

RELIABILITY REPORT
FOR
MAX9636AXT+
PLASTIC ENCAPSULATED DEVICES

March 2, 2011

MAXIM INTEGRATED PRODUCTS

120 SAN GABRIEL DR.
SUNNYVALE, CA 94086

Approved by
Sokhom Chum
Quality Assurance
Reliability Engineer

Conclusion

The MAX9636AXT+ 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	IV.Die Information
II.Manufacturing Information	V.Quality Assurance Information
III.Packaging Information	VI.Reliability Evaluation
.....Attachments	

I. Device Description

A. General

The MAX9636/MAX9637/MAX9638 are single-supply, CMOS input op amps featuring wide bandwidth at low quiescent current, making them suitable for a broad range of battery-powered applications such as portable medical instruments, portable media players, and smoke detectors. A combination of extremely low input bias currents, low input current noise and low input voltage noise allows interface to high-impedance sources such as photodiode and piezoelectric sensors. These devices are also ideal for general-purpose signal processing functions such as filtering and amplification in a broad range of portable, battery-powered applications. The ICs feature a maximized ratio of gain bandwidth (GBW) to supply current. The devices operate from a single 2.1V to 5.5V supply at a typical quiescent supply current of 36 μ A. For additional power conservation, the MAX9636 and MAX9638 offer a low-power shutdown mode that reduces supply current to 1 μ A and places the amplifiers' outputs into a high-impedance state. The ICs are specified over the automotive operating temperature range (-40°C to +125°C). The single is offered in a space-saving, 6-pin SC70 package, while the dual is offered in tiny, 8-pin SC70 and 10-pin UTQFN packages.

II. Manufacturing Information

A. Description/Function:	3V/5V Low-Power, Low-Noise, CMOS, Rail-to-Rail I/O Op Amps
B. Process:	S18
C. Number of Device Transistors:	370
D. Fabrication Location:	California
E. Assembly Location:	Thailand
F. Date of Initial Production:	April 23, 2010

III. Packaging Information

A. Package Type:	6-pin SC70
B. Lead Frame:	NiPd
C. Lead Finish:	100% matte Tin
D. Die Attach:	Non-conductive
E. Bondwire:	Au (1 mil dia.)
F. Mold Material:	Epoxy with silica filler
G. Assembly Diagram:	#05-9000-4069 / A
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:	326°C/W
K. Single Layer Theta Jc:	115°C/W
L. Multi Layer Theta Ja:	326.5°C/W
M. Multi Layer Theta Jc:	115°C/W

IV. Die Information

A. Dimensions:	30.31 X 22.83 mils
B. Passivation:	Si ₃ N ₄ /SiO ₂ (Silicon nitride/ Silicon dioxide)
C. Interconnect:	Al with Ti/TiN Barrier
D. Backside Metallization:	None
E. Minimum Metal Width:	0.18μm
F. Minimum Metal Spacing:	0.18μm
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: Richard Aburano (Manager, Reliability Engineering)
Don Lipps (Manager, Reliability Engineering)
Bryan Preeshl (Vice President 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 shown in Table 1. Using these results, the Failure Rate (λ) is calculated as follows:

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

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

$$\lambda = 22.9 \times 10^{-9}$$

$$\lambda = 22.9 \text{ F.I.T. (60\% confidence level @ 25°C)}$$

The following failure rate represents data collected from Maxim's reliability monitor program. Maxim performs quarterly life test monitors on its processes. This data is published in the Reliability Report found at <http://www.maxim-ic.com/qa/reliability/monitor>. Cumulative monitor data for the S18 Process results in a FIT Rate of 0.40 @ 25C and 6.96 @ 55C (0.8 eV, 60% UCL)

B. E.S.D. and Latch-Up Testing (lot SI6ZAQ001B D/C 1005)

The OY55 die type has been found to have all pins able to withstand a HBM transient pulse of +/- 2500V per JEDEC JESD22-A114. Latch-Up testing has shown that this device withstands a current of +/-250mA and overvoltage per JEDEC JESD78.

Table 1
Reliability Evaluation Test Results

MAX9636AXT+

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	COMMENTS
Static Life Test (Note 1)	Ta = 135°C Biased Time = 192 hrs.	DC Parameters & functionality	48	0	SI6ZAQ001B, D/C 1005

Note 1: Life Test Data may represent plastic DIP qualification lots.