

February 2008

74LVX08 Low Voltage Quad 2-Input AND Gate

Features

- Input voltage level translation from 5V to 3V
- Ideal for low power/low noise 3.3V applications
- Guaranteed simultaneous switching noise level and dynamic threshold performance

General Description

The LVX08 contains four 2-input AND gates. The inputs tolerate voltages up to 7V allowing the interface of 5V systems to 3V systems.

Ordering Information

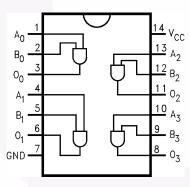
Order Number	Package Number	Package Description
74LVX08M	M14A	14-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150" Narrow
74LVX08SJ	M14D	14-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide
74LVX08MTC	MTC14	14-Lead Thin Shrink Small Outline Package (TSSOP), JEDEC MO-153, 4.4mm Wide

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

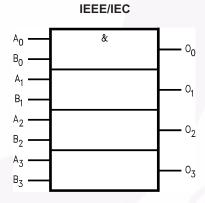


All packages are lead free per JEDEC: J-STD-020B standard.

Connection Diagram



Logic Symbol



Pin Description

Pin Names	Description
A _n , B _n	Inputs
O _n	Outputs

Absolute Maximum Ratings

Stresses exceeding the absolute maximum ratings may damage the device. The device may not function or be operable above the recommended operating conditions and stressing the parts to these levels is not recommended. In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only.

Symbol	Parameter	Rating
V _{CC}	Supply Voltage	-0.5V to +7.0V
I _{IK}	DC Input Diode Current, V _I = -0.5V	-20mA
V _I	DC Input Voltage	-0.5V to 7V
I _{OK}	DC Output Diode Current	
	$V_{O} = -0.5V$	–20mA
	$V_{O} = V_{CC} + 0.5V$	+20mA
Vo	DC Output Voltage	-0.5V to V _{CC} + 0.5V
Io	DC Output Source or Sink Current	±25mA
I _{CC} or I _{GND}	DC V _{CC} or Ground Current	±50mA
T _{STG}	Storage Temperature	−65°C to +150°C
Р	Power Dissipation	180mW
T _L	Lead Temperature (Soldering, 10 seconds)	240°C

Recommended Operating Conditions⁽¹⁾

The Recommended Operating Conditions table defines the conditions for actual device operation. Recommended operating conditions are specified to ensure optimal performance to the datasheet specifications. Fairchild does not recommend exceeding them or designing to absolute maximum ratings.

Symbol	Parameter	Rating
V _{CC}	Supply Voltage	2.0V to 3.6V
V _I	Input Voltage	0V to 5.5V
V _O	Output Voltage	0V to V _{CC}
T _A	Operating Temperature	–40°C to +85°C
Δt / ΔV	Input Rise and Fall Time	0ns/V to 100ns/V

Note:

1. Unused inputs must be held HIGH or LOW. They may not float.

DC Electrical Characteristics

				TA	\ = +2 5	°C		40°C to 5°C	
Symbol	Parameter	V _{CC}	Conditions	Min.	Тур.	Max.	Min.	Max.	Units
V _{IH}	HIGH Level Input	2.0		1.5			1.5		V
	Voltage	3.0		2.0			2.0		
		3.6		2.4			2.4		
V _{IL}	LOW Level Input	2.0				0.5		0.5	V
	Voltage	3.0				8.0		0.8	
		3.6				0.8		0.8	
V _{OH}	HIGH Level Output Voltage	2.0	$V_{IN} = V_{IL} \text{ or } V_{IH},$ $I_{OH} = -50 \mu A$	1.9	2.0		1.9		V
		3.0	$V_{IN} = V_{IL} \text{ or } V_{IH},$ $I_{OH} = -50 \mu A$	2.9	3.0		2.9		
			$V_{IN} = V_{IL} \text{ or } V_{IH},$ $I_{OH} = -4\text{mA}$	2.58			2.48		
V _{OL}	LOW Level Output Voltage	2.0	$V_{IN} = V_{IL} \text{ or } V_{IH},$ $I_{OL} = 50 \mu A$		0.0	0.1		0.1	V
		3.0	$V_{IN} = V_{IL} \text{ or } V_{IH},$ $I_{OL} = 50 \mu A$		0.0	0.1		0.1	
			$V_{IN} = V_{IL} \text{ or } V_{IH},$ $I_{OL} = 4\text{mA}$			0.36		0.44	
I _{IN}	Input Leakage Current	3.6	V _{IN} = 5.5V or GND			±0.1		±1.0	μA
I _{CC}	Quiescent Supply Current	3.6	$V_{IN} = V_{CC}$ or GND			2.0		20.0	μA

Noise Characteristics⁽²⁾

				$T_A = 25^{\circ}C$		
Symbol	Parameter	V _{CC} (V)	C _L (pF)	Тур.	Limit	Units
V _{OLP}	Quiet Output Maximum Dynamic V _{OL}	3.3	50	0.3	0.5	V
V _{OLV}	Quiet Output Minimum Dynamic V _{OL}	3.3	50	-0.3	-0.5	V
V _{IHD}	Minimum HIGH Level Dynamic Input Voltage	3.3	50		2.0	V
V _{ILD}	Maximum LOW Level Dynamic Input Voltage	3.3	50		0.8	V

Note:

2. Input $t_r = t_f = 3ns$

AC Electrical Characteristics

				T,	ղ = +25 °	°C	T _A = -4 +8!	0°C to 5°C	
Symbol	Parameter	V _{CC} (V)	C _L (pF)	Min.	Тур.	Max.	Min.	Max.	Units
t _{PLH} , t _{PHL}	Propagation Delay Time	2.7	15		6.3	11.4	1.0	13.5	ns
			50		8.8	14.9	1.0	17.0	
		3.3 ± 0.3	15		4.8	7.1	1.0	8.5	
			50		7.3	10.6	1.0	12.0	
tosch, toshc	Output to Output Skew ⁽³⁾	2.7	50			1.5		1.5	ns
		3.3				1.5		1.5	

