

7430, LS30 Gates

Eight-Input NAND Gate
Product Specification

Logic Products

| TYPE | TYPICAL PROPAGATION DELAY | TYPICAL SUPPLY CURRENT (TOTAL) |
|--------|---------------------------|--------------------------------|
| 7430 | 11ns | 2mA |
| 74LS30 | 11ns | 0.5mA |

ORDERING CODE

| PACKAGES | COMMERCIAL RANGE $V_{CC} = 5V \pm 5\%$; $T_A = 0^\circ C$ to $+70^\circ C$ |
|-------------|--|
| Plastic DIP | N7430N, N74LS30N |
| Plastic SO | N74LS30D |

FUNCTION TABLE

| INPUTS | | | | | | | | OUTPUT |
|--------|---|---|---|---|---|---|---|--------|
| A | B | C | D | E | F | G | H | Y |
| L | X | X | X | X | X | X | X | H |
| X | L | X | X | X | X | X | X | H |
| X | X | L | X | X | X | X | X | H |
| X | X | X | L | X | X | X | X | H |
| X | X | X | X | L | X | X | X | H |
| X | X | X | X | X | L | X | X | H |
| X | X | X | X | X | X | L | X | H |
| X | X | X | X | X | X | X | L | H |
| H | H | H | H | H | H | H | H | L |

H = HIGH voltage level
L = LOW voltage level
X = Don't care

NOTE:

For information regarding devices processed to Military Specifications, see the Signetics Military Products Data Manual.

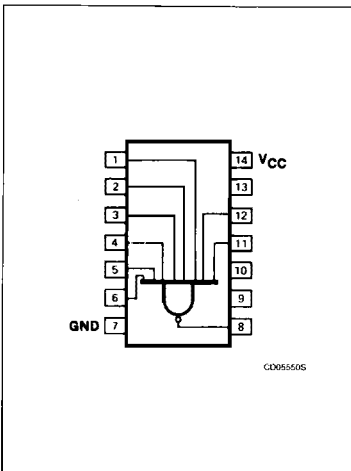
INPUT AND OUTPUT LOADING AND FAN-OUT TABLE

| PINS | DESCRIPTION | 74 | 74LS |
|-------|-------------|------|--------|
| A - H | Inputs | 1ul | 1LSul |
| Y | Output | 10ul | 10LSul |

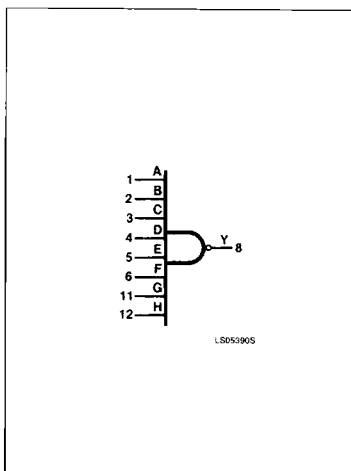
NOTE:

Where a 74 unit load (ul) is understood to be $40\mu A$ I_{IH} and $-1.6mA$ I_{IL} , and a 74LS unit load (LSul) is $20\mu A$ I_{IH} and $-0.4mA$ I_{IL} .

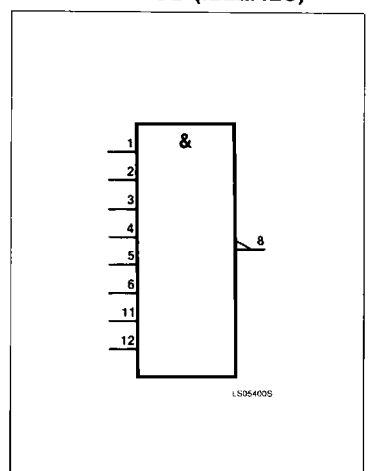
PIN CONFIGURATION



LOGIC SYMBOL



LOGIC SYMBOL (IEEE/IEC)



Gates

7430, LS30

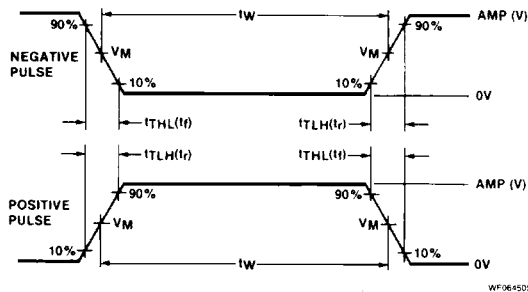
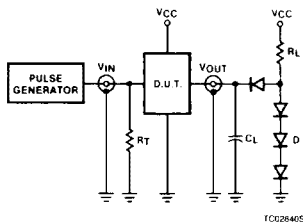
ABSOLUTE MAXIMUM RATINGS (Over operating free-air temperature range unless otherwise noted.)

| PARAMETER | 74 | 74LS | UNIT |
|---|--------------------------|--------------------------|------|
| V _{CC} Supply voltage | 7.0 | 7.0 | V |
| V _{IN} Input voltage | -0.5 to +5.5 | -0.5 to +7.0 | V |
| I _{IN} Input current | -30 to +5 | -30 to +1 | mA |
| V _{OUT} Voltage applied to output in HIGH output state | -0.5 to +V _{CC} | -0.5 to +V _{CC} | V |
| T _A Operating free-air temperature range | 0 to 70 | | °C |

