RELIABILITY REPORT

FOR

MAX1361EUB+

PLASTIC ENCAPSULATED DEVICES

October 20, 2009

MAXIM INTEGRATED PRODUCTS

120 SAN GABRIEL DR.

SUNNYVALE, CA 94086

Approved by
Ken Wendel
Quality Assurance
Director, Reliability Engineering

Maxim Integrated Products. All rights reserved.

Conclusion

The MAX1361EUB+ 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 MAX1361/MAX1362 low-power, 10-bit, 4-channel, analog-to-digital converters (ADCs) feature a digitally programmable window comparator with an interrupt output for automatic system-monitoring applications. Once configured, monitor mode automatically asserts an interrupt when any analog input exceeds the programmed upper or lower thresholds, without interaction to the host. The MAX1361/MAX1362 respond to the SMBus(tm) alert, allowing quick identification of the alarming device on a shared interrupt. A programmable delay between monitoring intervals lowers power consumption at reduced monitoring rates. In addition, the MAX1361/MAX1362 integrate an internal voltage reference, a clock, and a 1.7MHz, highspeed, I²C-compatible, 2-wire, serial interface. The optimized interface allows a maximum conversion rate of 94.4ksps in normal mode while reading back the conversion results. Each of the four analog inputs is configurable for single-ended or fully differential operation and unipolar or bipolar operation. Two scan modes utilize on-chip random access memory (RAM) to allow eight conversions of a selected channel or scanning of a group of channels to reduce interface overhead. These devices operate from a single 2.7V to 3.6V (MAX1361) or 4.5V to 5.5V (MAX1362) supply and require only 436µA at the maximum sampling rate of 150ksps in monitor mode and 670µA at the maximum sampling rate of 94.4ksps. AutoShutdown(tm) powers down the devices between conversions, reducing supply current to less than 0.5µA when idle. The full-scale analog-input range is determined by the internal reference or by an externally applied reference voltage ranging from 1V to VDD . The MAX1361 features a 2.048V internal reference, and the MAX1362 features a 4.096V internal reference. The MAX1361/MAX1362 are available in a 10-pin µMAX®; package and are specified over the extended (-40°C to +85°C) temperature range. For 12-bit applications, refer to the pin-compatible MAX1363/MAX1364 data sheet.

Maxim Integrated Products. All rights reserved.

II. Manufacturing Information

A. Description/Function:	4-Channel, 10-Bit, System Monitors with Programmable Trip Window and SMBus Alert Response
B. Process:	C6Y
C. Number of Device Transistors:	15720
D. Fabrication Location:	Japan
E. Assembly Location:	Thailand
F. Date of Initial Production:	April 24, 2004

III. Packaging Information

A. Package Type:	10-pin uMAX
B. Lead Frame:	Copper Alloy
C. Lead Finish:	Matte Sn Plate
D. Die Attach:	Non-conductive Epoxy
E. Bondwire:	Gold (1 mil dia.)
F. Mold Material:	Epoxy with silica filler
G. Assembly Diagram:	#05-9000-0984
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:	180°C/W
K. Single Layer Theta Jc:	41.9°C/W
L. Multi Layer Theta Ja:	113.1°C/W
M. Multi Layer Theta Jc:	41.9°C/W

IV. Die Information

A. Dimensions:	75 X 88 mils
B. Passivation:	Si_3N_4/SiO_2 (Silicon nitride/ Silicon dioxide)
C. Interconnect:	Al with Ti/TiN Barrier
D. Backside Metallization:	None
E. Minimum Metal Width:	0.6 microns (as drawn)
F. Minimum Metal Spacing:	0.6 microns (as drawn)
G. Bondpad Dimensions:	5 mil. Sq.
H. Isolation Dielectric:	SiO_2
I. Die Separation Method:	Wafer Saw

Maxim Integrated Products. All rights reserved.

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:

$$\lambda = \frac{1}{MTTF} = \frac{1.83}{192 \times 4340 \times 89 \times 2}$$ (Chi square value for MTTF upper limit)

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

$\lambda = 12.07 \times 10^{-9}$

λ = 12.07 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 C6Y Process results in a FIT Rate of 0.90 @ 25C and 15.55 @ 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 AC67-3 die type has been found to have all pins able to withstand a HBM transient pulse of 2500 per JEDEC JESD22-A114. Latch-Up testing has shown that this device withstands a current of 250.

Maxim Integrated Products. All rights reserved.

Table 1

Reliability Evaluation Test Results

MAX1361EUB+

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	89	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

Maxim Integrated Products. All rights reserved.