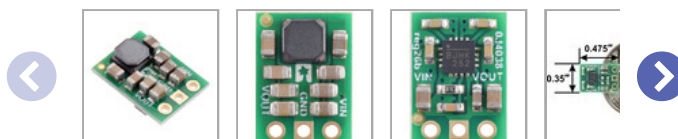
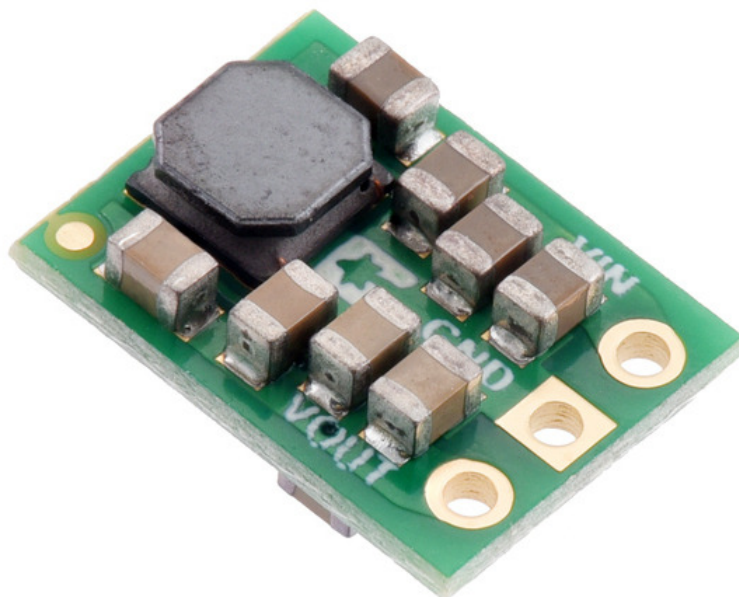


# **5V, 1A Step-Up/Step-Down Voltage Regulator**

## **S13V10F5**



**Pololu item #:** 4083

**Brand:** [Pololu](#)

**Status:** Active and Preferred [?](#)

**✓RoHS3**

**Free add-on shipping in USA** [?](#)

**Free shipping in USA over \$40** [?](#)

**282** in stock  
[supply outlook](#)

Price break	Unit price (US\$)
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1	6.95
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5	6.39
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**Quantity:**

**backorders** allowed

Add to cart

Add to wish list

This powerful synchronous switching step-up/step-down regulator efficiently produces 5 V from input voltages between 2.8 V and 22 V.

Its ability to convert both higher and lower input voltages makes it useful for applications where the power supply voltage can vary greatly, as with batteries that start above but discharge below 5 V. The board measures 0.35" × 0.475", has a typical efficiency of 85% to 95%, and can supply a typical continuous output current of around 1 A.

Alternatives available with variations in these parameter(s):  
continuous output current [Select variant...](#)

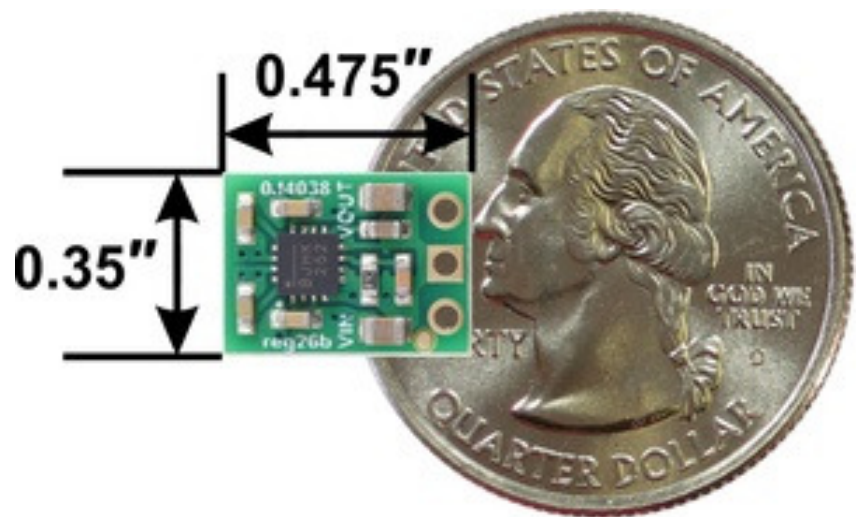
**Description**    **Specs (11)**    **Pictures (13)**    **Resources (3)**

