maxim integrated

RELIABILITY REPORT

FOR

MAX3292CSD+

PLASTIC ENCAPSULATED DEVICES

December 15, 2014

MAXIM INTEGRATED

160 RIO ROBLES

SAN JOSE, CA 95134

Approved by
Sokhom Chum
Quality Assurance
Reliability Engineer

Maxim Integrated. All rights reserved.

maxim integrated™

Conclusion

The MAX3292CSD+ 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

II. ....Manufacturing Information

III. ....Packaging Information

.....Attachments

IV. ....Die Information

V. ....Quality Assurance Information

VI. ....Reliability Evaluation

I. Device Description

A. General

The MAX3291/MAX3292 high-speed RS-485/RS-422 transceivers feature driver preemphasis circuitry, which extends the distance and increases the data rate of reliable communication by reducing intersymbol interference (ISI) caused by long cables. The MAX3291 is programmable for data rates of 5Mbps to 10Mbps, while the MAX3292 is programmable for data rates up to 10Mbps by using a single external resistor. The MAX3291/MAX3292 are full-duplex devices that operate from a single +5V supply and offer a low-current shutdown mode that reduces supply current to 100nA. They feature driver output short-circuit current limiting and a fail-safe receiver input that guarantees a logic-high output if the input is open circuit. A 1/4-unit-load receiver input impedance allows up to 128 transceivers on the bus.

Maxim Integrated. All rights reserved.

maxim integrated

II. Manufacturing Information

A. Description/Function:	RS-485/RS-422 Transceivers with Preemphasis for High-Speed, Long-Distance Communication
B. Process:	S3
C. Number of Device Transistors:	
D. Fabrication Location:	Oregon
E. Assembly Location:	Philippines, Thailand
F. Date of Initial Production:	October 24, 1998

III. Packaging Information

A. Package Type:	14-pin SOIC (N)
B. Lead Frame:	Copper
C. Lead Finish:	100% matte Tin
D. Die Attach:	Conductive
E. Bondwire:	Au (1 mil dia.)
F. Mold Material:	Epoxy with silica filler
G. Assembly Diagram:	#05-1901-0194
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:	120°C/W
K. Single Layer Theta Jc:	37°C/W
L. Multi Layer Theta Ja:	83°C/W
M. Multi Layer Theta Jc:	34°C/W

IV. Die Information

A. Dimensions:	202X85 mils
B. Passivation:	Si_3N_4/SiO_2 (Silicon nitride/ Silicon dioxide)
C. Interconnect:	Al/0.5%Cu with Ti/TiN Barrier
D. Backside Metallization:	None
E. Minimum Metal Width:	3.0 microns (as drawn)
F. Minimum Metal Spacing:	3.0 microns (as drawn)
G. Bondpad Dimensions:	
H. Isolation Dielectric:	SiO_2
I. Die Separation Method:	Wafer Saw

Maxim Integrated. All rights reserved.

maxim integrated

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 135C biased (static) life test are shown in Table 1. Using these results, the Failure Rate (λ) is calculated as follows:

$$\lambda = \frac{1}{MTTF} = \frac{1.83}{1000 \times 4340 \times 133 \times 2}$$ (Chi square value for MTTF upper limit)

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

$\lambda = 1.59 \times 10^{-9}$

λ = 1.59 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 S3 Process results in a FIT Rate of 0.03 @ 25C and 0.50 @ 55C (0.8 eV, 60% UCL).

B. E.S.D. and Latch-Up Testing (lot NJ3DCQ001B, D/C 9841)

The RS41-3 die type has been found to have all pins able to withstand a HBM transient pulse of +/-800V per Mil-Std 883 Method 3015.7. Latch-Up testing has shown that this device withstands a current of +/-250mA.

Maxim Integrated. All rights reserved.

maxim integrated™

Table 1
Reliability Evaluation Test Results

MAX3292CSD+

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	COMMENTS
Static Life Test (Note 1)	Ta = 135°C Biased Time = 1000 hrs.	DC Parameters & functionality	133	0	NJ3ADA052Q, D/C 0607

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

Maxim Integrated. All rights reserved.