RELIABILITY REPORT
FOR
MAX170DCPA+
PLASTIC ENCAPSULATED DEVICES

July 31, 2009

MAXIM INTEGRATED PRODUCTS
120 SAN GABRIEL DR.
SUNNYVALE, CA 94086

Approved by
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Quality Assurance
Director, Reliability Engineering
Conclusion

The MAX170DCPA+ 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

See Data Sheet
II. Manufacturing Information

A. Description/Function: Serial Output, 5.6µs, 12-Bit ADC with Reference
B. Process: SG5
C. Number of Device Transistors: 
D. Fabrication Location: Oregon
E. Assembly Location: Thailand, Philippines
F. Date of Initial Production: Pre 1997

III. Packaging Information

A. Package Type: 8-pin PDIP
B. Lead Frame: Copper
C. Lead Finish: 100% matte Tin
D. Die Attach: Conductive Epoxy
E. Bondwire: Gold (1.3 mil dia.)
F. Mold Material: Epoxy with silica filler
G. Assembly Diagram: #05-0101-0182
H. Flammability Rating: Class UL94-V0
I. Classification of Moisture Sensitivity per JEDEC standard J-STD-020-C Level 1
J. Single Layer Theta Ja: 110°C/W
K. Single Layer Theta Jc: 40°C/W

IV. Die Information

A. Dimensions: 115 X 116 mils
B. Passivation: Si₃N₄/SiO₂ (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: 5 mil. Sq.
H. Isolation Dielectric: SiO₂
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 pending. Using these results, the Failure Rate ($\lambda$) is calculated as follows:

$$\lambda = \frac{1}{\text{MTTF}} = \frac{4.04}{192 \times 4340 \times 80 \times 2}$$  
(Chi square value for MTTF upper limit)

(where $4340 = \text{Temperature Acceleration factor assuming an activation energy of 0.8eV}$)

$$\lambda = 29.6 \times 10^{-9}$$

$$\lambda = 29.6 \text{ F.I.T. (60% confidence level @ 25C)}$$

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 SG5 Process results in a FIT Rate of 0.4 @ 25C and 7.4 @ 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 AD27 die type has been found to have all pins able to withstand a HBM transient pulse of +/-1000 V per Mil-Std 883 Method 3015.7. Latch-Up testing has shown that this device withstands a current of +/-50 mA.
# Table 1
Reliability Evaluation Test Results

<table>
<thead>
<tr>
<th>TEST ITEM</th>
<th>TEST CONDITION</th>
<th>FAILURE IDENTIFICATION</th>
<th>SAMPLE SIZE</th>
<th>NUMBER OF FAILURES</th>
</tr>
</thead>
</table>
| **Static Life Test** (Note 1) | Ta = 135°C  
Biased  
Time = 192 hrs. | DC Parameters & functionality | 80          | 1                  |
| **Moisture Testing** (Note 2) | 85/85  
Ta = 85°C  
RH = 85%  
Biased  
Time = 1000hrs. | DC Parameters & functionality | 77          | 0                  |
| **Mechanical Stress** (Note 2) | Temperature  
-65°C/150°C  
Cycle  
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