RELIABILITY REPORT

FOR

MAX2373EGC+
(MAX2371/MAX2373)

PLASTIC ENCAPSULATED DEVICES

January 7, 2009

MAXIM INTEGRATED PRODUCTS

120 SAN GABRIEL DR.

SUNNYVALE, CA 94086

Approved by
Ken Wendel
Quality Assurance
Director, Reliability Engineering

Conclusion

The MAX2373EGC+ 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 MAX2371/MAX2373 wideband low-noise amplifier (LNA) ICs are designed for direct conversion receiver (DCR) or very low intermediate frequency (VLIF) receiver applications. They contain single-channel, single-ended LNAs with switchable attenuator and automatic gain control (AGC) intended as a low-noise gain stage. These devices provide high gain-control range (typically 60dB) at radio frequency (RF) with excellent noise and reverse isolation characteristics. The MAX2371/MAX2373 can work over the frequency range from 100MHz to 1GHz. In practice, only a narrow band is needed in each application, so different matching circuits can be applied. The devices are dynamically configured through the digital/analog control pins to select either maximum gain and low noise figure or power-saving mode. In addition, the MAX2371/MAX2373 feature high/low-current modes, high/low attenuation modes, linearly controlled gain states, and shutdown mode.

II. Manufacturing Information

A. Description/Function:	LNAs with Step Attenuator and VGA
B. Process:	GST3
C. Number of Device Transistors:	
D. Fabrication Location:	Oregon
E. Assembly Location:	ATK Korea
F. Date of Initial Production:	January 25, 2002

III. Packaging Information

A. Package Type:	12-pin QFN 3x3
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:	#05-9000-0337
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:	68°C/W
K. Single Layer Theta Jc:	15.1°C/W
L. Multi Layer Theta Ja:	62°C/W
M. Multi Layer Theta Jc:	15.1°C/W

IV. Die Information

A. Dimensions:	41 X 41 mils
B. Passivation:	Si_3N_4 (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:	SiO_2
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 (λ) is calculated as follows:

$$\lambda = \frac{1}{MTTF} = \frac{1.83}{192 \times 4340 \times 45 \times 2}$$ (Chi square value for MTTF upper limit)

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

$\lambda = 10.6 \times 10^{-9}$

$\lambda = 10.6$ 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 WC28-2 die type has been found to have all pins able to withstand a HBM transient pulse of +/-200 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

MAX2373EGC+

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES
Static Life Test (Note 1)				
	Ta = 150°C Biased Time = 192 hrs.	DC Parameters & functionality	45	0
Moisture Testing (Note 2)				
85/85	Ta = 85°C RH = 85% Biased Time = 1000hrs.	DC Parameters & functionality	77	0
Mechanical Stress (Note 2)				
Temperature Cycle	-65°C/150°C 1000 Cycles Method 1010	DC Parameters & functionality	77	0

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