

TPS7A4700 instructions manual

How to setup output voltage

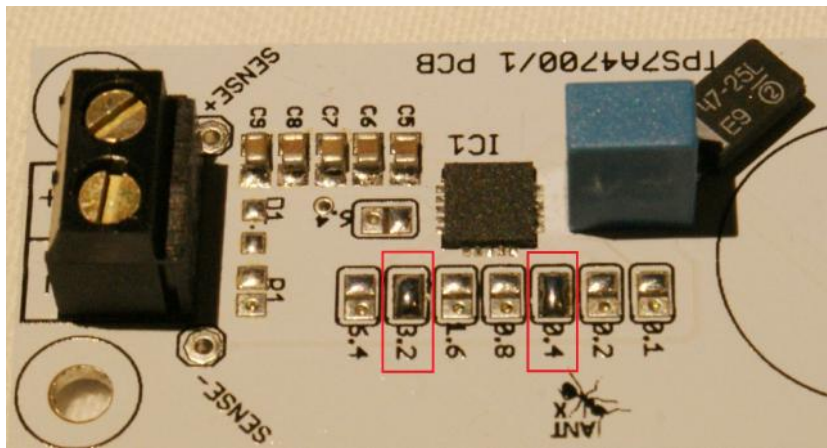
Tps7a4700 regulators has several pins which program or setup output voltage when they are shorted to ground. On this regulator PCB you'll find several solder jumpers near the chip. When you short one or more of them you'll program regulator to the corresponding value that is next to the solder jumper. You must not forget for the reference voltage which is 1.4V. For easier understanding here are couple of calculations for most common voltages.

$$3.3V = 1.4 + 1.6 + 0.2 + 0.1$$

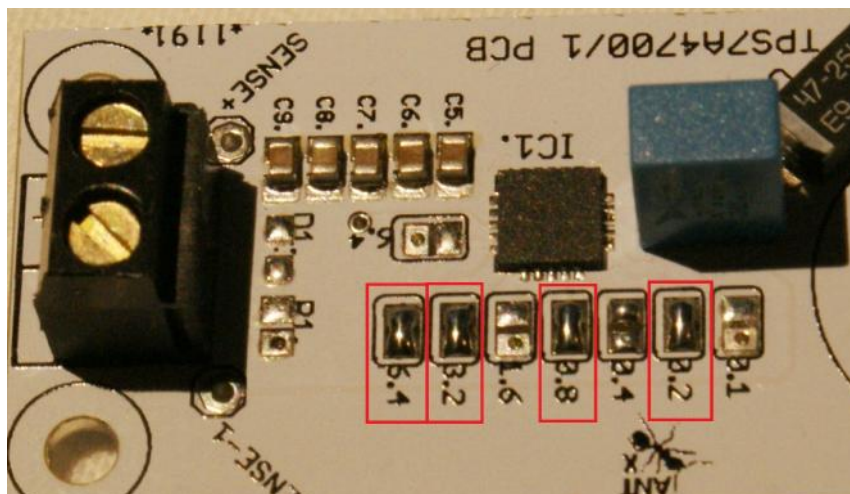
$$5V = 1.4 + 3.2 + 0.4 \text{ (Picture 1)}$$

$$12V = 1.4 + 6.4 + 3.2 + 0.8 + 0.2 \text{ (Picture 2)}$$

$$15V = 1.4 + 6.4 + 6.4 + 0.8$$



Picture 1: Example for 5Vout



Picture 2: Example for 12Vout

Transformer

AC transformer should be chosen wisely. In order to achieve regulators heat as small as possible, and therefore also expand lifetime of other components, match AC voltage very close to the output DC voltage. Calculation formula is quite simple. For example let say we want 5V_{out} from regulator. Regulator needs drop of 340mV but to be on safe side lets give it 1V for a drop, so 6V on its input. Into consideration we must also take voltage drop on diodes which is usually, and also in our case, 0.7V per diode. So end formula would be like this:

V_{max}=voltage measured after bridge rectifier

V_{eff}=AC voltage from transformer

V=voltage measured after bridge rectifier under load

V_{max}=1.414xV_{eff}

V=V_{max}-2x0.7V

Searching for our transformer voltage:

V_{eff}=(V+1.4V)/1.414

V_{eff}~5.233V AC

For dual PCB you need transformer with double secondaries for example 0-12V 0-12V and NOT center tapped transformer!

