RELIABILITY REPORT

FOR

MAX1274AETC+

PLASTIC ENCAPSULATED DEVICES

March 27, 2012

MAXIM INTEGRATED PRODUCTS

120 SAN GABRIEL DR.

SUNNYVALE, CA 94086

Approved by
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Quality Assurance
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Conclusion

The MAX1274AETC+ 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 MAX1274/MAX1275 low-power, high-speed, serialoutput, 12-bit, analog-to-digital converters (ADCs) operate at up to 1.8Msps. These devices feature true-differential inputs, offering better noise immunity, distortion improvements, and a wider dynamic range over singleended inputs. A standard SPI™/QSPI™/MICROWIRE™ interface provides the clock necessary for conversion. These devices easily interface with standard digital signal processor (DSP) synchronous serial interfaces.

The MAX1274/MAX1275 operate from a single +4.75V to +5.25V supply voltage and require an external reference. The MAX1274 has a unipolar analog input, while the MAX1275 has a bipolar analog input. These devices feature a partial power-down mode and a full power-down mode for use between conversions, which lower the supply current to 1mA (typ) and 1uA (max), respectively. Also featured is a separate power-supply input (VL), which allows direct interfacing to +1.8V to VDD digital logic. The fast conversion speed, low-power dissipation, excellent AC performance, and DC accuracy (±1 LSB INL) make the MAX1274/MAX1275 ideal for industrial process control, motor control, and base-station applications.

The MAX1274/MAX1275 come in a 12-pin TQFN package, and are available in the extended (-40°C to +85°C) temperature range.

II. Manufacturing Information

A. Description/Function:	1.8Msps, Single-Supply, Low-Power, True-Differential, 12-Bit ADCs
B. Process:	C6
C. Number of Device Transistors:	13016
D. Fabrication Location:	Japan
E. Assembly Location:	China
F. Date of Initial Production:	January 24, 2004

III. Packaging Information

A. Package Type:	12L TQFN 4x4
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:	#05-9000-0570 / C
H. Flammability Rating:	Class UL94-V0
I. Classification of Moisture Sensitivity per JEDEC standard J-STD-020-C	1
J. Single Layer Theta Ja:	59.3°C/W
K. Single Layer Theta Jc:	6°C/W
L. Multi Layer Theta Ja:	41°C/W
M. Multi Layer Theta Jc:	6°C/W

IV. Die Information

A. Dimensions:	87 X 62 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:	0.6 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

V. Quality Assurance Information

A. Quality Assurance Contacts:	Richard Aburano (Manager, Reliability Engineering) 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 biased (static) life test are shown in Table 1. Using these results, the Failure Rate (λ) is calculated as follows:

$$\lambda = \frac{1}{MTTF} = \frac{1.83}{192 \times 4340 \times 96 \times 2}$$ (Chi square value for MTTF upper limit)

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

$\lambda = 11.4 \times 10^{-9}$

$\lambda = 11.4$ F.I.T. (60% confidence level @ 25°C)

The following failure rate represents data collected from Maxim's reliability monitor program. Maxim performs quarterly 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 C6 Process results in a FIT Rate of 0.43 @ 25C and 7.50 @ 55C (0.8 eV, 60% UCL)

B. E.S.D. and Latch-Up Testing (lot IAG4BQ001C D/C 0348)

The AC37-4 die type has been found to have all pins able to withstand a HBM transient pulse of +/-2500V per Mil-Std 883 Method 3015.7. Latch-Up testing has shown that this device withstands a current of +/-250mA.

Table 1
Reliability Evaluation Test Results

MAX1274AETC+

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	COMMENTS
Static Life Test (Note 1)					
	Ta = 135°C	DC Parameters	48	0	SAG0EA010B, D/C 0716
	Biased	& functionality	48	0	IAG5BQ001F, D/C 0352
	Time = 192 hrs.				

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