

RELIABILITY REPORT  
FOR  
MAX1490ACPG+  
PLASTIC ENCAPSULATED DEVICES

August 18, 2009

**MAXIM INTEGRATED PRODUCTS**

120 SAN GABRIEL DR.  
SUNNYVALE, CA 94086

<b>Approved by</b>
Ken Wendel
Quality Assurance
Director, Reliability Engineering

## Conclusion

The MAX1490ACPG+ 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 MAX1480A/MAX1480B/MAX1480C/MAX1490A/ MAX1490B are complete, electrically isolated, RS-485/ RS-422 data-communications interface solutions in a hybrid microcircuit. Transceivers, optocouplers, and a transformer provide a complete interface in a standard DIP package. A single +5V supply on the logic side powers both sides of the interface. The MAX1480B/MAX1480C/MAX1490B feature reduced slew- rate drivers that minimize EMI and reduce reflections caused by improperly terminated cables, allowing error-free data transmission at data rates up to 250kbps. The MAX1480A/MAX1490A driver slew rate is not limited, allowing transmission rates up to 2.5Mbps. The MAX1480A/B/C are designed for half-duplex communication, while the MAX1490A/B feature full-duplex communication. Drivers are short-circuit current limited and protected against excessive power dissipation by thermal shutdown circuitry that places the driver outputs into a high impedance state. The receiver input has a fail-safe feature that guarantees a known output (RO-bar low for the MAX1480A/B/C, RO high for the MAX1490A/B/C) if the input is open circuit. The MAX1480A/MAX1480B/MAX1480C/MAX1490A/ MAX1490B typically withstand 1600VRMS (1 minute) or 2000VRMS (1 second). Their isolated outputs meet all RS-485/RS-422 specifications. The MAX1480A/B/C are available in a 28-pin DIP package, and the MAX1490A/B are available in a 24-pin DIP package.

## II. Manufacturing Information

A. Description/Function:	Complete, Isolated RS-485/RS-422 Data Interface
B. Process:	Mixed
C. Number of Device Transistors:	
D. Fabrication Location:	Mixed
E. Assembly Location:	Philippines
F. Date of Initial Production:	Pre 1997

## III. Packaging Information

A. Package Type:	24-pin PDIP
B. Lead Frame:	Copper
C. Lead Finish:	100% matte Tin
D. Die Attach:	None
E. Bondwire:	Au (1.0 mil dia.)
F. Mold Material:	Epoxy with silica filler
G. Assembly Diagram:	#31-4749
H. Flammability Rating:	Class UL94-V0
I. Classification of Moisture Sensitivity per JEDEC standard J-STD-020-C	Level 1

## IV. Die Information

Process:	Hybrid with mixed die and piece parts.
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## 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 biased (static) life test are pending. Using these results, the Failure Rate ( $\lambda$ ) is calculated as follows:

$$\lambda = \frac{1}{\text{MTTF}} = \frac{1.83}{192 \times 4340 \times 77 \times 2} \quad (\text{Chi square value for MTTF upper limit})$$

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

$$\lambda = 13.9 \times 10^{-9}$$

$$\lambda = 13.9 \text{ F.I.T. (60\% confidence level @ 25°C)}$$

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/>.

### 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 RT16-RT16P die type has been found to have all pins able to withstand a HBM transient pulse of +/-1000 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

**MAX1490ACPG+**

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES
<b>Static Life Test</b> (Note 1)	Ta = Biased Time = 192 hrs.	DC Parameters & functionality	77	0
<b>Moisture Testing</b> (Note 2) 85/85	Ta = 85°C RH = 85% Biased Time = 1000hrs.	DC Parameters & functionality	77	0
<b>Mechanical Stress</b> (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