RELIABILITY REPORT

FOR

MAX4693EBE+
(MAX4691-MAX4694)

CHIP SCALE PACKAGE

January 26, 2009

MAXIM INTEGRATED PRODUCTS

120 SAN GABRIEL DR.

SUNNYVALE, CA 94086

Approved by
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Quality Assurance
Director, Reliability Engineering

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Conclusion

The MAX4693EBE+ 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 MAX4691-MAX4694 are low-voltage CMOS analog ICs configured as an 8-channel multiplexer (MAX4691), two 4-channel multiplexers (MAX4692), three single-pole/double-throw (SPDT) switches (MAX4693), and four SPDT switches (MAX4694). The MAX4691/MAX4692/MAX4693 operate from either a single +2V to +11V power supply or dual ±2V to ±5.5V power supplies. When operating from ±5V supplies they offer 25 on-resistance (RON), 3.5 (max) RON flatness, and 3 (max) matching between channels. The MAX4694 operates from a single +2V to +11V supply. Each switch has rail-to-rail signal handling and a low 1nA leakage current. All digital inputs are 1.8V logic-compatible when operating from a +3V supply and TTL compatible when operating from a +5V supply. The MAX4691-MAX4694 are available in 16-pin, 4mm x 4mm QFN and 16-bump UCSP packages. The chip-scale package (UCSP(tm)) occupies a 2mm x 2mm area, significantly reducing the required PC board area.

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II. Manufacturing Information

A. Description/Function:	Low-Voltage 8:1 Mux/Dual 4:1 Mux/Triple SPDT/Quad SPDT in UCSP Package
B. Process:	S3
C. Number of Device Transistors:	
D. Fabrication Location:	Oregon
E. Assembly Location:	Dallas TX
F. Date of Initial Production:	January 27, 2001

III. Packaging Information

A. Package Type:	16-pin UCSP
B. Lead Frame:	N/A
C. Lead Finish:	N/A
D. Die Attach:	N/A
E. Bondwire:	N/A
F. Mold Material:	N/A
G. Assembly Diagram:	#05-1201-0216
H. Flammability Rating:	Class UL94-V0
I. Classification of Moisture Sensitivity per JEDEC standard J-STD-020-C	Level 1

IV. Die Information

A. Dimensions:	80 X 80 mils
B. Passivation:	Si_3N_4/SiO_2 (Silicon nitride/ Silicon dioxide
C. Interconnect:	Aluminum/Si (Si = 1%)
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

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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:

$$\lambda = \frac{1}{MTTF} = \frac{1.83}{192 \times 4340 \times 77 \times 2}$$ (Chi square value for MTTF upper limit)

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

$\lambda = 13.9 \times 10^{-9}$

λ = 13.9 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 S3 Process results in a FIT Rate of 3.6 @ 25C and 66.0 @ 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 AH75-2 die type has been found to have all pins able to withstand a HBM transient pulse of +/-2500 V per Mil-Std 883 Method 3015.7. Latch-Up testing has shown that this device withstands a current of +/-250 mA.

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Table 1

Reliability Evaluation Test Results

MAX4693EBE+

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	77	0
Moisture Testing (Note 2)				
85/85	Ta = 85°C RH = 85% Biased Time = 1000hrs.	DC Parameters & functionality	77	0
Mechanical Stress (Note 2 & 3)				
Temperature Cycle	-40ºC/125ºC 1000 Cycles (Note 3)	DC Parameters & functionality	77	0

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

Note 2: Generic Package/Process data

Note 3: Ramp rate 11ºC/minute, dwell=15 minutes, One cycle/hour.

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