RELIABILITY REPORT

FOR

MAX11259AWX+T

WAFER LEVEL DEVICES

May 23, 2017

MAXIM INTEGRATED

160 RIO ROBLES

SAN JOSE, CA 95134

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Conclusion

The MAX11259AWX+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 MAX11259 is a 6-channel, 24-bit delta-sigma ADC that achieves exceptional performance while consuming very low power. Sample rates up to 16ksps allow precision DC measurements. The MAX11259 communicates via an I^2C-compatible serial interface and is available in a small (3mm x 3mm) WLP package. The MAX11259 offers a 6.2nV/ noise programmable gain amplifier (PGA) with gain settings from 1x to 128x. The integrated PGA provides isolation of the signal inputs from the switched capacitor sampling network. The PGA also enables the MAX11259 to interface directly with high-impedance sources without compromising available dynamic range. The MAX11259 operates from a single 2.7V to 3.6V analog supply, or split ±1.8V analog supplies, allowing the analog input to be sampled below ground. The digital supply range is 1.7V to 2.0V or 2.0V to 3.6V, allowing communication with 1.8V, 2.5V, 3V, or 3.3V logic.

II. Manufacturing Information

A. Description/Function:	24-Bit, 6-Channel, 16ksps, 6.2nVHz PGA, Delta-Sigma ADC with I²C Interface
B. Process:	TS18
C. Number of Device Transistors:	289738
D. Fabrication Location:	Taiwan
E. Assembly Location:	China
F. Date of Initial Production:	September 29, 2015

III. Packaging Information

A. Package Type:	36-bump WLP
B. Lead Frame:	N/A
C. Lead Finish:	N/A
D. Die Attach:	None
E. Bondwire:	N/A (N/A mil dia.)
F. Mold Material:	None
G. Assembly Diagram:	#05-9000-5804
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:	N/A°C/W
K. Single Layer Theta Jc:	N/A°C/W
L. Multi Layer Theta Ja:	38°C/W
M. Multi Layer Theta Jc:	N/A°C/W

IV. Die Information

A. Dimensions:	117.7165X117.7165 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:	0.23 microns (as drawn)
F. Minimum Metal Spacing:	0.23 microns (as drawn)
G. Isolation Dielectric:	SiO_2
H. Die Separation Method:	Wafer Saw

V. Quality Assurance Information

A. Quality Assurance Contacts:	Eric Wright (Reliability Engineering) Brian Standley (Manager, Reliability) 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 135C 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)

$\lambda = 13.7 \times 10^{-9}$

$\lambda = 13.7$ 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 TS18 Process results in a FIT Rate of 0.24 @ 25C and 4.14 @ 55C (0.8 eV, 60% UCL)

B. E.S.D. and Latch-Up Testing

The AZ05-0 die type has been found to have all pins able to withstand an 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.

Table 1
Reliability Evaluation Test Results

MAX11259AWX+T

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	COMMENTS
Static Life Test (Note 1)					
	Ta = 135C Biased Time = 192 hrs.	DC Parameters & functionality	80	0	

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