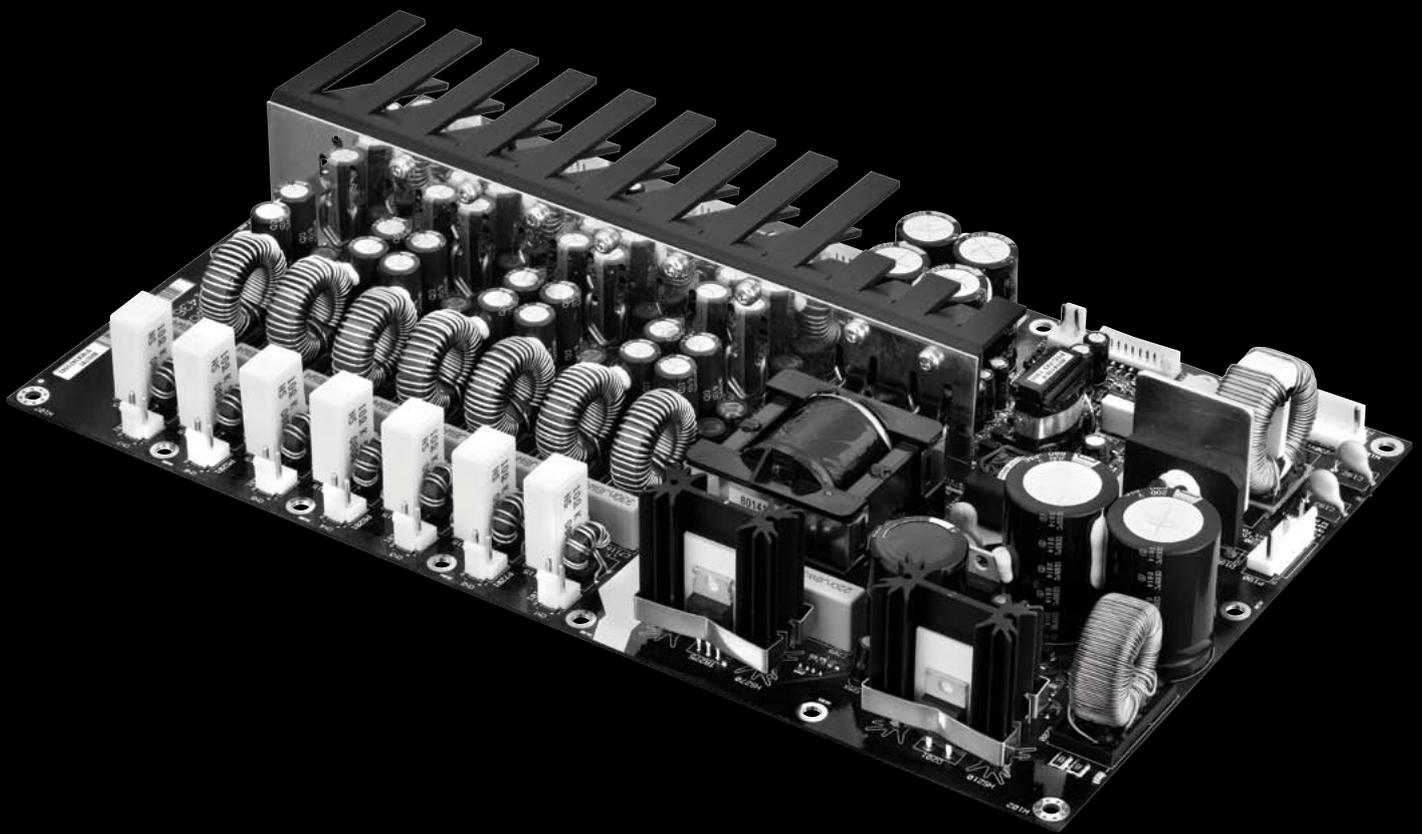
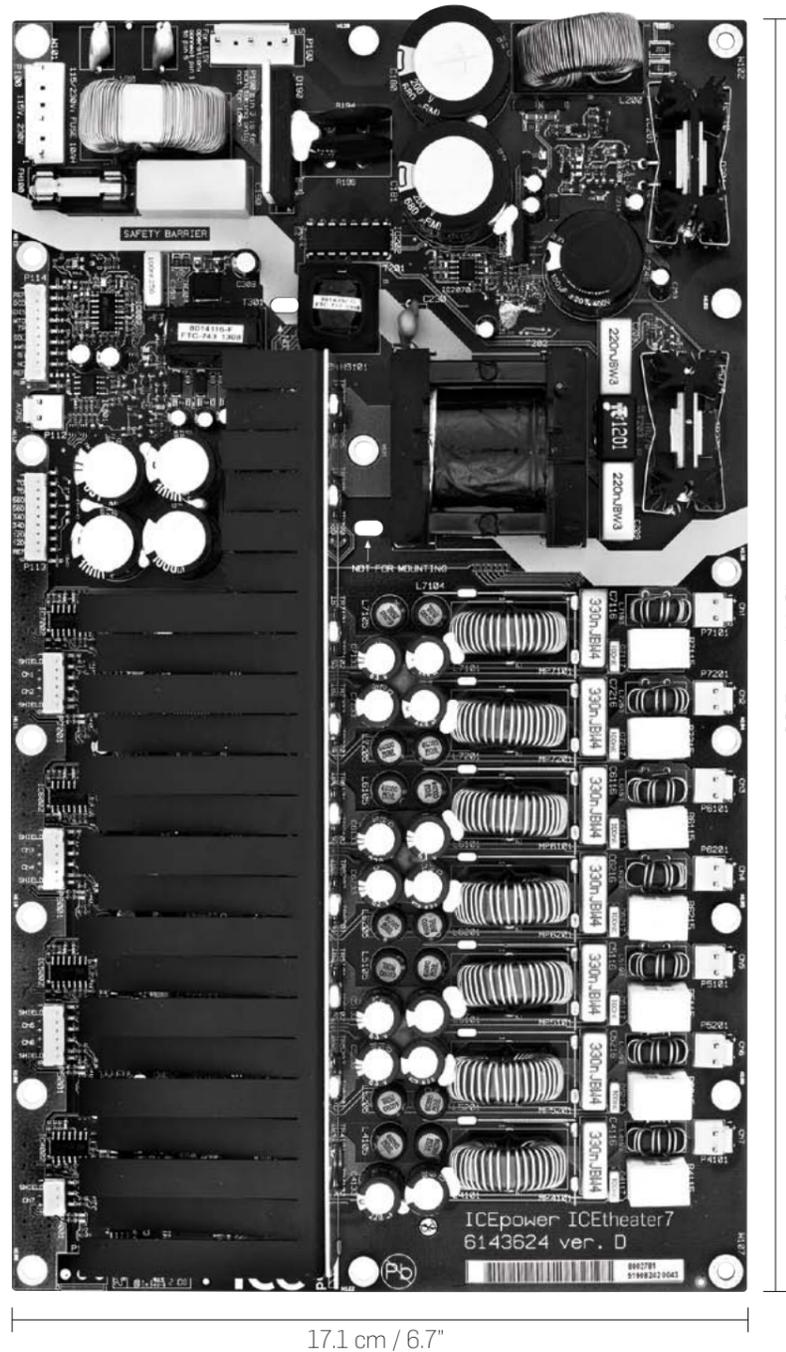


