

74LS00

DATASHEET

Specification Revision History:

| Version | Date | Description |
|---------|---------|--|
| V1.0 | 2019/07 | New |
| V1.1 | 2021/10 | Modify Ordering Information |
| V1.2 | 2025/02 | Modify Ordering Information |
| V1.3 | 2025/03 | Add application precautions and overall typesetting. |

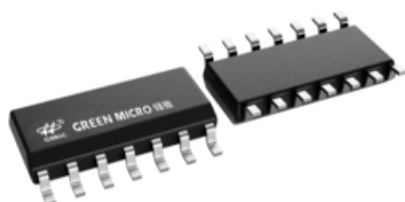
DESCRIPTION

The 74LS00 is a Quadruple 2-input positive-NAND gate with provides the function $Y = \overline{\overline{A} \times \overline{B}}$ or $Y = \overline{A+B}$.

FEATURES

- Operation voltage range: 2.0V ~ 6.0V
- Low Quiescent Current: $I_{CC} = 2\mu A$ (Max.)

The appearance of the product

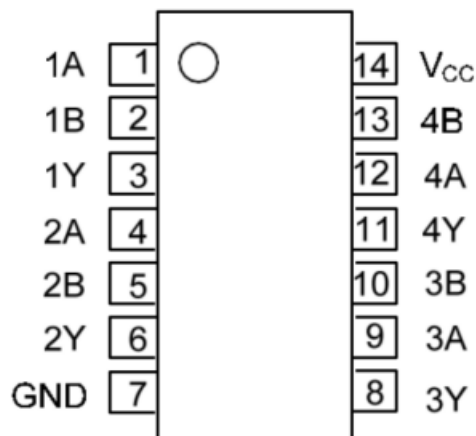


SOP-14

Ordering Information

| Product Model | Package Type | Marking | Packing | Packing Qty |
|---------------|--------------|------------|---------|--------------|
| SN74LS00DS | SOP-14 | 74LS00 3B2 | REEL | 4000PCS/REEL |

PIN CONFIGURATION



FUNCTION TABLE

| INPUT | | OUTPUT |
|-------|---|--------|
| A | B | Y |
| H | H | L |
| L | X | H |
| X | L | H |

LOGIC DIAGRAM (positive logic)



ABSOLUTE MAXIMUM RATINGS (Note 2)

| PARAMETER | SYMBOL | RATINGS | UNIT |
|----------------------|-----------|------------|-------------|
| Supply Voltage | V_{CC} | -0.5 ~ 7.0 | V |
| Input Clamp Current | I_{IK} | ± 20 | mA |
| Output Clamp Current | I_{OK} | ± 20 | mA |
| Output Current | I_{OUT} | ± 25 | mA |
| VCC or GND Current | I_{CC} | ± 50 | mA |
| Storage Temperature | T_{STG} | -65 ~ +150 | $^{\circ}C$ |

Notes:

1. Absolute maximum ratings are those values beyond which the device could be permanently damaged.

Absolute maximum ratings are stress ratings only and functional device operation is not implied.

2. The input and output voltage ratings may be exceeded if the input and output current ratings are observed.

THERMAL DATA

| PARAMETER | | SYMBOL | RATINGS | UNIT |
|---------------------|-----------|---------------|---------|-----------------------------|
| Junction to Ambient | DIP-14 | θ_{JA} | 90 | $^{\circ}\text{C}/\text{W}$ |
| | SOP-14U | | 95 | $^{\circ}\text{C}/\text{W}$ |
| | TSSOP-14U | | 120 | $^{\circ}\text{C}/\text{W}$ |

RECOMMENDED OPERATING CONDITIONS

| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|------------------------------------|------------|----------------------|-----|-----|----------|--------------------|
| Supply Voltage | V_{CC} | | 2 | | 6 | V |
| Input Voltage | V_{IN} | | 0 | | V_{CC} | V |
| Output Voltage | V_{OUT} | | 0 | | V_{CC} | V |
| Input Transition Rise or Fall Rate | t_R, t_F | $V_{CC}=2\text{V}$ | | | 1000 | ns |
| | | $V_{CC}=4.5\text{V}$ | | | 500 | ns |
| | | $V_{CC}=6\text{V}$ | | | 400 | ns |
| Operating Temperature | T_A | | -40 | | +125 | $^{\circ}\text{C}$ |

Note: All unused inputs of the device must be held at VCC or GND to ensure proper device operation.

