



RELIABILITY REPORT  
FOR  
MAX2605EUT+T  
PLASTIC ENCAPSULATED DEVICES

August 26, 2011

**MAXIM INTEGRATED PRODUCTS**

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Quality Assurance
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## Conclusion

The MAX2605EUT+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 MAX2605-MAX2609 are compact, high-performance intermediate-frequency (IF) voltage-controlled oscillators (VCOs) designed specifically for demanding portable wireless communication systems. They combine monolithic construction with low-noise, low-power operation in a tiny 6-pin SOT23 package. These low-noise VCOs feature an on-chip varactor and feedback capacitors that eliminate the need for external tuning elements, making the MAX2605-MAX2609 ideal for portable systems. Only an external inductor is required to set the oscillation frequency. In addition, an integrated differential output buffer is provided for driving a mixer or prescaler. The buffer output is capable of supplying up to -8dBm (differential) with a simple power match. It also provides isolation from load impedance variations. The MAX2605-MAX2609 operate from a single +2.7V to +5.5V supply and offer low current consumption. These IF oscillators can cover the 45MHz to 650MHz frequency range.

## II. Manufacturing Information

A. Description/Function:	45MHz to 650MHz, Integrated IF VCOs with Differential Output
B. Process:	MB1
C. Number of Device Transistors:	
D. Fabrication Location:	Oregon
E. Assembly Location:	Malaysia, Philippines, Thailand
F. Date of Initial Production:	April 22, 2000

## 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:	#05-2201-0011
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:	°C/W
K. Single Layer Theta Jc:	°C/W
L. Multi Layer Theta Ja:	230°C/W
M. Multi Layer Theta Jc:	76°C/W

## IV. Die Information

A. Dimensions:	49 X 33 mils
B. Passivation:	Si <sub>3</sub> N <sub>4</sub> (Silicon nitride)
C. Interconnect:	Au
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:	
H. Isolation Dielectric:	SiO <sub>2</sub>
I. Die Separation Method:	Wafer Saw

## V. Quality Assurance Information

- A. Quality Assurance Contacts: Richard Aburano (Manager, Reliability Engineering)  
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 ( $\lambda$ ) is calculated as follows:

$$\lambda = \frac{1}{\text{MTTF}} = \frac{1.83}{192 \times 4340 \times 154 \times 2} \quad (\text{Chi square value for MTTF upper limit})$$

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

$$\lambda = 7.14 \times 10^{-9}$$

$$\lambda = 7.14 \text{ F.I.T. (60\% confidence level @ 25°C)}$$

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 MB1 Process results in a FIT Rate of 0.17 @ 25C and 2.97 @ 55C (0.8 eV, 60% UCL)

### B. E.S.D. and Latch-Up Testing (lot N7DCF3056E, D/C 0619)

The WR50-1 die type has been found to have all pins able to withstand a transient pulse of:

ESD-HBM: +/- 300V per JEDEC JESD22-A114

ESD-CDM: +/- 750V per JEDEC JESD22-C101

Latch-Up testing has shown that this device withstands a current of +/- 100mA.

**Table 1**  
Reliability Evaluation Test Results

**MAX2605EUT+T**

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	COMMENTS
<b>Static Life Test</b> (Note 1)					
	Ta = 135°C	DC Parameters	79	0	N7DCF3056E, D/C 0619
	Biased Time = 192 hrs.	& functionality	75	0	N7DBFZ043B, D/C 0728

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