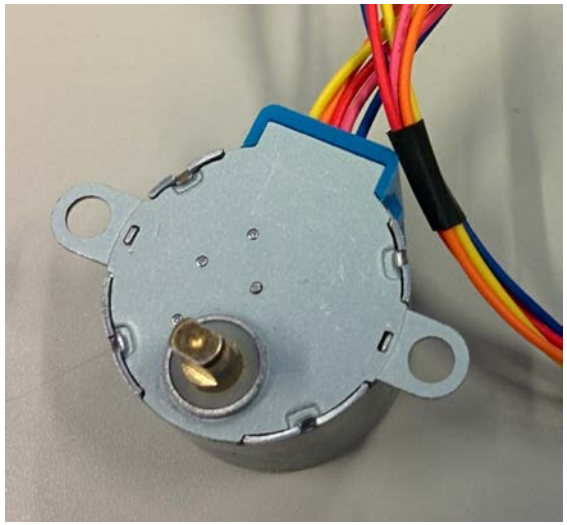
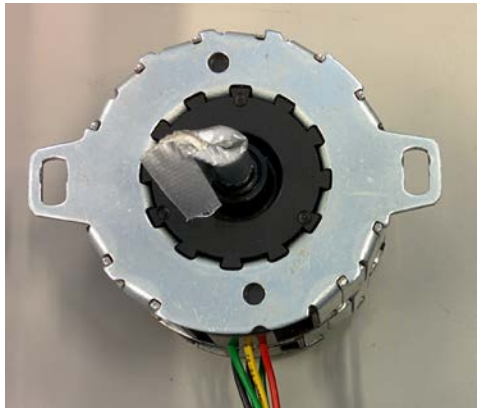
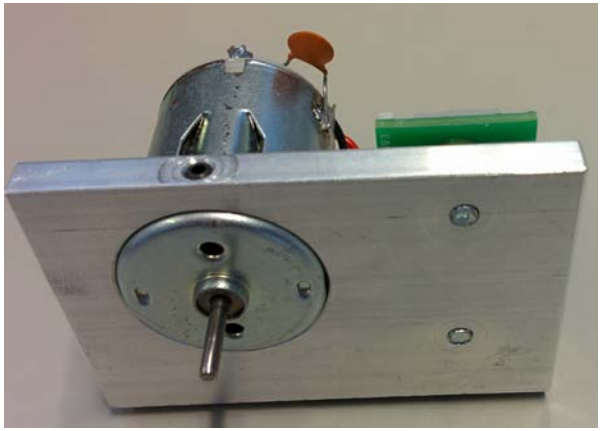
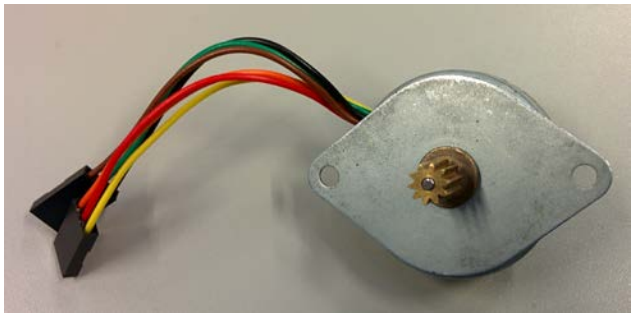


