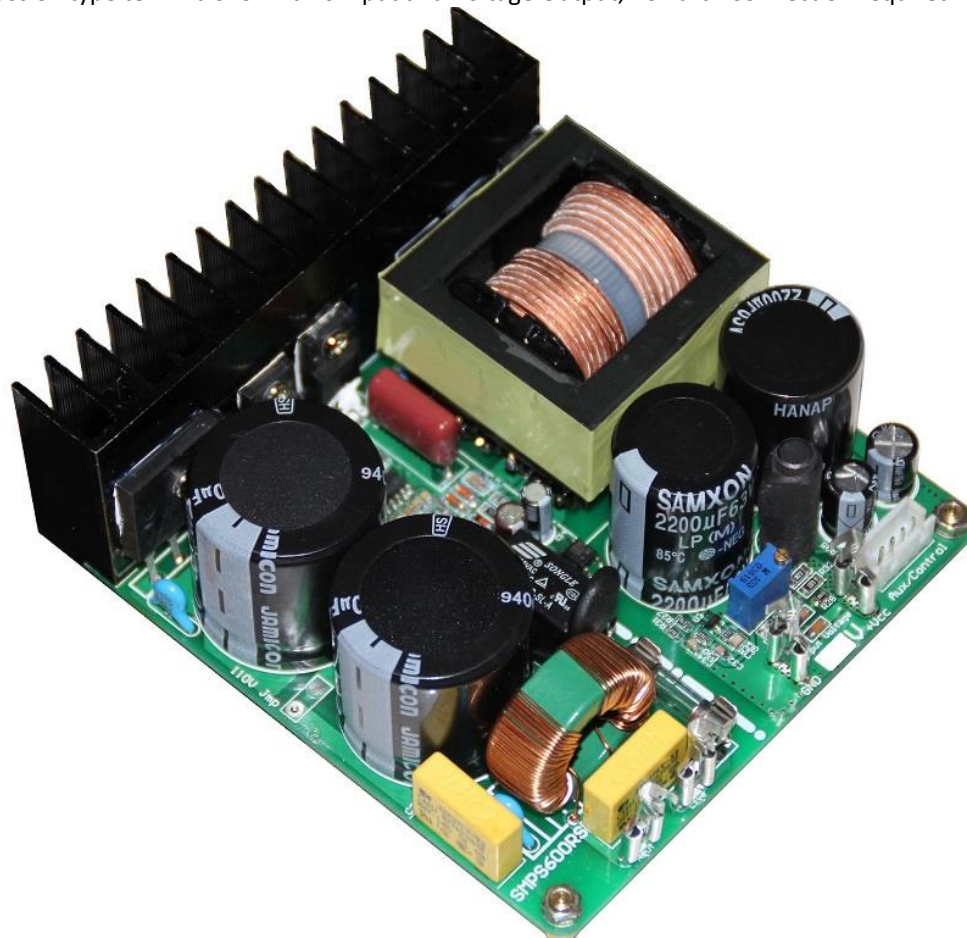


# SMPS600RS

The **SMPS600RS** Switched Mode Power Supply (SMPS) was designed to be used for Audio Amplifiers, such as class D or Class T, some class AB amplifiers which allow single supply, RF Power Amplifiers as well as non-audio related application. **SMPS600RS** use state of the art, highly efficient LLC Series Resonant Converter Topology. Due to the soft-switched topology used, the **SMPS600RS** has very low EMI noise, Output voltage ripple and lower losses and is more compact than a similar power rating classic hard-switched SMPS and incomparably better than any linear Power Supply. Several output voltage ranges are available for stock **SMPS600RS**, all of them with regulated output voltage, and adjustable within ~10% limits, making the **SMPS600RS** useful for a wide range of applications.

## SMPS600RS basic Features:

- Uses LLC Series Resonant Converter Topology to achieve highest efficiency, up to 95.2% and lowest EMI.
- 230V AC (default) and 120V AC configurable by setting a jumper.
- 600W Output Power with crest factor 2.5, 720W Peak Output Power, 800W Short-Time Peak Power.
- Four output voltages versions available from stock: 28V, 38V, 48V, 72V plus other values on request.
- 12V 500mA regulated Auxiliary Voltage available. Other values in range of 5V-24V available on request.
- Secondary side, isolated ON/Off control which brings the SMPS600RS in idle low-power low-voltage mode.
- Complete protection set, Under-voltage, Overvoltage, Over-current, and Over-temperature Protection.
- Burst-Mode operation at low load or no-load to achieve the highest efficiency. Requires about 2-3W idle power consumption for continuous mode operation.
- On-board Soft Start for smooth turn ON without huge current peaks. No additional Soft-start is required.
- Compact size, 100x112mm, 38mm to 48mm tall depending on version, lightweight, ~400 grams.
- Fast-on type terminals for Mains Input and Voltage Output, no Earth Connection required.



