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Audio Power Chipset for Class D Digital Amplifiers

Features at a Glance:

- HEXFET[®] power MOSFETs with gate driver IC
- Optimized for Crystal[®] CS44210 TrueDigital[™] Class D power amplifier controller IC
- Up to 1MHz operating frequency with tight deadtime control
- Low $R_{DS(on)}$ and C_{OSS} for low power losses
- Fast and soft recovery body diode to minimize THD
- Gate driver IC for fast switching and low power losses

The IR Advantage:

When combined with Crystal CS44210 IC:

- Increases efficiency from 50% to 90%
- Reduces size by a factor of four
- Reduces THD for high quality sound



Topology	Power/Channel	Load	Cirrus Logic Controller	IR Gate Driver IC*	IR HEXFET [®] MOSFET*
Full Bridge	50W	8Ω	CS44210	IRCS8001 (SOIC-16)	IRCS8101 (D-Pak)
Half/Un-Bridged	50W	8Ω	CS44210	IRCS8001 (SOIC-16)	IRCS8102 (D-Pak)

IRCS-Series parts are designed to be used in the circuits provided in the Class D amplifier demo boards available from the [Cirrus Logic web site](#)

Background Information

International Rectifier's IRCS-Series power semiconductor chipsets include the IRCS8101 and IRCS8102 HEXFET[®] power MOSFETs and IRCS8001 gate driver integrated circuit (IC). The IRCS-Series IC and MOSFETs have been specifically designed and optimized for use with the Crystal[®] CS44210 TrueDigital[™] Class D power amplifier controller IC from Cirrus Logic[®] Inc.

Today, most audio applications use Class AB linear amplifiers. The emerging trend is to move to digital amplifiers, which offer a number of benefits over the traditional linear solution. With a higher efficiency, digital

amplifiers are smaller, lighter, streamlined, cool and quiet with extended battery life compared to the power hungry analog devices.

International Rectifier has leveraged its applications expertise in switching mode power supplies along with its advanced MOSFET technology to develop application-tuned MOSFETs for Class D amplifiers. In the Class D amplifier topologies, which evolved from switch mode power supplies, dead time control is critical to reduce total harmonic distortion (THD) and provide high audio quality.

IRCS-Series MOSFETs offer switching speeds up to 1MHz, without any compromise in efficiency, thanks to their low gate-to-drain charge (Q_{GD}), output capacitance (C_{OSS}) and on resistance ($R_{DS(on)}$). IRCS-Series MOSFETs minimize conduction and switching losses to improve the efficiency of Class D amplifiers. The industry norm efficiency for Class AB amplifier with bipolar transistors averages 50%. IR audio power chipset combined with Crystal CS44210 IC deliver a breakthrough efficiency of over 90%.

The low output capacitance and soft and fast recovery diode of the IRCS-Series MOSFETs enhance Class D amplifier to significantly reduce distortions in sound output. The IRCS8001 gate driver IC combines in a single chip, most of the functions to drive the MOSFETs and provides very fast switching speeds and low power dissipation. The IRCS8001 IC is specifically designed for the IRCS-Series MOSFET to deliver the highest performance.

Enhanced efficiency allows manufacturers to dramatically shrink the size of a typical audio amplifier by a factor of four. Better efficiency also translates in weight and system cost reduction. The size reduction increases product design creativity, allowing the amplifier to be built into a speaker or other unit, such as set-top boxes and DVD players. Increased efficiency also enables battery-powered amplifiers that can run up to three times as long compared to conventional amplifiers.

Cirrus Logic and IR have collaborated to develop complete optimized Class D amplifier solutions that make it easy for the audio designer to implement digital amplifier controllers. Cirrus Logic and IR have jointly developed demo boards combining expertise in audio ICs and power management. With these demo boards, the designers who choose to incorporate Class D amplifiers in their products reduce design time and time-to-market.

To order International Rectifier parts, please contact your [local International Rectifier representative](#)

To order Cirrus Logic parts and/or the demp boards, please contact your [local Cirrus Logic representative](#)

Location: [China](#) [Japan](#)

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