RELIABILITY REPORT

FOR

MAX982EPA+

PLASTIC ENCAPSULATED DEVICES

September 22, 2009

MAXIM INTEGRATED PRODUCTS

120 SAN GABRIEL DR.

SUNNYVALE, CA 94086

Approved by
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Quality Assurance
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Conclusion

The MAX982EPA+ 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 MAX971-MAX974 and MAX981-MAX984 single/dual/quad low-voltage comparators feature the lowest power consumption available. These micropower devices draw less than 4µA supply current over temperature (MAX971/MAX972/MAX981/MAX982), and include an internal 1.182V ±1% (MAX971/MAX973/ MAX974) or ±2% (MAX981-MAX984) voltage reference and programmable hysteresis. Ideal for 3V or 5V single-supply applications, these devices operate from a single 2.5V to 11V supply (or ±1.25V to ±5.5V dual supplies), and each comparator's input voltage ranges from the negative supply rail to within 1.3V of the positive supply. The single MAX971/MAX981 and the dual MAX973/ MAX982/MAX983 provide a unique, simple method for adding hysteresis without feedback or complicated equations, simply by using the HYST pin plus two resistors. The MAX971-MAX974 and MAX981-MAX984's open-drain outputs permit wire-ORed configurations. Thanks to an 11V output range and separate GND pin for the output transistor (MAX971/MAX974, MAX981/MAX984), these devices are ideal for level translators and bipolar to single-ended converters. For similar devices with complementary output stages, see the MAX921-MAX924 (1% reference) and the MAX931-MAX934 (2% reference).

II. Manufacturing Information

A. Description/Function:	Ultra-Low-Power, Open-Drain, Single/Dual-Supply Comparators
B. Process:	S3
C. Number of Device Transistors:	
D. Fabrication Location:	Oregon
E. Assembly Location:	Thailand, Philippines, Malaysia
F. Date of Initial Production:	Pre 1997

III. Packaging Information

A. Package Type:	8-pin PDIP
B. Lead Frame:	Copper
C. Lead Finish:	100% matte Tin
D. Die Attach:	Conductive Epoxy
E. Bondwire:	Gold (1 mil dia.)
F. Mold Material:	Epoxy with silica filler
G. Assembly Diagram:	#05-1501-0128
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:	110°C/W
K. Single Layer Theta Jc:	40°C/W

IV. Die Information

A. Dimensions:	77 X 58 mils
B. Passivation:	Si_3N_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:	3.0 microns (as drawn)
F. Minimum Metal Spacing:	3.0 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:

$$\lambda = \frac{1}{MTTF} = \frac{1.83}{192 \times 4340 \times 584 \times 2}$$ (Chi square value for MTTF upper limit)

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

$\lambda = 1.8 \times 10^{-9}$

λ = 1.8 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 S3 Process results in a FIT Rate of 0.04 @ 25C and 0.69 @ 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 CM30-5 die type has been found to have all pins able to withstand a HBM transient pulse of +/-1500 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

MAX982EPA+

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	584	0
Moisture Testing (Note 2)				
HAST	Ta = 130°C RH = 85% Biased Time = 96hrs.	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