RELIABILITY REPORT

FOR

MAX9597CTI+

PLASTIC ENCAPSULATED DEVICES

September 4, 2009

MAXIM INTEGRATED PRODUCTS

120 SAN GABRIEL DR.

SUNNYVALE, CA 94086

Approved by
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Director, Reliability Engineering

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Conclusion

The MAX9597CTI+ 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

II. ....Manufacturing Information

III. ....Packaging Information

.....Attachments

V. ....Quality Assurance Information

VI. ....Reliability Evaluation

IV. ....Die Information

I. Device Description

A. General

The MAX9597 single SCART interface routes audio and video signals between a set-top box decoder chip and an external SCART connector under I²C control. Operating from a 3.3V supply and a 12V supply, the MAX9597 consumes 53mW during quiescent operation and 254mW during average operation when driving typical signals into typical loads. The MAX9597 audio section contains left and right audio paths with an independent operational amplifier at the inputs. The DirectDrive® output amplifiers create a 2VRMS full-scale audio signal biased around ground, eliminating the need for bulky output capacitors and reducing click-and-pop noise. The zero-cross detection circuitry also further reduces clicks and pops by enabling audio sources to switch only during a zero-crossing. The MAX9597 video section contains 4 channels of video filter amplifiers. The standard-definition video signals from the set-top box decoder chip are lowpass filtered to remove out-of-bandwidth artifacts. The MAX9597 also supports slow-switching and fast-switching signals. The MAX9597 is available in a compact 28-pin thin QFN package and is specified over the 0°C to +70°C commercial temperature range.

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II. Manufacturing Information

A. Description/Function:	Low-Power Audio/Video Interface for Single SCART Connectors
B. Process:	S4
C. Number of Device Transistors:	11381
D. Fabrication Location:	California, Texas or Japan
E. Assembly Location:	Thailand
F. Date of Initial Production:	Pre 1997

III. Packaging Information

A. Package Type:	28-pin TQFN 5x5
B. Lead Frame:	Copper
C. Lead Finish:	100% matte Tin
D. Die Attach:	Conductive
E. Bondwire:	Au (.001"Au mil dia.)
F. Mold Material:	Epoxy with silica filler
G. Assembly Diagram:	#05-9000-3119
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:	47°C/W
K. Single Layer Theta Jc:	1.7°C/W
L. Multi Layer Theta Ja:	29°C/W
M. Multi Layer Theta Jc:	1.7°C/W

IV. Die Information

A. Dimensions:	77 X 77 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

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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:

$$\lambda = \frac{1}{MTTF} = \frac{1.83}{192 \times 4340 \times 95 \times 2}$$ (Chi square value for MTTF upper limit)

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

$\lambda = 11.3 \times 10^{-9}$

λ = 11.3 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. 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 VA67 die type has been found to have all pins able to withstand a transient pulse of:

HBM: +/-2500 V per JEDEC JESD22-A114

MM: +/-200V Per JEDEC JESD22-A115

Latch-Up testing has shown that this device withstands a current of +/-250 mA, 1.5X VCCMax Overvoltage.

Table 1
Reliability Evaluation Test Results

MAX9597CTI+

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	0	0
Moisture Testing (Note 2)				
HAST	Ta = 130°C RH = 85% Biased Time = 96hrs.	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

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