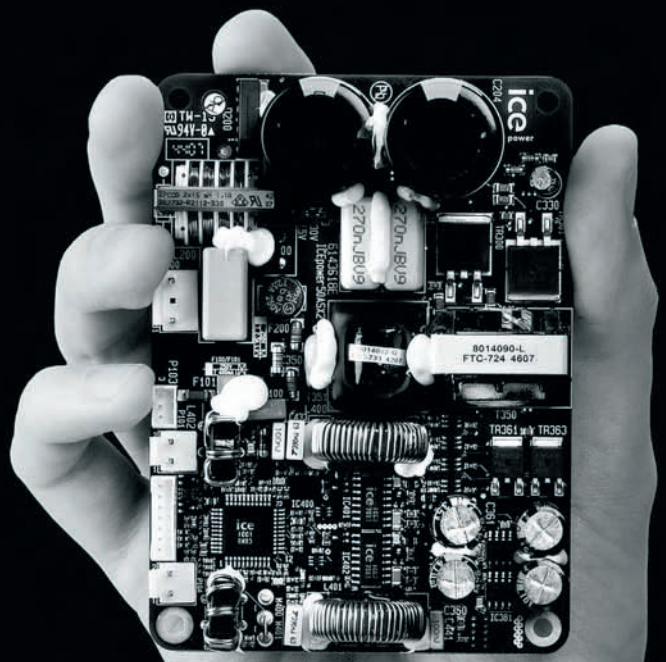
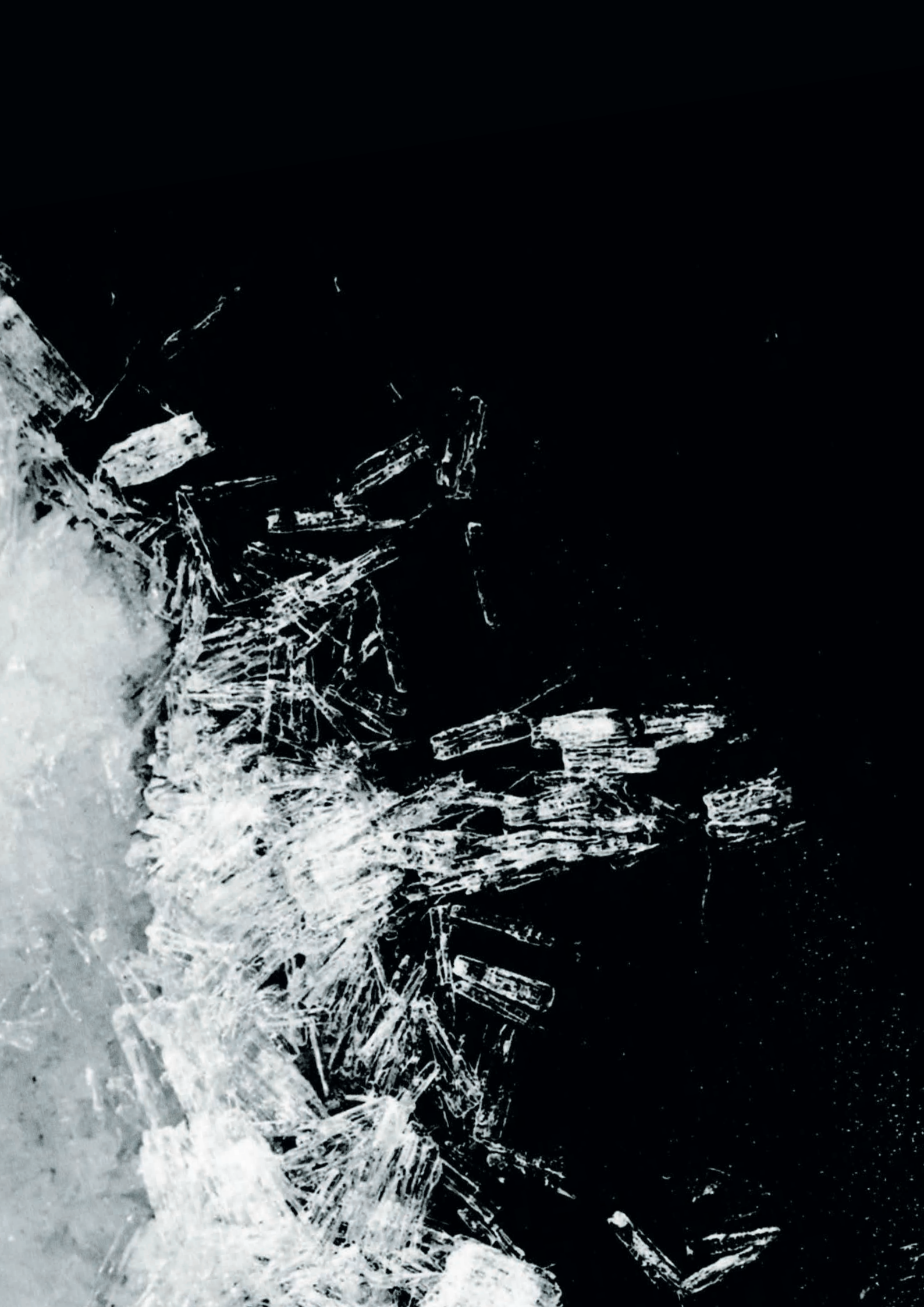
ICEpower ASX2 Series



