



**Is Now Part of**



**ON Semiconductor®**

**To learn more about ON Semiconductor, please visit our website at  
[www.onsemi.com](http://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](http://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.

## FIN1017

### 3.3V LVDS, 1-Bit, High-Speed Differential Driver

#### Features

- Greater than 600Mbps Data Rate
- 3.3V Power Supply Operation
- 0.5ns Maximum Differential Pulse Skew
- 1.5ns Maximum Propagation Delay
- Low Power Dissipation
- Power-Off Protection
- Meets or Exceeds the TIA/EIA-644 LVDS Standard
- Flow-Through Pinout Simplifies PCB Layout
- 8-Lead SOIC and US8 Packages Save Space

#### Description

This single driver is designed for high-speed interconnects utilizing Low Voltage Differential Signaling (LVDS) technology. The driver translates LVTTTL signal levels to LVDS levels with a typical differential output swing of 350mV, which provides low EMI at ultra-low power dissipation even at high frequencies. This device is ideal for high-speed transfer of clock or data.

The FIN1017 can be paired with its companion receiver, the FIN1018, or with any other LVDS receiver.

#### Ordering Information

| Part Number | Operating Temperature Range | Package                                                                        | Packing Method |
|-------------|-----------------------------|--------------------------------------------------------------------------------|----------------|
| FIN1017MX   | -40 to +85°C                | 8-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150inch Narrow | Tape and Reel  |
| FIN1017K8X  | -40 to +85°C                | 8-Lead US8, JEDEC MO-187, Variation CA 3.1mm Wide                              | Tape and Reel  |

## Pin Configuration

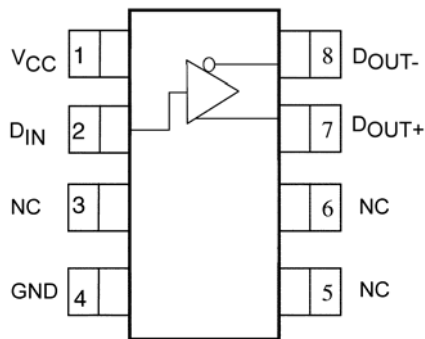


Figure 1. SOIC

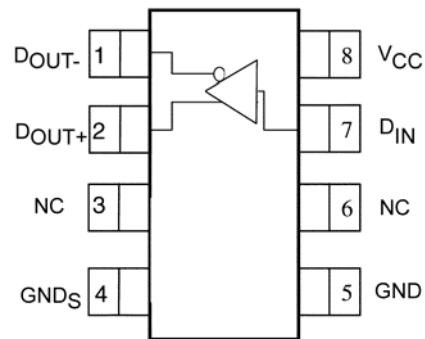


Figure 2. US-8 (Top View)<sup>(1)</sup>

### Note:

1. Ground pins 4 and 5 for optimum performance.

## Pin Definitions

| Pin# US-8 | Pin# SOIC | Name                   | Description                 |
|-----------|-----------|------------------------|-----------------------------|
| 7         | 2         | D <sub>IN</sub>        | LVTTL Data Input            |
| 2         | 7         | D <sub>OUT+</sub>      | Non-inverting Driver Output |
| 1         | 8         | D <sub>OUT-</sub>      | Inverting Driver Output     |
| 8         | 1         | V <sub>CC</sub>        | Power Supply                |
| 4, 5      | 4         | GND / GND <sub>s</sub> | Ground                      |
| 3, 6      | 3, 5, 6   | NC                     | No Connect                  |

## Function Table

| Input           | Outputs           |                   |
|-----------------|-------------------|-------------------|
| D <sub>IN</sub> | D <sub>OUT+</sub> | D <sub>OUT-</sub> |
| LOW             | LOW               | HIGH              |
| HIGH            | HIGH              | LOW               |
| OPEN            | LOW               | HIGH              |

## 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                                | Min. | Max.  | Unit |
|-----------|------------------------------------------|------|-------|------|
| $V_{CC}$  | Supply Voltage                           | -0.5 | +4.6  | V    |
| $D_{IN}$  | DC Input Voltage                         | -0.5 | +6.0  | V    |
| $D_{OUT}$ | DC Output Voltage                        | -0.5 | +4.7  | V    |
| $I_{OSD}$ | Driver Short-Circuit Current, Continuous |      | 10    | mA   |
| $T_{STG}$ | Storage Temperature Range                | -65  | +150  | °C   |
| $T_J$     | Max Junction Temperature                 |      | +150  | °C   |
| $T_L$     | Lead Temperature (Soldering, 10 Seconds) |      | +260  | °C   |
| ESD       | Human Body Model, JESD22-A114            |      | 6500  | V    |
|           | Bus Pins $D_{OUT+}/D_{OUT-}$ to GND      |      | 10500 |      |
|           | Machine Model, JESD22-A115               |      | 350   |      |