# ICEpower ICEtheater7



# ICEtheater7 Size and Power

ICEtheater7 - the audiophile home theater solution  
7 x 150W into 8 ohm audio amplifier



# Dear Audio Manufacturer

In recent years, interest within home theater and cinematic movie experiences at home has boomed among consumers. The potential in the market for home theater solutions is enormous and still growing. However, developing an A/V amplifier with state-of-the-art features and sublime audio capabilities is difficult and creating a solution that will satisfy the end-user and generate eye-catching reviews is time-consuming and challenging - until now.

With our multichannel amplifier, ICEtheater7, we have already taken most of the steps in the development process for you in order to support your development of a significant audio product that fulfills any demand for high-end audio quality and engaging movie experiences at home.

Today's consumers demand large sound from small boxes. No problem, ICEtheater7 is incredibly compact with a low height that easily will fit a small enclosure and a width developed for standard 17" (43 cm) cabinets. This makes it perfect for compact lifestyle products for the modern home. On top, ICEtheater7 has very low power consumption and heat dissipation thanks to efficient ICEpower Class D technology which keeps the electrical bill in check and leaves a small environmental footprint.

ICEtheater7 excels with sublime audio quality thanks to DualLoop<sup>3</sup> – ICEpower's third generation Class D topology. The DualLoop<sup>3</sup> technology inherits the good virtues from our previous generations with its exceptional control of real world loudspeakers and excellent audio performance and pairs it with new linearization techniques creating a big leap forward in audio performance and perceived sound quality. With ICEtheater7, you will benefit from our highest achievements in audio reproduction so far.

In order to save you valuable time and costs, ICEtheater7 has been pre-approved for safety and EMC, simplifying the task of achieving certifications for your final product. Furthermore, the build quality is exceptionally solid and we have added all relevant protection features to ensure long-time usage and outstanding reliability in order to minimize your quality costs.

