

RELIABILITY REPORT  
FOR  
MAX2206EBS+  
(MAX2205&#150;MAX2208)  
CHIP SCALE PACKAGE

April 5, 2009

**MAXIM INTEGRATED PRODUCTS**

120 SAN GABRIEL DR.  
SUNNYVALE, CA 94086

<b>Approved by</b>
Ken Wendel
Quality Assurance
Director, Reliability Engineering

## Conclusion

The MAX2206EBS+ 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.

## Table of Contents

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

### I. Device Description

#### A. General

The MAX2205/MAX2208 wideband (800MHz to 2GHz) power detectors are ideal for GSM/EDGE (MAX2206), TDMA (MAX2207), and CDMA (MAX2205/MAX2208) applications. The MAX2206/MAX2207/MAX2208 take an RF signal from a directional coupler at the input, and output a highly repeatable voltage. The output voltage increases monotonically with increasing input power. The output is compensated for temperature and process shifts, reducing the worst-case variation to less than  $\pm 1$ dB at full power and  $\pm 2.5$ dB at the lowest power. The MAX2206 features 40dB dynamic range, making it ideally suited to GSM/EDGE applications. The MAX2207 offers reduced current consumption for TDMA applications. The MAX2205/MAX2208 each have an integrated filter to allow for average power detection of CDMA signals over a 25dB dynamic range. The MAX2206/MAX2207/MAX2208 offer internal 50  $\Omega$  termination for interfacing with a directional coupler. The MAX2205 has a high-impedance input to provide a low-loss resistive tap in CDMA applications. All devices allow the user to control the averaging time constant externally. The MAX2205/MAX2208 come in a space-saving 2 x 2, 0.5mm-pitch UCSP package and require only three external components.

**II. Manufacturing Information**

A. Description/Function:	RF Power Detectors in UCSP
B. Process:	GST2
C. Number of Device Transistors:	
D. Fabrication Location:	Oregon
E. Assembly Location:	Texas
F. Date of Initial Production:	April 28, 2001

**III. Packaging Information**

A. Package Type:	4-pin UCSP
B. Lead Frame:	N/A
C. Lead Finish:	N/A
D. Die Attach:	N/A
E. Bondwire:	N/A
F. Mold Material:	N/A
G. Assembly Diagram:	#05-3201-0008
H. Flammability Rating:	Class UL94-V0
I. Classification of Moisture Sensitivity per JEDEC standard J-STD-020-C	Level 1

**IV. Die Information**

A. Dimensions:	40 X 40 mils
B. Passivation:	Si <sub>3</sub> N <sub>4</sub> (Silicon nitride)
C. Interconnect:	Poly / Au
D. Backside Metallization:	None
E. Minimum Metal Width:	2 microns (as drawn)
F. Minimum Metal Spacing:	2 microns (as drawn)
G. Bondpad Dimensions:	5 mil. Sq.
H. Isolation Dielectric:	SiO <sub>2</sub>
I. Die Separation Method:	Wafer Saw

## V. Quality Assurance Information

- |                                   |   |
|-----------------------------------|---|
| A. Quality Assurance Contacts:    | Ken Wendel (Director, Reliability Engineering)<br>Bryan Preeshl (Managing Director 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 150°C biased (static) life test are shown in Table 1. Using these results, the Failure Rate ( $\lambda$ ) is calculated as follows:

$$\lambda = \frac{1}{\text{MTTF}} = \frac{1.83}{192 \times 4340 \times 45 \times 2} \quad (\text{Chi square value for MTTF upper limit})$$

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

$$\lambda = 10.6 \times 10^{-9}$$

$$\lambda = 10.6 \text{ F.I.T. (60\% confidence level @ 25°C)}$$

The following failure rate represents data collected from Maxim's reliability monitor program. Maxim performs quarterly 1000 hour life test monitors on its processes. This data is published in the Product Reliability Report found at <http://www.maxim-ic.com/>. Current monitor data for the GST20 Process results in a FIT Rate of 1.0 @ 25C and 17.8 @ 55C (0.8 eV, 60% UCL)

### B. Moisture Resistance Tests

The industry standard 85°C/85%RH or HAST testing is monitored per device process once a quarter.

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

The WC15-1 die type has been found to have all pins able to withstand a HBM transient pulse of +/-2000 V per Mil-Std 883 Method 3015.7. Latch-Up testing has shown that this device withstands a current of +/-250 mA.

**Table 1**  
Reliability Evaluation Test Results

**MAX2206EBS+**

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES
<b>Static Life Test</b> (Note 1)	Ta = 150°C Biased Time = 192 hrs.	DC Parameters & functionality	45	0
<b>Moisture Testing</b> (Note 2) 85/85	Ta = 85°C RH = 85% Biased Time = 1000hrs.	DC Parameters & functionality	77	0
<b>Mechanical Stress</b> (Note 2 & 3) Temperature Cycle	-40°C/125°C 1000 Cycles (Note 3)	DC Parameters & functionality	77	0

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

Note 2: Generic Package/Process data

Note 3: Ramp rate 11°C/minute, dwell=15 minutes, One cycle/hour.