



74LV14A

Description

The 74LV14A 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 2.0V to 5.5V.

The inputs are tolerant to 5.5V allowing this device to be used in a mixed voltage environment. The device is fully specified for partial power down applications using I_{OFF} . The I_{OFF} circuitry disables the output preventing damaging current backflow when the device is powered down.

The gates perform the Boolean function:

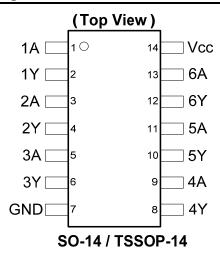
 $Y = \overline{A}$

Features

- Wide Supply Voltage Range from 2.0V to 5.5V
- Sinks or sources 12mA at V_{CC} = 4.5V
- CMOS low power consumption
- I_{OFF} Supports Partial -Power Down Operation
- Inputs or Outputs accept up to 5.5V
- Inputs can be driven by 3.3V or 5V allowing for voltage translation applications.
- Schmitt Trigger Action at All Inputs
- ESD Protection Tested per JESD 22
 - Exceeds 200-V Machine Model (A115)
 - Exceeds 2000-V Human Body Model (A114)
 - Exceeds 1000-V Charged Device Model (C101)
- Latch-Up Exceeds 100mA per JESD 78, Class I
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)
- Halogen and Antimony Free. "Green" Device (Note 3)

HEX INVERTERS WITH SCHMITT TRIGGER INPUTS

Pin Assignments



Applications

- General Purpose Logic
- Power Down Signal Isolation
- Wide array of products such as:
 - PCs, networking, notebooks, ultrabooks, netbooks
 - Computer peripherals, hard drives, CD/DVD ROM
 - TV, DVD, DVR, set top box

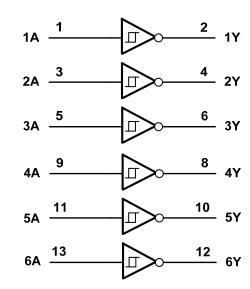
- Notes: 1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
 - 2. See http://www.diodes.com/quality/lead_free.html for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
 - 3. Halogen- and Antimony-free "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	Description
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
А	Y
Н	L
L	Н

Absolute Maximum Ratings (Note 4) (@T_A = +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 note 4	-0.5 to +7.0	V
I _{IK}	Input Clamp Current VI< 0V	-20	mA
loк	Output Clamp Current Vo<-0V	-50	mA
Io	Continuous Output Current - 0.5V < V _O V _{CC} + 0.5V	±25	mA
I _{CC}	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	Conditions	Min	Max	Unit
V _{CC}	Supply Voltage	—	2.0	5.5	V
VI	Input Voltage	—	0	5.5	V
Vo	Output Voltage	—	0	V _{cc}	V
	2.0V	—	-50	mA	
	I _{OH} High-Level Output Current	2.3V to 2.7V	—	-2	μA
IOH		3.0V to 3.6V	—	-6	mA
		4.5V to 5.5V	—	-12	mA
		2.0V	—	50	μA
	Low Lovel Output Current	2.3V to 2.7V	—	2	mA
I _{OL}	Low-Level Output Current	3.0V to 3.6V	—	6	mA
		4.5V to 5.5V	—	12	mA
TA	Operating Free-Air Temperature	_	-40	+125	°C

Note: 5. Unused inputs should be held at V_{CC} or Ground.