## Recommended Operating Conditions

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             | Min. | Max.     | Unit |
|----------|-----------------------|------|----------|------|
| $V_{CC}$ | Supply Voltage        | 3.0  | 3.6      | V    |
| $V_{IN}$ | Input Voltage         | 0    | $V_{CC}$ | V    |
| $T_A$    | Operating Temperature | -40  | +85      | °C   |

## DC Electrical Characteristics

Over-supply voltage and operating temperature ranges, unless otherwise specified. All typical values are at  $T_A = 25^\circ\text{C}$  and with  $V_{CC} = 3.3\text{V}$ .

| Symbol          | Parameter                                               | Conditions                                                    | Min.  | Typ.  | Max.     | Units |
|-----------------|---------------------------------------------------------|---------------------------------------------------------------|-------|-------|----------|-------|
| $V_{OD}$        | Output Differential Voltage                             | $R_L = 100\ \Omega$ , See Figure 3                            | 250   | 350   | 450      | mV    |
| $\Delta V_{OD}$ | $V_{OD}$ Magnitude Change from Differential LOW-to-HIGH |                                                               |       |       | 25       | mV    |
| $V_{OS}$        | Offset Voltage                                          |                                                               | 1.125 | 1.250 | 1.375    | V     |
| $\Delta V_{OS}$ | Offset Magnitude Change from Differential LOW-to-HIGH   |                                                               |       |       | 25       | mV    |
| $I_{OFF}$       | Power-Off Output Current                                | $V_{CC} = 0\text{V}$ , $V_{OUT} = 0\text{V}$ or $3.6\text{V}$ |       |       | $\pm 20$ | mA    |
| $I_{OS}$        | Short-Circuit Output Current                            | $V_{OUT} = 0\text{V}$                                         |       |       | -8       | mA    |
|                 |                                                         | $V_{OD} = 0\text{V}$                                          |       |       | $\pm 8$  |       |
| $V_{IH}$        | Input HIGH Voltage                                      |                                                               | 2     |       | $V_{CC}$ | V     |
| $V_{IL}$        | Input LOW Voltage                                       |                                                               | GND   |       | 0.8      | V     |
| $I_{IN}$        | Input Current                                           | $V_{IN} = 0\text{V}$ or $V_{CC}$                              |       |       | $\pm 20$ | mA    |
| $I_{I(OFF)}$    | Power-Off Input Current                                 | $V_{CC} = 0\text{V}$ , $V_{IN} = 0\text{V}$ or $3.6\text{V}$  |       |       | $\pm 20$ | mA    |
| $V_{IK}$        | Input Clamp Voltage                                     | $I_{IK} = -18\text{mA}$                                       | -1.5  |       |          | V     |
| $I_{CC}$        | Power Supply Current                                    | No Load, $V_{IN} = 0\text{V}$ or $V_{CC}$                     |       |       | 8        | mA    |
|                 |                                                         | $R_L = 100\ \Omega$ , $V_{IN} = 0\text{V}$ or $V_{CC}$        |       |       | 10       | mA    |
| $C_{IN}$        | Input Capacitance                                       |                                                               |       | 4     |          | pF    |
| $C_{OUT}$       | Output Capacitance                                      |                                                               |       | 6     |          | pF    |

## AC Electrical Characteristics

Over-supply voltage and operating temperature ranges, unless otherwise specified. All typical values are at  $T_A = 25^\circ\text{C}$  and with  $V_{CC} = 3.3\text{V}$ .

| Symbol       | Parameter                                   | Test Conditions                                                          | Min. | Max. | Units |
|--------------|---------------------------------------------|--------------------------------------------------------------------------|------|------|-------|
| $t_{PLHD}$   | Differential Propagation Delay, LOW-to-HIGH | $R_L = 100\ \Omega$ , $C_L = 10\text{pF}$ ,<br>see Figure 4 and Figure 5 | 0.5  | 1.5  | ns    |
| $t_{PHLD}$   | Differential Propagation Delay, HIGH-to-LOW |                                                                          | 0.5  | 1.5  | ns    |
| $t_{TLHD}$   | Differential Output Rise Time (20% to 80%)  |                                                                          | 0.4  | 1.0  | ns    |
| $t_{THLD}$   | Differential Output Fall Time (80% to 20%)  |                                                                          | 0.4  | 1.0  | ns    |
| $t_{SK(P)}$  | Pulse Skew $ t_{PLH} - t_{PHL} $            |                                                                          |      | 0.5  | ns    |
| $t_{SK(PP)}$ | Part-to-Part Skew <sup>(2)</sup>            |                                                                          |      | 1.0  | ns    |

**Note:**

- $t_{SK(PP)}$  is the magnitude of the difference in propagation delay times between any specified terminals 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.

