

PA3CC

Power Amplifier module with 3 pairs output devices

Features

- 300W Power Amplifier module
- Class AB output stage
- Unique aluminium assembly profile
- Short circuit protection
- Thermal protection at 90°C
- Mute control
- Very reliable construction

Applications

- High End Stereo
- Supreme Surround Sound

Description

PA3CC is a bipolar power amplifier of classical design working in class AB. PA3CC consists of a differential cascode coupled input stage controlled by a current generator. The input stage is totally discreet to optimize for linearity and bandwidth. The voltage gain stage is also cascode coupled, which is differentially symmetric in class A, to achieve low distortion at high frequencies. The output stage is of high current gain being an easy load to the voltage gain stage. The output stage consists of 6 pieces totally complimentary high speed high power bipolar transistors. PA3CC has short circuit protection, thermal protection and rail fuses to prevent output device break down. PA3CC features sonic excellence, constant low output impedance, low noise, low distortion and high reliability.

PA3CC Module



Operating Conditions

	Min	Typ	Max	Units
Supply voltage	±30		±90	Volts
Recommended supply voltage		±65		Volts
Quiescent current	40	60	90	mA
Thermal protection			80	°C
Load	2			Ω

Technical specifications

Measured with PSU12SA and TR600, one module driven	Typ	Units
Maximum output power at 8Ω	175	Watts
Maximum output power at 4Ω	320	Watts
Maximum output power at 2Ω (not recommended for high continues power)	500	Watts
THD, 20-20kHz and 8Ω	<0,1	%
Power bandwidth	10 – 50.000	Hz
Slew rate	40	V/μS
Signal to Noise Ratio	>110	dB
Gain	22	dB
Input impedance	4	kΩ
Output impedance	<0,1	Ω
Weight	320	g
Rail fuses, supplied and recommended	T6,3	A

Power Supply

A symmetric power supply is required in the range from about ±30V to ±90V. A classical construction would be transformer 2 x 45V, bridge rectifier GBPC3506, 2 pcs 10000uF per module. Additional comments: The transformer should be rated about 200VA per module for normal conditions and remember that music has a crest factor of 10 – 12dB, which means peak power level of 200W is 20W average! Bridge rectifier GBPC3506 (rated 35A/600V) has lower voltage drop than GBPC2506 (rated 25A/600V) giving less heat generation. Our experience is telling us that the bank of capacitors is very important for the sonic excellence of sound. To get the best performance of any amplifier it is important to have very low ESR resistance. This is reflected in our own power supplies PSU4SA and PSU12SA. A rather strange assumption is that it is important with a very high rated transformer in VA and less requirement of the capacitors, when it's the opposite which is valid! The amplifier can't wait for a new portion of power from the transformer whether it's an iron or ferrite transformer, when it has to reproduce a music signal. It's much better to have a large capacitor bank with low ESR, just look at the peak and average power!

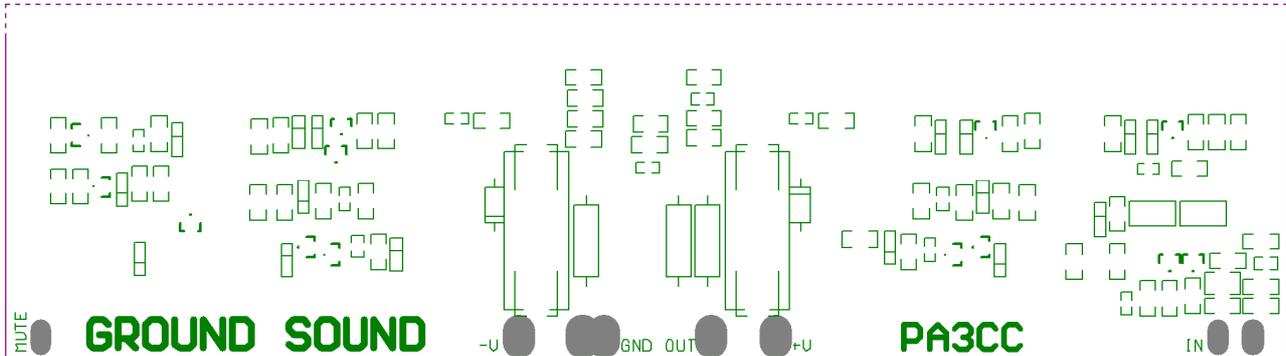
Cooling

This amplifier module has a Class AB output stage, which will require cooling for uninterrupted reproduction of music. We recommend cooling capacity of around 0,6K/W for normal applications, but the requirement of cooling is very depending upon supply voltage, load and signal strength. Higher thermal resistance than 0,6K/W (less cooling efficiency) can be sufficient with recommended supply voltage, easy load (8Ω) and normal listening level. The output stage is low biased and does not produce much heat which has to be dissipated under normal conditions. In fact this amplifier has comparable efficiency as a Class D amplifier at normal conditions (dissipates equal amount of heat). Remember to put thermal conductive compound (silicon-free paste or goop if you prefer) between ALU profile and heatsink.

Mute control

The mute control enables the amplifier when power ground (GND) is applied. It can be controlled either by a switch, relay, opto-coupler with transistor output or a transistor. It works like a **pullup** to ground as the mute circuit actually is at the negative voltage part of the amplifier. The opto-coupler with transistor output solution or a relay is the easiest way if you already got a control system and the isolation ensures that no ground loops are introduced. If a Ground Sound power supply is used it's simply connecting all amp mute pads with PSU mute with 0,2mm wire.

