



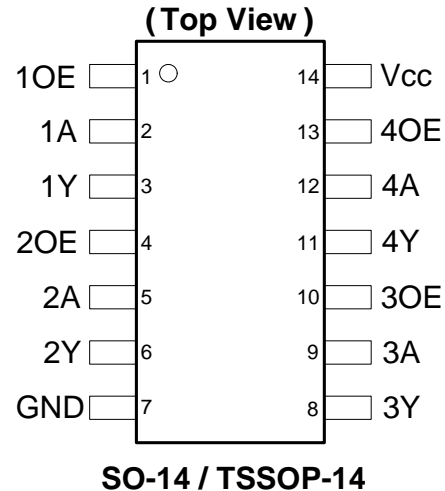
**THE DATASHEET OF  
74AHC126S14-13**



## Description

The 74AHC126 provides provides four independent buffer gates with 3-state outputs. Each buffer has a separate enable pin that when driven with a low logic level places the corresponding output in the high-impedance state. 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.

## Pin Assignments



## Features

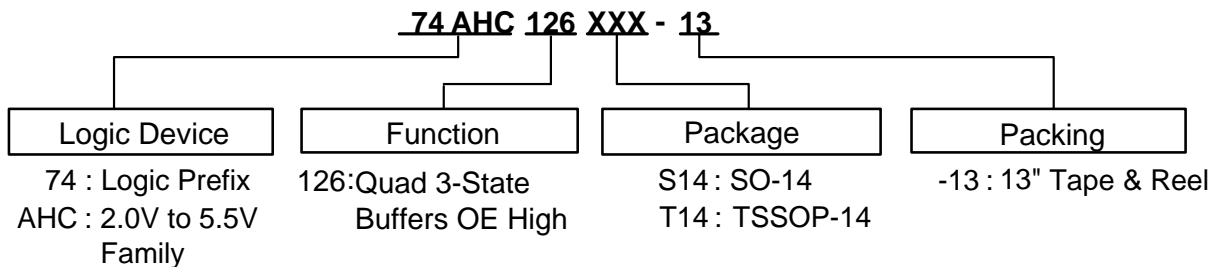
- Wide Supply Voltage Range from 2.0V to 5.5V
- Outputs Sink or Source 8mA at V<sub>CC</sub> = 4.5V
- CMOS Low Power Consumption
- Schmitt Trigger Action at All Inputs
- Inputs can be Driven by 3.3V or 5.5V Allowing for Voltage Translation Applications
- ESD Protection Exceeds JESD 22
  - 200V Machine Model (A115)
  - 2000V Human Body Model (A114)
  - Exceeds 1000V Charged Device Model (C101)
- 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)**

- 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.

## 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

## Ordering Information



Device	Package Code	Packaging	13" Tape and Reel	
			Quantity	Part Number Suffix
74AHC126S14-13	S14	SO-14	2500/Tape & Reel	-13
74AHC126T14-13	T14	TSSOP-14	2500/Tape & Reel	-13

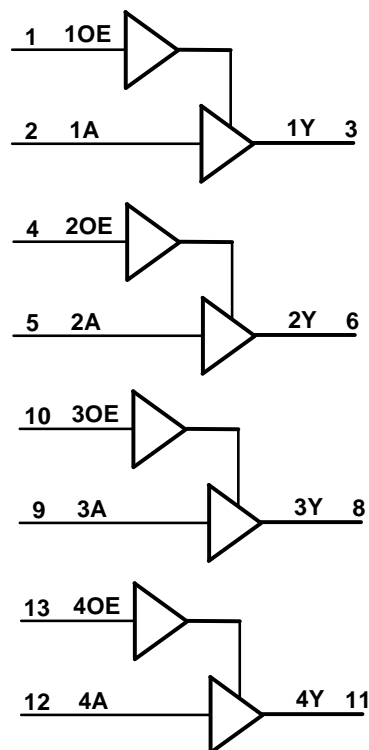
## Pin Descriptions

Pin Number	Pin Name	Function
1	1OE	Data Enable Input (Active High)
2	1A	Data Input
3	1Y	Data Output
4	2OE	Data Enable Input (Active High)
5	2A	Data Input
6	2Y	Data Output
7	GND	Ground
8	3Y	Data Output
9	3A	Data Input
10	3OE	Data Enable Input (Active High)
11	4Y	Data Output
12	4A	Data Input
13	4OE	Data Enable Input (Active High)
14	V <sub>CC</sub>	Supply Voltage

