

RELIABILITY REPORT FOR MAX30100EFD+T PLASTIC ENCAPSULATED DEVICES

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MAXIM INTEGRATED

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Approved by		
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Quality Assurance		
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Conclusion

The MAX30100EFD+T successfully met 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
- II.Manufacturing Information
- IV.Die Information
- III.Packaging Information
- VI.Reliability Evaluation

V.Quality Assurance Information

.....Attachments

I. Device Description

A. General

The MAX30100 is an integrated pulse oximetry and heart-rate monitor sensor solution. It combines two LEDs, a photodetector, optimized optics, and low-noise analog signal processing to detect pulse oximetry and heart-rate signals. The MAX30100 operates from 1.8V and 3.3V power supplies and can be powered down through software with negligible standby current, permitting the power supply to remain connected at all times.



II. Manufacturing Information

A. Description/Function:	Pulse Oximeter and Heart-Rate Sensor IC for Wearable Health
B. Process:	S18
C. Number of Device Transistors:	111252
D. Fabrication Location:	USA
E. Assembly Location:	Taiwan
F. Date of Initial Production:	February 11, 2014

III. Packaging Information

A. Package Type:	14-pin OE SiP
B. Lead Frame:	Copper
C. Lead Finish:	AuNi
D. Die Attach:	Conductive
E. Bondwire:	Au (1 mil dia.)
F. Mold Material:	Epoxy with silica filler
G. Assembly Diagram:	#05-9000-5648
H. Flammability Rating:	Class UL94-V0
I. Classification of Moisture Sensitivity per JEDEC standard J-STD-020-C	Level 3
J. Single Layer Theta Ja:	N/A°C/W
K. Single Layer Theta Jc:	N/A°C/W
L. Multi Layer Theta Ja:	150°C/W
M. Multi Layer Theta Jc:	170°C/W

IV. Die Information

Α.	Dimensions:	39.3701 X 62.9921 mils
В.	Passivation:	$Si_3N_4\!/SiO_2~$ (Silicon nitride/ Silicon dioxide)
C.	Interconnect:	Al/0.5%Cu with Ti/TiN Barrier
D.	Backside Metallization:	None
E.	Minimum Metal Width:	0.23 microns (as drawn)
F.	Minimum Metal Spacing:	0.23 microns (as drawn)
G.	Bondpad Dimensions:	
Н.	Isolation Dielectric:	SiO ₂
I.	Die Separation Method:	Wafer Saw

V. Quality Assurance Information



A.	Quality Assurance Contacts:	Don Lipps (Manager, Reliability Engineering) Bryan Preeshl (Vice President of QA)
В.	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 135°C biased (static) life test are shown in Table 1. Using these results, the Failure Rate (λ) is calculated as follows:

$$\lambda = \frac{1}{\text{MTTF}} = \frac{1.83}{500 \times 4340 \times 77 \times 2}$$
(Chi square value for MTTF upper limit)
(where 4340 = Temperature Acceleration factor assuming an activation energy of 0.8eV)

$$\lambda = 5.48 \times 10^{-9}$$

$$\lambda = 5.48 \text{ F.I.T.}$$
(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 S18 Process results in a FIT Rate of 0.40 @ 25°C and 6.96 @ 55°C (0.8 eV, 60% UCL)

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

The OS21-0 die type has been found to have all pins able to withstand a transient pulse of:

ESD-HBM: +/- 2500V per JEDEC JESD22-A114

ESD-CDM: +/- 750V per JEDEC JESD22-C101

ESD-MM: +/- 250 V per JEDEC JESD22-A115

Latch-Up testing has shown that this device withstands a current of +/-250mA and overvoltage per JEDEC JESD78.



Table 1 Reliability Evaluation Test Results

MAX30100EFD+T

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	COMMENTS	
Static Life Test (Note 1)						
	Ta = 135°C	DC Parameters	77	0		
	Biased	& functionality				
	Time = 500 hrs.					

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