FlexTrip – Adjustable e-Fuse with Ideal Diode for 3-22 V DC, 5 A

1. Features

- Electronic fuse with latch-off overcurrent protection at adjustable levels of 0.5, 1, 2, 3, 5 or 5.5 A.
- Wide 3-22 V input range
- Reverse polarity to -12 V
- Low on-state resistance (37 mΩ)
- Thermal shutdown protection
- Electrical or mechanical reset option
- Digital interface featuring Power Good and Reset signals.
- Breadboard compatible (header pins), SMT compatible or can be used with included terminal blocks (footprint included)

2. Applications

- Power ORing or Power Multiplexing
- Reverse polarity and reverse current protection
- High-side load switch operated via the Reset pin.

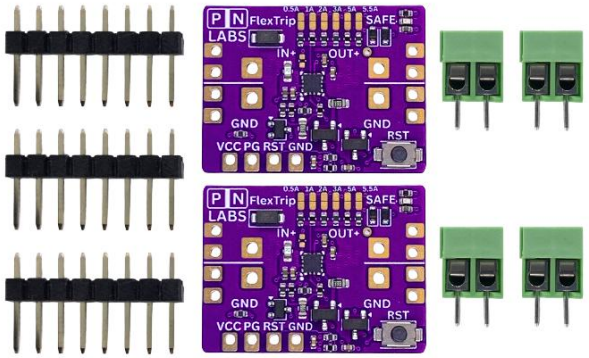
3. Description

FlexTrip is your essential tool for protecting and managing DC power delivery in your projects. Acting as a precision electronic fuse, it sits between your power source and load, continuously monitoring current flow and interrupting if it exceeds the set threshold. With selectable trip currents from 0.5 to 5.5 A, FlexTrip lets you fine-tune protection for everything from sensitive circuits to high-power devices.

It supports a wide operating range of 3-22 V and is resettable after a latch-off overcurrent fault by pressing the onboard reset button or by sending a 3-15 V signal to the reset pin. Thanks to its low on-resistance ideal diode architecture, FlexTrip minimizes voltage drop under normal operation while maintaining fast, safe cutoff during short circuits or inrush events.

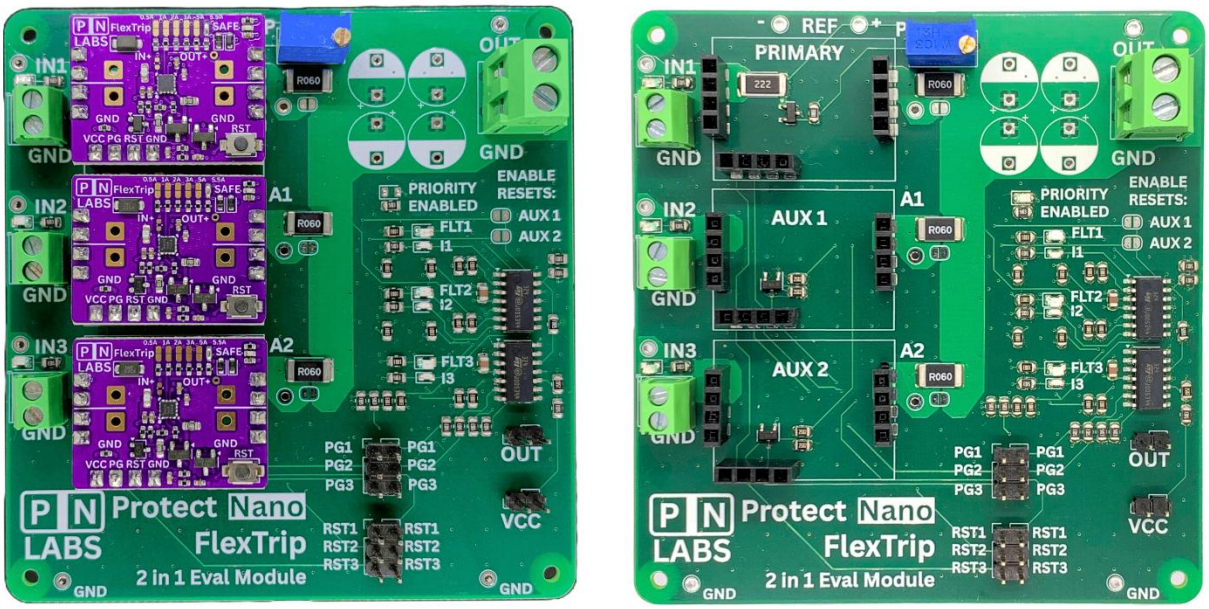
In addition to replacing conventional fuses in your electronics project, FlexTrip's ideal diode and reset functionality can also be used to parallel multiple supplies in a power ORing or power multiplexing configuration. This makes it an excellent choice for configuring your projects to work from multiple power supplies for redundancy, to extend battery life, or to prioritize power from an external source instead of an onboard battery.

