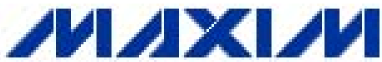

RELIABILITY REPORT

FOR MAX2063ETM+T

PLASTIC ENCAPSULATED DEVICES

September 28, 2010

MAXIM INTEGRATED PRODUCTS

120 SAN GABRIEL DR.

SUNNYVALE, CA 94086

Approved by
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Quality Assurance
Manager, Reliability Operations

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Conclusion

The MAX2063ETM+T 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 MAX2063 high-linearity, dual digital variable-gain amplifier (VGA) operates in the 50MHz to 1000MHz frequency range. Each digital attenuator is controlled as a slave peripheral using either the SPI(tm)-compatible interface or a 5-bit parallel bus with 31dB total adjustment range in 1dB steps. An added feature allows rapid-fire gain selection between each of four steps, preprogrammed by the user through the SPI-compatible interface. A separate 2-pin control allows the user to quickly access any one of four customized attenuation states without reprogramming the SPI bus. Since each of the stages has its own external RF input and RF output, this component can be configured to either optimize noise figure (amplifier configured first) or OIP3 (amplifier configured last). The device's performance features include 24dB of amplifier gain (amplifier only), 5.6dB noise figure (NF) at maximum gain (including attenuator insertion losses), and a high OIP3 level of +41dBm. Each of these features makes the device an ideal VGA for multipath receiver and transmitter applications. In addition, the device operates from a single +5V supply with full performance, or a +3.3V supply for an enhanced power-savings mode with lower performance. This device is available in a compact 48-pin thin QFN package (7mm × 7mm) with an exposed pad. Electrical performance is guaranteed over the extended temperature range, from TC = -40°C to +85°C.

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II. Manufacturing Information

A. Description/Function:	Dual 50MHz to 1000MHz High-Linearity, Serial/Parallel-Controlled Digital VGA
B. Process:	MB3
C. Number of Device Transistors:	15837
D. Fabrication Location:	California
E. Assembly Location:	China and Thailand
F. Date of Initial Production:	June 25, 2010

III. Packaging Information

A. Package Type:	48-pin TQFN 7x7
B. Lead Frame:	Copper
C. Lead Finish:	100% matte Tin
D. Die Attach:	Conductive
E. Bondwire:	Au (1 mil dia.)
F. Mold Material:	Epoxy with silica filler
G. Assembly Diagram:	#05-9000-3891
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:	38°C/W
K. Single Layer Theta Jc:	1.3°C/W
L. Multi Layer Theta Ja:	26°C/W
M. Multi Layer Theta Jc:	1.3°C/W

IV. Die Information

A. Dimensions:	126X122 mils
B. Passivation:	BCB
C. Interconnect:	Al with top layer 100% Cu
D. Backside Metallization:	None
E. Minimum Metal Width:	0.35µm
F. Minimum Metal Spacing:	0.35µm
G. Bondpad Dimensions:	5 mil. Sq.
H. Isolation Dielectric:	SiO_2
I. Die Separation Method:	Wafer Saw

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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 (λ) is calculated as follows:

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

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

$\lambda = 23.4 \times 10^{-9}$

λ = 23.4 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 MB3 Process results in a FIT Rate of 0.08 @ 25C and 1.33 @ 55C (0.8 eV, 60% UCL)

B. E.S.D. and Latch-Up Testing (lot SXMZBQ001E, D/C 1024)

The CR49 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 +/- 100mA and overvoltage per JEDEC JESD78.

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Table 1

Reliability Evaluation Test Results

MAX2063ETM+T

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	COMMENTS
Static Life Test (Note 1)					
	Ta = 135°C Biased Time = 192 hrs.	DC Parameters & functionality	47	0	SXMZBQ001E, D/C 1024

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

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