October 2008

FIN1027 / FIN1027A — 3.3V LVDS, 2-Bit, High-Speed, Differential Driver

Features

- Greater than 600Mbs Data Rate
- 3V Power Supply Operation
- 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

Description

This dual driver is designed for high-speed interconnects utilizing Low Voltage Differential Signaling (LVDS) technology. The driver translates LVTTL 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 FIN1027 or FIN1027A can be paired with its companion receiver, the FIN1028, or with any other LVDS receiver.

Ordering Information

Part Number	Operating Temperature Range	Eco Status	Package	Packing Method
FIN1027M	-40 to +85°C	RoHS	8-Lead Small Outline Package (SOIC) JEDEC MS-012, 0.150 inch Narrow	Trays
FIN1027MX	-40 to +85°C	RoHS	8-Lead Small Outline Package (SOIC) JEDEC MS-012, 0.150 inch Narrow	Tape and Reel
FIN1027K8X	-40 to +85°C	Green	8-Lead US8, JEDEC MO-187, Variation CA 3.1mm Wide	Tape and Reel
FIN1027AM	-40 to +85°C	RoHS	8-Lead Small Outline Package (SOIC) JEDEC MS-012, 0.150 inch Narrow	Trays
FIN1027AMX	-40 to +85°C	RoHS	8-Lead Small Outline Package (SOIC) JEDEC MS-012, 0.150 inch Narrow	Tape and Reel

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Pin Configuration

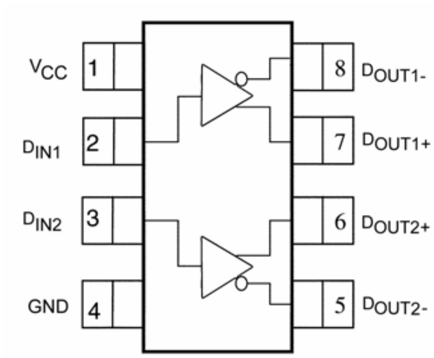


Figure 1. FIN1027 SOIC Pin Assignment (Top View)

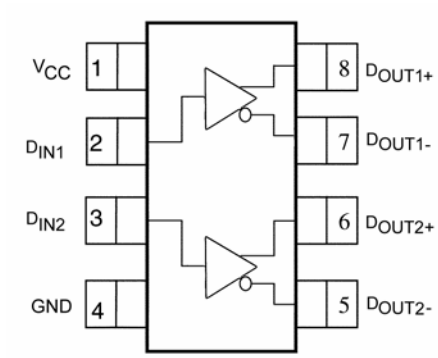


Figure 2. FIN1027A SOIC Pin Assignment (Top View)

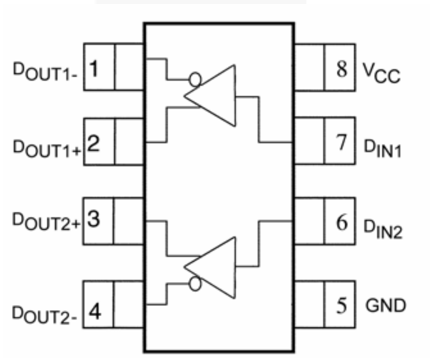


Figure 3. FIN1027 US8 Pin Assignment (Top View)

Pin Definitions

Name	Pin # FIN1027 SOIC	Pin # FIN1027A SOIC	Pin # FIN1027 US8	Description
V_{CC}	1	1	8	Power Supply
D_{IN1}	2	2	7	LVTTL Data Input
D_{IN2}	3	3	6	LVTTL Data Input
GND	4	4	5	Ground
D_{OUT2-}	5	5	4	Inverting Driver Output
D_{OUT2+}	6	6	3	Non-Inverting Driver Output
D_{OUT1+}	7	8	2	Non-Inverting Driver Output
D_{OUT1-}	8	7	1	Inverting Driver Output

Function Table

Input	Outputs	
D_{IN}	D_{OUT+}	D_{OUT-}
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		mA
T_{STG}	Storage Temperature Range	-65	+150	°C
T_J	Maximum Junction Temperature		+150	°C
T_L	Lead Temperature, Soldering, 10 Seconds		+260	°C
ESD	Human Body Model, JESD22-A114		≥6500	V
	Machine Model, JESD22-A115		≥400	

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

All typical values are at T_A = 25°C and V_{CC} = 3.3V. Over-supply voltage and operating temperature ranges, unless otherwise noted.