# ICEtheater7 Overview

ICEtheater7 is an integrated amplifier and power supply solution that utilizes ICEpower's switching technologies. ICEtheater7 delivers 7 x 150W into 8Ω and incorporates our so far highest achievements in audio reproduction with DualLoop<sup>3</sup> - ICEpower's third generation class D topology.

## Feature Set Summary

Audiophile audio quality thanks to DualLoop <sup>3</sup> - ICEpower's 3rd generation Class D topology	✓
Compact size and light weight - perfect for lifestyle products	✓
Universal mains to minimize your stock (with ICEExtend)	✓
Standby functionality ErP 2013 compliant (with ICEExtend)	✓
Fully balanced input for easy integration and improved audio quality	✓
Single-ended outputs	✓
High power density	✓
Overcurrent and thermal protection	✓
Pre-approved for Safety, EMC and RoHS	✓

## Key Performance Parameters

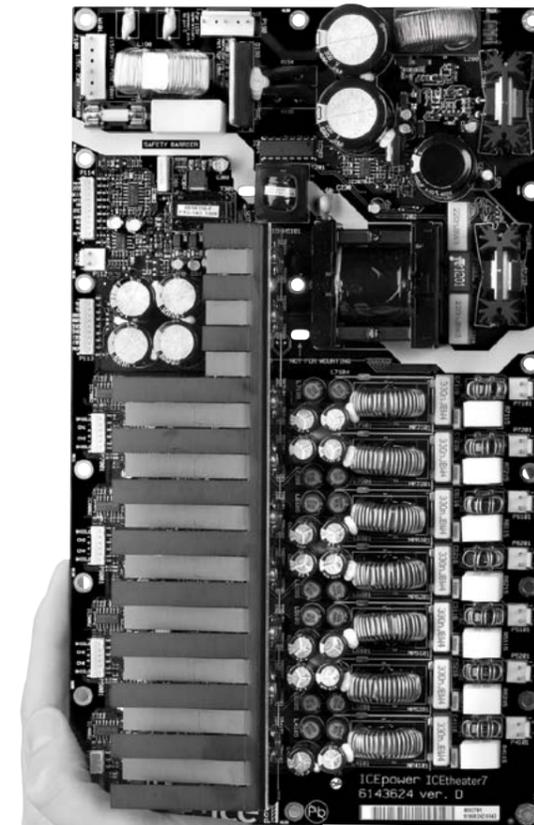
Nominal Power <0.05% THD+N, 8Ω, 20Hz-20kHz One channel driven FTC	150 Watts
Nominal Power <0.1% THD+N, 8Ω, 20Hz-20kHz Two channel driven FTC	150 Watts
Nominal Power <0.1% THD+N, 8Ω, 1kHz Seven channels driven	120 Watts
Nominal Power <0.1% THD+N, 8Ω, 20Hz-20kHz Seven channels driven FTC	63 Watts
Bandwidth 8Ω, -3dB point	100 kHz
Frequency Response 7Hz-20kHz 4Ω-16Ω load range	+/-0.8 dB
Damping Factor 8Ω, f<8kHz	>400
THD+N 1kHz, 5W, 8Ω	0.003 %
Dynamic Range A-weighted, stereo	115 dB

# Efficient Amplification the ICEpower Way

The efficiency of ICEtheater7 exceeds 90% in both the amplifier and power supply sections. This eliminates the notorious heat problems in traditional AV receiver and AV amplifier designs and ensures cool and reliable performance.

We are quite proud of the fact that ICEpower was one of the first companies that pioneered the audio industry's change from analogue technologies to highly efficient switching technologies, which brought about a true paradigm shift in the industry. Our technologies have raised the efficiency of the amplifier and power supply sections of the audio power conversion chain from 50-70%, possible with traditional analogue technologies, to 80-95% - making audio products "greener".

With today's widespread interest in home theater entertainment and advanced audio equipment, ICEpower's technologies truly make a significant contribution to rational use of energy in various audio applications.



# Application Convenience

The integrated design and compact, low profile form factor of the ICEtheater7 open up a world of new design opportunities for home theater audio applications. The overall weight and complexity of the amplifier section is dramatically reduced, mainly by eliminating the massive transformer and the bulky heat sinks normally required by class AB amplifiers.

Integrating switching power electronics into audio products introduces a range of challenges, particularly in AV Receivers. EMC-issues, AM/FM tuner compatibility and general performance degradation require unique specialist competences and significant R&D effort.

ICEtheater7 solves these complex issues by offering an integrated amplifier and power supply solution on a single board. This novel design approach ensures a smooth and easy application of the module by our customers, supported by the advanced feature set and the availability of all the relevant EMC and safety pre-approvals.

