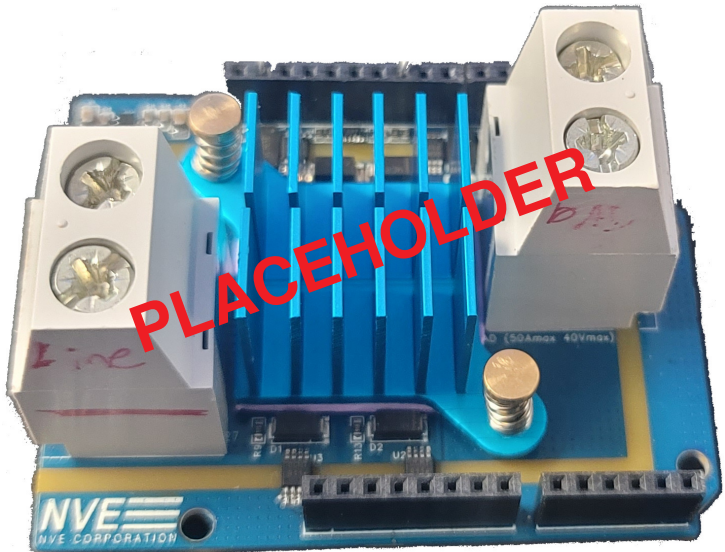


H-Bridge Arduino Shield



Scan for more information

H-Bridge Shield Overview

Features

- Fully Arduino compatible
- Simple three-wire Arduino interface (PWM, Dir, and Enable)
- Motor control up to 2 kW (2.5 HP)
- Thermal vias and heat-sinking
- Standard Arduino Shield form factor outline
- Includes Arduino example programs on a memory stick

Specifications

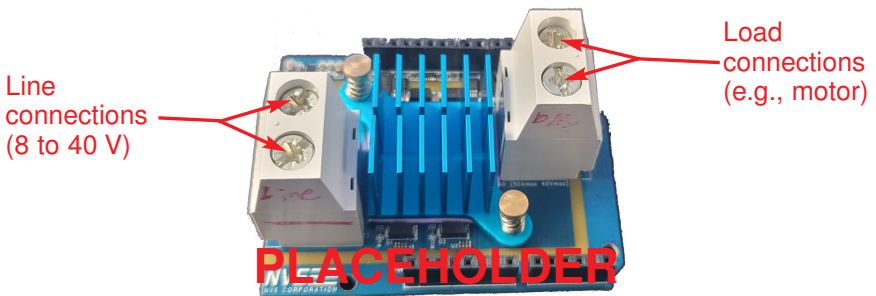
- Max. load: 2 kW (40 V / 50 A)
- Load supply line: 8 - 40 V
- Logic supply: 4.5 - 5.5 V, 500 mA max.
- Logic-to-load isolation: 2.5 kV_{RMS} per UL 1577
- Dimensions: 2.1 in. by 2.7 in. (53.4 mm by 68.6 mm)

