

RELIABILITY REPORT  
FOR  
MAXM17575ALI+T  
PLASTIC ENCAPSULATED DEVICES

October 10, 2017

**MAXIM INTEGRATED**

160 RIO ROBLES  
SAN JOSE, CA 95134

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## Conclusion

The MAXM17575ALI+T 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 MAXM17575 is an easy-to-use power module that combines a synchronous step-down DC-DC converter, a fully shielded inductor, and compensation components into a low-profile, thermally-efficient, system-in-package (SiP). The device operates over a wide input-voltage range of 4.5V to 60V, delivers up to 1.5A continuous output current and has excellent line and load regulation over an output-voltage range of 0.9V to 12V. The high level of integration significantly reduces design complexity, manufacturing risks, and offers a true plug-and-play power-supply solution, reducing time-to-market. The MAXM17575 offers resistor-programmable switching frequency, RESET output-voltage monitoring, adjustable input undervoltage lockout, and programmable soft-start. The device also features hiccup-mode overload protection, and thermal shutdown function. The MAXM17575 is available in a low-profile, highly thermal-emissive, compact, 28-pin 6.5mm × 10mm × 2.92mm SiP package, which reduces power dissipation and enhances efficiency. The package is easily soldered onto a printed circuit board and is suitable for automated circuit board assembly. The device can operate over the industrial temperature range from -40°C to +125°C.

## II. Manufacturing Information

A. Description/Function:	4.5V to 60V, 1.5A High-Efficiency, DC-DC Step-Down Power Module with Integrated Inductor
B. Process:	S18
C. Fabrication Location:	USA
D. Assembly Location:	Taiwan
E. Date of Initial Production:	July 7, 2017

## III. Packaging Information

A. Package Type:	28-pad LGA
B. Lead Frame:	N/A
C. Lead Finish:	N/A
D. Die Attach:	AB2100
E. Bondwire:	Au (1.3 mil dia.)
F. Mold Material:	G760L
G. Assembly Diagram:	#05-100604
H. Flammability Rating:	Class UL94-V0
I. Classification of Moisture Sensitivity per JEDEC standard J-STD-020-C	Level 3
J. Single Layer Theta Ja:	N/A°C/W
K. Single Layer Theta Jc:	N/A°C/W
L. Multi Layer Theta Ja:	25.5°C/W
M. Multi Layer Theta Jc:	N/A°C/W

## IV. Die Information

A. Passivation:	Si <sub>3</sub> N <sub>4</sub> /SiO <sub>2</sub> (Silicon nitride/ Silicon dioxide)
B. Interconnect:	Al/0.5%Cu with Ti/TiN Barrier
C. Minimum Metal Width:	0.23 microns (as drawn)
D. Minimum Metal Spacing:	0.23 microns (as drawn)
E. Isolation Dielectric:	SiO <sub>2</sub>
F. Die Separation Method:	Wafer Saw

## V. Quality Assurance Information

- A. Quality Assurance Contacts: Eric Wright (Reliability Engineering)  
Brian Standley (Manager, Reliability)  
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 135C biased (static) life test are shown in Table 1. Using these results, the Failure Rate ( $\lambda$ ) is calculated as follows:

$$\lambda = \frac{1}{\text{MTTF}} = \frac{1.83}{1000 \times 4340 \times 95 \times 2} \quad (\text{Chi square value for MTTF upper limit})$$

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

$$\lambda = 2.22 \times 10^{-9}$$

$$\lambda = 2.22 \text{ F.I.T. (60\% confidence level @ 25°C)}$$

The following failure rate represents data collected from Maxim Integrated's reliability monitor program. Maxim Integrated performs quarterly life test monitors on its processes. This data is published in the Reliability Report found at <http://www.maximintegrated.com/qa/reliability/monitor>. Cumulative monitor data for the S18 Process results in a FIT Rate of 0.05@ 25C and 0.93@ 55C (0.8 eV, 60% UCL)

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

The PI61-0 die type has been found to have all pins able to withstand an 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

**MAXM17575ALI+T**

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	COMMENTS
<b>Static Life Test</b> (Note 1)	Ta = 135C Biased Time = 1000 hrs.	DC Parameters & functionality	95	0	

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