

## Boosted Digital Speaker Amplifier for Piezo Speakers with I-Sense

### Features

- High Efficiency Boost Converter
  - High efficiency 20 V output voltage for 40 V<sub>PP</sub> piezo drive
  - Multi-step class-H control by digital feed-forward processing
  - Active anti-windup scheme for boost converter loop compensation
- High Performance Digital Piezo Speaker Amplifier
  - Full digital class-D audio amplifier : Max. 40 V<sub>PP</sub> output
  - Large capacitive load drive : Max. 5 μF load drive
  - Low output noise : < 60 μVrms (A-weighted)
  - High audio performance : SNR 105 dB
  - I<sup>2</sup>S digital audio input interface: 8 kHz to 192 kHz
  - TDM multi-channel input interface : 4 or 8 channel, 16-bit or 32-bit at 48 kHz
  - I<sup>2</sup>C address selection input for stereo speakers
  - SDO output high impedance control for stereo speakers
  - Load current sense ADC for load impedance detection
- Digital Signal Processing for Sound Tuning
  - DSP for no-series-resistance piezo drive
  - Piezo tuning filter
  - Dynamic gain control
  - Soft volume and soft mute
  - Ten band 32-bit parametric equalizers for receiver or speaker sound tuning
  - Dynamic range compressor
  - Digital audio feedback signal for echo cancellation
  - Fine volume (+3 dB to -3 dB / 0.125 dB steps) after DRC
  - Tone generator
- Protections
  - Overcurrent protection
  - Under / overvoltage protection for boost converter

- Over current limit for boost converter
- Active anti-windup scheme for boost converter loop compensation
- Thermal management / shutdown circuit
- 7-step brownout protection / input voltage monitoring
- Others
  - Fault diagnostics by I<sup>2</sup>C interface
  - System clock source selection control
  - Input clock monitoring circuit with internal oscillator
  - Internal fractional-N PLL

### Applications

- Mobile Phones
- Laptops
- LCD, OLED TVs
- Wireless Mobile Speakers

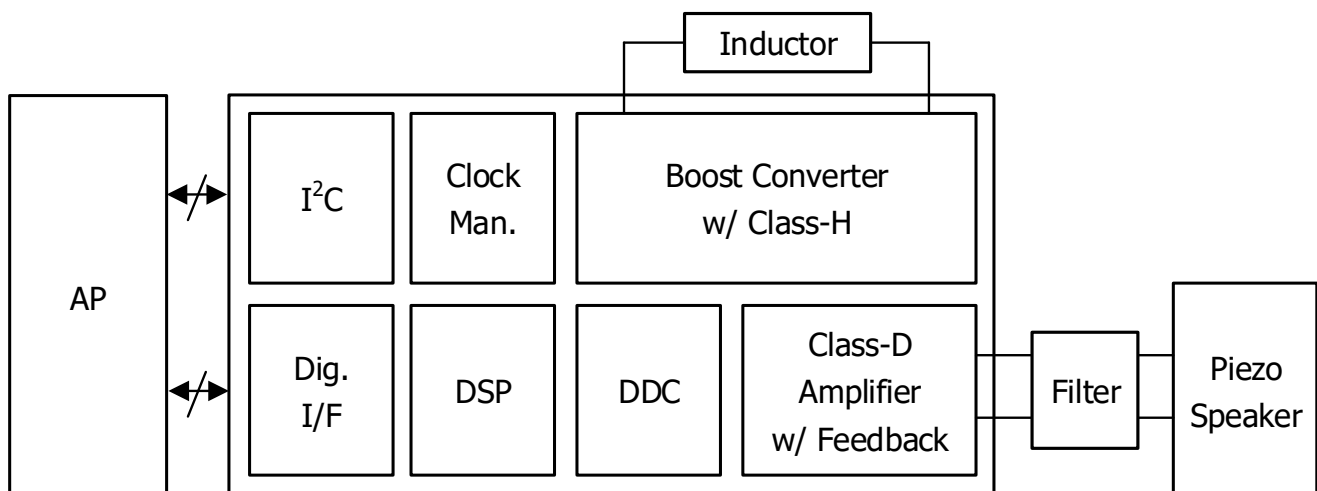
### Description

This document contains the detailed specifications of the SMA6201 digital class-D audio amplifier with an integrated boost converter. From input voltage or a single cell Li-ion battery power supply, the boost converter converts boosted output voltage into a full digital amplifier to make the large signal of outputs stable for the piezo speaker drive. Maximum output voltage level is 40 V<sub>PP</sub>.

### Device Information

Part Number	Package	Body Size
SMA6201-W	6 x 5 - WLCSP	2.48 mm x 2.41 mm

### Simplified Block Diagram



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