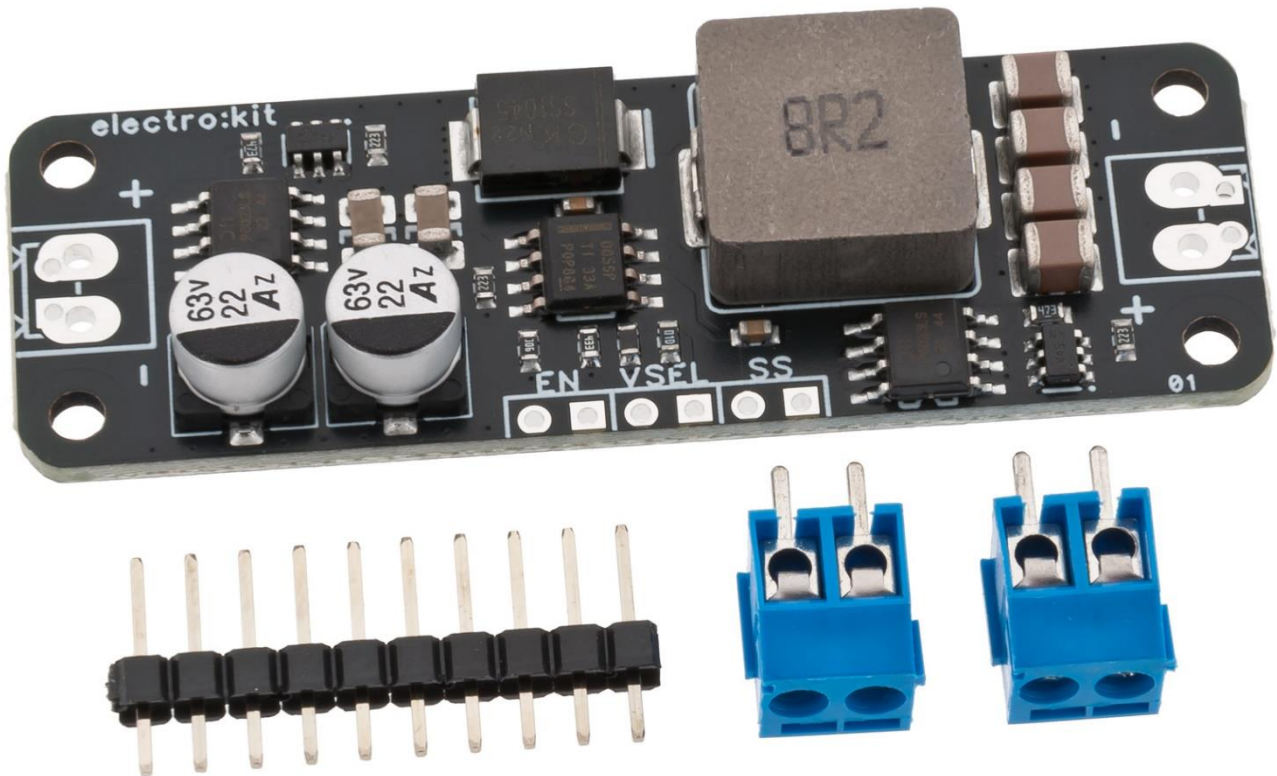# DC-DC Converter Step-down 3.3V/5V 5A

Part.no. 41023271

EKM006 is a compact and powerful DC-DC converter with extra-wide input voltage range. This module is capable of converting an input voltage from 4 - 40VDC to a lower. The converter is pre-configured to output 3.3V, but can easily be changed to 5V by shorting the "VSEL" jumper. Other output voltages are also possible by adding external resistors. Please note that the input voltage must always be approximately a volt higher than the desired output voltage for the regulation to function normally (step-down). The maximum current output is limited to 5A. The module is protected against reverse polarity and back current with external circuits. Internally, the regulator is protected against overload, high temperature, and overvoltage. See the LMR14050 datasheet for more details. Other functions on the board include a precise Enable input that can also be configured to function as an undervoltage lockout (UVLO) and an adjustable soft start (requires an external capacitor). The board is fully assembled, but with connectors unsoldered. Two screw terminals (3.5mm pitch) and a pin header are included.

