Product Overview

The Advantages are Clear
The earSmart™ eS305 Advanced Voice processor from Audience features innovations to deliver high-definition (HD) voice communications and sound quality for tablets, as well as mobile phones. Offering a low-power, high performance solution, with all-digital interfaces, the earSmart eS305 processor is specifically designed for easy integration into tablet architectures, in addition to mobile phones, and provides dramatic voice enhancement and wideband noise suppression for handheld speakerphone use. This makes the earSmart eS305 processor uniquely optimized to enable HD voice quality, giving tablet users clear, life-like conversations for video chats, VoIP and mobile calls over broadband Wi-Fi® and 4G wireless networks.

New Technologies Create New Demands
New feature-rich mobile devices, and expanding wideband 4G network access, are creating more ways to communicate and increasing the need for the highly advanced voice technology provided by the earSmart eS305 processor. With wideband networks, voice transmission becomes high-definition, but so does surrounding noise. In addition, the latest devices, such as tablets, and wideband applications like video calls, require handheld or hands-free (“far-talk”) speakerphone use, where the device is often held, or positioned away from the user. The combination of broadband transmission with far-talk communications presents new challenges in delivering a quality user experience, requiring more advanced voice processing solutions that meet higher standards.

A New Standard in Voice Quality
The earSmart eS305 Advanced Voice processor is based on reverse-engineering functions of the human hearing system. Replicating human auditory processes, the earSmart chip can distinguish sounds, isolate and enhance the voice signal, and suppress surrounding noise, from both ends of a call, to deliver clear communications in nearly any environment. These unique signal processing capabilities allow the earSmart eS305 processor to provide wideband HD voice and audio quality, with wideband non-stationary noise suppression, even for handheld speakerphone use, plus acoustic echo cancellation and automatic voice equalization.

With these features, the earSmart eS305 Advanced Voice processor gives tablets, as well as mobile phones, acoustic intelligence, to deliver clear communications in nearly any setting. The earSmart processor enables HD sound for more realistic voice reproduction, across speech applications, from VoIP calling to speakerphone conversations, video chats, voice memos, and more. For users on narrowband networks, it also provides a similar HD voice quality experience, transforming narrowband to wideband. It’s also highly consistent and robust, delivering voice enhancement and noise suppression across wideband 4G and narrowband (2 or 3G) networks, varied device usage modes, and changing device orientation, from landscape to portrait.

Easy Integration. Easily Customized
For device manufacturers the earSmart eS305 Advanced Voice processor is designed for seamless integration into all tablet, as well as mobile phone architectures, and features all-digital interfaces for performance and flexibility. earSmart technology offers a “whole product” solution, including software, tools, design collateral, and global technical support to facilitate design-in and speed-to-market. The earSmart eS305 processor is also highly customizable, allowing manufacturers to tune the system-on-chip's audio features to create a differentiating, signature sound.

More Power Using Less Power
Offering a custom high-performance, low-power Audio DSP core, the earSmart eS305 processor delivers twice the functionality with the same power consumption as provided in Audience’s earlier generation products. This additional computational capacity provides industry-leading voice processing for more functionality.
Audience eS305 Voice Processor Product Brief

The Science Behind earSmart
Audience is a pioneer in the development of commercial products based on the science of Computational Auditory Scene Analysis (CASA) to manage the characterization, grouping and processing of complex mixtures of sound. Using the principles of CASA, the eS305 voice processor makes mobile devices acutely aware of their surroundings, instinctively enhancing voice communication and suppressing noise, for a clear voice experience even in noisy settings.

Product Highlights

Powerful Processing

Featuring Audience’s next generation, high-performance custom digital signal processor (DSP) core, the eS305 system-on-chip provide advanced processing for:
- Wideband and narrowband non-stationary noise suppression, both transmit and receive
- Handheld speakerphone (HHS) non-stationary noise suppression, transmit and receive
- Automatic receive voice equalization (VEQ) to boost voice above the ambient acoustic environment
- Parametric equalizer for enhancing audio playback
- HD voice listening experience over narrowband networks

Accessibility Features

To provide customization and personalization options for OEMs, the eS305 processor includes:
- Personal Receiver Equalization – to allow customers to select a receive frequency response that matches their hearing characteristic
- Voice Stretch Mode – slows a calling party’s voice in real-time, retaining pitch accuracy, for improved comprehension during rapid conversations or for voice recording playback including voicemail

Customization Features

To optimize performance, the eS305 processor includes:
- A post-equalization (Post-EQ) filter for voice color tuning and to allow device manufacturers to manage frequency response
- A receive multi-band compander (MBC) to improve audio quality and offer speaker distortion compensation

Easy Integration

Enabling easy design-in, the eS305 processor includes:
- Audience’s AuViD 2.0 graphical software application to support the design and integration process, featuring step-by-step visual design tools to efficiently tune the audio features of the eS305 processor and customize voice capabilities
- Auto microphone calibration to eliminate costly testing and per-unit adjustments on the production line
- Graphical filter design tools for easy customization of Post-EQ and MBC filter design
- All-digital interfaces designed to fit any tablet or handset style in any design configuration

Efficient Platform

Designed for energy efficiency, the low-power, high performance chip is:
- Packaged in a highly compact 3.5mm x 3.5mm, 32-pin BGA (0.5mm pitch)
- Meets RoHS and Green requirements

Specifications

- Power Supplies
  - I/O: 3.3V – 1.8V
- Host Interface
  - Up to 1Mbps I2C interface
  - Up to 3Mbps UART
- Digital Audio Interface
  - Four I2S/PCM interfaces
  - Support digital microphone input

EarSmart Technology Diagram
eS305 Typical Application Diagrams

**Tablet**

[Diagram of a typical application diagram for a tablet, showing connections between various components like I2S/PCM, Tablet SOC, and eS305 Voice Processor.]

**Smartphone**

[Diagram of a typical application diagram for a smartphone, showing connections between various components like TX I2S, Mobile SOC, and eS305 Voice Processor.]