Product Photo



Also be sure to check out our 2-in-1 Evaluation Module for understanding FlexTrip and Protect Nano. This is a helpful tool for understanding how power-good and reset signals on the board behave, and features:

- Current indicator LEDs
- Fault, Input, and Priority Enabled LEDs
- External comparator with adjustable threshold for creating a priority power multiplexing scheme between the Primary (top) and auxiliary (bottom) channels.



You can use it with up to 3 Protect Nano/FlexTrip modules.

4. Revision History

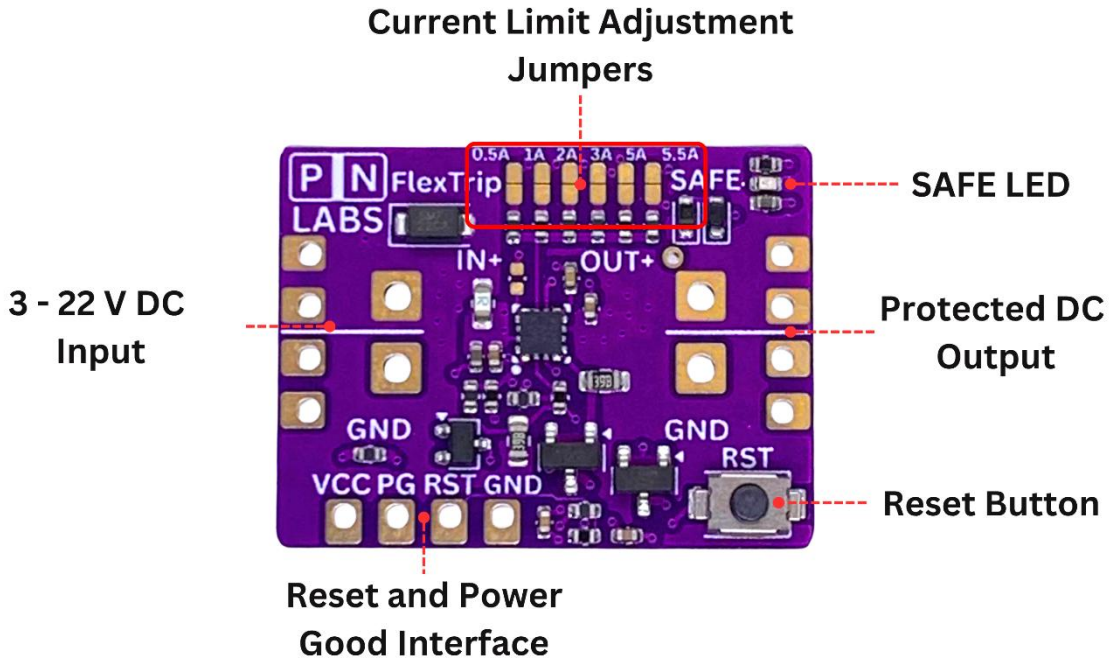
- October 2025 – Released
- January 2026 – Updated Safety Information

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. Understand the limitations of solid-state protection modules on our website and in **Section 7.6** before use.

