

CS-300MB Current Stage module with power supply

Due to our completely different way of thinking when it comes to PCB design and layout, mechanical and thermal stress, magnetic interference, EMI, etc., an ELTIM amplifier built with these modules looks and acts a bit different, which is [confirmed by our customers](#). According to them they make *MUSIC*, not just power ! And that for a (very) long period of time due to the stress-free setup and quality components.

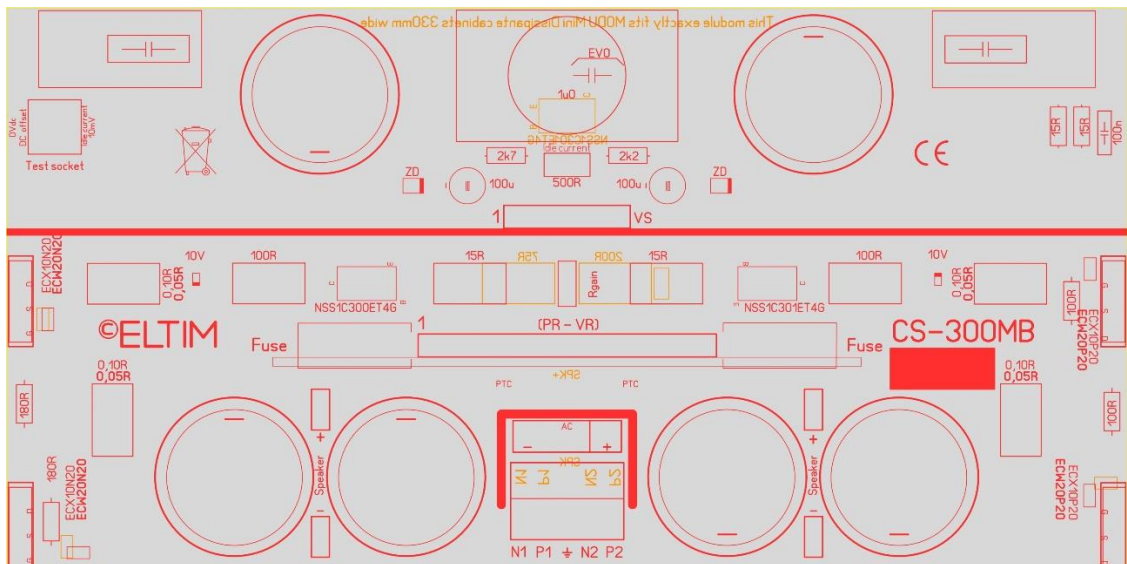
To make a true difference, we split our power amplifier schematics in a voltage- and a current stage board to obtain the maximum possible sound quality. This means that an ELTIM amplifier is based on these two (VS + CS) modules. A VS-input stage processes the sensitive and often small signal voltages and transfers it into signals powering a CS-module, which is leading the transient rich high currents.

This cooperation works very well indeed as many indicated as a “tube like” sound, added with solid bass. While using large TO-247 or even TO-263 sized power Fets, our amplifier systems are extremely stable, can deliver lots of power and more important, together with our totally different and symmetrical PCB setup, they have better control over your speaker system compared to most other amplifier designs.

We only use very high-quality materials lasting for 20 years and heat resistant, double sided FR4+ PCB's made by a highly regarded European manufacturer, double sided (2x35um), tinned isles, text on both sides, etc. On this CS-300MB module we also integrated a symmetrical power supply. Just connect a transformer.

PICTURE SOON

CS-300MB



This CS-300MB is especially made to fit in [MODU Mini Dissipante](#) cabinets, 330mm wide. The double power Mosfet pairs are mounted left and right, and the aluminium heatsinks are cooling them. The Mosfet driving stage is built up in pure straight line with ditto and shortest possible tracks. We used the most linear functioning, rare driving transistors we could find. Besides a Current Stage part there is also an integrated symmetrical power supply on board with space for 2x 3 Ø35mm pitch 10mm electrolytic capacitors. In the idle current circuit fits up to Ø20x52mm MKP capacitor and stabilizing this circuit. About all resistors are low induction [BOURNS PWR163](#) or induction free [CADDOCK MP725](#) SMD resistors. Two significant sized MKP capacitors can be mounted over the power rails, improving sound details.

