RELIABILITY REPORT

FOR

MAX9723AEBE+

CHIP SCALE PACKAGE

February 15, 2016

MAXIM INTEGRATED

160 RIO ROBLES

SAN JOSE, CA 95134

Approved by
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Quality Assurance
Reliability Engineer

Conclusion

The MAX9723AEBE+ 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.

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I. Device Description

A. General

The MAX9723 stereo DirectDrive headphone amplifier with BassMax and volume control is ideal for portable audio applications where space is at a premium and performance is essential. The MAX9723 operates from a single 1.8V to 3.6V power supply and includes features that reduce external component count, system cost, board space, and improves audio reproduction. The headphone amplifier uses Maxim's DirectDrive architecture that produces a ground-referenced output from a single supply, eliminating the need for large DC-blocking capacitors. The headphone amplifiers deliver 62mW into a 16 load, feature low 0.006% THD+N, and high 90dB PSRR. The MAX9723 features Maxim's industry-leading click-and-pop suppression. The BassMax feature boosts the bass response of the amplifier, improving audio reproduction when using inexpensive headphones. The integrated volume control features 32 discrete volume levels, eliminating the need for an external potentiometer. BassMax and the volume control are enabled through the I²C/SMBus(tm)-compatible interface. Shutdown is controlled through either the hardware or software interfaces. The MAX9723 consumes only 3.7mA of supply current at 1.8V, provides short-circuit and thermal-overload protection, and is fully specified over the extended -40°C to +85°C temperature range. The MAX9723 is available in a tiny (2mm x 2mm x 0.62mm) 16-bump chip-scale package (UCSP(tm)) or 16-pin thin QFN (4mm x 4mm x 0.8mm) package.

II. Manufacturing Information

A. Description/Function:	Stereo DirectDrive® Headphone Amplifier with BassMax, Volume Control, and I²C
B. Process:	C6Y
C. Number of Device Transistors:	7165
D. Fabrication Location:	Japan
E. Assembly Location:	The Philippines
F. Date of Initial Production:	October 13, 2005

III. Packaging Information

A. Package Type:	16-pin UCSP
B. Lead Frame:	N/A
C. Lead Finish:	N/A
D. Die Attach:	N/A
E. Bondwire:	N/A
F. Mold Material:	N/A
G. Assembly Diagram:	#05-9000-1172
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:	N/A
K. Single Layer Theta Jc:	N/A
L. Multi Layer Theta Ja:	N/A
M. Multi Layer Theta Jc:	N/A

IV. Die Information

A. Dimensions:	81X81 mils
B. Passivation:	Si_3N_4/SiO_2 (Silicon nitride/ Silicon dioxide)
C. Interconnect:	Al with Ti/TiN Barrier
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:	
H. Isolation Dielectric:	SiO_2
I. Die Separation Method:	Wafer Saw

V. Quality Assurance Information

A. Quality Assurance Contacts:	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 135C biased (static) life test are shown in Table 1. Using these results, the Failure Rate (λ) is calculated as follows:

$$\lambda = \frac{1}{MTTF} = \frac{1.83}{1000 \times 4340 \times 95 \times 2}$$ (Chi square value for MTTF upper limit)

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

$\lambda = 2.22 \times 10^{-9}$

$\lambda = 2.22$ 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 C6Y Process results in a FIT Rate of 0.25 @ 25C and 4.45 @ 55C (0.8 eV, 60% UCL)

B. E.S.D. and Latch-Up Testing (lot SSB3FZ005D, D/C 0724)

The AU36 die type has been found to have all pins able to withstand a HBM transient pulse of +/-700V per JEDEC JESD22-A114. Latch-Up testing has shown that this device withstands a current of +/-250mA.

Table 1
Reliability Evaluation Test Results

MAX9723AEBE+

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	COMMENTS
Static Life Test (Note 1)					
	Ta = 135°C	DC Parameters	48	0	SSB3FZ005D, D/C 0724
	Biased	& functionality	47	0	SSB3D2128B, D/C 0647
	Time = 1000 hrs.				

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