



RELIABILITY REPORT
FOR
MAX9737ETG+
PLASTIC ENCAPSULATED DEVICES

December 13, 2011

MAXIM INTEGRATED PRODUCTS

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Approved by
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Quality Assurance
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Conclusion

The MAX9737ETG+ 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 MAX9737 mono 7W Class D amplifier provides a high-performance, thermally efficient amplifier solution that offers up to 88% efficiency at a 12V supply. The device operates from 8V to 28V and provides a high 80dB PSRR, eliminating the need for a regulated power supply. Filterless modulation allows the MAX9737 to pass CE EMI limits with 1m cables using only a low-cost ferrite bead and small-value capacitor on each output. Comprehensive click-and-pop suppression circuitry reduces noise on power-up/down or into and out of shutdown or mute. An input op amp allows the user to create a lowpass or highpass filter, and select an optimal gain. The internal precharge circuit ensures clickless/popless turn-on within 10ms. The MAX9737 is available in the 24-pin, TQFN-EP package and is specified over the -40°C to +85°C temperature range.

II. Manufacturing Information

A. Description/Function:	Mono 7W Class D Amplifier
B. Process:	S4
C. Number of Device Transistors:	13839
D. Fabrication Location:	California
E. Assembly Location:	Taiwan
F. Date of Initial Production:	October 25, 2008

III. Packaging Information

A. Package Type:	4x4 24L TQFN Sawn
B. Lead Frame:	Copper
C. Lead Finish:	100% matte Tin
D. Die Attach:	Conductive
E. Bondwire:	Au (1.3 mil dia.)
F. Mold Material:	Epoxy with silica filler
G. Assembly Diagram:	#05-9000-3352 / A
H. Flammability Rating:	Class UL94-V0
I. Classification of Moisture Sensitivity per JEDEC standard J-STD-020-C	1
J. Single Layer Theta Ja:	48°C/W
K. Single Layer Theta Jc:	3°C/W
L. Multi Layer Theta Ja:	36°C/W
M. Multi Layer Theta Jc:	3°C/W

IV. Die Information

A. Dimensions:	94 X 91 mils
B. Passivation:	Si ₃ N 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:	Metal1 = 0.5 / Metal2 = 0.6 / Metal3 = 0.6 microns (as drawn)
F. Minimum Metal Spacing:	Metal1 = 0.45 / Metal2 = 0.5 / Metal3 = 0.6 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:	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 biased (static) life test are shown in Table 1. Using these results, the Failure Rate (λ) is calculated as follows:

$$\lambda = \frac{1}{\text{MTTF}} = \frac{1.83}{192 \times 4340 \times 47 \times 2} \quad (\text{Chi square value for MTTF upper limit})$$

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

$$\lambda = 23.4 \times 10^{-9}$$

$$\lambda = 23.4 \text{ F.I.T. (60\% confidence level @ 25°C)}$$

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 S4 Process results in a FIT Rate of 0.49 @ 25C and 8.49 @ 55C (0.8 eV, 60% UCL)

B. E.S.D. and Latch-Up Testing (ESD lot TQXZBA004C D/C 0935, Latch-Up lot TQXZAQ001E D/C 0826)

The AX11 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.

Table 1
Reliability Evaluation Test Results

MAX9737ETG+

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	47	0	TQXZAQ001E, D/C 0826

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