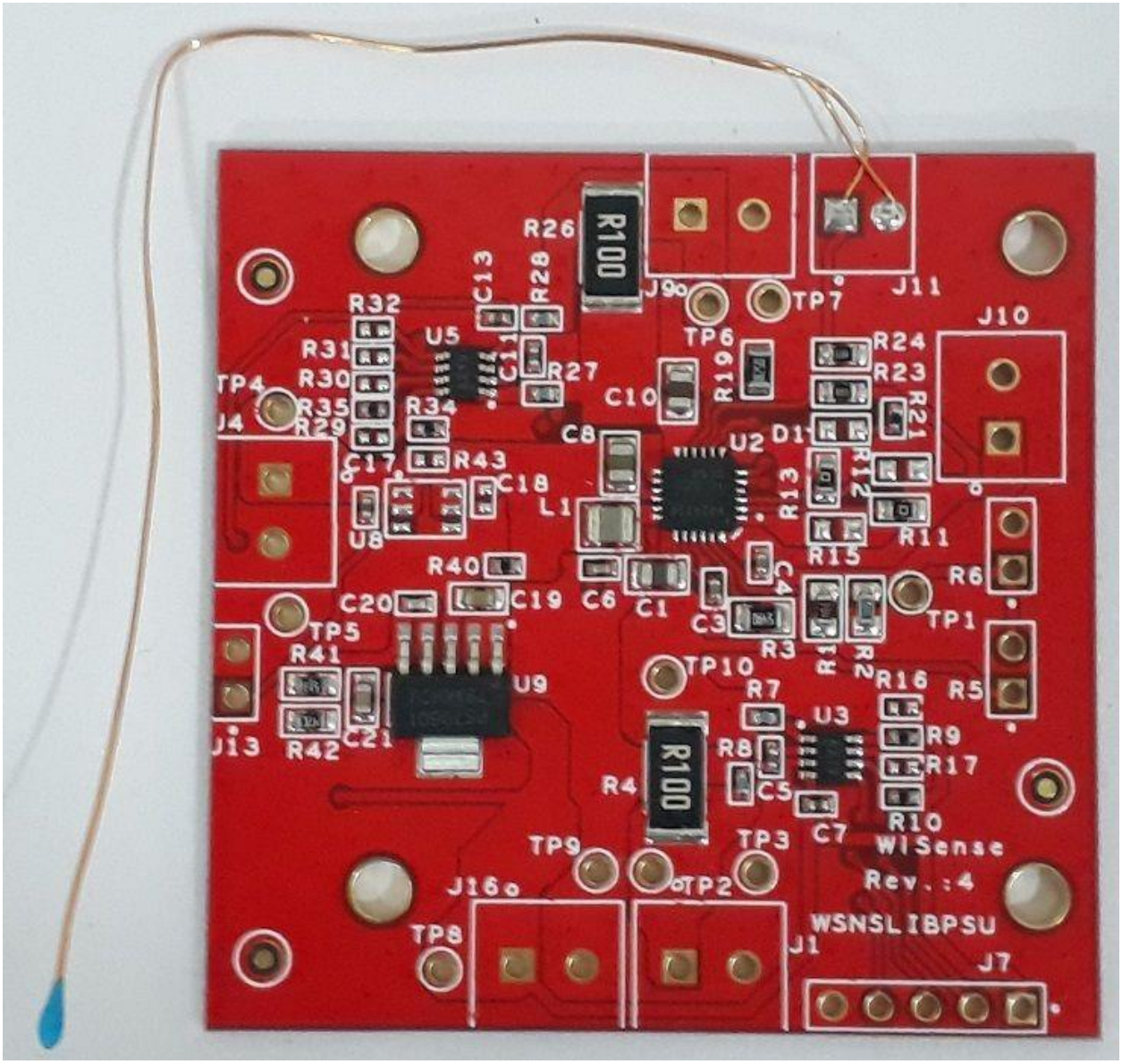
WSN-SLIB-PSU Rev 4.0

Solar Powered Power Supply Unit with Lithium Ion Battery Back Up.

