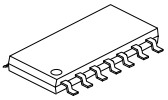
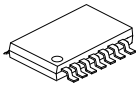
# U74AC32

**CMOS IC**

## QUADRUPLE 2-INPUT POSITIVE-OR GATE



SOP-14



TSSOP-14

### ■ DESCRIPTION

The **U74AC32** is a quad 2-input positive-OR gate. The device performs the Boolean function Y=A+B or $Y = \overline{\overline{A} \bullet \overline{B}}$ in positive logic.

### ■ FEATURES

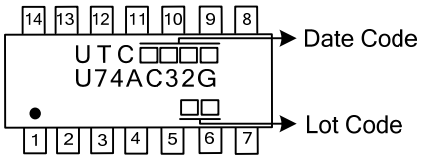
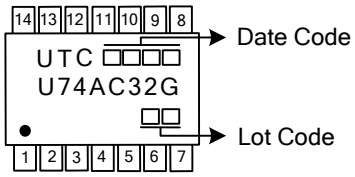
* Operation Voltage Range: 2~6V
* Inputs Accept Voltages to 6V
* Max $t_{pd}$ of 7.5 ns at 5V

### ■ ORDERING INFORMATION

| Ordering Number | Package | Packing |
|---|---|---|
| U74AC32G-S14-R | SOP-14 | Tape Reel |
| U74AC32G-P14-R | TSSOP-14 | Tape Reel |

| | |
|---|---|
| U74AC32G-S14-R<br>(1)Packing Type<br>(2)Package Type<br>(3)Green Package | (1) R: Tape Reel<br>(2) S14: SOP-14, P14: TSSOP-14<br>(3) G: Halogen Free and Lead Free |

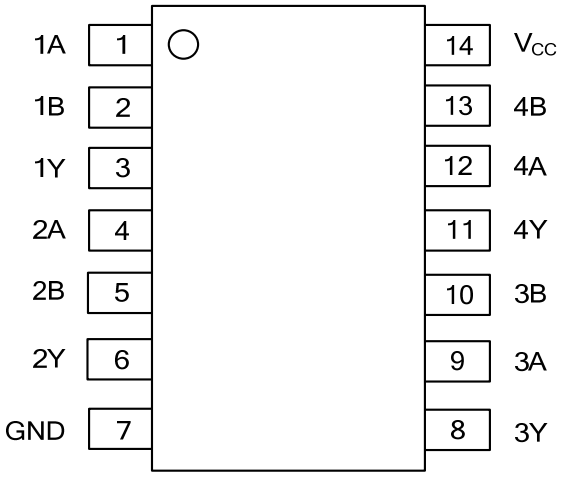
### ■ MARKING

| SOP-14 | TSSOP-14 |
|---|---|
|  |  |




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## ■ PIN CONFIGURATION




## ■ FUNCTION TABLE(EACH GATE)

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

L: low voltage level; H: high voltage level; X: don't care

## ■ LOGIC DIAGRAM,EACH GATE (POSITIVE LOGIC)



## ■ ABSOLUTE MAXIMUM RATING (unless otherwise specified) (Note 2)

| PARAMETER | SYMBOL | RATINGS | UNIT |
|---|---|---|---|
| Supply Voltage | $V_{CC}$ | -0.5~7.0 | V |
| Input Voltage | $V_{IN}$ | -0.5~Vcc+0.5 | V |
| Output Voltage | $V_{OUT}$ | -0.5~$V_{CC}$+0.5 | V |
| Input Clamp Current ($V_I$<0 or $V_I$>$V_{CC}$ ) | $I_{IK}$ | ±20 | mA |
| Output Clamp Current ($V_O$<0 or $V_O$>$V_{CC}$) | $I_{OK}$ | ±20 | mA |
| Output Current($V_O$=0 to $V_{CC}$) | $I_{OUT}$ | ±50 | mA |
| Continuous current through $V_{CC}$ or GND | $I_{CC}$ | ±200 | mA |
| Storage Temperature | $T_{STG}$ | -65 ~ +150 | °C |

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

## ■ THERMAL DATA

| PARAMETER | | SYMBOL | RATINGS | UNIT |
|---|---|---|---|---|
| Junction to Ambient | SOP-14 | $\theta_{JA}$ | 86 | °C/W |
| | TSSOP-14 | | 113 | °C/W |

## ■ RECOMMENDED OPERATING CONDITIONS

| PARAMETER | SYMBOL | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|
| Supply Voltage | $V_{CC}$ | 2 | | 6 | V |
| Input Voltage | $V_{IN}$ | 0 | | Vcc | V |
| Output Voltage | $V_{OUT}$ | 0 | | Vcc | V |
| Operating free-air temperature | $T_A$ | -40 | | 85 | °C |
| Input Transition Rise or Fall Rate | Δt/Δv | | | 8 | ns/V |

