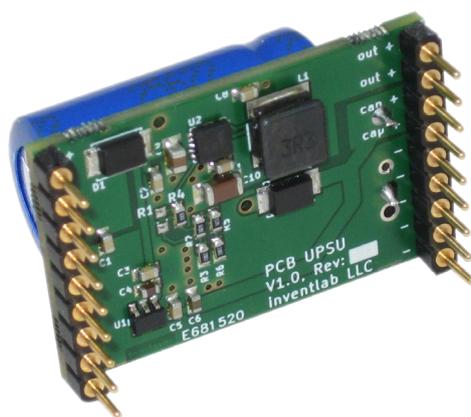


PCB UPS[™]

Datasheet

Observe safety instructions on page 2



PCB UPSU
with pin header on top layer



PCB UPSU features

- ▶ Supercap/Ultracap based UPS
- ▶ Maintenance-free
- ▶ -40°C - +65°C temperature range
- ▶ Fast charge
- ▶ High cycle life: 500'000 times charge/discharge
- ▶ 3.3V (default) or 5.0V output
- ▶ 3.3 - 5.5V input
- ▶ Buck-Boost converter: Input voltage can be higher, lower or equal to output voltage
- ▶ Small form factor: 35.56 x 22.86mm
- ▶ Capacity is easy and unlimited extendable with additional Supercaps/Ultracaps

Applications

- ▶ Save states in case of power failure
- ▶ Transmit informations in case of power failure
- ▶ Regulate/control devices in case of power failure
- ▶ Hot-Plug/Power source switching devices
- ▶ Get constant voltage from volatile voltage source

Output voltage set

PCB UPSU's default output voltage is 3.3V, when R4 is placed. To set the output voltage to 5.0V: Remove R4 and place it (0R 0603 resistor) to the R1 footprint. See „Dimensions / Pinout“ illustration.

Description

PCB UPSU is a small DC UPS solution for mounting on a PCB. The module has a Supercap/Ultracap for energy storage, which makes PCB UPSU free of maintenance and provides high cycle life.

PCB UPSU protects your electronics from voltage interruptions and provides a regulated output voltage. PCB UPSU is the easiest and maintenance-free solution, if electronic has to do something in case of power input failure, e.g. to transmit a security power-fail-information over GSM.

Safety instructions

The manufacturer declines any liability for damage to humans and machines. In particular, damage arising from the non-observance of the following safety regulations!

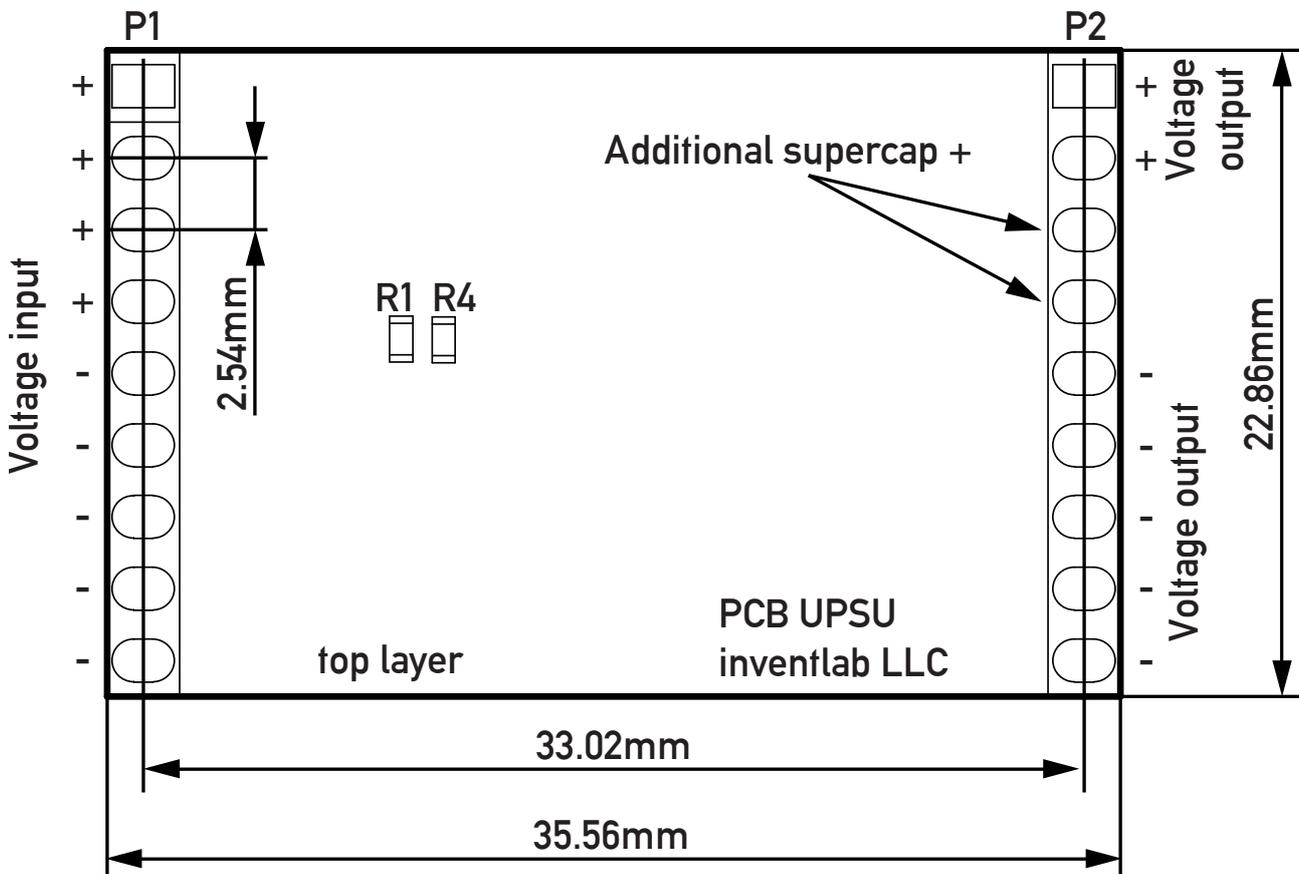
All work on the device must be carried out only by qualified and trained personnel!

