



## U74HC14

CMOS IC

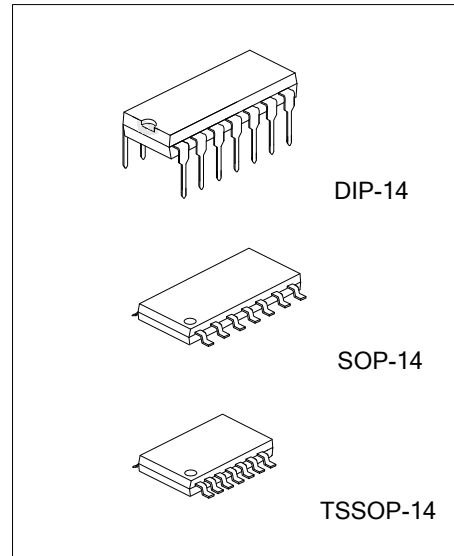
### HIGH-SPEED CMOS LOGIC HEX INVERTING SCHMITT TRIGGER

#### DESCRIPTION

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

#### 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

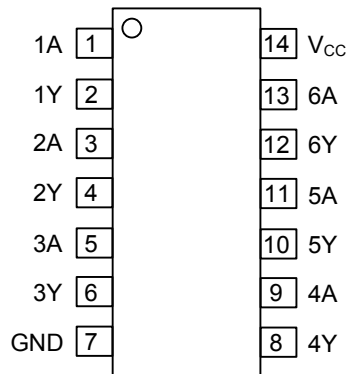
Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74HC14L-D14-T	U74HC14G-D14-T	DIP-14	Tube
U74HC14L-S14-R	U74HC14G-S14-R	SOP-14	Tape Reel
U74HC14L-P14-R	U74HC14G-P14-R	TSSOP-14	Tape Reel

<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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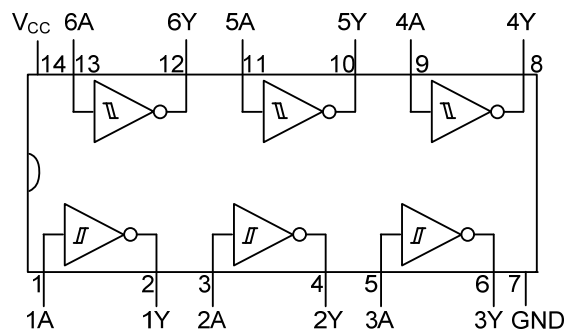
#### MARKING

DIP-14	SOP-14 / TSSOP-14
<p>UTC □□□□ → Date Code U74HC14 □ → L: Lead Free □ → G: Halogen Free □□ → Lot Code</p>	<p>UTC □□□□ → Date Code U74HC14 □ → L: Lead Free □ → G: Halogen Free □□ → Lot Code</p>

■ PIN CONFIGURATION



■ FUNCTIONAL DIAGRAM



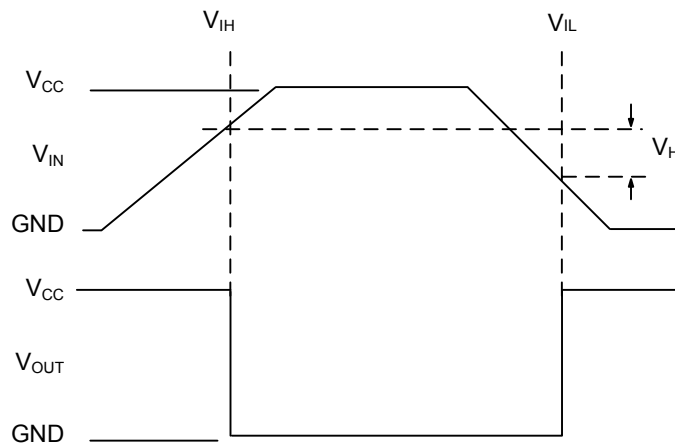
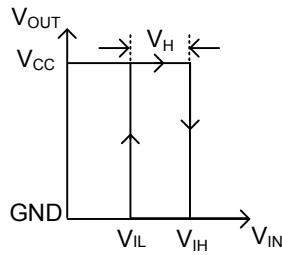
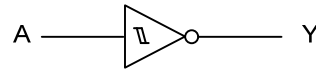
■ TRUTH TABLE

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

H=High level

L=Low Level

■ LOGIC DIAGRAM



Hysteresis Definition, Characteristic, And Test Setup

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## ■ ABSOLUTE MAXIMUM RATINGS

PARAMETER		SYMBOL	RATINGS	UNIT
Supply Voltage		$V_{CC}$	-0.5V ~ 7V	V
Input Clamp Current	For $V_{IN} < 0$ or $V_{IN} > V_{CC}$	$I_{IK}$	$\pm 20$	mA
Output Clamp Current	For $V_{OUT} < 0$ or $V_{OUT} > V_{CC}$	$I_{OK}$	$\pm 20$	mA
Continuous Output Current	For $V_{OUT} = 0$ to $V_{CC}$	$I_{OUT}$	$\pm 25$	mA
$V_{CC}$ or Ground Current		$I_{CC}$	$\pm 50$	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	$\theta_{JA}$	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	$^{\circ}C$

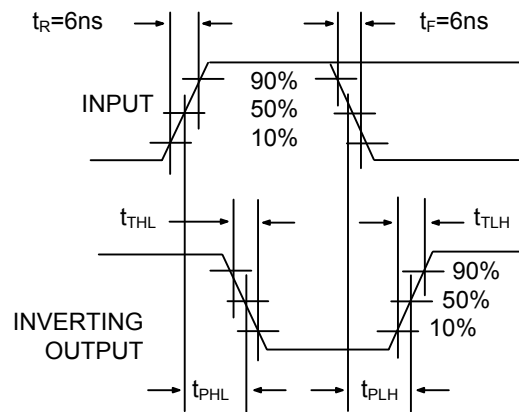
## ■ ELECTRICAL CHARACTERISTICS ( $T_A = 25^{\circ}C$ , unless otherwise specified)

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 $V_{IL}, V_{CC}=4.5V, I_{OH}=-4mA$	3.98			V
$V_{IN}=V_{IH}$ or $V_{IL}, V_{CC}=6V, I_{OH}=-5.2mA$		5.48			V	
Low Level Output Voltage CMOS Loads	$V_{OL}$	$V_{IN}=V_{IH}$ or $V_{IL}, V_{CC}=2V, I_{OL}=0.02mA$			0.1	V
$V_{IN}=V_{IH}$ or $V_{IL}, V_{CC}=4.5V, I_{OL}=0.02mA$				0.1	V	
$V_{IN}=V_{IH}$ or $V_{IL}, V_{CC}=6V, I_{OL}=0.02mA$				0.1	V	
Low Level Output Voltage TTL Loads	$V_{OL}$	$V_{IN}=V_{IH}$ or $V_{IL}, V_{CC}=4.5V, I_{OL}=4mA$			0.26	V
$V_{IN}=V_{IH}$ or $V_{IL}, V_{CC}=6V, I_{OL}=5.2mA$				0.26	V	
Input Leakage Current	$I_{IN}$	$V_{IN}=V_{CC}$ and GND, $V_{CC}=6V$			$\pm 0.1$	$\mu A$
Quiescent Device Current	$I_Q$	$V_{IN}=V_{CC}$ or GND, $V_{CC}=6V, I_{OUT}=0$			2	$\mu A$

■ 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

UTC assumes no responsibility for equipment failures that result from using products at values that exceed, even momentarily, rated values (such as maximum ratings, operating condition ranges, or other parameters) listed in products specifications of any and all UTC products described or contained herein. UTC products are not designed for use in life support appliances, devices or systems where malfunction of these products can be reasonably expected to result in personal injury. Reproduction in whole or in part is prohibited without the prior written consent of the copyright owner. UTC reserves the right to make changes to information published in this document, including without limitation specifications and product descriptions, at any time and without notice. This document supersedes and replaces all information supplied prior to the publication hereof.