December 2008



Dear Audio Manufacturer,

We are happy to present the completed ICEpower ASX2 Series, a trilogy of ICEpower modules that cover applications from 25W to 630W. The ASX2 are complete AC plug-to-speaker amplification audio solutions offering flexible two-channel or bridgeable speaker drive.

True to the ICEpower brand promise, the ASX2 Series sets a new industry benchmark in audio performance, efficiency and power density. This is made possible by adapting the very latest ICEpower technological advances.

The ASX2 modules are made to replace the traditional amplifier and power supply assemblies in a range of applications:

- Stereo and integrated amplifier solutions
- Active speakers and subwoofers
- Multi-channel home installation systems
- Multimedia audio products
- Audio systems in performance flat-panel TV
- Musical instruments and combo amplifiers
- Powered semi-professional speakers and studio monitors

We hope that the following pages will inspire you for a new wave of innovation in your audio products.

Small size Big power

The ASX2 Series consists of three distinct product variants:

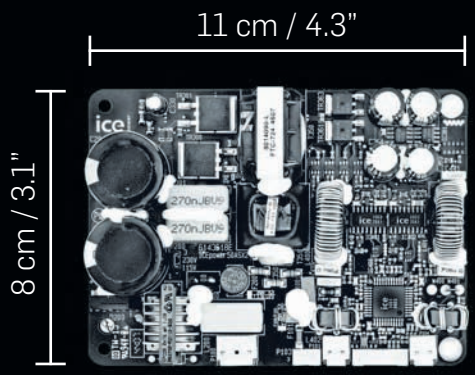
Product	Power Rating BTL 10% THD+N	Power Rating SE 1% THD+N	Dimensions L x W x H
50ASX2 SE	-	2 x 50W, 4Ω	11 x 8 x 3.5 cm 4.3" x 3.1" x 1.4"
50ASX2 BTL	220W, 4Ω	-	11 x 8 x 3.5 cm 4.3" x 3.1" x 1.4"
125ASX2	550W, 4Ω	2 x 125W, 4Ω	16 x 8 x 3.5 cm 6.3" x 3.1" x 1.4"
250ASX2	630W, 8Ω	2 x 250W, 4Ω	21 x 8 x 4 cm 8.3" x 3.1" x 1.6"

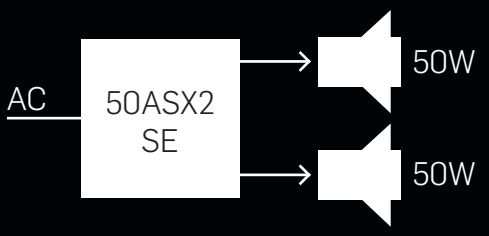
The mechanical outline features a uniform slim width combined with a uniform low profile building height. Power increases evenly by the module length.

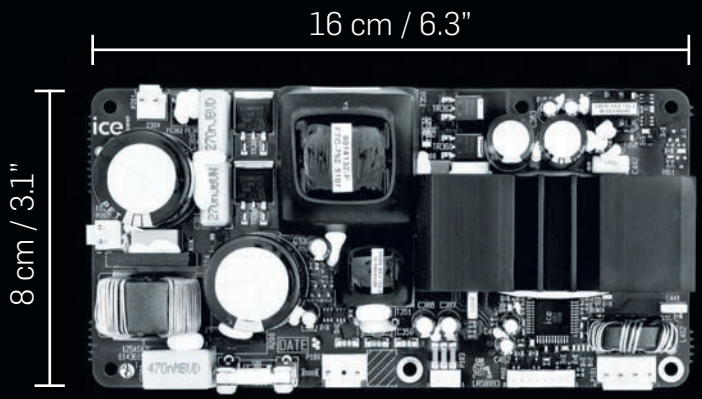
The power density, which exceeds 20 Watts per cubic inch, combined with the unique geometries of the ASX2 Series, open up new innovation space for audio manufacturers.

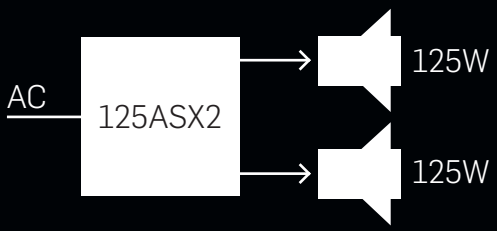
The efficiency exceeds 90 percent in both amplifier and power supply sections, which secures cool operation and enhances product reliability. Combined with the low idle consumption, which is 5 to 10 times lower than in comparable Class AB amplifier assemblies, the ASX2 solutions are a responsible choice when caring for the environment.

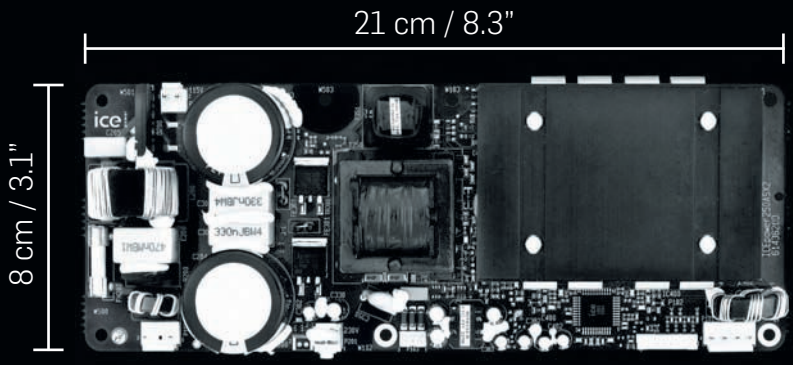
Due to their extremely compact size, the ASX2 solutions are suitable for various product architectures, bringing a new, exceptionally powerful experience to audio reproduction.

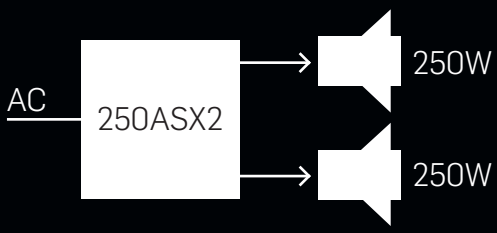

11 cm / 4.3"
8 cm / 3.1"


AC
50ASX2
SE
50W
50W


16 cm / 6.3"
8 cm / 3.1"


AC
125ASX2
125W
125W


21 cm / 8.3"
8 cm / 3.1"


AC
250ASX2
250W
250W

Innovation Freedom

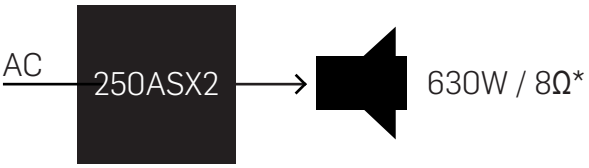
Flexibility is paramount to the ASX2 Series. The three modules can be combined as application building blocks to generate a wide variety of 1-8 channel audio applications in consumer, semi-professional and multimedia audio products.

High current output stages, designed to comfortably drive any speaker load from 2Ω and up, significantly enhance product design flexibility for our customers.

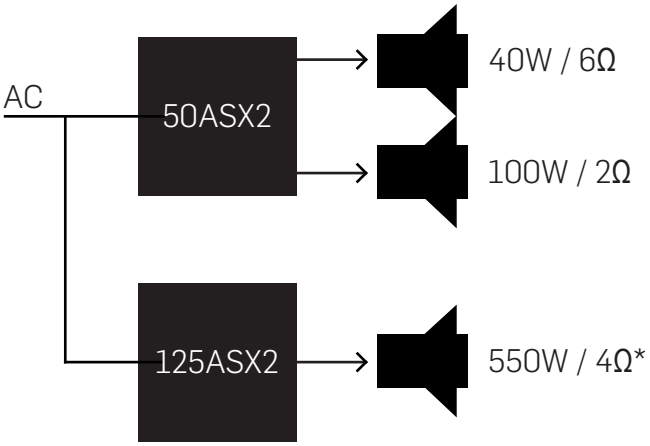
ICEpower50ASX2 comes in two versions: one optimized for dual-channel single-ended output (SE), and the other one optimized for bridged (BTL) higher power single-channel operations. While the 125ASX2 and 250ASX2 modules can be configured at the customer's production line for SE or BTL operations, thus improving the customer's logistics.

With their unique features, also discussed on the following pages, the ICEpower ASX2 solutions serve as a flexible product development platform for audio manufacturers with versatile end-user products.

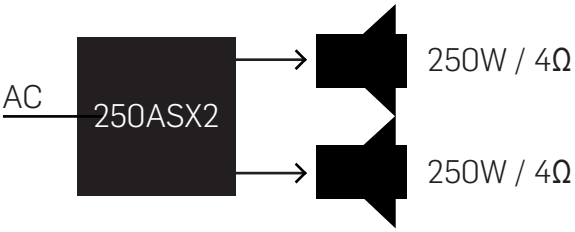
High power subwoofer



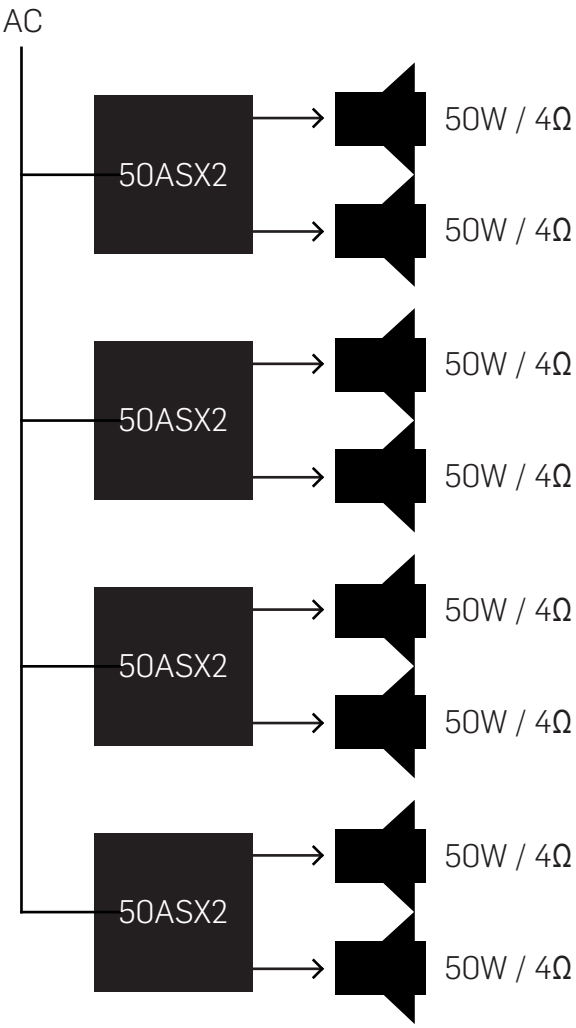
3-way active speaker



Powerful stereo amplifier



8-channel amplifier



* At 10% THD+N

Application Convenience

Application convenience has been high on our priority list when developing the ASX2 Series. We have striven to make the solutions easy and convenient to implement, so that our customers can focus on design and audio quality of their own products.

ICEpower ASX2 Series conveniently complies with all relevant EMC and Safety standards, and full RoHS compliance is certified by compliance certificates. The modules in the ASX2 Series require no extra heat sinking or shielding due to the excellent efficiency and the carefully engineered EMC architecture.

The on-board ICEpower switch-mode power supply operates globally on nominal mains of 100-120V and 200-240V. A low-power DC auxiliary supply has been integrated in order for the external circuits to be powered from the ASX2 module.

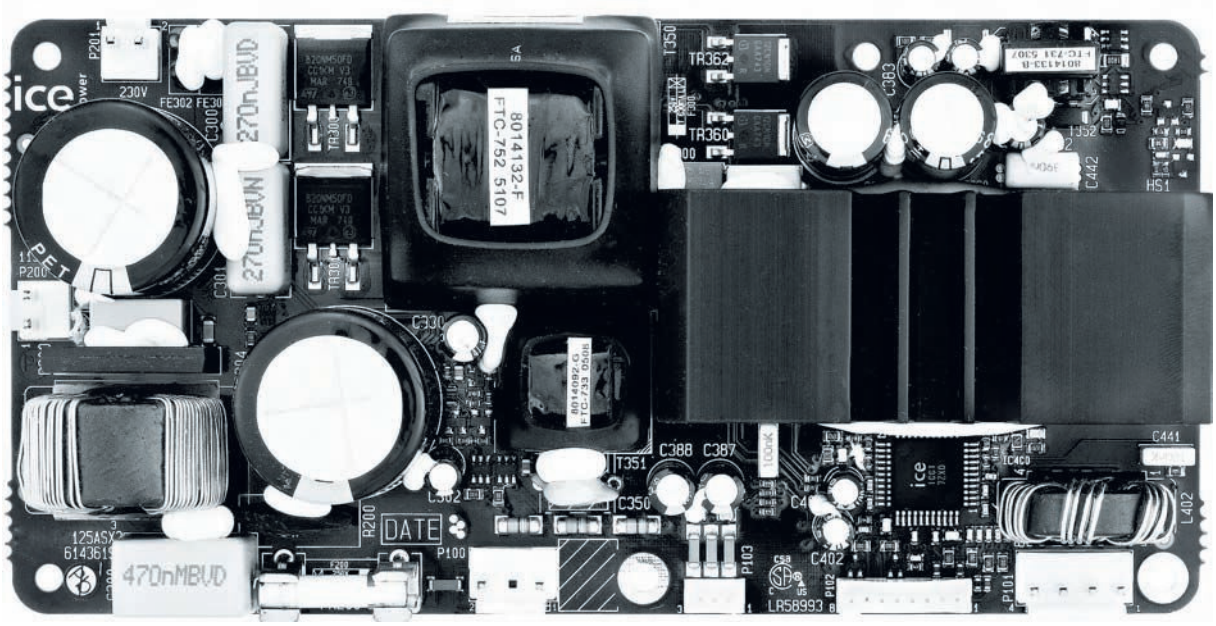
These attributes combined, simplify module integration and cause significant size and weight reductions, compared to the traditional power supply and amplifier assemblies of equivalent power.

Typical electrical, mechanical and thermal limitations should no longer constrain creativity of audio manufacturers. Nor should application or approval difficulties in adapting the switching technologies.

Feature set summary

	50ASX2	125ASX2	250ASX2
Global AC input selection 115V setting: 85-132V 230V setting: 170-264V	■	■	■
Full 20kHz power bandwidth	■	■	
Full 15kHz power bandwidth			■
Short circuit protection	■	■	■
Over-current protection	■	■	■
Thermal protection	■	■	■
Thermal protection monitoring	■	■	■
Over-current protection monitoring	■	■	■
Safety pre-approved	■	■	■
EMC pre-approved	■	■	■
RoHS compliant	■	■	■

ICEpower125ASX2 true size
No external shield of heat sink is required



Audiophile Performance

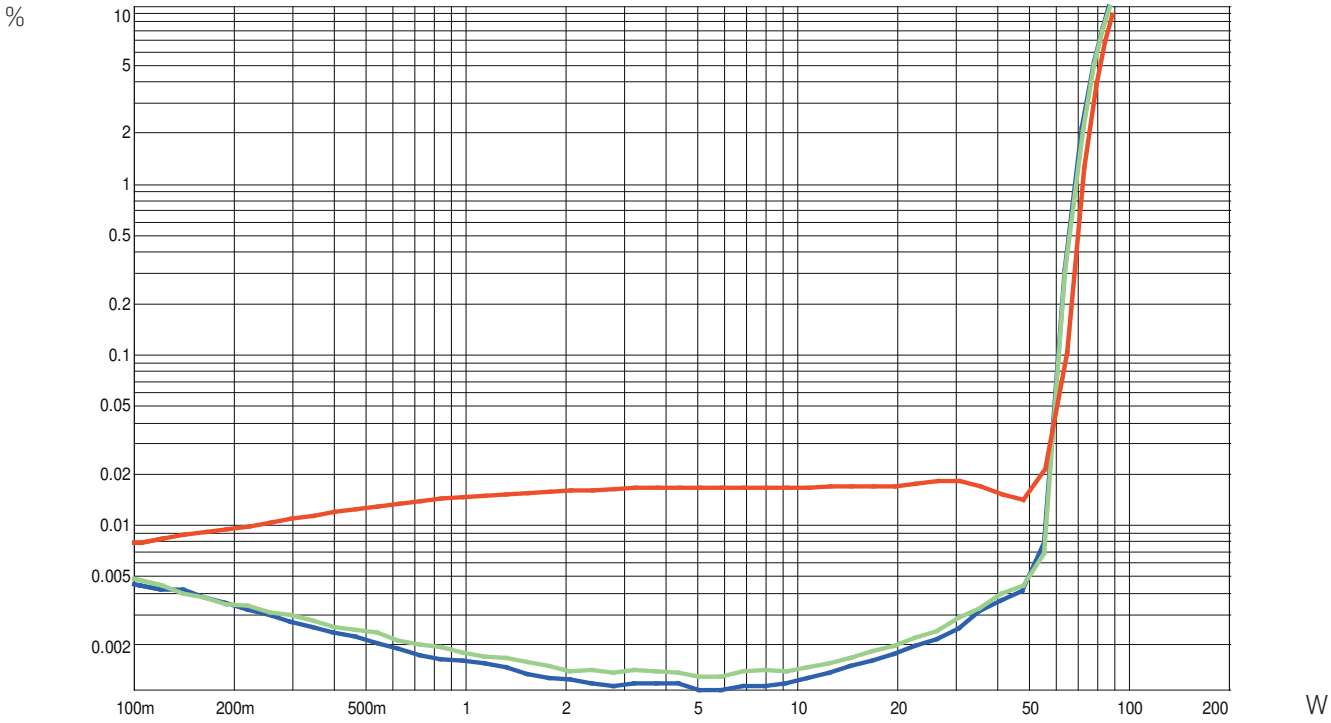
Today, ICEpower® brand is associated with superior audio performance, accomplished through a range of successful applications by the most demanding audio brands in high-end consumer, automotive and professional markets.

The ASX2 Series is based on our 3rd generation technologies, which take ICEpower® audio performance to the next level. The advancements include extended bandwidth, improved dynamic range and exceptionally low distortion, achieved through our novel and proprietary HCOM amplifier topology.

The speaker drive unit is tightly controlled. Load invariance has been improved by high current output stages with an exceptionally low output impedance, which enhances the overall frequency response in all load situations.

