MAX1523EUT
Rev. A

RELIABILITY REPORT

FOR

MAX1523EUT

PLASTIC ENCAPSULATED DEVICES

February 7, 2003

MAXIM INTEGRATED PRODUCTS

120 SAN GABRIEL DR.

SUNNYVALE, CA 94086

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Conclusion

The MAX1523 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.

Table of Contents

I. Device Description

A. General

The MAX1523 is a simple, compact boost controller designed for a wide range of DC-DC conversion topologies, including step-up, SEPIC, and flyback applications. It is for applications where extremely low cost and small size are top priorities. This device is designed specifically to provide a simple application circuit and minimize the size and number of external components, making them ideal for PDAs, digital cameras, and other low-cost consumer electronics applications.

This device uses a unique fixed on-time, minimum off-time architecture, which provides excellent efficiency over a wide-range of input/output voltage combinations and load currents. The fixed on-time is pin selectable to either 0.5µs (50% max duty cycle) or 3µs (85% max duty cycle), permitting optimization of external component size and ease of design for a wide range of output voltages.

The MAX1523 operates from a +2.5V to +5.5V input voltage range and is capable of generating a wide range of outputs. The device has an internal soft-start and short-circuit protection to prevent excessive switching current during startup and under output fault conditions. The MAX1523 reenters soft-start mode during output fault conditions. The MAX1523 is available in a space-saving 6-pin SOT23 package.

B. Absolute Maximum Ratings

Item	Rating
VCC, FB, SHDN , SET to GND	-0.3V to +6V
EXT to GND	-0.3V to (VCC + 0.3V)
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)	
6-Pin SOT23	696mW
Derates above +70°C	
6-Pin SOT23	8.7mW/°C

II. Manufacturing Information

A. Description/Function: Simple SOT23 Boost Controllers

B. Process: S8 - Standard 8 micron silicon gate CMOS

C. Number of Device Transistors: 1302

D. Fabrication Location: California, USA

E. Assembly Location: Malaysia, Philippines or Thailand

F. Date of Initial Production: January, 2001

III. Packaging Information

A. Package Type: **6-Lead SOT**

B. Lead Frame: Copper

C. Lead Finish: Solder Plate

D. Die Attach: Non-Conductive Epoxy

E. Bondwire: Gold (1.0 mil dia.)

F. Mold Material: Epoxy with silica filler

G. Assembly Diagram: Buildsheet # 05-2301-0076

H. Flammability Rating: Class UL94-V0

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

IV. Die Information

A. Dimensions: 41 X 57 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: 2.7 mil. Sq.

H. Isolation Dielectric: SiO_2

I. Die Separation Method: Wafer Saw

V. Quality Assurance Information

A. Quality Assurance Contacts: Jim Pedicord (Reliability Lab Manager)
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 shown in **Table 1**. Using these results, the Failure Rate (λ) is calculated as follows:

$$\lambda = \frac{1}{\text{MTTF}} = \frac{1.83}{192 \times 4389 \times 80 \times 2}$$ (Chi square value for MTTF upper limit)

(4389:) Temperature Acceleration factor assuming an activation energy of 0.8eV

$\lambda = 13.57 \times 10^{-9}$ $\lambda = 13.57$ F.I.T. (60% confidence level @ 25°C)

This low failure rate represents data collected from Maxim's reliability qualification and monitor programs. Maxim also performs weekly Burn-In on samples from production to assure reliability of its processes. The reliability required for lots which receive a burn-in qualification is 59 F.I.T. at a 60% confidence level, which equates to 3 failures in an 80 piece sample. Maxim performs failure analysis on rejects from lots exceeding this level. The Burn-In Schematic (Spec.# 06-5647) shows the static circuit used for this test. Maxim also performs 1000 hour life test monitors quarterly for each process. This data is published in the Product Reliability Report (**RR-1M**) located on the Maxim website at http://www.maxim-ic.com .

