

RELIABILITY REPORT
FOR
MAX4159EEE+
(MAX4158/MAX4159/MAX4258/MAX4259)
PLASTIC ENCAPSULATED DEVICES

January 22, 2009

MAXIM INTEGRATED PRODUCTS

120 SAN GABRIEL DR.
SUNNYVALE, CA 94086

Approved by
Ken Wendel
Quality Assurance
Director, Reliability Engineering

Conclusion

The MAX4159EEE+ 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 MAX4158/MAX4159/MAX4258/MAX4259 are wideband, 2-channel, noninverting video amplifiers with input multiplexing, capable of driving $\pm 2.5V$ signals into 50 or 75 loads. These devices are current-mode feedback amplifiers; gain is set by external feedback resistors. The MAX4158/MAX4159 are optimized for unity gain (0dB) with a -3dB bandwidth of 350MHz. The MAX4258/MAX4259 are optimized for gains of two (6dB) or more with a 250MHz -3dB bandwidth. These devices have low (0.01%/0.01°) differential gain and phase errors, and operate from $\pm 5V$ supplies. These devices are ideal for use in broadcast and graphics video systems because of their low, 2pF input capacitance, channel-to-channel switching time of only 20ns, and wide, 130MHz 0.1dB bandwidth. In addition, the combination of ultra-high speed and low power makes them suitable for use in general-purpose high-speed applications, such as medical imaging, industrial instrumentation, and communications systems. The MAX4159/MAX4259 have address latching and high-impedance output disabling, allowing them to be incorporated into large switching arrays. They are available in 14-pin SO and 16-pin QSOP packages. The MAX4158/MAX4258 have no address latching or output disabling, but are available in space-saving 8-pin μ MAX® and SO packages.

II. Manufacturing Information

A. Description/Function:	350MHz/250MHz, 2-Channel Video Multiplexer-Amplifiers
B. Process:	CB2
C. Number of Device Transistors:	
D. Fabrication Location:	Oregon
E. Assembly Location:	Carsem Malaysia, ATP Philippines, UTL Thailand
F. Date of Initial Production:	Pre 1997

III. Packaging Information

A. Package Type:	16-pin QSOP
B. Lead Frame:	Copper
C. Lead Finish:	100% matte Tin
D. Die Attach:	Conductive Epoxy
E. Bondwire:	Gold (1.3 mil dia.)
F. Mold Material:	Epoxy with silica filler
G. Assembly Diagram:	#05-0601-0479
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:	120°C/W
K. Single Layer Theta Jc:	37°C/W
L. Multi Layer Theta Ja:	103.7°C/W
M. Multi Layer Theta Jc:	37°C/W

IV. Die Information

A. Dimensions:	57 X 62 mils
B. Passivation:	Si ₃ N ₄ (Silicon nitride)
C. Interconnect:	Gold
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:

$$\lambda = \frac{1}{\text{MTTF}} = \frac{1.83}{192 \times 4340 \times 400 \times 2} \quad (\text{Chi square value for MTTF upper limit})$$

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

$$\lambda = 13.4 \times 10^{-9}$$

$\lambda = 13.4$ F.I.T. (60% confidence level @ 25°C)

The following failure rate represents data collected from Maxim's reliability monitor program. Maxim performs quarterly 1000 hour life test monitors on its processes. This data is published in the Product Reliability Report found at <http://www.maxim-ic.com/>. Current monitor data for the CB20 Process results in a FIT Rate of 0.14 @ 25C and 2.14 @ 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 OA71 die type has been found to have all pins able to withstand a HBM transient pulse of +/-3000 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

MAX4159EEE+

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	400	2
Moisture Testing (Note 2) 85/85	Ta = 85°C RH = 85% Biased Time = 1000hrs.	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