

Informática industrial: entrada y salida digital

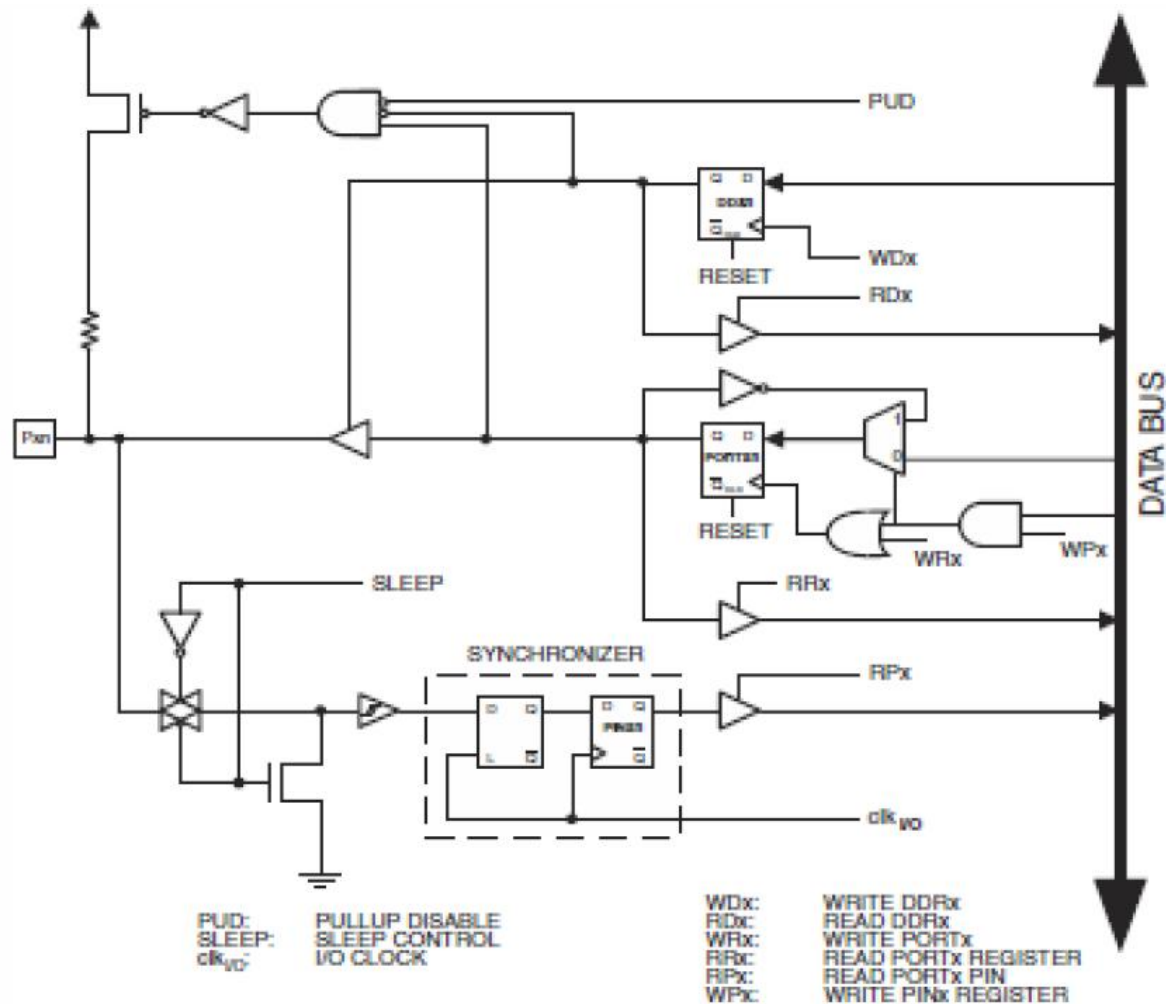
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jzamora@fi.upm.es

D-4202

DATSI/UPM

Atmel AVR ATmega32U4 digital I/O pin

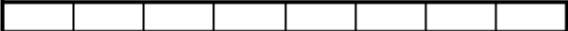


Note: 1. WR_x, WP_x, WD_x, RR_x, RP_x, and RD_x are common to all pins within the same port. clk_{I/O}, SLEEP, and PUD are common to all ports.

Atmel AVR ATmega32U4 digital I/O ports

Puerto(x)

DDR(x)



PORT(x)



PIN(x)



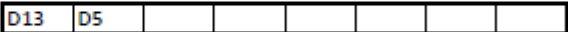
D0	PD2
D1	PD3
D2	PD1
D3	PD0
D4	PD4
D5	PC6
D6	PD7
D7	PE6
D8	PB4
D9	PB5
D10	PB6
D11	PB7
D12	PD6
D13	PC7

A0	PF7
A1	PF6
A2	PF5
A3	PF4
A4	PF1
A5	PF0

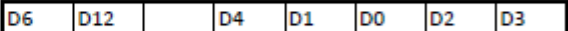
PORTB



PORTC



PORTD



PORTE



AINO

PORTF



ADC7 ADC6 ADC5 ADC4

ADC1 ADC0

```
pinMode(pin, OUTPUT);
```

```
INPUT, OUTPUT, INPUT_PULLUP
```

```
DDRB |= (1 << bit)
```

```
digitalWrite(pin, LOW);
```

```
HIGH, LOW
```

```
PORTB &= ~(1 << bit);
```

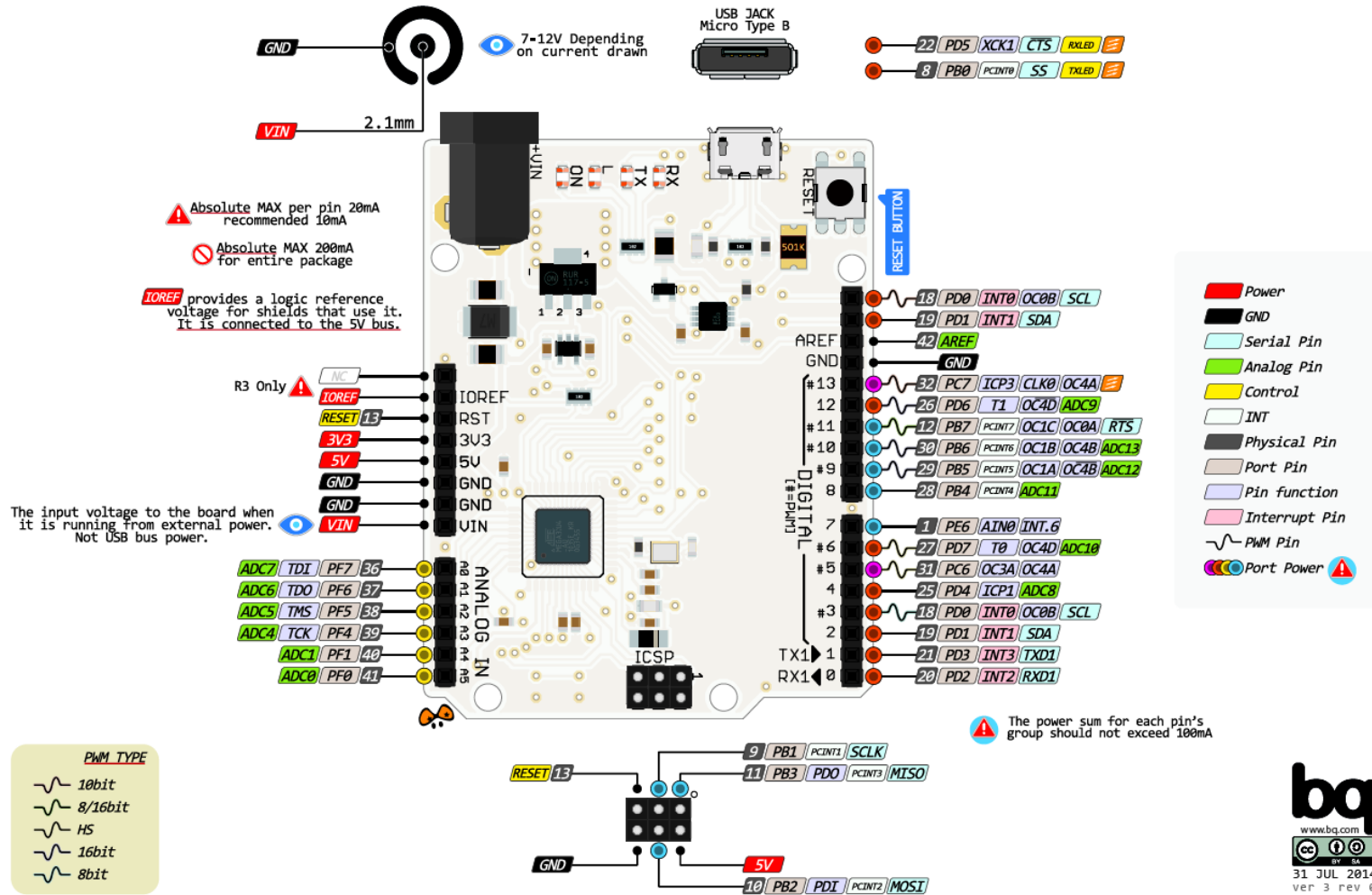
```
val = digitalRead(pin);
```

```
HIGH, LOW
```

