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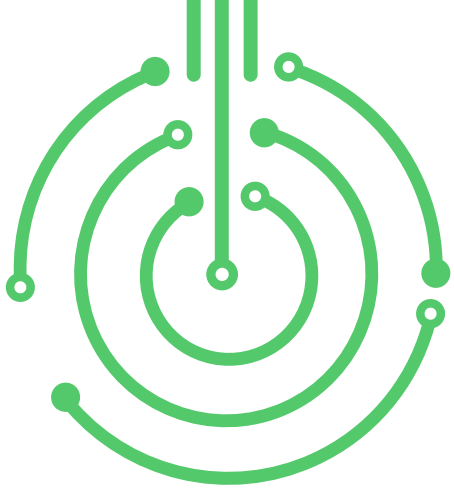


H-Bridge for High Power Brushed DC Motor with Current Sense

SKU: EL144112

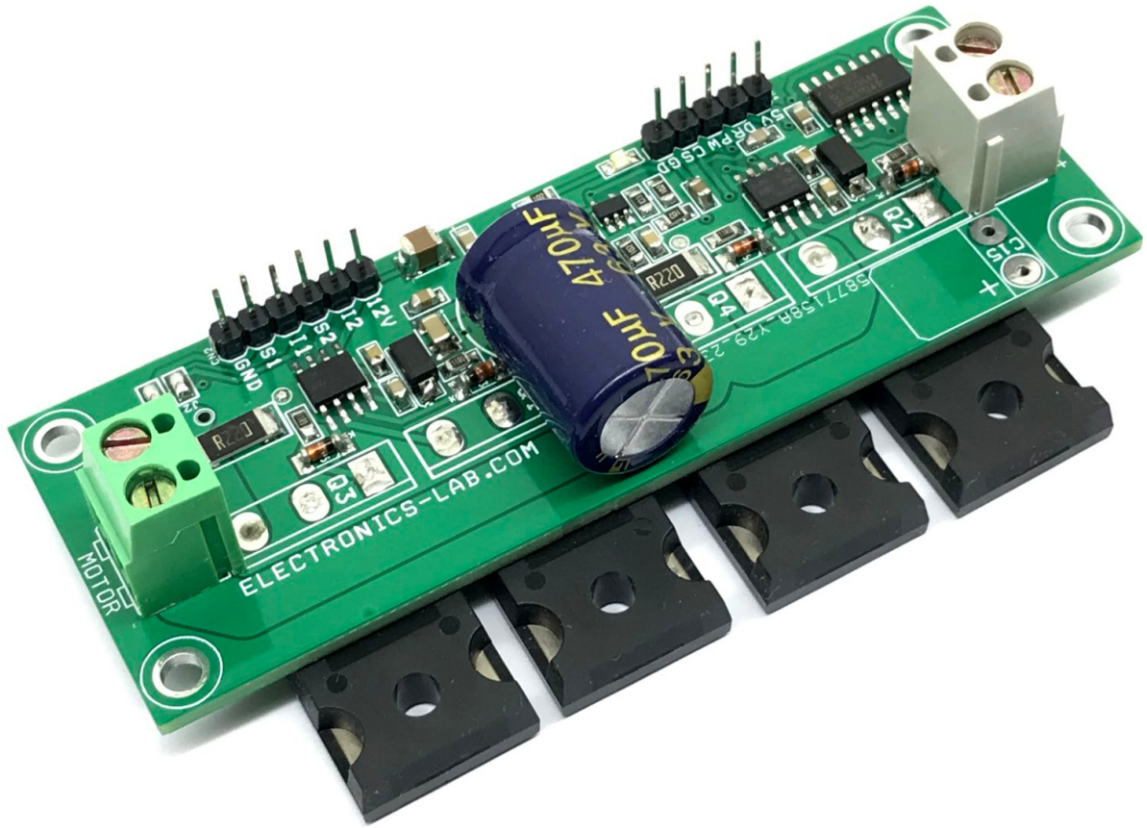
MOTOR CONTROL

H-Bridge for High Power Brushed DC Motor with Current Sense

This H-bridge board is an easy-to-use brushed DC motor driver that can handle large-size motors such as wheelchair motors, and winch motors. An H-bridge is an electronic circuit that switches the polarity of a voltage applied to a load. The circuit is built using 4 x N-Channel MOSFETs, gate driver IR2104, and a logic circuit. The direction of rotation is dependent upon the polarity of the applied voltage. If you reverse the voltage, the direction of rotation reverses.

FEATURES

- Power Supply Motor 12V to 50V DC
- Load Up to 10Amp Continues – Tested, Maximum 20A
- Gate Driver Power Supply 12V to 15V
- Logic/Current Sense Power Supply 5V
- PWM Frequency Up to 20Khz
- PWM Duty Cycle Input 95% to 5%
- On Board Current Circuit
- On Board Power LED (Gate Driver)
- 4 x 3MM Mounting Holes
- PCB Dimensions 91.92 X 32.70MM



PWM and Direction Control

The project requires 2 signals to control the DC motor, a PWM for speed control and a DIR signal for direction control. The project is tested with a frequency up to 20KHz and a PWM duty cycle 95% to 5%. Both logic signals are TTL 5V compatible.

CN4: All Inputs are TTL 5V

- Pin 1 5V DC for U3 Chip
- Pin 2 Direction High or Low
- Pin 3 PWM Duty Cycle 95% to 5% Frequency up to 20Khz
- Pin 4 Current Sense Output
- Pin 5 GND

Direct Gate Driver Control: Shutdown, PWM/Logic

The project also can be controlled with direct logic signals applied to Gate driver chip IR2104, use connector CN2 for inputs, and don't populate the U3 chip in this case.

CN2 Input Signals: All Input Signals are TTL 5V

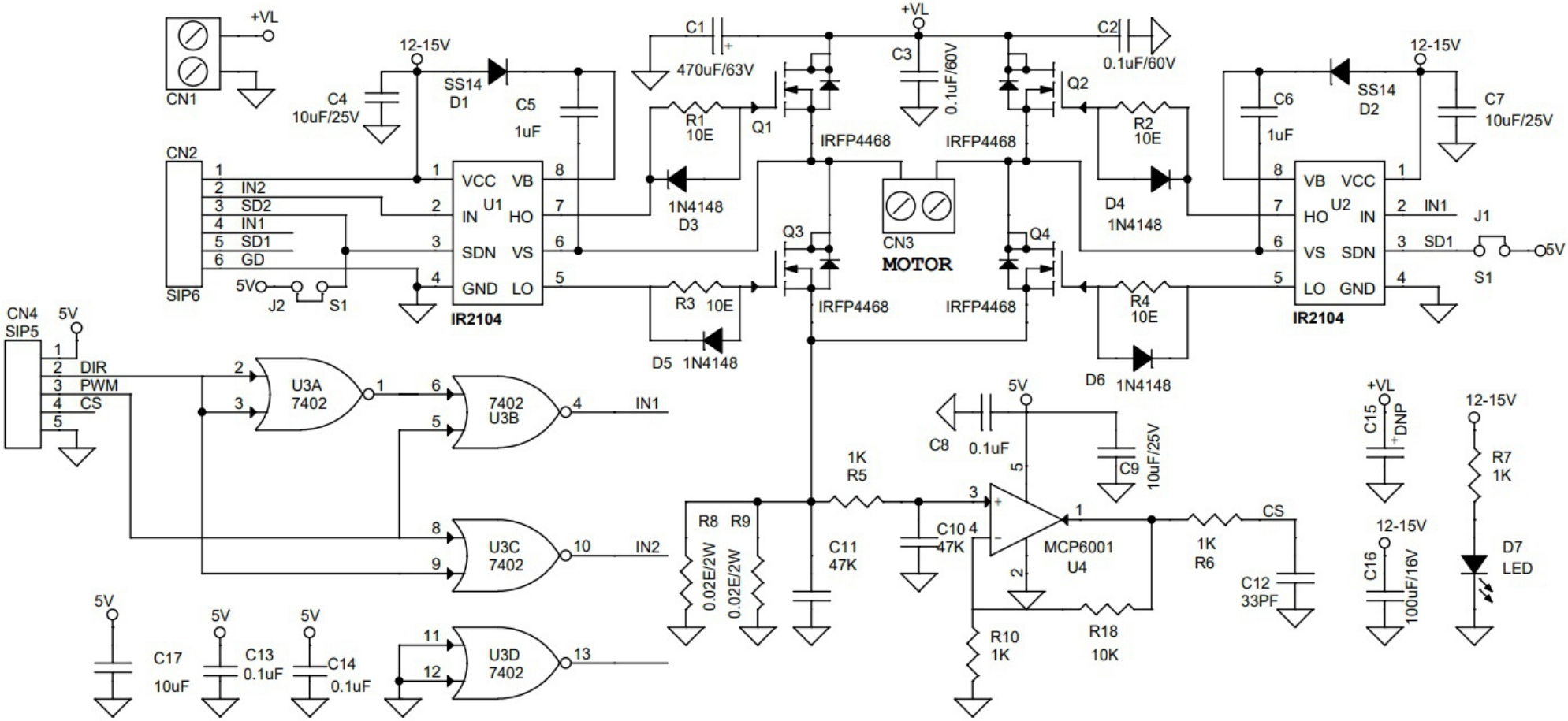
- Pin 1 = VCC 12V Power for Gate Driver
- Pin 2 = IN2 PWM/Logic Input
- Pin 3 = Shutdown 2 (TTL Logic High=Enable)
- Pin 4 = IN1 PWM/Logic Input
- Pin 5 = Shutdown 1 (TTL Logic High=Enable)
- Pin 6 = GND

Current Sense

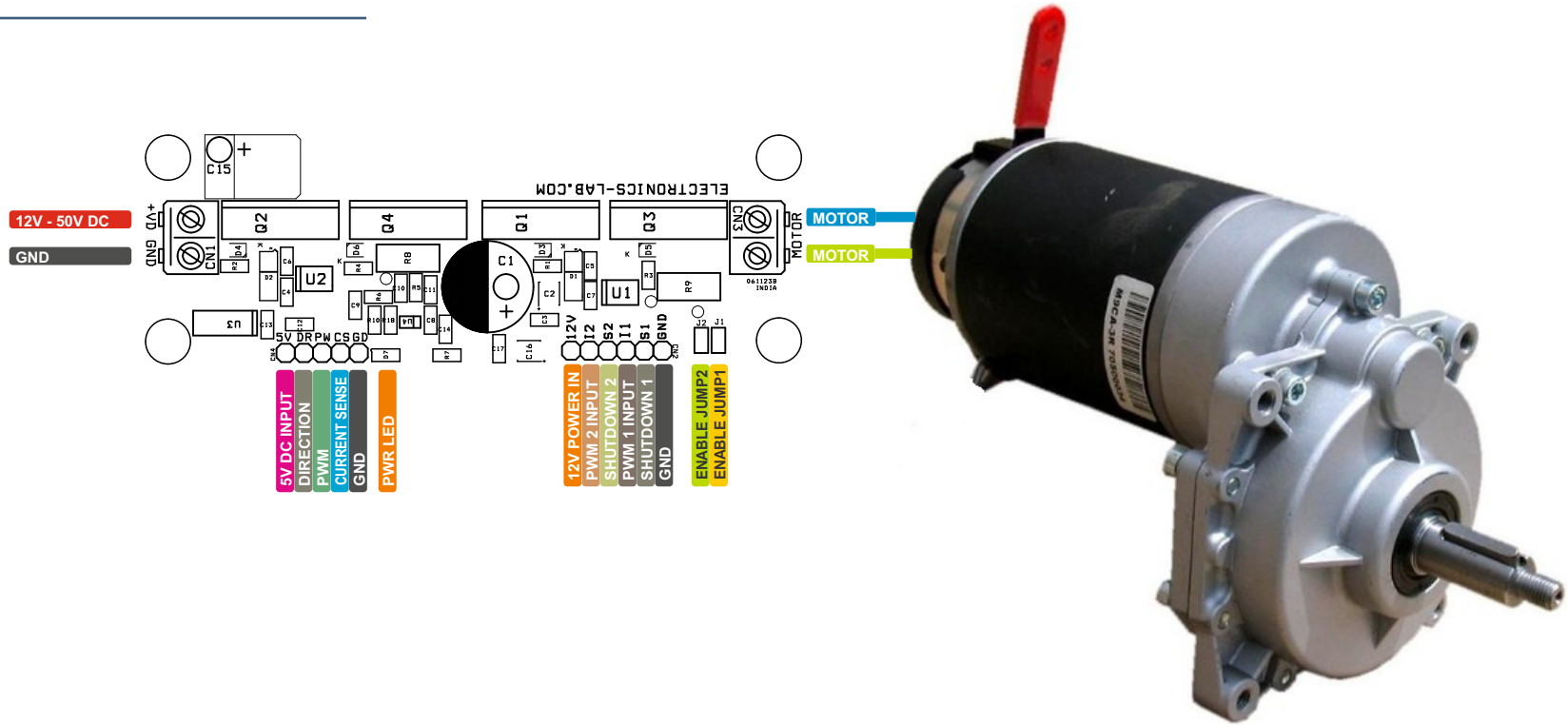
An optional current sense circuit can be used if required. The current sense circuit is built using OPAMP U4, which measures the current across shunt resistors R8 and R9 and provides current feedback at CN4 Pin 4. This signal can be used to detect the current flow, over current conditions etc. Current sense Output approx. 0.1V/A

Note1: If current sense circuit not required don't install following components: R5, R10, R18, R6, C12, C10, C11 and U4, Replace R8 and R9 with 0 Ohm.
Note:2: Project can handle higher voltage and current, choose appropriate MOSFETS, , it is important to replace capacitor C1, C2, C3 and C15 with required voltage capacity.

Schematic


CN1
+VL
12-15V
C4
10uF/25V
SS14
D1
C5
1uF
C1
470uF/63V
C3
0.1uF/60V
C2
0.1uF/60V
CN2
SIP6
IN2
SD2
IN1
SD1
GD
5V
J2
S1
U1
VCC
IN
SDN
GND
VB
HO
VS
LO
IR2104
R1
10E
Q1
IRFP4468
1N4148
D3
Q2
R2
10E
D4
1N4148
CN3
MOTOR
Q3
Q4
R3
10E
D5
1N4148
R4
10E
D6
1N4148
C6
1uF
SS14
D2
C7
10E
U2
J1
CN4
SIP5
DIR
PWM
CS
U3A
7402
U3B
U3C
U3D
IN1
IN2
C8
0.1uF
C9
10uF/25V
1K
R5
R8
R9
0.02E/2W
C10
47K
C11
47K
MCP6001
U4
R6
CS
C12
33PF
R10
1K
R18
10K
C15
DNP
C16
100uF/16V
R7
1K
D7
LED
C17
10uF
C13
0.1uF
C14
0.1uF

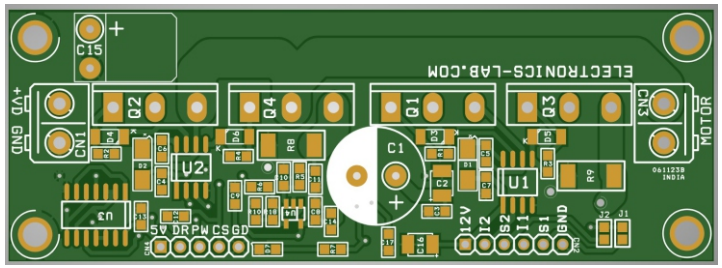
Connections

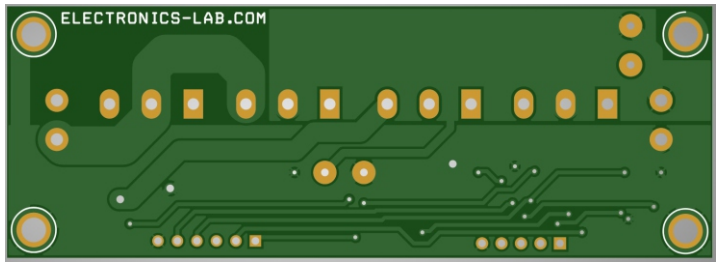


CONNECTIONS:

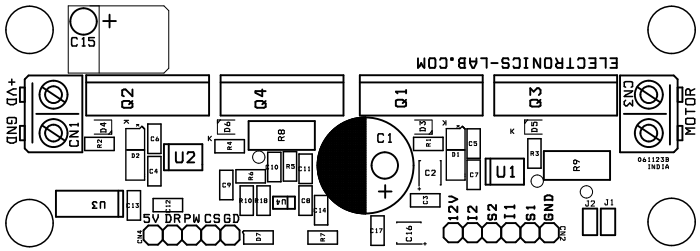
- Cn1: Pin 1 = Motor Power Supply 12V to 50V DC, Pin 2 GND
- CN2: Pin 1 = Power for Gate driver 12 to 15V, Pin 2 IN2, Pin 3 Shutdown 3, Pin 4 IN1, Pin 5 = Shutdown 1, Pin 6 = GND
- CN3: Pin 1 = Motor, Pin 2 Motor
- CN4: Pin 1 = 5V DC for U3 and Current Sense Circuit, Pin 2 = Direction Input TTL5V (High/Low), Pin 3 = PWM Input Duty Cycle 95% to 5%, Pin 4 = Current Sense Output, Pin 5 = GND
- Jumper J1: Enable/Disable U2 (Jumper Closed = Enable)
- Jumper J2: Enable/Disable U1 (Jumper Closed = Enable)
- D7: Power LED

PCB

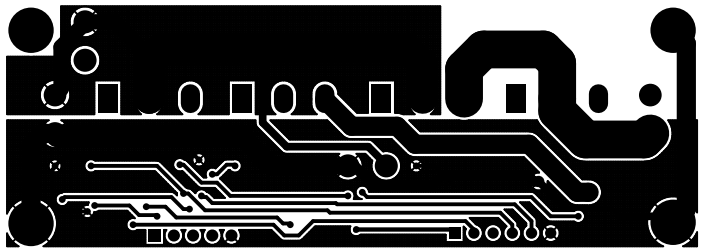




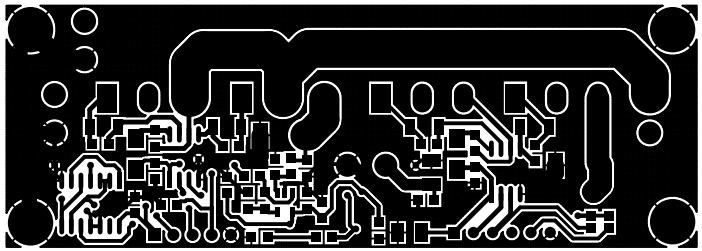
PCB GERBER FILES AVAILABLE



SILK SCREEN TOP



BOTTOM LAYER



TOP LAYER

PCB DIMENSIONS 91.92 X 32.70MM

Parts List

BOM						
NO.	QNTY.	REF.	DESC.	MANUFACTURER	SUPPLIER	SUPPLIER PART NO
1	2	CN1,CN3	2 PIN SCREW TERMINAL PITCH 5.08MM	PHOENIX	DIGIKEY	277-1247-ND
2	1	CN2	6 PIN MALE HEADER PITCH 2.54MM	WURTH	DIGIKEY	732-5319-ND
3	1	CN4	5 PIN MALE HEADER PITCH 2.54MM	WURTH	DIGIKEY	732-5318-ND
4	1	C1	470uF/63V ELECTROLYTIC	PANASONIC	DIGIKEY	P10352-ND
5	3	C8,C13,C14	0.1uF/50V CERAMIC SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
6	2	C2,C3	0.1uF/60V CERAMIC SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
7	4	C4,C7,C9,C17	10uF/25V	YAGEO/MURATA	DIGIKEY	
8	2	C5,C6	1uF/25V CERAMIC SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
11	2	C10,C11	47KPF CERAMIC SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
12	1	C12	33PF/50V CERAMIC SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
13	1	C15	DNP			
14	1	C16	100uF/16V CERAMIC SMD SIZE 1210	TAIYO YUDEN	DIGIKEY	587-5426-2-ND
16	2	D1,D2	SS14	TAIWAN SEMI	MOUSER	821-SS14M2G
17	4	D3,D4,D5,D6	1N4148	VISHAY	MOUSER	78-1N4148WS-E3-18
18	1	D7	LED SMD SIZE 0805	475-1278-1-ND	DIGIKEY	OSRAM
19	2	J1,J2	SOLDER JUMPER ON PCB			
20	4	Q1,Q2,Q3,Q4	IRFP4468 TO247	INFINEON	DIGIKEY	IRFP4468PBF
21	4	R1,R2,R3,R4	10E 5% SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
22	4	R5,R6,R7,R10	1K 5% SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
23	2	R8,R9	0.02E/2W		DIGIKEY	
24	1	R18	10K 5% SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
25	2	U1,U2	IR2104 SOIC8	INFINEON	MOUSER	942-IR2104STRPBF
26	1	U3	SN7402 SOIC14	TI	DIGIKEY	296-1188-1-ND
27	1	U4	MCP6001 SOT23-5	MICROCHIP	DIGIKEY	MCP6001UT-I/OTCT-ND

Notes

APP

Android App

DOWNLOAD

Android App launched in 2017 and has 100k+ downloads - rated with 4.5 stars.

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