



Qualcomm® CSRA6640 Single-Chip Amplifier Solution

Highly integrated single-chip amplifier solution with Qualcomm® DDFA™ Digital Amplifier Technology, designed for smaller form factor speakers, portable speakers, and more.

CSRA6640 is a flexible, single-chip solution designed to bring a new level of integration to our patented DDFA amplifier technology.

This tight integration makes superior class-D amplification more commercially viable on smaller form factors and cost sensitive products, helping manufacturers to differentiate by supporting premium sound quality in their mid to high-end audio products.

CSRA6640 is designed to offer multiple development advantages for premium audio performance, reduced BOM and reduced complexity of design.

Key benefits of CSRA6640 include:

- Premium amplification engineered for superior audio quality in smaller form factor, lower power speakers
- A new level of integration to help reduce design complexity and optimize BOM. This product includes our patented DDFA technology integrated on a single amplifier chip, including the amplifier output stage.
- Unique, patented DDFA technology - Qualcomm DDFA is designed to optimally balance the power efficiency of Class D devices alongside the high-performance audio output of traditional, linear amplifiers
- A new scalable evaluation kit is available with CSRA6640 which includes the necessary hardware, software, development tools and information needed to help optimize product scoping and design and reduce development time.

Product Highlights

Highly-integrated, single-chip architecture

Digital modulator, feedback processor, microcontroller, memory, configurable DSP, additional features and output phase -- all integrated on a single-chip solution.



Superior sounding digital audio

DDFA true digital and patented closed-loop architecture is engineered to provide a solution for designing speakers and amplifiers with low-noise, low-distortion and high dynamic range.



Advanced DSP features

The advanced configurable DSP with high-resolution support, automatic sample rate conversion, and mixing and filtering capabilities can help manufacturers build high-quality devices without the need for additional, external components.



Renowned DDFA technology

DDFA has been associated with high-end audio devices for more than ten years and is used by industry leading brands in the audio market today. As a result, DDFA technology and branding is recognised as a sign of excellent sound quality among audio-enthusiasts and consumers.



Qualcomm® DDFA™

Qualcomm

CSRA6640

CSRA6640 Applications

- Portable Speakers
- Speakers
- Soundbars
- Networked Audio Products
- Headphone Amplifiers
- Hifi Amplifiers

Features

Highly integrated single-chip architecture:

- DDFA Digital PWM modulator
- Analogue feedback processor
- Integrated microcontroller and OTP Memory
- Power management unit with single input power supply
- 2x20W BTL or 1x40W PBTL output stage
- Thermal protection

High-resolution configurable DSP:

- 8 channels, 2 channels out, with integrated audio mixer
- Up to 384kHz PCM and TDM inputs, as well as DSD64/128
- Automatic sample rate detection and conversion
- Bass and treble crossovers and tone control
- 15 biquad filters per channels
- Choice of interpolation filters with different sound characters
- Independent volume controls
- Delay lines for driver alignment
- Dynamic compression and soft clipping management

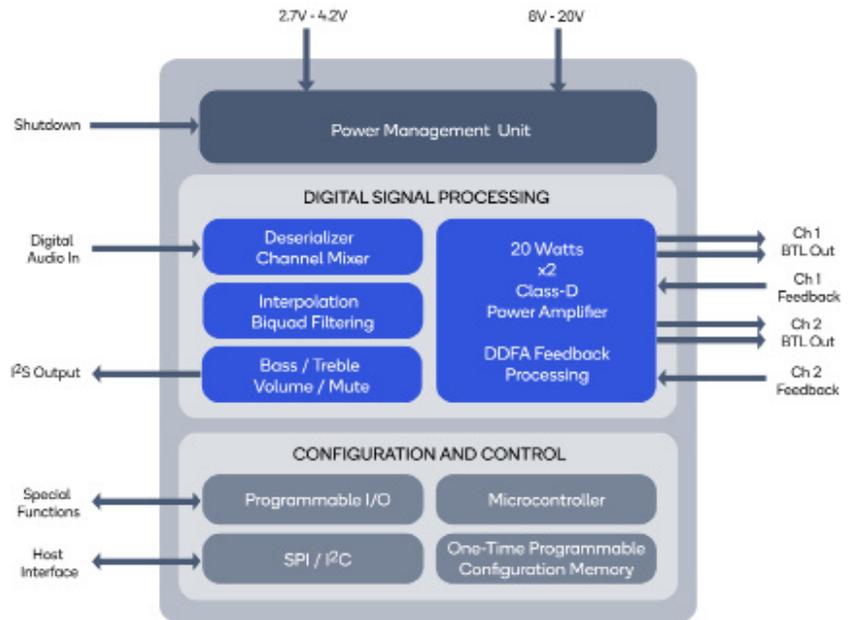
Flexible PWM configuration:

- 400KHz and 800KHz modulation
- AD and BD modulation options

Additional features:

- Cascade mode with four CSRA6640 combined for up to eight channels output sharing a single TMD bus and crystal
- Serial control interface over SPI/I²C
- Tuning tools for PCs
- GPIO resources

CSRA6640 Block Diagram



CSRA6640 Specifications*

THD+N < 0.0025% (8 Ohms, AD 400KHz modulation, 1kHz, -1dBFS)

Signal-to-Noise Ratio > 112dB (AD 400kHz modulation, A-wt, 1kHz, 0dBFS)

Dynamic Range > 112dB (AD modulation, A-wt, 1kHz, 0dBFS)

Noise Floor Modulation < 2dB (-60dBFS to -1dBFS)

Residual Noise < 35µVrms (AD modulation)

Package Size 9mm x 9mm x 0.9mm
0.4 mm pitch, 76-pin QFN

* These specifications are based on typical performances, and may vary based on your design.

Qualcomm®
DDFA™

To learn more visit: qualcomm.com

Qualcomm