

74LCX06

Low Voltage Hex Inverter/Buffer with Open Drain Outputs

General Description

The LCX06 contains six inverters/buffers. The inputs tolerate voltages up to 7V allowing the interface of 5V systems to 3V systems.

The outputs of the LCX06 are open drain and can be connected to other open drain outputs to implement active LOW wire AND or active HIGH wire OR functions.

The 74LCX06 is fabricated with advanced CMOS technology to achieve high speed operation while maintaining CMOS low power dissipation.

Features

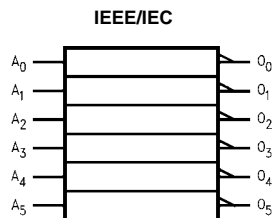
- 5V tolerant inputs
- 2.3V–3.6V V_{CC} specifications provided
- 3.7 ns t_{PD} max ($V_{CC} = 3.3V$), 10 μA I_{CC} max
- Power down high impedance inputs and outputs
- 24 mA output drive ($V_{CC} = 3.0V$)
- Implements patented noise/EMI reduction circuitry
- Latch-up performance exceeds 500 mA
- Functionally compatible with 74 series 05
- ESD performance:
 - Human body model > 2000V
 - Machine model > 200V

Ordering Code:

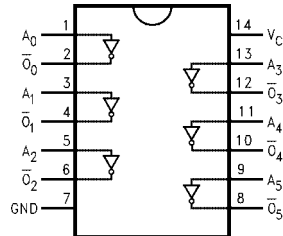
Order Number	Package Number	Package Description
74LCX06M	M14A	14-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150" Narrow
74LCX06SJ	M14D	14-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide
74LCX06MTC	MTC14	14-Lead Thin Shrink Small Outline Package (TSSOP), JEDEC MO-153, 4.4mm Wide

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

Logic Symbol



Connection Diagram



Pin Descriptions

Pin Names	Description
A_n	Inputs
\bar{O}_n	Outputs

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 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}		
I _O	DC Output 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 _I	Input Voltage	0	5.5	V	
V _O	Output Voltage	0	5.5	V	
I _{OL}	Output Current	V _{CC} = 3.0V - 3.6V		+24	mA
		V _{CC} = 2.7V - 3.0V		+12	
		V _{CC} = 2.3V - 2.7V		+8	
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 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		2.3 - 2.7	1.7		V
			2.7 - 3.6	2.0		
V _{IL}	LOW Level Input Voltage		2.3 - 2.7		0.7	V
			2.7 - 3.6		0.8	
V _{OL}	LOW Level Output Voltage	I _{OL} = -100 μA	2.3 - 3.6		0.2	V
		I _{OL} = 8 mA	2.3		0.6	
		I _{OL} = 12 mA	2.7		0.4	
		I _{OL} = 16 mA	3.0		0.4	
		I _{OL} = 24 mA	3.0		0.55	
I _I	Input Leakage Current	0 ≤ V _I ≤ 5.5V	2.3 - 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	2.3 - 3.6		10	μA
		3.6V ≤ V _I ≤ 5.5V	2.3 - 3.6		±10	
ΔI _{CC}	Increase in I _{CC} per Input	V _{IH} = V _{CC} - 0.6V	2.3 - 3.6		500	μA
I _{OHZ}	Off State Current	V _O = 5.5	2 - 3.6		10	μA

AC Electrical Characteristics

Symbol	Parameter	$T_A = -40^{\circ}\text{C to } +85^{\circ}\text{C}, R_L = 500\Omega$						Units
		$V_{CC} = 3.3V \pm 0.3V$		$V_{CC} = 2.7V$		$V_{CC} = 2.5V \pm 0.2V$		
		$C_L = 50\text{ pF}$		$C_L = 50\text{ pF}$		$C_L = 30\text{ pF}$		
		Min	Max	Min	Max	Min	Max	
t_{PZL}	Propagation Delay Time	0.8	3.7	1.0	4.1	0.8	3.5	ns
t_{PLZ}		0.8	3.7	1.0	4.1	0.8	3.5	

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}	$C_L = 50\text{ pF}, V_{IH} = 3.3V, V_{IL} = 0V$ $C_L = 30\text{ pF}, V_{IH} = 2.5V, V_{IL} = 0V$	3.3 2.5	0.9 0.7	V
V_{OLV}	Quiet Output Dynamic Valley V_{OL}	$C_L = 50\text{ pF}, V_{IH} = 3.3V, V_{IL} = 0V$ $C_L = 30\text{ pF}, V_{IH} = 2.5V, V_{IL} = 0V$	3.3 2.5	-0.8 -0.6	V

