

RELIABILITY REPORT  
FOR  
MAX3280EAK+T  
PLASTIC ENCAPSULATED DEVICES

August 12, 2016

**MAXIM INTEGRATED**

160 RIO ROBLES  
SAN JOSE, CA 95134

<b>Approved by</b>
Eric Wright
Quality Assurance
Reliability Engineer

## Conclusion

The MAX3280E/AUK+T 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 MAX3280E/MAX3281E/MAX3283E/MAX3284E are single receivers designed for RS-485 and RS-422 communication. These devices guarantee data rates up to 52Mbps, even with a 3V power supply. Excellent propagation delay (15ns max) and package-to-package skew time (8ns max) make these devices ideal for multidrop clock distribution applications. The MAX3280E/MAX3281E/MAX3283E/MAX3284E have true fail-safe circuitry, which guarantees a logic-high receiver output when the receiver inputs are opened or shorted. The receiver output will be a logic high if all transmitters on a terminated bus are disabled (high impedance). These devices feature 1/4-unit-load receiver input impedance, allowing up to 128 receivers on the same bus. The MAX3280E is a single receiver available in a 5-pin SOT23 package. The MAX3281E/MAX3283E single receivers have a receiver enable (EN or active-low EN) function and are offered in a 6-pin SOT23 package. The MAX3284E features a voltage logic pin that allows compatibility with low-voltage logic levels, as in digital FPGAs/ASICs. On the MAX3284E, the voltage threshold for a logic high is user-defined by setting VL in the range from 1.65V to VCC. The MAX3284E is also offered in a 6-pin SOT23 package.

## II. Manufacturing Information

A. Description/Function:	±15kV ESD-Protected 52Mbps, 3V to 5.5V, SOT23 RS-485/RS-422 True Fail-Safe Receivers
B. Process:	B8
C. Fabrication Location:	USA
D. Assembly Location:	Malaysia, Thailand
E. Date of Initial Production:	January 26, 2002

## 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:	#05-9000-0319
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:	255.90°C/W
M. Multi Layer Theta Jc:	81°C/W

## IV. Die Information

A. Dimensions:	43X35 mils
B. Passivation:	Si <sub>3</sub> N <sub>4</sub> /SiO <sub>2</sub> (Silicon nitride/ Silicon dioxide)
C. Interconnect:	Al/0.5%Cu with Ti/TiN Barrier
D. Backside Metallization:	None
E. Minimum Metal Width:	0.8 microns (as drawn)
F. Minimum Metal Spacing:	0.8 microns (as drawn)
G. Bondpad Dimensions:	
H. Isolation Dielectric:	SiO <sub>2</sub>
I. Die Separation Method:	Wafer Saw

## V. Quality Assurance Information

- A. Quality Assurance Contacts: Eric Wright (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 ( $\lambda$ ) is calculated as follows:

$$\lambda = \frac{1}{\text{MTTF}} = \frac{1.83}{192 \times 4340 \times 80 \times 2} \quad (\text{Chi square value for MTTF upper limit})$$

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

$$\lambda = 13.7 \times 10^{-9}$$

$$\lambda = 13.7 \text{ F.I.T. (60\% confidence level @ 25°C)}$$

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 B8 Process results in a FIT Rate of 0.06 @ 25C and 0.99 @ 55C (0.8 eV, 60% UCL)

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

The RT33 die type has been found to have all pins able to withstand an HBM transient pulse of +/-2500V per JEDEC JESD22-A114. Latch-Up testing has shown that this device withstands a current of +/-250mA and overvoltage per JEDEC JESD78.

**Table 1**  
Reliability Evaluation Test Results

**MAX3280EAUK+T**

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	COMMENTS
<b>Static Life Test</b> (Note 1)	Ta = 135C Biased Time = 192 hrs.	DC Parameters & functionality	80	0	

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