RELIABILITY REPORT

FOR

MAX1206ETL+

PLASTIC ENCAPSULATED DEVICES

September 30, 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 MAX1206ETL+ 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 MAX1206 is a 3.3V, 12-bit analog-to-digital converter (ADC) featuring a fully differential wideband track-and-hold (T/H) input, driving the internal quantizer. The MAX1206 is optimized for low power, small size, and high dynamic performance. This ADC operates from a single 3.0V to 3.6V supply, consuming only 159mW, while delivering a typical signal-to-noise ratio (SNR) performance of 68.6dB at a 20MHz input frequency. The T/H-driven input stage accepts single-ended or differential inputs. In addition to low operating power, the MAX1206 features a 0.15mW power-down mode to conserve power during idle periods. A flexible reference structure allows the MAX1206 to use its internal precision bandgap reference or accept an externally applied reference. A common-mode reference is provided to simplify design and reduce external component count in differential analog input circuits. The MAX1206 supports both a single-ended and differential input clock drive. Wide variations in the clock duty cycle are compensated with the ADC's internal duty-cycle equalizer. The MAX1206 features parallel, CMOS-compatible outputs. The digital output format is pin selectable to be either two's complement or Gray code. A data-valid indicator eliminates external components that are normally required for reliable digital interfacing. A separate power input for the digital outputs accepts a voltage from 1.7V to 3.6V for flexible interfacing with various logic levels. The MAX1206 is available in a 6mm x 6mm x 0.8mm, 40- pin thin QFN package with exposed paddle (EP), and is specified for the extended industrial (-40°C to +85°C) temperature range. Refer to the MAX1209 and MAX1211 (see *Pin-Compatible Higher/Speed Versions* table) for applications that require high dynamic performance for IF input frequencies. See a parametric table of the complete family of pin-compatible, 12-/14-bit high-speed ADCs.

II. Manufacturing Information

A. Description/Function:	12-Bit, 40Msps ADC
B. Process:	TS18
C. Number of Device Transistors:	
D. Fabrication Location:	Taiwan
E. Assembly Location:	Thailand
F. Date of Initial Production:	April 23, 2004

III. Packaging Information

A. Package Type:	40-pin TQFN 6x6
B. Lead Frame:	Copper
C. Lead Finish:	100% matte Tin
D. Die Attach:	Conductive
E. Bondwire:	Au (1 mil dia.)
F. Mold Material:	Epoxy with silica filler
G. Assembly Diagram:	
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:	133 X 124 mils
B. Passivation:	Si_3N_4/SiO_2 (Silicon nitride/ Silicon dioxide)
C. Interconnect:	Al/0.5%Cu with Ti/TiN Barrier
D. Backside Metallization:	None
E. Minimum Metal Width:	0.18µm F.
Minimum Metal Spacing:	0.18µm
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:	Don Lipps (Manager, 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 biased (static) life test are shown in Table 1. Using these results, the Failure Rate (λ) is calculated as follows:

$$\lambda = \frac{1}{MTTF} = \frac{1.83}{192 \times 4340 \times 186 \times 2}$$ (Chi square value for MTTF upper limit)

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

$\lambda = 5.9 \times 10^{-9}$

λ = 5.9 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 Process results in a FIT Rate of @ 25C and @ 55C (0.8 eV, 60% UCL)

B. E.S.D. and Latch-Up Testing (lot QM02AQ001B, D/C 0508)

The CA04 die type has been found to have all pins able to withstand a HBM transient pulse of +/-2500V per JEDEC JESD22-A114. Latch-Up testing has shown that this device withstands a current of +/-250mA.

Table 1

Reliability Evaluation Test Results

MAX1206ETL+

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	COMMENTS
Static Life Test (Note 1)					
	Ta = 135°C	DC Parameters	48	0	QM02AQ001B, DC 0508
	Biased	& functionality	48	0	QM01CQ001B, DC 0508
	Time = 192 hrs.		45	0	QM01AQ001K, DC 0418
			45	0	QM00BQ001C, DC 0322

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