Applications

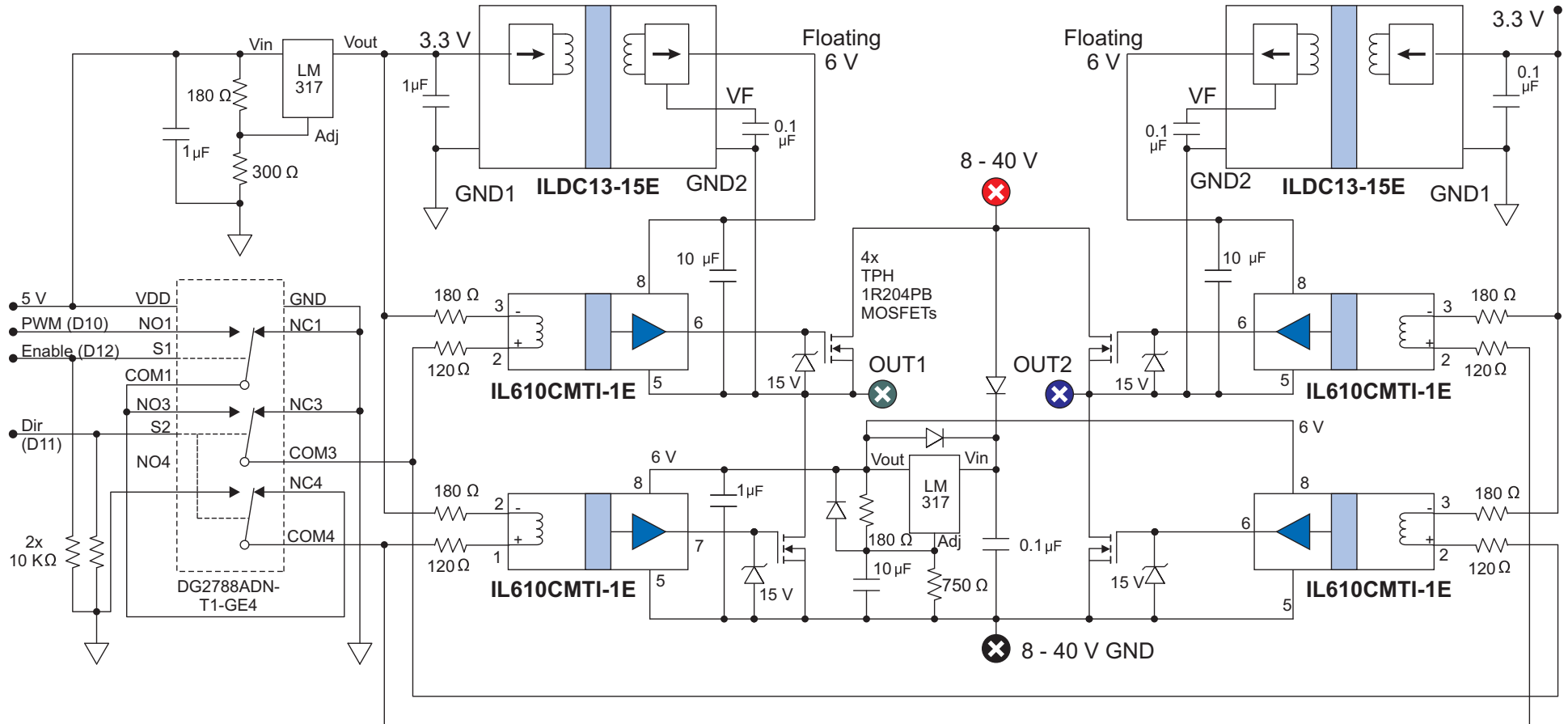
- Motor speed and direction control
 - Robotics
 - DC-to-AC invertors
-

Quick Start

- ⇒ Connect the Shield board to an Arduino.
- ⇒ Connect the “line side” screw terminals to a motor power supply.
- ⇒ Connect a motor to the “load side” screw terminals.
- ⇒ Scan the QR Code below and download an Arduino program.
- ⇒ Run the Arduino program.
- ⇒ Modify the Arduino program for your application.



Scan for Arduino programs



Circuit Description

At the heart of the H-bridge Arduino Shield are four power MOSFETs, four ultrahigh CMTI isolated MOSFET drivers, and two ultraminiature isolated DC-to-DC convertors.

The low-side IL610CMTI-1E isolators shift the Arduino outputs to six volts to drive the MOSFET gates. The high-side isolators allow a logic signal to drive the high-side MOSFET as their source voltages float with the load voltage. The two high-side ILDC13-15E DC-to-DC convertors provide a floating six-volt supply, referenced to the MOSFET source pins, to power the isolator gate drivers.

The isolators have extremely high Common-Mode Transient Immunity (CMTI), so they do not glitch even when MOSFET source pin voltages change rapidly as the MOSFETs switch.

The resistors in series with the isolator input coils set the input current to approximately 12 mA. The resistor values maximize CMTI.

The DG2788 analog switch provides PWM, Enable, and Direction inputs for a simple Arduino interface. This interface also allows the MOSFETs to be disabled during a reversal to prevent two MOSFETs on the same side from being on at the same time (“shoot-through”).

There are two LM317 regulators. One provides a 3.3-volt supply from the Arduino power for the DC-to-DC convertors; the other provides a six-volt supply from the line input supply to power the low-side gate drivers. The LM317's 40-volt maximum input voltage limits the line input supply. The six-volt regulator has diodes for short-circuit and reverse voltage protection. One diode prevents the regulator's output bypass capacitor from discharging through the regulator during an input short circuit. Another diode protects against the capacitor on the regulator input from discharging through the regulator during an output short circuit. Diodes also prevent the capacitor on the regulator's Adj pin from discharging through the regulator during an input short circuit.

