



RELIABILITY REPORT  
FOR  
MAX2829ETN+D  
MAX2828 - MAX 2829  
PLASTIC ENCAPSULATED DEVICES

December 6, 2008

**MAXIM INTEGRATED PRODUCTS**

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## Conclusion

The MAX2829ETN+D 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 MAX2828/MAX2829 single-chip, RF transceiver ICs are designed specifically for OFDM 802.11 WLAN applications. The MAX2828 is designed for single-band 802.11a applications covering world-band frequencies of 4.9GHz to 5.875GHz. The MAX2829 is designed for dual-band 802.11a/g applications covering world-bands of 2.4GHz to 2.5GHz and 4.9GHz to 5.875GHz. The ICs include all circuitry required to implement the RF transceiver function, providing a fully integrated receive path, transmit path, VCO, frequency synthesizer, and baseband/ control interface. Only the PA, RF switches, RF bandpass filters (BPF), RF baluns, and a small number of passive components are needed to form the complete RF front-end solution. Each IC completely eliminates the need for external SAW filters by implementing on-chip monolithic filters for both the receiver and transmitter. The baseband filtering and the Rx/Tx signal paths are optimized to meet the 802.11a/g IEEE® standards and cover the full range of the required data rates (6, 9, 12, 18, 24, 36, 48, and 54Mbps for OFDM; 1, 2, 5.5, and 11Mbps for CK/DSSS), at receiver sensitivity levels up to 10dB better than 802.11a/g standards. The MAX2828/MAX2829 transceivers are available in the small 56-pin, exposed paddle thin QFN package.

## II. Manufacturing Information

A. Description/Function:	Single-/Dual-Band 802.11a/b/g World-Band Transceiver ICs
B. Process:	G4
C. Number of Device Transistors:	
D. Fabrication Location:	Oregon
E. Assembly Location:	UTL Thailand
F. Date of Initial Production:	October 22, 2004

## III. Packaging Information

A. Package Type:	56-pin TQFN 8x8
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:	#05-9000-1242
H. Flammability Rating:	Class UL94-V0
I. Classification of Moisture Sensitivity per JEDEC standard J-STD-020-C	Level 3
J. Single Layer Theta Ja:	35°C/W
K. Single Layer Theta Jc:	0.6°C/W
L. Multi Layer Theta Ja:	21°C/W
M. Multi Layer Theta Jc:	0.6°C/W

## IV. Die Information

A. Dimensions:	189 X 180 mils
B. Passivation:	Si <sub>3</sub> N <sub>4</sub>
C. Interconnect:	Au
D. Backside Metallization:	None
E. Minimum Metal Width:	1.2 microns (as drawn) Metal 1, 2 & 3 5.6 microns (as drawn) Metal 4
F. Minimum Metal Spacing:	1.6 microns (as drawn) Metal 1, 2 & 3, 4.2 microns (as drawn) Metal 4
G. Bondpad Dimensions:	5 mil. Sq.
H. Isolation Dielectric:	SiO <sub>2</sub>
I. Die Separation Method:	Wafer Saw

## 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 xx biased (static) life test are pending. Using these results, the Failure Rate ( $\lambda$ ) is calculated as follows:

$$\lambda = \frac{1}{\text{MTTF}} = \frac{1.83}{192 \times 4340 \times 47 \times 2} \quad (\text{Chi square value for MTTF upper limit})$$

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

$$\lambda = 22.8 \times 10^{-9}$$

$$\lambda = 22.8 \text{ F.I.T. (60\% confidence level @ 25°C)}$$

The following failure rate represents data collected from Maxim's reliability monitor program. Maxim performs quarterly 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 G4 Process results in a FIT Rate of 0.2 @ 25C and 3.6 @ 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 WD26 die type has been found to have all pins able to withstand a HBM transient pulse of +/-1000 V per Mil-Std 883 Method 3015.7. Latch-Up testing has shown that this device withstands a current of +/-250 mA.

**Table 1**  
Reliability Evaluation Test Results

**MAX2829ETN+D**

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES
<b>Static Life Test</b> (Note 1)	Ta = xx Biased Time = 192 hrs.	DC Parameters & functionality	47	0
<b>Moisture Testing</b> (Note 2) 85/85	Ta = 85°C RH = 85% Biased Time = 1000hrs.	DC Parameters & functionality	77	0
<b>Mechanical Stress</b> (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