

RELIABILITY REPORT  
FOR  
MAX17498BATE+  
PLASTIC ENCAPSULATED DEVICES

March 13, 2013

**MAXIM INTEGRATED**

160 RIO ROBLES  
SAN JOSE, CA 95134

<b>Approved by</b>
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Quality Assurance
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## Conclusion

The MAX17498BATE+ 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.

## Table of Contents

<b>I. ....Device Description</b>	<b>IV. ....Die Information</b>
<b>II. ....Manufacturing Information</b>	<b>V. ....Quality Assurance Information</b>
<b>III. ....Packaging Information</b>	<b>VI. ....Reliability Evaluation</b>
<b>.....Attachments</b>	

### I. Device Description

#### A. General

The MAX17498A/MAX17498B/MAX17498C devices are current-mode fixed-frequency flyback/boost converters with a minimum number of external components. They contain all the control circuitry required to design wide input voltage isolated and nonisolated power supplies. The MAX17498A has its rising/falling undervoltage lockout (UVLO) thresholds optimized for universal offline (85V AC to 265V AC) applications, while the MAX17498B/MAX17498C support UVLO thresholds suitable to low-voltage DC-DC applications. The switching frequency of the MAX17498A/MAX17498C is 250kHz, while that of the MAX17498B is 500kHz. These frequencies allow the use of tiny magnetic and filter components, resulting in compact, cost-effective power supplies. 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 that ensures that the converter shuts down when the DC input voltage exceeds the desired maximum value. The devices incorporate a flexible error amplifier and an accurate reference voltage (REF) to enable the end user to regulate both positive and negative outputs. Programmable current limit allows proper sizing and protection of the primary switching FET. The devices support a maximum duty cycle greater than 92% and provide programmable slope compensation to allow optimization of control loop performance. The devices provide an open-drain PGOOD pin that serves as a power-good indicator and enters the high-impedance state to indicate that the flyback/boost converter is in regulation. An SS pin allows programmable soft-start time for the flyback/boost converter. Hiccup-mode overcurrent protection and thermal shutdown are provided to minimize dissipation under overcurrent and overtemperature fault conditions. The devices are available in a space-saving, 16-pin (3mm x 3mm) TQFN package with 0.5mm lead spacing.

## II. Manufacturing Information

A. Description/Function:	AC-DC and DC-DC Peak-Current-Mode Converters for Flyback/Boost Applications
B. Process:	S18
C. Number of Device Transistors:	18109
D. Fabrication Location:	California
E. Assembly Location:	Taiwan, China, or 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 (1.3 mil dia.)
F. Mold Material:	Epoxy with silica filler
G. Assembly Diagram:	#05-9000-4557
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:	68°C/W
K. Single Layer Theta Jc:	10°C/W
L. Multi Layer Theta Ja:	48°C/W
M. Multi Layer Theta Jc:	10°C/W

## IV. Die Information

A. Dimensions:	68.8976X68.8976 mils
B. Passivation:	Si <sub>3</sub> N <sub>4</sub> /SiO <sub>2</sub> (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 <sub>2</sub>
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 ( $\lambda$ ) is calculated as follows:

$$\lambda = \frac{1}{\text{MTTF}} = \frac{1.83}{192 \times 4340 \times 160 \times 2} \quad (\text{Chi square value for MTTF upper limit})$$

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

$$\lambda = 6.9 \times 10^{-9}$$

$$\lambda = 6.9 \text{ F.I.T. (60\% confidence level @ 25°C)}$$

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 (lot SABN1Q001C D/C 1147)

The PI09-1 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

**MAX17498BATE+**

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	COMMENTS
<b>Static Life Test</b> (Note 1)	Ta = 135°C Biased Time = 192 hrs.	DC Parameters & functionality	160	0	S0XZBQ001C, D/C 1131

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