



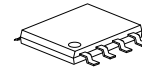
## U74AHC2G02

CMOS IC

### DUAL 2-INPUT NOR GATE

#### DESCRIPTION

The **U74AHC2G32** is a high speed Si-gate CMOS device.  
The **U74AHC2G32** provides two 2-input NOR gates.



TSSOP-8

#### FEATURES

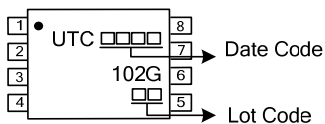
- \* Symmetrical output impedance
- \* High noise immunity
- \* Low power dissipation
- \* Balanced propagation delays
- \* Multiple package options
- \* Specified from -40 °C to +125 °C

#### ORDERING INFORMATION

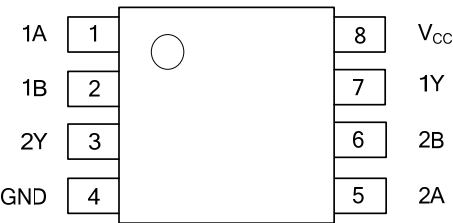
| Ordering Number   | Package | Packing   |
|-------------------|---------|-----------|
| U74AHC2G02G-P08-R | TSSOP-8 | Tape Reel |

|                   |                                                        |                                                                           |
|-------------------|--------------------------------------------------------|---------------------------------------------------------------------------|
| U74AHC2G02G-P08-R | (1)Packing Type<br>(2)Package Type<br>(3)Green Package | (1) R: Tape Reel<br>(2) P08: TSSOP-8<br>(3) G: Halogen Free and Lead Free |
|-------------------|--------------------------------------------------------|---------------------------------------------------------------------------|

#### MARKING



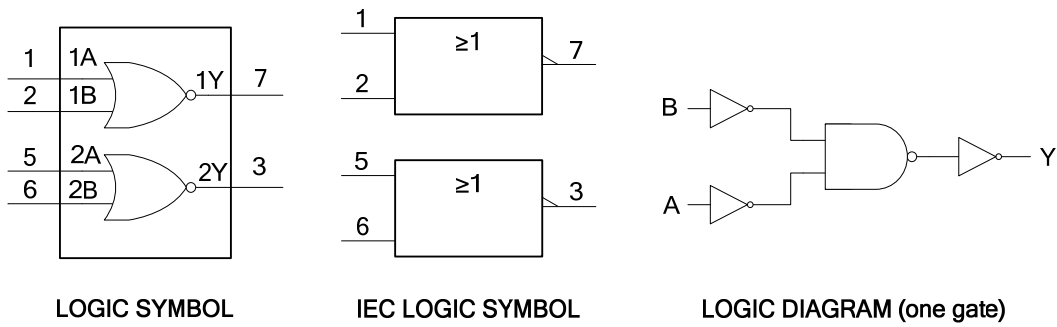
PIN CONFIGURATION



PIN CONFIGURATION

| PIN No | SYMBOL          | DESCRIPTION    |
|--------|-----------------|----------------|
| 1, 5   | 1A, 2A          | Data input     |
| 2, 6   | 1B, 2B          | Data input     |
| 4      | GND             | Ground (0V)    |
| 7, 3   | 1Y, 2Y          | Data output    |
| 8      | V <sub>CC</sub> | Supply voltage |

FUNCTIONAL DIAGRAM



FUNCTION TABLE

| Input |    | Output |
|-------|----|--------|
| nA    | nB | nY     |
| L     | L  | H      |
| L     | H  | L      |
| H     | L  | L      |
| H     | H  | L      |

H=HIGH voltage level; L=LOW voltage level.

### ■ ABSOLUTE MAXIMUM RATING

| PARAMETER               | SYMBOL    | CONDITIONS                             | MIN  | TYP | MAX      | UNIT |
|-------------------------|-----------|----------------------------------------|------|-----|----------|------|
| Supply Voltage          | $V_{CC}$  |                                        | -0.5 |     | +7.0     | V    |
| Input Voltage           | $V_I$     |                                        | -0.5 |     | +7.0     | V    |
| Input Clamping Current  | $I_{IK}$  | $V_I < -0.5V$                          | -20  |     |          | mA   |
| Output Clamping Current | $I_{OK}$  | $V_O < -0.5V$ or $V_O > V_{CC} + 0.5V$ |      |     | $\pm 20$ | mA   |
| Output Current          | $I_O$     | $V_O = -0.5V \sim (V_{CC} + 0.5V)$     |      |     | $\pm 25$ | mA   |
| Supply Current          | $I_{CC}$  |                                        |      |     | 50       | mA   |
| Ground Current          | $I_{GND}$ |                                        | -50  |     |          | mA   |
| Power Dissipation       | $P_D$     |                                        |      |     | 300      | mW   |
| Storage Temperature     | $T_{STG}$ |                                        | -65  |     | +150     | °C   |

