

RELIABILITY REPORT
FOR
MAX9812HEXT+T / MAX9812LEXT+T
PLASTIC ENCAPSULATED DEVICES

November 5, 2012

MAXIM INTEGRATED

160 RIO ROBLES
SAN JOSE, CA 95134

Approved by
Richard Aburano
Quality Assurance
Manager, Reliability Engineering

Conclusion

The MAX9812LEXT+T successfully meets the quality and reliability standards required of all Maxim Integrated products. In addition, Maxim Integrated's continuous reliability monitoring program ensures that all outgoing product will continue to meet Maxim Integrated'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 MAX9812/MAX9813 are single/dual-input, 20dB fixed-gain microphone amplifiers. They offer tiny packaging and a low-noise, integrated microphone bias, making them ideal for portable audio applications such as notebook computers, cell phones, and PDAs. These amplifiers feature a 500kHz bandwidth, rail-to-rail outputs, an industry-leading 100dB power-supply rejection ratio, and a very low 0.015% THD+N. Power-saving features include very low 230 μ A supply current and a total shutdown mode that cuts the combined supply and BIAS currents to only 100nA. The MAX9812 is a single amplifier in a 6-pin SC70 package (2mm x 2.1mm) and the MAX9813 is a dual-input amplifier available in an 8-pin SOT23 (3mm x 3mm) package. The MAX9813 has two inputs allowing two microphones to be multiplexed to a single output. The MAX9812/MAX9813 are offered in two grades. The MAX9812L/MAX9813L are optimized for 3.3V supply operation (2.7V to 3.6V). The MAX9812H/MAX9813H are PC2001 compliant and are optimized for 5V operation (4.5V to 5.5V). Both devices are specified over the -40°C to +85°C extended operating temperature range.

II. Manufacturing Information

A. Description/Function:	Tiny, Low-Cost, Single/Dual-Input, Fixed-Gain Microphone Amplifiers with Integrated Bias
B. Process:	B6
C. Number of Device Transistors:	
D. Fabrication Location:	USA
E. Assembly Location:	Malaysia and Thailand
F. Date of Initial Production:	April 26, 2003

III. Packaging Information

A. Package Type:	6-pin SC70
B. Lead Frame:	Copper
C. Lead Finish:	NiPdAu
D. Die Attach:	Non-conductive
E. Bondwire:	Au (1 mil dia.)
F. Mold Material:	Epoxy with silica filler
G. Assembly Diagram:	#05-9000-0238
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:	31 X 29 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:	0.9 microns (as drawn)
F. Minimum Metal Spacing:	0.9 microns (as drawn)
G. Bondpad Dimensions:	
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:

$$\lambda = \frac{1}{\text{MTTF}} = \frac{1.83}{192 \times 4340 \times 50 \times 2} \quad (\text{Chi square value for MTTF upper limit})$$

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

$$\lambda = 21.9 \times 10^{-9}$$

$$\lambda = 21.9 \text{ F.I.T. (60\% confidence level @ 25°C)}$$

The following failure rate represents data collected from Maxim Integrated's reliability monitor program. Maxim Integrated performs quarterly life test monitors on its processes. This data is published in the Reliability Report found at <http://www.maximintegrated.com/qa/reliability/monitor>. Cumulative monitor data for the B6 Process results in a FIT Rate of 0.06 @ 25C and 1.04 @ 55C (0.8 eV, 60% UCL)

B. E.S.D. and Latch-Up Testing (lot SBV1FA023B, D/C 0824)

The AU20 die type has been found to have all pins able to withstand a transient pulse of:

ESD-HBM:	+/- 400V per JEDEC JESD22-A114
ESD-CDM:	+/- 750V per JEDEC JESD22-C101

Latch-Up testing has shown that this device withstands a current of +/- 100mA and overvoltage per JEDEC JESD78.

Table 1
Reliability Evaluation Test Results

MAX9812LEXT+T

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	50	0	IBV0BQ001C, D/C 0313

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