**Fig.1 SMPS600RS appearance**

**SMPS600RS Description:** Although the first SMPS's was developed nearly 50 years ago, most of the audio amplifiers manufacturers, both in HI-FI or Pro-Audio field, still use the old school linear power supplies made of bulky, heavy and inefficient mains transformer, rectifier bridge and large electrolytic capacitors to provide all necessary supply voltages for an audio amplifier, no matter if is class A, Class AB or switched amplifier, Class D/T. At the other extreme, some audio amplifier manufacturers are using hard-switching unregulated SMPS's which proved to be an EMI inferno, requiring extra additional filtering and shielding to achieve decent EMI performances and to not disturb all the sensitive circuits near-by. The main reasons behind these facts are the development costs and mass production costs and the lack of knowledge and fully understanding of ZVS SMPS operation, the only type of SMPS which has proven suitable for audio use. These facts created a SMPS-phobia among audio enthusiasts and Audio-amplifiers SMPS's are not yet widely accepted, mainly from subjective reasons such as "sound quality degradation" which was a direct effect of the previously mentioned early SMPS's. When it comes about the costs, the development cost of classic old type linear supply with bulky mains transformers is next to zero, in most cases all it takes is choosing the right transformer, an oversized rectifier bridge and some electrolytic capacitors with higher rated voltage than maximum DC voltage on the circuit and enough capacitance to hold the voltage during the most current demanding situation. For small and medium quantities, several thousands of units, the old type mains transformers costs purchased in mass-production quantities beats the cost of developing and producing a decent performance SMPS for audio applications. Even today, many companies which produce audio equipment, both for consumer and pro-audio are still using old type mains transformers and some, still use the old, hard-switched type SMPS mainly because most of the SMPS designers came from consumer products field where product cost stays ahead performance and high quality SMPS are out of budget. Other companies, simply hire a design house specialized in SMPS to do the job for them, sometimes with results below expectations.

Being soft commutated, the **SMPS600RS** intermodulation noise which might occur has very low values, below the S/N ration threshold, thus inaudible. Switching frequency during normal operation is almost constant, around 100KHz, and is completely rejected by the mains EMI filters, so it doesn't interfere with near-by equipment through power lines. The ZVS topology used for the **SMPS600R** was chosen due to its many advantages compared with all other topologies. Among the advantages, we consider that the most important are superior efficiency, up to 95.2% lower EMI and noise, compact size and reasonable complexity. The operation principle of this converter was described in many papers, application notes, and reference designs. Although is not a new technology, being discovered more than 20 years ago, until recently, the lack of knowledge, documentation and availability of good characteristic electronic components such as high-speed MOS-FET's or IGBT's prohibited this topology to spread like other hard switched topologies did. Only after the LCD and Plasma TV's came-up and initiatives to increase efficiency of the consumer products such as 80+, 90+ were imposed, engineers had to look towards other solution than the current, mature hard-switched topologies, which can't break the 90% efficiency barrier without significant cost and complexity increase. For a ZVS resonant converter, efficiencies greater than 92% are common and even 95-96% can be achieved. In some cases the DC-DC converter is supplied from the output of a PFC pre-regulator capable to supply a constant 400V DC. In our case, the PFC stage is not required, due to the purpose of the application and because similar or better efficiencies can be achieved without using a complicated PFC circuitry which would increase the size of the SMPS board, EMI, and decrease the performance due to the fact that the available space is limited and the PFC inductor might interfere with other circuits operation.

