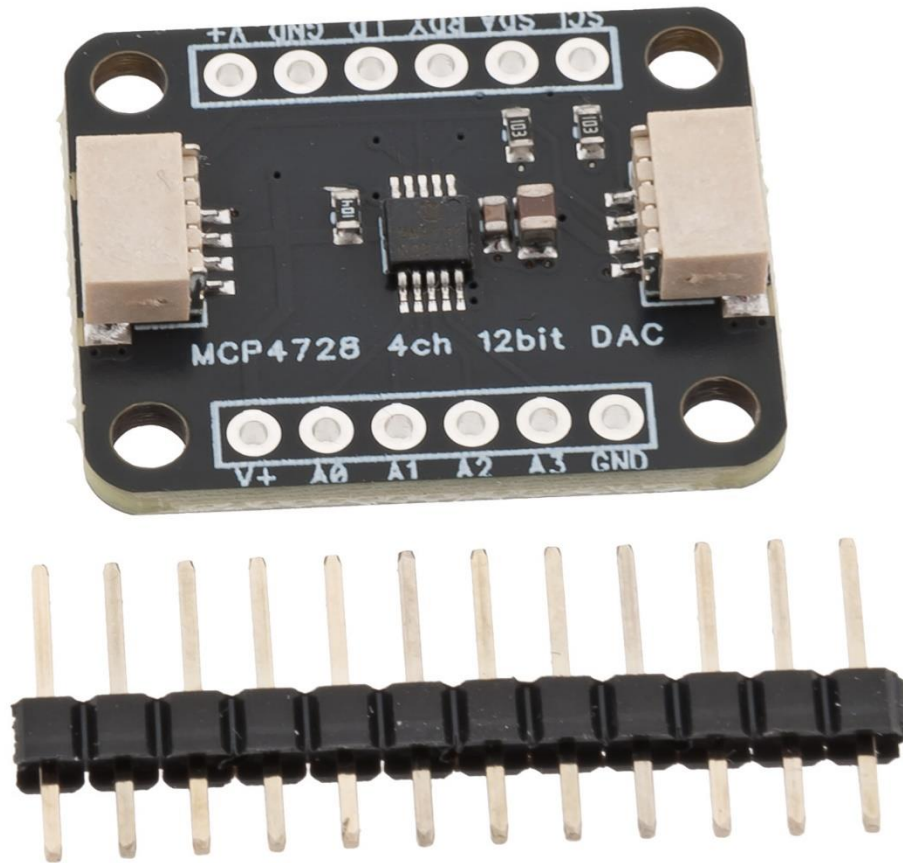# MCP4728 4-ch 12-bit DA Converter

Part.no. 41024449

DAC module based around Microchip MCP4728, 4-channel 12-bit DA-converter. The on-board EEPROM can store configuration and DAC codes to make it start with the last DAC values after power-down. This is useful for applications where the DAC is used for calibration and the voltage only needs to be set once or infrequently.

The output voltage range using the internal reference is either 0V to 2.048V (gain setting 1) or 0V to 4.096V (gain setting 2). Each channel can also be configured to use V+ as a reference, which will limit the output range to 0V to V+.

MCP4728 supports standard (100kHz), fast (400kHz) and high speed (3.4MHz) I2C bus clocks.

LD pin (LDAC) can be used to simultaneously update all four channels for perfect synchronization.

Functions

- Four high resolution analog outputs
- Stores DAC values in EEPROM
- Supports high speed 3.4MHz I2C clock
- 2V, 4V or V+ as maximum voltage swing
- Very low power consumption

Specifications

- Supply voltage: 2.7 - 5.5 VDC
- Reference voltage: 2.048 V (or V+)
- Output swing: 0 V to 2.048V (gain 1) / 4.096V (gain 2) / V+ (ext ref)
- Settling time: 6 us
- Max non-linearity: ±0.2 LSB
- I2C bus speed: 100 kHz / 400 kHz / 3.4 MHz
- I2C address: 0x60 (software programmable)
- Dimensions: 25 x 20 mm
- Mounting holes: c-c 20 x 15 mm / ø2.5 mm