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 PY54-1 die type has been found to have all pins able to withstand a transient pulse of ±1000V, 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

MAX1523EUT

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	80	0
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	77	0

Note 1: Life Test Data may represent plastic D.I.P. qualification lots.
Note 2: Generic process/package data

Attachment #3

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

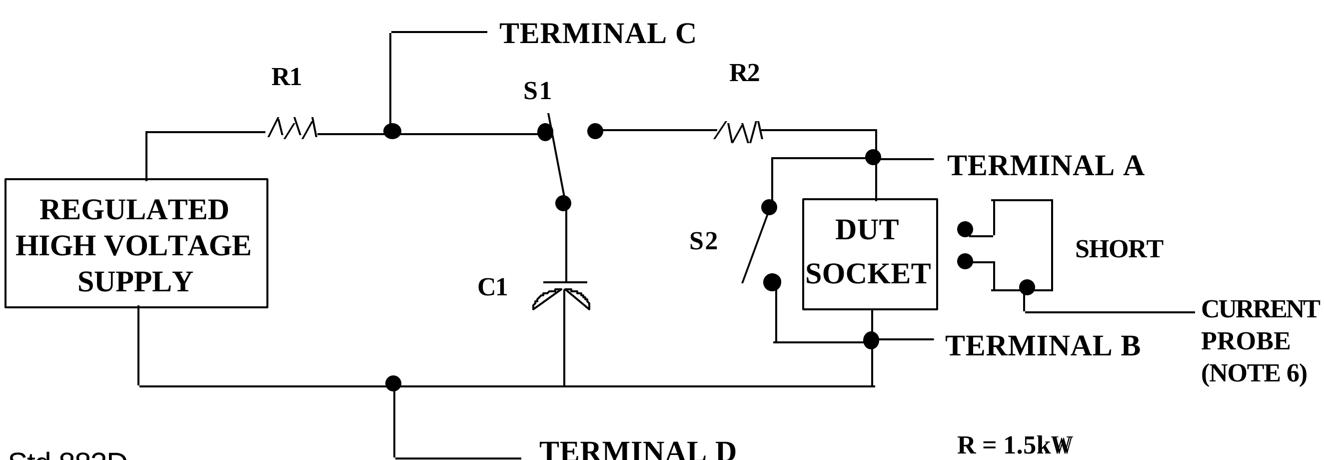
(e.g., where V_{PS1} is V_{DD}, V_{CC}, V_{SS}, V_{BB}, GND, $+V_S$, $-V_S$, V_{REF}, etc).

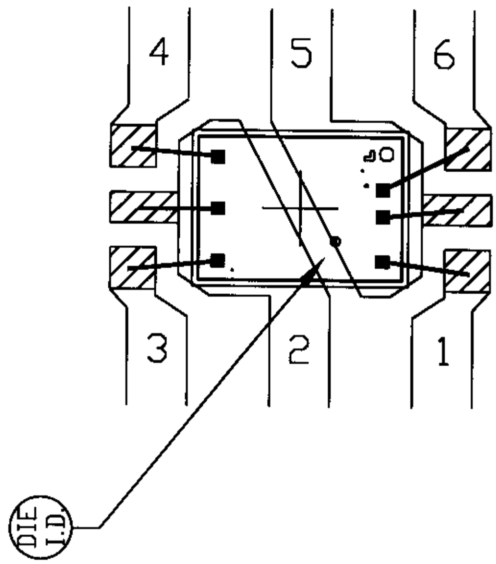
3.4 Pin combinations to be tested.

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.