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
V_{OD}	Output Differential Voltage	R_L = 100Ω, Figure 4	250	350	450	mV
ΔV_{OD}	V_{OD} Magnitude Change from Differential LOW-to-HIGH				25	mV
V_{OS}	Offset Voltage		1.125	1.250	1.375	V
ΔV_{OS}	Offset Magnitude Change from Differential LOW-to-HIGH				25	mV
I_{OFF}	Power-Off Output current	V_{CC} = 0V, V_{OUT} = 0V or 3.6V			±20	µA
I_{OS}	Short-Circuit Output Current	V_{OUT} = 0V			-8	mA
		V_{OD} = 0V			±8	
V_{IH}	Input HIGH Voltage		2.0		V_{CC}	V
V_{IL}	Input LOW Voltage		GND		0.8	V
I_{IN}	Input Current	V_{IN} = 0V or V_{CC}			±20	µA
$I_{I(OFF)}$	Power-Off Input Current	V_{CC} = 0V, V_{IN} = 0V or 3.6V			±20	µA
V_{IK}	Input Clamp Voltage	I_{IK} = -18mA	-1.5			V
I_{CC}	Power Supply Current	No Load, V_{IN} = 0V or V_{CC}			12.5	mA
		R_L = 100Ω, V_{IN} = 0V or V_{CC}			17.0	mA
C_{IN}	Input Capacitance			4		pF
C_{OUT}	Output Capacitance			6		pF

AC Electrical Characteristics

All typical values are at T_A = 25°C and V_{CC} = 3.3V. Over-supply voltage and operating temperature ranges, unless otherwise noted.

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
t_{PLHD}	Differential Propagation Delay, LOW-to-HIGH	R_L = 100Ω, C_L = 10pF, Figure 5, Figure 6	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 $\lvert t_{PLH} - t_{PHL} \rvert$				0.5	ns
$t_{SK(LH)}$, $t_{SK(HL)}$	Channel-to-Channel Skew[1]				0.3	ns
$t_{SK(PP)}$	Part-to-Part Skew[2]				1.0	ns

Notes:

1. $t_{SK(LH)}$, $t_{SK(HL)}$ is the skew between specified outputs of a single device when the outputs have identical loads and are switching in the same direction.
2. $t_{SK(PP)}$ 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

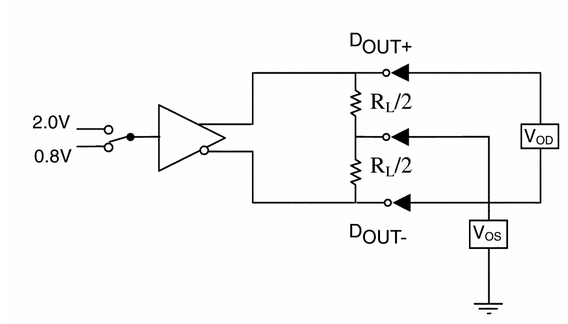
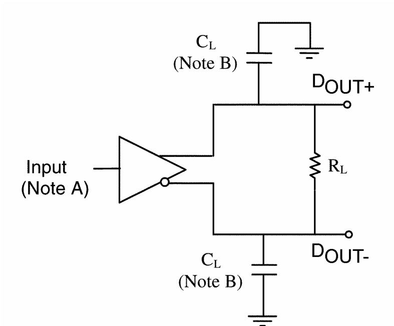


Figure 4. Differential Driver DC Test Circuit



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. Differential Driver Propagation Delay and Transition Time Test Circuit

