RELIABILITY REPORT

FOR

MAX2548E

PLASTIC ENCAPSULATED DEVICES

October 13, 2008

MAXIM INTEGRATED PRODUCTS

120 SAN GABRIEL DR.

SUNNYVALE, CA 94086

Approved by
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Quality Assurance
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Conclusion

The MAX2548E 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 MAX2548 quad-band direct-conversion RF-to-bits radio receiver is designed for 1x (3.84Mcps) and 2x (7.68Mcps) TDD-WCDMA applications. The part supports operation in the 915MHz to 921MHz, 1900MHz to 1920MHz, 2010MHz to 2025MHz, and 2050MHz to 2082MHz frequency bands.

The unique RF-to-bits architecture of the MAX2548 integrates 4 LNAs, quadrature mixers, baseband anti-aliasing filters, programmable gain baseband amplifiers, high dynamic range I and Q sigma-delta analog-to-digital converters (ADCs), a fractional-N frequency synthesizer for local oscillator (LO) generation, and a fractional-N frequency synthesizer for sampling clock generation. Data is transferred from the radio to the baseband/DSP by a digital 1-bit sigma-delta modulated I and Q bit-stream through an LVDS-like interface. All decimation, compensation, and channel filtering is performed in the digital domain in compliance with the MAX-PHY digital section definition. The operating mode of the radio is fully programmable by a 3-wire serial interface.

The MAX2548 is specified for operation in the extended -40°C to +85°C temperature range and is available in a 7mm x 7mm x 1.4mm fcLGA package with exposed paddle (EP).

II. Manufacturing Information

A. Description/Function:	Quad-Band TDD-WCDMA RF-to-Bits Radio Receiver
B. Process:	MB3HF
C. Number of Device Transistors:	61715
D. Fabrication Location:	California, Texas or Japan
E. Assembly Location:	UTL (NSEB) UTAC Thailand; ASAT-DongGuan (China) DongGuan

III. Packaging Information

A. Package Type:	48 FCLGA 7x7
B. Lead Frame:	PCB Substrate
C. Lead Finish:	SnPb Plating
D. Bondwire:	4.0 mil Au
E. Flammability Rating:	Class UL94-V0
F. Classification of Moisture Sensitivity per JEDEC standard J-STD-020-C	Level 1

IV. Die Information

A. Die Type:	WC38Y-8Z
B. Dimensions:	166.9X124.4 mils
C. Passivation:	Si_3N_4/SiO_2 (Silicon nitride/ Silicon dioxide
D. Interconnect:	Aluminum/Cu (Cu = 0.5%)
E. Backside Metallization:	None
F. Bondpad Opening Dimensions:	4 mil. Sq.
G. Isolation Dielectric:	SiO_2
H. Die Separation Method:	Wafer Saw

V. Quality Assurance Information

A. Quality Assurance Contacts:	Ken Wendel (Director, Rel 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 135°C biased (static) life test are pending. Using these results, the Failure Rate (λ) is calculated as follows:

$$\lambda = \frac{1}{MTTF} = \frac{1.83}{192 \times 4340 \times 1830 \times 2}$$ (Chi square value for MTTF upper limit)

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

$\lambda = 0.6 \times 10^{-9}$

λ = 0.6 F.I.T. (60% confidence level @ 25°C)

This 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 MBIC3 Process results in a FIT Rate of 0.6 @ 25C and 9.23 @ 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 WC38Y die type has been found to have all pins able to withstand a HBM transient pulse of 2500V per JEDEC JESD22-A114-D. Latch-Up testing has shown that this device withstands a current of 250ma.

Table 1
Reliability Evaluation Test Results

MAX2548E

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES
Static Life Test (Note 1)				
	Ta = 135°C Biased Time = 192 hrs.	DC Parameters & functionality	1830	0
Moisture Testing (Note 2)				
85/85	Ta = 85°C RH = 85% Biased Time = 1000hrs.	DC Parameters & functionality	77	0
Mechanical Stress (Note 2)				
Temperature Cycle	-40°C/125°C 1000 Cycles Method 1010	DC Parameters & functionality	77	0

Note 1: Life Test Data may represent plastic DIP qualification lots.
Note 2: Generic Package/Process data