

Description

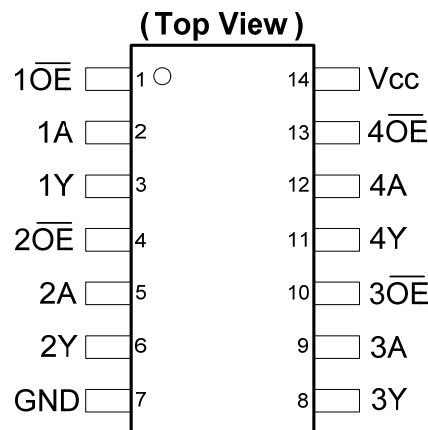
The 74AHC125 provides provides four independent buffer gates with 3-state outputs. Each buffer has a separate enable pin that when driven with a high logic level places the corresponding output in the high impedance state. The device is designed for operation with a power supply range of 2.0V to 5.5V. The inputs are tolerant to 5.5V allowing this device to be used in a mixed voltage environment.

Features

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

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 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

[Click here for ordering information, located at the end of datasheet](#)

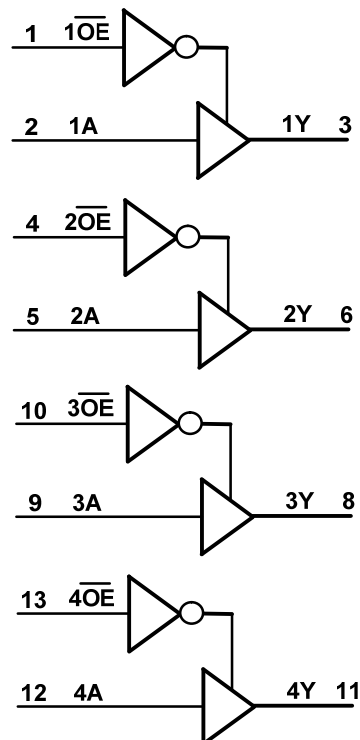
Pin Descriptions

Pin Number	Pin Name	Function
1	$\overline{1OE}$	Data Enable Input (active low)
2	1A	Data Input
3	1Y	Data Output
4	$\overline{2OE}$	Data Enable Input (active low)
5	2A	Data Input
6	2Y	Data Output
7	GND	Ground
8	3Y	Data Output
9	3A	Data Input
10	$\overline{3OE}$	Data Enable Input (active low)
11	4Y	Data Output
12	4A	Data Input
13	$\overline{4OE}$	Data Enable Input (active low)
14	V _{CC}	Supply Voltage

Function Table

Inputs		Output
$\overline{OE}$	A	Y
L	H	H
L	L	L
H	X	Z

Logic Diagram



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
V _I	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
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	°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		2.0	5.5	V
V _I	Input Voltage		0	5.5	V
V _O	Output Voltage		0	V _{CC}	V
Δt/ΔV	Input Transition Rise or Fall Rate	V _{CC} = 3.0V to 3.6V		100	ns/V
		V _{CC} = 4.5V to 5.5V		20	
T _A	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.)

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		2.0V	1.5		1.5		V
			3.0V	2.1		2.1		
			5.5V	3.85		3.85		
V _{IL}	Low-Level Input Voltage		2.0V		0.5		0.5	V
			3.0V		0.9		0.9	
			5.5V		1.65		1.65	
V _{OH}	High-Level Output Voltage	I _{OH} = -50μA	2.0V	1.9		1.9		V
		I _{OH} = -50μA	3.0V	2.9		2.9		
		I _{OH} = -50μA	4.5V	4.4		4.4		
		I _{OH} = -4mA	3.0V	2.48		2.40		
		I _{OH} = -8mA	4.5V	3.80		3.70		
V _{OL}	Low-Level Output Voltage	I _{OL} = 50μA	2.0V		0.1		0.1	V
		I _{OL} = 50μA	3.0V		0.1		0.1	
		I _{OL} = 50μA	4.5V		0.1		0.1	
		I _{OL} = 4mA	3.0V		0.44		0.55	
		I _{OL} = 8mA	4.5V		0.44		0.55	
I _{oz}	Z State Leakage Current	V _O = 0 to 5.5V V _I = GND or 5.5V	5.5V		±2.5		±10	μA
I _I	Input Current	V _I = GND to 5.5V	3.6V		±1		±2	μA
I _{CC}	Supply Current	V _I = GND or V _{CC} , I _O = 0	3.6V		20		40	μA

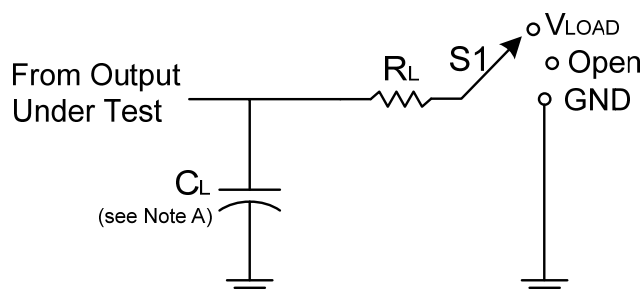
Operating Characteristics

Parameter		Test Conditions	V _{CC} = 2.0V	V _{CC} = 3.3V	V _{CC} = 5V	Unit
			Typ	Typ	Typ	
C _{pd}	Power Dissipation Capacitance per Gate	f = 1MHz	10.1	13.1	15	pF
C _i	Input Capacitance	V _i = V _{CC} – or GND	4.0	4.0	4.0	pF

Switching Characteristics

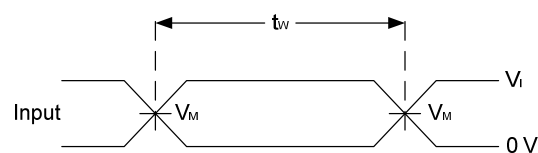
Symbol	Parameter	Test Conditions	V _{CC}	T _A = +25°C			-40°C to +85°C		-40°C to +125°C		Unit
				Min	Typ	Max	Min	Max	Min	Max	
t _{PD}	Propagation Delay A _N to Y _N	Figure 1 C _L = 15pF	3.0V to 3.6V	0.5	4.4	8.0	0.5	9.5	0.5	11.5	ns
			4.5V to 5.5V	0.5	3.0	5.5	0.5	6.5	0.5	7.0	
		Figure 1 C _L = 50pF	3.0V to 3.6V	0.5	6.2	11.5	0.5	13.0	0.5	14.5	
			4.5V to 5.5 V	0.5	4.3	7.5	0.5	8.5	0.5	9.5	
t _{EN}	Enable Time OE _N to Y _N	Figure 1 C _L = 15pF	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 _L = 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 _{DIS}	Disable Time OE _N to Y _N	Figure 1 C _L = 15pF	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 _L = 50pF	3.0 V 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

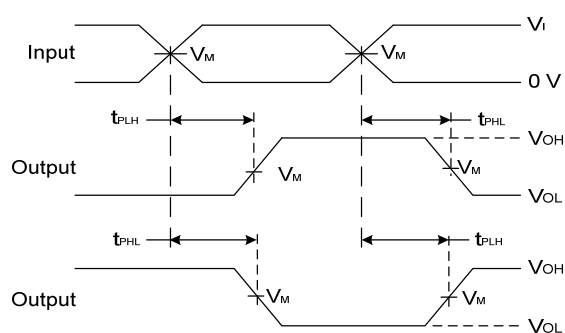


TEST	S1
t_{PLH}/t_{PHL}	Open
t_{PLZ}/t_{PZL}	Vload
t_{PHZ}/t_{PZH}	GND

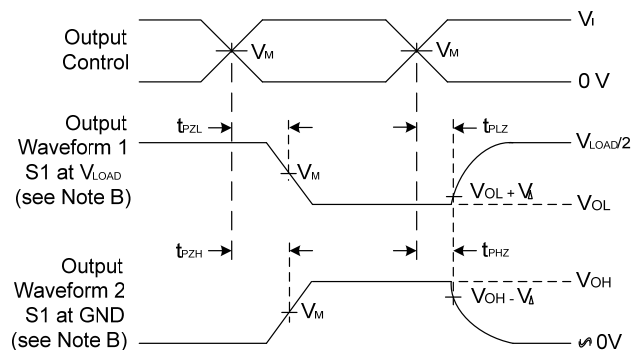
V_{CC}	Inputs		V_M	V_{LOAD}	C_L	R_L	V_{Δ}
	V_I	t_r/t_f					
$3.3V \pm 0.3V$	3 V	$\leq 3ns$	$V_{CC}/2$	V_{CC}	15,50 pF	1K Ω	0.3 V
$5V \pm 0.5V$	V_{CC}	$\leq 3ns$	$V_{CC}/2$	V_{CC}	15,50 pF	1K Ω	0.3 V



Voltage Waveform Pulse Duration



Voltage Waveform Propagation Delay Times
Inverting and Non Inverting Outputs

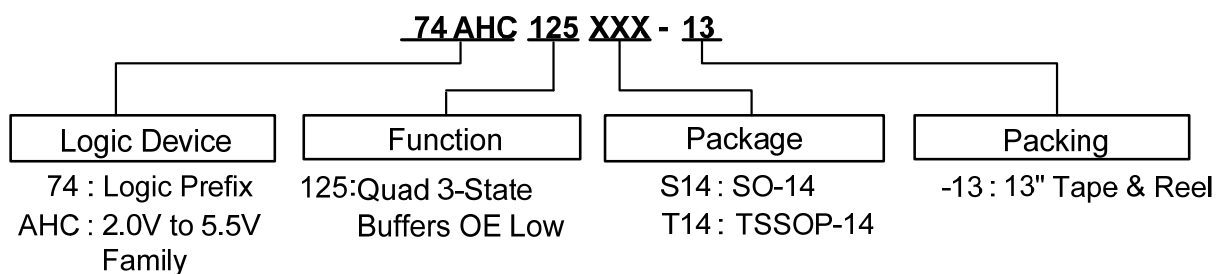


Voltage Waveform Enable and Disable Times
Low and High Level Enabling

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 ≤ 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} .

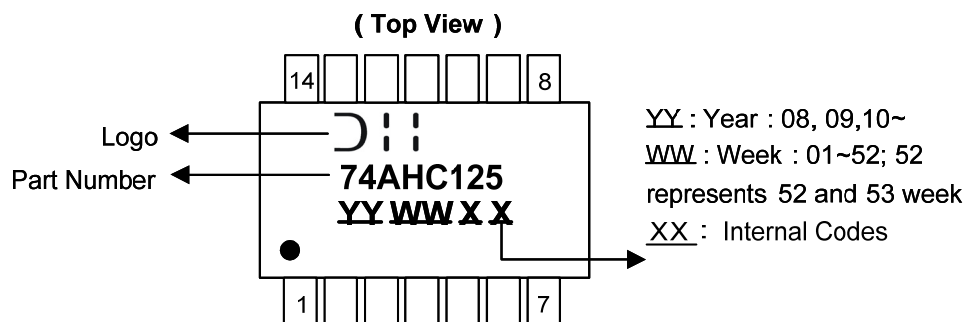
Ordering Information



Device	Package Code	Packaging	7" Tape and Reel	
			Quantity	Part Number Suffix
74AHC125S14-13	S14	SO-14	2500/Tape & Reel	-13
74AHC125T14-13	T14	TSSOP-14	2500/Tape & Reel	-13

Marking Information

(1) SO-14, TSSOP-14

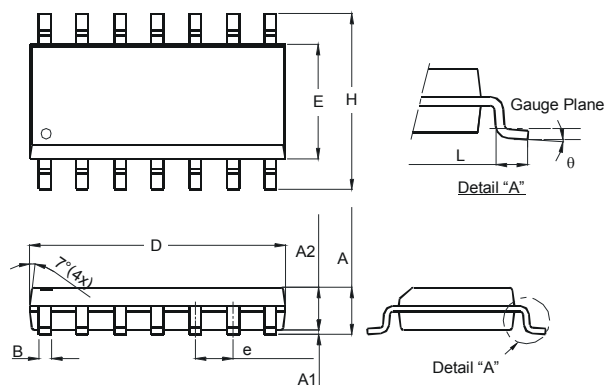


Part Number	Package
74AHC125S14	SO-14
74AHC125T14	TSSOP-14

Package Outline Dimensions (All dimensions in mm.)

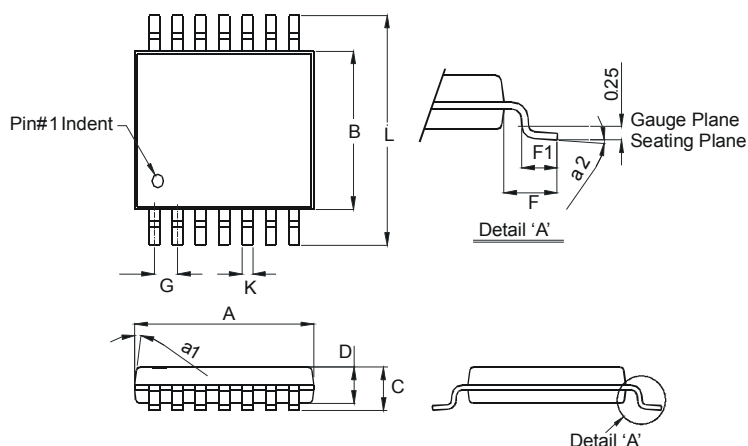
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.

Package Type: SO-14



SO-14		
Dim	Min	Max
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		

Package Type: TSSOP-14

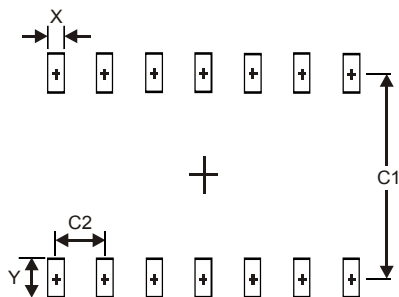


TSSOP-14		
Dim	Min	Max
a1	7° (4X)	
a2	0°	8°
A	4.9	5.10
B	4.30	4.50
C	—	1.2
D	0.8	1.05
F	1.00 Typ	
F1	0.45	0.75
G	0.65 Typ	
K	0.19	0.30
L	6.40 Typ	
All Dimensions in mm		

Suggested Pad Layout

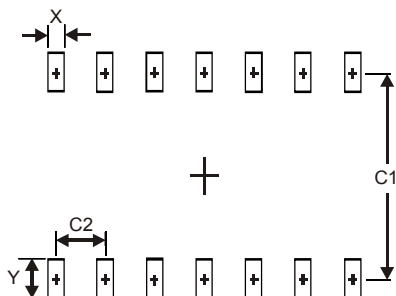
Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.

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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