



## U74AHC04

CMOS IC

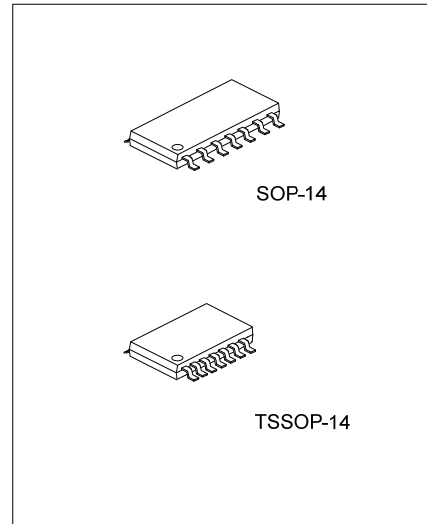
### HEX INVERTER

#### 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

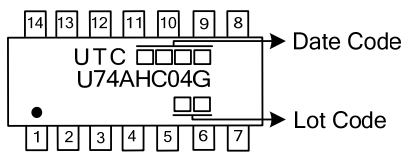


#### ORDERING INFORMATION

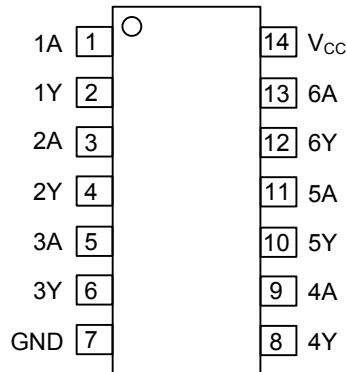
Ordering Number	Package	Packing
U74AHC04G-S14-R	SOP-14	Tape Reel
U74AHC04G-P14-R	TSSOP-14	Tape Reel

<p>U74AHC04G-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</p>
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#### MARKING



■ PIN CONFIGURATION

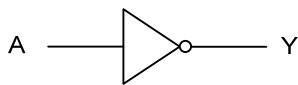


■ FUNCTION TABLE (Each Gate)

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	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
		$V_{CC} = 3.3V \pm 0.3V$			-4	mA
		$V_{CC} = 5V \pm 0.5V$			-8	
Low-Level Output Current	$I_{OL}$	$V_{CC} = 2.0V$			50	μA
		$V_{CC} = 3.3V \pm 0.3V$			4	mA
		$V_{CC} = 5V \pm 0.5V$			8	
Input Transition Rise or Fall Rate	$t_R / t_F$	$V_{CC} = 3.3 \pm 0.3V$			100	ns/V
		$V_{CC} = 5.0 \pm 0.5V$			20	
Operating Temperature	$T_A$		-40		+85	°C

■ STATIC CHARACTERISTICS (T<sub>A</sub>=25°C)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
High-Level Output Voltage	V <sub>OH</sub>	I <sub>OH</sub> =-50μA	V <sub>CC</sub> =2.0V	1.9	2.0	V
			V <sub>CC</sub> =3.0V	2.9	3.0	
			V <sub>CC</sub> =4.5V	4.4	4.5	
		I <sub>OH</sub> =-4 mA	V <sub>CC</sub> =3.0V	2.58		
		I <sub>OH</sub> =-8mA	V <sub>CC</sub> =4.5V	3.94		
Low-Level Output Voltage	V <sub>OL</sub>	I <sub>OL</sub> =50μA	V <sub>CC</sub> =2.0V		0.1	V
			V <sub>CC</sub> =3.0V		0.1	
			V <sub>CC</sub> =4.5V		0.1	
		I <sub>OL</sub> =4 mA	V <sub>CC</sub> =3.0V		0.36	
		I <sub>OL</sub> =8mA	V <sub>CC</sub> =4.5V		0.36	
Input Leakage Current	I <sub>I(LEAK)</sub>	V <sub>IN</sub> =5.5V or GND, V <sub>CC</sub> =0V to 5.5V			0.1	μA
Quiescent Supply Current	I <sub>Q</sub>	V <sub>IN</sub> =V <sub>CC</sub> or GND, I <sub>OUT</sub> =0, V <sub>CC</sub> =5.5V			2	μA
Input Capacitance	C <sub>I</sub>	V <sub>IN</sub> =V <sub>CC</sub> or GND, V <sub>CC</sub> =5V		2	10	pF

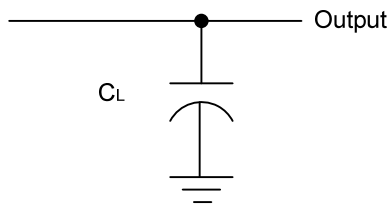
■ SWITCHING CHARACTERISTICS (T<sub>A</sub>=25°C)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT	
Propagation Delay, From Input(A) To Output(Y)	t <sub>PHL</sub> / t <sub>PLH</sub>	V <sub>CC</sub> =3.3±0.3 V		C <sub>L</sub> =15 pF	5	8.9	ns
				C <sub>L</sub> =50 pF	7.5	11.4	ns
Propagation Delay, From Input(A) To Output(Y)	t <sub>PHL</sub> / t <sub>PLH</sub>	V <sub>CC</sub> =5±0.5 V		C <sub>L</sub> =15 pF	3.8	5.5	ns
				C <sub>L</sub> =50 pF	5.3	7.5	ns

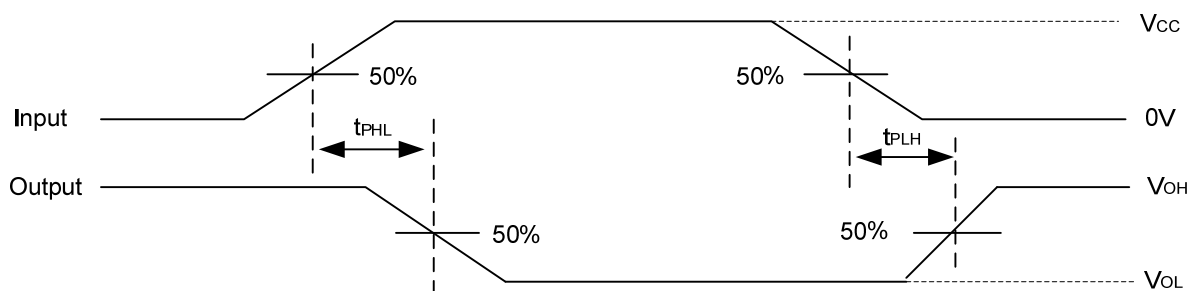
■ OPERATING CHARACTERISTICS (V<sub>CC</sub>=5V; T<sub>A</sub>=25°C)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Power Dissipation Capacitance	C <sub>PD</sub>	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:  $PRR \leq 1\text{MHz}$ ,  $Z_o = 50\Omega$ ,  $t_R \leq 3\text{ns}$ ,  $t_F \leq 3\text{ns}$ .

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