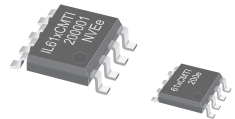
Zener diodes protect the MOSFET gates from overvoltage.

Bill of Materials

Qty.	Designator	Part #	Manufacturer	Description
2	U6,U7	ILDC13-15E	NVE	Ultraminiature Isolated 1/4W 3.3-to-6V DC-DC Conv
4	U2,U3,U4,U8	IL610CMTI	NVE	1-Channel Ultrahigh CMTI Isolator, 2.5 kV, MSOP
4	M1,M2,M3,M4	TPH1R204PB	Toshiba	MOSFET N-CH 40V 150A 8SOP
1	U14	NCV8187AMT330TAG	onsemi	IC REG LINEAR 3.3V 1.2A 6WDFN
1	U5	NCV317MBSTT3G	onsemi	IC REG LIN POS ADJ 500MA SOT223
3	D5,D6,D7	F1M	Yangzhou Yangjie	DIODE GEN PURP 1KV 1A SOD123FL
4	D1,D2,D3,D4	3SMAJ5929B-TP	Micro Commercial	DIODE ZENER 15V 3W DO214AC
2	H1,H2	691256610002_	Würth Elektronik	TERM BLK 2P SIDE ENT 10.16MM PCB
1	H4	SSW-106-03-T-S	Samtec Inc.	CONN RCPT 6POS 0.1 TIN PCB
2	H3,H6	SSW-108-03-T-S	Samtec Inc.	CONN RCPT 8POS 0.1 TIN PCB
1	H7	SSQ-110-03-T-S	Samtec Inc.	CONN RCPT 10POS 0.1 TIN PCB
4	R2,R4,R6,R8	RMCF0603JG120R	Stackpole	RES 120 OHM 5% 1/10W 0603
5	R1,R3,R5,R7	RMCF0603JT180R	Stackpole	RES 180 OHM 5% 1/10W 0603
4	R9,R10,R13,R14	RMCF0603JT51K0	Stackpole	RES 51K OHM 5% 1/10W 0603
1	R12	RMCF0603FT576R	Stackpole	RES 576 OHM 1% 1/10W 0603
4	C7,C8,C15,C18	CL10B104KC8NNNC	Samsung	0.1 μ F \pm 10% 100V Ceramic Capacitor X7R 0603
11	C3-6; C9-14; C17	CL10A105KB8NNNC	Samsung	1 μ F \pm 10% 50V Ceramic Capacitor X5R 0603
1	C19	CL10A106MA8NRNC	Samsung	10 μ F \pm 20% 25V Ceramic Capacitor X5R 0603
2	C1,C2	CL21A106KOQNNNE	Samsung	10 μ F \pm 10% 16V Ceramic Capacitor X5R 0805

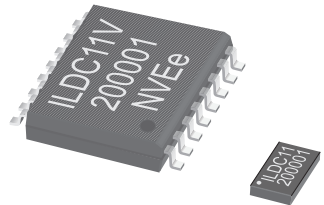
IL61xCMTI: Ultrahigh CMTI Isolated MOSFET Drivers

- 200 kV/ μ s guaranteed CMTI; 300 kV/ μ s with deglitch circuitry
- Extended 3 to 6.6 volt power supply range
- Flexible inputs with wide input voltage range
- No input-side power supply needed
- 2.5 kV isolation
- 44000 year barrier life
- Single- and dual-channel configurations
- 8-pin MSOP and SOIC packages



ILDC1x: Ultraminiature Isolated DC-to-DC Convertors

- World's smallest isolated DC-to-DC convertors
- Ultraminiature 3 x 5.5 x 0.9 mm DFN or 8 mm creepage SOIC16-WB
- 3.3 volt input; 3.3, 5, or 6 volt output options
- ¼ watt, fully-regulated output
- No minimum load
- Low EMI without ferrite beads or inductors
- Short-circuit and thermal protection
- 2.5 kV or 4 kV isolation
- -40 °C to 125 °C with no derating



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