RELIABILITY REPORT

FOR

MAX500AEWE+

PLASTIC ENCAPSULATED DEVICES

September 8, 2011

MAXIM INTEGRATED PRODUCTS

120 SAN GABRIEL DR.

SUNNYVALE, CA 94086

Approved by
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Conclusion

The MAX500AEWE+ 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 MAX500 is a quad, 8-bit, voltage-output digital-to-analog converter (DAC) with a cascadable serial interface. The IC includes four output buffer amplifiers and input logic for an easy-to-use, two- or three-wire serial interface. In a system with several MAX500s, only one serial data line is required to load all the DACs by cascading them. The MAX500 contains double-buffered logic and a 10-bit shift register that allows all four DACs to be updated simultaneously using one control signal. There are three reference inputs so the range of two of the DACs can be independently set while the other two DACs track each other. The MAX500 achieves 8-bit performance over the full operating temperature range without external trimming.

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II. Manufacturing Information

A. Description/Function:	CMOS, Quad, Serial Interface 8-Bit DAC
B. Process:	SG5
C. Number of Device Transistors:	
D. Fabrication Location:	Oregon
E. Assembly Location:	Malaysia
F. Date of Initial Production:	Pre 1997

III. Packaging Information

A. Package Type:	16-pin SOIC (W)
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:	#05-0401-0177 / B
H. Flammability Rating:	Class UL94-V0
I. Classification of Moisture Sensitivity per JEDEC standard J-STD-020-C	1
J. Single Layer Theta Ja:	105°C/W
K. Single Layer Theta Jc:	22°C/W
L. Multi Layer Theta Ja:	69.1 °C/W
M. Multi Layer Theta Jc:	22°C/W

IV. Die Information

A. Dimensions:	150 X 159 mils
B. Passivation:	Si_3N_4/SiO_2 (Silicon nitride/ Silicon dioxide)
C. Interconnect:	Al/0.5%Cu with Ti/TiN Barrier
D. Backside Metallization:	None
E. Minimum Metal Width:	5.0 microns (as drawn)
F. Minimum Metal Spacing:	5.0 microns (as drawn)
G. Bondpad Dimensions:	
H. Isolation Dielectric:	SiO_2
I. Die Separation Method:	Wafer Saw

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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 biased (static) life test are shown in Table 1. Using these results, the Failure Rate (λ) is calculated as follows:

$$\lambda = \frac{1}{\text{MTTF}} = \frac{4.04}{192 \times 4340 \times 445 \times 2}$$

(Chi square value for MTTF upper limit)

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

$\lambda = 5.4 \times 10^{-9}$

λ = 5.4 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 SG5 Process results in a FIT Rate of 0.12 @ 25C and 2.04 @ 55C (0.8 eV, 60% UCL)

B. E.S.D. and Latch-Up Testing (lot NLOAFQ001B D/C 9918)

The DA17 die type has been found to have all pins able to withstand a HBM transient pulse of +/-1500V per Mil-Std 883 Method 3015.7. Latch-Up testing has shown that this device withstands a current of +/-250mA.

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Table 1
Reliability Evaluation Test Results

MAX500AEWE+

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	COMMENTS
Static Life Test (Note 1)					
	Ta = 135°C	DC Parameters	80	1	NLQAFQ001B, D/C 9918
	Biased	& functionality	80	0	XLQAEA108F, D/C 9826
	Time = 192 hrs.		80	0	XLQADA095C, D/C 9818
			45	0	XLQACB031Q, D/C N/A
			80	0	XLQACA031A, D/C N/A
			80	0	XLQABY027A, D/C N/A

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

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