ICEtheater7 contains an on-board heat sink. Therefore, the solution is fully self-contained, both mechanically and thermally, and is delivered ready for mounting in a standard 43 cm (17") chassis. ICEtheater7 carries switchable mains to accommodate for electrical mains worldwide. Universal mains is obtainable with the ICEExtend frontend.

The switch-mode power supply has been optimized for home theater use: a special control loop has been implemented for communicating power level between power supply and the amplifier. Further, ICEtheater7 is designed for easy and tidy signal routing in a typical AVR or home theater amplifier.

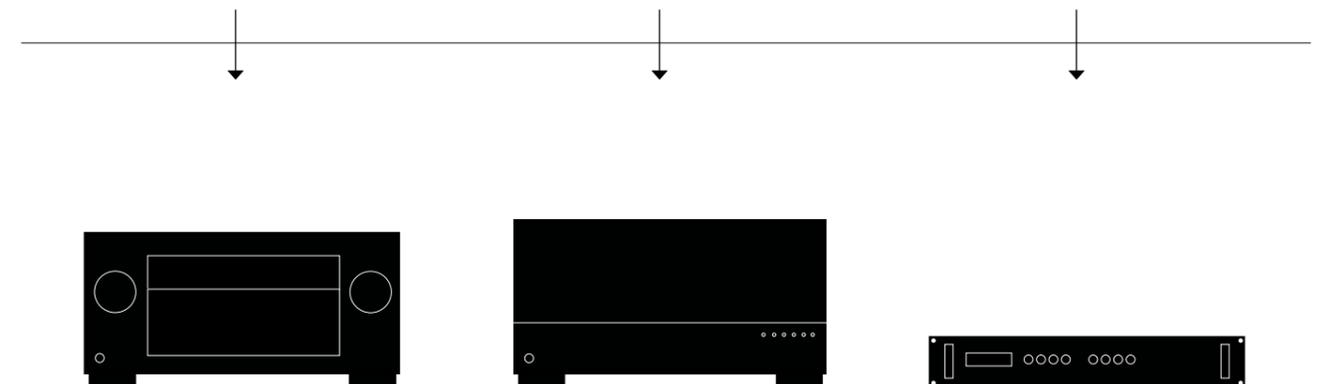
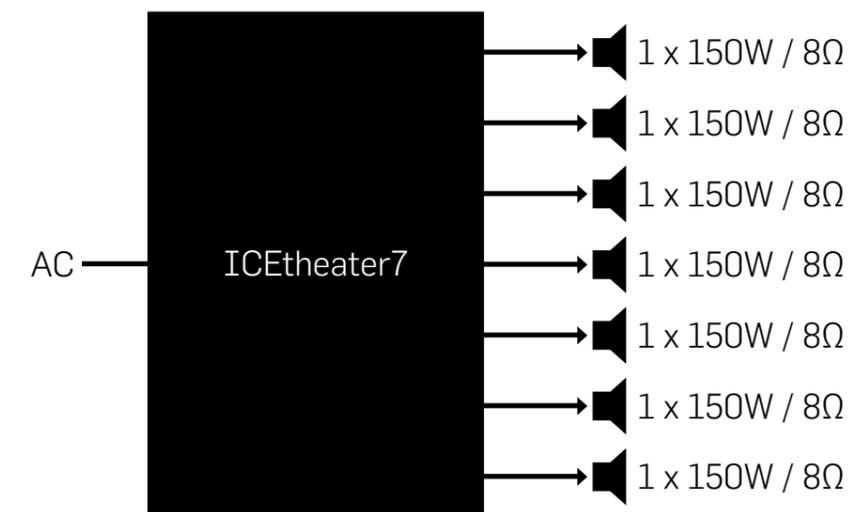
The solution contains a diagnostic interface made for easy integration with the A/V receiver's micro controller, where the information such as temperature and amplifier protection status can be read.

Finally, ICEtheater7 incorporates extensive protection schemes which have been integrated to secure optimal reliability through development, testing and most importantly, through the years of operation in our customers' products.

# Applications

Building a complete home theater has never been easier with the new ICEtheater7. With up to seven channels achievable, a comprehensive range of protective features and an excellent construction quality, the system is the evident choice for the following applications:

- A/V multichannel amplifiers and receivers
- Custom installation amplifiers



# Superior Audio Performance - Thanks to DualLoop<sup>3</sup> Technology

In our constant strive to improve the sonic performance of our Class D amplifiers, the ICEpower R&D team has produced yet another breakthrough introducing the DualLoop<sup>3</sup> technology.

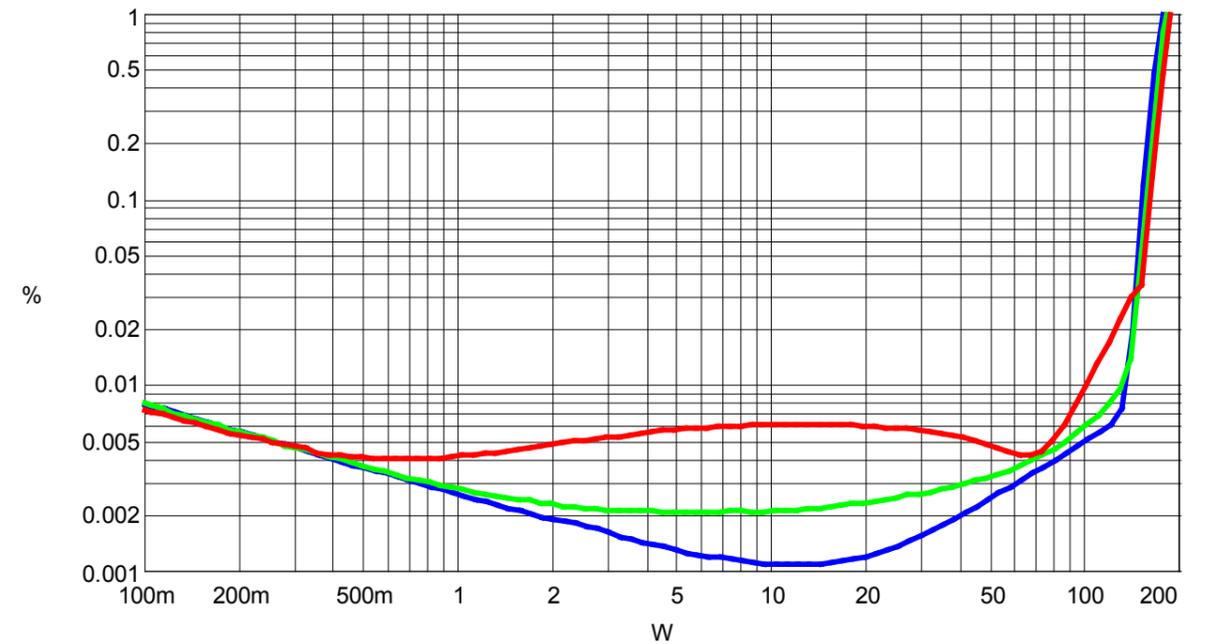
The DualLoop<sup>3</sup> technology is the ICEpower third generation Class D amplifier loop implementation which inherits the good virtues from our previous generations with its exceptional control of real world loudspeakers, excellent audio performance and pairs it with new linearization techniques creating a big leap forward in audio performance and perceived sound quality.

The ICEpower DualLoop<sup>3</sup> consists of a self-oscillating inner loop creating a stable and load invariant oscillation condition with improved linearity and a second loop - the global outer loop taken right from the loudspeaker connection which includes newly invented linearization characteristics. The sum of these inventions reduces the harmonic distortion and noise level, improves the power supply rejection ratio as well as the channel separation and, importantly, it enhances the ability to control real world loudspeaker impedance loads. Other amplifier parameters have also been kept in focus and the switching amplifier efficiency is still maintained at over 90%.

We are proud to conclude that our technical ideas to invent improved loop technologies have proven very successful also in relation to the reproduced sound quality. This has been verified during our own listening sessions as well as by some of our trusted customers. The Dual Loop<sup>3</sup> technology conveys a greatly improved sonic performance. This is exemplified by a clearer midrange with extended detail without any harshness and a treble with finer resolution leaving the instrument overtones intact creating a truly natural sound. The bass reproduction is still powerful with exceptional control and detail as well as having a high dynamic impact. The sound stage is widened with easily detectable and natural positioning of the musicians. Also the depth of the sound field is increased resulting in a more involving experience. All in all, the music is effortlessly reproduced on a more black background.

