RELIABILITY REPORT

FOR

MAX1200EMH

PLASTIC ENCAPSULATED DEVICES

February 5, 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 MAX1200EMH 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

A. General

The MAX1200 16-bit, monolithic, analog-to-digital converter (ADC) is capable of conversion rates up to 1Msps. This CMOS integrated circuit uses a fully differential, pipelined architecture with digital error correction and a short self-calibration to ensure 16-bit linearity at full sample rates. An on-chip track/hold (T/H) maintains superb dynamic performance up to the Nyquist frequency. The MAX1200 operates from a single +5V supply.

The fully differential inputs allow an input swing of ±VREF. The reference is also differential with the positive reference (RFPF) typically connected to +4.096V and the negative reference (RFNF) connected to analog ground. Additional sensing pins (RFPS, RFNS) are provided to compensate for any resistive divider action that may occur. A single-ended input is also possible using two operational amplifiers.

Power dissipation is typically only 273mW at +5V, at a sampling rate of 1Msps. The device employs a CMOS-compatible, 16-bit parallel, two's complement output data format. For a higher sampling speed (up to 2.2Msps) but lower resolution (14-bit), select the MAX1201, a pin-compatible version of the MAX1200.

The MAX1200 is available in an MQFP package and operates over the commercial (0°C to +70°C) and extended-industrial (-40°C to +85°C) temperature ranges.

II. Manufacturing Information

A. Description/Function:	+5V Single-Supply, 1Msps, 16-Bit Self-Calibrating ADC
B. Process:	TS602P2ME
C. Number of Device Transistors:	
D. Fabrication Location:	Taiwan
E. Assembly Location:	Philippines
F. Date of Initial Production:	1/21/1999

III. Packaging Information

A. Package Type:	44-pin MQFP
B. Lead Frame:	Copper
C. Lead Finish:	85Sn/15Pb plate
D. Die Attach:	Conductive Epoxy
E. Bondwire:	Au (1.3 mil dia.)
F. Mold Material:	Epoxy with silica filler
G. Assembly Diagram:	#05-0101-0451
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:	79°C/W
K. Single Layer Theta Jc:	21°C/W
L. Multi Layer Theta Ja:	64.6°C/W
M. Multi Layer Theta Jc:	21°C/W

IV. Die Information

A. Dimensions:	246 X 218 mils
B. Passivation:	Si_3N_4/SiO_2 (Silicon nitride/ Silicon dioxide)
C. Interconnect:	Aluminum/Si (Si = 1%)
D. Backside Metallization:	None
E. Minimum Metal Width:	Metal 1 - 0.9 microns / Metal 2 - 0.9 microns (as drawn)
F. Minimum Metal Spacing:	Metal 1 - 0.9 microns / Metal 2 - 0.9 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 135°C biased (static) life test are shown in Table 1. Using these results, the Failure Rate (λ) is calculated as follows:

$$\lambda = \frac{1}{MTTF} = \frac{1.83}{192 \times 4340 \times 39 \times 2}$$ (Chi square value for MTTF upper limit)

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

$\lambda = 28.2 \times 10^{-9}$

$\lambda = 28.2$ 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 TS602P2ME Process results in a FIT Rate of 0.5 @ 25C and 8.57 @ 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 AD71 die type has been found to have all pins able to withstand a HBM transient pulse of +/-350 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

MAX1200EMH

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	39	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