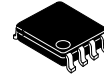


# LVDS Single Port High Speed Repeater

## FIN1101



SOIC8  
CASE 751EB



US8  
CASE 846AN

### 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
- 3.3 V 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 Exceed the TA/EIA-644-A LVDS Standard
- Packaged in 8-Pin SOIC and US8
- Open Circuit Fail Safe Protection
- These Devices are Pb-Free, Halide Free and are RoHS Compliant

### PIN DESCRIPTIONS

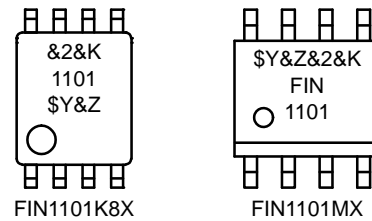
Pin Name	Description
R <sub>IN+</sub>	Non-Inverting LVDS Inputs
R <sub>IN-</sub>	Inverting LVDS Inputs
D <sub>OUT+</sub>	Non-Inverting Driver Outputs
D <sub>OUT-</sub>	Inverting Driver Outputs
EN	Driver Enable Pin
V <sub>CC</sub>	Power Supply
GND	Ground

### FUNCTION TABLE

Inputs			Outputs	
EN	R <sub>IN+</sub>	R <sub>IN-</sub>	D <sub>OUT+</sub>	D <sub>OUT-</sub>
H	H	L	H	L
H	L	H	L	H
H	Fail Safe Case		H	L
L	X	X	Z	Z

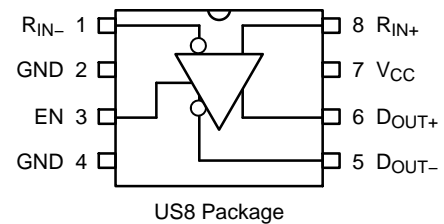
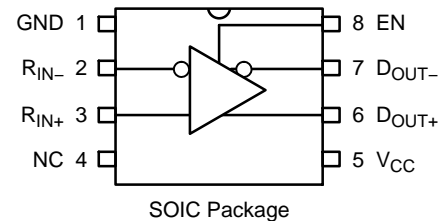
H = HIGH Logic Level      L = LOW Logic Level  
X = Don't Care                Z = High Impedance

### MARKING DIAGRAM

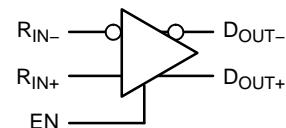


\$Y = Logo  
&Z = Assembly Plant Code  
&2 = 2-Digit Date Code  
&K = 2-Digits Lot Run Traceability Code  
1101, FIN1101 = Specific Device Code

### CONNECTION DIAGRAMS



### FUNCTIONAL DIAGRAM



### ORDERING INFORMATION

See detailed ordering and shipping information on page 4 of this data sheet.

## ABSOLUTE MAXIMUM RATINGS

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

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

## RECOMMENDED OPERATING CONDITIONS

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

Functional operation above the stresses listed in the Recommended Operating Ranges is not implied. Extended exposure to stresses beyond the Recommended Operating Ranges limits may affect device reliability.

