

RELIABILITY REPORT
FOR
MAXM17635AMG+, MAXM17635AMG+T

June 9, 2020

MAXIM INTEGRATED

160 RIO ROBLES
SAN JOSE, CA 95134



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Conclusion

The MAXM17635 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 MAXM17633, MAXM17634, and MAXM17635 are a family of high-frequency synchronous step-down DC-DC converter modules with integrated controller, MOSFETs, compensation components, and inductor, that operate over a wide input voltage range. The modules operate from 4.5V to 36V input and deliver up to 2A output current. MAXM17633 and MAXM17634 are fixed 3.3V and 5V output modules, respectively. The MAXM17635 is an adjustable-output voltage (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.

The MAXM17633/MAXM17634/MAXM17635 modules employ peak-current-mode control architecture. To reduce input inrush current, the devices offer a programmable soft-start time.

The MAXM17633/MAXM17634/MAXM17635 modules are available in a low profile, compact 24-pin, 4mm x 4mm x 1.75mm, uSLIC™ package.

II. Manufacturing Information

A. Description/Function:	4.5V to 36V, 2A Himalaya uSLIC Step-Down Power Modules
B. Process:	S18
C. Device Count:	21689
D. Fabrication Location:	Japan
E. Assembly Location:	Taiwan
F. Date of Initial Production:	July 2019

III. Packaging Information

A. Package Type:	uSLIC
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. Flammability Rating:	N/A
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:	N/A
L. Multi Layer Theta Jc:	N/A

IV. Die Information

A. Dimensions:	77.559x84.6457 mils
B. Passivation:	SiN / SiO ₂

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:

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

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

$$\lambda = 1.61 \times 10^{-9}$$

$$\lambda = 1.61 \text{ FITs (60\% confidence level @25°C)}$$

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>.

S18 cumulative process data:

$$\lambda = 0.02 \text{ FITs (60\% confidence level @25°C)}$$

$$\lambda = 0.24 \text{ FITs (60\% confidence level @55°C)}$$

B. ESD and Latch-Up Testing

The MAXM17635 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
MAXM17635AMG+T

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	COMMENTS
Static Life Test (Note 1)	Ta = 125°C Biased Time = 1000 hrs.	DC parameters & functionality	77	0	R40392A
Static Life Test (Note 1)	Ta = 125°C Biased Time = 1000 hrs.	DC parameters & functionality	77	0	R40392B
Static Life Test (Note 1)	Ta = 125°C Biased Time = 1000 hrs.	DC parameters & functionality	77	0	R40392C

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