Not respecting the maximum ratings and guides outlined in this data sheet may result in damage to the product and/or your circuit.

5. Board Diagram and Set-up Guide

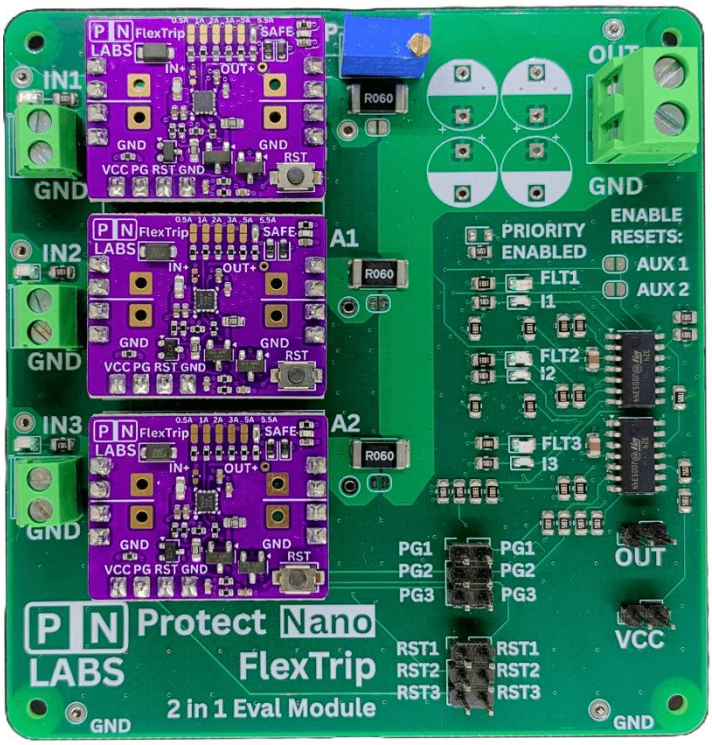


Overcurrent Response Behavior:
The overcurrent threshold is defined solely by soldering the corresponding solder jumper.

- If downstream loads attempt to exceed the set current limit, the device will actively regulate the input voltage in an attempt to not exceed the limit. If enough heat is dissipated in the device that its over-temperature feature activates, it will latch off.
- If the overcurrent event is severe enough that it exceeds double the set current limit, the device will skip current limiting and immediately shut down, latching off.

For **paralleling operation**, use one FlexTrip module per individual power supply.

1. Set each of their voltage and current settings to be the same (mandatory for paralleling operation).
2. Connect them in a common bus configuration, with the outputs tied together. One example is shown on our Eval module below:

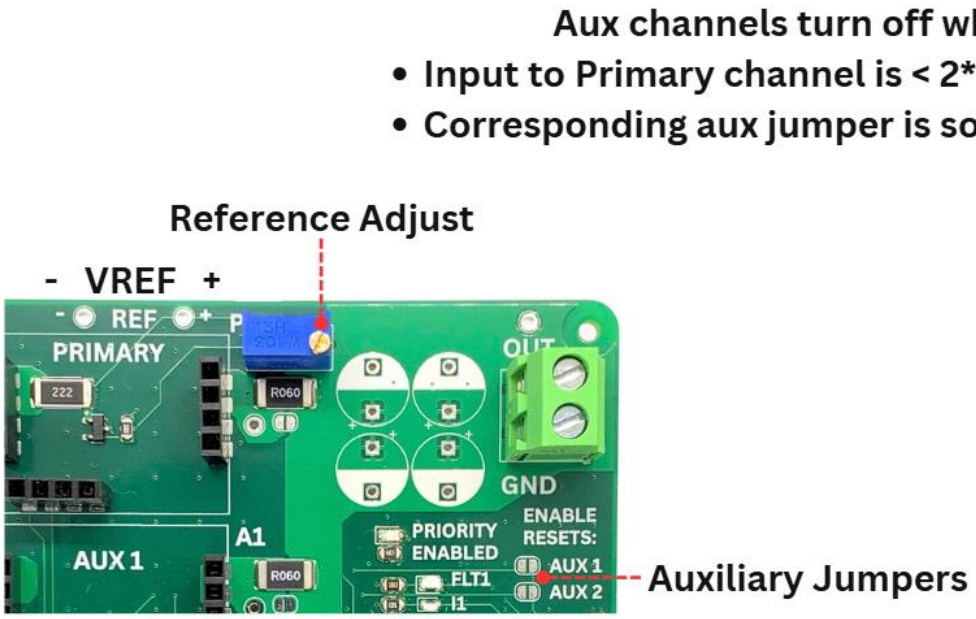


This configuration isolates the power paths by virtue of the internal ideal diode to the FlexTrip IC. Both paths should share the current equally if the input voltages are the same, with current sharing ceasing if the voltages have a difference greater than ~0.6 V.

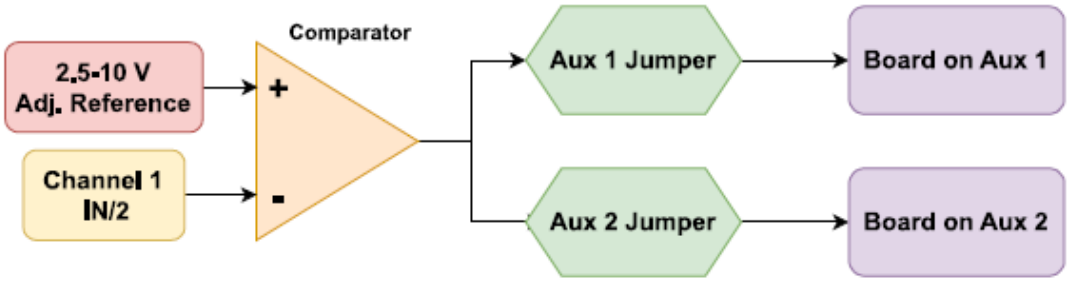
3. Turn on your supplies and hook up the load, you can watch them share the current in real time by adjusting the voltages of your supplies! If you're using the demo module, the blue LEDs show the active path where current is flowing.

Another very popular configuration is called Priority Power Multiplexing, which is when a particular power path is preferred if it is present while disabling any other paths. If the preferred path falls below a voltage threshold, only then do the auxiliary supplies turn on.

To operate the FlexTrip in Priority Power Multiplexing (PPM) configuration, a reset signal between 3-15 V must be sent to the reset (RST) pins of the lower priority supplies when the priority supply is valid. This is done on the Eval module using a comparator and adjustable voltage reference:



A block diagram of this situation is shown to aid in understanding:



6. Specifications

Stresses beyond those listed under Section 6.1 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 6.2. Exposure to absolute maximum rated conditions for extended periods may affect device reliability.

6.1 Absolute Maximum ratings

At 25 °C ambient temperature.

	MIN	NOM	MAX	UNIT
Input Voltage	-	-	25	V
Reset Signal	-	-	20	V
Vcc	-	-	20	V
Output Current	-	-	5.5	A