## Test Diagrams

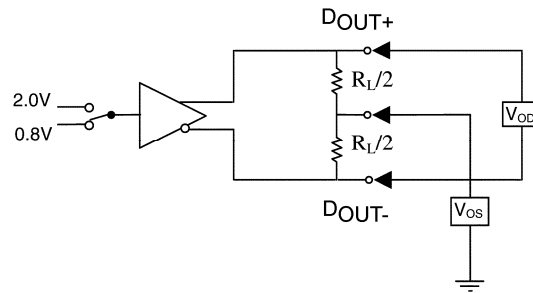


Figure 3. Differential Driver DC Test Circuit

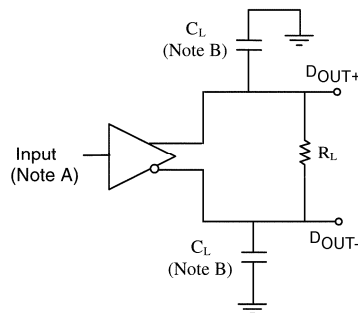


Figure 4. Differential Driver Propagation Delay and Transition Time Test Circuit

### Notes:

Note A: All input pulses have frequency = 10MHz,  $t_R$  or  $t_F$  = 2ns.

Note B:  $C_L$  includes all probe and fixture capacitances.

