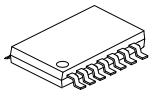
HEX INVERTERS



TSSOP-14

■ DESCRIPTION

The **U74HCU04** is designed specifically for 2V to 6V V_{CC} operation.

This device contains six independent inverters. The devices perform the Boolean function $Y = \overline{A}$ in positive logic.

This device is fully specified for partial-power-down applications using I_{OFF}. The I_{OFF} circuitry disables the outputs, preventing damaging current backflow through the device when it is powered down.

■ FEATURES

* Wide operating voltage range of 2V to 6V
* Outputs can drive up to 10 LSTTL loads
* Low power consumption, 2μA max I_{CC}
* Typical t_{PD}=7ns
* ±4mA Output drive at 5V
* Low input current of 1μA max
* Unbuffered Outputs

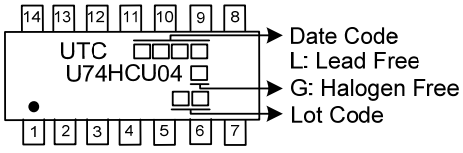
■ ORDERING INFORMATION

Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74HCU04L-P14-R	U74HCU04G-P14-R	TSSOP-14	Tape Reel

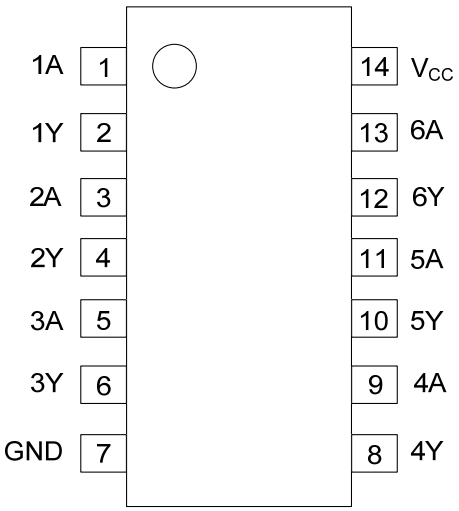
U74HCU04G-P14-R
(1)Packing Type
(2)Package Type
(3)Green Package

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

■ MARKING



■ PIN CONFIGURATION

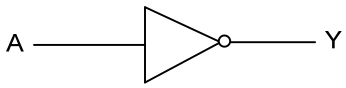


■ FUNCTION TABLE (each gate)

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

Note: H: HIGH Voltage Level L: LOW Voltage Level

■ LOGIC DIAGRAM (positive logic)



■ ABSOLUTE MAXIMUM RATING (T_A=25°C, unless otherwise specified)

PARAMETER	SYMBOL	CONDITIONS	RATINGS	UNIT
Supply Voltage	V_{CC}		-0.5 ~ +7	V
Continuous V_{CC} or GND Current	I_{CC}		±50	mA
Continuous Output Current	I_{OUT}		±25	mA
Input Clamp Current	I_{IK}	V_{IN}<0V	±20	mA
Output Clamp Current	I_{OK}	V_{OUT}<0V	±20	mA
Storage Temperature Range	T_{STG}		-60 ~ +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}	Operating	2	5	6	V
Input Voltage	V_I		0		V_{CC}	V
Output Voltage	V_O		0		V_{CC}	V
Input Transition Rise or Fall Rate	Δt/Δv	V_{CC}=2V			1000	ns/V
		V_{CC}=4.5V			500	ns/V
		V_{CC}=6V			400	ns/V
Operating Temperature	T_A		-40		+125	°C