STATIC CHARACTERISTICS ($T_A=25^{\circ}\text{C}$, unless otherwise specified)

| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|---------------------------|----------|--|------|-------|------|------|
| High-Level Input Voltage | V_{IH} | $V_{CC}=2\text{V}$ | 1.5 | | | V |
| | | $V_{CC}=4.5\text{V}$ | 3.15 | | | V |
| | | $V_{CC}=6\text{V}$ | 4.2 | | | V |
| Low-Level Input Voltage | V_{IL} | $V_{CC}=2\text{V}$ | | | 0.5 | V |
| | | $V_{CC}=4.5\text{V}$ | | | 1.35 | V |
| | | $V_{CC}=6\text{V}$ | | | 1.8 | V |
| High-Level Output Voltage | V_{OH} | $V_{CC}=2\text{V}, V_{IN}=V_{IH}$ or $V_{IL}, I_{OH}=-20\mu\text{A}$ | 1.9 | 1.998 | | V |
| | | $V_{CC}=4.5\text{V}, V_{IN}=V_{IH}$ or $V_{IL}, I_{OH}=-20\mu\text{A}$ | 4.4 | 4.499 | | V |
| | | $V_{CC}=6\text{V}, V_{IN}=V_{IH}$ or $V_{IL}, I_{OH}=-20\mu\text{A}$ | 5.9 | 5.999 | | V |
| | | $V_{CC}=4.5\text{V}, V_{IN}=V_{IH}$ or $V_{IL}, I_{OH}=-4\text{mA}$ | 3.98 | 4.3 | | V |
| | | $V_{CC}=6\text{V}, V_{IN}=V_{IH}$ or $V_{IL}, I_{OH}=-5.2\text{mA}$ | 5.48 | 5.8 | | V |
| Low-Level Output Voltage | V_{OL} | $V_{CC}=2\text{V}, V_{IN}=V_{IH}$ or $V_{IL}, I_{OL}=20\mu\text{A}$ | | 0.002 | 0.1 | V |
| | | $V_{CC}=4.5\text{V}, V_{IN}=V_{IH}$ or $V_{IL}, I_{OL}=20\mu\text{A}$ | | 0.001 | 0.1 | V |
| | | $V_{CC}=6\text{V}, V_{IN}=V_{IH}$ or $V_{IL}, I_{OL}=20\mu\text{A}$ | | 0.001 | 0.1 | V |
| | | $V_{CC}=4.5\text{V}, V_{IN}=V_{IH}$ or $V_{IL}, I_{OL}=4\text{mA}$ | | 0.17 | 0.26 | V |
| | | $V_{CC}=6\text{V}, V_{IN}=V_{IH}$ or $V_{IL}, I_{OL}=5.2\text{mA}$ | | 0.15 | 0.26 | V |

| | | | | | |
|--------------------------|--------------|--|-----------|-----------|---------|
| Input Leakage Current | $I_{(LEAK)}$ | $V_{CC}=6V, V_{IN}=V_{CC}$ or 0 | ± 0.1 | ± 100 | nA |
| Quiescent Supply Current | I_Q | $V_{CC}=6V, V_{IN}=V_{CC}$ or 0, $I_{OUT}=0$ | | 2 | μA |
| Input Capacitance | C_{IN} | $V_{CC}=2V\sim 6V$ | 3 | 10 | pF |

DYNAMIC CHARACTERISTICS

($T_A=25^\circ C$, Input: $t_r=t_f=6ns$; PRR $\leq 1MHz$, unless otherwise specified)

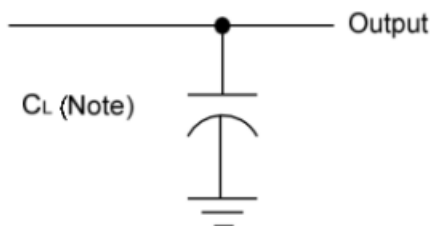
| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|---|--------------------|-------------------------|-----|-----|-----|------|
| Propagation Delay, (A) or (B) to (Y) | t_{PLH}, t_{PHL} | $V_{CC}=2V, C_L=50pF$ | | 45 | 90 | ns |
| | | $V_{CC}=4.5V, C_L=50pF$ | | 9 | 18 | ns |
| | | $V_{CC}=6V, C_L=50pF$ | | 8 | 15 | ns |
| Output Transition Times | t_{TLH}, t_{THL} | $V_{CC}=2V, C_L=50pF$ | | 38 | 75 | ns |
| | | $V_{CC}=4.5V, C_L=50pF$ | | 8 | 15 | ns |
| | | $V_{CC}=6V, C_L=50pF$ | | 6 | 13 | ns |

OPERATING CHARACTERISTICS ($T_A=25^\circ C$, unless otherwise specified)