Useful for powering all kinds of outdoor electronics like wireless sensor nodes and associated sensors/actuators etc.



Components

- Charger IC: BQ24250 (1 on board)
- Current/Voltage measurement IC: INA219 (2 on board)

- 3.3V @ 1A LDO: TPS79601 (1 on board)
- Load switch for gating battery output: SIP32510DT (1 on board)
- 2600 mAh Li-Ion Battery (1 off board)
- 3W-10W Solar Panel (1 off board)

Operating Specs

- Max input solar panel voltage (panel Voc): 10.5 V
- Solar panel Vpeak: 5V to 10V (assuming Voc <= 10.5V)
- Max charge current: 2 A
- Max battery discharge current: 4 A
- Li-Ion battery charged in 3 phases (trickle charge, pre-charge, constant current and constant voltage).
- Battery under-voltage lockout supported as load is not connected directly to battery.
- Charger IC can power the load and charge the battery simultaneously.
- NTC thermistor as required by charger IC.
- Multiple output voltages (On separate headers/connectors)
    - ~3.3V (Max 1 A)
    - 4.9V (Max 50 mA)
    - Li-Ion battery output (Max 4A). This supply is gated by a load switch which can be controlled by a signal external to the PSU (for example – by an external micro-controller).
- On PCB current and voltage sensors (two ICs) which measure the parameters listed below. All values reported over a single I2C bus.
    - Solar panel output voltage
    - Solar panel output current

- Battery voltage
- Battery current

- Positive values reported when battery is getting charged
- Negative values reported when battery is getting discharged

PCB specs

- Layers: 4
- Dimensions: 48.5 mm x 48.5 mm
- Mounting holes: 4
- Finish: ENIG
- All terminals are 2.54 mm pitch

Terminals

- **J1**: Connect Solar panel leads here
  - Pin #1: Solar panel +
  - Pin #2: Solar panel -
  - *3.5 mm screw terminal*

- **J9**: Connect Li-Ion battery leads here
  - Pin #1: Battery +
  - Pin #2: Battery -
  - *3.5 mm screw terminal*

- **J11**: Connect thermistor leads here (comes pre-connected)
  - Pin #1: No polarity

- Pin #2: No polarity
- *2.54 mm screw terminal*

- **J4**: Load switch gated BQ24250 SYS_V output (Max 4A)
  - Pin #1: SYS_V
  - Pin #2: Gnd
  - *3.5 mm screw terminal*

- **J10**: Output of BQ24250's internal LDO
  - Pin #1: V_ext_ldo
  - Pin #2: Gnd
  - *3.5 mm screw terminal*

- **J13**: Connect load switch control signal to Pin #1
  - Pin #1: V_signal
  - Pin #2: Gnd
  - *2.54 mm header*

- **J16**: 3.3V @ 1A LDO output
  - Pin #1: V_int_ldo
  - Pin #2: Gnd
  - *3.5 mm screw terminal*

- **J7**: I2C interface
  - Pin #1: Connect external voltage here to power the two INA219s
  - Pin #2: I2C SDA (optional on board 4.7K pull-up)
  - Pin #3: I2C SCL (optional on board 4.7K pull-up)
  - Pin #4: INT pin from BQ24250
  - Pin #5: Gnd

- *2.54 mm header*

Assembly

Machine assembled in Bangalore with imported components

PSU Kit

Includes

- 1 Nos WSN-SLIB-PSU V4.0
- 1 Nos 2600 mAh Li-Ion battery
- 1 Solar panel (3W to 10W)

Notes

- **Test Panel/Battery Specs**

  We have tested this PSU with different panels and batteries.