## DC ELECTRICAL CHARACTERISTICS (Over supply voltage and operating temperature ranges, unless otherwise specified)

Symbol	Parameter	Test Conditions	Min	Typ (Note 1)	Max	Unit
$V_{TH}$	Differential Input Threshold HIGH	See Figure 1; $V_{IC} = +0.05\text{ V}, +1.2\text{ V},$ or $(V_{CC} - 0.05\text{ V})$	-	-	100	mV
$V_{TL}$	Differential Input Threshold LOW	See Figure 1; $V_{IC} = +0.05\text{ V}, +1.2\text{ V},$ or $(V_{CC} - 0.05\text{ V})$	-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	$R_L = 100\ \Omega$ , Driver Enabled, See Figure 2	250	330	450	mV
$\Delta V_{OD}$	$V_{OD}$ Magnitude Change from Differential LOW-to-HIGH	$R_L = 100\ \Omega$ , Driver Enabled, See Figure 2	-	-	25	mV
$V_{OS}$	Offset Voltage	$R_L = 100\ \Omega$ , Driver Enabled, See Figure 2	1.125	1.23	1.375	V
$\Delta V_{OS}$	Offset Magnitude Change from Differential LOW-to-HIGH	$R_L = 100\ \Omega$ , Driver Enabled, See Figure 2	-	-	25	mV
$I_{OS}$	Short Circuit Output Current	$D_{OUT+} = 0\text{ V}$ & $D_{OUT-} = 0\text{ V}$ , Driver Enabled	-	-3.4	-6	mA
$I_{OS}$	Short Circuit Output Current	$V_{OD} = 0\text{ V}$ , Driver Enabled	-	$\pm 3.4$	$\pm 6$	mA
$I_{IN}$	Input Current (EN, $D_{INX+}$ , $D_{INX-}$ )	$V_{IN} = 0\text{ V}$ to $V_{CC}$ , Other Input = $V_{CC}$ or $0\text{ V}$ (for Differential Inputs)	-	-	$\pm 20$	$\mu\text{A}$
$I_{OFF}$	Power-Off Input or Output Current	$V_{CC} = 0\text{ V}$ , $V_{IN}$ or $V_{OUT} = 0\text{ V}$ to $3.6\text{ V}$	-	-	$\pm 20$	$\mu\text{A}$
$I_{CCZ}$	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, $D_{OUT+} = 0\text{ V}$ to $3.6\text{ V}$ or $D_{OUT-} = 0\text{ V}$ to $3.6\text{ V}$	-	-	$\pm 20$	$\mu\text{A}$
$V_{IC}$	Common Mode Voltage Range	$ V_{ID}  = 100\text{ mV}$ to $V_{CC}$	$0\text{ V} +  V_{ID}  / 2$	-	$V_{CC} - ( V_{ID}  / 2)$	V
$C_{IN}$	Input Capacitance	EN Input	-	2.2	-	pF
		Data Input	-	2.0	-	pF
$C_{OUT}$	Output Capacitance		-	2.6	-	pF

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

# FIN1101

## AC ELECTRICAL CHARACTERISTICS (Over supply voltage and operating temperature ranges, unless otherwise specified)

Symbol	Parameter	Test Conditions	Min	Typ (Note 2)	Max	Unit
$t_{PLHD}$	Differential Propagation Delay LOW-to-HIGH	$R_L = 100 \Omega$ , $C_L = 5 \text{ pF}$ , $V_{ID} = 200 \text{ mV}$ to $450 \text{ mV}$ , $V_{IC} =  V_{ID}  / 2$ to $(V_{CC} - (V_{ID} / 2))$ , Duty Cycle = 50%, See Figure 3 and Figure 4	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%)		0.29	0.40	0.58	ns
$t_{THLD}$	Differential Output Fall Time (80% to 20%)		0.29	0.40	0.58	ns
$t_{SK(P)}$	Pulse Skew $ t_{PLH} - t_{PHL} $		-	0.01	0.2	ns
$t_{SK(PP)}$	Part-to-Part Skew (Note 3)		-	-	0.5	ns
$f_{MAX}$	Maximum Frequency (Note 4) (Note 5)		400	800	-	MHz
$t_{PZH}$	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
$t_{PZH}$	Differential Output Enable Time from Z to LOW		-	2.3	5	ns
$t_{PHZ}$	Differential Output Disable Time from HIGH to Z		-	1.5	5	ns
$t_{PLZ}$	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

- 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.
- $t_{SK(PP)}$  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.
- 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.
- Output loading is transmission line environment only;  $C_L$  is  $< 1 \text{ pF}$  of stray test fixture capacitance.