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

### ■ RECOMMENDED OPERATING CONDITIONS

| PARAMETER                           | SYMBOL                | TEST CONDITIONS          | MIN | TYP | MAX      | UNIT |
|-------------------------------------|-----------------------|--------------------------|-----|-----|----------|------|
| Supply Voltage                      | $V_{CC}$              |                          | 2   | 5   | 5.5      | V    |
| Input Voltage                       | $V_I$                 |                          | 0   |     | 5.5      | V    |
| Output Voltage                      | $V_O$                 |                          | 0   |     | $V_{CC}$ | V    |
| Input Transition Rise and Fall Rate | $\Delta t / \Delta V$ | $V_{CC} = 3.3V \pm 0.3V$ |     |     | 100      | ns/V |
|                                     |                       | $V_{CC} = 5V \pm 0.5V$   |     |     | 20       |      |
| Ambient Temperature                 | $T_A$                 |                          | -40 | +25 | +125     | °C   |

Note: Voltages are referenced to GND (ground=0V).

### ■ ELECTRICAL CHARACTERISTICS ( $T_A = 25^\circ C$ , unless otherwise specified)

| PARAMETER                 | SYMBOL   | TEST CONDITIONS                                     | MIN  | TYP | MAX       | UNIT    |
|---------------------------|----------|-----------------------------------------------------|------|-----|-----------|---------|
| High-level Input Voltage  | $V_{IH}$ | $V_{CC} = 2V$                                       | 1.5  |     |           | V       |
|                           |          | $V_{CC} = 3V$                                       | 2.1  |     |           |         |
|                           |          | $V_{CC} = 5.5V$                                     | 3.85 |     |           |         |
| Low-level Input Voltage   | $V_{IL}$ | $V_{CC} = 2V$                                       |      |     | 0.5       | V       |
|                           |          | $V_{CC} = 3V$                                       |      |     | 0.9       |         |
|                           |          | $V_{CC} = 5.5V$                                     |      |     | 1.65      |         |
| Output Voltage HIGH-Level | $V_{OH}$ | $V_{CC} = 2V, I_{OH} = -50\mu A$                    | 1.9  | 2.0 |           | V       |
|                           |          | $V_{CC} = 3V, I_{OH} = -50\mu A$                    | 2.9  | 3.0 |           |         |
|                           |          | $V_{CC} = 4.5V, I_{OH} = -50\mu A$                  | 4.4  | 4.5 |           |         |
|                           |          | $V_{CC} = 3V, I_{OH} = -4mA$                        | 2.58 |     |           |         |
|                           |          | $V_{CC} = 4.5V, I_{OH} = -8mA$                      | 3.94 |     |           |         |
| Output Voltage LOW-Level  | $V_{OL}$ | $V_{CC} = 2V, I_{OL} = 50\mu A$                     |      |     | 0.1       | V       |
|                           |          | $V_{CC} = 3V, I_{OL} = 50\mu A$                     |      |     | 0.1       |         |
|                           |          | $V_{CC} = 4.5V, I_{OL} = 50\mu A$                   |      |     | 0.1       |         |
|                           |          | $V_{CC} = 3V, I_{OL} = 4mA$                         |      |     | 0.36      |         |
|                           |          | $V_{CC} = 4.5V, I_{OL} = 8mA$                       |      |     | 0.36      |         |
| Input Leakage Current     | $I_I$    | $V_{CC} = 0$ to $5.5V, V_I = 5.5V$ or GND           |      |     | $\pm 0.1$ | $\mu A$ |
| Quiescent Supply Current  | $I_{CC}$ | $V_{CC} = 5.5V, V_I = V_{CC}$ or GND, $I_{OUT} = 0$ |      |     | 1         | $\mu A$ |