Connections

Voltage supply and control pins:
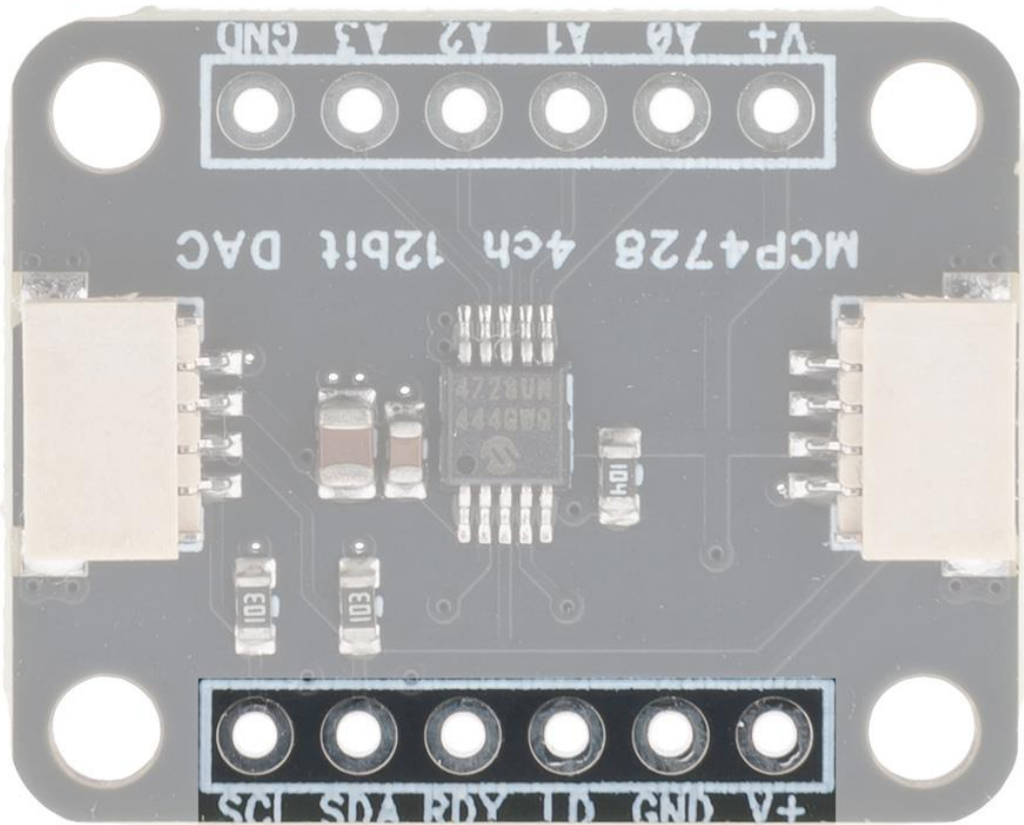
Connect V+ and GND to a voltage supply between 2.7V and 5.5V.

Connect SCL and SDA to the corresponding I2C pins on the microcontoller.

RDY (RDY/BSY) is an active-low output that will indicate EEPROM activity. When the EEPROM is written to, RDY will be pulled low and return to high when write is complete. This pin can be used to notify the controller when the DAC is ready to accept new data.

LD (LDAC is an active-low input and used for loading new values from the input register to the output buffer or to program a new I2C address.

Read more on how to program addresses in the datasheet (page 37). Pull the pin low to transfer new data to the output registers and update all outputs simultaneously. If the pin is permanently pulled low, the DAC will transfer new data continously.

