Analog class-D amplifiers

The world's highest-efficiency class-D amplifier family

September 2009

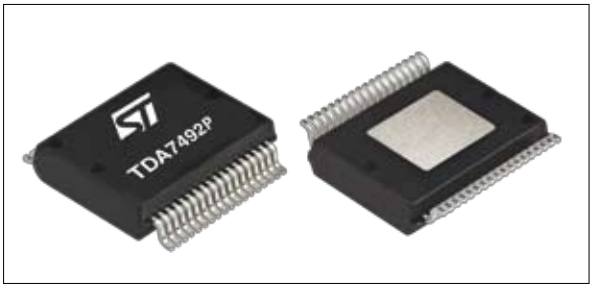
www.st.com/audio

Leveraging its long experience in audio devices, STMicroelectronics offers the widest range of analog class-D power amplifiers, ranging from a few watts up to 100 W per channel. This portfolio gives application designers an easy route to high-quality sound.

The pin-to-pin compatibility and ease of use simplifies design and reduces time to market and costs.

The technology used gives the highest efficiency in the world and so allows assembly in a very small SMD package, the PSSO36. The bottom side of the package has an exposed pad (slug down) that allows most applications to dissipate the small fraction of energy not used by the speakers through the PCB without use of a heatsink.

This family of products is specifically designed to address TVs (flat panels and CRTs) and home stereo equipment.



TDA7492P slug down view

TDA7492 slug up view

High reliability, outstanding audio quality, turnkey solution support and design resources have made ST the world leader in analog audio class-D amplifiers.
This brochure includes a simple selection guide for our analog class-D amplifiers to help you choose the best solution for your application.

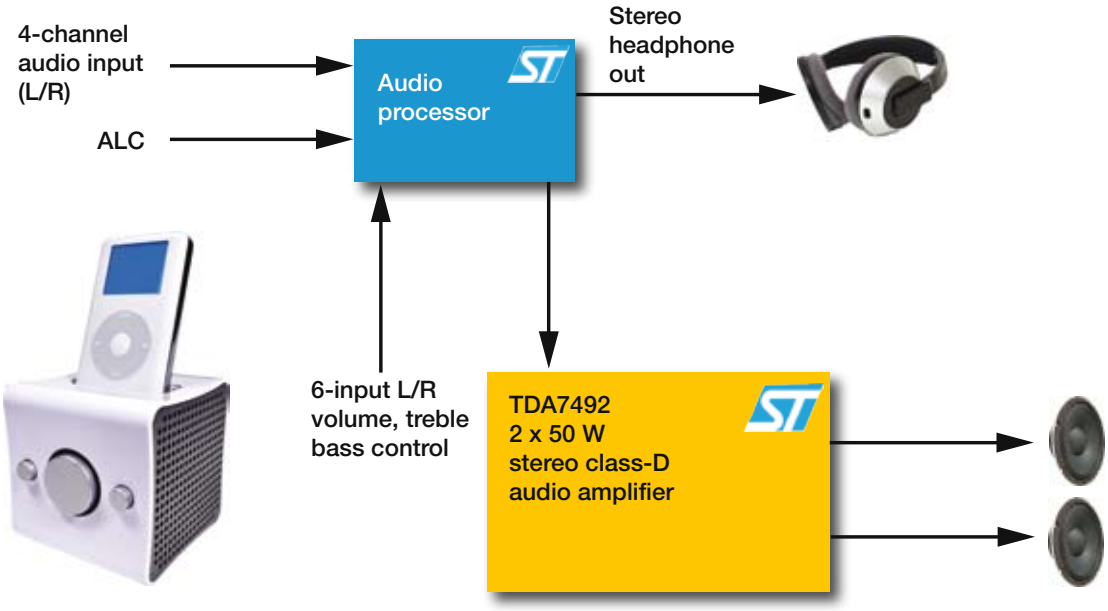


Figure 1. Audio processor with TDA7492 (2 x 50 W high-efficiency class-D audio power amplifier)

TDA749xx class-D audio amplifiers

TDA749xx amplifiers are all designed to work with a single supply and an operating range from 3 V up to 40 V.
They are fed with single-ended analog inputs. In noisy environments, they can also be operated with differential inputs, so improving the common-mode noise rejection.
The internal voltage feedback is common to all devices.
Four selectable fixed-gain values increase flexibility by matching different audio-source requirements.
In multichannel systems where more than one TDA749xx device is used in the same application, an external synchronization facility locks their internal clocks together to avoid any audible interference.

