RELIABILITY REPORT

FOR

MAX9513ATE+

PLASTIC ENCAPSULATED DEVICES

March 31, 2011

MAXIM INTEGRATED PRODUCTS

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Approved by
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Quality Assurance
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Conclusion

The MAX9513ATE+ 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 MAX9513 CVBS video filter amplifier with SmartSleep and bidirectional video support is ideal for portable DVD players and portable media players (PMPs). The input can be directly connected to the digital-to-analog converter (DAC) output. The reconstruction filter removes high-frequency signals above 6.75MHz. The amplifiers have 6dB of gain, and the outputs can be DC-coupled to a load of 75 , which is equivalent to two video loads, or can be AC-coupled to a load of 150 . The SmartSleep circuitry intelligently reduces power consumption based on the presence of the input signal and the output loads. When the MAX9513 does not detect the presence of sync on the input video signal, the supply current is reduced to less than 7µA. The device only enables a video amplifier when there is an active video input signal and an attached load. The video amplifier remains on while a load is connected. If the load is disconnected, the video amplifier is turned off. The MAX9513 contains one reconstruction filter, two video amplifiers, and a pulldown switch at one of the two CVBS outputs. The MAX9513 has the ability to control the bidirectional video signals at the CVBS video connections without the need for separate switches or relays. This feature is particularly useful for portable DVD players, which often use the same connector to drive a composite video output and to accept an external video signal to display on the LCD panel. The MAX9513 operates from a 2.7V to 3.6V single supply and is offered in a small 16-pin TQFN (3mm x 3mm) package. The device is specified over the -40°C to +125°C automotive temperature range.

II. Manufacturing Information

A. Description/Function:	CVBS Video Filter Amplifier with SmartSleep and Bidirectional Video Support
B. Process:	S4
C. Number of Device Transistors:	
D. Fabrication Location:	California
E. Assembly Location:	China, Malaysia, Philippines, Thailand
F. Date of Initial Production:	July 21, 2006

III. Packaging Information

A. Package Type:	16-pin TQFN 3x3
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:	#05-9000-2435
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:	64°C/W
K. Single Layer Theta Jc:	7.0°C/W
L. Multi Layer Theta Ja:	48°C/W
M. Multi Layer Theta Jc:	7.0°C/W

IV. Die Information

A. Dimensions:	60 X 61 mils
B. Passivation:	Si_3N_4/SiO_2 (Silicon nitride/ Silicon dioxide)
C. Interconnect:	Al 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 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'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 0.05 @ 25C and 0.83 @ 55C (0.8 eV, 60% UCL)

B. E.S.D. and Latch-Up Testing (lot SS90AQ001E D/C 0611)

The MV01 die type has been found to have all pins able to withstand a HBM transient pulse of +/-1500V per JEDEC JESD22-A114. Latch-Up testing has shown that this device withstands a current of +/-250mA.

Table 1
Reliability Evaluation Test Results

MAX9513ATE+

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	45	0	SS90AQ001D, D/C 0548

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