No configuration is required for regular use.

Functions

- 4 to 40V voltage input
- Configurable output (3.3V or 5V).
- High efficiency switching design
- Configurable soft-start to limit inrush current.
- Enable input with dual function (Enable or UVLO).
- Ultra-low quincent current in shutdown (1μA)

Specifications

- Supply voltage: 4 - 40VDC
- Output voltage: 3.3V or 5V
- Efficency: Up to 92%
- Maximum current output: 5A
- Quiescent current: <50μA
- Dimensions: 60 x 20 x 7.5mm
- Mounting holes: 4x ø2.5mm / c-c 54 x 14mm

Connections

Power input:
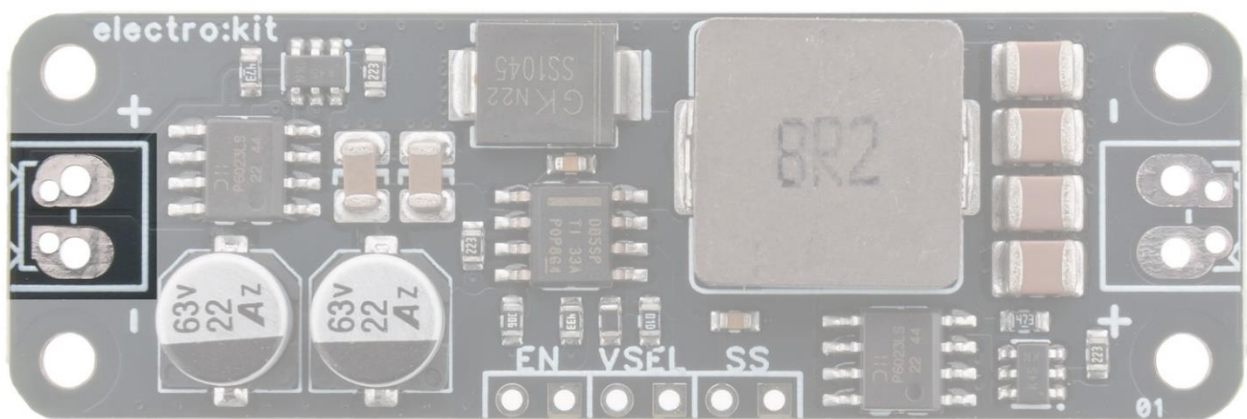

The module can be supplied with a DC voltage between 4 and 40V, but must be 1V higher than the selected output. For 3.3V output, VIN must be ~4.5V and for 5V out, ~6V.

The input is protected against reverse polarity, so nothing bad will happen and no current will flow if the wires are reversed. The protection will withstand the maximum rated voltage for any length of time.

Two different connectors are included (3.5mm screw terminal and 2.54mm pin header) and either can be soldered to the board, but soldering wires directly to the board is also fine.

Power output:
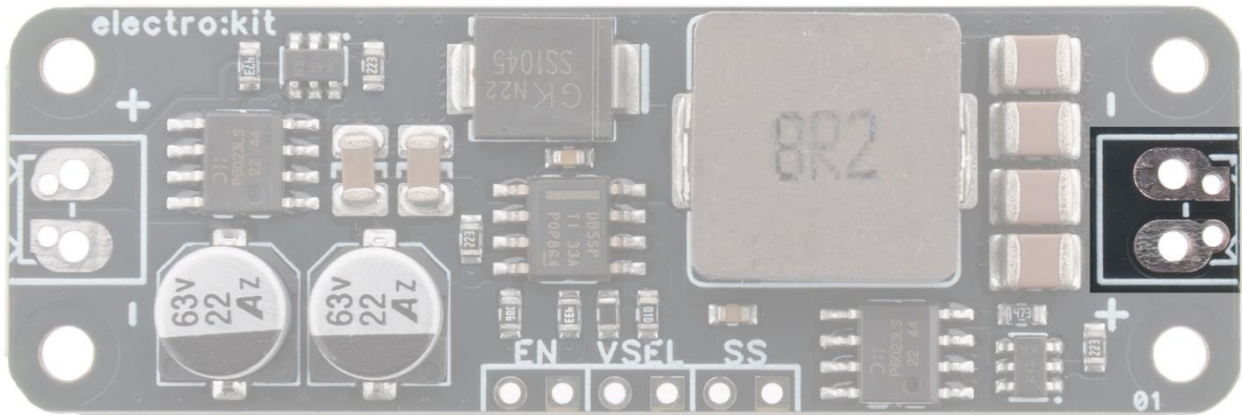
The output pins are identical in size as the input and will work with the same connectors. The output has the same type of protection as the input and will protect the module from backfeed, which means that it can be used in applications where more than one source is used (e.g. when a device can be powered from either a DC-jack, a USB port or both at the same time).

