

RELIABILITY REPORT  
FOR  
MAX2832ETM+T  
PLASTIC ENCAPSULATED DEVICES

May 7, 2013

**MAXIM INTEGRATED**

160 RIO ROBLES  
SAN JOSE, CA 95134

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## Conclusion

The MAX2832ETM+T successfully meets the quality and reliability standards required of all Maxim Integrated products. In addition, Maxim Integrated's continuous reliability monitoring program ensures that all outgoing product will continue to meet Maxim Integrated's quality and reliability standards.

## Table of Contents

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

### I. Device Description

#### A. General

The MAX2831/MAX2832 direct conversion, zero-IF, RF transceivers are designed specifically for 2.4GHz to 2.5GHz 802.11g/b WLAN applications. The MAX2831 completely integrates all circuitry required to implement the RF transceiver function, providing an RF power amplifier (PA), RF-to-baseband receive path, baseband-to-RF transmit path, VCO, frequency synthesizer, crystal oscillator, and baseband/control interface. The MAX2832 integrates the same functional blocks except for the PA. Both devices include a fast-settling sigma-delta RF synthesizer with smaller than 20Hz frequency steps and a digitally tuned crystal oscillator allowing use of a low-cost crystal. The devices also integrate on-chip DC-offset cancellation and I/Q errors and carrier leakage-detection circuits. Only an RF bandpass filter (BPF), crystal, RF switch, and a small number of passive components are needed to form a complete 802.11g/b WLAN RF front-end solution. The MAX2831/MAX2832 completely eliminate the need for an external SAW filter by implementing on-chip monolithic filters for both the receiver and transmitter. The baseband filters are optimized to meet the IEEE® 802.11g standard and proprietary turbo modes up to 40MHz channel bandwidth. These devices are suitable for the full range of 802.11g OFDM data rates (6Mbps to 54Mbps) and 802.11b QPSK and CCK data rates (1Mbps to 11Mbps). The ICs are available in a small, 48-pin TQFN package measuring only 7mm x 7mm x 0.8mm.

**II. Manufacturing Information**

A. Description/Function:	2.4GHz to 2.5GHz, 802.11g RF Transceivers with Integrated PA
B. Process:	MB3
C. Number of Device Transistors:	40431
D. Fabrication Location:	USA
E. Assembly Location:	China, Taiwan and Thailand
F. Date of Initial Production:	June 4, 2010

**III. Packaging Information**

A. Package Type:	48-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:	#05-9000-2131
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:	136 X 136 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 <sub>2</sub>
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 135°C biased (static) life test are shown in Table 1. Using these results, the Failure Rate ( $\lambda$ ) is calculated as follows:

$$\lambda = \frac{1}{\text{MTTF}} = \frac{1.83}{192 \times 4340 \times 118 \times 2} \quad (\text{Chi square value for MTTF upper limit})$$

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

$$\lambda = 9.3 \times 10^{-9}$$

$$\lambda = 9.3 \text{ F.I.T. (60\% confidence level @ 25°C)}$$

The following failure rate represents data collected from Maxim Integrated's reliability monitor program. Maxim Integrated performs quarterly life test monitors on its processes. This data is published in the Reliability Report found at <http://www.maximintegrated.com/qa/reliability/monitor>. Cumulative monitor data for the MB3 Process results in a FIT Rate of 0.05 @ 25C and 0.9 @ 55C (0.8 eV, 60% UCL)

### B. E.S.D. and Latch-Up Testing

The WD22-3 die type has been found to have all pins able to withstand a transient pulse of:

ESD-HBM:	+/- 2500V per JEDEC JESD22-A114 (lot STB3NA291E, D/C 1304)
ESD-MM:	+/- 150V per JEDEC JESD22-A115 (lot STB3NA291E, D/C 1304)
ESD-CDM:	+/- 100V per JEDEC JESD22-C101 (lot STB3NA291D, D/C 1303)

Latch-Up testing has shown that this device withstands a current of +/- 100mA and overvoltage per JEDEC JESD78 (lot STB3M3278A, D/C 1020).

**Table 1**  
Reliability Evaluation Test Results

**MAX2832ETM+T**

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	COMMENTS
<b>Static Life Test</b> (Note 1)	Ta = 135°C	DC Parameters	48	0	STB3M3278A, D/C 1020
	Biased	& functionality	70	0	STB3NA291D, D/C 1303
	Time = 192 hrs.				

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