MC74HCT125A

Quad 3-State Noninverting Buffer with LSTTL Compatible Inputs

High−Performance Silicon−Gate CMOS

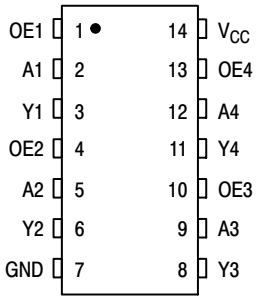
The MC74HCT125A is identical in pinout to the LS125. The device inputs are compatible with standard CMOS and LSTTL outputs.

The MC74HCT125A noninverting buffer is designed to be used with 3−state memory address drivers, clock drivers, and other bus−oriented systems. The devices have four separate output enables that are active−low.

Features

- Output Drive Capability: 15 LSTTL Loads
- Outputs Directly Interface to CMOS, NMOS, and TTL
- Operating Voltage Range: 2.0 to 6.0 V
- Low Input Current: 1.0 μA
- High Noise Immunity Characteristic of CMOS Devices
- In Compliance with the JEDEC Standard No. 7A Requirements
- Chip Complexity: 72 FETs or 18 Equivalent Gates
- NLV Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC−Q101 Qualified and PPAP Capable
- These are Pb−Free Devices

PIN ASSIGNMENT

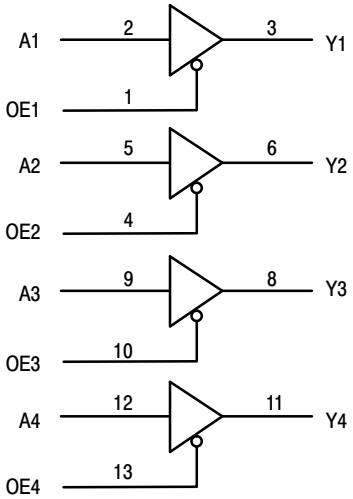


FUNCTION TABLE

HCT125A		
Inputs		Output
A	OE	Y
H	L	H
L	L	L
X	H	Z

LOGIC DIAGRAM

Active−Low Output Enables



PIN 14 = V_{CC}
PIN 7 = GND

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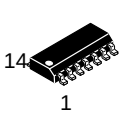
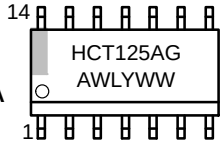
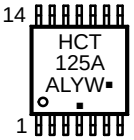
MARKING DIAGRAMS



SOIC−14
D SUFFIX
CASE 751A



TSSOP−14
DT SUFFIX
CASE 948G



A	=	Assembly Location
L, WL	=	Wafer Lot
Y, YY	=	Year
W, WW	=	Work Week
G	=	Pb−Free Package
▪	=	Pb−Free Package

(Note: Microdot may be in either location)

ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 3 of this data sheet.

MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{CC}	DC Supply Voltage (Referenced to GND)	– 0.5 to + 7.0	V
V_{in}	DC Input Voltage (Referenced to GND)	– 0.5 to V_{CC} + 0.5	V
V_{out}	DC Output Voltage (Referenced to GND)	– 0.5 to V_{CC} + 0.5	V
I_{in}	DC Input Current, per Pin	± 20	mA
I_{out}	DC Output Current, per Pin	± 35	mA
I_{CC}	DC Supply Current, V_{CC} and GND Pins	± 75	mA
P_D	Power Dissipation in Still Air SOIC Package† TSSOP Package†	500 450	mW
T_{stg}	Storage Temperature	– 65 to + 150	°C
T_L	Lead Temperature, 1 mm from Case for 10 Seconds (SOIC or TSSOP Package)	260	°C

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

†Derating — SOIC Package: – 7 mW/°C from 65° to 125°C
TSSOP Package: – 6.1 mW/°C from 65° to 125°C

This device contains protection circuitry to guard against damage due to high static voltages or electric fields. However, precautions must be taken to avoid applications of any voltage higher than maximum rated voltages to this high−impedance circuit. For proper operation, V_{in} and V_{out} should be constrained to the range GND ≤ (V_{in} or V_{out}) ≤ V_{CC}.

Unused inputs must always be tied to an appropriate logic voltage level (e.g., either GND or V_{CC}). Unused outputs must be left open.

RECOMMENDED OPERATING CONDITIONS

Symbol	Parameter		Min	Max	Unit
V_{CC}	DC Supply Voltage (Referenced to GND)		2.0	6.0	V
V_{in}, V_{out}	DC Input Voltage, Output Voltage (Referenced to GND)		0	V_{CC}	V
T_A	Operating Temperature, All Package Types		– 55	+ 125	°C
t_r, t_f	Input Rise and Fall Time (Figure 1)	V_{CC} = 2.0 V V_{CC} = 4.5 V V_{CC} = 6.0 V	0 0 0	1000 500 400	ns

DC ELECTRICAL CHARACTERISTICS (Voltages Referenced to GND)

Symbol	Parameter	Test Conditions	V_{CC} V	Guaranteed Limit			Unit
				– 55 to 25°C	≤ 85°C	≤ 125°C	
V_{IH}	Minimum High−Level Input Voltage	V_{out} = V_{CC} – 0.1 V $\|I_{out}\| \leq$ 20 μA	4.5 to 5.5	2.0	2.0	2.0	V
V_{IL}	Maximum Low−Level Input Voltage	V_{out} = 0.1 V $\|I_{out}\| \leq$ 20 μA	4.5 to 5.5	0.8	0.8	0.8	V
V_{OH}	Minimum High−Level Output Voltage	V_{in} = V_{IH} $\|I_{out}\| \leq$ 20 μA	4.5 5.5	4.4 5.4	4.4 5.4	4.4 5.4	V
		V_{in} = V_{IH} $\|I_{out}\| \leq$ 6.0 mA	4.5	3.98	3.84	3.7	
V_{OL}	Maximum Low−Level Output Voltage	V_{in} = V_{IL} $\|I_{out}\| \leq$ 20 μA	4.5 5.5	0.1 0.1	0.1 0.1	0.1 0.1	V
		V_{in} = V_{IL} $\|I_{out}\| \leq$ 6.0 mA	4.5	0.26	0.33	0.4	
I_{in}	Maximum Input Leakage Current	V_{in} = V_{CC} or GND	5.5	±0.1	±1.0	±1.0	μA
I_{OZ}	Maximum Three−State Leakage Current	Output in High−Impedance State V_{in} = V_{IL} or V_{IH} V_{out} = V_{CC} or GND	5.5	±0.5	±5.0	±10	μA
I_{CC}	Maximum Quiescent Supply Current (per Package)	V_{in} = V_{CC} or GND I_{out} = 0 μA	5.5	4.0	40	160	μA

AC ELECTRICAL CHARACTERISTICS (C_L = 50 pF, Input t_r = t_f = 6.0 ns, V_{CC} = 5.0 V ± 10%)

Symbol	Parameter	V_{CC} V	Guaranteed Limit			Unit
			– 55 to 25°C	≤ 85°C	≤ 125°C	
t_{PLH}, t_{PHL}	Maximum Propagation Delay, Input A to Output Y (Figures 1 and 3)	5.0	18	23	27	ns
t_{PLZ}, t_{PHZ}	Maximum Propagation Delay, Output Enable to Y (Figures 2 and 4)	5.0	24	30	36	ns
t_{PZL}, t_{PZH}	Maximum Propagation Delay, Output Enable to Y (Figures 2 and 4)	5.0	18	23	27	ns
t_{TLH}, t_{THL}	Maximum Output Transition Time, Any Output (Figures 1 and 3)	5.0	12	15	18	ns
C_{in}	Maximum Input Capacitance	–	10	10	10	pF
C_{out}	Maximum 3−State Output Capacitance (Output in High−Impedance State)	–	15	15	15	pF

		Typical @ 25°C, V_{CC} = 5.0 V	
C_{PD}	Power Dissipation Capacitance (Per Buffer)*	30	pF

* Used to determine the no−load dynamic power consumption: $P_D = C_{PD} V_{CC}^2 f + I_{CC} V_{CC}$.

ORDERING INFORMATION

Device	Package	Shipping†
MC74HCT125ADG	SOIC−14 (Pb−Free)	55 Units / Rail
MC74HCT125ADR2G		2500 / Tape & Reel
NLV74HCT125ADR2G*		2500 / Tape & Reel
MC74HCT125ADTG	TSSOP−14 (Pb−Free)	96 Units / Rail
MC74HCT125ADTR2G		2500 / Tape & Reel
NLVHCT125ADTR2G*		2500 / Tape & Reel

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

*NLV Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC−Q101 Qualified and PPAP Capable.

SWITCHING WAVEFORMS

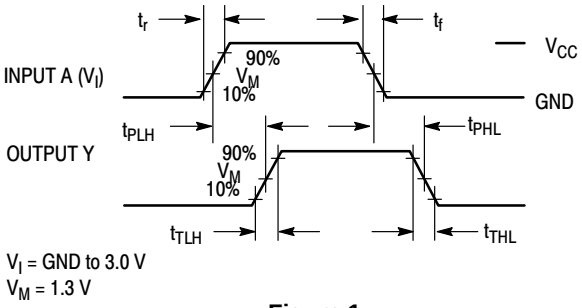


Figure 1.

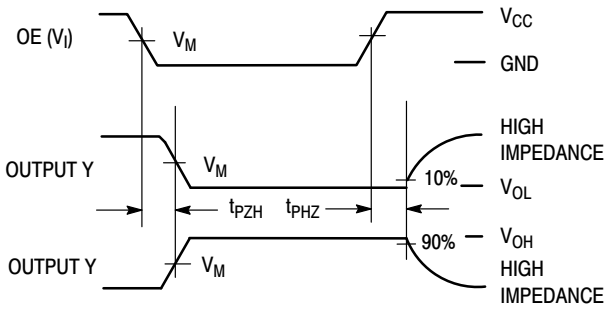
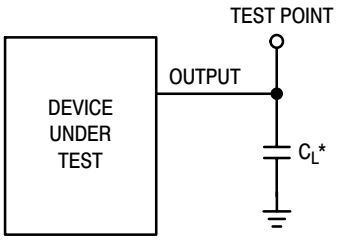
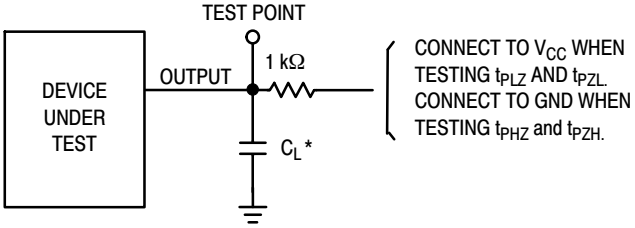


Figure 2.



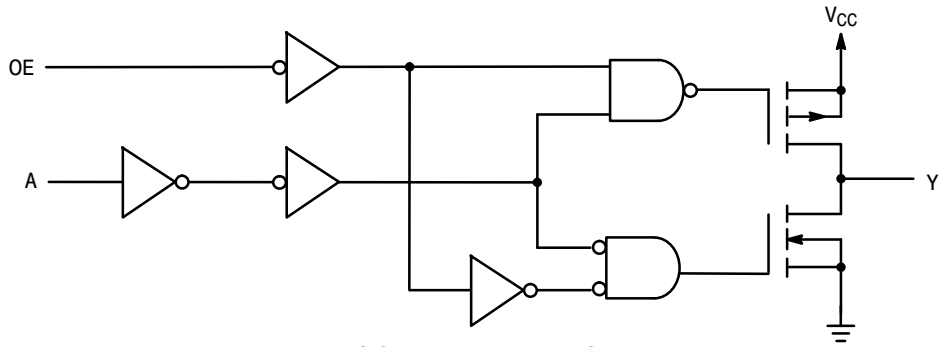
*Includes all probe and jig capacitance

Figure 3. Test Circuit



*Includes all probe and jig capacitance

Figure 4. Test Circuit



(1/4 OF THE DEVICE)

ADDITIONAL INFORMATION

TECHNICAL PUBLICATIONS:
Technical Library: www.onsemi.com/design/resources/technical−documentation
onsemi Website: www.onsemi.com

ONLINE SUPPORT: www.onsemi.com/support
For additional information, please contact your local Sales Representative at www.onsemi.com/support/sales