  ➢ **Panel #1**

  - Peak power: 3 Watts
  - Voltage output at peak power point (**Vpeak**): 8.5 V
  - Current output at peak power point (**Ipeak**): 300 mA ➢

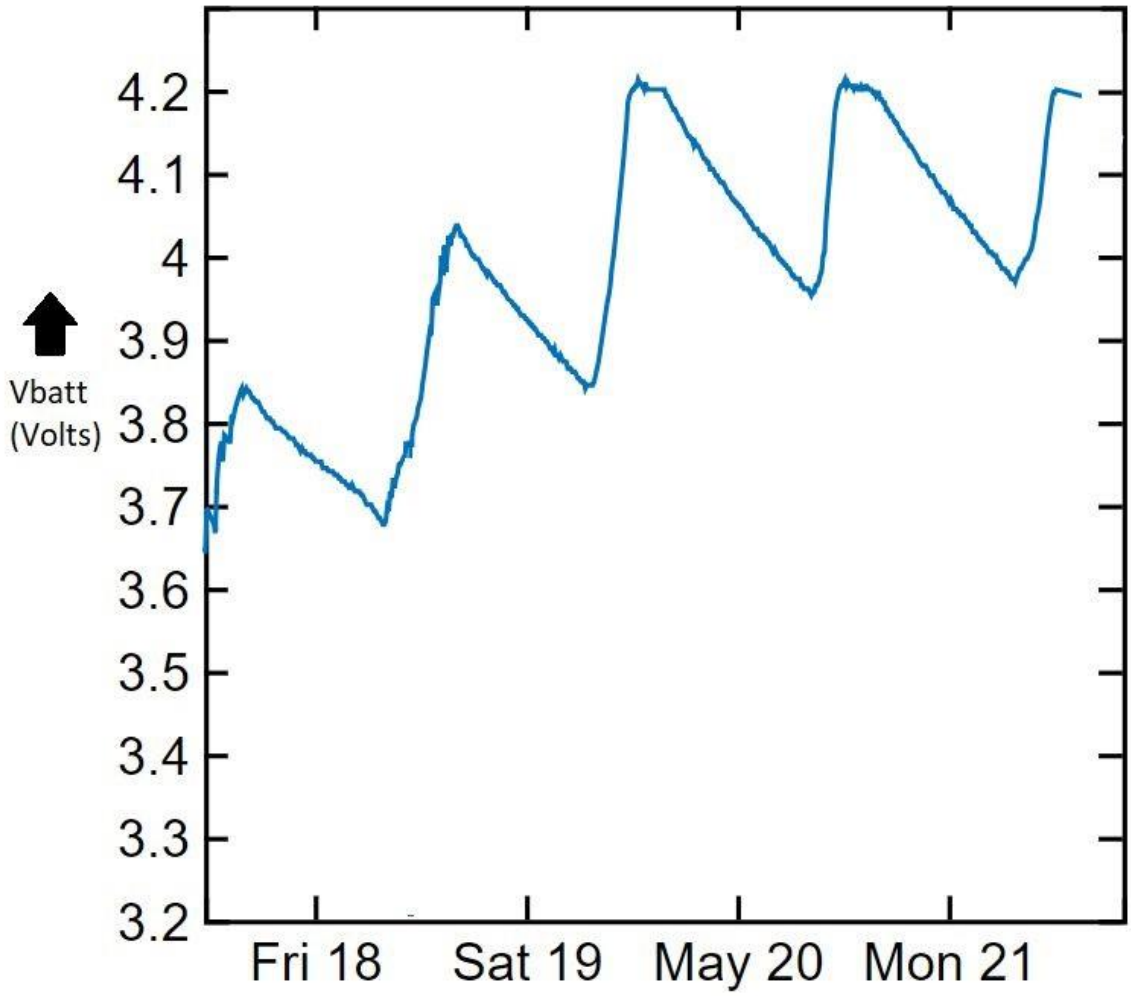
  Panel #2

  - Peak power: 6.5 Watts
  - Voltage output at peak power point (**Vpeak**): 6.5 V
  - Current output at peak power point (**Ipeak**): 1000 mA ➢

  Battery #1

  - Chemistry: Single cell Lithium-Ion Battery
  - Capacity: 2600 mAh
  - Output voltage: 3.7 V (nominal), 4.2 V (full charge)