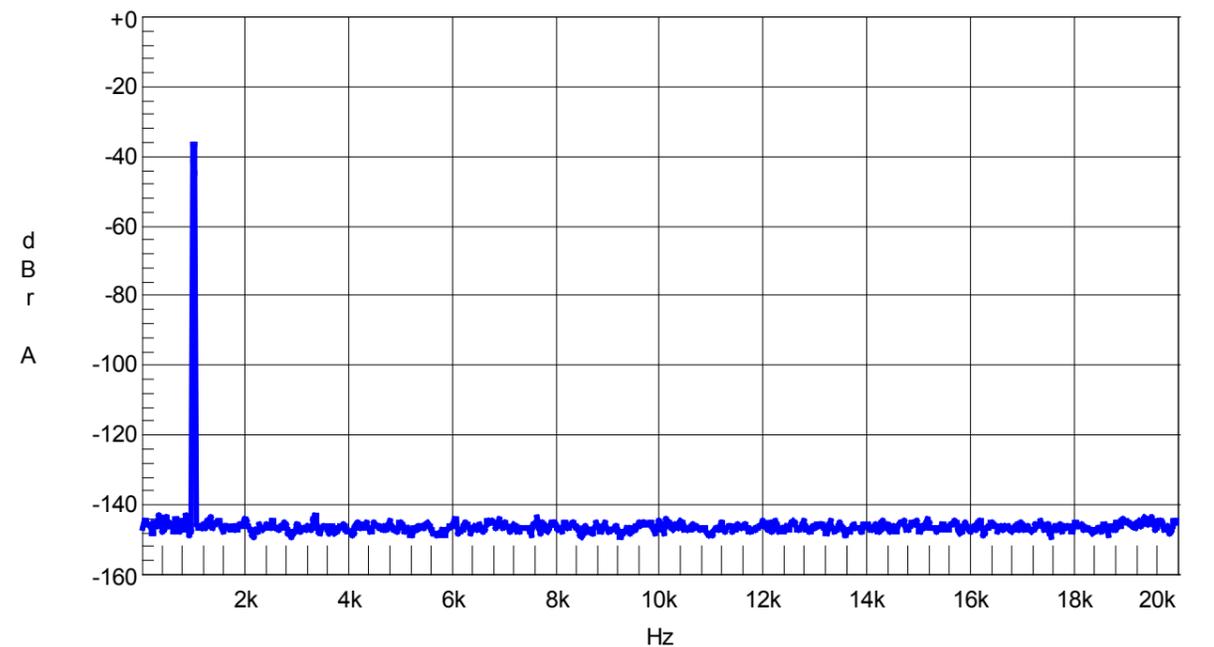
The ICEpower DualLoop<sup>3</sup> technology is the result of targeted research towards an extraordinary audiophile experience and our next contribution to the audio world of power electronics. ICetheater7 is the first amplifier to benefit from our so far highest achievement in audio reproduction.

## THD+N vs. output power



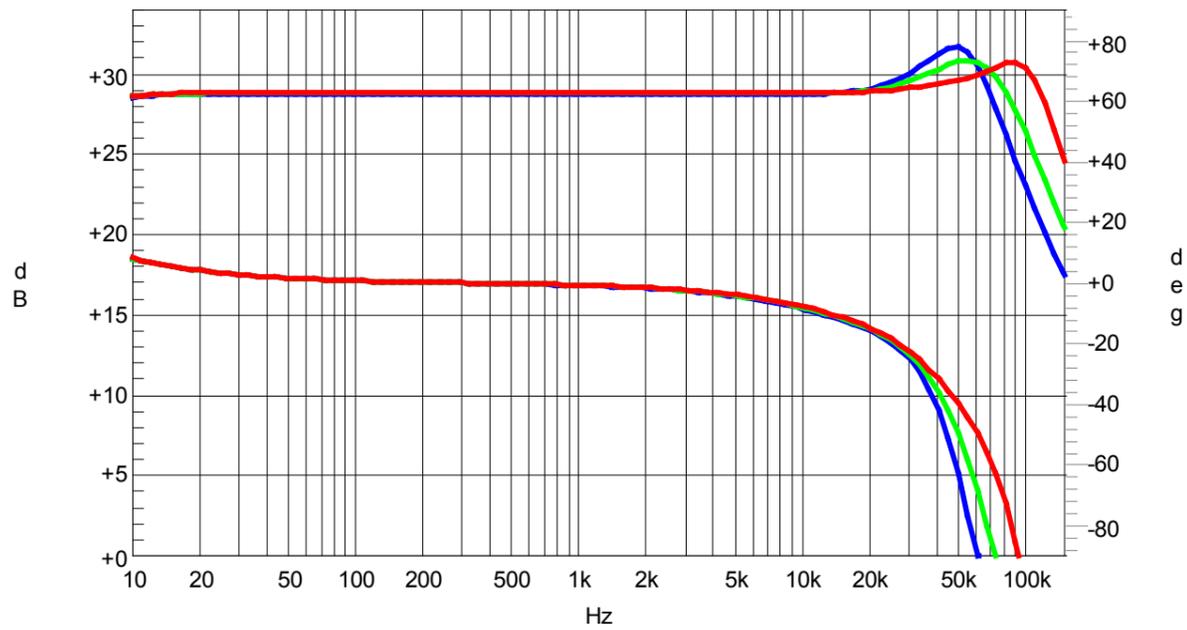
At 100 Hz, 1 kHz and 6.67 kHz, 8Ω (AES17 measurement filter).

