

RELIABILITY REPORT  
FOR  
MAX3601CWO+  
WAFER LEVEL PRODUCTS

August 1, 2013

**MAXIM INTEGRATED**

160 RIO ROBLES  
SAN JOSE, CA 95134

<b>Approved by</b>
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Quality Assurance
Reliability Engineer

**Conclusion**

The MAX3601CWO+ successfully meets the quality and reliability standards required of all Maxim Integrated products. In addition, Maxim Integrated's continuous reliability monitoring program ensures that all outgoing product will continue to meet Maxim Integrated's quality and reliability standards.

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**I. Device Description****A. General**

The MAX3601 laser driver for pico projectors supports video imaging with red, blue, and green lasers. Each output includes two 8-bit digital-to-analog converters (DAC) with programmable gain and up to 400mA driving capability per channel. DAC A has a full-scale current up to 320mA while DAC B has full-scale current up to 80mA. All three channels can be combined into a single channel with up to 1.2A drive capability. Maxim's patented technology allows pulsed current to operate lasers efficiently while reducing speckle. This feature operates from the video data clock. The driver is available in a 3.0mm x 3.5mm, 42-bump wafer-level Package for commercial applications, and a 5mm x 5mm, 40-pin TQFN package for industrial and automotive applications.

## II. Manufacturing Information

A. Description/Function:	Laser Driver for Projectors
B. Process:	S18
C. Number of Device Transistors:	166343
D. Fabrication Location:	California
E. Assembly Location:	Texas
F. Date of Initial Production:	September 26, 2012

## III. Packaging Information

A. Package Type:	42 bmp WLP
B. Lead Frame:	N/A
C. Lead Finish:	N/A
D. Die Attach:	N/A
E. Bondwire:	N/A
F. Mold Material:	Epoxy with silica filler
G. Assembly Diagram:	#05-9000-4948
H. Flammability Rating:	Class UL94-V0
I. Classification of Moisture Sensitivity per JEDEC standard J-STD-020-C	1
J. Single Layer Theta Ja:	N/A
K. Single Layer Theta Jc:	N/A
L. Multi Layer Theta Ja:	36°C/W
M. Multi Layer Theta Jc:	N/A

## IV. Die Information

A. Dimensions:	135.0393X139.7637 mils
B. Passivation:	Si <sub>3</sub> N <sub>4</sub> /SiO <sub>2</sub> (Silicon nitride/ Silicon dioxide)
C. Interconnect:	Al with Ti/TiN Barrier
D. Backside Metallization:	None
E. Minimum Metal Width:	0.18um
F. Minimum Metal Spacing:	0.18um
G. Bondpad Dimensions:	
H. Isolation Dielectric:	SiO <sub>2</sub>
I. Die Separation Method:	Wafer Saw

## V. Quality Assurance Information

- A. Quality Assurance Contacts: Richard Aburano (Manager, Reliability Engineering)  
Don Lipps (Manager, Reliability Engineering)  
Bryan Preeshl (Vice President 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 135C biased (static) life test are shown in Table 1. Using these results, the Failure Rate ( $\lambda$ ) is calculated as follows:

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

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

$$\lambda = 13.7 \times 10^{-9}$$

$$\lambda = 13.7 \text{ F.I.T. (60\% confidence level @ 25°C)}$$

The following failure rate represents data collected from Maxim Integrated's reliability monitor program. Maxim Integrated performs quarterly life test monitors on its processes. This data is published in the Reliability Report found at <http://www.maximintegrated.com/qa/reliability/monitor>. Cumulative monitor data for the S18 Process results in a FIT Rate of 0.05 @ 25C and 0.93 @ 55C (0.8 eV, 60% UCL).

### B. E.S.D. and Latch-Up Testing ( lot SAEZ3Q001E D/C 1242)

The HT78-0 die type has been found to have all pins able to withstand a HBM transient pulse of +/-2500V per JEDEC JESD22-A114. Latch-Up testing has shown that this device withstands a current of +/-250mA and overvoltage per JEDEC JESD78.

**Table 1**  
Reliability Evaluation Test Results

**MAX3601CWO+**

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	COMMENTS
<b>Static Life Test</b> (Note 1)	Ta = 135°C	DC Parameters	40	0	SAEZ3Q001F, D/C 1242
	Biased	& functionality	40	0	SAEZ3Q001E, D/C 1242
	Time = 192 hrs.				

Note 1: Life Test Data may represent plastic DIP qualification lots.