## ■ ELECTRICAL CHARACTERISTICS ($T_A$=25°C, unless otherwise specified)

| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|
| HIGH-level input voltage | $V_{IH}$ | $V_{CC}$=3V | 2.1 | | | V |
| | | $V_{CC}$=4.5V | 3.15 | | | |
| | | $V_{CC}$=5.5V | 3.85 | | | |
| LOW-lever output voltage | $V_{IL}$ | $V_{CC}$=3V | | | 0.9 | V |
| | | $V_{CC}$=4.5V | | | 1.35 | |
| | | $V_{CC}$=5.5V | | | 1.65 | |
| High-Level Output Voltage | $V_{OH}$ | $V_{CC}$=3V, $I_{OH}$=-50μA | 2.9 | | | V |
| | | $V_{CC}$=4.5V, $I_{OH}$=-50μA | 4.4 | | | |
| | | $V_{CC}$=5.5V, $I_{OH}$=-50μA | 5.4 | | | |
| | | $V_{CC}$=3V, $I_{OH}$=-12mA | 2.56 | | | |
| | | $V_{CC}$=4.5V, $I_{OH}$=-24mA | 3.86 | | | |
| | | $V_{CC}$=5.5V, $I_{OH}$=-24mA | 4.86 | | | |
| Low-Level Output Voltage | $V_{OL}$ | $V_{CC}$=3V, $I_{OH}$=50μA | | 0.002 | 0.1 | V |
| | | $V_{CC}$=4.5V, $I_{OH}$=50μA | | 0.001 | 0.1 | |
| | | $V_{CC}$=5.5V, $I_{OH}$=50μA | | 0.001 | 0.1 | |
| | | $V_{CC}$=3V, $I_{OH}$=12mA | | | 0.36 | |
| | | $V_{CC}$=4.5V, $I_{OH}$=24mA | | | 0.36 | |
| | | $V_{CC}$=5.5V, $I_{OH}$=24mA | | | 0.36 | |
| Input Leakage Current | $I_I$ | $V_I$=$V_{CC}$ or GND, $V_{CC}$=5.5V | | | ±0.1 | μA |
| Quiescent Supply Current | $I_{CC}$ | $V_I$=GND or $V_{CC}$, $I_O$=0, $V_{CC}$=5.5V | | | 2 | μA |
| Input Capacitance | $C_I$ | $V_I$=$V_{CC}$ or GND, $V_{CC}$=5V | | 2.6 | | pF |

## ■ DYNAMIC CHARACTERISTICS

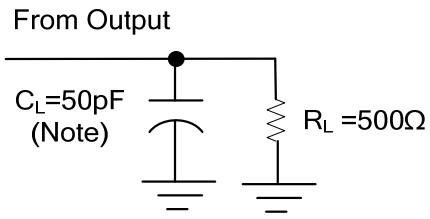
($C_L$=50pF, $R_L$=500Ω, $T_A$=25°C, unless otherwise specified) (see Figure 1)

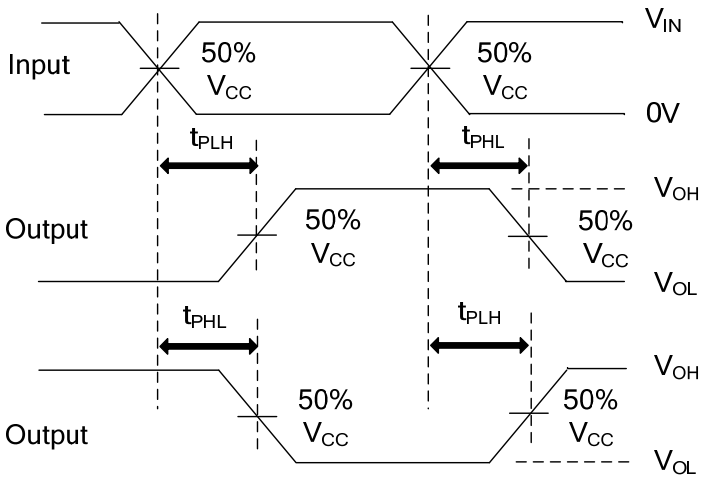
| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|
| Propagation delay from Input(A or B) to Output(Y) | $t_{PLH}$ | $V_{CC}$=3.3V±0.3V | 1.5 | 7 | 9 | ns |
| | | $V_{CC}$=5V±0.5V | 1.5 | 5.5 | 7.5 | ns |
| | $t_{PHL}$ | $V_{CC}$=3.3V±0.3V | 1.5 | 7 | 8.5 | ns |
| | | $V_{CC}$=5V±0.5V | 1.5 | 5 | 7 | ns |

## ■ OPERATING CHARACTERISTICS ($V_{CC}$=5V,$T_A$=25°C, unless otherwise specified)

| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|
| Power Dissipation Capacitance | $C_{PD}$ | $C_L$=50pF, f =1MHz | | 40 | | pF |

## ■ TEST CIRCUIT AND WAVEFORMS




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≤1MHZ, $Z_O$=50Ω, tr≤2.5ns,tf≤2.5ns.
3. The outputs are measured one at a time with one input transition per measurement.

**Figure 1. Load Circuit and Voltage Waveforms**

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