The **output voltage** of **SMPS600RS** is fully regulated and independent of mains voltage variation as long as the mains voltage value and load current consumption is within specified limits. For example, the **SMPS600RS** 48V version, the output voltage will not change when the mains supply voltage varies from 200 to 250V AC or 100 to 130V AC and output power from zero to full load. For comparison, using a classic power supply comprised of a 600VA mains transformer, rectifier bridge and same capacitance value for electrolytic capacitors as **SMPS600RS** use on secondary side, designed to deliver 48V at amplifier idle current consumption, let's say 200mA, the voltage at no load will be around 53 to 56V, but under full load will drop down to 40-42V, due to several factors such as transformer windings DC and AC resistance, and the lack of large primary side storage capacitance which **SMPS600RS** have and the classic power supply doesn't have. The equivalent of total secondary side capacitance of **SMPS600RS** is about 3-4 times higher than the value of the actual secondary side capacitors due to the fact that the main storage capacitors placed on the primary side can store more energy per volume being high-voltage type. The actual capacitance in the secondary side of **SMPS600RS** is lower than the capacitance of similar power SMPS from our products range due to the fact that the fast voltage regulation and low output ripple allow using a smaller capacitance while keeping the small form factor and size.

**SMPS600RS Applications:** Although **SMPS600RS** was designed and built to be used mainly for class D and Class T audio amplifiers as well as RF Power amplifiers due to its high performances and versatility can be used for several applications, not just audio and RF amplifiers. It all started several years ago with the previous version, **SMPS500RS** which was a successful product. Since the technology keeps improving and the power transistors are getting better and better, we are able to get more power and higher efficiency from the same size power supply and as the previous version while reducing the price per watt. Since the audio amplifiers draw a pulsed power not continuous, with a crest factor (peak to average ratio) of at least 3 or more (standards states a value of 8) we have chosen a more conservative value for the design: 2.5 this means that the **SMPS600RS** can supply at least 240W long term continuously to the load without any issue. Higher output voltage versions such as 48V and 72V can supply at least 320W when powered at 230V AC mains. This is more than half of its rated power for audio amplifier use. Many other power supplies for audio available on the market can barely sustain ¼ of their claimed power. Some of the most suitable fields and applications where the SMPS600RS was successfully tested and outperformed alternative power supply solutions:

**Audio Amplifiers:** **SMPS600RS** relatively high output power for its size and high efficiency makes this power supply the most suitable candidate for high-efficiency, low weight and compact size Class D or T power amplifiers. Due to the fact that the main output is single voltage is single voltage not differential, **SMPS600RS** is mainly suitable for chip-based class D amplifiers with **BTL** output connected speakers instead of **SE** connected speakers. **SMPS600RS** can be used to supply amplifiers using single or multi-chip solutions produced by several manufacturers. Some of these chips are: TAS5630(B) TAS5631(B) TAS5162 TAS5613 TAS5614 TDA7492 TDA7498 TK2050/STA510 and many others. Several TPA3118 or TPA3116 based amplifiers can be powered from a single **SMPS600RS** if lower voltage version is selected on request. **SMPS600RS** will work flawlessly with most of the amplifiers built by third party amplifier manufacturers which are using these chips including open-loop class D amplifiers which are known for their high stability and excellent regulation power supply requirements and many other amplifier chips as long as the implementation is neat and respects all the implementation rules required by the chip manufacturer, explained in detail in their datasheets and application notes. Recently we noticed a sharp increase of amplifier kits and boards sold on auction sites sometimes for a price lower than their core parts price and for which the quality and price are highly overrated while keeping the price main sale point. Although the **SMPS600RS** and its previous version, **SMPS500RS** were field tested with almost all available amplifiers on the market with excellent results in the past few years, we cannot not guarantee or know what to expect if **SMPS600RS** will be used to supply a poor implemented design. Amplifier technology had evolved as well, and lots of decent made amplifier can be found at reasonable prices. One should not try to save some bucks on a critical part of system such as amplifier which can lead to frustrating results until eventually will have to spend money again buying a good amplifier this time.

