

Is Now Part of



ON Semiconductor®

To learn more about ON Semiconductor, please visit our website at
www.onsemi.com

Please note: As part of the Fairchild Semiconductor integration, some of the Fairchild orderable part numbers will need to change in order to meet ON Semiconductor's system requirements. Since the ON Semiconductor product management systems do not have the ability to manage part nomenclature that utilizes an underscore (_), the underscore (_) in the Fairchild part numbers will be changed to a dash (-). This document may contain device numbers with an underscore (_). Please check the ON Semiconductor website to verify the updated device numbers. The most current and up-to-date ordering information can be found at www.onsemi.com. Please email any questions regarding the system integration to Fairchild_questions@onsemi.com.

ON Semiconductor and the ON Semiconductor logo are trademarks of Semiconductor Components Industries, LLC dba ON Semiconductor or its subsidiaries in the United States and/or other countries. ON Semiconductor owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of ON Semiconductor's product/patent coverage may be accessed at www.onsemi.com/site/pdf/Patent-Marking.pdf. ON Semiconductor reserves the right to make changes without further notice to any products herein. ON Semiconductor makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does ON Semiconductor assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. Buyer is responsible for its products and applications using ON Semiconductor products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by ON Semiconductor. "Typical" parameters which may be provided in ON Semiconductor data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. ON Semiconductor does not convey any license under its patent rights nor the rights of others. ON Semiconductor products are not designed, intended, or authorized for use as a critical component in life support systems or any FDA Class 3 medical devices or medical devices with a same or similar classification in a foreign jurisdiction or any devices intended for implantation in the human body. Should Buyer purchase or use ON Semiconductor products for any such unintended or unauthorized application, Buyer shall indemnify and hold ON Semiconductor and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that ON Semiconductor was negligent regarding the design or manufacture of the part. ON Semiconductor is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

FAIRCHILD SEMICONDUCTOR®

February 2008

74LVX86
Low Voltage Quad 2-Input Exclusive-OR 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 LVX86 contains four 2-input exclusive-OR gates. The inputs tolerate voltages up to 7V allowing the interface of 5V systems to 3V systems.

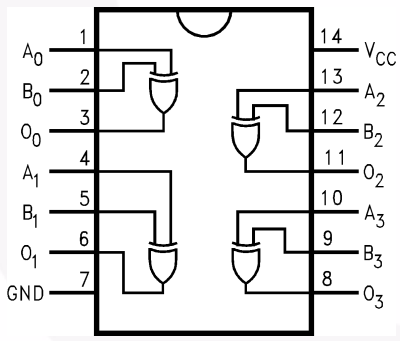
Ordering Information

Order Number	Package Number	Package Description
74LVX86M	M14A	14-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150" Narrow
74LVX86SJ	M14D	14-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide
74LVX86MTC	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.

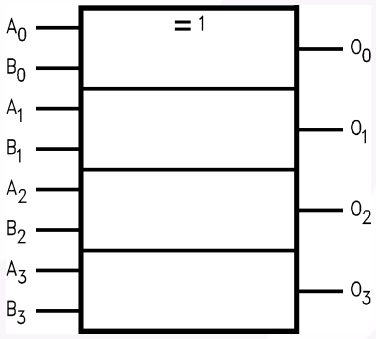
All packages are lead free per JEDEC: J-STD-020B standard.

Connection Diagram



Logic Symbol

IEEE/IEC



Pin Description

Pin Names	Description
A_0–A_3	Inputs
B_0–B_3	Inputs
O_0–O_3	Outputs

©1993 Fairchild Semiconductor Corporation

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
V_O	DC Output Voltage	–0.5V to V_{CC} + 0.5V
I_O	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
P	Power Dissipation	180mW

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
$\Delta t / \Delta V$	Input Rise and Fall Time	0ns/V to 100ns/V

Note:

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

©1993 Fairchild Semiconductor Corporation

DC Electrical Characteristics

Symbol	Parameter	V_{CC}	Conditions	T_A = +25°C			T_A = –40°C to +85°C		Units
				Min.	Typ.	Max.	Min.	Max.	
V_{IH}	HIGH Level Input Voltage	2.0		1.5			1.5		V
		3.0		2.0			2.0		
		3.6		2.4			2.4		
V_{IL}	LOW Level Input Voltage	2.0				0.5		0.5	V
		3.0				0.8		0.8	
		3.6				0.8		0.8	
V_{OH}	HIGH Level Output Voltage	2.0	$V_{IN} = V_{IL}$ or V_{IH}, $I_{OH} = –50\mu A$	1.9	2.0		1.9		V
		3.0	$V_{IN} = V_{IL}$ or V_{IH}, $I_{OH} = –50\mu A$	2.9	3.0		2.9		
			$V_{IN} = V_{IL}$ or V_{IH}, $I_{OH} = –4mA$	2.58			2.48		
V_{OL}	LOW Level Output Voltage	2.0	$V_{IN} = V_{IL}$ or V_{IH}, $I_{OL} = 50\mu A$		0.0	0.1		0.1	V
		3.0	$V_{IN} = V_{IL}$ or V_{IH}, $I_{OL} = 50\mu A$		0.0	0.1		0.1	
			$V_{IN} = V_{IL}$ or V_{IH}, $I_{OL} = 4mA$			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]

Symbol	Parameter	V_{CC} (V)	C_L (pF)	T_A = 25°C		Units
				Typ.	Limit	
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

©1993 Fairchild Semiconductor Corporation

AC Electrical Characteristics

Symbol	Parameter	V_{CC} (V)	C_L (pF)	T_A = +25°C			T_A = –40°C to +85°C		Units
				Min.	Typ.	Max.	Min.	Max.	
t_{PLH}, t_{PHL}	Propagation Delay Time	2.7	15		7.5	14.5	1.0	17.5	ns
			50		10.0	18.0	1.0	21.0	
		3.3 ± 0.3	15		5.8	9.3	1.0	11.0	
			50		8.3	12.8	1.0	14.5	
t_{OSLH}, t_{OSHL}	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

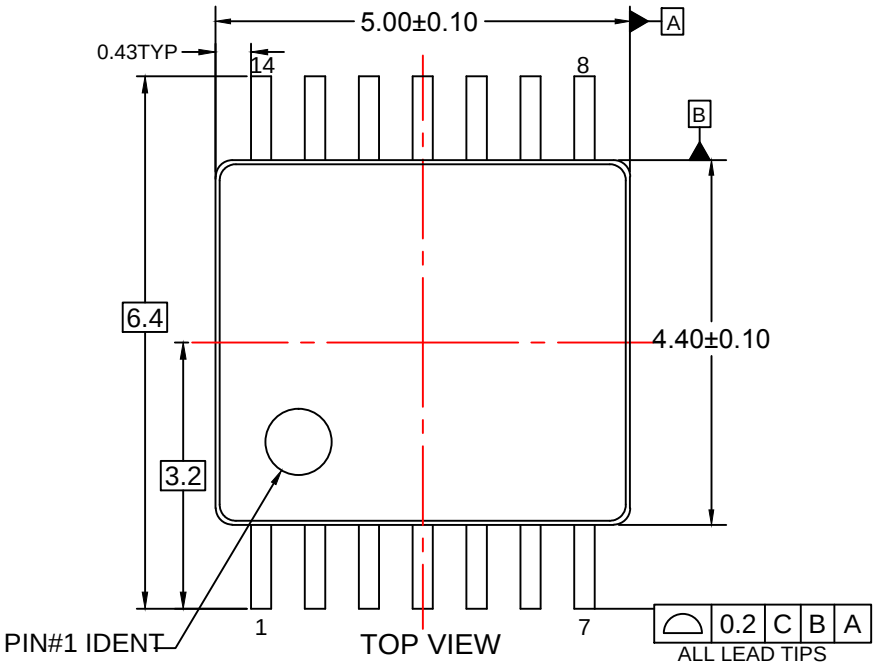
Symbol	Parameter	T_A = +25°C			T_A = –40°C to +85°C		Units
		Min.	Typ.	Max.	Min.	Max.	
C_{IN}	Input Capacitance		4	10		10	pF
C_{PD}	Power Dissipation Capacitance(4)		18				pF