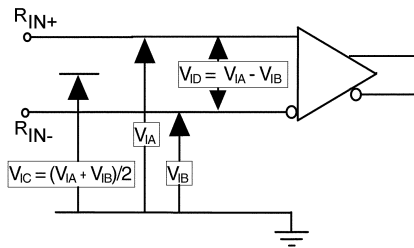


Figure 1. Differential Receiver Voltage Definitions and Propagation I and Transition Time Test Circuit

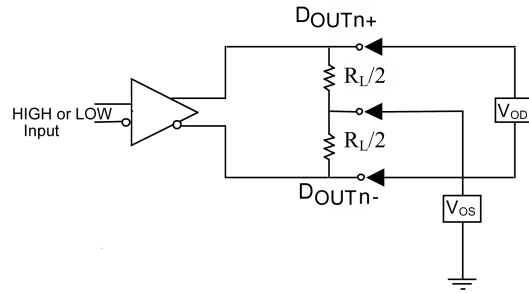
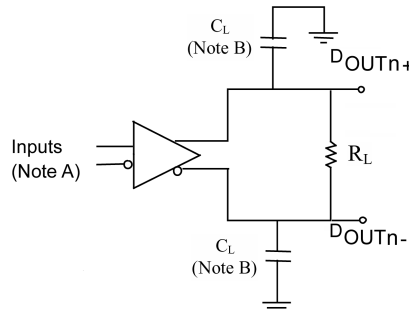


Figure 2. Differential Driver DC Test Circuit



- Note A: All LVDS input pulses have frequency = 10 MHz,  $t_R$  or  $t_F \leq 0.5 \text{ ns}$   
 Note B:  $C_L$  includes all probe and test fixture capacitances

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

# FIN1101

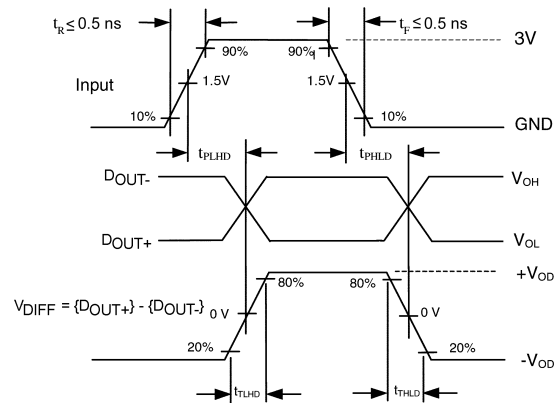
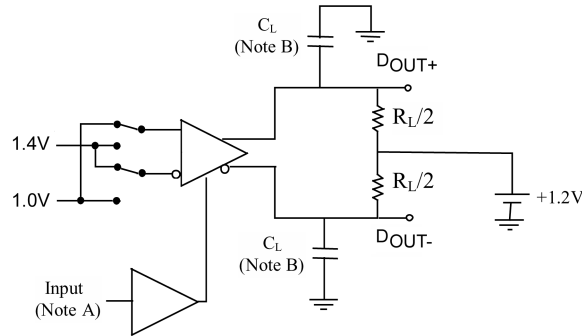


Figure 4. AC Waveforms



Note A: All LVTTTL input pulses have frequency = 10 MHz,  $t_R$  or  $t_F \leq 2$  ns  
 Note B:  $C_L$  includes all probe and test fixture capacitances

