

# High-Power Audio Amplifiers

Big sound. Small footprint. Great listening experience.



Wireless Speakers  
Soundbars  
Subwoofers  
Audio/Video Receivers  
Studio Monitors  
Automotive Amplifiers  
PA Speakers

At Texas Instruments, we believe in empowering our customers to design systems with the highest quality listening experience. Our history in audio, our best-in-class system expertise, and our commitment to customer satisfaction enables us to design products and ecosystems that make it easier for you to develop audio solutions.



## High-Resolution and Bandwidth

Deliver audio as it was recorded all the way to the speaker. The TPA32xx family supports up to 100 kHz audio bandwidth.



## Easy to Use

Simplify PCB design with fewer external components, integrated protection, scalable power options, and pin-to-pin compatibility.



## Advanced Signal Path

Innovative new modulation schemes and advanced feedback loop design to achieve nothing but the best device performance.



## Efficient Design

Best power efficiency and idle losses enable low power consumption and a smaller heat sink.



## High-Power

Devices with 35 W to 650 W of output power that deliver large sound in a compact size.



## Low-Distortion

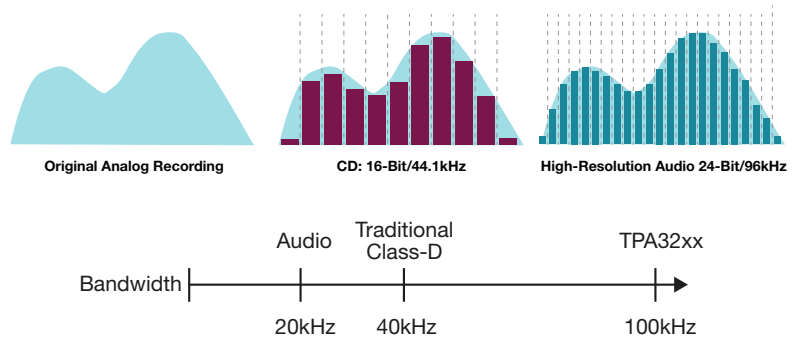
A new closed-loop design enables ultra-low THD across all frequencies.

# The High Power Audio benefit

## High-Resolution Audio

High-resolution audio offers listeners the ability to hear audio as it was originally recorded and higher bandwidth amplifiers are the key to delivering hi-res audio all the way to the speaker.

The TPA32xx series of amplifiers support high-resolution audio playback with a wide audio bandwidth (100 kHz) and unique features that reduce distortion.



## Efficiency

### High efficiency at full output power

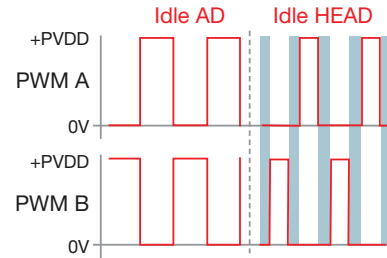
Nearly twice as efficient as Class-AB amplifiers

### High power, low idle loss

Output up to 650W, idle losses as low as 0.3W

### Play music longer from battery

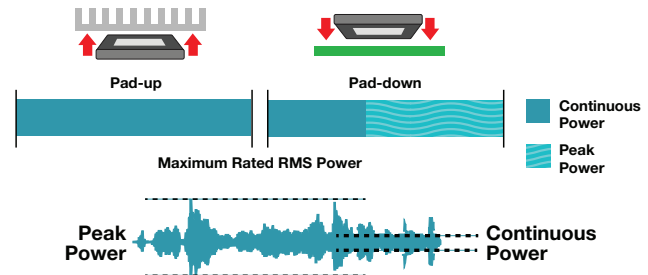
Industry leading low idle losses save power



## Peak Power vs. Continuous Power

Audio consists of low average power with few peaks that may allow eliminating the heatsink to save space.

The TPA32xx family offers pad-up and pad-down package options that allow either a heatsink or just the PCB to be used for dissipating heat.



## Integrated Protection

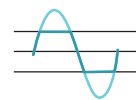
The TPA32xx family integrates many protection features to save space and ensure the safety of your product and speakers.



