Description

The 74LVC07A provides six independent open-drain buffers. The device is designed for operation with a power supply range of 1.65V 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 outputs can be connected to implement active-low wired-OR or active-high wired-AND functions.

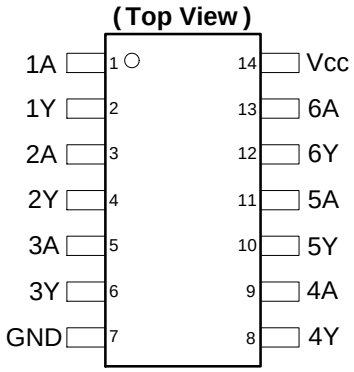
The gates perform the positive Boolean function:

$$Y = A$$

Features

- Wide Supply Voltage Range from 1.65V to 5.5V
- Sinks 24mA at V_{CC} = 3.3V
- CMOS low power consumption
- I_{OFF} Supports Partial-Power-Down Mode Operation
- Inputs or outputs accept up to 5.5V
- 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 250 mA 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)**
- **For automotive applications requiring specific change control (i.e. parts qualified to AEC-Q100/101/104/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please contact us or your local Diodes representative. https://www.diodes.com/quality/product-definitions/**

Pin Assignments



SO-14 / TSSOP-14

Applications

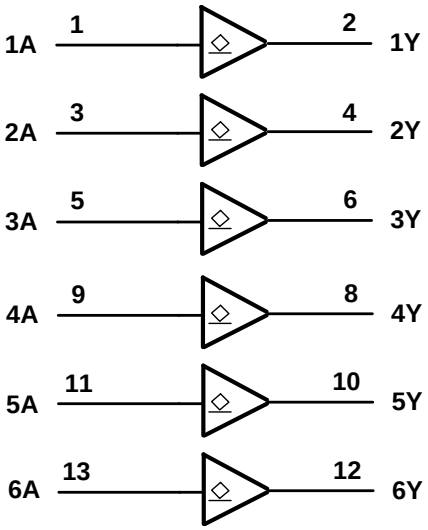
- Voltage level shifting
- General-purpose logic
- Power down signal isolation
- Wide array of products such as:
  - PCs, networking, notebooks, ultrabooks, netbooks
  - Computer peripherals, hard drives, CD/DVD ROM
  - TV, DVD, DVR, set top boxes

Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
2. See https://www.diodes.com/quality/lead-free/ 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	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	V_{CC}	Supply Voltage

Logic Diagram



Function Table

Inputs	Outputs
A	**Y**
L	L
H	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 +6.5	V
V_I	Input Voltage Range	-0.5 to +6.5	V
V_O	Voltage applied to output in high impedance or I_{OFF} state	-0.5 to +6.5	V
V_O	Voltage applied to output in high or low state	-0.3 to V_{CC} +0.5	V
I_{IK}	Input Clamp Current $V_I < 0$	-50	mA
I_{OK}	Output Clamp Current $V_O < 0$	-50	mA
I_O	Continuous output current	50	mA
—	Continuous current through Vdd or GND	±100	mA
T_J	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	—	1.65	5.5	V
V_I	Input Voltage	—	0	5.5	V
V_O	Output Voltage	Active Mode	0	V_{CC}	V
		V_{CC} = 0V; Power Down Mode	0	5.5	V
Δt/ΔV	Input transition rise or fall rate	V_{CC} = 1.65V to 2.7V	—	20	ns/V
		V_{CC} = 2.7V to 5.5V	—	10	
T_A	Operating free-air temperature	—	-40	+125	ºC

