



# U74HCT00

CMOS IC

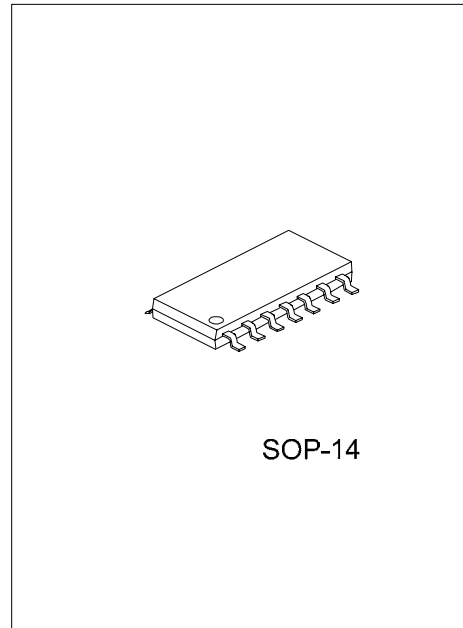
## QUADRUPLE 2-INPUT NAND GATE

### DESCRIPTION

The U74HCT00 is a Quadruple 2-input NAND gate which provides the Function  $Y = \overline{A \cdot B}$ .

### FEATURES

- \* Operation voltage range: 4.5~5.5V
- \* Low power dissipation:  $I_{CC} = 20\mu A$ (Max)
- \* High speed:  $t_{pd} = 10ns$ (Typ)
- \*  $\pm 4mA$  output drive at 5V
- \* Input are TTL-voltage compatible



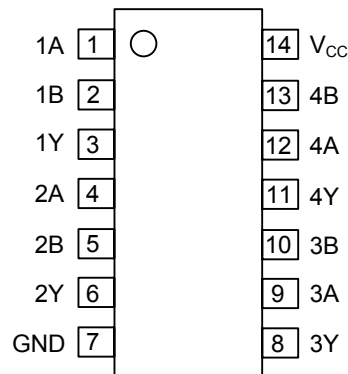
\*Pb-free plating product number:  
U74HCT00L

### ORDERING INFORMATION

| Ordering Number |                   | Package | Packing   |
|-----------------|-------------------|---------|-----------|
| Normal          | Lead Free Plating |         |           |
| U74HCT00-S14-R  | U74HCT00L-S14-R   | SOP-14  | Tape Reel |
| U74HCT00-S14-T  | U74HCT00L-S14-T   | SOP-14  | Tube      |

|                        |   |   |
|------------------------|---|---|
| <p>U74HCT00L-S14-R</p> | <p>(1) Packing Type<br/>(2) Package Type<br/>(3) Lead Plating</p> | <p>(1) R: Tape Reel, T: Tube<br/>(2) S14: SOP-14<br/>(3) L: Lead Free Plating, Blank: Pb/Sn</p> |
|------------------------|---|---|

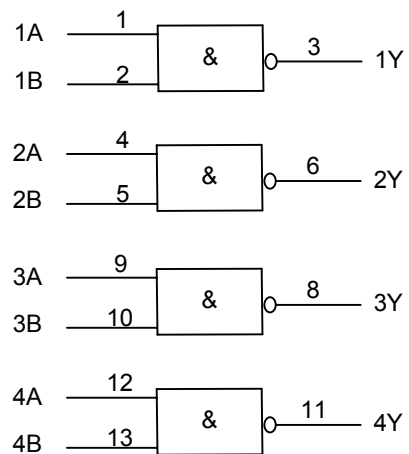
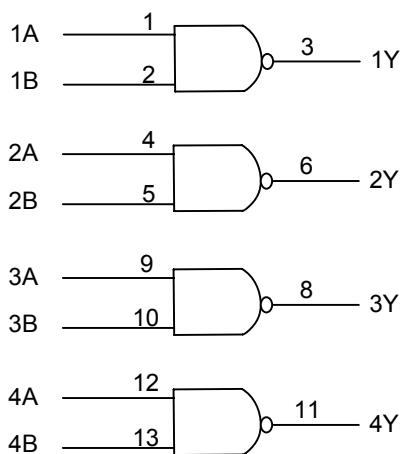
■ PIN CONFIGURATION



