

74LCX125

Low Voltage Quad Buffer with 5V Tolerant Inputs and Outputs

General Description

The LCX125 contains four independent non-inverting buffers with 3-STATE outputs. The inputs tolerate voltages up to 7V allowing the interface of 5V systems to 3V systems.

Features

- 5V tolerant inputs and outputs
- 6.0 ns t_{PD} max, 10 μ A I_{CCQ} max
- Power down high impedance inputs and outputs

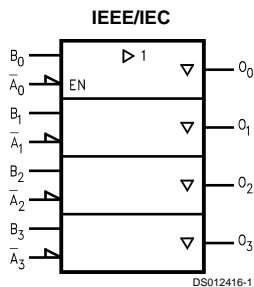
- Supports live insertion/withdrawal
- 2.0V–3.6V V_{CC} supply operation
- ± 24 mA output drive
- Implements patented noise/EMI reduction circuitry
- Functionally compatible with 74 series 125
- Latch-up performance exceeds 500 mA
- ESD performance:
 - Human body model > 2000V
 - Machine model > 100V

Ordering Code:

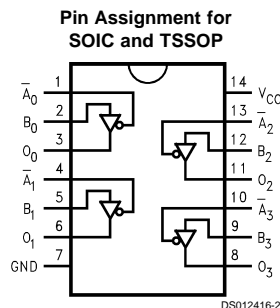
Order Number	Package Number	Package Description
74LCX125M	M14A	14-Lead (0.150" Wide) Molded Small Outline Package, SOIC, JEDEC
74LCX125SJ	M14D	14-Lead Molded Small Outline Package, SOIC EIAJ
74LCX125MTC	MTC14	14-Lead Thin Shrink Small Outline Package, TSSOP

Device also available in Tape and Reel. Specify by appending suffix letter "X" to the ordering code.

Logic Symbol



Connection Diagram



Pin Descriptions

Pin Names	Description
A_n, B_n	Inputs
O_n	Outputs

Truth Tables

Inputs		Output
A_n	B_n	O_n
L	L	L
L	H	H
H	X	Z

H = HIGH Voltage Level
L = LOW Voltage Level
Z = High Impedance
X = Immaterial

Absolute Maximum Ratings (Note 1)

Symbol	Parameter	Value	Conditions	Units
V _{CC}	Supply Voltage	-0.5 to +7.0		V
V _I	DC Input Voltage	-0.5 to +7.0		V
V _O	DC Output Voltage	-0.5 to +7.0	Output in 3-STATE	V
		-0.5 to V _{CC} + 0.5	Output in High or Low State (Note 2)	V
I _{IK}	DC Input Diode Current	-50	V _I < GND	mA
I _{OK}	DC Output Diode Current	-50	V _O < GND	mA
		+50	V _O > V _{CC}	mA
I _O	DC Output Source/Sink Current	±50		mA
I _{CC}	DC Supply Current per Supply Pin	±100		mA
I _{GND}	DC Ground Current per Ground Pin	±100		mA
T _{STG}	Storage Temperature	-65 to +150		°C

Recommended Operating Conditions (Note 3)

Symbol	Parameter	Min	Max	Units	
V _{CC}	Supply Voltage	Operating	2.0	3.6	V
		Data Retention	1.5	3.6	V
V _I	Input Voltage	0	5.5	V	
V _O	Output Voltage	HIGH or LOW State	0	V _{CC}	V
		3-STATE	0	5.5	V
I _{OH} /I _{OL}	Output Current	V _{CC} = 3.0V–3.6V V _{CC} = 2.7V	±24 ±12	mA	
T _A	Free-Air Operating Temperature	-40	85	°C	
Δt/ΔV	Input Edge Rate, V _{IN} = 0.8V–2.0V, V _{CC} = 3.0V	0	10	ns/V	

Note 1: The Absolute Maximum Ratings are those values beyond which the safety of the device cannot be guaranteed. The device should not be operated at these limits. The parametric values defined in the Electrical Characteristics tables are not guaranteed at the Absolute Maximum Ratings. The "Recommended Operating Conditions" table will define the conditions for actual device operation.

Note 2: I_O Absolute Maximum Rating must be observed.

Note 3: Unused inputs or I/Os must be held HIGH or LOW. They may not float.

