



RELIABILITY REPORT
FOR
MAX1237EUA
PLASTIC ENCAPSULATED DEVICES

August 3, 2009

MAXIM INTEGRATED PRODUCTS

120 SAN GABRIEL DR.
SUNNYVALE, CA 94086

Approved by
Ken Wendel
Quality Assurance
Director, Reliability Engineering

Conclusion

The MAX1237EUA 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	V.Quality Assurance Information
II.Manufacturing Information	VI.Reliability Evaluation
III.Packaging Information	IV.Die Information
.....Attachments	

I. Device Description

A. General

The MAX1236-MAX1239 low-power, 12-bit, multichannel analog-to-digital converters (ADCs) feature internal track/hold (T/H), voltage reference, clock, and an I²C-compatible 2-wire serial interface. These devices operate from a single supply of 2.7V to 3.6V (MAX1237/MAX1239) or 4.5V to 5.5V (MAX1236/MAX1238) and require only 670μA at the maximum sampling rate of 94.4ksps. Supply current falls below 230μA for sampling rates under 46ksps. AutoShutdown(tm) powers down the devices between conversions, reducing supply current to less than 1μA at low throughput rates. The MAX1236/MAX1237 have four analog input channels each, while the MAX1238/MAX1239 have 12 analog input channels each. The fully differential analog inputs are software configurable for unipolar or bipolar, and single-ended or differential operation.

The full-scale analog input range is determined by the internal reference or by an externally applied reference voltage ranging from 1V to V_{DD} . The MAX1237/MAX1239 feature a 2.048V internal reference and the MAX1236/MAX1238 feature a 4.096V internal reference. The MAX1236/MAX1237 are available in an 8-pin μMAX® package. The MAX1238/MAX1239 are available in a 16-pin QSOP package. The MAX1236-MAX1239 are guaranteed over the extended temperature range (-40°C to +85°C). For pin-compatible 10-bit parts, refer to the MAX1136-MAX1139 data sheet. For pin-compatible 8-bit parts, refer to the MAX1036-MAX1039 data sheet.

**II. Manufacturing Information**

A. Description/Function:	2.7V to 3.6V and 4.5V to 5.5V, Low-Power, 4-/12-Channel, 2-Wire Serial, 12-Bit ADCs
B. Process:	B6
C. Number of Device Transistors:	11,362
D. Fabrication Location:	California
E. Assembly Location:	Malaysia, Thailand
F. Date of Initial Production:	April 27, 2002

III. Packaging Information

A. Package Type:	U8C-3
B. Lead Frame:	Copper
C. Lead Finish:	85Sn/15Pb plate or 100% Matte Tin
D. Die Attach:	Non-conductive Epoxy
E. Bondwire:	Gold (1 mil dia.)
F. Mold Material:	Epoxy with silica filler
G. Assembly Diagram:	#05-2101-0049
H. Flammability Rating:	Class UL94-V0
I. Classification of Moisture Sensitivity per JEDEC standard J-STD-020-C	Level 1
J. Theta Ja:	170°C/W

IV. Die Information

A. Dimensions:	88 X 75 mils
B. Passivation:	Si ₃ N ₄ /SiO ₂ (Silicon nitride/ Silicon dioxide)
C. Interconnect:	Aluminum/Si (Si = 1%)
D. Backside Metallization:	None
E. Minimum Metal Width:	0.6 microns (as drawn)
F. Minimum Metal Spacing:	0.6 microns (as drawn)
G. Bondpad Dimensions:	5 mil. Sq.
H. Isolation Dielectric:	SiO ₂
I. Die Separation Method:	Wafer Saw

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:

$$\lambda = \frac{1}{\text{MTTF}} = \frac{1.83}{192 \times 4340 \times 219 \times 2} \quad (\text{Chi square value for MTTF upper limit})$$

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

$$\lambda = 5.02 \times 10^{-9}$$

$$\lambda = 5.02 \text{ F.I.T. (60\% confidence level @ 25°C)}$$

The following failure rate represents data collected from Maxim's reliability monitor program. Maxim performs quarterly 1000 hour life test monitors on its processes. This data is published in the Product Reliability Report found at <http://www.maxim-ic.com/>. Current monitor data for the B6 Process results in a FIT Rate of 0.8 @ 25C and 14.2 @ 55C (0.8 eV, 60% UCL)

B. Moisture Resistance Tests

Maxim pulls pressure pot samples from every assembly process three times per week. Each lot sample must meet an LTPD = 20 or less before shipment as standard product. Additionally, the industry standard 85°C/85%RH testing is done per generic device/package family once a quarter.