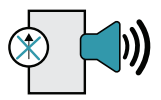
Over-Current Protection



Over-Temperature Protection



Early Clip Warning



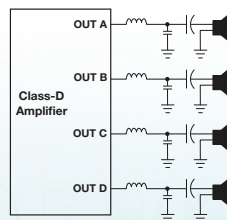
DC Bias Protection

## Flexible Design Options

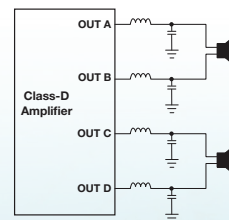
The TPA32xx devices support multiple output configurations all in the same package:

- 4-channels - Singled ended (SE)
- Stereo - Bridge-tied load (BTL)
- Mono - Parallel bridge-tied load (PTBL) in post- or pre-filter

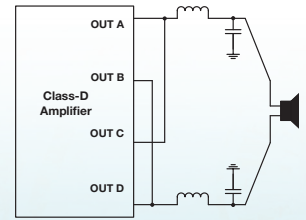
Family devices are pin-to-pin compatible for fast and easy reuse.



4-Channels—Single-ended (SE)



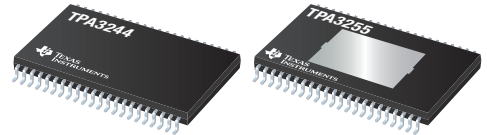
2-Channels—Bridge-tied load (BTL)



1-Channel—Parallel bridge-tied load (PBTL)

# TPA324x/5x

The highest performing monolithic Class-D in the industry

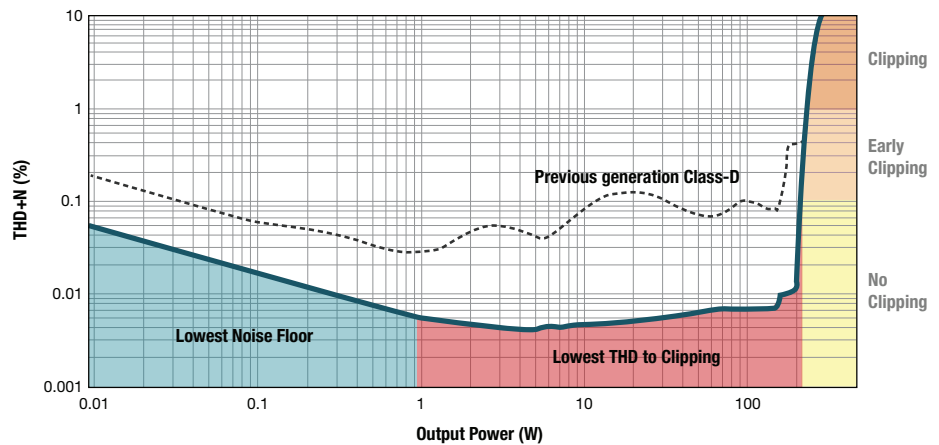


## Ultra HD Audio

To achieve the best and most accurate audio quality we designed the TPA324x/5x with **the lowest noise floor and total harmonic distortion (THD+N)** of any integrated Class-D.

Combined with a Signal to Noise ratio (SNR) of >110dB, the TPA324x/5x sets a new quality standard for audio amplification while achieving efficiency levels well above 90%.

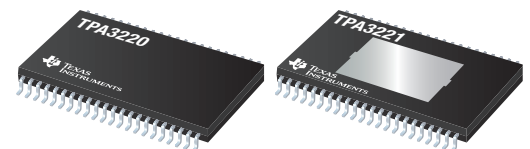
THD+N vs. Output Power



	Max Power to BTL/ Ch (W)	Max Power to PBTL (W)	Power Stage Supply Max (V)	Thermal Pad Location	Package	Dimensions
TPA3244	110 (4Ω)	160 (3Ω)	31.5	Bottom	44HTSSOP <sup>2</sup>	6.1 x 14mm
TPA3245	145 (3Ω)	230 (2Ω)	31.5	Top	44HTSSOP <sup>1</sup>	6.1 x 14mm
TPA3250	130 (4Ω)	190 (3Ω)	38	Bottom	44HTSSOP <sup>2</sup>	6.1 x 14mm
TPA3251	220 (3Ω)	355 (2Ω)	38	Top	44HTSSOP <sup>1</sup>	6.1 x 14mm
TPA3255	315 (4Ω)	605 (2Ω)	53.5	Top	44HTSSOP <sup>1</sup>	6.1 x 14mm

# TPA322x

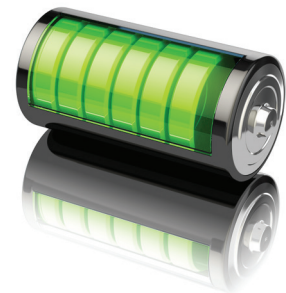
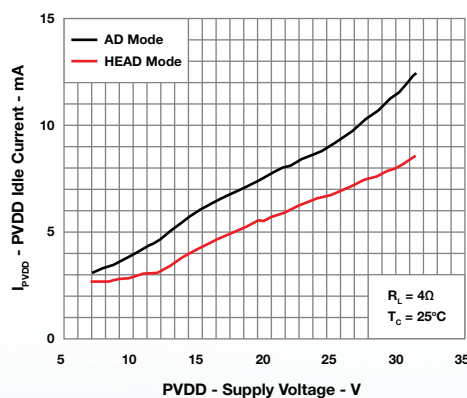
Lowest idle loss, rich features and an outstanding value



## Innovate Your Design

The TPA322x family is packed with integration and features to make designs simpler yet far more efficient. The TPA322x family can stretch the runtime of a battery with its high efficiencies and incredibly low idle losses.

