



RELIABILITY REPORT  
FOR  
MAX253CSA+  
PLASTIC ENCAPSULATED DEVICES

May 6, 2011

**MAXIM INTEGRATED PRODUCTS**

120 SAN GABRIEL DR.  
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<b>Approved by</b>
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Quality Assurance
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## Conclusion

The MAX253CSA+ 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 MAX253 monolithic oscillator/power-driver is specifically designed to provide isolated power for an isolated RS-485 or RS-232 data interface. The device drives a center-tapped transformer primary from a 5V or 3.3V DC power supply. The secondary can be wound to provide any isolated voltage needed at power levels up to 1W. The MAX253 consists of a CMOS oscillator driving a pair of N-channel power switches. The oscillator runs at double the output frequency, driving a toggle flip-flop to ensure 50% duty cycle to each of the switches. Internal delays are arranged to ensure break-before-make action between the two switches. The SD pin puts the entire device into a low-power shutdown state, disabling both the power switches and oscillator.

## II. Manufacturing Information

A. Description/Function:	1W Primary-Side Transformer H-Bridge Driver for Isolated Supplies
B. Process:	M5
C. Number of Device Transistors:	
D. Fabrication Location:	Oregon
E. Assembly Location:	Malaysia, Philippines, Thailand
F. Date of Initial Production:	Pre 1997

## III. Packaging Information

A. Package Type:	8-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:	#05-1901-0044
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:	170°C/W
K. Single Layer Theta Jc:	40°C/W
L. Multi Layer Theta Ja:	132°C/W
M. Multi Layer Theta Jc:	38°C/W

## IV. Die Information

A. Dimensions:	58 X 85 mils
B. Passivation:	Si <sub>3</sub> N <sub>4</sub> /SiO <sub>2</sub> (Silicon nitride/ Silicon dioxide)
C. Interconnect:	Al/1.0%Si
D. Backside Metallization:	None
E. Minimum Metal Width:	Metal1 = 0.5 / Metal2 = 0.6 / Metal3 = 0.6 microns (as drawn)
F. Minimum Metal Spacing:	Metal1 = 0.45 / Metal2 = 0.5 / Metal3 = 0.6 microns (as drawn)
G. Bondpad Dimensions:	5 mil. Sq.
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 135°C 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'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 M5 Process results in a FIT Rate of 0.34 @ 25C and 5.79 @ 55C (0.8 eV, 60% UCL)

### B. E.S.D. and Latch-Up Testing (lot NCVACO002B D/C 9606)

The RS19 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 +/-100mA.

**Table 1**  
Reliability Evaluation Test Results

**MAX253CSA+**

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	COMMENTS
<b>Static Life Test</b> (Note 1)	Ta = 135°C Biased Time = 192 hrs.	DC Parameters & functionality	80	0	XCVAAB006C, D/C 9531

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