[BASICS ELECTRONICS]

HOW NOT GET LOST...

...EVEN MORE

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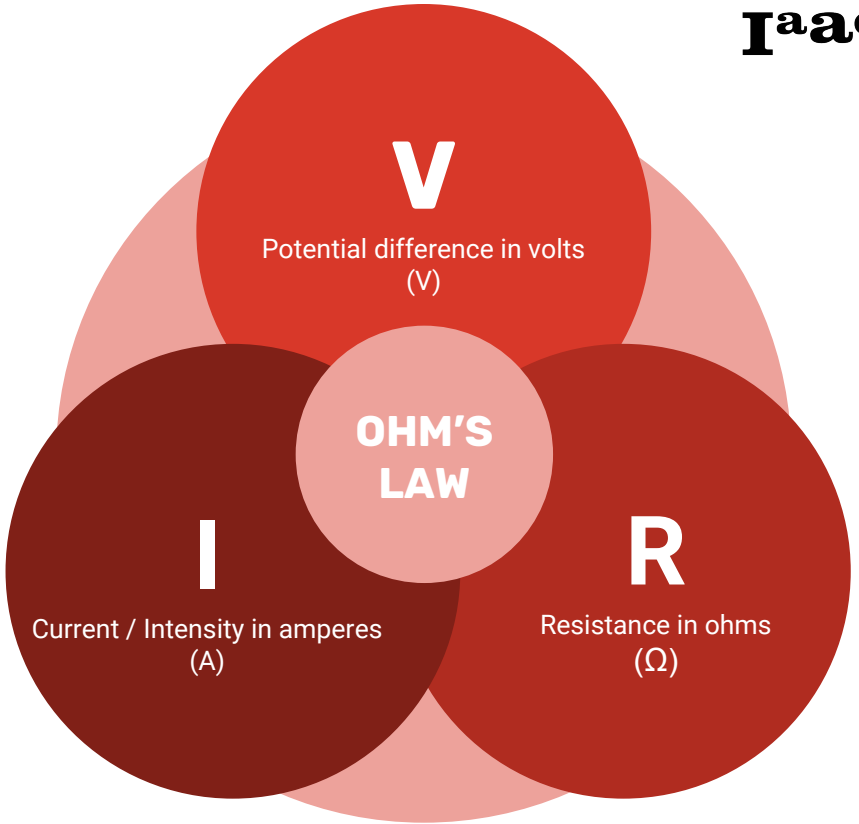
Future Learning Unit FLU



Ohm's law states that the current through a conductor between two points is directly proportional to the voltage across the two points

+INFO

I=V/R V=R•I R=V/I

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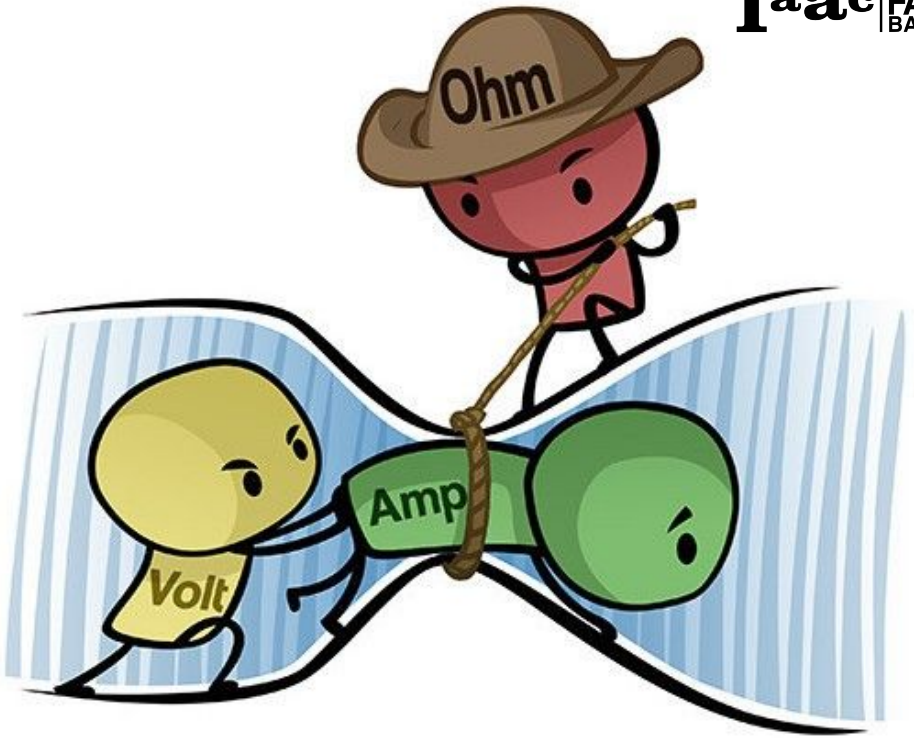
+INFO



Ohm's law states that the current through a conductor between two points is directly proportional to the voltage across the two points

+INFO

[RESISTANCE]

The **electrical resistance** of an electrical conductor is a measure of the difficulty to pass an electric current through that conductor.