Figure 5. Differential Driver Enable and Disable Test Circuit

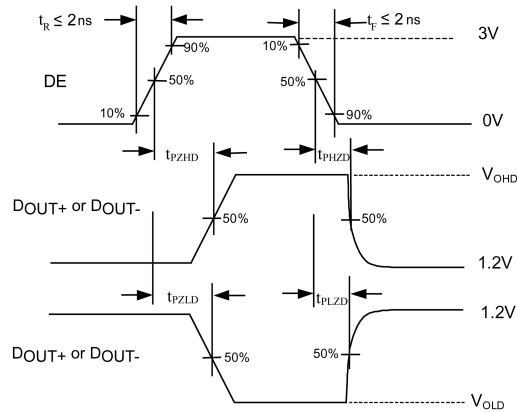


Figure 6. Enable and Disable AC Waveforms

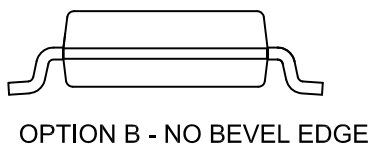
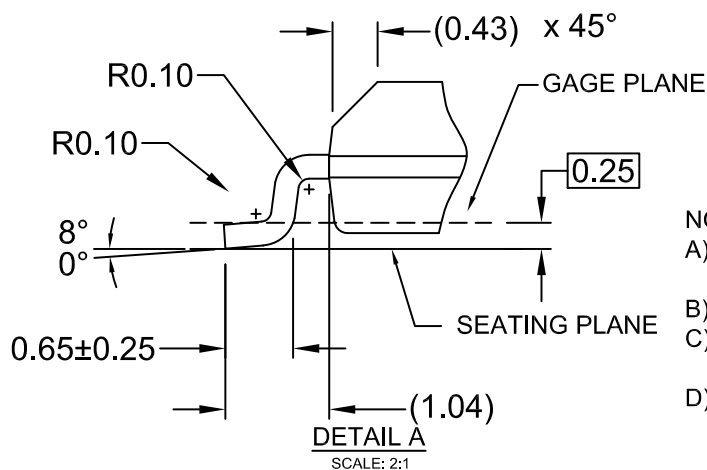
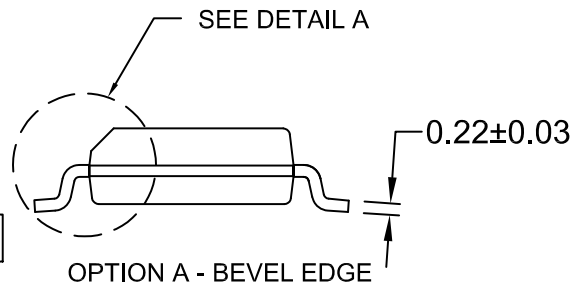
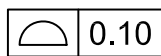
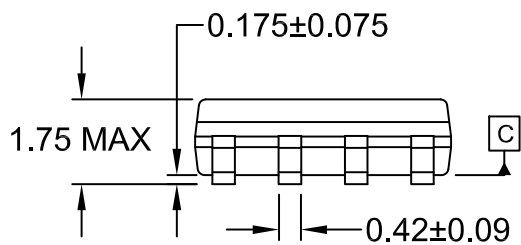
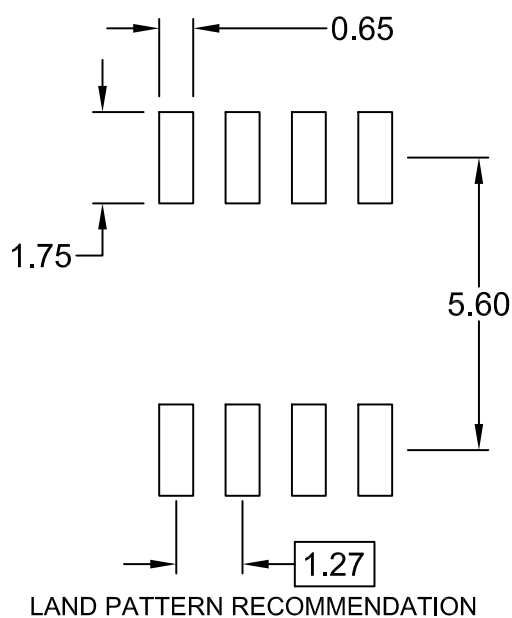
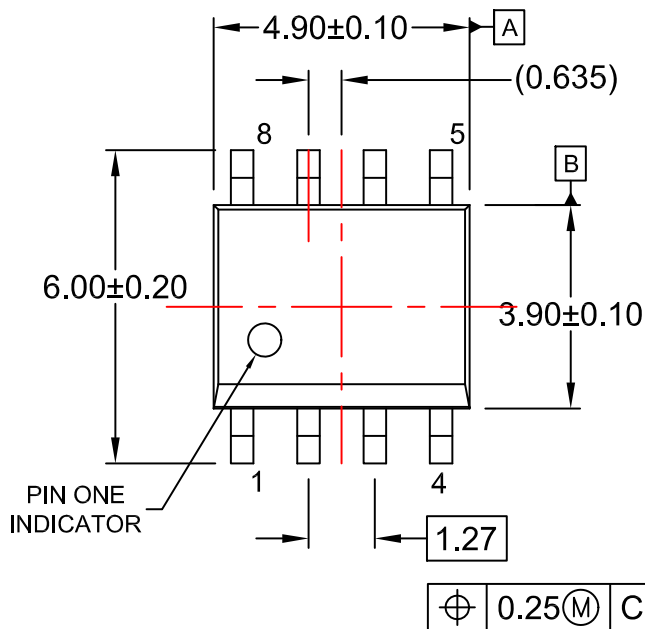
## ORDERING INFORMATION