Wiring



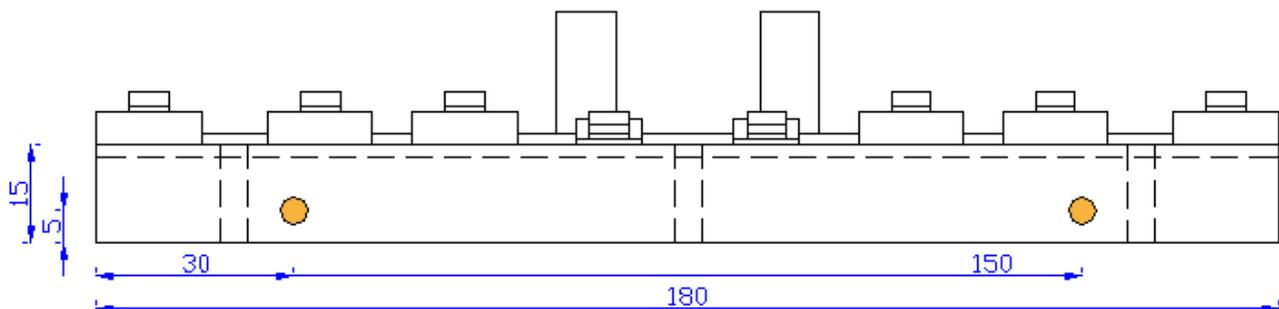
The power supply wires should be $0,75\text{mm}^2 - 1,5\text{mm}^2$ multi core and recommended is $0,75\text{mm}^2$. We recommend that the three wires from the supply is twisted rather than using thicker cable because there is very little difference of resistance in this length of wire, but crosstalk between wires can degrade performance - enhancing hum and noise. The same recommendations apply for the output wires. To obtain a good performance for amplifiers, it's recommended to use star ground, which is placed at ground plane between the power supply's positive and negative capacitors. Usually one would take the output ground from this star ground, but that's not necessary as the "same" wire runs in the supply ground wire. It also ensures that the twisted output wires produce less hum and noise rather than the two wires running separately!

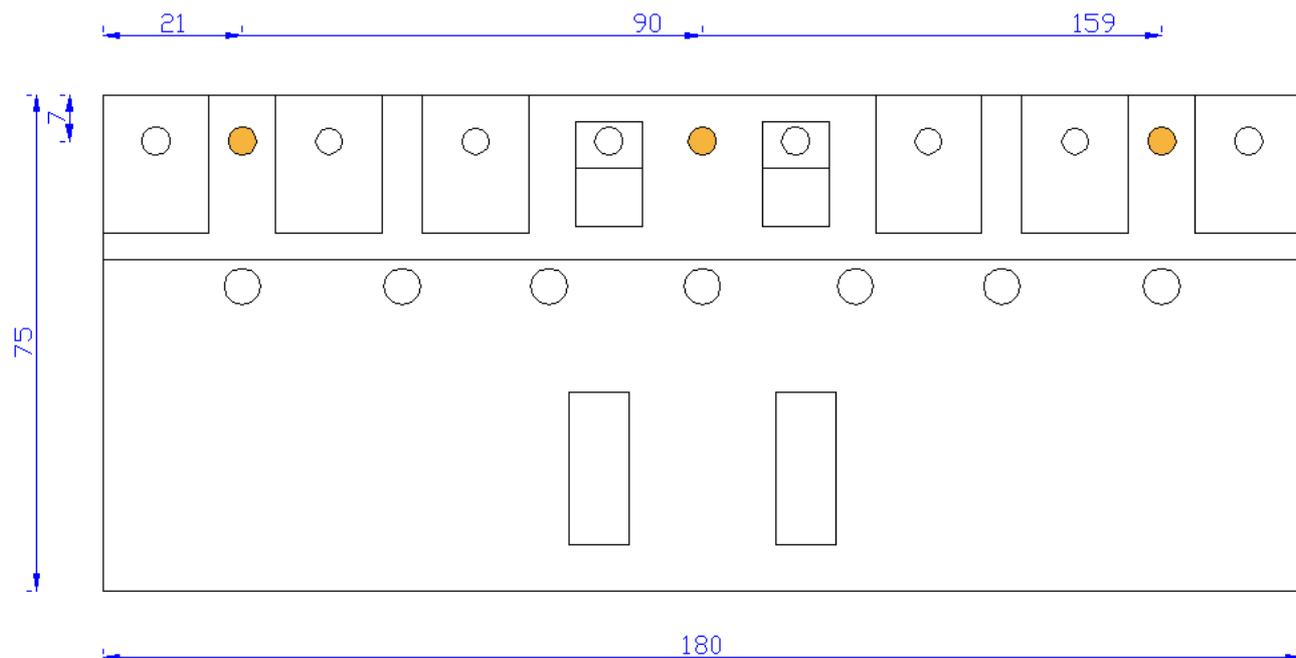
The mute control is only a control signal requiring a wire of $0,2\text{mm}^2$.

The input signal requires a good shielded cable to maintain low noise, but there is no need for big diameters as this is low current signal. The pad marked IN is the "hot"/signal (inner core) and the pad beside it is the signal ground (shield). Note that signal ground isn't the same as power ground - GND!

Mechanical dimensions

There are two mounting options, either parallel to the heat sink or 90° angle. It requires 2 or 3 pcs 4mm screws + spring washer to secure module.





Ground Sound reserves the rights to make alterations without prior notice.

Revision A: 2007-05-20

Revision B: 2008-10-13

Revision C: 2010-07-30

New version of PA3CC

Dimension drawing updated