RELIABILITY REPORT

FOR

MAX11163EUB+T

PLASTIC ENCAPSULATED DEVICES

December 21, 2013

MAXIM INTEGRATED

160 RIO ROBLES

SAN JOSE, CA 95134

Approved by
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Reliability Engineering

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Conclusion

The MAX11163EUB+T 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 MAX11163 is a 16-bit, 250ksps, +5V unipolar pseudo-differential input SAR ADC offering excellent AC and DC performance in small standard package. This ADC typically achieves 93.8dB SNR, -106dB THD, and ±0.5 LSB INL, ±0.2 LSB DNL. The MAX11163 guarantees 16-bit no-missing codes. The MAX11163 communicates using a SPI-compatible serial interface at 2.5V, 3V, 3.3V, or 5V logic. The serial interface can be used to daisy-chain multiple ADCs for multichannel applications and provides a busy indicator option for simplified system synchronization and timing. The MAX11163 is offered in a 10-pin, 3mm x 5mm, μMAX® package and is specified over the -40°C to +85°C temperature range.

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II. Manufacturing Information

A. Description/Function:	16-Bit, 250ksps, +5V Unipolar Input, SAR ADC, in Tiny 10-Pin µMAX
B. Process:	S45
C. Number of Device Transistors:	35573
D. Fabrication Location:	USA
E. Assembly Location:	USA, Philippines, Thailand
F. Date of Initial Production:	October 24, 2013

III. Packaging Information

A. Package Type:	10-pin uMAX
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:	#05-9000-4678
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:	36°C/W
L. Multi Layer Theta Ja:	113.1°C/W
M. Multi Layer Theta Jc:	36°C/W

IV. Die Information

A. Dimensions:	62 X 87 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:	0.4 microns (as drawn)
F. Minimum Metal Spacing:	0.6 microns (as drawn)
G. Bondpad Dimensions:	
H. Isolation Dielectric:	SiO_2
I. Die Separation Method:	Wafer Saw

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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 135°C biased (static) life test are shown in Table 1. Using these results, the Failure Rate (λ) is calculated as follows:

$$\lambda = \frac{1}{MTTF} = \frac{1.83}{192 \times 4340 \times 79 \times 2}$$ (Chi square value for MTTF upper limit)

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

$\lambda = 13.9 \times 10^{-9}$

λ = 13.9 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 S45 Process results in a FIT Rate of 0.4 @ 25°C and 0.69 @ 55°C (0.8 eV, 60% UCL)

B. E.S.D. and Latch-Up Testing (lot TALD9Q003I, D/C 1319)

The AC91-1 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 and overvoltage per JEDEC JESD78.

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Table 1
Reliability Evaluation Test Results

MAX11163EUB+T

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	COMMENTS
Static Life Test (Note 1)					
	Ta = 135°C Biased Time = 192 hrs.	DC Parameters & functionality	79	0	T2UZBQ002B, D/C 1220

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

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