



Is Now Part of



ON Semiconductor®

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

FIN1101

LVDS Single Port High Speed Repeater

General Description

This single port repeater is designed for high speed interconnects utilizing Low Voltage Differential Signaling (LVDS) technology. It accepts and outputs LVDS levels with a typical differential output swing of 330 mV which provides low EMI at ultra low power dissipation even at high frequencies. It can directly accept multiple differential I/O including: LVPECL, HSTL, and SSTL-2 for translating directly to LVDS.

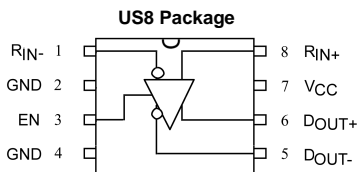
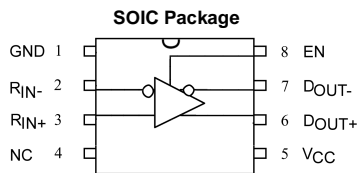
Features

- Up to 1.6 Gb/s full differential path
- 3.5 ps max random jitter and 135 ps max deterministic jitter
- 3.3V power supply operation
- Wide rail-to-rail common mode range
- Ultra low power consumption
- LVDS receiver inputs accept LVPECL, HSTL, and SSTL-2 directly
- Power off protection
- 7 kV HBM ESD protection (all pins)
- Meets or exceeds the TA/EIA-644-A LVDS standard
- Packaged in 8-pin SOIC and US8
- Open circuit fail safe protection

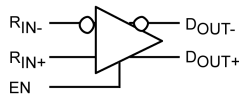
Ordering Code:

Order Number	Package Number	Package Description
FIN1101M	M08A	8-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150" Narrow [TUBE]
FIN1101MX	M08A	8-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150" Narrow [TAPE and REEL]
FIN1101K8X	MAB08A	8-Lead US8, JEDEC MO-187, Variation CA 3.1mm Wide [TAPE and REEL]

Connection Diagrams



Functional Diagram



Pin Descriptions

Pin Name	Description
R _{IN+}	Non-Inverting LVDS Inputs
R _{IN-}	Inverting LVDS Inputs
D _{OUT+}	Non-Inverting Driver Outputs
D _{OUT-}	Inverting Driver Outputs
EN	Driver Enable Pin
V _{CC}	Power Supply
GND	Ground

Function Table

Inputs			Outputs	
EN	R _{IN+}	R _{IN-}	D _{OUT+}	D _{OUT-}
H	H	L	H	L
H	L	H	L	H
H	Fail Safe Case		H	L
L	X	X	Z	Z

H = HIGH Logic Level
L = LOW Logic Level
X = Don't Care
Z = High Impedance

Absolute Maximum Ratings(Note 1)

Supply Voltage (V_{CC})	-0.5V to +4.6V
LVDS DC Input Voltage (V_{IN})	-0.5V to +4.6V
LVDS DC Output Voltage (V_{OUT})	-0.5V to +4.6V
Driver Short Circuit Current (I_{OSD})	Continuous 10 mA
Storage Temperature Range (T_{STG})	-65°C to +150°C
Max Junction Temperature (T_J)	150°C
Lead Temperature (T_L) (Soldering, 10 seconds)	260°C
ESD (Human Body Model)	7000V
ESD (Machine Model)	300V

Recommended Operating Conditions

Supply Voltage (V_{CC})	3.0V to 3.6V
Operating Temperature (T_A)	-40°C to +85°C
Magnitude of Input Differential Voltage ($ V_{ID} $)	100 mV to V_{CC}
Common Mode Input Voltage (V_{IC})	$(0V + V_{ID} /2)$ to $(V_{CC} - V_{ID} /2)$

Note 1: The "Absolute Maximum Ratings" are those values beyond which damage to the device may occur. The databook specifications should be met, without exception, to ensure that the system design is reliable over its power supply, temperature and output/input loading variables. Fairchild does not recommend operation of circuits outside databook specification.