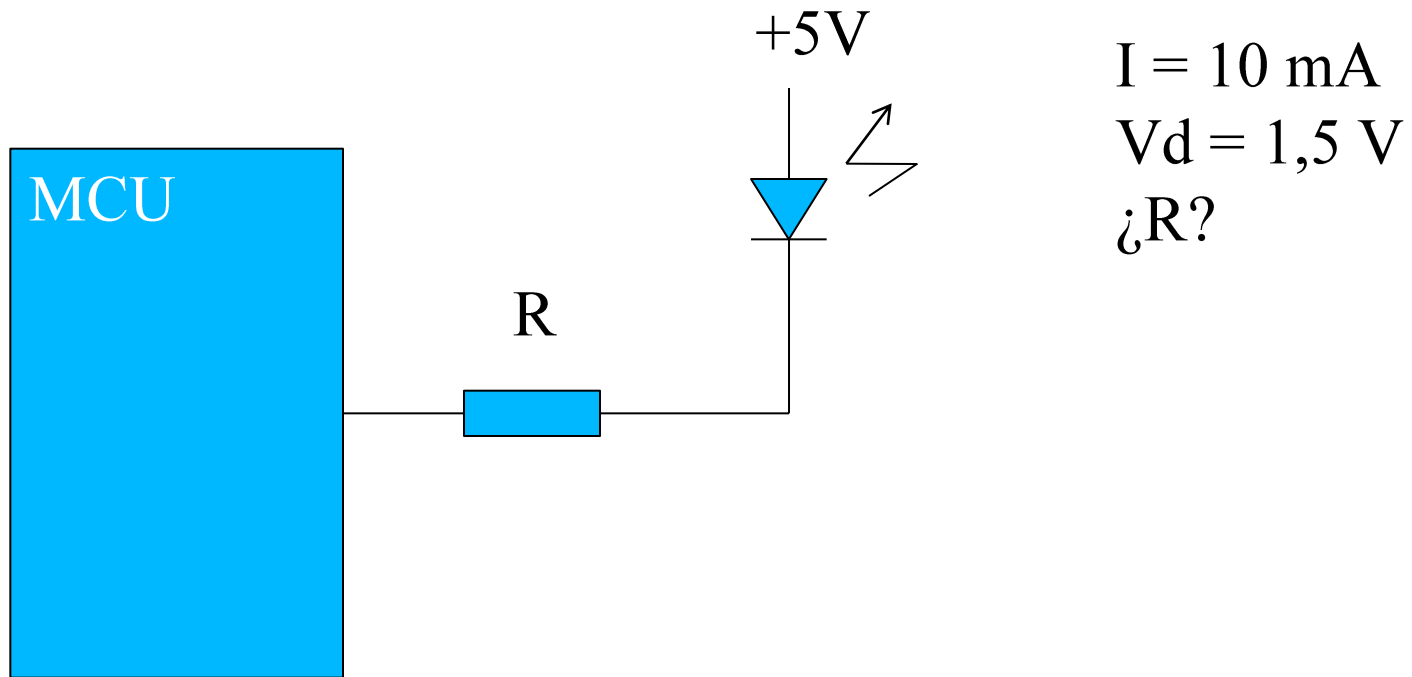
```
val = PINB & (1 << bit);
```

Arduino Leonardo

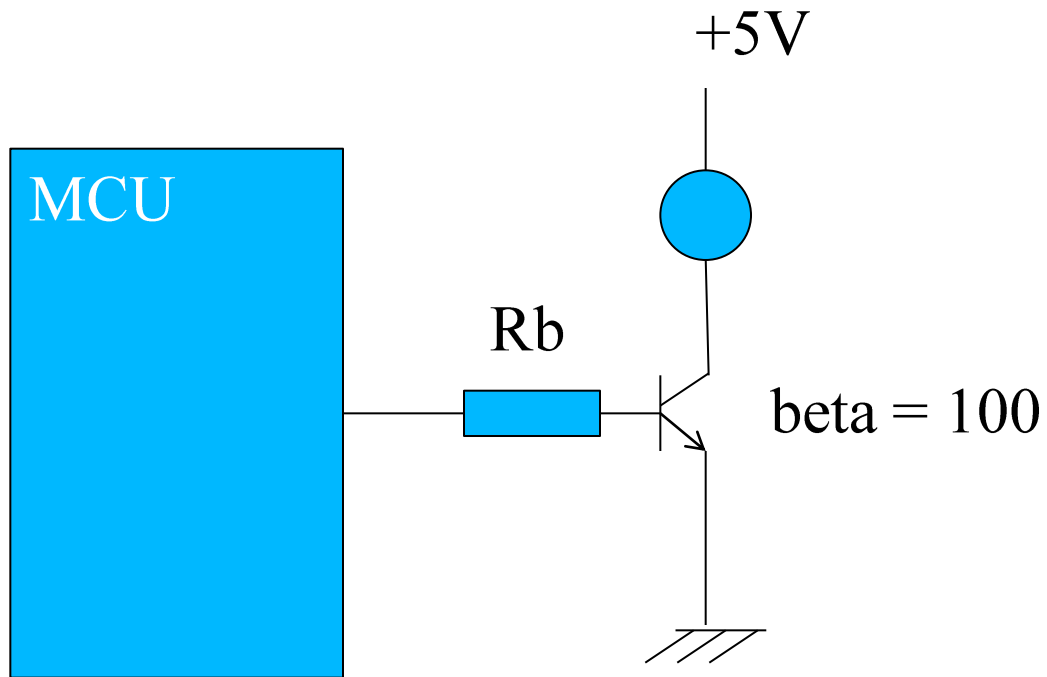
LEONARDO PINOUT



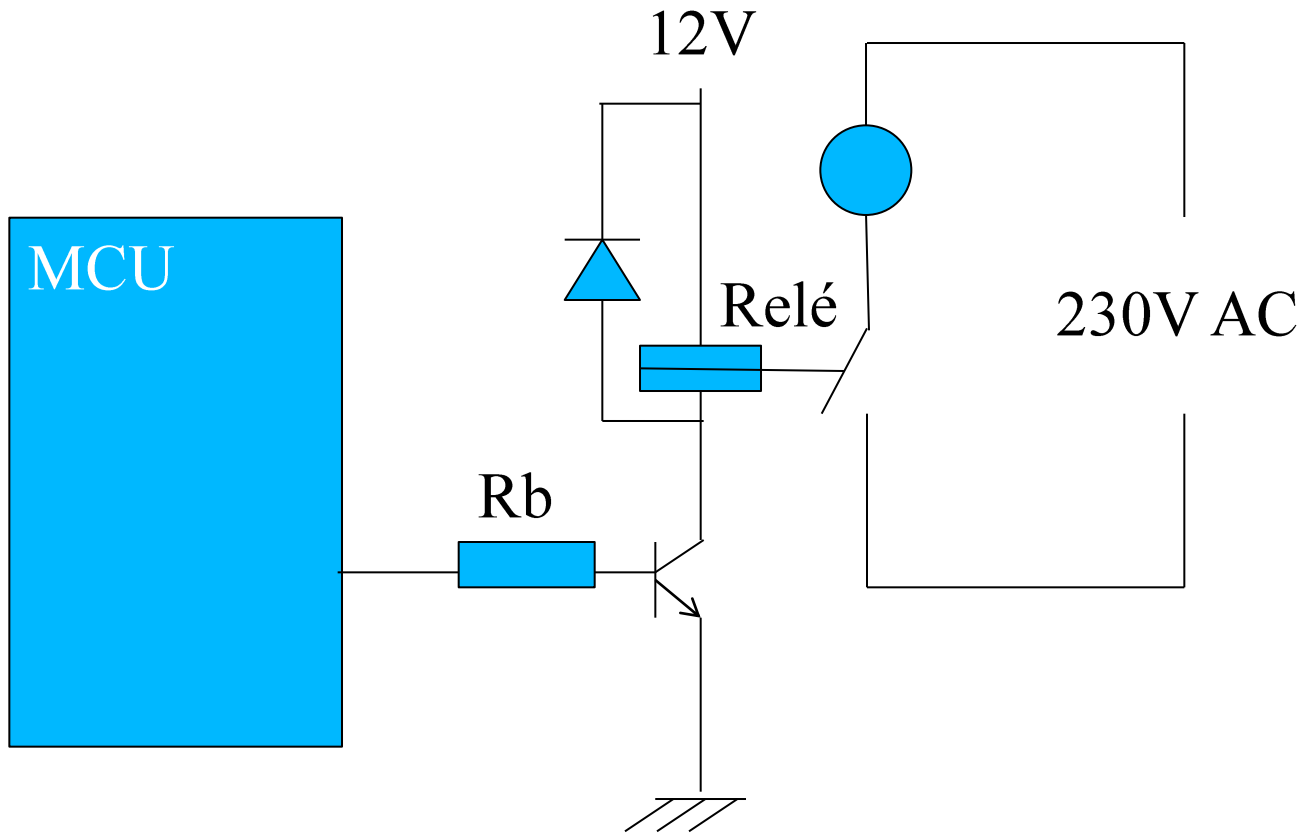
I/O pin con diodo LED



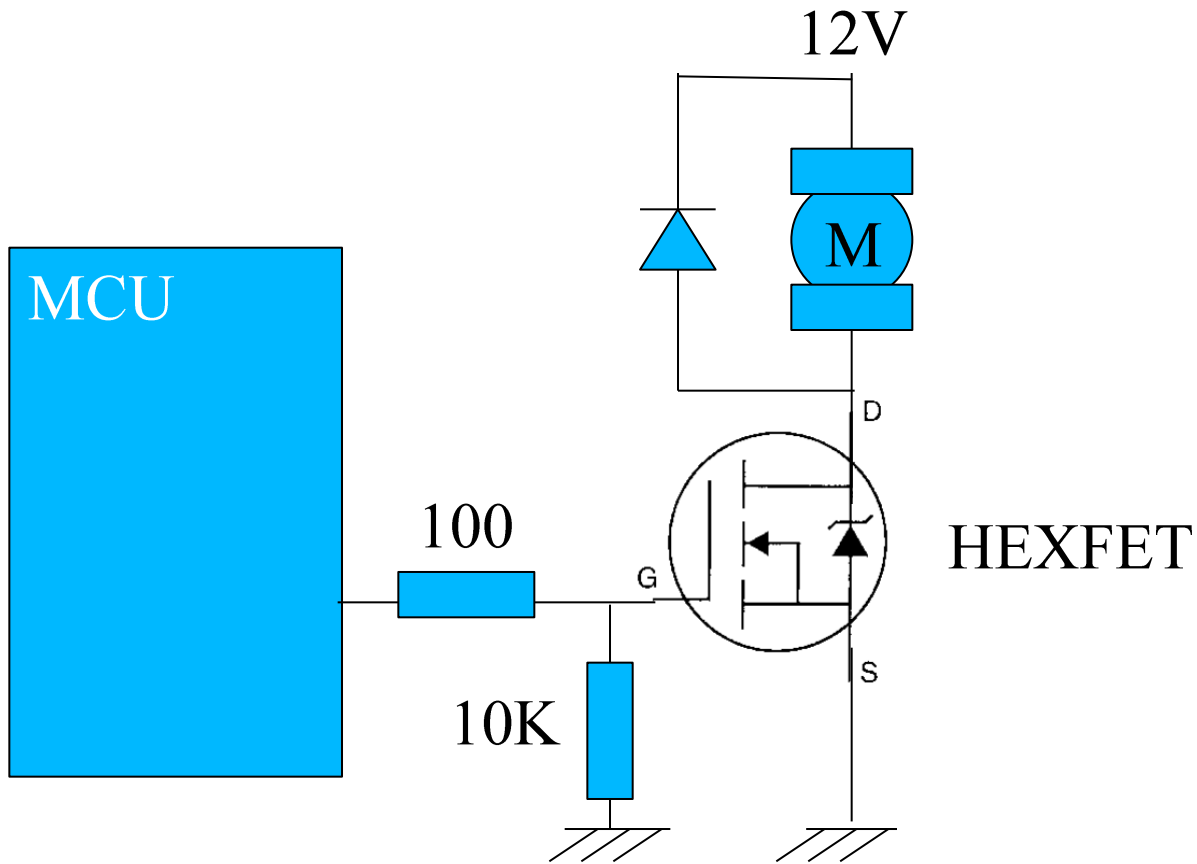
