

RELIABILITY REPORT
FOR
MAX9010EXT+T
PLASTIC ENCAPSULATED DEVICES

November 13, 2014

MAXIM INTEGRATED

160 RIO ROBLES
SAN JOSE, CA 95134

Approved by
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Conclusion

The MAX9010EXT+T successfully meets the quality and reliability standards required of all Maxim Integrated products. In addition, Maxim Integrated's continuous reliability monitoring program ensures that all outgoing product will continue to meet Maxim Integrated's quality and reliability standards.

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I. Device Description

A. General

The MAX9010/MAX9011/MAX9013 single and MAX9012 dual, high-speed comparators operate from a single 4.5V to 5.5V power supply and feature low-current consumption. They have precision differential inputs and TTL outputs. They feature short propagation delay (5ns, typ), low-supply current, and a wide common-mode input range that includes ground. They are ideal for low-power, high-speed, single-supply applications. The comparator outputs remain stable through the linear region when driven with slow-moving or low input-overdrive signals, eliminating the output instability common to other high-speed comparators. The input voltage range extends to 200mV below ground with no output phase reversal. The MAX9013 features complementary outputs and both the MAX9011/MAX9013 have a latch enable input (LE). The MAX9013 is an improved plug-in replacement for the industry-standard MAX913 and LT1016/LT1116, offering lower power and higher speed when used in a single 5V supply application. For space-critical designs, the single MAX9010 is available in the tiny 6-pin SC70 package. The single MAX9011 is available in a space-saving 6-pin SOT23 package. The dual MAX9012 and the single MAX9013 are available in 8-pin μ MAX® and 8-pin SO packages. All products in the family are guaranteed over the extended temperature range of -40°C to +85°C.

II. Manufacturing Information

A. Description/Function:	SC70, 5ns, Low-Power, Single-Supply, Precision TTL Comparators
B. Process:	CB3
C. Number of Device Transistors:	
D. Fabrication Location:	Oregon
E. Assembly Location:	Malaysia, Thailand
F. Date of Initial Production:	January 27, 2001

III. Packaging Information

A. Package Type:	6-pin SC70
B. Lead Frame:	NiPdAu
C. Lead Finish:	100% matte Tin
D. Die Attach:	Non-conductive
E. Bondwire:	Au (1 mil dia.)
F. Mold Material:	Epoxy with silica filler
G. Assembly Diagram:	#05-1501-0177
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:	326°C/W
K. Single Layer Theta Jc:	115°C/W
L. Multi Layer Theta Ja:	326.5°C/W
M. Multi Layer Theta Jc:	115°C/W

IV. Die Information

A. Dimensions:	30X31 mils
B. Passivation:	Si ₃ N ₄ (Silicon nitride)
C. Interconnect:	Au
D. Backside Metallization:	None
E. Minimum Metal Width:	Metal1 = 0.5 microns (as drawn)
F. Minimum Metal Spacing:	Metal1 = 0.45 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: 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 150C biased (static) life test are shown in Table 1. Using these results, the Failure Rate (λ) is calculated as follows:

$$\lambda = \frac{1}{\text{MTTF}} = \frac{1.83}{192 \times 9706 \times 240 \times 2} \quad (\text{Chi square value for MTTF upper limit})$$

(where 9706 = Temperature Acceleration factor assuming an activation energy of 0.8eV)

$$\lambda = 2.05 \times 10^{-9}$$

$\lambda = 2.05$ F.I.T. (60% confidence level @ 25°C)

The following failure rate represents data collected from Maxim Integrated's reliability monitor program. Maxim Integrated performs quarterly life test monitors on its processes. This data is published in the Reliability Report found at <http://www.maximintegrated.com/qa/reliability/monitor>. Cumulative monitor data for the CB3 Process results in a FIT Rate of 0.09 @ 25C and 1.49 @ 55C (0.8 eV, 60% UCL).

B. E.S.D. and Latch-Up Testing (lot N44AC3008D, D/C 0141)

The CM46 die type has been found to have all pins able to withstand a HBM transient pulse of +/-2000V per Mil-Std 883 Method 3015.7. Latch-Up testing has shown that this device withstands a current of +/-250mA.

Table 1
Reliability Evaluation Test Results

MAX9010EXT+T

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	COMMENTS
Static Life Test (Note 1)	Ta = 150°C	DC Parameters & functionality	80	0	N44AE3008C, D/C 0145
	Biased		80	0	N44AD3008F, D/C 0142
	Time = 192 hrs.		80	0	N44AC3008D, D/C 0031

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