

Power Supply ICs Are Honed For High-Fidelity Audio

[ROHM Semiconductor's](#) BD372xx series high-fidelity power supply ICs are optimized for audio devices requiring high-resolution playback. According to the company, these are the first audio power supply ICs to combine leading-edge analog and sound reproduction technologies. The series consists of three linear regulator models: the BD37201NUX low-voltage input, positive linear regulator, the BD37210MUV high-voltage input, positive linear regulator, and the BD37215MUV high-voltage input, negative linear regulator. Key electrical specs for these chips are shown in the table and Fig. 1 illustrates their use in a typical audio application.

In addition to integrating a newly developed fast response error amp circuit and low-noise architecture, multiple parameters that were shown to affect audio quality in the development and manufacturing processes were optimized via real-world listening tests. According to Rohm, these improvements resulted in industry-leading performance in all key characteristics (voltage stability, noise level, and power supply symmetry) required by power supplies for audio equipment. The company claims that until now there has not been an IC that optimally balances all three voltage regulator characteristics for demanding audio applications. Fig. 2 illustrates the power supply characteristics that need to be optimized for audio and how the impact of the BD372xx series on sound quality compares with that of existing power supply ICs.

The BD372xx regulators provide improved voltage stabilization by incorporating a newly developed error amp circuit capable of high-speed response over a wide bandwidth. This minimizes the effects of input voltage/output current fluctuations on the output voltage. The result is more faithful reproduction at the lower (bass) frequencies.

Class-leading low noise is achieved by adopting a low-noise architecture that suppresses noise generated within the IC (the 4.6- μ Vrms spec is said to be 50x lower than conventional devices). This eliminates the influence of noise to deliver clearer sound with superior transparency. Fig. 3 compares the PSRR (a measure of voltage stabilization) and noise level of the BD372xx with conventional voltage regulator options.

Besides the two positive linear regulators, this series offers a negative type that can be configured to achieve excellent symmetry in characteristics when used together. This makes it possible to improve sound image localization and expand the sound stage.

Members of the BD372xx series are available now in sample quantities with production quantities expected next month (June 2018). The BD37201NUX is suited for low-voltage digital devices such as DACs and DSPs, while the BD37210MUV and BD37215MUV are optimized for analog devices (i.e. sound processors, current-voltage conversion amps) that operate using both positive and negative voltage supplies. For more information see the BD37201NUX [product page](#), the BD37210MUV [product page](#), and the BD37215MUV [product page](#).

Table 1. Key electrical specs for the BD372xx series of linear regulators optimized for high-fidelity audio applications.

Part No.	Function	Input Voltage	Output Voltage	Output Current	Noise Level	Line Transient	PSRR	Package
BD37201NUX	Low voltage input, Compact package	2.7V to 5.5V	1.0V to 4.5V	500mA	4.72 μ Vrms (10Hz to 100kHz)	3mV (1.0V/ μ sec)	90dB (1kHz) 50dB \leq (10Hz to 1MHz)	VSON008X2030 (2.00 x 3.00mm)
BD37210MUV	High voltage input, Positive type	3.0V to 16.0V	1.0V to 15.0V	1000mA	4.60 μ Vrms (10Hz to 100kHz)	3mV (1.0V/ μ sec)	78dB (1kHz) 50dB \leq (10Hz to 1MHz)	VQFN020V4040 (4.00 x 4.00mm)
BD37215MUV	High voltage input, Negative type	-16.0V to -3.0V	-15.0V to -1.0V	-1000mA	5.10 μ Vrms (10Hz to 100kHz)	3mV (1.0V/ μ sec)	90dB (1kHz) 50dB \leq (10Hz to 1MHz)	VQFN020V4040 (4.00 x 4.00mm)

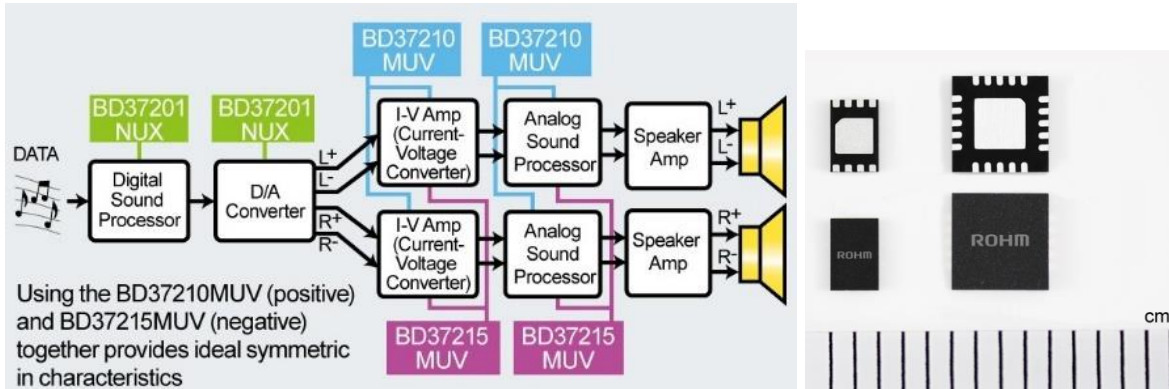


Fig. 1. Typical audio application using the BD372xx series of linear regulators. Device packaging is shown on the right.

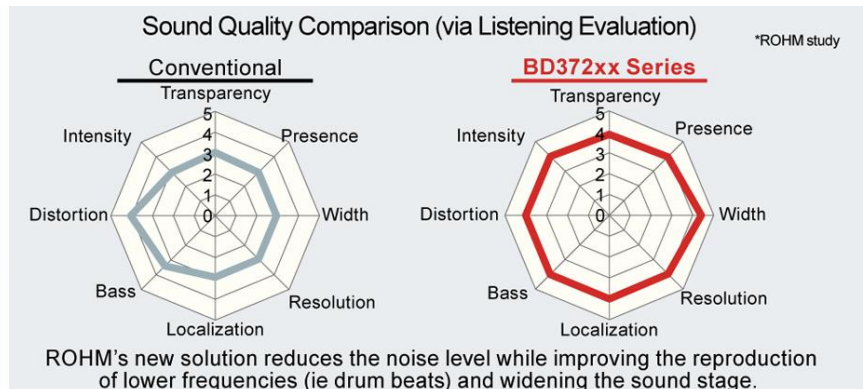
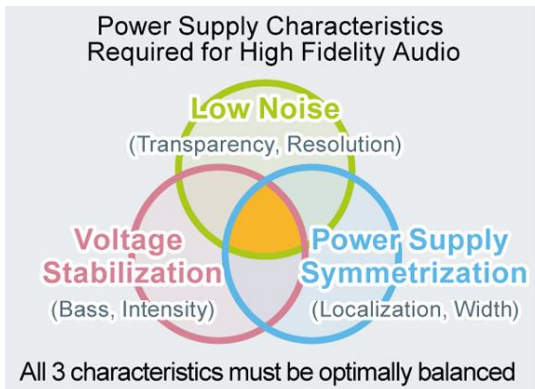


Fig. 2. The BD372xx series linear regulators are said to be the first audio power supply ICs that excel in all three characteristics—voltage stability, noise level, and power supply symmetry. The company's proprietary power supply analog design technology leverages power processes with audio quality expertise. The result is a very clean power supply compared with conventional solutions according to the company.

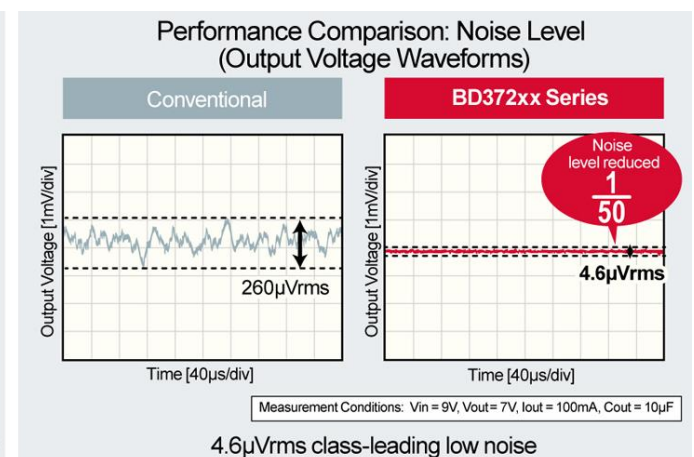
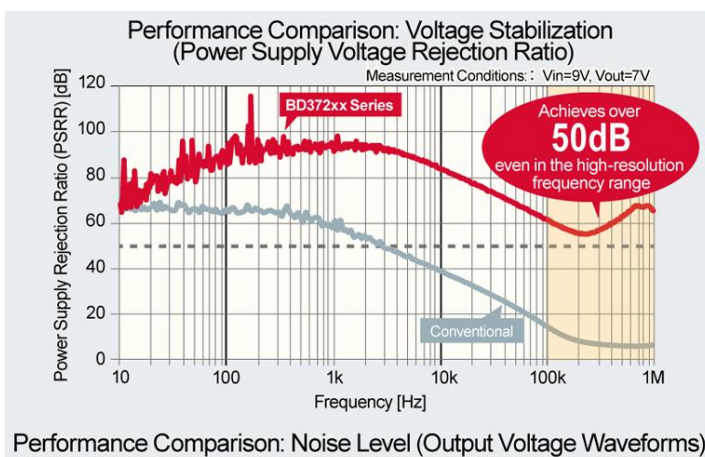


Fig. 3. The new linear regulators achieve over 50-dB PSSR even at high frequencies, while their 4.6-µVrms internal noise level is about 35 dB below conventional solutions.