[RESISTANCE]

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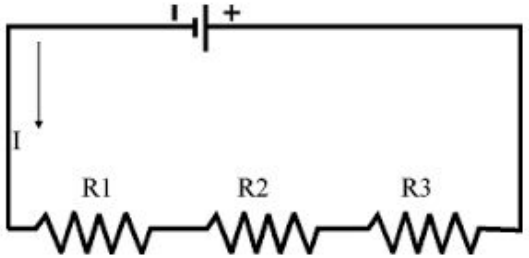
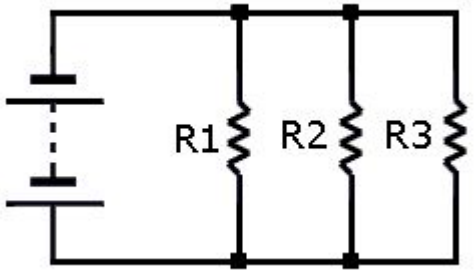
SERIAL

$$R_{eq} = R_1 + R_2 + R_3...$$

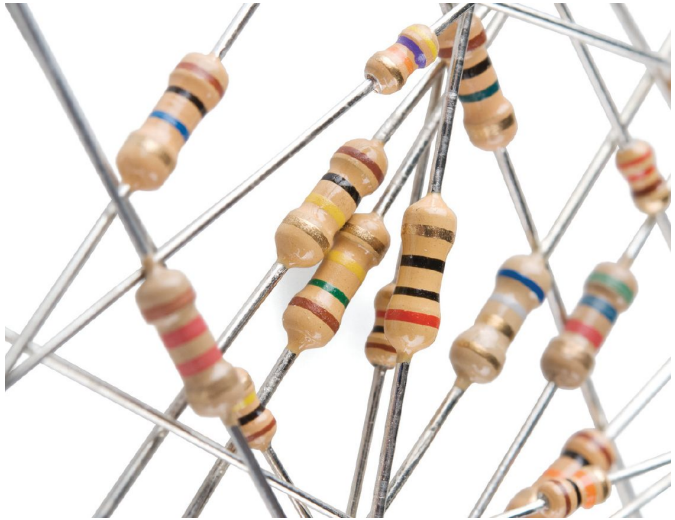


PARALLEL

$$\frac{1}{R_{eq}} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}...$$



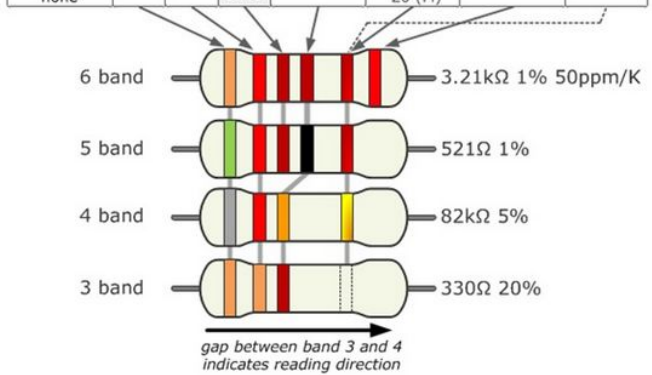
[RESISTORS]



[SMD]

[RESISTORS]

Color	Signficant figures			Multiply	Tolerance (%)	Temp. Coeff. (ppm/K)	Fail Rate (%)
black	0	0	0	x 1		250 (U)	
brown	1	1	1	x 10	1 (F)	100 (S)	1
red	2	2	2	x 100	2 (G)	50 (R)	0.1
orange	3	3	3	x 1K		15 (P)	0.01
yellow	4	4	4	x 10K		25 (Q)	0.001
green	5	5	5	x 100K	0.5 (D)	20 (Z)	
blue	6	6	6	x 1M	0.25 (C)	10 (Z)	
violet	7	7	7	x 10M	0.1 (B)	5 (M)	
grey	8	8	8	x 100M	0.05 (A)	1(K)	
white	9	9	9	x 1G			
gold			3th digit only for 5 and 6 bands	x 0.1	5 (J)		
silver				x 0.01	10 (K)		
none					20 (M)		



