RELIABILITY REPORT

FOR

MAX3397EELA+

PLASTIC ENCAPSULATED DEVICES

November 6, 2007

MAXIM INTEGRATED PRODUCTS

120 SAN GABRIEL DR.

SUNNYVALE, CA 94086

Approved by
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Quality Assurance
Manager, Reliability Operations

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Conclusion

The MAX3397EELA+ successfully meets the quality and reliability standards required of all Maxim products. In addition, Maxim"s continuous reliability monitoring program ensures that all outgoing product will continue to meet Maxim"s quality and reliability standards.

Table of Contents

I. ....Device Description

II. ....Manufacturing Information

III. ....Packaging Information

.....Attachments

V. ....Quality Assurance Information

VI. ....Reliability Evaluation

IV. ....Die Information

I. Device Description

A. General

The MAX3397E ±15kV ESD-protected bidirectional level translator provides level shifting for data transfer in a multivoltage system. Externally applied voltages, VCC and VL, set the logic levels on either side of the device. A logic-low signal present on the VL side of the device appears as a logic-low signal on the VCC side of the device, and vice versa. The MAX3397E utilizes a transmission- gate-based design to allow data translation in either direction (VL ↔ VCC) on any single data line. The MAX3397E accepts VL from +1.2V to +5.5V and VCC from +1.65V to +5.5V, making the device ideal for data transfer between low-voltage ASICs/PLDs and higher voltage systems. The MAX3397E features a shutdown mode that reduces supply current to less than 1µA, thermal short-circuit protection, and ±15kV ESD protection on the VCC side for greater protection in applications that route signals externally. The MAX3397E operates at a guaranteed data rate of 8Mbps over the entire specified operating voltage range. Within specific voltage domains, higher data rates are possible. See the *Timing Characteristics* table in the full data sheet. The MAX3397E is available in an 8-pin µDFN package and specified over the extended -40°C to +85°C operating temperature range.

II. Manufacturing Information

A. Description/Function:	Dual Bidirectional Low-Level Translator in µDFN
B. Process:	B8
C. Number of Device Transistors:	737
D. Fabrication Location:	California or Texas
E. Assembly Location:	Thailand
F. Date of Initial Production:	April 10, 2007

III. Packaging Information

A. Package Type:	8-pin uDFN
B. Lead Frame:	Substrate
C. Lead Finish:	Gold
D. Die Attach:	Non-conductive Epoxy
E. Bondwire:	Gold (1 mil dia.)
F. Mold Material:	Epoxy with silica filler
G. Assembly Diagram:	#05-9000-2649
H. Flammability Rating:	Class UL94-V0
I. Classification of Moisture Sensitivity per JEDEC standard J-STD-020-C	Level 1
J. Single Layer Theta Ja:	NA°C/W
K. Single Layer Theta Jc:	NA°C/W
L. Multi Layer Theta Ja:	210.2°C/W
M. Multi Layer Theta Jc:	122.1°C/W

IV. Die Information

A. Dimensions:	62 X 45 mils
B. Passivation:	Si_3N_4/SiO_2 (Silicon nitride/ Silicon dioxide
C. Interconnect:	Aluminum/Si (Si = 1%)
D. Backside Metallization:	None
E. Minimum Metal Width:	0.8 microns (as drawn)
F. Minimum Metal Spacing:	0.8 microns (as drawn)
G. Bondpad Dimensions:	5 mil. Sq.
H. Isolation Dielectric:	SiO_2
I. Die Separation Method:	Wafer Saw

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V. Quality Assurance Information

A. Quality Assurance Contacts: Jim Pedicord (Manager, Rel Operations)
Bryan Preeshl (Managing Director of QA)

B. Outgoing Inspection Level: 0.1% for all electrical parameters guaranteed by the Datasheet.
0.1% For all Visual Defects.