This [CS-300MB](#) power (current) stage PCB highlights:

- Positions for GSD (mostly Mosfets) oriented types, TO-247 or TO-263. We use [EXICON](#).
- Two pairs of selected 8A/200V or 16A/200V fit.
- Driving stage with shortest possible tracks and extremely linear functioning, yet rare driving transistors.
- Integrated, symmetrical power supply with sufficient space for serious supply capacitors.
- 2x3 Ø30/35mm, pitch 10mm, low ESR electrolytic capacitors fit. We prefer [MUNDORF MLGO](#).
- Space for two low capacitance (0,1-0,22uF) high quality MKP capacitors over the power rails.
- About any large, high quality 1,0uF capacitor fits in the idle current network, stabilising it.
- Current driven feedback circuit in the centre of the PCB.
- Mosfet driving train is in a straight line with straight and shortest/widest possible tracks.
- All power resistors are low induction ([BOURNS PWR163](#)) or induction free ([CADDOCK MP725](#)) types.
- All other resistors are regular MOX or relatively expensive [DALE RN60D](#) mil. grade types.
- Speaker output both left and right by 6,3mm gold plated Faston blades.
- Alternative speaker wiring by 2x3 1,5mm² wires soldered in the centre.
- No coil in the output line results in a way better impulse behaviour.
- Separate Current stage (CS) and Voltage stage (VS) supply tracks.
- Separate tracks for Power-, VS- and input ground.
- Widest possible and thick (35um) speaker-, ground- and power rails tracks.
- Milled, gold plated beryllium copper connectors, with multiple pin (12x 3A for supply) connections. Way higher quality than regular (1A) headers.
- Larger than other, our Reference class [VS-50 input stage](#) fits exactly.
- Especially designed to fit exactly in [MODU Mini Dissipante](#) 330x300mm cabinets with 1x Ø 150mm transformer in Monoblock configuration. In 400mm deep versions any transformer fits.
- For lower power purposes you could mount two modules above each other in 120mm high version.
- Dimensions: 248x124mm. Effective height depends on elco's and VS-module used.



In the order process you can select the types of Power Fets, supply capacitors, resistor types, etc.

So, there are numerous combinations; you will receive exactly the bespoke, unique module you have in mind.

Due to the specifications of the power transistors, resistors and capacitor types/voltage, the final “figures”, the sound and pricing of your bespoke built CS-module can differ significantly, depending on your choices.

We strongly believe this design will comfort those who desire a powerful, Reference quality monoblock!

Integrated Power Supply

There is a sufficient symmetrical power supply on board already and you only need to connect a dual secondary winding [transformer](#) to it. It should be rated at around 130-150% of the expected max. Prms of your amplifier module. See the power graphs for details.

The rectifier is cooled by a small heatsink and holes in the PCB around it provide cooling air can around it.

You (or we) can mount all kinds of qualities electrolytic supply capacitors. The choice of a specific type can make a significant difference in the final quality and pricing! We list some in the order process.

Some say that the ones we list are not OK. Well, then select “NONE” and mount the ones you prefer.

Every Mosfet is connected in shortest way to its own supply capacitor and an extra one right after the rectifier.

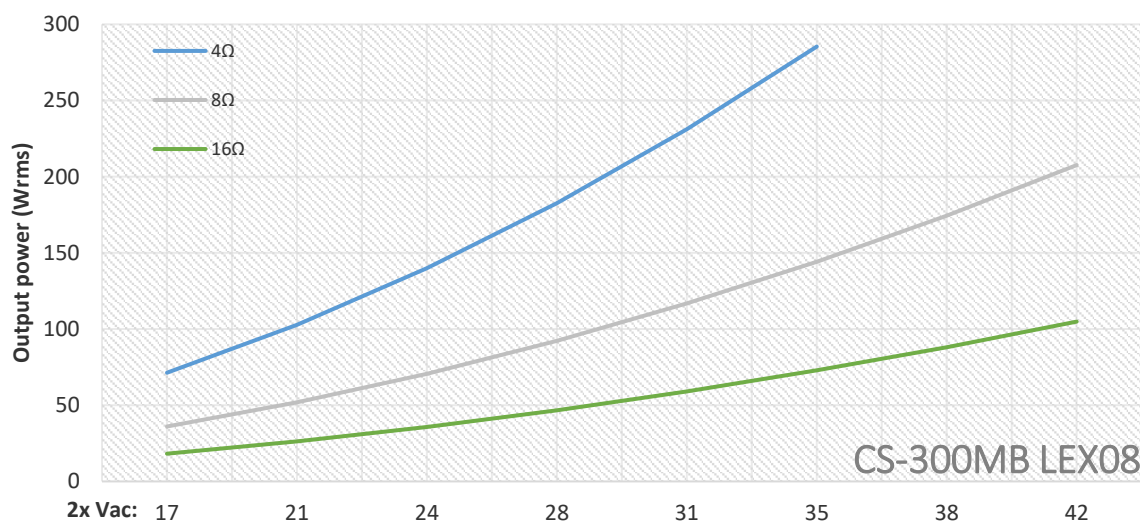
We recommend using > 4700uF/100Wrms. On this board there is way more storage capacity possible.

