

## PIEZO AUDIO AMPLIFIERS



### INTRODUCTION

The **P**iezo **A**udio **A**mplifiers-series are a total solution to drive piezoceramic sound components. A range of different PCB sizes, amplifier topologies and maximum voltage peak to peak outputs, cover a wide solution to piezo audio amplification.

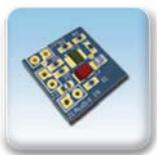
Piezo audio amplifiers are designed to handle capacitive loads and have the possibility to deliver large voltages peak to peak over the complete audio frequency range.

The heart of a piezo audio component is a ceramic piezo stone that interacts when it feels a certain voltage difference. An increase of a voltage peak to peak will have a larger piezo deformation and results in a larger sound output.

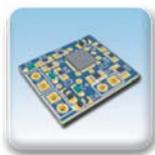
The PAA-series give a quality amplifier solution where a quality sound is needed.

### GENERAL OVERVIEW PAA SERIES

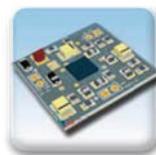
Model	PAA-LT3469-01	PAA-MAX9788-01	PAA-LM4960-02	PAA-StepUpBTL-01
Measurements PCB(mm)	15x15mm	14x16.5mm	25x25mm	40x35mm
Voltage input (V)	5V	5V	5V	5V-25V
MAX Capacitance Piezo Speaker	200nF	1µF	600nF	1µF
Max Voltage Output Vpp	33Vpp	20Vpp	24Vpp	60Vpp
Voltage Topology	Integrated step Up converter	Integrated step up converter	Integrated step up converter	Step up converter
Amplifier classification	Class A	Class G	Class AB	Class AB
Used amplifier configuration	Single ended	Fully Differential	Bridge Tied Load	Bridge Tied Load
Average current consumption of speaker and amplifier (mA)	45mA	15mA	85mA	40mA-400mA (2 Watt)



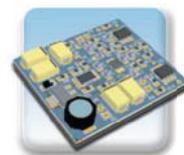
PAA-LT3469-01



PAA-MAX9788-01



PAA-LM4960SQ-02



PAA-StepUpBTL-01

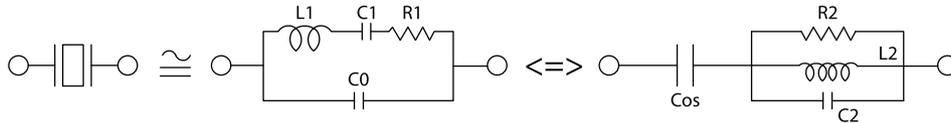
## BASICS OF PIEZO AUDIO AMPLIFIERS

$$PAA = P_{\text{piezo}} A_{\text{audio}} A_{\text{amplifier}}$$

An amplifier for audio signals special designed to drive capacitive loads.

**Max Cap.:** The maximum capacitance the Piezo Audio amplifier can handle.

-*Load Capacitance:* The main impedance of the Piezo Speaker or Piezo vibration element is a capacitance with values mostly between 10nF and 1µF.

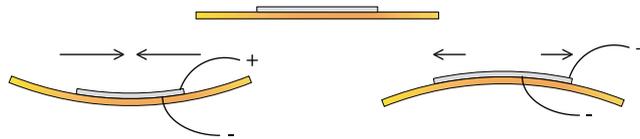


Simple Equivalent electronic circuits of a piezo element:

**Max Vpp:** Maximum voltage peak to peak that an amplifier can deliver at his output channel.

-*Max speaker Vpp:* Maximum voltage swing a piezo speaker can handle to work correctly within the described life time.

-*The heart of a Piezo speaker* is the piezo ceramic stone that interacts with voltage differences. How larger the voltage difference how more intense the amplitude of the sound will be.



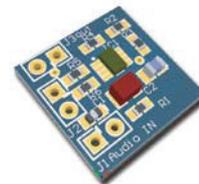
## PIEZO AUDIO AMPLIFIER SERIES

### PAA-LT3469-01

A PCB of only 2.25cm<sup>2</sup>. The LT3469 is a very small signal amplifier up to 30Vpp.

- Integrated charge pump power supply
- Class A Amplifier
- Single ended
- Capacitive load up to 250nF
- 10 components

total thickness:  
2.7 mm



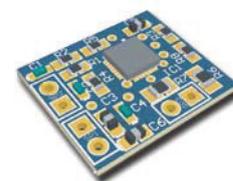
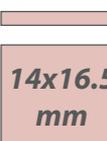
Fixed amplification ratio: +/- 131  
Voltage input: 5 V

### PAA-MAX9788-01

Designed on a printed circuits board of only 2,31 cm<sup>2</sup>, the "Max9788" piezo audio amplifier of Maxim fulfils the needs of very small designs in portable applications. A maximum output of 20Vpp and very low power consumption makes it even more attractive.

- Integrated charge pump power supply
- Class G Amplifier
- Fully differential inputs and outputs
- Capacitive load up to 1µF
- 15 components

total thickness:  
1.88 mm



Fixed amplification ratio: +/- 80  
Voltage input: 5 V