

RELIABILITY REPORT

FOR

MAXM22510GLH+  
MAXM22510GLH+T

September 24, 2019

**MAXIM INTEGRATED**

160 RIO ROBLES

SAN JOSE, CA 95134



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## Conclusion

The MAXM22510 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

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

### I. Device Description

#### A. General

The MAXM22510 and MAXM22511 isolated RS-485/RS-422, full-duplex, transceiver modules provide 2500VRMS (60s) of galvanic isolation between the cableside (RS-485/RS-422 driver/receiver side) and the UART-side of the device. An integrated DC-DC powers the cable-side of the module. No external components are required. Isolation improves communication by breaking ground loops and reduces noise when there are large differences in ground potential between ports. These devices allow for robust communication up to 500kbps (MAXM22510) and 25Mbps (MAXM22511). The MAXM22510/MAXM22511 operate from a single 3.3V supply on the UART-side. An integrated DC-DC converter generates the 3.3V operating voltage for the cable-side of the module. The devices include one drive channel and one receive channel. The receiver is 1/4-unit load, allowing up to 128 transceivers on a common bus. Integrated true fail-safe circuitry ensures a logic-high on the receiver output when inputs are shorted or open. Undervoltage lockout disables the driver when cable-side or UART-side power supplies are below functional levels.

## II. Manufacturing Information

A. Description/Function:	2.5kV <sub>RMS</sub> Complete Isolated RS-485/RS-422 Module Transceiver + Power
B. Process:	S18 and B8
C. Device Count:	9039 (RV72), 5871 (RU80), and 1063 (RU94)
D. Fabrication Location:	USA
E. Assembly Location:	South Korea
F. Date of Initial Production:	June 2019

## III. Packaging Information

A. Package Type:	LGA Hybrid
B. Lead Frame:	N/A
C. Lead Finish:	N/A
D. Die Attach:	AB2100A
E. Bondwire:	Au (1.00 mil dia.)
F. Mold Material:	GE100LFCWA
G. Assembly Diagram:	05-100761
H. Flammability Rating:	UL-94 (V-0 Rating)
I. Classification of Moisture Sensitivity per JEDEC standard J-STD-020-C	Level 3
J. Single Layer Theta Ja:	N/A
K. Single Layer Theta Jc:	N/A
L. Multi Layer Theta Ja:	48.3 °C/W
M. Multi Layer Theta Jc:	39.2 °C/W

## IV. Die Information

A. Dimensions:	40.1575X88.189 mils (RV72), 41.7323X94.4882 mils (RU80), and 56X99 mils (RU94)
B. Passivation:	Si <sub>3</sub> N <sub>4</sub> /SiO <sub>2</sub>

## V. Quality Assurance Information

A. Quality Assurance Contacts:	Norbert Gerena (Engineer, Reliability) Michael Cairnes (Executive Director, Reliability) Bryan Preeshl (SVP 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 125C biased (static) life test are shown in Table 1. Using these results, the Failure Rate  $\lambda$  is calculated as follows:

$$\lambda = \frac{1}{MTTF} = \frac{1.83}{1000 \times 2454 \times 80 \times 2} \text{ (Chi square value for MTTF upper limit)}$$

(where 2454 = Temperature Acceleration factor assuming an activation energy of 0.8eV)

$$\lambda = 4.67 \times 10^{-9}$$

$$\lambda = 4.67 \text{ FITs (60\% confidence level @25°C)}$$

Maxim Integrated performs quarterly life test monitors on its processes. This data is published in the Reliability Report found at <https://www.maximintegrated.com/en/support/qa-reliability/reliability/reliability-monitor-program.html>.

MFN S18 Quarterly Process FIT from Q2CY19

$$\lambda = 0.2 \text{ FITs (60\% confidence level @25°C)}$$

San Antonio S18 Quarterly Process FIT from Q2CY19

$$\lambda = 0.9 \text{ FITs (60\% confidence level @25°C)}$$

MFN B8 Quarterly Process FIT from Q2CY19

$$\lambda = 0.7 \text{ FITs (60\% confidence level @25°C)}$$

### B. E.S.D. and Latch-Up Testing

The MAXM22510 has been found to withstand an HBM transient pulse of +/- 2500 V per JEDEC / ESDA JS-001. Latch-Up testing has shown that this device withstands +/- 250 mA current injection and supply overvoltage per JEDEC JESD78.

**Table 1**  
Reliability Evaluation Test Results

**MAXM22510**

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	COMMENTS
<b>Static Life Test</b> (Note 1)	Ta = 125C Biased Time = 1000 hrs.	DC Parameters & functionality	80	0	

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