RELIABILITY REPORT
FOR
MAX9526AEI+
PLASTIC ENCAPSULATED DEVICES

June 11, 2009

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

Approved by
Ken Wendel
Quality Assurance
Director, Reliability Engineering
Conclusion

The MAX9526AEI+ 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 MAX9526 is a low-power video decoder that converts NTSC or PAL composite video signals to 8-bit or 10-bit YCbCr component video compliant with the ITUR BT.656 standard. The device powers up in fully operational mode and automatically configures itself to decode the detected input standard. The MAX9526 typically consumes 200mW of power in normal operation and typically less than 100µW in shutdown mode. An internal 10-bit, 54MHz analog-to-digital converter (ADC) samples the input with four times oversampling. The MAX9526 features a DC restoration circuit with offset correction and automatic gain control to accurately optimize the full-scale range of the ADC. An integrated analog anti-aliasing filter eliminates the need for external filtering. The MAX9526 includes a 2:1 input multiplexer with automatic signal selection based on activity at the inputs. An internal line-locked phase-locked loop (PLL) generates the sample clock and the line-locked clock (LLC) output to provide an ITU-compliant output. Alternatively, the PLL can be configured to provide a sample clock and output clock at 2x and 1x the frequency of the crystal oscillator, respectively. The MAX9526 provides a multiline adaptive comb filter to reduce cross-chrominance and cross-luminance artifacts. A single 1.8V supply is used for both the digital and analog supplies. The digital outputs operate from a separate +1.7V to +3.45V supply to allow direct connection to a wide range of digital processors. The MAX9526 operates over the -40°C to +125°C automotive temperature range and is available in both a 28-pin QSOP and a 32-pin TQFN (5mm x 6mm).
II. Manufacturing Information

A. Description/Function: Low-Power, High-Performance NTSC/PAL Video Decoder
B. Process: 0.18um 1 Poly 6 Metal CMOS
C. Number of Device Transistors: 1997544
D. Fabrication Location: Taiwan
E. Assembly Location: UTL Thailand
F. Date of Initial Production: April 23, 2009

III. Packaging Information

A. Package Type: 28-pin QSOP
B. Lead Frame: Copper
C. Lead Finish: 100% matte Tin
D. Die Attach: Conductive Epoxy
E. Bondwire: Au (1.0 mil dia.)
F. Mold Material: Epoxy with silica filler
G. Assembly Diagram: #
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: 93°C/W
K. Single Layer Theta Jc: 27°C/W
L. Multi Layer Theta Ja: 79.3°C/W
M. Multi Layer Theta Jc: 27°C/W

IV. Die Information

A. Dimensions: 86 x 148 mils
B. Passivation: Laser/TEOS Ox - Pass/Nit -PreLP+GenLP
C. Interconnect: Al/Cu 0.5%
D. Backside Metallization: None
E. Minimum Metal Width: 0.18um
F. Minimum Metal Spacing: 0.18um
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 (λ) is calculated as follows:

\[ \lambda = \frac{1}{MTTF} = \frac{1.83}{192 \times 4340 \times 48 \times 2} \]

(Chi square value for MTTF upper limit)

\[ \lambda = 22.4 \times 10^{-9} \]

\[ \lambda = 22.4 \text{ F.I.T. (60% confidence level @ 25°C)} \]

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 TSMC 0.18um Process results in a FIT Rate of 0.8 @ 25°C and 13.1 @ 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 VA81 die type has been found to have all pins able to withstand a HBM transient pulse of +/-2500 V per JEDEC JESD22-A114. Latch-Up testing has shown that this device withstands a current of +/-250 mA, 1.5x VCCMax Overvoltage per JESD78.
<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><strong>Static Life Test</strong> (Note 1)</td>
<td>Ta = 135°C Biased Time = 192 hrs.</td>
<td>DC Parameters &amp; functionality</td>
<td>48</td>
<td>0</td>
</tr>
<tr>
<td><strong>Moisture Testing</strong> (Note 2)</td>
<td>Ta = 85°C RH = 85% Biased Time = 1000hrs.</td>
<td>DC Parameters &amp; functionality</td>
<td>77</td>
<td>0</td>
</tr>
<tr>
<td><strong>Mechanical Stress</strong> (Note 2)</td>
<td>Temperature Cycle</td>
<td>DC Parameters &amp; functionality</td>
<td>77</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>-65°C/150°C 1000 Cycles Method 1010</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note 1: Life Test Data may represent plastic DIP qualification lots.
Note 2: Generic Package/Process data