



U74AHC00

CMOS IC

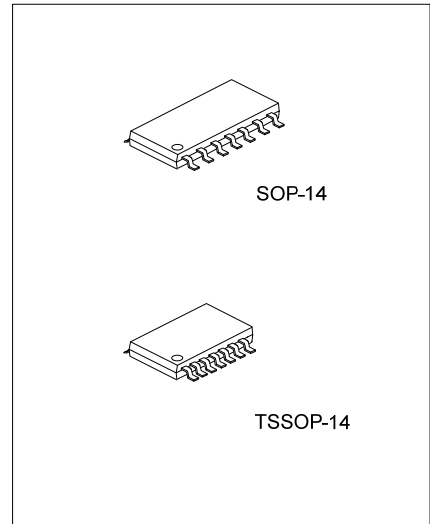
QUADRUPLE 2-INPUT POSITIVE-NAND GATES

DESCRIPTION

The **U74AHC00** is QUADRUPLE 2-INPUT POSITIVE-NAND GATES. Which provides the function $Y = \overline{A \times B}$.

FEATURES

- * Operation voltage range: 2~5.5V
- * Max t_{pd} of 6.5 ns at 5 V
- * Low power consumption, 20-uA Max I_{CC}
- * $\pm 8mA$ output drive at 5 V

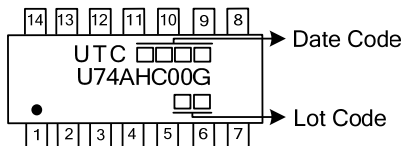


ORDERING INFORMATION

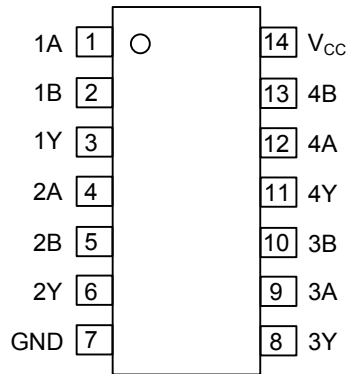
| Ordering Number | Package | Packing |
|-----------------|----------|-----------|
| U74AHC00G-S14-R | SOP-14 | Tape Reel |
| U74AHC00G-P14-R | TSSOP-14 | Tape Reel |

| | |
|--|---|
| <p>U74AHC00G-S14-R</p> <ul style="list-style-type: none"> (1) Packing Type (2) Package Type (3) Green Package | <ul style="list-style-type: none"> (1) R: Tape Reel (2) S14: SOP-14, P14: TSSOP-14 (3) G: Halogen Free and Lead Free |
|--|---|

MARKING



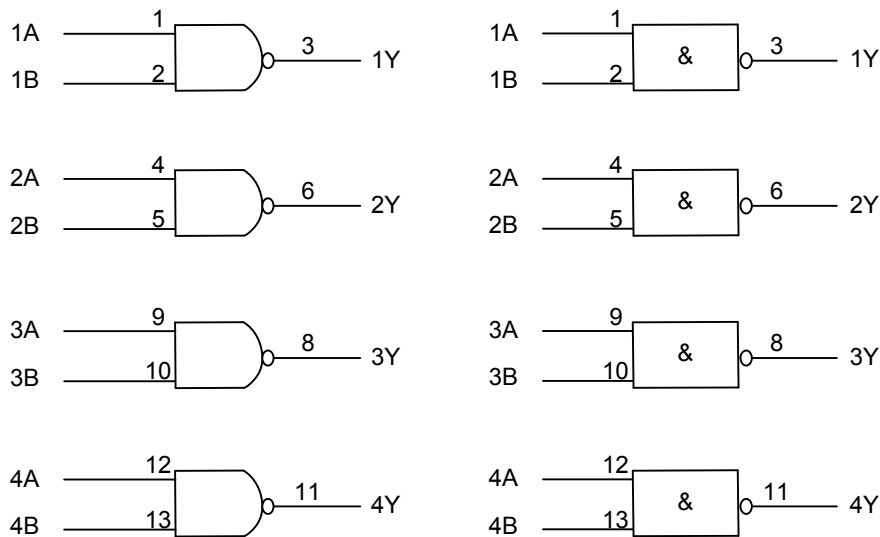
■ PIN CONFIGURATION



■ FUNCTION TABLE (each gate)

| INPUT(A) | INPUT(B) | OUTPUT(Y) |
|----------|----------|-----------|
| L | L | H |
| L | H | H |
| H | L | H |
| H | H | L |

■ LOGIC DIAGRAM (positive logic)



■ ABSOLUTE MAXIMUM RATING (unless otherwise specified)

| PARAMETER | SYMBOL | RATINGS | UNIT |
|-------------------------|-----------|--------------------|------|
| Supply Voltage | V_{CC} | -0.5~7 | V |
| Input Voltage | V_{IN} | -0.5~7 | V |
| Output Voltage | V_{OUT} | -0.5~ $V_{CC}+0.5$ | 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 | °C |

Note: 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.

