RELIABILITY REPORT

FOR

MAX9516ALB+

PLASTIC ENCAPSULATED DEVICES

April 13, 2009

MAXIM INTEGRATED PRODUCTS

120 SAN GABRIEL DR.

SUNNYVALE, CA 94086

Approved by
Ken Wendel
Quality Assurance
Director, Reliability Engineering

Conclusion

The MAX9516ALB+ 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.

Table of Contents

I. Device Description

A. General

Operating at 1.8V from a single power supply, the MAX9516 amplifies standard-definition video signals and only consumes 6mW quiescent power and 12mW average power. The MAX9516 leverages Maxim's DirectDrive(tm) technology. Combining DirectDrive with the external positive 1.8V supply, the MAX9516 is able to drive a 2VP-P video signal into a 150 load. The MAX9516 has the ability to detect and report the presence of a video load and reduce power consumption when the load is not present. The MAX9516 can detect the presence of a video load and report a change in load through the LOAD flag. This feature helps reduce overall system power consumption because the video encoder and the MAX9516 only need to be turned on when a video load is connected. If no load is connected, the MAX9516 is placed in an active-detect mode and only consumes 31µW. Maxim's DirectDrive technology eliminates large output-coupling capacitors and sets the output video black level near ground. DirectDrive requires an integrated charge pump and an internal linear regulator to create a clean negative power supply so that the amplifier can pull the sync below ground. The charge pump injects so little noise into the video output that the picture is visibly flawless. The MAX9516 features an internal reconstruction filter that smoothes the steps and reduces the spikes on the video signal from the video digital-to-analog converter (DAC). The reconstruction filter typically has ±1dB passband flatness of 7.5MHz, and 46dB (typ) attenuation at 27MHz. The input of the MAX9516 can be directly connected to the output of a video DAC. The MAX9516 also features a transparent input sync-tip clamp, allowing AC-coupling of input signals with different DC biases. The MAX9516 has an internal fixed gain of 8. The input full-scale video signal is nominally 0.25VP-P, and the output full-scale video signal is nominally 2V P-P.

II. Manufacturing Information

A. Description/Function:	1.8V, Ultra-Low-Power, DirectDrive Video Filter Amplifier with Load Detect
B. Process:	S4
C. Number of Device Transistors:	
D. Fabrication Location:	California
E. Assembly Location:	Hana Thailand
F. Date of Initial Production:	October 24, 2007

III. Packaging Information

A. Package Type:	10-pin uDFN
B. Lead Frame:	Substrate
C. Lead Finish:	Gold
D. Die Attach:	Non-conductive Epoxy
E. Bondwire:	Gold (1 mil dia.)
F. Mold Material:	Epoxy with silica filler
G. Assembly Diagram:	#05-9000-2609
H. Flammability Rating:	Class UL94-V0
I. Classification of Moisture Sensitivity per JEDEC standard J-STD-020-C	Level 1
J. Multi Layer Theta Ja:	198.6°C/W
K. Multi Layer Theta Jc:	122.1°C/W

IV. Die Information

A. Dimensions:	61 X 33 mils
B. Passivation:	Si_3N_4/SiO_2 (Silicon nitride/ Silicon dioxide
C. Interconnect:	Aluminum/Si (Si = 1%)
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:

$$\lambda = \frac{1}{\text{MTTF}} = \frac{1.83}{192 \times 4340 \times 48 \times 2}$$ (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 1000 hour life test monitors on its processes. This data is published in the Product Reliability Report found at http://www.maxim-ic.com/. Current monitor data for the S4 Process results in a FIT Rate of 0.28 @ 25C and 4.85 @ 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 MV08 die type has been found to have all pins able to withstand a HBM transient pulse of +/-2500 V per JEDEC JESD22-A114-D. Latch-Up testing has shown that this device withstands a current of +/-250 mA.

Table 1
Reliability Evaluation Test Results

MAX9516ALB+

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	-55ºC/125ºC 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