**FAQs (0)**    **On the blog (1)**

## Overview

The S13VxF5 family of efficient switching regulators (also called switched-mode power supplies (SMPS) or DC-to-DC converters) use a buck-boost topology to convert both higher and lower input voltages to a

regulated 5 V output. They take input voltages from 2.8 V to 22 V and increase or decrease them as necessary, offering a typical efficiency

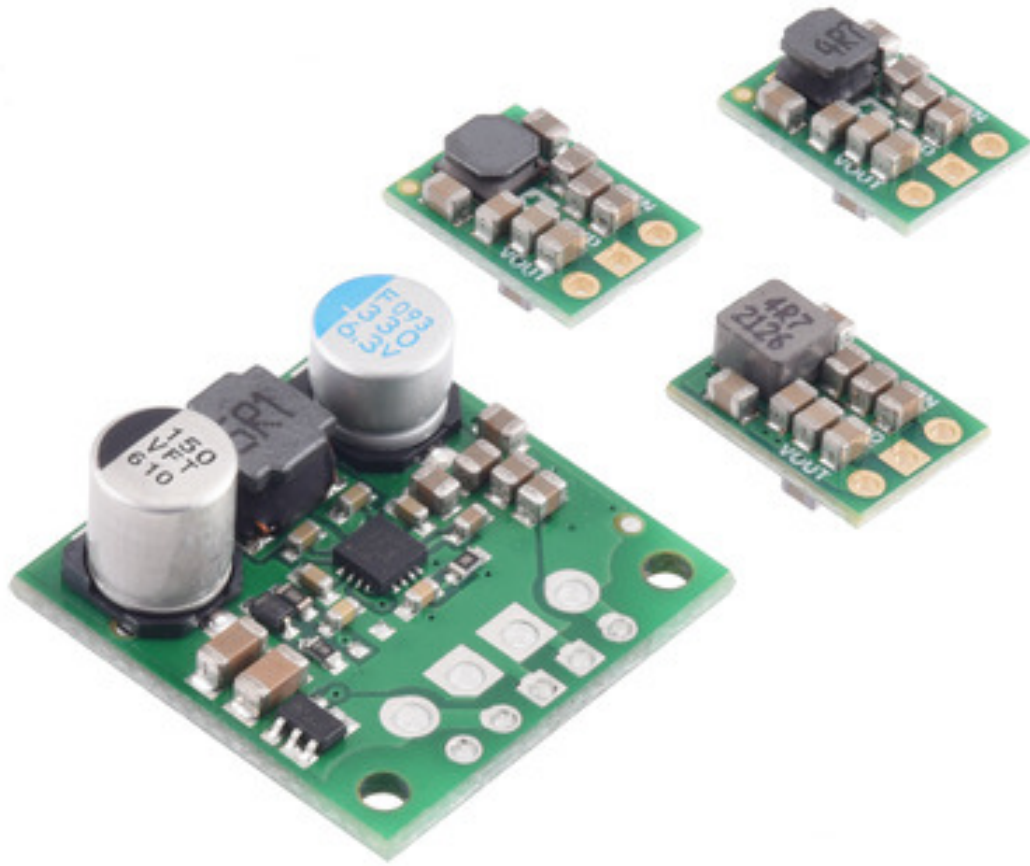


of over 85% and typical continuous output currents between 1 A and 3 A . The flexibility in input voltage offered by this family of regulators is especially well-suited for battery-powered applications in which the battery voltage begins above 5 V and drops below as the battery discharges. Without the typical restriction on the battery voltage staying above the required voltage throughout its life, new battery packs and form factors can be considered.

