



RELIABILITY REPORT
FOR
MAX2550ETN+T
PLASTIC ENCAPSULATED DEVICES

July 31, 2012

MAXIM INTEGRATED PRODUCTS

120 SAN GABRIEL DR.
SUNNYVALE, CA 94086

Approved by
Richard Aburano
Quality Assurance
Manager, Reliability Engineering

Conclusion

The MAX2550ETN+T 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 MAX2550 is a complete single-chip RF-to-bits and bits-to-RF radio transceiver. This device is in compliance with the 3GPP TS25.104 femtocell standard for Band I, V, and VIII. It's equipped with multiple receive inputs and transmit outputs for low band, high band, and macro-cell monitoring.

This fully integrated transceiver facilitates compact radio designs for dongle and standalone femtocell products by minimizing external component count. Maxim's MAX-PHY serial interface is used to drastically reduce IC pin count, while worldwide field-proven architecture accelerates time to product deployment.

The device features unparalleled receive blocker performance and the industry's lowest noise figure for higher data rates and range. Low-power operational modes are available to minimize power consumption. The transmitter is designed to deliver EVM far exceeding the standard requirement at 0dBm.

The MAX2550-MAX2553 is a family of pin-compatible transceivers to cover all major WCDMA and cdma2000® bands. All parts are controlled by a 4-wire interface. The MAX2550 is packaged in a compact 7mm x 7mm TQFN and specified over the -40°C to +85°C extended temperature range. A complete radio reference design is available to facilitate custom designs.

II. Manufacturing Information

A. Description/Function:	Band I, V, and VIII WCDMA Femtocell Transceiver with GSM Monitoring
B. Process:	MB3
C. Number of Device Transistors:	153693
D. Fabrication Location:	USA
E. Assembly Location:	China, Taiwan and Thailand
F. Date of Initial Production:	June 2012

III. Packaging Information

A. Package Type:	56-pin TQFN 7x7
B. Lead Frame:	Copper
C. Lead Finish:	100% matte Tin
D. Die Attach:	Conductive
E. Bondwire:	Au (1 mil dia.)
F. Mold Material:	Epoxy with silica filler
G. Assembly Diagram:	#05-9000-4396
H. Flammability Rating:	Class UL94-V0
I. Classification of Moisture Sensitivity per JEDEC standard J-STD-020-C	Level 1
J. Single Layer Theta Ja:	36°C/W
K. Single Layer Theta Jc:	1°C/W
L. Multi Layer Theta Ja:	25°C/W
M. Multi Layer Theta Jc:	1°C/W

IV. Die Information

A. Dimensions:	187.8 X 187.8 mils
B. Passivation:	BCB
C. Interconnect:	Al with top layer 100% Cu
D. Backside Metallization:	None
E. Minimum Metal Width:	0.23 microns as drawn
F. Minimum Metal Spacing:	0.23 microns as drawn
G. Bondpad Dimensions:	
H. Isolation Dielectric:	SiO ₂
I. Die Separation Method:	Wafer Saw

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 135C biased (static) life test are shown in Table 1. Using these results, the Failure Rate (λ) is calculated as follows:

$$\lambda = \frac{1}{\text{MTTF}} = \frac{1.83}{192 \times 4340 \times 108 \times 2} \text{ (Chi square value for MTTF upper limit)}$$

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

$$\lambda = 10.2 \times 10^{-9}$$

$$\lambda = 10.2 \text{ F.I.T. (60\% confidence level @ 25°C)}$$

The following failure rate represents data collected from Maxim's reliability monitor program. Maxim performs quarterly 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 MB3 Process results in a FIT Rate of 0.08 @ 25C and 1.33 @ 55C (0.8 eV, 60% UCL)

B. E.S.D. and Latch-Up Testing (lot SZ7YDQ001D, D/C 1142)

The WC46-1 die type has been found to have all pins able to withstand a HBM transient pulse of +/- 2500V per JEDEC JESD22-A114. Latch-Up testing has shown that this device withstands a current of +/- 100mA and overvoltage per JEDEC JESD78.

Table 1
Reliability Evaluation Test Results

MAX2550ETN+T

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	COMMENTS
Static Life Test (Note 1)	Ta = 135C	DC Parameters	60	0	SZ7XDQ001A, D/C 1134
	Biased	& functionality	48	0	SZ7XDQ001B, D/C 1134
	Time = 192 hrs.				

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