



HEX INVERTERS WITH OPEN DRAIN OUTPUTS

Description

The 74HC05 provides provides six independent inverters with open drain outputs. The device is designed for operation with a power supply range of 2.0V to 6.0V.

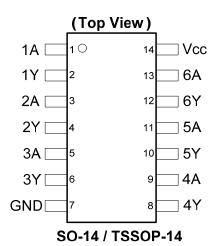
The gates perform the Boolean function:

$$Y=\overline{\boldsymbol{A}}$$

Features

- Wide Supply Voltage Range from 2.0V to 6.0V
- Sinks 4mA 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)
- 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:

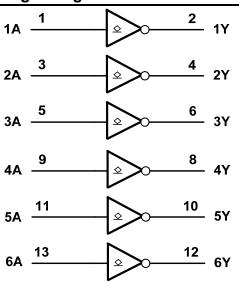
- 1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
- 2. See http://www.diodes.com for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
- 3. Halogen- and Antimony-free "Green" products are defined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



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	V _{CC}	Supply Voltage

Logic Diagram



Function Table

Input	Output
Α	Υ
Н	L
L	Z



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 5)	-0.5 to +7.0	V
lıĸ	Input Clamp Current V _I < -0.5V or Vi > V _{CC} + 0.5V	±20	mA
lok	Output Clamp Current $V_O < -0.5V$ or $V_O > V_{CC} + 0.5V$	±20	mA
I _O	Continuous Output Current - 0.5V < V _O V _{CC} + 0.5V	+/- 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

Notes:

Recommended Operating Conditions (Note 6) (@T_A = +25°C, unless otherwise specified.)

Symbol	Parameter	Conditions	Min	Max	Unit
V _{CC}	Supply Voltage		2.0	6.0	V
VI	Input Voltage		0	Vcc	V
Vo	Output Voltage		0	V _{CC}	V
		V _{CC} = 2.0V		625	
Δt/ΔV	Input transition rise or fall rate	V_{CC} = 4.5 V		140	ns/V
		$V_{CC} = 6.0V$		85	
T _A	Operating free-air temperature		-40	+125	°C

Note: 6. Unused inputs should be held at V_{CC} or Ground.

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

Cumbal	Davamatar	Toot Conditions	V	T _A = -40°	C to +85°C	T _A = -40°C	to +125°C	l lmi4
Symbol	Parameter	Test Conditions	V _{CC}	Min	Max	Min	Max	Unit
	18 1 1 11 1		2.0V	1.5		1.5		
V_{IH}	High-level Input Voltage		4.5V	3.15		3.15		V
	Voltage		6.0V	4.2		4.2		
	1 1 1 ! 4		2.0V		0.5		0.5	
V_{IL}	Low-level input voltage		4.5V		1.35		1.35	V
	Voltage		6.0V		1.8		1.8	
		$I_{OL} = 20\mu A$	2.0V		0.1		0.1	
		I _{OL} = 20μA	4.5V		0.1		0.1	
V_{OL}	Low-level Output Voltage	I _{OL} = 20μA	6.0V		0.1		0.1	V
	Voltage	I _{OL} = 4mA	4.5V		0.33		0.44	
		I _{OL} = 5.2mA	6.0V		0.33		0.44	
l _{OZ}	Z State Leakage Current	V _O =0 to 6.0V V _I =GND or 6.0V	6.0V		± 5.0		± 10	μА
II	Input Current	V _I =GND to 5.5V	6.0V		± 1		± 1	μΑ
I _{CC}	Supply Current	$V_I = GND \text{ or } V_{CC},$ $I_O=0$	6.0V		20		40	μА

^{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.

^{5.} Input Voltage cannot exceed V_{CC} to the extent the Maximum clamp current is exceeded



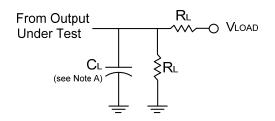
Switching Characteristics

Symbol	Parameter	Test	V		T _A = +25°(2	-40°C to +85°C	-40°C to +125°C	Unit
Symbol	Parameter	Conditions	Vcc	Min	Тур	Max	Max	Max	Onit
	Decembration	Figure 1	2.0V	_	25	90	115	125	
t _{PD}	Propagation Delay A _N to Y _N		4.5V	_	9	18	23	27	ns
			6.0V	_	7	15	20	23	
		Figure 1	2.0V	_	19	75	95	110	
t _t Transition time	Transition time	time Figure 1 $C_L = 50 \text{ pF}$	4.5V	_	7	15	19	22	ns
			6.0V	_	6	13	16	19	

