

RELIABILITY REPORT

FOR

MAX5884EGM+  
MAX5884EGM+D  
MAX5884EGM+TD

November 4, 2020

**MAXIM INTEGRATED**

160 RIO ROBLES  
SAN JOSE, CA 95134



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## Conclusion

The MAX5884 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 MAX5884 is an advanced, 14-bit, 200MSPS digital-to-analog converter (DAC) designed to meet the demanding performance requirements of signal synthesis applications found in wireless base stations and other communications applications. Operating from a single 3.3V supply, this DAC offers exceptional dynamic performance such as 77dBc spurious-free dynamic range (SFDR) at  $f_{OUT} = 10\text{MHz}$ . The DAC supports update rates of 200MSPS at a power dissipation of less than 200mW.

The MAX5884 utilizes a current-steering architecture, which supports a full-scale output current range of 2mA to 20mA, and allows a differential output voltage swing between 0.1VP-P and 1VP-P.

The MAX5884 features an integrated 1.2V bandgap reference and control amplifier to ensure high accuracy and low noise performance. Additionally, a separate reference input pin enables the user to apply an external reference source for optimum flexibility and to improve gain accuracy.

The digital and clock inputs of the MAX5884 are designed for CMOS-compatible voltage levels. The MAX5884 is available in a 48-pin QFN package with an exposed paddle (EP) and is specified for the extended industrial temperature range (-40°C to +85°C).

Refer to the MAX5883 and MAX5885 data sheets for pin-compatible 12- and 16-bit versions of the MAX5884. For LVDS high-speed versions, refer to the MAX5886, MAX5887, and MAX5888 data sheets.

## II. Manufacturing Information

A. Description/Function:	3.3V, 14-Bit, 200Mps High Dynamic Performance DAC with CMOS Inputs
B. Process:	TS35
C. Device Count:	N/A
D. Fabrication Location:	Taiwan
E. Assembly Location:	Philippines
F. Date of Initial Production:	March 23, 2003

## III. Packaging Information

A. Package Type:	QFN
B. Lead Frame:	CU194
C. Lead Finish:	Matte Tin
D. Die Attach:	AB8290
E. Bondwire:	1 mil Au
F. Mold Material:	G700
G. Assembly Diagram:	05-9000-0051
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:	37 °C/W
K. Single Layer Theta Jc:	1 °C/W
L. Multi Layer Theta Ja:	26 °C/W
M. Multi Layer Theta Jc:	1 °C/W

## IV. Die Information

A. Dimensions:	105X134 mils
B. Passivation:	SiO/SiN

## V. Quality Assurance Information

<b>A. Quality Assurance Contacts:</b>	Ryan Wall (Manager, Reliability) Michael Cairnes (Executive Director, Reliability) Bryan Preeshl (SVP of QA)
<b>B. Outgoing Inspection Level:</b>	0.1% for all electrical parameters guaranteed by the Datasheet. 0.1% for all Visual Defects.
<b>C. Observed Outgoing Defect Rate:</b>	< 50 ppm
<b>D. Sampling Plan:</b>	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:

$$\lambda = \frac{1}{MTTF} = \frac{1.83}{1000 \times 2454 \times 45 \times 2} \quad (\text{Chi square value for MTTF upper limit})$$

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

$$\lambda = 8.296 \times 10^{-9}$$

$$\lambda = 8.296 \text{ FITs (60\% confidence level @25°C)}$$

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>.

TS35 cumulative process Fit

$$\lambda = 0.28 \text{ FITs (60\% confidence level @25°C)}$$

$$\lambda = 3.37 \text{ FITs (60\% confidence level @55°C)}$$

### B. ESD and Latch-Up Testing

The MAX5884 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  $\pm 250$  mA current injection and supply overvoltage per JEDEC JESD78.

**Table 1**  
Reliability Evaluation Test Results  
**MAX5884EGM+**

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	

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