



RELIABILITY REPORT
FOR
MAX9026EBT+T
CHIP SCALE PACKAGE

August 4, 2011

MAXIM INTEGRATED PRODUCTS

120 SAN GABRIEL DR.
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Approved by
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Conclusion

The MAX9026EBT+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.

Table of Contents

I.Device Description	V.Quality Assurance Information
II.Manufacturing Information	VI.Reliability Evaluation
III.Packaging Information	IV.Die Information
.....Attachments	

I. Device Description

A. General

The MAX9025-MAX9028 nanopower comparators in space-saving chip-scale (UCSP(tm)) packages feature Beyond-the-Rails(tm) inputs and are guaranteed to operate down to +1.8V. The MAX9025/MAX9026 feature an on-board 1.236V $\pm 1\%$ reference and draw an ultra-low supply current of only 1 μ A, while the MAX9027/MAX9028 (without reference) require just 0.6 μ A of supply current. These features make the MAX9025-MAX9028 family of comparators ideal for all 2-cell battery-monitoring/management applications. The unique design of the output stage limits supply-current surges while switching, virtually eliminating the supply glitches typical of many other comparators. This design also minimizes overall power consumption under dynamic conditions. The MAX9025/MAX9027 have a push-pull output stage that sinks and sources current. Large internal-output drivers allow rail-to-rail output swing with loads up to 5mA. The MAX9026/MAX9028 have an open-drain output stage that makes them suitable for mixed-voltage system design. All devices are available in the miniature 6-bump UCSP packages. Refer to the MAX9117 data sheet for similar comparators in 5-pin SC70 packages and the MAX9017 data sheet for similar dual comparators in 8-pin SOT23 packages.

II. Manufacturing Information

A. Description/Function:	UCSP, 1.8V, Nanopower, Beyond-the-Rails Comparators With/Without Reference
B. Process:	B8
C. Number of Device Transistors:	
D. Fabrication Location:	California or Texas
E. Assembly Location:	USA
F. Date of Initial Production:	April 20, 2004

III. Packaging Information

A. Package Type:	6-bump UCSP
B. Lead Frame:	N/A
C. Lead Finish:	N/A
D. Die Attach:	N/A
E. Bondwire:	N/A
F. Mold Material:	N/A
G. Assembly Diagram:	#05-9000-0967
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:	°C/W
K. Single Layer Theta Jc:	°C/W
L. Multi Layer Theta Ja:	259.5°C/W
M. Multi Layer Theta Jc:	°C/W

IV. Die Information

A. Dimensions:	42 X 62 mils
B. Passivation:	Si ₃ N ₄ /SiO ₂ (Silicon nitride/ Silicon dioxide)
C. Interconnect:	Al/0.5%Cu with Ti/TiN Barrier
D. Backside Metallization:	None
E. Minimum Metal Width:	0.8 microns (as drawn)
F. Minimum Metal Spacing:	0.8 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: 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 135°C biased (static) life test are shown in Table 1. Using these results, the Failure Rate (λ) is calculated as follows:

$$\lambda = \frac{1}{\text{MTTF}} = \frac{1.83}{192 \times 4340 \times 50 \times 2} \quad (\text{Chi square value for MTTF upper limit})$$

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

$$\lambda = 22.0 \times 10^{-9}$$

$$\lambda = 22.0 \text{ F.I.T. (60\% confidence level @ 25°C)}$$

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 B8 Process results in a FIT Rate of 0.06 @ 25C and 0.99 @ 55C (0.8 eV, 60% UCL)

B. E.S.D. and Latch-Up Testing (lot SOY1AQ001B, D/C 0348)

The CM91-1 die type has been found to have all pins able to withstand a HBM transient pulse of +/- 1000V per JEDEC JESD22-A114. Latch-Up testing has shown that this device withstands a current of 250mA.

Table 1
Reliability Evaluation Test Results

MAX9026EBT+T

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	50	0	SOY0AQ001B, D/C 0348

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