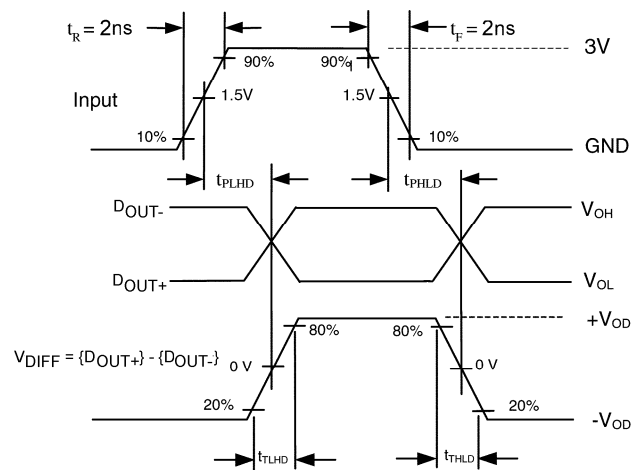


Figure 5. AC Waveforms

## Typical Performance Characteristics

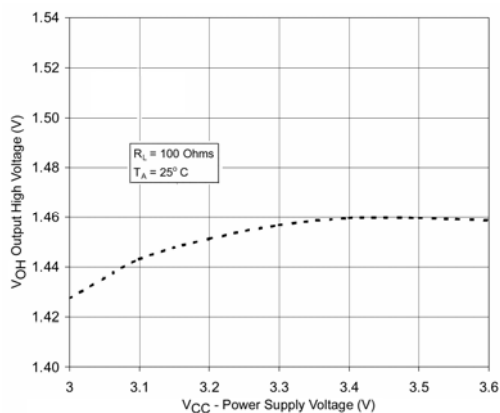


Figure 6. Output High Voltage vs. Power Supply Voltage

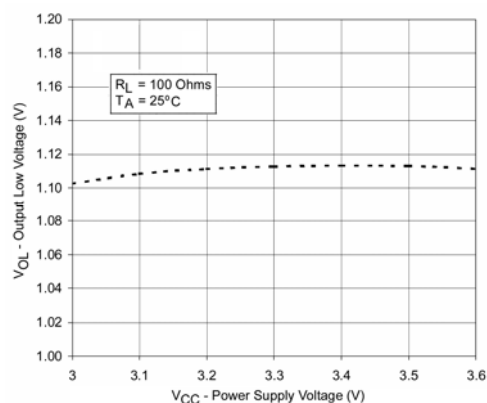


Figure 7. Output Low Voltage vs. Power Supply Voltage

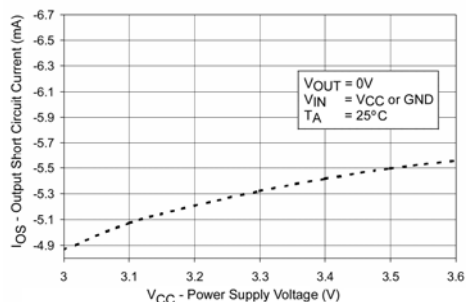


Figure 8. Output Short Circuit Current vs. Power Supply Voltage

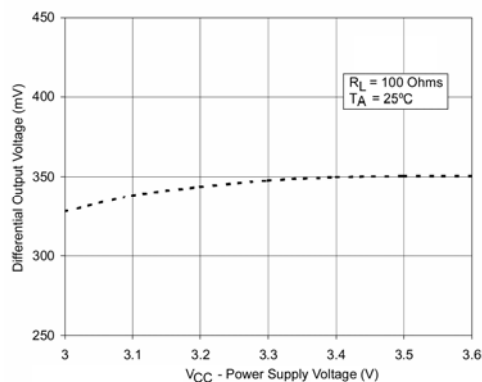


Figure 9. Differential Output Voltage vs. Power Supply Voltage

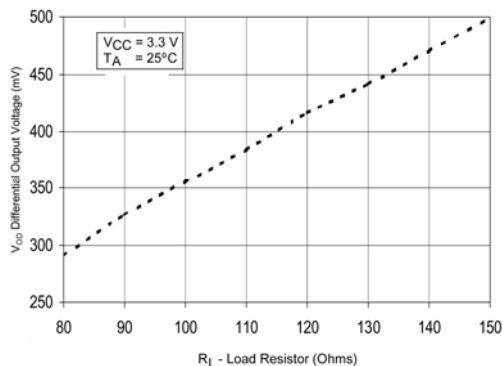


Figure 10. Differential Output Voltage vs. Load Resistor

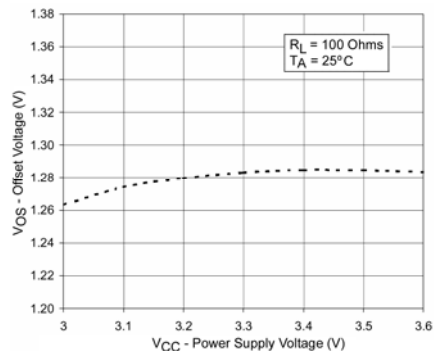


Figure 11. Offset Voltage vs. Power Supply Voltage

## Typical Performance Characteristics

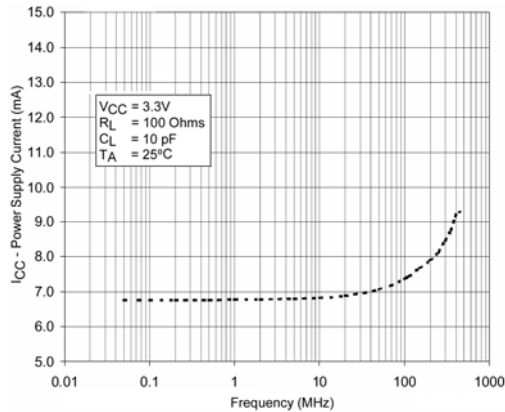


