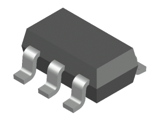
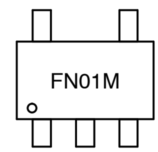
3.3 V LVDS 1-Bit, High-Speed Differential Driver

FIN1001



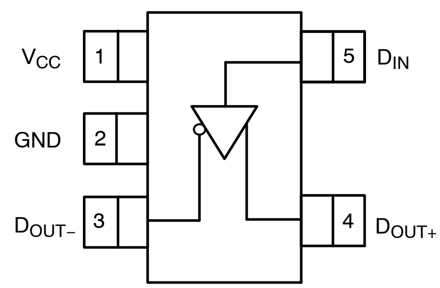
SOT−23, 5 Lead
CASE 527AH

MARKING DIAGRAMS



FN01 = Specific Device Code
M = Assembly Operation Month

CONNECTION DIAGRAM



(Top View)

ORDERING INFORMATION

See detailed ordering and shipping information on page 6 of this data sheet.

Description

This single driver is designed for high−speed interconnects utilizing Low Voltage Differential Signaling (LVDS) technology. The driver translates LVTTL levels to LVDS levels with a typical differential output swing of 350 mV 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 FIN1001 can be paired with its companion receiver, the FIN1002, or with any other LVDS receiver.

Features

- Greater than 600 Mbs Data Rate
- 3.3 V Power Supply Operation
- 0.5 ns Maximum Pulse Skew
- 1.5 ns Maximum Propagation Delay
- Low Power Dissipation
- Power−Off Protection
- Meets or Exceeds TIA/EIA−644 LVDS Standard
- Flow−through Pin−out Simplifies PCB Layout
- 5−Lead SOT23 Package Saves Space
- This is a Pb−Free and Halide Free Device

PIN DEFINITIONS

Pin No.	Name	Description
1	V_{CC}	Power Supply
2	GND	Ground
3	D_{OUT-}	Inverting LVDS Driver Output
4	D_{OUT+}	Non−inverting LVDS Driver Output
5	D_{IN}	LVTTL Data Input

FUNCTION TABLE

Inputs	Outputs	
D_{IN}	D_{OUT+}	D_{OUT-}
LOW	LOW	HIGH
HIGH	HIGH	LOW

ABSOLUTE MAXIMUM RATINGS

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	4.6	V
I_{OSD}	Driver Short Circuit Current		Continuous		
I_O	Output Current		–	16	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	Electrostatic Discharge	Human Body Model	–	7500	V
		Machine Model	–	400	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	Min.	Max.	Unit
V_{CC}	Supply Voltage	3.0	3.6	V
V_{IN}	Input Voltage	0	Vcc	V
T_A	Operating Temperature	−40	+125	°C

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 (Note 1)

All min and max values are guaranteed at T_A = −40°C to +125°C, unless otherwise specified.
All typical values are at T_A = 25°C and with V_{CC} = 3.3 V, unless otherwise specified.

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_{OD}	Output Differential Voltage	R_L = 100 Ω, See Figure 1	T_A = −40°C to 85°C	250	350	450	mV
			T_A = −40°C to 125°C	230	350	450	mV
ΔV_{OD}	VOD Magnitude Change from Differential Low−to−High		T_A = −40° to 125°C	–	–	25	mV
V_{OS}	Offset Voltage			1.125	1.25	1.375	V
ΔV_{OS}	Offset Magnitude Change from Differential Low−to−High			–	–	25	mV
I_{OFF}	Power−Off Output Current	V_{CC} = 0 V, V_{OUT} = 0 V or 3.6 V		–	–	±20	µA
I_{OS}	Short Circuit Output Current	V_{OUT} = 0 V		–	−5.5	−8	mA
		V_{OD} = 0 V		–	±4	±8	
$I_{I(OFF)}$	Power−OFF Input Current	V_{CC} = 0 V, V_{IN} = 0 V or 3.6 V		–	–	±20	µA
V_{IH}	Input HIGH Voltage			2.0	–	VCC	V
V_{IL}	Input LOW Voltage			GND	–	0.8	V
I_{IN}	Input Current	V_{IN} = 0 V or V_{CC}		–	–	±20	µA
$I_{I(OFF)}$	Power−Off Input Current	V_{CC} = 0 V, V_{IN} = 0 V or 3.6 V		–	–	±20	µA
V_{IK}	Input Clamp Voltage	I_{IK} = −18 mA		−1.5	−0.8	–	V
I_{CC}	Power Supply Current	No Load, V_{IN} = 0 V or V_{CC}		–	4.5	8	mA
		R_L = 100 Ω, V_{IN} = 0 V or V_{CC}		–	6.5	10	
C_{IN}	Input Capacitance	V_{CC} = 3.3 V		–	3.2	–	pF
C_{OUT}	Output Capacitance	V_{CC} = 0 V		–	3.3	–	pF

