RELIABILITY REPORT

FOR

MAX1896EUT

PLASTIC ENCAPSULATED DEVICES

May 16, 2006

MAXIM INTEGRATED PRODUCTS

120 SAN GABRIEL DR.

SUNNYVALE, CA 94086

Written by

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Conclusion

The MAX1896 sucessfully 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 MAX1896 step-up DC-DC converter incorporates high-performance current-mode, fixed-frequency, pulse-width modulation (PWM) circuitry and an internal 0.7Ω N-channel MOSFET to provide a highly efficient regulator with fast response.

High switching frequency (1.4MHz) allows fast loop response and easy filtering with small components. The MAX1896 can produce an output voltage as high as 13V from an input as low as 2.6V. Soft-start is programmable with an external capacitor, which sets the input current ramp rate. In shutdown mode, current consumption is reduced to 0.01µA.

The MAX1896 is available in a space-saving 6-pin SOT23 package. The ultra-small package and high switching frequency allow cost and space-efficient implementations.

B. Absolute Maximum Ratings

Item	Rating
LX to GND	-0.3V to +14V
IN, SHDN, FB to GND	-0.3V to +6V
SS to GND	-0.3V to (VIN + 0.3V)
RMS LX Pin Current	0.6A
Continuous Power Dissipation (TA = +70°C) (Note 1)	
6-Pin SOT23 (derate 9.1mW/°C above +70°C)	727mW
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

Note 1: Thermal properties are specified with product mounted on PC board with one square-inch of copper area and still air.

II. Manufacturing Information

A. Description/Function:	1.4MHz SOT23 Current-Mode Step-Up DC-DC Converter
B. Process:	B8 (Standard .8 micron Silicon Gate CMOS)
C. Number of Device Transistors:	970
D. Fabrication Location:	Dallas, USA
E. Assembly Location:	Thailand
F. Date of Initial Production:	October, 2001

III. Packaging Information

A. Package Type:	**6-Pin SOT Flip-Chip**
B. Lead Frame:	Copper
C. Lead Finish:	Solder Plate
D. Die Attach:	Silver-Filled Epoxy
E. Bondwire:	6 mil dia. Ball
F. Mold Material:	Epoxy with silica filler
G. Assembly Diagram:	# 05-9000-2208
H. Flammability Rating:	Class UL94-V0
I. Classification of Moisture Sensitivity per JEDEC standard J-STD-020-C:	Level 1

IV. Die Information

A. Dimensions:	42 x 88 mils
B. Passivation:	Si_3N_4/SiO_2 (Silicon nitride/ Silicon dioxide)
C. Interconnect:	Aluminum/Copper/Silicon
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 (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:

$$\lambda = \frac{1}{MTTF} = \frac{1.83}{192 \times 4340 \times 45 \times 2}$$ (Chi square value for MTTF upper limit)

↳ Thermal acceleration factor assuming a 0.8eV activation energy

$\lambda = 24.43 \times 10^{-9}$ λ= 24.43 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 the 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 lots exceeding this level. The following Burn-In Schematic (Spec. #06-5636) 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-1N**). Current monitor data for the S8/B8 Process results in a FIT Rate of 0.27 @ 25C and 4.64 @ 55C (0.8 eV, 60% UCL)

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 PM07 die type has been found to have all pins able to withstand a transient pulse of +/-2500V, per HBM ESD spec JEDEC JESD22-A114D and 200V MM ESD per JEDEC JESD22-A115. Latch-Up testing has shown that this device withstands a current of ±250mA.

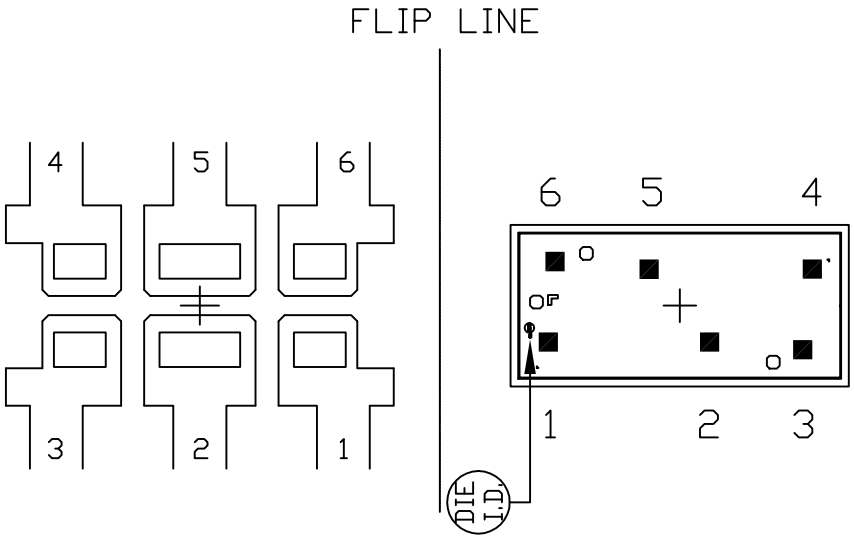
Table 1
Reliability Evaluation Test Results

MAX1896EUT

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	PACKAGE	SAMPLE SIZE	NUMBER OF FAILURES
Static Life Test (Note 1)					
	Ta = 135°C Biased Time = 192 hrs.	DC Parameters & functionality		45	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 & functionality		77	0

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

FLIP CHIP PKG.
w/HIGH LEAD BUMP,
MATTE TIN PLATE.



ORIGINAL PINOUT

NOTE: CAVITY DOWN

PKG. CODE: U6FH-6		SIGNATURES	DATE	MAXIM CONFIDENTIAL & PROPRIETARY
CAV./PAD SIZE: FLIP CHIP	PKG.			BOND DIAGRAM #: 05-9000-2208 / REV: A
	DESIGN			