

# Test Results

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

By observation, there is no components shedding.

The measurements are taken below:

Input voltage/V	Input current/A	12V output current/mA	12V output voltage/V	5V output current/mA	5V output voltage/V
3	0.223	20.08	12.05	20.12	5.05

It shows that the DPS does not damage at temperature down to -40°C.

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

Temperature	0 °C	10 °C	20 °C	30 °C	40 °C	70 °C
Input voltage/V	3.5	3.5	3.5	3.5	3.5	3.5
12V output voltage/V	11.31	11.66	12.00	12.01	12.01	12.02
5V output voltage/V	4.73	4.84	5.00	5.02	5.03	5.07

The data proves the DPS can maintain voltage output specifications in the temperature range.

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

The measurements are taken below:

Input voltage = 3V

Input current = 0.225A

12V input current = 0.175A

5V input current = 0.094A

12V output voltage = 12.05V

12V output current = 20.06mA

5V output voltage = 5.00V

5V output current = 19.93mA

Calculating:

Output power/Input power \* 100%

$$\frac{12.05 \times 0.02006 + 5 \times 0.01993}{3 \times 0.225} \times 100\% = 50.6\%$$

$$\frac{12.05 \times 0.02006}{3 \times 0.175} \times 100\% = 46.0\%$$

$$\frac{5 \times 0.01993}{3 \times 0.094} \times 100\% = 35.3\%$$

Almost reach the requirements.

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

5V output is in the range



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

12V output is in the range



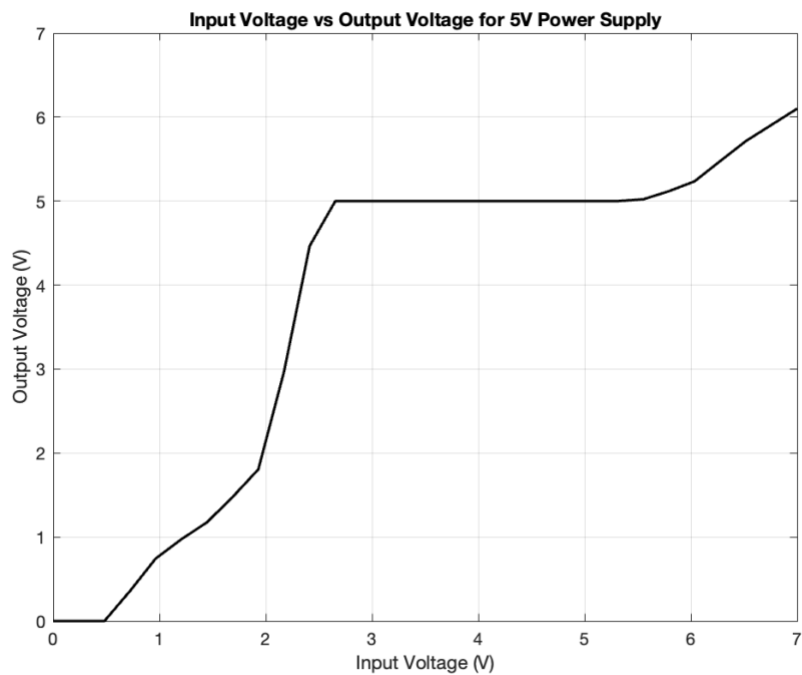
**6 The DPS shall operate with a single voltage input from 2.7 to 5.8V. The input voltage must not be within +/- 10% of either of the output voltages (5 V and 12 V).**

The input voltage of the design is 3V.