■ FUNCTION TABLE (each gate)

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

■ LOGIC DIAGRAM (positive logic)



■ ABSOLUTE MAXIMUM RATINGS (unless otherwise specified)(Note 1)

| PARAMETER               | SYMBOL    | RATINGS    | UNIT |
|-------------------------|-----------|------------|------|
| Supply Voltage          | $V_{CC}$  | -0.5~7     | V    |
| Input Clamp Current     | $I_{IK}$  | ±20        | mA   |
| Output Clamp Current    | $I_{OK}$  | ±20        | mA   |
| Output Current          | $I_{OUT}$ | ±25        | mA   |
| $V_{CC}$ or GND Current | $I_{CC}$  | ±50        | mA   |
| Storage Temperature     | $T_{STG}$ | -65 ~ +150 |      |

Note 1. The input and output voltage ratings may be exceeded if the input and output current ratings are observed.

2. 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.

■ THERMAL DATA

| PARAMETER                           | SYMBOL        | RATINGS | UNIT |
|-------------------------------------|---------------|---------|------|
| Thermal Resistance Junction Ambient | $\theta_{JA}$ | 76      | /W   |

■ RECOMMENDED OPERATING CONDITIONS

| PARAMETER                           | SYMBOL     | CONDITIONS | MIN | TYP | MAX      | UNIT |
|-------------------------------------|------------|------------|-----|-----|----------|------|
| Supply Voltage                      | $V_{CC}$   |            | 4.5 | 5.0 | 5.5      | V    |
| Input Voltage                       | $V_{IN}$   |            | 0   |     | $V_{CC}$ | V    |
| Output Voltage                      | $V_{OUT}$  |            | 0   |     | $V_{CC}$ | V    |
| Input Transition Rise or Fall Times | $t_R, t_F$ |            |     |     | 500      | ns   |
| Operating Temperature               | $T_A$      |            | -40 |     | 85       |      |

■ STATIC CHARACTERISTICS ( $T_A=25$  , unless otherwise specified)

| PARAMETER                           | SYMBOL        | TEST CONDITIONS  | MIN  | TYP   | MAX  | UNIT |
|-------------------------------------|---------------|--|------|-------|------|------|
| High-Level Input Voltage            | $V_{IH}$      | $V_{CC}=4.5V\sim 5.5V$   | 2    |       |      | V    |
| Low-Level Input Voltage             | $V_{IL}$      | $V_{CC}=4.5V\sim 5.5V$   |      |       | 0.8  | V    |
| High-Level Output Voltage           | $V_{OH}$      | $V_{CC}=4.5V, I_{OH}=-20\mu A$   | 4.4  | 4.499 |      | V    |
|                                     |               | $V_{CC}=4.5V, I_{OH}=-4mA$   | 3.98 | 4.3   |      |      |
| Low-Level Output Voltage            | $V_{OL}$      | $V_{CC}=4.5V, I_{OL}=20\mu A$  |      | 0.001 | 0.1  | V    |
|                                     |               | $V_{CC}=4.5V, I_{OL}=4mA$  |      | 0.17  | 0.26 |      |
| Input Leakage Current               | $I_{I(LEAK)}$ | $V_{CC}=0\sim 6.0V, V_{IN}=V_{CC}$ or GND                                |      | ±0.1  | ±100 | nA   |
| Quiescent Supply Current            | $I_Q$         | $V_{CC}=5.5V, V_{IN}=V_{CC}$ or GND, $I_{OUT}=0$                         |      |       | 2    | μA   |
| Additional Quiescent Supply Current | $\Delta I_Q$  | $V_{CC}=5.5V$ , One input at 0.5V or 2.4V, other inputs at 0 or $V_{CC}$ |      | 1.4   | 2.4  | mA   |
| Input Capacitance                   | $C_{IN}$      | $V_{CC}=4.5V\sim 5.5V, V_{IN}=V_{CC}$ or GND                             |      | 3     | 10   | pF   |