Motor control
Lab experiment



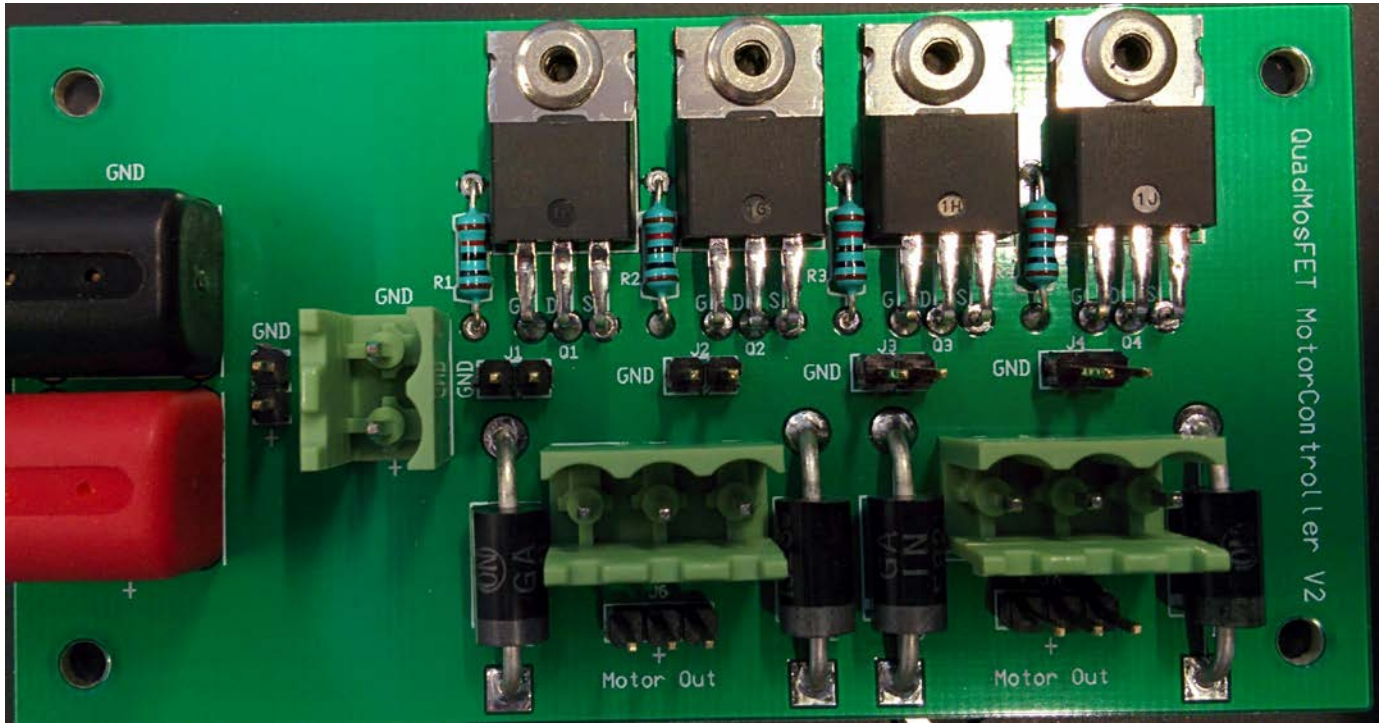




3 experiments

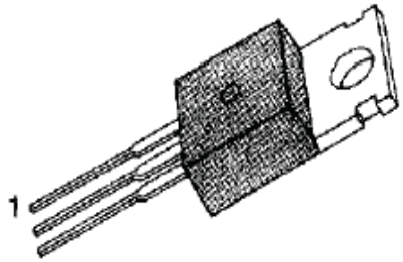
- DC motor speed control with PWM.
- DC motor speed control with PWM and direction control with an H-Bridge.
- Stepper motor control.
- (+optional: Servo motor)

MOSFET PCB


GND
GND
GND
R1
R2
R3
J1
Q1
J2
Q2
J3
Q3
J4
Q4
GND
GND
GND
Motor Out
Motor Out
QuadMosFET MotorController V2

