

RELIABILITY REPORT

FOR

MAXM17552AMB+
MAXM17552AMB+T

December 16, 2019

MAXIM INTEGRATED

160 RIO ROBLES

SAN JOSE, CA 95134



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Conclusion

The MAXM17552 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 powersupply solutions. The MAXM17552 is a high-efficiency, synchronous, step-down DC-DC power module with integrated controller, MOSFETs, compensation components, and inductor that operates over a wide input-voltage range. The module operates from 4V to 60V input voltage and delivers up to 100mA output current over a programmable output voltage from 0.9V to 5.5V. The module significantly reduces design complexity, manufacturing risks and offers a true “plug and play” power supply solution, reducing the time-to-market. The MAXM17552 employs peak-current-mode control architecture. To reduce input inrush current, the device offers a soft-start feature including the default soft-start time of 5.1ms.

II. Manufacturing Information

A. Description/Function:	4V to 60V, 100mA, Compact Step-Down Power Module
B. Process:	S18
C. Device Count:	22441
D. Fabrication Location:	Japan
E. Assembly Location:	Taiwan
F. Date of Initial Production:	October 2018

III. Packaging Information

A. Package Type:	eMGA
B. Lead Frame:	N/A
C. Lead Finish:	SAC125Ni
D. Die Attach:	N/A
E. Bondwire:	N/A
F. Mold Material:	N/A
G. Assembly Diagram:	05-100290
H. Classification of Moisture Sensitivity per JEDEC standard J-STD-020-C	Level 3
I. Single Layer Theta Ja:	41.70 °C/W
J. Single Layer Theta Jc:	15.80 °C/W
K. Multi Layer Theta Ja:	30.6 °C/W
L. Multi Layer Theta Jc:	N/A

IV. Die Information

A. Dimensions:	40.9449X87.7953 mils
B. Passivation:	Si ₃ N 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:

$$\lambda = \frac{1}{MTTF} = \frac{1.83}{1000 \times 2454 \times 79 \times 2} \quad (\text{Chi square value for MTTF upper limit})$$

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

$$\lambda = 4.73 \times 10^{-9}$$

$$\lambda = 4.73 \text{ FITs (60\% confidence level @25°C)}$$

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 MAXM17552 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

MAXM17552

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	COMMENTS
Static Life Test (Note 1)	Ta = 125C Biased Time = 1000 hrs.	DC Parameters & functionality	79	0	

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