The different members of this family offer different continuous output currents:

- **S13V10F5: 1 A continuous output current**
- **S13V15F5: 1.5 A continuous output current**
- **S13V20F5: 2 A continuous output current**
- **S13V30F5: 3 A continuous output current**

The regulators have under-voltage lockout, output over-voltage protection, and over-current protection. A thermal shutdown feature also helps prevent damage from overheating and a soft-start feature limits the inrush current and gradually ramps the output voltage on startup. The larger 3 A S13V30F5 has reverse-voltage protection up to 20 V, but the S13V10F5, S13V15F5, and S13V20F5 do not.

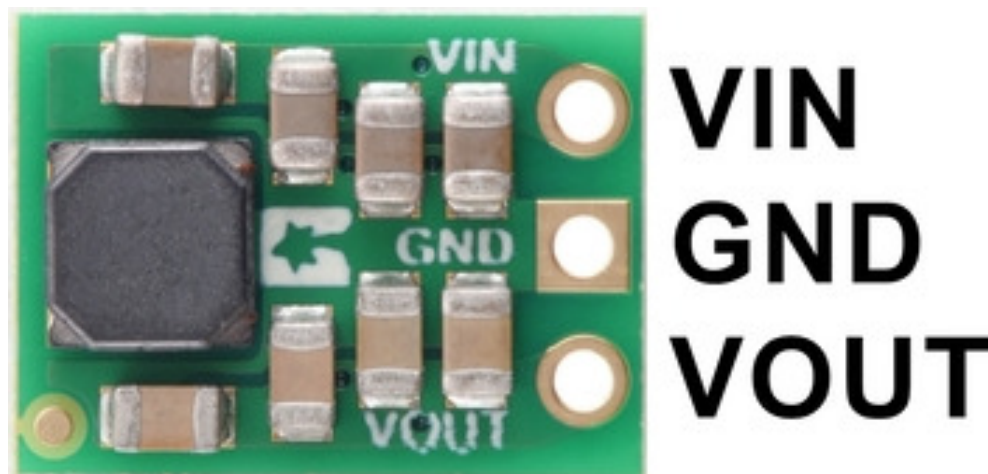


## Details for item #4083

### Features

- Input voltage: 2.8 V to 22 V
- Output voltage: 5 V with 3% accuracy
- Typical maximum continuous output current: 1 A (see the [maximum continuous output current graph](#) below)
- Typical efficiency of 85% to 95%, depending on input voltage and load (see the [efficiency graph](#) below)
- 10 mA to 20 mA typical no-load quiescent current (see the [quiescent current graph](#) below)

- Input under-voltage lockout and output over-voltage protection
- Soft-start feature limits inrush current and gradually ramps output voltage
- Over-current protection and over-temperature shutoff
- 1 A output current limit
- Fixed switching frequency of ~500 kHz
- Compact size: 0.35" × 0.475" × 0.17" (8.9 mm × 12.1 mm × 4.2 mm); see the [dimension diagram](#) (720k pdf) for more information

