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**Description**


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The 74AHCT05 provides six independent inverters with open drain outputs. The device is designed for operation with a power supply range of 4.5V to 5.5V.

The gates perform the Boolean function:

$$Y = \bar{A}$$

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**Features**

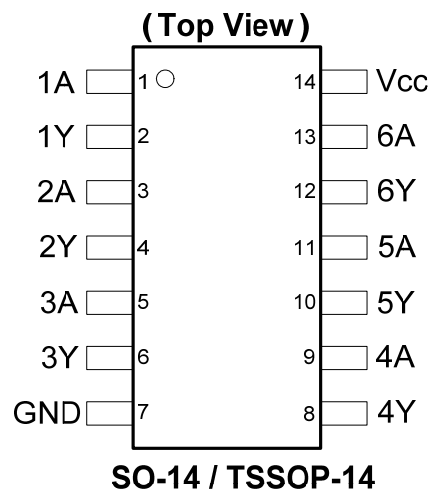

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- Wide Supply Voltage Range from 4.5V to 5.5V
- Inputs Are TTL Voltage Level Compatible
- Outputs Sink or Source 8mA at  $V_{CC} = 4.5V$
- CMOS Low Power Consumption
- Schmitt Trigger Action at All Inputs
- ESD Protection Exceeds JESD 22
  - 200-V 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)**

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**Pin Assignments**


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**Applications**


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- 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:

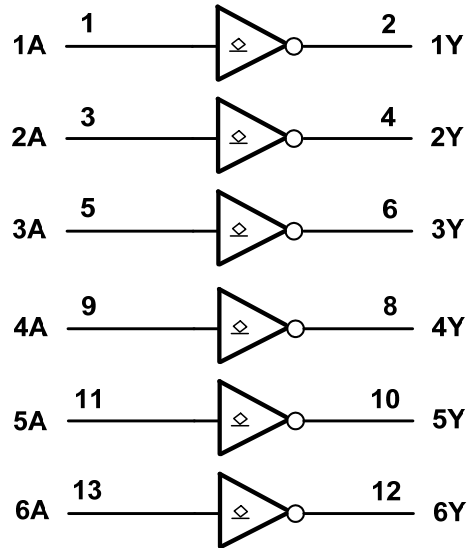
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
2. See <http://www.diodes.com> for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
3. Halogen- and Antimony-free "Green" products are defined 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	V <sub>CC</sub>	Supply Voltage

### Logic Diagram



### Function Table

Input	Output
A	Y
L	Z
H	L

### Absolute Maximum Ratings (Note 4) (@T<sub>A</sub> = +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 <sub>CC</sub>	Supply Voltage Range	-0.5 to +7.0	V
V <sub>I</sub>	Input Voltage Range	-0.5 to +7.0	V
I <sub>IK</sub>	Input Clamp Current V <sub>I</sub> < -0.5V	-20	mA
I <sub>OK</sub>	Output Clamp Current V <sub>O</sub> < 0V	-20	mA
I <sub>OK</sub>	Output Clamp Current V <sub>O</sub> > V <sub>CC</sub>	20	mA
I <sub>O</sub>	Continuous Output Current 0V < V <sub>O</sub> < V <sub>CC</sub>	+/- 25	mA
I <sub>CC</sub>	Continuous Current Through V <sub>CC</sub>	50	mA
I <sub>GND</sub>	Continuous Current Through GND	-50	mA
T <sub>J</sub>	Operating Junction Temperature	-40 to +150	°C
T <sub>STG</sub>	Storage Temperature	-65 to +150	°C
P <sub>TOT</sub>	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<sub>A</sub> = +25°C, unless otherwise specified.)

Symbol	Parameter	Min	Max	Unit
V <sub>CC</sub>	Supply Voltage	4.5	5.5	V
V <sub>I</sub>	Input Voltage	0	5.5	V
V <sub>O</sub>	Output Voltage	0	V <sub>CC</sub>	V
Δt/ΔV	Input Transition Rise or Fall Rate		20	ns/V
T <sub>A</sub>	Operating Free-Air Temperature	-40	+125	°C

 Note: 5. Unused inputs should be held at V<sub>CC</sub> or Ground.