I/O pin con bombilla 5V DC 0.75 W



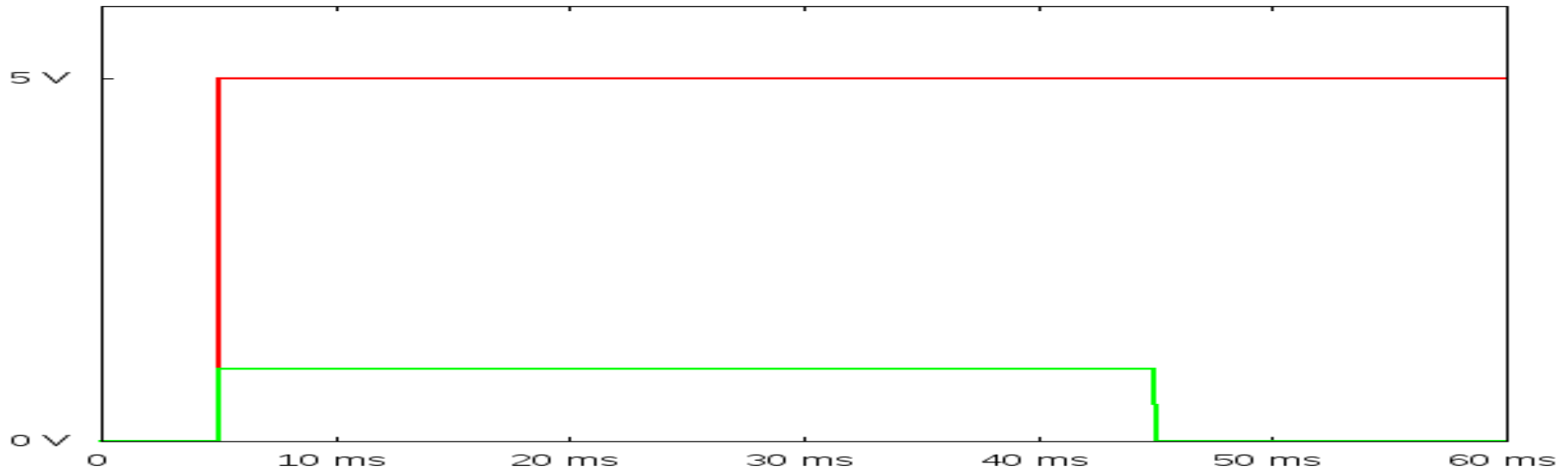
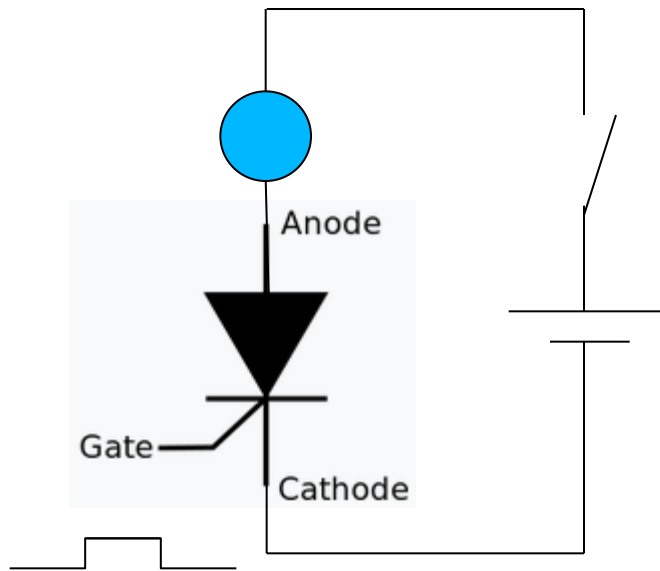
I/O pin con bombilla 230V AC 100 W



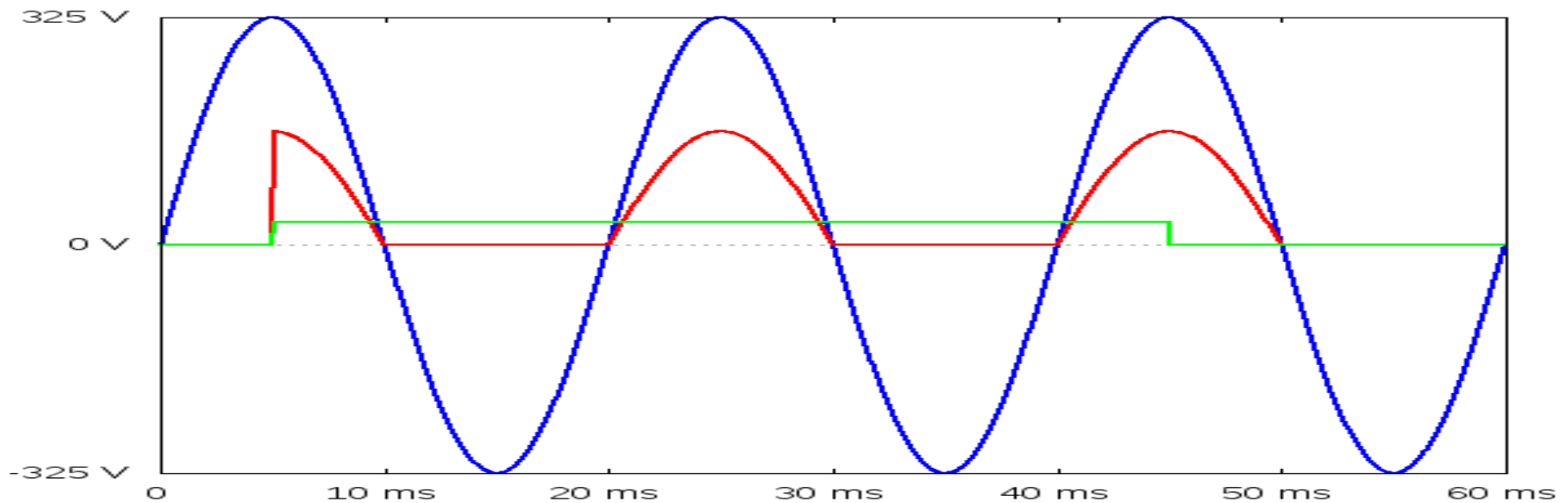
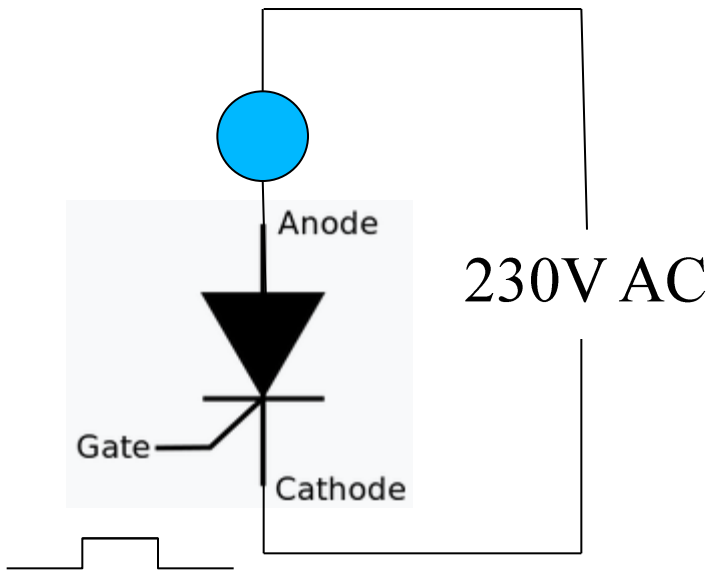
I/O pin con motor de 12 V DC 50W



