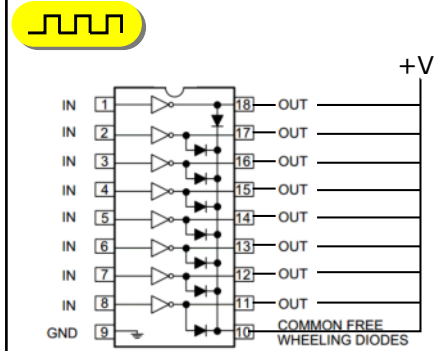


# INTERFACE

## 8 Darlington Driver IC

Diagram:



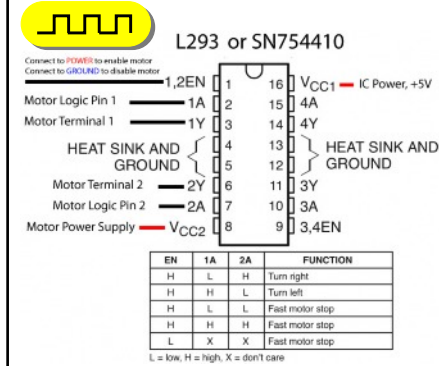
**Function:**  
A Darlington Driver is a chip that contains 8 individual drivers each driver can control up to 500mA max, and the +V can be any voltage up to 36V, normally 5V to 9V for motors etc.

**ULN2803A** - 8 drivers

# INTERFACE

## H-Bridge Motor driver

Diagram:



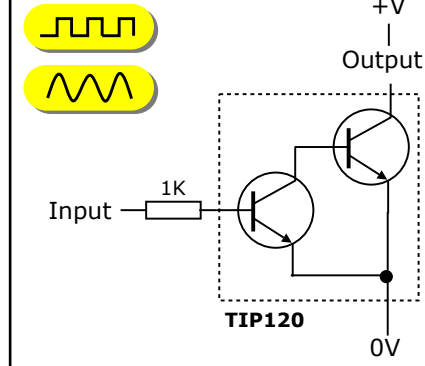
**Function:**  
This type of motor driver gives bi-directional control, a single chip can control 2 motors - ideal for a Robot or other type vehicle. Connections 3 & 4 for 2<sup>nd</sup> motor.

**L293D** can control 300mA per motor, the **SN754410** can control 600mA per motor

# INTERFACE

## Darlington Driver

Diagram:



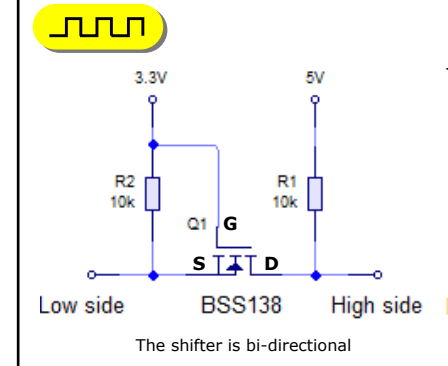
**Function:**  
If the output is too small to drive motors and other current hungry devices. The solution is to use a Darlington Driver, which is a special transistor made up from two transistor all in one package.

If you need more than 1 or 2, it is better to use a Darlington Driver IC **ULN28003A** or **ULN2003A**.

# INTERFACE

## 3.3V <> 5V Level shifter

Diagram:

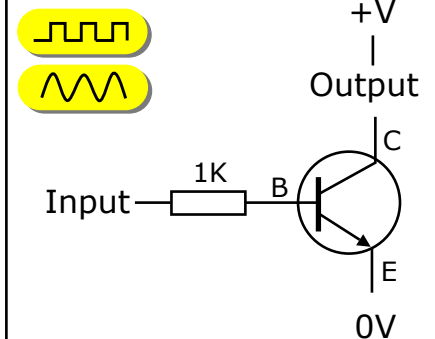


**Function:**  
Microcontrollers use 3.3V or 5V, some devices we use with them only work with 3.3V or 5V, which can be different to their normal supply. To overcome this problem a level shifter is used. The 3.3V input or output is connected to the **low side**, whilst a 5V input or output is connected to the **high side**.  
The shifter is bi-directional

# INTERFACE

## NPN Transistor driver

Diagram:



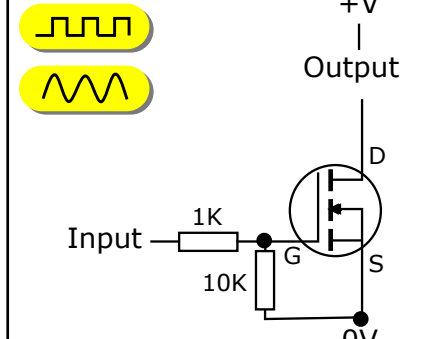
**Function:**  
When the input is less than 0.7V the output is off. The output is on when the input is greater than 0.7V.

