RELIABILITY REPORT
FOR
MAX2753EUAA+
PLASTIC ENCAPSULATED DEVICES

April 8, 2009

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

Approved by
Ken Wendel
Quality Assurance
Director, Reliability Engineering
Conclusion

The MAX2753EUA+ 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 MAX2753 is a self-contained voltage-controlled oscillator (VCO) intended for use in 2.4GHz radios that utilize a low-IF or zero-IF architecture. It combines a fully integrated oscillator and output buffer in a miniature 8-pin µMAX® package. The inductor and varactor elements of the tank are integrated on-chip, greatly simplifying application of the part. The only required external components are a couple of supply bypass capacitors. The MAX2753 provides direct connection to the VCO tuning voltage input and the VCO buffer output. The tuning voltage input range is +0.4V to +2.4V, and the oscillator frequency tuning range is factory adjusted to provide guaranteed limits. The output signal is buffered by an amplifier stage (internally matched to 50 ) to provide higher output power and isolate the device from load impedance variations. In addition, the MAX2753 provides differential outputs. The MAX2753 operates over a +2.7V to +5.5V supply voltage range. Internal regulation of the oscillator supply voltage eliminates the need for an external LDO regulator for the VCO. The MAX2753 also provides a digitally controlled shutdown mode to permit implementation of sophisticated power-supply management. In shutdown, the supply current is reduced to less than 1µA.
II. Manufacturing Information

A. Description/Function: 2.4GHz, Monolithic Voltage-Controlled Oscillator with Differential Outputs
B. Process: GST3
C. Number of Device Transistors: 
D. Fabrication Location: Oregon
E. Assembly Location: Carsem Malaysia, UTL Thailand, Unisem Malaysia
F. Date of Initial Production: January 27, 2001

III. Packaging Information

A. Package Type: 8-pin uMAX
B. Lead Frame: Copper
C. Lead Finish: 100% matte Tin
D. Die Attach: Conductive Epoxy
E. Bondwire: Gold (1 mil dia.)
F. Mold Material: Epoxy with silica filler
G. Assembly Diagram: #05-2201-0036
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: 41.9°C/W
L. Multi Layer Theta Ja: 206.3°C/W
M. Multi Layer Theta Jc: 41.9°C/W

IV. Die Information

A. Dimensions: 57 X 41 mils
B. Passivation: Si3N4 (Silicon nitride)
C. Interconnect: Gold
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: 5 mil. Sq.
H. Isolation Dielectric: SiO2
I. Die Separation Method: Wafer Saw
V. Quality Assurance Information

A. Quality Assurance Contacts: Ken Wendel (Director, Reliability Engineering) 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 150°C biased (static) life test are shown in Table 1. Using these results, the Failure Rate ($\lambda$) is calculated as follows:

$$\lambda = \frac{1}{MTTF} = \frac{1.83}{192 \times 4340 \times 50 \times 2}$$

(Chi square value for MTTF upper limit)

$$\lambda = 9.58 \times 10^{-9}$$

$\chi$ = 9.58 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 GST3 Process results in a FIT Rate of 0.21 @ 25C and 3.64 @ 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 WR87 die type has been found to have all pins able to withstand a HBM transient pulse of +/-2500 V per Mil-Std 883 Method 3015.7. Latch-Up testing has shown that this device withstands a current of +/-250 mA.
Table 1
Reliability Evaluation Test Results

MAX2753EUA+

<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><strong>Static Life Test</strong> (Note 1)</td>
<td>Ta = 150°C</td>
<td>DC Parameters &amp; functionality</td>
<td>50</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Biased</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Time = 192 hrs.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Moisture Testing</strong> (Note 2)</td>
<td>Ta = 85°C</td>
<td>DC Parameters &amp; functionality</td>
<td>77</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>RH = 85%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Biased</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Time = 1000hrs.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Mechanical Stress</strong> (Note 2)</td>
<td>Temperature -65°C/150°C</td>
<td>DC Parameters &amp; functionality</td>
<td>77</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Cycle 1000 Cycles Method 1010</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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