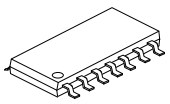
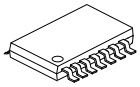
U74AC04

CMOS IC

HEX INVERTERS



SOP-14



TSSOP-14

■ 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}=0.1μA(Max.) at T_A =25°C
* Low Power Dissipation: I_{CC}=2μA(Max.) at T_A =25°C

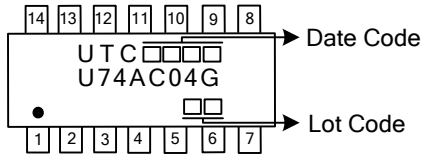
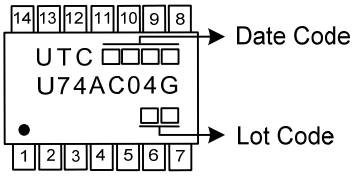
■ ORDERING INFORMATION

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

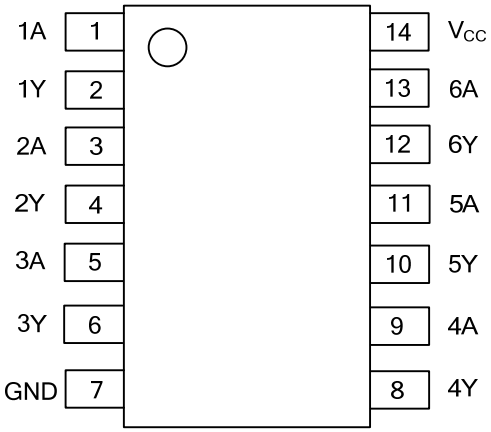
U74AC04G-P14-R
(1)Packing Type
(2)Package Type
(3)Green Package

(1) R: Tape Reel
(2) P14: TSSOP-14, S14: SOP-14
(3) G: Halogen Free and Lead Free

■ MARKING

SOP-14	TSSOP-14
	

■ PIN CONFIGURATION

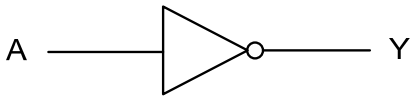


■ FUNCTION TABLE (Each Inverter)

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°C)	P_D	0.5	W
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	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	°C
High-Level Output Current	I_{OH}	V_{CC}=3V			-12	mA
		V_{CC}=4.5V			-24	mA
		V_{CC}=5.5V			-24	mA
Low-Level Output Current	I_{OL}	V_{CC}=3V			12	mA
		V_{CC}=4.5V			24	mA
		V_{CC}=5.5V			24	mA
Input Transition Rise or Fall Rate	t_R / t_F		0		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
		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}	I_{OH}=-50μA	V_{CC}=3V	2.9	2.99		V
		I_{OH}=-50μA	V_{CC}=4.5V	4.4	4.49		V
		I_{OH}=-50μA	V_{CC}=5.5V	5.4	5.49		V
		I_{OH}=-12mA	V_{CC}=3V	2.56			V
		I_{OH}=-24mA	V_{CC}=4.5V	3.86			V
		I_{OH}=-24mA	V_{CC}=5.5V	4.86			V
Low-Level Output Voltage	V_{OL}	I_{OL}=50μA	V_{CC}=3V			0.1	V
		I_{OL}=50μA	V_{CC}=4.5V			0.1	V
		I_{OL}=50μA	V_{CC}=5.5V			0.1	V
		I_{OL}=12mA	V_{CC}=3V			0.36	V
		I_{OL}=24mA	V_{CC}=4.5V			0.36	V
		I_{OL}=24mA	V_{CC}=5.5V			0.36	V
Input Leakage Current	$I_{I(LEAK)}$	V_{IN}= V_{CC} or GND, V_{CC}=5.5V				±0.1	μA
Quiescent Supply Current	I_Q	V_{IN}= V_{CC} or GND, I_{OUT}=0 V_{CC}=5.5V				2	μA
Input Capacitance	C_{IN}	V_{IN}= V_{CC} or GND			2.8		pF

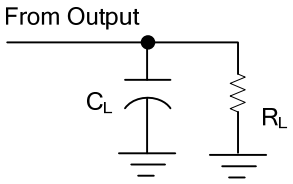
■ SWITCHING CHARACTERISTICS (T_A=25°C)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Propagation delay from input (nA) to output(nY)	t_{PLH}	V_{CC}=3.3±0.3V,C_L=50pF, R_L=500Ω	1.5	4.5	9	ns
	t_{PHL}		1.5	4.5	8.5	ns
	t_{PLH}	V_{CC}=5±0.5V,C_L=50pF, R_L=500Ω	1.5	4	7	ns
	t_{PHL}		1.5	3.5	6.5	ns

■ OPERATING CHARACTERISTICS (T_A=25°C)

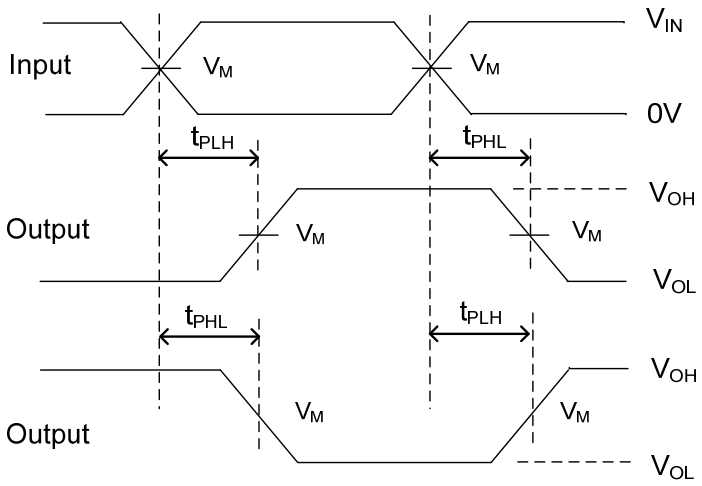
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Power Dissipation Capacitance	C_{PD}	C_L=50pF, f=10MH_Z		45		pF

■ TEST CIRCUIT AND WAVEFORMS



TEST CIRCUIT

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



VOLTAGE WAVEFORMS

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.