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

1. Not production tested across the full temperature range.

AC ELECTRICAL CHARACTERISTICS

All min and max values are guaranteed at T_A = −40 to +85°C.
All typical values are at T_A = 25°C and with V_{CC} = 3.3 V, unless otherwise specified.
R_L = 100 Ω, C_L = 5 pF. See Figure 2 and Figure 3.

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
t_{PLHD}	Propagation Delay	LOW to HIGH	0.50	0.98	1.50	ns
t_{PHLD}	Propagation Delay	HIGH to LOW	0.50	0.93	1.50	ns
t_{TLHD}	Differential Output Rise Time	20% to 80%	0.4	0.5	1.0	ns
t_{THLD}	Output Fall Time	80% to 20%	0.4	0.5	1.0	ns
$t_{SK(p)}$	Pulse Skew	$\|t_{PLH}$ - $t_{PHL}\|$	–	0.05	0.5	ns
$t_{SK(PP)}$	Part−to−Part Skew (Note 2)		–	–	1.0	ns

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

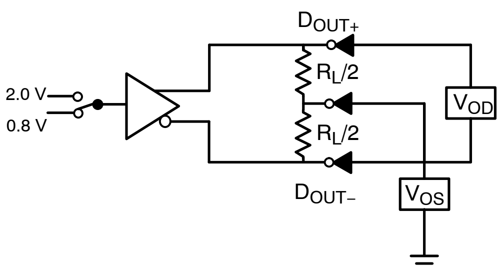
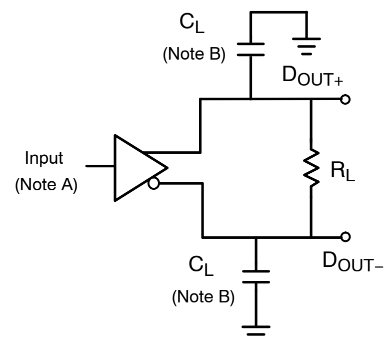


