RELIABILITY REPORT

FOR

MAX2660EUT+

PLASTIC ENCAPSULATED DEVICES

October 21, 2010

MAXIM INTEGRATED PRODUCTS

120 SAN GABRIEL DR.

SUNNYVALE, CA 94086

Approved by
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Quality Assurance
Manager, Reliability Engineering

Conclusion

The MAX2660EUT+ 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 MAX2660/MAX2661/MAX2663/MAX2671/MAX2673 miniature, low-cost, low-noise upconverters are designed for low-voltage operation and are ideal for use in portable consumer equipment. Signals at the IF input port are mixed with signals at the local oscillator (LO) port using a double-balanced mixer. These upconverters operate with IF input frequencies between 40MHz and 500MHz, and upconvert to output frequencies as high as 2.5GHz. These upconverters offer a wide range of supply currents and output intercept levels to optimize system performance. Supply current is essentially constant over the specified supply voltage range. Additionally, when the devices are in a typical configuration with VSHDN-bar = 0, a shutdown mode reduces the supply current to less than 1µA. The MAX2660/MAX2661/MAX2663/MAX2671 family of upconverters are offered in the space-saving 6-pin SOT23 package. For applications requiring balanced IF ports, choose the MAX2673 upconverters in the 8-pin µMAX package.

II. Manufacturing Information

A. Description/Function:	400MHz to 2.5GHz Upconverters
B. Process:	GST2
C. Number of Device Transistors:	
D. Fabrication Location:	Oregon
E. Assembly Location:	Malaysia, Thailand
F. Date of Initial Production:	July 25, 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:	#05-7001-0266
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:	115*°C/W
K. Single Layer Theta Jc:	80°C/W
L. Multi Layer Theta Ja:	N/A
M. Multi Layer Theta Jc:	N/A

IV. Die Information

A. Dimensions:	32 X 32 mils
B. Passivation:	Si_3N_4 (Silicon nitride)
C. Interconnect:	Au
D. Backside Metallization:	None
E. Minimum Metal Width:	2 microns (as drawn)
F. Minimum Metal Spacing:	2 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:	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 150°C biased (static) life test are shown in Table 1. Using these results, the Failure Rate (λ) is calculated as follows:

$$\lambda = \frac{1}{MTTF} = \frac{1.83}{192 \times 4340 \times 77 \times 2}$$ (Chi square value for MTTF upper limit)

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

$\lambda = 14.3 \times 10^{-9}$

$\lambda = 14.3$ 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 GST2 Process results in a FIT Rate of 0.06 @ 25C and 1.10 @ 55C (0.8 eV, 60% UCL)

B. E.S.D. and Latch-Up Testing (ESD lot NXQAFA005C D/C 0837, Latchup lot NXQGD3006B D/C 0146)

The WR20 die type has been found to have all pins able to withstand a HBM transient pulse of +/-200V per JEDEC JESD22-A114. Latch-Up testing has shown that this device withstands a current of +/-50mA.

Table 1
Reliability Evaluation Test Results

MAX2660EUT+

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	77	0	NXQGE3014A, DC 0304

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