Application Brief

The Future Speaks: Advancing Intelligent Robots With Texas Instruments' Audio Amplifiers

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Introduction

Artificial intelligence is evolving rapidly and a key trend in the robotics industry is the ability to produce clear high-quality audio. Adding the ability to output sounds, alerts, and communication enhances the robot-to-human interaction. Because humans are naturally predisposed to communicate through speech and sound, robots with clear articulation can integrate more seamlessly into our lives. This clear communication also increases the efficiency of information comprehension.

The Brains Behind the Speaker

Introducing the brains behind the speaker: Texas Instruments offers a wide portfolio of audio amplifiers engineered to deliver the audio performance necessary for intelligent robots. TI's amplifiers deliver the clarity, efficiency, and reliability needed to drive sophisticated audio-driven robotic artificial intelligence (AI) applications. Not sure which amplifier is the right fit? See the following to explore various options and discover the designed audio amplifier for your unique design.

Use case: Simple voice prompts, music, beeps, and chimes

TAS2120: Efficient and Reliable Audio for Basic Communication (QFN)

The TAS2120 is a mono, digital input Class-D audio amplifier with an integrated boost for higher power delivery in battery-operated systems. Featuring both I2C control and hardware pin control modes, TAS2120 is a designed device to quickly implement audio into a smart robot. TAS2120 is engineered to deliver best battery life through advanced efficiency optimization features that enable the device to produce best-in-class efficiency across all power regions of operation. The Class-D amplifier is capable of delivering 8.2 W output power using integrated Class-H Boost.

Use case: Mid-level voice prompts, music, and alerts with small speakers

TAS2781: Precision Audio for Complex Robotic Announcements and Feedback (QFN)

The TAS2781 is a mono, digital input Class-D audio amplifier optimized for efficiently driving high peak power into loudspeakers. The Class-D amplifier is capable of delivering 25 W of continuous power into a 4Ω load with less than 1% THD+N. This is broad voltage input range and the high output power makes this amplifier versatile enough to work with various battery powered systems. An on-chip DSP supports Texas Instruments' Smart Amp speaker protection algorithm which allows for real-time monitoring of loudspeakers. This industry leading algorithm makes the TAS2781 designed for small intelligent robots that need to maximize a small speaker's potential.

Use case: Loud voice prompts, music, and alarms

TAS5830: High-Power, Premium Audio for Engaging Robotic Experiences (TSSOP)

The TAS5830 is a high-performance stereo digital input Class-D audio amplifier designed for sophisticated robotic applications. This stereo amplifier can output two 65 W channels with 4Ω loads while remaining at 1% THD or the outputs can be tied together to output 131 W with a 3Ω load. With large input voltage capabilities [4.5V – 30V] and an integrated audio processor this amplifier can be scaled to fit within various applications that need to deliver clear audio to a wide area.

Conclusion

Texas Instruments is committed to providing the technology that enables the next generation of powerfully communicative robots. Our audio amplifiers, combined with our broader expertise in sensing, processing, and power management, empower you to create robots that do not just respond to the world – the robots engage with the world.

To learn more about Texas Instruments wide audio amplifier portfolio, please visit Audio, Haptics, and Piezo.

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