February 1998

FAIRCHILD SEMICONDUCTOR™

74LVX08
Low Voltage Quad 2-Input AND Gate

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.

Features

- Input voltage level translation from 5V to 3V
- Ideal for low power/low noise 3.3V applications
- Available in SOIC JEDEC, SOIC EIAJ and TSSOP packages
- Guaranteed simultaneous switching noise level and dynamic threshold performance

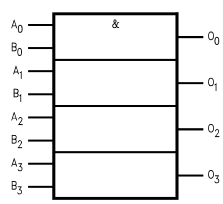
Ordering Code:

Order Number	Package Number	Package Description
74LVX08M	M14A	14-Lead (0.150" Wide) Small Outline Package SOIC JEDEC
74LVX08SJ	M14D	14-Lead Small Outline Package SOIC EIAJ
74LVX08MTC	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

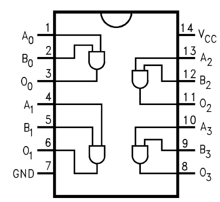
IEEE/IEC



DS011602-2

Connection Diagram

Pin Assignment for SOIC and TSSOP



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Pin Descriptions

Pin Names	Description
A_n, B_n	Inputs
O_n	Outputs

Absolute Maximum Ratings (Note 1)

Supply Voltage (V_{CC})	−0.5V to +7.0V
DC Input Diode Current (I_{IK})	
V_I = −0.5V	−20 mA
DC Input Voltage (V_I)	−0.5V to 7V
DC Output Diode Current (I_{OK})	
V_O = −0.5V	−20 mA
V_O = V_{CC} + 0.5V	+20 mA
DC Output Voltage (V_O)	−0.5V to V_{CC} + 0.5V
DC Output Source or Sink Current (I_O)	±25 mA
DC V_{CC} or Ground Current (I_{CC} or I_{GND})	±50 mA
Storage Temperature (T_{STG})	−65°C to +150°C
Power Dissipation	180 mW
Lead Temperature (T_L) (Soldering, 10 sec.)	240°C

Recommended Operating Conditions (Note 2)

Supply Voltage (V_{CC})	2.0V to 3.6V
Input Voltage (V_I)	0V to 5.5V
Output Voltage (V_O)	0V to V_{CC}
Operating Temperature (T_A)	−40°C to +85°C
Input Rise and Fall Time (Δt/ΔV)	0 ns/V to 100 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: Unused inputs must be held HIGH or LOW. They may not float.

DC Electrical Characteristics

Symbol	Parameter	V_{CC}	T_A = +25°C			T_A = −40°C to +85°C		Units	Conditions	
			Min	Typ	Max	Min	Max			
V_{IH}	High Level Input Voltage	2.0	1	1		1.5				
		3.0	2.0			2.0		V		
		3.6	2.4			2.4				
V_{IL}	Low Level Input Voltage	2.0			0.5		0.5			
		3.0			0.8		0.8	V		
		3.6			0.8		0.8			
V_{OH}	High Level Output Voltage	2.0	1.9	2.0		1.9			V_{IN} = V_{IL} or V_{IH}	I_{OH} = −50 µA
		3.0	2.9	3.0		2.9		V		I_{OH} = −50 µA
		3.0	2.58			2.48				I_{OH} = −4 mA
V_{OL}	Low Level Output Voltage	2.0		0.0	0.1		0.1		V_{IN} = V_{IL} or V_{IH}	I_{OL} = 50 µA
		3.0			0.1		0.1	V		I_{OL} = 50 µA
		3.0			0.36		0.44			I_{OL} = 4 mA
I_{IN}	Input Leakage Current	3.6			±0.1		±1.0	µA	V_{IN} = 5.5V or GND	
I_{CC}	Quiescent Supply Current	3.6			2.0		20.0	µA	V_{IN} = V_{CC} or GND	

Noise Characteristics (Note 3)

Symbol	Parameter	V_{CC} (V)	T_A = 25°C		Units	C_L (pF)
			Typ	Limit		
V_{OLP}	Quiet Output Maximum Dynamic V_{OL}	3.3	0.3	0.5	V	50
V_{OLV}	Quiet Output Minimum Dynamic V_{OL}	3.3	−0.3	−0.5	V	50
V_{IHD}	Minimum High Level Dynamic Input Voltage	3.3		2.0	V	50
V_{ILD}	Maximum Low Level Dynamic Input Voltage	3.3		0.8	V	50

