QUADRUPLE 3-STATE BUFFERS OE LOW

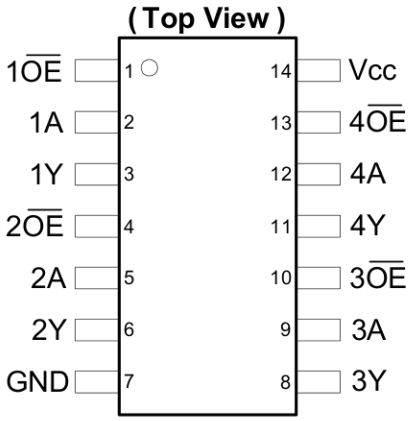
Description

The 74HCT125 provides provides four independent buffer gates with 3-state outputs. Each buffer has a separate enable pin that if 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 4.5V to 5.5V.

Features

- Wide Supply Voltage Range from 4.5V to 5.5V
- Pin Compatible with Low Power Schottky (LSTTL)
- Inputs Are TTL Voltage Level Compatible
- Sinks or Sources 4mA 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)
- 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

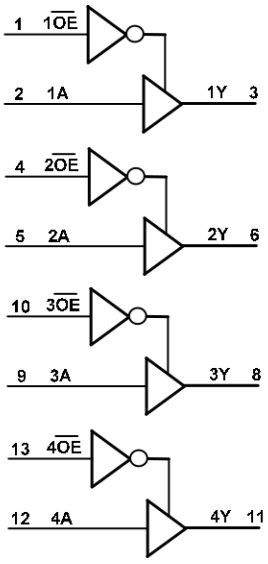
- General Purpose Logic
- Wide array of products such as:
  - PCs, networking, notebooks, netbooks
  - Computer peripherals, hard drives, CD/DVD ROM
  - TV, DVD, DVR, set top box

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.

Pin Descriptions

Pin Number	Pin Name	Description
1	$1\overline{OE}$	Data Enable Input (active low)
2	1A	Data Input
3	1Y	Data Output
4	$2\overline{OE}$	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	$3\overline{OE}$	Data Enable Input (active low)
11	4Y	Data Outp
12	4A	Data Input
13	$4\overline{OE}$	Data Enable Input (active low)
14	V_{CC}	Supply Voltage

Logic Diagram



Function Table

Inputs		Output
$\overline{OE}$	A	Y
L	H	H
L	L	L
H	X	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 +7.0	V
V_I	Input Voltage Range (Note 5)	-0.5 to +7.0	V
I_{IK}	Input Clamp Current V_I < -0.5V or Vi > V_{CC} +0.5V	±20	mA
I_{OK}	Output Clamp Current V_O < -0.5V or V_O > V_{CC} +0.5V	±20	mA
I_O	Continuous Output Current -0.5V < V_O V_{CC} +0.5V	+/-25	mA
I_{CC}	Continuous Current Through Vcc	50	mA
I_{GND}	Continuous Current Through GND	-50	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

Notes: 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.
5. Input Voltage cannot exceed V_{CC} to the extent the Maximum clamp current is exceeded.

Recommended Operating Conditions (Note 6) (@T_A = +25°C, unless otherwise specified.)

Symbol	Parameter	Conditions	Min	Max	Unit
V_{CC}	Supply Voltage		4.5	5.5	V
V_I	Input Voltage		0	V_{CC}	V
V_O	Output Voltage		0	V_{CC}	V
Δt/ΔV	Input Transition Rise or Fall Rate	V_{CC} = 4.5V to 5.5V		500	ns/V
T_A	Operating Free-Air Temperature		-40	+125	°C

Note: 6. 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		4.5V to 5.5V	2.0		2.0		V
V_{IL}	Low-Level Input Voltage		4.5V to 5.5V		0.8		0.8	V
V_{OH}	High-Level Output Voltage	I_{OH} = -20μA	4.5V	4.4		4.4		V
		I_{OH} = -4mA	4.5V	3.84		3.70		
V_{OL}	Low-Level Output Voltage	I_{OL} = 20μA	4.5V		0.1		0.1	V
		I_{OL} = 4.0mA	4.5V		0.33		0.4	
I_{OZ}	Z State Leakage Current	V_O = 0 to 5.5V	5.5V		± 5.0		± 10	μA
I_I	Input Current	V_I =GND to 6.0V	6.0V		± 1		± 1	μA
I_{CC}	Supply Current	V_I = GND or V_{CC}, I_O = 0	6.0V		20		40	μA
ΔI_{CC}	Additional Supply Current	One Input at V_{CC} –2.1V Other Pins at V_{CC} or GND	4.5V to 5.5V		675		735	μA

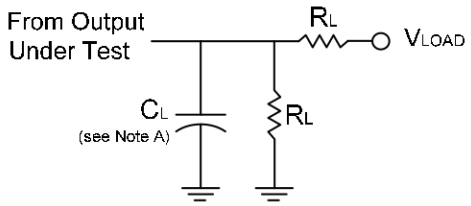
Switching Characteristics

Symbol	Parameter	Test Conditions	V_{CC}	T_A = +25°C			-40°C to +85°C	-40°C to +125°C	Unit
				Min	Typ	Max	Max	Max	
t_{PD}	Propagation Delay A_N to Y_N	Figure 1 C_L = 50pF	4.5V	—	15	25	31	38	ns
t_{EN}	Enable Time OE_N to Y_N			—	15	28	35	42	ns
t_{DIS}	DisableTime OE_N to Y_N			—	15	25	31	38	ns
t_t	Transition Time			—	5	12	15	18	ns

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

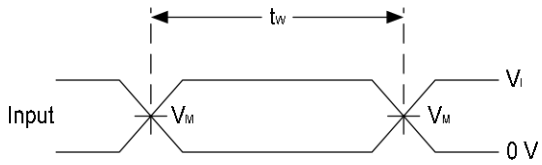
Parameter		Test Conditions	V_{CC} = 5.5V	Unit
			Typ	
C_{pd}	Power Dissipation Capacitance per Gate	f = 1 MHz	24	pF
C_I	Input Capacitance	V_I = V_{CC} – or GND	3.5	pF

Parameter Measurement Information

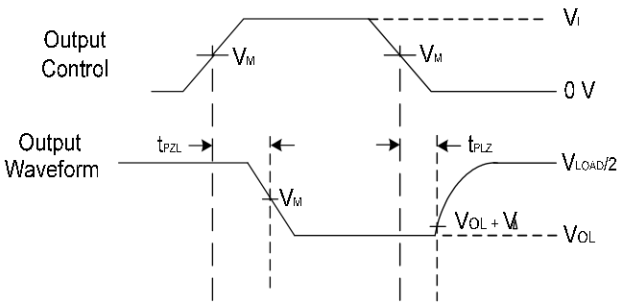


TEST	Condition
t_{PLZ} (see Notes D and E)	Vload
t_{PZL}(see Notes D and F)	Vload

V_{CC}	Inputs		V_M	V_{LOAD}	C_L	R_L	V_Δ
	V_I	t_r/t_f					
4.5V	1.5V	≤6ns	3.0V	2 X V_{CC}	50pF	2KΩ	10% of V_{CC}



Voltage Waveform
Pulse Duration

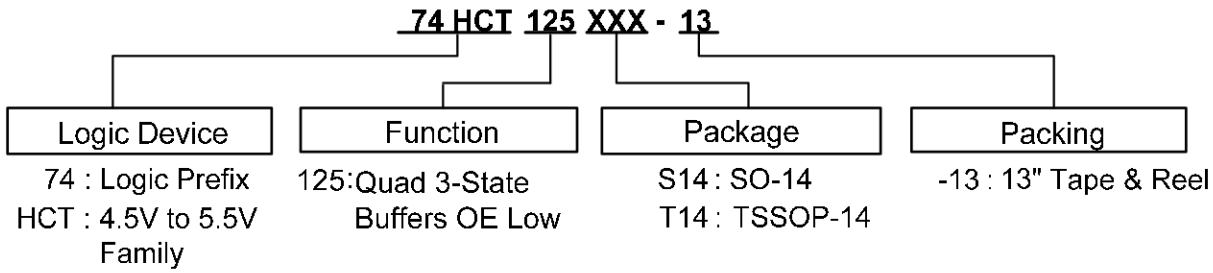


Voltage Waveform
Propagation Delay Times

Notes:
A. Includes test lead and test apparatus capacitance.
B. All pulses are supplied at pulse repetition rate ≤ 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_Δ
F. A Thevenin equivalent load may be used in place of V_{CC} X 2 and resistor divider

Figure 1 Load Circuit and Voltage Waveforms

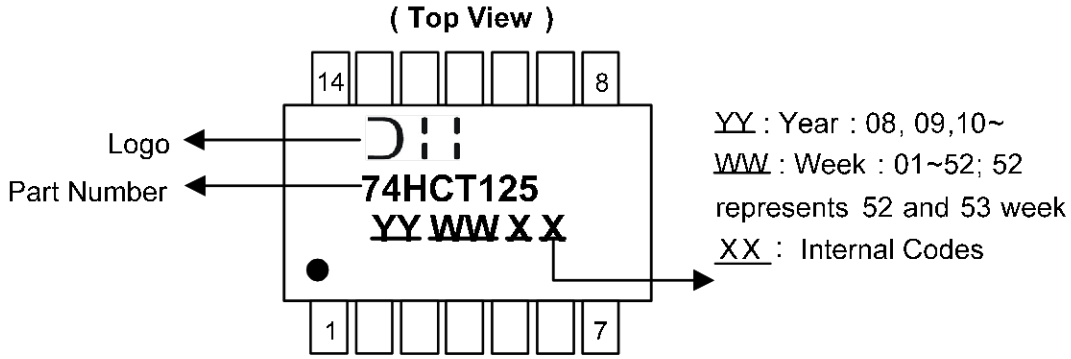
Ordering Information



Device	Package Code	Packaging	7" Tape and Reel	
			Quantity	Part Number Suffix
74HCT125S14-13	S14	SO-14	2500/Tape & Reel	-13
74HCT125T14-13	T14	TSSOP-14	2500/Tape & Reel	-13

Marking Information

(1) SO-14, TSSOP-14

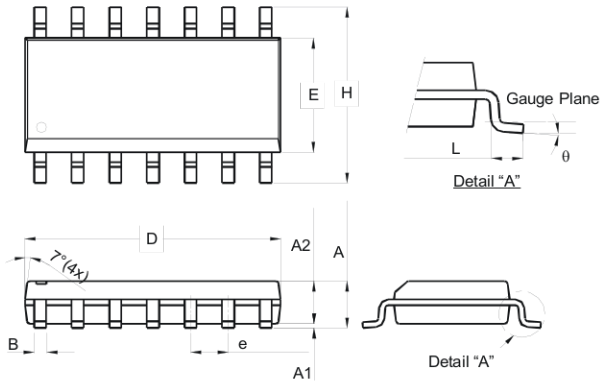


Part Number	Package
74HCT125S14	SO-14
74HCT125T14	TSSOP-14

Package Outline Dimensions (All dimensions in mm.)

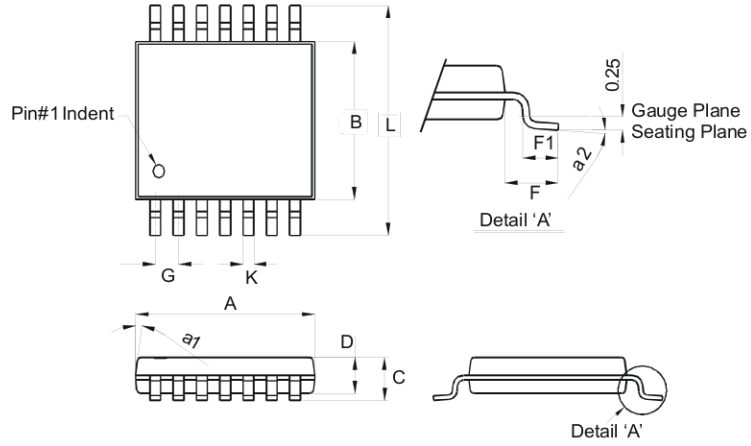
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for latest version.

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

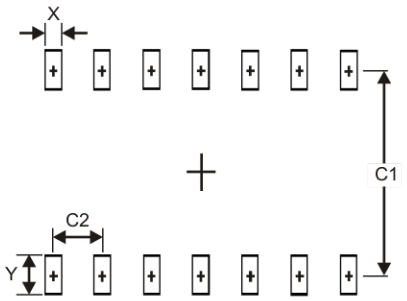


TSSOP-14		
Dim	**Min**	**Max**
a1	7° (4X)	
a2	0°	8°
A	4.9	5.10
B	4.30	4.50
C	—	1.2
D	0.8	1.05
F	1.00 Typ	
F1	0.45	0.75
G	0.65 Typ	
K	0.19	0.30
L	6.40 Typ	
All Dimensions in mm		

Suggested Pad Layout

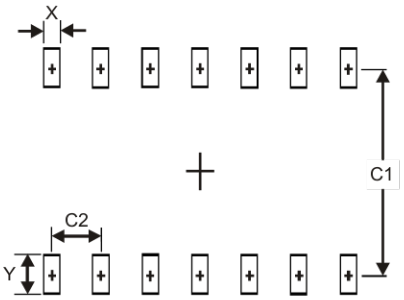
Please see AP02001 at http://www.diodes.com/datasheets/ap02001.pdf for latest version.

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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