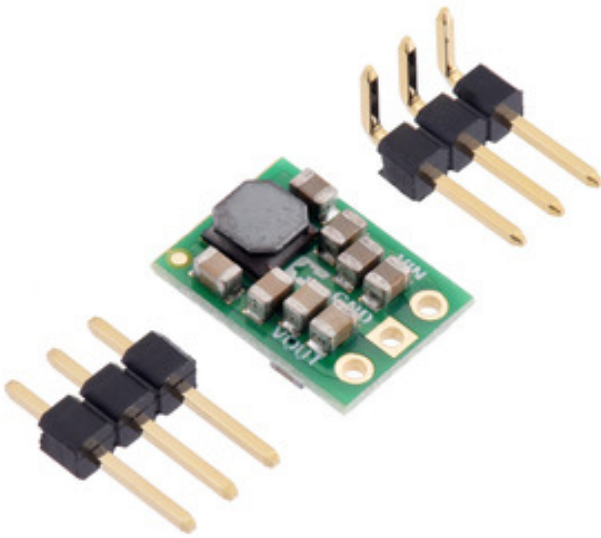


**5V, 1A Step-Up/Step-Down Voltage Regulator  
S13V10F5 pinout.**

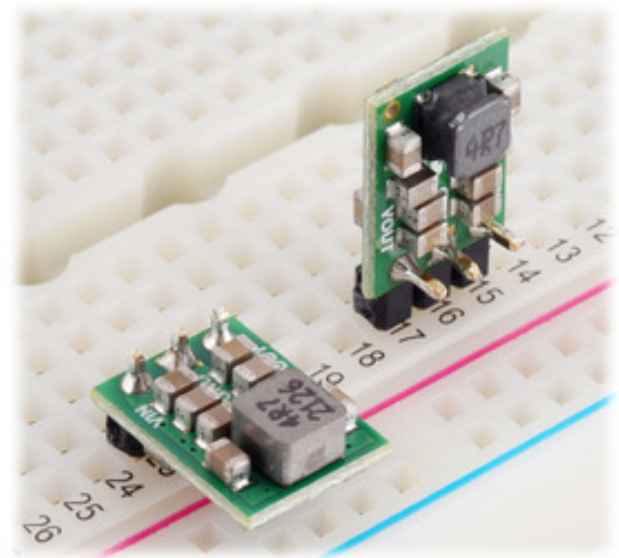
## Connections

The step-up/step-down regulator has just three connections: the input voltage (VIN), ground (GND), and the output voltage (VOUT). The input voltage, VIN, powers the regulator. Voltages between 2.8 V and 22 V can be applied to VIN. VOUT is the regulated output

voltage. These through-holes are arranged with a 0.1" spacing along the edge of the board for compatibility with standard [solderless breadboards](#) and perfboards and [connectors](#) that use a 0.1" grid. A 3×1 [straight male header strip](#) and a 3×1 [right-angle male header strip](#) are included, and you can solder in the one that gives you your desired board orientation. Alternatively, you can solder wires directly to the board for the most compact installations.