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

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

Symbol	Parameter	Test Conditions	V_{CC}	T_A = -40°C to +85°C		T_A = -40°C to +125°C		Unit
				Min	Max	Min	Max	
V_{IH}	High-level Input Voltage	—	1.65V to 1.95V	0.65 X V_{CC}	—	0.65 X V_{CC}	—	V
		—	2.3V to 2.7V	1.7	—	1.6	—	
		—	2.7V to 3.6V	2.0	—	2.0	—	
		—	4.5V to 5.5V	0.7 X V_{CC}	—	2.0	—	
V_{IL}	Low-level input voltage	—	1.65V to 1.95V	—	0.35 X V_{CC}	—	0.35 X V_{CC}	V
		—	2.3V to 2.7V	—	0.7	—	0.7	
		—	2.7V to 3.6V	—	0.8	—	0.8	
		—	4.5V to 5.5V	—	0.3 X V_{CC}	—	0.3 X V_{CC}	
V_{OL}	Low-level Output Voltage	I_{OL} = 100μA	1.65V to 5.5V	—	0.2	—	0.3	V
		I_{OL} = 4mA	1.65V	—	0.45	—	0.6	
		I_{OL} = 8mA	2.3V	—	0.70	—	0.85	
		I_{OL} = 12mA	2.7V	—	0.40	—	0.6	
			3.0V	—	0.55	—	0.6	
		I_{OL} = 24mA	3.0V	—	0.55	—	0.6	
		I_{OL}= 32mA	4.5V	—	0.55	—	0.6	
I_I	Input Current	V_I = GND to 5.5V	3.6V	—	± 5	—	± 20	μA
I_{OZ}	Z State Leakage Current	V_O = GND or 5.5V	3.6V	—	±10	—	±20	μA
I_{OFF}	Power Down Leakage Current	V_I or V_O = 0V to 3.6V	0	—	10	—	20	μA
I_{CC}	Supply Current	V_I = GND or V_{CC} I_O = 0	3.6V	—	10	—	40	μA

Switching Characteristics

Symbol	Parameter	Test Conditions	V_{CC}	T_A = +25°C			-40°C to +85°C		-40°C to +125°C		Unit
				Min	Typ	Max	Min	Max	Min	Max	
t_{PLZ} /t_{PZL}	Propagation Delay A_N to Y_N	Figure 1	1.65V to1.95V	0.3	2.9	5.7	0.3	5.8	0.3	7.6	ns
			2.3V to 2.7V	0.3	2.6	4.1	0.3	4.7	0.3	5.5	
			2.7V	0.3	2.5	4.0	0.3	4.5	0.3	5.0	
			3V to 3.6V	0.3	2.3	3.5	0.3	3.7	0.3	5.0	
			4.5V to 5.5V	0.3	1.7	3.2	0.3	3.4	0.3	4.5	

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

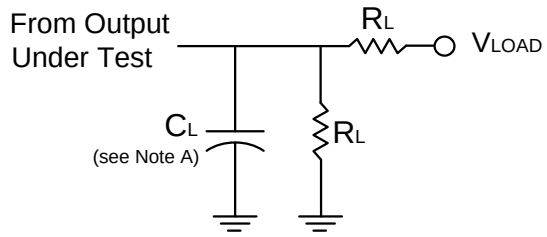
Parameter		Test Conditions	V_{CC} = 1.8V	V_{CC} = 2.5V	V_{CC} = 3.3V	V_{CC} = 5V	Unit
			Typ	Typ	Typ	Typ	
C_{pd}	Power dissipation capacitance per gate	f = 10 MHz	7.0	7.5	8.0	8.6	pF
C_I	Input Capacitance	V_I = V_{CC} – or GND	4	4	4	4	pF

Package Characteristics

Symbol	Parameter	Test Conditions	V_{CC}	Min	Typ	Max	Unit
θ_{JA}	Thermal Resistance Junction-to-Ambient	SO-14	(Note 6)		TBD		°C/W
		TSSOP-14			159		
θ_{JC}	Thermal Resistance Junction-to-Case	SO-14	(Note 6)		TBD		°C/W
		TSSOP-14			25		

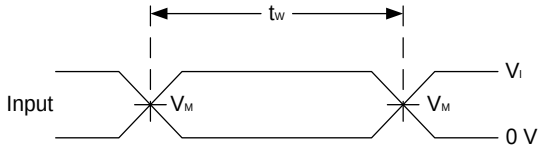
Note: 6. Test condition for SO-14 and TSSOP-14: Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.