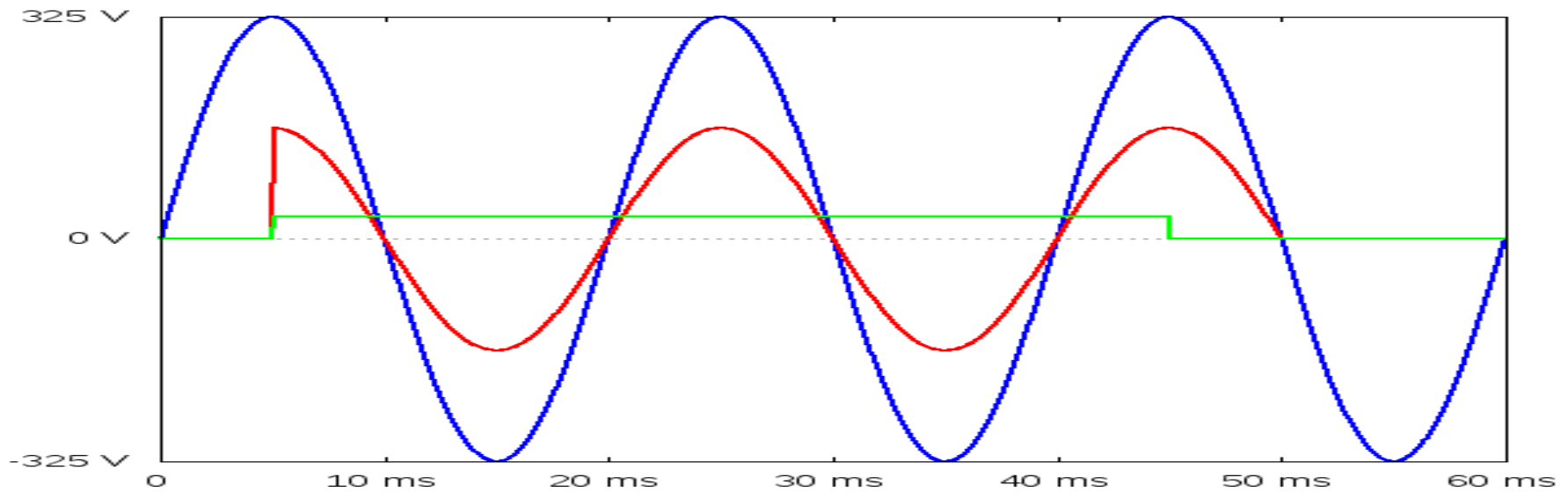
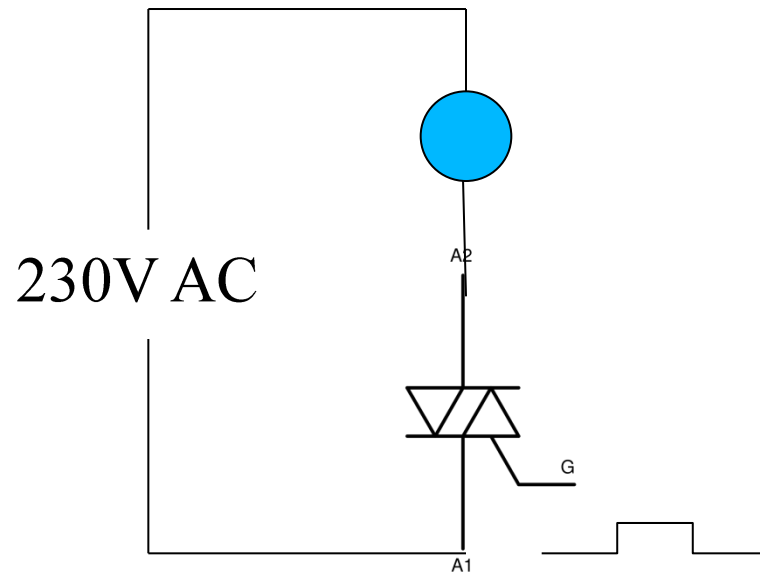
Control de potencia: tiristor con DC



