



U74HC14

CMOS IC

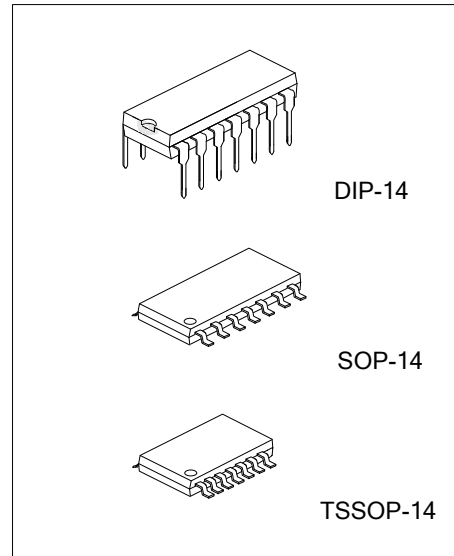
HIGH-SPEED CMOS LOGIC HEX INVERTING SCHMITT TRIGGER

■ 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

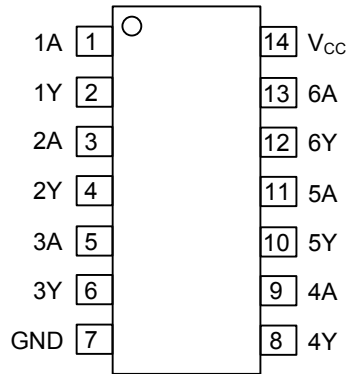
Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74HC14L-D14-T	U74HC14G-D14-T	DIP-14	Tube
U74HC14L-S14-R	U74HC14G-S14-R	SOP-14	Tape Reel
U74HC14L-P14-R	U74HC14G-P14-R	TSSOP-14	Tape Reel

<p>U74HC14G-D14-T</p> <p>(1)Packing Type (2)Package Type (3)Green Package</p>	<p>(1) R: Tape Reel, T: Tube (2) D14: DIP-14, P14: TSSOP-14, S14: SOP-14 (3) G: Halogen Free and Lead Free, L: Lead Free</p>
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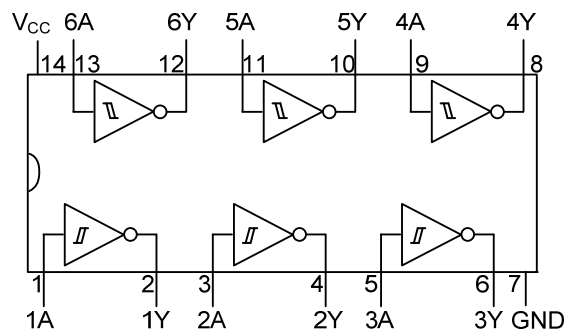
■ MARKING

DIP-14	SOP-14 / TSSOP-14
<p>UTC □□□□ → Date Code L: Lead Free G: Halogen Free □□ → Lot Code</p>	<p>UTC □□□□ → Date Code L: Lead Free G: Halogen Free □□ → Lot Code</p>

■ PIN CONFIGURATION



■ FUNCTIONAL DIAGRAM

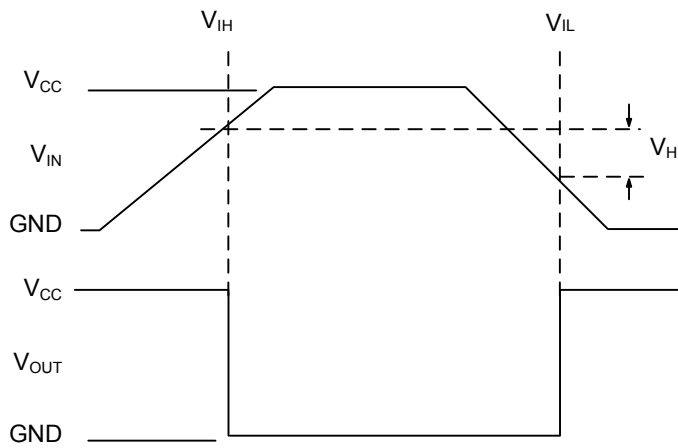
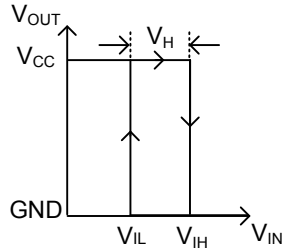
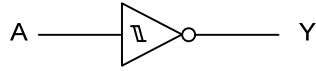