## Function Table

Inputs		Output
OE	A	Y
H	H	H
H	L	L
L	X	Z

## Logic Diagram



### Absolute Maximum Ratings (Note 4) ( $T_A = +25^\circ\text{C}$ , 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
$V_I$	Input Voltage Range	-0.5 to +7.0	V
$I_{IK}$	Input Clamp Current $V_I < -0.5\text{V}$	-20	mA
$I_{OK}$	Output Clamp Current $V_O < -0.5\text{V}$	-20	mA
$I_{OK}$	Output Clamp Current $V_O > V_{CC} + 0.5\text{V}$	25	mA
$I_O$	Continuous Output Current $-0.5\text{V} < V_O < V_{CC} + 0.5\text{V}$	$\pm 25$	mA
$I_{CC}$	Continuous Current Through $V_{CC}$	75	mA
$I_{GND}$	Continuous Current Through GND	-75	mA
$T_J$	Operating Junction Temperature	-40 to +150	$^\circ\text{C}$
$T_{STG}$	Storage Temperature	-65 to +150	$^\circ\text{C}$
$P_{TOT}$	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) ( $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Symbol	Parameter	Conditions	Min	Max	Unit
$V_{CC}$	Supply Voltage	—	2.0	5.5	V
$V_I$	Input Voltage	—	0	5.5	V
$V_O$	Output Voltage	—	0	$V_{CC}$	V
$\Delta t/\Delta V$	Input Transition Rise or Fall Rate	$V_{CC} = 3.0\text{V to } 3.6\text{V}$	—	100	ns/V
		$V_{CC} = 4.5\text{V to } 5.5\text{V}$	—	20	
$T_A$	Operating Free-Air Temperature	—	-40	+125	$^\circ\text{C}$

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

### Electrical Characteristics

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	—	2.0V	1.5	—	1.5	—	V
		—	3.0V	2.1	—	2.1	—	
		—	5.5V	3.85	—	3.85	—	
V <sub>IL</sub>	Low-Level Input Voltage	—	2.0V	—	0.5	—	0.5	V
		—	3.0V	—	0.9	—	0.9	
		—	5.5V	—	1.65	—	1.65	
V <sub>OH</sub>	High-Level Output Voltage	I <sub>OH</sub> = -50μA	2.0V	1.9	—	1.9	—	V
		I <sub>OH</sub> = -50μA	3.0V	2.9	—	2.9	—	
		I <sub>OH</sub> = -50μA	4.5V	4.4	—	4.4	—	
		I <sub>OH</sub> = -4mA	3.0V	2.48	—	2.40	—	
		I <sub>OH</sub> = -8mA	4.5V	3.80	—	3.70	—	
V <sub>OL</sub>	Low-Level Output Voltage	I <sub>OL</sub> = 50μA	2.0V	—	0.1	—	0.1	V
		I <sub>OL</sub> = 50μA	3.0V	—	0.1	—	0.1	
		I <sub>OL</sub> = 50μA	4.5V	—	0.1	—	0.1	
		I <sub>OL</sub> = 4mA	3.0V	—	0.44	—	0.55	
		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 V <sub>I</sub> = GND or 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

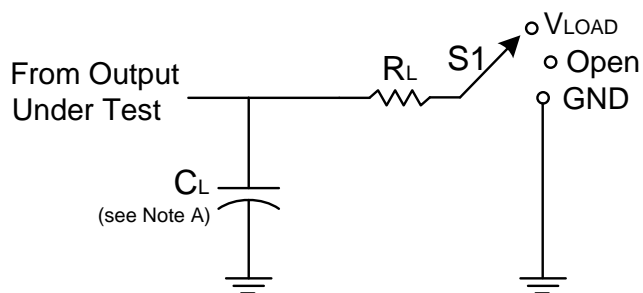
### Operating Characteristics

Parameter		Test Conditions	V <sub>CC</sub> = 2.0V	V <sub>CC</sub> = 3.3V	V <sub>CC</sub> = 5V	Unit
			Typ	Typ	Typ	
C <sub>pd</sub>	Power Dissipation Capacitance per Gate	f = 1MHz	10.1	13.1	15	pF
C <sub>i</sub>	Input Capacitance	V <sub>I</sub> = V <sub>CC</sub> – or GND	4.0	4.0	4.0	pF