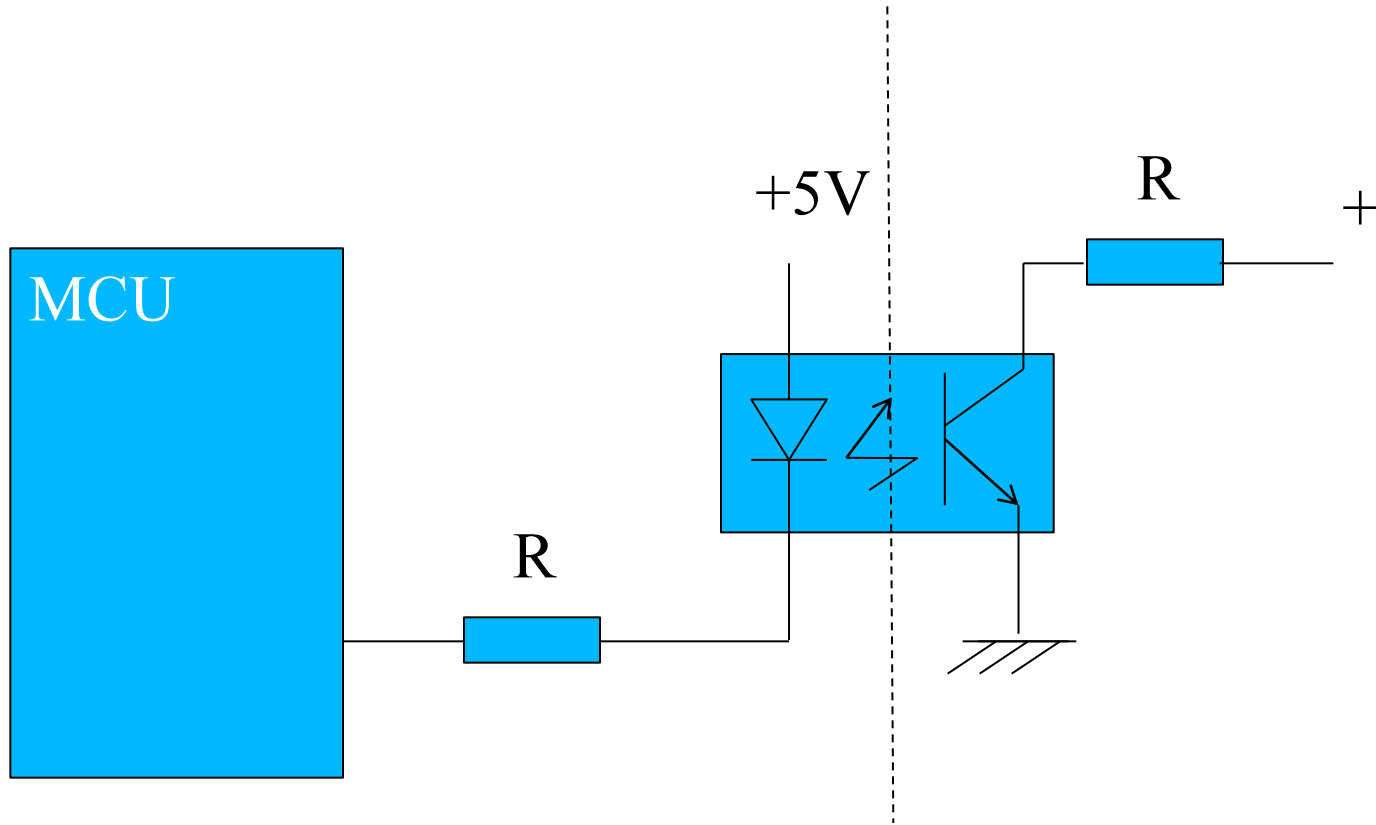
Control de potencia: tiristor con AC



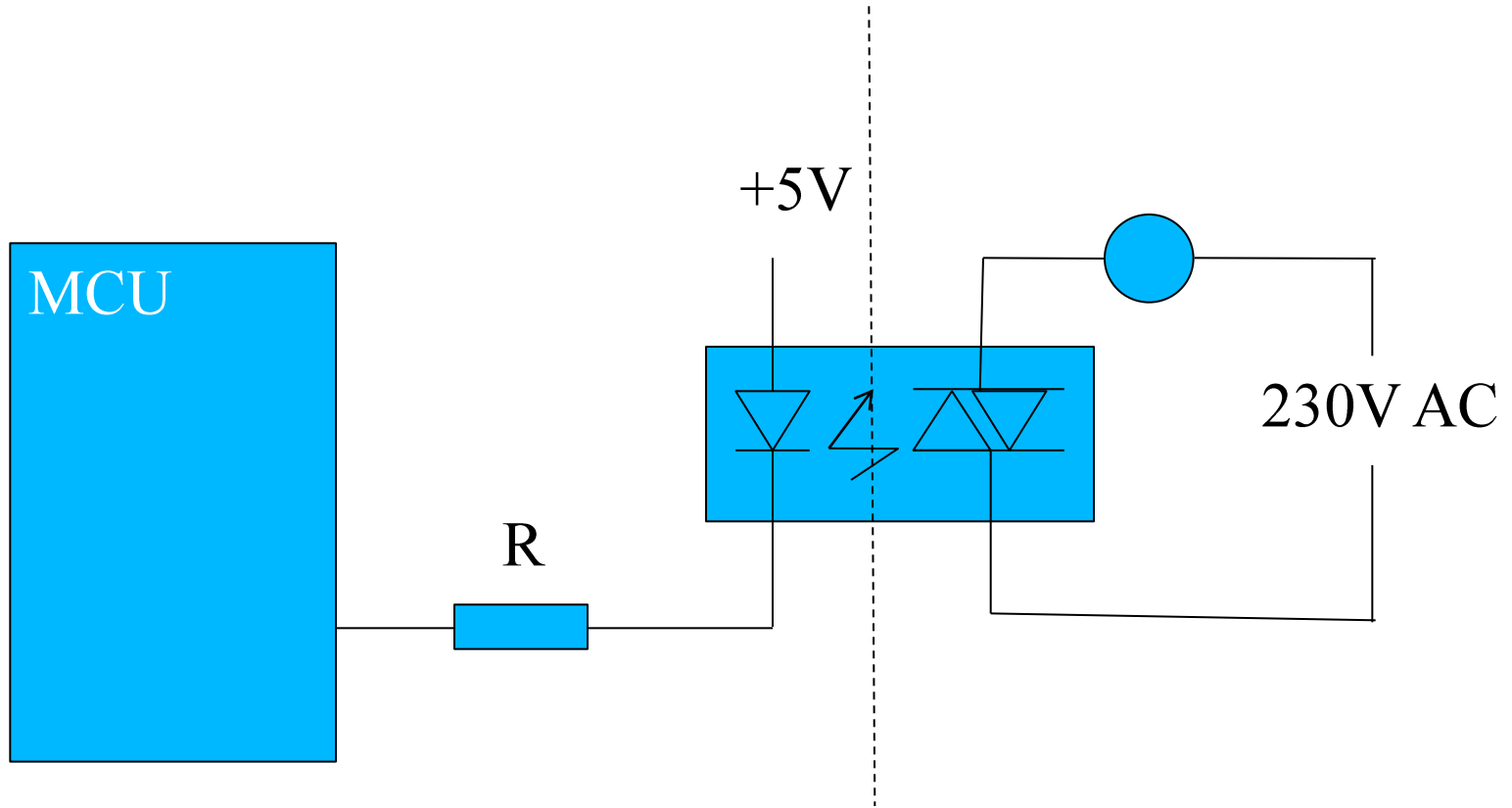
Control de potencia: TRIAC



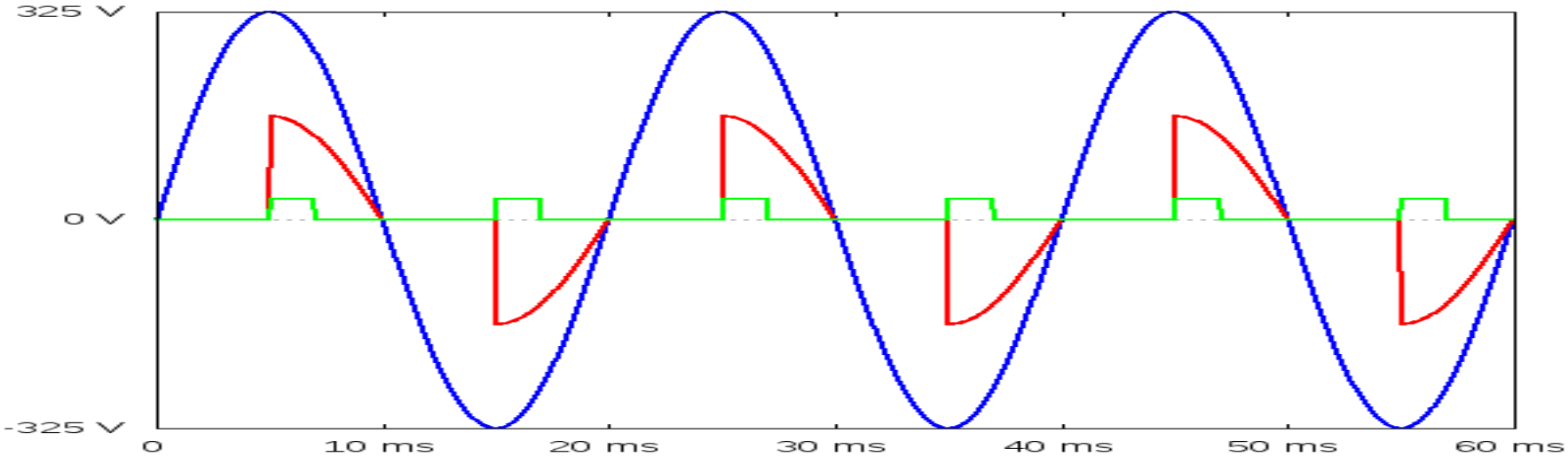
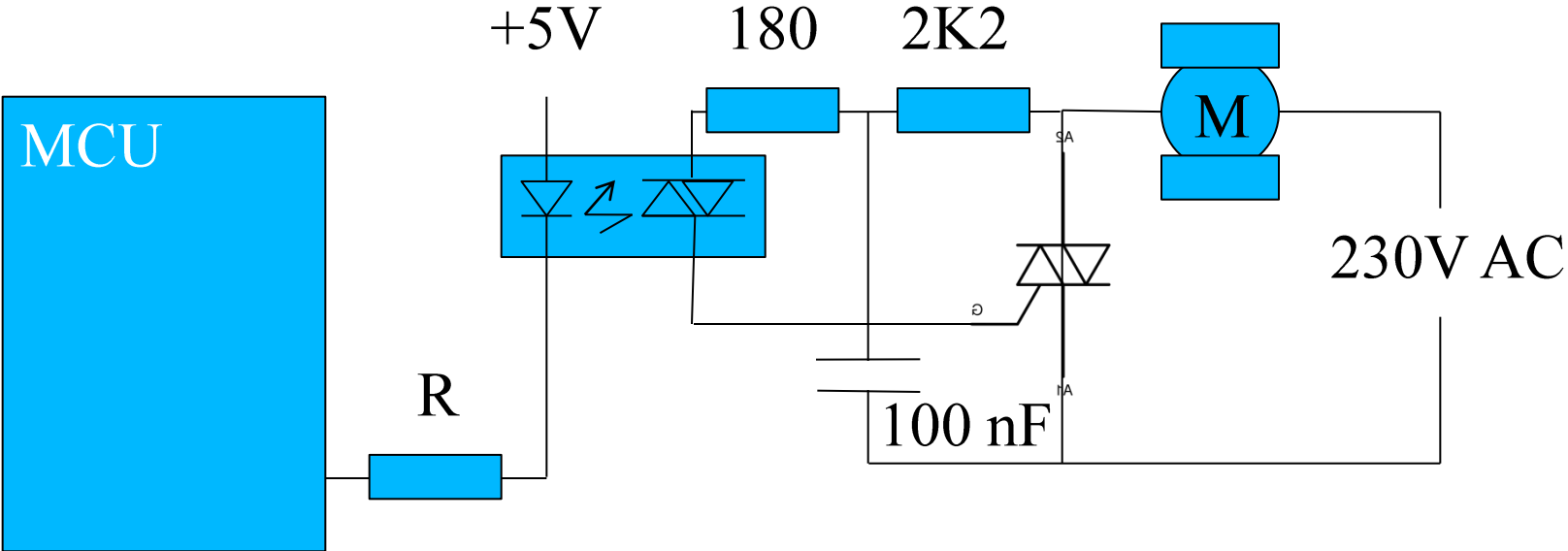
Aislamiento mediante optoacoplador



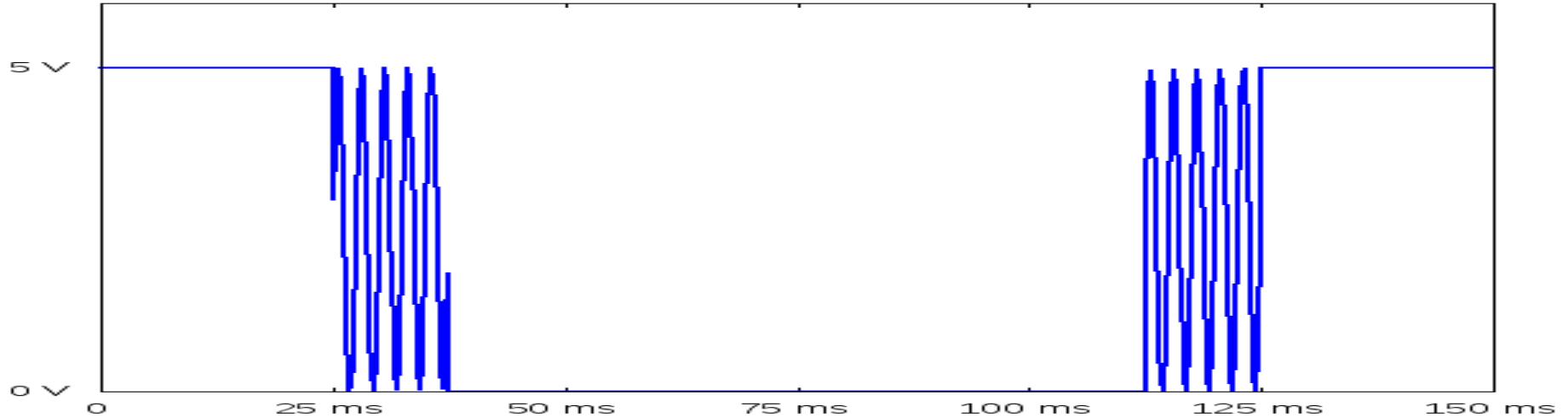
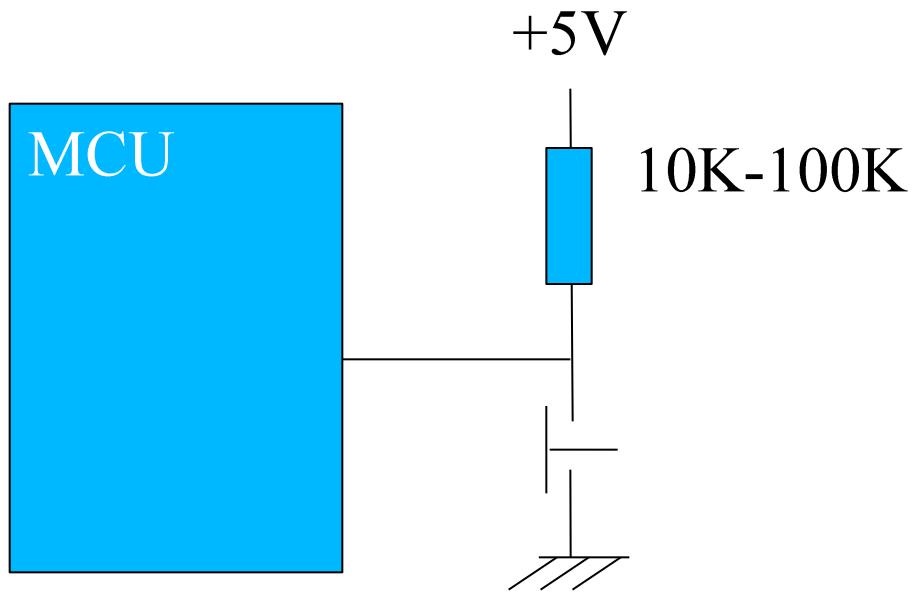
Aislamiento mediante optoTRIAC



