RELIABILITY REPORT

FOR

MAX1197ECM+D

PLASTIC ENCAPSULATED DEVICES

March 7, 2014

MAXIM INTEGRATED

160 RIO ROBLES

SAN JOSE, CA 95134

Approved by
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Quality Assurance
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Conclusion

The MAX1197ECM+D successfully meets the quality and reliability standards required of all Maxim Integrated products. In addition, Maxim Integrated's continuous reliability monitoring program ensures that all outgoing product will continue to meet Maxim Integrated's quality and reliability standards.

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I. Device Description

A. General

The MAX1197 is a 3V, dual, 8-bit analog-to-digital converter (ADC) featuring fully differential wideband track-and-hold (T/H) inputs, driving two ADCs. The MAX1197 is optimized for low-power, small size, and high-dynamic performance for applications in imaging, instrumentation and digital communications. This ADC operates from a single 2.7V to 3.6V supply, consuming only 120mW while delivering a typical signal-to-noise and distortion (SINAD) of 48.5dB at an input frequency of 30MHz and a sampling rate of 60Msps. 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 MAX1197 features a 3mA sleep mode as well as a 0.1µA 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 applied reference, if desired, for applications requiring increased accuracy or a different input voltage range. The MAX1197 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 with various logic families. The MAX1197 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. See a parametric table of the complete family of pin-compatible, 8-bit high-speed ADCs. For a 10-bit, pin-compatible upgrade, refer to the MAX1182 data sheet. With the N.C. pins of the MAX1197 internally pulled down to ground, this ADC becomes a drop-in replacement for the MAX1182.

II. Manufacturing Information

A. Description/Function:	Dual, 8-Bit, 60Msps, 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:	April 26, 2002

III. Packaging Information

A. Package Type:	48-pin TQFP
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:	#05-2101-0058
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:	N/A
K. Single Layer Theta Jc:	N/A
L. Multi Layer Theta Ja:	32.9°C/W
M. Multi Layer Theta Jc:	2°C/W

IV. Die Information

A. Dimensions:	101X139 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:	0.35um
F. Minimum Metal Spacing:	0.35um
G. Bondpad Dimensions:	
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 (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 135uC biased (static) life test are shown in Table 1. Using these results, the Failure Rate (λ) is calculated as follows:

$$\lambda = \frac{1}{MTTF} = \frac{1.83}{192 \times 4340 \times 140 \times 2}$$ (Chi square value for MTTF upper limit)

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

$\lambda = 7.85 \times 10^{-9}$

$\lambda = 7.85$ F.I.T. (60% confidence level @ 25°C)

The following failure rate represents data collected from Maxim Integrated's reliability monitor program. Maxim Integrated performs quarterly life test monitors on its processes. This data is published in the Reliability Report found at http://www.maximintegrated.com/qa/reliability/monitor. Cumulative monitor data for the TS35 Process results in a FIT Rate of 0.11 @ 25C and 1.80 @ 55C (0.8 eV, 60% UCL).

B. E.S.D. and Latch-Up Testing (lot QG80AQ001J D/C 0214)

The AC41 die type has been found to have all pins able to withstand a HBM transient pulse of +/-800V per Mil-Std 883 Method 3015.7. Latch-Up testing has shown that this device withstands a current of +/-250mA.

Table 1
Reliability Evaluation Test Results

MAX1197ECM+D

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	COMMENTS
Static Life Test (Note 1)					
	Ta = 135°C	DC Parameters	50	0	QG80CQ002B, D/C 0334
	Biased	& functionality	45	0	QG81BQ001B, D/C 0334
	Time = 192 hrs.		45	0	QG80AQ001J, D/C 0214

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