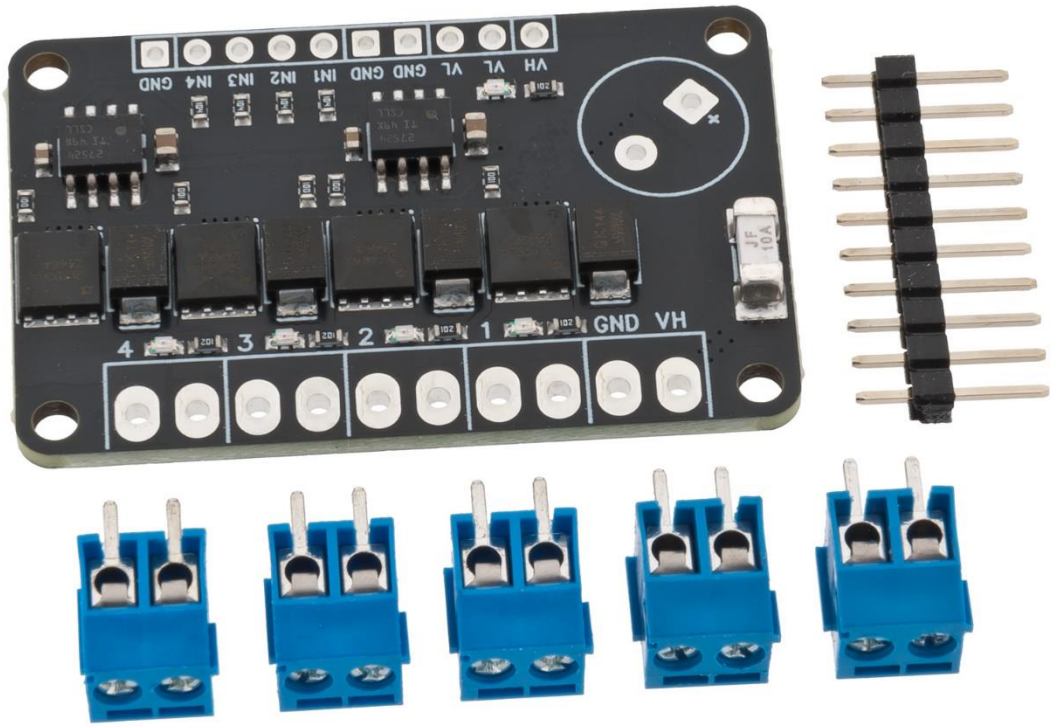
4-channel MOSFET Driver Board

Part.no 41024394



EKM013 and EKM014 are two small modules with two (EKM013) and four (EKM014) powerful FETs for driving heavy loads. The FETs are controlled by a very fast driver IC from Ti that can toggle the transistors fully on and off at extremely high frequencies.

The board has separate voltage supplies for the driver ICs and the transistors. The driver can be powered with voltages ranging from 4.5 to 12V and the transistors up to ~50V. The control inputs can handle 3.3V and 5V logic levels. Please note that VH must be equal to or higher than VL!

The transistors are wired as low side switches and will break the negative terminal of a connected load. This arrangement will work with pretty much all DC loads, like motors, solenoids, LED lamps and any other resistive, inductive or capacitive load. Please note that this board is not a full H-bridge driver and cannot drive motors in both directions. Each channel is protected from back EMF with powerful Schottky diodes that will handle transients upp to 100V and 175A.

The driver IC, UCC27524, will provide enough current to charge the transistor gates extremely fast. With a peak drive current of 5A, this driver can switch each transistor at

rates exceeding, 1MHz. Rise and fall times as specified in the datasheet are 6ns and 10ns (typ.) with around 1ns matching between channels. The control inputs are hysteretic and pulled to ground with 120 kohm to ensure glitch-free operation under any condition.

The board has space to mount a large through-hole capacitor. The capacitor is usually not required if the load is small and the power supply is connected with short wires.

The board comes with all components assembled and connectors included (unsoldered).

Included hardware:

- 5x 3.5mm 2-pin screw terminals
- 1x 2.54mm 10-pin header

Functions

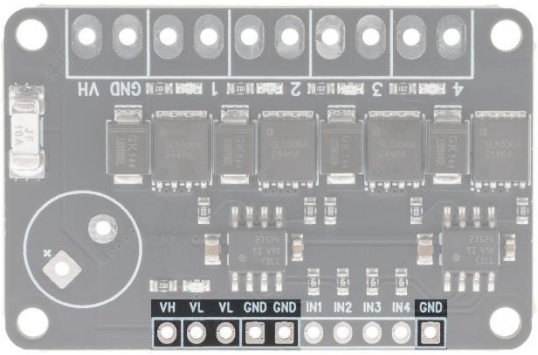
- Control DC loads with great speed
- Highly efficient, almost no heat
- Miniature sized design
- LED indicators for logic supply and outputs

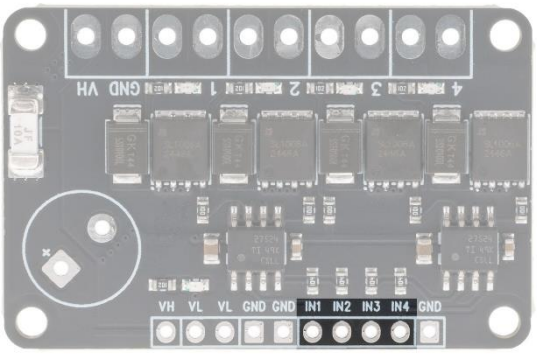
Specifications

- Supply voltage (FET): 5 - 50 VDC
- Supply voltage (logic): 4.5 - 12 VDC
- Logic levels: 3 - 12 V
- FET RDSon: <5 mOhm
- FET limits: 100 V / 100 A
- Dimensions: 46 x 30 mm
- Mounting holes: c-c 41 x 25 mm / ø2.5 mm