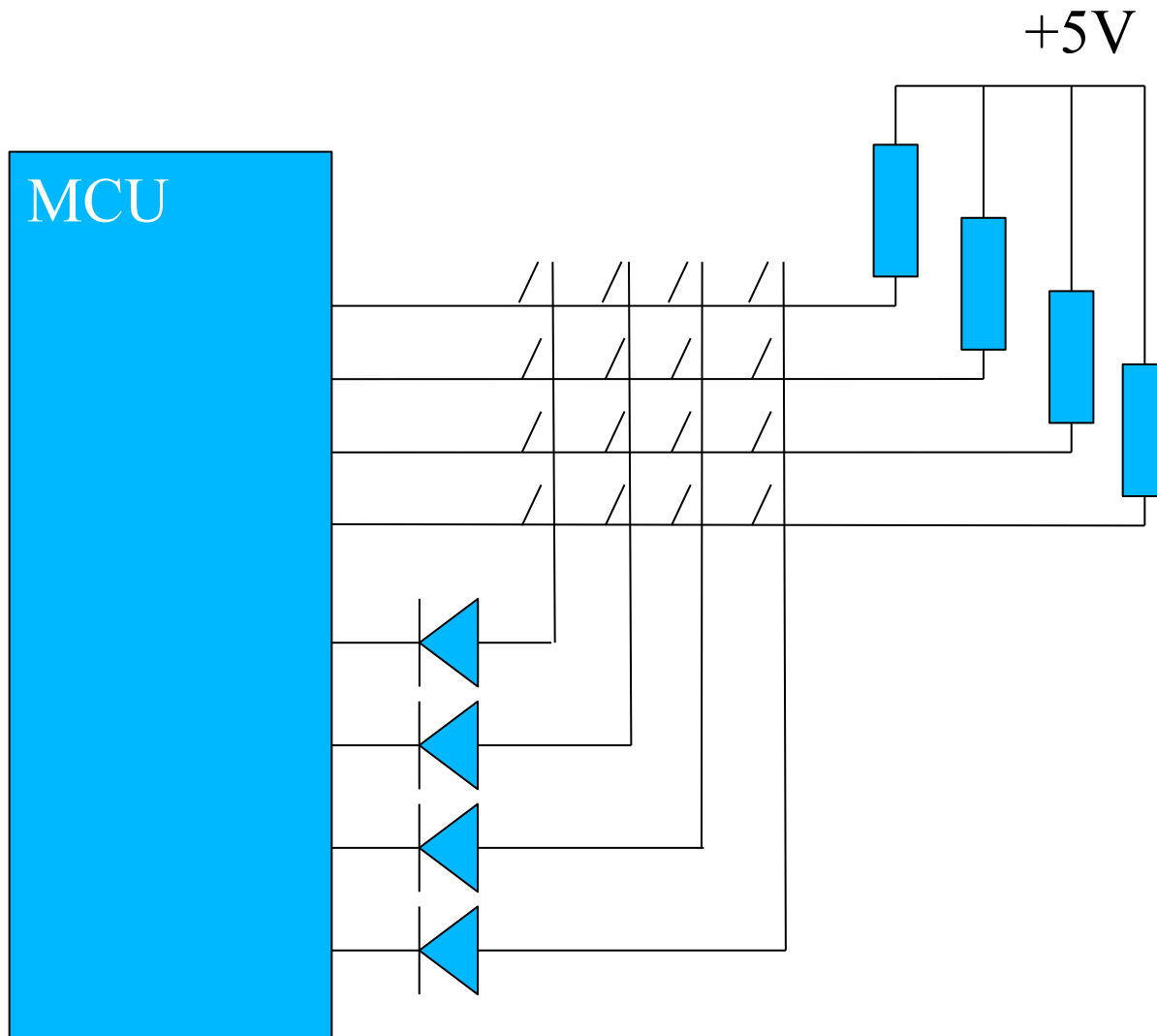
Control de potencia 230 V AC con TRIAC y snubber



