



RELIABILITY REPORT
FOR
MAX2557
PLASTIC ENCAPSULATED DEVICES

November 12, 2009

MAXIM INTEGRATED PRODUCTS

120 SAN GABRIEL DR.
SUNNYVALE, CA 94086

Approved by
Ken Wendel
Quality Assurance
Director, Reliability Engineering



Conclusion

The MAX2557 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

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

I. Device Description

A. General

The MAX2557 direct-conversion RF-to-bits radio receiver is designed for HSPA-FDD femto basestations in bands II and V. The device has dedicated receive paths to enable downlink activities in both bands. The MAX2557 also provides GSM monitoring capability in the U.S. cellular and U.S. PCS bands.

The unique RF-to-bits architecture of the MAX2557 integrates four LNAs with inputs/outputs internally matched to 50 Ω , quadrature mixers, baseband anti-aliasing filters, programmable-gain RF and baseband amplifiers, fractional-N RF synthesizer, RF VCO, fractional-N frequency synthesizer for ADC sampling clock, and high-dynamic-range I/Q continuous-time sigma-delta ADCs. The sigma-delta modulators perform I and Q analog-to-digital conversion onto 1-bit digital streams. A programmable LVDS-like interface, with its own frac-N clock generation system, is used for the data transfer to the baseband/DSP, where the final decimation, equalization, and digital channel filtering are performed in compliance with the MAX-PHY digital section definition. Digital IP blocks are available from Maxim.

The MAX2557 modes of operation are programmable by a 3-wire serial bus. The MAX2557 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:	Multiband, Multimode RF-to-Bits Femto-Basestation Radio Receiver
B. Process:	MB3HF
C. Number of Device Transistors:	61715
D. Fabrication Location:	California
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 3

IV. Die Information

A. Die Type:	WC38Y-6Z
B. Dimensions:	166.9X124.4 mils
C. Passivation:	Si ₃ N 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:

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

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

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

$$\lambda = 0.6 \text{ F.I.T. (60\% confidence level @ 25°C)}$$

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

MAX2557

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