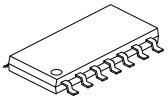
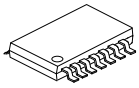
U74AHC04

CMOS IC

HEX INVERTER



SOP-14



TSSOP-14

■ DESCRIPTION

The **U74AHC04** is six independent inverters and each inverter provides the Function Y= $\overline{A}$

■ FEATURES

* Operation Voltage Range: 2V~5.5V
* High Noise Immunity
* Low Power Dissipation
* Balanced Propagation Delays

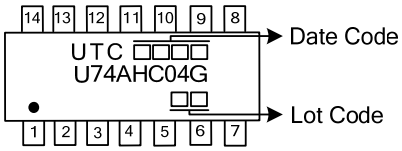
■ ORDERING INFORMATION

Ordering Number	Package	Packing
U74AHC04G-S14-R	SOP-14	Tape Reel
U74AHC04G-P14-R	TSSOP-14	Tape Reel

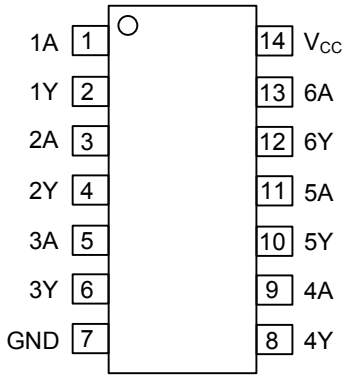
U74AHC04G-S14-R
(1)Packing Type
(2)Packing Type
(3)Green Package

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

■ MARKING



■ PIN CONFIGURATION

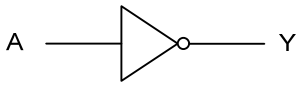


■ FUNCTION TABLE (Each Gate)

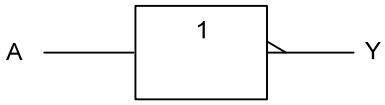
INPUT A	OUTPUT Y
H	L
L	H

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

■ LOGIC DIAGRAM (Each Gate)



Logic Symbol



IEC Logic Symbol

■ ABSOLUTE MAXIMUM RATING (Unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V_{CC}	-0.5~+7.0	V
Input Voltage	V_{IN}	-0.5~+7.0	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}	±25	mA
V_{CC} or GND Current	I_{CC}	±50	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.

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	SOP-14	θ_{JA}	76	°C/W
	TSSOP-14		113	

■ RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage	V_{CC}		2.0		5.5	V
Input Voltage	V_{IN}		0		5.5	V
Output Voltage	V_{OUT}		0		V_{CC}	V
High-Level Input Voltage	V_{IH}	V_{CC} =2.0V	1.5			V
		V_{CC} =3.0V	2.1			
		V_{CC} =5.5V	3.85			
Low-Level Input Voltage	V_{IL}	V_{CC} =2.0V			0.5	V
		V_{CC} =3.0V			0.9	
		V_{CC} =5.5V			1.65	
High-Level Output Current	I_{OH}	V_{CC} =2.0V			-50	μA
		V_{CC} =3.3V±0.3V			-4	mA
		V_{CC} =5V±0.5V			-8	
Low-Level Output Current	I_{OL}	V_{CC} =2.0V			50	μA
		V_{CC} =3.3V±0.3V			4	mA
		V_{CC} =5V±0.5V			8	
Input Transition Rise or Fall Rate	t_R / t_F	V_{CC}=3.3+0.3V			100	ns/V
		V_{CC}=5.0+0.5V			20	
Operating Temperature	T_A		-40		+85	°C

■ STATIC CHARACTERISTICS (T_A=25°C)

PARAMETER	SYMBOL	TEST CONDITIONS		MIN	TYP	MAX	UNIT
High-Level Output Voltage	V_{OH}	I_{OH}=-50μA	V_{CC} =2.0V	1.9	2.0		V
			V_{CC} =3.0V	2.9	3.0		
			V_{CC} =4.5V	4.4	4.5		
		I_{OH}=-4 mA	V_{CC} =3.0V	2.58			
		I_{OH}=-8mA	V_{CC} =4.5V	3.94			
Low-Level Output Voltage	V_{OL}	I_{OL}=50μA	V_{CC} =2.0V			0.1	V
			V_{CC} =3.0V			0.1	
			V_{CC} =4.5V			0.1	
		I_{OL} =4 mA	V_{CC} =3.0V			0.36	
		I_{OL} =8mA	V_{CC} =4.5V			0.36	
Input Leakage Current	$I_{I(LEAK)}$	V_{IN}=5.5V or GND,V_{CC} =0V to 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_I	V_{IN}=V_{CC} or GND, V_{CC} =5V			2	10	pF

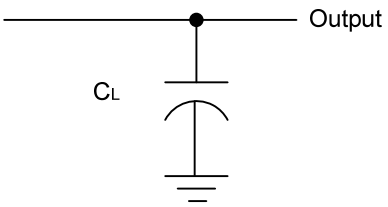
■ SWITCHING CHARACTERISTICS (T_A=25°C)

PARAMETER	SYMBOL	TEST CONDITIONS		MIN	TYP	MAX	UNIT
Propagation Delay, From Input(A) To Output(Y)	t_{PHL} / t_{PLH}	V_{CC} =3.3±0.3 V	C_L=15 pF		5	8.9	ns
			C_L=50 pF		7.5	11.4	ns
Propagation Delay, From Input(A) To Output(Y)	t_{PHL} / t_{PLH}	V_{CC} =5±0.5 V	C_L=15 pF		3.8	5.5	ns
			C_L=50 pF		5.3	7.5	ns

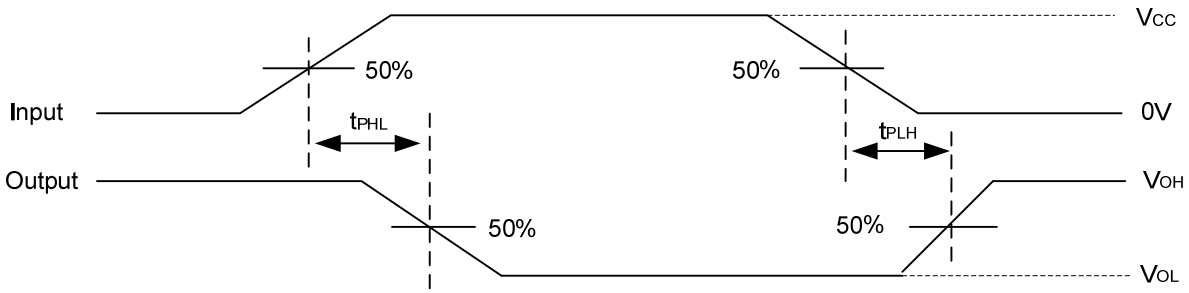
■ OPERATING CHARACTERISTICS (V_{CC}=5V; T_A=25°C)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Power Dissipation Capacitance	C_{PD}	NO Load, f=1MHz		12		pF

■ TEST CIRCUIT AND WAVEFORMS



Test circuit for measuring propagation delay



Waveforms showing the Input(A) to Output(Y) propagation delays.

Note: C_L includes probe and jig capacitance.
All input pulses are supplied by generators having the following characteristics: PRR ≤1MHz, Zo = 50Ω, $t_R \leqslant 3$ns, $t_F \leqslant 3$ns.