Maximum current draw from the output is limited to 5A. If more current is drawn or the output is shorted, the regulator will perform a cycle-by-cycle current limit, thereby reducing the voltage to near-zero.

Enable input (EN):
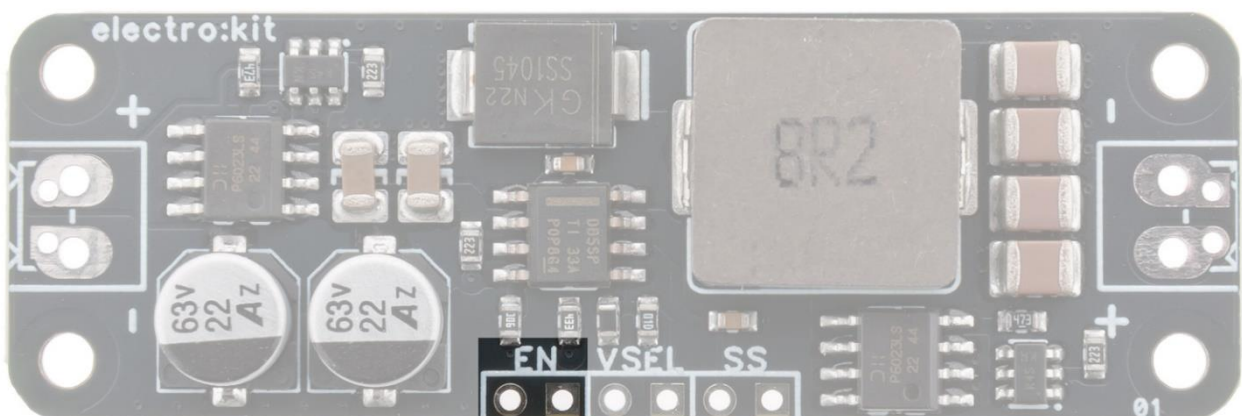
The enable input can be used to put the regulator to sleep and reduce the quincent current to 1µA.

To shut down the regulator, simply jumper the two EN pins. If left unconnected, the regulator will be on. The enable pin is pulled to VIN with a 22k resistor.

To use the UVLO (undervoltage lockout) functionality, an external resistor needs to be connected between the two EN pins to program the UVLO threshold. The threshold level formula is found in the LMR14050 datasheet on page 11 (fig 15).

