

RELIABILITY REPORT
FOR
MAX11509UUD+
(MAX11508/MAX11509)
PLASTIC ENCAPSULATED DEVICES

January 23, 2009

MAXIM INTEGRATED PRODUCTS

120 SAN GABRIEL DR.
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Conclusion

The MAX11509UUD+ 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 MAX11508/MAX11509 integrated 3-channel video filters for high-definition (HD), progressive-scan (PS), standard-definition (SD), and bypass (BP) video include an output buffer with +6dB gain and are ideal for digital video disc (DVD) players, set-top box (STB) receivers, high-definition television (HDTV), digital video recorders (DVRs), and similar devices. The MAX11508/MAX11509 video inputs feature a transparent clamp compatible with AC- and DC-coupled input signals and allow DAC outputs to be directly coupled, eliminating the need for bulky coupling capacitors. The filter bandwidths are selectable to HD, PS, and SD. A BP mode is provided for 1080p and high-bandwidth RGB signals. Selectable input bias circuitry on 2 filter channels offers simple connection to bipolar video signals such as C, Pb, and Pr. The MAX11508 filters provide -3dB bandwidths of 9MHz (SD), 16MHz (PS), 33MHz (HD), and 60MHz (BP). The MAX11509 filters provide -3dB bandwidths of 10MHz (SD), 17MHz (PS), 34MHz (HD), and 60MHz (BP). Each channel includes an output buffer with +6dB gain that provides a full 2VP-P video signal into a 150 video load. The buffers drive either AC- or DC-coupled loads and assure a blanking level of below 1V after the backmatch resistor. The shutdown mode provided reduces device current to 1 μ A (typ). The MAX11508 offers a flat passband and the MAX11509 features +0.8dB peaking to compensate for DAC rolloff. The MAX11508/MAX11509 operate from a 5V power supply and operate over the upper commercial (0°C to +85°C) temperature range. The parts are offered in the 14-pin TSSOP package.

II. Manufacturing Information

A. Description/Function:	Low-Cost, 3-Channel, HD/PS/SD/BP Video Filters with Buffer
B. Process:	C6
C. Number of Device Transistors:	
D. Fabrication Location:	California
E. Assembly Location:	ATP Philippines, UTL Thailand, Carsem Malaysia
F. Date of Initial Production:	Oct 23, 2008

III. Packaging Information

A. Package Type:	14-pin TSSOP
B. Lead Frame:	Copper
C. Lead Finish:	100% matte Tin
D. Die Attach:	Conductive Epoxy
E. Bondwire:	Au (1.0 mil dia.)
F. Mold Material:	Epoxy with silica filler
G. Assembly Diagram:	#
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:	30°C/W
L. Multi Layer Theta Ja:	100.4°C/W
M. Multi Layer Theta Jc:	30°C/W

IV. Die Information

A. Dimensions:	63 X 63 mils
B. Passivation:	SiO ₂ /SiN ₃
C. Interconnect:	Al/Cu
D. Backside Metallization:	None
E. Minimum Metal Width:	0.6um
F. Minimum Metal Spacing:	0.6um
G. Bondpad Dimensions:	5 mil. Sq.
H. Isolation Dielectric:	SiO ₂
I. Die Separation Method:	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:

$$\lambda = \frac{1}{\text{MTTF}} = \frac{1.83}{192 \times 4340 \times 48 \times 2} \quad (\text{Chi square value for MTTF upper limit})$$

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

$$\lambda = 22.4 \times 10^{-9}$$

$$\lambda = 22.4 \text{ F.I.T. (60\% confidence level @ 25°C)}$$

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 C6 Process results in a FIT Rate of 0.82 @ 25C and 14.21 @ 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 VP35-1 die type has been found to have all pins able to withstand a HBM transient pulse of +/-2500 V per JEDEC JESD22-A114-D. Latch-Up testing has shown that this device withstands a current of +/-250 mA.

Table 1
Reliability Evaluation Test Results

MAX11509UUD+

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	48	0
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