Note 3: Input t_r = t_f = 3 ns

AC Electrical Characteristics

Symbol	Parameter	V_{CC} (V)	T_A = +25°C			T_A =−40°C to +85°C		Units	C_L (pF)
			Min	Typ	Max	Min	Max		
t_{PLH} t_{PHL}	Propagation Delay Time	2.7		6.3	11.4	1.0	13.5	ns	15
				8.8	14.9	1.0	17.0		50
		3.3 ±0.3		4.8	7.1	1.0	8.5		15
				7.3	10.6	1.0	12.0		50
t_{OSLH} t_{OSHL}	Output to Output Skew (Note 4)	2.7			1.5		1.5	ns	50

Note 4: Parameter guaranteed by design. $t_{OSLH} = |t_{PLHm} - t_{PLHn}|$, $t_{OSHL} = |t_{PHLm} - t_{PHLn}|$

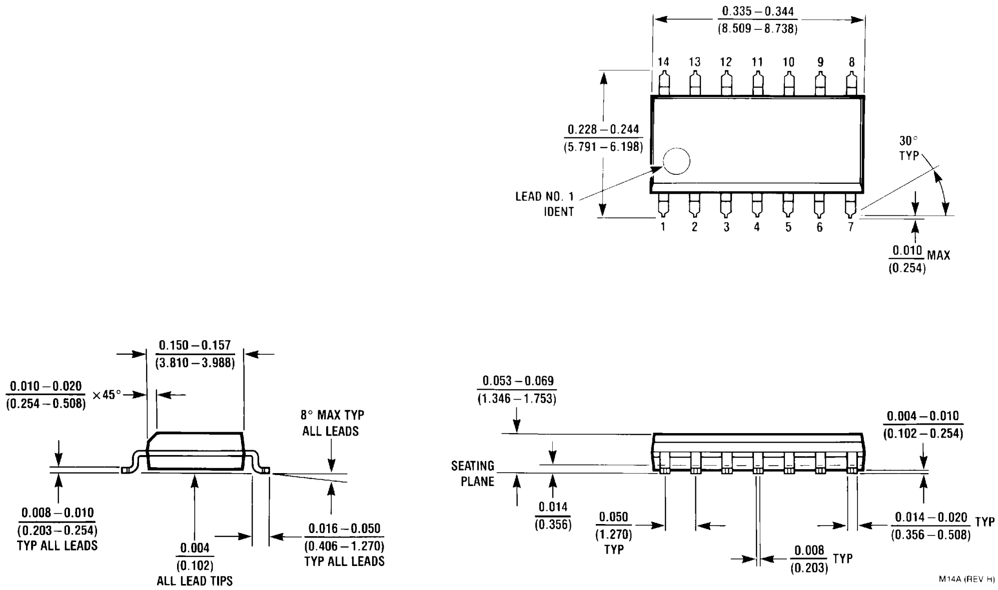
Capacitance

Symbol	Parameter	T_A = +25°C			T_A = −40°C to +85°C		Units
		Min	Typ	Max	Min	Max	
C_{IN}	Input Capacitance		4	10		10	pF
C_{PD}	Power Dissipation Capacitance (Note 5)		18				pF