### Switching Characteristics

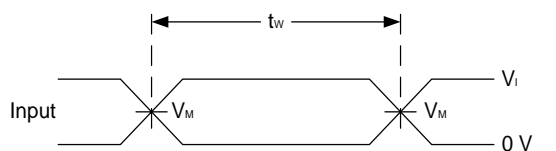
Symbol	Parameter	Test Conditions	V <sub>CC</sub>	T <sub>A</sub> = +25°C			-40°C to +85°C		-40°C to +125°C		Unit
				Min	Typ	Max	Min	Max	Min	Max	
t <sub>PD</sub>	Propagation Delay A <sub>N</sub> to Y <sub>N</sub>	Figure 1 C <sub>L</sub> = 15pF	3.0V to 3.6V	0.5	4.4	8.0	0.5	9.5	0.5	11.5	ns
			4.5V to 5.5V	0.5	3.0	5.5	0.5	6.5	0.5	7.0	
		Figure 1 C <sub>L</sub> = 50pF	3.0V to 3.6V	0.5	6.2	11.5	0.5	13.0	0.5	14.5	
			4.5V to 5.5V	0.5	4.3	7.5	0.5	8.5	0.5	9.5	
t <sub>EN</sub>	Enable Time OE <sub>N</sub> to Y <sub>N</sub>	Figure 1 C <sub>L</sub> = 15 pF	3.0V to 3.6V	0.5	4.7	8.0	0.5	9.5	0.5	11.5	ns
			4.5V to 5.5V	0.5	3.3	5.1	0.5	6.0	0.5	7.5	
		Figure 1 C <sub>L</sub> = 50pF	3.0V to 3.6V	0.5	6.8	11.5	0.5	13.0	0.5	14.5	
			4.5V to 5.5V	0.5	4.7	7.1	0.5	8.0	0.5	9.0	
t <sub>DIS</sub>	Disable Time OE <sub>N</sub> to Y <sub>N</sub>	Figure 1 C <sub>L</sub> = 15 pF	3.0V to 3.6V	0.5	6.7	9.7	0.5	11.5	0.5	12.5	ns
			4.5V to 5.5V	0.5	4.8	6.8	0.5	8.0	0.5	8.5	
		Figure 1 C <sub>L</sub> = 50pF	3.0V to 3.6V	0.5	9.6	13.2	0.5	15.0	0.5	16.5	
			4.5V to 5.5V	0.5	6.8	8.8	0.5	10.0	0.5	11.0	

**Parameter Measurement Information**

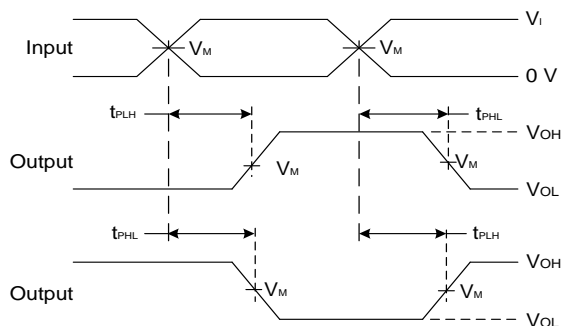


TEST	S1
$t_{PLH}/t_{PHL}$	Open
$t_{PLZ}/t_{PZL}$	Vload
$t_{PHZ}/t_{PZH}$	GND

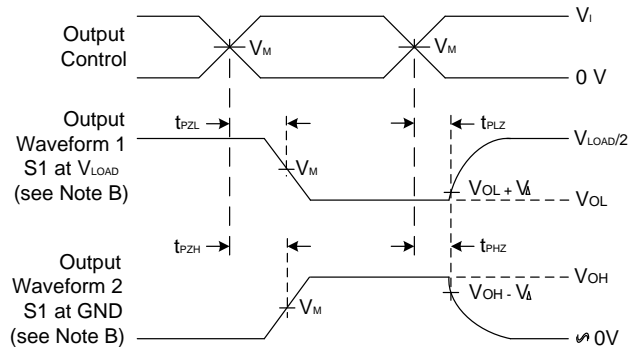
$V_{CC}$	Inputs		$V_M$	$V_{LOAD}$	$C_L$	$R_L$	$V_{\Delta}$
	$V_I$	$t_r/t_f$					
$3.3V \pm 0.3V$	3 V	$\leq 3ns$	$V_{CC}/2$	$V_{CC}$	15,50 pF	1K $\Omega$	0.3 V
$5V \pm 0.5V$	$V_{CC}$	$\leq 3ns$	$V_{CC}/2$	$V_{CC}$	15,50 pF	1K $\Omega$	0.3 V



