RELIABILITY REPORT

FOR

MAX9586AZK+
MAX9586ATT

PLASTIC ENCAPSULATED DEVICES

April 10, 2009

MAXIM INTEGRATED PRODUCTS

120 SAN GABRIEL DR.

SUNNYVALE, CA 94086

Approved by
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Quality Assurance
Director, Reliability Engineering

Conclusion

The MAX9586+ 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 MAX9586-MAX9589 are small, low-power, multichannel video amplifiers with integrated reconstruction filters and input clamps. Specially suited for standard-definition video signals, these devices are ideal for a wide range of television and set-top box applications. The video signals from the outputs of a digital-to-analog converter (DAC) are AC-coupled to the inputs of the MAX9586-MAX9589. External video signals, in which the DC bias is usually not known, can also be AC-coupled to the inputs of the MAX9586-MAX9589. The input sync-tip clamps set the DC level of composite video or luma signals, and the input bias circuits set the DC level of chroma signals. The reconstruction filter typically has ±1dB passband flatness at 8.5MHz and 55dB attenuation at 27MHz. The amplifiers have 2V/V gain and the outputs can be DC-coupled to a 75 load, which is the equivalent of two video loads, or AC-coupled to a 150 load. The MAX9586-MAX9589 operate from a 2.7V to 3.6V single supply and are specified over the -40°C to +125°C automotive temperature range. The MAX9586-MAX9589 are offered in small SOT23 and µMAX® packages.

II. Manufacturing Information

A. Description/Function:	Single, Dual, Triple, and Quad Standard-Definition Video Filter Amplifiers with AC-Coupled Input Buffers
B. Process:	S4
C. Number of Device Transistors:	952
D. Fabrication Location:	California, Texas or Japan
E. Assembly Location:	Philippines or Thailand
F. Date of Initial Production:	10/22/2007

III. Packaging Information

A. Package Type:	5-pin TSOT	6-pin TQFN
B. Lead Frame:	Copper	Copper
C. Lead Finish:	100% matte Tin	100% matte Tin
D. Die Attach:	Conductive Epoxy	Conductive Epoxy
E. Bondwire:	Gold (1 mil dia.)	Gold (1 mil dia.)
F. Mold Material:	Epoxy with silica filler	Epoxy with silica filler
G. Assembly Diagram:	#05-9000-2674	#05-9000-2673
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:	365.1°C/W	55.0°C/W
K. K. Single Layer Theta Jc:	75°C/W	9.0°C/W

IV. Die Information

A. Dimensions:	54 X 34 mils
B. Passivation:	Si_3N_4/SiO_2 (Silicon nitride/ Silicon dioxide
C. Interconnect:	Al/0.5%Cu
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:	Ken Wendel (Director, Reliability Engineering) Bryan Preeshl (Managing Director 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)

$\lambda = 22.4 \times 10^{-9}$

λ = 22.4 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 Product Reliability Report found at http://www.maxim-ic.com/. Cumulative monitor data for the S4 Process results in a FIT Rate of 0.05 @ 25C and 0.83 @ 55C (0.8 eV, 60% UCL)

B. Moisture Resistance Tests

The industry standard 85°C/85%RH or HAST testing is monitored per device process once a quarter.

C. E.S.D. and Latch-Up Testing

The VA62 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

MAX9586+

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES
Static Life Test (Note 1)				
	Ta = 135°C Biased Time = 192 hrs.	DC Parameters & functionality	48	0
Moisture Testing (Note 2)				
85/85	Ta = 85°C RH = 85% Biased Time = 1000hrs.	DC Parameters & functionality	77	0
Mechanical Stress (Note 2)				
Temperature Cycle	-65°C/150°C 1000 Cycles Method 1010	DC Parameters & functionality	77	0

Note 1: Life Test Data may represent plastic DIP qualification lots.
Note 2: Generic Package/Process data