Figure 12. Power Supply Current vs. Frequency

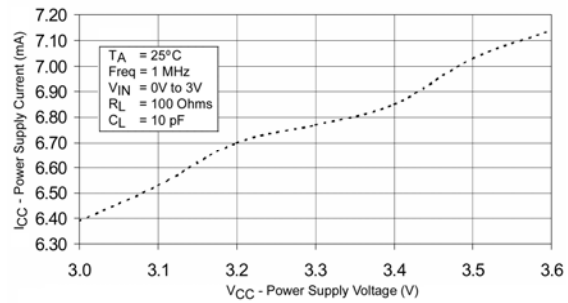


Figure 13. Power Supply Current vs. Power Supply Voltage

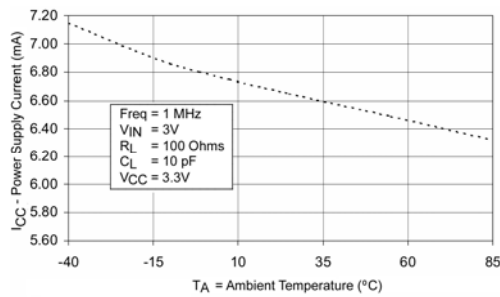


Figure 14. Power Supply Current vs. Ambient Temperature

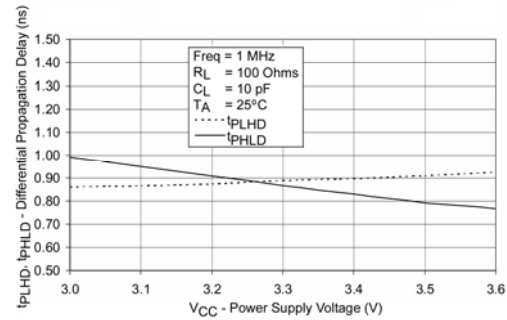


Figure 15. Differential Propagation Delay vs. Power Supply

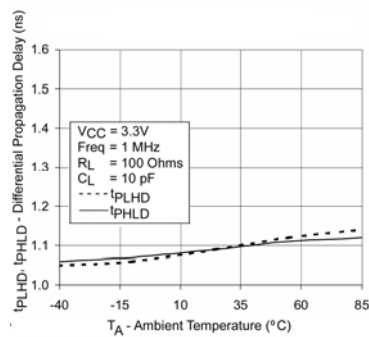


Figure 16. Differential Propagation Delay vs. Ambient Temperature

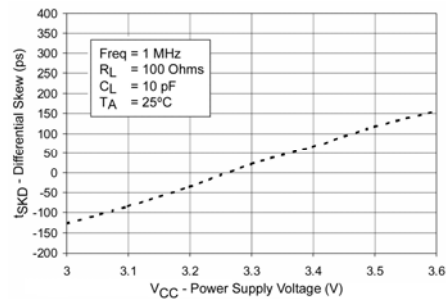


Figure 17. Differential Pulse Skew ( $t_{PLH} - t_{PHL}$ ) vs. Power Supply Voltage



## Typical Performance Characteristics

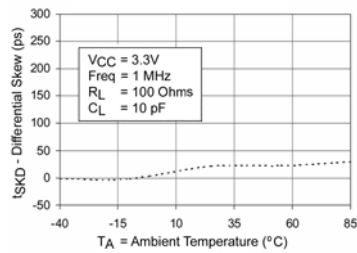


Figure 18. Differential Pulse Skew ( $t_{PLH} - t_{PHL}$ ) vs. Ambient Temperature