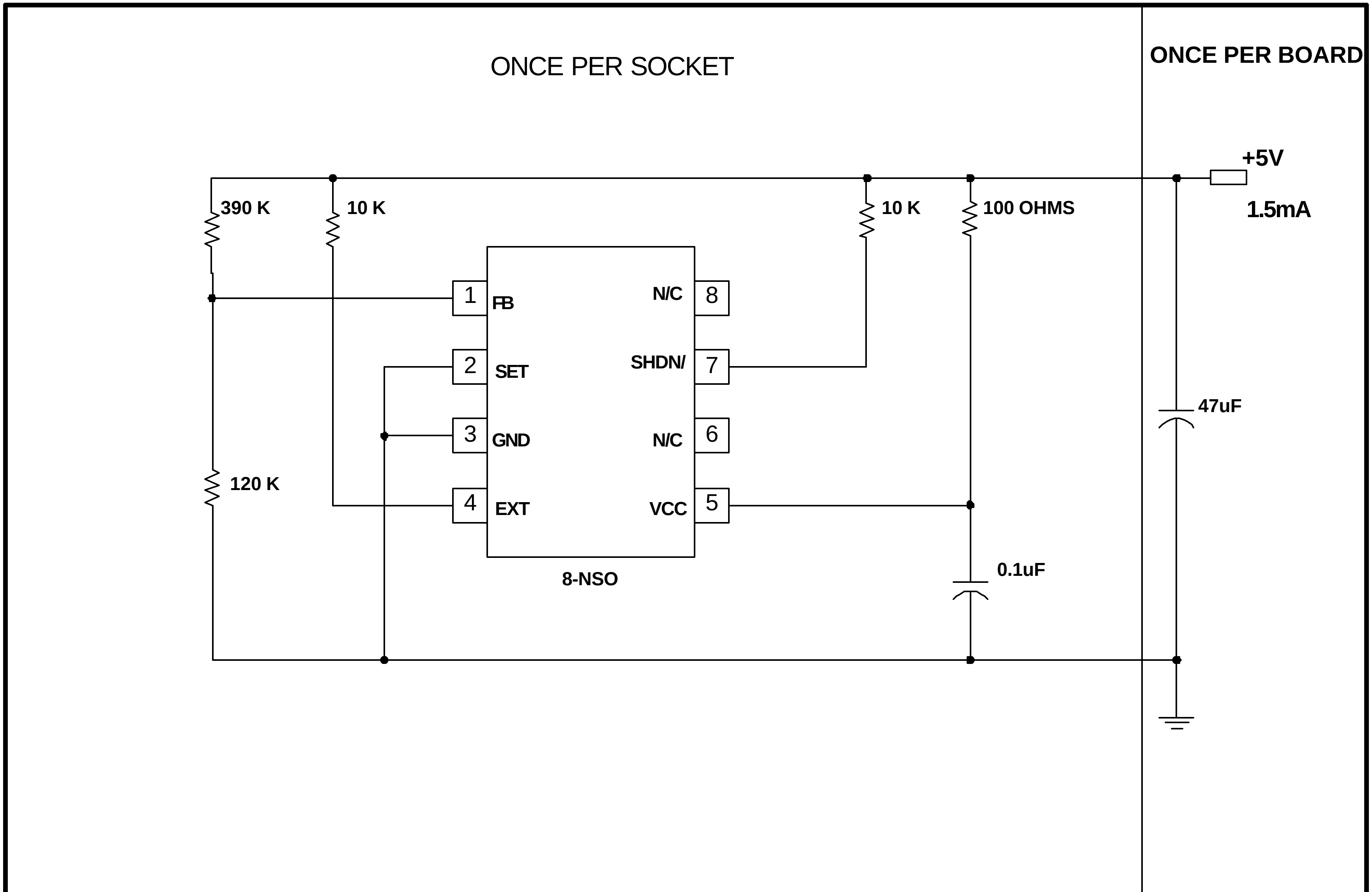




NOTE: USE NON-CONDUCTIVE EPOXY ONLY

BONDABLE AREA

PKG. CODE: U6S-3		SIGNATURES	DATE	MAXIM CONFIDENTIAL & PROPRIETARY
CAV./PAD SIZE: 64x46	PKG.			BOND DIAGRAM #: 05-2301-0076
	DESIGN			REV: A



DEVICES: MAX1522 / 1523 / 1524

MAX. EXPECTED CURRENT = 1.5mA

DRAWN BY: HAK TAN

NOTES: