RELIABILITY REPORT

FOR

MAX108CHC-D

PLASTIC ENCAPSULATED DEVICES

October 6, 2009

MAXIM INTEGRATED PRODUCTS

120 SAN GABRIEL DR.

SUNNYVALE, CA 94086

Approved by
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Quality Assurance
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Conclusion

The MAX108CHC-D 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 MAX108 PECL-compatible, 1.5Gsps, 8-bit ultra high-speed analog-to-digital converter (ADC) allows accurate digitizing of analog signals with bandwidths to 2.2GHz. Fabricated on Maxim's proprietary advanced GST-2 bipolar process, the MAX108 integrates a high-performance track/hold (T/H) amplifier and a quantizer on a single monolithic die. The innovative design of the internal T/H, which has an exceptionally wide 2.2GHz full-power input bandwidth, results in high performance (typically 7.5 effective bits) at the Nyquist frequency. A fully differential comparator design and decoding circuitry reduce out-of-sequence code errors (thermometer bubbles or sparkle codes) and provide excellent metastable performance. Unlike other ultra high-speed ADCs that can have errors resulting in false full- or zero-scale outputs, the MAX108 limits the error magnitude to 1 LSB. The analog input is designed for either differential or single-ended use with a ±250mV input voltage range. Dual, differential, positive-referenced emitter-coupled logic (PECL)-compatible output data paths ensure easy interfacing and include an 8:16 demultiplexer feature that reduces output data rates to one-half the sampling clock rate. The PECL outputs can be operated from any supply between +3V to +5V for compatibility with +3.3V or +5V referenced systems. Control inputs are provided for interleaving additional MAX108 devices to increase the effective system sampling rate. The MAX108 is packaged in a 25mm x 25mm, 192-contact Enhanced Super Ball-Grid Array (ESBGA(tm)) and is specified over the commercial (0°C to +70°C) temperature range. For pin-compatible, lower speed versions of the MAX108, see the MAX104 (1Gsps) and the MAX106 (600Msps) data sheets.

II. Manufacturing Information

A. Description/Function:	±5V, 1.5Gsps, 8-Bit, Ultra High-Speed, A to D Converter with On-Chip 2.2GHz Track/Hold Amplifier
B. Process:	GST2
C. Number of Device Transistors:	
D. Fabrication Location:	Oregon
E. Assembly Location:	Philippines
F. Date of Initial Production:	September 22, 1999

III. Packaging Information

A. Package Type:	97-pin SBGA
B. Lead Frame:	N/A
C. Lead Finish:	None- Eutectic SnPb balls
D. Die Attach:	Qmi595 Epoxy
E. Bondwire:	Gold (1.2 mil dia.)
F. Mold Material:	Epoxy with silica filler
G. Assembly Diagram:	#05-7001-0368
H. Flammability Rating:	Class UL94-V0
I. Classification of Moisture Sensitivity per JEDEC standard J-STD-020-C	Level 3
J. Multi Layer Theta Ja:	19°C/W
K. Multi Layer Theta Jc:	2°C/W

IV. Die Information

A. Dimensions:	155 X 197 mils
B. Passivation:	Si_3N_4 (Silicon nitride)
C. Interconnect:	Au
D. Backside Metallization:	None
E. Minimum Metal Width:	2 microns (as drawn)
F. Minimum Metal Spacing:	2 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 150°C biased (static) life test are shown in Table 1. Using these results, the Failure Rate (λ) is calculated as follows:

$$\lambda = \frac{1}{MTTF} = \frac{1.83}{192 \times 4340 \times 80 \times 2}$$ (Chi square value for MTTF upper limit)

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

$\lambda = 6.0 \times 10^{-9}$

λ = 6.0 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 GST2 Process results in a FIT Rate of 0.06 @ 25C and 1.10 @ 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 AD79 die type has been found to have all pins able to withstand a HBM transient pulse of +/-1000 V per Mil-Std 883 Method 3015.7. Latch-Up testing has shown that this device withstands a current of +/-250 mA.

Table 1

Reliability Evaluation Test Results

MAX108CHC-D

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES
Static Life Test (Note 1)				
	Ta = 150°C Biased Time = 192 hrs.	DC Parameters & functionality	80	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