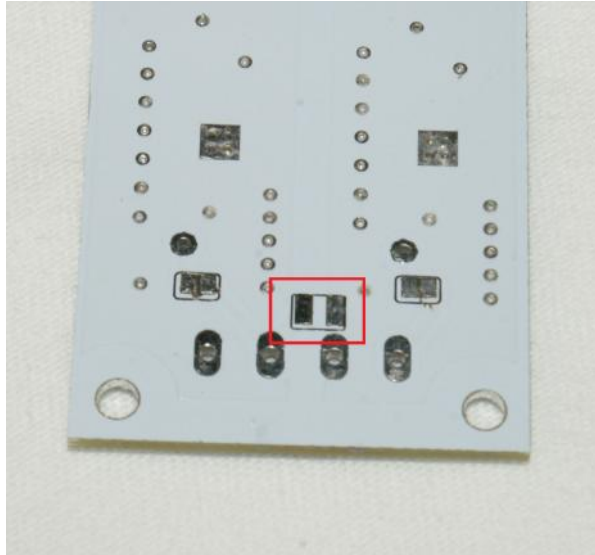
Because all components are rated 25V DC maximum AC input is therefore 16V AC.

Heatsink or heatbridge

In the package you'll find one small green heatsink and one aluminum block with allen screw. The first is intended to be used when current going to the load from regulator will not be bigger than 500mA. Technically it could be bigger but the heat, produced by the regulator, will be taking effect on other components and therefore reduce their lifetime. For currents bigger than 500mA there is this aluminum which serves as heatbridge between PCB and bigger cooling area eg. casing bottom, proper heatsink etc.. If installing it you need to use insulation thermal pad(not included) between block and PCB and to check with DMM that there is no electrical contact between them. Side of the block, which is in contact with bigger cooling area, it is advised to use thermal compound to maximize heat transfer.

Symmetrical output for dual pcb

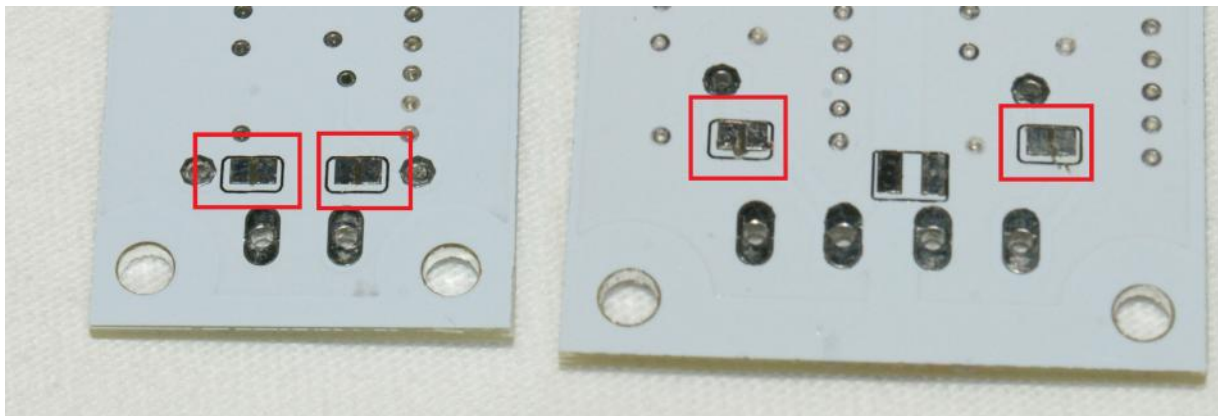
Dual PCB has option to create ground point if you want to supply your preamplifier or any other device which requires symmetrical voltage. PCB has to be set to same output voltages and big solder jumper needs to be applied. See picture 3 where to apply solder jumper .