Actually, while using top class MUNDORF MLGO 63V/Ø35mm types you can mount a total of 2x 66.000uF.....

Since electrolytic capacitors have a limited lifespan, even when stored, we recommend NOT to use cheap N.O.S. versions. Lifespan will be short, and the sound quality could be disappointing!

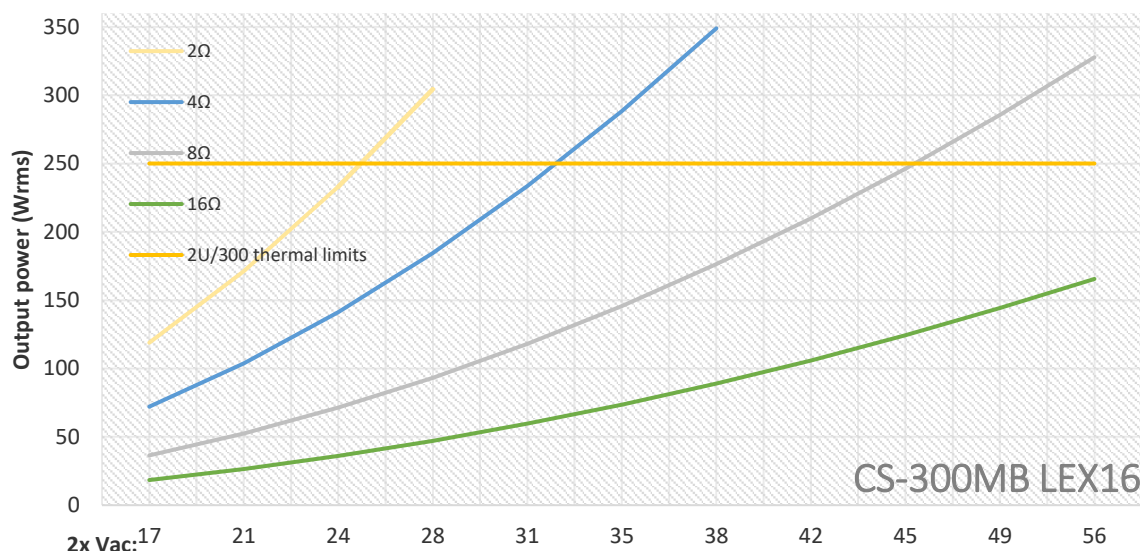
If it all becomes a bit narrow in mounting, we suggest mounting the transformer connector at the bottom side. Then the trafo wiring can be done nicer and out of sight, under a chassis plate.

Output power for models with audiophile [EXICON lateral Mosfets](#):



CS-300MB LEX08, with 2 pairs EXICON 8A/200V /125W, TO-247 lateral Mosfets

The power is limited to around 200Wrms due to the thermal limits of the 8A Mosfets L-mounted to 300x80mm heatsinks.



