

Verification Plan

1. The DPS shall not suffer damage at temperatures down to -40°C.

Equipment required: digital power supply, oscilloscope, jumper wires, thermometer.

Put the PCB board into the refrigerator, and control the temperature at -40°C. Using the thermometer to measure the temperature. After taking it off, first check the components on the DPS and make sure they are not suffering damage. Then, using the digital power supply generates input voltage 3V. The digital power supply and the PCB board are connected by jumper wires. The oscilloscope shows the output voltage. Then, recording the two output voltages to make sure the DPS shall not suffer damage at -40°C.

2. The DPS shall maintain voltage output specifications over temperature range of 0-70°C.

Equipment required: Multisim simulation

The temperature in the lab is around 20°C which cannot cover the whole testing temperature range. The simulation in Multisim is used to do the test. The temperature is modified in the application and run the DPS in it to observe the results. The data for input and output voltages are recorded and analysed.

3. The DPS shall have a power efficiency of >60% with 20 mA current load on either of the two outputs.

Equipment required: digital power supply, digital multimeter, oscilloscope, jumper wires.

The digital power supply generates input voltage 3V. The digital power supply and the PCB board are connected by jumper wires. The oscilloscope shows the output voltage. Using the digital multimeter to measure the load current. Then, using the results to calculate the power efficiency.

4. The DPS shall have a 5 V output. Voltage ranges from 4.85V to 5.15V with maximum current load of 20mA.

Equipment required: digital power supply, digital multimeter, oscilloscope, jumper wires, resistors.

The digital power supply generates input voltage 3V. The digital power supply and the PCB board are connected by jumper wires. Load resistors are also connected between output voltage and ground pins on the DPS board by jumper wires. The oscilloscope shows the output voltage. Using the digital multimeter to measure the load current by connecting in series with load resistors.

5. The DPS shall have a 12 V output. Voltage ranges from 11.2V to 12.8V with maximum current load of 20mA.

Equipment required: digital power supply, digital multimeter, oscilloscope, jumper wires, resistors.

The digital power supply generates input voltage 3V. The digital power supply and the PCB board are connected by jumper wires. Load resistors are also connected between output voltage and ground pins on the DPS board by jumper wires. The oscilloscope shows the output voltage. Using the digital multimeter to measure the load current by connecting in series with load resistors.

6. The DPS shall operate with a single voltage input from 2.7 to 5.8V. The input voltage must not be within +/- 10% of either of the output voltages (5 V and 12 V).

Equipment required: digital multimeter

Using the digital multimeter to generate input voltage in the range given and observe whether the DPS works as expected.

7. The DPS shall maintain voltage output specifications with an input voltage +/-20% from nominal.

Equipment required: digital multimeter, oscilloscope, jumper wires

The input voltage is generated by the digital multimeter. The voltage varies within +/-20%. The jumper wires are used for connection. Then, observing the

change of output voltage.

8. The DPS shall have flying leads for the connection to the battery.

Equipment required: jumper wires

Observing whether the jumper wires are used to connect the battery and the DPS.

9. The DPS shall have test pins for the output voltages.

Observing whether the design contains test pins on the DPS.

10. The DPS shall have a mass of no more than 25 g including PCB and components (without leads).

Equipment required: scale

Using a scale to weigh the board and ensure the mass is no more than 25g.

11. The DPS shall generate maximum 30 mA output current under a short circuit condition on either output.

Equipment required: digital power supply, digital multimeter, jumper wires

The input voltage is generated by the digital multimeter. The jumper wires are used for connection. Then, connecting the digital multimeter in series between output voltage pin and ground pin instead of the load resistors. The short circuit current can be measured.

Verification Matrix

Requirement	Requirements Document	Method	Verification Plan Document	Responsible Organisation/ Person	Verification Results Document
The DPS shall not suffer damage at temperatures down to -40°C	Requirements Specification	I	Verification Plan	Abby, Jinxuan	Test Results
The DPS shall maintain voltage output specifications over temperature range of 0-70° C.	Requirements Specification	I	Verification Plan	Abby, Jinxuan	Test Results
The DPS shall have a power efficiency of >60% with 20 mA current load on either of the two outputs.	Requirements Specification	A & D	Verification Plan	Everyone	Test Results
The DPS shall have a 5 V output. Voltage ranges from 4.85V to 5.15V (based on highest minimum voltage and lowest maximum voltage) with maximum current load of 20mA.	Requirements Specification	D & T	Verification Plan	Everyone	Test Results
The DPS shall have a 12 V output. Voltage	Requirements Specification	D & T	Verification Plan	Everyone	Test Results

ranges from 11.2V to 12.8V with maximum current load of 20mA.					
The DPS shall operate with a single voltage input from 2.7 to 5.8V. The input voltage must not be within +/- 10% of either of the output voltages (5 V and 12 V).	Requirements Specification	I	Verification Plan	Everyone	Test Results
The DPS shall maintain voltage output specifications with an input voltage +/-20% from nominal.	Requirements Specification	A & D	Verification Plan	Abby, Jinxuan	Test Results
The DPS shall have flying leads for the connection to the battery.	Requirements Specification	I	Verification Plan	Everyone	Test Results
The DPS shall have test pins for the output voltages.	Requirements Specification	I	Verification Plan	Everyone	Test Results
The DPS shall have a mass of no more than 25 g including PCB and components (without leads).	Requirements Specification	I	Verification Plan	Abby	Test Results
The DPS shall generate maximum 30 mA output current under a	Requirements Specification	D	Verification Plan	Everyone	Test Results

short circuit condition on either output.					
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- Inspection (I) - visual examination of drawings, data, or the item itself without the use of special laboratory procedures or equipment.
- Analysis (A) - evaluation of design or data by analytical techniques and may involve calculation or simulation.
- Demonstration (D) - operation, adjustment, or reconfiguration.
- Test (T) – formal test or measurement.