Parameter Measurement Information

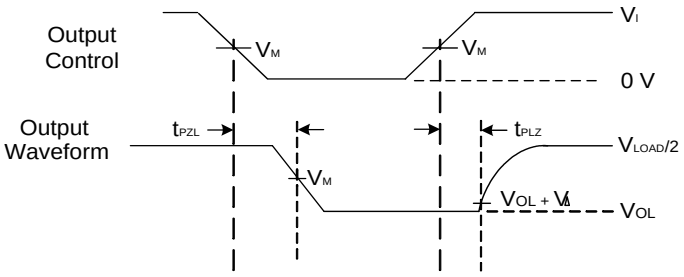


TEST	Condition
t_{PLZ} (see Note E)	V_{LOAD}
t_{PZL}(see Note D)	V_{LOAD}

V_{CC}	Inputs		V_M	V_{LOAD}	C_L	R_L	$V\Delta$
	V_I	t_r/t_f					
1.8V±0.15V	V_{CC}	≤2ns	$V_{CC}/2$	2 X V_{CC}	30pF	1KΩ	0.15V
2.5V±0.2V	V_{CC}	≤2ns	$V_{CC}/2$	2 X V_{CC}	30pF	500Ω	0.15V
2.7V	2.7V	≤2ns	1.5V	6V	50pF	500Ω	0.3V
3.3V±0.3V	3V	≤2.5ns	1.5V	6V	50pF	500Ω	0.3V
5V±0.5V	V_{CC}	≤2.5ns	$V_{CC}/2$	2 X V_{CC}	50pF	500Ω	0.3V



Voltage Waveform
Pulse Duration

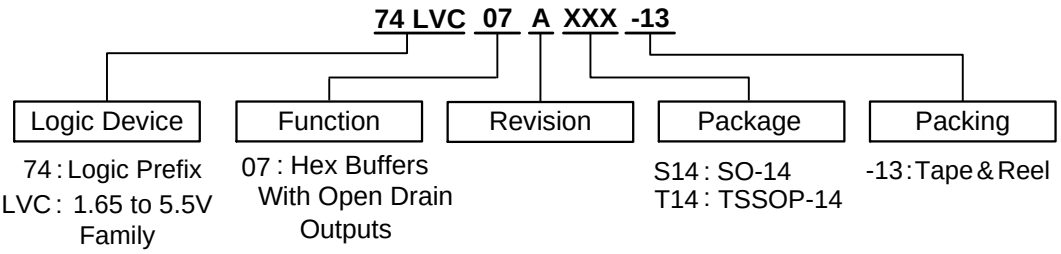


Voltage Waveform
Propagation Delay Times

Notes:
A. Includes test lead and test apparatus capacitance.
B. All pulses are supplied at pulse repetition rate ≤ 10 MHz
C. The inputs are measured one at a time with one transition per measurement.
D. t_{PZL} is measured at V_M.
E. t_{PLZ} is measured at V_{OL} + V_Δ

Figure 1. Load Circuit and Voltage Waveforms

Ordering Information

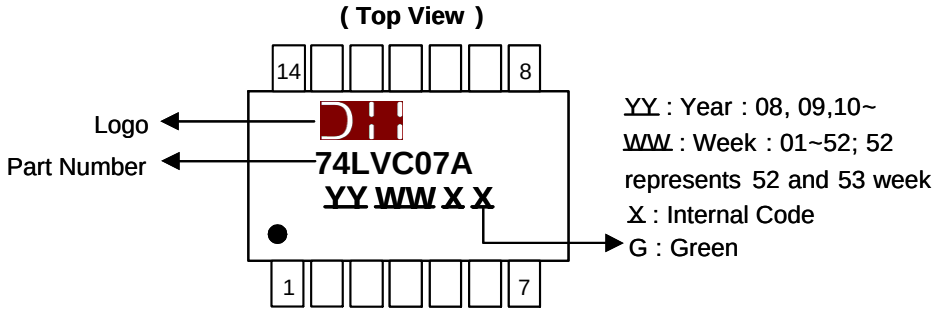


Orderable Part Number	Package Code	Package (Note 7)	Packing		
			Quantity	Carrier	Part Number Suffix
74LVC07AS14-13	S14	SO-14	2,500	13" Tape & Reel	-13
74LVC07AT14-13	T14	TSSOP-14	2,500	13" Tape & Reel	-13

