

74AHC08

QUADRUPLE 2-INPUT AND GATES

Description

The 74AHC08 provides provides four independent 2-input AND gates 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.

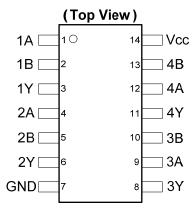
The gates perform the Boolean function:

$$Y = A \bullet B$$
 or $Y = \overline{A} + \overline{B}$

Features

- Wide Supply Voltage Range from 2.0V to 5.5 V
- Outputs Sink or Source 8 mA at V_{CC} = 4.5V
- CMOS Low Power Consumption
- Schmitt Trigger Action at All Inputs
- Inputs can be driven by 3.3V or 5.5V allowing for voltage translation applications.
- 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



SO-14 / TSSOP-14

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.

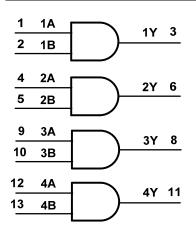
Click here for ordering information, located at the end of datasheet



Pin Descriptions

Pin Number	Pin Name	Function
1	1A	Data Input
2	1B	Data Input
3	1Y	Data Output
4	2A	Data Input
5	2B	Data Input
6	2Y	Data Output
7	GND	Ground
8	3Y	Data Output
9	3A	Data Input
10	3B	Data Input
11	4Y	Data Output
12	4A	Data Input
13	4B	Data Input
14	V _{CC}	Supply Voltage

Logic Diagram



Function Table

In	Output	
Α	В	Y
L	L	L
L	Н	L
Н	L	L
Н	Н	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	-0.5 to +7.0	V
I _{IK} Input Clamp Current V _I < -0.5V		-20	mA
I _{OK}	Output Clamp Current V _O < -0.5V	-20	mA
I _{OK}	Output Clamp Current V _O > V _{CC} +0.5V	25	mA
I _O	Continuous Output Current - 0.5V < V _O V _{CC} +0.5V	+/- 25	mA
Icc	Continuous Current Through V _{CC}	75	mA
I _{GND}	Continuous Current Through GND	-75	mA
T _J Operating Junction Temperature		-40 to +150	°C
T _{STG} Storage Temperature		-65 to +150	°C
Ртот	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
Vcc	Supply Voltage		2.0	5.5	V
VI	Input Voltage		0	5.5	V
Vo	Output Voltage		0	V _{CC}	V
Δt/ΔV		V_{CC} = 3.0V to 3.6V		100	ns/V
ΔυΔν	Input Transition Rise or Fall Rate	V _{CC} = 4.5V to 5.5V		20	115/ V
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	Domoniation	Test Canditions	N/	T _A = -40°	C to +85°C	T _A = -40°C	C to +125°C	Unit
Symbol	Symbol Parameter	Parameter Test Conditions	Vcc	Min	Max	Min	Max	
			2.0V	1.5		1.5		
VIH	High-Level Input Voltage		3.0V	2.1		2.1		V
	Volkago		5.5V	3.85		3.85		
			2.0V		0.5		0.5	
VIL	Low-Level Input Voltage		3.0V		0.9		0.9	V
	Voltage		5.5V		1.65		1.65	
		I _{OH} = -50μA	2.0V	1.9		1.9		
		I _{OH} = -50µА	3.0V	2.9		2.9		
VOH	High-Level Output Voltage	I _{OH} = -50μA	4.5V	4.4		4.4		V
	Voltage	I _{OH} = -4mA	3.0V	2.48		2.40		
		I _{OH} = -8mA	4.5V	3.80		3.70		
		I _{OL} = 50μA	2.0V		0.1		0.1	
		I _{OL} = 50μA	3.0V		0.1		0.1	1
V _{OL}	Low-Level Output Voltage	I _{OL} = 50μA	4.5V		0.1		0.1	V
	Vollage	I _{OL} = 4mA	3.0V		0.44		0.55	1
	I _{OL} = 8mA	4.5V		0.44		0.55	1	
lı	Input Current	VI =GND to 5.5V	3.6V		±1		±2	μA
lcc	Supply Current	$V_I = GND \text{ or } V_{CC}, I_O = 0$	3.6V		20		40	μA

Operating Characteristics

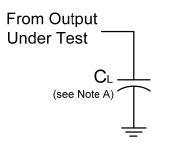
Parameter		Test Conditions	V _{CC} = 2.0V Typ	V _{CC} = 3.3V Typ	V _{CC} = 5V Typ	Unit
C _{pd}	Power Dissipation Capacitance per Gate	f = 1 MHz	9.7	11.0	15	pF
Ci	Input Capacitance	$V_i = V_{CC} - or GND$	4.0	4.0	4.0	pF



