Protect G2: 5-30 V DC Over-Voltage Protection Module with Ideal Diode, 25 A

1. Features

- Active over-voltage detection module with auto-recovery
- 5 to 30 V Input Voltage – Max 80 V Blocking
- 2S-6S Lithium Battery Input
- 25 A continuous current rating
- Soft-start power-on
- Optional Enable function using low-power switch
- Optional opto-isolated fault signal pulled high to Vcc.
- Reverse Current Blocking due to ideal diode functionality
- Reverse Polarity Protection to -60 V
- High-Current XT-60 Connectors rated for 30 A continuous – with connecting pair and heat shrink included

2. Applications

- Power-input protection for robotics, radio equipment
- Adjustable over-voltage protection for solar applications
- Power ORing multiple supplies

3. Description

The PN Labs Protect G2 is a refined version of the original Protect module. Now in a smaller size, increased It sits between your power source and circuit, continuously monitoring input conditions and disconnecting the load if unsafe voltages are detected—helping to prevent costly damage. It supports a wide 5 to 30 V input range and can be adjusted to block any voltage between those values, while withstanding applied voltages up to 80 V. Its compact, high current design with its ideal diode functionality also allows it to be used to isolate multiple power supplies in parallel – known as power ORing.

Product Photo

4. Revision History

- August 2026 - Released

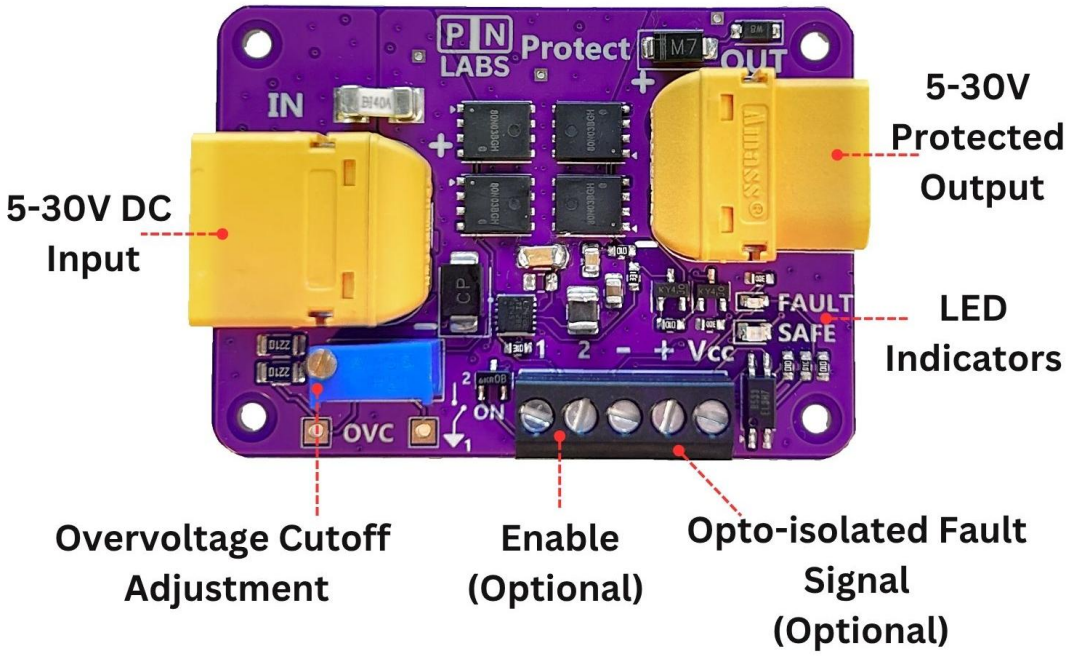
5. Safety Disclaimer

During normal operation at high currents, this product gets hot enough to burn you. Take care when handling this product or other components connected to it.

Not warranted for use in safety-critical systems as a replacement for UL or CSA certified circuit breakers. This product is a supplemental protective component for integration.

Not respecting the maximum ratings and guides outlined in this data sheet may result in damage to the product and/or your circuit. You are responsible for the safe integration of this module into your system.