Note:

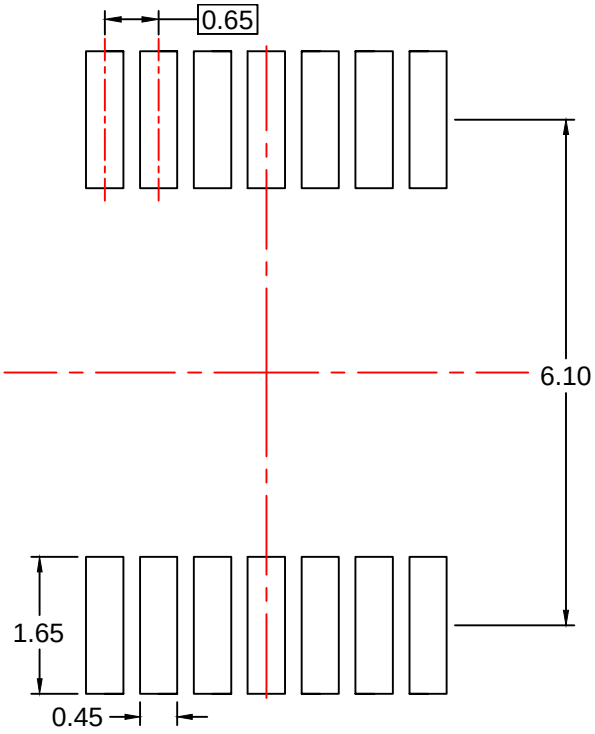
4. C_{PD} is defined as the value of the internal equivalent capacitance which is calculated from the operating current consumption without load.

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

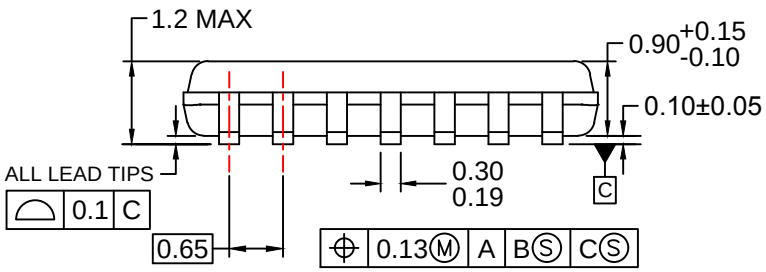
©1993 Fairchild Semiconductor Corporation



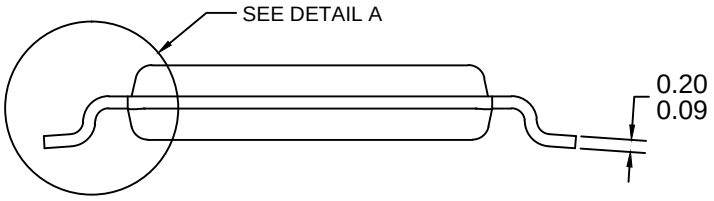
TOP VIEW

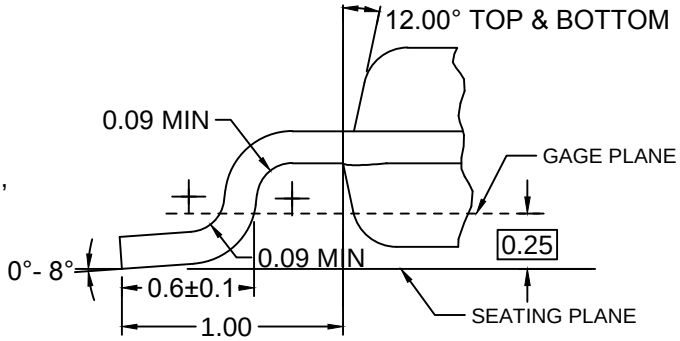


RECOMMENDED LAND PATTERN



FRONT VIEW





DETAIL A

NOTES:

A. CONFORMS TO JEDEC REGISTRATION MO-153, VARIATION AB, REF NOTE 6

B. DIMENSIONS ARE IN MILLIMETERS.

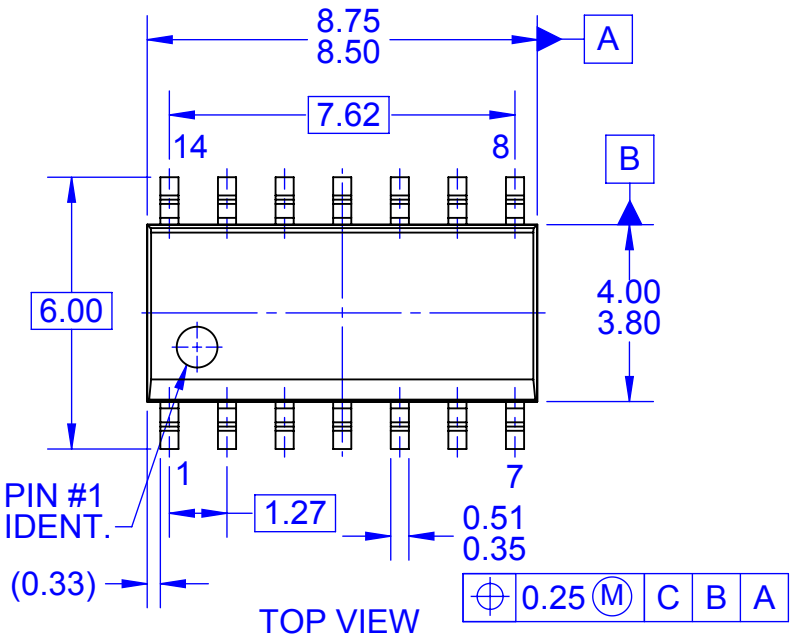
C. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH, AND TIE BAR EXTRUSIONS

D. DIMENSIONING AND TOLERANCES PER ANSI Y14.5M, 2009.

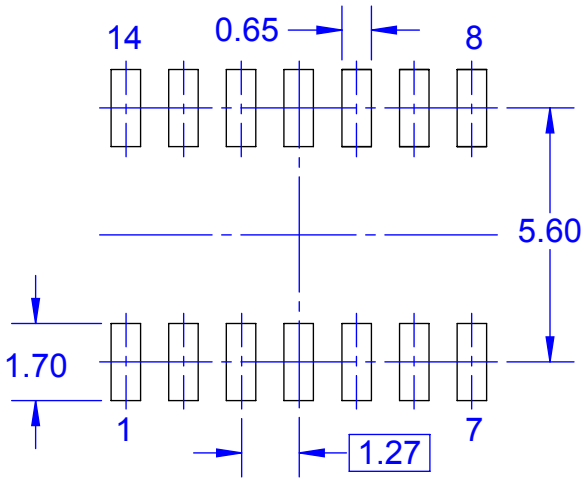
E. LANDPATTERN STANDARD: SOP65P640X110-14M.