C. Observed Outgoing Defect Rate: < 50 ppm

D. Sampling Plan: Mil-Std-105D

VI. Reliability Evaluation

A. Accelerated Life Test

The results of the 135°C biased (static) life test are pending. Using these results, the Failure Rate (λ) is calculated as follows:

$$\lambda = \frac{1}{\text{MTTF}} = \frac{1.83}{192 \times 4340 \times 48 \times 2}$$ (Chi square value for MTTF upper limit)

(where 4340 = Temperature Acceleration factor assuming an activation energy of 0.8eV)

$\lambda = 22.91 \times 10^{-9}$

λ = 22.91 F.I.T. (60% confidence level @ 25°C)

This low failure rate represents data collected from Maxim"s reliability monitor program. In addition to routine production Burn-In, Maxim pulls a sample from every fabrication process three times per week and subjects it to an extended Burn-In prior to shipment to ensure its reliability. The reliability control level for each lot to be shipped as standard product is 59 F.I.T. at a 60% confidence level, which equates to 3 failures in an 80 piece sample. Maxim performs failure analysis on any lot that exceeds this reliability control level. Attached Burn-In Schematic (Spec. # 06-0170a) shows the static Burn-In circuit. Maxim also performs quarterly 1000 hour life test monitors. This data is published in the Product Reliability Report (RR-1N). Current monitor data for the S4 Process results in a FIT Rate of 0.09 @ 25C and 1.61 @ 55C (0.8 eV, 60% UCL)

B. Moisture Resistance Tests

The industry standard 85°C/85%RH or HAST testing is monitored per device process once a quarter.

C. E.S.D. and Latch-Up Testing

The LT08 die type has been found to have all pins able to withstand a HBM transient pulse of +/-2500V per JEDEC JESD22-A114-D. Latch-Up testing has shown that this device withstands a current of +/-250mA.

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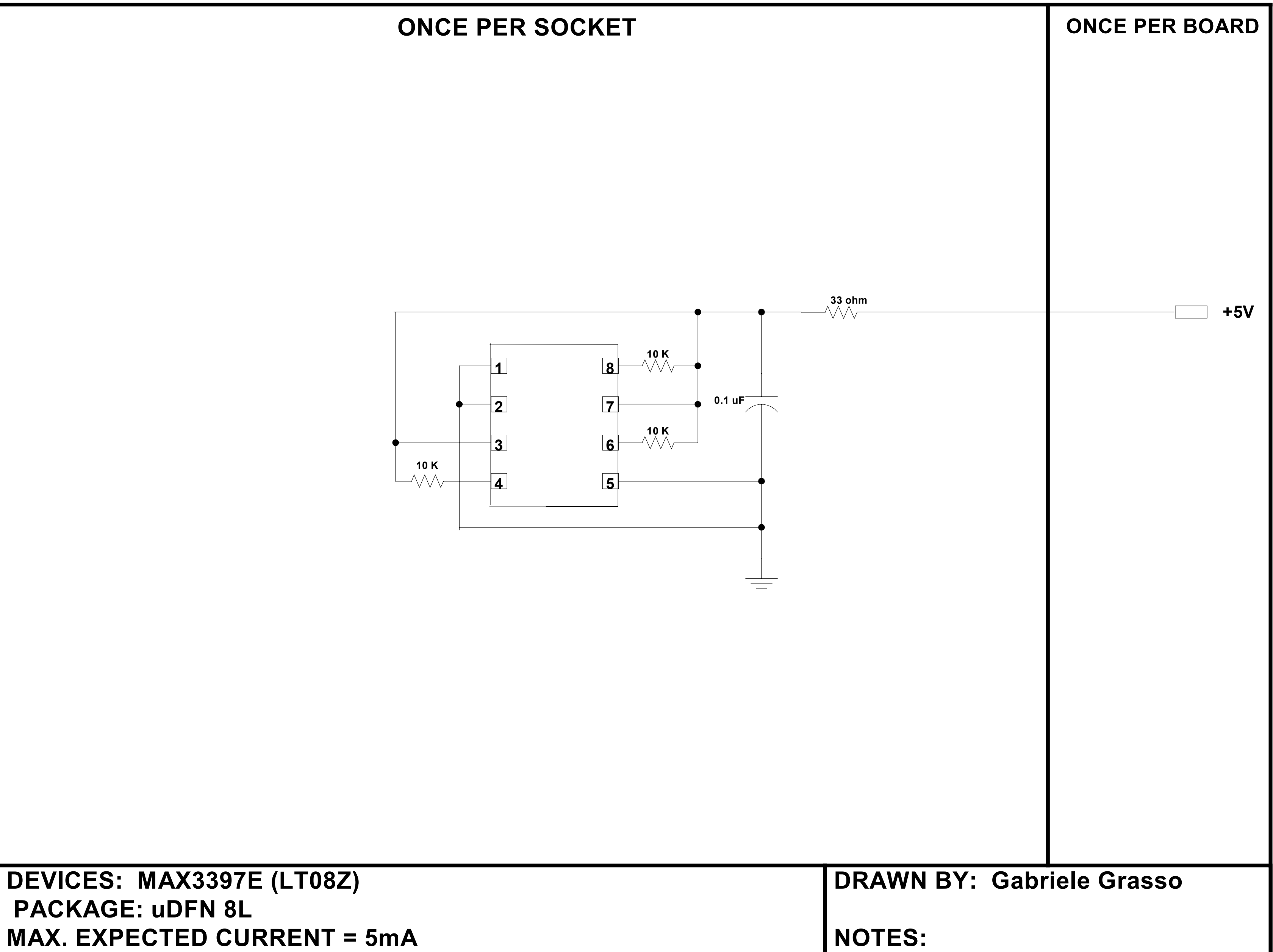
Table 1
Reliability Evaluation Test Results

