RELIABILITY REPORT

FOR MAX2242EBC+TW

CHIP SCALE PACKAGE

December 17, 2008

MAXIM INTEGRATED PRODUCTS

120 SAN GABRIEL DR.

SUNNYVALE, CA 94086

Approved by
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Quality Assurance
Director, Reliability Engineering

Conclusion

The MAX2242EBC+TW 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 MAX2242 low-voltage linear power amplifier (PA) is designed for 2.4GHz ISM-band wireless LAN applications. It delivers +22.5dBm of linear output power with an adjacent-channel power ratio (ACPR) of <-33dBc 1st-side lobe and <-55dBc 2nd-side lobe, compliant with the IEEE® 802.11b 11MB/s WLAN standard with at least 3dB margin. The PA is packaged in the tiny 3x4 chip-scale package (UCSP™), measuring only 1.5mm x 2.0mm, ideal for radios built in small PC card and compact flash card form factors. The MAX2242 PA consists of a three-stage PA, power detector, and power management circuitry. The power detector provides over 20dB of dynamic range with ±0.8dB accuracy at the highest output power level. An accurate automatic level control (ALC) function can be easily implemented using this detector circuit. The PA also features an external bias control pin. Through the use of an external DAC, the current can be throttled back at lower output power levels while maintaining sufficient ACPR performance. As a result, the highest possible efficiency is maintained at all power levels. The device operates over a single +2.7V to +3.6V power-supply range. An on-chip shutdown feature reduces operating current to 0.5µA, eliminating the need for an external supply switch.

II. Manufacturing Information

A. Description/Function:	2.4GHz to 2.5GHz Linear Power Amplifier
B. Process:	GST2
C. Number of Device Transistors:	
D. Fabrication Location:	Oregon
E. Assembly Location:	Dallas TX
F. Date of Initial Production:	January 27, 2001

III. Packaging Information

A. Package Type:	12-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:	#05-3101-0001
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:	61 X 81 mils
B. Passivation:	Si_3N_4 (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_2
I. Die Separation Method:	Wafer Saw

V. Quality Assurance Information

A. Quality Assurance Contacts:	Ken Wendel (Director, Reliability Engineering) Bryan Preeshl (Managing Director 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 150°C biased (static) life test are listed in table 1. Using these results, the Failure Rate (λ) is calculated as follows:

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

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

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

$\lambda = 10.6$ 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 WD01 die type has been found to have all pins able to withstand a HBM transient pulse of +/-<200 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

MAX2242EBC+TW

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES
Static Life Test (Note 1)				
	Ta = 150°C Biased Time = 192 hrs.	DC Parameters & functionality	45	0
Moisture Testing (Note 2)				
85/85	Ta = 85°C RH = 85% Biased Time = 1000hrs.	DC Parameters & functionality	77	0
Mechanical Stress (Note 2 & 3)				
Temperature Cycle	-40ºC/125ºC 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 11ºC/minute, dwell=15 minutes, One cycle/hour.