RELIABILITY REPORT

FOR

MAX6001EUR+
(MAX6002, MAX6003, MAX6004)

PLASTIC ENCAPSULATED DEVICES

October 27, 2008

MAXIM INTEGRATED PRODUCTS

120 SAN GABRIEL DR.

SUNNYVALE, CA 94086

Approved by
Ken Wendel
Quality Assurance
Director, Reliability Engineering

Conclusion

The MAX6001EUR+ 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.

Table of Contents

I. Device Description

A. General

The MAX6001-MAX6005 family of SOT23, low-cost series voltage references meets the cost advantage of shunt references and offers the power-saving advantage of series references, which traditionally cost more. Unlike conventional shunt-mode (two-terminal) references that must be biased at the load current and require an external resistor, these devices eliminate the need for an external resistor and offer a supply current that is virtually independent of the supply voltage. These micropower, low-dropout, low-cost devices are ideal for high-volume, cost-sensitive 3V and 5V battery- operated systems with wide variations in supply voltage that require very low power dissipation. Additionally, these devices are internally compensated and do not require an external compensation capacitor, saving valuable board area in space-critical applications.

II. Manufacturing Information

A. Description/Function:	Low-Cost, Low-Power, Low-Dropout, SOT23-3 Voltage References
B. Process:	B12
C. Number of Device Transistors:	
D. Fabrication Location:	Oregon
E. Assembly Location:	Carsem Malaysia, Unisem Malaysia, UTL Thailand, ISPL Philippines
F. Date of Initial Production:	October 24, 1998

III. Packaging Information

A. Package Type:	3-pin SOT23
B. Lead Frame:	Copper
C. Lead Finish:	100% matte Tin D.
Die Attach:	84-1lmisr4 Epoxy
E. Bondwire:	Gold (1 mil dia.)
F. Mold Material:	Epoxy with silica filler
G. Assembly Diagram:	#05-0901-0151
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:	250*°C/W
K. Single Layer Theta Jc:	130°C/W

IV. Die Information

A. Dimensions:	44 X 31 mils
B. Passivation:	Si_3N_4/SiO_2 (Silicon nitride/ Silicon dioxide
C. Interconnect:	Aluminum/Si (Si = 1%)
D. Backside Metallization:	None
E. Minimum Metal Width:	1.2 microns (as drawn)
F. Minimum Metal Spacing:	1.2 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: 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°C biased (static) life test are pending. Using these results, the Failure Rate (λ) is calculated as follows:

$$\lambda = \frac{1}{\text{MTTF}} = \frac{1.83}{192 \times 4340 \times 444 \times 2} \text{ (Chi square value for MTTF upper limit)}$$

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

$\lambda = 11.02 \times 10^{-9}$

λ = 11.02 F.I.T. (60% confidence level @ 25°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 B12 Process results in a FIT Rate of 3.13 @ 25C and 54.16 @ 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 RF23-6 die type has been found to have all pins able to withstand a HBM transient pulse of 2500 V per . Latch-Up testing has shown that this device withstands a current of 250 mA.

Table 1

Reliability Evaluation Test Results

MAX6001EUR+

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES
Static Life Test (Note 1)	Ta = 135°C Biased Time = 192 hrs.	DC Parameters & functionality	444	3
Moisture Testing (Note 2) 85/85	Ta = 85°C RH = 85% Biased Time = 1000hrs.	DC Parameters & functionality	77	0
Mechanical Stress (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