RELIABILITY REPORT

FOR

MAX17541GATB+T

PLASTIC ENCAPSULATED DEVICES

March 10, 2016

MAXIM INTEGRATED

160 RIO ROBLES

SAN JOSE, CA 95134

Approved by
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Conclusion

The MAX17541GATB+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 MAX17541G high-efficiency, high-voltage, synchronous step-down DC-DC converter with integrated MOSFETs operates over 4.5V to 42V input. The converter can deliver up to 500mA and generates output voltages from 0.9V up to 0.92 x VIN. The feedback (FB) voltage is accurate to within ±1.7% over -40°C to +125°C. The MAX17541G uses peak-current-mode control with pulse-width modulation (PWM) and operates with fixed 600kHz switching frequency at any load. The device is available in a 10-pin (3mm × 2mm) TDFN package. Simulation models are available.

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II. Manufacturing Information

A. Description/Function:	42V, 500mA, Ultra-Small, High-Efficiency, Synchronous Step-Down DC-DC Converter
B. Process:	S18
C. Number of Device Transistors:	14609
D. Fabrication Location:	Japan
E. Assembly Location:	Thailand, Taiwan
F. Date of Initial Production:	September 24, 2015

III. Packaging Information

A. Package Type:	10-pin TDFN
B. Lead Frame:	Copper
C. Lead Finish:	NiPdAu
D. Die Attach:	Da_8006ns-2x
E. Bondwire:	Au (1.3 mil dia.)
F. Mold Material:	Epoxy with silica filler
G. Assembly Diagram:	#05-9000-4357
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:	87.5°C/W
K. Single Layer Theta Jc:	18.2°C/W
L. Multi Layer Theta Ja:	67.3°C/W
M. Multi Layer Theta Jc:	18.2°C/W

IV. Die Information

A. Dimensions:	40.9449X103.937 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:	0.23 microns (as drawn)
F. Minimum Metal Spacing:	0.23 microns (as drawn)
G. Isolation Dielectric:	SiO_2
H. Die Separation Method:	Wafer Saw

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V. Quality Assurance Information

A. Quality Assurance Contacts:	Eric Wright (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:

$$\lambda = \frac{1}{MTTF} = \frac{1.83}{192 \times 4340 \times 237 \times 2}$$ (Chi square value for MTTF upper limit)

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

$\lambda = 4.64 \times 10^{-9}$

$\lambda = 4.64$ 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 0.40 @ 25C and 6.96 @ 55C (0.8 eV, 60% UCL)

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

The PI01-0 die type has been found to have all pins able to withstand a transient pulse of:

ESD-HBM: +/- 2500V per JEDEC JESD22-A114
ESD-CDM: +/- 750V per JEDEC JESD22-C101

Latch-Up testing has shown that this device withstands a current of +/-100mA and overvoltage per JEDEC JESD78.

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Table 1

Reliability Evaluation Test Results

MAX17541GATB+T

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES
Static Life Test (Note 1)				
	Ta = 135C Biased Time = 192 hrs.	DC Parameters & functionality	237	0

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

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