RELIABILITY REPORT

FOR

MAX5088ATE+

PLASTIC ENCAPSULATED DEVICES

August 10, 2009

MAXIM INTEGRATED PRODUCTS

120 SAN GABRIEL DR.

SUNNYVALE, CA 94086

Approved by
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Quality Assurance
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Conclusion

The MAX5088ATE+ 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 MAX5088/MAX5089 high-frequency, DC-DC converters with an integrated n-channel power MOSFET provide up to 2A of load current. The MAX5088 includes an internal power MOSFET to enable the design of a nonsynchronous buck topology power supply. The MAX5089 is for the design of a synchronous buck topology power supply. These devices operate from a 4.5V to 5.5V or 5.5V to 23V input voltage and a 200kHz to 2.2MHz resistor-programmable switching frequency. The voltage-mode architecture with a peak switch current-limit scheme provides stable operation up to a 2.2MHz switching frequency. The MAX5088 includes a clock output for driving a second DC-DC converter 180° out-of-phase and a power-on-reset (RESET-bar) output. The MAX5089 includes a power-good output and a synchronous rectifier driver to drive an external low-side MOSFET in the buck converter configuration for high efficiency. The MAX5088/MAX5089 protect against overcurrent conditions by utilizing a peak current limit as well as overtemperature shutdown providing a very reliable and compact power source for point-of-load regulation applications. Additional features include synchronization, internal digital soft-start, and an enable input. The MAX5088/MAX5089 are available in a thermally enhanced, space-saving 16-pin TQFN (5mm x 5mm) package and operate over the -40°C to +125°C temperature range.

II. Manufacturing Information

A. Description/Function:	2.2MHz, 2A Buck Converters with an Integrated High-Side Switch
B. Process:	B8
C. Number of Device Transistors:	
D. Fabrication Location:	California or Texas
E. Assembly Location:	China, Thailand
F. Date of Initial Production:	January 21, 2006

III. Packaging Information

A. Package Type:	16-pin TQFN 5x5
B. Lead Frame:	Copper
C. Lead Finish:	100% matte Tin
D. Die Attach:	Conductive Epoxy
E. Bondwire:	Gold (1.3 mil dia.)
F. Mold Material:	Epoxy with silica filler
G. Assembly Diagram:	#05-9000-2728
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:	48°C/W
K. Single Layer Theta Jc:	1.7°C/W
L. Multi Layer Theta Ja:	30°C/W
M. Multi Layer Theta Jc:	1.7°C/W

IV. Die Information

A. Dimensions:	136 X 136 mils
B. Passivation:	Si_3N_4/SiO_2 (Silicon nitride/ Silicon dioxide)
C. Interconnect:	Al/0.5%Cu with Ti/TiN Barrier
D. Backside Metallization:	None
E. Minimum Metal Width:	0.8 microns (as drawn)
F. Minimum Metal Spacing:	0.8 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:	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:

$$\lambda = \frac{1}{MTTF} = \frac{1.83}{192 \times 4340 \times 47 \times 2}$$ (Chi square value for MTTF upper limit)

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

$\lambda = 22.8 \times 10^{-9}$

$\lambda = 22.8$ 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 B8 Process results in a FIT Rate of 1.86 @ 25C and 22.5 @ 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 NP75 die type has been found to have all pins able to withstand a HBM transient pulse of <+/-500 V per JEDEC JESD22-A114. Latch-Up testing has shown that this device withstands a current of +/-250 mA.

Table 1
Reliability Evaluation Test Results

MAX5088ATE+

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	47	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