RELIABILITY REPORT
FOR
MAX9130EXT+
PLASTIC ENCAPSULATED DEVICES

June 14, 2011

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

Approved by
Sokhom Chum
Quality Assurance
Reliability Engineer
Conclusion

The MAX9130EXT+ 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.

Table of Contents

[Image]

I. Device Description
   A. General

The MAX9130 is a single low-voltage differential signaling (LVDS) line receiver ideal for applications requiring high data rates, low power, and low noise. The device is guaranteed to receive data at speeds up to 500Mbps (250MHz). The MAX9130 accepts an LVDS differential input and translates it to an LVTTL/LVCMOS output. The fail-safe feature sets the output high when the inputs are undriven and open, terminated, or shorted. The device supports a wide common-mode input range, allowing a ground potential difference and common-mode noise between the driver and the receiver. The MAX9130 conforms to the ANSI/TIA/EIA-644 LVDS standard. The MAX9130 operates from a single +3.3V supply, and is specified for operation from -40°C to +85°C. It is available in a space-saving 6-pin SC70 package. Refer to the MAX9110/MAX9112 data sheet for single/dual LVDS line drivers. Refer to the MAX9115 for a lower speed (200Mbps) single LVDS line receiver in SC70.
II. Manufacturing Information

A. Description/Function: Single 500Mbps LVDS Line Receiver in SC70
B. Process: TS35
C. Number of Device Transistors: 96
D. Fabrication Location: Taiwan
E. Assembly Location: Malaysia, Thailand
F. Date of Initial Production: October 27, 2001

III. Packaging Information

A. Package Type: 6-pin SC70
B. Lead Finish: NiPd
C. Lead Finish: 100% matte Tin
D. Die Attach: Non-conductive
E. Bondwire: Au (1 mil dia.)
F. Mold Material: Epoxy with silica filler
G. Assembly Diagram: #05-2801-0027
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: 326°C/W
K. Single Layer Theta Jc: 115°C/W
L. Multi Layer Theta Ja: 326.5°C/W
M. Multi Layer Theta Jc: 115°C/W

IV. Die Information

A. Dimensions: 30 X 31 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: 0.35µm
F. Minimum Metal Spacing: 0.35µm
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 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:

\[ \lambda = \frac{1}{MTTF} = \frac{1.83}{192 \times 4340 \times 68 \times 2} \]  
(Chi square value for MTTF upper limit)

\[ (\text{where } 4340 = \text{Temperature Acceleration factor assuming an activation energy of } 0.8eV) \]

\[ \lambda = 16.2 \times 10^{-9} \]

\[ \lambda = 16.2 \text{ F.I.T. (60% confidence level @ 25°C)} \]

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 TS35 Process results in a FIT Rate of 0.11 @ 25C and 1.93 @ 55C (0.8 eV, 60% UCL)

B. E.S.D. and Latch-Up Testing (lot Q310A001H D/C 0120)

The HS13 die type has been found to have all pins able to withstand a HBM transient pulse of +/-1000V per Mil-Std 883 Method 3015.7. Latch-Up testing has shown that this device withstands a current of +/-250mA.
Table 1
Reliability Evaluation Test Results

MAX9130EXT+

<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>68</td>
<td>0</td>
<td>Q310AQ001D, D/C 0103</td>
</tr>
<tr>
<td>Biased</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time = 192 hrs.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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