Note: 7. The taping orientation and tape details can be found at http://www.diodes.com/datasheets/ap02007.pdf

Marking Information

(1) SO-14, TSSOP-14

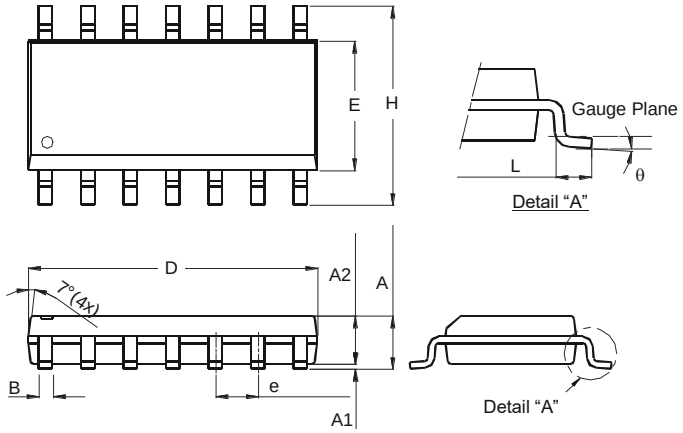


Part Number	Package
74LVC07AS14	SO-14
74LVC07AT14	TSSOP-14

Package Outline Dimensions (All dimensions in mm.)

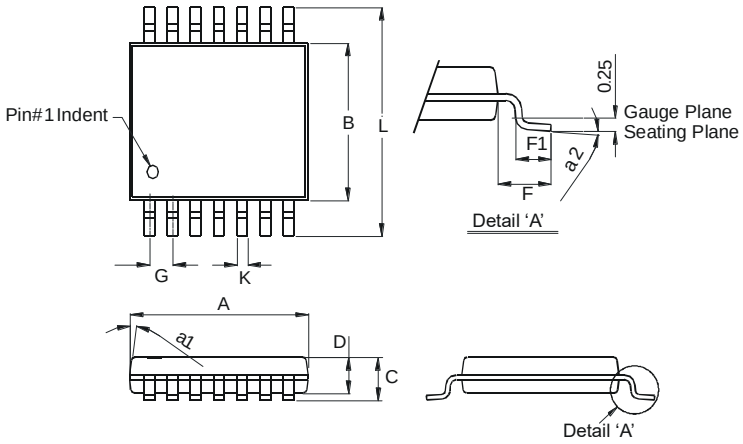
Please see http://www.diodes.com/package-outlines.html for the latest version.

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
θ	0°	8°
All Dimensions in mm		

TSSOP-14

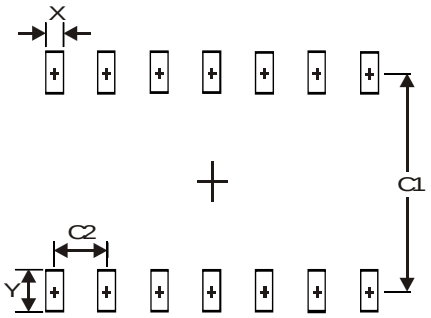


TSSOP-14		
Dim	**Min**	**Max**
a1	7° (4X)	
a2	0°	8°
A	4.9	5.10
B	4.30	4.50
C	-	1.2
D	0.8	1.05
F	1.00 Typ	
F1	0.45	0.75
G	0.65 Typ	
K	0.19	0.30
L	6.40 Typ	
All Dimensions in mm		

Suggested Pad Layout

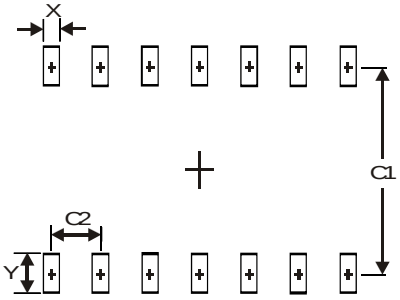
Please see http://www.diodes.com/package-outlines.html for the latest version.

