



RELIABILITY REPORT
FOR
MAX999EUK+T
PLASTIC ENCAPSULATED DEVICES

November 12, 2010

MAXIM INTEGRATED PRODUCTS

120 SAN GABRIEL DR.
SUNNYVALE, CA 94086

Approved by
Don Lipps
Quality Assurance
Manager, Reliability Engineering

Conclusion

The MAX999EUK+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 MAX961-MAX964/MAX997/MAX999 are low-power, ultra-high-speed comparators with internal hysteresis. These devices are optimized for single +3V or +5V operation. The input common-mode range extends 100mV Beyond-the-Rails(tm), and the outputs can sink or source 4mA to within 0.52V of GND and VCC. Propagation delay is 4.5ns (5mV overdrive), while supply current is 5mA per comparator. The MAX961/MAX963/MAX964 and MAX997 have a shutdown mode in which they consume only 270µA supply current per comparator. The MAX961/MAX963 provide complementary outputs and a latch-enable feature. Latch enable allows the user to hold a valid comparator output. The MAX999 is available in a tiny SOT23-5 package. The single MAX961/MAX997 and dual MAX962 are available in space-saving 8-pin µMAX® packages.

II. Manufacturing Information

A. Description/Function:	Single/Dual/Quad, Ultra-High-Speed, +3V/+5V, Beyond-the-Rails Comparators
B. Process:	CB2
C. Number of Device Transistors:	
D. Fabrication Location:	Oregon
E. Assembly Location:	Malaysia, Thailand
F. Date of Initial Production:	January 24, 1998

III. Packaging Information

A. Package Type:	5-pin SOT23
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:	#05-1501-0147
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:	324.3°C/W
K. Single Layer Theta Jc:	82°C/W
L. Multi Layer Theta Ja:	N/A
M. Multi Layer Theta Jc:	N/A

IV. Die Information

A. Dimensions:	57 X 33 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:	5 mil. Sq.
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 150°C biased (static) life test are shown in Table 1. Using these results, the Failure Rate (λ) is calculated as follows:

$$\lambda = \frac{1}{\text{MTTF}} = \frac{1.83}{192 \times 4340 \times 159 \times 2} \quad (\text{Chi square value for MTTF upper limit})$$

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

$$\lambda = 6.9 \times 10^{-9}$$

$\lambda = 6.9$ 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 NL5ADA039C, D/C 0650)

The CM40 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.

Table 1
Reliability Evaluation Test Results

MAX999EUK+T

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	COMMENTS
Static Life Test (Note 1)	Ta = 135°C	DC Parameters	79	0	NL5BBA005E, DC 0108
	Biased	& functionality	80	0	BL5BAX002B, DC 9751
	Time = 192 hrs.				

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