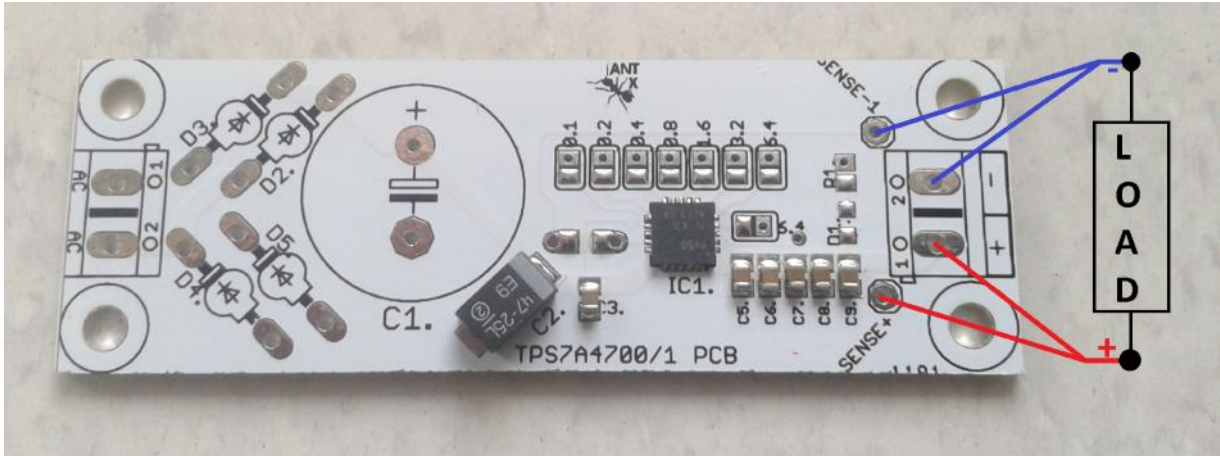
Picture 3: Jumper for symmetrical output and ground point

Sensing pins

Single PCB and dual PCB have option to improve their performance in voltage regulation with sensing pins. This function is especially used when wires from regulator to the load are long. Single PCB has sensing for negative and positive voltage, while dual PCB has sensing only for positive voltage. If not used, solder jumpers must be applied in marked positions, picture 4. Picture 5 shows how to connect regulator and sensing pins to a load. Wires from output and from sensing pins must be connected together at load.