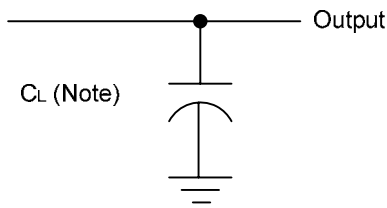
■ DYNAMIC CHARACTERISTICS ( $T_A=25$  , Input:  $t_R, t_F\leq 6ns$ ; PRR≤1MHz)

| PARAMETER  | SYMBOL              | TEST CONDITIONS           | MIN | TYP | MAX | UNIT |
|--|---------------------|---------------------------|-----|-----|-----|------|
| Propagation delay from input (nA) and (nB) to output(nY) | $t_{PHL} / t_{PLH}$ | $V_{CC}=4.5V, C_L = 50pF$ |     | 11  | 20  | ns   |
|  |                     | $V_{CC}=5.5V, C_L = 50pF$ |     | 10  | 18  |      |
| Output transition time                                   | $t_{THL} / t_{TLH}$ | $V_{CC}=4.5V, C_L = 50pF$ |     | 9   | 15  | ns   |
|  |                     | $V_{CC}=5.5V, C_L = 50pF$ |     | 8   | 14  |      |

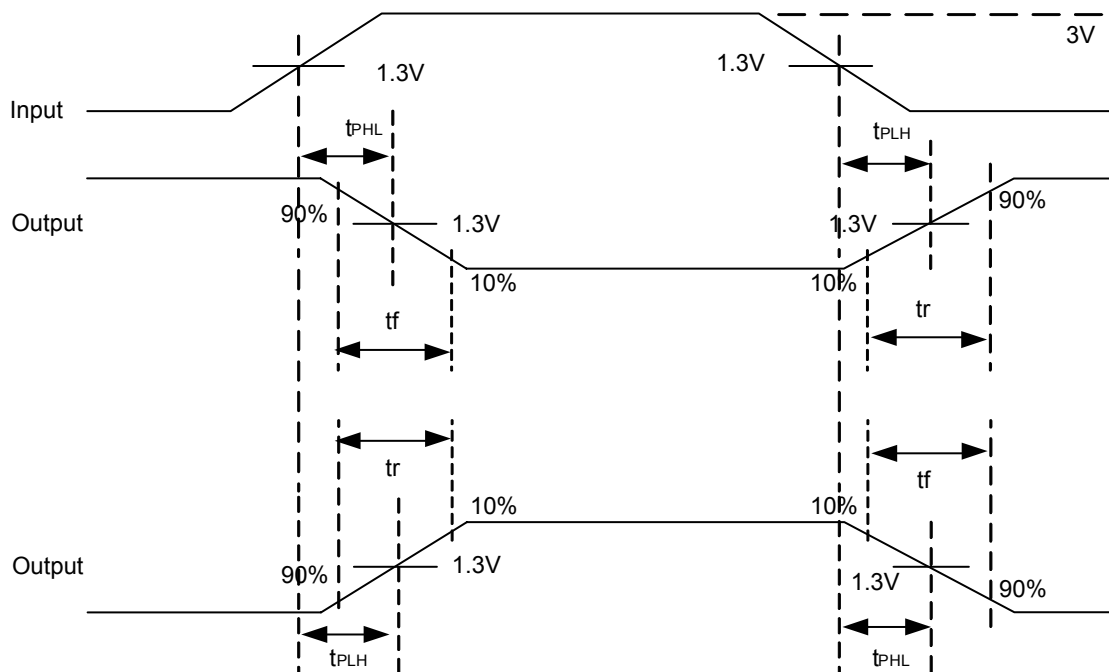
■ OPERATING CHARACTERISTICS ( $T_A=25$  , unless otherwise specified)

| PARAMETER                     | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|-------------------------------|--------|-----------------|-----|-----|-----|------|
| Power Dissipation Capacitance | Cpd    | No load         |     | 20  |     | pF   |

■ TEST CIRCUIT AND WAVEFORMS



Note:  $C_L$  includes probe and jig capacitance.



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