Capacitance

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

AC Loading and Waveforms Generic for LCX Family

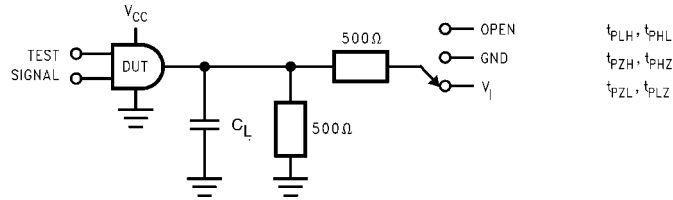


FIGURE 1. AC Test Circuit
 (C_L includes probe and jig capacitance)

Test	Switch
t_{PLH}, t_{PHL}	OPEN
t_{PZL}, t_{PLZ}	6V at $V_{CC} = 3.3 \pm 0.3V$ $V_{CC} \times 2$ at $V_{CC} = 2.5 \pm 0.2V$
t_{PZH}, t_{PHZ}	GND

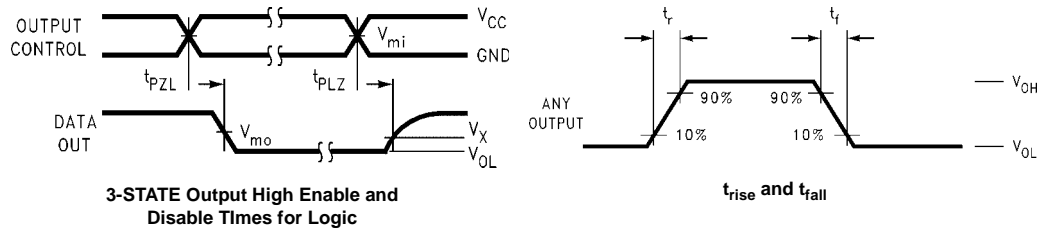
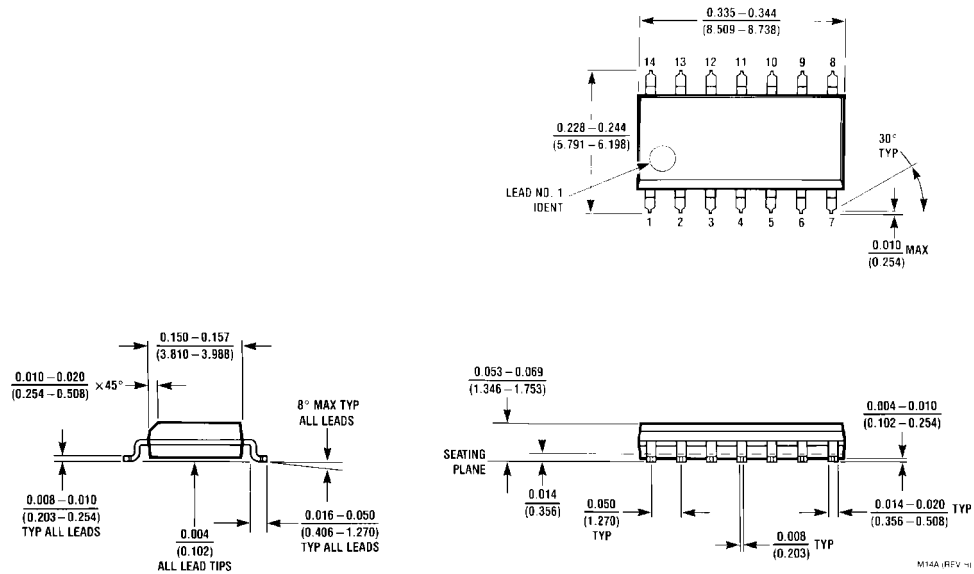


FIGURE 2. Waveforms
 (Input Pulse Characteristics; $f = 1MHz, t_r = t_f = 3ns$)

Symbol	V_{CC}		
	$3.3V \pm 0.3V$	$2.7V$	$2.5V \pm 0.2V$
V_{mi}	1.5V	1.5V	$V_{CC}/2$
V_{mo}	1.5V	1.5V	$V_{CC}/2$
V_x	$V_{OL} + 0.3V$	$V_{OL} + 0.3V$	$V_{OL} + 0.15V$
V_y	$V_{OH} - 0.3V$	$V_{OH} - 0.3V$	$V_{OH} - 0.15V$