DC Electrical Characteristics

Symbol	Parameter	Conditions	V _{CC} (V)	T _A = -40°C to +85°C		Units
				Min	Max	
V _{IH}	HIGH Level Input Voltage		2.7–3.6	2.0		V
V _{IL}	LOW Level Input Voltage		2.7–3.6		0.8	V
V _{OH}	HIGH Level Output Voltage	I _{OH} = -100 μA	2.7–3.6	V _{CC} - 0.2		V
		I _{OH} = -12 mA	2.7	2.2		V
		I _{OH} = -18 mA	3.0	2.4		V
		I _{OH} = -24 mA	3.0	2.2		V
V _{OL}	LOW Level Output Voltage	I _{OL} = 100 μA	2.7–3.6		0.2	V
		I _{OL} = 12 mA	2.7		0.4	V
		I _{OL} = 16 mA	3.0		0.4	V
		I _{OL} = 24 mA	3.0		0.55	V
I _I	Input Leakage Current	0 ≤ V _I ≤ 5.5V	2.7–3.6		±5.0	μA
I _{OZ}	3-STATE Output Leakage	0 ≤ V _O ≤ 5.5V V _I = V _{IH} or V _{IL}	2.7–3.6		±5.0	μA
I _{OFF}	Power-Off Leakage Current	V _I or V _O = 5.5V	0		10	μA
I _{CC}	Quiescent Supply Current	V _I = V _{CC} or GND	2.7–3.6		10	μA
		3.6V ≤ V _I , V _O ≤ 5.5V	2.7–3.6		±10	μA
ΔI _{CC}	Increase in I _{CC} per Input	V _{IH} = V _{CC} - 0.6V	2.7–3.6		500	μA

AC Electrical Characteristics

Symbol	Parameter	$T_A = -40^{\circ}\text{C}$ to $+85^{\circ}\text{C}$, $C_L = 50\text{pF}$, $R_L = 500\Omega$				Units
		$V_{CC} = 3.3\text{V} \pm 0.3\text{V}$		$V_{CC} = 2.7\text{V}$		
		Min	Max	Min	Max	
t_{PHL}	Propagation Delay	1.5	6.0	1.5	6.5	ns
t_{PLH}		1.5	6.0	1.5	6.5	
t_{PZL}	Output Enable Time	1.5	7.0	1.5	8.0	ns
t_{PZH}		1.5	7.0	1.5	8.0	
t_{PLZ}	Output Disable Time	1.5	6.0	1.5	7.0	ns
t_{PHZ}		1.5	6.0	1.5	7.0	
t_{OSHL}	Output to Output Skew (Note 4)		1.0			ns
t_{OSLH}			1.0			

Note 4: Skew is defined as the absolute value of the difference between the actual propagation delay for any two separate outputs of the same device. The specification applies to any outputs switching in the same direction, either HIGH to LOW (t_{OSHL}) or LOW to HIGH (t_{OSLH}).

Dynamic Switching Characteristics

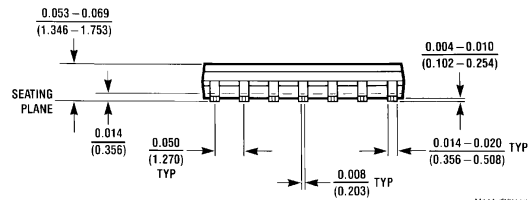
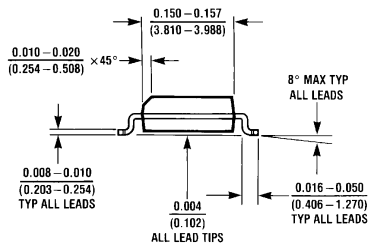
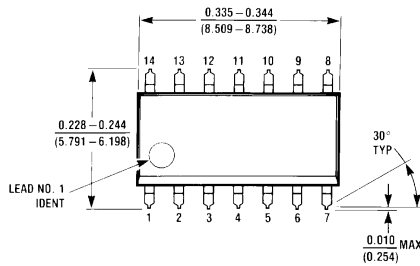
Symbol	Parameter	Conditions	V_{CC} (V)	$T_A = 25^{\circ}\text{C}$	Units
				Typical	
V_{OLP}	Quiet Output Dynamic Peak V_{OL}	$C_L = 50\text{ pF}$, $V_{IH} = 3.3\text{V}$, $V_{IL} = 0\text{V}$	3.3	0.8	V
V_{OLV}	Quiet Output Dynamic Valley V_{OL}	$C_L = 50\text{ pF}$, $V_{IH} = 3.3\text{V}$, $V_{IL} = 0\text{V}$	3.3	-0.8	V

Capacitance

Symbol	Parameter	Conditions	Typical	Units
C_{IN}	Input Capacitance	$V_{CC} = \text{Open}$, $V_I = 0\text{V}$ or V_{CC}	7	pF
C_{OUT}	Output Capacitance	$V_{CC} = 3.3\text{V}$, $V_I = 0\text{V}$ or V_{CC}	8	pF
C_{PD}	Power Dissipation Capacitance	$V_{CC} = 3.3\text{V}$, $V_I = 0\text{V}$ or V_{CC} , $f = 10\text{ MHz}$	25	pF

