APPLICATION FOCUS

# Exceptional Class D subwoofer amplifier solutions

## Setting new benchmarks in performance, power and cost

ZETEX
SEMICONDUCTORS

# Exceptional power and performance

The ZXCDSUBEV series of reference designs offers users:

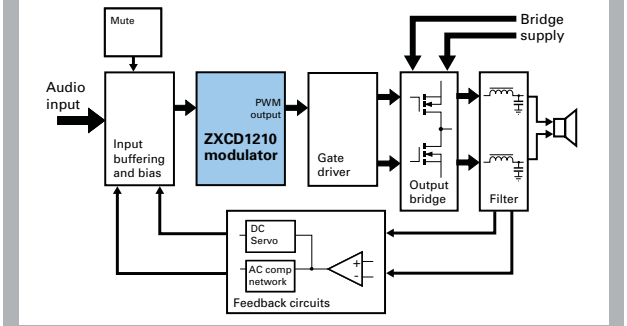
- THD+N less than 0.05%, 98dB DNR
- 125W to 500W power options from a single platform
- SE, BTL, protection and filter system options
- Unregulated supply or simple SMPS
- Selection of reference designs available

The ZXCDSUBEV series provides closed loop, analog input Class D amplifiers for subwoofer applications. The simple, scalable architecture enables very cost effective circuits at output power levels of 150W, 250W and 500W into 4Ω with exceptional audio performance.

Achieving THD+N figures better than 0.05% up to 90% full power with a flat frequency response up to 250Hz, ZXCDSUBEV reference designs are setting new standards for audio performance in active subwoofers.

These switching amplifiers owe much of their outstanding audio performance to a unique feedback architecture designed to reduce distortion. By taking its feedback signal from the filtered amplifier output, this high gain circuit design compensates for bridge mismatches and filter non-linearities, to achieve a reduction in THD+N across the entire power band.

The high performance ZXCD1210 modulator IC forms the heart of the amplifier design, providing complete control of the modulation function. Selection of Zetex FETs with optimum switching characteristics completes the N-channel FET power output stage.




The ZXCDSUBEV series of reference designs provides output power with exceptional audio performance.

**Scalable architecture:**
All N-channel output stage with either bridge tied load (BTL) or single ended (SE) configurations, together with power supply options generates 150W, 250W or 500W RMS into 4Ω with many more power options readily available.

**Feedback topology:**
Maintains high efficiency, very low distortion and cool running in the smallest footprint. Achieves much reduced output impedance for tight bass control.

**Easy power supply design:**
Feedback architecture compensates for supply dips and bridge design accommodates high off load voltages. Use of a basic SMPS or an unregulated supply is achievable without compromising performance.

**Anti-pop:**
Soft start controls 'on pop', under voltage lockout controls 'off pop'.

**Design options:**
Short circuit, thermal and DC offset protection circuits are available. Volume and phase controls and high/low pass filters are simply added.

# The performance advantage

The nature of many music and movie soundtracks means that significant power capacity above the mean level is required to correctly deliver the full impact of the sound. The excellent dynamic headroom offered by the ZXCDSUBEV architecture gives the ideal subwoofer performance, accurately reproducing large transients without clipping and with low distortion and flawless control.

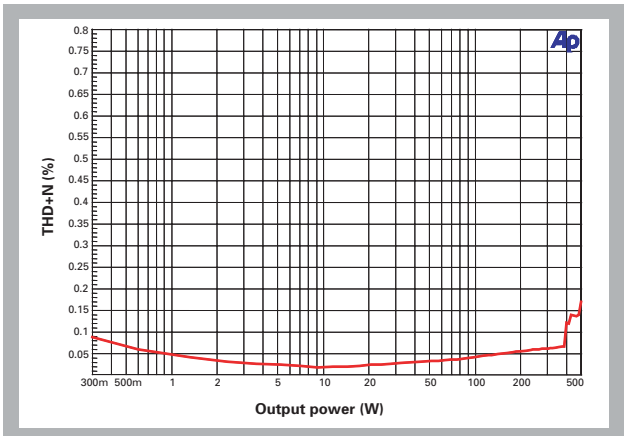
**Distortion and noise:**
THD+N <0.05% from 1W to 90% full power.

