



U74AHC1G00

CMOS IC

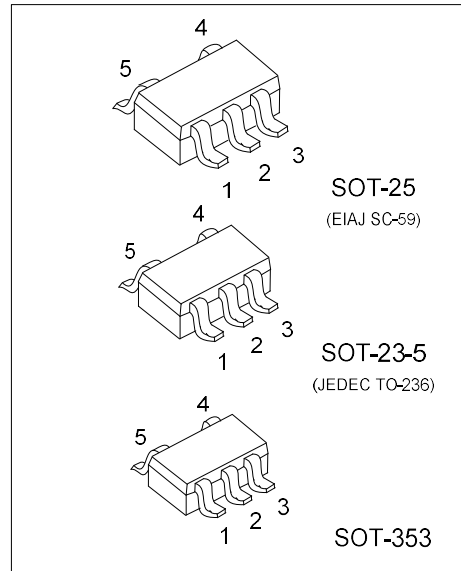
2-INPUT NAND GATE

DESCRIPTION

The **U74AHC1G00** is a 2-input NAND gate which provides the Function $Y = \overline{A \times B}$.

FEATURES

- * Operation Voltage Range: 2~5.5V
- * Low Power Dissipation: $I_{CC}=1.0\mu A$ (Max)
- * High Speed: $t_{PD}=4.3ns$ (Typ)

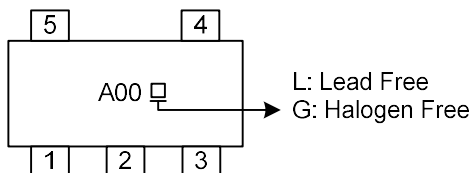


ORDERING INFORMATION

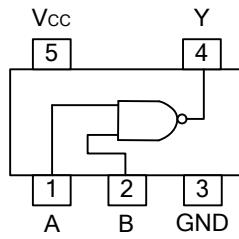
| Ordering Number | | Package | Packing |
|-------------------|-------------------|----------|-----------|
| Lead Free | Halogen Free | | |
| U74AHC1G00L-AE5-R | U74AHC1G00G-AE5-R | SOT-23-5 | Tape Reel |
| U74AHC1G00L-AF5-R | U74AHC1G00G-AF5-R | SOT-25 | Tape Reel |
| U74AHC1G00L-AL5-R | U74AHC1G00G-AL5-R | SOT-353 | Tape Reel |

| | |
|---|--|
| <p>U74AHC1G00G-AE5-R</p> <p>(1) Packing Type (2) Package Type (3) Green Package</p> | <p>(1) R: Tape Reel (2) AE5: SOT-23-5, AF5: SOT-25, AL5: SOT-353 (3) G: Halogen Free and Lead Free, L: Lead Free</p> |
|---|--|

MARKING



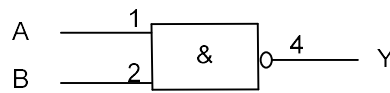
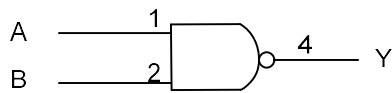
■ **PIN CONFIGURATION**



■ **FUNCTION TABLE** (each gate)

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

■ **LOGIC DIAGRAM** (positive logic)



■ ABSOLUTE MAXIMUM RATING (Note 1)

| 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 |

Notes: 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.

■ 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 |
| High-Level Output Current | I_{OH} | $V_{CC}=2V$ | | | -50 | μA |
| | | $V_{CC}=3.3\pm 0.3V$ | | | -4 | mA |
| | | $V_{CC}=5\pm 0.3V$ | | | -8 | mA |
| Low-Level Output Current | I_{OL} | $V_{CC}=2V$ | | | 50 | μA |
| | | $V_{CC}=3.3\pm 0.3V$ | | | 4 | mA |
| | | $V_{CC}=5\pm 0.5V$ | | | 8 | mA |
| Input Transition Rise or Fall Rate | $\Delta t/\Delta V$ | $V_{CC}=3.3+0.3V$ | | | 100 | ns/V |
| | | $V_{CC}=5.0+0.5V$ | | | 20 | |
| Operating Temperature | T_A | | -40 | | +125 | °C |