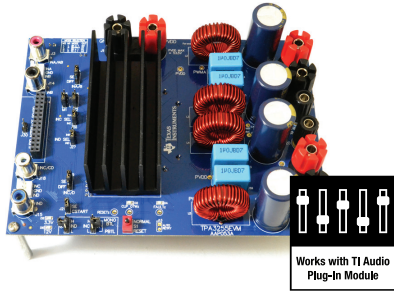
TPA322x features selectable gains, single rail supply or optional 5V gate drive, a mute pin, integrated protection including cycle-by-cycle current limiting, and support for the new HEAD modulation scheme.



	Max Power to BTL/ Ch (W)	Max Power to PBTL (W)	Power Stage Supply Max (V)	Thermal Pad Location	Package	Dimensions
TPA3220	110 (4Ω)	155 (3Ω)	32	Bottom	44HTSSOP <sup>2</sup>	6.1 x 14mm
TPA3221	105 (4Ω)	208 (2Ω)	32	Top	44HTSSOP <sup>1</sup>	6.1 x 14mm

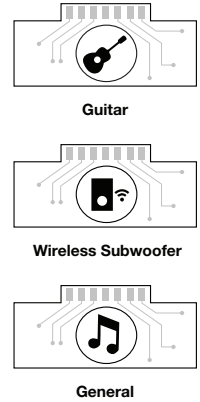
<sup>1</sup>Pad-Up, pin-compatible package  
<sup>2</sup>Pad-Down, pin-compatible package  
 Power numbers taken at 10% THD+N

# Tools to Get You Started



## Setup and Listen for Yourself.

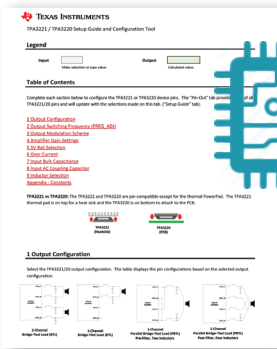
Experience TI Class-D amplifiers by listening to the performance for yourself with an Evaluation Module (EVM). EVMs are available for all Class-D amplifiers. Pair it with an Audio Plug-in Module (APM) and evaluate the whole signal chain fast and easy.



# Guides and Application Notes

## Device Configuration Tools

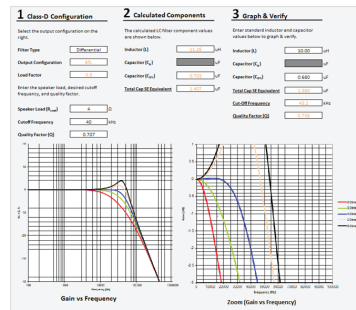
Choose your setup and we'll do the math.



A step-by-step setup guide and configuration tool for all TI Class-D amplifiers.

## LC Filter Designer

Calculate and design your Class-D LC filter.



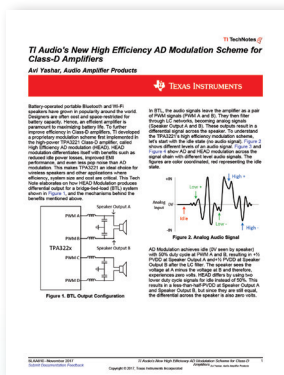
[ti.com/tool/lcfilter-calc-tool](http://ti.com/tool/lcfilter-calc-tool)

## Application and Tech Notes

Expand your knowledge and become an expert.

## TI Designs for Audio

Complete reference designs with schematic, layout and design guide.



## TI TechNotes

- Post-Filter Feedback (SLAA788)
- LC Filter Design (SLAA701A)
- Multi-Device Configuration (SLAA787)
- HEAD Modulation (SLAA810)
- Analog Input Grounding (SLAA719)



## TI Designs

- Dolby Atmos® Soundbar (TIDA-01414)
- Digital-Input Amplifier (TIDA-00874)
- Automotive External Amp (PMP11769)
- Universal 3.3V/12V/36V PSU (PMP10215)
- Wireless Subwoofer (TIDA-00232)



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