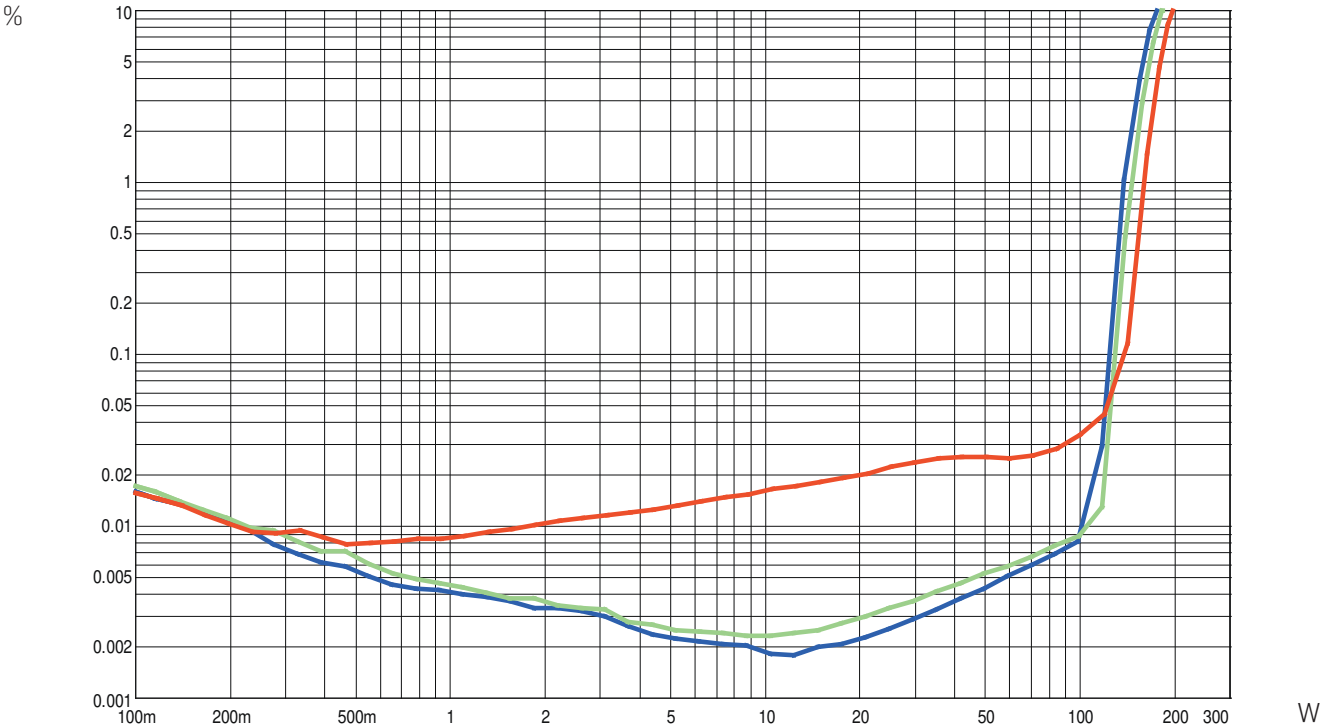
	50ASX2	125ASX2	250ASX2	Unit
Nominal power 1% THD+N, SE mode, 4Ω, 1kHz	2 x 50	2 x 125	2 x 250	Watts
Nominal power 1% THD+N, BTL mode, 4Ω, 1kHz	170	450	-	Watts
Maximal power 10% THD+N, BTL mode, 4Ω, 1kHz	220	550	-	Watts
Nominal power 1% THD+N, SE mode, 8Ω, 1kHz	2 x 25	2 x 65	2 x 125	Watts
Nominal power 1% THD+N, BTL mode, 8Ω, 1kHz	100	250	500	Watts
Maximal power 10% THD+N, BTL mode, 8Ω, 1kHz	130	300	630	Watts
Bandwidth 8Ω, -3dB point, SE mode	130	120	130	kHz
Frequency response, 20Hz-20kHz, 2Ω-8Ω load range	+/- 0.5	+/- 0.5	+/- 0.5	dB
Damping factor 8Ω, 100Hz	>500	>500	>500	
THD+N 1kHz, 1W	0.002	0.003	0.008	%
Dynamic range A-weighted, SE mode	120	117	112	dB
Dynamic range A-weighted, BTL mode	125	121	121	dB

