

RELIABILITY REPORT
FOR
MAXM17515ALI+
PLASTIC ENCAPSULATED DEVICES

April 8, 2015

MAXIM INTEGRATED

160 RIO ROBLES
SAN JOSE, CA 95134

Approved by
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Quality Assurance
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Conclusion

The MAXM17515ALI+ 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 MAXM17515 is a fixed-frequency, step-down power module in a thermally-efficient system-in-package (SiP) package that operates from a 2.4V to 5.5V input supply voltage and supports output currents up to 5A. The device includes switch-mode power-supply controller, dual n-channel MOSFET power switches, a fully shielded inductor, as well as compensation components. The device supports 0.75V to 3.6V programmable output voltage. The high level of integration significantly reduces design complexity, manufacturing risks, and offers a true plug-and-play power-supply solution, reducing the time to market. The MAXM17515 is available in a thermally enhanced, compact 28-pin, 10mm x 6.5mm x 2.8mm SiP package and can operate over the -40Å°C to +125Å°C industrial temperature range.

II. Manufacturing Information

A. Description/Function:	5A, 2.4V to 5.5V Input, High-Efficiency Power Module
B. Process:	Hybrid
C. Number of Device Transistors:	
D. Fabrication Location:	Oregon
E. Assembly Location:	Taiwan
F. Date of Initial Production:	December 14, 2014

III. Packaging Information

A. Package Type:	28L LGA
B. Lead Frame:	N/A
C. Lead Finish:	100% matte Tin
D. Die Attach:	Conductive
E. Bondwire:	Au (2 mil dia.)
F. Mold Material:	Epoxy with silica filler
G. Assembly Diagram:	#31-4927
H. Flammability Rating:	Class UL94-V0
I. Classification of Moisture Sensitivity per JEDEC standard J-STD-020-C	3
J. Single Layer Theta Ja:	N/A
K. Single Layer Theta Jc:	N/A
L. Multi Layer Theta Ja:	33.56°C/W
M. Multi Layer Theta Jc:	33.55°C/W

IV. Die Information

A. Dimensions:	39.3701X39.3701 mils
B. Passivation:	N/A
C. Interconnect:	N/A
D. Backside Metallization:	N/A
E. Minimum Metal Width:	N/A
F. Minimum Metal Spacing:	N/A
G. Bondpad Dimensions:	
H. Isolation Dielectric:	N/A
I. Die Separation Method:	N/A

V. Quality Assurance Information

- A. Quality Assurance Contacts: Don Lipps (Manager, Reliability Engineering)
Bryan Preeshl (Vice President 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 biased (static) life test are shown in Table 1. Using these results, the Failure Rate (λ) is calculated as follows:

$$\lambda = \frac{1}{\text{MTTF}} = \frac{1.83}{1000 \times 4340 \times 389 \times 2} \quad (\text{Chi square value for MTTF upper limit})$$

(where 4340 = Temperature Acceleration factor assuming an activation energy of 0.8eV)

$$\lambda = 0.54 \times 10^{-9}$$

$$\lambda = 0.54 \text{ F.I.T. (60\% confidence level @ 25}^\circ\text{C)}$$

B. E.S.D. and Latch-Up Testing (lot TADI0Q003C, D/C 1322)

The PI22-0 die type has been found to have all pins able to withstand a HBM transient pulse of +/-2500V per JEDEC JESD22-A114. Latch-Up testing has shown that this device withstands a current of +/-250mA and overvoltage per JEDEC JESD78.

Table 1
Reliability Evaluation Test Results

MAXM17515ALI+

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	COMMENTS
Static Life Test (Note 1)	Ta = 135°C	DC Parameters	239	0	BAMA8AB, D/C 1420
	Biased	& functionality	150	0	P3110MHL0P, D/C 1113
	Time = 1000 hrs.				

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