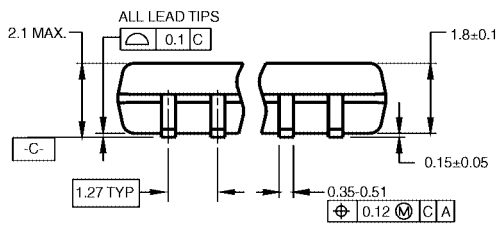
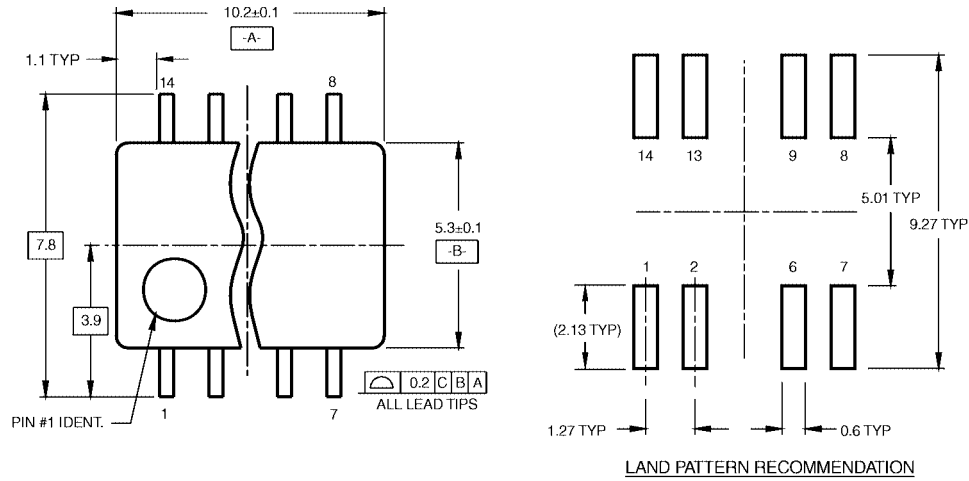
Physical Dimensions inches (millimeters) unless otherwise noted



**14-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150" Narrow
Package Number M14A**

M14A (REV. 1)

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



DIMENSIONS ARE IN MILLIMETERS

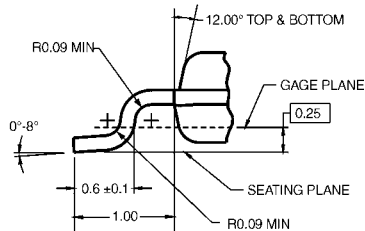
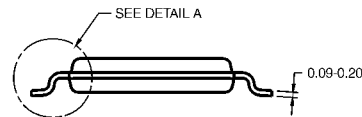
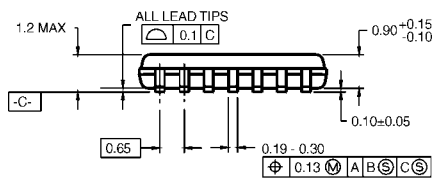
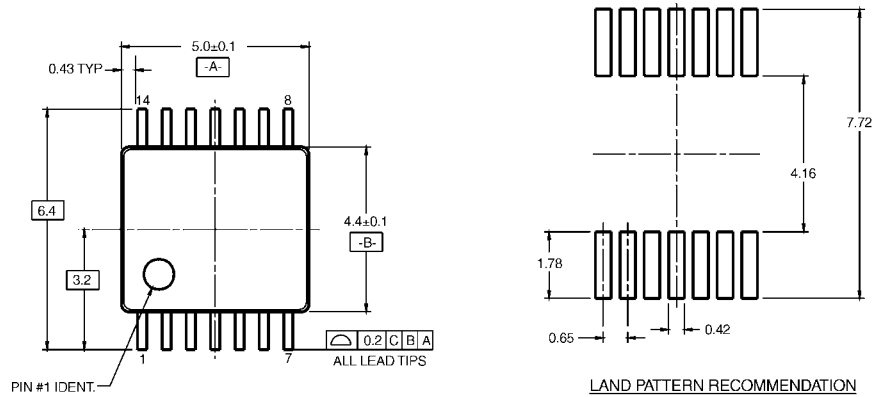
- NOTES:
- A. CONFORMS TO EIAJ EDR-7320 REGISTRATION, ESTABLISHED IN DECEMBER, 1998.
 - B. DIMENSIONS ARE IN MILLIMETERS.
 - C. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH, AND TIE BAR EXTRUSIONS.

M14DRevB1



**14-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide
Package Number M14D**

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



- NOTES:
- A. CONFORMS TO JEDEC REGISTRATION MO-153, VARIATION AB, REF NOTE 6, DATE 7/93.
 - B. DIMENSIONS ARE IN MILLIMETERS.
 - C. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH, AND TIE BAR EXTRUSIONS.
 - D. DIMENSIONS AND TOLERANCES PER ANSI Y14.5M, 1982.

MTC14RevC3

DETAIL A

14-Lead Thin Shrink Small Outline Package (TSSOP), JEDEC MO-153, 4.4mm Wide Package Number MTC14

Fairchild does not assume any responsibility for use of any circuitry described, no circuit patent licenses are implied and Fairchild reserves the right at any time without notice to change said circuitry and specifications.

LIFE SUPPORT POLICY

FAIRCHILD'S PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS WRITTEN APPROVAL OF THE PRESIDENT OF FAIRCHILD SEMICONDUCTOR CORPORATION. As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, and (c) whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury to the user.
2. A critical component in any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

www.fairchildsemi.com