Note:

3. Parameter guaranteed by design $t_{OSLH} = |t_{PLHm} - t_{PLHn}|$, $t_{OSHL} = |t_{PHLm} - t_{PHLn}|$

Capacitance

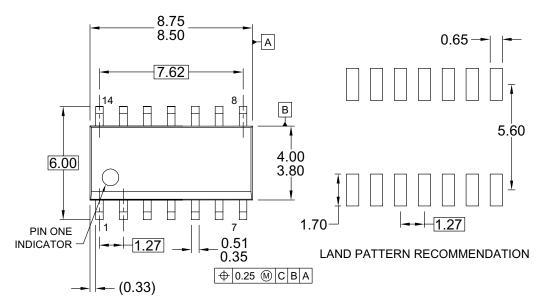
		1	A = +25°	С	T _A = -4	10°C to 5°C	
Symbol	Parameter	Min.	Тур.	Max.	Min.	Max.	Units
C _{IN}	Input Capacitance		4	10		10	pF
C _{PD}	Power Dissipation Capacitance ⁽⁴⁾		18				pF

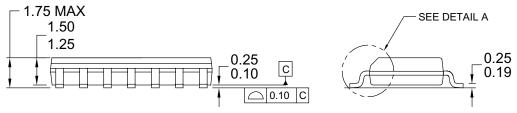
Note:

4. C_{PD} is defined as the value of the internal equivalent capacitance which is calculated from the operating current consumption without load.

Average operating current can be obtained by the equation: $I_{CC(opr.)} = \frac{C_{PD} \times V_{CC} \times f_{IN} \times I_{CC}}{4 \text{ (per Gate)}}$

Physical Dimensions





NOTES: UNLESS OTHERWISE SPECIFIED

- A) THIS PACKAGE CONFORMS TO JEDEC MS-012, VARIATION AB, ISSUE C, 0.50 X 45° ALL DIMENSIONS ARE IN MILLIMETERS. 0.25 DIMENSIONS DO NOT INCLUDE MOLD R0.10 **GAGE PLANE** FLASH OR BURRS.
 - LANDPATTERN STANDARD:
 - SOIC127P600X145-14M
 - DRAWING CONFORMS TO ASME Y14.5M-1994
 - F) DRAWING FILE NAME: M14AREV13

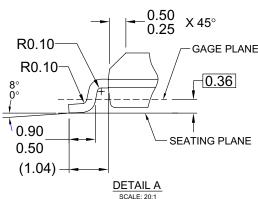
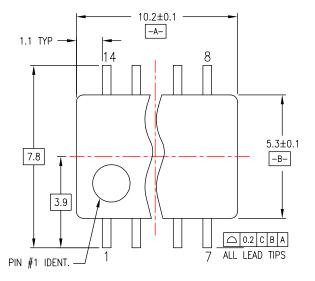


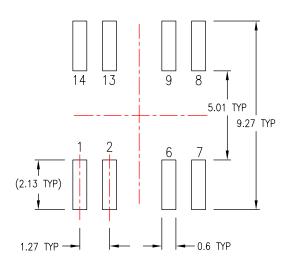
Figure 1. 14-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150" Narrow

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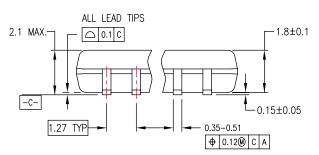
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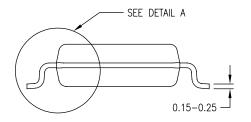
Physical Dimensions (Continued)





LAND PATTERN RECOMMENDATION



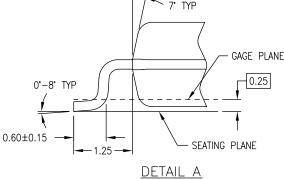


DIMENSIONS ARE IN MILLIMETERS

NOTES:

- A. CONFORMS TO EIAJ EDR-7320 REGISTRATION, ESTABLISHED IN DECEMBER, 1998.
 B. DIMENSIONS ARE IN MILLIMETERS.

DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH, AND TIE BAR EXTRUSIONS.



M14DREVC

Figure 2. 14-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide

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Physical Dimensions (Continued) 5.0±0.1 -A-0.43 TYF 0.65 6.4 4.4±0.1 -B--1.65 3.2 □ 0.2 C B A PIN #1 IDENT. 6 10 LAND PATTERN RECOMMENDATION SEE DETAIL A ALL LEAD TIPS 0.90+0.15 1.2 MAX □ 0.1 C -0.10 0.09-0.20 -C-0.10±0.05 0.65 0.19 - 0.30⊕ 0.13M ABS CS 12.00°TOP & BOTTOM R0.09 min **GAGE PLANE** 0.25 0°-8° NOTES: A. CONFORMS TO JEDEC REGISTRATION MO-153. 0.6±0.1 SEATING PLANE R0.09min VARIATION AB, REF NOTE 6 1 00 **B. DIMENSIONS ARE IN MILLIMETERS DETAIL A** C. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH, AND TIE BAR EXTRUSIONS D. DIMENSIONING AND TOLERANCES PER ANSI

- Y14.5M, 1982
- E. LANDPATTERN STANDARD: SOP65P640X110-14M
- F. DRAWING FILE NAME: MTC14REV6

Figure 3. 14-Lead Thin Shrink Small Outline Package (TSSOP), JEDEC MO-153, 4.4mm Wide

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