MAX1508ETA
Rev. C

RELIABILITY REPORT

FOR

MAX1508ETA

PLASTIC ENCAPSULATED DEVICES

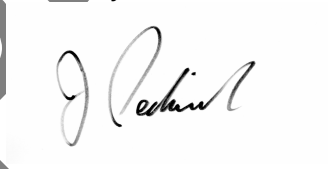
July 7, 2003

MAXIM INTEGRATED PRODUCTS

120 SAN GABRIEL DR.

SUNNYVALE, CA 94086

Written by



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Quality Assurance
Reliability Lab Manager

Reviewed by

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Executive Director

Conclusion

The MAX1508 is currently undergoing product qualification with completion expected by the end of July, 2003 at which time a final report will be made available.

Table of Contents

I. Device Description

A. General

The MAX1508 is an intelligent, stand-alone constant-current, constant-voltage (CCCV), thermally regulated linear charger for a single-cell lithium-ion (Li+) battery. The MAX1508 integrates the current-sense circuit, MOS pass element, and thermal-regulation circuitry, and also eliminates the reverse-blocking Schottky diode, to create the simplest and smallest charging solution for hand-held equipment.

The MAX1508 functions as a stand-alone charger to control the charging sequence from the prequalification state through fast-charge, top-off charge, and full-charge indication.

Proprietary thermal-regulation circuitry limits the die temperature to +100°C when fast charging or while exposed to high ambient temperatures, allowing maximum charging current without damaging the IC.

The MAX1508 achieves high flexibility by providing an adjustable fast-charge current by an external resistor. Other features include the charging status (CHG-bar) of the battery, an active-low control input (EN-bar), and an active-low-input power-source detection output (ACOK-bar).

The MAX1508 accepts a +4.25V to +13V supply, but disables charging when the input voltage exceeds +7V to protect against unqualified or faulty AC adapters. The MAX1508 operates over the extended temperature range (-40°C to +85°C) and is available in a compact 8-pin thermally enhanced 3mm x 3mm thin DFN package with 0.8mm height.

B. Absolute Maximum Ratings

Item	Rating
IN, CHG to GND	-0.3V to +14V
VL, BATT, ISET, EN, ACOK to GND	-0.3V to +6V
VL to IN	-14V to +0.3V
IN to BATT Continuous Current	0.9A
Short-Circuit Duration	Continuous
Operating Temperature Range	-40°C to +85°C
Junction Temperature	+150°C
Storage Temperature Range	-65°C to +150°C
Lead Temperature (soldering, 10s)	+300°C
Continuous Power Dissipation (TA = +70°C)	
8-Pin DFN	1951mW
Derates above +70°C	
8-Pin DFN	24.4mW/°C

II. Manufacturing Information

A. Description/Function: Linear Li+ Battery Charger with Integrated Pass FET, Thermal Regulation, and ACOK

B. Process: B8 - Standard 8 micron silicon gate CMOS

C. Number of Device Transistors: 1812

D. Fabrication Location: California, USA

E. Assembly Location: Thailand

F. Date of Initial Production: July, 2003

III. Packaging Information

A. Package Type: **8-Lead DFN (3x3)**

B. Lead Frame: Copper

C. Lead Finish: Solder Plate

D. Die Attach: Silver-filled Epoxy

E. Bondwire: Gold (1.0 mil dia.)

F. Mold Material: Epoxy with silica filler

G. Assembly Diagram: Buildsheet # 05-9000-0579

H. Flammability Rating: Class UL94-V0

I. Classification of Moisture Sensitivity per JEDEC standard JESD22-A112: Level 1

IV. Die Information

A. Dimensions: 92 X 60 mils

B. Passivation: Si_3N_4/SiO_2 (Silicon nitride/ Silicon dioxide)

C. Interconnect: TiW/ AlCu/ TiWN

D. Backside Metallization: None

E. Minimum Metal Width: .8 microns (as drawn)

F. Minimum Metal Spacing: .8 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: Jim Pedicord (Manager, Reliability Operations)
Bryan Preeshl (Executive Director of QA)
Kenneth Huening (Vice President)

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 still ongoing. The final report will have these results and a final FIT number:

B. Moisture Resistance Tests

Maxim evaluates pressure pot stress from every assembly process during qualification of each new design. Pressure Pot testing must pass a 20% LTPD for acceptance. Additionally, industry standard 85°C/85%RH or HAST tests are performed quarterly per device/package family.

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

The PN23-1 die type has been found to have all pins able to withstand a transient pulse of ±400V, per Mil-Std-883 Method 3015 (reference attached ESD Test Circuit). Latch-Up testing has shown that this device withstands a current of ±250mA.