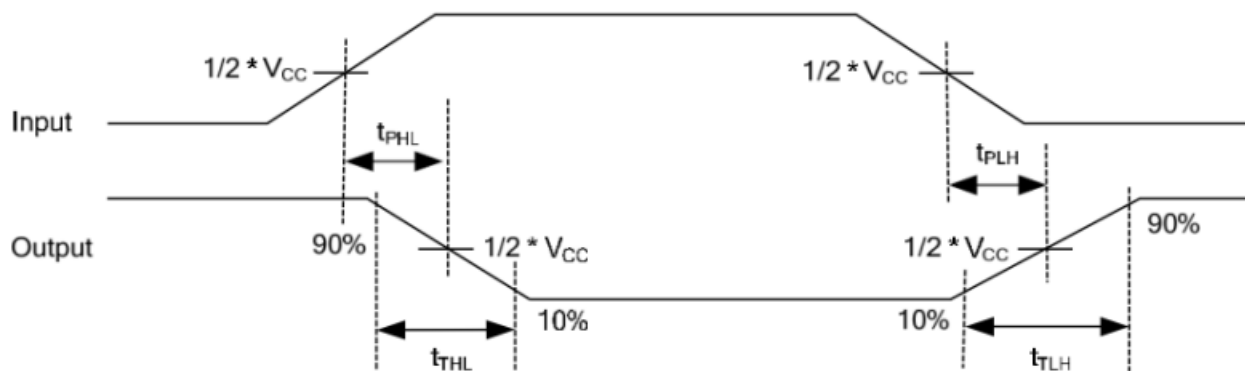
| PARAMETER | SYMBOL | TEST CONDITION | RATINGS | UNIT |
|----------------------------------|----------|----------------|---------|------|
| Power Dissipation Capacitance | C_{PD} | No Load | 20 | pF |

Note: All unused inputs of the device must be held at VCC or GND to ensure proper device operation.

TEST CIRCUIT AND WAVEFORMS



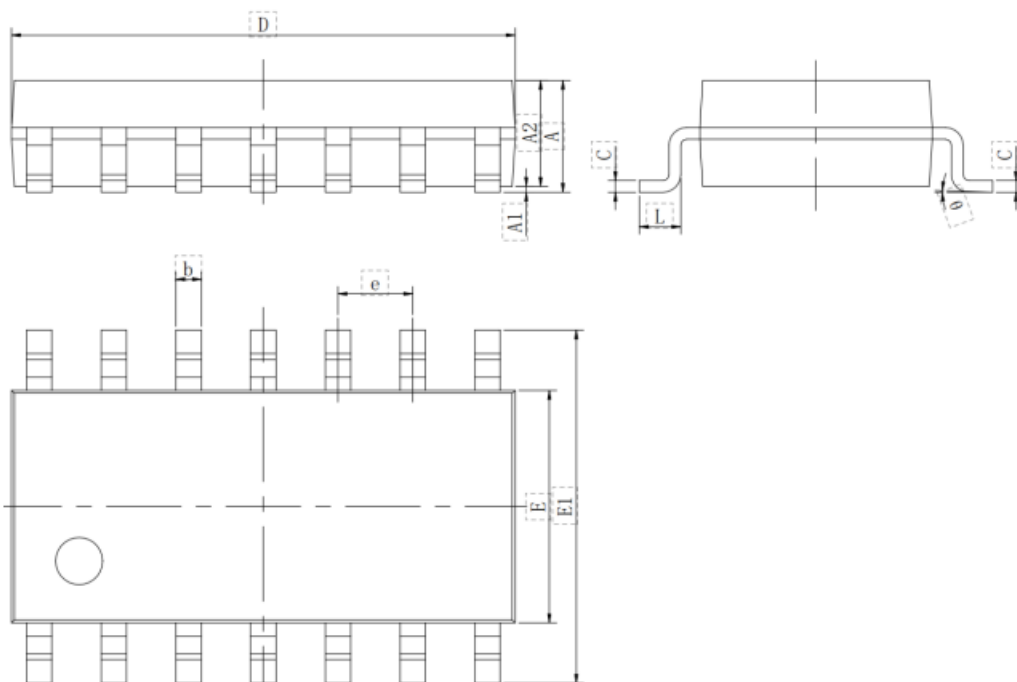
Note: C_L includes probe and jig capacitance.



Outline Dimensions

SOP-14

Unit : mm



| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|--------|---------------------------|-------|----------------------|-------|
| | Min | Max | Min | Max |
| A | 1.350 | 1.750 | 0.053 | 0.069 |
| A1 | 0.100 | 0.250 | 0.004 | 0.010 |
| A2 | 1.350 | 1.550 | 0.053 | 0.061 |
| b | 0.330 | 0.510 | 0.013 | 0.020 |
| c | 0.170 | 0.250 | 0.007 | 0.010 |
| D | 8.360 | 8.760 | 0.329 | 0.345 |
| E | 3.800 | 4.000 | 0.150 | 0.157 |
| E1 | 5.800 | 6.200 | 0.228 | 0.244 |
| e | 1.270 (BSC) | | 0.050 (BSC) | |
| L | 0.400 | 1.270 | 0.016 | 0.050 |
| theta | 0 ° | 8 ° | 0 ° | 8 ° |

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