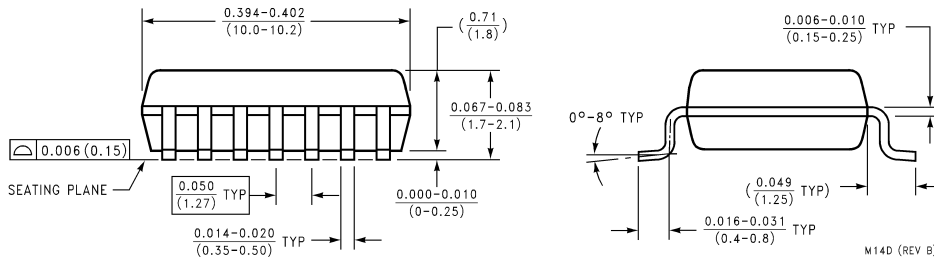
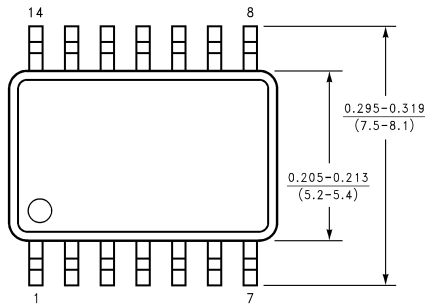


Physical Dimensions inches (millimeters) unless otherwise noted



M14A (REV. H)

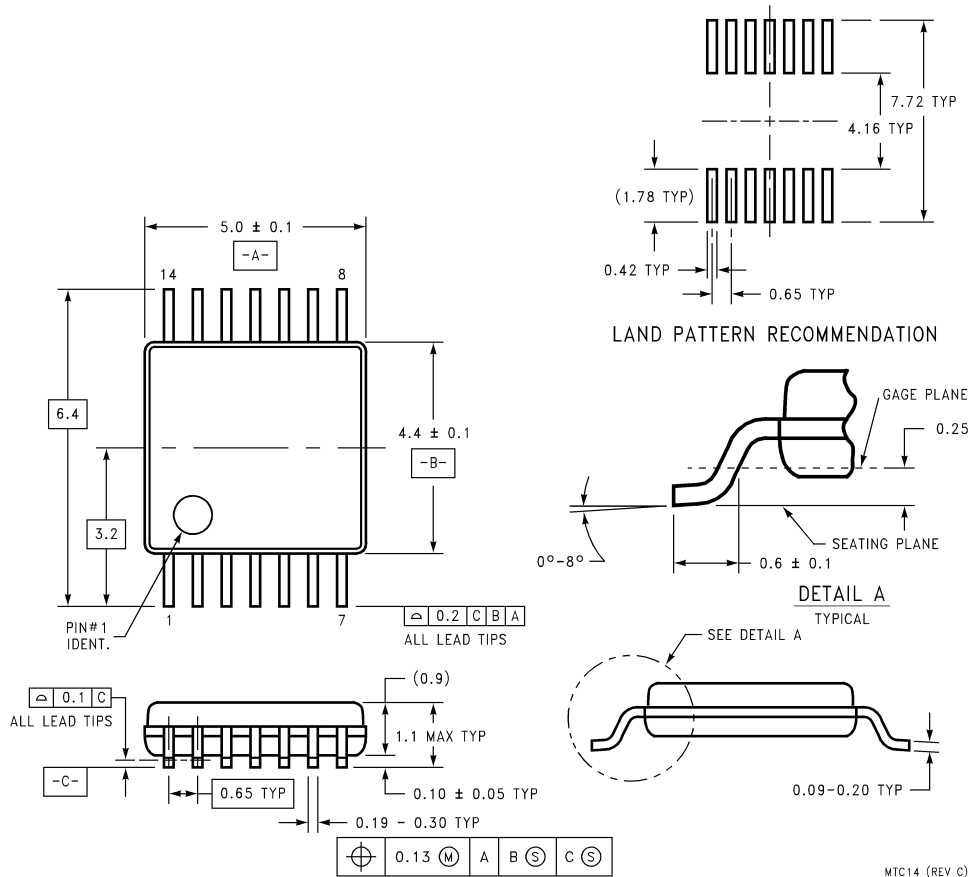
**14-Lead (0.150" Wide) Molded Small Outline Package, JEDEC
Package Number M14A**



M14D (REV. B)

**14-Lead Molded Small Outline Package, EIAJ
Package Number M14D**

Physical Dimensions inches (millimeters) unless otherwise noted (Continued)



14-Lead Thin Shrink Small Outline Package (MTC)
Package Number MTC14

MTC14 (REV C)

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