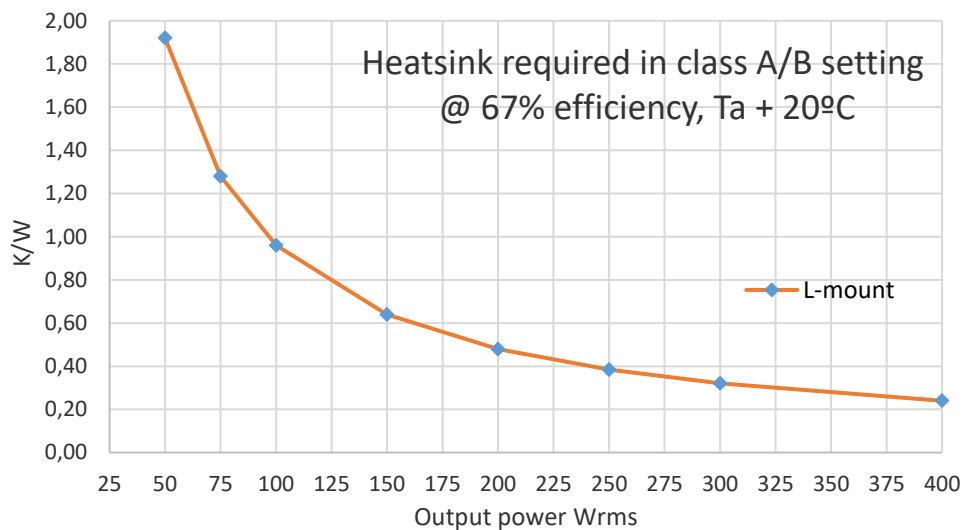
CS-300MB LEX16, with 2 pairs EXICON 16A/200V/250W, TO-264 lateral Mosfets

The power is limited to apr. 300Wrms due to the thermal limits of the 16A Mosfets L-mounted to 300x120mm heatsinks. While mounting it in a 80mm (2U) high MODU Mini Dissipante cabinet the power is thermal limited to around 250Wrms.

Technical specifications:

Frequency range:	DC - >200kHz within 0,2dB
-3dB point:	> 650kHz
Phase shift:	< -0,3° (DC-20000Hz), -3° @ 25kHz
Distortion figure (THD):	< 0,001% (1W/1kHz/8ohm) < 0,002% (80W/1kHz/8ohm)
Slew rate:	> 70V/μs (@ +/- 30V). Limited by AC-input filter on VS-module used.
Harmonics:	<< -60dB, NONE specific, see graph right below. Unnoticeable.
Damping factor:	> 500 (strongly depending on power Mosfets and supply capacitors used)
Input voltage:	1 Volt
Input impedance:	See VS-input stage (required!) specs. VS-50 recommended!
Output load:	Depending on model and supplied voltages, see graphs.
Supply voltage:	Dual secondary transformer, depending on the model, see graphs.
Output power:	Depending on the model and supplied voltages, see graphs.
Dimensions:	248x124mm, height depends on type of supply capacitors and VS-module used.

Heatsink data



Connector functions

The 5-pole screw connector is where the two secondary windings of a suitable transformer is connected. The bottom header connector on our CS-300MB module is where one of our Voltage regulator or Protection modules can be mounted, both feeding regulated voltages to the VS-input stage only. If a VR/PR-module is used, you must cut away the two ZD marked diodes just above the VS-connector!

Left and right of the VR-connector there are two quality fuse holders. While mounting our Protection Module here, the fuse holders must be replaced by additional headers. Then, the [Protection module](#) takes over the function of the fuses, but in a way more complex manner, controlling overheating, overload, distortion, etc.

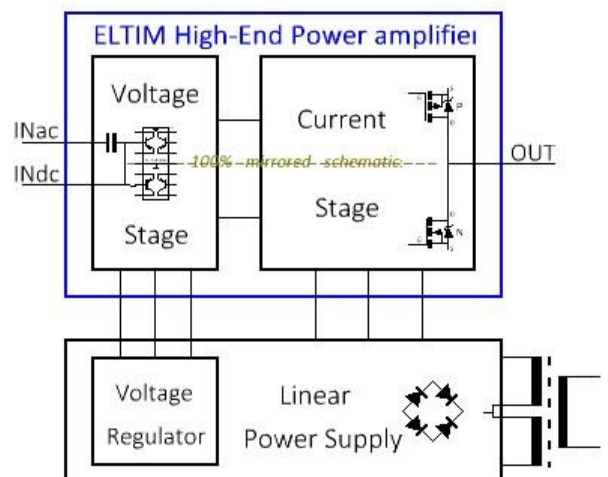
Where is the input?

We split up a power amplifier schematic into a Voltage Stage (input, small voltages) and a Current Stage (output, large currents) to get the significantly different sound results compared to all the rest.

The centre connector is where one of our [VS-5/VS10/20/50 Voltage Stage \(input\) modules](#) is connected. They all have line inputs.