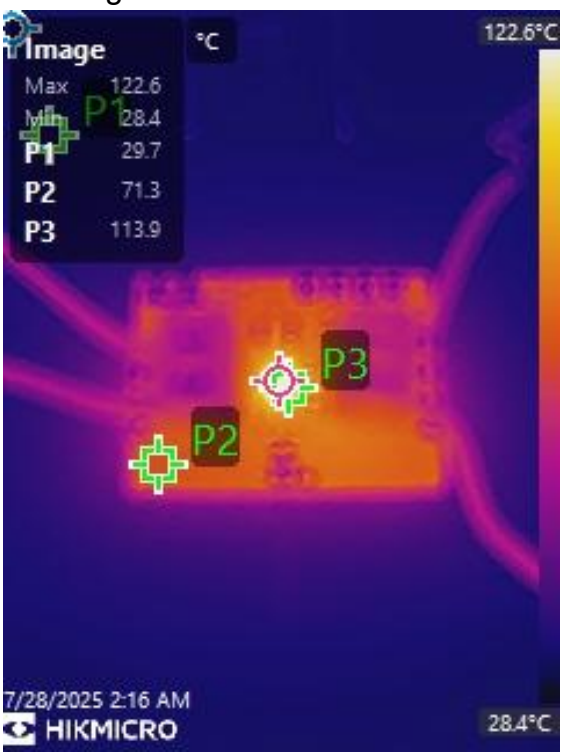
6.2 Recommended Operating Conditions

At 25 °C ambient temperature.

	MIN	NOM	MAX	UNIT
Input Voltage	3	-	22	V
Reset Signal	3	-	15	V
Vcc	3	-	15	V
Continuous Output Current	0	-	5	A

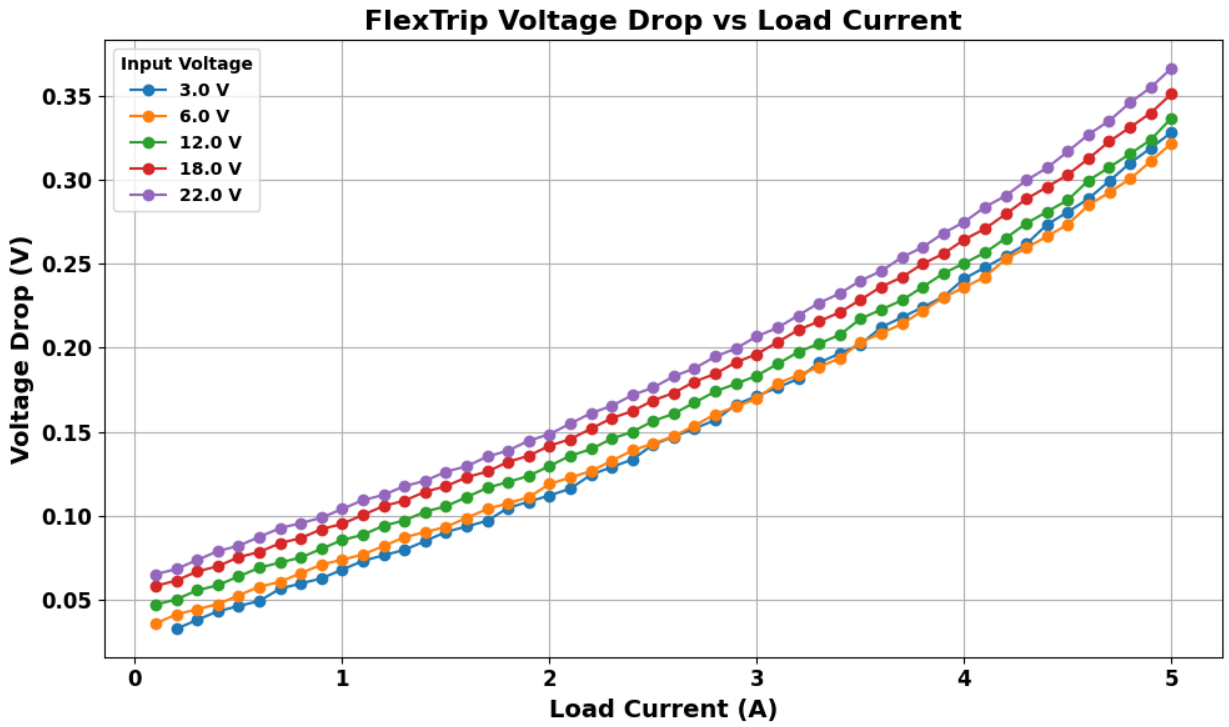
6.3 Thermal Information

Shown below is the thermal profile of FlexTrip running 5 A continuously for about 8 minutes at about 5 V input voltage.