ICEpower125ASX2
THD+N vs. Output Power



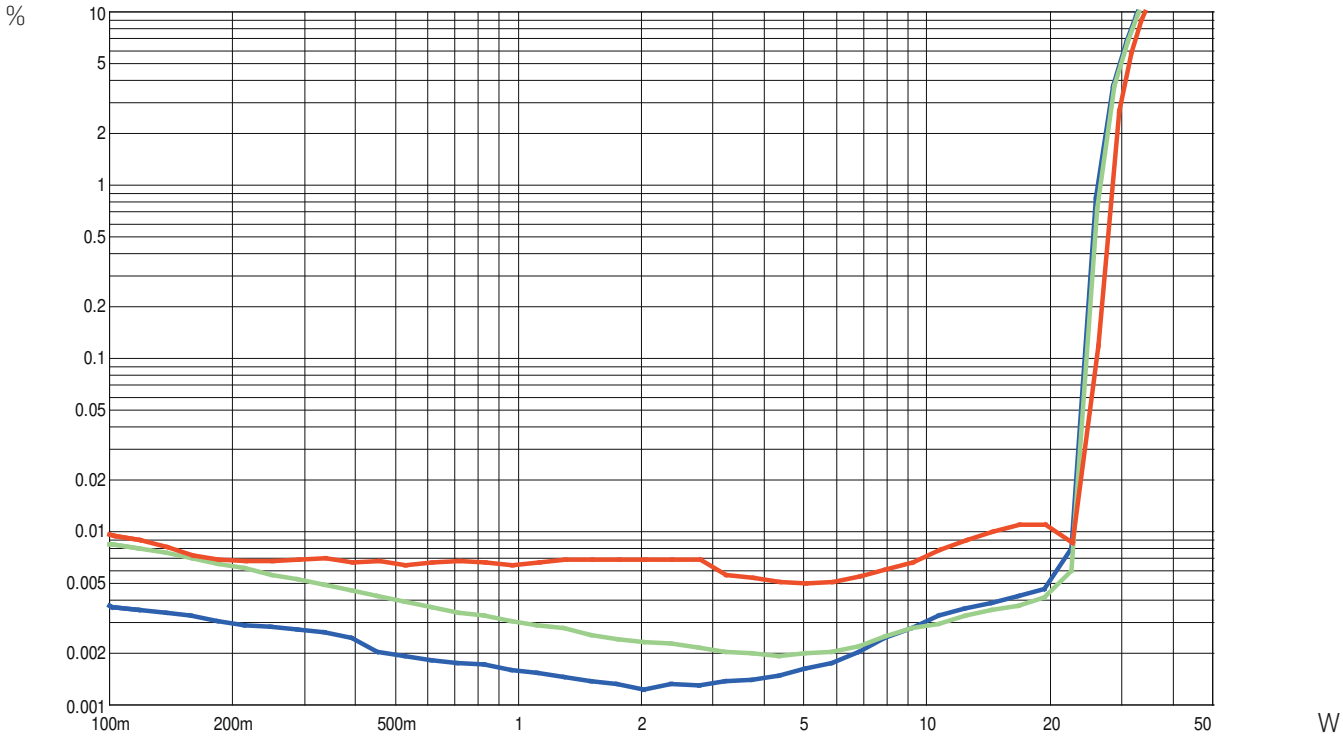
8Ω SE, 230V, at 100 Hz, 1 kHz and 6.67 kHz (AES17 measurement filter)

ICEpower 250ASX2
THD+N vs. Output Power



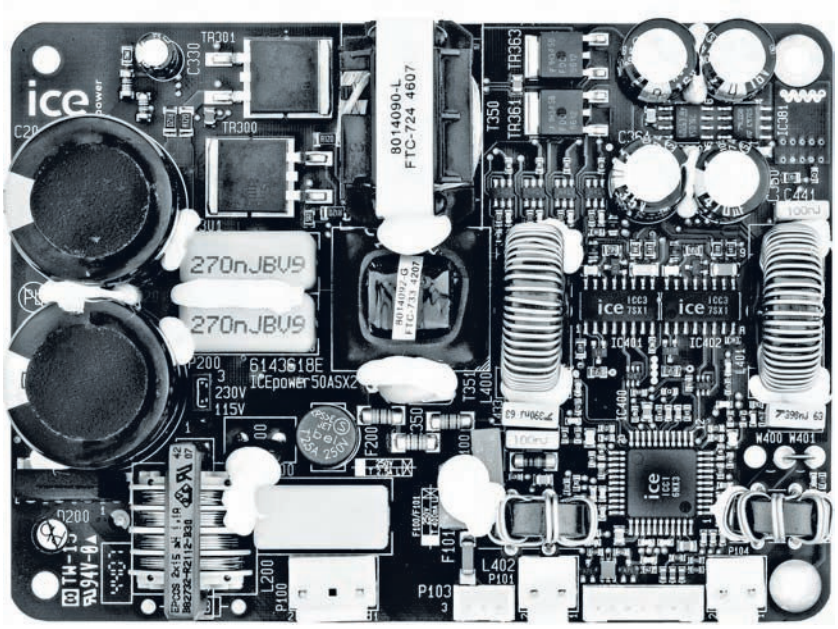
8Ω SE, 230V, at 100 Hz, 1 kHz and 6.67 kHz (AES17 measurement filter)

ICEpower 50ASX2
THD+N vs. Output Power



8Ω SE, 230V, at 100 Hz, 1 kHz and 6.67 kHz (AES17 measurement filter)

ICEpower50ASX2
True size



The ASX2 Series is the first ICEpower standard series to adapt our third generation HCOM/MECC SE amplifier topology. The dual amplifier stage is implemented utilizing the ICEpower ASIC chipset.