Two dedicated pins allow you to easily toggle the amp to either standby or mute mode, then back to play mode without pop noise during the transitions.
Filterless operation is possible for low-power devices and the EMI performances are still inside the FCC requirements.
Safeguards against the most common causes of IC damage are built-in: overcurrent, over/undervoltage and thermal protection.

Figure 1 shows a simple example of a stereo analog solution based on an audio processor with headphone drive, with a TDA7492 (2 x 50 W) analog class-D amplifier. Docking stations can be easily addressed with the proposed solution.

Key features

- Up to 90 % efficiency
- Synchronization
- Internal feedback
- Selectable gain
- Popless mute/standby
- Differential or single-ended inputs
- Filterless operation

Targeted applications

- Flat-panel TVs
- CRT TVs
- Audio home systems
- Active speakers
- Set-top boxes

A wide choice of bridge-tied-load (BTL) output powers

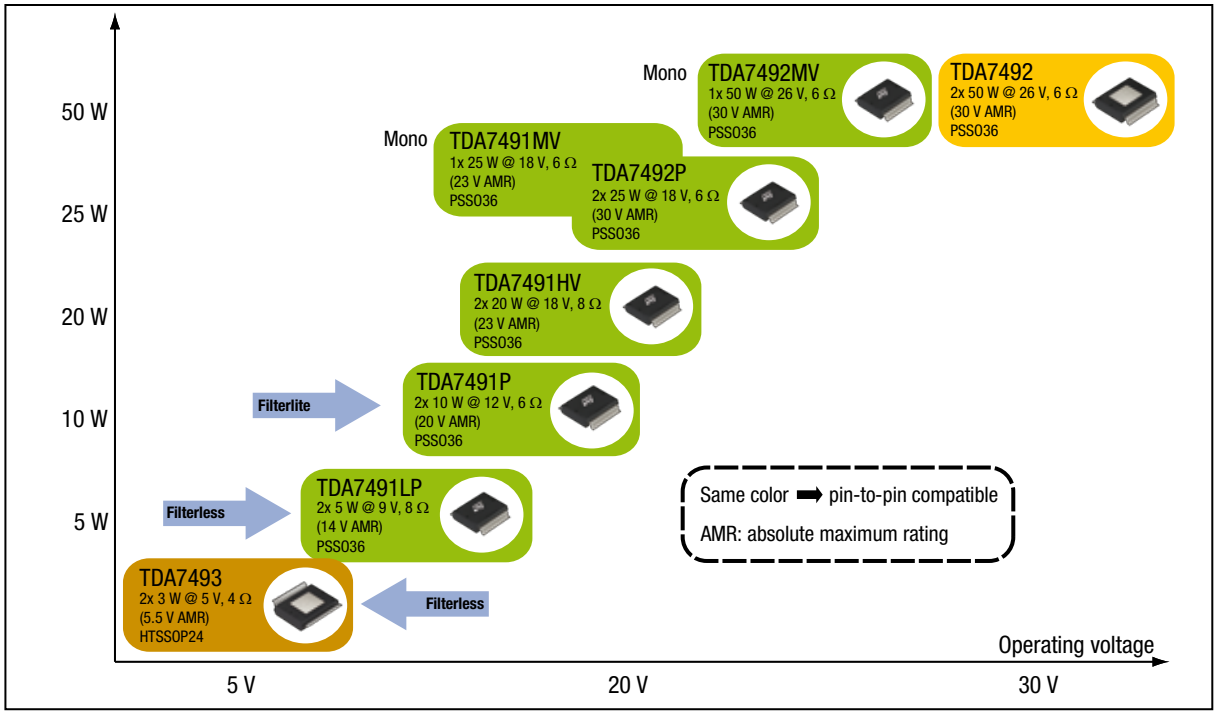