IRLZ24 N-channel MOSFET

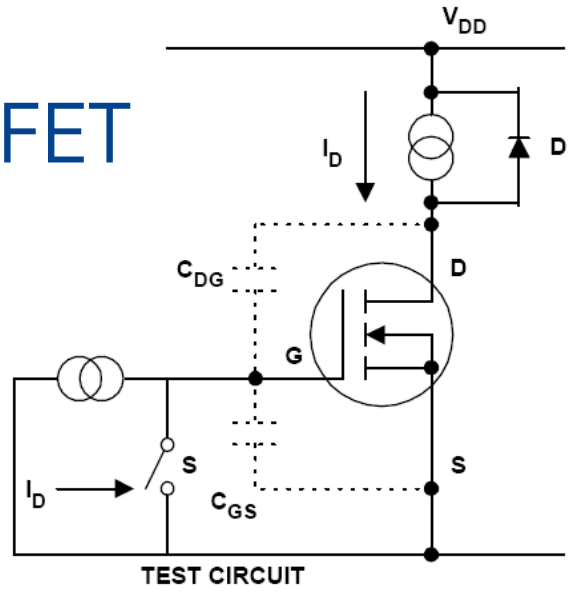
TO-220



1. Gate 2. Drain 3. Source

Characteristic	Symbol	IRLZ24	IRLZ20	Unit
Drain-Source Voltage (1)	V_{DSS}	60	50	Vdc
Drain-Gate Voltage (R_{GS}=1MΩ)(1)	V_{DGR}	60	50	Vdc
Gate-Source Voltage	V_{GS}	±15		Adc
Continuous Drain Current Tc=25 °C	I_D	14.0		Adc
Continuous Drain Current Tc=100 °C	I_D	9.8		Adc
Drain Current - Pulsed (3)	I_{DM}	56		Adc
Total Power Dissipation @ Tc=25 °C Derate Above 25 °C	P_D	50 0.33		Watts W/ °C
Operating and Storage Junction Temperature Range	T_J, T_{STG}	-55 to +175		°C
Maximum Lead Temp. for Soldering Purposes, 1/8" from case for 5 seconds	T_L	300		°C

