RELIABILITY REPORT

FOR

MAX17595ATE+T

PLASTIC ENCAPSULATED DEVICES

October 30, 2012

MAXIM INTEGRATED

160 RIO ROBLES

SAN JOSE, CA 95134

Approved by
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Conclusion

The MAX17595ATE+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 which contain all the circuitry required for the design of wide input-voltage flyback and boost regulators. The MAX17595 offers optimized input rising and falling thresholds for universal input AC-DC converters and telecom DC-DC (36V-72V input range) power supplies. The MAX17596 offers input rising and falling thresholds suitable for low-voltage DC-DC applications (4.5V-36V input range). The MAX17597 offers all circuitry needed to implement a boost converter controller. 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, useful in implementations without the need for an external reference. The switching frequency is programmable from 100kHz to 1MHz with an accuracy of 8% using an external resistor, allowing optimization of magnetic and filter components, resulting in compact and cost-effective power conversion solutions. For EMI sensitive applications, the MAX17595/MAX17596/MAX17597 family incorporates a programmable-frequency dithering scheme, enabling low-EMI spread-spectrum operation. An EN/UVLO input allows the user to start the power supply precisely at the desired input voltage, while also functioning as an on/off pin. The OVI pin enables implementation of an input overvoltage protection scheme, ensuring that the converter shuts down when the DC input voltage exceeds a set maximum value. The SS pin allows programmable soft-start time for the power converter, and helps limit inrush current during startup. The MAX17595/MAX17596/MAX17597 family also allows the designer to choose between voltage soft-start and current soft-start modes, useful in optoisolated designs. A programmable slope compensation scheme is provided to enhance the 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. The IC is available in a space-saving 16-pin, 3mm x 3mm TQFN package with 0.5mm lead spacing.

II. Manufacturing Information

A. Description/Function:	Peak-Current-Mode Controllers for Flyback and Boost Regulators
B. Process:	S18
C. Number of Device Transistors:	
D. Fabrication Location:	USA
E. Assembly Location:	China, Taiwan and Thailand
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:	#05-9000-4960
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:	7°C/W
L. Multi Layer Theta Ja:	48°C/W
M. Multi Layer Theta Jc:	7°C/W

IV. Die Information

A. Dimensions:	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:	Metal1 = 0.23 / Metal2-3 = 0.28 / Metal 4 = 2.6 microns (as drawn)
F. Minimum Metal Spacing:	Metal1 = 0.23 / Metal2-3 = 0.28 / Metal 4 = 3.0 microns (as drawn)
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:

$$\lambda = \frac{1}{MTTF} = \frac{1.83}{192 \times 4340 \times 156 \times 2}$$ (Chi square value for MTTF upper limit)

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

$\lambda = 7.05 \times 10^{-9}$

$\lambda = 7.05$ 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 0.06 @ 25C and 1.04 @ 55C (0.8 eV, 60% UCL)

B. E.S.D. and Latch-Up Testing

The PI17-0 die type has been found to have all pins able to withstand a HBM transient pulse of +/- 2500V per JEDEC JESD22-A114 (lot SABE1Q001A, D/C 1139). Latch-Up testing has shown that this device withstands a current of +/- 250mA and overvoltage per JEDEC JESD78, with MSV = 34V during overvoltage stress (lot SAFE0Q001C, D/C 1211)

Table 1

Reliability Evaluation Test Results

MAX17595ATE+T

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	COMMENTS
Static Life Test (Note 1)					
	Ta = 135C	DC Parameters	79	0	SABE2Q001A D/C 1139
	Biased	& functionality	77	0	SABE1Q001B, D/C 1139
	Time = 192 hrs.				

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