

RELIABILITY REPORT  
FOR  
MAXM17630AME+  
MAXM17631AME+

September 17, 2019

**MAXIM INTEGRATED**  
160 RIO ROBLES  
SAN JOSE, CA 95134



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## Conclusion

The MAXM17630/MAXM17631 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. The MAXM17630/MAXM17631/MAXM17632 are a family of high-efficiency, synchronous step-down DC-DC modules with integrated controller, MOSEFTs, compensation components and inductor that operate over a wide input-voltage range. The modules operate from 4.5V to 36V and deliver up to 1A output current. The MAXM17630 and MAXM17631 are fixed 3.3V and 5V output modules, respectively. The MAXM17632 is an adjustable output (0.9V to 12V) module. The modules significantly reduce design complexity, manufacturing risks, and offer a true plug-and-play power-supply solution, reducing time-to-market. Built-in compensation across the output-voltage range eliminates the need for external compensation components. These modules feature peak-current-mode control architecture. The modules can be operated in pulsewidth modulation (PWM), or pulse-frequency modulation (PFM), or discontinuous-conduction mode (DCM) to enable high efficiency under light-load conditions.

**II. Manufacturing Information**

A. Description/Function:	4.5V to 36V, 1A Himalaya uSLIC Step-Down Power Module
B. Process:	S18
C. Device Count:	20405
D. Fabrication Location:	Japan
E. Assembly Location:	China
F. Date of Initial Production:	July 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:	05-101209
H. Flammability Rating:	UL-94 (V-0 Rating)
I. Classification of Moisture Sensitivity per JEDEC standard J-STD-020-C	Level 1
J. Single Layer Theta Ja:	N/A
K. Single Layer Theta Jc:	N/A
L. Multi Layer Theta Ja:	28 °C/W
M. Multi Layer Theta Jc:	N/A

**IV. Die Information**

A. Dimensions:	66.9291X66.9291mils
B. Passivation:	Si <sub>3</sub> N <sub>4</sub> /SiO <sub>2</sub>

## 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  $\lambda$  is calculated as follows:

$$\lambda = \frac{1}{MTTF} = \frac{1.83}{1000 \times 2454 \times 231 \times 2} \quad (\text{Chi square value for MTTF upper limit})$$

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

$$\lambda = 1.62 \times 10^{-9}$$

$$\lambda = 1.62 \text{ FITs (60\% confidence level @25°C)}$$

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>.

Epson S18 Quarterly Process FIT from Q2CY19

$$\lambda = 0.5 \text{ FITs (60\% confidence level @25°C)}$$

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

The MAXM17630/MAXM17631 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 +/- 100 mA current injection and supply overvoltage per JEDEC JESD78.

**Table 1**  
Reliability Evaluation Test Results  
**MAXM17630/MAXM17631**

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	COMMENTS
Static Life Test (Note 1)	Ta = 125C	DC Parameters & functionality	77 x 3 lots	0	
	Biased Time = 1000 hrs.				

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