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

Ourseland	Parameter	Toot Conditions	N/	T _A = -40°0	C to +85°C	T _A = -40°C	to +125°C	Unit
Symbol	ymbol Parameter	Test Conditions	Vcc	Min	Мах	Min	Мах	Unit
Booitivo Coing	—	2.5 V	1	1.75	1	1.75		
V _{T+}	Positive Going Threshold	—	3.3 V	1.31	2.31	1.31	2.31	V
	Threshold	—	5.0 V	1.95	3.5	1.95	3.5	
	Negative Caine	—	2.5 V	0.75	1.5	0.75	1.5	
V _{T-}	Negative Going Threshold	—	3.3 V	0.99	2.07	0.99	2.07	—
	meshold	—	5.0 V	1.5	3.05	1.5	3.05	
		—	2.5 V	0.25	1	0.25	1	
V_{H}	Hysteresis (V _{T+-} V _{T-)}	—	3.3 V	0.33	1.32	0.33	1.32	V
	(v +- v -)	—	5.0 V	0.5	2	0.5	2	
	High-Level	I _{OH} = -50µА	2.0V to 5.5V	V _{CC} -0.1	—	V _{CC} -0.1	_	- v
V		I _{OH} = -2mA	2.3V	2.0	—	2.0	—	
V _{OH}	Output Voltage	I _{OH} = -6mA	3.0V	2.48	—	2.48	—	v
		I _{OH} = -12mA	4.5V	3.8	—	3.8	—	
		I _{OL} = 50μA	2.0V to 5.5V	—	0.1	—	0.1	
	Low-Level	I _{OL} = 2mA	2.3V	—	0.4	—	0.4	v
V _{OL}	Output Voltage	I _{OL} = 6mA	3.0V	—	0.44	—	0.44	v
		I _{OL} = 12mA	4.5V	—	0.55	—	0.55	
IOFF	Power Down Leakage Current	$V_{\rm I}$ or $V_{\rm O}$ = 0 to 5.5V	0V	—	5	_	5	μA
Ц	Input Current	V _I = GND or 5.5V	0 to 5.5V	_	±1	_	±1	μA
Icc	Supply Current	$V_{I} = GND \text{ or } V_{CC}$ $I_{O}=0$	5.5V	_	20	_	20	μA



Switching Characteristics

Symbol	Symbol Parameter	Test	V	-	Γ _A = +25°C	;	-40°C to	o +85°C	-40°C to	+125°C	Unit
Symbol		er Conditions	Vcc	Min	Тур.	Max	Min	Max	Min	Max	Unit
		Figure 1 C _L = 15pF	2.5V ± 0.2V	_	10.2	19.7	1	22	1	22	
			3.3V ± 0.3V	_	7.3	12.8	1	15	1	15.9	ns
	Propagation	CL = 15pi	5.0V ± 0.5V	_	5.1	8.6	1	10	1	10	
t _{PD}	Delay A_N to Y_N	F : 4	2.5V ± 0.2V		13.3	24	1	27	1	27	
		Figure 1 C _L = 50pF	3.3V ± 0.3V	_	9.6	16.3	1	18.5	1	19.4	ns
			5.0V ± 0.5V		6.7	10.6	1	12	1	12	

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

	Parameter	Test Conditions	V _{cc}	Тур	Unit
0	Power Dissipation	F= 10 MHz	3.3V	8.8	<u>م</u> ۲
C _{pd}	Capacitance per Gate	C _L =50pF	5.0V	9.6	pF

Noise Characteristics

V_{CC} = 3V, C_L = 50pF T_A = +25°C

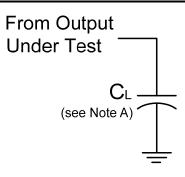
Symbol	Parameter	Min	Тур	Max	Unit
V _{OL(p)}	Quiet output, maximum dynamic V _{OL}		0.2	0.8	V
V _{OL(V)}	Quiet output, minimum dynamic V _{OL}	-	-0.1	-0.8	V
V _{OH(V)}	Quiet output, minimum dynamic V _{OH}	_	3.1	_	V
V _{IH(D)}	High Level dynamic input voltage	2.31	_	_	V
VIL(D)	Low Level dynamic input voltage	_	_	0.99	V

Package Characterisitics

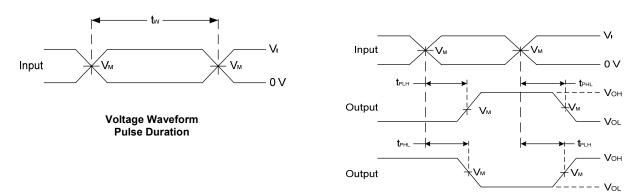
Symbol	Parameter	Test Conditions	Vcc	Min	Тур	Max	Unit
Ci	Input Capacitance	$V_i = V_{CC} - or GND$	2.0 to 5.5V	_	3.3	10	pF