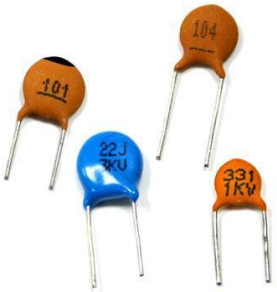
Color Coding Table

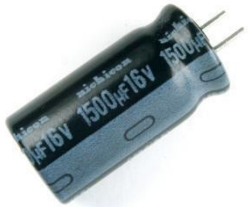
ON LINE

[CAPACITORS]

A **capacitor** is a passive two-terminal electrical component that stores potential energy in an electric field. The effect of a capacitor is known as capacitance. While some capacitance exists between any two electrical conductors in proximity in a circuit, a capacitor is a component designed to add capacitance to a circuit. The capacitor was originally known as a **condenser**

[CAPACITORS]

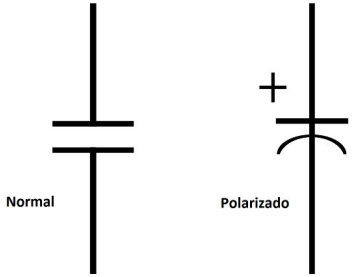


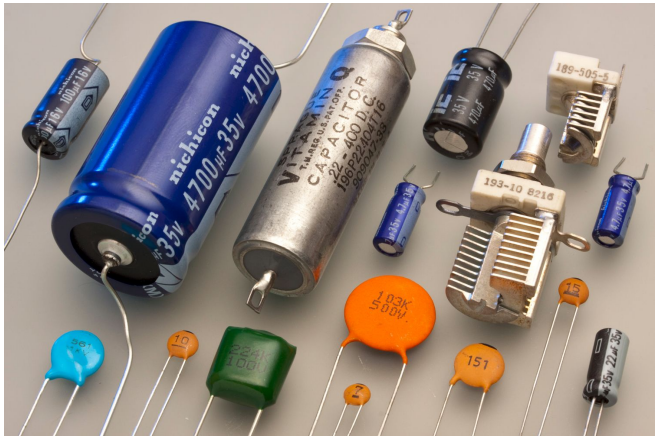


[NOT POLARIZED]

[POLARIZED]

[CAPACITORS]

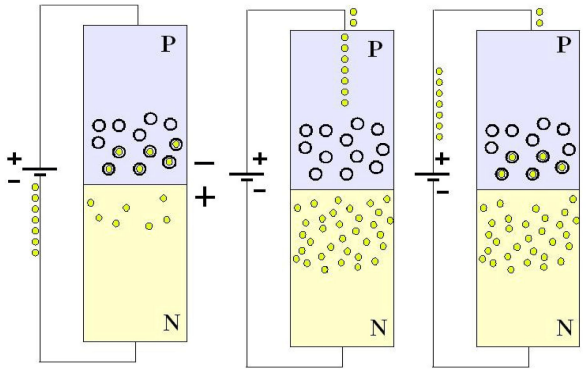




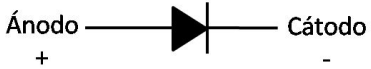
[SMD]

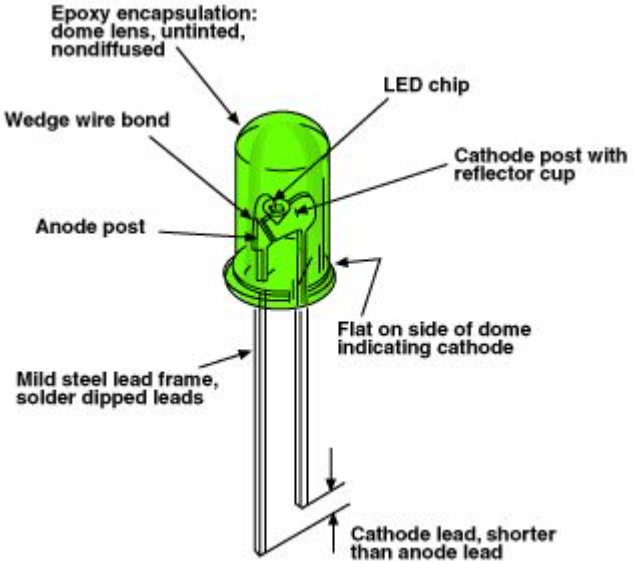
[DIODE (LED)]

A **light-emitting diode** (**LED**) is a two-lead semiconductor light source. It is a p–n junction diode that emits light when activated.