Figure 1. Differential Driver DC Test Circuit



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

Note B: C_L includes all probe and fixture capacitances

Figure 2. Differential Driver Propagation Delay and Transition Time Test Circuit

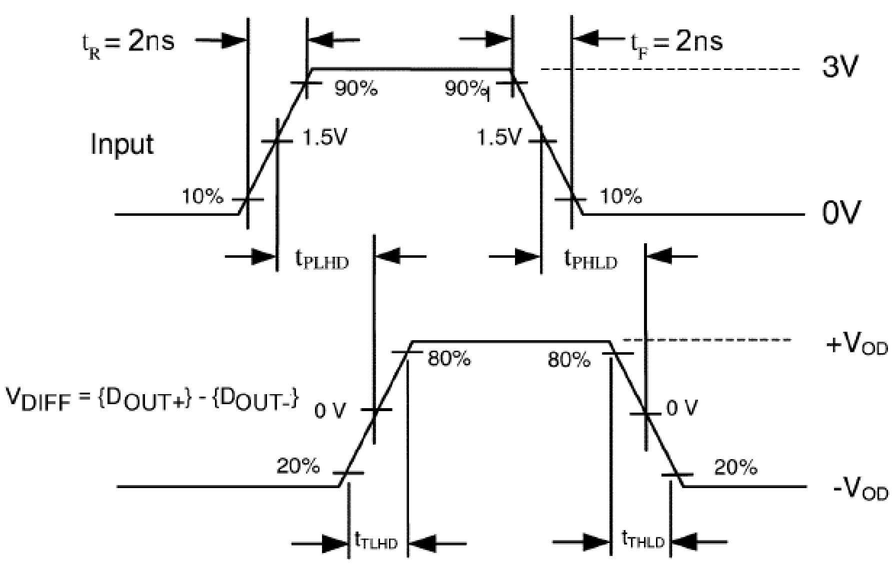


Figure 3. AC Waveforms

TYPICAL PERFORMANCE CHARACTERISTICS

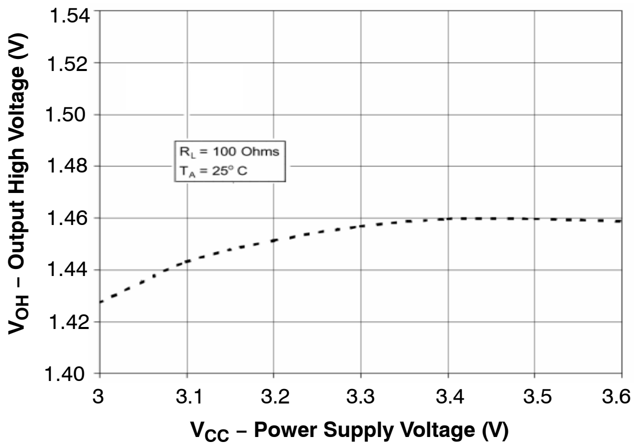


Figure 4. Output High Voltage vs. Power Supply Voltage

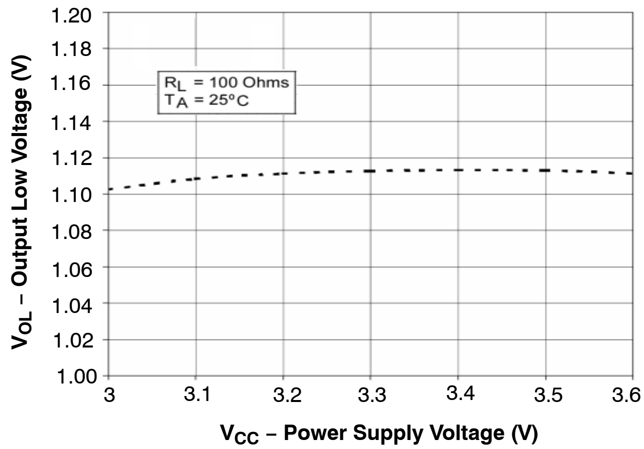


Figure 5. Output Low Voltage vs. Power Supply Voltage

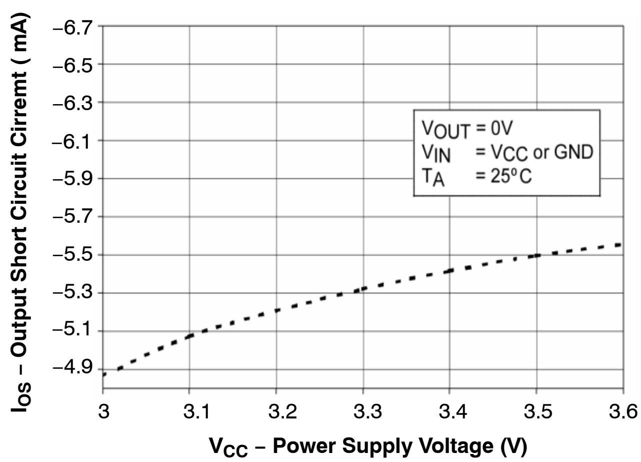


Figure 6. Output Short Circuit Current vs. Power Supply Voltage

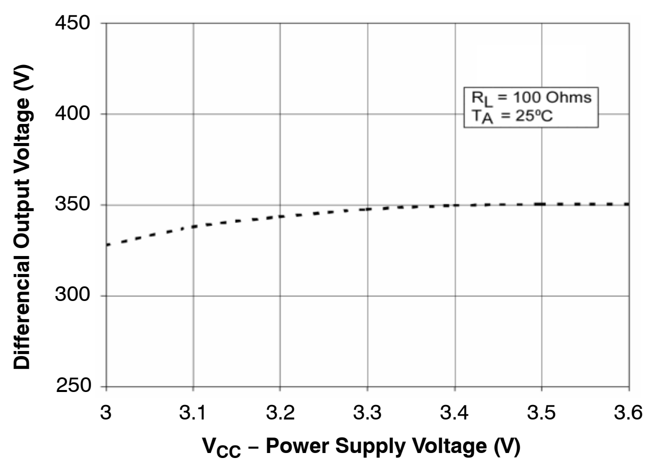


Figure 7. Differential Output Voltage vs. Power Supply Voltage

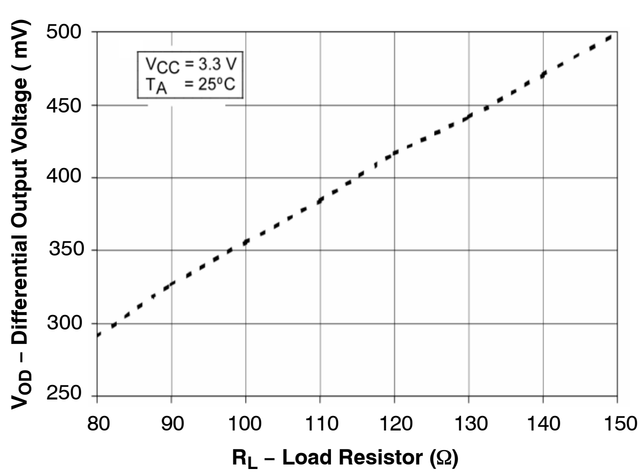


Figure 8. Differential Output Voltage vs. Load Resistor

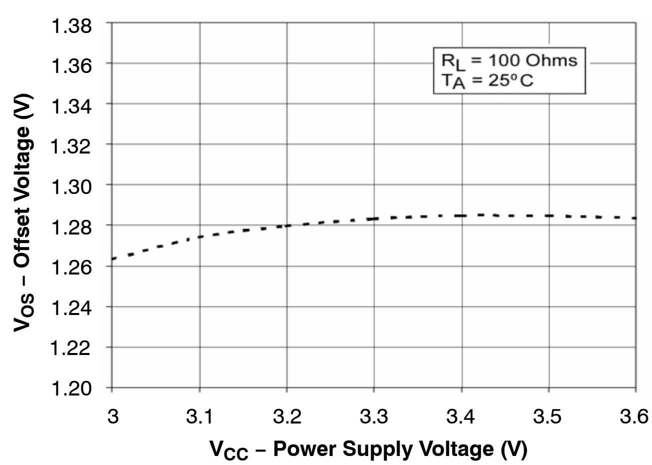


Figure 9. Offset Voltage vs. Power Supply Voltage

TYPICAL PERFORMANCE CHARACTERISTICS

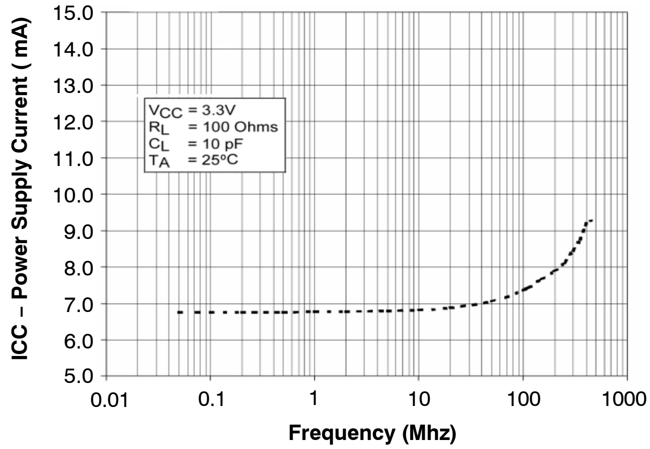


Figure 10. Power Supply Current vs. Frequency

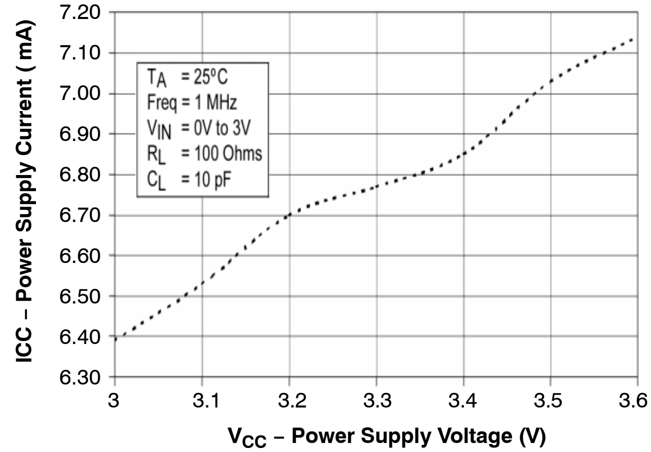


Figure 11. Power Supply Current vs. Power Supply Voltage

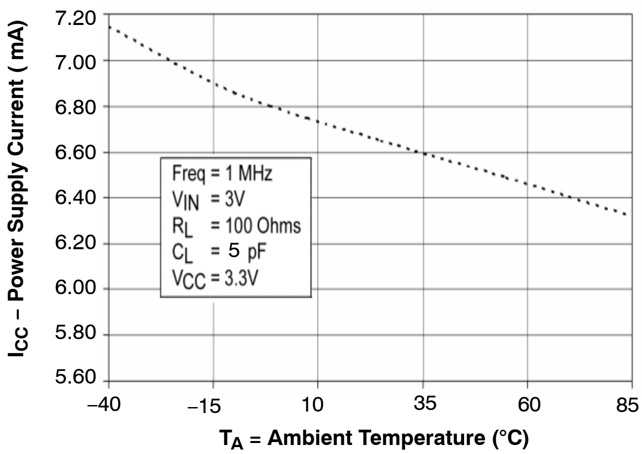


Figure 12. Power Supply Current vs. Ambient Temperature

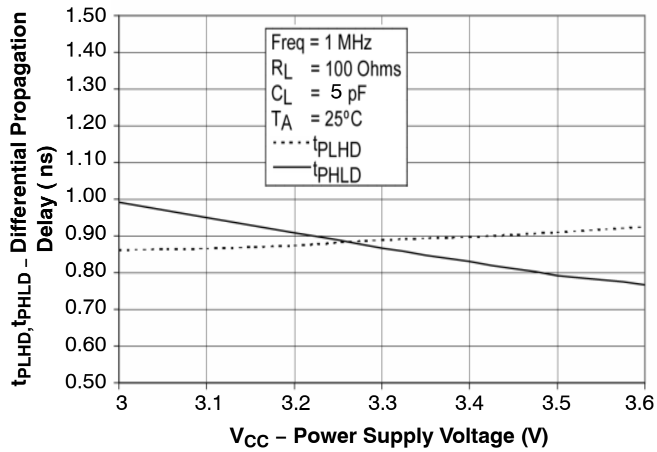


Figure 13. Differential Propagation Delay vs. Power Supply

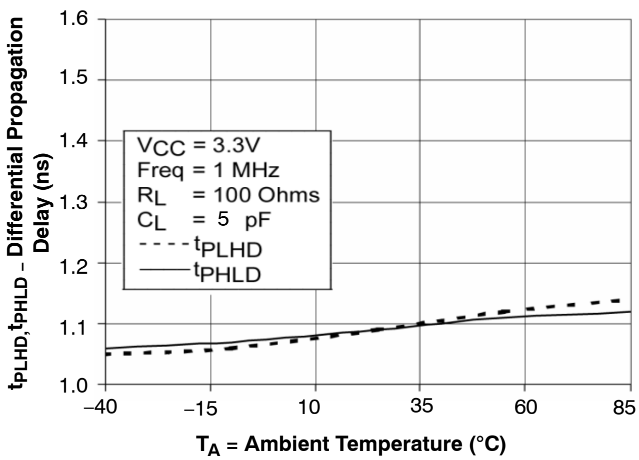


