RELIABILITY REPORT

FOR

MAX1379ATP+
(MAX1377/MAX1379/MAX1383)

PLASTIC ENCAPSULATED DEVICES

January 9, 2009

MAXIM INTEGRATED PRODUCTS

120 SAN GABRIEL DR.

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Approved by
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Quality Assurance
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Conclusion

The MAX1379ATP+ 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 MAX1377/MAX1379/MAX1383 feature two simultaneous-sampling, low-power, 12-bit ADCs with serial interface and internal voltage reference. Fast sampling rate, low power dissipation, and excellent dynamic performance make the MAX1377/MAX1379/MAX1383 ideal for industrial process control, motor control, and RF applications. Conversion results are available through a SPI(tm)-/QSPI(tm)-/MICROWIRE(tm)-/DSP-compatible interface with independent serial digital outputs for each channel. The serial outputs allow twice as much data to be transferred at the given clock rate. The conversion results for both ADCs can also be output on a single digital output for microcontrollers (µCs) and DSPs with only a single serial input available. The MAX1377 operates from a 2.7V to 3.6V analog supply and the MAX1379/MAX1383 operate from a 4.75V to 5.25V analog supply. A separate 1.8V to AVDD digital supply allows interfacing to low voltage logic without the use of level translators. Two power-down modes, partial and full, allow the MAX1377/MAX1379 and MAX1383 (full power-down only) to save power between conversions. Partial power-down mode reduces the supply current to 2mA while leaving the reference enabled for quick power-up. Full powerdown mode reduces the supply current to 1µA. The MAX1377/MAX1379 inputs accept voltages between zero and the reference voltage or ±VREF/2. The MAX1383 offers an input voltage range of ±10V, which is ideal for industrial and motor-control applications. The input to each of the ADCs supports either a true-differential input or two single-ended inputs. The MAX1377/MAX1379/MAX1383 are available in a 20-pin TQFN package, and are specified for the automotive (-40°C to +125°C) temperature range.

II. Manufacturing Information

A. Description/Function:	Dual, 12-Bit, 1.25Msps, Simultaneous-Sampling ADCs with Serial Interface
B. Process:	B6
C. Number of Device Transistors:	
D. Fabrication Location:	California
E. Assembly Location:	ASAT China, UTL Thailand
F. Date of Initial Production:	7/22/2008

III. Packaging Information

A. Package Type:	20-pin TQFN 5x5
B. Lead Frame:	Copper
C. Lead Finish:	100% matte Tin
D. Die Attach:	Conductive Epoxy
E. Bondwire:	Gold (1 mil dia.)
F. Mold Material:	Epoxy with silica filler
G. Assembly Diagram:	#05-9000-1458
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:	48°C/W
K. Single Layer Theta Jc:	2.1°C/W
L. Multi Layer Theta Ja:	30°C/W
M. Multi Layer Theta Jc:	2.1°C/W

IV. Die Information

A. Dimensions:	114 X 124 mils
B. Passivation:	Si_3N_4/SiO_2 (Silicon nitride/ Silicon dioxide
C. Interconnect:	Aluminum/Si (Si = 1%)
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

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:

$$\lambda = \frac{1}{MTTF} = \frac{1.83}{192 \times 4340 \times 48 \times 2}$$ (Chi square value for MTTF upper limit)

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

$\lambda = 22.4 \times 10^{-9}$

$\lambda = 22.4$ F.I.T. (60% confidence level @ 25°C)

The following failure rate represents data collected from Maxim's reliability monitor program. Maxim performs quarterly 1000 hour life test monitors on its processes. This data is published in the Product Reliability Report found at http://www.maxim-ic.com/. Current monitor data for the B6 Process results in a FIT Rate of 0.8 @ 25C and 14.2 @ 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 AC62-1 die type has been found to have all pins able to withstand a HBM transient pulse of +/-2500 V per JEDEC JESD22-A114-D. Latch-Up testing has shown that this device withstands a current of +/-250 mA, 1.5xVCCmax OverVoltage.

Table 1
Reliability Evaluation Test Results

MAX1379ATP+

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	48	0
Moisture Testing (Note 2)				
85/85	Ta = 85°C RH = 85% Biased Time = 1000hrs.	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