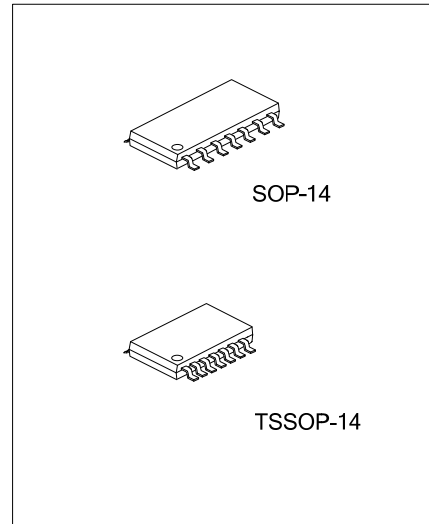




U74AC00

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

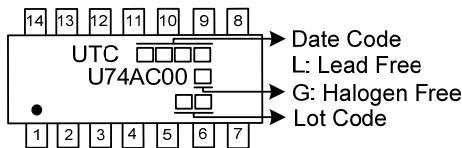
- * Operation voltage range: 2V ~ 6V
- * Low power dissipation: $I_{CC} = 2\mu A$ (Max)
- * High speed: $t_{pd} = 7ns$ (Typ.) @ 5V
- * Low input current: $0.1\mu A$ (Max) @ 25°C

ORDERING INFORMATION

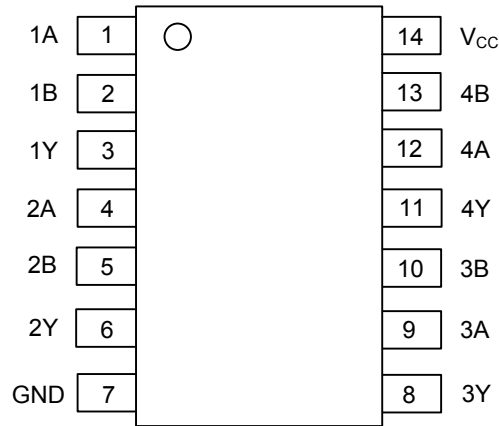
Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74AC00L-S14-R	U74AC00G-S14-R	SOP-14	Tape Reel
U74AC00L-P14-R	U74AC00G-P14-R	TSSOP-14	Tape Reel

<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, L: Lead Free</p>
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MARKING



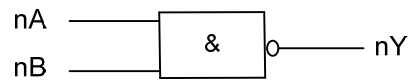
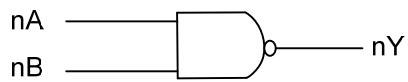
■ PIN CONFIGURATION



■ 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	μA
Quiescent Supply Current	I_Q	$V_{CC} = 5.5\text{V}, V_{IN} = V_{CC}$ or GND, $I_{OUT} = 0$			2	μA
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.

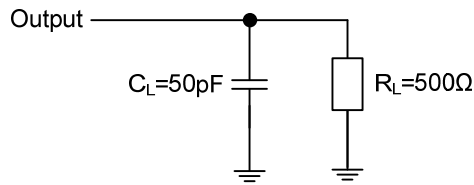
■ DYNAMIC CHARACTERISTICS (Ta=25°C, Input: t_R=t_F=2.5ns, unless otherwise specified)

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, C _L =50pf, R _L =500Ω	2	7	9.5	ns
		V _{CC} =5V±0.5V, C _L =50pF, R _L =500Ω	1.5	6	8	ns
	t _{PHL}	V _{CC} =3.3V±0.3V, C _L =50pf, R _L =500Ω	1.5	5.5	8	ns
		V _{CC} =5V±0.5V, C _L =50pF, R _L =500Ω	1.5	4.5	6.5	ns

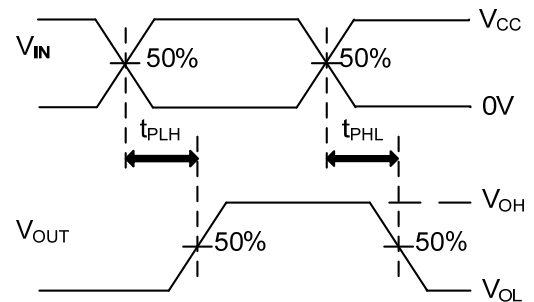
■ OPERATING CHARACTERISTICS (Ta=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNIT
Power Dissipation Capacitance	Cpd	C _L =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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