RELIABILITY REPORT

FOR

MAX4330EUK+

PLASTIC ENCAPSULATED DEVICES

November 5, 2009

MAXIM INTEGRATED PRODUCTS

120 SAN GABRIEL DR.

SUNNYVALE, CA 94086

Approved by
Ken Wendel
Quality Assurance
Director, Reliability Engineering

Conclusion

The MAX4330EUK+ 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 MAX4330-MAX4334 single/dual/quad op amps combine a wide 3MHz bandwidth, low-power operation, and excellent DC accuracy with rail-to-rail inputs and outputs. These devices require only 245µA per amplifier, and operate from either a single +2.3V to +6.5V supply or dual ±1.15V to ±3.25V supplies. The input common-mode voltage range extends 250mV beyond VEE and VCC, and the outputs swing rail-to-rail. The MAX4331/MAX4333 feature a shutdown mode in which the output goes high impedance and the supply current decreases to 9µA per amplifier. Low-power operation combined with rail-to-rail input common-mode range and output swing makes these amplifiers ideal for portable/battery-powered equipment and other low-voltage, single-supply applications. Although the minimum operating voltage is specified at 2.3V, these devices typically operate down to 2.0V. Low offset voltage and high speed make these amplifiers excellent choices for signal-conditioning stages in precision, low-voltage data-acquisition systems. The MAX4330 is available in the space-saving 5-pin SOT23 package, and the MAX4331/MAX4333 are offered in a µMAX® package.

II. Manufacturing Information

A. Description/Function:	Single/Dual/Quad, Low-Power, Single-Supply, Rail-to-Rail I/O Op Amps with Shutdown
B. Process:	CB2
C. Fabrication Location:	Oregon
D. Assembly Location:	Malaysia, Philippines, Thailand
E. Date of Initial Production:	February 27, 1997

III. Packaging Information

A. Package Type:	5-pin SOT23
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:	#05-3001-0043
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

IV. Die Information

A. Dimensions:	52 X 38 mils
B. Passivation:	Si_3N_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:	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 150°C biased (static) life test are shown in Table 1. Using these results, the Failure Rate (λ) is calculated as follows:

$$\lambda = \frac{1}{MTTF} = \frac{1.83}{192 \times 4340 \times 80 \times 2}$$ (Chi square value for MTTF upper limit)

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

$\lambda = 6.15 \times 10^{-9}$

$\lambda = 6.15$ 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. 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 OP40 die type has been found to have all pins able to withstand a HBM transient pulse of +/-2000 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

MAX4330EUK+

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES
Static Life Test (Note 1)				
	Ta = 150°C Biased Time = 192 hrs.	DC Parameters & functionality	80	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