

RELIABILITY REPORT  
FOR  
MAX44206AUA+T  
PLASTIC ENCAPSULATED DEVICES

March 13, 2015

**MAXIM INTEGRATED**

160 RIO ROBLES  
SAN JOSE, CA 95134

<b>Approved by</b>
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## Conclusion

The MAX44206AUA+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 MAX44206 is a low-noise, low-distortion fully differential operational amplifier suitable for driving high-speed, high-resolution, 20-/18-/16-bit SAR ADCs, including the MAX11905 ADC family. Featuring a combination of wide 2.7V to 13.2V supply voltage range and wide 400MHz bandwidth, the MAX44206 is suitable for low-power, high-performance data acquisition systems. The MAX44206 offers a V<sub>OCM</sub> input to adjust the output common-mode voltage, eliminating the need for a coupling transformer or AC-coupling capacitors. This adjustable output common-mode voltage allows the MAX44206 to match the input common-mode voltage range of the ADC following it. Shutdown mode consumes only 6.8 $\mu$ A and extends battery life in battery-powered applications or reduces average power in systems cycling between shutdown and periodic data readings. The MAX44206 is available in an 8-pin  $\mu$ MAX® package and is specified for operation over the -40°C to +125°C temperature range.

## II. Manufacturing Information

A. Description/Function:	180MHz, Low-Noise, Low-Distortion, Fully Differential Op Amp/ADC Driver
B. Process:	CB5
C. Fabrication Location:	USA
D. Assembly Location:	USA, Philippines, Thailand
E. Date of Initial Production:	December 8, 2014

## III. Packaging Information

A. Package Type:	8-pin uMAX
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:	#05-9000-5537
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:	97°C/W
K. Single Layer Theta Jc:	5°C/W
L. Multi Layer Theta Ja:	77.6°C/W
M. Multi Layer Theta Jc:	5°C/W

## IV. Die Information

A. Dimensions:	59.8425 X 59.8425 mils
B. Passivation:	Si <sub>3</sub> N <sub>4</sub> /SiO <sub>2</sub> (Silicon nitride/ Silicon dioxide)
C. Interconnect:	Al with Ti/TiN Barrier
D. Backside Metallization:	None
E. Minimum Metal Width:	0.6 microns (as drawn)
F. Minimum Metal Spacing:	0.4 microns (as drawn)
G. Isolation Dielectric:	SiO <sub>2</sub>
H. Die Separation Method:	Wafer Saw

## V. Quality Assurance Information

- |                                   |   |
|-----------------------------------|---|
| A. Quality Assurance Contacts:    | Don Lipps (Manager, Reliability Engineering)<br>Bryan Preeshl (Vice President of QA)            |
| B. Outgoing Inspection Level:     | 0.1% for all electrical parameters guaranteed by the Datasheet.<br>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 ( $\lambda$ ) is calculated as follows:

$$\lambda = \frac{1}{\text{MTTF}} = \frac{1.83}{192 \times 4340 \times 79 \times 2} \quad (\text{Chi square value for MTTF upper limit})$$

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

$$\lambda = 13.9 \times 10^{-9}$$

$$\lambda = 13.9 \text{ F.I.T. (60\% confidence level @ 25°C)}$$

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 Process results in a FIT Rate of 0.88 @ 25°C and 15.16 @ 55°C (0.8 eV, 60% UCL)

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

The OZ02-0 die type has been found to have all pins able to withstand an HBM transient pulse of +/-1500V 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

**MAX44206AUA+T**

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	COMMENTS
<b>Static Life Test</b> (Note 1)	Ta = 135°C Biased Time = 192 hrs.	DC Parameters & functionality	79	0	

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