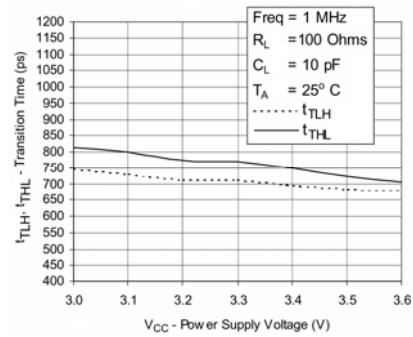


Figure 19. Transition Time vs. Power Supply Voltage

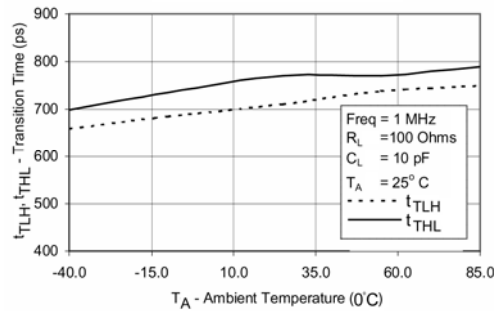
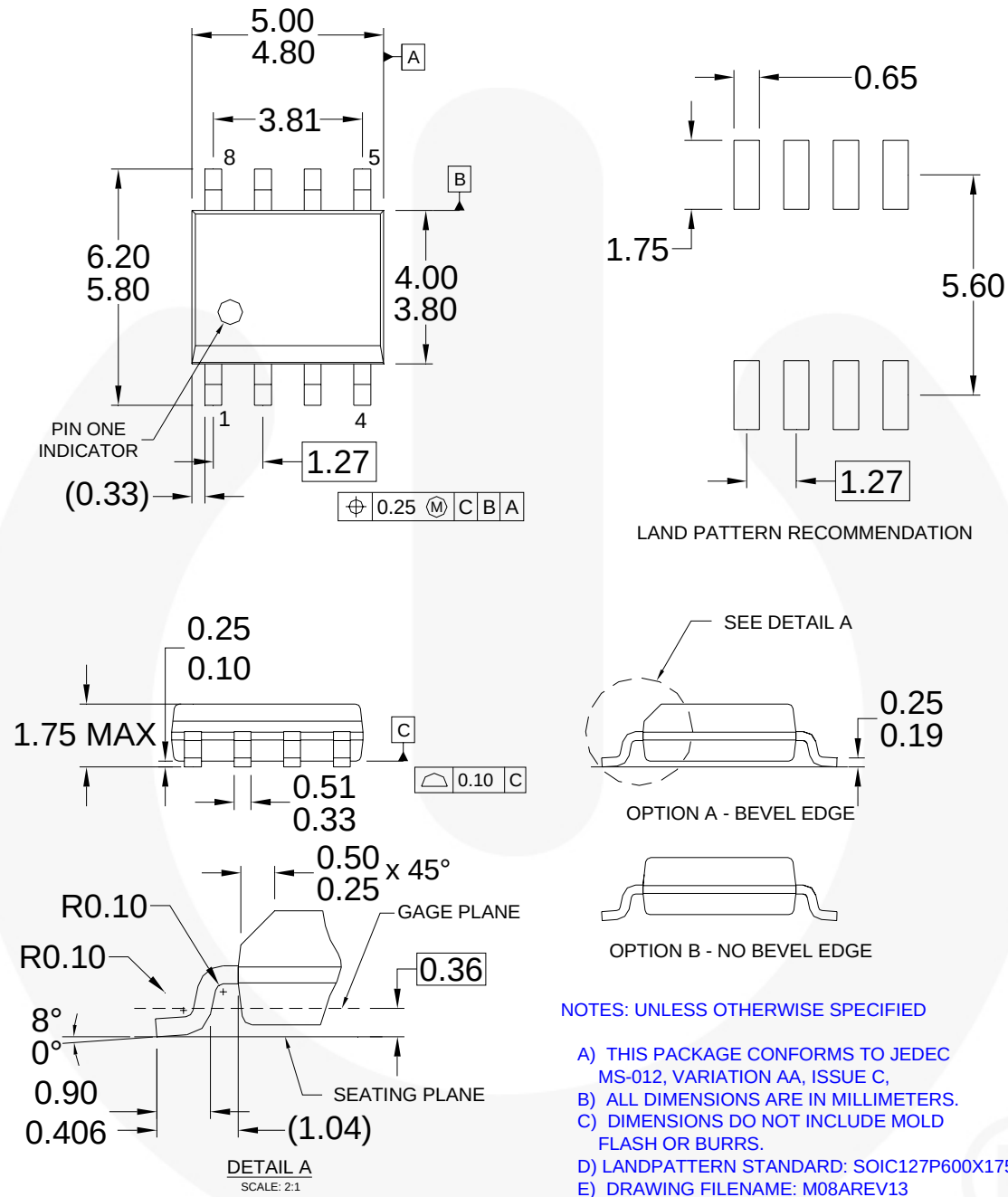


