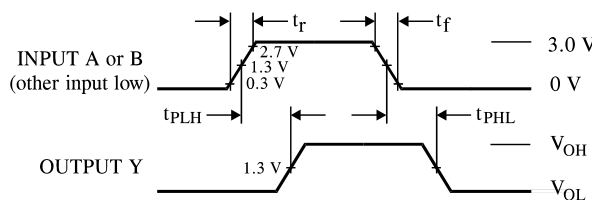


Figure 1. Switching Waveforms

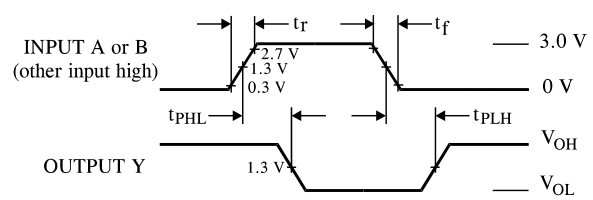
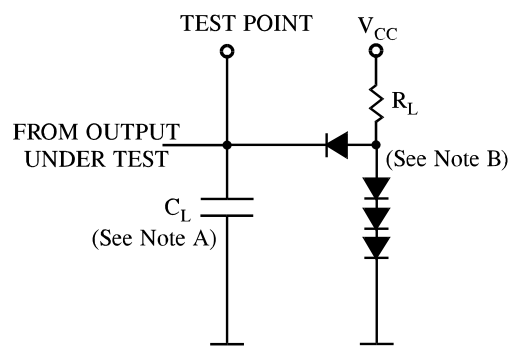


Figure 2. Switching Waveforms



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

Figure 3. Test Circuit