

RELIABILITY REPORT  
FOR  
MAX3624AETJ+T  
PLASTIC ENCAPSULATED DEVICES

December 22, 2011

**MAXIM INTEGRATED PRODUCTS**

120 SAN GABRIEL DR.  
SUNNYVALE, CA 94086

<b>Approved by</b>
Richard Aburano
Quality Assurance
Manager, Reliability Engineering

## Conclusion

The MAX3624AETJ+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 MAX3624A is a low-jitter precision clock generator optimized for networking applications. The device integrates a crystal oscillator and a phase-locked loop (PLL) clock multiplier to generate high-frequency clock outputs for Ethernet, Fibre Channel, SONET/SDH, and other networking applications. Maxim's proprietary PLL design features ultra-low jitter (0.36psRMS) and excellent power-supply noise rejection, minimizing design risk for network equipment. The MAX3624A has three LVPECL outputs and one LVCMOS output. Selectable output dividers and a selectable feedback divider allow a range of output frequencies.

**II. Manufacturing Information**

A. Description/Function:	Low-Jitter, Precision Clock Generator with Four Outputs
B. Process:	MB3
C. Number of Device Transistors:	10769
D. Fabrication Location:	USA
E. Assembly Location:	China, Malaysia, Taiwan and Thailand
F. Date of Initial Production:	October 22, 2009

**III. Packaging Information**

A. Package Type:	32-pin TQFN 5x5
B. Lead Frame:	Copper
C. Lead Finish:	100% matte Tin
D. Die Attach:	Conductive
E. Bondwire:	Au (1.3 mil dia.)
F. Mold Material:	Epoxy with silica filler
G. Assembly Diagram:	#05-9000-2571
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:	47°C/W
K. Single Layer Theta Jc:	1.7°C/W
L. Multi Layer Theta Ja:	29°C/W
M. Multi Layer Theta Jc:	1.7°C/W

**IV. Die Information**

A. Dimensions:	82.28 X 82.28 mils
B. Passivation:	BCB
C. Interconnect:	Al/0.5%Cu
D. Backside Metallization:	None
E. Minimum Metal Width:	Metal1 = 0.23 / Metal2 = 0.6 / Metal3 = 1.2 / Metal4 = 4 microns (as drawn)
F. Minimum Metal Spacing:	Metal1 = 0.23 / Metal2 = 0.5 / Metal3 = 1.2 / Metal4 = 4 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 135C biased (static) life test are shown in Table 1. Using these results, the Failure Rate ( $\lambda$ ) is calculated as follows:

$$\lambda = \frac{1}{\text{MTTF}} = \frac{1.83}{192 \times 4340 \times 96 \times 2} \quad (\text{Chi square value for MTTF upper limit})$$

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

$$\lambda = 11.5 \times 10^{-9}$$

$$\lambda = 11.5 \text{ F.I.T. (60\% confidence level @ 25}^\circ\text{C)}$$

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 0.06 @ 25C and 1.05 @ 55C (0.8 eV, 60% UCL)

## B. E.S.D. and Latch-Up Testing (lot SWPZBQ001C, D/C 0917)

The HQ13 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 +/- 250mA and overvoltage per JEDEC JESD78.

**Table 1**  
Reliability Evaluation Test Results

**MAX3624AETJ+T**

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	COMMENTS
<b>Static Life Test</b> (Note 1)	Ta = 135C	DC Parameters	48	0	SWPZBQ001B, D/C 0915
	Biased	& functionality	48	0	SWPZBQ002A, D/C 1013
	Time = 192 hrs.				

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