RELIABILITY REPORT

FOR

MAX2659ELT+T

PLASTIC ENCAPSULATED DEVICES

January 23, 2015

MAXIM INTEGRATED

160 RIO ROBLES

SAN JOSE, CA 95134

Approved by
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Quality Assurance
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Conclusion

The MAX2659ELT+T successfully meets the quality and reliability standards required of all Maxim Integrated products. In addition, Maxim Integrated's continuous reliability monitoring program ensures that all outgoing product will continue to meet Maxim Integrated's quality and reliability standards.

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I. Device Description

A. General

The MAX2659 high-gain, low-noise amplifier (LNA) is designed for GPS, Galileo, and GLONASS applications. Designed in Maxim's advanced SiGe process, the device achieves a 20.5dB gain and an ultra-low-noise figure of 0.8dB while maximizing the input-referred 1dB compression point and the 3rd-order intercept point at -12dBm and -5dBm, respectively. The MAX2659 operates from a +1.6V to +3.3V single supply and consumes only 4.1mA. The shutdown feature in the device reduces the supply current to be less than 1µA. The MAX2659 is available in a very small, lead-free, RoHS-compliant, 1.5mm x 1.0mm x 0.75mm, 6-pin µDFN package.

II. Manufacturing Information

A. Description/Function:	GPS/GNSS Low-Noise Amplifier
B. Process:	MB3
C. Number of Device Transistors:	363
D. Fabrication Location:	California
E. Assembly Location:	Thailand
F. Date of Initial Production:	April 20, 2007

III. Packaging Information

A. Package Type:	6-pin uDFN
B. Lead Frame:	Substrate
C. Lead Finish:	Gold
D. Die Attach:	Non-conductive
E. Bondwire:	Au (1 mil dia.)
F. Mold Material:	Epoxy with silica filler
G. Assembly Diagram:	#05-9000-2587
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:	N/A
K. Single Layer Theta Jc:	N/A
L. Multi Layer Theta Ja:	477°C/W
M. Multi Layer Theta Jc:	122°C/W

IV. Die Information

A. Dimensions:	30X30 mils
B. Passivation:	BCB
C. Interconnect:	Al with top layer 100% Cu
D. Backside Metallization:	None
E. Minimum Metal Width:	0.35um
F. Minimum Metal Spacing:	0.35um
G. Bondpad Dimensions:	
H. Isolation Dielectric:	SiO_2
I. Die Separation Method:	Wafer Saw

V. Quality Assurance Information

A. Quality Assurance Contacts:	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 135C biased (static) life test are shown in Table 1. Using these results, the Failure Rate (λ) is calculated as follows:

$$\lambda = \frac{1}{MTTF} = \frac{1.83}{1000 \times 4340 \times 315 \times 2}$$ (Chi square value for MTTF upper limit)

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

$\lambda = 0.67 \times 10^{-9}$

$\lambda = 0.67$ F.I.T. (60% confidence level @ 25°C)

The following failure rate represents data collected from Maxim Integrated's reliability monitor program. Maxim Integrated performs quarterly life test monitors on its processes. This data is published in the Reliability Report found at http://www.maximintegrated.com/qa/reliability/monitor. Cumulative monitor data for the MB3 Process results in a FIT Rate of 0.05 @ 25C and 0.88 @ 55C (0.8 eV, 60% UCL).

B. E.S.D. and Latch-Up Testing (lot EAJL22044A, D/C 1404)

The WV15 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 +/-150mA.

Table 1
Reliability Evaluation Test Results

MAX2659ELT+T

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	COMMENTS
Static Life Test (Note 1)					
	Ta = 135°C	DC Parameters	236	0	EAJL2A013Q, D/C 1349
	Biased	& functionality	79	0	EAJL2A0A0H, D/C 1416
	Time = 1000 hrs.				

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