Order Number	Package Number	Package Description	Shipping†
FIN1101MX	M08A	8-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150" Narrow (Pb-Free)	2500 / Tape & Reel
FIN1101K8X	MAB08A	8-Lead US8, JEDEC MO-187, Variation CA 3.1 mm Wide (Pb-Free)	3000 / Tape & Reel

†For Information On Tape And Reel Specifications, Including Part Orientation And Tape Sizes, Please Refer To Our Tape And Reel Packaging Specifications Brochure, Brd8011/D.

**SOIC8**  
CASE 751EB  
ISSUE A

DATE 24 AUG 2017



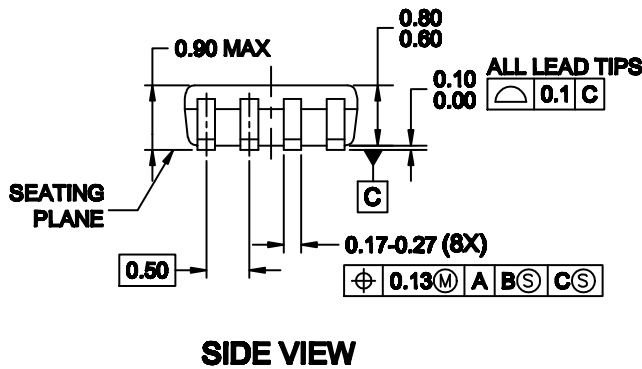
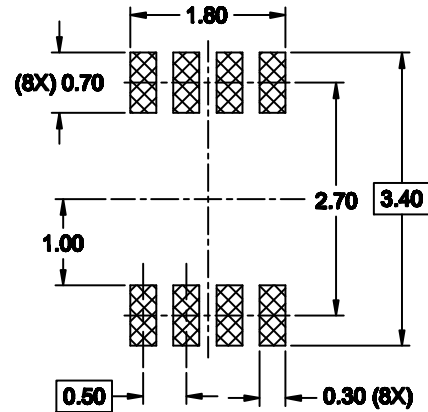
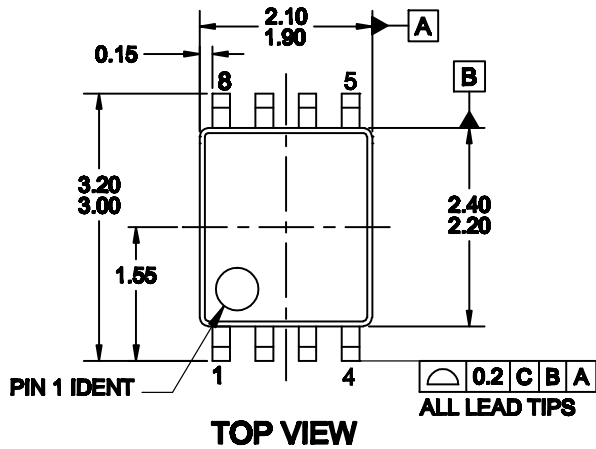
- NOTES:  
 A) THIS PACKAGE CONFORMS TO JEDEC MS-012, VARIATION AA.  
 B) ALL DIMENSIONS ARE IN MILLIMETERS.  
 C) DIMENSIONS DO NOT INCLUDE MOLD FLASH OR BURRS.  
 D) LANDPATTERN STANDARD: SOIC127P600X175-8M

