

RELIABILITY REPORT
FOR
MAX913CSA+
PLASTIC ENCAPSULATED DEVICES

July 7, 2011

MAXIM INTEGRATED PRODUCTS

120 SAN GABRIEL DR.
SUNNYVALE, CA 94086

Approved by
Sokhom Chum
Quality Assurance
Reliability Engineer

Conclusion

The MAX913CSA+ 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 MAX913 single and MAX912 dual, high-speed, low-power comparators have differential inputs and complementary TTL outputs. Fast propagation delay (10ns, typ), extremely low supply current, and a wide common-mode input range that includes the negative rail make the MAX912/MAX913 ideal for low-power, high-speed, single +5V (or $\pm 5V$) applications such as V/F converters or switching regulators. The MAX912/MAX913 outputs remain stable through the linear region. This feature eliminates output instability common to high-speed comparators when driven with a slow-moving input signal. The MAX912/MAX913 can be powered from a single +5V supply or a $\pm 5V$ split supply. The MAX913 is an improved plug-in replacement for the LT1016. It provides significantly wider input voltage range and equivalent speed at a fraction of the power. The MAX912 dual comparator has equal performance to the MAX913 and includes independent latch controls.

II. Manufacturing Information

A. Description/Function:	Single/Dual, Ultra-Fast, Low-Power, Precision TTL Comparators
B. Process:	CB2
C. Number of Device Transistors:	
D. Fabrication Location:	Oregon
E. Assembly Location:	Malaysia, Philippines, Thailand
F. Date of Initial Production:	Pre 1997

III. Packaging Information

A. Package Type:	8-pin SOIC (N)
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:	#05-1501-0268
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:	170°C/W
K. Single Layer Theta Jc:	40°C/W
L. Multi Layer Theta Ja:	136°C/W
M. Multi Layer Theta Jc:	38°C/W

IV. Die Information

A. Dimensions:	60 X 61 mils
B. Passivation:	Si ₃ N ₄ (Silicon nitride)
C. Interconnect:	Au
D. Backside Metallization:	None
E. Minimum Metal Width:	2 microns (as drawn)
F. Minimum Metal Spacing:	2 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 150°C biased (static) life test are shown in Table 1. Using these results, the Failure Rate (λ) is calculated as follows:

$$\lambda = \frac{1}{\text{MTTF}} = \frac{1.83}{1000 \times 4340 \times 313 \times 2} \quad (\text{Chi square value for MTTF upper limit})$$

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

$$\lambda = 0.7 \times 10^{-9}$$

$$\lambda = 0.7 \text{ F.I.T. (60\% confidence level @ 25°C)}$$

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 CB2 Process results in a FIT Rate of 0.14 @ 25C and 2.48 @ 55C (0.8 eV, 60% UCL)

B. E.S.D. and Latch-Up Testing (lot NKE0C2057D D/C 1107)

The CM86 die type has been found to have all pins able to withstand a HBM transient pulse of +/-2500V per JEDEC JESD22-A114. Latch-Up testing has shown that this device withstands a current of +/-250mA and overvoltage per JEDEC JESD78.

Table 1
Reliability Evaluation Test Results

MAX913CSA+

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	COMMENTS
Static Life Test (Note 1)	Ta = 135°C	DC Parameters	80	0	NKE0C2057D, D/C 1107
	Biased	& functionality	80	0	NKE0C2052B, D/C 1023
	Time = 1000 hrs.		77	0	NKE0CA008E, D/C 0430
				76	0

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