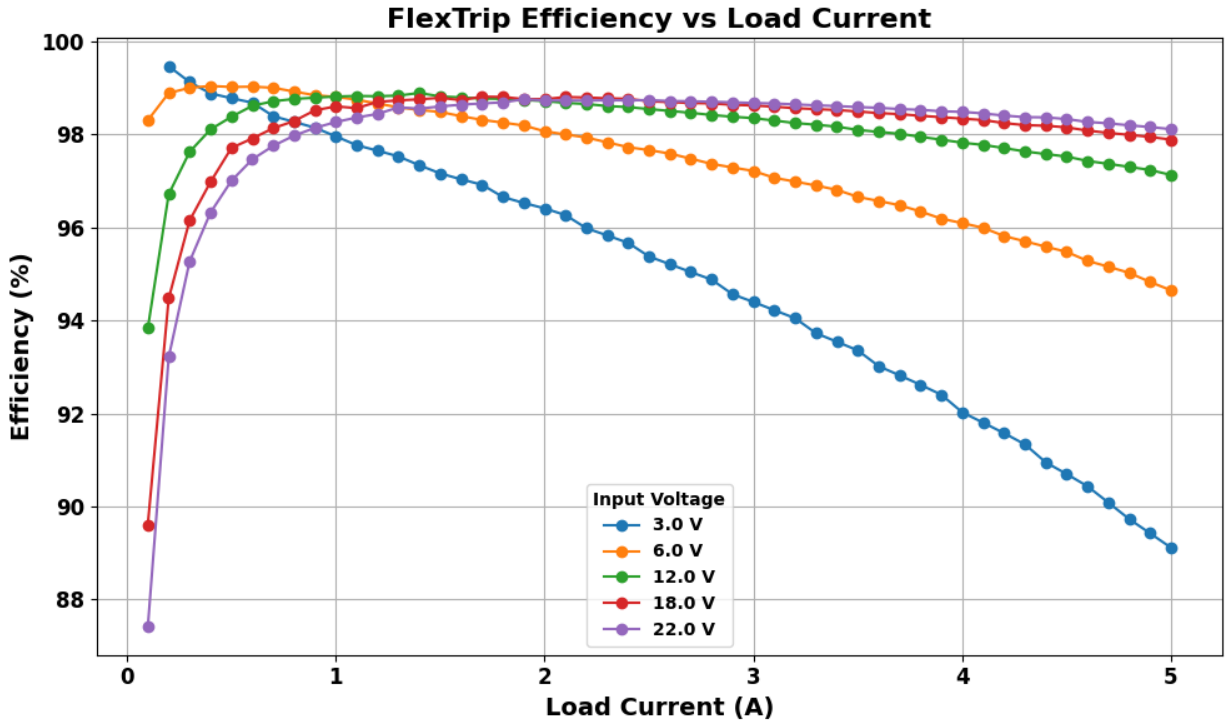


6.4 Inline Voltage Drop and Efficiency vs Load Current Characteristics

The total voltage drop was measured using a programmable electronic load and power supply:



The efficiency was also similarly measured and is shown below:



The efficiency was measured as a standard DC:DC converter. A 4-wire measurement of the output voltage on the electronic load was made, and the output of the power supply was compensated to account for the voltage drop in the wires going to the device.

6.5 Soft-start Behavior on Start-up

Upon start-up, FlexTrip will ramp the output at approximately 1 V/ms after the under-voltage condition is exceeded until the output reaches its final value.