QWIIC connectors:
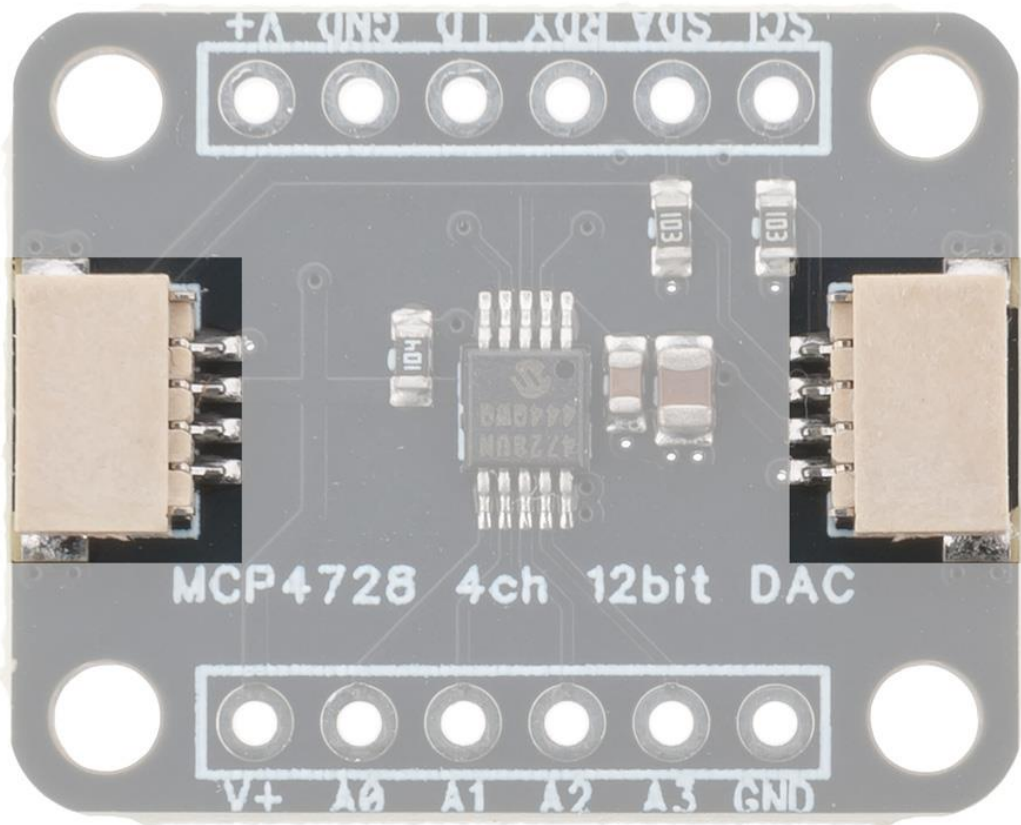
Two QWIIC connectors are available for fast and easy wiring using QWIIC cables. The QWIIC system contains V+, GND, SCL and SDA signals. LDAC and RDY/BSY must be wired separately.

DAC outputs:
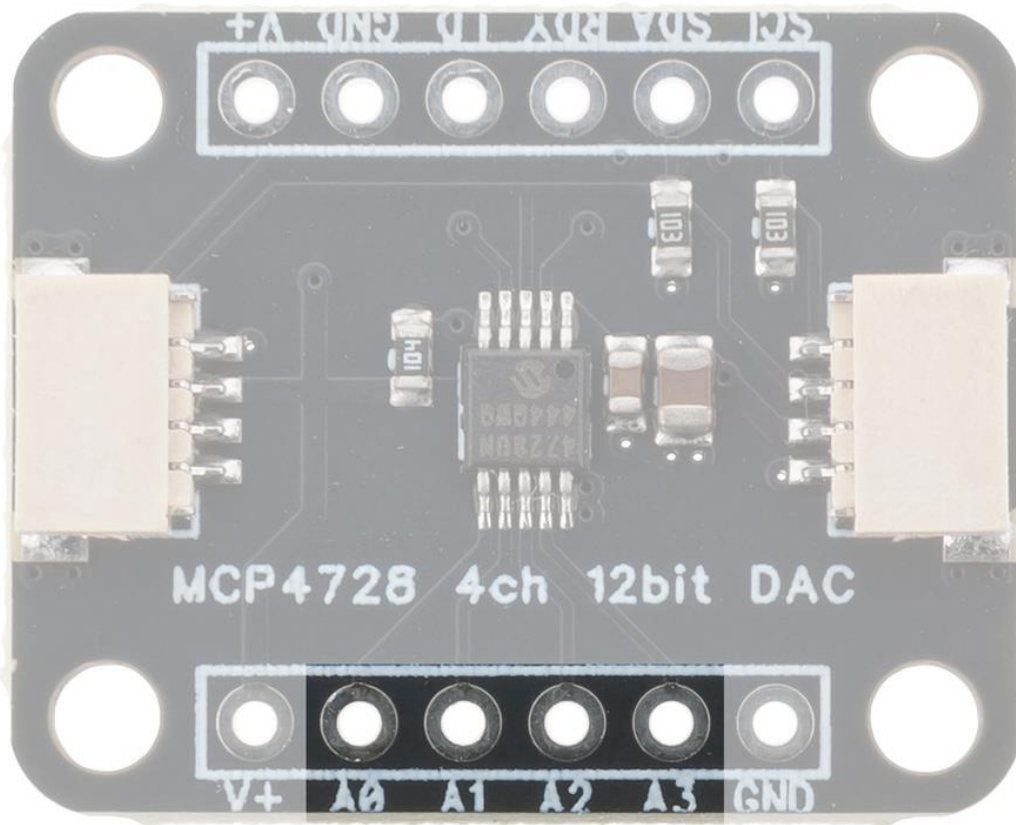
The four voltage outputs from the DAC are aligned along one side of the board. The outputs are ground referenced and have limited drive capability, around 20mA per pin. The output impedance is 1 ohm. When the chip is powered down, the output buffers are disconnected from the DAC and can be set to a known resistance of 1k, 100k or 500k, to ground.

