



U74AUC1G02

CMOS IC

SINGLE 2-INPUT NOR GATE

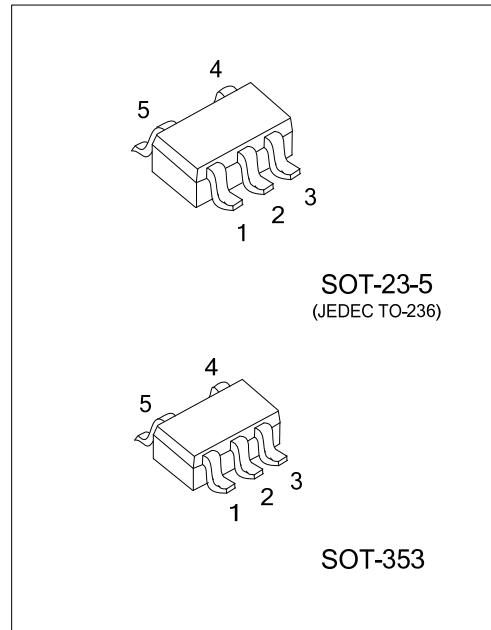
DESCRIPTION

The **U74AUC1G02** is a 2-input NOR gate which provides the function $Y = \overline{A+B}$ or $Y = \overline{A} \cdot \overline{B}$ in positive logic.

This device has power-down protective circuit, preventing device destruction when it is powered down.

FEATURES

- * Operate from 0.8V to 2.7V
- * Low power dissipation : $I_{CC} = 10\mu A$ (Max.)
- * $\pm 8mA$ Output Driver : $V_{CC} = 1.8V$
- * I_{off} Supports partial-Power-Down Mode Operation

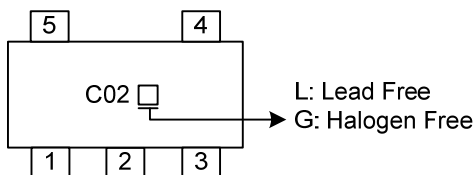


ORDERING INFORMATION

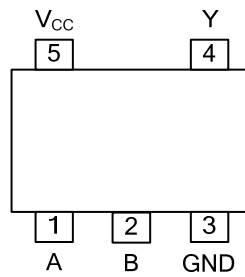
| Ordering Number | | Package | Packing |
|-------------------|-------------------|----------|-----------|
| Lead Free | Halogen Free | | |
| U74AUC1G02L-AE5-R | U74AUC1G02G-AE5-R | SOT-23-5 | Tape Reel |
| U74AUC1G02L-AL5-R | U74AUC1G02G-AL5-R | SOT-353 | Tape Reel |

| | |
|---|---|
| <p>U74AUC1G02G-AE5-R</p> <p>(1) Packing Type (2) Package Type (3) Green Package</p> | <p>(1) R: Tape Reel (2) AE5: SOT-23-5, AL5: SOT-353 (3) G: Halogen Free and Lead Free, L: Lead Free</p> |
|---|---|

MARKING



■ PIN CONFIGURATION

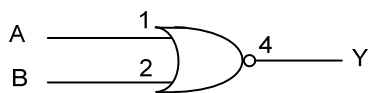


■ FUNCTION TABLE

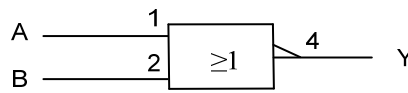
| INPUT(A) | INPUT(B) | OUTPUT(Y) |
|----------|----------|-----------|
| H | H | L |
| H | L | L |
| L | H | L |
| L | L | H |

Note: H: HIGH voltage level; L: LOW voltage level.

