

RELIABILITY REPORT  
FOR  
MAX1473EUI+  
PLASTIC ENCAPSULATED DEVICES

November 10, 2008

**MAXIM INTEGRATED PRODUCTS**

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## Conclusion

The MAX1473EUI+ 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 MAX1473 fully integrated low-power CMOS superheterodyne receiver is ideal for receiving amplitude-shift-keyed (ASK) data in the 300MHz to 450MHz frequency range. Its signal range is from -114dBm to 0dBm. With few external components and a low-current power-down mode, it is ideal for cost- and power-sensitive applications typical in the automotive and consumer markets. The chip consists of a low-noise amplifier (LNA), a fully differential image-rejection mixer, an on-chip phase-locked-loop (PLL) with integrated voltage-controlled oscillator (VCO), a 10.7MHz IF limiting amplifier stage with received-signal-strength indicator (RSSI), and analog baseband data-recovery circuitry. The MAX1473 also has a discrete one-step automatic gain control (AGC) that drops the LNA gain by 35dB when the RF input signal is greater than -57dBm. The MAX1473 is available in 28-pin TSSOP and 32-pin thin QFN packages. Both versions are specified for the extended (-40°C to +85°C) temperature range.

## II. Manufacturing Information

A. Description/Function:	315MHz/433MHz ASK Superheterodyne Receiver with Extended Dynamic Range
B. Process:	0.35UM 2 Poly 3 Metal CMOS
C. Number of Device Transistors:	
D. Fabrication Location:	Taiwan
E. Assembly Location:	ATP Philippines, UTL Thailand, Carsem Malaysia
F. Date of Initial Production:	January 25, 2003

## III. Packaging Information

A. Package Type:	28-pin TSSOP
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:	#05-9000-0283
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:	78°C/W
K. Single Layer Theta Jc:	12.5°C/W
L. Multi Layer Theta Ja:	71.6°C/W
M. Multi Layer Theta Jc:	13°C/W

## IV. Die Information

A. Dimensions:	75 X 58 mils
B. Passivation:	Silicon Dioxide/Silicon Nitride
C. Interconnect:	Al/Cu
D. Backside Metallization:	None
E. Minimum Metal Width:	0.35um
F. Minimum Metal Spacing:	0.35um
G. Bondpad Dimensions:	5 mil. Sq.
H. Isolation Dielectric:	Silicon Dioxide
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 135 biased (static) life test are pending. Using these results, the Failure Rate ( $\lambda$ ) is calculated as follows:

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

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

$$\lambda = 23.9 \times 10^{-9}$$

$$\lambda = 23.9 \text{ F.I.T. (60\% confidence level @ 25}^\circ\text{C)}$$

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 TS352P3M Process results in a FIT Rate of 0.43 @ 25C and 7.50 @ 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 SC73 die type has been found to have all pins able to withstand a HBM transient pulse of +/-500 V per JEDEC JESD22-A114-D. Latch-Up testing has shown that this device withstands a current of 250 mA.

**Table 1**  
Reliability Evaluation Test Results

**MAX1473EUI+**

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES
<b>Static Life Test</b> (Note 1)	Ta = 135 Biased Time = 192 hrs.	DC Parameters & functionality	45	0
<b>Moisture Testing</b> (Note 2) 85/85	Ta = 85°C RH = 85% Biased Time = 1000hrs.	DC Parameters & functionality	77	0
<b>Mechanical Stress</b> (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