3.6A Bidirectional DC Motor Driver Arduino Nano Shield

Another Arduino Nano shield which can drive brushed dc motor in both direction with PWM for speed control and also included current trip facility. Project is based on DRV8870 IC which can handle current up to 3.6Amps, shield also included with IR sensor and trimmer potentiometer. Trimmer Pot can help to develop Motor speed controller application, IR sensor can be used to make remote based DC motor driver. DRV8870 required two PWM signals to control the motor speed and direction both these pins connected D9 and D10 PWM pins of Arduino Nano. Analog pin A0 connected to Trimmer Pot, digital pin D12 connected to IR sensor, two IN1 and IN2 PWM pin connected to Digital PWM pin D9 and D10 of Arduino Nano. The board can drive brushed DC Motor up to 3.6Amp and voltage 6.5V to 12V DC. This shield can drive higher voltage DC motor up to 45V with few changes, Omit R3 and D1 and use high value and voltage rating capacitor C1 on motor supply. Trimmer potentiometer PR1 provided to adjust the maximum load trip current. For more information refer DRV8870 data sheet.
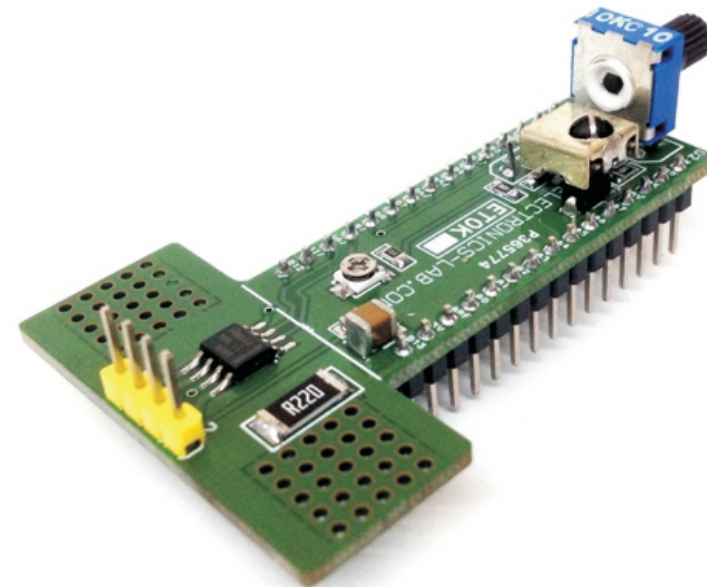
A single-power input, VM Motor supply , serves as both device power and the motor winding bias voltage. The integrated charge pump of the device boosts VM internally and fully enhances the high-side FETs. Motor speed can be controlled with pulse-width modulation, at frequencies between 0 to 100 kHz. The device has an integrated sleep mode that is entered by bringing both inputs low. An assortment of protection features prevent the device from being damaged if a system fault occurs.
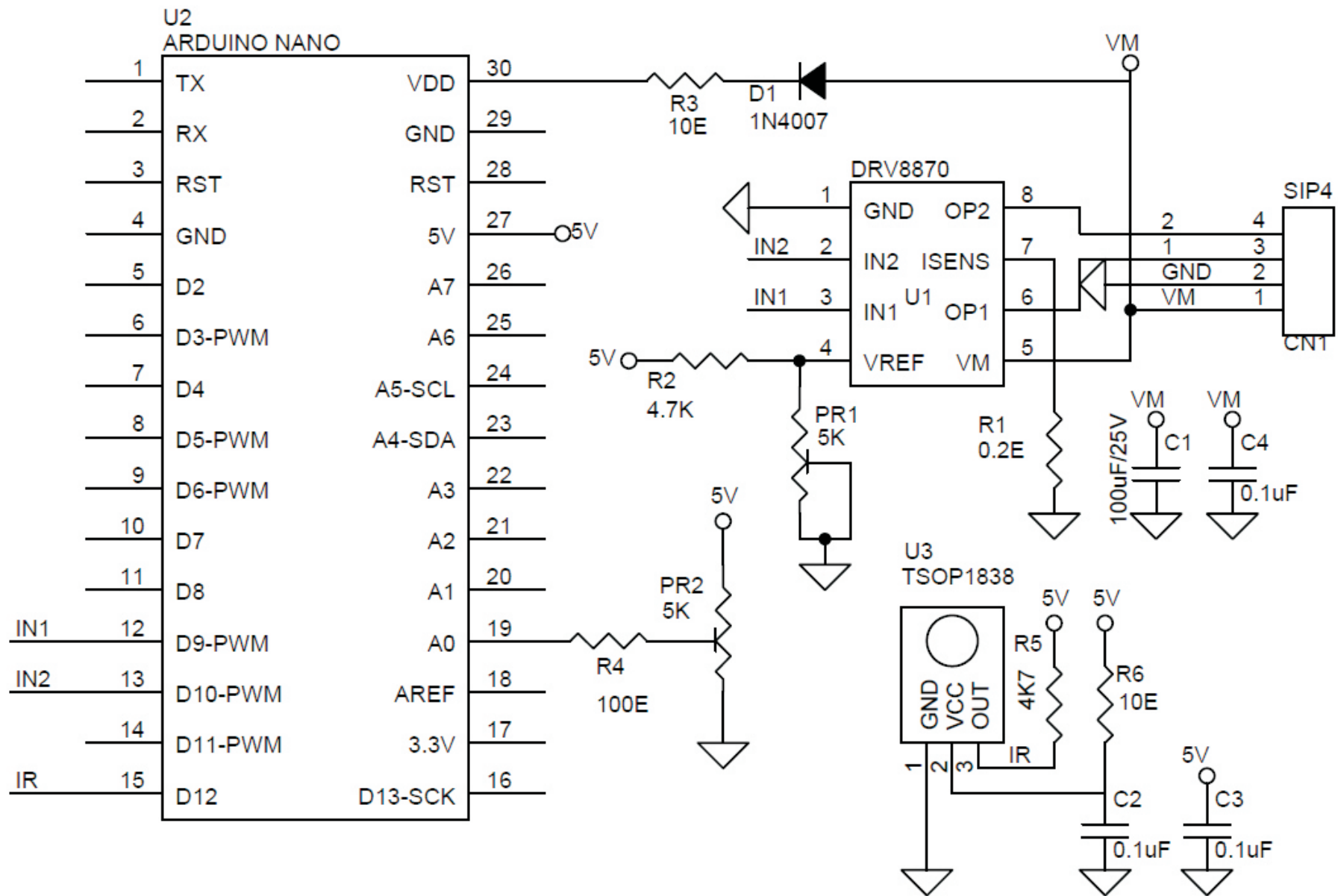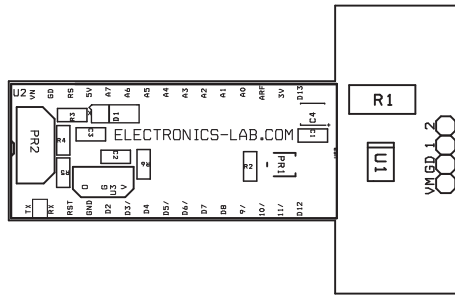
DRV8870

