

RELIABILITY REPORT
FOR
DG300AAA
(DG300-DG303, DG300A-DG303A)
PLASTIC ENCAPSULATED DEVICES

January 19, 2009

MAXIM INTEGRATED PRODUCTS

120 SAN GABRIEL DR.
SUNNYVALE, CA 94086

Approved by
Ken Wendel
Quality Assurance
Director, Reliability Engineering

Conclusion

The DG300AAA 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

Maxim's DG300-DG303 and DG300A-DG303A CMOS dual and quad analog switches combine low power operation with fast switching times and superior DC and AC switch characteristics. On-resistance is less than 50 Ω and is essentially constant over the analog signal range. Device specifications are ideal for battery-powered circuitry. These switches are available in a variety of formats as outlined in the Pin Configurations section in the full data sheet. The switch control logic inputs are fully TTL and CMOS compatible. Also featured are "break-before-make" switching and low charge injection. Maxim's DG300-DG303 and DG300A-DG303A families are electrically compatible and pin compatible with the original manufacturer's devices. All devices operate with power supplies ranging from $\pm 5V$ to $\pm 18V$. Single-supply operation is implemented by connecting V- to GND.

II. Manufacturing Information

A. Description/Function:	TTL Compatible CMOS Analog Switches
B. Process:	M6H
C. Number of Device Transistors:	
D. Fabrication Location:	Oregon
E. Assembly Location:	PACSEM
F. Date of Initial Production:	Pre 1997

III. Packaging Information

A. Package Type:	10-pin GOLD CAN
B. Lead Frame:	N/A
C. Lead Finish:	Preplated Gold over Nickel
D. Die Attach:	30x30 Au/Si Epoxy
E. Bondwire:	Aluminum (1.25 mil dia.)
F. Mold Material:	Epoxy with silica filler
G. Assembly Diagram:	#05-0301-0350
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:	97 X 101 mils
B. Passivation:	Si ₃ N ₄ /SiO ₂ (Silicon nitride/ Silicon dioxide)
C. Interconnect:	Aluminum/Si (Si = 1%)
D. Backside Metallization:	None
E. Minimum Metal Width:	Metal1 = 0.5 / Metal2 = 0.6 / Metal3 = 0.6 microns (as drawn)
F. Minimum Metal Spacing:	Metal1 = 0.45 / Metal2 = 0.5 / Metal3 = 0.6 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:

$$\lambda = \frac{1}{\text{MTTF}} = \frac{1.83}{192 \times 4340 \times 2134 \times 2} \quad (\text{Chi square value for MTTF upper limit})$$

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

$$\lambda = 1.7 \times 10^{-9}$$

$$\lambda = 1.7 \text{ F.I.T. (60\% confidence level @ 25°C)}$$

This low failure rate represents data collected from Maxim's reliability monitor program.

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 AG37 die type has been found to have all pins able to withstand a HBM transient pulse of +/-400 V per JEDEC JESD22-A114-D. Latch-Up testing has shown that this device withstands a current of +/-100 mA.

Table 1
Reliability Evaluation Test Results

DG300AAA

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	2134	2
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	-65°C/150°C 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