RELIABILITY REPORT

FOR

MAXM17624AMB+
MAXM17624AMB+T

October 24, 2019

MAXIM INTEGRATED

160 RIO ROBLES

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Conclusion

The MAXM17624 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 Himalaya series of voltage regulator ICs and power modules enable cooler, smaller, and simpler power-supply solutions. MAXM17623 and MAXM17624 are high-frequency synchronous step down DC-DC converter modules, with integrated MOSFETs, compensation components, and inductors, that operate over 2.9V to 5.5V input voltage range. MAXM17623 and MAXM17624 support up to 1A load current and allow use of small, low-cost input and output capacitors. The output voltage can be adjusted from 0.8V to 3.3V. The modules significantly reduce design complexity, manufacturing risks, and offer a true plug-and-play power supply solution, reducing time-to-market. The MAXM17623 and MAXM17624 modules employ peak-current-mode control architecture under steady-state operation. To reduce input inrush current, the devices offer a fixed 1ms soft-start time. Both modules feature selectable PWM or PFM mode of operation at light loads. When PWM mode is selected, MAXM17623 operates at a fixed 2MHz switching frequency and MAXM17624 operates at a fixed 4MHz switching frequency. MAXM17623 offers output voltages from 0.8V to 1.5V and MAXM17624 offers output voltages from 1.5V to 3.3V.

II. Manufacturing Information

A. Description/Function:	2.9V to 5.5V, 1A Himalaya uSLIC Step-Down Power Modules
B. Process:	S18
C. Device Count:	17334
D. Fabrication Location:	USA
E. Assembly Location:	Taiwan
F. Date of Initial Production:	January 2019

III. Packaging Information

A. Package Type:	eMGA
B. Lead Frame:	N/A
C. Lead Finish:	N/A
D. Die Attach:	N/A
E. Bondwire:	N/A
F. Mold Material:	N/A
G. Assembly Diagram:	05-101118
H. Classification of Moisture Sensitivity per JEDEC standard J-STD-020-C	Level 3
I. Single Layer Theta Ja:	N/A
J. Single Layer Theta Jc:	N/A
K. Multi Layer Theta Ja:	77 °C/W
L. Multi Layer Theta Jc:	N/A

IV. Die Information

A. Dimensions:	35.0394X60.2362 mils
B. Passivation:	Si_3N_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 125C biased (static) life test are shown in Table 1. Using these results, the Failure Rate λ is calculated as follows:

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

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

$$\lambda = 24.31\ x\ 10^{-9}$$

$$\lambda = 24.31\ FITs\ (60\%\ confidence\ level\ @25°C)$$

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

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

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

The MAXM17624 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

MAXM17624

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

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