RECOMMENDED OPERATING CONDITIONS

| PARAMETER | 74 | | | 74LS | | | UNIT |
|---|------|-----|------|------|-----|------|------|
| | Min | Nom | Max | Min | Nom | Max | |
| V _{CC} Supply voltage | 4.75 | 5.0 | 5.25 | 4.75 | 5.0 | 5.25 | V |
| V _{IH} HIGH-level input voltage | 2.0 | | | 2.0 | | | V |
| V _{IL} LOW-level input voltage | | | +0.8 | | | +0.8 | V |
| I _{IK} Input clamp current | | | -12 | | | -18 | mA |
| I _{OH} HIGH-level output current | | | -400 | | | -400 | μA |
| I _{OL} LOW-level output current | | | 16 | | | 8 | mA |
| T _A Operating free-air temperature | 0 | | 70 | 0 | | 70 | °C |

TEST CIRCUITS AND WAVEFORMS



V_M = 1.3V for 74LS; V_M = 1.5V for all other TTL families.

Test Circuit For 74 Totem-Pole Outputs

DEFINITIONS

R_L = Load resistor to V_{CC}; see AC CHARACTERISTICS for value.

C_L = Load capacitance includes jig and probe capacitance; see AC CHARACTERISTICS for value.

R_T = Termination resistance should be equal to Z_{OUT} of Pulse Generators.

D = Diodes are 1N916, 1N3064, or equivalent.

t_{TLH}, t_{THL} Values should be less than or equal to the table entries.

Input Pulse Definition

| FAMILY | INPUT PULSE REQUIREMENTS | | | | |
|--------|--------------------------|-----------|-------------|------------------|------------------|
| | Amplitude | Rep. Rate | Pulse Width | t _{TLH} | t _{THL} |
| 74 | 3.0V | 1MHz | 500ns | 7ns | 7ns |
| 74LS | 3.0V | 1MHz | 500ns | 15ns | 6ns |
| 74S | 3.0V | 1MHz | 500ns | 2.5ns | 2.5ns |

Gates

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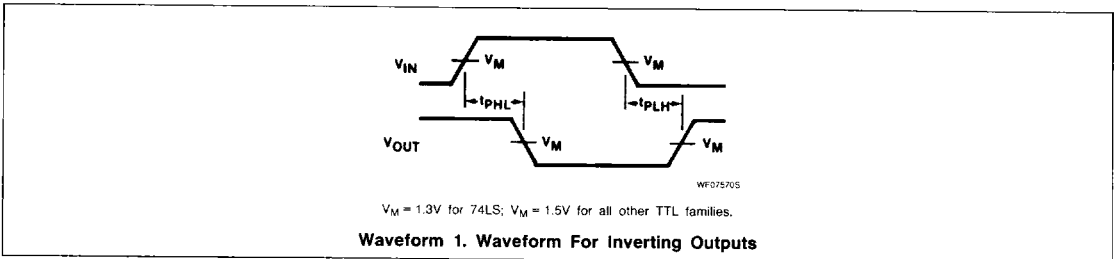
DC ELECTRICAL CHARACTERISTICS (Over recommended operating free-air temperature range unless otherwise noted.)

| PARAMETER | TEST CONDITIONS ¹ | 7430 | | | 74LS30 | | | UNIT |
|---|---|------|------------------|------|--------|------------------|------|------|
| | | Min | Typ ² | Max | Min | Typ ² | Max | |
| V _{OH} HIGH-level output voltage | V _{CC} = MIN, V _{IL} = MAX, I _{OH} = MAX | 2.4 | 3.4 | | 2.7 | 3.4 | | V |
| V _{OL} LOW-level output voltage | V _{CC} = MIN, V _{IH} = MIN, I _{OL} = MAX | | 0.2 | 0.4 | | 0.35 | 0.5 | V |
| | | | | | | 0.25 | 0.4 | V |
| V _{IK} Input clamp voltage | V _{CC} = MIN, I _i = I _{IK} | | | -1.5 | | | -1.5 | V |
| I _i Input current at maximum input voltage | V _{CC} = MAX | | | 1.0 | | | | mA |
| | | | | | | | 0.1 | mA |
| I _{IH} HIGH-level input current | V _{CC} = MAX | | | 40 | | | | μA |
| | | | | | | | 20 | μA |
| I _{IL} LOW-level input current | V _{CC} = MAX, V _I = 0.4V | | | -1.6 | | | -0.4 | mA |
| I _{OS} Short-circuit output current ³ | V _{CC} = MAX | -18 | | -55 | -20 | | -100 | mA |
| I _{CC} Supply current (total) | V _{CC} = MAX | | 1 | 2 | | 0.35 | 0.5 | mA |
| | | | 3 | 6 | | 0.6 | 1.1 | mA |

NOTES

- For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions for the applicable type.
- All typical values are at V_{CC} = 5V, T_A = 25°C.
- I_{OS} is tested with V_{OUT} = +0.5V and V_{CC} = V_{CC} MAX + 0.5V. Not more than one output should be shorted at a time and duration of the short circuit should not exceed one second.

AC WAVEFORM



AC ELECTRICAL CHARACTERISTICS T_A = 25°C, V_{CC} = 5.0V

| PARAMETER | TEST CONDITIONS | 74 | | 74LS | | UNIT |
|--|-----------------|--|----------|---|----------|------|
| | | C _L = 15pF, R _L = 400Ω | | C _L = 15pF, R _L = 2kΩ | | |
| | | Min | Max | Min | Max | |
| t _{PLH} t _{PHL} Propagation delay | Waveform 1 | | 22 15 | | 15 20 | ns |