N N	Inj	outs	N N	0	
VCC		t _r / t _f	VM	CL	
2.0V to 5.5V	V _{CC}	< 3ns	V _{CC} / 2	15pF or 50pF	



Voltage Waveform Propagation Delay Times Inverting and Non Inverting Outputs

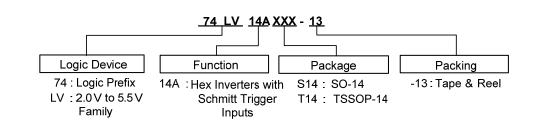
Notes: A. Includes test lead and test apparatus capacitance.

- B. All pulses are supplied at pulse repetition rate \leq 10MHz.
- C. Inputs are measured separately one transition per measurement. D. t_{PLH} and t_{PHL} are the same as t_{PD} .

Figure 1 Load Circuit and Voltage Waveforms



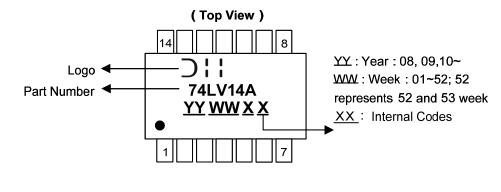
Ordering Information



Part Number	Deekere Code	Packaging	13" Tape	and Reel			
Part Number	Package Code	(Note 6)	Quantity	Part Number Suffix			
74LV14AS14-13	S14	SO-14	2500/Tape & Reel	-13			
74LV14AT14-13	T14	TSSOP-14	2500/Tape & Reel	-13			
Note: 6. The taping orie	lote: 6. The taping orientation and tape details can be found at http://www.diodes.com/datasheets/ap02007.pdf						

Marking Information

(1) SO14, TSSOP14



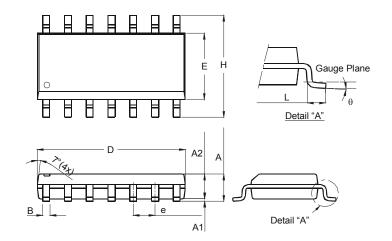
Part Number	Package
74LV14AS14	SO-14
74LV14AT14	TSSOP-14



Package Outline Dimensions (All dimensions in mm.)

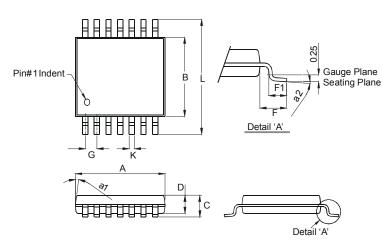
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for latest version.

Package Type: SO-14



SO-14		
Dim	Min	Max
Α	1.47	1.73
A1	0.10	0.25
A2	1.45 Typ	
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 Dimensions in mm		

Package Type: TSSOP-14



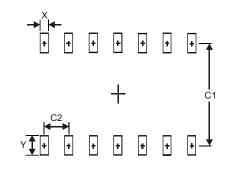
TSSOP-14			
Dim	Min	Max	
a1	7° (4X)		
a2	0°	8°	
Α	4.9	5.10	
В	4.30	4.50	
С	_	1.2	
D	0.8	1.05	
F	1.00 Typ		
F1	0.45	0.75	
G	0.65 Typ		
κ	0.19	0.30	
L	6.40 Тур		
All Dimensions in mm			



Suggested Pad Layout

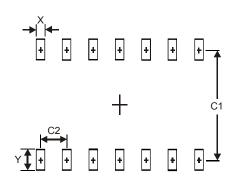
Please see AP02001 at http://www.diodes.com/datasheets/ap02001.pdf for the latest version.

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)
Х	0.45
Y	1.45
C1	5.9
C2	0.65



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