Figure 2a. Low to mid power class-D amplifiers

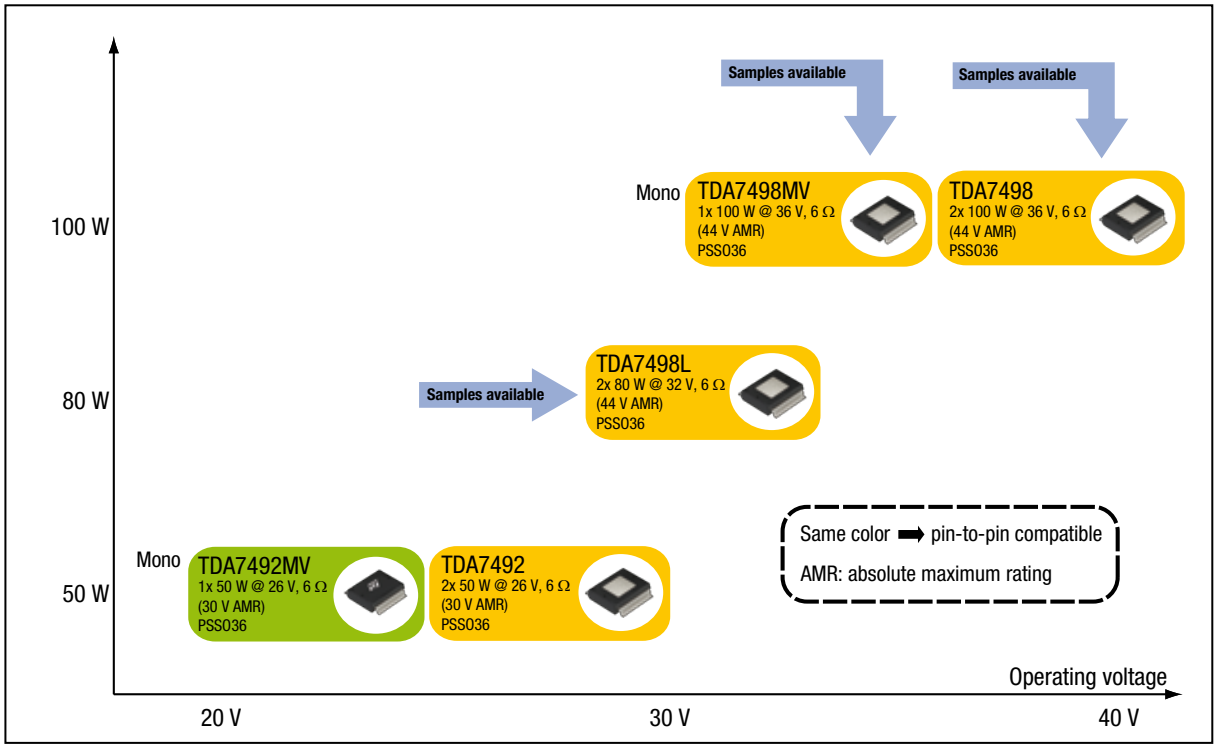


Figure 2b. Mid to high power class-D amplifiers

Class-D audio amplifier product table

Part number	Channels	P_{out} (W)	Selectable gain (dB)	Filterless(*)	Differential input	V_{cc} (V)	Packages
TDA7493	2	2 x 3	20, 26, 30, 36	•	•	3 to 5.5	HTSSOP24
TDA7491LP	2	2 x 5	20, 26, 30, 36	•	•	5 to 14	PSSO36 slug-down
TDA7491P	2	2 x 10	20, 26, 30, 36	•	•	5 to 18	PSSO36 slug-down
TDA7491HV	2	2 x 20	20, 26, 30, 36		•	5 to 18	PSSO36 slug-down
TDA7491MV	1	1 x 25	20, 26, 30, 36		•	5 to 18	PSSO36 slug-down
TDA7492	2	2 x 50	21.6, 27.6, 31.1, 33.6		•	10 to 26	PSSO36 slug-up
TDA7492P	2	2 x 25	21.6, 27.6, 31.1, 33.6		•	10 to 26	PSSO36 slug-down
TDA7492MV	1	1 x 50	21.6, 27.6, 31.1, 33.6		•	10 to 26	PSSO36 slug-down
TDA7498L	2	2 x 80	25.6, 31.6, 35.1, 37.6		•	10 to 36	PSSO36 slug-up
TDA7498	2	2 x 100	25.6, 31.6, 35.1, 37.6		•	10 to 39	PSSO36 slug-up
TDA7498MV	1	1 x 100	25.6, 31.6, 35.1, 37.6		•	10 to 39	PSSO36 slug-up

