RELIABILITY REPORT
FOR
MAX708TCUA+
PLASTIC ENCAPSULATED DEVICES

May 9, 2011

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

Approved by
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Quality Assurance
Reliability Engineer
Conclusion

The MAX708TCUA+ 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 MAX706P/R/S/T, MAX706AP/AR/AS/AT, and MAX708R/S/T microprocessor (µP) supervisory circuits reduce the complexity and number of components required to monitor +3V power-supply levels in +3V to +5V µP systems. These devices significantly improve system reliability and accuracy compared to separate ICs or discrete components. The MAX706P/R/S/T and MAX706AP/AR/AS/AT supervisory circuits provide the following four functions: 1) A reset output during power-up, power-down, and brownout conditions. 2) An independent watchdog output that goes low if the watchdog input has not been toggled within 1.6s. 3) A 1.25V threshold detector for power-fail warning, low-battery detection, or for monitoring a power supply other than the main supply. 4) An active-low, manual-reset input. The only difference between the MAX706R/AR, MAX706S/AS, and MAX706T/AT is the reset-threshold voltage levels, which are 2.63V, 2.93V, and 3.08V, respectively. All have active-low reset output signals. The MAX706P/AP are identical to the MAX706R/AR, except the reset output signal is active-high. The watchdog timer function for the MAX706AP/AR/AS/AT disables when the WDI input is left open or connected to a high-impedance state of a low-leakage tri-state output. The MAX708R/S/T provide the same functions as the MAX706R/S/T and MAX706AR/AS/AT except they do not have a watchdog timer. Instead, they provide both active-low RESET and RESET outputs. As with the MAX706, devices with R, S, and T suffixes have reset thresholds of 2.63V, 2.93V, and 3.08V, respectively. These devices are available in 8-pin SO, DIP, and µMAX® packages and are fully specified over the operating temperature range.
II. Manufacturing Information

A. Description/Function: +3V Voltage Monitoring, Low-Cost, µP Supervisory Circuits
B. Process: B3
C. Number of Device Transistors: 648
D. Fabrication Location: Oregon
E. Assembly Location: Malaysia
F. Date of Initial Production: Pre 1997

III. Packaging Information

A. Package Type: 8-pin uMAX
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: #05-1701-0187 / B
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: 221°C/W
K. Single Layer Theta Jc: 42°C/W
L. Multi Layer Theta Ja: 206.3°C/W
M. Multi Layer Theta Jc: 42°C/W

IV. Die Information

A. Dimensions: 70 X 51 mils
B. Passivation: Si$_3$N$_4$/SiO$_2$ (Silicon nitride/ Silicon dioxide)
C. Interconnect: Al/0.5%Cu with Ti/TiN Barrier
D. Backside Metallization: None
E. Minimum Metal Width: 3.0 microns (as drawn)
F. Minimum Metal Spacing: 3.0 microns (as drawn)
G. Bondpad Dimensions: 5 mil. Sq.
H. Isolation Dielectric: SiO$_2$
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 (χ) is calculated as follows:

\[
\chi = \frac{1}{\text{MTTF}} = \frac{1.83}{1000 \times 4340 \times 159 \times 2}
\]

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

\[
\chi = 1.3 \times 10^{-9}
\]

\[
\chi = 1.3 \text{ F.I.T. (60% confidence level @ } 25^\circ\text{C)}
\]

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 B3 Process results in a FIT Rate of 0.51 @ 25°C and 8.79 @ 55°C (0.8 eV, 60% UCL)

B. E.S.D. and Latch-Up Testing (lot NTOJHA775A D/C 0326)

The PW27-9 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>
<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>79</td>
<td>0</td>
<td>NTOAH20A9F, D/C 1015</td>
</tr>
<tr>
<td></td>
<td>Biased</td>
<td>&amp; functionality</td>
<td>80</td>
<td>0</td>
<td>NTOBI2079BB, D/C 0943</td>
</tr>
</tbody>
</table>

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