

RELIABILITY REPORT  
FOR  
MAX14829ATG+T  
MAX14829ATG+

July 3, 2020

**MAXIM INTEGRATED**

160 RIO ROBLES  
SAN JOSE, CA 95134



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## Conclusion

The MAX14829 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.

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## I. Device Description

### A. General

The MAX14829 integrates the high-voltage functions commonly found in industrial sensors. The MAX14829 features two ultra low-power drivers with active reverse polarity protection and is specified for operation with supply voltages from 9V to 60V. The high-voltage tolerance of the MAX14829 allows for the use of micro-TVS, simplifying transient protection.

Pins are used to configure and monitor the device. Driver overload and supply monitor outputs are available. Pin control allows for operation with switching sensors that do not use a microcontroller.

Two integrated linear regulators (3.3V and 5V) provide low-noise analog and logic supply rails for the device or external circuits.

The MAX14829 is available in a (4mm x 4mm) 24-pin TQFN package and is specified over the extended -40°C to +125°C temperature range.

**II. Manufacturing Information**

A. Description/Function:	Low-Power IO-Link Device Transceiver with Dual Drivers
B. Process:	S18
C. Device Count:	44115
D. Fabrication Location:	USA
E. Assembly Location:	Thailand or Taiwan
F. Date of Initial Production:	November 22, 2019

**III. Packaging Information**

A. Package Type:	TQFN
B. Lead Frame:	CU194
C. Lead Finish:	Matte Tin
D. Die Attach:	AB8200T or EN4900G
E. Bondwire:	1 mil CUPd
F. Mold Material:	G770HCD or G700LA
G. Assembly Diagram:	05-9000-5978
H. Flammability Rating:	UL-94 (V-0 Rating)
I. Classification of Moisture Sensitivity per JEDEC standard J-STD-020-C	Level 1
J. Single Layer Theta Ja:	48 °C/W
K. Single Layer Theta Jc:	3 °C/W
L. Multi Layer Theta Ja:	36 °C/W
M. Multi Layer Theta Jc:	3 °C/W

**IV. Die Information**

A. Dimensions:	100X100 mil
B. Passivation:	SiN/SiO <sub>2</sub>

## V. Quality Assurance Information

<b>A. Quality Assurance Contacts:</b>	Ryan Wall (Manager, Reliability) Michael Cairnes (Executive Director, Reliability) Bryan Preeshl (SVP of QA)
<b>B. Outgoing Inspection Level:</b>	0.1% for all electrical parameters guaranteed by the Datasheet. 0.1% for all Visual Defects.
<b>C. Observed Outgoing Defect Rate:</b>	< 50 ppm
<b>D. Sampling Plan:</b>	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:

$$\lambda = \frac{1}{MTTF} = \frac{1.83}{192 \times 2454 \times 80 \times 2} \text{ (Chi square value for MTTF upper limit)}$$

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

$$\lambda = 24.30 \times 10^{-9}$$

$$\lambda = 24.30 \text{ FITs (60\% confidence level @25°C)}$$

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>.

S18 cumulative process Fit

$$\lambda = 0.02 \text{ FITs (60\% confidence level @25°C)}$$

$$\lambda = 0.24 \text{ FITs (60\% confidence level @55°C)}$$

### B. ESD and Latch-Up Testing

The MAX14829 has been found to have all pins able to withstand an HBM transient pulse of  $\pm 2500$  V per JEDEC / ESDA JS-001. Latch-Up testing has shown that this device withstands  $\pm 100$  mA current injection and supply overvoltage per JEDEC JESD78.

**Table 1**  
Reliability Evaluation Test Results  
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TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	COMMENTS
Static Life Test (Note 1)	Ta = 125°C Biased Time = 192 hrs.	DC parameters & functionality	80	0	

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