F. DRAWING FILE NAME: MKT-MTC14rev7.

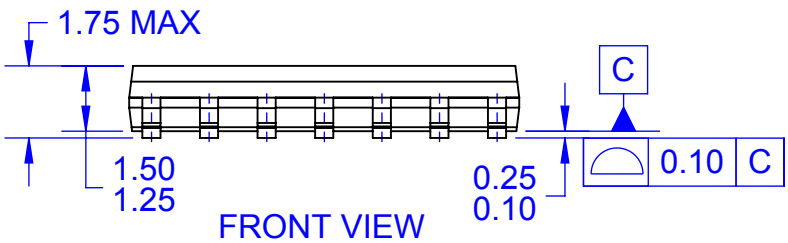
FAIRCHILD



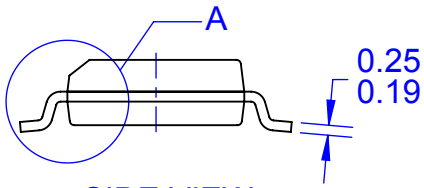
TOP VIEW



LAND PATTERN RECOMMENDATION



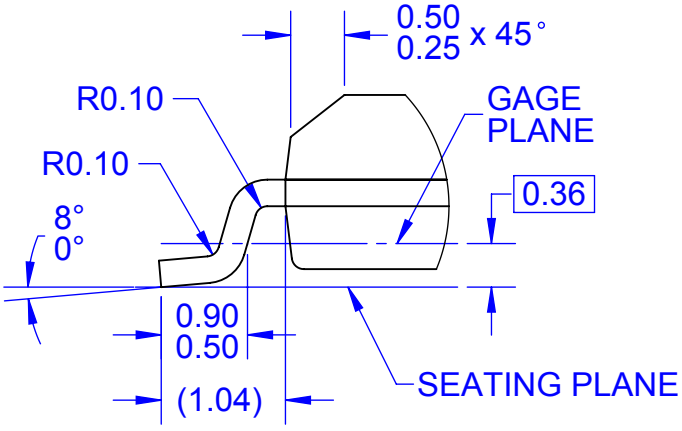
FRONT VIEW



SIDE VIEW

NOTES:

A. CONFORMS TO JEDEC MS-012, VARIATION AB, ISSUE C
B. ALL DIMENSIONS ARE IN MILLIMETERS
C. DIMENSIONS DO NOT INCLUDE MOLD FLASH OR BURRS
D. LAND PATTERN STANDARD: SOIC127P600X145-14M
E. CONFORMS TO ASME Y14.5M, 2009
D. DRAWING FILENAME: MKT-M14Arev14



DETAIL A
SCALE 16 : 1

FAIRCHILD ™

ON Semiconductor and ON are trademarks of Semiconductor Components Industries, LLC dba ON Semiconductor or its subsidiaries in the United States and/or other countries. ON Semiconductor owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of ON Semiconductor's product/patent coverage may be accessed at www.onsemi.com/site/pdf/Patent−Marking.pdf. ON Semiconductor reserves the right to make changes without further notice to any products herein. ON Semiconductor makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does ON Semiconductor assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. Buyer is responsible for its products and applications using ON Semiconductor products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by ON Semiconductor. "Typical" parameters which may be provided in ON Semiconductor data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. ON Semiconductor does not convey any license under its patent rights nor the rights of others. ON Semiconductor products are not designed, intended, or authorized for use as a critical component in life support systems or any FDA Class 3 medical devices or medical devices with a same or similar classification in a foreign jurisdiction or any devices intended for implantation in the human body. Should Buyer purchase or use ON Semiconductor products for any such unintended or unauthorized application, Buyer shall indemnify and hold ON Semiconductor and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that ON Semiconductor was negligent regarding the design or manufacture of the part. ON Semiconductor is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:
Literature Distribution Center for ON Semiconductor
19521 E. 32nd Pkwy, Aurora, Colorado 80011 USA
Phone: 303−675−2175 or 800−344−3860 Toll Free USA/Canada
Fax: 303−675−2176 or 800−344−3867 Toll Free USA/Canada
Email: orderlit@onsemi.com

N. American Technical Support: 800−282−9855 Toll Free USA/Canada
Europe, Middle East and Africa Technical Support:
Phone: 421 33 790 2910
Japan Customer Focus Center
Phone: 81−3−5817−1050

ON Semiconductor Website: **www.onsemi.com**

Order Literature: http://www.onsemi.com/orderlit

For additional information, please contact your local Sales Representative