RELIABILITY REPORT

FOR

MAX5020ESA+
(MAX5019/MAX5020)

PLASTIC ENCAPSULATED DEVICES

April 12, 2009

MAXIM INTEGRATED PRODUCTS

120 SAN GABRIEL DR.

SUNNYVALE, CA 94086

Approved by
Ken Wendel
Quality Assurance
Director, Reliability Engineering

Maxim Integrated Products. All rights reserved.

Conclusion

The MAX5020ESA+ 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 MAX5019/MAX5020 integrate all the building blocks necessary for implementing DC-DC fixed-frequency power supplies. Either primary- or secondary-side regulation may be used to implement isolated or nonisolated power supplies. These devices are current-mode controllers with an integrated high-voltage startup circuit suitable for telecom/industrial voltage range power supplies. Current-mode control with leading-edge blanking simplifies control-loop design and internal ramp compensation circuitry stabilizes the current loop when operating at duty cycles above 50% (MAX5019). The MAX5019 allows 85% operating duty cycle and can be used to implement flyback converters whereas the MAX5020 limits the operating duty cycle to less than 50% and can be used in single-ended forward converters. A high-voltage startup circuit allows these devices to draw power directly from the 18V to 110V input supply during startup. The switching frequency is internally trimmed to 275kHz ±10%, thus reducing magnetics and filter component costs. The MAX5019/MAX5020 are available in 8-pin SO packages. **Warning:** The MAX5019/MAX5020 operate with high voltages. Exercise caution.

Maxim Integrated Products. All rights reserved.

II. Manufacturing Information

A. Description/Function:	Current-Mode PWM Controllers with Integrated Startup Circuit
B. Process:	S3
C. Number of Device Transistors:	
D. Fabrication Location:	Oregon
E. Assembly Location:	ATP Philippines, UTL Thailand
F. Date of Initial Production:	July 26, 2001

III. Packaging Information

A. Package Type:	8-pin SOIC (N)
B. Lead Frame:	Copper
C. Lead Finish:	100% matte Tin
D. Die Attach:	Conductive Epoxy
E. Bondwire:	Gold (1 mil dia.)
F. Mold Material:	Epoxy with silica filler
G. Assembly Diagram:	#05-1301-0019
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:	170°C/W
K. Single Layer Theta Jc:	40°C/W
L. Multi Layer Theta Ja:	128.4°C/W
M. Multi Layer Theta Jc:	36°C/W

IV. Die Information

A. Dimensions:	82 X 121 mils
B. Passivation:	Si_3N_4/SiO_2 (Silicon nitride/ Silicon dioxide
C. Interconnect:	Aluminum/Cu (Cu = 0.5%)
D. Backside Metallization:	None
E. Minimum Metal Width:	3.0 microns (as drawn)
F. Minimum Metal Spacing:	3.0 microns (as drawn)
G. Bondpad Dimensions:	5 mil. Sq.
H. Isolation Dielectric:	SiO_2
I. Die Separation Method:	Wafer Saw

Maxim Integrated Products. All rights reserved.

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:

$$\lambda = \frac{1}{MTTF} = \frac{1.83}{192 \times 4340 \times 80 \times 2}$$ (Chi square value for MTTF upper limit)

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

$\lambda = 13.4 \times 10^{-9}$

$\lambda = 13.4$ 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 S3 Process results in a FIT Rate of 3.6 @ 25C and 66.0 @ 55C (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 NP16-5 die type has been found to have all pins able to withstand a HBM transient pulse of +/-1500 per Mil-Std 883 Method 3015.7. Latch-Up testing has shown that this device withstands a current of +/-200 mA.

Maxim Integrated Products. All rights reserved.

Table 1
Reliability Evaluation Test Results

MAX5020ESA+

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)				
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

Maxim Integrated Products. All rights reserved.