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BRYSTON 'CLASS D' Technical Brochure

PERFORMANCE DEFINED — DYNAMIC/CLEAN /ACCURATE



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BRYSTON 'CLASS D' AMPLIFIERS

Bryston is pleased to announce our first 'Class D' amplifiers.

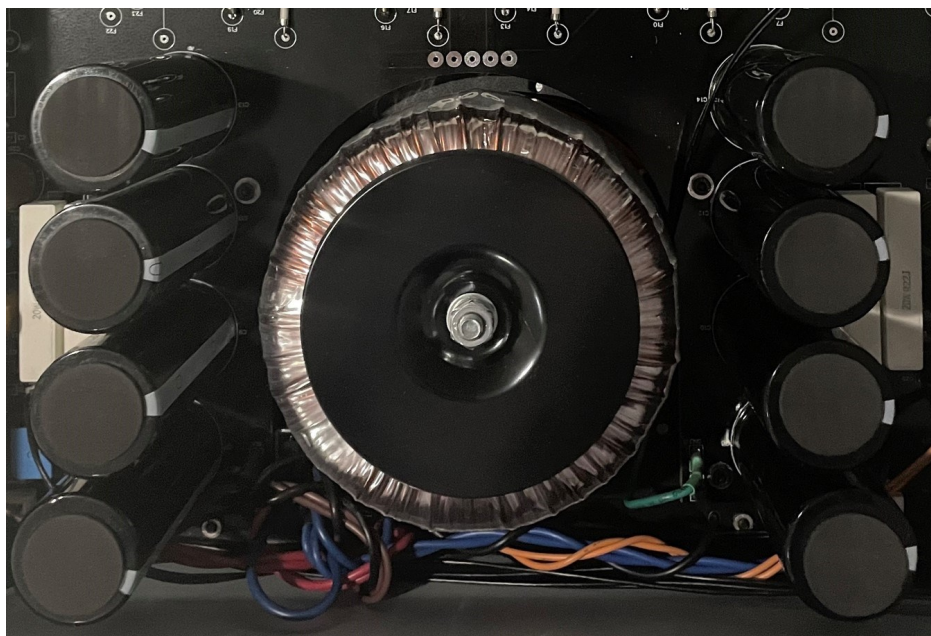
DEFINITION OF A CLASS D AMPLIFIER

A Class D amplifier is a type of audio amplifier that uses a digital switching technology to amplify audio signals. It is also known as a switching amplifier or a digital (erroneously) amplifier. Unlike traditional analog amplifiers, which use continuous voltage waveforms to amplify signals, Class D amplifiers employ a more efficient method that switches the input signal on and off rapidly.

HOW CLASS D WORKS

Class D amplifiers work by using 'Pulse Width Modulation' (PWM) to convert the audio signal into a series of high-frequency pulses. These pulses are then amplified by a Mosfet switching transistor, which acts as a switch that turns on and off at a high frequency. The width of the pulses determines the amplitude of the audio signal.

The audio signal is first converted into a digital format by an analog-to-digital converter (ADC). The digital signal is then processed by a digital signal processor (DSP), which generates the PWM signal based on the input signal. The PWM signal is then fed into the switching transistor, which amplifies the signal and converts it back into an analog format through a low-pass filter.



Bryston Class D utilizes massive toroidal transformers with extensive storage capacitance

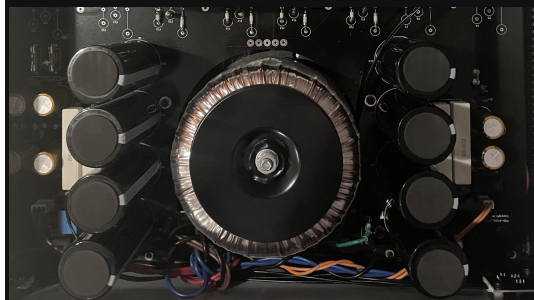
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EXCEEDING EXPECTATIONS

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ONE
OF THE
MAJOR
ADVANTAGES
OF
'CLASS D'
AMPLIFIERS
IS
EXCEPTIONAL
EFFICIENCY



DYNAMIC HEADROOM IS CRITICAL

HIGH EFFICIENCY

One of the major advantages of Class D amplifiers is their exceptional efficiency. Unlike traditional amplifiers, which operate in the linear region and dissipate a significant amount of power as heat, Class D amplifiers utilize switching technology to achieve high efficiency levels.

By employing pulse width modulation (PWM) techniques, Class D amplifiers rapidly switch the output transistors on and off, effectively creating a series of pulses that represent the audio signal. This switching action allows the amplifier to deliver power to the load with minimal power loss, resulting in higher efficiency.

The efficiency of Class D amplifiers can exceed 90%, significantly surpassing that of Class A, Class B, and Class AB amplifiers. This high efficiency translates into less power wasted as heat, reducing energy consumption and making Class D amplifiers more environmentally friendly.

COMPACT SIZE

Another notable advantage of Class D amplifiers is their compact size (assuming switching power supplies are utilized). The efficient switching operation allows for the use of smaller and lighter components, reducing the overall size and weight of the amplifier. Traditional A and AB amplifiers require large heatsinks and bulky power transformers to handle the dissipated heat and power requirements. In contrast, Class D amplifiers generate less heat and can use smaller heatsinks or even eliminate the need for them altogether. This compact design makes Class D amplifiers ideal for applications where space is limited, such as portable devices and car audio systems. There are dynamic limitations though with switching power supplies.

REDUCED HEAT DISSIPATION

Class D amplifiers operate in a way that significantly reduces heat dissipation compared to other amplifier classes. As mentioned earlier, the switching action of Class D amplifiers minimizes power loss and, consequently, heat generation. The lower heat output of Class D amplifiers also eliminates the need for active cooling systems, such as fans, in most cases. This further enhances and ensures quieter operation, as there are no fan noises to contend with.

IMPROVED POWER HANDLING

Class D amplifiers excel in power handling capabilities, making them an excellent choice for applications where high power output is required. Due to their efficient switching operation, Class D

MAKING MUSIC MATTER



MASSIVE

LINEAR

POWER SUPPLIES

REMOVE

ANY HINT OF

DYNAMIC

COMPRESSION

amplifiers can deliver substantial power to the load without compromising audio quality. Furthermore, Class D amplifiers are compatible with a wide range of speaker impedance loads, ensuring optimal performance and power delivery across different setups. This flexibility in power handling makes Class D amplifiers versatile and adaptable to various audio requirements.

To summarize, Class D amplifiers offer a range of advantages that set them apart from other amplifier classes. Their higher efficiency, compact size, reduced heat dissipation, and improved power handling make them an attractive choice for audio systems and home theater setups.

DYNAMIC HEADROOM

One of the concerns with Class D designs is the power supply section typically utilizing a 'Switching' supply. When your system runs out of what is called 'dynamic headroom', it often clips, adding distortion to the signal and deflating the sonic energy in the music.

Bryston Class D amplifiers use massive **LINEAR** power supplies with our proprietary Class D amplifier modules to remove any hint of dynamic compression. Power isn't a matter of just 'loud', it's a combination of dynamic but clean and distortion free that together create an impression of depth and dynamism, responding instantly to signals coming from your source material, driving your system to its full potential. By combining our class-D amplifier module with a massive toroidal transformer and large storage capacitance, you have the muscle you need to deliver high quality power where it's required.

UNDERSTANDING AMPLIFIER POWER

Amp power can be a bit confusing to understand because there are a number of specifications that need to be looked at together to determine exactly how much power you have available for music and movie playback.

A typical way power is measured for an amplifier is a steady tone at 1 kHz into a resistor at either 2 ohms, 4 ohms, or 8 ohms and to a maximum distortion of 1%. Typically, power is almost always rated at one channel driven (especially in receivers) with no dynamic headroom. This means that an amplifier rating of 120 watts per channel, given seven channels operating, only has a total power available to each channel, with all channels driven, of 17 watts per channel.

This provides some consistency for comparison purposes but does not give us the whole story we need to know to determine how much power we actually have available for the dynamic playback of music and movies. Unfortunately, it can also cause a

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Class D
amplifiers
can deliver substantial power
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race between companies to get the highest possible wattage number when measured this way at the expense of the more important number, which includes time and distortion, generally referred to as clean dynamic headroom.

