RELIABILITY REPORT

FOR

MAX1183ECM+

PLASTIC ENCAPSULATED DEVICES

November 20, 2009

MAXIM INTEGRATED PRODUCTS

120 SAN GABRIEL DR.

SUNNYVALE, CA 94086

Approved by
Ken Wendel
Quality Assurance
Director, Reliability Engineering

Conclusion

The MAX1183ECM+ 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 MAX1183 is a 3V, dual 10-bit analog-to-digital converter (ADC) featuring fully differential wideband track-and-hold (T/H) inputs, driving two pipelined, nine-stage ADCs. The MAX1183 is optimized for low-power, high dynamic performance applications in imaging, instrumentation, and digital communication applications. This ADC operates from a single 2.7V to 3.6V supply, consuming only 120mW while delivering a typical signal-to-noise ratio (SNR) of 59.6dB at an input frequency of 20MHz and a sampling rate of 40Msps. The T/H driven input stages incorporate 400MHz (-3dB) input amplifiers. The converters may also be operated with single-ended inputs. In addition to low operating power, the MAX1183 features a 2.8mA sleep mode as well as a 1µA power-down mode to conserve power during idle periods.

An internal 2.048V precision bandgap reference sets the full-scale range of the ADC. A flexible reference structure allows the use of this internal or an externally derived reference, if desired for applications requiring increased accuracy or a different input voltage range. The MAX1183 features parallel, CMOS-compatible three-state outputs. The digital output format can be set to two's complement or straight offset binary through a single control pin. The device provides for a separate output power supply of 1.7V to 3.6V for flexible interfacing. The MAX1183 is available in a 7mm x 7mm, 48-pin TQFP package, and is specified for the extended industrial (-40°C to +85°C) temperature range.

Pin-compatible lower and higher speed versions of the MAX1183 are also available. See Table 2 at end of data sheet for a list of pin-compatible versions. Refer to the MAX1180 data sheet for 105Msps, the MAX1181 data sheet for 80Msps, the MAX1182 data sheet for 65Msps, and the MAX1184 data sheet for 20Msps. In addition to these speed grades, this family includes a multiplexed output version, for which digital data is presented time-interleaved and on a single, parallel 10-bit output port.

II. Manufacturing Information

A. Description/Function:	Dual 10-Bit, 40Msps, 3V, Low-Power ADC with Internal Reference and Parallel Outputs
B. Process:	TS35
C. Number of Device Transistors:	
D. Fabrication Location:	Taiwan
E. Assembly Location:	Korea
F. Date of Initial Production:	10/25/2001

III. Packaging Information

A. Package Type:	48-pin TQFP
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:	#05-9000-1211
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:	32.9°C/W
K. Multi Layer Theta Jc:	2°C/W

IV. Die Information

A. Dimensions:	101 X 139 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:	0.35µm
F. Minimum Metal Spacing:	0.35µm
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:

$$\lambda = \frac{1}{MTTF} = \frac{1.83}{192 \times 4340 \times 160 \times 2}$$ (Chi square value for MTTF upper limit)

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

$\lambda = 6.71 \times 10^{-9}$

$\lambda = 6.71$ 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 TS35 Process results in a FIT Rate of 0.11 @ 25C and 1.93 @ 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 AC26-1 die type has been found to have all pins able to withstand a HBM transient pulse of +/-1500 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

MAX1183ECM+

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	160	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