RELIABILITY REPORT

FOR

MAX17597ATE+T

PLASTIC ENCAPSULATED DEVICES

October 21, 2013

MAXIM INTEGRATED

160 RIO ROBLES

SAN JOSE, CA 95134

Approved by
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Quality Assurance
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Conclusion

The MAX17597ATE+T successfully meets the quality and reliability standards required of all Maxim Integrated products. In addition, Maxim Integrated's continuous reliability monitoring program ensures that all outgoing product will continue to meet Maxim Integrated's quality and reliability standards.

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I. Device Description

A. General

The MAX17595/MAX17596/MAX17597 is a family of peak-current-mode controllers for design of wide input-voltage flyback and boost regulators. The MAX17595 offers optimized input thresholds for universal input AC-DC converters and telecom DC-DC (36V to 72V input range) power supplies. The MAX17596/MAX17597 offer input thresholds suitable for low-voltage DC-DC applications (4.5V to 36V). The MAX17597 implements a boost converter. All three controllers contain a built-in gate driver for external n-channel MOSFETs. The MAX17595/MAX17596/MAX17597 house an internal error amplifier with 1% accurate reference, eliminating the need for an external reference. The switching frequency is programmable from 100kHz to 1MHz with an accuracy of 8%, allowing optimization of magnetic and filter components, resulting in compact and cost-effective power conversion. For EMI-sensitive applications, the MAX17595/MAX17596/MAX17597 family incorporates a programmable frequency dithering scheme, enabling low-EMI spread-spectrum operation. Users can start the power supply precisely at the desired input voltage, implement input overvoltage protection, and program soft-start time. A programmable slope compensation scheme is provided to ensuree stability of the peak-current-mode control scheme. Hiccup-mode overcurrent protection and thermal shutdown are provided to minimize dissipation in overcurrent and overtemperature fault conditions.

II. Manufacturing Information

A. Description/Function:	Peak-Current-Mode Controllers for Flyback and Boost Regulators
B. Process:	S18
C. Number of Device Transistors:	6831
D. Fabrication Location:	California
E. Assembly Location:	China
F. Date of Initial Production:	December 22, 2011

III. Packaging Information

A. Package Type:	16-pin TQFN 3x3
B. Lead Frame:	Copper
C. Lead Finish:	100% matte Tin
D. Die Attach:	Conductive
E. Bondwire:	Au (1 mil dia.)
F. Mold Material:	Epoxy with silica filler
G. Assembly Diagram:	#05-9000-4961
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:	64°C/W
K. Single Layer Theta Jc:	6.9°C/W
L. Multi Layer Theta Ja:	48°C/W
M. Multi Layer Theta Jc:	6.9°C/W

IV. Die Information

A. Dimensions:	49.6063X51.1811 mils
B. Passivation:	Si_3N_4/SiO_2 (Silicon nitride/ Silicon dioxide)
C. Interconnect:	Al with Ti/TiN Barrier
D. Backside Metallization:	None
E. Minimum Metal Width:	0.18um
F. Minimum Metal Spacing:	0.18um
G. Bondpad Dimensions:	
H. Isolation Dielectric:	SiO_2
I. Die Separation Method:	Wafer Saw

V. Quality Assurance Information

A. Quality Assurance Contacts:	Richard Aburano (Manager, Reliability Engineering) Don Lipps (Manager, Reliability Engineering) Bryan Preeshl (Vice President 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 135C biased (static) life test are shown in Table 1. Using these results, the Failure Rate (λ) is calculated as follows:

$$\lambda = \frac{1}{MTTF} = \frac{1.83}{264 \times 4340 \times 79 \times 2}$$ (Chi square value for MTTF upper limit)

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

$\lambda = 10.1 \times 10^{-9}$

$\lambda = 10.1$ F.I.T. (60% confidence level @ 25°C)

The following failure rate represents data collected from Maxim Integrated's reliability monitor program. Maxim Integrated performs quarterly life test monitors on its processes. This data is published in the Reliability Report found at http://www.maximintegrated.com/qa/reliability/monitor. Cumulative monitor data for the S18 Process results in a FIT Rate of 0.05 @ 25C and 0.93 @ 55C (0.8 eV, 60% UCL).

B. E.S.D. and Latch-Up Testing (ESD lot SABE2Q001A D/C 1139, Latch-up lot SABE2Q001B D/C 1139)

The PI17-1 die type has been found to have all pins able to withstand a HBM transient pulse of +/-2500V per JEDEC JESD22-A114. Latch-Up testing has shown that this device withstands a current of +/-250mA and overvoltage per JEDEC JESD78.

Table 1
Reliability Evaluation Test Results

MAX17597ATE+T

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	COMMENTS
Static Life Test (Note 1)	Ta = 135°C Biased Time = 264 hrs.	DC Parameters & functionality	79	0	SABE2Q001A, D/C 1139

Note 1: Life Test Data may represent plastic DIP qualification lots.