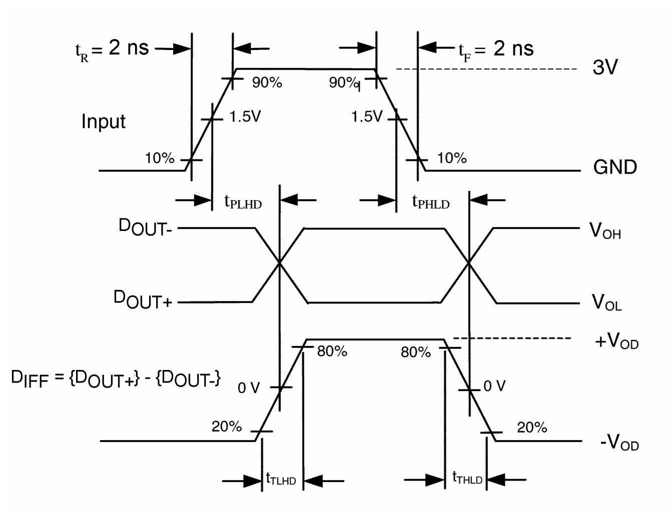


Figure 6. AC Waveforms

Typical Performance Characteristics

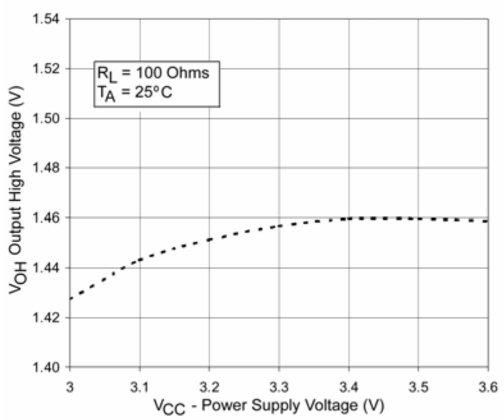


Figure 7. Output High Voltage vs. Power Supply Voltage

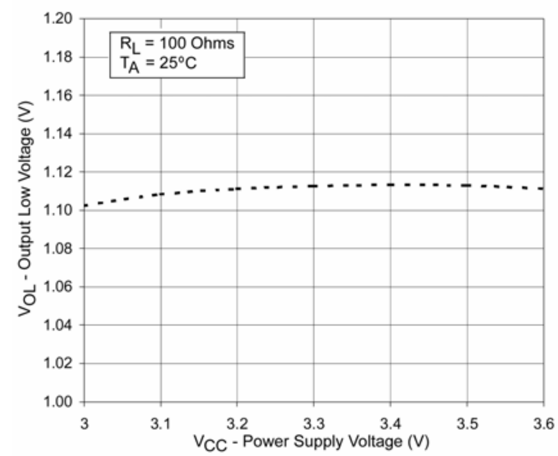


Figure 8. Output Low Voltage vs. Power Supply Voltage

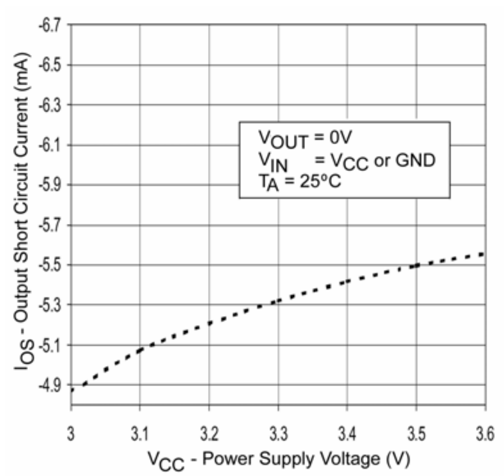


Figure 9. Output Short Circuit Current vs. Power Supply Voltage