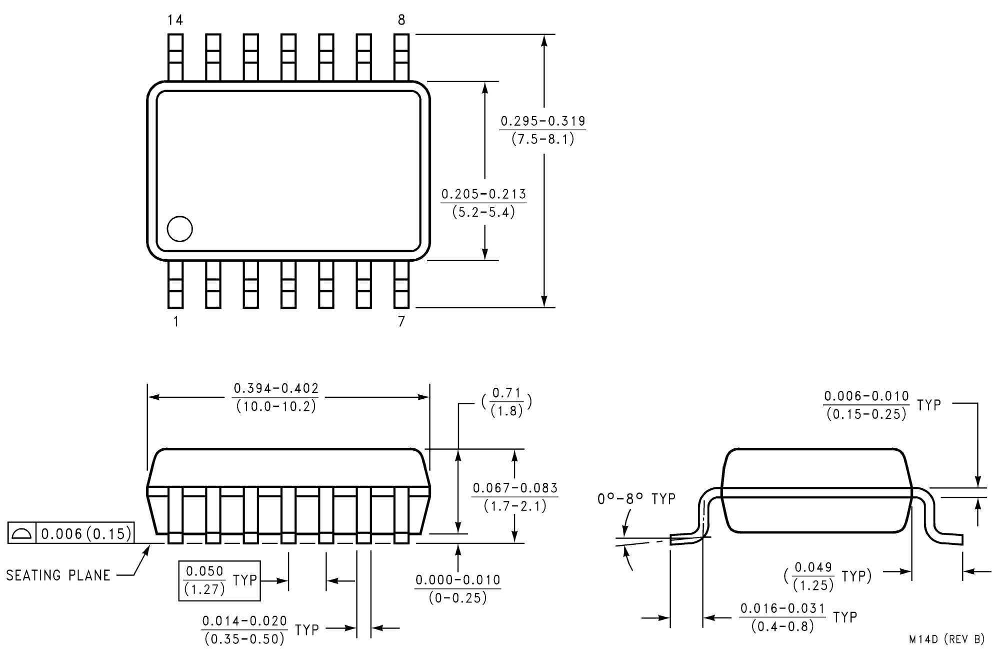
Note 5: C_{PD} is defined as the value of the internal equivalent capacitance which is calculated from the operating current consumption without load.

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

Physical Dimensions inches (millimeters) unless otherwise noted

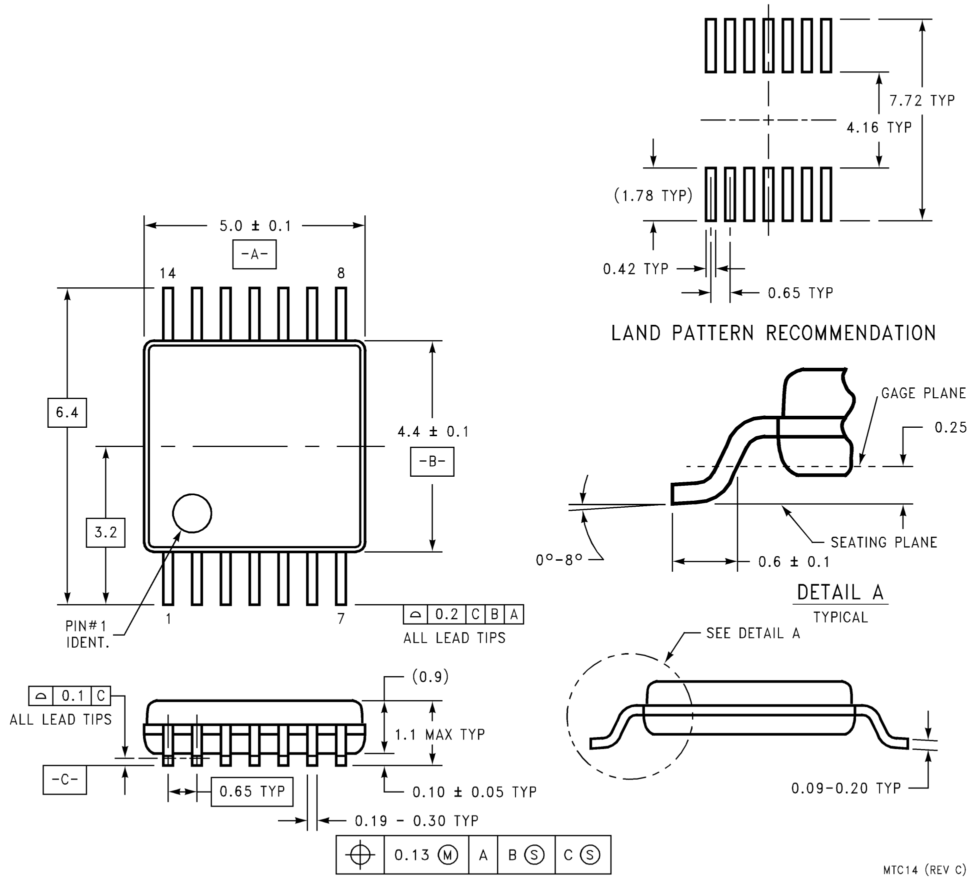


14-Lead Small (0.150" Wide) Outline Package JEDEC (M)
Package Number M14A



14-Lead Small Outline Package EIAJ (SJ)
Package Number M14D

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



14-Lead Thin Shrink Small Outline Package, JEDEC
Package Number MTC14

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