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

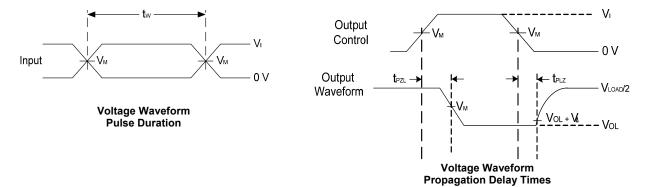
Parameter		Test Conditions	V _{CC} = 6V Typ	Unit
C _{pd}	Power dissipation capacitance per gate	f = 1 MHz	22	pF
Cı	Input Capacitance	$V_1 = V_{CC} - \text{or GND}$	4	pF

Parameter Measurement Information



TEST	Condition
t _{PLZ} (see Notes D and E)	Vload
t _{PZL} (see Notes D and F)	Vload

V	Inp	uts	V	V	•		V/A
V _{CC}	VI	t _r /t _f	V _M	VLOAD	CL	K _L	V Δ
2.0V to 6.0V	V _{CC}	≤6ns	V _{CC} /2	2 X V _{CC}	50 pF	2 ΚΩ	10% of Vcc



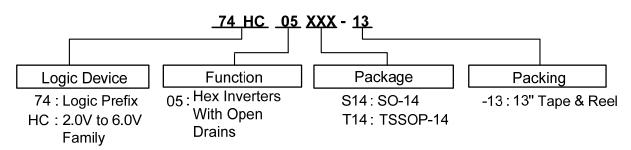
Notes: A. Includes test lead and test apparatus capacitance.

- B. All pulses are supplied at pulse repetition rate ≤ 1 MHz.
- C.The inputs are measured one at a time with one transition per measurement.
- D. For the open drain device t_{PLZ} and t_{PZL} are the same as $t_{\text{PD.}}$
- E. t_{PZL} is measured at V_{M} .
- F. t_{PLZ} is measured at V_{OL} + V_{Δ} .
- D. A Thevenin equivalent load may be used in place of V_{CC} X 2 and resistor divider.

Figure 1 Load Circuit and Voltage Waveforms



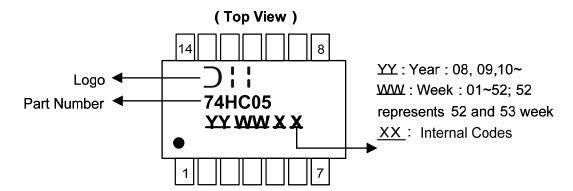
Ordering Information



	Davisa	Backers Code	Dookoning	7" Тар	e and Reel
	Device	Package Code	Packaging	Quantity	Part Number Suffix
Pb Lead-free Green	74HC05S14-13	S14	SO-14	2500/Tape & Reel	-13
Lead-free Green	74HC05T14-13	T14	TSSOP-14	2500/Tape & Reel	-13

Marking Information

(1) SO-14, TSSOP-14



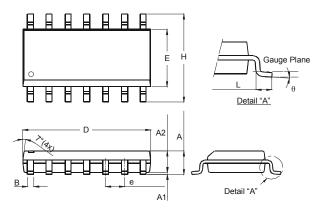
Part Number	Package
74HC05S14	SO-14
74HC05T14	TSSOP-14



Package Outline Dimensions (All dimensions in mm.)

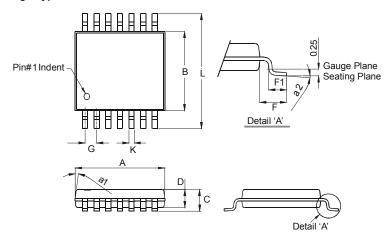
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for latest version.

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

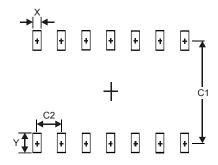


TSSOP-14			
Dim	Min	Max	
a1	7° (4X)		
a2	0°	8°	
Α	4.9	5.10	
В	4.30	4.50	
С	_	1.2	
D	0.8	1.05	
F	1.00 Typ		
F1	0.45	0.75	
G	0.65 Typ		
K	0.19	0.30	
L	6.40 Typ		
All Dimensions in mm			

Suggested Pad Layout

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

Package Type: SO-14

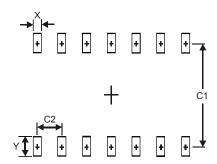


Dimensions	Value (in mm)
Х	0.60
Y	1.50
C1	5.4
C2	1.27



Suggested Pad Layout (cont.)

Package Type: TSSOP-14



Dimensions	Value (in mm)
Х	0.45
Y	1.45
C1	5.9
C2	0.65

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