RELIABILITY REPORT

FOR

MAX9263GCB/V+T

PLASTIC ENCAPSULATED DEVICES

November 29, 2011

MAXIM INTEGRATED PRODUCTS

120 SAN GABRIEL DR.

SUNNYVALE, CA 94086

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Conclusion

The MAX9263GCB/V+T 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 MAX9263/MAX9264 chipset extends Maxim's gigabit multimedia serial link (GMSL) technology to include high-bandwidth digital content protection (HDCP) encryption for content protection of DVD and Blu-ray(tm) video and audio data. The MAX9263 serializer, or any HDCP-GMSL serializer, pairs with the MAX9264 deserializer, or any HDCP-GMSL deserializer, to form a digital serial link for the transmission of control data and HDCP encrypted video and audio data. GMSL is an HDCP technology approved protocol by Digital Content Protection (DCP), LLC. The parallel interface is programmable for 24-bit or 32-bit width and operates with a pixel clock of 8.33MHz to 104MHz (24 bit) or 6.25MHz to 78MHz (32 bit). When programmed for 24-bit or 32-bit width, three inputs are for I²S audio, supporting a sampling frequency from 8kHz to 192kHz and a sample depth of 4 bits to 32 bits. The embedded control channel forms a full-duplex differential 9.6kbps to 1Mbps UART link between the serializer and deserializer. An electronic control unit (ECU), or microcontroller (µC), can be located on the serializer side of the link (typical for video display), on the deserializer side of the link (typical for image sensing), or on both sides (typical for HDCP video display repeaters). The control channel enables ECU/µC control of peripherals on the remote side, such as backlight control, touch screen, and perform HDCP-related operations. The serial link signaling is AC-coupled CML with 8b/10b coding. For driving longer cables, the serializer has programmable pre/deemphasis, and the deserializer has a programmable channel equalizer. The GMSL devices have programmable spread spectrum on the serial (serializer) and parallel (deserializer) output. The serial link input and output meet ISO 10605 and IEC 61000-4-2 ESD standards. The serializer core supply is 1.8V and the deserializer core supply is 3.3V. The I/O supply is 1.8V to 3.3V. Both devices are available in a 64-pin TQFP package with an exposed pad and are specified over the -40°C to +105°C automotive temperature range.

II. Manufacturing Information

A. Description/Function:	HDCP Gigabit Multimedia Serial Link Serializer/Deserializer
B. Process:	0.18µm CMOS
C. Number of Device Transistors:	652852
D. Fabrication Location:	Taiwan
E. Assembly Location:	Korea
F. Date of Initial Production:	December 21, 2010

III. Packaging Information

A. Package Type:	64-pin TQFP
B. Lead Frame:	Copper
C. Lead Finish:	100% matte Tin
D. Die Attach:	Conductive
E. Bondwire:	Au (0.8 mil dia.)
F. Mold Material:	Epoxy with silica filler
G. Assembly Diagram:	#05-9000-4172
H. Flammability Rating:	Class UL94-V0
I. Classification of Moisture Sensitivity per JEDEC standard J-STD-020-C	Level 3
J. Single Layer Theta Ja:	°C/W
K. Single Layer Theta Jc:	°C/W
L. Multi Layer Theta Ja:	31.9°C/W
M. Multi Layer Theta Jc:	1°C/W

IV. Die Information

A. Dimensions:	165.35X163.78 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 = 0.23 / Metal 2-5 = 0.28 / Metal6 = 0.44 micron (as drawn)
F. Minimum Metal Spacing:	Metal1 = 0.23 / Metal 2-5 = 0.28 / Metal6 = 0.46 micron (as drawn)
G. Bondpad Dimensions:	
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 125°C biased (static) life test are shown in Table 1. Using these results, the Failure Rate (λ) is calculated as follows:

$$\lambda = \frac{1}{MTTF} = \frac{1.83}{192 \times 2454 \times 250 \times 2}$$ (Chi square value for MTTF upper limit)

(where 2454 = Temperature Acceleration factor assuming an activation energy of 0.8eV)

$\lambda = 7.8 \times 10^{-9}$

λ = 7.8 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 TS18 Process results in a FIT Rate of 0.7 @ 25C and 12.3 @ 55C (0.8 eV, 60% UCL)

B. E.S.D. and Latch-Up Testing (lots QO5ZBQ002B, D/C 1112; QO5ZAQ001B, D/C 1020)

The HS44 die type has been found to have all pins able to withstand a transient pulse of:

ESD-HBM:	+/- 4000V all pins per JEDEC JESD22-A114, +/- 8000V CML pins to AGND
ESD-CDM:	+/- 250V per JEDEC JESD22-C101
ESD-MM:	+/- 200V per JEDEC JESD22-A115
ESD gun (contact):	+/- 10kV CML pins per ISO10605, +/- 10kV CML pins per IEC61000-4-2
ESD gun (air gap):	+/- 25kV CML pins per ISO10605, +/- 12kV CML pins per IEC61000-4-2

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

Table 1
Reliability Evaluation Test Results

MAX9263GCB/V+T

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	COMMENTS
Static Life Test (Note 1)					
	Ta = 125°C	DC Parameters	92	0	QO5ZBQ001D, D/C 1035
	Biased	& functionality	78	0	QO5ZBQ003B, D/C 1116
	Time = 192 hrs.		80	0	QO5ZBA004A, D/C 1119

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