IRLZ24 N-channel MOSFET

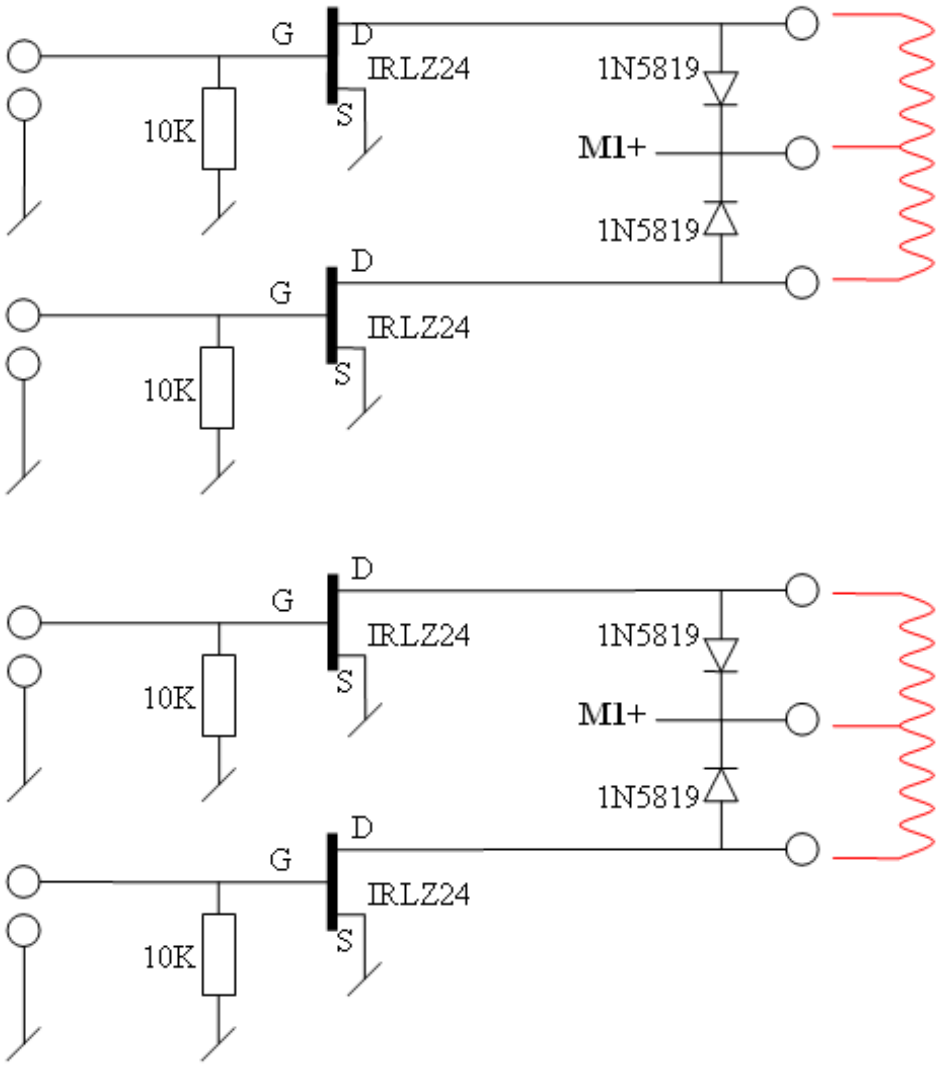


TEST CIRCUIT

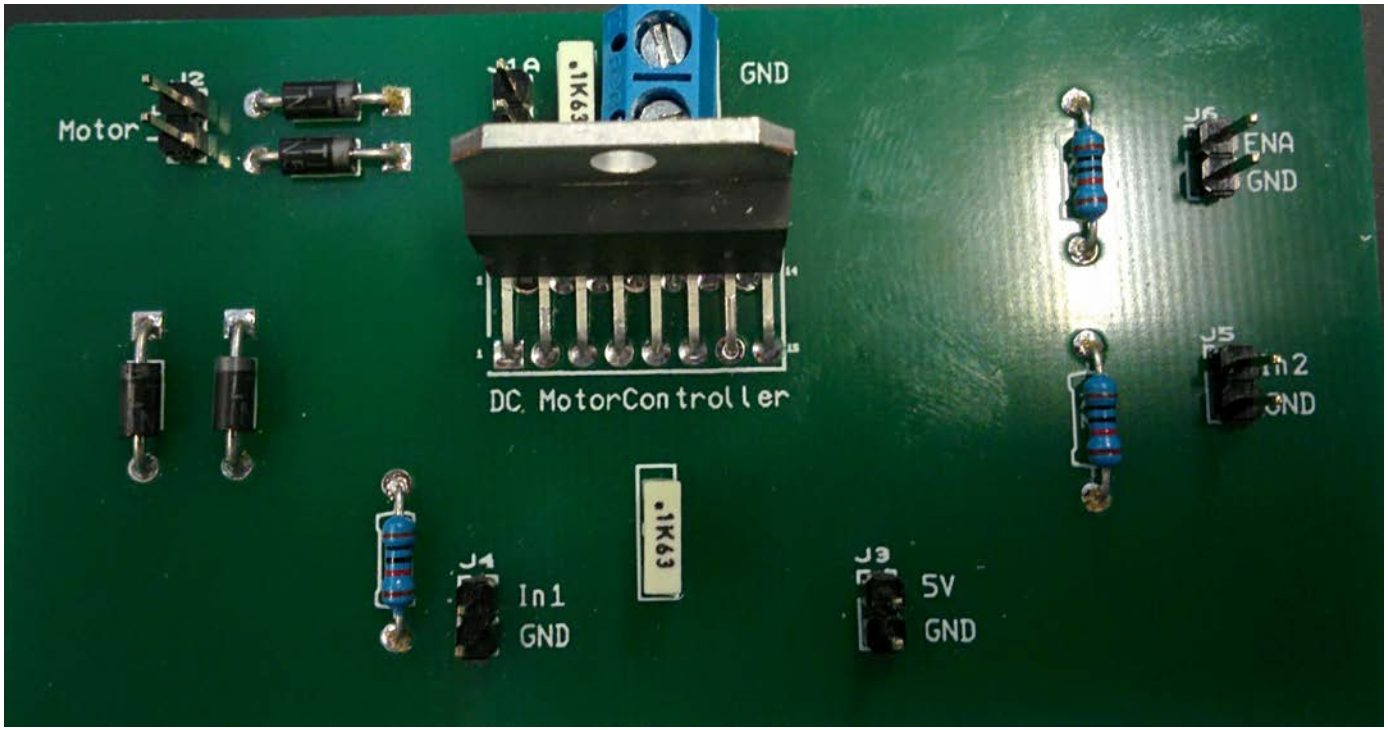
Symbol	Characteristic	Min	Typ	Max	Units	Test Conditions
BV_{DSS}	Drain-Source Breakdown Voltage					
	IRLZ24	60	-	-	V	V_{GS}=0V, I_D=250μA
	IRLZ20	50	-	-	V	
$V_{GS(th)}$	Gate Threshold Voltage	1.0	-	2.0	V	V_{DS}=V_{GS}, I_D=1mA
I_{GSS}	Gate-Source Leakage Forward	-	-	100	nA	V_{GS}=15V
I_{GSS}	Gate-Source Leakage Reverse	-	-	-100	nA	V_{GS}=-15V
I_{DSS}	Zero Gate Voltage Drain Current	-	-	250	μA	V_{DS}=Max. Rating, V_{GS}=0V
		-	-	1000	μA	V_{DS}=0.8 Max. Rating, V_{GS}=0V, T_C=125°C
$R_{DS(on)}$	Static Drain-Source On-Resistance(2)	-	-	0.15	Ω	V_{GS}=5.0V, I_D=7A
g_{fs}	Forward Transconductance (2)	2.0	-	-	℧	V_{DS}≥15V, I_D=7A

- There are two revisions of the MOSFET PCB. On the new revision of the PCB, the IRLZ24 is replaced by IRLZ44.
- For IRLZ44, the gate-threshold voltage can be up to 3V.
- So the PSoC shall use 5V logic, i.e. no modifications on the PSoC and set output to strong drive (the default).

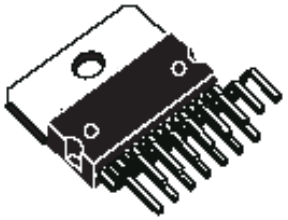
MOS FET driver (LAB)



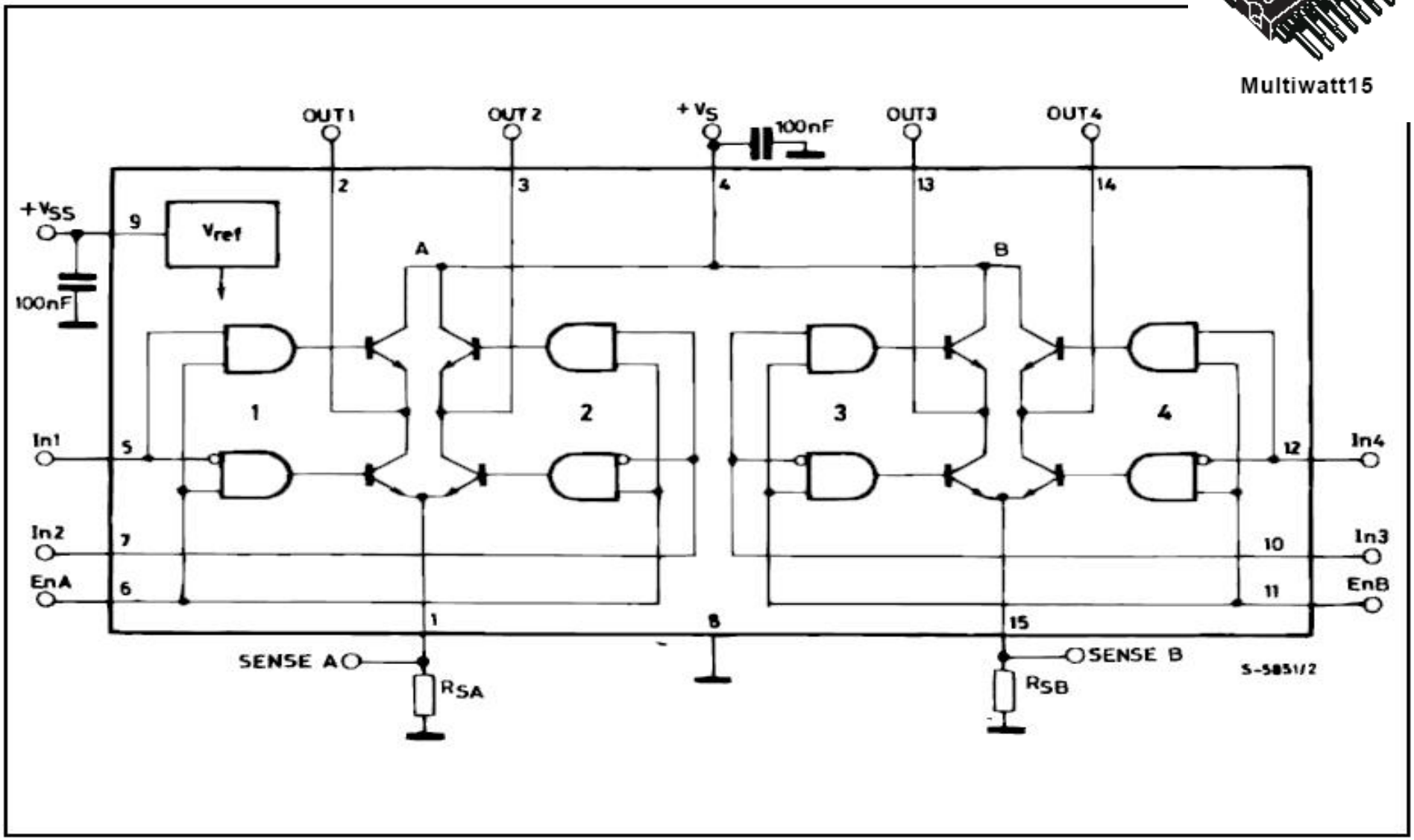
L298 PCB



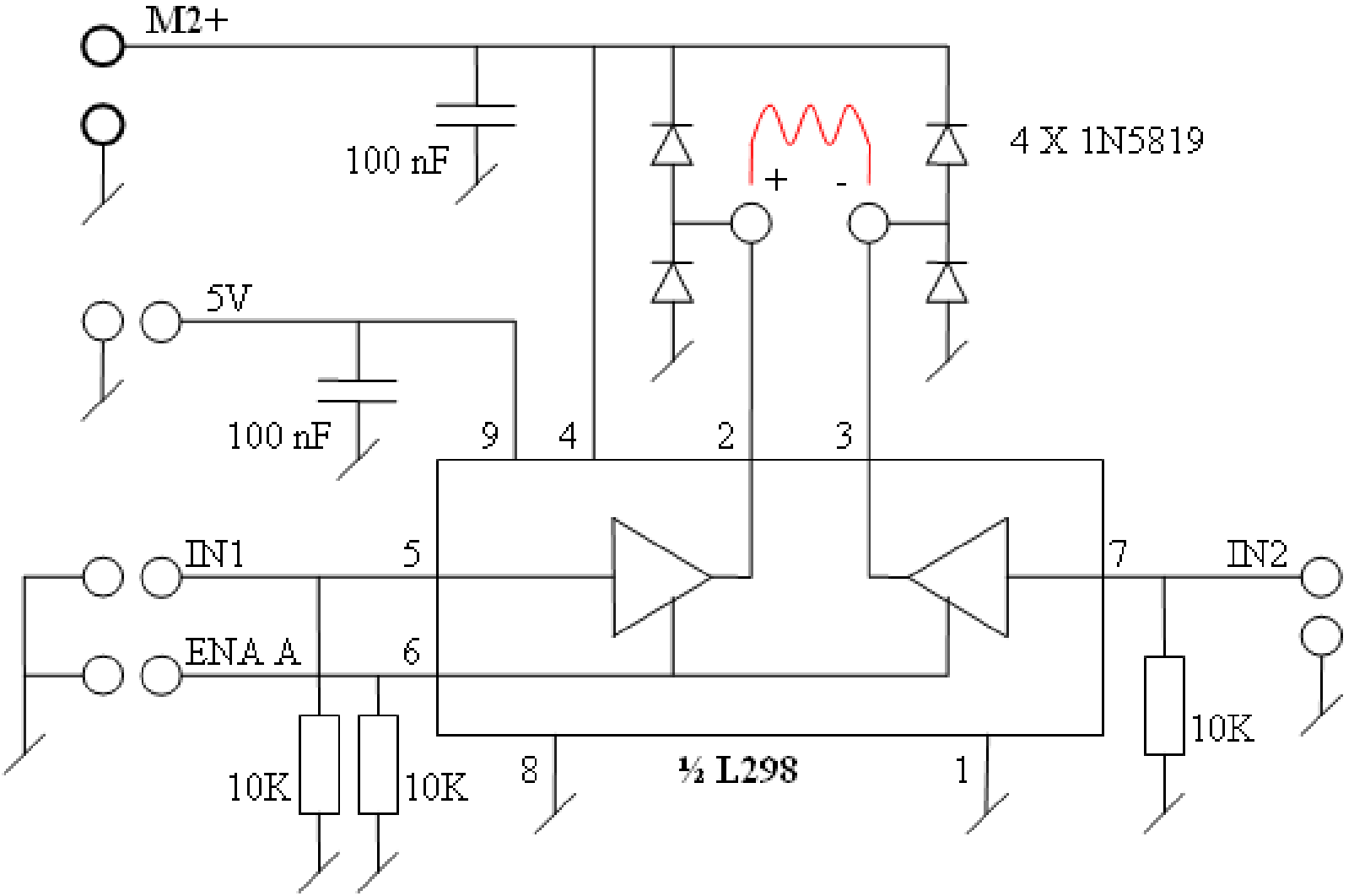
L298: Dual Full Bridge Driver



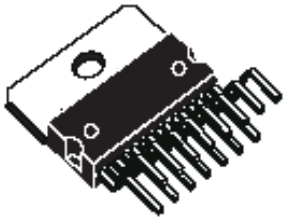
Multiwatt15

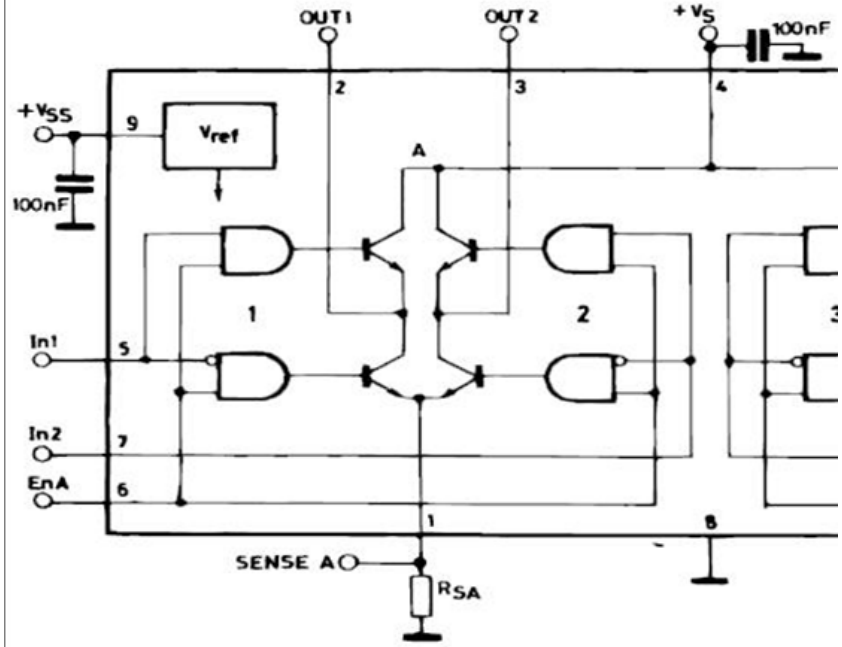


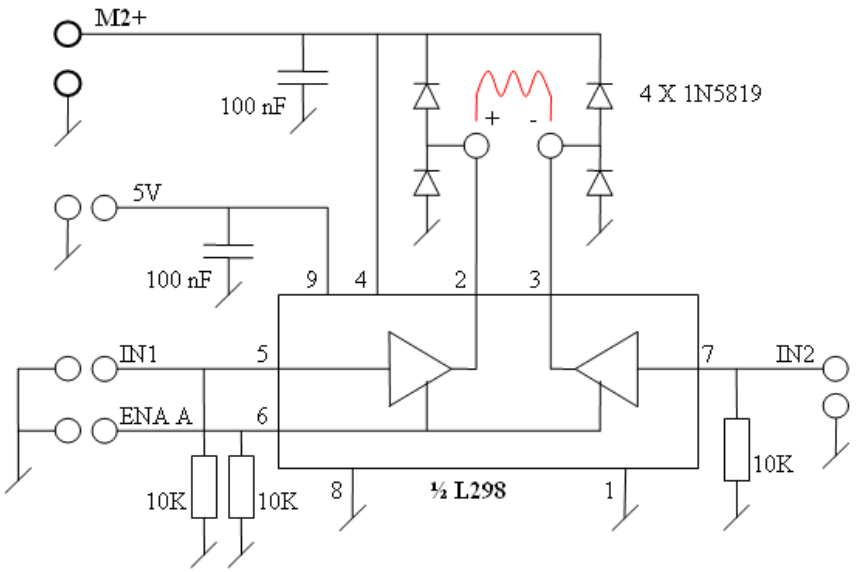
Lab H-Bridge


M2+
100 nF
4 X 1N5819
+
-
5V
100 nF
9
4
2
3
IN1
5
7
IN2
ENA A
6
10K
10K
8
½ L298
1
10K

L298: Dual Full Bridge Driver







PSoC project on blackboard

- You can use the provided PSoC project on blackboard as a starting point.
- It has a UART and a PWM component.

