

RELIABILITY REPORT
FOR
MAX20734EPL+, MAX0734EPL +T

April 25, 2022

Analog Devices

160 RIO ROBLES
SAN JOSE, CA 95134



Sheena Karlyn Basinang
Engineer, Reliability



Ryan Wall
Manager, Reliability

Conclusion

The MAX20734 successfully meets the quality and reliability standards required of all Analog Devices products. In addition, Analog Devices' continuous reliability monitoring program ensures that all outgoing product will continue to meet Analog Devices' quality and reliability standards.

Table of Contents

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

I. Device Description

A. General

The MAX20734 is a fully integrated, highly efficient switching regulator with PMBus™ for applications operating from 4.5V to 16V and requiring up to 40A (max) load. This single-chip regulator provides extremely compact, highefficiency power-delivery solutions with high-precision output voltages and excellent transient response for networking, datacom, and telecom equipment.

The IC offers a broad range of programmable features through either the PMBus or a capacitor and resistor connected to a dedicated programming pin. Using this feature, the operation can be optimized for a specific application, reducing the component count and/or setting appropriate trade-offs between the regulator's performance and system cost. Ease of programming enables using the same design for multiple applications.

The IC includes protection and telemetry features. Positive and negative cycle-by-cycle overcurrent protection and overtemperature protection ensure a rugged design. Input undervoltage lockout shuts down the device to prevent operation when the input voltage is out of specification. A status pin provides an output signal to show that the output voltage is within range and the system is regulating.

II. Manufacturing Information

A. Description/Function:	Integrated, Step-Down Switching Regulator with PMBus
B. Process:	TS18BCD
C. Device Count:	120800
D. Fabrication Location:	Taiwan
E. Assembly Location:	China, Thailand
F. Date of Initial Production:	June 2017

III. Packaging Information

A. Package Type:	15 FCQFN
B. Lead Frame:	N/A
C. Lead Finish:	Matte Tin
D. 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:	34.57 °C/W
L. Multi Layer Theta Jc:	0.24 °C/W

IV. Die Information

A. Dimensions:	88.58 X 303.15 mils
B. Passivation:	Si3N4/SiO2

V. Quality Assurance Information

A. Quality Assurance Contacts:	Ryan Wall (Manager, Reliability) Jeff Aquino (Sr. Manager, Reliability) Mike McCullar (VP 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:

$$\lambda = \frac{1}{MTTF} = \frac{1.83}{192 \times 2454 \times 80 \times 2} \text{ (Chi square value for MTTF upper limit)}$$

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

$$\lambda = 24.3 \times 10^{-9}$$

$$\lambda = 24.3 \text{ FITs (60\% confidence level @25°C)}$$

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

TS18 cumulative process data:

$$\lambda = 0.03 \text{ FITs (60\% confidence level @25°C)}$$

$$\lambda = 0.35 \text{ FITs (60\% confidence level @55°C)}$$

B. ESD and Latch-Up Testing

The MAX20734 has been found to have all pins able to withstand the following:

- HBM transient pulse of ± 2500 V per JEDEC / ESDA JS-001
- CDM transient pulse of ± 1000 V per JEDEC / ESDA JS-002

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
MAX20734EPL+

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	COMMENTS
Static Life Test (Note 1)	Ta = 125°C Biased Time = 192 hrs.	DC parameters & functionality	80	0	

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