Voltage outputs:
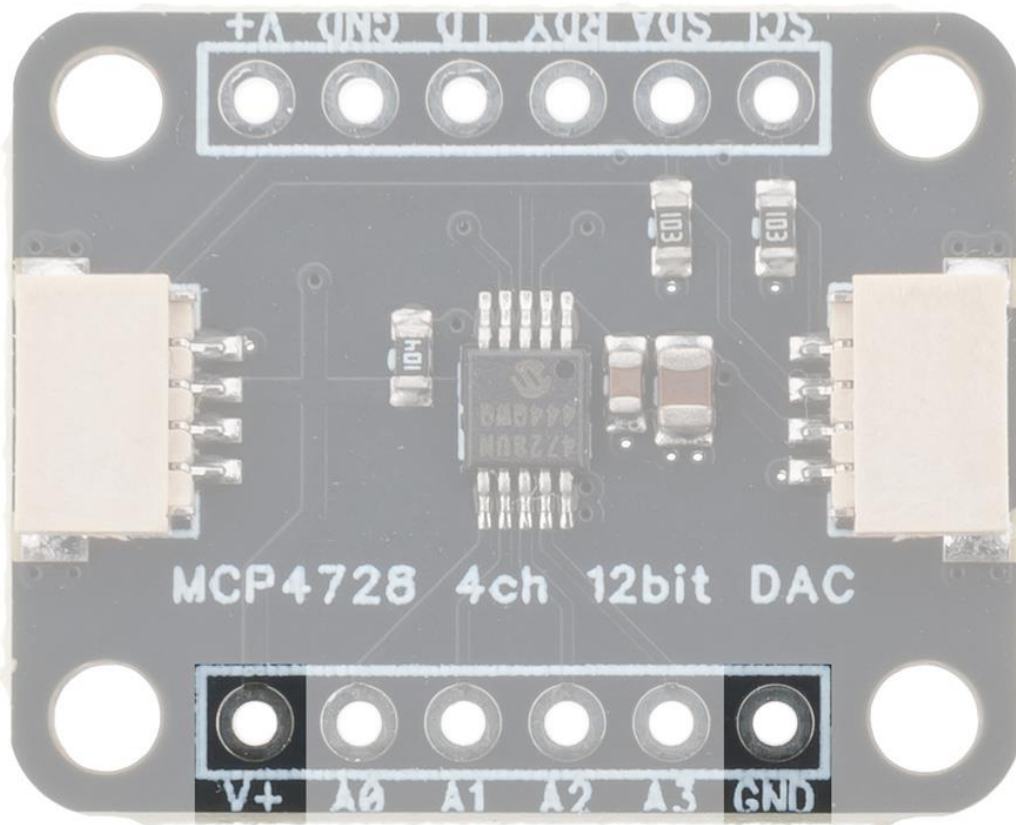
V+ and GND on this side of the board are connected to the same nets as V+ and GND on the other side and can be used to supply other modules and components, like OP-amps, filters or bias resistors.

Additional resources:

- [MCP4728 Datasheet @ Microchip](#)
- [Arduino library @ GitHub](#)
- [Python library @ GitHub](#)

Mechanical dimensions