RELIABILITY REPORT
FOR
MAX274/A/Bxyz+
PLASTIC ENCAPSULATED DEVICES

April 21, 2009

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

Approved by
Ken Wendel
Quality Assurance
Director, Reliability Engineering
The MAX274/A/Bxyz+ 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 MAX274 and MAX275 are continuous-time active filters consisting of independent cascadable 2nd-order sections. Each section can implement and all-pole bandpass or lowpass filter response, such as Butterworth, Bessel, Chebyshev, and is programmed by four external resistors. The MAX274/MAX275 provide lower noise that switched-capacitor filters, as well as superior dynamic performance—both due to the continuous-time design. Since continuous-time filters do not require a clock, aliased and clock noise are eliminated with the MAX274/MAX275. The MAX274 comprises of four 2nd-order sections, permitting 8th-order filters to be realized. Center frequencies range up to 150kHz, and are accurate to within ±1% over the full operating temperature range. Total harmonic distortion (THD) is typically better than -86dB. The MAX275 comprises of two 2nd-order sections, permitting 4th-order filters to be realized. Center frequencies range up to 300kHz, and are accurate to within ±0.9% over the full operating temperature range. Total harmonic distortion (THD) is typically better than -86dB. Both filters operate from a single +5V supply or from dual ±5V supplies.
II. Manufacturing Information

A. Description/Function: 4th- and 8th-Order, Continuous-Time Active Filters
B. Process: SG5
C. Number of Device Transistors: 
D. Fabrication Location: Oregon
E. Assembly Location: ATP Philippines, Carsem Malaysia
F. Date of Initial Production: Pre 1997

III. Packaging Information

A. Package Type: 28-pin SOIC (W)
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: #05-0201-0078
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: 80°C/W
K. Single Layer Theta Jc: 18°C/W
L. Multi Layer Theta Ja: 59°C/W
M. Multi Layer Theta Jc: 18°C/W

IV. Die Information

A. Dimensions: 140 X 187 mils
B. Passivation: Si₃N₄/SiO₂ (Silicon nitride/ Silicon dioxide
C. Interconnect: Aluminum/Si (Si = 1%)
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 shown in Table 1. Using these results, the Failure Rate ($\lambda$) is calculated as follows:

$$\chi = \frac{1}{MTTF} = \frac{1.83}{192 \times 4340 \times 509 \times 2}$$

(Chi square value for MTTF upper limit)

(Chi square value for MTTF upper limit)

$$\chi = 2.1 \times 10^{-9}$$

$$\chi = 2.1 \text{ F.I.T. (60% confidence level @ 25°C)}$$

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 SG5 Process results in a FIT Rate of 0.4 @ 25°C and 7.4 @ 55°C (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. ESD. and Latch-Up Testing

The AF08 die type has been found to have all pins able to withstand a HBM transient pulse of +/-1500 V per Mil-Std 883 Method 3015.7. Latch-Up testing has shown that this device withstands a current of +/-250 mA.
<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>
<tbody>
<tr>
<td>Static Life Test (Note 1)</td>
<td>Ta = 135°C</td>
<td>DC Parameters &amp; functionality</td>
<td>509</td>
<td>0</td>
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<tr>
<td></td>
<td>Biased</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Time = 192 hrs.</td>
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<tr>
<td>Moisture Testing (Note 2)</td>
<td>Ta = 85°C</td>
<td>DC Parameters &amp; functionality</td>
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<td>0</td>
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<tr>
<td></td>
<td>RH = 85%</td>
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</tr>
<tr>
<td></td>
<td>Biased</td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Time = 1000hrs.</td>
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</tr>
<tr>
<td>Mechanical Stress (Note 2)</td>
<td>Temperature -65°C/150°C</td>
<td>DC Parameters &amp; functionality</td>
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<td>0</td>
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<tr>
<td>Cycle</td>
<td>1000 Cycles</td>
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<td>Method 1010</td>
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Note 1: Life Test Data may represent plastic DIP qualification lots.
Note 2: Generic Package/Process data