

Synaptics AS6303 46Vpp Boosted Piezo Speaker Amplifier

Preliminary Product Brief

Product Description



The AS6303 is a high-performance amplifier designed to drive capacitive loads of up to 10 μ F, such as piezo transducers. It integrates a 25 V boost converter, enabling Class H operation through an envelope-tracking architecture. The fine-grained booster, combined with advanced power flow management, minimizes current peaks in and out of the input supply for smooth system integration into portable devices.

The boost converter input supply is 10 V capable, allowing the AS6303 to be powered by 1-cell or 2-cell battery systems. The boost converter can be bypassed if desired, using an external voltage supply of up to 25 V.

The AS6303's high-performance digital Class D amplifier is able to drive capacitive loads of up to 10 μ F with an output voltage of up to 16Vrms, 46Vpp with advanced anti-pop protection and wide dynamic range. The AS6303 gain structure allows it to support both receiver and speaker modes, with extremely low idle channel noise. Its TDM / I²S-compliant digital interface simplifies connectivity to any host processor. Battery voltage, output load voltage, output load current, and feedback digital reference (post DSP) are converted into digital words and output via the TDM / I²S interface to the host processor for advanced control algorithms.

Applications

- Mobile and smart phones
- Tablets and laptops
- Smart watch
- Smart home displays
- Portable gaming systems
- Automotive

Features

High Efficiency Envelope Tracking 25 V Boost Converter

- Multi-step Class H operation, digital feed forward, envelope tracking control
- Advanced boost management power flow architecture minimizes battery-referred currents, simplifying system integration
- Wide input voltage supply range, from 2.7 V to 10 V, supporting both 1-cell and 2-cell battery powered systems

High Performance Digital Class-D Amplifier

- Can drive capacitive loads of up to 10 μ F
- Capable of driving dynamic speakers
- Ultra-low noise floor
- Wide dynamic range
- Output voltage up to 46 Vpp
- Anti-pop noise power up / down

Integrated Sensing for Advanced DSP Control

- Speaker load voltage/current, temperature/battery
- Sound pressure level (SPL) maximizer and impedance-tracking algorithms
- Digital audio feedback for echo cancellation

Advanced DSP

- Soft start / soft mute
- Smart auto-mute feature
- Supports TDM interface
- Tone generator

Host Processor Interface

- I²C interface
- One dedicated interrupt line
- TDM / I²S digital serial interface

Safety Features

- Short-circuit protection
- Over-temperature protection
- Battery-rail reactive brownout system protection
- Speaker current sensing and protection

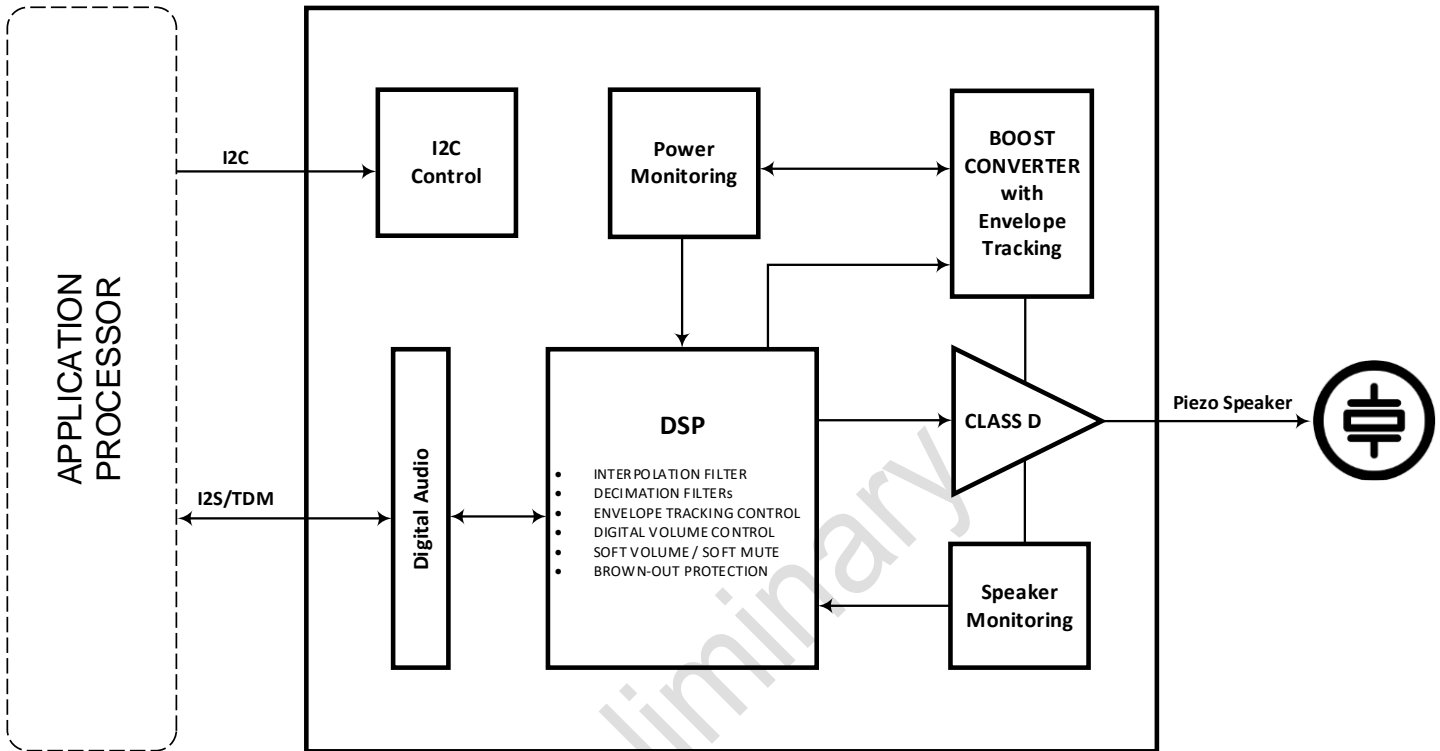
Advantages Over Traditional Amp

- Extreme power reduction
- Force sensing (gaming, button press)
- Haptic + ultrasound pattern generator

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AS6303 System Block Diagram



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