

RELIABILITY REPORT  
FOR  
MAX2306ETI+  
PLASTIC ENCAPSULATED DEVICES

January 21, 2014

**MAXIM INTEGRATED**

160 RIO ROBLES  
SAN JOSE, CA 95134

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

The MAX2306ETI+ 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.

## Table of Contents

<b>I. ....Device Description</b>	<b>IV. ....Die Information</b>
<b>II. ....Manufacturing Information</b>	<b>V. ....Quality Assurance Information</b>
<b>III. ....Packaging Information</b>	<b>VI. ....Reliability Evaluation</b>
<b>.....Attachments</b>	

### I. Device Description

#### A. General

The MAX2306/MAX2308/MAX2309 are IF receivers designed for dual-band, dual-mode, and single-mode N-CDMA and W-CDMA cellular phone systems. The signal path consists of a variable-gain amplifier (VGA) and I/Q demodulator. The devices feature guaranteed +2.7V operation, a gain control range of over 110dB, and high input IP3 (-31dBm at 35dB gain, 3.4dBm at -35dB gain).

Unlike similar devices, the MAX2306 family of receivers includes dual oscillators and synthesizers to form a self-contained IF subsystem. The synthesizer's reference and RF dividers are fully programmable through a 3-wire serial bus, enabling dual-band system architectures using any common reference and IF frequency. The differential baseband outputs have enough bandwidth to suit both N-CDMA and W-CDMA systems, and offer saturated output levels of 2.7Vp-p at a low +2.75V supply voltage. Including the low-noise voltage-controlled oscillator (VCO) and synthesizer, the MAX2306 draws only 26mA from a +2.75V supply in CDMA (differential IF) mode.

The MAX2306/MAX2308/MAX2309 are available in 28-pin QFN packages.

## II. Manufacturing Information

A. Description/Function:	CDMA IF VGAs and I/Q Demodulators with VCO and Synthesizer
B. Process:	GST2
C. Number of Device Transistors:	
D. Fabrication Location:	Oregon
E. Assembly Location:	China, Thailand, or Malaysia
F. Date of Initial Production:	April 28, 2001

## III. Packaging Information

A. Package Type:	28-pin TQFN 5x5
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:	#05-9000-2502
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:	47°C/W
K. Single Layer Theta Jc:	2.1°C/W
L. Multi Layer Theta Ja:	29°C/W
M. Multi Layer Theta Jc:	2.1°C/W

## IV. Die Information

A. Dimensions:	120X76 mils
B. Passivation:	Si <sub>3</sub> N <sub>4</sub> (Silicon nitride)
C. Interconnect:	Au
D. Backside Metallization:	None
E. Minimum Metal Width:	2 microns (as drawn)
F. Minimum Metal Spacing:	2 microns (as drawn)
G. Bondpad Dimensions:	
H. Isolation Dielectric:	SiO <sub>2</sub>
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 150C biased (static) life test are shown in Table 1. Using these results, the Failure Rate ( $\lambda$ ) is calculated as follows:

$$\lambda = \frac{1}{\text{MTTF}} = \frac{1.83}{192 \times 9706 \times 45 \times 2} \quad (\text{Chi square value for MTTF upper limit})$$

(where 9706 = Temperature Acceleration factor assuming an activation energy of 0.8eV)

$$\lambda = 10.9 \times 10^{-9}$$

$$\lambda = 10.9 \text{ F.I.T. (60\% confidence level @ 25°C)}$$

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 GST2 Process results in a FIT Rate of 0.06 @ 25C and 1.08 @ 55C (0.8 eV, 60% UCL).

### B. E.S.D. and Latch-Up Testing (lot NX9BDA006CQ, D/C 0112)

The WR29-1 die type has been found to have all pins able to withstand a HBM transient pulse of +/-500V 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

**MAX2306ETI+**

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	COMMENTS
<b>Static Life Test</b> (Note 1)	Ta = 150°C Biased Time = 192 hrs.	DC Parameters & functionality	45	0	NX9BDA006C, D/C 0112

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