Keep conductive parts away from the modules, risk of short circuit!

If the device has visible defects, disconnect the module and return it to manufacturer for repair.

Do not connect/disconnect or solder something, after PCB UPSUs supercap is charged. Risk of high-current short circuits!

Dimensions / Pinout



Note: All „-“ pins are connected together.

Charging time

Charging times for full charge when the capacitor is completely empty:

~2 minutes @3.3V input voltage

~3.5 minutes @5.0V input voltage

Charging time tolerance: $\pm 40\%$

Note: Charging time increases with additional Supercaps and higher input voltages.

Running time in the case of power failure

Note: Following running times are without any additional Supercaps.

Power consumption [W]	Running time [s]
0.1	170
1	17
2	8.5

Running time tolerance: $\pm 20\%$

Adding additional Supercaps

Additional Supercaps can be added to increase the running time in case of power input failure.

Add the positive pin (+) from Supercap to the PCB UPSU „Additional supercap +“ pins and the negative pin (-) to the negative (-) pins of PCB UPSU.

See „Dimensions / Pinout“ illustration.

Make sure, your Supercap's max. voltage rating is $>2.5V$. Read safety instructions!

Request design support from inventlab LLC.

Pin header mounting (P1 and P2)

Select the best suited for you:

- ▶ Solder a 2.54mm, 9pin pin-header on bottom layer (the same layer, which contains the Supercap). Compatible is for example the pin header 54111-408091850LF from FCI.
- ▶ Otherwise, place a pin header on the top layer

Design recommendations

Depending on the required output power, one or more 47uF output capacitors are recommended, to reduce output ripple voltage. Place these capacitors as close as possible to the voltage output pins.

An EMI filter on PCB UPSU's voltage input and voltage output is recommended.

It's recommended to fasten the Supercapacitor to prevent from vibrations, e.g. with silicone.

Ask inventlab LLC for design support.

Electrical Specifications / Absolute Maximum Ratings

Symbol	Parameter	Condition	Min.	Typ.	Max.	Units
U_{IN}	Input voltage		-30	3.3 - 5.5 ¹	5.8	V
U_{OUT}	Output voltage	R4=0 Ohm, output voltage=3.3V	3.15	3.3	3.45	V
U_{OUT}	Output voltage	R1=0 Ohm, output voltage=5.0V	4.75	5.0	5.25	V
U_{OUT}	Output voltage	possible output voltage range ²	1.2		5.5	V
I_{OUT}	Output current			0.6	1.2 ³	A
f	Switching frequency		1250	1400	1500	kHz
η	Efficiency		86	93	96	%
U_{UVLO}	Undervoltage lockout	voltage regulator minimum input voltage ⁴	1.5	1.7	1.8	V
V_{PP}	Ripple Peak-Peak			68 ⁵	182 ⁵	mV
T_A	Temperature range	Storage, uncharged	-40	20	70	°C
T_O	Temperature range	Operating	-40	20	65	°C

¹ Input voltage between 2.8V and 3.3V is possible, but this may increase output ripple voltage and reduce efficiency. Input voltages below 2.8V achieved in reduced stored energy capacity.

² Ask inventlab for other output voltages than 3.3V and 5.0V

³ With output currents higher than 0.6A, ripple voltage increases, additional output capacitors are required and efficiency may be reduced. Higher output currents than 0.6A are only possible, while input voltage is available and $\geq 3.3V$. Otherwise output voltage may decrease. This may or may not be acceptable in your design.

⁴ This voltage plus 0.3V is the minimum supercap voltage. At this voltage switches PCB UPSU the output voltage off. Note: You have to power PCB UPSU with $\geq 2.8V$ and $\leq 5.5V$ so that PCB UPSU can charge the supercap/s. Below 2.8V, PCB UPSU cannot fully charge the supercap and efficiency decreases.

⁵ Measured with one 47uF output capacitor (see design recommendations).

Manufacturer



inventlab LLC
Solothurnstrasse 6
CH-4702 Oensingen

www.inventlab.ch
info@inventlab.ch
+41 62 544 68 05

Ordering information

PCB UPSU can be ordered with assembled pin headers and/or with other Supercap types and/or with other output voltages than 3.3V or 5.0V.

You can also place an order with already fixed Supercapacitor with silicone.

Ask inventlab LLC for more informations.

Where to buy

shop.inventlab.ch

Product website

www.pcb-upsu.com

Patent information

Patent pending

Your specific requirements

Please contact inventlab LLC if your project has special PCB UPSU requirements. Our engineers look forward to hearing from you.

Disclaimer

All copies other than the version on pcb-upsu.ch/pcb-upsu.com website are uncontrolled and may not be up to date. inventlab LLC reserves the right to change the design or construction of any products or limit distribution of any products without prior notice. The information in this document is only to be used in connection with inventlab LLC products and is for users to engineer and design their applications with inventlab LLC products.

inventlab®, CHYPSOTECH®, ElektronikEntwicklung.ch®, ATX UPSU®, 20W UPSU®, MIL UPSU®, PC104 UPSU®, Das Zuhause der Technik.® and ercotima® are registered trademarks of inventlab LLC, all other brand names, trademarks and registered trademarks are property of their respective owners.