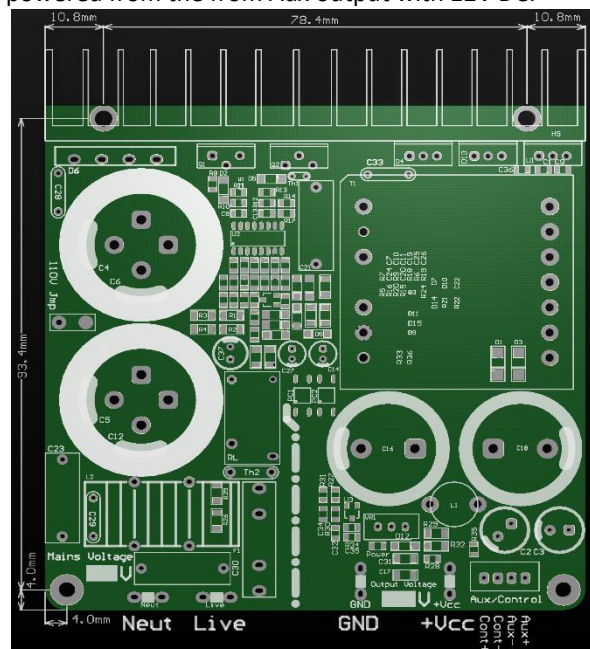
**RF Amplifiers:** Due to the high performances and high efficiency, **SMPS600RS** is suitable to be used not only for audio amplifiers applications but also for RF Power amplifiers which are well known for their delicate power supply requirements: very stable and ripple-free supply voltage, minimum possible EMI radiated by SMPS which can interfere with low-signal stages and eventually being amplified and transmitted along with useful signal. Besides the low EMI generate by soft-switching technique used by the **SMPS600RS**, the use of CLC output filter to minimize the output voltage ripple and variable switching frequency – a particularity of chosen topology used to generate spread-spectrum EMI instead of fixed frequency, this is particularly useful for RF amplifiers application. The high efficiency and lower size and weight come as a bonus, especially when the RF amplifiers must be kept at a relatively low temperature considering their high power dissipation, and any additional source of heat would increase the cost and weight of the cooling system and mechanical assembly. **SMPS600RS** was successfully tested with several RF power amplifiers with output power range of 50W to 400W working on 100m to 70cm bands.

**Small scale automation and DIY tools:** Recently a number of customers have used the previous version, **SMPS500RS** in home-automation systems including lighting, smart-home and security, constant voltage battery chargers for back-up systems as well as power supply for DIY built CNC's and increasingly popular now 3D printers. While the **SMPS600RS** was designed to be used mainly for amplifiers, with a careful consideration can be used for other applications too. The main consideration is the maximum continuous output power required by the system supplied by **SMPS600RS**. For automation projects **SMPS600RS** can supply the full rated power, 600W if the load has a crest factor similar with amplifiers, 2.5 and the longest time the load draw the full power does not exceed 2-3 minutes. The long term continuous power is at least 240W for the lowest output voltage version 28V and higher output voltage versions such as 48V and above can supply at least 320W when powered at 230V AC mains.

**Mains Voltage:** For proper operation the mains voltage must be within 196-254V AC range for 230V mains voltage version and 98-132V AC for 120V mains voltage version. Other mains voltage versions are available on request. The ambient temperature must not exceed 45-50°C and the environment must be dust and moisture free for long term reliability. **SMPS600RS** features a soft-start characteristic, using a power thermistor and relay which short the thermistor once the **SMPS600RS** started. Note that when the power supply is working in burst mode with low load or no-load at all, the LED light which indicate output voltage presence might dim as well as the mains soft start relay might click ON-Off due to insufficient load on the output, especially when minimum voltage was set at no load. This is not an issue and the relay will close as soon as a min. load of ~2W is added. Within a system, either if the load is an audio or RF amplifier or any other kind of load, there is a quiescent current of at least 30-50mA which will bring the **SMPS600RS** in continuous operation mode and avoid the relay clicking. The soft-start circuit also allows progressive charge of the output filter capacitors with a controlled charging current, protecting them and the load connected without tripping overcurrent protection. The value and the working voltage of the output capacitors depend on the type of the SMPS, single or dual voltage, and the value of the output voltage. These capacitors have enough capacitance for most stringent applications, adding extra capacitors is not necessary or recommended, because if the capacitance is too high, the overcurrent protection might trip during power ON.