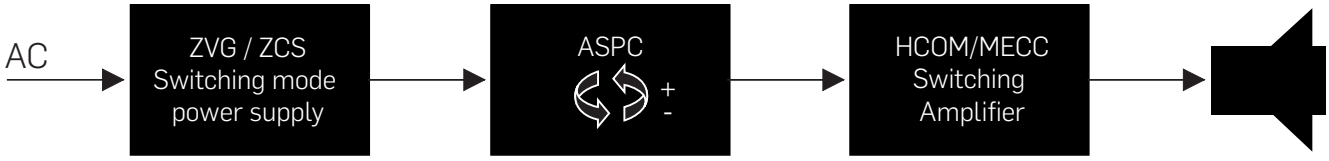
Technology Breakthroughs

Several of ICEpower's technology breakthroughs have been introduced in the ASX2 Series.

The ICEpower® Supply section includes the key innovation of the new Zero Voltage / Zero Current Switching SMPS topology with a fully integrated Adaptive Supply Pump Cancellation (ASPC). The result is the significantly improved quality of power supply; as well as virtual elimination of the well-known power supply pumping phenomenon, and of the need for large secondary buffering capacitors. This new technology has helped us to drive audio quality, efficiency, power density and the Watt/USD quotient up.

The ASX2 Series employs the third generation of ICEpower's proprietary HCOM modulator topology, which in combination with the MECC* feedback architecture enhances the critical performance parameters.

Audio Power Conversion Chain



The ASX2 is the first ICEpower product series to adapt ground-referenced SE amplifier output stages for increased flexibility, and to incorporate ICEpower® silicon ASIC integration of the Amplifier stage.

* HCOM: Hybrid Controlled Oscillation Modulator;
MECC: Multi-Variable Enhanced Cascade Control – patented technologies of Bang & Olufsen ICEpower a/s.

Next steps

We hope that the information in this brochure has inspired your engineering and design ambitions as for simplifying your product development, making your audio power conversion chain more efficient, while achieving excellent audio quality in the final product.

You can find more technical information on ICEpower ASX2 Series at
http://www.icepower.bang-olufsen.com/en/downloads/

and order complete evaluation kits by writing us to
ICEpowerinfo@bang-olufsen.dk

Our excellent engineers and account managers stand at your service to answer any of your questions and provide you with suitable price quotations.

Please contact the ICEpower office closest to you (as shown on the back cover of this brochure) and expect your product development worries to be lessened.

About ICEpower

Bang & Olufsen ICEpower a/s was founded jointly by Bang & Olufsen and Dr. Karsten Nielsen in 1999, based on the technologies developed by Dr. Nielsen during his PhD work carried out in collaboration between B&O and the Technical University of Denmark.

ICEpower today is a fast growing, scientifically based innovation house specializing in audio power conversion solutions. Over 80 percent of our 40 employees are directly involved in R&D. Based on our innovative technologies represented in our strong IPR portfolio we develop dedicated sound solutions for consumer and professional speakers, automotive audio, mobile/portable devices and home theatre systems.

The core brand promise of ICEpower is to deliver the industry's best audio performance, efficiency and power density in audio power conversion. After more than 14 years of scientific research, ICEpower has been able to achieve significant leaps in audio power conversion technology.

Our "vision impossible" is to achieve 100 percent energy efficiency throughout the complete audio power conversion path, from the AC plug or battery to an acoustic output. This pursuit of perfection brings radically new value to audio reproduction.

We closely cooperate with the leading Danish and European technical universities and incorporate scientific findings from the academic projects into our revolutionary solutions. Out of the students, come some of the best engineers in switching audio power electronics, electro acoustics and digital signal processing, whom we are proud to employ.

Over nine years of our history, ICEpower has grown from being a technology startup serving high-end niche markets, to the developer of premium quality audio power conversion solutions for both niche and volume industries.

Since the company's establishment, we have acquired over 50 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, Samsung, Toshiba, Sanyo and Audi.

The satisfaction of our customers and our smart selection of development partners have enabled a steady growth of our revenues and profits, and have allowed us to undertake ambitious R&D projects.

Please visit us at ICEpower.dk to learn more about our company and to get inspiration from our developments.

Your global partner

ICEpower operates on three continents, with offices in Denmark, Japan and the United States. We aim to collaborate closely with our customers and enhance their product development with our solutions. Please contact the ICEpower office closest to you and expect to be inspired.

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