



## U74AC00

CMOS IC

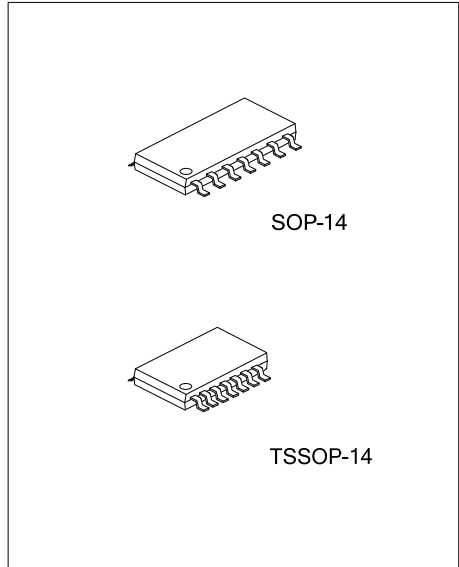
### QUADRUPLE 2-INPUT POSITIVE-NAND GATES

#### DESCRIPTION

The UTC **U74AC00** contains four independent 2-input NAND gates, and those gates perform the Boolean function of  $Y = \overline{A \times B}$  or  $Y = \overline{A + B}$  in positive logic.

#### FEATURES

- \* Operation voltage range: 2V ~ 6V
- \* Low power dissipation:  $I_{CC} = 2\mu A$  (Max)
- \* High speed:  $t_{pd} = 7ns$  (Typ.) @ 5V
- \* Low input current:  $0.1\mu A$  (Max) @ 25°C
- \* Halogen Free

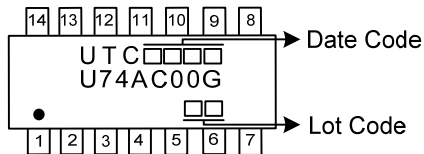


#### ORDERING INFORMATION

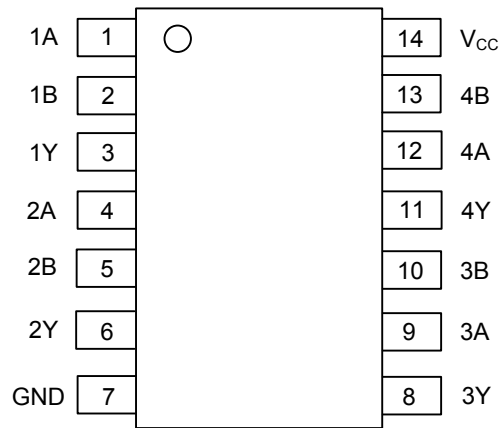
Ordering Number	Package	Packing
U74AC00G-S14-R	SOP-14	Tape Reel
U74AC00G-P14-R	TSSOP-14	Tape Reel

<p>U74AC00G-S14-R</p> <p>(1) Packing Type</p> <p>(2) Package Type</p> <p>(3) Green Package</p>	<p>(1) R: Tape Reel</p> <p>(2) S14: SOP-14, P14: TSSOP-14</p> <p>(3) G: Halogen Free and Lead Free</p>
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#### MARKING



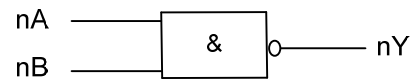
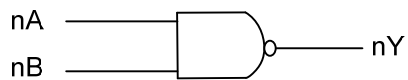
■ PIN CONFIGURATION



■ FUNCTION TABLE (each gate)

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

■ 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 ~ $V_{CC}+0.5$	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	$I_{OUT}$	±50	mA
$V_{CC}$ or GND Current	$I_{CC}$	±200	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	MIN	TYP	MAX	UNIT
Supply Voltage	$V_{CC}$	2		6	V
Input Voltage	$V_{IN}$	0		$V_{CC}$	V
Output Voltage	$V_{OUT}$	0		$V_{CC}$	V
Input Transition Rise or Fall Rate	$t_R, t_F$			8	ns/V
Operating Temperature	$T_A$	-40		85	°C

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Case	SOP-14	76	°C/W
	TSSOP-14	113	°C/W

■ STATIC CHARACTERISTICS ( $T_a = 25^\circ\text{C}$ )

