RELIABILITY REPORT

FOR

MAX9018EKA
(MAX9015 -MAX9020)

PLASTIC ENCAPSULATED DEVICES

December 23, 2008

MAXIM INTEGRATED PRODUCTS

120 SAN GABRIEL DR.

SUNNYVALE, CA 94086

Approved by
Ken Wendel
Quality Assurance
Director, Reliability Engineering

Conclusion

The MAX9018EKA 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 single MAX9015/MAX9016 and dual MAX9017-MAX9020 nanopower comparators in space-saving SOT23 packages feature Beyond-the-Rails(tm) inputs and are guaranteed to operate down to 1.8V. The A-grade packages feature an on-board 1.236V ±1% reference, while the B-grade packages feature a 1.24V ±1.75%5 reference. An ultra-low supply current of 0.85µA (MAX9019/MAX9020), 1µA (MAX9015/MAX9016), or 1.2µA (MAX9017/MAX9018) makes the MAX9015-MAX9020 family of comparators ideal for all 2-cell battery monitoring/management applications. The unique design of the MAX9015-MAX9020 output stage limits supply-current surges while switching, which virtually eliminates the supply glitches typical of many other comparators. This design also minimizes overall power consumption under dynamic conditions. The MAX9015/MAX9017/MAX9019 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 6mA. The MAX9016/MAX9018/MAX9020 have an open-drain output stage that makes them suitable for mixed-voltage system design. All devices are available in the ultra-small 8-pin SOT23 package. Refer to the MAX9117-MAX9120 data sheet for similar single comparators with or without reference in a tiny SC70 package.

II. Manufacturing Information

A. Description/Function:	SOT23, Dual, Precision, 1.8V, Nanopower Comparators With/Without Reference
B. Process:	B8
C. Number of Device Transistors:	
D. Fabrication Location:	Texas
E. Assembly Location:	Carsem Malaysia
F. Date of Initial Production:	April 26, 2003

III. Packaging Information

A. Package Type:	8-pin SOT23
B. Lead Frame:	Copper
C. Lead Finish:	85Sn/15Pb plate D.
Die Attach:	Conductive Epoxy
E. Bondwire:	Gold (1 mil dia.)
F. Mold Material:	Epoxy with silica filler
G. Assembly Diagram:	#05-9000-0428
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:	110*°C/W
K. Single Layer Theta Jc:	80°C/W

IV. Die Information

A. Dimensions:	24 X 80 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:	0.8 microns (as drawn)
F. Minimum Metal Spacing:	0.8 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 shown in Table 1. Using these results, the Failure Rate (λ) is calculated as follows:

$$\lambda = \frac{1}{MTTF} = \frac{1.83}{192 \times 4340 \times 48 \times 2}$$ (Chi square value for MTTF upper limit)

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

$\lambda = 22.4 \times 10^{-9}$

$\lambda = 22.4$ 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 B8 Process results in a FIT Rate of 2.71 @ 25C and 17.30 @ 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 CM90-5 die type has been found to have all pins able to withstand a HBM transient pulse of +/-1000 V per Mil-Std 883 Method 3015.7. Latch-Up testing has shown that this device withstands a current of +/-250 mA.

Table 1
Reliability Evaluation Test Results

MAX9018EKA

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	48	0
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