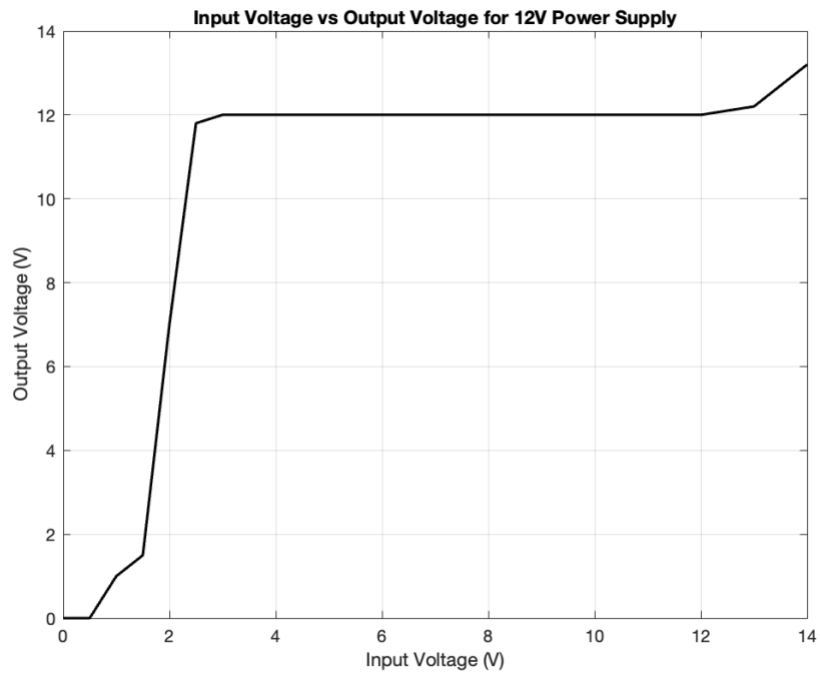
**7 The DPS shall maintain voltage output specifications with an input voltage +/- 20% from nominal.**

The data is recorded in the tables below, and the graphs are plotted by MATLAB.

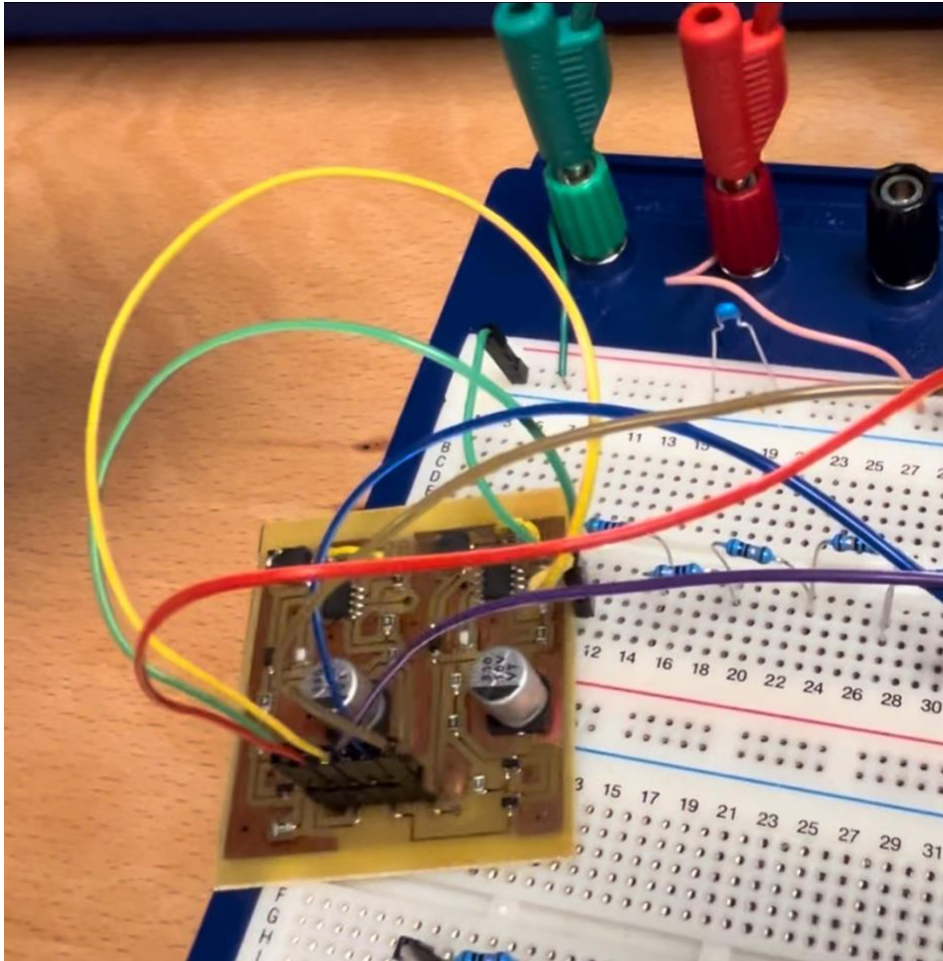
Input voltage/V	Input current/A	Output voltage/V (5)	Output current/mA
0	0	0	0
0.5	0	0	0
1	0.003	0.8	3.2
1.5	0.01	1.22	4.88
2	0.055	1.9	7.6
2.5	0.11	5	20
3	0.094	5	20
3.5	0.08	5	20
4	0.075	5	20
4.5	0.071	5	20
5	0.065	5	20
5.5	0.055	5	20
6	0.037	5.2	20.8
6.5	0.038	5.7	22.8
7	0.038	6.1	24.4



Input voltage/V	Input current/A	Output voltage/V (12)	Output current/mA
0	0	0	0
0.5	0	0	0
1	0.003	1.50	2.50
1.5	0.01	7.00	11.67
2	0.089	11.80	19.67
2.5	0.163	12.05	20.08
3	0.175	12.05	20.08
3.5	0.129	12.05	20.08
4	0.125	12.05	20.08
4.5	0.130	12.05	20.08
5	0.12	12.05	20.08
5.5	0.11	12.05	20.08
6	0.1	12.05	20.08
6.5	0.085	12.05	20.08
7	0.08	12.05	20.08
8	0.0665	12.05	20.08
9	0.055	12.05	20.08
10	0.05	12.05	20.08
11	0.045	12.05	20.08
12	0.04	12.05	20.08
13	0.033	12.20	20.33
14	0.035	13.20	22.00



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



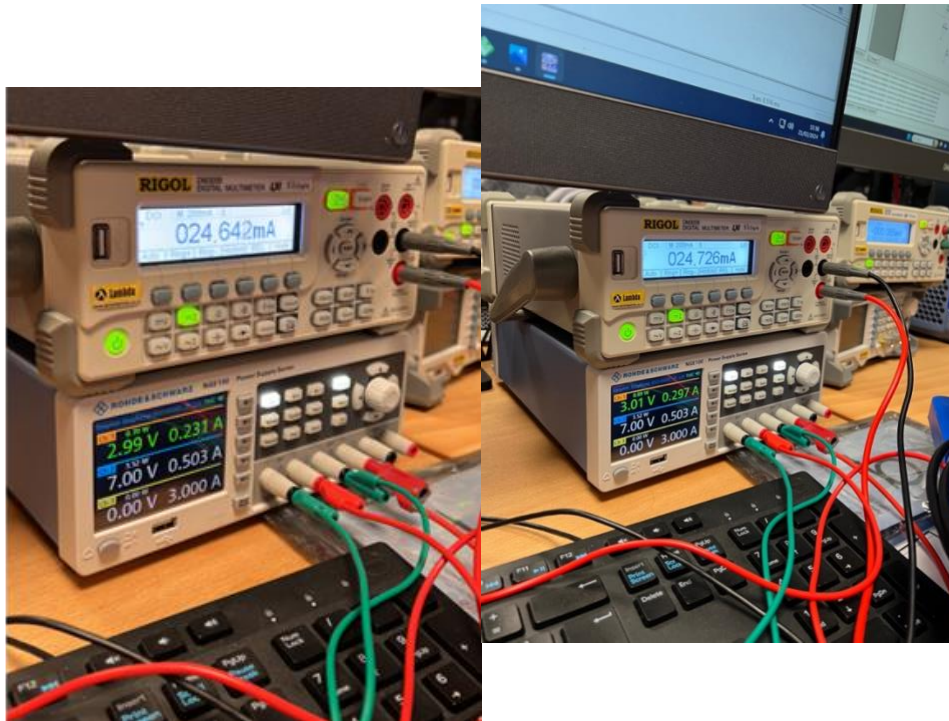
**9 The DPS shall have test pins for the output voltages.**



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

The design is 8g

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



The short circuit currents do not exceed 30mA for both outputs.