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
High-Level Input Voltage	$V_{IH}$	$V_{CC} = 3\text{V}$	2.1			V
		$V_{CC} = 4.5\text{V}$	3.15			V
		$V_{CC} = 5.5\text{V}$	3.85			V
Low-Level Input Voltage	$V_{IL}$	$V_{CC} = 3\text{V}$			0.9	V
		$V_{CC} = 4.5\text{V}$			1.35	V
		$V_{CC} = 5.5\text{V}$			1.65	V
High-Level Output Voltage	$V_{OH}$	$V_{CC} = 3\text{V}, I_{OH} = -50\mu\text{A}$	2.9			V
		$V_{CC} = 4.5\text{V}, I_{OH} = -50\mu\text{A}$	4.4			V
		$V_{CC} = 5.5\text{V}, I_{OH} = -50\mu\text{A}$	5.4			V
		$V_{CC} = 3\text{V}, I_{OH} = -12\text{mA}$	2.56			V
		$V_{CC} = 4.5\text{V}, I_{OH} = -24\text{mA}$	3.86			V
		$V_{CC} = 5.5\text{V}, I_{OH} = -24\text{mA}$	4.86			V
		$V_{CC} = 5.5\text{V}, I_{OH} = -75\text{mA (Note)}$	3.85			V
Low-Level Output Voltage	$V_{OL}$	$V_{CC} = 3\text{V}, I_{OL} = 50\mu\text{A}$		0.002	0.1	V
		$V_{CC} = 4.5\text{V}, I_{OL} = 50\mu\text{A}$		0.001	0.1	V
		$V_{CC} = 5.5\text{V}, I_{OL} = 50\mu\text{A}$		0.001	0.1	V
		$V_{CC} = 3\text{V}, I_{OL} = 12\text{mA}$			0.36	V
		$V_{CC} = 4.5\text{V}, I_{OL} = 24\text{mA}$			0.36	V
		$V_{CC} = 5.5\text{V}, I_{OL} = 24\text{mA}$			0.36	V
		$V_{CC} = 5.5\text{V}, I_{OL} = 75\text{mA (Note)}$			1.65	V
Input Leakage Current	$I_{I(LEAK)}$	$V_{CC} = 5.5\text{V}, V_{IN} = V_{CC}$ or GND			0.1	$\mu\text{A}$
Quiescent Supply Current	$I_Q$	$V_{CC} = 5.5\text{V}, V_{IN} = V_{CC}$ or GND, $I_{OUT} = 0$			2	$\mu\text{A}$
Input Capacitance	$C_{IN}$	$V_{CC} = 5\text{V}, V_{IN} = V_{CC}$ or GND		2.6		pF

Note: Not more than one output should be tested at a time, and the duration of the test should not exceed 2 ms.

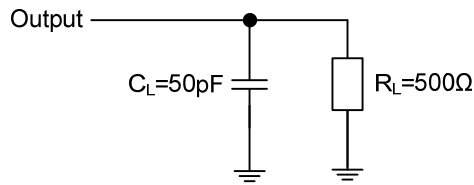
■ DYNAMIC CHARACTERISTICS (Ta=25°C, Input: t<sub>R</sub>=t<sub>F</sub>=2.5ns, unless otherwise specified )

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Propagation delay from Input(A or B) to Output(Y)	t <sub>PLH</sub>	V <sub>CC</sub> =3.3V±0.3V, C <sub>L</sub> =50pf, R <sub>L</sub> =500Ω	2	7	9.5	ns
		V <sub>CC</sub> =5V±0.5V, C <sub>L</sub> =50pF, R <sub>L</sub> =500Ω	1.5	6	8	ns
	t <sub>PHL</sub>	V <sub>CC</sub> =3.3V±0.3V, C <sub>L</sub> =50pf, R <sub>L</sub> =500Ω	1.5	5.5	8	ns
		V <sub>CC</sub> =5V±0.5V, C <sub>L</sub> =50pF, R <sub>L</sub> =500Ω	1.5	4.5	6.5	ns

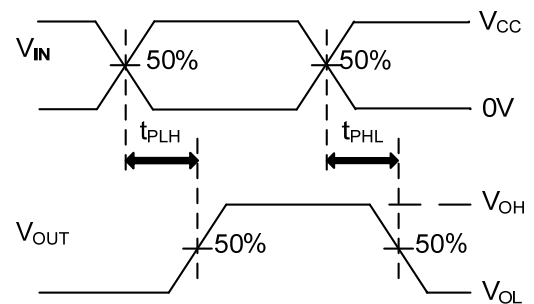
■ OPERATING CHARACTERISTICS (Ta=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNIT
Power Dissipation Capacitance	Cpd	C <sub>L</sub> =50pF, f=1MHz		40		pF

■ TEST CIRCUIT AND WAVEFORMS



Definitions for test circuit



Propagation Delay Times

Note:  $C_L$  includes probe and jig capacitance.  
 $PRR \leq 1\text{MHz}$ ,  $Z_O = 50\Omega$ ,  $t_r \leq 2.5\text{ns}$ ,  $t_f \leq 2.5\text{ns}$ .

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