**Thermal Management:** **SMPS600RS** requires proper thermal management to keep the nominal temperature of all the components within their operating range. The efficiency of **SMPS600RS** from 20% to 100% load is over 90% with peak efficiency over 95%. Efficiency and dissipated power depends on output voltage version, the highest the voltage the highest the efficiency. Although the soft-switching characteristic allows the **SMPS600RS** to run cooler than similar power hard-switched SMPS's, over-temperature protection was added. If the **SMPS600RS** is installed in a poor ventilated enclosure and the power demand is high, the temperature can reach the over-temperature threshold and activate the over-temperature protection. This consists of a circuit which monitors the temperature of the primary side MOS-FET's and disables the power supply when the operating temperature reach approx. 80°C and resume operation after the temperature drops few °C. If **SMPS600RS** output current demand is high, using a cooling fan is strongly recommended to keep the temperature within normal operation limits, improving the reliability. The fan must be installed on the back side of the enclosure and absorb the hot air through the board from the upper right side (refer to board layout figure) where the rectifier bridge is installed, then the power inductor and power transformer and blow the air outside the enclosure. While the hot air is removed from the enclosure instead of blowing air inside, the average temperature of PCB and temperature sensitive components such as electrolytic capacitors is kept 15-20°C lower than if the air would circulate in opposite direction. The cooling fan must be 12V 80-120mA rated, 50x50mm or 40x40mm type, ball bearing. It is not provided but can be supplied on request. The fan can be powered from the from Aux output with 12V DC.

**SMPS600RS** PCB board size is 100x100mm and the on-board heatsink is extended 12mm outside the board so that the air can pass easily through heatsink fins for efficient cooling. The minimum height of the **SMPS600RS** is approx. 38mm including the PCB board and maximum height can be 48mm or more, depending on the electrolytic capacitors height. If low profile is required, it must be mentioned prior order. Four mounting holes are used to secure the PCB board inside the enclosure. No Earth connection is available at the mains connection side, **SMPS600RS** uses Cat II isolation. If the enclosure is made of metal, aluminum or steel, it is recommended that the chassis to be connected to Protective Earth terminal of the mains supply cable. Mains voltage must be supplied to **SMPS600RS** through the Fast-On plugs at **Neut** and **Live** pins. Bare Fast-On plugs without wires are provided, on which properly sized wires must be attached. For mains supply 2-2.5mm<sup>2</sup> wires are recommended while for output DC voltage at least 2.5-4mm<sup>2</sup> must be used, depending on the output current, allowing up to 5A/mm<sup>2</sup> current density. Aux/Control mating connector with wires is supplied.



**Fig.2 SMPS600RS PCB board layout and size**

**Auxiliary Output:** SMPS600RS has a regulated auxiliary output of 12V and 500mA continuous current and up to 1A peak. This auxiliary voltage GND is isolated from the main output GND and can be used to supply auxiliary circuits within the system. Default value for auxiliary voltage is 12V (11.8 to 12.2V) and is regulated using a 7812V regulator type from an 18-19V DC auxiliary voltage. Other standard regulator type can be used on request. The full current capability of auxiliary output is reached when the SMPS600RS is working in continuous mode or when the main output is loaded with at least 50mA current and no burst mode occur.

**Control:** Some applications require that the main output voltage to be disabled in certain conditions. Either for Stand-By mode or if some fault is detected on the circuits supplied. By applying a 5-12V at 2-5mA on the pins **Cont-** and **Cont+** the SMPS600RS can be brought to **Stand-by** mode when both the main output voltage and Aux. voltage are disabled and the power supply mains consumption drops to about 250W as required by the most stringent energy saving standards. As soon as the power is removed from the control pins the SMPS600RS resume operation and the output voltage and auxiliary voltage rise to nominal value. This feature is particularly useful when the audio amplifier operation must be controlled remotely or a critical fault which requires shut-down the power occur. Powered speakers or subwoofers which must turn ON/Off when audio signal presence or absence is detected, or fast-shut-down if the amplifier fails and put out DC voltage to protect the speaker.

The control voltage must be provided from an external source such as the stand-by power supply of the amplifier or system. In many cases there is no such voltage because there is no other power supply to provide it. The aux. voltage of SMPS600RS can be used to control its own status. By supplying the Control pins from the 12V aux. voltage, the SMPS600RS will be brought in a self-sustained narrow pulse-operation mode where very narrow bursts will allow secondary voltages to build up to ~20% of their nominal value then immediately shut-down for about 300-800mS then the cycle will repeat. If there is no load on the secondary side, the mains power consumption will be below 0.5W and the main output voltage and power will be very low, approx. 20% of the nominal value and cannot sustain the load, but most of the loads are inactive when the power supply is below 50-70% of the nominal supply voltage so there will be little or no current draw. For example, if a power audio amplifier which normally requires 48V is supplied with less than 24-30V DC the operation will be inhibited due to under-voltage lock-out mode and no current or very little current will be drawn. Before such implementation can be done, must verify if the amplifier can be used in this conditions.