■ TRUTH TABLE

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}	-0.5V ~ 7V	V
Input Clamp Current	For $V_{IN} < 0$ or $V_{IN} > V_{CC}$	I_{IK}	± 20	mA
Output Clamp Current	For $V_{OUT} < 0$ or $V_{OUT} > V_{CC}$	I_{OK}	± 20	mA
Continuous Output Current	For $V_{OUT} = 0$ to V_{CC}	I_{OUT}	± 25	mA
V_{CC} or Ground Current		I_{CC}	± 50	mA
Storage Temperature		T_{STG}	-65 ~ +150	$^{\circ}C$

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
Thermal Resistance Junction Ambient	DIP-14	θ_{JA}	80	$^{\circ}C/W$
	SOP-14		76	$^{\circ}C/W$
	TSSOP-14		113	$^{\circ}C/W$

■ 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		85	$^{\circ}C$

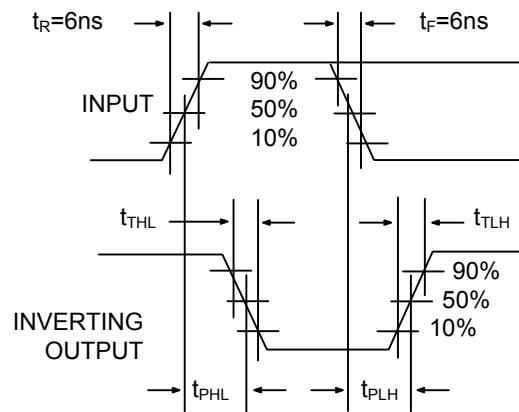
■ ELECTRICAL CHARACTERISTICS ($T_A = 25^{\circ}C$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Input Switch Points	V_{IH}	$V_{CC}=2V$	0.7	1.2	1.5	
		$V_{CC}=4.5V$	1.55	2.5	3.15	
		$V_{CC}=6V$	2.1	3.3	4.2	
	V_{IL}	$V_{CC}=2V$	0.3	0.6	1	V
		$V_{CC}=4.5V$	0.9	1.6	2.45	V
		$V_{CC}=6V$	1.2	2	3.2	V
	V_{TH}	$V_{CC}=2V$	0.2	0.6	1.2	V
		$V_{CC}=4.5V$	0.4	0.9	2.1	V
		$V_{CC}=6V$	0.5	1.3	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			V
$V_{IN}=V_{IH}$ or $V_{IL}, V_{CC}=4.5V, I_{OH}=-0.02mA$		4.4			V	
$V_{IN}=V_{IH}$ or $V_{IL}, V_{CC}=6V, I_{OH}=-0.02mA$		5.9			V	
High Level Output Voltage TTL Loads	V_{OH}	$V_{IN}=V_{IH}$ or $V_{IL}, V_{CC}=4.5V, I_{OH}=-4 mA$	3.98			V
$V_{IN}=V_{IH}$ or $V_{IL}, V_{CC}=6V, I_{OH}=-5.2 mA$		5.48			V	
Low Level Output Voltage CMOS Loads	V_{OL}	$V_{IN}=V_{IH}$ or $V_{IL}, V_{CC}=2V, I_{OL}=0.02 mA$			0.1	V
$V_{IN}=V_{IH}$ or $V_{IL}, V_{CC}=4.5V, I_{OL}=0.02 mA$				0.1	V	
$V_{IN}=V_{IH}$ or $V_{IL}, V_{CC}=6V, I_{OL}=0.02 mA$				0.1	V	
Low Level Output Voltage TTL Loads	V_{OL}	$V_{IN}=V_{IH}$ or $V_{IL}, V_{CC}=4.5V, I_{OL}=4 mA$			0.26	V
$V_{IN}=V_{IH}$ or $V_{IL}, V_{CC}=6V, I_{OL}=5.2 mA$				0.26	V	
Input Leakage Current	I_{IN}	$V_{IN}=V_{CC}$ and GND, $V_{CC}=6V$			± 0.1	μA
Quiescent Device Current	I_Q	$V_{IN}=V_{CC}$ or GND, $V_{CC}=6V, I_{OUT}=0$			2	μA

■ SWITCHING SPECIFICATIONS ($T_A = 25^\circ\text{C}$, Input $t_R, t_F = 6\text{ns}$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Propagation Delay, A to Y	t_{PLH}, t_{PHL}	$V_{CC}=2\text{V}, C_L=50\text{pF}$		55	125	ns
		$V_{CC}=4.5\text{V}, C_L=50\text{pF}$		12	25	ns
		$V_{CC}=6\text{V}, C_L=50\text{pF}$		11	21	ns
Output Transition Times	t_{TLH}, t_{THL}	$V_{CC}=2\text{V}, C_L=50\text{pF}$		38	75	ns
		$V_{CC}=4.5\text{V}, C_L=50\text{pF}$		8	15	ns
		$V_{CC}=6\text{V}, C_L=50\text{pF}$		6	13	ns
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

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