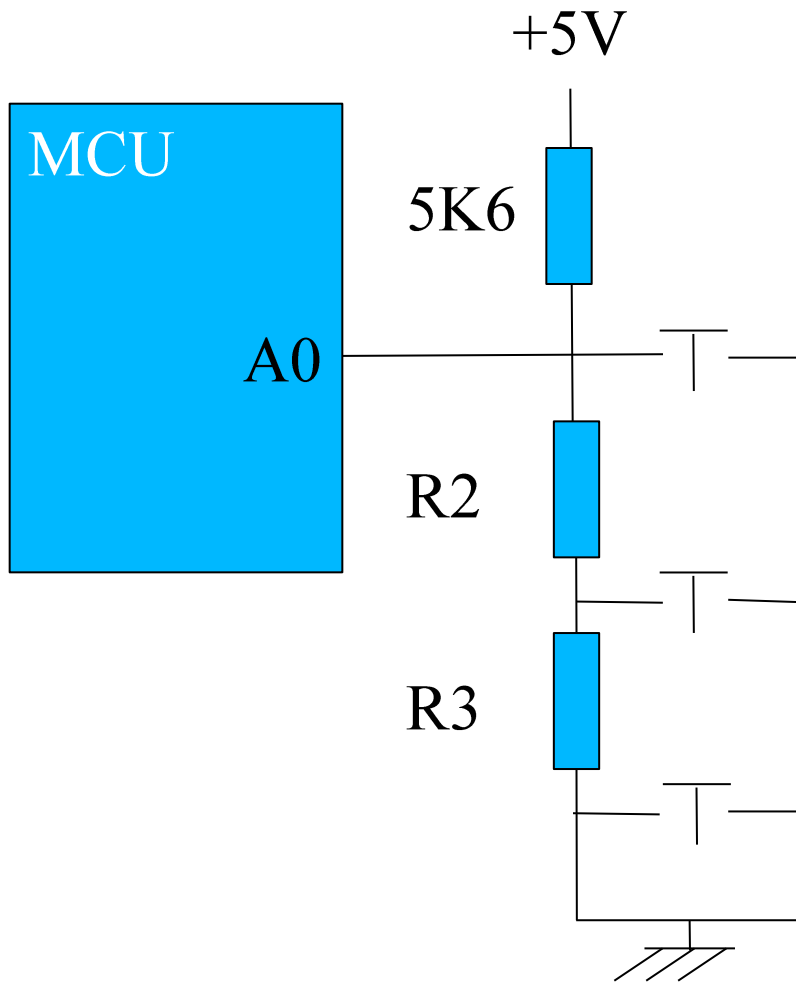
Entrada pasiva: pulsador



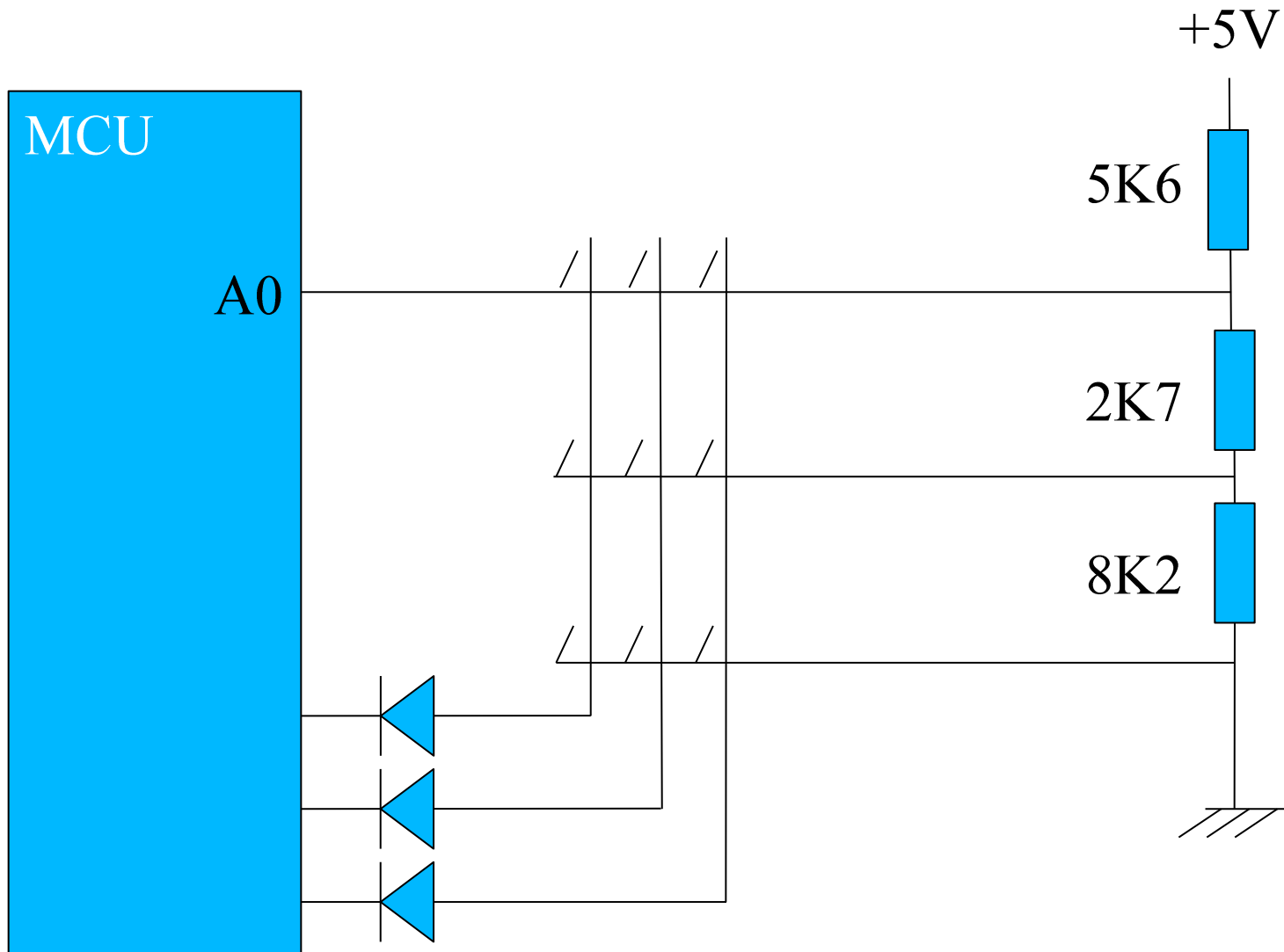
Entrada pasiva: teclado digital



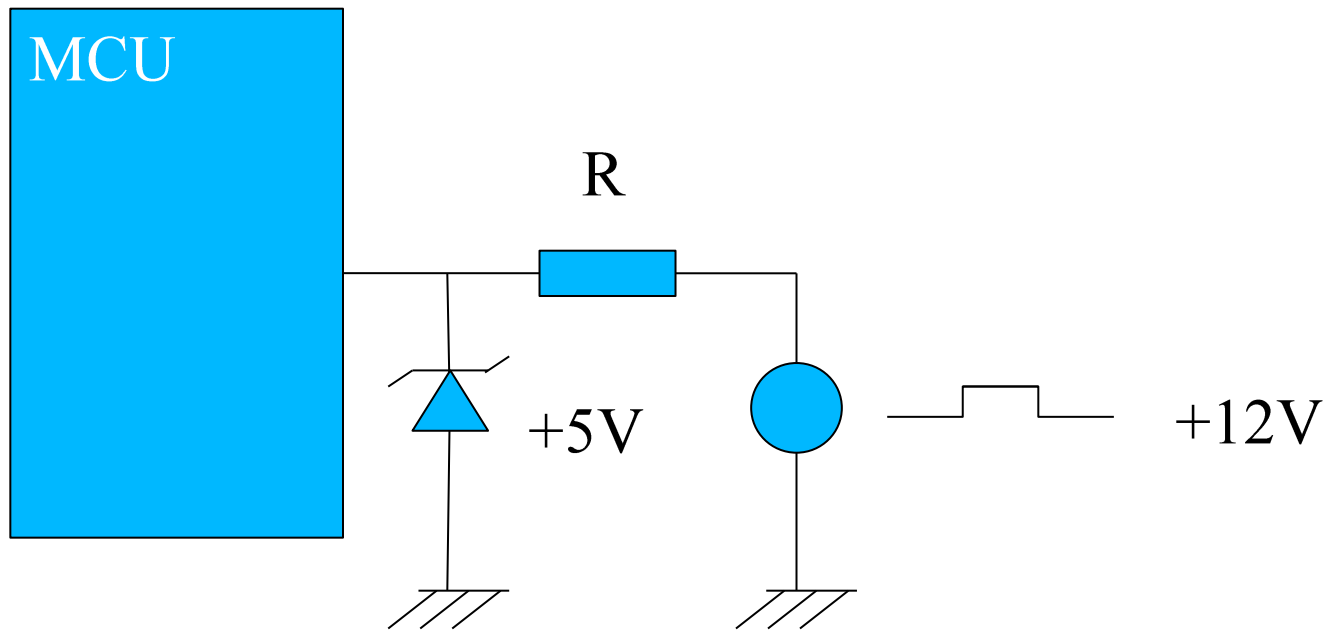
Entrada pasiva: teclado analógico



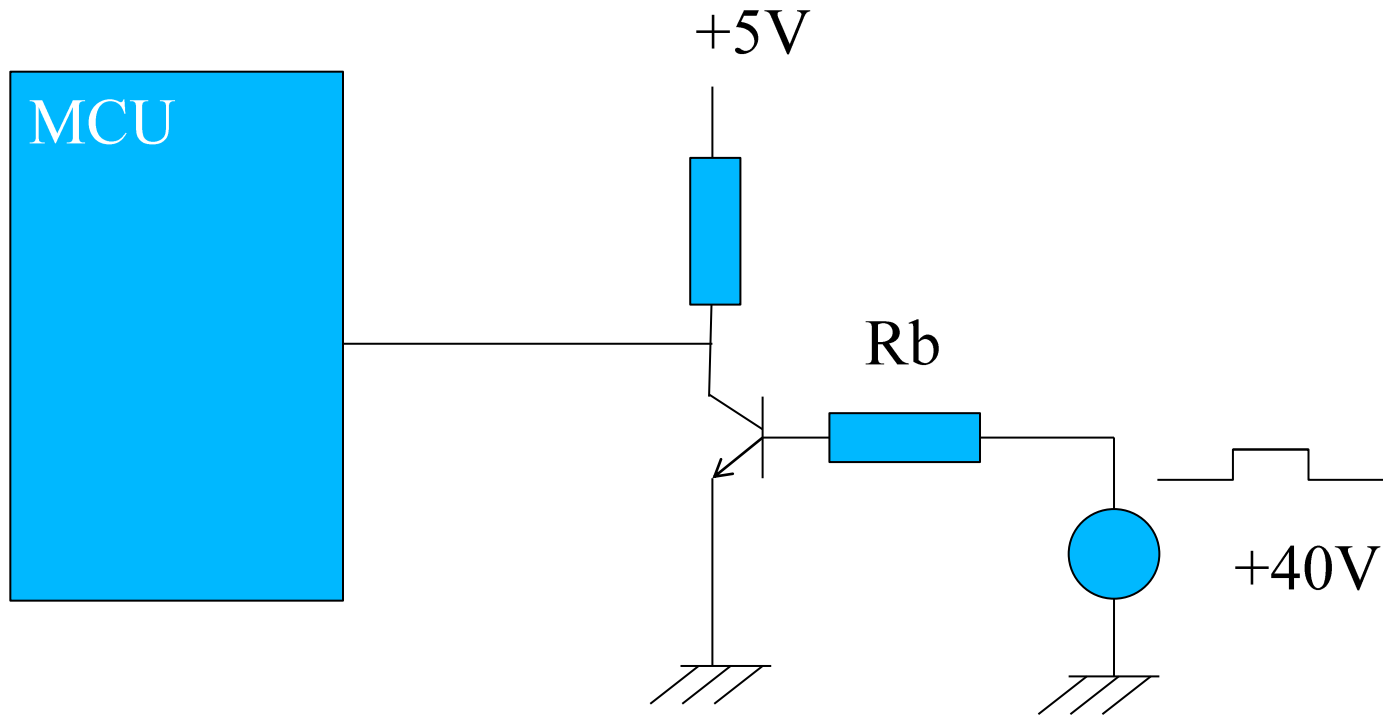
Entrada pasiva: teclado analógico



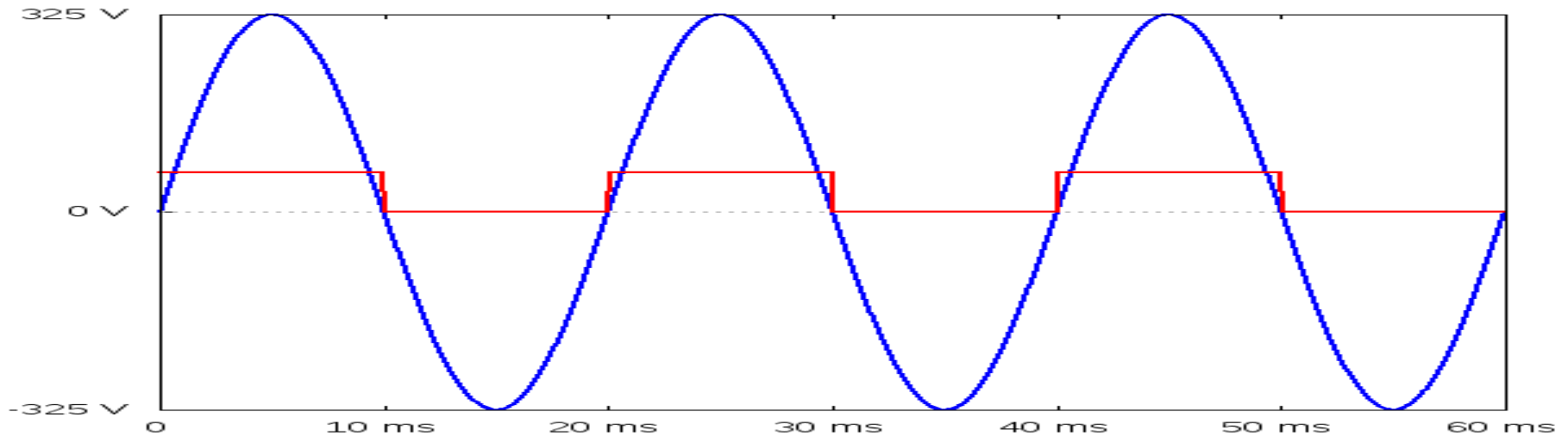
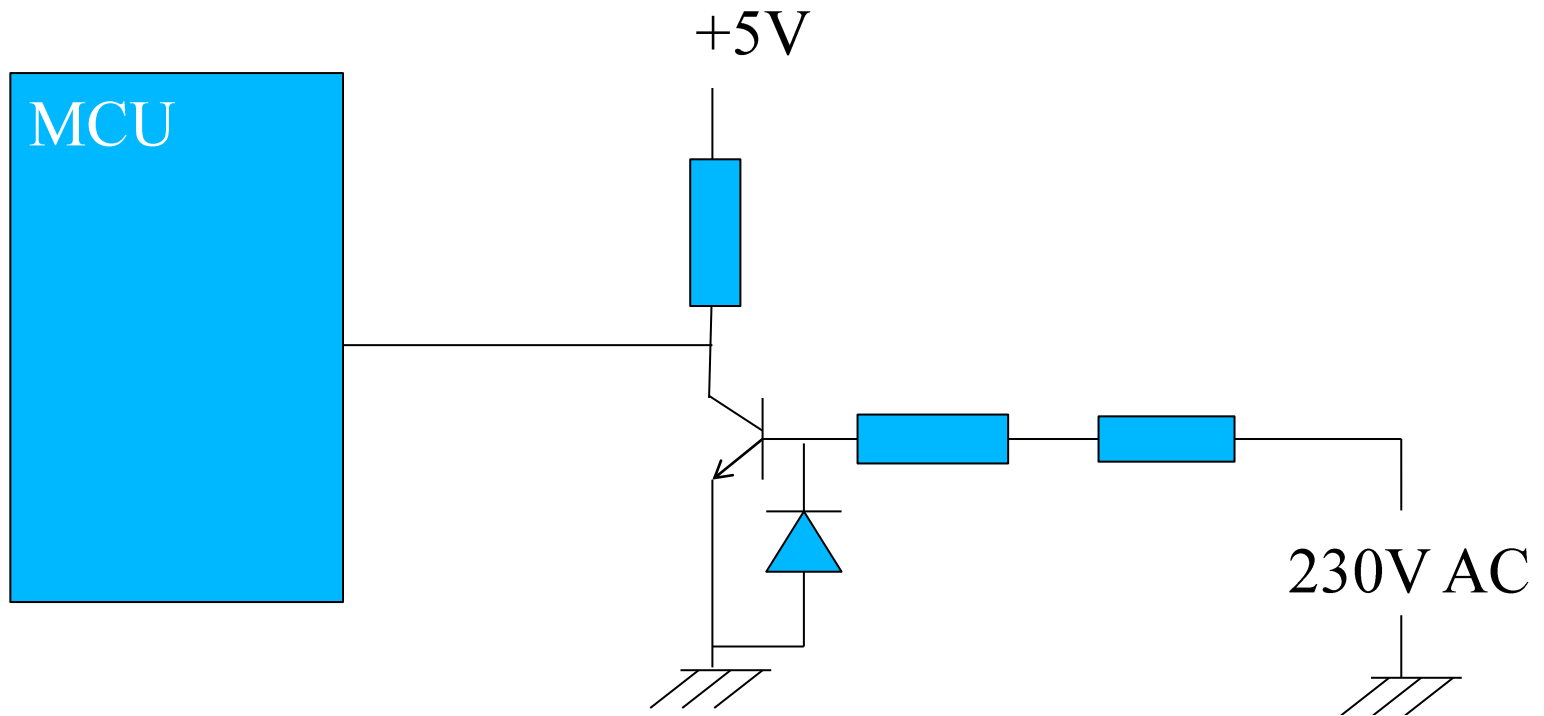
Entrada activa con diodo Zener



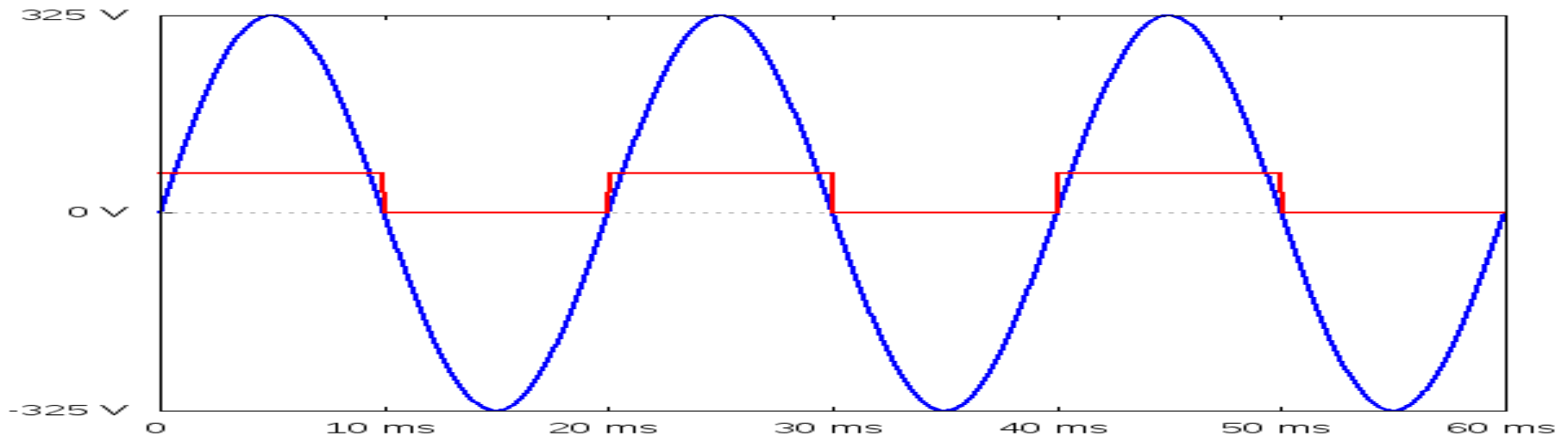
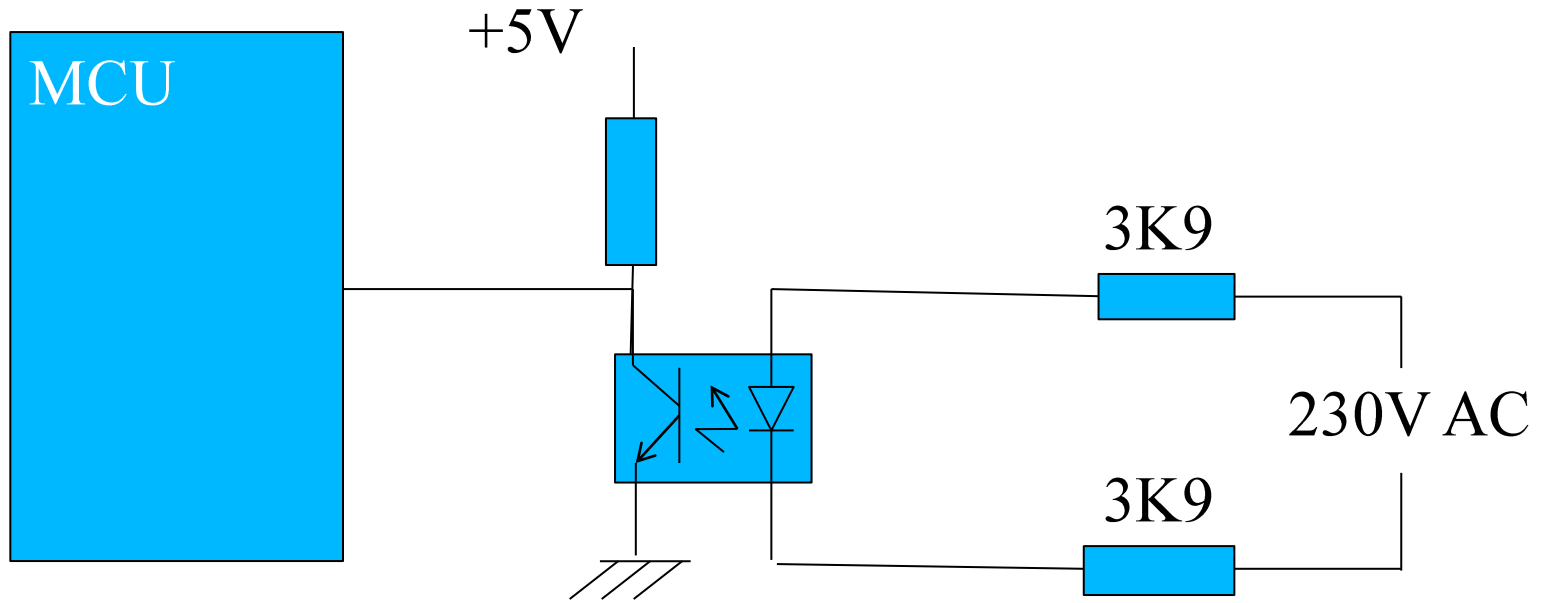
Entrada activa con transistor



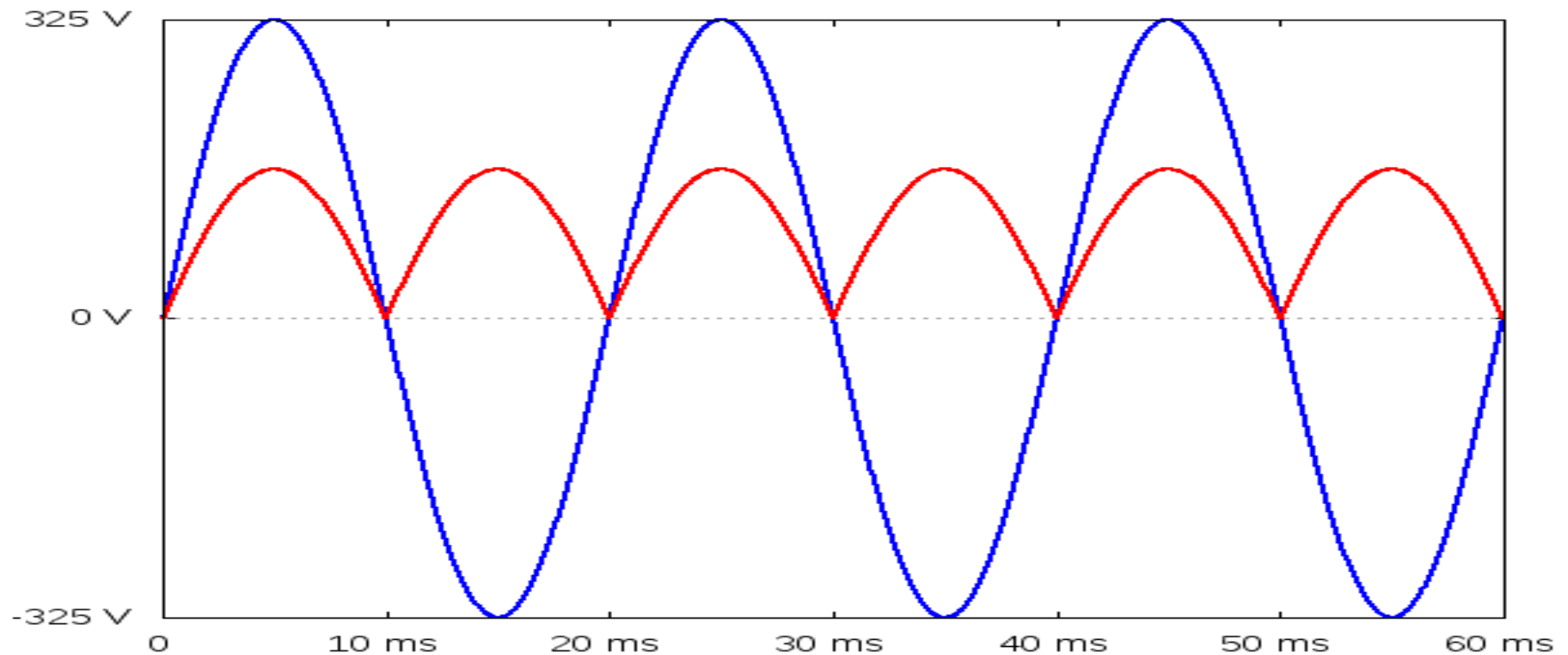
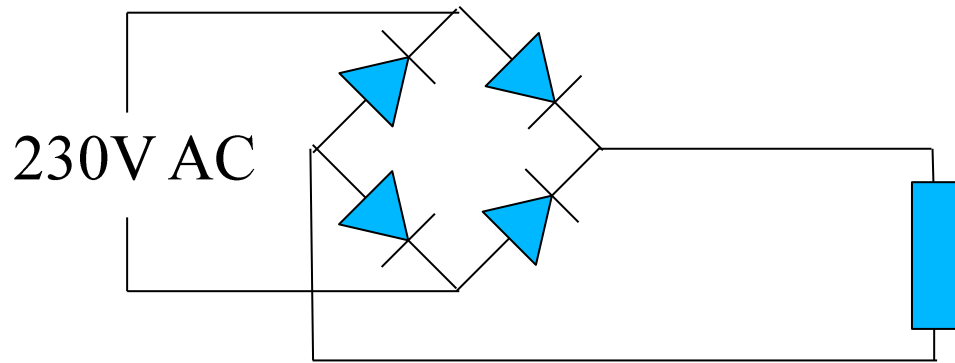
Entrada activa: detección de red 230V AC



Entrada activa: detección de red 230V AC



Detección de red 230 V AC: puente de diodos



Entrada activa: detección de red 230V AC

