RELIABILITY REPORT

FOR

MAX30205MTA+T

PLASTIC ENCAPSULATED DEVICES

December 20, 2016

MAXIM INTEGRATED

160 RIO ROBLES

SAN JOSE, CA 95134

Approved by
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Conclusion

The MAX30205MTA+T 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 MAX30205 temperature sensor accurately measures temperature and provide an overtemperature alarm/interrupt/shutdown output. This device converts the temperature measurements to digital form using a high-resolution, sigma-delta, analog-to-digital converter (ADC). Accuracy meets clinical thermometry specification of the ASTM E1112 when soldered on the final PCB. Communication is through an I^2C-compatible 2-wire serial interface.

The I^2C serial interface accepts standard write byte, read byte, send byte, and receive byte commands to read the temperature data and configure the behavior of the open-drain overtemperature shutdown output.

The MAX30205 features three address select lines with a total of 32 available addresses. The sensor has a 2.7V to 3.3V supply voltage range, low 600µA supply current, and a lockup-protected I^2C-compatible interface that make them ideal for wearable fitness and medical applications.

This device is available in an 8-pin TDFN package and operates over the 0°C to +50°C temperature range.

II. Manufacturing Information

A. Description/Function:	Human Body Temperature Sensor
B. Process:	S4
C. Fabrication Location:	USA
D. Assembly Location:	Taiwan, Thailand
E. Date of Initial Production:	March 25, 2016

III. Packaging Information

A. Package Type:	8-pin TDFN
B. Lead Frame:	Copper
C. Lead Finish:	100% matte Tin
D. Die Attach:	Conductive
E. Bondwire:	Au (1 mil dia.)
F. Mold Material:	Epoxy with silica filler
G. Assembly Diagram:	#05-MAXCIM-0692
H. Flammability Rating:	Class UL94-V0
I. Classification of Moisture Sensitivity per JEDEC standard J-STD-020-C	Level 1
J. Single Layer Theta Ja:	54°C/W
K. Single Layer Theta Jc:	8°C/W
L. Multi Layer Theta Ja:	41°C/W
M. Multi Layer Theta Jc:	8°C/W

IV. Die Information

A. Dimensions:	72X94 mils
B. 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:	0.4 microns (as drawn)
F. Minimum Metal Spacing:	0.6 microns (as drawn)
G. Bondpad Dimensions:	
H. Isolation Dielectric:	SiO_2
I. Die Separation Method:	Wafer Saw

V. Quality Assurance Information

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

$$\lambda = \frac{1}{MTTF} = \frac{1.83}{192 \times 4340 \times 80 \times 2}$$ (Chi square value for MTTF upper limit)

(where 4340 = Temperature Acceleration factor assuming an activation energy of 0.8eV)

$\lambda = 13.7 \times 10^{-9}$

$\lambda = 13.7$ 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 S4 Process results in a FIT Rate of 0.04@ 25C and 0.69@ 55C (0.8 eV, 60% UCL)

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

The DT07-0 die type has been found to have all pins able to withstand an HBM transient pulse of +/-2500V per JEDEC JESD22-A114. Latch-Up testing has shown that this device withstands a current of +/-250mA and overvoltage per JEDEC JESD78.

Table 1

Reliability Evaluation Test Results

MAX30205MTA+T

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	COMMENTS
Static Life Test (Note 1)					
	Ta = 135C Biased Time = 192 hrs.	DC Parameters & functionality	80	0	

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