- **Graph** below shows daily charging and discharging of new battery kept outdoors (over 5 days)

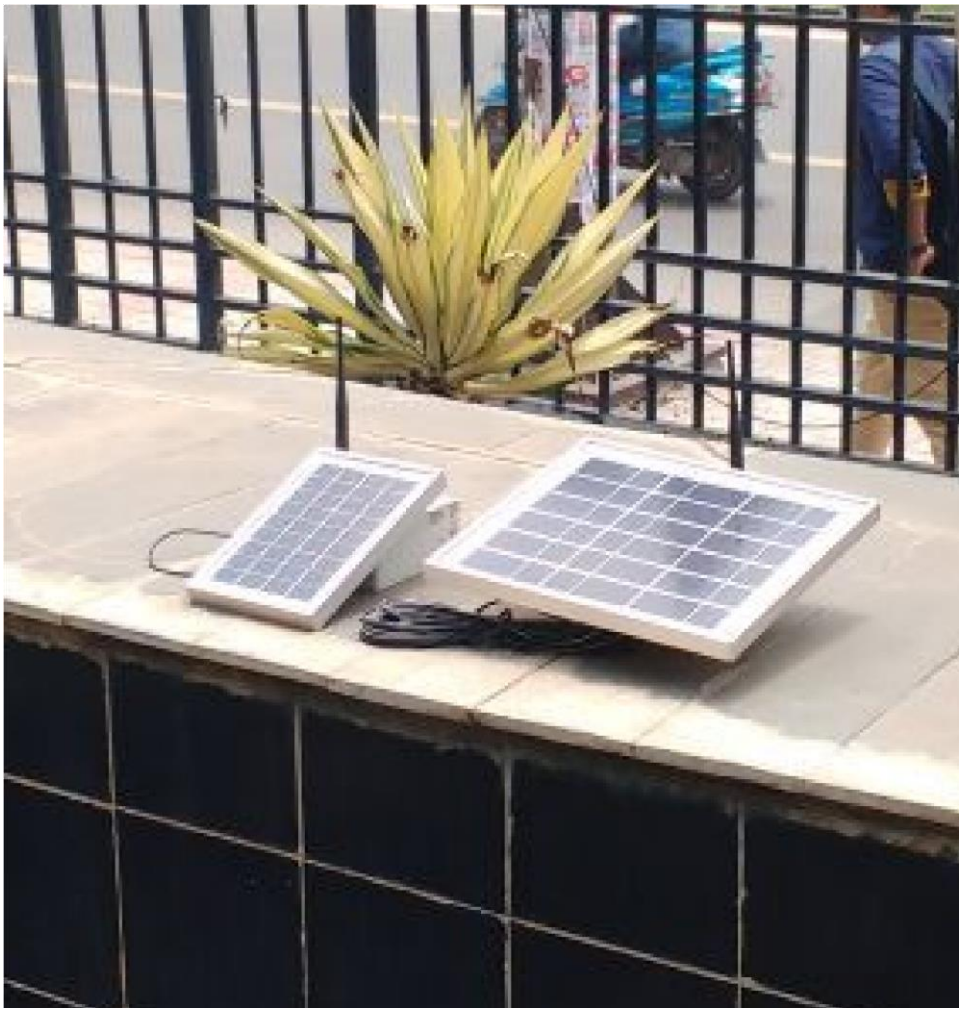


- **Software**

  If you want to use this charger in your product, we will provide the driver (c code) for reading the current and voltage measurements. Note that the charger IC works in stand-alone mode. It does not need any external configuration. The voltage and current measurements are performed by two separate sensor ICs (external to the charger IC). These sensors can be accessed over I2C. You may choose not to read this data.

  If you want to use a solar panel with a different **Vpeak**, we will change the relevant passives free of cost to suit your panel.

In the pic below, you can see couple of WiSense nodes each powered by the WSN-SLIB-PSU. You can see each node's solar panel and external antenna. Rest of the components are inside the respective enclosure.



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