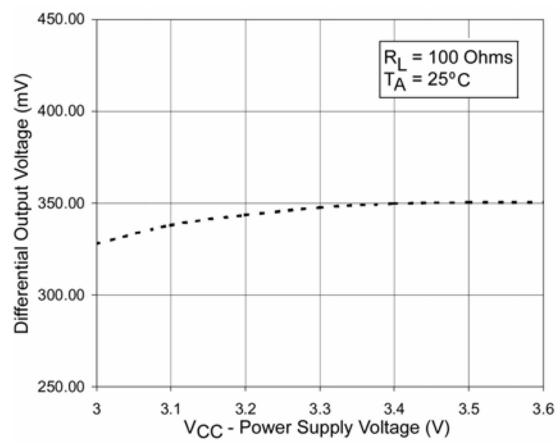


Figure 10. Differential Output Voltage vs. Power Supply Voltage

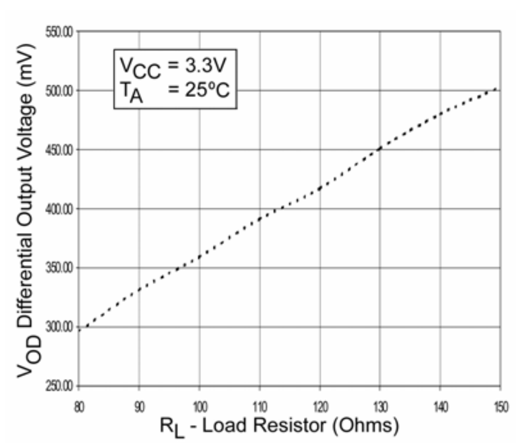


Figure 11. Differential Output Voltage vs. Load Resistor

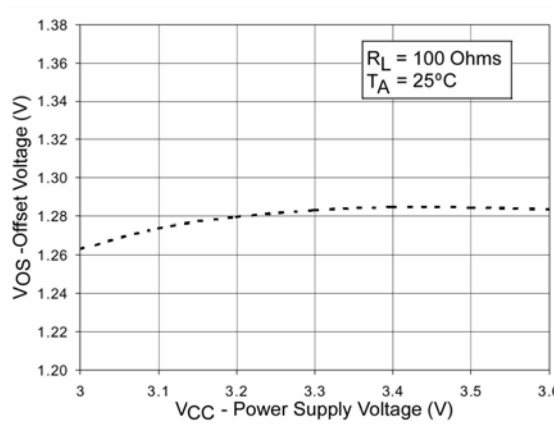


Figure 12. Offset Voltage vs. Power Supply Voltage

Typical Performance Characteristics (Continued)

