RELIABILITY REPORT

FOR

MAX1290ACEI+

PLASTIC ENCAPSULATED DEVICES

January 12, 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 MAX1290ACEI+ 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 MAX1290/MAX1292 low-power, 12-bit analog-to-digital converters (ADCs) feature a successive-approximation ADC, automatic power-down, fast wake-up (2µs), an on-chip clock, +2.5V internal reference, and a high-speed, byte-wide parallel interface. The devices operate with a single +5V analog supply and feature a VLOGIC pin that allows them to interface directly with a +2.7V to +5.5V digital supply. Power consumption is only 10mW (VDD = VLOGIC) at a 400ksps max sampling rate. Two software-selectable power-down modes enable the MAX1290/MAX1292 to be shut down between conversions; accessing the parallel interface returns them to normal operation. Powering down between conversions can cut supply current to under 10µA at reduced sampling rates. Both devices offer software-configurable analog inputs for unipolar/bipolar and single-ended/pseudo-differential operation. In single-ended mode, the MAX1290 has eight input channels and the MAX1292 has four input channels (four and two input channels, respectively, when in pseudo-differential mode). Excellent dynamic performance and low power, combined with ease of use and small package size, make these converters ideal for battery-powered and data-acquisition applications or for other circuits with demanding power consumption and space requirements. The MAX1290/MAX1292 tri-states active-low INT when active-low CS goes high. Refer to MAX1262/MAX1264 if tri-stating active-low INT is not desired. The MAX1290 is available in a 28-pin QSOP package, while the MAX1292 comes in a 24-pin QSOP. For pin-compatible +3V, 12-bit versions, refer to the MAX1291/MAX1293 data sheet.

II. Manufacturing Information

A. Description/Function:	400ksps, +5V, 8-/4-Channel, 12-Bit ADCs with +2.5V Reference and Parallel Interface
B. Process:	B12
C. Number of Device Transistors:	
D. Fabrication Location:	Oregon, California or Texas
E. Assembly Location:	Malaysia, Philippines, Thailand
F. Date of Initial Production:	April 24, 1999

III. Packaging Information

A. Package Type:	28-pin QSOP
B. Lead Frame:	Copper
C. Lead Finish:	100% matte Tin
D. Die Attach:	Conductive
E. Bondwire:	Au (1.3 mil dia.)
F. Mold Material:	Epoxy with silica filler
G. Assembly Diagram:	#05-0101-0490
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:	93°C/W
K. Single Layer Theta Jc:	27°C/W
L. Multi Layer Theta Ja:	79.3°C/W
M. Multi Layer Theta Jc:	27°C/W

IV. Die Information

A. Dimensions:	86 X 160 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:	1.2 microns (as drawn)
F. Minimum Metal Spacing:	1.2 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 135°C biased (static) life test are shown in Table 1. Using these results, the Failure Rate (λ) is calculated as follows:

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

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

$\lambda = 13.4 \times 10^{-9}$

λ = 13.4 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 B12 Process results in a FIT Rate of 0.06 @ 25C and 1.06 @ 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 AD92 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

MAX1290ACEI+

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	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