RELIABILITY REPORT
FOR
MAX3845UCQ+
PLASTIC ENCAPSULATED DEVICES

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MAXIM INTEGRATED
160 RIO ROBLES
SAN JOSE, CA 95134

Approved by
Sokhom Chum
Quality Assurance
Reliability Engineer
Conclusion

The MAX3845UCQ+ 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 MAX3845 is a TMDS® 2-to-4 fanout switch and cable driver for multimonitor distribution of DVI(tm) or HDMI(tm) signaling up to 1.65Gbps. Both inputs and outputs are standard TMDS signaling as per DVI and HDMI standards. Because TMDS links are "point-to-point", buffering is required for fanout applications. Four DVI/HDMI TMDS outputs are provided for fanout distribution. Each TMDS output can be independently sourced from either input or can be turned off. Each TMDS input or output is composed of four differential channels that can be arbitrarily assigned to the three data signals and the 1/10th-rate clock. The data rate depends on resolution, but it can vary from 250Mbps (VGA) to 1.65Gbps (UXGA or 1080p/60). Typical applications include multroom display of the same video source or industrial/commercial signage applications such as airport monitors or trading room floor displays. The MAX3845 includes selectable output preemphasis that extends output cable reach up to an additional 7m. For DDC switching, use the companion MAX4814E 2:4 low-resistance CMOS crosspoint switch. DDC switching is not required for applications that connect DDC to one reference monitor only. The MAX3845 can be configured to create a 2 x 8 or 4 x 4 switch (see the Typical Operating Circuit diagrams located in the full data sheet). The MAX3845 is available in a 14mm × 14mm, 100-pin TQFP-EP package and operates over the -10°C to +85°C temperature range.
II. Manufacturing Information

A. Description/Function: DVI/HDMI 2:4 TMDS Fanout Switch and Cable Driver
B. Process: G4
C. Number of Device Transistors: 22622
D. Fabrication Location: Oregon
E. Assembly Location: Korea, Taiwan
F. Date of Initial Production: August 14, 2007

III. Packaging Information

A. Package Type: 100-pin TQFP
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: #05-9000-2368
H. Flammability Rating: Class UL94-V0
I. Classification of Moisture Sensitivity per JEDEC standard J-STD-020-C Level 3
J. Single Layer Theta Ja: N/A
K. Single Layer Theta Jc: N/A
L. Multi Layer Theta Ja: 22°C/W
M. Multi Layer Theta Jc: 2°C/W

IV. Die Information

A. Dimensions: 207.00X204.00 mils
B. Passivation: Si3N4
C. Interconnect: Au
D. Backside Metallization: None
E. Minimum Metal Width: 1.2 microns (as drawn)
F. Minimum Metal Spacing: 1.6 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 150C biased (static) life test are shown in Table 1. Using these results, the Failure Rate ($\lambda$) is calculated as follows:

$$\lambda = \frac{1}{\text{MTTF}} = \frac{1.83}{192 \times 9706 \times 48 \times 2}$$  
(Chi square value for MTTF upper limit)

(where 9706 = Temperature Acceleration factor assuming an activation energy of 0.8eV)

$$\lambda = 10.2 \times 10^{-9}$$  
$$\lambda = 10.2 \text{ F.I.T. (60% confidence level @ 25°C)}$$

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 G4 Process results in a FIT Rate of 0.04 @ 25°C and 0.66 @ 55°C (0.8 eV, 60% UCL).

B. E.S.D. and Latch-Up Testing (lot NZ50C3004B, D/C 0708)

The HD85 die type has been found to have all pins able to withstand a transient pulse of:

- ESD-HBM: +/- 2500V per JEDEC JESD22-A114  
  lot NZ50C3004B, D/C 0708
- ESD-CDM: +/- 750V per JEDEC JESD22-C101  
  lot NZ50CA010C, D/C 1020

Latch-Up testing has shown that this device withstands a current of +/- 250mA.
### Table 1
Reliability Evaluation Test Results

MAX3845UCQ+

<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 = 150°C</td>
<td>DC Parameters &amp; functiona</td>
<td>48</td>
<td>0</td>
<td>NZ50C3004B, D/C 0708</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.