RELIABILITY REPORT

FOR

MAX13208EALB+

PLASTIC ENCAPSULATED DEVICES

July 7, 2009

MAXIM INTEGRATED PRODUCTS

120 SAN GABRIEL DR.

SUNNYVALE, CA 94086

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Quality Assurance
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Conclusion

The MAX13208EALB+ 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 MAX13202E/MAX13204E/MAX13206E/MAX13208E low-capacitance ±30kV ESD-protection diode arrays are designed to protect sensitive electronics attached to communication lines. Each channel consists of a pair of diodes that steer ESD current pulses to VCC or GND. The MAX13202E/MAX13204E/MAX13206E/MAX13208E protect against ESD pulses up to ±15kV Human Body Model (HBM) and ±30kV Air-Gap Discharge, as specified in IEC 61000-4-2. These devices have a 6pF on-capacitance per channel, making them ideal for use on high-speed data I/O interfaces. The MAX13204E is a quad-ESD structure designed for Ethernet and FireWire® applications. The MAX13202E/MAX13206E/MAX13208E are 2-channel, 6-channel, and 8-channel devices. They are designed for cellphone connectors and SVGA video connections. These devices are available in 6-, 8-, and 10-pin µDFN packages and are specified over the -40°C to +125°C automotive operating temperature range.

II. Manufacturing Information

A. Description/Function:	2-/4-/6-/8-Channel ±30kV ESD Protectors in µDFN
B. Process:	BCD8
C. Number of Device Transistors:	
D. Fabrication Location:	Oregon
E. Assembly Location:	Thailand
F. Date of Initial Production:	December 22, 2005

III. Packaging Information

A. Package Type:	10-pin uDFN
B. Lead Frame:	Substrate
C. Lead Finish:	Gold
D. Die Attach:	Non-conductive Epoxy
E. Bondwire:	Gold (1 mil dia.)
F. Mold Material:	Epoxy with silica filler
G. Assembly Diagram:	#05-9000-1977
H. Flammability Rating:	Class UL94-V0
I. Classification of Moisture Sensitivity per JEDEC standard J-STD-020-C	Level 1
J. Multi Layer Theta Ja:	198.6°C/W
K. Multi Layer Theta Jc:	122.1°C/W

IV. Die Information

A. Dimensions:	43 X 61 mils
B. Passivation:	Si_3N_4/SiO_2 (Silicon nitride/ Silicon dioxide
C. Interconnect:	Al/0.5%Cu
D. Backside Metallization:	None
E. Minimum Metal Width:	3.0 microns (as drawn)
F. Minimum Metal Spacing:	3.0 microns (as drawn)
G. Bondpad Dimensions:	5 mil. Sq.
H. Isolation Dielectric:	SiO_2
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 135°C biased (static) life test are shown in Table 1. Using these results, the Failure Rate (λ) is calculated as follows:

$$\lambda = \frac{1}{MTTF} = \frac{1.83}{192 \times 4340 \times 157 \times 2}$$ (Chi square value for MTTF upper limit)

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

$\lambda = 2.2 \times 10^{-9}$

$\lambda = 2.2$ 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 BCD80 Process results in a FIT Rate of 0.22 @ 25C and 3.76 @ 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 RU14 die type has been found to have all pins able to withstand a HBM transient pulse of +/-2500 V per JEDEC JESD22-A114. Latch-Up testing has shown that this device withstands a current of +/-250 mA.

Table 1
Reliability Evaluation Test Results

MAX13208EALB+

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	157	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	-55ºC/125ºC 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