Figure 20. Transition Time vs. Ambient Temperature

# Physical Dimensions

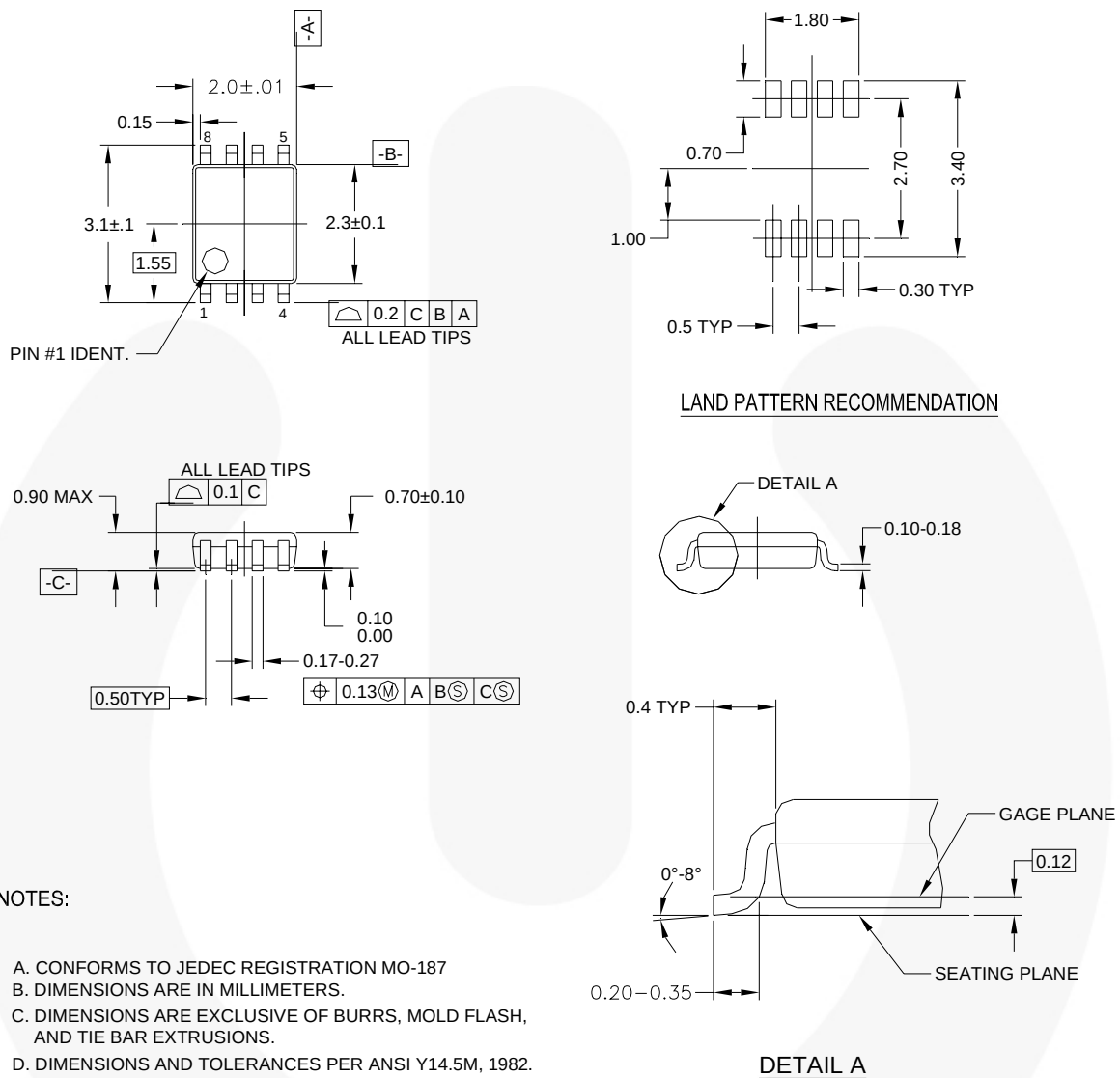


**Figure 21. 8-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150inch Narrow**

Package drawings are provided as a service to customers considering Fairchild components. Drawings may change in any manner without notice. Please note the revision and/or date on the drawing and contact a Fairchild Semiconductor representative to verify or obtain the most recent revision. Package specifications do not expand the terms of Fairchild's worldwide terms and conditions, specifically the warranty therein, which covers Fairchild products.

Always visit Fairchild Semiconductor's online packaging area for the most recent package drawings:  
<http://www.fairchildsemi.com/packaging/>

## Physical Dimensions



MAB08AREVC

Figure 22. 8-Lead US8, JEDEC MO-187, Variation CA 3.1mm Wide

Package drawings are provided as a service to customers considering Fairchild components. Drawings may change in any manner without notice. Please note the revision and/or date on the drawing and contact a Fairchild Semiconductor representative to verify or obtain the most recent revision. Package specifications do not expand the terms of Fairchild's worldwide terms and conditions, specifically the warranty therein, which covers Fairchild products.

Always visit Fairchild Semiconductor's online packaging area for the most recent package drawings:  
<http://www.fairchildsemi.com/packaging/>



## TRADEMARKS

The following includes registered and unregistered trademarks and service marks, owned by Fairchild Semiconductor and/or its global subsidiaries, and is not intended to be an exhaustive list of all such trademarks.

AccuPower™  
Auto-SPM™  
Build it Now™  
CorePLUS™  
CorePOWER™  
CROSSVOLT™  
CTL™  
Current Transfer Logic™  
DEUXPEED®  
Dual Cool™  
EcoSPARK®  
EfficientMax™  
ESBC™  
f®  
Fairchild®  
Fairchild Semiconductor®  
FACT Quiet Series™  
FACT®  
FAST®  
FastvCore™  
FETBench™  
FlashWriter®  
FPS™