DC Electrical Characteristics

Over supply voltage and operating temperature ranges, unless otherwise specified

Symbol	Parameter	Test Conditions	Min	Typ (Note 2)	Max	Units
V_{TH}	Differential Input Threshold HIGH	See Figure 1; $V_{IC} = +0.05V, +1.2V,$ or $(V_{CC} - 0.05V)$			100	mV
V_{TL}	Differential Input Threshold LOW	See Figure 1; $V_{IC} = +0.05V, +1.2V,$ or $(V_{CC} - 0.05V)$	-100			mV
V_{IH}	Input High Voltage (EN)		2.0		V_{CC}	V
V_{IL}	Input Low Voltage (EN)		GND		0.8	V
V_{OD}	Output Differential Voltage		250	330	450	mV
ΔV_{OD}	V_{OD} Magnitude Change from Differential LOW-to-HIGH	$R_L = 100 \Omega$, Driver Enabled, See Figure 2			25	mV
V_{OS}	Offset Voltage		1.125	1.23	1.375	V
ΔV_{OS}	Offset Magnitude Change from Differential LOW-to-HIGH				25	mV
I_{OS}	Short Circuit Output Current	$D_{OUT+} = 0V$ & $D_{OUT-} = 0V$, Driver Enabled $V_{OD} = 0V$, Driver Enabled		-3.4 ± 3.4	-6 ± 6	mA
I_{IN}	Input Current (EN, D_{INX+} , D_{INX-})	$V_{IN} = 0V$ to V_{CC} , Other Input = V_{CC} or 0V (for Differential Inputs)			± 20	μA
I_{OFF}	Power-Off Input or Output Current	$V_{CC} = 0V$, V_{IN} or $V_{OUT} = 0V$ to 3.6V			± 20	μA
I_{CCZ}	Disabled Power Supply Current	Drivers Disabled		3.2	5.5	mA
I_{CC}	Power Supply Current	Drivers Enabled, Any Valid Input Condition		9.3	13.5	mA
I_{OZ}	Disabled Output Leakage Current	Driver Disabled, $D_{OUT+} = 0V$ to 3.6V or $D_{OUT-} = 0V$ to 3.6V			± 20	μA
V_{IC}	Common Mode Voltage Range	$ V_{ID} = 100$ mV to V_{CC}	$0V + V_{ID} /2$		$V_{CC} - (V_{ID} /2)$	V
C_{IN}	Input Capacitance	EN Input		2.2		pF
		Data Input		2.0		
C_{OUT}	Output Capacitance			2.6		pF

Note 2: All typical values are at $T_A = 25^\circ C$ and with $V_{CC} = 3.3V$.

AC Electrical Characteristics

Over supply voltage and operating temperature ranges, unless otherwise specified

Symbol	Parameter	Test Conditions	Min	Typ (Note 3)	Max	Units
t_{PLHD}	Differential Propagation Delay LOW-to-HIGH	$R_L = 100 \Omega$, $C_L = 5 \text{ pF}$, $V_{ID} = 200 \text{ mV to } 450 \text{ mV}$,	0.75	1.1	1.75	ns
t_{PHLD}	Differential Propagation Delay HIGH-to-LOW		0.75	1.1	1.75	ns
t_{TLHD}	Differential Output Rise Time (20% to 80%)	$V_{IC} = V_{ID} /2 \text{ to } (V_{CC} - (V_{ID}/2))$,	0.29	0.40	0.58	ns
t_{THLD}	Differential Output Fall Time (80% to 20%)	Duty Cycle = 50%,	0.29	0.40	0.58	ns
$t_{SK(P)}$	Pulse Skew $ t_{PLH} - t_{PHL} $	See Figure 3 and Figure 4		0.01	0.2	ns
$t_{SK(PP)}$	Part-to-Part Skew (Note 4)				0.5	ns
f_{MAX}	Maximum Frequency (Note 5)(Note 6)		400	800		MHz
t_{PZHD}	Differential Output Enable Time from Z to HIGH	$R_L = 100 \Omega$, $C_L = 5 \text{ pF}$, See Figure 2 and Figure 3		2.1	5	ns
t_{PZLD}	Differential Output Enable Time from Z to LOW			2.3	5	ns
t_{PHZD}	Differential Output Disable Time from HIGH to Z			1.5	5	ns
t_{PLZD}	Differential Output Disable Time from LOW to Z			1.8	5	ns
t_{DJ}	LVDS Data Jitter, Deterministic	$V_{ID} = 300 \text{ mV}$, PRBS = $2^{23} - 1$, $V_{IC} = 1.2 \text{ V}$ at 800 Mbps		85	135	ps
t_{RJ}	LVDS Clock Jitter, Random (RMS)	$V_{ID} = 300 \text{ mV}$ $V_{IC} = 1.2 \text{ V}$ at 400 MHz		2.1	3.5	ps

Note 3: All typical values are at $T_A = 25^\circ\text{C}$ and with $V_{CC} = 3.3\text{V}$, $V_{ID} = 300\text{mV}$, $V_{IC} = 1.2\text{V}$ unless otherwise specified.

