

RELIABILITY REPORT

FOR

MAXM15064AMB+
MAXM15064AMB+T

PLASTIC ENCAPSULATED DEVICES

January 18, 2019

MAXIM INTEGRATED

160 RIO ROBLES
SAN JOSE, CA 95134

A handwritten signature in black ink, appearing to read 'Gerena'.

Norbert Paul Gerena
Engineer, Reliability

A handwritten signature in black ink, appearing to read 'Standley'.

Brian Standley
Manager, Reliability

Conclusion

The MAXM15064 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 MAXM15064 is a high-efficiency, synchronous stepdown DC-DC module with integrated circuit and inductor that operates over a wide input-voltage range. The module operates from 4.5V to 60V input and delivers up to 300mA output current over a programmable output voltage from 0.9V to 5V. The module is an easy-to use, step-down power module that significantly reduces design complexity, manufacturing risks, and offers a true plug-and-play power-supply solution, reducing time-to market. The device employs peak-current-mode control architecture through the MODE pin that can be used to operate the device in pulse-width modulation (PWM) or pulse-frequency modulation (PFM) control schemes. To reduce input inrush current, the device offers an internal soft-start. The MAXM15064 module is available in a low profile, compact 10-pin, 2.6mm × 3mm × 1.5mm, uSLIC™ package. The device can operate over a wide temperature range from -40°C to +125°C.

II. Manufacturing Information

A. Description/Function:	4.5V to 60V, 300mA Compact Step-Down Power Module
B. Process:	S18
C. Device Count	17522
D. Fabrication Location:	Japan and USA
E. Assembly Location:	China
F. Date of Initial Production:	July 13, 2018

III. Packaging Information

A. Package Type:	eMGA
B. Lead Frame:	N/A
C. Lead Finish:	N/A
D. Die Attach:	AD225
E. Bondwire:	N/A
F. Mold Material:	N/A
G. Assembly Diagram:	05-100674
H. Classification of Moisture Sensitivity per JEDEC standard J-STD-020-C	Level 3
I. Single Layer Theta Ja:	42.80 °C/W
J. Single Layer Theta Jc:	21.80 °C/W
K. Multi Layer Theta Ja:	N/A
L. Multi Layer Theta Jc:	N/A

IV. Die Information

A. Dimensions:	55.1181X65.3543 mils
B. Passivation:	Si ₃ N ₄ /SiO ₂

V. Quality Assurance Information

A. Quality Assurance Contacts:	Norbert Gerena (Engineer, Reliability) Brian Standley (Manager, 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:

$$\lambda = \frac{1}{MTTF} = \frac{1.83}{1000 \times 2454 \times 78 \times 2} \text{ (Chi square value for MTTF upper limit)}$$

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

$$\lambda = 4.79 \times 10^{-9}$$

$$\lambda = 4.79 \text{ FITs (60\% confidence level @25°C)}$$

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 Q3CY18

$$\lambda = 0.3 \text{ FITs (60\% confidence level @25°C)}$$

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

The MAXM15064AMB+T 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 +/- 100 mA current injection and supply overvoltage per JEDEC JESD78.

Table 1
Reliability Evaluation Test Results

MAXM15064AMB+T

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	78	0	

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