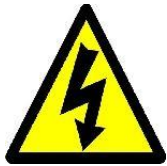
### SMPS600RS Output Voltage version dependent specifications:

Output voltage version:	SMPS600RS 28V	SMPS600RS 38V	SMPS600RS 48V	SMPS600RS 72V	SMPS600RS Custom voltage
<b>Parameters:</b>					
Output Voltage Range: Measured at 10-100% load	Minimum: 25.8V Maximum: 30.5V	Minimum: 35.6V Maximum: 40.8V	Minimum: 45.3V Maximum: 51.2V	Minimum: 68.7V Maximum: 75.6V	Minimum: 20V Maximum: 120V
Main output current at nominal output voltage:	Nominal: 18A Peak: 24A	Nominal: 16A Peak: 19A	Nominal: 12.5A Peak: 15A	Nominal: 8.3 Peak: 10A	Max Nominal: 18A Max. Peak: 25 A
Max. Output Voltage Ripple: Measured at 10 & 70% load	10% load: 16mVpp 70% load: 76mVpp	10% load: 15mVpp 70% load: 64mVpp	10% load: 16mVpp 70% load: 68mVpp	10% load: 19mVpp 70% load: 82mVpp	10% load: 40mVpp 70% load: 170mVp
Aux. Output Voltage: Nominal Aux. Current:	Nominal: 12V Iaux=500mA	Nominal: 12V Iaux=500mA	Nominal: 12V Iaux=500mA	Nominal: 12V Iaux=500mA	Minimum: 5V Maximum: 24V
Maximum output voltage overvoltage allowed:	Typical: 29.5V Maximum: 30.8V	Typical: 40.6V Maximum: 41.2V	Typical: 51.4V Maximum: 52.6V	Typical: 75.5V Maximum: 76.8V	Typical: 21.5/130V Maximum: 136V
Mains Input Voltage range:	120V: 98-127V 230V: 196-254V	120V: 98-127V 230V: 196-254V	120V: 98-127V 230V: 196-254V	120V: 98-127V 230V: 196-254V	120V: 98-127V 230V: 196-254V
Mains $\Delta V$ regulation: Load $\Delta I$ 10-100% regulation:	Maximum: $\pm 0.32\%$ Maximum: $\pm 0.15\%$	Maximum: $\pm 0.35\%$ Maximum: $\pm 0.16\%$	Maximum: $\pm 0.36\%$ Maximum: $\pm 0.16\%$	Maximum: $\pm 0.4\%$ Maximum: $\pm 0.2\%$	Maximum: $\pm 0.8\%$ Maximum: $\pm 0.5\%$
Output load for continuous (no burst mode) operation:	Min: 45mA Max: 80mA	Min: 32mA Max: 60mA	Min: 25mA Max: 50mA	Min: 20mA Max: 40mA	Min: 20mA Max: 120mA
No-Load power Consumption with burst-mode allowed:	Min: 1.2W Max: 2.5W	Min: 1.4W Max: 2.6W	Min: 1.5W Max: 2.7W	Min: 1.7W Max: 2.8W	Min: 1.2 W Max: 3.7W
Average Efficiency at 50-70% load	110V: 91.5 % 230V: 92.4%	110V: 92.1 % 230V: 93.0%	110V: 92.6 % 230V: 93.9%	110V: 93.6 % 230V: 94.8%	110V: 90.4-93.8% 230V: 91.2-95.2%
Minimum Height (mm): Maximum Height (mm):	38mm - 39mm 48mm - 53mm	38mm - 39mm 48mm - 53mm	38mm - 39mm 48mm - 53mm	38mm - 39mm 48mm - 53mm	38mm - 39mm 48mm - 53mm

### SMPS600RS common specifications:

- Start-up time (cold start): 1.7-2.6 seconds
- Ripple and noise measured at 20MHz BW using 10" twisted pair wires terminated with 0.1uF || 47uF caps.
- Leakage current from Primary to secondary: less than 0.4mA
- Isolation resistance: >100MΩ between Primary and Secondary, 3KV AC 1min. withstand voltage.
- Heatsink is electrically connected to Main Output GND via 100nF capacitor, max. ΔV AC or DC.
- Ambient working temperature: 10-45°C. Output power must be reduced at temperatures above 50°C
- Over-Temperature trip point when power transistors reach 80°C or heatsink temperature approx. 70-75°C.
- Designed to comply with EMC and Safety standards.

