RELIABILITY REPORT

FOR

MAX2240EBL+

CHIP SCALE PACKAGE

May 23, 2012

MAXIM INTEGRATED PRODUCTS

120 SAN GABRIEL DR.

SUNNYVALE, CA 94086

Approved by
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Conclusion

The MAX2240EBL+ 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 MAX2240 single-supply, low-voltage power amplifier (PA) IC is designed specifically for applications in the 2.4GHz to 2.5GHz frequency band. The PA is compliant with Bluetooth®, HomeRF, and 802.11 standards, as well as other FSK modulation systems. The PA provides a nominal +20dBm (100mW) output power in the highest power mode. The PA includes a digital power control circuit to greatly simplify control of the output power. Four digitally controlled output power levels are provided: from +3dBm to +20dBm. A digital input controls the active or shutdown operating modes of the PA. In the shutdown mode, the current reduces to 0.5µA. The IC integrates the RF input and interstage matching to simplify application of the IC. Temperature and supply-independent biasing are also included to provide stable performance under all operating conditions. The IC operates from a +2.7V to +5V single-supply voltage. No negative bias voltage is required. Current consumption is a modest 105mA at the highest power level. The part is packaged in the UCSP™ package significantly reducing the required PC board area. The chip occupies only a 1.56mm x 1.56mm area. The 3 x 3 array of solder bumps are spaced with a 0.5mm bump pitch.

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II. Manufacturing Information

A. Description/Function:	2.5GHz, +20dBm Power Amplifier IC in UCSP Package
B. Process:	GST20
C. Number of Device Transistors:	
D. Fabrication Location:	Oregon
E. Assembly Location:	Dallas
F. Date of Initial Production:	March 21, 2000

III. Packaging Information

A. Package Type:	UCSP (B) 3x3 array
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:	#05-7001-0446 / B
H. Flammability Rating:	Class UL94-V0
I. Classification of Moisture Sensitivity per JEDEC standard J-STD-020-C	1
J. Single Layer Theta Ja:	N/A
K. Single Layer Theta Jc:	N/A
L. Multi Layer Theta Ja:	N/A
M. Multi Layer Theta Jc:	N/A

IV. Die Information

A. Dimensions:	61.4 X 61.4 mils
B. Passivation:	Si_3N_4 (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_2
I. Die Separation Method:	Wafer Saw

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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 biased (static) life test are shown in Table 1. Using these results, the Failure Rate (λ) is calculated as follows:

$$\lambda = \frac{1}{MTTF} = \frac{1.83}{192 \times 4340 \times 48 \times 2}$$

(Chi square value for MTTF upper limit)

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

$\lambda = 22.9 \times 10^{-9}$

λ = 22.9 F.I.T. (60% confidence level @ 25°C)

The following failure rate represents data collected from Maxim's reliability monitor program. Maxim performs quarterly life test monitors on its processes. This data is published in the Reliability Report found at http://www.maxim-ic.com/qa/reliability/monitor. Cumulative monitor data for the GST20 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 WR67 die type has been found to have all pins able to withstand a HBM transient pulse of +/-2000V per Mil-Std 883 Method 3015.7. Latch-Up testing has shown that this device withstands a current of +/-250mA.

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Table 1
Reliability Evaluation Test Results

MAX2240EBL+

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	COMMENTS
Static Life Test (Note 1)					
	Ta = 135°C Biased Time = 192 hrs.	DC Parameters & functionality	48	0	

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

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