SO-14



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

TSSOP-14



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

IMPORTANT NOTICE

1. DIODES INCORPORATED (Diodes) AND ITS SUBSIDIARIES MAKE NO WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, WITH REGARDS TO ANY INFORMATION CONTAINED IN THIS DOCUMENT, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR NON-INFRINGEMENT OF THIRD PARTY INTELLECTUAL PROPERTY RIGHTS (AND THEIR EQUIVALENTS UNDER THE LAWS OF ANY JURISDICTION).

2. The Information contained herein is for informational purpose only and is provided only to illustrate the operation of Diodes' products described herein and application examples. Diodes does not assume any liability arising out of the application or use of this document or any product described herein. This document is intended for skilled and technically trained engineering customers and users who design with Diodes' products. Diodes' products may be used to facilitate safety-related applications; however, in all instances customers and users are responsible for (a) selecting the appropriate Diodes products for their applications, (b) evaluating the suitability of Diodes' products for their intended applications, (c) ensuring their applications, which incorporate Diodes' products, comply the applicable legal and regulatory requirements as well as safety and functional-safety related standards, and (d) ensuring they design with appropriate safeguards (including testing, validation, quality control techniques, redundancy, malfunction prevention, and appropriate treatment for aging degradation) to minimize the risks associated with their applications.

3. Diodes assumes no liability for any application-related information, support, assistance or feedback that may be provided by Diodes from time to time. Any customer or user of this document or products described herein will assume all risks and liabilities associated with such use, and will hold Diodes and all companies whose products are represented herein or on Diodes' websites, harmless against all damages and liabilities.

4. Products described herein may be covered by one or more United States, international or foreign patents and pending patent applications. Product names and markings noted herein may also be covered by one or more United States, international or foreign trademarks and trademark applications. Diodes does not convey any license under any of its intellectual property rights or the rights of any third parties (including third parties whose products and services may be described in this document or on Diodes' website) under this document.

5. Diodes' products are provided subject to Diodes' Standard Terms and Conditions of Sale (https://www.diodes.com/about/company/terms-and-conditions/terms-and-conditions-of-sales/) or other applicable terms. This document does not alter or expand the applicable warranties provided by Diodes. Diodes does not warrant or accept any liability whatsoever in respect of any products purchased through unauthorized sales channel.

6. Diodes' products and technology may not be used for or incorporated into any products or systems whose manufacture, use or sale is prohibited under any applicable laws and regulations. Should customers or users use Diodes' products in contravention of any applicable laws or regulations, or for any unintended or unauthorized application, customers and users will (a) be solely responsible for any damages, losses or penalties arising in connection therewith or as a result thereof, and (b) indemnify and hold Diodes and its representatives and agents harmless against any and all claims, damages, expenses, and attorney fees arising out of, directly or indirectly, any claim relating to any noncompliance with the applicable laws and regulations, as well as any unintended or unauthorized application.

7. While efforts have been made to ensure the information contained in this document is accurate, complete and current, it may contain technical inaccuracies, omissions and typographical errors. Diodes does not warrant that information contained in this document is error-free and Diodes is under no obligation to update or otherwise correct this information. Notwithstanding the foregoing, Diodes reserves the right to make modifications, enhancements, improvements, corrections or other changes without further notice to this document and any product described herein. This document is written in English but may be translated into multiple languages for reference. Only the English version of this document is the final and determinative format released by Diodes.

8. Any unauthorized copying, modification, distribution, transmission, display or other use of this document (or any portion hereof) is prohibited. Diodes assumes no responsibility for any losses incurred by the customers or users or any third parties arising from any such unauthorized use.

9. This Notice may be periodically updated with the most recent version available at https://www.diodes.com/about/company/terms-and-conditions/important-notice

www.diodes.com

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

Diodes Incorporated:

74LVC07AT14-13 74LVC07AS14-13