Figure 14. Differential Propagation Delay vs. Ambient Temperature

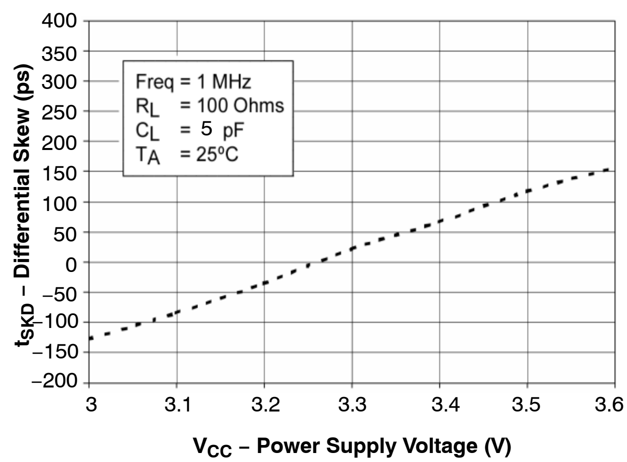


Figure 15. Differential Pulse Skew (t_{PLH} – t_{PHL}) vs. Power Supply Voltage

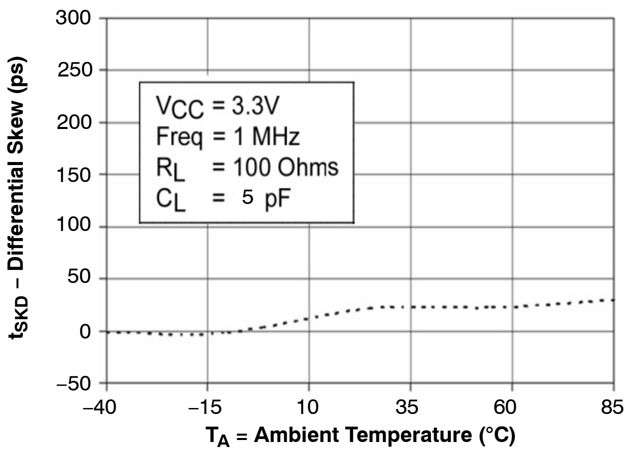


Figure 16. Differential Pulse Skew (t_{PLH} – t_{PHL}) vs. Ambient Temperature

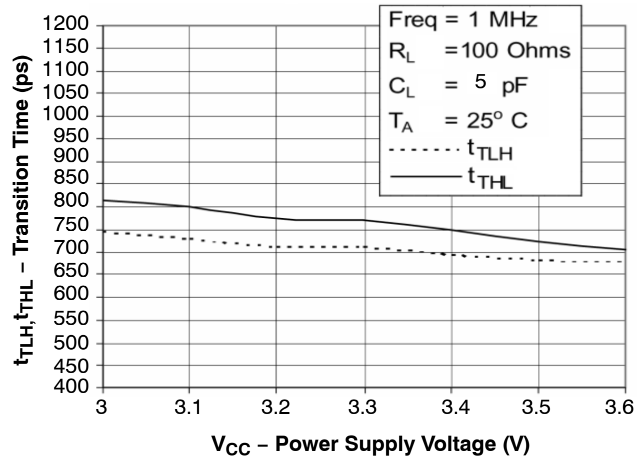


Figure 17. Transition Time vs. Power Supply Voltage

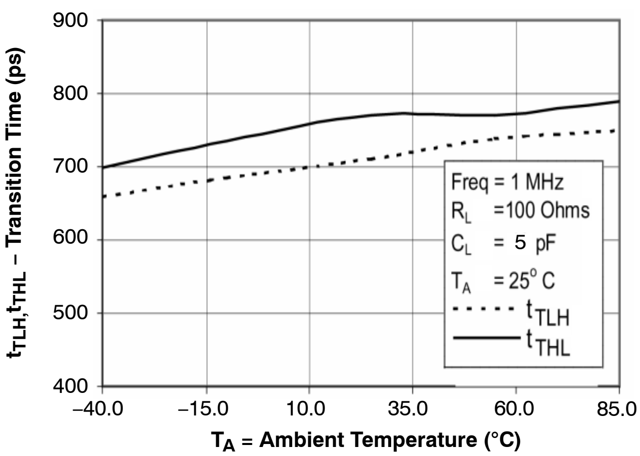
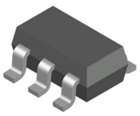


