

RELIABILITY REPORT

FOR

MAX16610GTB+

MAX16610GTB+T

August 7, 2020

MAXIM INTEGRATED

160 RIO ROBLES

SAN JOSE, CA 95134



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Conclusion

The MAX16610 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 MAX16610 IC is a highly integrated, scalable, controller for a switched tank converter (STC) topology. The STC provides highly efficient zero-current-switching (ZCS) voltage conversion from a 60V–40V input bus to an intermediate bus voltage. The intermediate bus voltage is unregulated and is approximately a quarter of the input voltage.

II. Manufacturing Information

A. Description/Function:	Switched Tank Converter (STC) Controller with Integrated Drivers
B. Process:	P90 / S4 (Hybrid)
C. Device Count:	N/A
D. Fabrication Location:	USA
E. Assembly Location:	Taiwan
F. Date of Initial Production:	July 10, 2019

III. Packaging Information

A. Package Type:	TQFN-CU
B. Lead Frame:	CU194
C. Lead Finish:	Matte Tin
D. Die Attach:	EN4900G
E. Bondwire:	1.30 mil CuPd
F. Mold Material:	G700LA
G. Assembly Diagram:	05-100966
H. Flammability Rating:	UL-94 (V-0 Rating)
I. Classification of Moisture Sensitivity per JEDEC standard J-STD-020-C	Level 3
J. Single Layer Theta Ja:	N/A
K. Single Layer Theta Jc:	N/A
L. Multi Layer Theta Ja:	N/A
M. Multi Layer Theta Jc:	N/A

IV. Die Information

A. Dimensions:	N/A
B. Passivation:	SiO ₂ /SiN

V. Quality Assurance Information

A. Quality Assurance Contacts:	Ryan Wall (Manager, Reliability) Michael Cairnes (Executive Director, Reliability) Bryan Preeshl (SVP 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 125C biased (static) life test are shown in Table 1. Using these results, the Failure Rate λ is calculated as follows:

$$\lambda = \frac{1}{MTTF} = \frac{1.83}{1000 \times 2454 \times 135 \times 2} \text{ (Chi square value for MTTF upper limit)}$$

(where 2454 = Temperature Acceleration factor assuming an activation energy of 0.8eV)

$$\lambda = 2.76 \times 10^{-9}$$

$$\lambda = 2.76 \text{ FITs (60\% confidence level @25°C)}$$

Maxim Integrated performs quarterly life test monitors on its processes. This data is published in the Reliability Report found at <https://www.maximintegrated.com/en/support/qa-reliability/reliability/reliability-monitor-program.html>.

P90 cumulative process Fit

$$\lambda = 0.11 \text{ FITs (60\% confidence level @25°C)}$$

$$\lambda = 1.28 \text{ FITs (60\% confidence level @55°C)}$$

S4 cumulative process Fit

$$\lambda = 0.02 \text{ FITs (60\% confidence level @25°C)}$$

$$\lambda = 0.24 \text{ FITs (60\% confidence level @55°C)}$$

B. ESD and Latch-Up Testing

The MAX16610 has been found to have all pins able to withstand an HBM transient pulse of ± 2000 V per JEDEC / ESDA JS-001. Latch-Up testing has shown that this device withstands ± 100 mA current injection and supply overvoltage per JEDEC JESD78.

Table 1
Reliability Evaluation Test Results
MAX16610GTB+

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	COMMENTS
Static Life Test (Note 1)	Ta = 125°C Biased Time = 1000 hrs.	DC parameters & functionality	45	0	R40659AL1
Static Life Test (Note 1)	Ta = 125°C Biased Time = 1000 hrs.	DC parameters & functionality	45	0	R40659BL1
Static Life Test (Note 1)	Ta = 125°C Biased Time = 1000 hrs.	DC parameters & functionality	45	0	R40659CL1

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