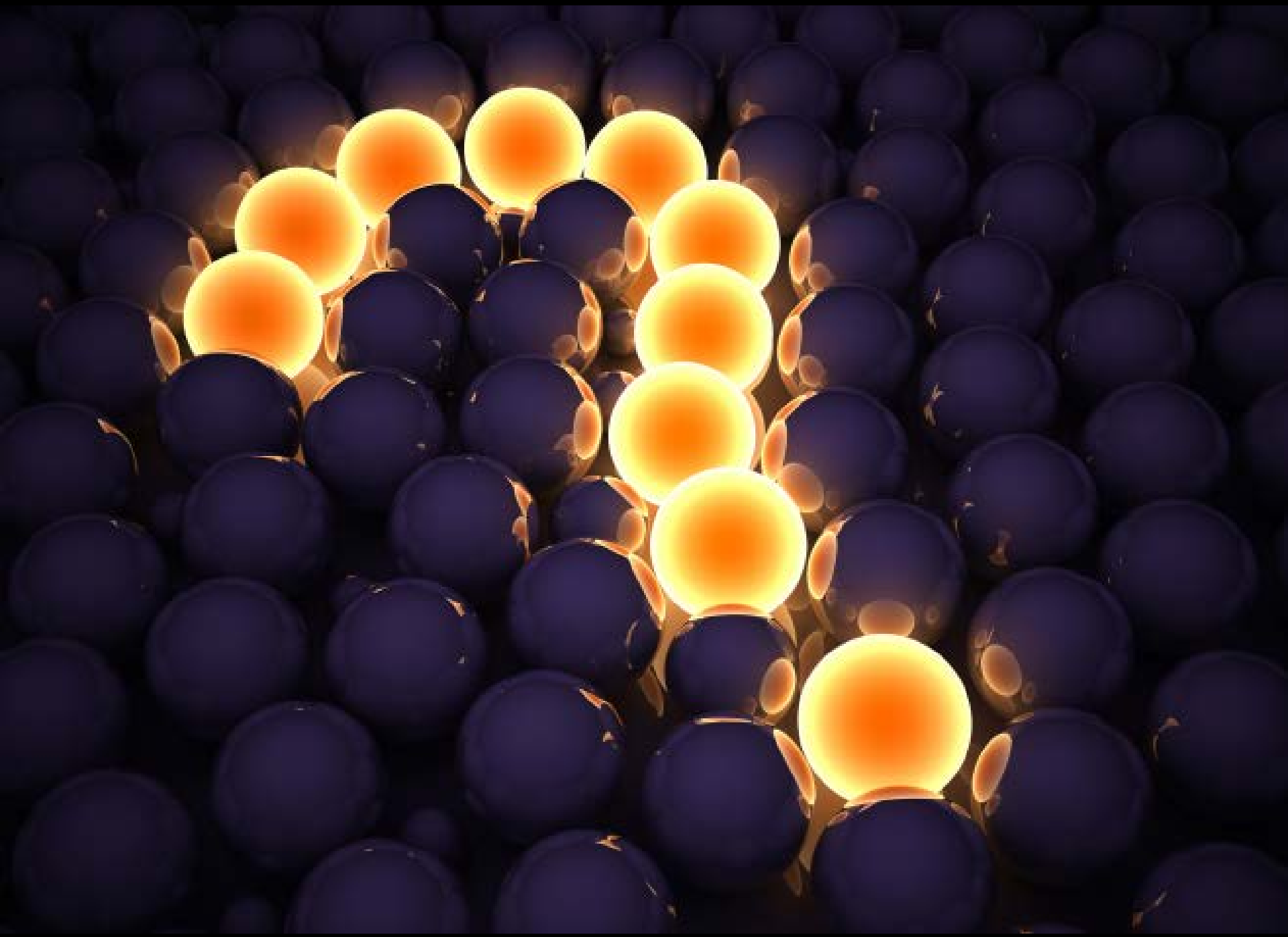


Image resources

- Question mark: https://wall.alphacoders.com/big.php?i=437563