RELIABILITY REPORT
FOR
MAX8840ELT28+
(MAX8840/MAX8841/MAX8842)
PLASTIC ENCAPSULATED DEVICES

March 8, 2010

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

Approved by
Richard Aburano
Quality Assurance
Manager, Reliability Operations
Conclusion

The MAX8840ELT28+ 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 MAX8840/MAX8841/MAX8842 ultra-low-noise, low-dropout (LDO) linear regulators are designed to deliver up to 150mA continuous output current. These regulators achieve a low 120mV dropout for 120mA load current. The MAX8840 uses an advanced architecture to achieve ultra-low output voltage noise of 11µVRMS and PSRR of 54dB at 100kHz. The MAX8841 does not require a bypass capacitor, hence achieving the smallest PC board area. The MAX8842 output voltage can be adjusted with an external divider. The MAX8840/MAX8841 are preset to a variety of voltages in the 1.5V to 4.5V range. Designed with a p-channel MOSFET series pass transistor, the MAX8840/MAX8841/MAX8842 maintain very low ground current (40µA). The regulators are designed and optimized to work with low-value, low-cost ceramic capacitors. The MAX8840 requires only 1µF (typ) of output capacitance for stability with any load. When disabled, current consumption drops to below 1µA. The MAX8840/MAX8841/MAX8842 are available in a tiny 1mm x 1.5mm x 0.8mm µDFN.
II. Manufacturing Information

A. Description/Function: Ultra-Low-Noise, High PSRR, Low-Dropout, 150mA Linear Regulators in µDFN
B. Process: B8
C. Number of Device Transistors:
D. Fabrication Location: California
E. Assembly Location: Hana Thailand
F. Date of Initial Production: October 04, 2006

III. Packaging Information

A. Package Type: 6-pin uDFN
B. Lead Frame: Substrate
C. Lead Finish: Gold
D. Die Attach: Non-conductive Epoxy
E. Bondwire: Gold (1 mil dia.)
F. Mold Material: Epoxy with silica filler
G. Assembly Diagram: #05-9000-2565
H. Flammability Rating: Class UL94-V0
I. Classification of Moisture Sensitivity per JEDEC standard J-STD-020-C: Level 1
J. Multi Layer Theta Ja: 477°C/W

IV. Die Information

A. Dimensions: 31 X 30 mils
B. Passivation: Si3N4/SiO2 (Silicon nitride/ Silicon dioxide)
C. Interconnect: Aluminum/Si (Si = 1%)
D. Backside Metallization: None
E. Minimum Metal Width: 0.8 microns (as drawn)
F. Minimum Metal Spacing: 0.8 microns (as drawn)
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 Operations)
   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 $\lambda$ is calculated as follows:

   $$\frac{1}{MTTF} = \frac{1.83}{192 \times 4340 \times 47 \times 2}$$
   (Chi square value for MTTF upper limit)

   $$\lambda = 22.8 \times 10^{-9}$$
   $$\lambda = 22.8 \text{ F.I.T}.$$ (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 B8 Process results in a FIT Rate of 2.71 @ 25C and 17.30 @ 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 PM21 die type has been found to have all pins able to withstand a transient pulse of

   ESD-HBM: +/- 1000V per JEDEC JESD22-A114
   ESD-MM:   +/- 150V per JEDEC JESD22-A115

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

MAX8840ELT28+

<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>Static Life Test</td>
<td>Ta = 135°C</td>
<td>DC Parameters &amp; functionality</td>
<td>47</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Biased</td>
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<td></td>
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<tr>
<td></td>
<td>Time = 192 hrs.</td>
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<tr>
<td>Moisture Testing</td>
<td>Ta = 85°C</td>
<td>DC Parameters &amp; functionality</td>
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<td>0</td>
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<tr>
<td></td>
<td>RH = 85%</td>
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<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Biased</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Time = 1000 hrs.</td>
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<td></td>
</tr>
<tr>
<td>Mechanical Stress</td>
<td>-55ºC/125ºC</td>
<td>DC Parameters &amp; functionality</td>
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<td>0</td>
</tr>
<tr>
<td></td>
<td>1000 Cycles</td>
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<tr>
<td></td>
<td>Method 1010</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

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