■ STATIC CHARACTERISTICS

| PARAMETER | SYMBOL | TEST CONDITIONS | $T_A=25^\circ C$ | | | $T_A=-40\sim +125^\circ C$ | | | UNIT |
|---------------------------|---------------|--|------------------|-----|------|----------------------------|-----|------|------|
| | | | MIN | TYP | MAX | MIN | TYP | MAX | |
| High-Level Input Voltage | V_{IH} | $V_{CC}=2.0V$ | 1.5 | | | 1.5 | | | V |
| | | $V_{CC}=3.0V$ | 2.1 | | | 2.1 | | | |
| | | $V_{CC}=5.5V$ | 3.85 | | | 3.85 | | | |
| Low-Level Input Voltage | V_{IL} | $V_{CC}=2.0V$ | | | 0.5 | | | 0.5 | V |
| | | $V_{CC}=3.0V$ | | | 0.9 | | | 0.9 | |
| | | $V_{CC}=5.5V$ | | | 1.65 | | | 1.65 | |
| High-Level Output Voltage | V_{OH} | $V_{CC}=2.0V, I_{OH}=-50\mu A$ | 1.9 | 2.0 | | 1.9 | | | V |
| | | $V_{CC}=3.0V, I_{OH}=-50\mu A$ | 2.9 | 3.0 | | 2.9 | | | |
| | | $V_{CC}=4.5V, I_{OH}=-50\mu A$ | 4.4 | 4.5 | | 4.4 | | | |
| | | $V_{CC}=3.0V, I_{OH}=-4mA$ | 2.58 | | | 2.4 | | | |
| | | $V_{CC}=4.5V, I_{OH}=-8mA$ | 3.94 | | | 3.7 | | | |
| Low-Level Output Voltage | V_{OL} | $V_{CC}=2.0V, I_{OL}=50\mu A$ | | | 0.1 | | | 0.1 | V |
| | | $V_{CC}=3.0V, I_{OL}=50\mu A$ | | | 0.1 | | | 0.1 | |
| | | $V_{CC}=4.5V, I_{OL}=50\mu A$ | | | 0.1 | | | 0.1 | |
| | | $V_{CC}=3.0V, I_{OL}=4mA$ | | | 0.36 | | | 0.55 | |
| | | $V_{CC}=4.5V, I_{OL}=8mA$ | | | 0.36 | | | 0.55 | |
| | | | | | | | | | |
| Input Leakage Current | $I_{I(LEAK)}$ | $V_{CC}=0\sim 5.5V, V_{IN}=V_{CC}$ or GND | | | ±0.1 | | | ±2 | μA |
| Quiescent Supply Current | I_{CC} | $V_{CC}=5.5V, V_{IN}=V_{CC}$ or GND, $I_{OUT}=0$ | | | 1 | | | 40 | μA |

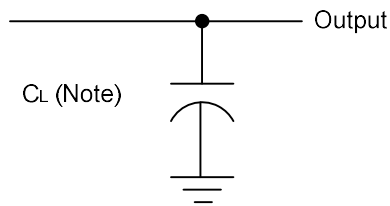
■ **DYNAMIC CHARACTERISTICS** (Input: $t_R, t_F \leq 3\text{ns}$; $P_{RR} \leq 1\text{MHz}$)

| PARAMETER | SYMBOL | TEST CONDITIONS | $T_A=25^\circ\text{C}$ | | | $T_A=-40\sim+125^\circ\text{C}$ | | | UNIT |
|---|-----------|--|------------------------|-----|------|---------------------------------|-----|------|------|
| | | | MIN | TYP | MAX | MIN | TYP | MAX | |
| Propagation Delay Time Input (A or B) to Output(Y) | t_{PLH} | $V_{CC}=3.3\pm 0.3\text{V}, C_L=15\text{pF}$ | | 5.5 | 7.9 | 1 | | 10.5 | ns |
| | t_{PHL} | | | 5.5 | 7.9 | 1 | | 10.5 | ns |
| | t_{PLH} | $V_{CC}=3.3\pm 0.3\text{V}, C_L=50\text{pF}$ | | 8 | 11.4 | 1 | | 14.5 | ns |
| | t_{PHL} | | | 8 | 11.4 | 1 | | 14.5 | ns |
| Propagation Delay Time Input (A or B) to Output(Y) | t_{PLH} | $V_{CC}=5\pm 0.5\text{V}, C_L=15\text{pF}$ | | 3.7 | 5.5 | 1 | | 7 | ns |
| | t_{PHL} | | | 3.7 | 5.5 | 1 | | 7 | ns |
| | t_{PLH} | $V_{CC}=5\pm 0.5\text{V}, C_L=50\text{pF}$ | | 5.2 | 7.5 | 1 | | 9.5 | ns |
| | t_{PHL} | | | 5.2 | 7.5 | 1 | | 9.5 | ns |

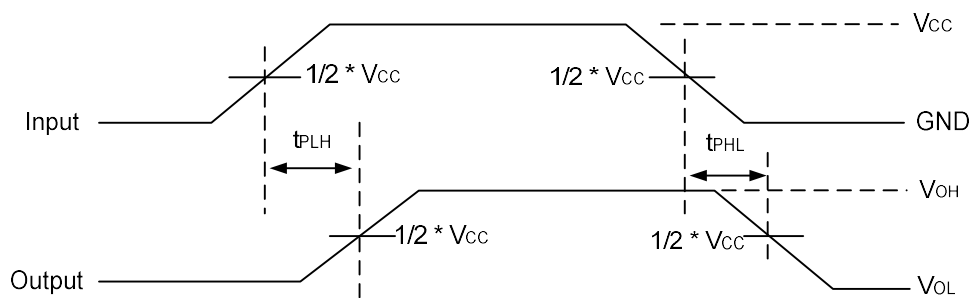
■ **OPERATING CHARACTERISTICS**

| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|-------------------------------|----------|--|-----|-----|-----|------|
| Input Capacitance | C_{IN} | $V_{CC}=5\text{V}, V_{IN}=V_{CC}$ or GND | | 4 | 10 | pF |
| Power Dissipation Capacitance | C_{PD} | No load, $f=1\text{MHz}, V_{CC}=5\text{V}$ | | 9.5 | | pF |

■ TEST CIRCUIT AND WAVEFORMS



Note: CL includes probe and jig capacitance.



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