

RELIABILITY REPORT  
FOR  
MAX1480BEPI+  
PLASTIC ENCAPSULATED DEVICES

July 29, 2015

**MAXIM INTEGRATED**

160 RIO ROBLES  
SAN JOSE, CA 95134

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

## Conclusion

The MAX1480BEPI+ 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.

## Table of Contents

I. ....Device Description	IV. ....Die Information
II. ....Manufacturing Information	V. ....Quality Assurance Information
III. ....Packaging Information	VI. ....Reliability Evaluation
.....Attachments	

### 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 (active-low RO low for the MAX1480A/B/C, RO high for the MAX1490A/B) 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:	Hybrid
C. Fabrication Location:	N/A
D. Assembly Location:	Philippines
E. Date of Initial Production:	Pre 1997

## III. Packaging Information

A. Package Type:	28-pin PDIP
B. Lead Frame:	Alloy-42
C. Lead Finish:	100% matte Tin
D. Die Attach:	Non-conductive
E. Bondwire:	Au (1.3 mil dia.)
F. Mold Material:	Epoxy with silica filler
G. Assembly Diagram:	#31-4748
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:	70°C/W
K. Single Layer Theta Jc:	21°C/W
L. Multi Layer Theta Ja:	N/A
M. Multi Layer Theta Jc:	N/A

## IV. Die Information

A. Dimensions:	N/A
B. Passivation:	N/A
C. Interconnect:	N/A
D. Backside Metallization:	N/A
E. Minimum Metal Width:	N/A
F. Minimum Metal Spacing:	N/A
G. Bondpad Dimensions:	N/A
H. Isolation Dielectric:	N/A
I. Die Separation Method	N/A

## V. Quality Assurance Information

- A. Quality Assurance Contacts: 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 biased (static) life test are shown in Table 1. Using these results, the Failure Rate ( $\lambda$ ) is calculated as follows:

$$\lambda = \frac{1}{\text{MTTF}} = \frac{1.83}{192 \times 4340 \times 560 \times 2} \quad (\text{Chi square value for MTTF upper limit})$$

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

$$\lambda = 1.96 \times 10^{-9}$$

$$\lambda = 1.96 \text{ F.I.T. (60\% confidence level @ 25°C)}$$

### B. E.S.D. and Latch-Up Testing (lot BPQCXKAQ, D/C 9420)

The RS14-P die type has been found to have all pins able to withstand a HBM transient pulse of +/-1500V per Mil-Std 883 Method 3015.7. Latch-Up testing has shown that this device withstands a current of +/-100mA and overvoltage per JEDEC JESD78.

**Table 1**  
Reliability Evaluation Test Results

## MAX1480BEPI+

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	PDQPCBG
			80	0	PDPPBAHB
			80	0	PDPPBAHA
			80	0	PDQPCBH
			80	0	PDQPCBM
			80	0	PDPPBAJ
			80	0	PDQPCBDA

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