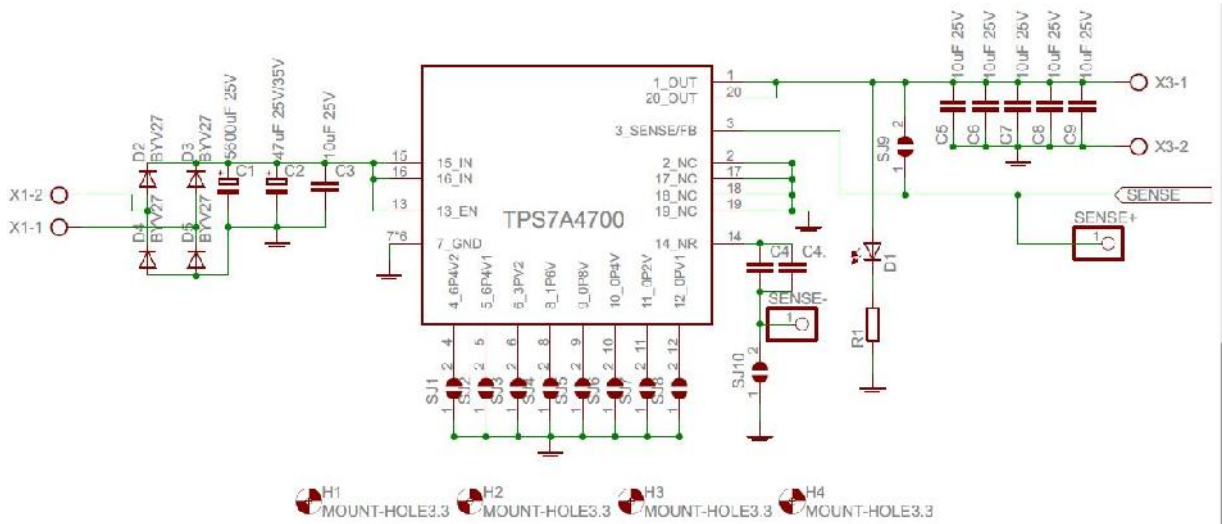


Picture 4: Jumpers positions if sensing is not used

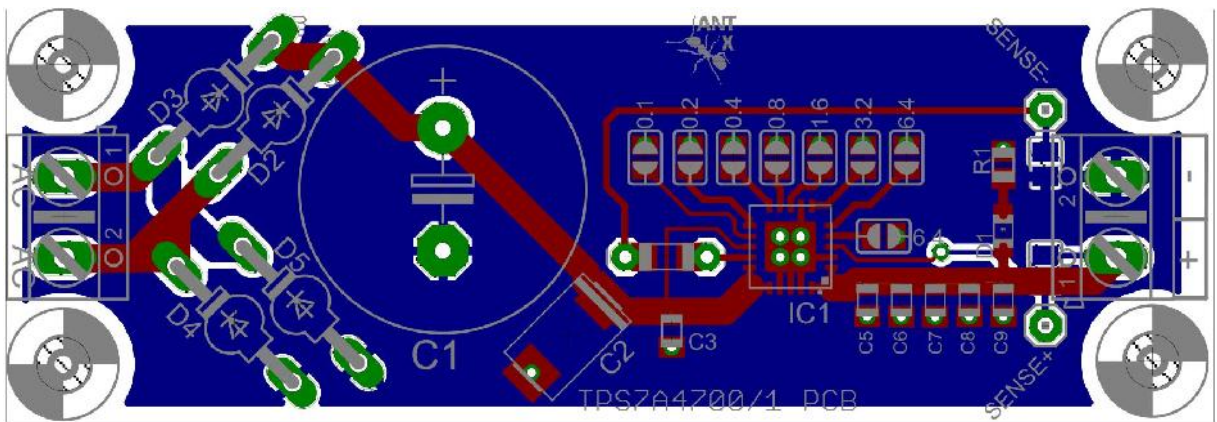


Picture 5: Connection to load when using sensing

Single PCB schematic:

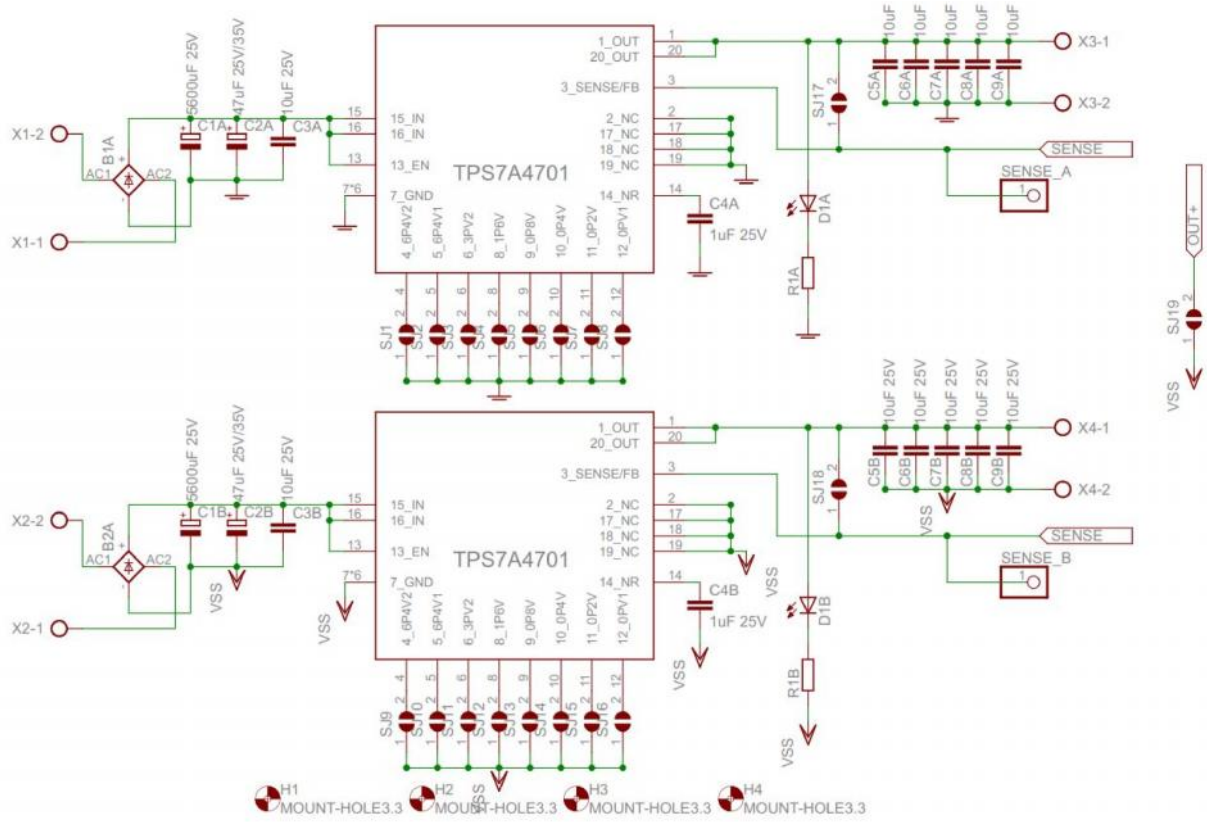


Single PCB silkscreen:

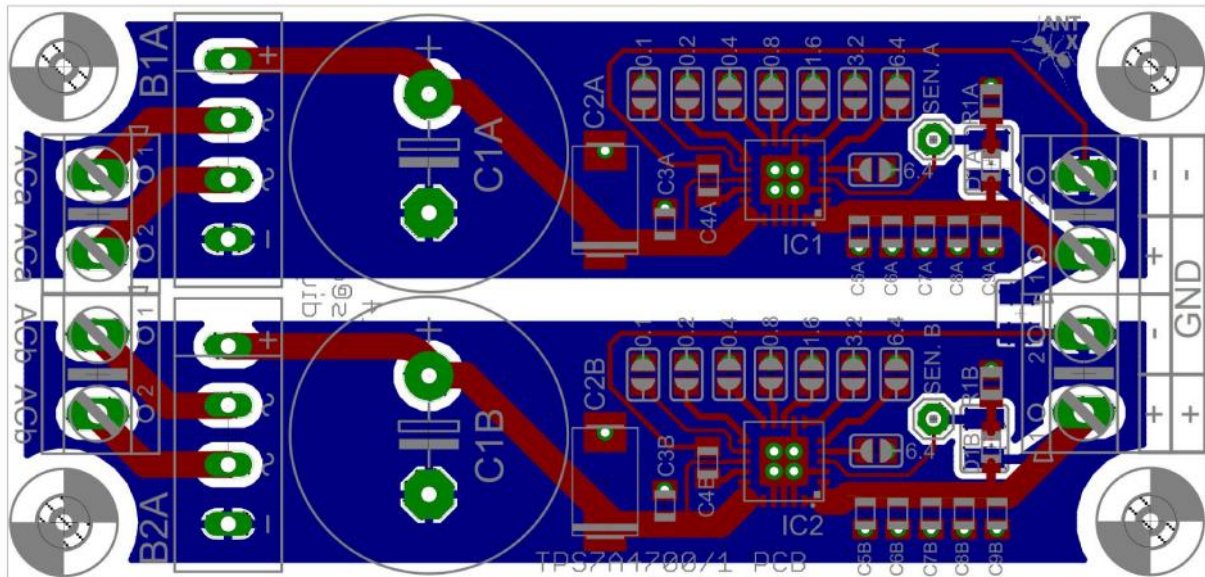


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Dual PCB scheme:



Dual PCB silkscreen:



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Technical specification:

Input voltage range: 2.2V to 17V AC, 3V to 25V

Output voltage range: 1.4V to 20.5V DC

Output voltage noise: 4uVrms(10Hz, 100kHz)

Dropout voltage: 350mV at 1A

Output current: 1A (with sufficient heatsink)

Written by mravlca(Antx) on November 2014.