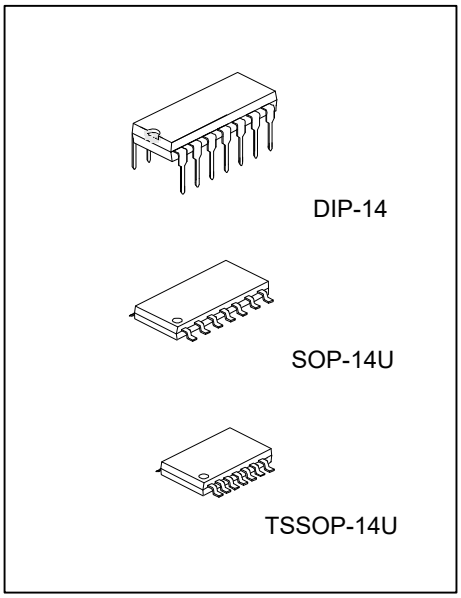
U74HC14

CMOS IC

HIGH-SPEED CMOS LOGIC HEX INVERTING SCHMITT TRIGGER



■ DESCRIPTION

The UTC **U74HC14** each contain six inverting Schmitt triggers in one package. Each of them perform the Boolean function $Y = \overline{A}$

■ FEATURES

* Widely range of input rise and fall time
* high noise immunity
* Fan-out parameters(over temperature range) up to 10 LSTTL Loads
* Low power consumption
* Wide range operation: 2V ~ 6V

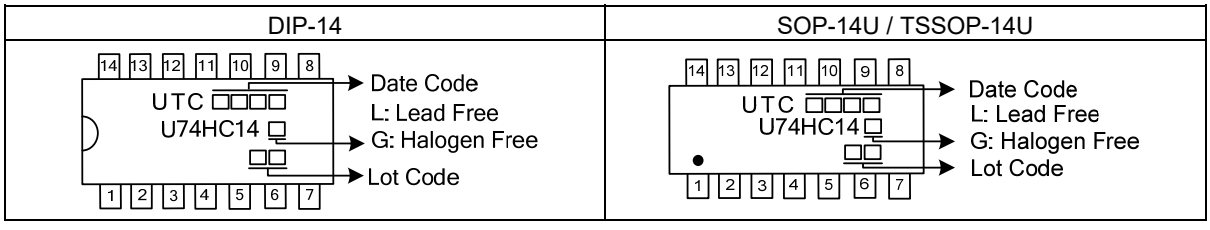
■ ORDERING INFORMATION

Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74HC14L-D14-T	U74HC14G-D14-T	DIP-14	Tube
U74HC14L-UEA-R	U74HC14G-UEA-R	SOP-14U	Tape Reel
U74HC14L-UEB-R	U74HC14G-UEB-R	TSSOP-14U	Tape Reel

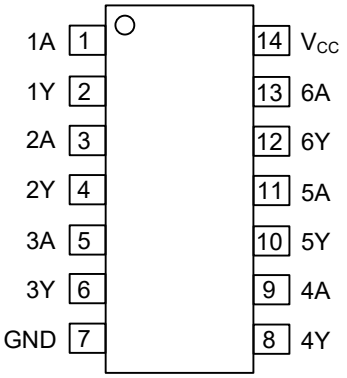
U74HC14G-D14-T
(1)Packing Type
(2)Package Type
(3)Green Package

(1) T: Tube, R: Tape Reel
(2) D14: DIP-14, UEA: SOP-14U, UEB: TSSOP-14U
(3) G: Halogen Free and Lead Free, L: Lead Free

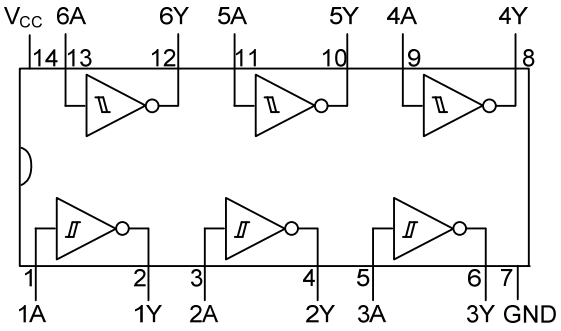
■ MARKING



■ PIN CONFIGURATION



■ FUNCTIONAL DIAGRAM

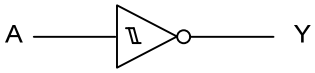


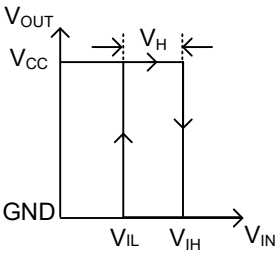
■ TRUTH TABLE

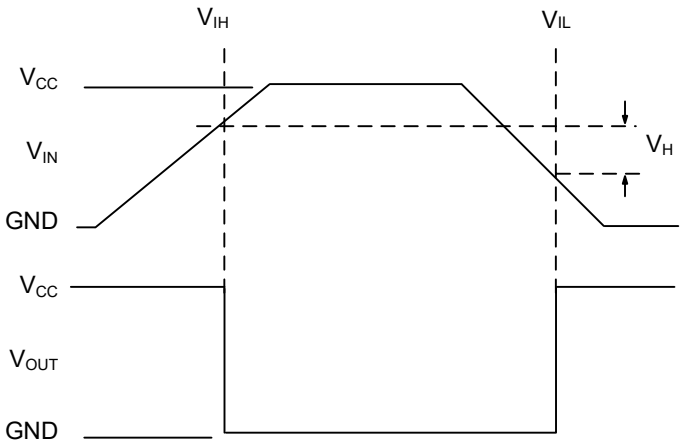
INPUT(A)	OUTPUT(Y)
L	H
H	L

H=High level
L=Low Level

■ LOGIC DIAGRAM







Hysteresis Definition, Characteristic, And Test Setup

■ ABSOLUTE MAXIMUM RATINGS

PARAMETER		SYMBOL	RATINGS	UNIT
Supply Voltage		V_{CC}	-0.5 ~ 7	V
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
Continuous Output Current	V_{OUT} = 0 to V_{CC}	I_{OUT}	±25	mA
V_{CC} or Ground 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.

■ RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage Range HC Types	V_{CC}		2	5	6	V
Input or Output Voltage	V_{IN}, V_{OUT}		0		V_{CC}	V
Operating Temperature	T_A		-40		+125	°C

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Thermal Resistance Junction Ambient	DIP-14	θ_{JA}	100	°C/W
	SOP-14U		125	°C/W
	TSSOP-14U		150	°C/W

■ ELECTRICAL CHARACTERISTICS (Unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	T_A=25°C			T_A=-40°C~+125°C			UNIT
			MIN	TYP	MAX	MIN	TYP	MAX	
Input Switch Points	V_{IH}	V_{CC}=2V	0.7	1.2	1.5	0.7		1.5	V
		V_{CC}=4.5V	1.55	2.5	3.15	1.55		3.15	V
		V_{CC}=6V	2.1	3.3	4.2	2.1		4.2	V
	V_{IL}	V_{CC}=2V	0.3	0.6	1	0.3		1	V
		V_{CC}=4.5V	0.9	1.6	2.45	0.9		2.45	V
		V_{CC}=6V	1.2	2	3.2	1.2		3.2	V
	V_{TH}	V_{CC}=2V	0.2	0.6	1.2	0.2		1.2	V
		V_{CC}=4.5V	0.4	0.9	2.1	0.4		2.1	V
		V_{CC}=6V	0.5	1.3	2.5	0.5		2.5	V
High Level Output Voltage CMOS Loads	V_{OH}	V_{IN}=V_{IH} or V_{IL}, V_{CC}=2V, I_{OH}=-0.02mA	1.9			1.9			V
		V_{IN}=V_{IH} or V_{IL}, V_{CC}=4.5V, I_{OH}=-0.02mA	4.4			4.4			V
		V_{IN}=V_{IH} or V_{IL}, V_{CC}=6V, I_{OH}=-0.02mA	5.9			5.9			V
High Level Output Voltage TTL Loads		V_{IN}=V_{IH} or V_{IL}, V_{CC}=4.5V, I_{OH}=-4mA	3.98			3.7			V
		V_{IN}=V_{IH} or V_{IL}, V_{CC}=6V, I_{OH}=-5.2mA	5.48			5.2			V

■ ELECTRICAL CHARACTERISTICS (Cont.)

PARAMETER	SYMBOL	TEST CONDITIONS	T_A=25°C			T_A=-40°C~+125°C			UNIT
			MIN	TYP	MAX	MIN	TYP	MAX	
Low Level Output Voltage CMOS Loads	V_{OL}	$V_{IN}=V_{IH}$ or V_{IL}, V_{CC}=2V, I_{OL}=0.02mA			0.1			0.1	V
		$V_{IN}=V_{IH}$ or V_{IL}, V_{CC}=4.5V, I_{OL}=0.02mA			0.1			0.1	V
		$V_{IN}=V_{IH}$ or V_{IL}, V_{CC}=6V, I_{OL}=0.02mA			0.1			0.1	V
Low Level Output Voltage TTL Loads		$V_{IN}=V_{IH}$ or V_{IL}, V_{CC}=4.5V, I_{OL}=4mA			0.26			0.4	V
		$V_{IN}=V_{IH}$ or V_{IL}, V_{CC}=6V, I_{OL}=5.2mA			0.26			0.4	V
Input Leakage Current	I_{IN}	$V_{IN}=V_{CC}$ and GND, V_{CC}=6V			±0.1			±1	μA
Quiescent Device Current	I_Q	$V_{IN}=V_{CC}$ or GND, V_{CC}=6V, I_{OUT}=0			2			40	μA

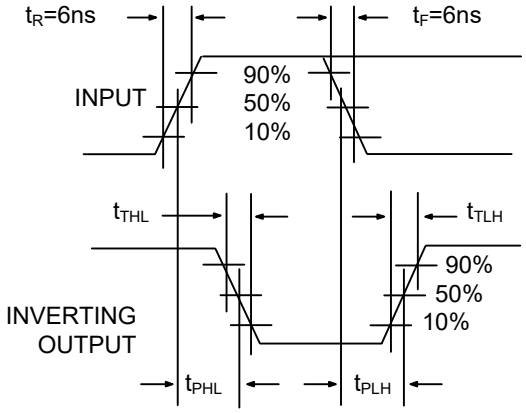
■ SWITCHING CHARACTERISTICS (C_L=50pF, Input t_R, t_F = 6ns, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	T_A=25°C			T_A=-40°C~+125°C			UNIT
			MIN	TYP	MAX	MIN	TYP	MAX	
Propagation Delay, A to Y	t_{PLH}, t_{PHL}	V_{CC}=2V		55	125			190	ns
		V_{CC}=4.5V		12	25			38	ns
		V_{CC}=6V		11	21			32	ns
Output Transition Times	t_{TLH}, t_{THL}	V_{CC}=2V		38	75			110	ns
		V_{CC}=4.5V		11	21			28	ns
		V_{CC}=6V		10	19			25	ns

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

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Input Capacitance	C_{IN}			3	10	pF
Power Dissipation Capacitance	C_{PD}	No load		20		pF

■ TEST CIRCUIT AND WAVEFORMS



Transition Times And Propagation
Delay Times, Combination Logic