<b>DOCUMENT NUMBER:</b>	<b>98AON13735G</b>	Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red.
<b>DESCRIPTION:</b>	<b>SOIC8</b>	<b>PAGE 1 OF 1</b>

onsemi and ONSEMI are trademarks of Semiconductor Components Industries, LLC dba onsemi or its subsidiaries in the United States and/or other countries. onsemi reserves the right to make changes without further notice to any products herein. onsemi makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does onsemi 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. onsemi does not convey any license under its patent rights nor the rights of others.

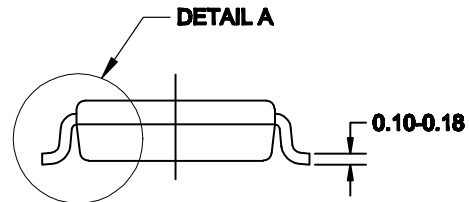
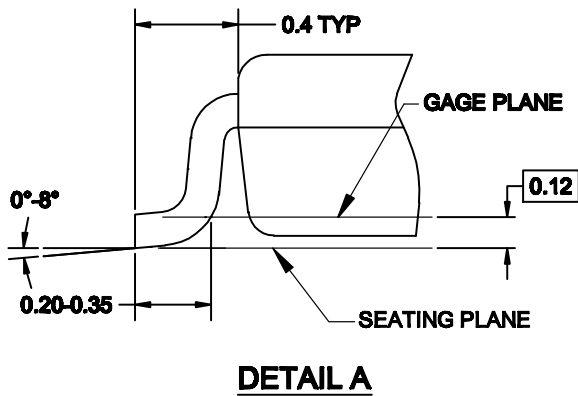
US8  
CASE 846AN  
ISSUE O

DATE 31 DEC 2016



**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, 1994.



DOCUMENT NUMBER:	98AON13778G	Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red.
DESCRIPTION:	US8	PAGE 1 OF 1

onsemi and ONSEMI are trademarks of Semiconductor Components Industries, LLC dba onsemi or its subsidiaries in the United States and/or other countries. onsemi reserves the right to make changes without further notice to any products herein. onsemi makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does onsemi 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. onsemi does not convey any license under its patent rights nor the rights of others.

**onsemi**, **Onsemi**, and other names, marks, and brands are registered and/or common law trademarks of Semiconductor Components Industries, LLC dba "**onsemi**" or its affiliates and/or subsidiaries in the United States and/or other countries. **onsemi** owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of **onsemi**'s product/patent coverage may be accessed at [www.onsemi.com/site/pdf/Patent-Marking.pdf](http://www.onsemi.com/site/pdf/Patent-Marking.pdf). **onsemi** reserves the right to make changes at any time to any products or information herein, without notice. The information herein is provided "as-is" and **onsemi** makes no warranty, representation or guarantee regarding the accuracy of the information, product features, availability, functionality, or suitability of its products for any particular purpose, nor does **onsemi** 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 **onsemi** products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by **onsemi**. "Typical" parameters which may be provided in **onsemi** 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. **onsemi** does not convey any license under any of its intellectual property rights nor the rights of others. **onsemi** 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 **onsemi** products for any such unintended or unauthorized application, Buyer shall indemnify and hold **onsemi** 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 **onsemi** was negligent regarding the design or manufacture of the part. **onsemi** is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

## ADDITIONAL INFORMATION

### TECHNICAL PUBLICATIONS:

Technical Library: [www.onsemi.com/design/resources/technical-documentation](http://www.onsemi.com/design/resources/technical-documentation)  
onsemi Website: [www.onsemi.com](http://www.onsemi.com)

### ONLINE SUPPORT: [www.onsemi.com/support](http://www.onsemi.com/support)

For additional information, please contact your local Sales Representative at [www.onsemi.com/support/sales](http://www.onsemi.com/support/sales)