RELIABILITY REPORT

FOR

MAX317CPA+

PLASTIC ENCAPSULATED DEVICES

March 26, 2012

MAXIM INTEGRATED PRODUCTS

120 SAN GABRIEL DR.

SUNNYVALE, CA 94086

Approved by
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Conclusion

The MAX317CPA+ 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 MAX317/MAX318/MAX319 are precision, CMOS, monolithic analog switches. The single-pole singlethrow (SPST) MAX317 is normally closed (NC), the SPST MAX318 is normally open (NO), and the singlepole double-throw (SPDT) MAX319 has one normally open and one normally closed switch. All three parts offer low on resistance (less than 35 Ohms), guaranteed to match within 2 Ohms between channels and to remain flat over the analog signal range (Delta 3 Ohm max). They also offer low leakage (less than 250pA at +25 deg C and less than 6nA at +85 Deg C) and fast switching (turn-on time less than 175ns and turn-off time less than 145ns).
The MAX317/MAX318/MAX319 are fabricated with Maxim¡¯s new improved silicon-gate process. Design improvements guarantee extremely low charge injection (10pC), low power consumption (35 uW), and electrostatic discharge (ESD) greater than +/-2000V. The 44V maximum breakdown voltage allows rail-to-rail analog signal handling capability.

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II. Manufacturing Information

A. Description/Function:	Precision, CMOS Analog Switches
B. Process:	S5
C. Number of Device Transistors:	
D. Fabrication Location:	Oregon
E. Assembly Location:	Philippines, Thailand
F. Date of Initial Production:	Pre 1997

III. Packaging Information

A. Package Type:	300 mil 8L PDIP
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:	#05-0301-0604 / 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:	110°C/W
K. Single Layer Theta Jc:	40°C/W
L. Multi Layer Theta Ja:	N/A
M. Multi Layer Theta Jc:	N/A

IV. Die Information

A. Dimensions:	76 X 58 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:

$$\lambda = \frac{1}{MTTF} = \frac{1.83}{192 \times 4340 \times 80 \times 2}$$ (Chi square value for MTTF upper limit)

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

$\lambda = 13.7 \times 10^{-9}$

λ = 13.7 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 S5 Process results in a FIT Rate of 0.09 @ 25C and 1.55 @ 55C (0.8 eV, 60% UCL)

B. E.S.D. and Latch-Up Testing (lot XSYABY001A D/C 9331)

The AG55 die type has been found to have all pins able to withstand a HBM transient pulse of +/-2000V per Mil-Std 883 Method 3015.7. Latch-Up testing has shown that this device withstands a current of +/-50mA.

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Table 1
Reliability Evaluation Test Results

MAX317CPA+

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	COMMENTS
Static Life Test (Note 1)					
	Ta = 135°C Biased Time = 192 hrs.	DC Parameters & functionality	80	0	XSYABY001A, D/C 9331

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

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