RELIABILITY REPORT

FOR

MAX4206ETE+

PLASTIC ENCAPSULATED DEVICES

April 26, 2012

MAXIM INTEGRATED PRODUCTS

120 SAN GABRIEL DR.

SUNNYVALE, CA 94086

Approved by
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Quality Assurance
Reliability Engineer

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Conclusion

The MAX4206ETE+ 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 MAX4206 logarithmic amplifier computes the log ratio of an input current relative to a reference current (externally or internally generated) and provides a corresponding voltage output with a default 0.25V/decade scale factor. The device operates from a single +2.7V to +11V supply or from dual ±2.7V to ±5.5V supplies and is capable of measuring five decades of input current across a 10nA to 1mA range. The MAX4206's uncommitted op amp can be used for a variety of functions, including filtering noise, adding offset, and adding additional gain. A 0.5V reference is also included to generate an optional precision current reference using an external resistor, which adjusts the log intercept of the MAX4206. The output-offset voltage and the adjustable scale factor are also set using external resistors. The MAX4206 is available in a space-saving 16-pin thin QFN package (4mm x 4mm x 0.8mm), and is specified for operation over the -40°C to +85°C extended temperature range.

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II. Manufacturing Information

A. Description/Function: Precision Transimpedance Logarithmic Amplifier with Over 5 Decades of Dynamic Range

B. Process:	B8
C. Number of Device Transistors:	
D. Fabrication Location:	Oregon
E. Assembly Location:	Taiwan
F. Date of Initial Production:	December 5, 2003

III. Packaging Information

A. Package Type:	16L TQFN
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:	#05-9000-0728 / B
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:	40°C/W
M. Multi Layer Theta Jc:	6°C/W

IV. Die Information

A. Dimensions:	81 X 81 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:	0.8 microns (as drawn)
F. Minimum Metal Spacing:	0.8 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: 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:

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

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

$\lambda = 22.9 \times 10^{-9}$

λ = 22.9 F.I.T. (60% confidence level @ 25°C)

The following failure rate represents data collected from Maxim's reliability monitor program. Maxim performs quarterly 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 B8 Process results in a FIT Rate of 0.06 @ 25C and 0.99 @ 55C (0.8 eV, 60% UCL)

B. E.S.D. and Latch-Up Testing (lot SIT0AQ001E D/C 0338)

The OY14 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.

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Table 1
Reliability Evaluation Test Results

MAX4206ETE+

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	48	0	SIT1AQ001C, D/C 0338

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

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