**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Symbol	Parameter	Test Conditions	V <sub>CC</sub>	T <sub>A</sub> = -40°C to +85°C		T <sub>A</sub> = -40°C to +125°C		Unit
				Min	Max	Min	Max	
V <sub>IH</sub>	High-Level Input Voltage		4.5V to 5.5V	2.0		2.0		V
V <sub>IL</sub>	Low-Level Input Voltage		4.5V to 5.5V		0.8		0.8	V
V <sub>OL</sub>	Low-Level Output Voltage	I <sub>OL</sub> = 50μA	4.5V		0.1		0.1	V
		I <sub>OL</sub> = 8mA	4.5V		0.44		0.55	
I <sub>OZ</sub>	Z State Leakage Current	V <sub>O</sub> = 0 to 5.5V	5.5V		±2.5		±10	μA
I <sub>I</sub>	Input Current	V <sub>I</sub> = GND to 5.5V	3.6V		±1		±2	μA
I <sub>CC</sub>	Supply Current	V <sub>I</sub> = GND or V <sub>CC</sub> , I <sub>O</sub> = 0	3.6V		20		40	μA
ΔI <sub>CC</sub>	Additional Supply Current	One input at V <sub>CC</sub> -2.1V Other pins at V <sub>CC</sub> or GND	5.5V		1.35		5	mA

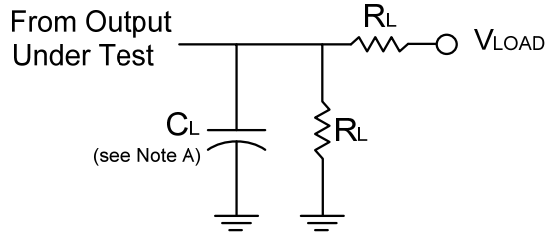
**Operating Characteristics**

Parameter		Test Conditions	V <sub>CC</sub> = 5.5V	Unit
			Typ	
C <sub>pd</sub>	Power Dissipation Capacitance per Gate	f = 1MHz	5	pF
C <sub>i</sub>	Input Capacitance	V <sub>i</sub> = V <sub>CC</sub> - or GND	4.0	pF

**Switching Characteristics**

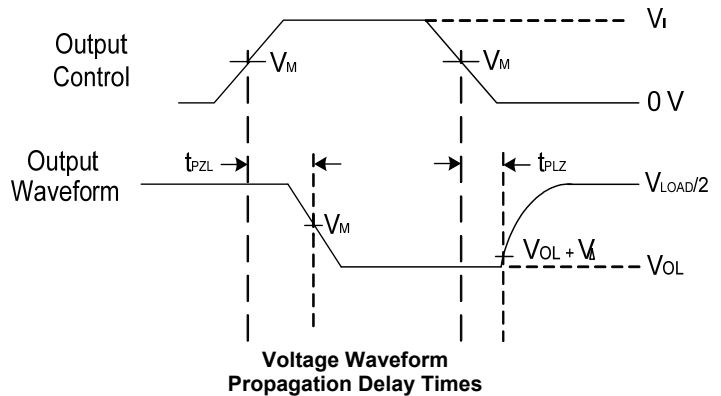
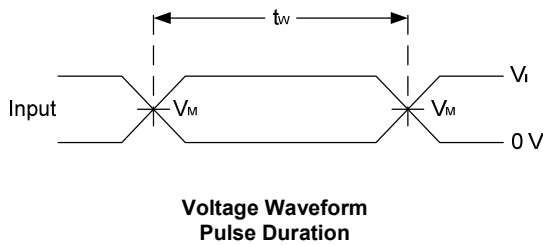
Symbol	Parameter	Test Conditions	V <sub>CC</sub>	T <sub>A</sub> = +25°C			-40°C to +85°C		-40°C to +125°C		Unit
				Min	Typ	Max	Min	Max	Min	Max	
t <sub>PD</sub>	Propagation Delay A <sub>N</sub> to Y <sub>N</sub>	Figure 1 C <sub>L</sub> = 15pF	4.5V to 5.5V	0.5	3.4	6.9	0.5	8.0	0.5	9.0	ns
		Figure 1 C <sub>L</sub> = 50pF	4.5V to 5.5V	0.5	4.9	10.0	0.5	10.0	0.5	11.0	

