

RELIABILITY REPORT
FOR
MAX3181EUK+
PLASTIC ENCAPSULATED DEVICES

October 24, 2013

MAXIM INTEGRATED

160 RIO ROBLES
SAN JOSE, CA 95134

Approved by
Sokhom Chum
Quality Assurance
Reliability Engineer

Conclusion

The MAX3181EUK+ 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 MAX3180-MAX3183 are single RS-232 receivers in a SOT23-5 package for space- and cost-constrained applications requiring minimal RS-232 communications. These devices minimize power and heat dissipation by consuming only 0.5 μ A supply current from a +3.0V to +5.5V supply voltage. They guarantee true RS-232 performance up to a 1.5Mbps data rate. The MAX3180/MAX3182 feature a three-state TTL/CMOS receiver output that is controlled by an active-low EN logic input. The MAX3181/MAX3183 feature an active-low INVALID output that indicates valid RS-232 signals at the receiver input for applications requiring automatic system wake-up. The MAX3180/MAX3181 receivers have a standard inverting output, while the MAX3182/MAX3183 receivers have a noninverting output.

II. Manufacturing Information

A. Description/Function:	+3V to +5.5V, 1.5Mbps RS-232 Receivers in SOT23-5
B. Process:	M5
C. Number of Device Transistors:	
D. Fabrication Location:	Oregon
E. Assembly Location:	Malaysia, Philippines, or Thailand
F. Date of Initial Production:	July 24, 1999

III. Packaging Information

A. Package Type:	5-pin SOT23
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:	#05-1901-0200
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:	324.3°C/W
K. Single Layer Theta Jc:	82°C/W
L. Multi Layer Theta Ja:	255.9°C/W
M. Multi Layer Theta Jc:	81°C/W

IV. Die Information

A. Dimensions:	57 X 38 mils
B. Passivation:	Si ₃ N ₄ /SiO ₂ (Silicon nitride/ Silicon dioxide)
C. Interconnect:	Al/1.0%Si
D. Backside Metallization:	None
E. Minimum Metal Width:	Metal1 = 0.5 microns (as drawn)
F. Minimum Metal Spacing:	Metal1 = 0.45 microns (as drawn)
G. Bondpad Dimensions:	
H. Isolation Dielectric:	SiO ₂
I. Die Separation Method:	Wafer Saw

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:

$$\lambda = \frac{1}{\text{MTTF}} = \frac{1.83}{192 \times 4340 \times 230 \times 2} \quad (\text{Chi square value for MTTF upper limit})$$

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

$$\lambda = 4.8 \times 10^{-9}$$

$$\lambda = 4.8 \text{ F.I.T. (60\% confidence level @ 25°C)}$$

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 M5 Process results in a FIT Rate of 3.2 @ 25C and 54.8 @ 55C (0.8 eV, 60% UCL).

B. E.S.D. and Latch-Up Testing (ESD lot N8DBBQ002E D/C 9924, Latch-Up lot N8DBBQ002B)

The RS78-1 die type has been found to have all pins able to withstand a HBM transient pulse of +/-2500V per Mil-Std 883 Method 3015.7. Latch-Up testing has shown that this device withstands a current of +/-250mA.

Table 1
Reliability Evaluation Test Results

MAX3181EUK+

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	COMMENTS
Static Life Test (Note 1)	Ta = 135°C	DC Parameters	70	0	N8DAAN001A, D/C 9907
	Biased	& functionality	160	0	N8DBBQ002E, D/C 9924
	Time = 192 hrs.				

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