

RELIABILITY REPORT  
FOR  
MAX86150EFF+  
MAX86150EFF+T

November 13, 2020

**MAXIM INTEGRATED**

160 RIO ROBLES  
SAN JOSE, CA 95134



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## Conclusion

The MAX86150 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 MAX86150 is an integrated electrocardiogram, pulse oximeter, heart rate monitor sensor module. It includes internal LEDs, photodetector, and low-noise electronics with ambient light rejection. The MAX86150 helps ease design-in to mobile and wearable devices.

The MAX86150 operates on a 1.8V supply voltage with a separate power supply for the internal LEDs. Communication to and from the module is entirely through a standard I2C-compatible interface. The module can be shut down through software with near zero standby current, allowing the power rails to remain powered at all times.

**II. Manufacturing Information**

A. Description/Function:	Integrated Photoplethysmogram and Electrocardiogram Bio-Sensor Module For Mobile Health
B. Process:	S18
C. Device Count:	2586370
D. Fabrication Location:	USA
E. Assembly Location:	Taiwan
F. Date of Initial Production:	December 22, 2015

**III. Packaging Information**

A. Package Type:	OLGA
B. Lead Frame:	Substrate
C. Lead Finish:	AuNi
D. Die Attach:	FS849-TI/AB2025DSI
E. Bondwire:	1 mil Au
F. Mold Material:	N/A
G. Assembly Diagram:	05-100131
H. Flammability Rating:	N/A
I. Classification of Moisture Sensitivity per JEDEC standard J-STD-020-C	Level 3
J. Single Layer Theta Ja:	N/A
K. Single Layer Theta Jc:	N/A
L. Multi Layer Theta Ja:	N/A
M. Multi Layer Theta Jc:	N/A

**IV. Die Information**

A. Dimensions:	78.7401X114.1732 mils
B. Passivation:	SiN/ SiO2

## 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:

$$\lambda = \frac{1}{MTTF} = \frac{1.83}{1000 \times 2454 \times 230 \times 2} \text{ (Chi square value for MTTF upper limit)}$$

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

$$\lambda = 1.62 \times 10^{-9}$$

$$\lambda = 1.62 \text{ FITs (60\% confidence level @25°C)}$$

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 MAX86150 has been found to have all pins able to withstand an HBM transient pulse of  $\pm 1000$  V per JEDEC / ESDA JS-001. Latch-Up testing has shown that this device withstands  $\pm 250$  mA current injection and supply overvoltage per JEDEC JESD78.

**Table 1**  
Reliability Evaluation Test Results  
**MAX86908EFF+ (Note 1)**

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	COMMENTS
Static Life Test (Note 2)	Ta = 125°C Biased Time = 1000 hrs.	DC parameters & functionality	77	0	R27938AL1
Static Life Test (Note 2)	Ta = 125°C Biased Time = 1000 hrs.	DC parameters & functionality	76	0	R27938BL1 – 1 unit physically damaged during ATE testing
Static Life Test (Note 2)	Ta = 125°C Biased Time = 1000 hrs.	DC parameters & functionality	77	0	R27938CL1

Note 1: MAX86908 and MAX86150 are the same silicon.

Note 2: Life Test Data may represent plastic DIP qualification lots.