RELIABILITY REPORT

FOR

MAX1736EUT42

PLASTIC ENCAPSULATED DEVICES

May 22, 2009

MAXIM INTEGRATED PRODUCTS

120 SAN GABRIEL DR.

SUNNYVALE, CA 94086

Approved by
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Quality Assurance
Director, Reliability Engineering

Conclusion

The MAX1736EUT42 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 MAX1736 is a simple, low-cost, single-cell lithium-ion (Li+) battery charger for small hand-held applications. When accompanied by a current-limited voltage source (such as a wall cube), the MAX1736 provides simple, accurate charging and termination control for single-cell Li+ batteries. The MAX1736EUT42 is preset to a 4.2V battery regulation voltage, while the MAX1736EUT41 is preset to 4.1V. The MAX1736 initiates charging in one of four ways: battery insertion, charger power-up, battery voltage threshold, and by external manipulation of the EN pin. The device features an internal precharge current source that safely charges near-dead cells, as well as input-supply detection that shuts down the MAX1736 when the supply is removed to minimize battery current drain. The MAX1736 accepts input voltages up to 22V, making it compatible with a wide range of input supplies. It has a single control input yet offers stand-alone and microprocessor-controlled operation. The MAX1736 is packaged in a small SOT23-6 package. An evaluation kit (EV kit) is available to reduce design time.

II. Manufacturing Information

A. Description/Function:	SOT23, Single-Cell Li+ Battery Charger for Current-Limited Supply
B. Process:	S12
C. Number of Device Transistors:	
D. Fabrication Location:	Oregon
E. Assembly Location:	Carsem Malalysia, UTL Thailand
F. Date of Initial Production:	April 22, 2000

III. Packaging Information

A. Package Type:	6-pin SOT23
B. Lead Frame:	Copper
C. Lead Finish:	Sn/Pb Plate
D. Die Attach:	Conductive Epoxy
E. Bondwire:	Flip Chip
F. Mold Material:	Epoxy with silica filler
G. Assembly Diagram:	#05-1101-0154
H. Flammability Rating:	Class UL94-V0
I. Classification of Moisture Sensitivity per JEDEC standard J-STD-020-C	Level 1
J. Single Layer Theta Ja:	185.5°C/W
K. Single Layer Theta Jc:	75°C/W
L. Multi Layer Theta Ja:	134.4°C/W
M. Multi Layer Theta Jc:	38.7°C/W

IV. Die Information

A. Dimensions:	72 X 45 mils
B. Passivation:	Si_3N_4/SiO_2 (Silicon nitride/ Silicon dioxide
C. Interconnect:	Aluminum/0.5% Cu
D. Backside Metallization:	None
E. Minimum Metal Width:	1.2 microns (as drawn)
F. Minimum Metal Spacing:	1.2 microns (as drawn)
G. Bondpad Dimensions:	5 mil. Sq.
H. Isolation Dielectric:	SiO_2
I. Die Separation Method:	Wafer Saw

V. Quality Assurance Information

A. Quality Assurance Contacts:	Ken Wendel (Director, Reliability Engineering) Bryan Preeshl (Managing Director 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 135°C biased (static) life test are shown in Table 1. Using these results, the Failure Rate (λ) is calculated as follows:

$$\lambda = \frac{1}{MTTF} = \frac{1.83}{192 \times 4340 \times 79 \times 2}$$ (Chi square value for MTTF upper limit)

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

$\lambda = 13.6 \times 10^{-9}$

$\lambda = 13.6$ F.I.T. (60% confidence level @ 25°C)

The following failure rate represents data collected from Maxim's reliability monitor program. Maxim performs quarterly 1000 hour life test monitors on its processes. This data is published in the Product Reliability Report found at http://www.maxim-ic.com/. Current monitor data for the S12 Process results in a FIT Rate of 0.09 @ 25C and 1.48 @ 55C, data limited (0.8 eV, 60% UCL)

B. Moisture Resistance Tests

The industry standard 85°C/85%RH or HAST testing is monitored per device process once a quarter.

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

The PX95 die type has been found to have all pins able to withstand a HBM transient pulse of +/-1500 V per Mil-Std 883 Method 3015.7. Latch-Up testing has shown that this device withstands a current of +/-250 mA.

Table 1
Reliability Evaluation Test Results

MAX1736EUT42

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES
Static Life Test (Note 1)				
	Ta = 135°C Biased Time = 192 hrs.	DC Parameters & functionality	79	0
Moisture Testing (Note 2)				
85/85	Ta = 85°C RH = 85% Biased Time = 1000hrs.	DC Parameters & functionality	77	0
Mechanical Stress (Note 2)				
Temperature Cycle	-65°C/150°C 1000 Cycles Method 1010	DC Parameters & functionality	77	0

Note 1: Life Test Data may represent plastic DIP qualification lots.
Note 2: Generic Package/Process data