MAX3397EELA+

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES
Static Life Test (Note 1)				
	Ta = 135°C Biased Time = 192 hrs.	DC Parameters & functionality	48	0
Moisture Testing (Note 2)				
85/85	Ta = 85°C RH = 85% Biased Time = 1000hrs.	DC Parameters & functionality	77	0
Mechanical Stress (Note 2)				
Temperature Cycle	-55ºC/125ºC 1000 Cycles Method 1010	DC Parameters & functionality	77	0

Note 1: Life Test Data may represent plastic DIP qualification lots.
Note 2: Generic Package/Process data



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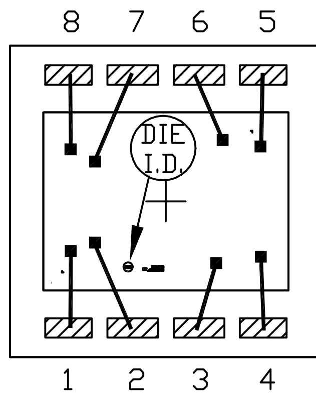
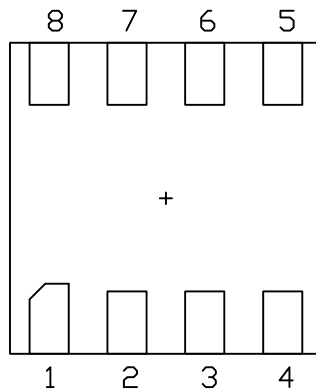
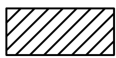
2x2x0.8mm uDFN

TOP VIEW



TOP VIEW OF BOTTOM LEADS



 BONDABLE AREA

MAX. DIE PLACEMENT AREA

NOTES:
1. MAX. DIE SIZE: 62x45
2. MIN. WIRE LENGTH: 15mils
3. DOWN BONDS NOT AVAILABLE

USE NON-CONDUCTIVE EPOXY

PKG. CODE: L822-1		SIGNATURES	DATE	MAXIM CONFIDENTIAL & PROPRIETARY	
CAV./PAD SIZE:	PKG.	ALBERT CHAN	08/22/06	BOND DIAGRAM #:	REV:
- -	DESIGN	GABRIELLE GRASSO	08/30/06	05-9000-2649	A

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