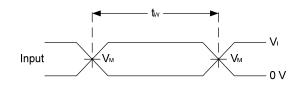
Switching Characteristics

Symbol Parameter		Test	N		T _A = +25°C		-40°C to +85°C		-40°C to +125°C		Unit
Symbol	Falameter	Conditions	Vcc	Min	Тур	Max	Min	Max	Min	Мах	Unit
		Figure 1	3.0V to 3.6V	0.5	4.5	7.9	0.5	9.5	0.5	10.0	
	Propagation	C _L = 15pF	4.5V to 5.5V	0.5	3.2	5.5	0.5	6.5	0.5	7.0	20
t _{PD}	Delay A_N to Y_N	Figure 1	3.0V to 3.6V	0.5	6.0	11.4	0.5	13.0	0.5	14.5	ns
		C _L = 50pF	4.5V to 5.5V	0.5	4.5	7.5	0.5	8.5	0.5	9.5	

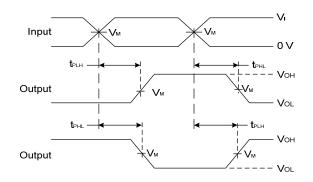
Parameter Measurement Information



N	Inj	puts	N N	0
V _{cc}	VI	t _r /t _f	V _M	υL
3.3V -3.6V	V _{CC}	3ns	V _{CC} /2	15pF, 50pF
4.5V to 5.5V	V _{CC}	3ns	V _{CC} /2	15pF, 50pF



Voltage Waveform Pulse Duration



Voltage Waveform Propagation Delay Times Inverting and Non Inverting Outputs

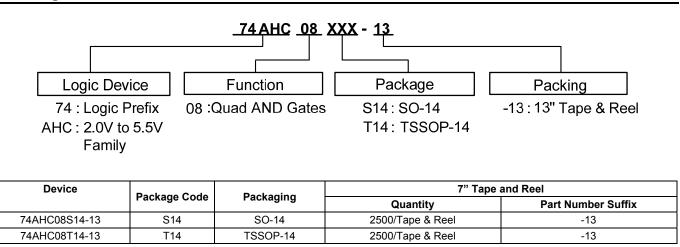
Figure 1 Load Circuit and Voltage Waveforms

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

- B. All pulses are supplied at pulse repetition rate \leq 1 MHz.
- C. Inputs are measured separately one transition per measurement.
- D. t_{PLH} and t_{PHL} are the same as t_{PD} .



Ordering Information



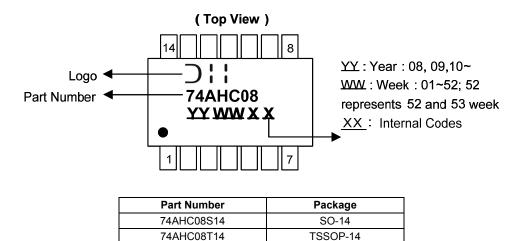
Marking Information

(1) SO-14, TSSOP-14

NEW PRODUCT

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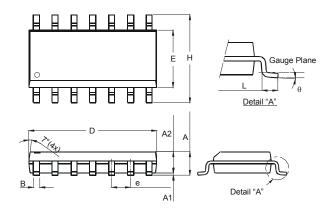




Package Outline Dimensions (All dimensions in mm.)

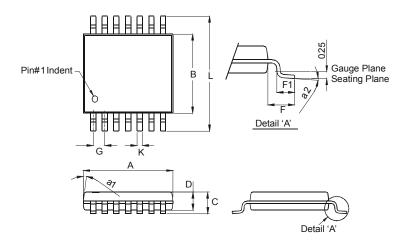
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for latest version.

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 Di	mensions	s 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	Тур				
F1	0.45	0.75				
G	0.65	Тур				
κ	0.19	0.30				
L	L 6.40 Typ					
All Dir	nensions	s in mm				

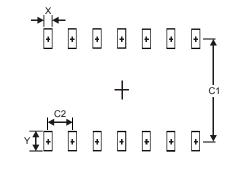
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Suggested Pad Layout

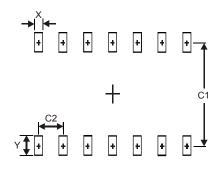
Please see AP02001 at http://www.diodes.com/datasheets/ap02001.pdf for the latest version.

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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