**Voltage Waveform Pulse Duration**



**Voltage Waveform Propagation Delay Times  
Inverting and Non Inverting Outputs**



**Voltage Waveform Enable and Disable Times  
Low and High Level Enabling**

**Figure 1. Load Circuit and Voltage Waveforms**

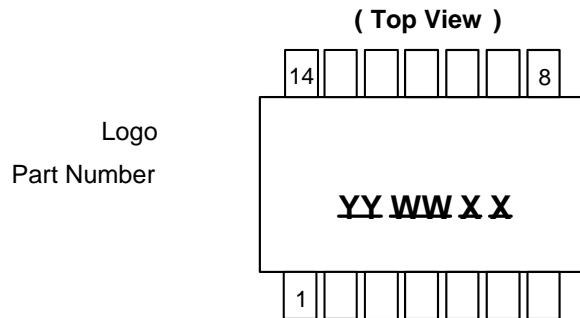
- Notes:
- A. Includes test lead and test apparatus capacitance.
  - B. All pulses are supplied at pulse repetition rate  $\leq 1$  MHz.
  - C. Inputs are measured separately one transition per measurement.
  - D.  $t_{PLZ}$  and  $t_{PHZ}$  are the same as  $t_{dis}$ .
  - E.  $t_{PZL}$  and  $t_{PZH}$  are the same as  $t_{EN0}$ .
  - F.  $t_{PLH}$  and  $t_{PHL}$  are the same as  $t_{PD}$ .

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## Marking Information

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(1) SO-14, TSSOP-14

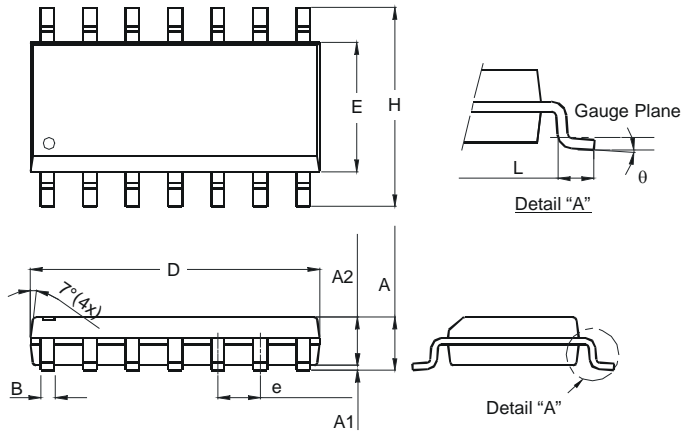


Part Number	Package
74AHC126S14	SO-14
74AHC126T14	TSSOP-14

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

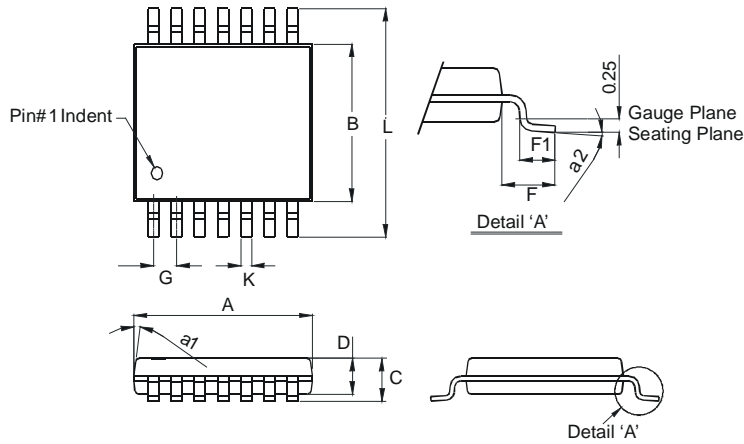
Please see <http://www.diodes.com/package-outlines.html> for the latest version.

**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
$\theta$	0°	8°
All Dimensions in mm		

**TSSOP-14**

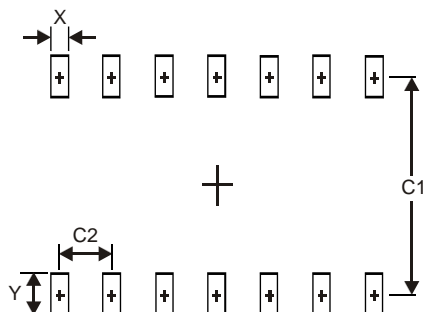


TSSOP-14		
Dim	Min	Max
a1	$7^\circ(4X)$	
a2	0°	8°
A	4.9	5.10
B	4.30	4.50
C	—	1.2
D	0.8	1.05
F	1.00 Typ	
F1	0.45	0.75
G	0.65 Typ	
K	0.19	0.30
L	6.40 Typ	
All Dimensions in mm		

## Suggested Pad Layout

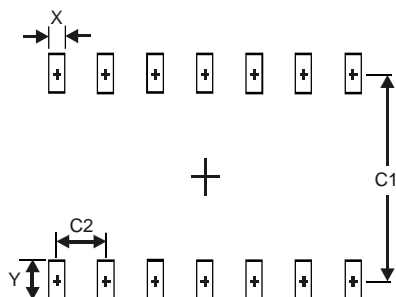
Please see <http://www.diodes.com/package-outlines.html> for the latest version.

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

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