■ LOGIC DIAGRAM (positive logic)



Logic symbol



IEC logic symbol

■ ABSOLUTE MAXIMUM RATING

| PARAMETER | SYMBOL | TEST CONDITIONS | RATINGS | UNIT |
|---------------------------|-----------|-------------------------------------|-----------------------|------|
| Supply Voltage | V_{CC} | | -0.5 ~ +3.6 | V |
| Input Voltage | V_{IN} | | -0.5 ~ +3.6 | V |
| Output Voltage | V_{OUT} | Output in the high or low state | -0.5 ~ $V_{CC} + 0.5$ | V |
| | | Output in the power-off state | -0.5 ~ +3.6 | V |
| V_{CC} or GND Current | I_{CC} | | ±100 | mA |
| Continuous Output Current | I_{OUT} | $V_{OUT}=0 \sim V_{CC}$ | ±20 | mA |
| Input Clamp Current | I_{IK} | $V_{IN}<0$ | -50 | mA |
| Output Clamp Current | I_{OK} | $V_{OUT} > V_{CC}$ or $V_{OUT} < 0$ | -50 | mA |
| Storage Temperature Range | 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 | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|------------------------------------|---------------------|--------------------------|-----|-----|----------|------|
| Supply Voltage | V_{CC} | Operating | 0.8 | | 2.7 | V |
| Input Voltage | V_{IN} | | 0 | | 3.6 | V |
| Output Voltage | V_{OUT} | High or low state | 0 | | V_{CC} | V |
| Operating Temperature | T_A | | -40 | | 85 | °C |
| Input Transition Rise or Fall Rate | $\Delta t/\Delta v$ | $V_{CC}=0.8V \sim 1.95V$ | | | 20 | ns/V |
| | | $V_{CC}=2.3V \sim 2.7V$ | | | 10 | ns/V |

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

| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|---------------------------|---------------|---|----------------------|------|----------------------|------|
| High-level Input Voltage | V_{IH} | $V_{CC}=0.8V$ | V_{CC} | | | V |
| | | $V_{CC}=1.1V \sim 1.95V$ | $0.65 \times V_{CC}$ | | | V |
| | | $V_{CC}=2.3V \sim 2.7V$ | 1.7 | | | V |
| Low-level Input Voltage | V_{IL} | $V_{CC}=0.8V$ | | | V_{CC} | V |
| | | $V_{CC}=1.1V \sim 1.95V$ | | | $0.35 \times V_{CC}$ | V |
| | | $V_{CC}=2.3V \sim 2.7V$ | | | 0.7 | V |
| High-Level Output Voltage | V_{OH} | $V_{CC}=0.8 \sim 2.7V, I_{OH}=-100\mu A$ | $V_{CC}-0.1$ | | | V |
| | | $V_{CC}=0.8V, I_{OH}=-700\mu A$ | | 0.55 | | V |
| | | $V_{CC}=1.1V, I_{OH}=-3mA$ | 0.8 | | | V |
| | | $V_{CC}=1.4V, I_{OH}=-5mA$ | 1 | | | V |
| | | $V_{CC}=1.65V, I_{OH}=-8mA$ | 1.2 | | | V |
| Low-Level Output Voltage | V_{OL} | $V_{CC}=2.3V, I_{OH}=-9mA$ | 1.8 | | | V |
| | | $V_{CC}=0.8 \sim 2.7V, I_{OL}=100\mu A$ | | | 0.2 | V |
| | | $V_{CC}=0.8V, I_{OL}=700\mu A$ | | 0.25 | | V |
| | | $V_{CC}=1.1V, I_{OL}=3mA$ | | | 0.3 | V |
| | | $V_{CC}=1.4V, I_{OL}=5mA$ | | | 0.4 | V |
| Input Leakage Current | $I_{I(LEAK)}$ | $V_{CC}=0 \sim 2.7V, V_{IN}=V_{CC}$ or GND | | ±0.1 | ±5 | μA |
| | | $V_{CC}=0V, V_{IN}=V_O$ or 2.7V | | ±0.1 | ±10 | μA |
| Quiescent Supply Current | I_{CC} | $V_{CC}=0.8 \sim 2.7V, V_{IN}=V_{CC}$ or GND $I_{OUT}=0$ | | 0.1 | 10 | μA |
| Input Capacitance | C_I | $V_{CC}=2.5V, V_{IN}=V_{CC}$ or GND | | 3 | | pF |

