

RELIABILITY REPORT  
FOR  
MAX2406EEP+T  
PLASTIC ENCAPSULATED DEVICES

June 3, 2016

**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 MAX2406EEP+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 MAX2406 low-noise amplifier (LNA)/downconverter mixer is designed for use over a wide range of frequencies and is optimized for communications systems operating at a frequency of 1.9GHz. Applications include PWT1900/DCT1900, DCS1800/PCS1900, PHS, and DECT. This device includes an LNA, a downconverter mixer, and a local-oscillator (LO) buffer in a low-cost, plastic surface-mount package. At 1.9GHz, the LNA has 2.5dB typical noise figure and a -9.5dBm input third-order intercept point (IP3). The downconverter mixer has a low 9.1dB noise figure and a 4.5dBm input IP3. Image and LO filtering are implemented off-chip for maximum flexibility. The MAX2406 has a differential IF port that can be used in a single-ended configuration by tying the unused side to VCC. The LO buffer can be driven differentially or in a single-ended configuration with only -10dBm of LO power. Power consumption is 60mW in receive mode, and typically drops to less than 1μW in shutdown mode. For transceiver applications, the MAX2410 or MAX2411A both offer a transmitter along with a similar receiver.

## II. Manufacturing Information

A. Description/Function:	Low-Cost Downconverter with Low-Noise Amplifier
B. Process:	GST2
C. Fabrication Location:	USA
D. Assembly Location:	Malaysia, Philippines, Thailand
E. Date of Initial Production:	October 24, 1997

## III. Packaging Information

A. Package Type:	20-pin QSOP
B. Lead Frame:	Copper
C. Lead Finish:	100% matte Tin
D. Die Attach:	Conductive
E. Bondwire:	Au (1.3 mil dia.)
F. Mold Material:	Epoxy with silica filler
G. Assembly Diagram:	#05-7001-0287
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:	110°C/W
K. Single Layer Theta Jc:	34°C/W
L. Multi Layer Theta Ja:	90.5°C/W
M. Multi Layer Theta Jc:	34°C/W

## IV. Die Information

A. Dimensions:	55X73 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: Eric Wright (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 135C biased (static) life test are shown in Table 1. Using these results, the Failure Rate ( $\lambda$ ) is calculated as follows:

$$\lambda = \frac{1}{\text{MTTF}} = \frac{1.83}{192 \times 4340 \times 50 \times 2} \quad (\text{Chi square value for MTTF upper limit})$$

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

$$\lambda = 22.0 \times 10^{-9}$$

$$\lambda = 22.0 \text{ F.I.T. (60\% confidence level @ 25°C)}$$

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 1.10 @ 55C (0.8 eV, 60% UCL)

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

The WR27 die type has been found to have all pins able to withstand an HBM transient pulse of +/-1000V 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

**MAX2406EEP+T**

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	COMMENTS
<b>Static Life Test</b> (Note 1)	Ta = 135C Biased Time = 192 hrs.	DC Parameters & functionality	50	0	

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