

RELIABILITY REPORT

FOR

MAX20796GFB+, MAX20796GFB+T, MAX20796AGFB+, MAX20796AGFB+T

August 7, 2020

## **MAXIM INTEGRATED**

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RWUH

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#### Conclusion

The MAX20796 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 MAX20796 offers a fully integrated, highly efficient, two-phase switching regulator for applications operating from 4.5V to 16V and requiring up to 60A maximum load or 90A with an optional third-phase external power stage. The output voltage range can be configured from 0.5V to 5.5V with some restrictions on duty cycle. The switching regulator uses a fixed-frequency control scheme providing an extremely compact, fast, and accurate power delivery solution for server and telecom applications. Integrated linear regulators allow single-supply operation. To further improve system efficiency and thermal performance, an external 3.3V supply or FET can be used to generate the core supply.

## II. Manufacturing Information



A. Description/Function:	Dual-Phase Scalable Integrated Voltage Regulator with PMBus Interface
B. Process:	TS18
C. Device Count:	800611
<b>D.</b> Fabrication Location:	Taiwan
E. Assembly Location:	China
F. Date of Initial Production:	March 2019

## III. Packaging Information

A. Package Type:	FC2QFN
B. Lead Frame:	N/A
C. Lead Finish:	NiPd
<b>D.</b> Die Attach:	N/A
E. Bondwire:	N/A
F. Mold Material:	G770HCD
G. Flammability Rating:	UL-94 (V-0 Rating)
H. Classification of Moisture Sensitivity per JEDEC standard J-STD-020-C	Level 1
I. Single Layer Theta Ja:	N/A
J. Single Layer Theta Jc:	N/A
K. Multi Layer Theta Ja:	N/A
L. Multi Layer Theta Jc:	N/A

## IV. Die Information

Α.	Dimensions:	133.86 x 397.64 mils
в.	Passivation:	HDP / SiO2



## 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  $\lambda$  is calculated as follows:

$$\lambda = \frac{1}{MTTF} = \frac{1.83}{1000 x 2454 x 77 x 2}$$
 (Chi square value for MTTF upper limit)

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

$$\lambda = 4.8 \ x \ 10^{-9}$$

 $\lambda = 4.8 FITs (60\% confidence level @25°C)$ 

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

TS18 cumulative process data:

 $\lambda = 0.03 FITs$  (60% confidence level @25°C)  $\lambda = 0.35 FITs$  (60% confidence level @55°C)

## B. ESD and Latch-Up Testing

The MAX20796 has been found to have all pins able to withstand an HBM transient pulse of  $\pm 2500$  V per JEDEC / ESDA JS-001. Latch-Up testing has shown that this device withstands  $\pm 100$  mA current injection and supply overvoltage per JEDEC JESD78.



# Table 1 Reliability Evaluation Test Results

## MAX20796GFB+

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	77	0	R40707NL1

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