RELIABILITY REPORT

FOR

MAX9718xxBL+

CHIP SCALE PACKAGE

November 5, 2009

MAXIM INTEGRATED PRODUCTS

120 SAN GABRIEL DR.

SUNNYVALE, CA 94086

Approved by
Ken Wendel
Quality Assurance
Director, Reliability Engineering

Conclusion

The MAX9718xxBL+ 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.

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I. Device Description

A. General

The MAX9718/MAX9719 differential input audio power amplifiers are ideal for portable audio devices with internal speakers. The differential input structure improves noise rejection and provides common-mode rejection. A bridge-tied load (BTL) architecture minimizes external component count, while providing high-quality, power audio amplification. The MAX9718 is a single-channel amplifier while the MAX9719 is a dual-channel amplifier for stereo systems. Both devices deliver 1.4W continuous average power per channel to a 4Ù load with less than 1% THD+N while operating from a single +5V supply. The devices are available as adjustable gain amplifiers or with internally fixed gains of 0dB, 3dB, and 6dB to reduce component count.

A shutdown input disables the bias generator and amplifiers and reduces quiescent current consumption to less than 100nA. The MAX9718 shutdown input can be set as active high or active low. These devices feature Maxim's comprehensive click-and-pop suppression circuitry that reduces audible clicks and pops during startup and shutdown.

The MAX9718 is pin compatible with the LM4895, and is available in 9-bump UCSP™, 10-pin TDFN, and 10-pin µMAX® packages. The MAX9719 is available in 16-pin TQFN, 16-pin TSSOP, and 16-bump UCSP packages. Both devices operate over the -40°C to +85°C extended temperature range.

II. Manufacturing Information

A. Description/Function:	Low-Cost, Mono/Stereo, 1.4W Differential Audio Power Amplifiers
B. Process:	B8
C. Number of Device Transistors:	565
D. Fabrication Location:	California or Texas
E. Assembly Location:	Texas
F. Date of Initial Production:	10/25/2003

III. Packaging Information

A. Package Type:	9-pin UCSP
B. Lead Frame:	N/A
C. Lead Finish:	SnAgCu
D. Die Attach:	N/A
E. Bondwire:	N/A
F. Mold Material:	N/A
G. Assembly Diagram:	#05-9000-0760
H. Flammability Rating:	Class UL94-V0
I. Classification of Moisture Sensitivity per JEDEC standard J-STD-020-C	Level 1

IV. Die Information

A. Dimensions:	61 X 63 mils
B. Passivation:	Si_3N_4/SiO_2 (Silicon nitride/ Silicon dioxide)
C. Interconnect:	Al/0.5%Cu with Ti/TiN Barrier
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

V. Quality Assurance Information

A. Quality Assurance Contacts:	Ken Wendel (Director, Reliability Engineering) 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 shown in Table 1. Using these results, the Failure Rate (λ) is calculated as follows:

$$\lambda = \frac{1}{MTTF} = \frac{1.83}{192 \times 4340 \times 96 \times 2}$$ (Chi square value for MTTF upper limit)

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

$\lambda = 11.2 \times 10^{-9}$

λ = 11.2 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 B8 Process results in a FIT Rate of 0.06 @ 25C and 0.99 @ 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 AU33-5 die type has been found to have all pins able to withstand a HBM transient pulse of +/-2500 V per Mil-Std 883 Method 3015.7. Latch-Up testing has shown that this device withstands a current of +/-250 mA.

Table 1

Reliability Evaluation Test Results

MAX9718xxBL+

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	96	0
Moisture Testing (Note 2)				
HAST	Ta = 130°C RH = 85% Biased Time = 96hrs.	DC Parameters & functionality	77	0
Mechanical Stress (Note 2 & 3)				
Temperature Cycle	-40ºC/125ºC 1000 Cycles (Note 3)	DC Parameters & functionality	77	0

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

Note 2: Generic Package/Process data

Note 3: Ramp rate 11ºC/minute, dwell=15 minutes, One cycle/hour.