RELIABILITY REPORT
FOR
MAX233AEWP+G36
PLASTIC ENCAPSULATED DEVICES

February 18, 2015

MAXIM INTEGRATED
160 RIO ROBLES
SAN JOSE, CA 95134

Approved by

<table>
<thead>
<tr>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sokhom Chum</td>
</tr>
<tr>
<td>Quality Assurance</td>
</tr>
<tr>
<td>Reliability Engineer</td>
</tr>
</tbody>
</table>

Conclusion

The MAX233A/B 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.

Table of Contents

I.  Device Description
II. Manufacturing Information
III. Packaging Information
IV. Die Information
V. Quality Assurance Information
VI. Reliability Evaluation

I. Device Description

A. General

The MAX220-MAX249 family of line drivers/receivers is intended for all EIA/TIA-232E and V.28/V.24 communications interfaces, particularly applications where ±12V is not available. These parts are especially useful in battery-powered systems, since their low-power shutdown mode reduces power dissipation to less than 5µW. The MAX225, MAX233, MAX235, and MAX245/MAX246/MAX247 use no external components and are recommended for applications where printed circuit board space is critical.
II. Manufacturing Information

A. Description/Function: +5V-Powered, Multichannel RS-232 Drivers/Receivers
B. Process: M6
C. Number of Device Transistors:
D. Fabrication Location: Oregon
E. Assembly Location: Philippines
F. 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: #31-4711
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:
B. Passivation: Si₃N₄/SiO₂ (Silicon nitride/ Silicon dioxide)
C. Interconnect: Al/1.0%Si
D. Backside Metallization: None
E. Minimum Metal Width: Metal1 = 0.5 microns (as drawn)
F. Minimum Metal Spacing: Metal1 = 0.45 microns (as drawn)
G. Bondpad Dimensions:
H. Isolation Dielectric: SiO₂
I. Die Separation Method: Wafer Saw
V. Quality Assurance Information

A. Quality Assurance Contacts:
   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 ($\lambda$) is calculated as follows:

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

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

   $\lambda = 13.7 \times 10^{-9}$
   $\lambda = 13.7$ 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 M6 Process results in a FIT Rate of 0.38 @ 25°C and 6.48 @ 55°C (0.8 eV, 60% UCL)

B. E.S.D. and Latch-Up Testing (lot LYLWBFB, D/C 9636)

   The PS38 die type has been found to have all pins able to withstand a HBM transient pulse of +/-1500V per Mil-Std 883 Method 3015.7. Latch-Up testing has shown that this device withstands a current of +/-100mA.
### 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>
<th>COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Static Life Test</td>
<td>Ta = 135°C</td>
<td>DC Parameters &amp; functionality</td>
<td>80</td>
<td>0</td>
<td>BYLOXABQ</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.