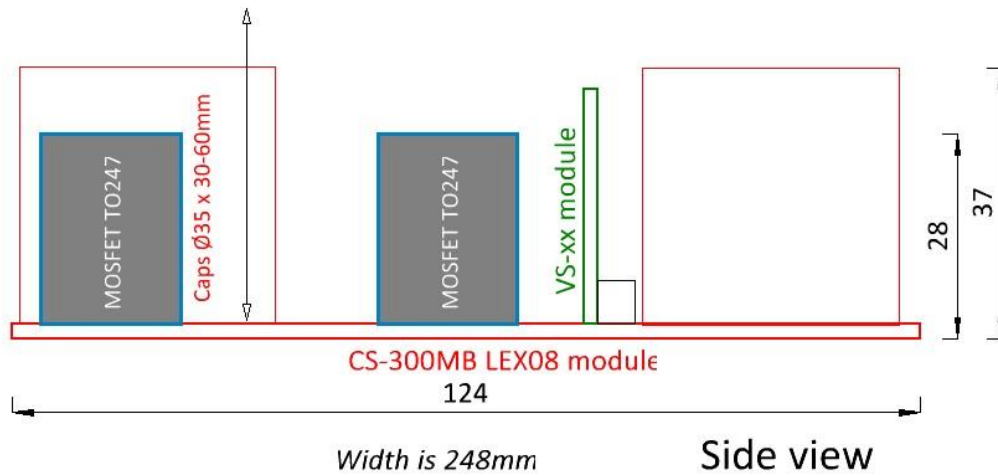
You can make a balanced input by use of one of our input [buffer modules](#). VS-50 selectable line/balanced. To build a complete and working ELTIM amplifier you always need the combination of a VS- and CS-module! On our VS-modules you find an ac-input and on most of them even a dc-input. While using this, you could even use our amp as a servo motor drive, just and plain amplifying the input dc voltage.....

Unlike most amp designs it works from DC on up to several hundreds of kHz and is limited by us to around 700kHz for stability. Taking out all frequency limiting parts, this CS-300MB module would run over 2MHz.....



Perhaps you wonder why we build our designs with this remarkable wide frequency range?

Well, a limited bandwidth design (like CD and Class-D amps....) show a limited linear phase response by nature. The higher the frequency, the later the output signal comes “behind” of the input signal, destroying the 3D and tonal performance of (especially metal) instruments, also results in sharp “s” and “t” sounds, etc. With our CS-300MB this phase linearity is straight as a ruler >> 20kHz. There are only a few doing that !



Besides the needed VS-connections for basic amplifier function, there are also solder connections for a PTC which can be connected to any kind of overheating protection electronics like our Protection module. The PTC leads via the bottom header connector to our optional Protection module.

The centre contact is leading to the idle current potmeter. Standard our amps are set in classical A/B setting. From that point on EXICONS are extremely linear already, where increasing of the idle current to a heat consuming class-A setting is useless because linearity will hardly increase. Still, you could make some kind of automatic Class-A setting system where the amp is set to that while playing at lower levels f.e.

At the left OR right the speaker leads are to be connected by 6,3mm gold plated Faston blades.

NOTE: it is obvious that despite the double speaker connections this is a single channel setup.....

We did this because you can make the speaker leads as short as possible only or better: use double wiring!

If you want to make it most symmetrical you can solder 2x3 speaker leads at the centre line of the PCB.

Protection

First, we delivered a variety of our modules all over the world and use them ourselves for years already. None of them ever broke down as far as we are aware of, not even under short term 2ohms loads under test. In that case about always the thermal limits of the cooling surface are limiting the max. power. If you want to protect your speaker, you need one of our [Protection modules](#). It is in development stage. This module detects differences between in- and output signals (distortion, errors), overload, broken Mosfets (max. 4 pairs), over temperature of interior and heatsinks, faulty supply and acts if one or more of these events occurs, f.e. overloading it or if the amp has a fault. It even provides a variable fan voltage. LED's for overload, over temperature, distortion and one summing all three indications. The protection module separates the integrated power supply from the electronics instead of a relay in the speaker line with unsuitable nickel/wolfram contacts causing distortion, especially with small signals. We often wonder why just the speaker is disconnected if an amp has a fault. We take the power down instead, which seems more logical.

The Mosfets we use show NO irregularities as many other Mosfets (easy breakdown and oscillations while overloaded) and regular transistors (thermal runaway, bad SOA and heavy oscillations at high power) tend to show. Since January 2025 the production process is improved (marked as W6) making them even more reliable.

We only recommend using our protection module if you use expensive speakers.

Of course, and as stated in our general terms, ELTIM cannot be held accountable for any damage.

Since we build our High-End modules as bespoke versions only,
expect a lead time of about three weeks.

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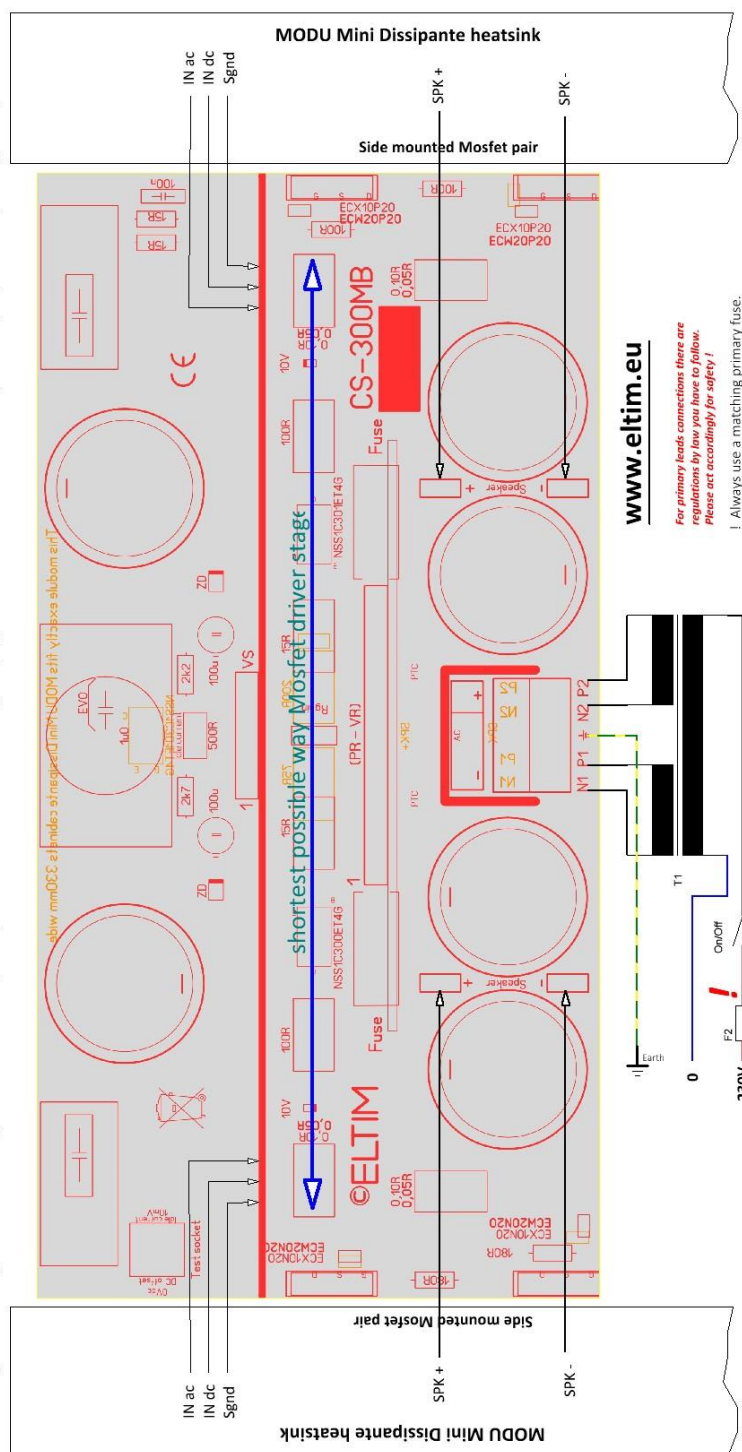
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The AC and DC input lines are at the VS-module, see the specific info of the module in question. A better high-end input cap can be mounted seperately and connected to DCin

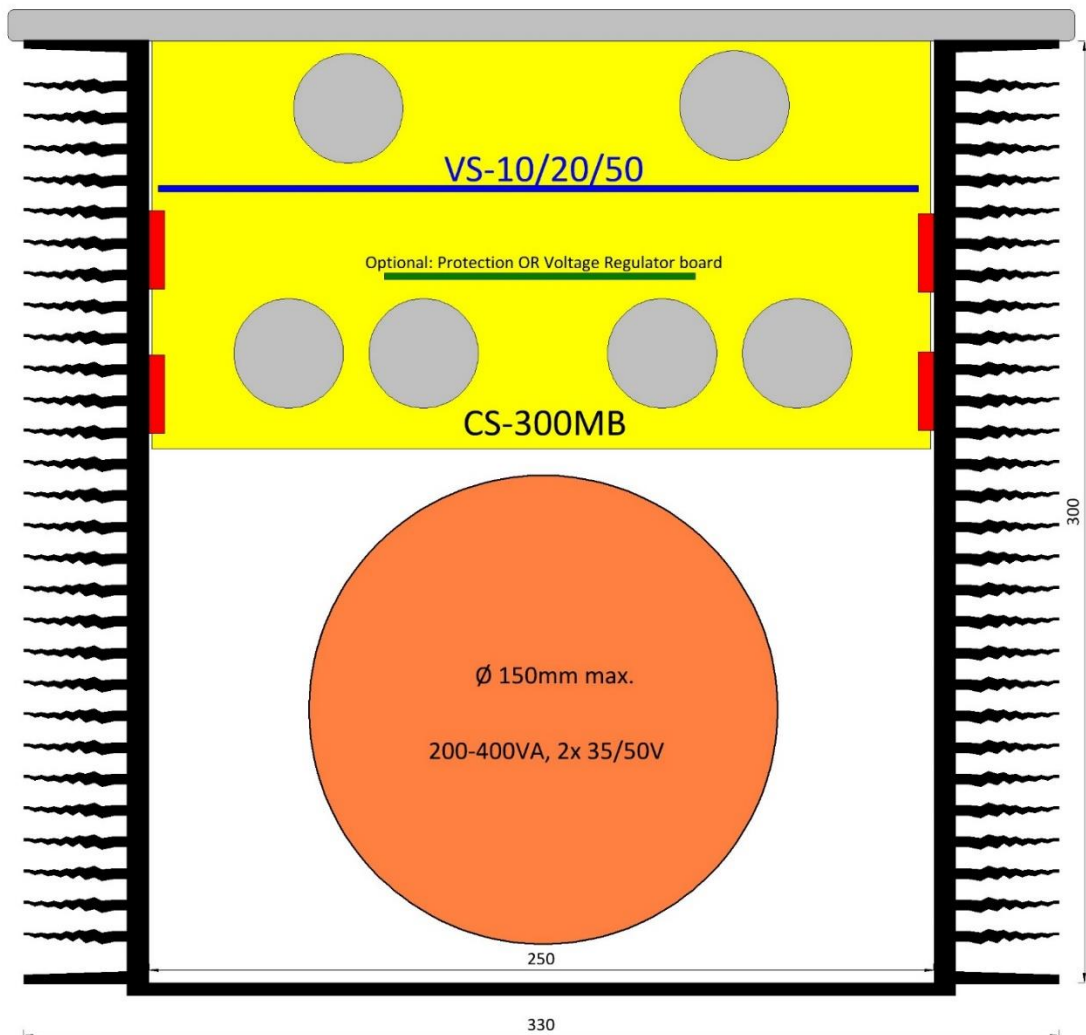
Use a double secondary winding transformer and connect it to the bottom screw terminal as in the schematics below. DON'T FORGET TO USE A PRIMARY FUSE WITH THE CORRECT VALUE ! Also take all precautions given in different legal documents about primary connections. We do NOT accept any legal actions or claims. It is YOUR responsibility to prevent any damage or injuries.



You can connect the input signal and speaker left or right for shortest connection. For optimal symmetry you even can hardwire the speakers at the centre of the PCB.

As mentioned above we specially designed CS-300MB for MODU Mini Dissipante:

CS-300MB Monoblock configuration



Cabinet: MODU Mini Dissipante 330 x 300 x 80 (8A Mosfets) / 120mm (16A Mosfets)



*MODU Mini Dissipante 330x300x80mm
Recommended for LEX08 version*



*MODU Mini Dissipante 330x300x120mm
Recommended for LEX16 version*

THE MISSING PARTS, or less is more....

While using the Mosfets we do, the schematics can be kept very simple. We don't need to feed the power transistors with a lot of current and they show a negative temperature characteristic. Due to this effect, we also don't need to take precautions avoiding a so called "thermal runaway" effect as regular transistor-based amps tend to show. We also don't need rows of Mosfets as seen everywhere and required to keep the Mosfets inside their Safe Operating Area (SOA). The ones we use have no SOA and so need only one pair. By using a fully symmetrical electrical and PCB design, there are no DC-irregularities in the output while switching the amp on or off, there is NO speaker "anti- plop" protection needed, mostly a (distorting) relay in the speaker line. With this amp module there is just a tiny "tick", without any woofer DC shifts when power comes on and about 1,5 secs. some minor distortion when power goes down (@ around 15Vdc) before signal stops, also without slow and far moving around of the woofer cone. If this short period of distortion disturbs you, take away the input signal with power off or use our protection module, which prevents this event by discharging the power supply fast, instead of a relay in the speaker line.

There is also no output coil in the output line, meant to prevent current peaks.

As a matter of fact, especially short impulse peaks make the music more real and this network is killing it..... So, we left this out.

The Fets we use can easily handle these peaks, actually 3-5x more than the supply chain can deliver, so the fuses will blow way before the Mosfets do. We did about all possible, 24 hours of clipping them, etc.

This output coil comes from ancient times where the power transistors (f.e. famous mother of all 2N3055) just barely could handle the power even without serious peak currents.....

And still they blew out even while rows of them were mounted.

The same counts for older Mosfet based amplifiers giving power Mosfets a bad name in recent past. Their bad "SOA" behaviour also made it necessary to mount multiple pairs instead of just one pair as we use.

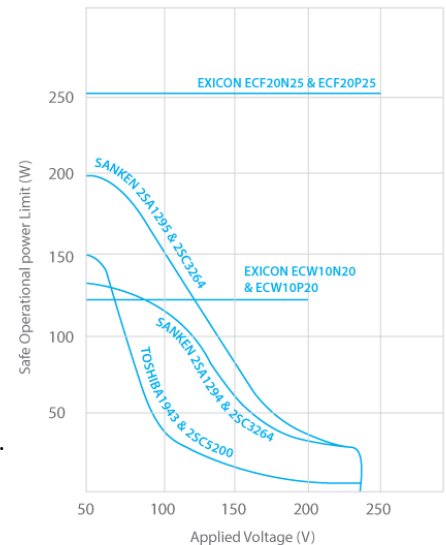
The graph at right shows a comparison with famous ones, as many still use today.

This graph comes from Exicon.

2025 versions, marked as W6 behind the type number, perform even better.

Before the chips were produced on 4" wafers, since Jan 2025 on 6" wafers.

While doing so, the reliability of EXICON Mosfets even increased further.



LISTENING (yes, not measuring over and over, 5 figures behind the comma....)

We listen to the simpler CS-40ps module for a real long time in our own living room now and simply forget that it's there. We use it as anyone else would do, listening to music, watch the news, series, and movies. There are NO irregularities, especially noticed with spoken voices. The bass fundament is simply fantastic and correct and makes you smile at first bass note/drum, especially while looking at the simple setup. The "air" around voices and instruments is amazingly beautiful "tube like" Cymbals singgggggggg as they always should do. Not Tsshhh, etc. as heard so often. Even non-audiophile visitors get tears in their eyes ! This CS-300MB is schematically the same as best sold CS-40ps, but uses better (best available) parts and allows for way wider and shortest possible speaker and supply tracks.

Once an Accuphase Class-A adept noticed our nice [P-450](#) needles waving, "Accuphase really does sound nice" he said. Yes, but surprise: our smallest and cheapest monoblocks (VS-20/CS-40psMB) were driving the speakers -)

Most of you probably won't believe that this already sounds better than our highly regarded P-450.

Our experiences are [confirmed by several true audiophile](#) listeners. They all are amazed about the natural sound and fantastic 3D presentation. The "air" around voices and instruments amazes all, incl. us while listening with our [Solo speakers](#). The wide PCB tracks and quality LINEAR power supply provide a smiling deep and tight bass response, even where "just" but unique MOREL SCM634 16cm widebanders are used.

We also got some replies confirming that the bass is deep and very well under control.

Some confirmed that it sounds better than the high-end stuff (even expensive, regarded brands) they use.....

Two words came up more than once: **MUSICAL** and **EMOTIONAL** Just as we wanted it and always should be.

More specific info of every separate module you can find at [our website](#).