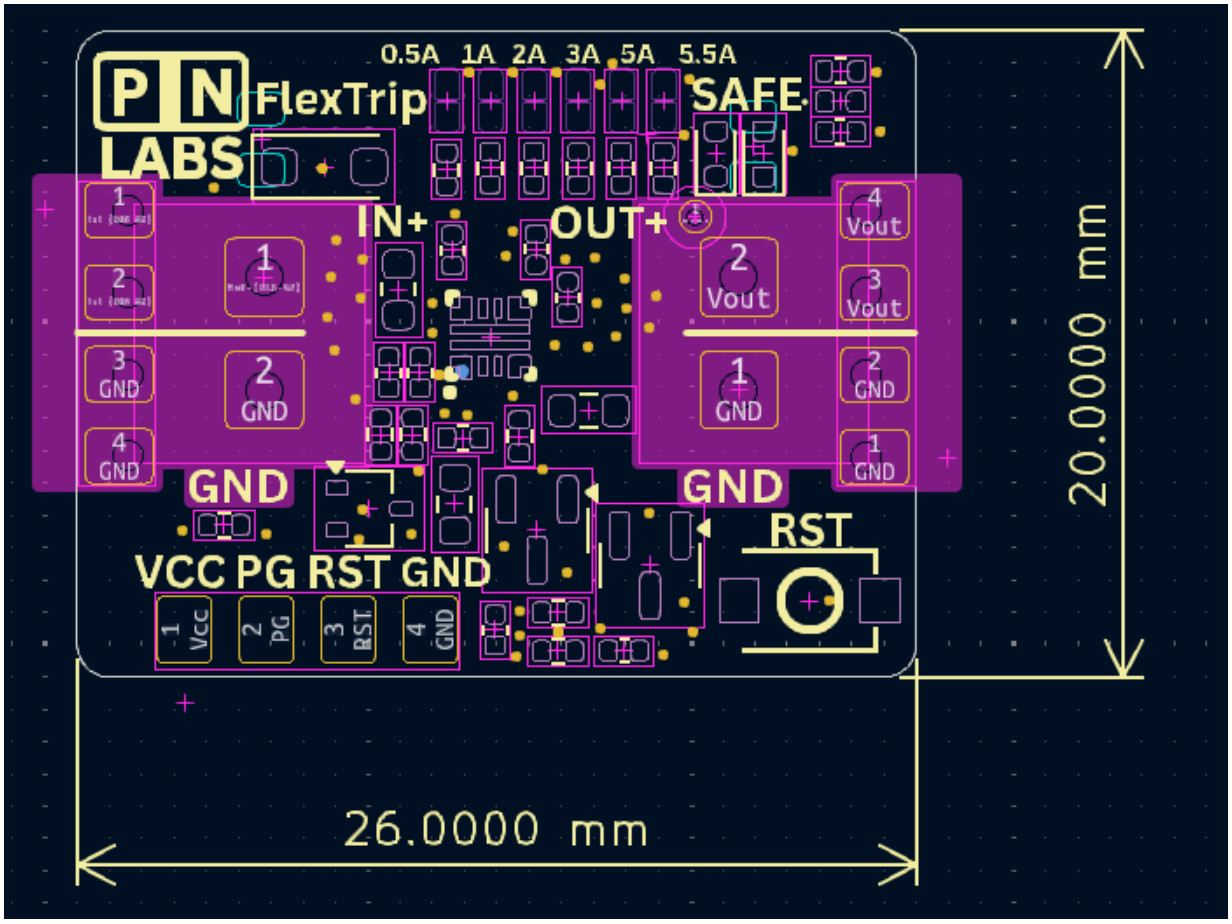
6.6 Typical Failure Mode

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.

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.

7. Mechanical Dimensions

Download the STEP file from our website for integration into your favorite CAD software. We also have recommended footprints.



Further questions? Found an error or need clarification?

Reach out to us at support@pnlabs.ca!