## FFT at 1 kHz



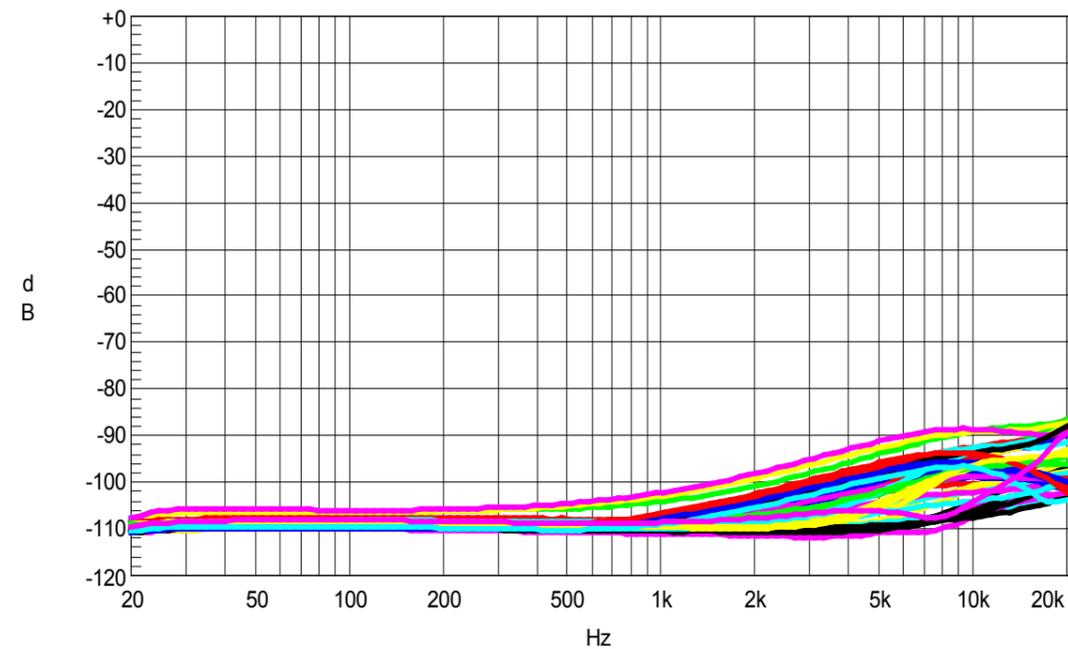
Po = 100mW, 8Ω loading (THD<0.0001 %)

### Frequency response



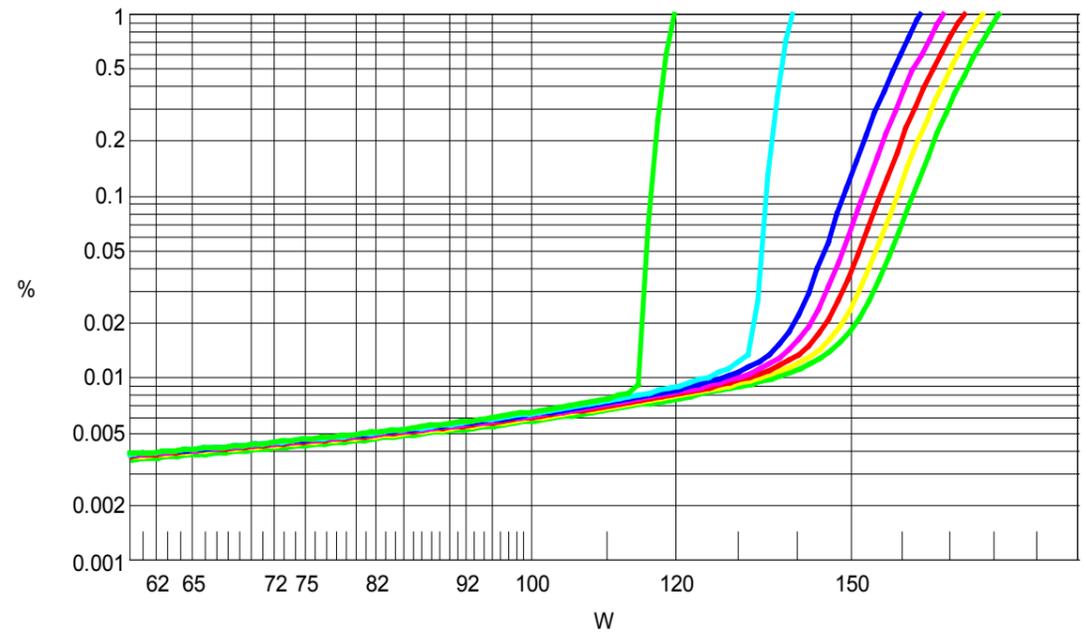
In 4Ω, 8Ω and open load. Top - amplitude. Bottom - phase.

### Crosstalk



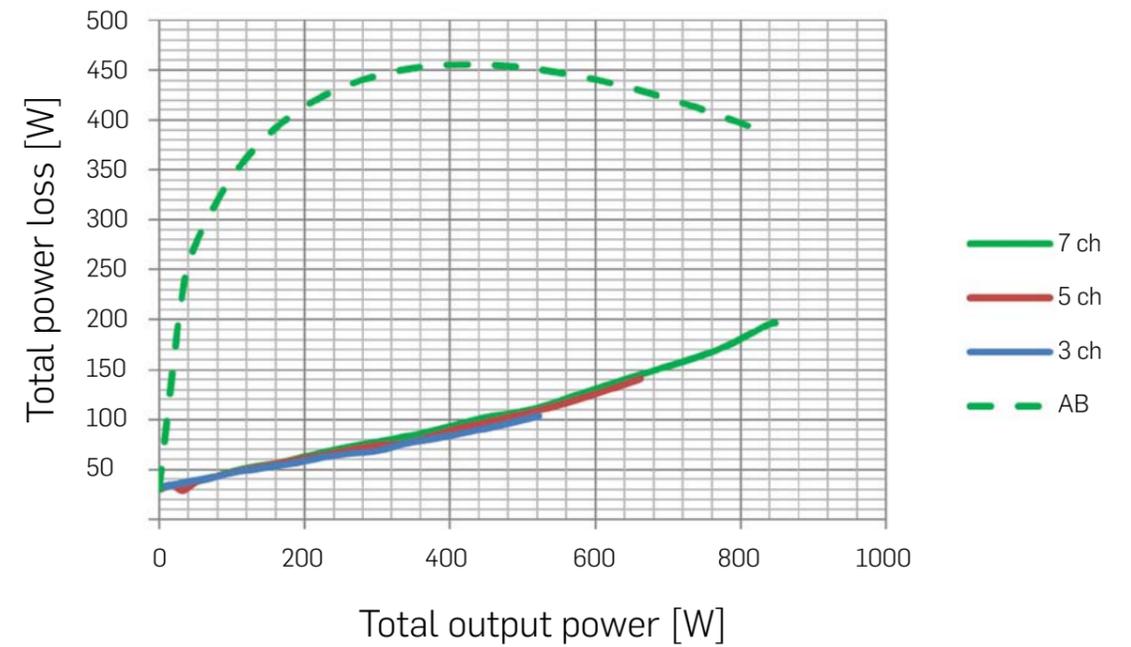
Crosstalk, all channels versus all channels

### THD+N



THD+N vs. Po at 1kHz, 1 to 7 channels driven - 230V AC 50Hz

### Efficiency



Dissipated power versus total output power. 3, 5 and 7 channels loaded. Dotted line ideal class-AB as reference

# About ICEpower

ICEpower is an innovative Danish company developing and manufacturing energy efficient, high performance class D audio solutions for consumer, professional, automotive and portable audio applications. Our products are based on a range of innovative, proprietary technologies that deliver the best audio performance, efficiency and power density in the industry.

The company was founded in 1999 by Bang & Olufsen and Dr. Karsten Nielsen, based on the technologies developed in a joint research project between Bang & Olufsen and the Technical University (DTU), where Karsten Nielsen managed to achieve significant improvements in efficiency and audio quality of switching technologies. Today, ICEpower is a company of 40 employees and an independent subsidiary of Bang & Olufsen.

We are proud of the fact that ICEpower was one of the first companies to pioneer the audio industry's change from analogue technologies to highly efficient switching technologies, bringing about a true paradigm shift in the industry. Our technologies have raised the efficiency of audio amplifiers and power supplies from 50-70%, possible with traditional analogue technologies, to 80-95% – making audio devices "greener".

Today, we continue our focus on enhancing the efficiency, audio performance and power density in the audio power conversion chain. We work hard to stay on the forefront of technological development in our niche, continuously working to enhance our technological portfolio through in-house development, academic collaboration and partnerships with other industry players.

Since our establishment, we have cooperated with over 100 loyal customers and partners all over the world. Among them are some of the world's most respected companies, such as Bang & Olufsen, Bowers & Wilkins, Pioneer, TEAC, Samsung, ASUS Computers, Toshiba, Sanyo and Audi.

Please visit us at [ICEpower.dk](http://ICEpower.dk) for further information about our products, our technologies and our company.

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