Figure 18. Transition Time vs. Ambient Temperature

ORDERING INFORMATION

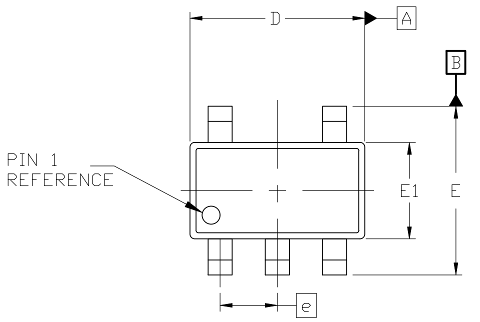
Part Number	Operating Temperature Range	Package	Shipping†
FIN1001M5X	−40°C − +125°C	5−Lead SOT23, JEDEC MO−178, 1.6 mm (Pb−Free)	3000 / Tape & Reel

†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.

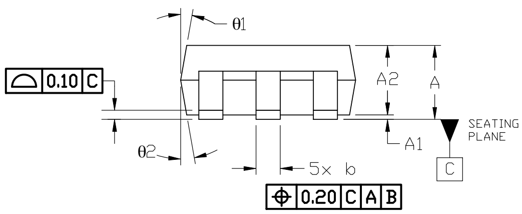


SOT−23, 5 Lead
CASE 527AH
ISSUE A

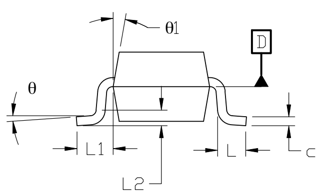
DATE 09 JUN 2021



TOP VIEW



SIDE VIEW

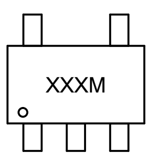


END VIEW

NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 19894
2. CONTROLLING DIMENSION: MILLIMETERS
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF THE BASE MATERIAL.
4. DIMENSIONS D AND E1 DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS. MOLD FLASH, PROTRUSIONS, OR GATE BURRS SHALL NOT EXCEED 0.25 PER SIDE. D AND E1 DIMENSIONS ARE DETERMINED AT DATUM D.
5. DIMENSION 'b' DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.08mm TOTAL IN EXCESS OF THE 'b' DIMENSION AT MAXIMUM MATERIAL CONDITION. MINIMUM SPACE BETWEEN PROTRUSION AND AN ADJACENT LEAD SHALL NOT BE LESS THAN 0.07mm.

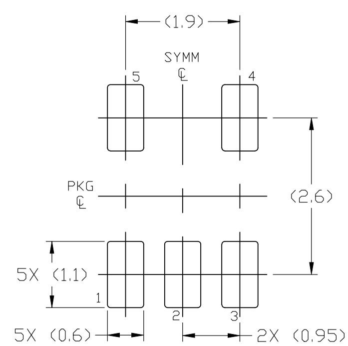
	MILLIMETERS		
DIM	MIN.	NOM.	MAX.
A	0.90	—	1.45
A1	0.00	—	0.15
A2	0.90	1.15	1.30
b	0.30	—	0.50
c	0.08	—	0.22
D	2.90 BSC		
E	2.80 BSC		
E1	1.60 BSC		
e	0.95 BSC		
L	0.30	0.45	0.60
L1	0.60 REF		
L2	0.25 REF		
θ	0°	4°	8°
θ1	0°	10°	15°
θ2	0°	10°	15°

GENERIC
MARKING DIAGRAM*



XXX = Specific Device Code
M = Date Code

*This information is generic. Please refer to device data sheet for actual part marking. Pb−Free indicator, "G" or microdot "▪", may or may not be present. Some products may not follow the Generic Marking.



RECOMMENDED MOUNTING FOOTPRINT

For additional information on our Pb−Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

DOCUMENT NUMBER:	98AON34320E	Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red.
DESCRIPTION:	SOT−23, 5 LEAD	PAGE 1 OF 1

PUBLICATION ORDERING INFORMATION

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Phone: 011 421 33 790 2910

Europe, Middle East and Africa Technical Support:
Phone: 00421 33 790 2910
For additional information, please contact your local Sales Representative

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