RELIABILITY REPORT

FOR

MAX98300EWL+T / MAX98300ETA+T

WAFER LEVEL PRODUCTS / PLASTIC ENCAPSULATED DEVICES

July 10, 2011

MAXIM INTEGRATED PRODUCTS

120 SAN GABRIEL DR.

SUNNYVALE, CA 94086

Approved by
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Quality Assurance
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Conclusion

The MAX98300EWL+T / MAX98300ETA+T 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 MAX98300 mono 2.6W Class D amplifier provides Class AB audio performance with Class D efficiency. This device offers five selectable gain settings (0dB, 3dB, 6dB, 9dB, and 12dB) set by a single gain-select input (GAIN). Active emissions-limiting edge-rate and overshoot control circuitry greatly reduces EMI. A filterless spread-spectrum modulation scheme eliminates the need for output filtering found in traditional Class D devices. These features reduce application component count. The MAX98300 industry-leading 0.78mA at 3.7V (1.1mA at 5V) quiescent current extends battery life in portable applications. The MAX98300 is available in an 8-pin TDFN-EP (2mm x 2mm x 0.8mm) and a 9-bump (1.2mm x 1.2mm) WLP. Both packages are specified over the extended -40°C to +85°C temperature range.

II. Manufacturing Information

A. Description/Function:	Mono 2W Class D Amplifier	
B. Process:	S18	
C. Number of Device Transistors:	3446	
D. Fabrication Location:	California	
E. Assembly Location:	Japan	Malaysia, Taiwan and Thailand
F. Date of Initial Production:	June 16, 2010	

III. Packaging Information

A. Package Type:	9-bump WLP 3x3 array	8-pin TDFN 2x2
B. Lead Frame:	N/A	Copper
C. Lead Finish:	N/A	100% matte Tin
D. Die Attach:	None	Conductive
E. Bondwire:	N/A (N/A mil dia.)	Au (1.3 mil dia.)
F. Mold Material:	None	Epoxy with silica filler
G. Assembly Diagram:	#05-9000-3879	#05-9000-3877
H. Flammability Rating:	Class UL94-V0	Class UL94-V0
I. Classification of Moisture Sensitivity per JEDEC standard J-STD-020-C	Level 1	Level 1
J. Single Layer Theta Ja:	°C/W	110°C/W
K. Single Layer Theta Jc:	°C/W	37°C/W
L. Multi Layer Theta Ja:	83°C/W	83.9°C/W
M. Multi Layer Theta Jc:	°C/W	37°C/W

IV. Die Information

A. Dimensions:	49.61 X 49.61 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:	0.18µm
F. Minimum Metal Spacing:	0.18µm
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:

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

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

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

$\lambda = 22.9$ 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 SA5ZCQ001B, D/C 1019)

The AX07/AX25 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

MAX98300EWL+T / MAX98300ETA+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	48	0	SA5ZCQ001B, D/C 1019

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