

HEX INVERTERS WITH SCHMITT TRIGGER INPUTS

Description

The 74AHCT14 provides provides six independent Schmitt trigger input inverters with standard push-pull outputs. The device is designed for operation with a power supply range of 4.5V to 5.5V.

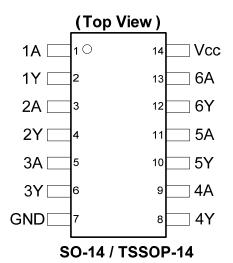
The gates perform the Boolean function:

 $Y = \overline{A}$

Features

- Wide Supply Voltage Range from 4.5V to 5.5V
- Inputs Are TTL Voltage Level Compatible
- Outputs Sink or Source 8mA at V_{CC} = 4.5V
- CMOS Low Power Consumption
- Schmitt Trigger Action at All Inputs
- ESD Protection Exceeds JESD 22
 - 200-V Machine Model (A115-A)
 - 2000-V Human Body Model (A114-A)
 - Exceeds 1000-V Charged Device Model (C101C)
- Latch-Up Exceeds 250mA per JESD 78, Class II
- Range of Package Options SO-14 and TSSOP-14
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)
- Halogen and Antimony Free. "Green" Device (Note 3)

Pin Assignments



Applications

- · General Purpose Logic
- Wide array of products such as:
 - PCs, Networking, Notebooks, Netbooks
 - Computer Peripherals, Hard Drives, CD/DVD ROM
 - TV, DVD, DVR, Set Top Box

Notes:

- 1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
- 2. See http://www.diodes.com for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
- 3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.

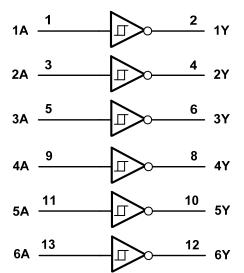
Click here for ordering information, located at the end of datasheet



Pin Descriptions

Pin Number	Pin Name	Function
1	1A	Data Input
2	1Y	Data Output
3	2A	Data Input
4	2Y	Data Output
5	3A	Data Input
6	3Y	Data Output
7	GND	Ground
8	4Y	Data Output
9	4A	Data Input
10	5Y	Data Output
11	5A	Data Input
12	6Y	Data Output
13	6A	Data Input
14	Vcc	Supply Voltage

Logic Diagram



Function Table

Input	Output
Α	Υ
L	Н
Н	L

Absolute Maximum Ratings (Note 4) (@TA = +25°C, unless otherwise specified.)

Symbol	Description	Rating	Unit
ESD HBM	Human Body Model ESD Protection	2	KV
ESD CDM	Charged Device Model ESD Protection	1	KV
ESD MM	Machine Model ESD Protection	200	V
V _{CC}	Supply Voltage Range	-0.5 to +7.0	V
VI	Input Voltage Range	-0.5 to +7.0	V
I _{IK}	Input Clamp Current V _I < -0.5V	-20	mA
lok	Output Clamp Current V _O < 0 V	-20	mA
lok	Output Clamp Current V _O > V _{CC}	20	mA
Io	Continuous Output Current 0 V < V _O < V _{CC}	+/- 25	mA
Icc	Continuous Current Through V _{CC}	50	mA
I _{GND}	Continuous Current Through GND	-50	mA
TJ	Operating Junction Temperature	-40 to +150	°C
T _{STG}	Storage Temperature	-65 to +150	°C
P _{TOT}	Total Power Dissipation	500	mW

Note:

4. Stresses beyond the absolute maximum may result in immediate failure or reduced reliability. These are stress values and device operation should be within recommend values.



Recommended Operating Conditions (Note 5) (@T_A = +25°C, unless otherwise specified.)

Symbol	Parameter	Min	Max	Unit
Vcc	Supply Voltage	4.5	5.5	V
VI	Input Voltage	0	5.5	V
Vo	Output Voltage	0	V _{CC}	V
Δt/ΔV	Input Transition Rise or Fall Rate		20	ns/V
TA	Operating Free-Air Temperature	-40	+125	°C

Note:

Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

0	D	To add O and diding a	.,	T _A = -40°	°C to +85°C	T _A = -40°0	C to +125°C	Unit
Symbol	Parameter	Test Conditions	V _{CC}	Min	Max	Min	Max	
	Positive-Going Input		4.5V		1.9		1.9	V
V_{T+}	Threshold Voltage		5.5V		2.1		2.1	ľ
	Negative-Going		4.5V	0.5		0.5		
V_{T-}	Input Threshold Voltage		5.5V	0.6		0.55		V
43.7	Hysteresis		4.5V	0.5		0.5		V
ΔV_T	$(V_{T+} - V_{T-})$		5.5V	0.6		0.6		
	High-Level Output	I _{OH} = -50μA	4.5V	4.4		4.4		V
V_{OH}	Voltage	I _{OH} = -8mA	4.5V	3.80		3.70		
	Low-Level Output	I _{OL} = 50μA	4.5V		0.1		0.1	V
V_{OL}	Voltage	I _{OL} = 8mA	4.5V		0.44		0.55	V
I _I	Input Current	V _I = GND to 5.5V	3.6V		±1		±2	μA
Icc	Supply Current	$V_I = GND \text{ or } V_{CC, I_O} = 0$	3.6V		20		40	μA
ΔI _{CC}	Additional Supply Current	One input at V _{CC} -2.1V Other pins at V _{CC} or GND.	4.5V to 5.5V		1.35		5	mA

Operating Characteristics

Parameter		Test	V _{CC} = 5.5V	Unit
		Conditions	Тур	5
C _{pd}	Power Dissipation Capacitance per Gate	f = 1 MHz	14.8	pF
C _i	Input Capacitance	$V_i = V_{CC} - or$ GND	4.0	pF

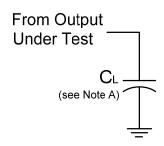
Switching Characteristics

Symbol	Parameter	Test	V	Т	A = +25°	С	-40°C to	+85°C	-40°C to	+125°C	Unit
Syllibol	Farameter	Conditions	V _{CC}	Min	Тур	Max	Min	Max	Min	Max	Ullit
t _{PD} Propagation Delay A _N to Y _N	Figure 1 $C_L = 15pF$	4.5V to 5.5V	0.5	3.4	6.9	0.5	8.0	0.5	9.0	20	
	Figure 1 $C_L = 50pF$	4.5V to 5.5V	0.5	4.9	10.0	0.5	10.0	0.5	11.0	ns	

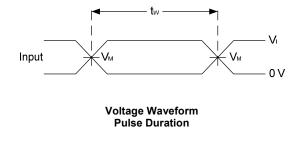
^{5.} Unused inputs should be held at $V_{\text{\footnotesize CC}}$ or Ground.

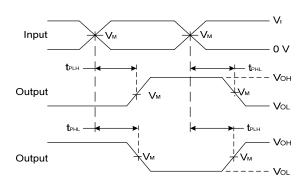


Parameter Measurement Information



V	Inputs V _M		Inputs		V _M	
V _{CC}	VI	t _r /t _f	Inputs	Outputs	C _L	
4.5V to 5.5V	3.0 V	3ns	1.5V	V _{CC} /2	15pF, 50pF	





Voltage Waveform Propagation Delay Times Inverting and Non Inverting Outputs

Figure 1 Load Circuit and Voltage Waveforms

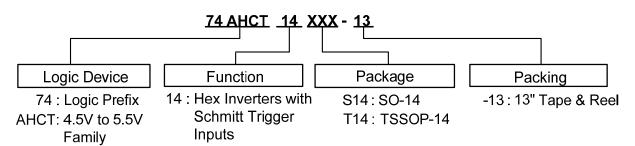
A. Includes test lead and test apparatus capacitance. Notes:

B. All pulses are supplied at pulse repetition rate ≤ 1 MHz.
C. Inputs are measured separately one transition per measurement.

D. t_{PLH} and t_{PHL} are the same as t_{PD} .



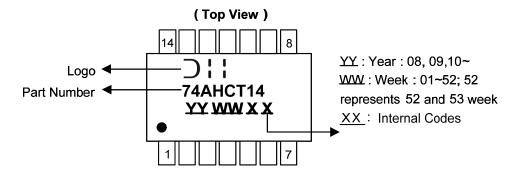
Ordering Information



	Part Number	Backage Code	Dockoning	7" Tape	and Reel
	Part Number	Package Code	Packaging	Quantity	Part Number Suffix
Pb.	74AHCT14S14-13	S14	SO-14	2500/Tape & Reel	-13
And free Green	74AHCT14T14-13	T14	TSSOP-14	2500/Tape & Reel	-13

Marking Information

(1) SO-14, TSSOP-14



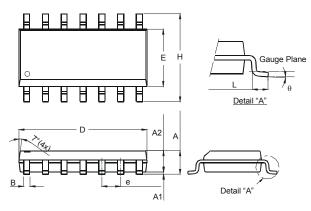
Part Number	Package
74AHCT14S14	SO-14
74AHCT14T14	TSSOP-14



Package Outline Dimensions (All dimensions in mm.)

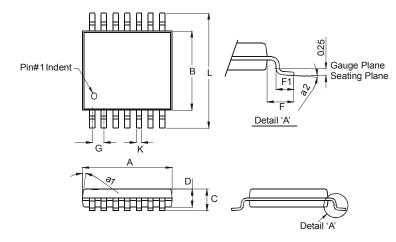
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for latest version.

Package Type: SO-14



	SO-14					
Dim	Min	Max				
Α	1.47	1.73				
A1	0.10	0.25				
A2	1.45	Тур				
В	0.33	0.51				
D	8.53	8.74				
Е	3.80	3.99				
е	1.27	Тур				
Н	5.80	6.20				
L	0.38	1.27				
θ	0°	8°				
All Din	nensions	All Dimensions in mm				

Package Type: TSSOP-14



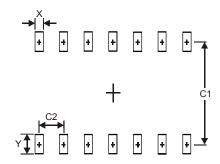
TSSOP-14					
Dim	Min	Max			
a1	7° ((4X)			
a2	0°	8°			
Α	4.9	5.10			
В	4.30	4.50			
C	_	1.2			
D	0.8	1.05			
F	1.00	Тур			
F1	0.45	0.75			
G	0.65 Typ				
K	0.19	0.30			
L	6.40	Тур			
All Dimensions in mm					



Suggested Pad Layout

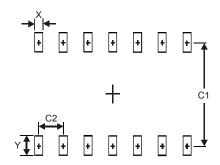
Please see AP02001 at http://www.diodes.com/datasheets/ap02001.pdf for the latest version.

Package Type: SO-14



Dimensions	Value (in mm)
Х	0.60
Y	1.50
C1	5.4
C2	1.27

Package Type: TSSOP-14



Dimensions	Value (in mm)
X	0.45
Υ	1.45
C1	5.9
C2	0.65



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