**5V, 1A Step-Up/Step-Down Voltage Regulator S13V10F5, with hardware.**



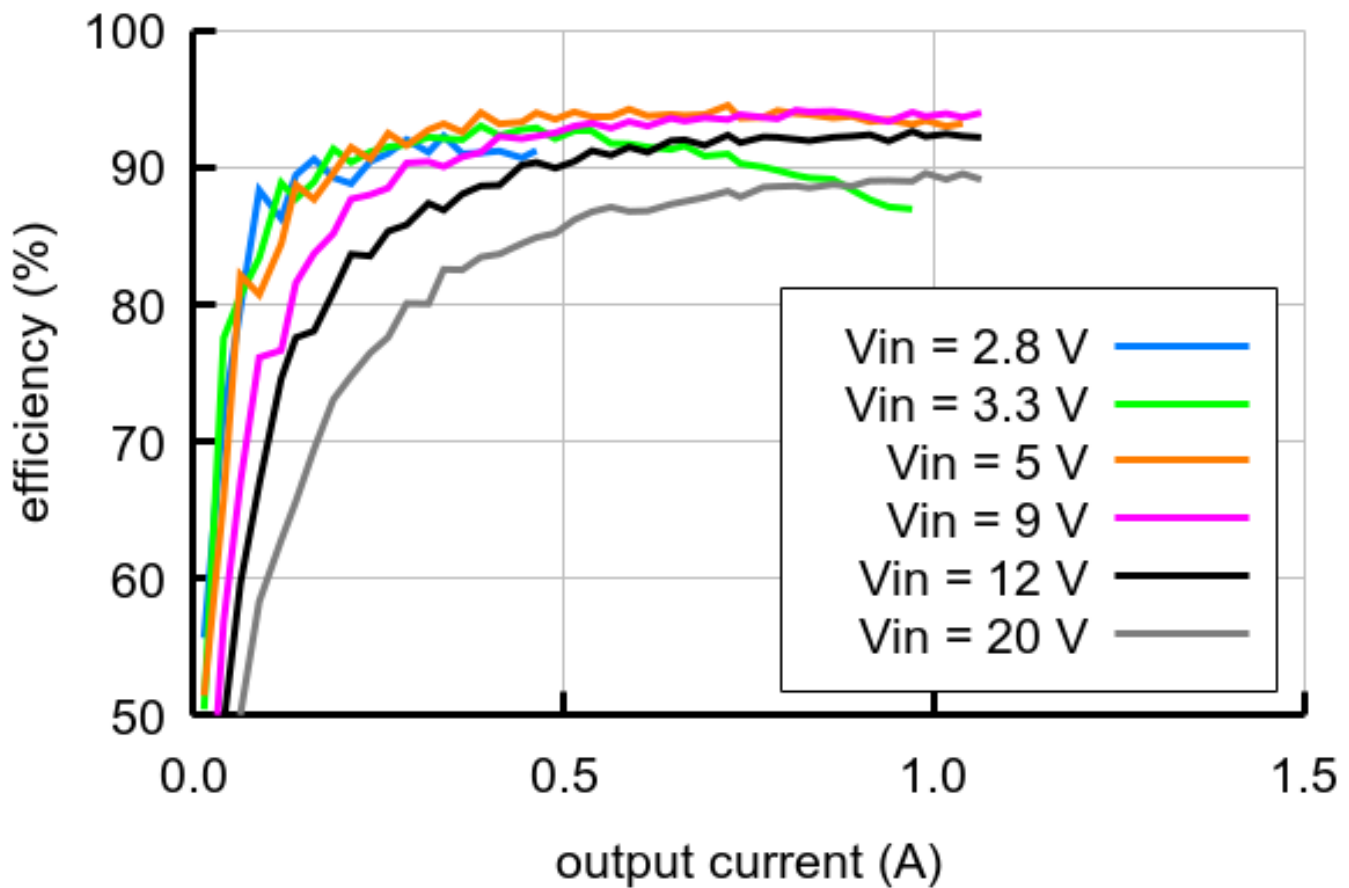
**5V Step-Up/Step-Down Voltage Regulator S13VxF5 units on a breadboard.**

## Typical efficiency

The efficiency of a voltage regulator, defined as  $(\text{Power out})/(\text{Power in})$ , is an important measure of its performance, especially when battery life or heat are concerns.