Connections

Logic supply and control pins:

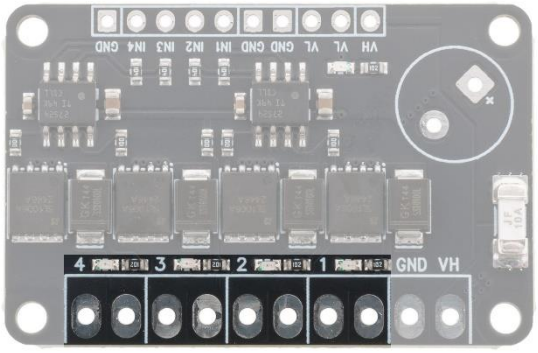


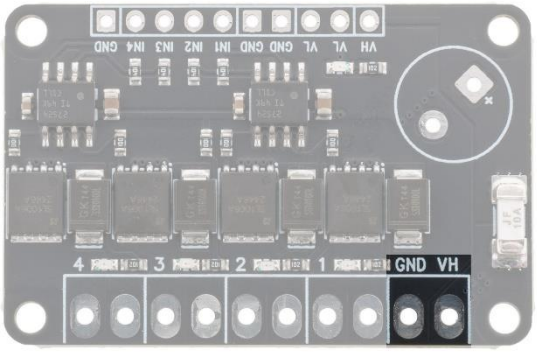


The logic supply voltage and control inputs are all arranged on one side of the board. The connector pitch is 2.54mm and will fit any standard pin header.

- VH, VL: FET voltage supply and logic voltage supply (4.5 - 12V). These two pins can be bridged if VH <= 12V and only one supply is required.
- VL, GND: Input for logic voltage supply and ground. 4.5V to 12V range.
- IN1, IN2, IN3, IN4: Control inputs for each channel. Logic levels can range from ~2V up to logic voltage supply (max 12V). High impedance and active high.

FET connections:





The connections for channels 1 to 4 and FET voltage supply are made using 3.5mm pitch screw terminals (or by soldering wires directly to the board).

VH and GND are the supply inputs for the transistors. Voltage range from 5 to around 50VDC. The transistors will handle voltages up to 100V, but for a safe margin, voltages higher than 50V is not recommended.

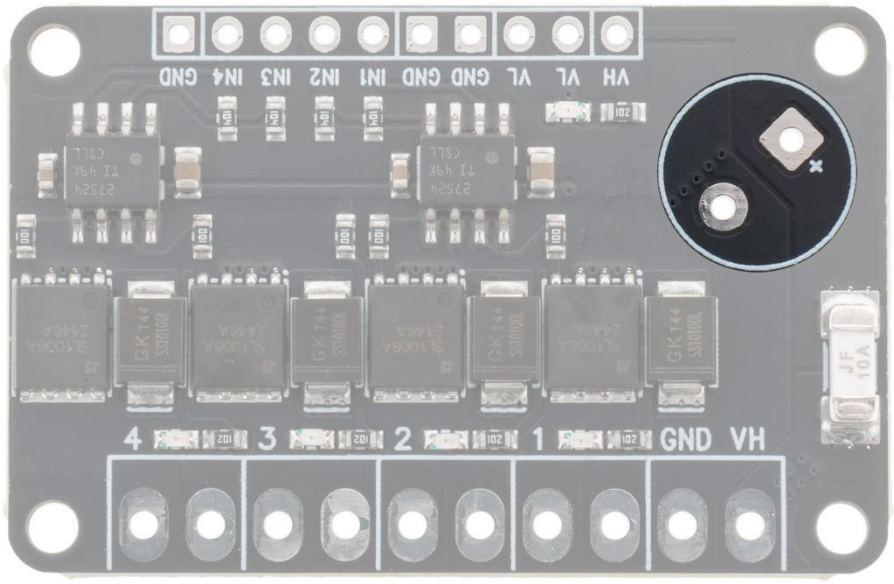
VH is protected from over current with a 10A slow-blow non-resettable fuse. The fuse is slow to react and will only blow when the current is exceeded by a fair amount (up to 15A) or a slightly lower overload over a longer period of time.

Each channel has its own LED that will show the analog value of respective output. Each channel has two pins, "+" (VH or FET voltage supply) and "-". The load should be connected with its positive terminal to "+" and the negative terminal to "-".

When the logic input is low, the transistor is off and the negative terminal "-" will be disconnected. When the logic input is high, the transistor will conduct and "-" will be connected to GND.

Please note that this driver will not work with motors or other loads that are chassis grounded (common in automotive use).

Capacitor:



The board has space for a large electrolytic capacitor that can be installed if necessary. The capacitor is normally not required for small loads and is not included. The pattern will fit capacitors with 5mm pitch and a diameter of 10mm (max 12.7mm). Be observant of the capacitor voltage rating! The working voltage should be higher than FET voltage supply with some margin and the capacitor should be a low impedance model.

Mechanical dimensions