

RELIABILITY REPORT
FOR
MAX4014EUK+
MAX4014EUK+T

September 7, 2020

MAXIM INTEGRATED

160 RIO ROBLES
SAN JOSE, CA 95134



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Conclusion

The MAX4014 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 MAX4014/MAX4017/MAX4019/MAX4022 are precision, closed-loop, gain of +2 (or -1) buffers featuring high slew rates, high output current drive, and low differential gain and phase errors. These single-supply devices operate from +3.15V to +11V, or from $\pm 1.575\text{V}$ to $\pm 5.5\text{V}$ dual supplies. The input voltage range extends 100mV beyond the negative supply rail and the outputs swing Rail-to-Rail®.

These devices require only 5.5mA of quiescent supply current while achieving a 200MHz -3dB bandwidth and a 600V/ μs slew rate. In addition, the MAX4019 has a disable feature that reduces the supply current to 400 μA . Input voltage noise for these parts is only 10nV/ $\sqrt{\text{Hz}}$ and input current noise is only 1.3pA/ $\sqrt{\text{Hz}}$. This buffer family is ideal for low-power/low-voltage applications that require wide bandwidth, such as video, communications, and instrumentation systems. For space-sensitive applications, the MAX4014 comes in a tiny 5-pin SOT23 package.

II. Manufacturing Information

A. Description/Function:	Low-Cost, High-Speed, Single-Supply, Gain of +2 Buffer with Rail-to-Rail Outputs in a SOT23 Package
B. Process:	CB20
C. Device Count:	N/A
D. Fabrication Location:	USA
E. Assembly Location:	Malaysia, Thailand
F. Date of Initial Production:	October 25, 1997

III. Packaging Information

A. Package Type:	SOT23
B. Lead Frame:	CU194
C. Lead Finish:	Matte Tin
D. Die Attach:	84-1LMISR4
E. Bondwire:	1 mil Au
F. Mold Material:	G600, CEL9220HF13
G. Assembly Diagram:	05-1601-0178
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:	324.30 °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:	36X36 mils
B. Passivation:	N ³

V. Quality Assurance Information

A. Quality Assurance Contacts:	Ryan Wall (Manager, 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 λ 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)

$$\lambda = 24.3 \times 10^{-9}$$

$$\lambda = 24.3 \text{ FITs (60\% confidence level @25°C)}$$

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>.

CB20 cumulative process Fit

$$\lambda = 0.20 \text{ FITs (60\% confidence level @25°C)}$$

$$\lambda = 2.41 \text{ FITs (60\% confidence level @55°C)}$$

B. ESD and Latch-Up Testing

The MAX4014 has been found to have all pins able to withstand an HBM transient pulse of ± 2000 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
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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.