## Pololu S13V10F5 Regulator Efficiency

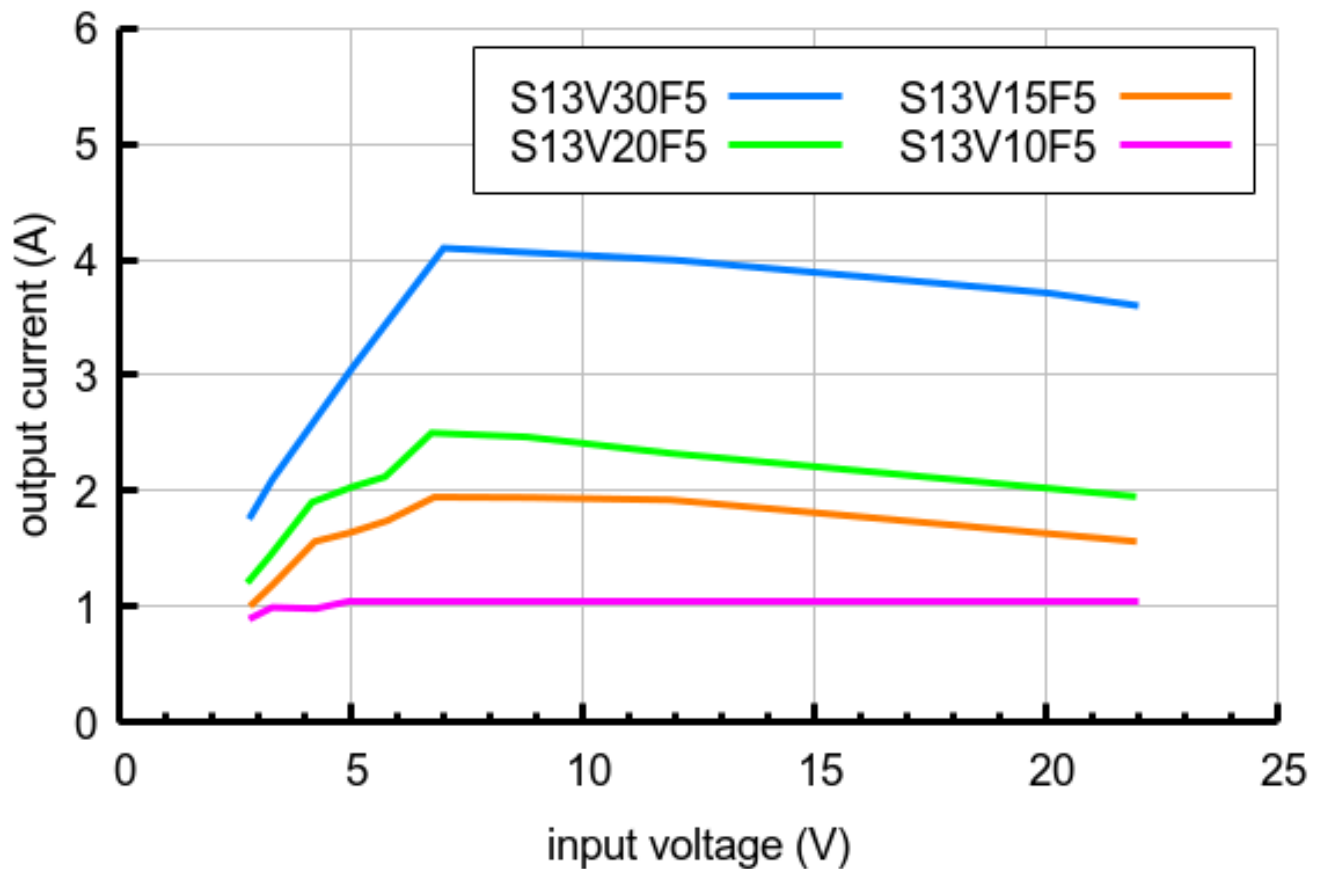


### Maximum continuous output current

The maximum achievable output current of the regulator varies with the input voltage but also depends on other factors, including the ambient temperature, air flow, and heat sinking. The graph below shows maximum output currents that the regulators in the S13VxF5 family can deliver continuously at room temperature in still air and without additional heat sinking.



