

Audio Drivers Intended for High-Power Digital Designs



Silicon Laboratories today introduced a family of isolated gate drivers designed for high-power Class D audio systems with output power ranging from 30 Watts to 1,000 Watts. The new Si824x Class D audio driver family provides exceptional high-fidelity performance, robust noise tolerance and precise dead-time control for a wide range of digital audio applications such as home entertainment systems, powered speakers, guitar amplifiers, public address and outdoor speaker systems, alarms and sirens, and car stereos.

Class D amplifiers – the solution of choice for low-power audio designs – are rapidly replacing Class AB amplifiers in high-power audio applications. As the high-fidelity market increasingly adopts digital audio technology and high-efficiency standards, developers are designing energy-efficient “green” systems that meet Energy Star guidelines while delivering exceptional audio performance and enabling BOM cost reductions. Silicon Labs’ Si824x audio drivers provide an ideal solution for these emerging high-power Class D audio designs.

Digital signals in high-power Class D designs require careful control of the “dead time” between pull-up and pull-down stages to optimize performance. Too little dead time can result in wasted power, while too much can cause high total harmonic distortion (THD). Optimal dead-time control is critical to achieving the ultra-low THD performance required by high-fidelity audio systems. While competing audio drivers provide limited capabilities to tweak dead time, the Si824x ICs support precise dead-time control based on the value of an external resistor. The developer can adjust the dead time simply by changing the resistor value, making it easy to meet varying audio design requirements.

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Based on Silicon Labs' proven digital isolation technology, the Si824x audio drivers provide high-voltage isolation of up to 2.5 kV between input and output stages, enabling the input stage to be driven by low-voltage Class D control signals while the output drives the high-voltage, high-current output-stage transistors. Isolating the input stage from the output stage prevents noise and transients from corrupting sensitive signals. The high- and low-side outputs are isolated from each other and can be driven up to 1500 V, enabling the Si824x ICs to support high-power audio requirements.

By isolating input and output stages, the Si824x architecture offers the advantage of built-in level shifting. The gate driver's isolated architecture allows the audio system to seamlessly interface the high-voltage power stage with the low-voltage DSP/modulator stage without requiring any extra BOM components. In addition, the power voltages can be arbitrarily chosen, which eliminates the need for costly dc-blocking capacitors often required by competitive solutions.

Designed to operate in noisy environments, the Si824x drivers are inherently immune to power supply transients that can cause damage-inducing "latch-up." This built-in latch-up immunity enables superior manufacturing and operational reliability and lower BOM costs. Some audio amplifier designs based on competing audio drivers contain up to 20 discrete components to protect the driver ICs from latch-up.

"Offering significant advantages over existing audio driver solutions, the Si824x family sets a new high-fidelity performance standard for high-fidelity Class D audio designs," said Diwakar Vishakhadatta, isolation product line director at Silicon Labs. "The combined benefits of built-in digital isolation, precise dead-time control to minimize THD, and high immunity to latch-up and noise make the Si824x ICs an ideal match for high-power Class D audio applications."

In addition to the new Si824x audio drivers, Silicon Labs provides a wide range of IC products for the audio market including multi-band receivers, radio data system (RDS) data receivers, FM receivers, FM transmitters, FM transceivers and the recently announced EMI-mitigating Si270x Class D amplifiers for low-power (up to 5 Watts) audio designs.

Pricing and Availability

Samples and pre-production quantities of the Si824x Class D audio drivers are available today in a 16-pin SOIC narrow body package. Pricing for the Si824x ICs in 10,000-unit quantities begins at \$1.82 (USD). To ease application development, Silicon Labs offers the full-featured Si824xClassD-KIT evaluation board priced at \$250 (USD). For additional Si824x product information, please visit www.silabs.com/pr/audio-driver.

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