

RELIABILITY REPORT FOR MAX2830ETM+T PLASTIC ENCAPSULATED DEVICES

December 5, 2011

MAXIM INTEGRATED PRODUCTS

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Approved by
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Conclusion

The MAX2830ETM+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.

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I. Device Description

A. General

The MAX2830 direct conversion, zero-IF, RF transceiver is designed specifically for 2.4GHz to 2.5GHz 802.11g/b WLAN applications. The MAX2830 completely integrates all circuitry required to implement the RF transceiver function, providing an RF power amplifier (PA), an Rx/Tx and antenna diversity switch, RF-to-baseband receive path, baseband-to-RF transmit path, voltage-controlled oscillator (VCO), frequency synthesizer, crystal oscillator, and baseband/control interface. The MAX2830 includes 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. No I/Q calibration is required; however, the device also integrates on-chip DC-offset cancellation and I/Q errors and carrier leakage-detection circuits for improved performance. Only an RF bandpass filter (BPF), crystal, a pair of baluns, and a small number of passive components are needed to form a complete 802.11g/b WLAN RF front-end solution. The MAX2830 completely eliminates 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/b RF Transceiver with PA and Rx/Tx/Diversity Switch
B. Process:	MB3
C. Number of Device Transistors:	40431
D. Fabrication Location:	California
E. Assembly Location:	China
F. Date of Initial Production:	May 23, 2007

III. Packaging Information

A. Package Type:	48L TQFN
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 / A
H. Flammability Rating:	Class UL94-V0
I. Classification of Moisture Sensitivity per JEDEC standard J-STD-020-C	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:	0.35µm
F. Minimum Metal Spacing:	0.35µm
G. Bondpad Dimensions:	
H. Isolation Dielectric:	SiO ₂
I. Die Separation Method:	Wafer Saw



V.	Quality	Assurance	Information
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Α.	Quality Assurance Contacts:	Richard Aburano (Manager, Reliability Engineering) Don Lipps (Manager, Reliability Engineering) Bryan Preeshl (Vice President of QA)			
В.	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 biased (static) life test are shown in Table 1. Using these results, the Failure Rate (λ) is calculated as follows:

 $\lambda = \underbrace{1}_{\text{MTTF}} = \underbrace{1.83}_{1000 \times 4340 \times 375 \times 2} \text{ (Chi square value for MTTF upper limit)}$ $\lambda = 0.6 \times 10^{-9}$ $\lambda = 0.6 \text{ F.I.T. (60\% confidence level @ 25°C)}$

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 STB1S3164C D/C 1014)

The WD22-1 die type has been found to have all pins able to withstand a transient pulse of:

ESD-HBM:	+/- 2500V per JEDEC JESD22-A114
ESD-CDM:	+/- 750V per JEDEC JESD22-C101

Latch-Up testing has shown that this device withstands a current of +/- 100mA and overvoltage per JEDEC JESD78.



Table 1 Reliability Evaluation Test Results

MAX2830ETM+T

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	COMMENTS	
Static Life Test (Note 1)						
	Ta = 135°C	DC Parameters	48	0	STB2Q6018A, D/C 0647	
	Biased	& functionality	48	0	STB2Q4021A, D/C 0651	
	Time = 1000 hrs.		77	0	STB1S3070C, D/C 0718	
			76	0	STB2S3126D, D/C 0814	
			77	0	STB2S2203A, D/C 0749	
			49	0	STB2Q3028A, D/C 0702	

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