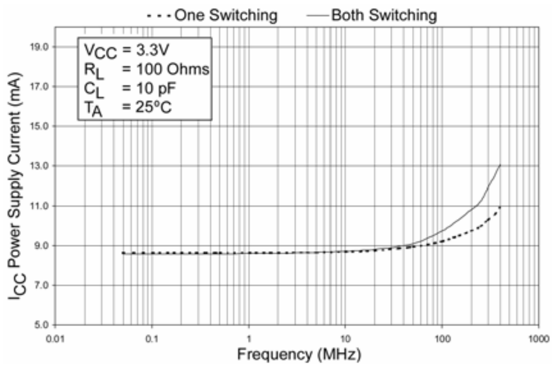


Figure 13. Power Supply Current vs. Frequency

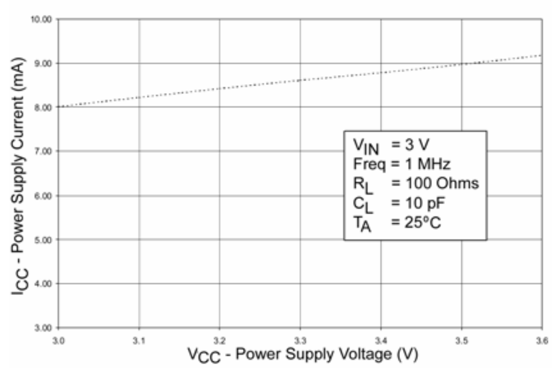


Figure 14. Power Supply Current vs. Power Supply Voltage

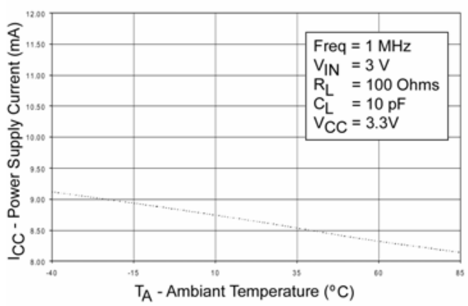


Figure 15. Power Supply Current vs. Ambient Temperature

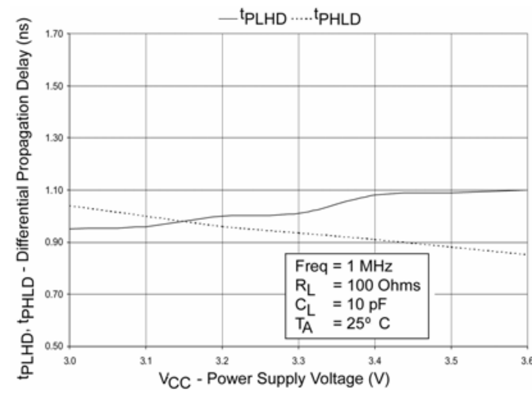


Figure 16. Differential Propagation Delay vs. Power Supply

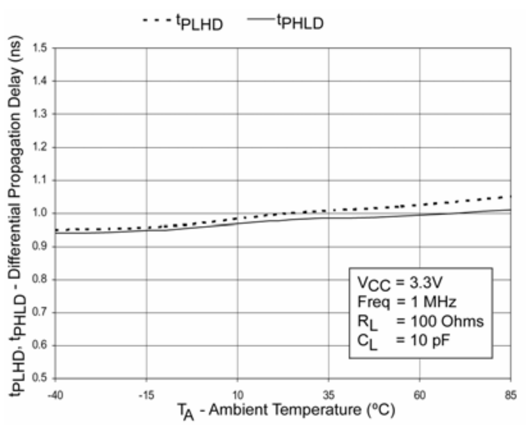


Figure 17. Differential Propagation Delay vs. Ambient Temperature

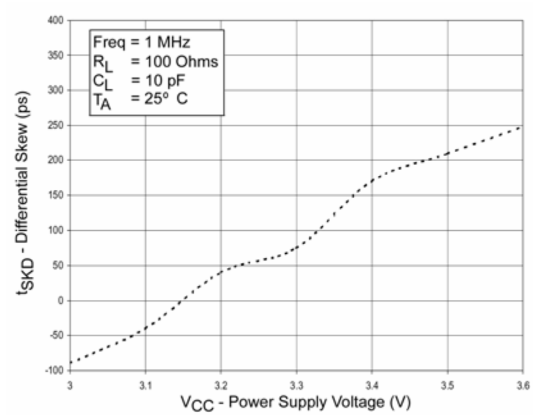


Figure 18. Differential Skew (t_{PLH}-t_{PHL}) vs. Power Supply

Typical Performance Characteristics (Continued)

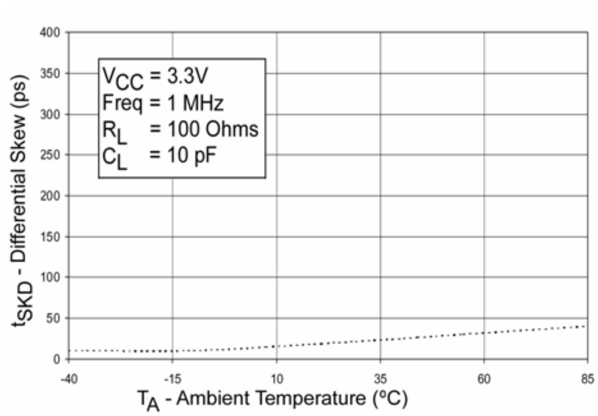


Figure 19. Differential Pulse Skew (t_{PLH}-t_{PHL})

