RELIABILITY REPORT
FOR
MAX4003EUA+
PLASTIC ENCAPSULATED DEVICES

August 1, 2011

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

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<th>Approved by</th>
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<tr>
<td>Sokhom Chum</td>
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<tr>
<td>Quality Assurance</td>
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<td>Reliability Engineer</td>
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Conclusion

The MAX4003EU+A 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 MAX4003 low-cost, low-power logarithmic amplifier is designed to detect the power levels of RF power amplifiers (PAs) operating from 100MHz to 2500MHz. A typical dynamic range of 45dB makes this logarithmic amplifier useful in a variety of wireless applications including cellular handset PA control, TSSI for wireless terminal devices, and other transmitter power measurements. This logarithmic amplifier provides much wider measurement range and superior accuracy than typical diode-based detectors. Excellent temperature stability is achieved over the full operating range of -40°C to +85°C. The MAX4003 logarithmic amplifier is a voltage-measuring device with a typical signal range of -58dBV to -13dBV. The input signal is internally AC-coupled by an on-chip 5pF capacitor in series with a 2kΩ resistance. This highpass coupling, with a corner at 16MHz, sets the lowest operating frequency and allows the input signal source to be DC grounded. The MAX4003 also features a power-on delay, which holds the detector output (OUT) low for approximately 5µs to ensure glitchless controller output. The MAX4003 is available in an 8-bump chip-scale package (UCSP™), an 8-pin µMAX® package, and an 8-pin thin QFN package. The device consumes 5.9mA with a 3.0V supply and only 13µA when the device is in shutdown.
II. Manufacturing Information

A. Description/Function: 100MHz to 2500MHz, 45dB RF Detector in a UCSP
B. Process: CB3
C. Number of Device Transistors: 
D. Fabrication Location: Oregon
E. Assembly Location: Malaysia, Philippines, Thailand
F. Date of Initial Production: October 26, 2002

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: #05-9000-0203
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: 61 X 61 mils
B. Passivation: Si3N4 (Silicon nitride)
C. Interconnect: Au
D. Backside Metallization: None
E. Minimum Metal Width: Metal1 = 0.5 / Metal2 = 0.6 / Metal3 = 0.6 microns (as drawn)
F. Minimum Metal Spacing: Metal1 = 0.45 / Metal2 = 0.5 / Metal3 = 0.6 microns (as drawn)
G. Bondpad Dimensions: 
H. Isolation Dielectric: SiO2
I. Die Separation Method: Wafer Saw
V. Quality Assurance Information

A. Quality Assurance Contacts: 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 150°C biased (static) life test are shown in Table 1. Using these results, the Failure Rate (χ) is calculated as follows:

\[ \chi = \frac{1}{\text{MTTF}} = \frac{1.83}{1000 \times 4340 \times 80 \times 2} \text{ (Chi square value for MTTF upper limit)} \]

(where 4340 = Temperature Acceleration factor assuming an activation energy of 0.8eV)

\[ \chi = 2.6 \times 10^{-9} \]

\[ \chi = 2.6 \text{ F.I.T. (60% confidence level @ 25°C)} \]

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 CB3 Process results in a FIT Rate of 0.25 @ 25C and 4.38 @ 55C (0.8 eV, 60% UCL)

B. E.S.D. and Latch-Up Testing (lot N9O3E2040A D/C 1105)

The OX84-3 die type has been found to have all pins able to withstand a HBM transient pulse of +/-2500V per JEDEC JESD22-A114. Latch-Up testing has shown that this device withstands a current of +/-250mA and overvoltage per JEDEC JESD78.
### Table 1
Reliability Evaluation Test Results

<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>80</td>
<td>0</td>
<td>N903E2040A, D/C 1105</td>
</tr>
<tr>
<td></td>
<td>Biased</td>
<td></td>
<td></td>
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<td></td>
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<td></td>
<td>Time = 1000 hrs.</td>
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Note 1: Life Test Data may represent plastic DIP qualification lots.