Note 4: $t_{SK(PP)}$ is the magnitude of the difference in differential propagation delay times between identical channels of two devices switching in the same direction (either LOW-to-HIGH or HIGH-to-LOW) when both devices operate with the same supply voltage, same temperature, and have identical test circuits.

Note 5: Passing criteria for maximum frequency is the output $V_{OD} > 200 \text{ mV}$ and the duty cycle is 45% to 55% with all channels switching.

Note 6: Output loading is transmission line environment only; C_L is $< 1 \text{ pF}$ of stray test fixture capacitance.

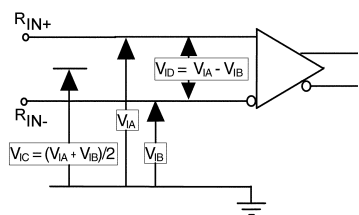


FIGURE 1. Differential Receiver Voltage Definitions and Propagation I and Transition Time Test Circuit

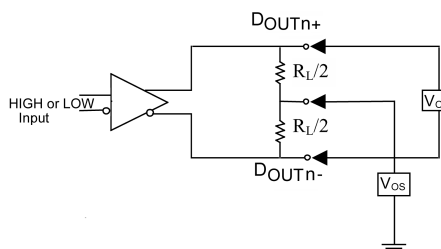
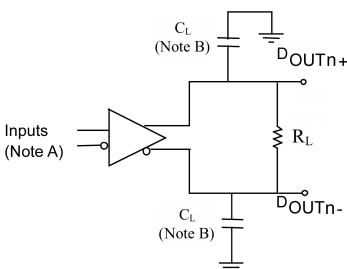


FIGURE 2. Differential Driver DC Test Circuit



Note A: All LVDS input pulses have frequency = 10MHz, t_R or $t_F <= 0.5 \text{ ns}$

Note B: C_L includes all probe and test fixture capacitances

FIGURE 3. Differential Driver Propagation Delay and Transition Time Test Circuit

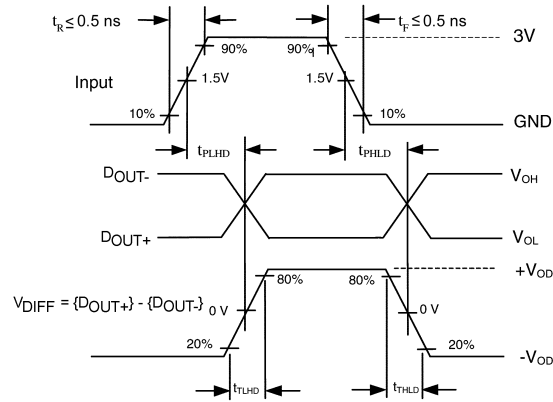
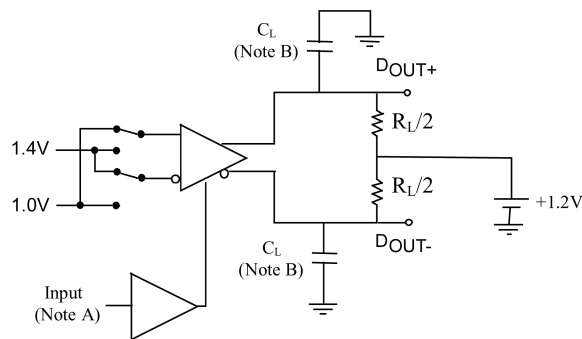


FIGURE 4. AC Waveforms



Note A: All LVTTTL input pulses have frequency = 10 MHz, t_r or $t_f < 2 \text{ ns}$
 Note B: C_L includes all probe and test fixture capacitances

FIGURE 5. Differential Driver Enable and Disable Test Circuit

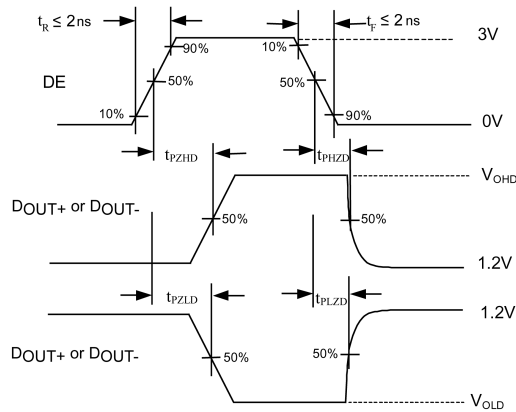
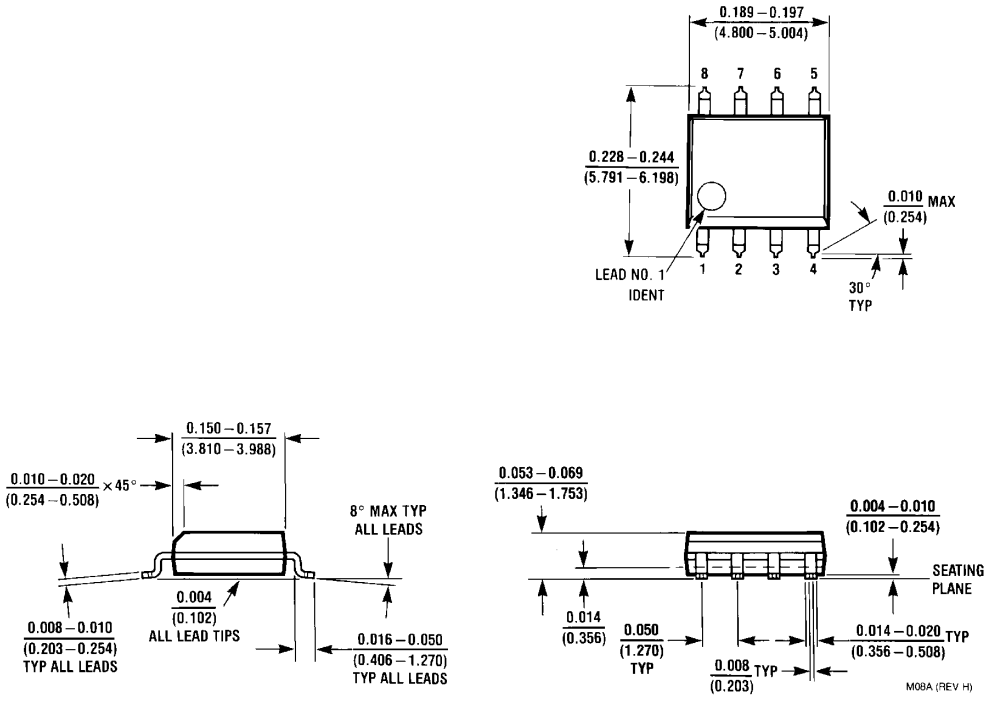


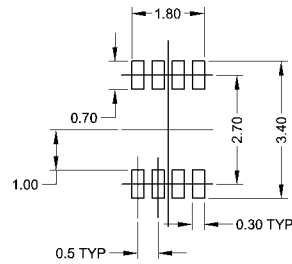
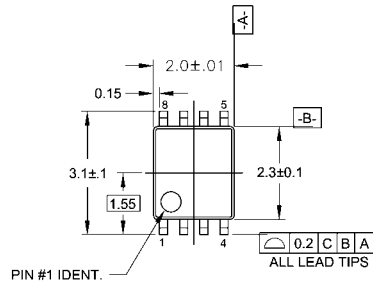
FIGURE 6. Enable and Disable AC Waveforms

Physical Dimensions inches (millimeters) unless otherwise noted

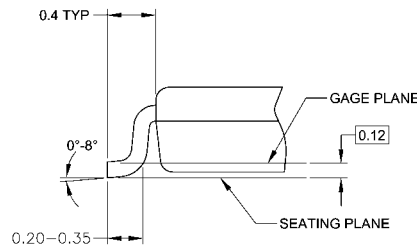
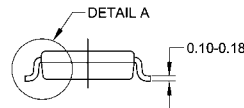
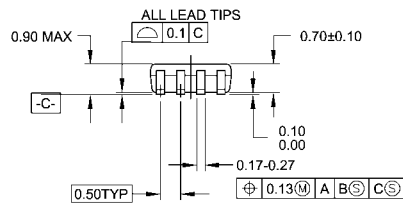


**8-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150" Narrow
Package Number M08A**

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



LAND PATTERN RECOMMENDATION



DETAIL A

NOTES:

- A. CONFORMS TO JEDEC REGISTRATION MO-187
- 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.

MAB08AREVC

**8-Lead US8, JEDEC MO-187, Variation CA 3.1mm Wide
Package Number MAB08A**

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

ON Semiconductor and  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