RELIABILITY REPORT

FOR

MAX9944ASA+T

PLASTIC ENCAPSULATED DEVICES

November 6, 2012

MAXIM INTEGRATED

160 RIO ROBLES

SAN JOSE, CA 95134

Approved by
Sokhom Chum
Quality Assurance
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Conclusion

The MAX9944ASA+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.

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I. Device Description

A. General

The MAX9943/MAX9944 is a family of high-voltage amplifiers that offers precision, low drift, and low power consumption. The MAX9943 (single) and MAX9944 (dual) op amps offer 2.4MHz of gain-bandwidth product with only 550µA of supply current per amplifier. The MAX9943/MAX9944 family has a wide power supply range operating from ±3V to ±19V dual supplies or a 6V to 38V single supply. The MAX9943/MAX9944 are ideal for sensor signal conditioning, high-performance industrial instrumentation and loop-powered systems (e.g., 4mA-20mA transmitters). The MAX9943 is offered in a space-saving 6-pin TDFN or 8-pin µMAX® package. The MAX9944 is offered in an 8-pin SO or an 8-pin TDFN package. These devices are specified over the -40°C to +125°C automotive temperature range.

II. Manufacturing Information

A. Description/Function:	High-Voltage, Precision, Low-Power Op Amps
B. Process:	BCD8
C. Number of Device Transistors:	160
D. Fabrication Location:	Oregon
E. Assembly Location:	Malaysia, Thailand, Philippines
F. Date of Initial Production:	April 23, 2009

III. Packaging Information

A. Package Type:	8-pin SOIC (N)
B. Lead Frame:	Copper
C. Lead Finish:	100% matte Tin
D. Die Attach:	Conductive
E. Bondwire:	Au (1 mil dia.)
F. Mold Material:	Epoxy with silica filler
G. Assembly Diagram:	#05-9000-3559
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:	170°C/W
K. Single Layer Theta Jc:	40°C/W
L. Multi Layer Theta Ja:	132°C/W
M. Multi Layer Theta Jc:	38°C/W

IV. Die Information

A. Dimensions:	70 X 93 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:	3.0 microns (as drawn)
F. Minimum Metal Spacing:	3.0 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:

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

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

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

$\lambda = 23.4$ 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 BCD8 Process results in a FIT Rate of 0.06 @ 25C and 1.08 @ 55C (0.8 eV, 60% UCL)

B. E.S.D. and Latch-Up Testing (lot JUBZAQ001E D/C 0903)

The OY34 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

MAX9944ASA+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	47	0	JUBZAQ001F, D/C 0903

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