Table 1
Reliability Evaluation Test Results

MAX1508ETA

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	Pending	Pending
Moisture Testing (Note 2)				
Pressure Pot	Ta = 121°C P = 15 psi. RH= 100% Time = 168hrs.	DC Parameters & functionality	77	0
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 D.I.P. qualification lots.
Note 2: Generic process/package data

Attachment #1

TABLE II. Pin combination to be tested. 1/ 2/

	Terminal A (Each pin individually connected to terminal A with the other floating)	Terminal B (The common combination of all like-named pins connected to terminal B)
1.	All pins except V_{PS1} 3/	All V_{PS1} pins
2.	All input and output pins	All other input-output pins

1/ Table II is restated in narrative form in 3.4 below.
2/ No connects are not to be tested.
3/ Repeat pin combination I for each named Power supply and for ground

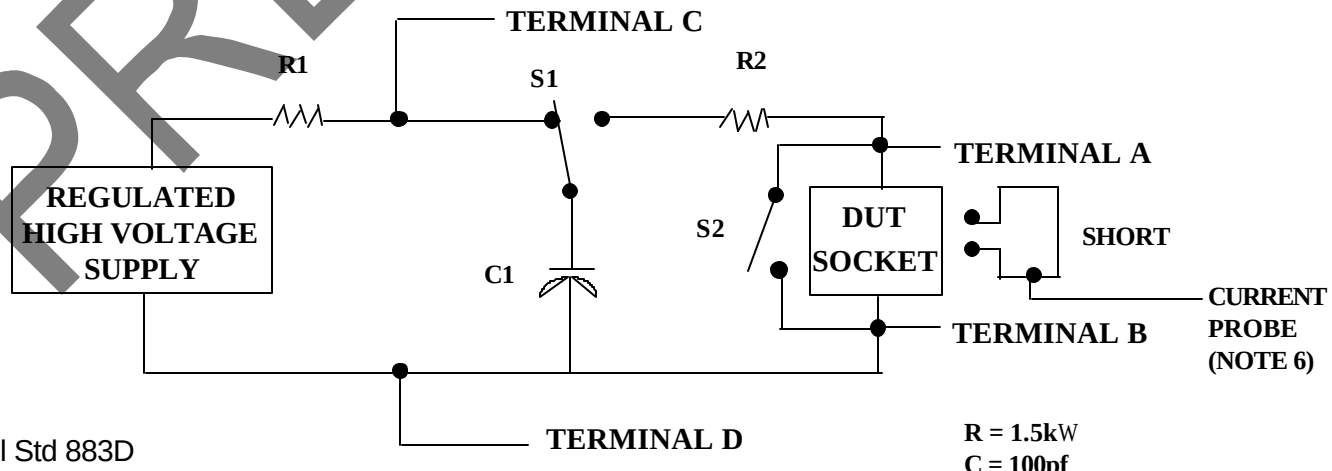
(e.g., where V_{PS1} is V_{DD}, V_{CC}, V_{SS}, V_{BB}, GND, $+V_S$, $-V_S$, V_{REF}, etc).

3.4 Pin combinations to be tested.

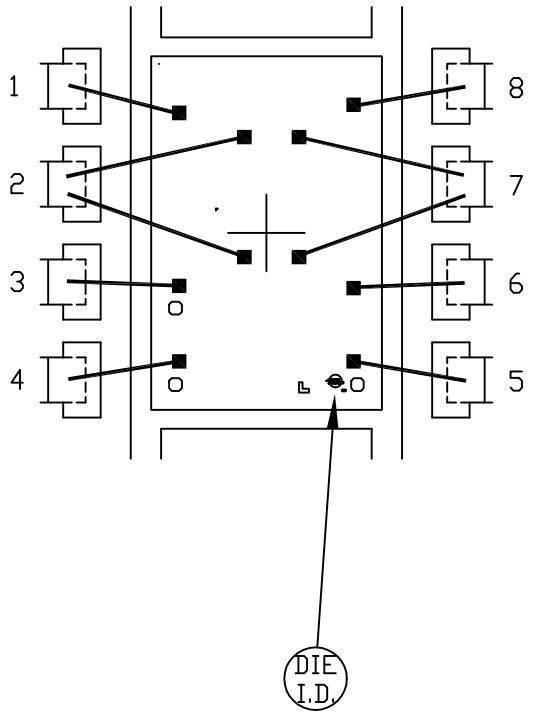
a. Each pin individually connected to terminal A with respect to the device ground pin(s) connected to terminal B. All pins except the one being tested and the ground pin(s) shall be open.

b. Each pin individually connected to terminal A with respect to each different set of a combination of all named power supply pins (e.g., V_{SS1}, or V_{SS2} or V_{SS3} or V_{CC1}, or V_{CC2}) connected to terminal B. All pins except the one being tested and the power supply pin or set of pins shall be open.

c. Each input and each output individually connected to terminal A with respect to a combination of all the other input and output pins connected to terminal B. All pins except the input or output pin being tested and the combination of all the other input and output pins shall be open.



3x3x0.8 MM QFN THIN PKG. EXPOSED PAD PKG.



PKG. CODE: T833-1		SIGNATURES	DATE	MAXIM CONFIDENTIAL & PROPRIETARY	
CAV./PAD SIZE: 71×102	PKG.			BOND DIAGRAM #: 05-9000-0579	REV: A
	DESIGN				