RELIABILITY REPORT
FOR
MAX9179EUE+
PLASTIC ENCAPSULATED DEVICES

November 22, 2013

MAXIM INTEGRATED
160 RIO ROBLES
SAN JOSE, CA 95134

Approved by
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Quality Assurance
Reliability Engineer
Conclusion

The MAX9179EUE+ 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 MAX9179 is a quad, low-voltage differential signaling (LVDS) line receiver designed for applications requiring high data rates, low power dissipation, and noise immunity. The receiver accepts four LVDS input signals and translates them to 3.3V LVCMOS output levels at speeds up to 400Mbps. The receiver features built-in hysteresis, which improves noise immunity and prevents multiple switching on slow-transitioning inputs. The device supports a wide 0.038V to 2.362V common-mode input voltage range, allowing for ground potential differences and common-mode noise between the driver and the receiver. A fail-safe circuit sets the output high when the input is open, undriven and shorted, or undriven and terminated. Common enable inputs control the high-impedance outputs. The MAX9179 has a flow-through pinout for easy PC board layout. It is pin compatible with the MAX9121 and the DS90LV048A, but it also features high-ESD tolerance and built-in hysteresis. Available in 16-pin TSSOP and thin QFN packages, the MAX9179 operates from a single 3.3V supply and is specified for -40°C to +85°C operation.
II. Manufacturing Information

A. Description/Function: Quad LVDS Receiver with Hysteresis
B. Process: TS35
C. Number of Device Transistors: 
D. Fabrication Location: Taiwan
E. Assembly Location: Philippines, Thailand, or Malaysia
F. Date of Initial Production: January 25, 2003

III. Packaging Information

A. Package Type: 16-pin TSSOP
B. Lead Frame: Copper
C. Lead Finish: 100% matte Tin
D. Die Attach: Conductive
E. Bondwire: Au (1 mil dia.)
F. Mold Material: Epoxy with silica filler
G. Assembly Diagram: #05-9000-0340
H. Flammability Rating: Class UL94-V0
I. Classification of Moisture Sensitivity per JEDEC standard J-STD-020-C
J. Single Layer Theta Ja: 106°C/W
K. Single Layer Theta Jc: 27°C/W
L. Multi Layer Theta Ja: 90°C/W
M. Multi Layer Theta Jc: 27°C/W

IV. Die Information

A. Dimensions: 63X68 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: 0.35um
F. Minimum Metal Spacing: 0.35um
G. Bondpad Dimensions:
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 135C biased (static) life test are shown in Table 1. Using these results, the Failure Rate ($\lambda$) is calculated as follows:

$$\lambda = \frac{1}{MTTF} = \frac{1.83}{192 \times 4340 \times 125 \times 2}$$

(Chi square value for MTTF upper limit)

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

$$\lambda = 8.8 \times 10^{-9}$$

$$\lambda = 8.8 \text{ F.I.T. (60% confidence level @ 25°C)}$$

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 TS35 Process results in a FIT Rate of 0.11 @ 25°C and 1.8 @ 55°C (0.8 eV, 60% UCL).

B. E.S.D. andLatch-Up Testing (lot QDA0BQ001A, D/C 0302)

The HS28 die type has been found to have all pins able to withstand a HBM transient pulse of +/-2000V 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

MAX9179EUE+

<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>QDA0BQ001F</td>
</tr>
<tr>
<td>Biased</td>
<td></td>
<td>&amp; functionality</td>
<td>80</td>
<td>0</td>
<td>QDA0BQ001A, D/C 0302</td>
</tr>
</tbody>
</table>

Time = 192 hrs.

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