**Parameter Measurement Information**



TEST	Condition
$t_{PLZ}$ (see Notes D and E)	Vload
$t_{PZL}$ (see Notes D and F)	Vload

$V_{CC}$	Inputs		$V_M$ Inputs	$V_M$ Outputs	$V_{LOAD}$	$C_L$	$R_L$	$V_{\Delta}$
	$V_I$	$t_r/t_f$						
4.5V to 5.5V	3 V	$\leq 3ns$	1.5V	$V_{CC}/2$	$2 \times V_{CC}$	15pF, 50pF	2K	0.3V

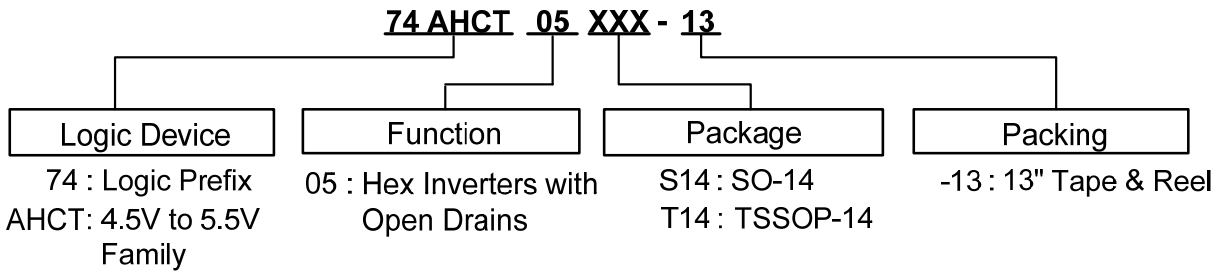


**Figure 1 Load Circuit and Voltage Waveforms**

- Notes:
- A. Includes test lead and test apparatus capacitance.
  - B. All pulses are supplied at pulse repetition rate  $\leq 1$  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  $t_{PD}$ .
  - E.  $t_{PZL}$  is measured at  $V_M$ .
  - D.  $t_{PLZ}$  is measured at  $V_{OL} + V_{\Delta}$ .

NEW PRODUCT

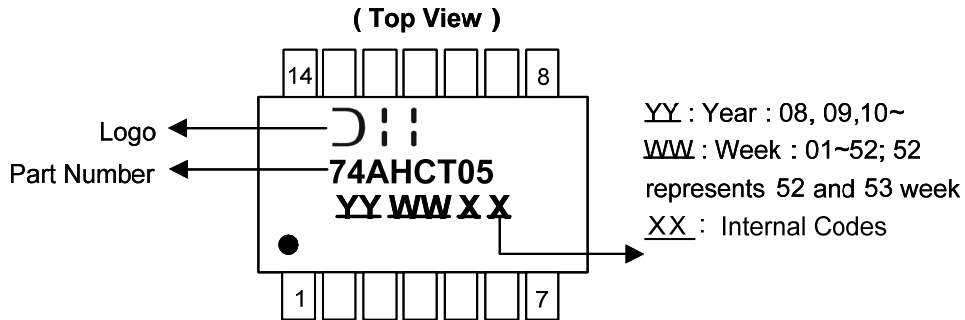
**Ordering Information**



Part Number	Package Code	Packaging	7" Tape and Reel	
			Quantity	Part Number Suffix
74AHCT05S14-13	S14	SO-14	2500/Tape & Reel	-13
74AHCT05T14-13	T14	TSSOP-14	2500/Tape & Reel	-13