Voltage selector:
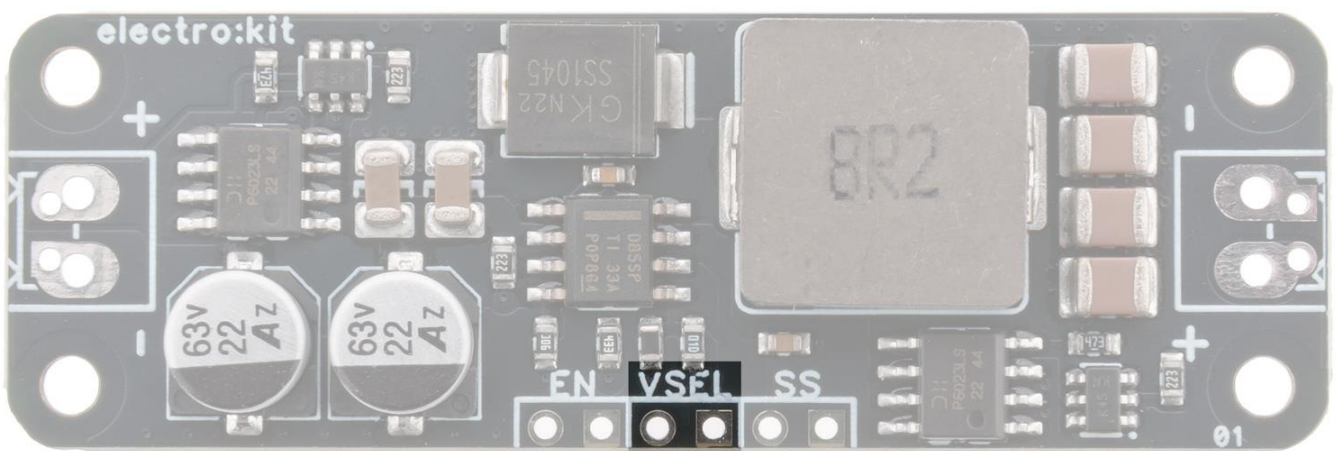
These two pins are used to select one of two pre-programmed output voltages. If left unconnected, the module will output a nice 3.3V. If shorted, it will output 5V. Simple!

It's possible to program an arbitrary output voltage as well with an external resistor. If a resistor is connected between the two VSEL pins, any voltage between 3.3V and 5V can be programmed. For higher voltages, a resistor can be connected between GND and VSEL pin1. To calculate the resistor, study the formula in the LMR14050 datasheet on page 16. Default resistors: Rfbt = 100k, Rfbb (3.3V) = 27.7k, Rfbb (5V) = 43k.

Soft-Start:
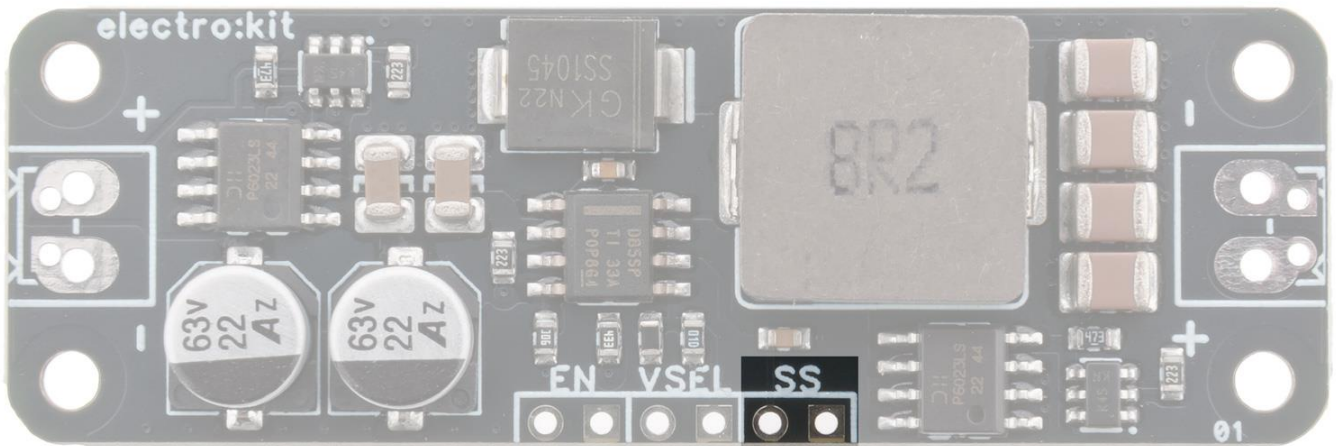
If the connected load has a large amount of capacitance, the inrush current can be limited by soft-starting the regulator. By default, the module is configured for a 5ms ramp-up, which is appropriate for most applications. If a longer ramp-up is required, a capacitor can be connected between the SS pins. The capacitor can be calculated using the formula in the LMR14050 datasheet on page 18.

Mechanical dimensions