■ ELECTRICAL CHARACTERISTICS (Unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	T_A=25°C			T_A=-40~+125°C			UNIT
			MIN	TYP	MAX	MIN	TYP	MAX	
High-Level Input Voltage	V_{IH}	V_{CC}=2V	1.7			1.7			V
		V_{CC}=4.5V	3.6			3.6			V
		V_{CC}=6V	4.8			4.8			V
Low-Level Input Voltage	V_{IL}	V_{CC}=2V			0.3			0.3	V
		V_{CC}=4.5V			0.9			0.9	V
		V_{CC}=6V			1.2			1.2	V
High-Level Output Voltage	V_{OH}	V_{CC}=2V, I_{OH}=-20μA	1.8			1.8			V
		V_{CC}=4.5V, I_{OH}=-20μA	4			4			V
		V_{CC}=6V, I_{OH}=-20μA	5.5			5.5			V
		V_{CC}=4.5V, I_{OH}=-4mA	3.98			3.7			V
		V_{CC}=6V, I_{OH}=-5.2mA	5.48			5.2			V
Low-Level Output Voltage	V_{OL}	V_{CC}=2V, I_{OL}=20μA			0.2			0.2	V
		V_{CC}=4.5V, I_{OL}=20μA			0.5			0.5	V
		V_{CC}=6V, I_{OL}=20μA			0.5			0.5	V
		V_{CC}=4.5V, I_{OL}=4mA			0.26			0.4	V
		V_{CC}=6V, I_{OL}=5.2mA			0.26			0.4	V
Input Leakage Current	I_I	V_{CC}= 6V, V_{IN} = V_{CC} or GND			±0.1			±1	μA
Quiescent Supply Current	I_{CC}	V_{CC}=6V, V_{IN}= V_{CC} or GND			1			10	μA
Input Capacitance	C_{IN}	V_{CC}=2V ~6V		5			-		pF

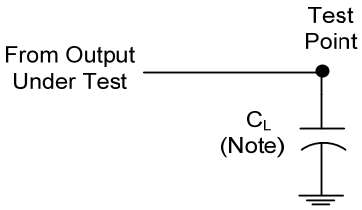
■ SWITCHING CHARACTERISTICS (Input: t_R=t_F=6ns, C_L=50pF, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	T_A=25°C			T_A=-40~+125°C			UNIT
			MIN	TYP	MAX	MIN	TYP	MAX	
Propagation Delay From Input (A) to Output(Y)	t_{PD}	V_{CC}=2V		20	80			105	ns
		V_{CC}=4.5V		8	16			21	ns
		V_{CC}=6V		7	14			18	ns
Transition Time Input to Output(Y)	t_F	V_{CC}=2V		19	75			110	ns
		V_{CC}=4.5V		8	15			22	ns
		V_{CC}=6V		6	13			19	ns

■ OPERATING CHARACTERISTICS (f=10MHz, T_A=25°C, unless otherwise specified)

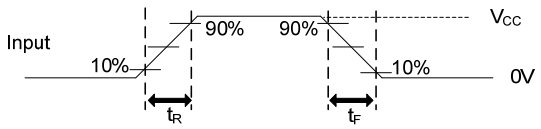
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Power Dissipation Capacitance	C_{PD}	No Load		20		pF

■ TEST CIRCUIT AND WAVEFORMS

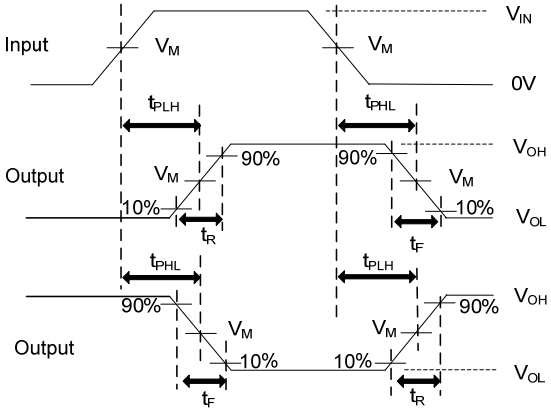


Note: C_L includes probe and jig capacitance.

Fig.1 Load circuitry for switching times.



INPUT RISE AND FALL TIMES



PROPAGATION DELAY TIMES

Notes: 1. C_L includes probe and jig capacitance.
2. All input pulses are supplied by generators having the following characteristics: PRR ≤10MHz, Z_O = 50Ω.

Fig. 2 Propagation delay from input to output and input voltage waveforms.