**Marking Information**

(1) SO-14, TSSOP-14



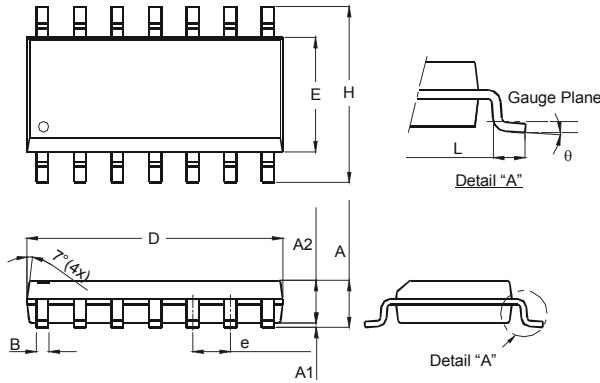
Part Number	Package
74AHCT05S14	SO-14
74AHCT05T14	TSSOP-14

NEW PRODUCT

**Package Outline Dimensions** (All dimensions in mm.)

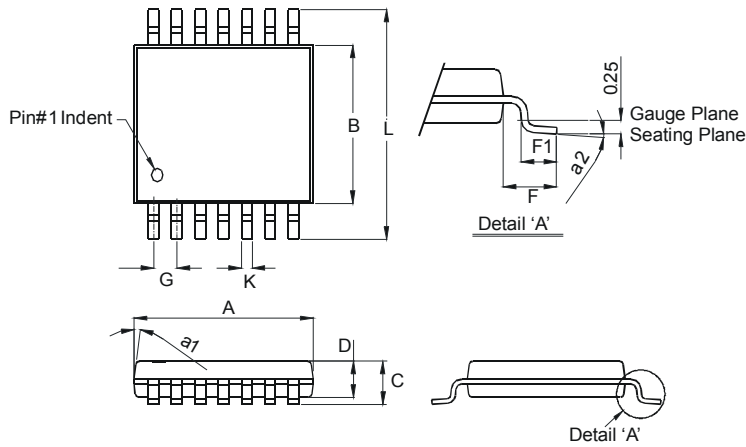
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.

**Package Type: SO-14**



SO-14		
Dim	Min	Max
A	1.47	1.73
A1	0.10	0.25
A2	1.45 Typ	
B	0.33	0.51
D	8.53	8.74
E	3.80	3.99
e	1.27 Typ	
H	5.80	6.20
L	0.38	1.27
$\theta$	0°	8°
<b>All Dimensions in mm</b>		

**Package Type: TSSOP-14**

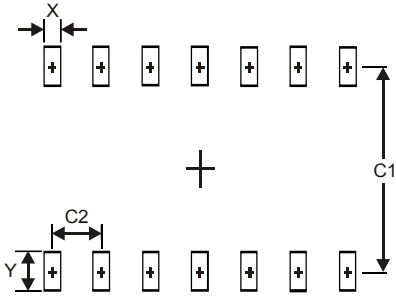


TSSOP-14		
Dim	Min	Max
a1	$7^\circ(4X)$	
a2	0°	8°
A	4.9	5.10
B	4.30	4.50
C	—	1.2
D	0.8	1.05
F	1.00 Typ	
F1	0.45	0.75
G	0.65 Typ	
K	0.19	0.30
L	6.40 Typ	
<b>All Dimensions in mm</b>		

**Suggested Pad Layout**

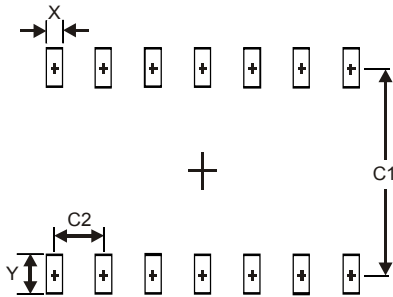
Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.

**Package Type: SO-14**



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

**Package Type: TSSOP-14**



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

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