■ RECOMMENDED OPERATING CONDITIONS

| PARAMETER | SYMBOL | CONDITIONS | MIN | TYP | MAX | UNIT |
|------------------------------------|------------|----------------------|-----|-----|----------|------|
| Supply Voltage | V_{CC} | | 2 | | 5.5 | V |
| Input Voltage | V_{IN} | | 0 | | 5.5 | V |
| Output Voltage | V_{OUT} | | 0 | | V_{CC} | V |
| Input Transition Rise or Fall Rate | t_R, t_F | $V_{CC}=3.3\pm 0.3V$ | | | 100 | ns/V |
| | | $V_{CC}=5.0\pm 0.5V$ | | | 20 | |
| Operating Temperature | T_A | | -40 | | 85 | °C |

■ STATIC CHARACTERISTICS ($T_A=25^\circ C$)

| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|---------------------------|---------------|--|------|-----|------|------|
| High-Level Input Voltage | V_{IH} | $V_{CC}=2.0V$ | 1.5 | | | V |
| | | $V_{CC}=3.0V$ | 2.1 | | | |
| | | $V_{CC}=5.5V$ | 3.85 | | | |
| Low-Level Input Voltage | V_{IL} | $V_{CC}=2.0V$ | | | 0.5 | V |
| | | $V_{CC}=3.0V$ | | | 0.9 | |
| | | $V_{CC}=5.5V$ | | | 1.65 | |
| High-Level Output Voltage | V_{OH} | $V_{CC}=2.0V, I_{OH}=-50\mu A$ | 1.9 | 2.0 | | V |
| | | $V_{CC}=3.0V, I_{OH}=-50\mu A$ | 2.9 | 3.0 | | |
| | | $V_{CC}=4.5V, I_{OH}=-50\mu A$ | 4.4 | 4.5 | | |
| | | $V_{CC}=3.0V, I_{OH}=-4mA$ | 2.58 | | | |
| | | $V_{CC}=4.5V, I_{OH}=-8mA$ | 3.94 | | | |
| Low-Level Output Voltage | V_{OL} | $V_{CC}=2.0V, I_{OL}=50\mu A$ | | | 0.1 | V |
| | | $V_{CC}=3.0V, I_{OL}=50\mu A$ | | | 0.1 | |
| | | $V_{CC}=4.5V, I_{OL}=50\mu A$ | | | 0.1 | |
| | | $V_{CC}=3.0V, I_{OL}=4mA$ | | | 0.36 | |
| | | $V_{CC}=4.5V, I_{OL}=8mA$ | | | 0.36 | |
| Input Leakage Current | $I_{I(LEAK)}$ | $V_{CC}=0\sim 5.5V, V_{IN}=5.5$ or GND | | | ±0.1 | μA |
| Quiescent Supply Current | I_Q | $V_{CC}=5.5V, V_{IN}=V_{CC}$ or GND, $I_{OUT}=0$ | | | 2 | μA |
| Input Capacitance | C_{IN} | $V_{CC}=5.0V, V_{IN}=V_{CC}$ or GND | | 2 | 10 | pF |

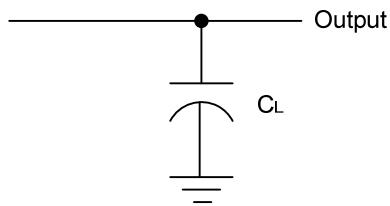
■ DYNAMIC CHARACTERISTICS ($T_A=25^\circ\text{C}$) (Input: $t_R, t_F \leq 3\text{ns}$; $\text{PRR} \leq 1\text{MHz}$)

| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|---|-----------|--|-----|-----|------|------|
| Propagation Delay from Input (A and B) to Output(Y) | t_{PLH} | $V_{CC}=3.3\pm 0.3\text{V}, C_L=15\text{pF}$ | | 5.5 | 7.9 | ns |
| | t_{PHL} | | | 5.5 | 7.9 | |
| | t_{PLH} | $V_{CC}=3.3\pm 0.3\text{V}, C_L=50\text{pF}$ | | 8 | 11.4 | |
| | t_{PHL} | | | 8 | 11.4 | |
| Propagation Delay from Input (A and B) to Output(Y) | t_{PLH} | $V_{CC}=5.0\pm 0.5\text{V}, C_L=15\text{pF}$ | | 3.7 | 5.5 | ns |
| | t_{PHL} | | | 3.7 | 5.5 | |
| | t_{PLH} | $V_{CC}=5.0\pm 0.5\text{V}, C_L=50\text{pF}$ | | 5.2 | 7.5 | |
| | t_{PHL} | | | 5.2 | 7.5 | |

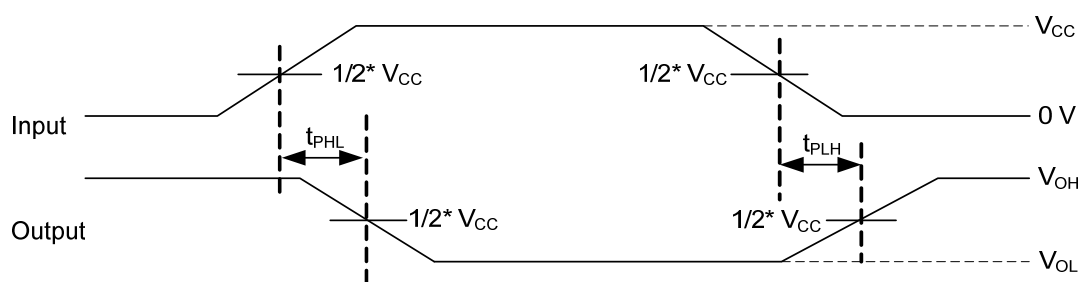
■ OPERATING CHARACTERISTICS ($V_{CC}=5\text{V}$; $T_A=25^\circ\text{C}$)

| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|-------------------------------|--------|--------------------------|-----|-----|-----|------|
| Power Dissipation Capacitance | Cpd | No load, $f=1\text{MHz}$ | | 9.5 | | pF |

■ TEST CIRCUIT AND WAVEFORM



C_L includes probe and jig capacitance.



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