F-PFS™  
FRFET®  
Global Power Resource™  
Green FPS™  
Green FPS™ e-Series™  
Gmax™  
GTO™  
IntelliMAX™  
ISOPLANAR™  
MegaBuck™  
MICROCOUPLER™  
MicroFET™  
MicroPak™  
MicroPak2™  
MillerDrive™  
MotionMax™  
Motion-SPM™  
OptoHIT™  
OPTOLOGIC®  
OPTOPLANAR®  
PDP SPM™

Power-SPM™  
PowerTrench®  
PowerXS™  
Programmable Active Droop™  
QFET®  
QST™  
Quiet Series™  
RapidConfigure™  
Saving our world, 1mW/W/kW at a time™  
SignalWise™  
SmartMax™  
SMART START™  
SPM®  
STEALTH™  
SuperFET™  
SuperSOT™.3  
SuperSOT™.6  
SuperSOT™.8  
SupreMOS®  
SyncFET™  
Sync-Lock™

SYSTEM GENERAL®  
The Power Franchise®  
the power franchise  
TinyBoost™  
TinyBuck™  
TinyCalc™  
TinyLogic®  
TINYOPTO™  
TinyPower™  
TinyPWM™  
TinyWire™  
TriFault Detect™  
TRUECURRENT™\*  
µSerDes™  
UHC®  
Ultra FRFET™  
UniFET™  
VCX™  
VisualMax™  
XST™

\* Trademarks of System General Corporation, used under license by Fairchild Semiconductor.

## DISCLAIMER

FAIRCHILD SEMICONDUCTOR RESERVES THE RIGHT TO MAKE CHANGES WITHOUT FURTHER NOTICE TO ANY PRODUCTS HEREIN TO IMPROVE RELIABILITY, FUNCTION, OR DESIGN. FAIRCHILD DOES NOT ASSUME ANY LIABILITY ARISING OUT OF THE APPLICATION OR USE OF ANY PRODUCT OR CIRCUIT DESCRIBED HEREIN; NEITHER DOES IT CONVEY ANY LICENSE UNDER ITS PATENT RIGHTS, NOR THE RIGHTS OF OTHERS. THESE SPECIFICATIONS DO NOT EXPAND THE TERMS OF FAIRCHILD'S WORLDWIDE TERMS AND CONDITIONS, SPECIFICALLY THE WARRANTY THEREIN, WHICH COVERS THESE PRODUCTS.

## 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 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 of 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.

## ANTI-COUNTERFEITING POLICY

Fairchild Semiconductor Corporation's Anti-Counterfeiting Policy. Fairchild's Anti-Counterfeiting Policy is also stated on our external website, [www.fairchildsemi.com](http://www.fairchildsemi.com), under Sales Support.

Counterfeiting of semiconductor parts is a growing problem in the industry. All manufacturers of semiconductor products are experiencing counterfeiting of their parts. Customers who inadvertently purchase counterfeit parts experience many problems such as loss of brand reputation, substandard performance, failed applications, and increased cost of production and manufacturing delays. Fairchild is taking strong measures to protect ourselves and our customers from the proliferation of counterfeit parts. Fairchild strongly encourages customers to purchase Fairchild parts either directly from Fairchild or from Authorized Fairchild Distributors who are listed by country on our web page cited above. Products customers buy either from Fairchild directly or from Authorized Fairchild Distributors are genuine parts, have full traceability, meet Fairchild's quality standards for handling and storage and provide access to Fairchild's full range of up-to-date technical and product information. Fairchild and our Authorized Distributors will stand behind all warranties and will appropriately address any warranty issues that may arise. Fairchild will not provide any warranty coverage or other assistance for parts bought from Unauthorized Sources. Fairchild is committed to combat this global problem and encourage our customers to do their part in stopping this practice by buying direct or from authorized distributors.

## PRODUCT STATUS DEFINITIONS

### Definition of Terms

| Datasheet Identification | Product Status        | Definition                                                                                                                                                                                          |
|--------------------------|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Advance Information      | Formative / In Design | Datasheet contains the design specifications for product development. Specifications may change in any manner without notice.                                                                       |
| Preliminary              | First Production      | Datasheet contains preliminary data; supplementary data will be published at a later date. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve design. |
| No Identification Needed | Full Production       | Datasheet contains final specifications. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve the design.                                               |
| Obsolete                 | Not In Production     | Datasheet contains specifications on a product that is discontinued by Fairchild Semiconductor. The datasheet is for reference information only.                                                    |

Rev. 149

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](http://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](mailto: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](http://www.onsemi.com)

**Order Literature:** <http://www.onsemi.com/orderlit>

For additional information, please contact your local  
Sales Representative