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

The AC30-1 die type has been found to have all pins able to withstand a transient pulse of +/-2500V per Mil-Std 883 Method 3015.7. Latch-Up testing has shown that this device withstands a current of +/-250mA.

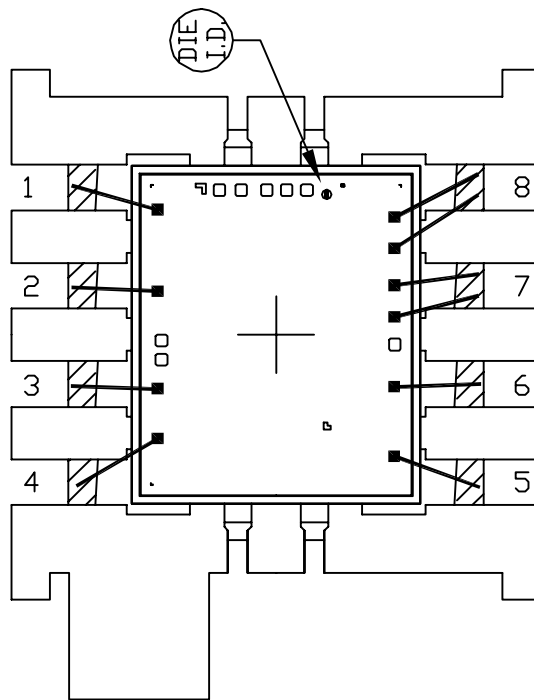
Table 1
Reliability Evaluation Test Results

MAX1237EUA

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	219	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	-65°C/150°C 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

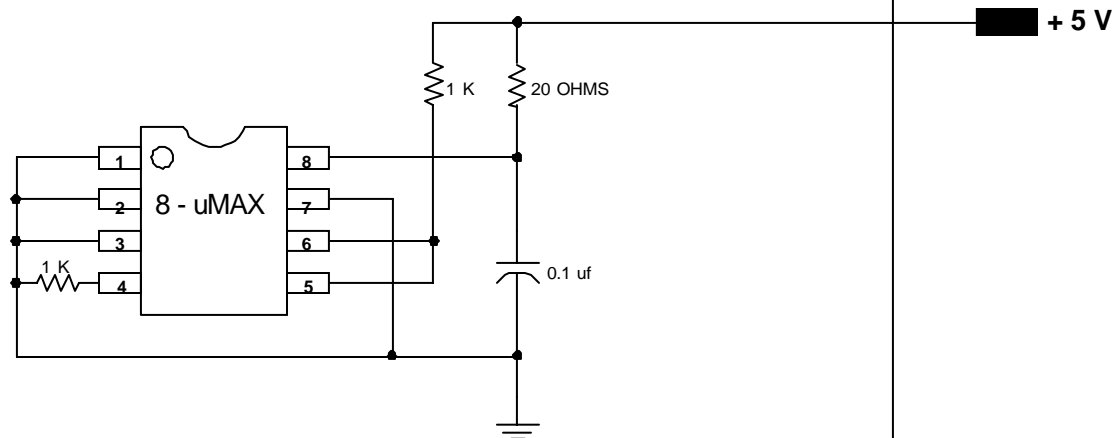


 BONDING AREA

PKG. CODE: U8C-3		SIGNATURES	DATE	 CONFIDENTIAL & PROPRIETARY	
CAV./PAD SIZE: CHIP ON LEAD	PKG. DESIGN			BOND DIAGRAM #: 05-2101-0049	REV: A

ONCE PER SOCKET

ONCE PER BOARD



DEVICES: MAX1136/7 AND MAX1236/7

MAX. EXPECTED CURRENT = 1 uA

DRAWN BY: HAK TAN

NOTES: