



U74AC04

CMOS IC

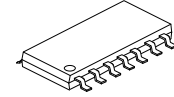
HEX INVERTERS

■ DESCRIPTION

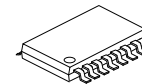
The **U74AC04** contains six independent inverters and performs the Boolean function $Y = \overline{A}$ in positive logic circuit.

■ FEATURES

- * Operation Voltage Range: $V_{CC} = 2V$ to $6V$
- * High Speed: $t_{PD} = 4ns$ (TYP.) at $V_{CC} = 5V$
- * Low Input Current: $I_{IN} = 0.1\mu A$ (Max.) at $T_A = 25^\circ C$
- * Low Power Dissipation: $I_{CC} = 2\mu A$ (Max.) at $T_A = 25^\circ C$



SOP-14



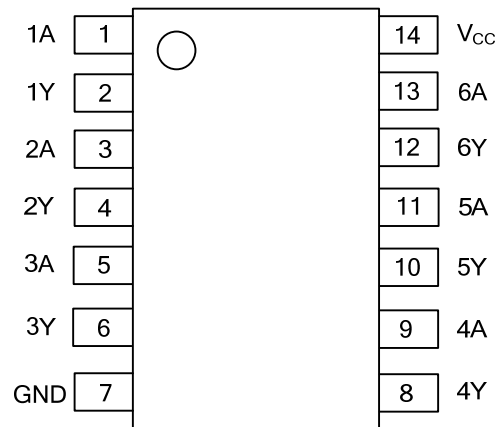
TSSOP-14

■ ORDERING INFORMATION

Ordering Number	Package	Packing
U74AC04G-S14-R	SOP-14	Tape Reel
U74AC04G-P14-R	TSSOP-14	Tape Reel

U74AC04G-P14-R	(1) Packing Type (2) Package Type (3) Halogen Free	(1) R: Tape Reel (2) P14: TSSOP-14, S14: SOP-14 (3) G: Halogen Free
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■ PIN CONFIGURATION

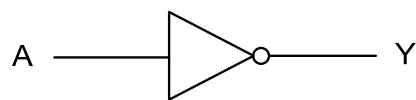


■ FUNCTION TABLE (Each Inverter)

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

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

■ LOGIC DIAGRAM (Each Inverter)



Logic Symbol

■ ABSOLUTE MAXIMUM RATING

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
V_{CC} or GND Current	I_{CC}	±200	mA
Continuous Output Current ($V_{OUT}=0$ to V_{CC})	I_{OUT}	±50	mA
Input Clamp Current ($V_{IN}<0$ or $V_{IN}>V_{CC}$)	I_{IK}	±20	mA
Output Clamp Current ($V_{OUT}<0$ or $V_{OUT}>V_{CC}$)	I_{OK}	±20	mA
Total Power Dissipation ($T_A=55^{\circ}\text{C}$)	P_D	0.5	W
Storage Temperature	T_{STG}	-65 ~ +150	$^{\circ}\text{C}$

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}		2		6	V
Input Voltage	V_{IN}		0		V_{CC}	V
Output Voltage	V_{OUT}		0		V_{CC}	V
Operating Temperature	T_A		-40		85	$^{\circ}\text{C}$
High-Level Output Current	I_{OH}	$V_{CC}=3\text{V}$			-12	mA
		$V_{CC}=4.5\text{V}$			-24	mA
		$V_{CC}=5.5\text{V}$			-24	mA
Low-Level Output Current	I_{OL}	$V_{CC}=3\text{V}$			12	mA
		$V_{CC}=4.5\text{V}$			24	mA
		$V_{CC}=5.5\text{V}$			24	mA
Input Transition Rise or Fall Rate	t_R / t_F		0		8	ns/V