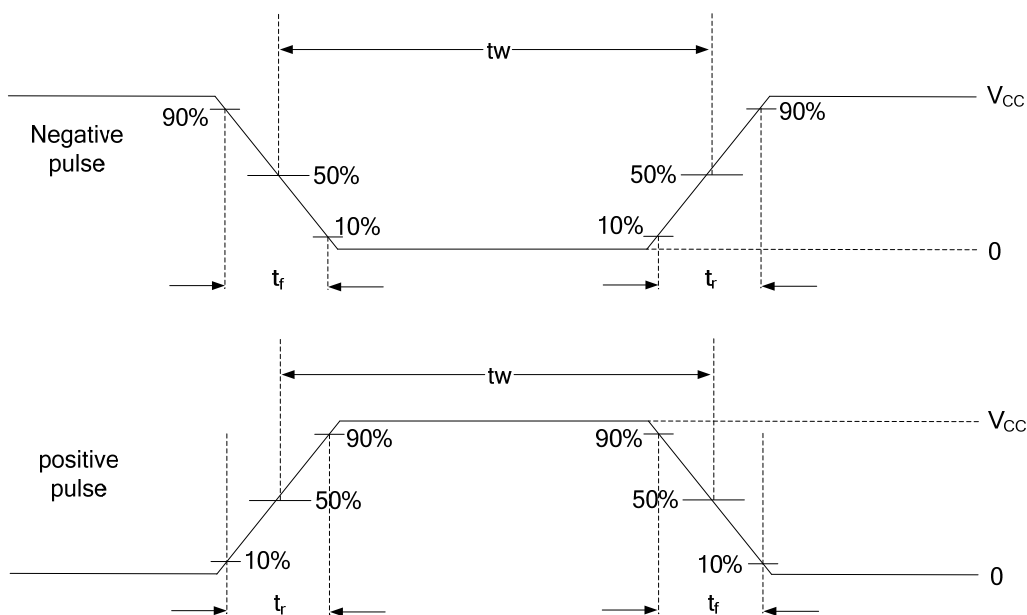
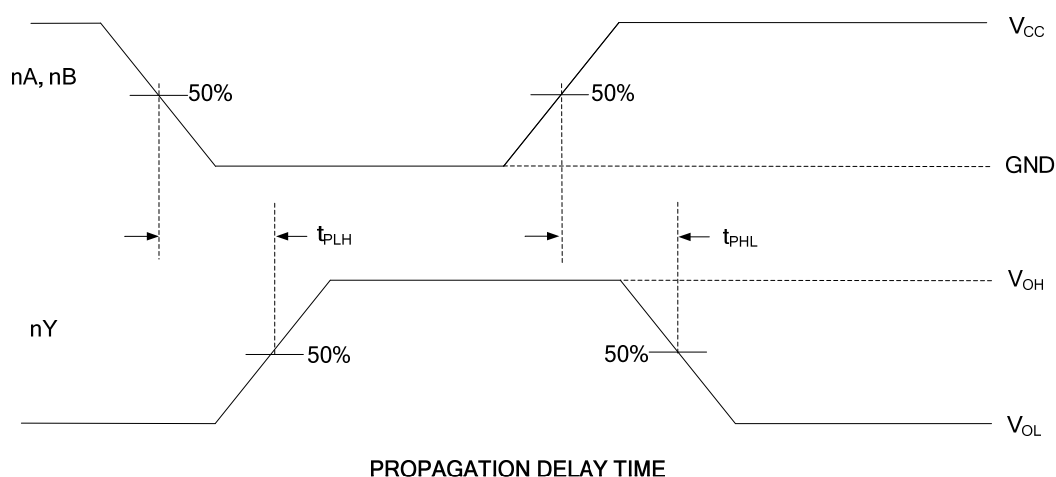
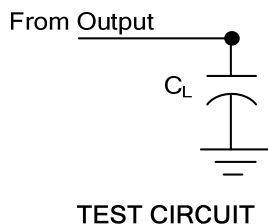
■ **SWITCHING CHARACTERISTICS** ( $t_r = t_f \leq 3\text{ns}$ ,  $T_A = 25^\circ\text{C}$ , unless otherwise specified)

| PARAMETER                                             | SYMBOL              | TEST CONDITIONS            |                   | MIN | TYP | MAX  | UNIT |
|-------------------------------------------------------|---------------------|----------------------------|-------------------|-----|-----|------|------|
| Propagation delay from input (nA, nB ) to output (nY) | $t_{PLH} / t_{PHL}$ | $V_{CC}=3.3\pm0.3\text{V}$ | $C_L=15\text{pF}$ |     | 5.6 | 7.9  | ns   |
|                                                       |                     |                            | $C_L=50\text{pF}$ |     | 8.1 | 11.4 | ns   |
|                                                       |                     | $V_{CC}=5\pm0.5\text{V}$   | $C_L=15\text{pF}$ |     | 3.6 | 5.5  | ns   |
|                                                       |                     |                            | $C_L=50\text{pF}$ |     | 5.1 | 7.5  | ns   |

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

| PARAMETER                     | SYMBOL   | TEST CONDITIONS            | MIN | TYP | MAX | UNIT |
|-------------------------------|----------|----------------------------|-----|-----|-----|------|
| Input Capacitance             | $C_i$    |                            |     | 4   | 10  | pF   |
| Power Dissipation Capacitance | $C_{PD}$ | No load, $f_i=1\text{MHz}$ |     | 15  |     | pF   |

## ■ TEST CIRCUIT AND WAVEFORMS



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