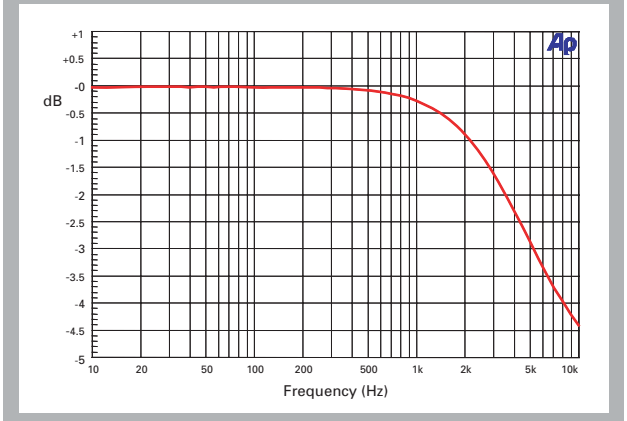
**Damping factor:**
Very low output impedance and damping factor of greater than 285 ensures tight bass response.

**PSRR:**
75dB supply rejection allows the use of simple SMPS or unregulated supplies.

**Dynamic range:**
Dynamic range (DNR) of 98dB and a noise floor -135dB ensures no hiss.

**Frequency response:**
Flat from 10Hz to 250Hz, dedicated to subwoofer applications.




Low THD+N up to 90% full power, high damping factor and 250Hz bandwidth are ideal for subwoofer applications.

# System design options

The scalable nature of the ZXCDSUBEV means that alternative power levels are easy to achieve. Other circuit options simplify system implementation:

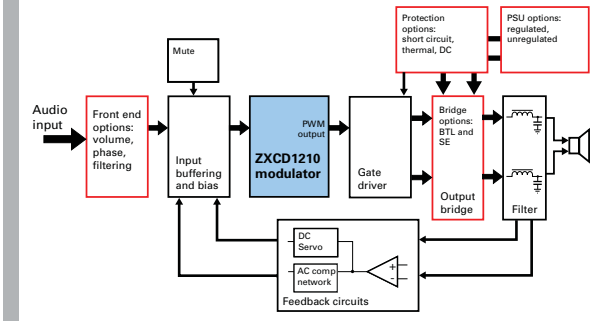
**Bridge architecture:**
An option between BTL and SE configurations results in a 4:1 power ratio from the same bridge supplies.

**Scalable power levels:**
Further adjustment of power is achieved by modification of the bridge power rails, ensuring a wide range of output powers can be achieved. All that is required is an adjustment of output FETs voltage rating to match.

**Power supply options:**
The high supply rejection resulting from the application of feedback gives users the option to use either regulated or unregulated supplies, including simple SMPS implementation.

**Protection options:**
Other options include protection features such as over-current sense for short circuits as well as a thermal overload detector and a DC offset detector.

**Front end options:**
Additional functions can easily be added to the front end of the reference designs to facilitate volume and phase control, high pass and low pass filtering.




Flexibility in design and circuit options match system requirements.

# Available reference designs

A selection of reference designs are available based on the ZXCDSUBEV architecture. These have been developed in order to demonstrate the range of bridge and power options from a common platform. Each uses essentially the same design and features the same high level of audio performance.

**ZXCDSUBEV500B:**
500W into 4Ω
BTL configuration
±35V bridge supply

**ZXCDSUBEV250B:**
250W into 4Ω
BTL configuration
±25V bridge supply

**ZXCDSUBEV150S:**
150W into 4Ω
SE configuration
±40V bridge supply

Contact your local Zetex representative for more details.

## Further information

Zetex aims to provide the most appropriate advice and support for users of the ZXCD series controllers, their associated reference designs and other switching amplifier products.

For further information on these reference designs, availability of evaluation boards and additional assistance refer to www.zetex.com/audio or email audio@zetex.com with your current project details.


ZETEX
SEMICONDUCTORS
ZXCDSUBEV Series
94V-0

## About Zetex

Zetex Semiconductors designs and manufactures high performance semiconductor solutions for analog signal processing and the management of power in automotive, communications, consumer and industrial electronics.

Meeting the demand for greater power economy, precision and speed in analog circuit design, the broad Zetex product range comprises application specific linear ICs and discrete semiconductor devices in multiple package configurations.

As a specialist in analog technology, Zetex offers a diverse series of ICs for motor control, lighting and DC-DC conversion as well as audio, video and linear applications. Its discrete component range features trench MOSFETs, IntelliFET™ smart MOSFETs and bipolar transistors.

Headquartered near Manchester in the UK, Zetex Semiconductors has manufacturing and sales operations in Asia, Europe and the USA and is supported by distributors in more than 45 countries.

For more information about Zetex, please visit
www.zetex.com
www.zetex.cn

Zetex Semiconductors is committed to protecting the environment and compliance with all relevant national and international legislation. In line with the European Union's RoHS directive (2002/95/EC), lead and other prohibited substances are being eliminated from the entire Zetex product range. For further information visit www.zetex.com/leadfree.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