RELIABILITY REPORT

FOR

MAX4445ESE+

PLASTIC ENCAPSULATED DEVICES

August 6, 2010

MAXIM INTEGRATED PRODUCTS

120 SAN GABRIEL DR.

SUNNYVALE, CA 94086

Approved by
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Quality Assurance
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Conclusion

The MAX4445ESE+ 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 MAX4444/MAX4445 differential line receivers offer unparalleled high-speed, low-distortion performance. Using a three op amp instrumentation amplifier architecture, these ICs have symmetrical differential inputs and a single-ended output. They operate from ±5V supplies and are capable of driving a 100 load to ±3.7V. The MAX4444 has an internally set closed-loop gain of +2V/V, while the MAX4445 is compensated for gains of +2V/V or greater, set by an external resistor. A low-power enable mode reduces current consumption to 3.5mA. Using current-feedback techniques, the MAX4444/MAX4445 achieve a 550MHz bandwidth while maintaining up to a 5000V/µs slew rate. Excellent differential gain/phase and noise specifications make these amplifiers ideal for a wide variety of video and RF signal-processing applications. An evaluation kit is available to speed design.

II. Manufacturing Information

A. Description/Function:	Ultra-High-Speed, Low-Distortion, Differential-to-Single-Ended Line Receivers with Enable
B. Process:	CB2
C. Number of Device Transistors:	
D. Fabrication Location:	Oregon
E. Assembly Location:	Malaysia, Thailand
F. Date of Initial Production:	October 08, 1999

III. Packaging Information

A. Package Type:	16-pin SOIC (N)
B. Lead Frame:	Copper
C. Lead Finish:	100% matte Tin
D. Die Attach:	Conductive
E. Bondwire:	Au (1.3 mil dia.)
F. Mold Material:	Epoxy with silica filler
G. Assembly Diagram:	#05-3001-0131
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:	77°C/W
K. Single Layer Theta Jc:	25°C/W
L. Multi Layer Theta Ja:	n/a
M. Multi Layer Theta Jc:	n/a

IV. Die Information

A. Dimensions:	68 X 53 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:	Don Lipps (Manager, 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:

$$\lambda = \frac{1}{MTTF} = \frac{1.83}{192 \times 4340 \times 319 \times 2}$$ (Chi square value for MTTF upper limit)

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

$\lambda = 3.5 \times 10^{-9}$

$\lambda = 3.5$ 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 OP80-1 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

MAX4445ESE+

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	319	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