

RELIABILITY REPORT

FOR

MAXM86161EFD+
MAXM86161EFD+T

PLASTIC ENCAPSULATED DEVICES

August 13, 2019

MAXIM INTEGRATED

160 RIO ROBLES

SAN JOSE, CA 95134



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Conclusion

The MAXM86161 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 MAXM86161 is an ultra-low-power, completely integrated, optical data-acquisition system. On the transmitter side, the MAXM86161 has three programmable high-current LED drivers. On the receiver side, MAXM86161 consists of a high efficiency PIN photo-diode and an optical readout channel. The optical readout has a low-noise signal conditioning analog front-end (AFE), including 19-bit ADC, an industry-lead ambient light cancellation (ALC) circuit, and a picket fence detect and replace algorithm. Due to the low power consumption, compact size, easy, flexible-to-use, and industry lead ambient light rejection capability of the MAXM86161, the device is ideal for a wide variety of optical sensing applications such as heart rate detection and pulse oximetry. The MAXM86161 operates on a 3.0V to 5.5V VLED single supply voltage. It supports a standard compatible interface and fully autonomous operation. Each device has a large 128-word built-in FIFO. The MAXM86161 is available in compact 2.9mm x 4.3mm x 1.4mm, 14-pin OLGA package.

II. Manufacturing Information

A. Description/Function:	Single-Supply Integrated Optical Module for HR and SpO2 Measurement
B. Process:	S18
C. Device Count:	387730
D. Fabrication Location:	USA
E. Assembly Location:	Taiwan
F. Date of Initial Production:	April 2019

III. Packaging Information

A. Package Type:	OLGA
B. Lead Frame:	N/A
C. Lead Finish:	N/A
D. Die Attach:	AB2025DSI, ABP_8060T
E. Bondwire:	Au (1.00 mil dia.)
F. Mold Material:	N/A
G. Assembly Diagram:	05-101109
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:	55.49 °C/W
M. Multi Layer Theta Jc:	N/A

IV. Die Information

A. Dimensions:	81.8897X74.0157 mils
B. Passivation:	Si ₃ N ₄ /SiO ₂

V. Quality Assurance Information

A. Quality Assurance Contacts:	Norbert Gerena (Engineer, 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 105C biased (static) life test are shown in Table 1. Using these results, the Failure Rate λ is calculated as follows:

$$\lambda = \frac{1}{MTTF} = \frac{1.83}{1000 \times 717 \times 240 \times 2} \quad (\text{Chi square value for MTTF upper limit})$$

(where 717 = Temperature Acceleration factor assuming an activation energy of 0.8eV)

$$\lambda = 5.33 \times 10^{-9}$$

$$\lambda = 5.33 \text{ FITs (60\% confidence level @25°C)}$$

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>.

MFN S18 Quarterly Process FIT from Q2CY19

$$\lambda = 0.2 \text{ FITs (60\% confidence level @25°C)}$$

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

The MAXM86161 has been found to withstand an HBM transient pulse of +/- 2500 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

MAXM86161EFD+T

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	COMMENTS
Static Life Test (Note 1)	Ta = 105C Biased Time = 1000 hrs.	DC Parameters & functionality	80 x 3 lots	0	R40252

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