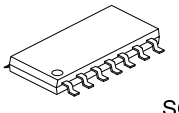
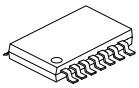
U74AC00

CMOS IC

QUADRUPLE 2-INPUT POSITIVE-NAND GATES



SOP-14U



TSSOP-14U

■ 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 $Y = \overline{A} + \overline{B}$ in positive logic.

■ FEATURES

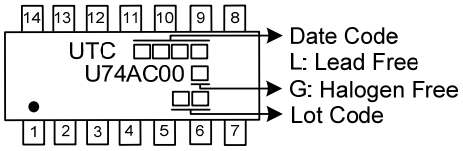
* Operation voltage range: 2V ~ 6V
* Low power dissipation: I_{CC} = 2μA (Max.)
* High speed: t_{PD} = 7ns (Typ.) @ 5.0V
* Low input current: 0.1μA (Max) @ 25°C

■ ORDERING INFORMATION

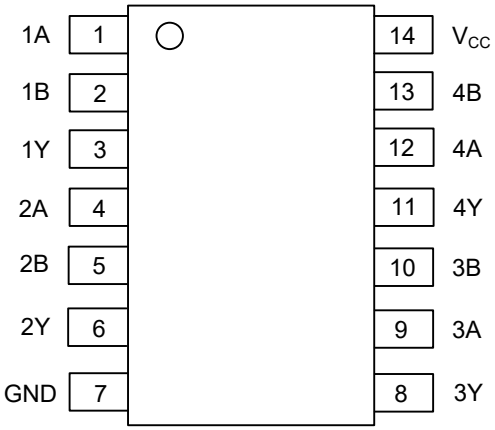
Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74AC00L-UEA-R	U74AC00G-UEA-R	SOP-14U	Tape Reel
U74AC00L-UEB-R	U74AC00G-UEB-R	TSSOP-14U	Tape Reel

U74AC00G-UEA-R (1)Packing Type (2)Package Type (3)Green Package	(1) R: Tape Reel (2) UEA: SOP-14U, UEB: TSSOP-14U (3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING



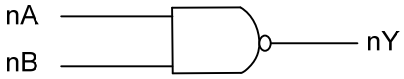
■ PIN CONFIGURATION

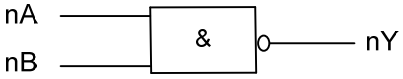


■ FUNCTION TABLE (each gate)

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 (T_A=25°C, 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 (T_A=25°C, unless otherwise specified)

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	Δt/Δv			8	ns/V
Operating Temperature	T_A	-40		+125	°C

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Case	SOP-14U	θ_{JA}	125	°C/W
	TSSOP-14U		150	°C/W

■ STATIC 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
		V_{CC}=5.5V	3.85			V
Low-Level Input Voltage	V_{IL}	V_{CC}=3V			0.9	V
		V_{CC}=4.5V			1.35	V
		V_{CC}=5.5V			1.65	V
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
		V_{CC}=5.5V, I_{OH}=-50μA	5.4			V
		V_{CC}=3V, I_{OH}=-12mA	2.56			V
		V_{CC}=4.5V, I_{OH}=-24mA	3.86			V
		V_{CC}=5.5V, I_{OH}=-24mA	4.86			V
		V_{CC}=5.5V, I_{OH}=-75mA(Note)	3.85			V
Low-Level Output Voltage	V_{OL}	V_{CC}=3V, I_{OL}=50μA		0.002	0.1	V
		V_{CC}=4.5V, I_{OL}=50μA		0.001	0.1	V
		V_{CC}=5.5V, I_{OL}=50μA		0.001	0.1	V
		V_{CC}=3V, I_{OL}=12mA			0.36	V
		V_{CC}=4.5V, I_{OL}=24mA			0.36	V
		V_{CC}=5.5V, I_{OL}=24mA			0.36	V
		V_{CC}=5.5V, I_{OL}=75mA(Note)			1.65	V
Input Leakage Current	$I_{I(LEAK)}$	V_{CC}=5.5V, V_{IN}=V_{CC} or GND			0.1	μA
Quiescent Supply Current	I_Q	V_{CC}=5.5V, V_{IN}=V_{CC} or GND, I_{OUT}=0			2	μA
Input Capacitance	C_{IN}	V_{CC}=5V, 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.

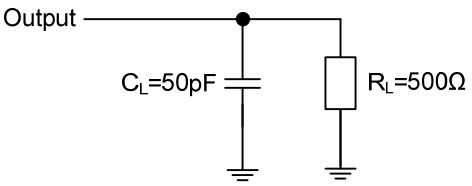
■ DYNAMIC CHARACTERISTICS (Input: t_R=t_F=2.5ns, T_A=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Propagation delay from Input (A or B) to Output (Y)	t_{PLH}	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

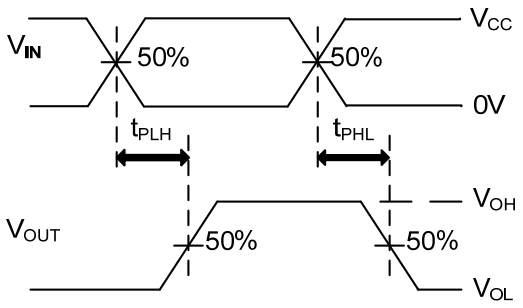
■ OPERATING CHARACTERISTICS (T_A=25°C, unless otherwise specified)

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

■ TEST CIRCUIT AND WAVEFORMS



Definitions for test circuit



Propagation Delay Times

Note: CL includes probe and jig capacitance.
PRR≤1MHz, Z_O = 50Ω, tr ≤2.5ns, tf ≤2.5ns.