

RELIABILITY REPORT
FOR
MAX9880AETM+
MAX9880AEWM+
PLASTIC ENCAPSULATED AND
WAFER LEVEL DEVICES

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MAXIM INTEGRATED

160 RIO ROBLES
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Conclusion

The MAX9880A 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 MAX9880A is a high-performance, stereo audio codec designed for portable consumer applications such as smartphones and tablets. Operating from a single 1.8V supply to ensure low-power consumption, the MAX9880A offers a variety of input and output configurations for design flexibility. The MAX9880A can be combined with an audio subsystem, such as the MAX9877 or MAX9879, for a complete audio solution for portable applications. The MAX9880A's stereo differential microphone inputs can support either analog or digital microphones. A stereo single-ended line input, with a configurable preamplifier, can either be recorded by the ADC or routed directly to the headphone or line output amplifiers. The stereo headphone amplifiers can be configured as differential, single ended, or capacitorless. The stereo line outputs have dedicated level adjustment. There are two digital audio interfaces. The primary interface is intended for voiceband applications, while the secondary interface can be used for high performance stereo audio data. Two digital input streams can be processed simultaneously and both digital interfaces support TDM and I²S data formats. The flexible clocking circuitry utilizes any available 10MHz to 60MHz system clock, eliminating the need for an external PLL and multiple crystal oscillators. Both the ADC and DAC can be operated synchronously or asynchronously in master or slave mode. The ADC can be operated from 8kHz to 48kHz sample rates, while the DAC can be operated up to 96kHz. The MAX9880A prevents click and pop during volume changes and during power-up and power-down. Audio quality is further enhanced with user-configurable digital filters for voice and audio data. Voiceband filters provide extra attenuation at the GSM packet frequency and greater than 70dB stopband attenuation at f_S/2. An I²C or SPI™ serial interface provides control for volume levels, signal mixing, and general operating modes.

II. Manufacturing Information

A. Description/Function:	Low-Power, High-Performance, Dual I ² S, Stereo Audio Codec
B. Process:	TS18
C. Device Count:	674087
D. Fabrication Location:	Taiwan
E. Assembly Location:	China, Taiwan, or Thailand
F. Date of Initial Production:	June 22, 2010

III. Packaging Information

	TQFN	WLP
A. Package Type:	TQFN	WLP
B. Lead Frame:	EFTEC64T	N/A
C. Lead Finish:	Matte Tin	N/A
D. Die Attach:	AB8200T or EN4900G	N/A
E. Bondwire:	Au (1.00 mil dia.)	N/A
F. Mold Material:	G770HCD or G770HJ	N/A
G. Assembly Diagram:	05-9000-3986	05-9000-3985
H. Flammability Rating:	UL-94 (V-0 Rating)	UL-94 (V-0 Rating)
I. Classification of Moisture Sensitivity per JEDEC standard J-STD-020-C	Level 1	Level 1
J. Single Layer Theta Ja:	38 °C/W	N/A
K. Single Layer Theta Jc:	1 °C/W	N/A
L. Multi Layer Theta Ja:	27 °C/W	42 °C/W
M. Multi Layer Theta Jc:	1 °C/W	N/A

IV. Die Information

A. Dimensions:	105.12X135.83 mils
B. Passivation:	Si ₃ N ₄ /SiO ₂

V. Quality Assurance Information

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|-----------------------------------|--|
| A. Quality Assurance Contacts: | Norbert Gerena (Engineer, Reliability)
Brian Standley (Manager, 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:

$$\lambda = \frac{1}{MTTF} = \frac{1.83}{192 \times 2454 \times 48 \times 2} \text{ (Chi square value for MTTF upper limit)}$$

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

$$\lambda = 40.51 \times 10^{-9}$$

$$\lambda = 40.51 \text{ FITs (60\% confidence level @25°C)}$$

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>.

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

The MAX9880A 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 +/- 250 mA current injection and supply overvoltage per JEDEC JESD78.

Table 1
Reliability Evaluation Test Results
MAX9880ETM+ (MAX9880A QBS)

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	COMMENTS
Static Life Test (Note 1)	Ta = 125C Biased Time = 192 hrs.	DC Parameters & functionality	48	0	

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