Since music and movie soundtracks are never playing a constant tone at one power level the important thing to know is what happens when the amplifier is asked to play a very loud dynamic peak for a fraction of a second over and over again. Power is logarithmic, meaning an amplifier must double its wattage output for every 3 dB more of output you want to achieve. So if we use 15 dB as a generally accepted amount of headroom for music and movie playback you will need a lot of power available for brief moments to achieve this without having the amplifier go into clipping or shutdown:

Here is an example of the dynamic power required short term with an amplifiers power rating of 100 watts per channel.

| | |
|----------------------------|------------|
| Continuous Average Output: | 100 watts |
| 3 dB of Dynamic Headroom: | 200 watts |
| 6 dB of Dynamic Headroom: | 400 watts |
| 9 dB of Dynamic Headroom: | 800 watts |
| 12 dB of Dynamic Headroom: | 1600 watts |
| 15 dB of Dynamic Headroom: | 3200 watts |

If the amplifier is using a switching power supply with a max rated power equal to the continuous rated power of the amplifier, with one channel driven, and little or no capacitance storage you will be severely limited in your real output capabilities to all channels.

This makes it very important to know what happens when the amplifier is asked to exceed its rated continuous output for a brief moment in time. If the amplifier has no ability to produce short bursts of power beyond its rated continuous power then you can look at this equation in reverse. Let's say the amplifier has a rated continuous output of 400 watts with no headroom above this, which is typical of amplifiers that use switching power supplies.

All Bryston power amplifiers use what is called a linear toroid power supply with multiple capacitors to ensure the instantaneous transient power required by very dynamic content is easily accommodated.

MAKING MUSIC MATTER



The Bryston
Class D
Amplifiers
use a ‘common chassis’
with the option of
1, 2,3, 4, 5, or 6
Independent
Class D Modules

This combination of a toroidal transformer and lots of storage capacitance means you have usable power many times the continuous rated power and that means dynamic and distortion free listening.

| | |
|---------------------------|------------|
| 15 dB peak: | 400 watts |
| 12 dB peak: | 200 watts |
| 9 dB peak: | 100 watts |
| 6 dB peak: | 50 watts |
| 3 dB peak: | 25 watts |
| Continuous Average Output | 12.5 watts |



Bryston Class D utilizes massive toroidal transformers with extensive storage capacitance

FLEXIBILITY

The Bryston Class D amplifiers use a ‘common chassis’ with the option of 1, 2,3, 4, 5, or 6 independent Class D modules

This provides real flexibility for multiple channel Active or Passive audio systems or custom install Zone applications.



SPECIFICATIONS



BRYSTON BD-225

Frequency Response (6 ohms-3dB) 1Hz - 45kHz

AC Input Voltage 115 or 230

RCA Input (Single Ended) Yes

Sensitivity 1.5 volts

Signal to Noise Ratio 103dB (at full power)

12 Volt Trigger Yes

Voltage Gain 29dB

XLR Input (Balanced) Yes

Capacitance 108,000uf

Continuous RMS Wattage per channel into 8 ohms 225 watts

Continuous RMS Wattage per channel into 4 ohms 450 watts

Continuous RMS Wattage available to all channel 1250 watts

Dynamic Wattage (100ms) available to all channels 3750 watts

Weight (lbs) each 53 Weight (kg) each 24

Dimensions H W D (inches) 5.25" x 17.75" x 16.75"

Dimensions H W D (mm) 133 x 450 x 425



BRYSTON BD-325

Frequency Response (6 ohms-3dB) 1Hz - 50kHz

AC Input Voltage 115 or 230

RCA Input (Single Ended) Yes

Sensitivity 2 volts

Signal to Noise Ratio 105dB (at full power)

12 Volt Trigger Yes

Voltage Gain 29dB

XLR Input (Balanced) Yes

Capacitance 144,000uf

Continuous RMS Wattage per channel into 8 ohms 325 watts

Continuous RMS Wattage per channel into 4 ohms 650 watts

Continuous RMS Wattage available to all channels 1500 watts

Dynamic Wattage (100ms) available to all channels 4500 watts

Weight (lbs) each 58

Weight (kg) each 26

Dimensions H W D (inches) 5.25" x 17.75" x 16.75"

Dimensions H W D (mm) 133 x 450 x 425



BRYSTON

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PERSONALIZED FACEPLATES

Bryston is pleased to introduce the availability of personalized faceplate colours, available now for Bryston amplifiers, preamplifiers, CD players, digital players, phono stages and DAC's.

Our new colour choices, plus the option to create custom colours, enable Bryston electronics to blend seamlessly or contrast elegantly within any décor or equipment rack.

Enjoy bespoke colour choices as an added touch to any entertainment space.

ADDITIONAL CUSTOM COLOURS ARE AVAILABLE UPON REQUEST

GUN METAL GREY



CHAMPAGNE



SILVER



WHITE



BLACK