6. Board Diagram and Set-up Guide



To set up the Protect module for **protection operation**, do the following:

1. Calculate the required value of the OVC resistor from the equation, where X is the value of the cutoff voltage in volts:

$$\mathbf{OVC\ Res\ (k\Omega)} = (\mathbf{X} - \mathbf{1.95})/\mathbf{2.89}$$

2. With the power turned off so you don't apply any external voltage to your multimeter, probe the OVC pads in resistance mode and adjust the potentiometer to set the OVC Resistor to its required value:

3. With the OVC resistor now set, you can now plug it into your circuit and turn the power on.

For **parallel operation**, you can use the over-voltage cutoff or set the OVC Resistor to be 10k, effectively rendering the OVC ~31 V. Use one Protect module per power source, and connect them to a common bus using wires that are roughly equal length so that voltage drop across the cabling is similar.

Please note that the Protect module does not ensure that the supplies share the current equally when put in parallel - that comes from ensuring both supplies are near the same voltage. The different supplies need to be within 0.5 V of each other to be able to share the load at all.

7. Specifications

Stresses beyond those listed under Section 7.1 may cause permanent damage to the device. These are stress ratings only, which do not imply functional operation of the device at these or any other conditions beyond those indicated under Section 7.2. Exposure to absolute maximum rated conditions for extended periods may affect device reliability.

7.1 Absolute Maximum ratings

At 25 °C ambient temperature.

	MIN	NOM	MAX	UNIT
Input Voltage	4	-	75	V
MOSFET DS Voltage (Max DC	-	-	80	V

Blocking Voltage)				
Vcc	-	-	30	V
Continuous Output Current	-	-	30	A
In-rush current immediately upon power on (100 ms)	-	-	20	A

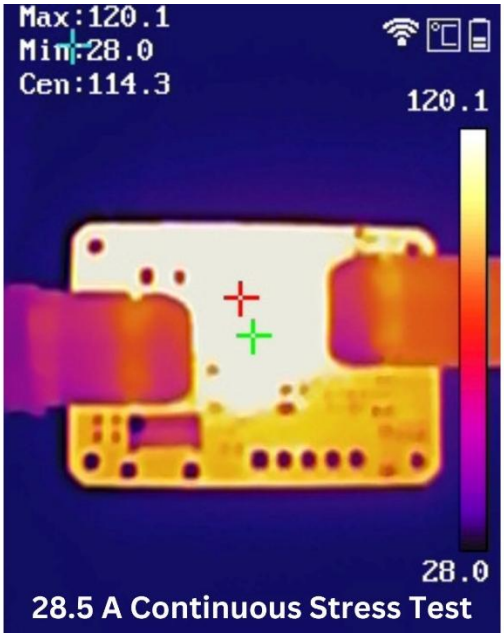
7.2 Recommended Operating Conditions

At 25 °C ambient temperature.

	MIN	NOM	MAX	UNIT
Input Voltage	5	-	30	V
Vcc	-	-	25	V
Continuous Output Current	0	-	25	A
In-rush current upon power-on (100 ms)	-	-	15	A

7.3 Thermal Information

5V input, drawing 28.5 A for around 5-8 minutes.



7.5 Soft-start Behavior on Start-up

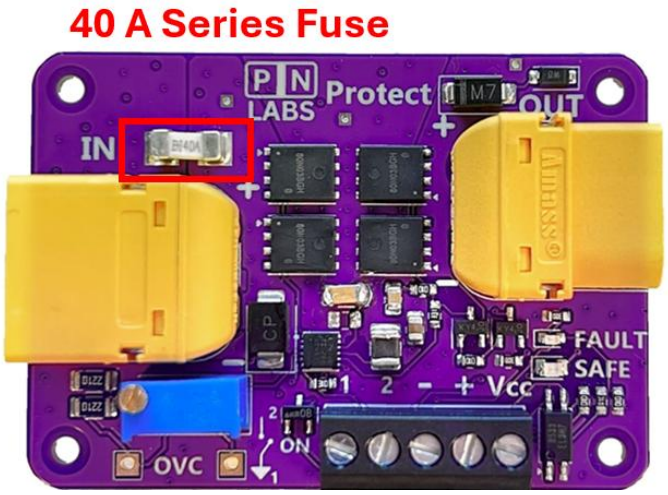
Shown below are two examples. The input is 24.75 V and the OVC threshold is around 22 V, and the output of the Protect is unloaded:

As can be seen, there is a 10 ms transitory period where the Protect is turning on but the MOSFETs have not fully been enhanced, and then this process stops when the threshold is exceeded. In the capture below, the input voltage was dropped below the threshold and a successful turn-on is shown:

As can be seen, the output voltage becomes ramped to the final value over about 60 ms.

7.6 Typical Failure Mode

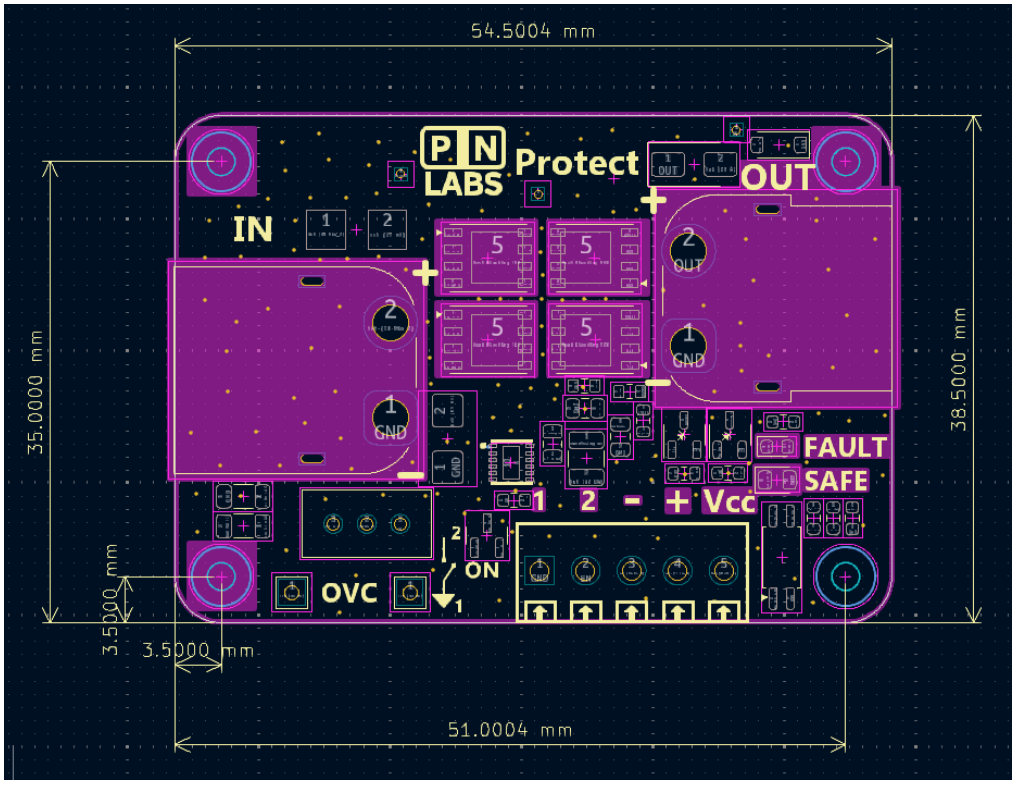
As with many semiconductors, MOSFETs fail short when overstressed by excessive voltage or high current. This means that the module will not protect against voltages higher than the maximum rated value in this datasheet and will let current through uninterrupted if the ratings are not respected. To this end, a 40 A series fuse is used on the module to protect against MOSFET failure.



This specific class of module uses MOSFETs for their speed and ability to create a true OVP system upon start-up. If you want a circuit with a higher isolation voltage, we recommend looking into conventional relay-based protection solutions.

8. Mechanical Dimensions

Download the STEP file from pnlabs.ca for insertion into your CAD software of choice.



Further Questions? Reach out to us and we'll answer!