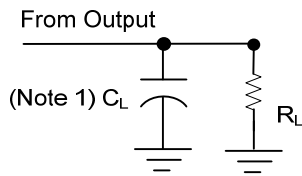
■ SWITCHING CHARACTERISTICS (T_A =25°C , unless otherwise specified)

| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT | |
|--|-------------------------------------|--|----------------------------|-----|-----|------|----|
| Propagation delay from input (A or B) to output(Y) | t _{PLH} / t _{PHL} | C _L =15pF, R _L =2KΩ | V _{CC} =0.8V | | 4.6 | | ns |
| | | | V _{CC} =1.2±0.1V | 0.9 | | | ns |
| | | | V _{CC} =1.5±0.1V | 0.5 | | | ns |
| | | | V _{CC} =1.8±0.15V | 0.4 | 1 | | ns |
| | | | V _{CC} =2.5±0.2V | 0.2 | | | ns |
| | | C _L =30pF, R _L =1KΩ | V _{CC} =1.8±0.15V | 0.7 | 1.3 | | ns |
| C _L =30pF, R _L =500Ω | V _{CC} =2.5±0.2V | 0.5 | 1.2 | | ns | | |

■ OPERATING CHARACTERISTICS (f=10MHz, T_A =25°C , unless otherwise specified)

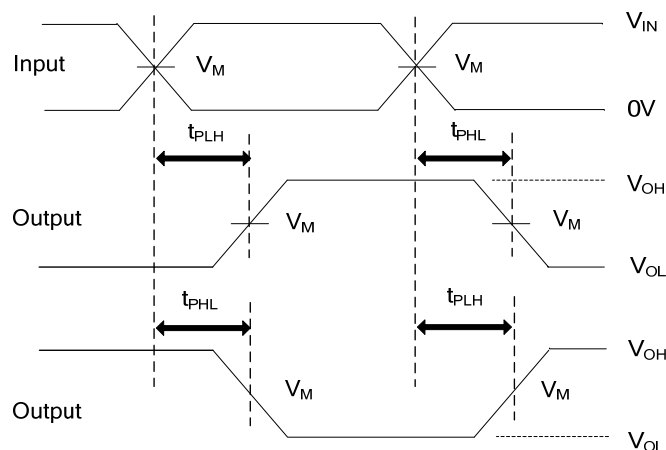
| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|-------------------------------|-----------------|-----------------------|-----|-----|-----|------|
| Power Dissipation Capacitance | C _{PD} | V _{CC} =0.8V | | 15 | | pF |
| | | V _{CC} =1.2V | | 15 | | pF |
| | | V _{CC} =1.5V | | 15 | | pF |
| | | V _{CC} =1.8V | | 15 | | pF |
| | | V _{CC} =2.5V | | 19 | | pF |

■ TEST CIRCUIT AND WAVEFORMS



TEST CIRCUIT

| V_{CC} | C_L | R_L | V_M |
|------------------|-------|--------------|------------|
| 0.8V | 15pF | 2k Ω | $V_{CC}/2$ |
| 1.2V \pm 0.1V | 15pF | 2k Ω | $V_{CC}/2$ |
| 1.5V \pm 0.1V | 15pF | 2k Ω | $V_{CC}/2$ |
| 1.8V \pm 0.15V | 15pF | 2k Ω | $V_{CC}/2$ |
| 2.5V \pm 0.2V | 15pF | 2k Ω | $V_{CC}/2$ |
| 1.8V \pm 0.15V | 30pF | 1k Ω | $V_{CC}/2$ |
| 2.5V \pm 0.2V | 30pF | 500 Ω | $V_{CC}/2$ |



PROPAGATION DELAY TIMES

Notes: 1. C_L includes probe and jig capacitance.

2. All input pulses are supplied by generators having the following characteristics: PRR \leq 10MHz, $Z_O = 50\Omega$.

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