



RELIABILITY REPORT
FOR
MAX9615AXA+T
PLASTIC ENCAPSULATED DEVICES

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MAXIM INTEGRATED

160 RIO ROBLES
SAN JOSE, CA 95134

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Conclusion

The MAX9615AXA+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 MAX9613/MAX9615 are low-power precision op amps with rail-to-rail inputs and rail-to-rail outputs. They feature precision MOS inputs powered from an internal charge pump to eliminate crossover distortion that is common to complementary input-pair type amplifier architectures. These devices are ideal for a large number of signal processing applications such as photodiode transimpedance amplifiers and filtering/amplification of a wide variety of signals in industrial equipment. The devices also feature excellent RF immunity, making them ideal for portable applications. The MAX9613/MAX9615 feature a self-calibration system (on power-up), eliminating the effects of temperature and power-supply variations. The MAX9613/MAX9615 are capable of operating from a 1.7V to 5.5V supply voltage over the 0°C to +70°C temperature range, and from 1.8V to 5.5V over the -40°C to +125°C automotive temperature range. Both singles and duals are available in tiny SC70 packages. The MAX9613 features a high-impedance output while in shutdown.

II. Manufacturing Information

A. Description/Function:	Low-Power, High-Efficiency, Single/Dual, Rail-to-Rail I/O Op Amps
B. Process:	S18
C. Number of Device Transistors:	2739
D. Fabrication Location:	USA
E. Assembly Location:	Thailand
F. Date of Initial Production:	August 6, 2010

III. Packaging Information

A. Package Type:	8-pin SC70
B. Lead Frame:	Copper
C. Lead Finish:	100% matte Tin
D. Die Attach:	Da_8006ns-2x
E. Bondwire:	Au (.8 mil dia.)
F. Mold Material:	Epoxy with silica filler
G. Assembly Diagram:	#05-9000-4165
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:	326°C/W
K. Single Layer Theta Jc:	115°C/W
L. Multi Layer Theta Ja:	326°C/W
M. Multi Layer Theta Jc:	115°C/W

IV. Die Information

A. Dimensions:	32.6772X40.9449 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:	0.23 microns (as drawn)
F. Minimum Metal Spacing:	0.23 microns (as drawn)
G. Isolation Dielectric:	SiO ₂
H. Die Separation Method:	Wafer Saw

V. Quality Assurance Information

A. Quality Assurance Contacts:	Eric Wright (Reliability Engineering) Brian Standley (Manager, Reliability) 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:

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

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

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

$$\lambda = 22.9 \text{ F.I.T. (60\% confidence level @ } 25^{\circ}\text{C)}$$

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 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

The OY39 die type has been found to have all pins able to withstand an 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
MAX9615AXA+T

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	COMMENTS
Static Life Test (Note 1)	Ta = 135C	DC Parameters & functionality	48	0	
	Biased Time = 192 hrs.				

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