RELIABILITY REPORT
FOR
MAX275BEWP+T
PLASTIC ENCAPSULATED DEVICES

November 3, 2016

MAXIM INTEGRATED
160 RIO ROBLES
SAN JOSE, CA 95134

Approved by
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Quality Assurance
Reliability Engineer
Conclusion

The MAX275BEWP+T successfully meets the quality and reliability standards required of all Maxim Integrated products. In addition, Maxim Integrated's continuous reliability monitoring program ensures that all outgoing product will continue to meet Maxim Integrated'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 any all-pole bandpass or low pass 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: S3
C. Fabrication Location: USA
D. Assembly Location: Malaysia, Philippines
E. Date of Initial Production: Pre 1997

III. Packaging Information

A. Package Type: 20-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: #05-0201-0081
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: 100°C/W
K. Single Layer Theta Jc: 20°C/W
L. Multi Layer Theta Ja: 67°C/W
M. Multi Layer Theta Jc: 23°C/W

IV. Die Information

A. Dimensions: 90X105 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: 3.0 microns (as drawn)
F. Minimum Metal Spacing: 3.0 microns (as drawn)
G. Bondpad Dimensions: 
H. Isolation Dielectric: SiO₂
I. Die Separation Method: Wafer Saw
V. Quality Assurance Information

A. Quality Assurance Contacts:
   Eric Wright (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 135°C biased (static) life test are shown in Table 1. Using these results, the Failure Rate (λ) is calculated as follows:

   \[ \lambda = \frac{1}{MTTF} = \frac{1.83}{192 \times 4340 \times 240 \times 2} \]

   (Chi square value for MTTF upper limit)

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

   \[ \lambda = 4.58 \times 10^{-9} \]

   \[ \lambda = 4.58 \text{ F.I.T. (60% confidence level @ 25°C)} \]

   The following failure rate represents data collected from Maxim Integrated's reliability monitor program. Maxim Integrated performs quarterly life test monitors on its processes. This data is published in the Reliability Report found at http://www.maximintegrated.com/qa/reliability/monitor. Cumulative monitor data for the S3 Process results in a FIT Rate of 0.04 @ 25°C and 0.69 @ 55°C (0.8 eV, 60% UCL)

B. E.S.D. and Latch-Up Testing

   The AF09 die type has been found to have all pins able to withstand an HBM transient pulse of +/-1000V per Mil-Std 883 Method 3015.7. Latch-Up testing has shown that this device withstands a current of +/-200mA and overvoltage per JEDEC JESD78.
### Table 1
Reliability Evaluation Test Results

**MAX275BEWP+T**

<table>
<thead>
<tr>
<th>TEST ITEM</th>
<th>TEST CONDITION</th>
<th>FAILURE IDENTIFICATION</th>
<th>SAMPLE SIZE</th>
<th>NUMBER OF FAILURES</th>
<th>COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Static Life Test (Note 1)</td>
<td>Ta = 135°C</td>
<td>DC Parameters &amp; functionality</td>
<td>240</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Biased</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Time = 192 hrs.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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