RELIABILITY REPORT

FOR

MAX2681EUT+T

PLASTIC ENCAPSULATED DEVICES

April 13, 2015

MAXIM INTEGRATED

160 RIO ROBLES

SAN JOSE, CA 95134

Approved by
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Quality Assurance
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Conclusion

The MAX2681EUT+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.

Table of Contents

I. Device Description

A. General

The MAX2680/MAX2681/MAX2682 miniature, low-cost, low-noise downconverter mixers are designed for low-voltage operation and are ideal for use in portable communications equipment. Signals at the RF input port are mixed with signals at the local oscillator (LO) port using a double-balanced mixer. These downconverter mixers operate with RF input frequencies between 400MHz and 2500MHz, and downconvert to IF output frequencies between 10MHz and 500MHz. The MAX2680/MAX2681/MAX2682 operate from a single +2.7V to +5.5V supply, allowing them to be powered directly from a 3-cell NiCd or a 1-cell Lithium battery. These devices offer a wide range of supply currents and input intercept (IIP3) levels to optimize system performance. Additionally, each device features a low-power shutdown mode in which it typically draws less than 0.1µA of supply current. Consult the *Selector Guide* for various combinations of IIP3 and supply current. The MAX2680/MAX2681/MAX2682 are manufactured on a high-frequency, low-noise, advanced silicon-germanium process and are offered in the space-saving 6-pin SOT23 package.

II. Manufacturing Information

A. Description/Function:	400MHz to 2.5GHz, Low-Noise, SiGe Downconverter Mixers
B. Process:	GST3
C. Number of Device Transistors:	
D. Fabrication Location:	Oregon
E. Assembly Location:	Malaysia, Philippines, Thailand
F. Date of Initial Production:	October 22, 1998

III. Packaging Information

A. Package Type:	6-pin SOT23
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:	#05-7001-0322
H. Flammability Rating:	Class UL94-V0
I. Classification of Moisture Sensitivity per JEDEC standard J-STD-020-C	Level 1
J. Single Layer Theta Jb:	N/A
K. Single Layer Theta Jc:	N/A
L. Multi Layer Theta Ja:	230°C/W
M. Multi Layer Theta Jc:	76°C/W

IV. Die Information

A. Dimensions:	33X36 mils
B. Passivation:	Si_3N_4 (Silicon nitride)
C. Interconnect:	Au
D. Backside Metallization:	None
E. Minimum Metal Width:	Metal1 = 0.5 microns (as drawn)
F. Minimum Metal Spacing:	Metal1 = 0.45 microns (as drawn)
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 150C biased (static) life test are shown in Table 1. Using these results, the Failure Rate (λ) is calculated as follows:

$$\lambda = \frac{1}{MTTF} = \frac{1.83}{1000 \times 9706 \times 152 \times 2}$$ (Chi square value for MTTF upper limit)

(where 9706 = Temperature Acceleration factor assuming an activation energy of 0.8eV)

$\lambda = 0.62 \times 10^{-9}$

$\lambda = 0.62$ 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 GST3 Process results in a FIT Rate of 0.06 @ 25C and 1.0 @ 55C (0.8 eV, 60% UCL)

B. E.S.D. and Latch-Up Testing (ESD lot NR3BDA061E D/C 0504, Latch-Up lot BR3BAQ002B)

The WR22-1 die type has been found to have all pins able to withstand a HBM transient pulse of +/-1500V per JEDEC JESD22-A114. Latch-Up testing has shown that this device withstands a current of +/-50mA.

Table 1

Reliability Evaluation Test Results

MAX2681EUT+T

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	COMMENTS
Static Life Test (Note 1)					
	Ta = 150°C	DC Parameters	76	0	NR3AE3019J, D/C 0724
	Biased	& functionality	76	0	NR3AEA078D, D/C 0723
	Time = 1000 hrs.				

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