## Pololu S13VxF5 Regulators Maximum Continuous Output Current

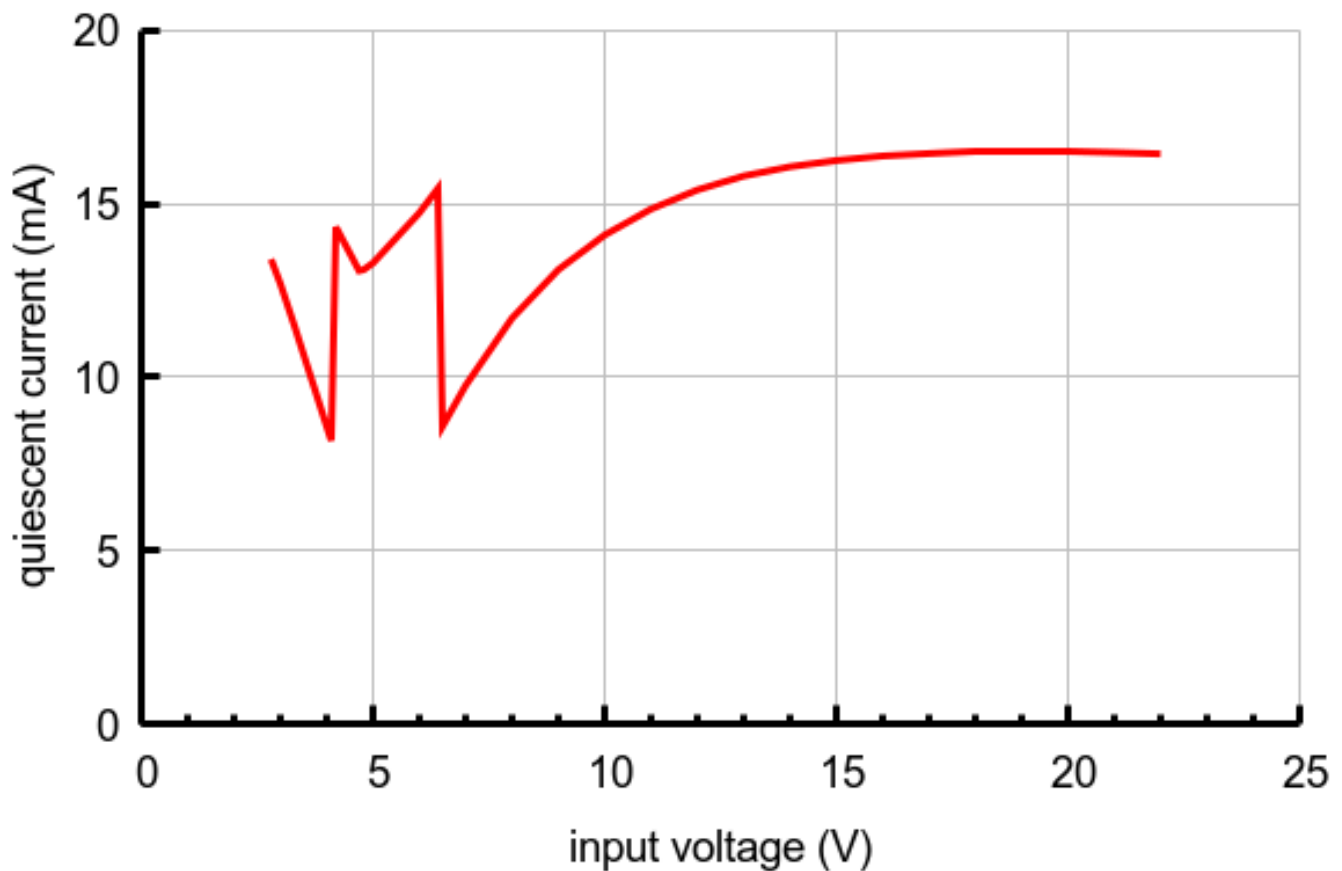


During normal operation, this product can get hot enough to burn you. Take care when handling this product or other components connected to it.

## Quiescent current

The quiescent current is the current the regulator uses just to power itself, and the graph below shows this as a function of the input voltage.

Pololu S13V10F5, S13V15F5, and S13V20F5 Regulators  
Quiescent Current



## LC Voltage Spikes

When connecting voltage to electronic circuits, the initial rush of current can cause voltage spikes that are much higher than the input voltage. If these spikes exceed the regulator's maximum voltage, the regulator can be destroyed. If you are connecting more than about 15 V, using power leads more than a few inches long, or using a power supply with high inductance, we recommend soldering a 33  $\mu$ F or larger electrolytic capacitor close to the regulator between VIN and GND. The capacitor should be rated for at least 35 V.

More information about LC spikes can be found in our application note, [Understanding Destructive LC Voltage Spikes](#).

People often buy this product together with:



Pololu 3.3V Step-  
Up/Step-Down  
Voltage Regulator  
S7V8F3



Mini Pushbutton  
Power Switch with  
Reverse Voltage  
Protection, LV



5V, 2A Step-  
Up/Step-Down  
Voltage Regulator  
S13V20F5