

RELIABILITY REPORT

FOR

MAX32666GWP+, MAX32666GWP+T,
MAX32666GWPBT+, MAX32666GWPBT+T,
MAX32666GXMBT+, MAX32666GXMBT+T

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MAXIM INTEGRATED

160 RIO ROBLES
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Conclusion

The MAX32666 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

DARWIN is a new breed of low-power microcontrollers built to thrive in the rapidly evolving Internet of Things (IoT). They are smart, with the biggest memories in their class and a massively scalable memory architecture. They run forever, thanks to wearable-grade power technology. They are durable enough to withstand the most advanced cyberattacks. DARWIN microcontrollers are designed to run any application imaginable—in places where you would not dream of sending other microcontrollers.

Generation UB microcontrollers are designed to handle the increasingly complex applications demanded by today's advanced battery-powered devices and wirelessly connected devices, while providing robust hardware security and Bluetooth® 5 Low Energy (BLE) radio connectivity.

II. Manufacturing Information

A. Description/Function:	Low-Power Arm Cortex-M4 with FPU-Based Microcontroller with Bluetooth 5 for Wearables
B. Process:	TS40EF
C. Device Count:	562404543
D. Fabrication Location:	Taiwan
E. Assembly Location:	Taiwan
F. Date of Initial Production:	October 13, 2018

III. Packaging Information

A. Package Type:	WLP	CTBGA
B. Lead Frame:	N/A	N/A
C. Lead Finish:	SAC solder ball	SAC solder ball
D. Die Attach:	N/A	AB2025D
E. Bondwire:	N/A	0.8 mil Cu
F. Mold Material:	N/A	KE-G1250
G. Flammability Rating:	N/A	UL-94 (V-0 Rating)
H. Classification of Moisture Sensitivity per JEDEC standard J-STD-020-C	Level 1	Level 3
I. Single Layer Theta Ja:	N/A	N/A
J. Single Layer Theta Jc:	N/A	N/A
K. Multi Layer Theta Ja:	38.1 °C/W	32.5 °C/W
L. Multi Layer Theta Jc:	N/A	8.8 °C/W

IV. Die Information

A. Dimensions:	150X165.9212 mils
B. Passivation:	SiO/SiN

V. Quality Assurance Information

A. Quality Assurance Contacts:	Ryan Wall (Manager, 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 125C biased (static) life test are shown in Table 1. Using these results, the Failure Rate λ is calculated as follows:

$$\lambda = \frac{1}{MTTF} = \frac{1.83}{192 \times 2454 \times 80 \times 2} \text{ (Chi square value for MTTF upper limit)}$$

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

$$\lambda = 24.3 \times 10^{-9}$$

$$\lambda = 24.3 \text{ FITs (60\% confidence level @25°C)}$$

B. ESD and Latch-Up Testing

The MAX32666GXMBT+ has been found to have all pins able 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
MAX32666GXMBT+

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	COMMENTS
Static Life Test (Note 1)	Ta = 125°C Biased Time = 192 hrs.	DC parameters & functionality	80	0	

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