The max current that flows is determined by the transistor type. **BC548B** is 300mA, **BC337** is 800mA

# INTERFACE

## N MOSFET Transistor driver

Diagram:



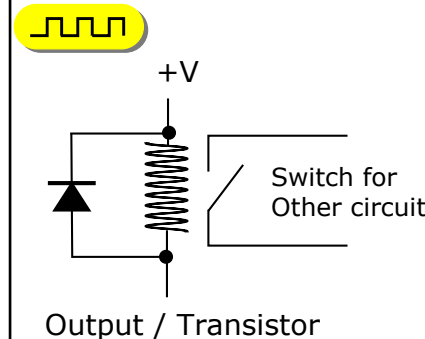
**Function:**  
When the input is less than 3V the output is off. The output is on when the input is greater than 3V.

The max current that flows is determined by the transistor type. **BS170** is 500mA, **ZVN4206A** is 1A

# INTERFACE

## Relay

Diagram:

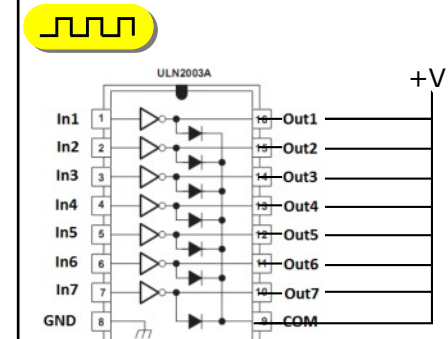


**Function:**  
The relay coil when energised cause the switch contact to close, operating the circuit connect to the relay switch contacts. They are used to control high current / voltage circuits from a low voltage / current system.

# INTERFACE

## 7 Darlington Driver IC

Diagram:



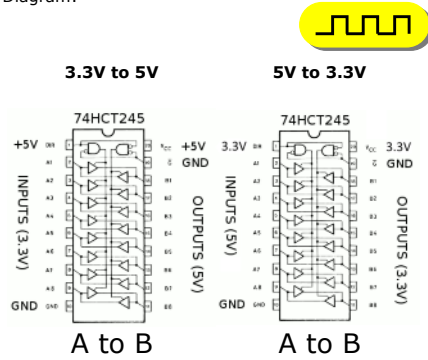
**Function:**  
A Darlington Driver is a chip that contains 7 individual drivers each driver can control up to 500mA max, and the +V can be any voltage up to 36V, normally 5V to 9V for motors etc.

**ULN2003A** - 7 drivers

# INTERFACE

## Octal level shifter

Diagram:



Function:

If you need to level shift a number of connections, a better solution is to use a 74HCT245 octal transceiver / buffer, all the input and outputs are grouped on each side of the chip. If you need it to work in the opposite direction B to A, then make the DIR pin (pin 1) = 0V, will swap the inputs & outputs.

# INTERFACE

Diagram:

Function:

# INTERFACE

## N MOSFET Power Driver

Diagram:

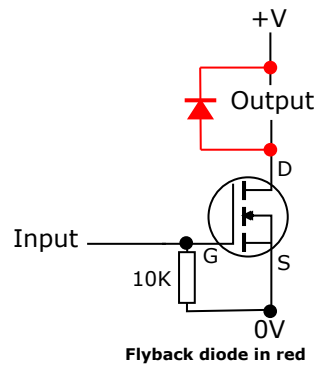
**Note**

IRF510 5.6A  
IRF530 8A  
IRF540 14A

**Pinout**



Same for all 3



Function:

To drive high current output devices the best method is to use a high power N MOSFET. If your output device is electromagnetic, such as a motor you will need to fit the 'flyback' diode to protect the transistor against the large back emf voltage produced when the motor etc is turned off.

# INTERFACE

Diagram:

Function:

# INTERFACE

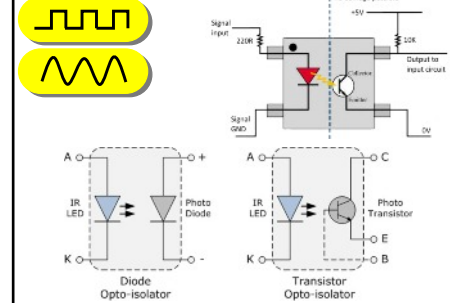
Diagram:

Function:

# INTERFACE

## Opto-isolator

Diagram:



**Note:** use the output with a pull-up or pull-down resistor to create a suitable signal for an input, can be digital or analog.

Function:

An opto isolator is used to connect one circuit to another without actually being connected electrically. They can be used as an input as well as an out system. The input is usually an LED and the output is usually a photo transistor, which is used to operate an appropriate input.

# INTERFACE

Diagram:

Function:

# INTERFACE

Diagram:

Function: