

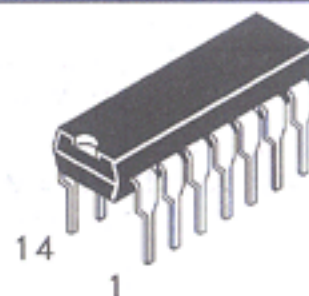
DV74HC125A Available Q2, 1995

Quad 3-State Noninverting Buffer

This device is a noninverting buffer to be used with 3-state memory address drivers, clock drivers, and other bus-oriented systems. The device also has four separate output enables that are active-low.

- Output Drive Capability: 15 LSTTL Loads
- Outputs Directly Interface to CMOS, NMOS, and TTL
- Operating Voltage Range: 2 to 6 V
- Low Input Current: 1 μ A
- DC, AC parameters guaranteed from -55°C to 125°C
- Buffered outputs tristated during power up/down

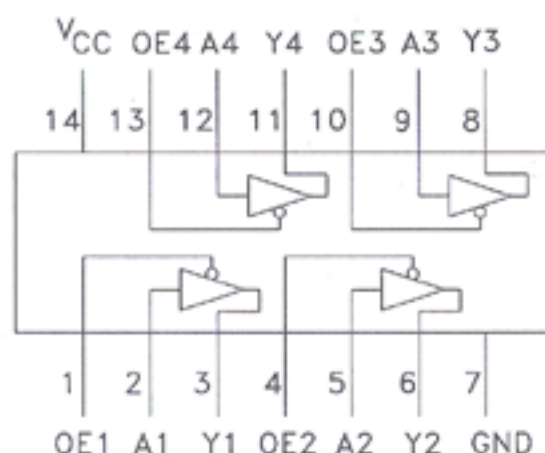
DV74HC125A DV74HCT125A



N Suffix
Plastic DIP
AVG-001 Case



D Suffix
Plastic SOP
AVG-002 Case



TRUTH TABLE

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

H = High Logic Level
L = Low Logic Level
Z = High Impedance State
X = Don't Care

ABSOLUTE MAXIMUM RATINGS

Maximum ratings are those values beyond which damage to the device may occur.

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)	-1.5 to V _{CC} +1.5	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	± 25	mA
I _{CC}	DC Supply Current, V _{CC} and GND Pins	± 50	mA
P _D	Power Dissipation in Still Air, Plastic DIP SOP Package	750 500	mW
T _{STG}	Storage Temperature Range	-65 to +150	°C
T _L	Lead Temperature, 1mm from Case for 10 Seconds	260	°C

GUARANTEED OPERATING CONDITIONS

Symbol	Parameter	Min	Max	Unit
V _{CC}	DC Supply Voltage, HC (HCT), Referenced to GND	2.0 (4.5)	6.0 (5.5)	V
V _{IN} , V _{OUT}	DC Input Voltage, Output Voltage, Referenced to GND	0	V _{CC}	V
T _A	Ambient Temperature	-55	+125	°C
t _r , t _f	Input Rise and Fall Time: HC: V _{CC} =2.0V HCT: V _{CC} =5.5V / HC: V _{CC} =4.5V HC: V _{CC} =6.0V	0 0 0	1000 500 400	ns

DC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Conditions	V _{CC} V	Guaranteed Limits			Unit
				25°C to -55°C	≤85°C	≤125°C	
V _{IH}	Minimum High-Level Input Voltage	V _{OUT} = 0.1 V, I _{OUT} ≤ 20 μA or V _{OUT} = V _{CC} - 0.1 V	2.0 4.5 6.0	1.5 3.15 4.2	1.5 3.15 4.2	1.5 3.15 4.2	V
V _{IL}	Maximum Low-Level Input Voltage	V _{OUT} = 0.1 V, I _{OUT} ≤ 20 μA or V _{OUT} = V _{CC} - 0.1 V	2.0 4.5 6.0	0.3 0.9 1.2	0.3 0.9 1.2	0.3 0.9 1.2	V
V _{OH}	Minimum High-Level Output Voltage	V _{IN} = V _{IH} or V _{IL} I _{OUT} ≤ 20 μA	2.0 4.5 6.0	1.9 4.4 5.9	1.9 4.4 5.9	1.9 4.4 5.9	V
		V _{IN} = V _{IH} or V _{IL} , I _{OUT} ≤ 6.0 mA I _{OUT} ≤ 7.8 mA	4.5 6.0	3.98 5.48	3.84 5.34	3.7 5.2	
V _{OL}	Maximum Low Level Output Voltage	V _{IN} = V _{IH} or V _{IL} I _{OUT} ≤ 20 μA	2.0 4.5 6.0	0.1 0.1 0.1	0.1 0.1 0.1	0.1 0.1 0.1	V
		V _{IN} = V _{IH} or V _{IL} , I _{OUT} ≤ 6.0 mA I _{OUT} ≤ 7.8 mA	4.5 6.0	0.26 0.26	0.33 0.33	0.40 0.40	
I _{IN}	Maximum Input Leakage Current	V _{IN} = V _{CC} or GND	6.0	± 0.1	± 1.0	± 1.0	μA
I _{OZ}	Maximum 3-State Leakage Current	Output in High Impedance V _{IN} = V _{IH} or V _{IL} V _{IN} = V _{CC} or GND	6.0	± 0.5	± 5.0	± 10.0	μA
I _{CC}	Maximum Quiescent Supply Current (Per Package)	V _{IN} = V _{CC} or GND, I _{OUT} = 0 μA	6.0	4.0	40	160	μA

AC ELECTRICAL CHARACTERISTICS over full operating conditions (C_L = 50 pF, R_L = 1 kΩ Input t_f = t_r = 6 ns)

Symbol	Parameter	V _{CC} V	Guaranteed Limit			Unit
			25°C to -55°C	≤85°C	≤125°C	
t _{PLH} , t _{PHL}	Maximum Propagation Delay Time, Input A to Output Y	2.0 4.5 6.0	90 18 15	115 23 20	135 27 23	ns
t _{PLZ} , t _{PHZ}	Maximum Propagation Delay Time, Output Disable to Y	2.0 4.5 6.0	120 24 20	150 30 26	180 36 31	ns
t _{PZL} , t _{PZH}	Maximum Propagation Delay Time, Output Enable to Y	2.0 4.5 6.0	90 18 15	115 23 20	135 27 23	ns
t _{TLH} , t _{THL}	Maximum Output Transition Time Any Output	2.0 4.5 6.0	60 12 10	75 15 13	90 18 15	ns
C _{IN}	Maximum Input Capacitance	—	10	10	10	pF
C _{OUT}	Maximum three-state Output Capacitance (Output in High-Impedance State), Q _A through Q _H	—	15	15	15	pF

Symbol	Parameter	Guaranteed Limits	Unit
C _{PD}	Power Dissipation Capacitance (Per Buffer) Used to determine the no-load dynamic power consumption, P _D = C _{PD} V _{CC} ² f + I _{CC} V _{CC}	Typical @ 25°C, V _{CC} = 5 V	pF
		45	

DC ELECTRICAL CHARACTERISTICS

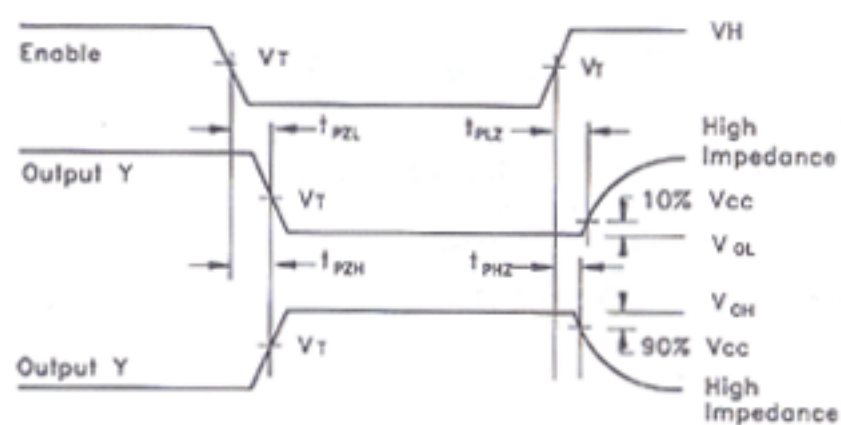
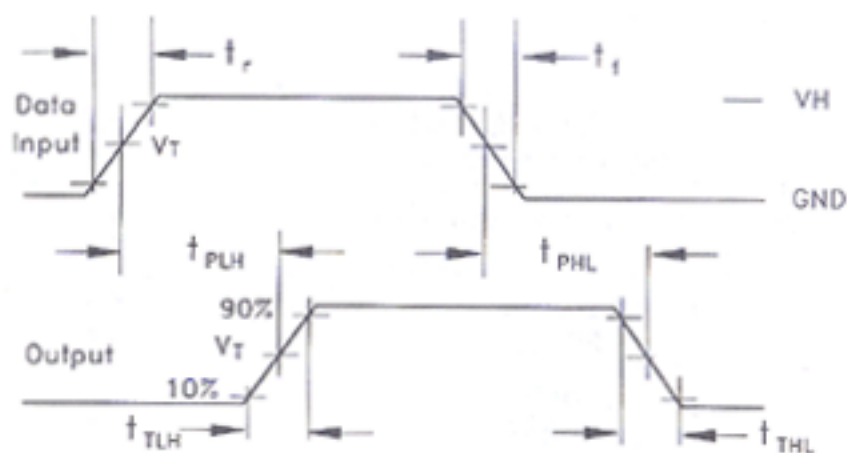
Symbol	Parameter	Conditions	V _{CC} V	Guaranteed Limits			Unit
				25°C to -55°C	≤85°C	≤125°C	
V _{IH}	Minimum High-Level Input Voltage	V _{OUT} =0.1 V, I _{OUT} =0μA or V _{OUT} = V _{CC} -0.1V	4.5 5.5	2.0 2.0	2.0 2.0	2.0 2.0	V
V _{IL}	Maximum Low- Level Input Voltage	V _{OUT} =0.1 V, I _{OUT} =0μA or V _{OUT} = V _{CC} -0.1V	4.5 5.5	0.8 0.8	0.8 0.8	0.8 0.8	V
V _{OH}	Minimum High-Level Output Voltage	V _{IN} = V _{IH} or V _{IL} I _{OUT} ≤ 20 μA	4.5 5.5	4.4 5.4	4.4 5.4	4.4 5.4	V
		V _{IN} =V _{IH} or V _{IL} I _{OUT} < 6.0mA	5.5	3.98	3.84	3.7	
V _{OL}	Maximum Low Level Output Voltage	V _{IN} = V _{IH} or V _{IL} I _{OUT} ≤ 20 μA	4.5 5.5	0.1 0.1	0.1 0.1	0.1 0.1	V
		V _{IN} =V _{IH} or V _{IL} , I _{OUT} ≤ 4.0mA I _{OUT} ≤ 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	± 1	μA
I _{OZ}	Maximum Three-State Leakage Current	Output in High-Impedence State V _{IN} =V _{IL} or V _{IH} V _{OUT} =V _{CC} or GND	6.0	± 0.5	± 5.0	± 10.0	μA
I _{CC}	Maximum Quiescent Supply Current (Per Package)	V _{IN} = V _{CC} or GND I _{OUT} ≤ 0 μA	5.5	4	40	160	μA
ΔI _{CC}	Additional Quiescent Supply Current	V _{IN} =2.4V, Any One Input V _{IN} =V _{CC} or GND,Other Inputs I _{OUT} =0μA	5.5	≥-55°C	25°C to 125°C		mA
				2.9	2.4		

AC ELECTRICAL CHARACTERISTICS over full operating conditions (C_L = 50 pF, R_L = 1 kΩ, Input t_f = t_r = 6 ns)

Symbol	Parameter V _{CC} = 5 V ± 10%	Guaranteed Limit			Unit
		25°C to -55°C	≤85°C	≤125°C	
t _{PLH} , t _{PHL}	Maximum Propagation Delay Time, Input to Output	18	23	27	ns
t _{PLZ} , t _{PHZ}	Maximum Propagation Delay Time, Output Disable to Output	24	30	36	ns
t _{PZL} , t _{PZH}	Maximum Propagation Delay Time, Output Enable to Output	18	23	27	ns
t _{TLH} , t _{THL}	Maximum Output Transition Time Any Output	12	15	18	ns
C _{IN}	Maximum Input Capacitance	10	10	10	pF
C _{OUT}	Maximum Three-State Output Capacitance (Output in High Impedance State)	15	15	15	pF

C _{PD}	Power Dissipation Capacitance (Per Gate) Used to determine the no-load dynamic power consumption P _D = C _{PD} V _{CC} ² f + I _{CC} V _{CC}	Typical @ 25°C, V _{CC} = 5 V	pF
		48	

SWITCHING WAVEFORMS



Input and Output Threshold Voltage: $V_T = 50\% V_{CC}$ for HC, 1.3V for HCT, $V_H = V_{CC}$ for HC, 3V for HCT