

RELIABILITY REPORT
FOR
MAX32625IWY+T
WAFER LEVEL DEVICES

November 15, 2016

MAXIM INTEGRATED

160 RIO ROBLES
SAN JOSE, CA 95134

Approved by
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Quality Assurance
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Conclusion

The MAX32625IWY+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 MAX32625/MAX32626 is an ARM® Cortex®-M4F 32-bit microcontroller with an unconnected point unit, ideal for the emerging category of wearable medical and fitness applications. The architecture combines ultra-low power, high-efficiency signal processing functionality and ease of use. An internal 96MHz oscillator provides high-performance capability, and the internal 4MHz oscillator supports minimal power consumption for applications requiring always-on monitoring. The device provides 512kB of flash and 160kB of SRAM. The device features four powerful and flexible power modes. A peripheral management unit (PMU) enables intelligent peripheral control with up to six channels to significantly reduce power consumption. Built-in dynamic clock gating and firmware-controlled power gating allows the user to optimize power for the specific application. Multiple SPI, UART, and I2C serial interfaces are provided, as well as a 1-Wire® master and USB, allowing for interconnection to a wide variety of external sensors. A four-input, 10-bit delta-sigma ADC monitors analog input from external sensors. The MAX32625L is a lower-cost version of the MAX32625, providing 256kB of flash and 128kB of SRAM. The MAX32626 is a secure version of the MAX32625. It incorporates a trust protection unit (TPU) with encryption and advanced security features. These features include a modular arithmetic accelerator (MAA) for ECDSA, a hardware PRNG entropy generator, and a secure boot loader. Both the MAX32626 and the MAX32625 provide a hardware AES engine.

II. Manufacturing Information

A. Description/Function:	Ultra-Low Power, High-Performance ARM Cortex-M4F Microcontroller for Wearables
B. Process:	TS90
C. Fabrication Location:	Taiwan
D. Assembly Location:	Thailand
E. Date of Initial Production:	August 2, 2016

III. Packaging Information

A. Package Type:	63-bump WLP
B. Lead Frame:	N/A
C. Lead Finish:	N/A
D. Die Attach:	None
E. Bondwire:	N/A (N/A mil dia.)
F. Mold Material:	None
G. Assembly Diagram:	#05-100285
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:	N/A°C/W
K. Single Layer Theta Jc:	N/A°C/W
L. Multi Layer Theta Ja:	35.9°C/W
M. Multi Layer Theta Jc:	N/A°C/W

IV. Die Information

A. Dimensions:	153.5433X122.0472 mils
B. Passivation:	Si ₃ N ₄ /SiO ₂ (Silicon nitride/ Silicon dioxide)
C. Interconnect:	Al with Ti/TiN Barrier
D. Backside Metallization:	None
E. Isolation Dielectric:	SiO ₂
F. 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:

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

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

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

$$\lambda = 13.7 \text{ F.I.T. (60\% confidence level @ 25°C)}$$

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

The ME03-0 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 +/-100mA and overvoltage per JEDEC JESD78.

Table 1
Reliability Evaluation Test Results

MAX32625IWY+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.