



RELIABILITY REPORT
FOR
MAX8969EWL35+T
WAFER LEVEL PRODUCTS

June 29, 2012

MAXIM INTEGRATED PRODUCTS

120 SAN GABRIEL DR.
SUNNYVALE, CA 94086

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| Approved by |
| Sokhom Chum |
| Quality Assurance |
| Reliability Engineer |

Conclusion

The MAX8969EWL35+T successfully meets the quality and reliability standards required of all Maxim products. In addition, Maxim's continuous reliability monitoring program ensures that all outgoing product will continue to meet Maxim's quality and reliability standards.

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I. Device Description

A. General

The MAX8969 is a simple 1A step-up converter in a small package that can be used in any single-cell Li-ion application. This IC provides protection features such as input undervoltage lockout, short circuit, and overtemperature shutdown. The IC transitions to skip mode seamlessly under light-load conditions to improve efficiency. Under these conditions, switching occurs only as needed, reducing switching frequency and supply current to maintain high efficiency. When the input voltage is sufficient to drive the load, the IC can be operated in track mode or automatic track mode (ATM). In track mode, the p-channel MOSFET acts as a current-limited load switch and quiescent current is as low as 30 μ A under a no-load condition. In ATM mode, the p-channel MOSFET acts as a current-limited load switch and quiescent current is as low as 60 μ A under a no-load condition. In ATM mode, the internal boost circuitry is enabled allowing for fast transitions into boost mode. The IC is available in a small, 1.25mm x 1.25mm, 9-bump WLP (0.4mm pitch) package.

II. Manufacturing Information

| | |
|----------------------------------|---|
| A. Description/Function: | Step-Up Converter for Handheld Applications |
| B. Process: | S18 |
| C. Number of Device Transistors: | 10097 |
| D. Fabrication Location: | Taiwan |
| E. Assembly Location: | Japan |
| F. Date of Initial Production: | November 9, 2011 |

III. Packaging Information

| | |
|--|--------------------------|
| A. Package Type: | 9 bmp WLP |
| B. Lead Frame: | N/A |
| C. Lead Finish: | N/A |
| D. Die Attach: | None |
| E. Bondwire: | N/A (N/A mil dia.) |
| F. Mold Material: | Epoxy with silica filler |
| G. Assembly Diagram: | #05-9000-4345 / B |
| H. Flammability Rating: | Class UL94-V0 |
| I. Classification of Moisture Sensitivity per JEDEC standard J-STD-020-C | 1 |
| J. Single Layer Theta Ja: | N/A |
| K. Single Layer Theta Jc: | N/A |
| L. Multi Layer Theta Ja: | 83°C/W |
| M. Multi Layer Theta Jc: | N/A |

IV. Die Information

| | |
|----------------------------|---|
| A. Dimensions: | 50.00 X 50.00 mils |
| B. Passivation: | Si ₃ N ₄ /SiO ₂ (Silicon nitride/ Silicon dioxide) |
| C. Interconnect: | Al with Ti/TiN Barrier |
| D. Backside Metallization: | None |
| E. Minimum Metal Width: | 0.18μm |
| F. Minimum Metal Spacing: | 0.18μm |
| G. Bondpad Dimensions: | |
| H. Isolation Dielectric: | SiO ₂ |
| I. Die Separation Method: | Wafer Saw |

V. Quality Assurance Information

- A. Quality Assurance Contacts: Richard Aburano (Manager, Reliability Engineering)
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:

$$\lambda = \frac{1}{\text{MTTF}} = \frac{1.83}{500 \times 4340 \times 48 \times 2} \quad (\text{Chi square value for MTTF upper limit})$$

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

$$\lambda = 8.8 \times 10^{-9}$$

$$\lambda = 8.8 \text{ F.I.T. (60\% confidence level @ 25°C)}$$

The following failure rate represents data collected from Maxim's reliability monitor program. Maxim performs quarterly life test monitors on its processes. This data is published in the Reliability Report found at <http://www.maxim-ic.com/qa/reliability/monitor>. Cumulative monitor data for the S18 Process results in a FIT Rate of 0.40 @ 25C and 6.96 @ 55C (0.8 eV, 60% UCL)

B. E.S.D. and Latch-Up Testing (lot VX2YBA006A DC 1139)

The PQ86-1 die type has been found to have all pins able to withstand a transient pulse of:

| | |
|----------|---------------------------------|
| ESD-HBM: | +/- 2000V per JEDEC JESD22-A114 |
| ESD-CDM: | +/- 750V per JEDEC JESD22-C101 |

Latch-Up testing has shown that this device withstands a current of +/- 250mA and overvoltage per JEDEC JESD78.

Table 1
Reliability Evaluation Test Results

MAX8969EWL35+T

| TEST ITEM | TEST CONDITION | FAILURE IDENTIFICATION | SAMPLE SIZE | NUMBER OF FAILURES | COMMENTS |
|----------------------------------|---|----------------------------------|-------------|--------------------|----------------------|
| Static Life Test (Note 1) | Ta = 135°C Biased Time = 500 hrs. | DC Parameters & functionality | 48 | 0 | VX2YBA006A, D/C 1139 |

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