RELIABILITY REPORT

FOR

MAX2831ETM+

PLASTIC ENCAPSULATED DEVICES

December 30, 2008

MAXIM INTEGRATED PRODUCTS

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Approved by
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Conclusion

The MAX2831ETM+ 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 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 frontend 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 thin QFN package measuring only 7mm x 7mm x 0.8mm. **Patented Receiver DC Offset Correction Scheme, Implemented Across RF Transceiver and Baseband Modem**

- Enables Fast DC Cancellation in - Dynamically Switchable Highpass-Filter Corner Frequency Controlled through the RXHP Pin

- No Calibration or Temperature Tracking Is Required

- U.S. Patent #7,110,734

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II. Manufacturing Information

A. Description/Function:	2.4GHz to 2.5GHz, 802.11g RF Transceivers with Integrated PA
B. Process:	MB3B
C. Number of Device Transistors:	
D. Fabrication Location:	California
E. Assembly Location:	UTL Thailand
F. Date of Initial Production:	September 27, 2006

III. Packaging Information

A. Package Type:	48-pin TQFN 7x7
B. Lead Frame:	Copper
C. Lead Finish:	100% matte Tin
D. Die Attach:	Conductive Epoxy
E. Bondwire:	Gold (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:	0.8°C/W
L. Multi Layer Theta Ja:	25°C/W
M. Multi Layer Theta Jc:	0.8°C/W

IV. Die Information

A. Dimensions:	136 X 136 mils
B. Passivation:	BCB
C. Interconnect:	2 x Aluminum/Cu (Cu = 0.5%), top layer 100% Cu
D. Backside Metallization:	None
E. Minimum Metal Width:	0.35 um
F. Minimum Metal Spacing:	0.35 um
G. Bondpad Dimensions:	5 mil. Sq.
H. Isolation Dielectric:	SiO_2
I. Die Separation Method:	Saw

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V. Quality Assurance Information

A. Quality Assurance Contacts: Ken Wendel (Director, Reliability 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 shown in Table 1. Using these results, the Failure Rate (λ) is calculated as follows:

$$\lambda = \frac{1}{MTTF} = \frac{1.83}{192 \times 4340 \times 149 \times 2}$$ (Chi square value for MTTF upper limit)

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

$\lambda = 7.2 \times 10^{-9}$

λ = 7.2 F.I.T. (60% confidence level @ 25°C)

The following 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 MB3HT Process results in a FIT Rate of 0.7 @ 25C and 11.5 @ 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 WD22-2 die type has been found to have all pins able to withstand a HBM transient pulse of +/-500 V per JEDEC JESD22-A114-D. Latch-Up testing has shown that this device withstands a current of +/-250 mA.

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Table 1

Reliability Evaluation Test Results

MAX2831ETM+

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	149	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	-65°C/150°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

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