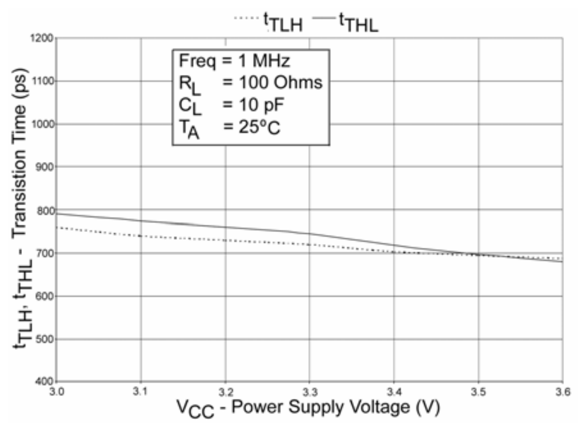


Figure 20. Transition Time vs. Power Supply Voltage

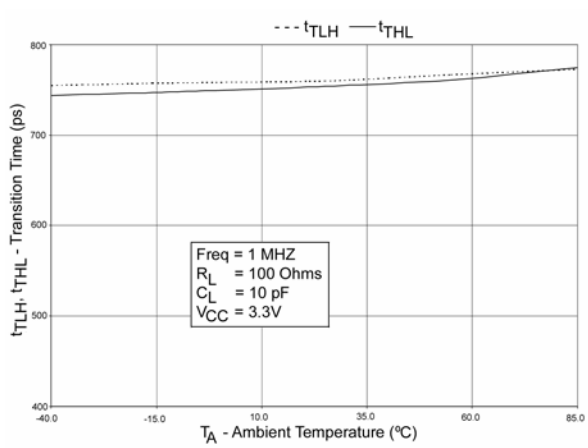


Figure 21. Transition Time vs. Ambient Temperature

Physical Dimensions

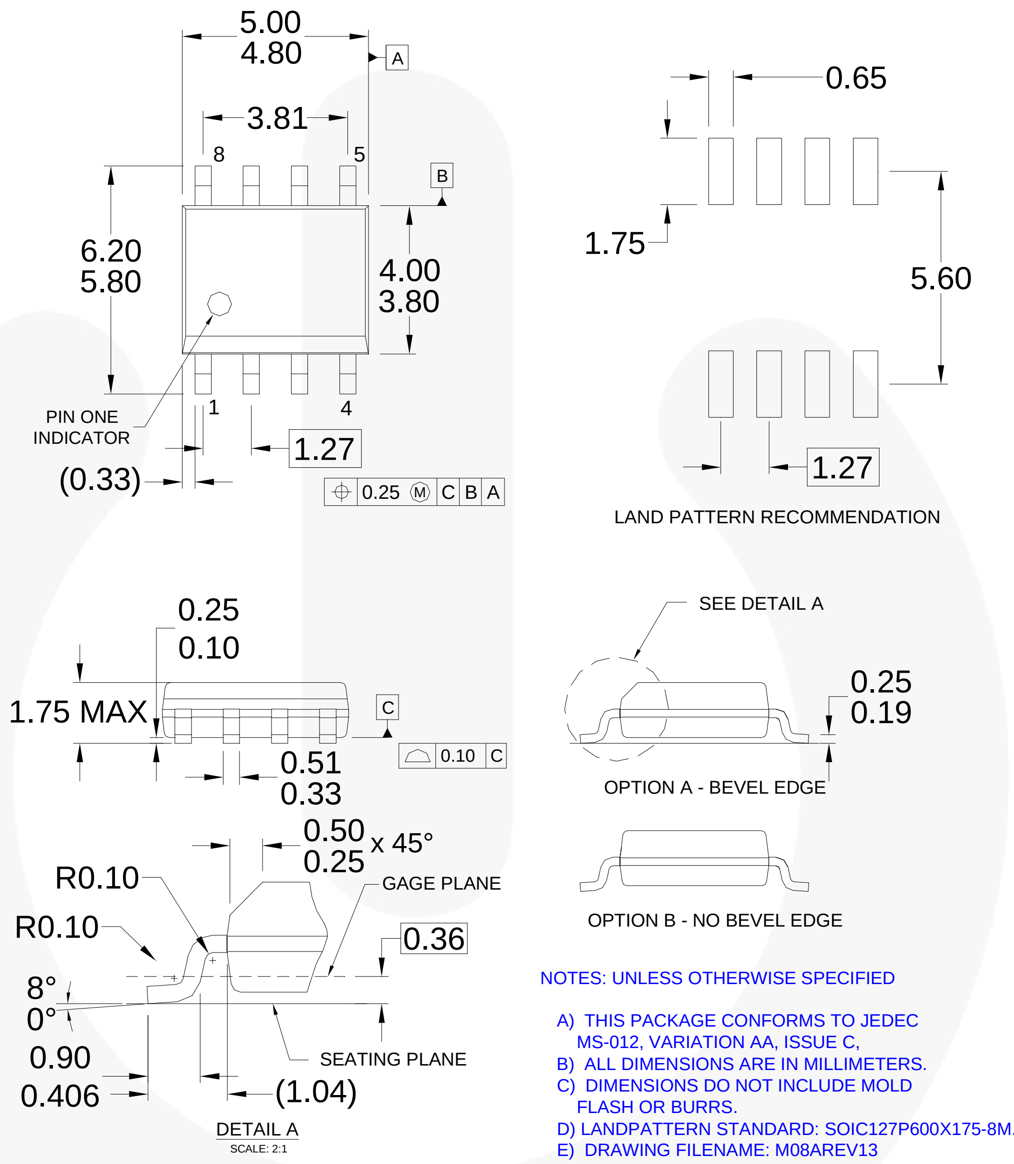


Figure 22. 8-Lead, Small Outline Package (SOIC), JEDEC MS-012, 0.150-inch, Narrow Body

