RELIABILITY REPORT
FOR
MAX6951CEE+
PLASTIC ENCAPSULATED DEVICES

March 30, 2011

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

Approved by
Sokhom Chum
Quality Assurance
Reliability Engineer
Conclusion

The MAX6951CEE+ 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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II. Manufacturing Information

A. Description/Function: Serially Interfaced, +2.7V to +5.5V, 5- and 8-Digit LED Display Drivers
B. Process: TS50
C. Number of Device Transistors: 
D. Fabrication Location: Taiwan
E. Assembly Location: Philippines, Thailand
F. Date of Initial Production: October 27, 2001

III. Packaging Information

A. Package Type: 16-pin QSOP
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: #05-3301-0005
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: 53°C/W
K. Single Layer Theta Jc: 6°C/W
L. Multi Layer Theta Ja: 44°C/W
M. Multi Layer Theta Jc: 6°C/W

IV. Die Information

A. Dimensions: 80 X 94 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: 0.50µm
F. Minimum Metal Spacing: 0.50µm
G. Bondpad Dimensions: 5 mil. Sq.
H. Isolation Dielectric: SiO₂
I. Die Separation Method: Wafer Saw
V. Quality Assurance Information

A. Quality Assurance Contacts:
   Richard Aburano (Manager, Reliability Engineering)
   Don Lipps (Manager, Reliability Engineering)
   Bryan Preeshl (Vice President of QA)

B. Outgoing Inspection Level:
   0.1% for all electrical parameters guaranteed by theDatasheet.
   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:

\[
\lambda = \frac{1}{\text{MTTF}} = \frac{1.83}{1000 \times 4340 \times 45 \times 2} \quad \text{(Chi square value for MTTF upper limit)}
\]

(Chi square value for MTTF upper limit)

\( \lambda = \frac{1}{1000 \times 4340 \times 45 \times 2} \)

\( \lambda = 4.7 \times 10^{-9} \)

\( \lambda = 4.7 \text{ F.I.T. (60% confidence level @ 25°C)} \)

The following failure rate represents data collected from Maxim's reliability monitor program. Maxim performs quarterly life test monitors on its processes. This data is published in the Reliability Report found at http://www.maxim-ic.com/qa/reliability/monitor. Cumulative monitor data for the TS50 Process results in a FIT Rate of 0.25 @ 25C and 6.11 @ 55C (0.8 eV, 60% UCL)

B. E.S.D. and Latch-Up Testing (ESD lot K210BA004L D/C 0630, Latch-Up lot K210BQ001B D/C 0115)

The DW05 die type has been found to have all pins able to withstand a HBM transient pulse of +/-2500V per JEDEC JESD22-A114. Latch-Up testing has shown that this device withstands a current of +/-100mA.
Table 1
Reliability Evaluation Test Results
MAX6951CEE+

<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</td>
<td>45</td>
<td>0</td>
<td>K210BQ002Q, D/C 0347</td>
</tr>
<tr>
<td></td>
<td>Biased</td>
<td>&amp; functionality</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Time = 1000 hrs.</td>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

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