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

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}	$I_{OH}=-50\mu\text{A}$ $V_{CC}=3\text{V}$	2.9	2.99		V
		$I_{OH}=-50\mu\text{A}$ $V_{CC}=4.5\text{V}$	4.4	4.49		V
		$I_{OH}=-50\mu\text{A}$ $V_{CC}=5.5\text{V}$	5.4	5.49		V
		$I_{OH}=-12\text{mA}$ $V_{CC}=3\text{V}$	2.56			V
		$I_{OH}=-24\text{mA}$ $V_{CC}=4.5\text{V}$	3.86			V
		$I_{OH}=-24\text{mA}$ $V_{CC}=5.5\text{V}$	4.86			V
Low-Level Output Voltage	V_{OL}	$I_{OL}=50\mu\text{A}$ $V_{CC}=3\text{V}$			0.1	V
		$I_{OL}=50\mu\text{A}$ $V_{CC}=4.5\text{V}$			0.1	V
		$I_{OL}=50\mu\text{A}$ $V_{CC}=5.5\text{V}$			0.1	V
		$I_{OL}=12\text{mA}$ $V_{CC}=3\text{V}$			0.36	V
		$I_{OL}=24\text{mA}$ $V_{CC}=4.5\text{V}$			0.36	V
		$I_{OL}=24\text{mA}$ $V_{CC}=5.5\text{V}$			0.36	V
Input Leakage Current	$I_{I(LEAK)}$	$V_{IN}=V_{CC}$ or GND, $V_{CC}=5.5\text{V}$			±0.1	μA
Quiescent Supply Current	I_Q	$V_{IN}=V_{CC}$ or GND, $I_{OUT}=0$ $V_{CC}=5.5\text{V}$			2	μA
Input Capacitance	C_{IN}	$V_{IN}=V_{CC}$ or GND		2.8		pF

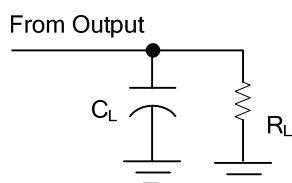
■ SWITCHING CHARACTERISTICS ($T_A=25^{\circ}\text{C}$)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Propagation delay from input (nA) to output(nY)	t_{PLH}	$V_{CC}=3.3\pm0.3\text{V}, C_L=50\text{pF}, R_L=500\Omega$	1.5	4.5	9	ns
	t_{PHL}		1.5	4.5	8.5	ns
	t_{PLH}	$V_{CC}=5\pm0.5\text{V}, C_L=50\text{pF}, R_L=500\Omega$	1.5	4	7	ns
	t_{PHL}		1.5	3.5	6.5	ns

■ OPERATING CHARACTERISTICS ($T_A=25^{\circ}\text{C}$)

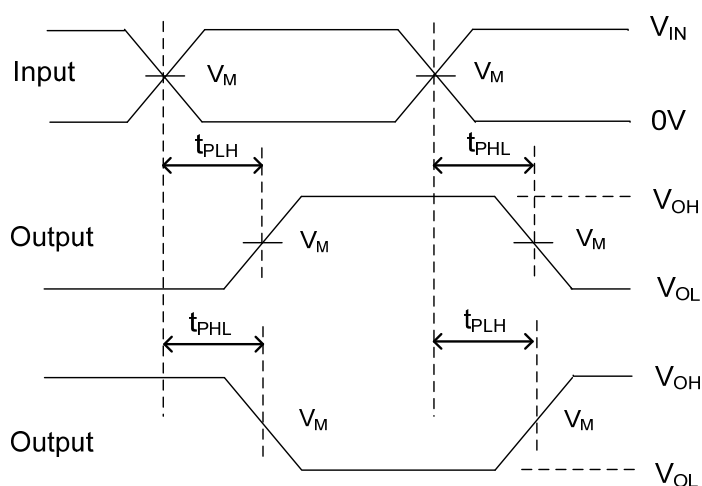
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Power Dissipation Capacitance	C_{PD}	$C_L=50\text{pF}, f=10\text{MHz}$		45		pF

■ TEST CIRCUIT AND WAVEFORMS



TEST CIRCUIT

V_{CC}	INPUTS		V_M	C_L	R_L
	V_{IN}	t_R, t_F			
$3.3V \pm 0.3V$	V_{CC}	$\leq 2.5ns$	$V_{CC}/2$	50pF	500 Ω
$5V \pm 0.5V$	V_{CC}	$\leq 2.5ns$	$V_{CC}/2$	50pF	500 Ω



VOLTAGE WAVEFORMS

Note: C_L includes probe and jig capacitance.

All input pulses are supplied by generators having the following characteristics: PRR $\leq 1MHz$, $Z_o = 50\Omega$.

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