(*) Please refer to the relevant datasheet and application note for further information

Suitable class-D audio amplifiers according to application

Application	Suitable device
Flat TV	TDA7491LP, TDA7491P, TDA7491HV, TDA7491MV
CRT TV	TDA7491LP, TDA7491P, TDA7491HV, TDA7491MV, TDA7492P
Home system	TDA7491HV, TDA7492P, TDA7492, TDA7492MV, TDA7498L, TDA7498MV, TDA7498
Active speakers	TDA7493, TDA7491LP, TDA7491P, TDA7492P
Set-top boxes	TDA7491P, TDA7491HV
PC	TDA7493

The TDA7493 has been qualified for the FCC EMI requirements for both filter and filterless operating modes. Figure 3 shows that the EMI results (filterless) are well within the FCC mask.

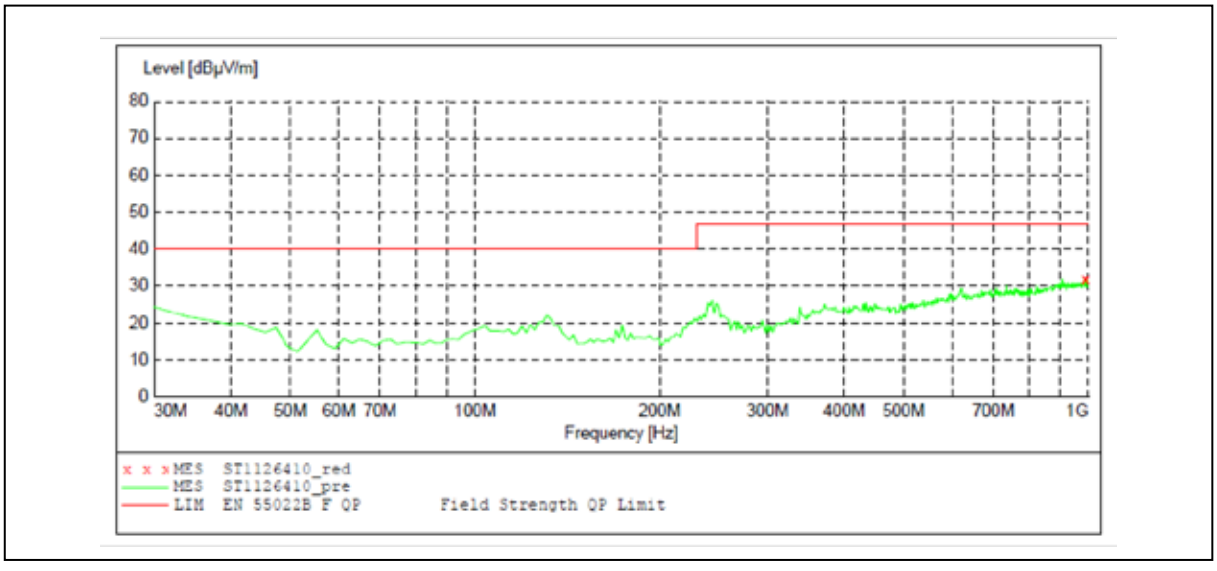


Figure 3. TDA7493 EMI test results under FCC requirements

The full pin-to-pin compatibility for most of the class-D family allows the use of the same PCB for applications targeting different output-power levels. This ensures a faster time to market and savings in development costs.

For more information about ST audio devices and boards, please see www.st.com/audio or contact eur.audio@st.com.

For more information on ST products and solutions,
visit www.st.com

Order code: BRCLASSD0909