All the output voltage values from the table above except Mains Input Voltage range were measured with steady mains voltage 230V AC 50Hz and 120V AC 60Hz as well as variable mains voltage according to table above using the following instruments: Fluke289 and HIOKI3238 Multimeters, HIOKI3332, Power Analyzer, LeCroy Wavesurfer LT374 and Tektronix TPS2024B Oscilloscopes, Rigol DSA815 Spectrum Analyzer and M9716B High Power Programmable DC load. For test results repeatability, must use the same values for mains voltage and load, and same measuring conditions and equipment.



### Warning:

**Before you proceed with installation, make sure you have read this warning!!!**

The SMPS600RS is powered from the mains voltage and the primary side of the SMPS has hazardous voltages up to 340V DC and up to 300V AC. This voltage levels are present on the top and bottom of the board, and during installation and operation should never touch any part of the SMPS while it is connected to the mains and at least 10 minutes after complete disconnect from mains. If any changes or reconnection needs to be done, disconnect the unit from the mains and allow all capacitors to discharge for at least 10 minutes before handling it. Any ignorance of this warning will be made on user's responsibility, and can lead to serious injuries and possible death by electrocution if is handled improperly. This product has no serviceable parts and the on-board mains fuse has just protection purpose. In case of blown fuse, do not attempt to replace the fuse, contact us first, because other components might be affected if a wrong fuse value is used. Do not attempt to change any other component from the SMPS600RS. A safety clearance of at least 5mm must be kept between the board and the case, or any conductive part of the amplifier and an insulating sheet made of suitable material must be used between the power supply board and bottom of the enclosure. The heat transfer between the heatsinks and ambient must not be obstructed for proper operation.

Mains voltage is set by default to 230V to prevent any possible faults if wrong voltage version is ordered, for example 120V version for countries where 230V is also available. In this case the user must connect the 120V jumper IF and ONLY the mains voltage is within 100-127V interval otherwise damage might occur. A 230V configured power supply won't start at 120V and no damage can occur. But if it is configured for 120V and powered with 230V there are many chances to damage the power supply. The SMPS600RS is designed to allow both 200V and 400V type capacitors to be installed on the primary side in series or parallel connection allowing the most suitable configuration and highest total capacitance to be achieved. The 230V version will use 400V capacitors only while 120V will use 180-200V capacitors. We try to achieve the best performance and among other components, capacitors type and values are chosen for best fit on each power supply voltage version and two power supplies with same output voltage version from two different product batches might use different capacitors.



## Disclaimer:

**The SMPS600RS shall be used according with the instructions provided in this document. The user should NOT attempt to modify or change any of the parameters of this product, which can lead to malfunction. The designer and manufacturer of the product, Connexelectronic, is not liable for any kind of loss or damage, including but not limited to incidental or consequential damages. Due to the mains voltages of this board, only skilled users can install and use this product and the user should take all the measures needed when working with mains voltages, they should not touch any unisolated part of the board or connectors, or short-circuit any part of the board or connectors. Any misuse is the user's responsibility.**

The designer and manufacturer reserve the right to make changes or modifications on both the product functions and the performance without notice. The design details and PCB design is **Connexelectronic** proprietary information and shall not be copied published or distributed without **Connexelectronic** written agreement. **Connexelectronic** reserve the right to offer limited support for the boards purchased directly from **Connexelectronic**, and no support at all for the similar boards which aren't purchased directly from **Connexelectronic** or listed resellers, and from various reasons they look or pretend to be similar, exactly the same, or improved version products. **Purchasing the product means that you are aware and agree with these conditions.**

## Distribution network:

We are continuously striving to offer the best product quality and availability for our products, and the **SMPS600RS** can be purchased either directly from our website or through our distributor network as well. The current distributors list can be found on the website, and the list will be updated periodically. For uncompromised quality and support, we strongly recommend to purchase our products only from our website or listed distributors. Any product purchased from any third-party organization or individual does not qualify for our support.