RELIABILITY REPORT

FOR

MAX9671CTH+

PLASTIC ENCAPSULATED DEVICES

March 8, 2010

MAXIM INTEGRATED PRODUCTS

120 SAN GABRIEL DR.

SUNNYVALE, CA 94086

Approved by
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Quality Assurance
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Conclusion

The MAX9671CTH+ 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 MAX9670/MAX9671 dual SCART matrices route audio and video signals between a set-top box decoder chip and two external SCART connectors under I2C control. Operating from a 3.3V supply and a 12V supply, the MAX9670/MAX9671 consume 70mW during quiescent operation and 471mW during average operation when driving typical signals into typical loads. Video input detection, video load detection, and a 2mW standby mode facilitate the design of intelligent, low-power set-top boxes. The MAX9670/MAX9671 audio section contains a buffered crosspoint to route audio inputs to audio outputs and programmable volume control from -62dB to 0dB in 2dB steps. 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 MAX9671 offers TV left and right audio inputs. The MAX9670/MAX9671 video section contains a buffered crosspoint to route video inputs to video outputs. The standard-definition video signals from the set-top box decoder chip are lowpass filtered to remove out-of-band artifacts. The MAX9670/MAX9671 also support slow-switching and fast-switching signals. An interrupt signal from the MAX9670/MAX9671 informs the microcontroller when the system status has changed.

II. Manufacturing Information

A. Description/Function:	Low-Power Audio/Video Switches with Audio Volume Control for Dual SCART Connectors
B. Process:	S4
C. Number of Device Transistors:	23344
D. Fabrication Location:	Texas
E. Assembly Location:	Philippines, Thailand
F. Date of Initial Production:	June 23, 2009

III. Packaging Information

A. Package Type:	44-pin TQFN 7x7
B. Lead Frame:	Copper
C. Lead Finish:	100% matte Tin
D. Die Attach:	Conductive Epoxy
E. Bondwire:	Au (1.0 mil dia.)
F. Mold Material:	Epoxy with silica filler
G. Assembly Diagram:	#05-9000-3391
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:	38°C/W
K. Single Layer Theta Jc:	1.4°C/W
L. Multi Layer Theta Ja:	27°C/W
M. Multi Layer Theta Jc:	1.4°C/W

IV. Die Information

A. Dimensions:	102 X 102 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:	Richard Aburano (Manager, Reliability Operations) 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)

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

$\lambda = 22.4$ 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 4.6 @ 25C and 79.2 @ 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 VA71 die type has been found to have all pins able to withstand a transient pulse of

ESD-HBM:	+/- 1500V per JEDEC JESD22-A114
ESD-CDM:	+/- 750V per JEDEC JESD22-C101
ESD-MM:	+/- 200V per JEDEC JESD22-A115

Latch-Up testing has shown that this device withstands a current of +/- 100mA and overvoltage per JEDEC JESD78.

Table 1
Reliability Evaluation Test Results

MAX9671CTH+

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