RELIABILITY REPORT

FOR

MAX1179ACUI+
(MAX1179/MAX1187/MAX1189)

PLASTIC ENCAPSULATED DEVICES

March 16, 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 MAX1179ACUI+ 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.

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I. Device Description

A. General

The MAX1179/MAX1187/MAX1189 16-bit, low-power, successive-approximation analog-to-digital converters (ADCs) feature automatic power-down, a factory-trimmed internal clock, and a 16-bit wide parallel interface. The devices operate from a single +4.75V to +5.25V analog supply and feature a separate digital supply input for direct interface with +2.7V to +5.25V digital logic. The MAX1179 accepts a bipolar input voltage range of ±5V. The MAX1187 accepts an analog input voltage range from 0 to +10V, while the MAX1189 accepts a bipolar analog input voltage range of ±10V. All devices consume only 23mW at a sampling rate of 135ksps when using an external reference and 29mW when using the internal +4.096V reference. AutoShutdown™ reduces supply current to 0.4mA at 10ksps. The MAX1179/MAX1187/MAX1189 are ideal for high-performance, battery-powered data-acquisition applications. Excellent AC performance (THD = -100dB) and DC accuracy (±2 LSB INL) make the MAX1179/MAX1187/ MAX1189 ideal for industrial process control, instrumentation, and medical applications. The MAX1179/MAX1187/MAX1189 are available in a 28-pin TSSOP package and are fully specified over the -40°C to +85°C extended temperature range and the 0°C to +70°C commercial temperature range.

II. Manufacturing Information

A. Description/Function:	16-Bit, 135ksps, Single-Supply ADCs with Bipolar Analog Input Range
B. Process:	C6Y
C. Number of Device Transistors:	15383
D. Fabrication Location:	Japan
E. Assembly Location:	ATP Philippines, UTL Thailand, Carsem Malaysia
F. Date of Initial Production:	January 25, 2003

III. Packaging Information

A. Package Type:	28-pin TSSOP
B. Lead Frame:	Copper
C. Lead Finish:	100% matte Tin
D. Die Attach:	Conductive Epoxy
E. Bondwire:	Au (1.0 mil dia.)
F. Mold Material:	Epoxy with silica filler
G. Assembly Diagram:	#
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:	78°C/W
K. Single Layer Theta Jc:	12.5°C/W
L. Multi Layer Theta Ja:	71.6°C/W
M. Multi Layer Theta Jc:	13°C/W

IV. Die Information

A. Dimensions:	93 X 128 mils
B. Passivation:	SiO2/SiN3
C. Interconnect:	Al/Cu
D. Backside Metallization:	None
E. Minimum Metal Width:	0.6um
F. Minimum Metal Spacing:	0.6um
G. Bondpad Dimensions:	5 mil. Sq.
H. Isolation Dielectric:	SiO2
I. Die Separation Method:	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:

$$\lambda = \frac{1}{MTTF} = \frac{1.83}{192 \times 4340 \times 45 \times 2}$$ (Chi square value for MTTF upper limit)

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

$\lambda = 23.9 \times 10^{-9}$

$\lambda = 23.9$ 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 C6Y Process results in a FIT Rate of 0.82 @ 25C and 14.21 @ 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 AC52-6 die type has been found to have all pins able to withstand a HBM transient pulse of +/-2000 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

MAX1179ACUI+

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	45	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