Click here for tape and reel specifications, available at:

http://www.fairchildsemi.com/products/discrete/pdf/soic8_tr.pdf

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Physical Dimensions

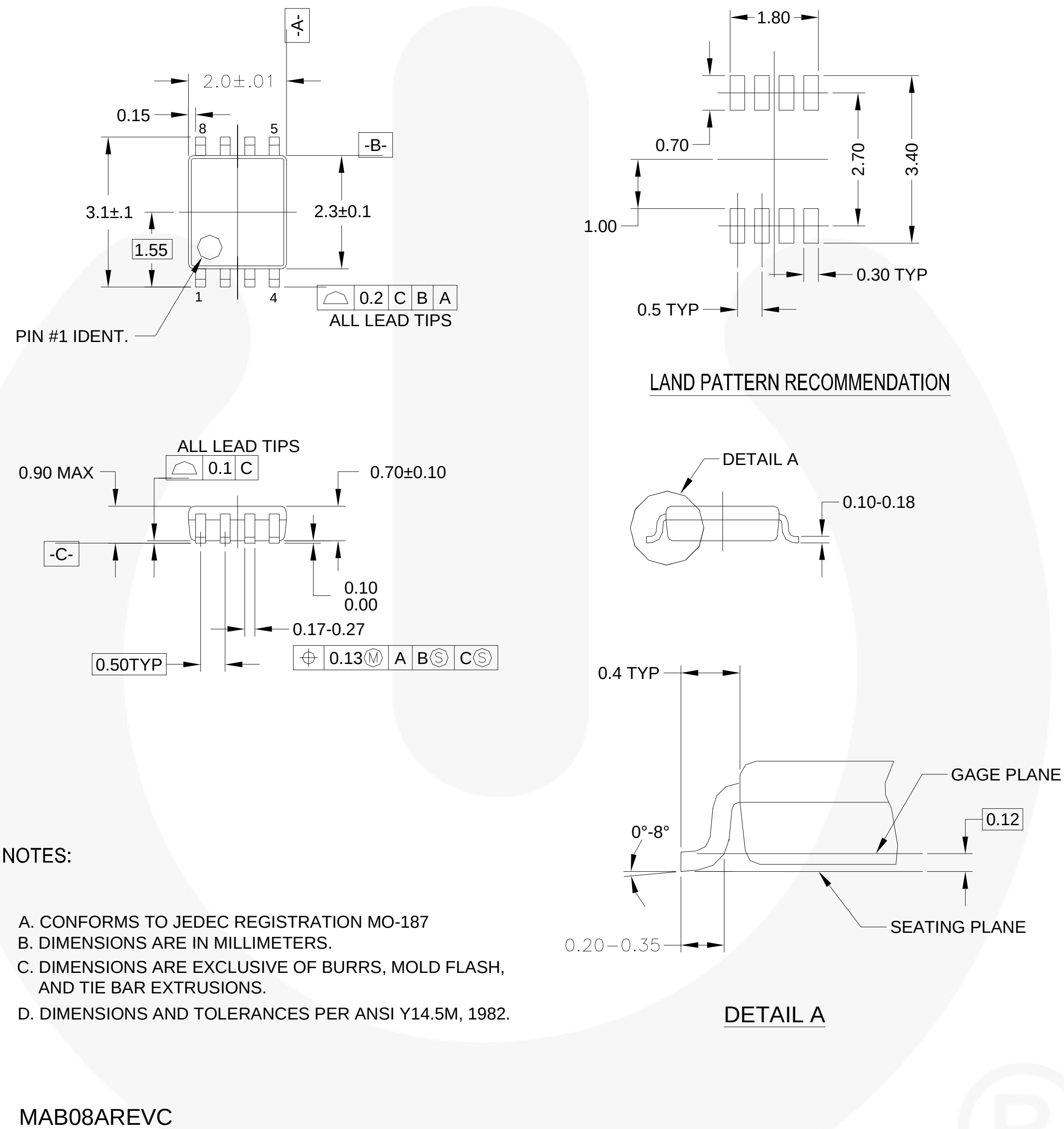

Figure 23. 8-Lead US8, JEDEC MO-187, Variation CA 3.1mm Wide

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