The DRV8870 device is a brushed-DC motor driver for printers, appliances, industrial equipment, and other small machines. Two logic inputs control the Hbridge driver, which consists of four N-channel MOSFETs that can control motors directionally with up to 3.6-A peak current. The inputs can be pulse-width modulated (PWM) to control motor speed, using a choice of current-decay modes. Setting both inputs low enters a low-power sleep mode. The DRV8870 device features integrated current regulation, based on the analog input VREF and the voltage on the ISEN pin, which is proportional to motor current through an external sense resistor. The ability to limit current to a known level can significantly reduce the system power requirements and bulk capacitance needed to maintain stable voltage, especially for motor startup and stall conditions.
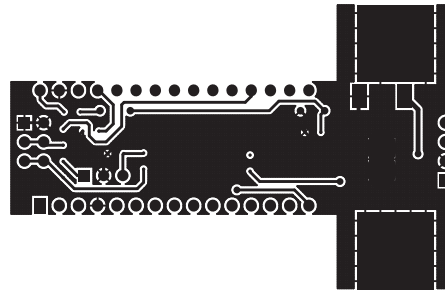
Features

- Supply 6.5V to 12V DC
- Motor Load Up to 3.6Amps
- Over Load Current Facility
- Over Load Trip Adjust Trimmer Pot
- Trimmer Pot provided on Analog Pin A0 to make Motor Speed Controller
- IR Sensor On D12 Digital Pin
- PWM Frequency 0-100Khz
- Motor Input Pin In1 and In2 Connected to D9 and D10 PWM Pins
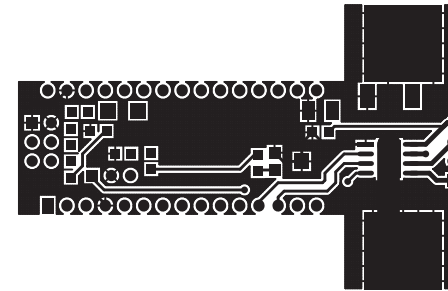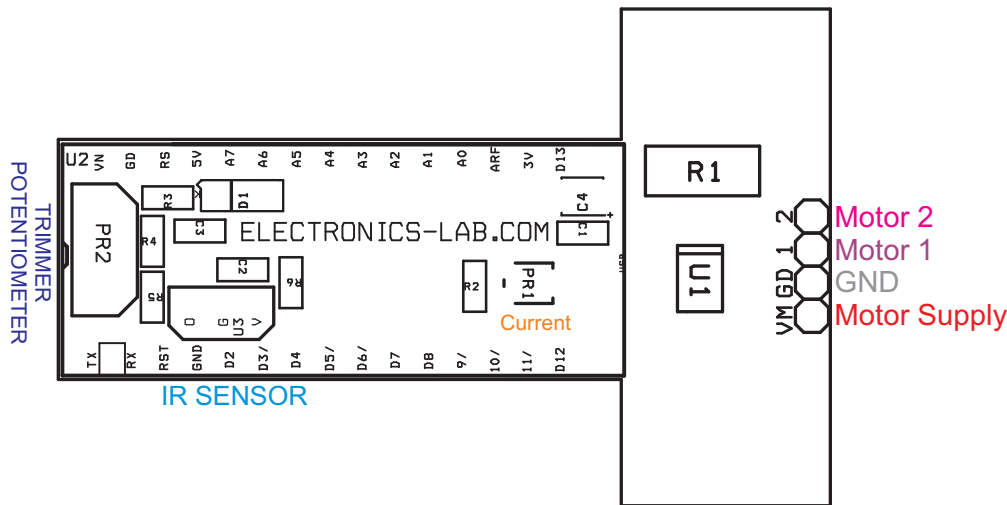- PCB Dimensions 59.19mm X 38.15mm

Silk Screen Top

Bottom Layer

Top Layer

PCB Dimensions 59.19mm X 38.15mm

TRIMMER POTENTIOMETER

Motor 2
Motor 1
GND
Motor Supply

Current

IR SENSOR

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Bom			
SR.	QNTY.	REF.	DESC.
1	1	CN1	4 Pin Header Connector
2	1	C1	100uF/25V SMD 1210
3	3	C2,C3,C4	0.1uF SMD 0805
4	1	D1	1N4007 SMD
5	2	PR1,PR2	5K TRIM POT
6	1	R1	0.2E/2W SMD 2512
7	1	R2	4.7K SMD 0805
8	2	R3,R6	10E SMD 0805
9	1	R4	100E SMD 0805
10	1	R5	4K7 SMD 0805
11	1	U1	DRV8870 SMD SO8
12	1	U2	ARDUINO NANO SHIELD
13	1	U3	TSOP1838 IR SENSOR VISHAY