[DIODE (LED)]



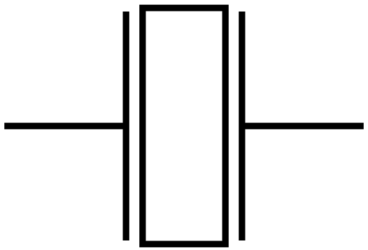


[SMD]

[CRYSTAL]

Crystal oscillator is an electronic oscillator circuit that uses the mechanical resonance of a vibrating crystal of piezoelectric material to create an electrical signal with a precise frequency

[CRYSTAL]

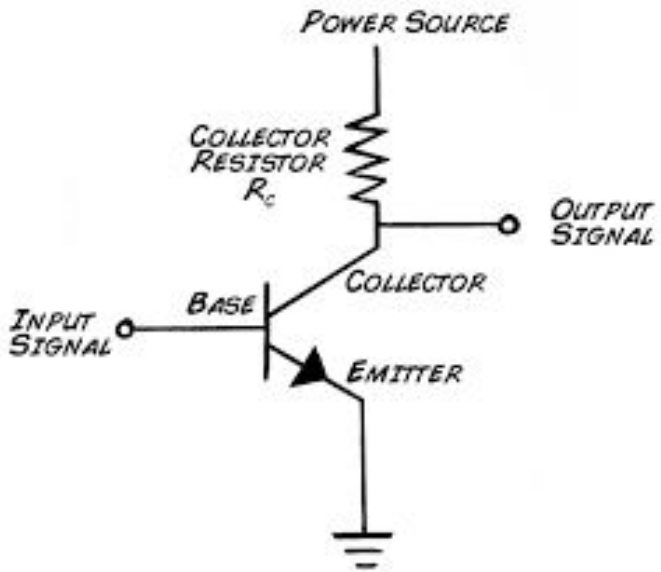


[SMD]

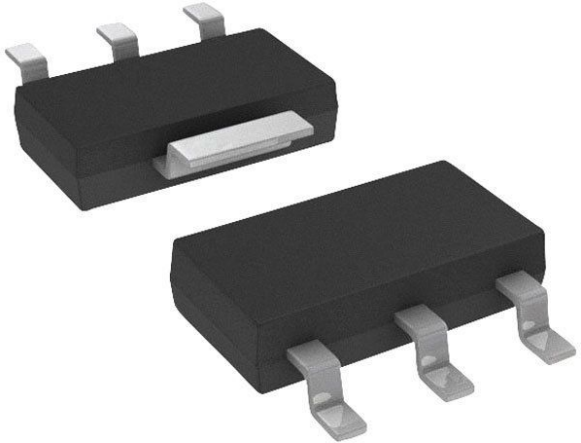
[TRANSISTOR]

A **transistor** is a semiconductor device used to amplify or switch electronic signals and electrical power. A voltage or current applied to one pair of the transistor's terminals controls the current through another pair of terminals. Because the controlled (output) power can be higher than the controlling (input) power, a transistor can amplify a signal.

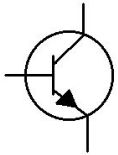
[TRANSISTOR]

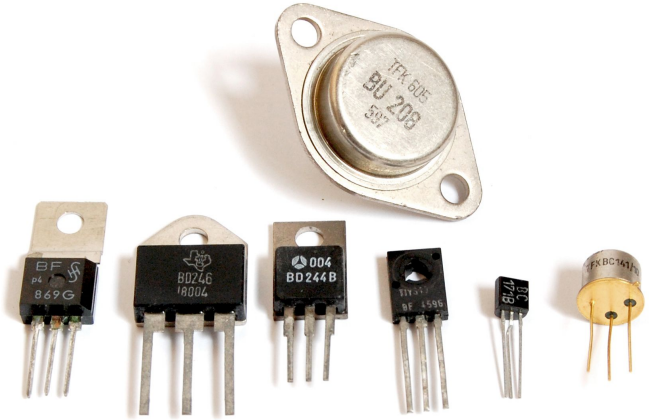

POWER SOURCE
COLLECTOR RESISTOR R_c
OUTPUT SIGNAL
COLLECTOR
BASE
INPUT SIGNAL
EMITTER

[TRANSISTOR]



[SMD]





[LOGICAL LEVELS]

The voltages used to represent a 1 and a 0 are called logical levels, in the case of Arduino the 1 can be 5 volts or 3.3 volts and the 0 is 0 volts.
There is a general range of the High and Low levels acceptable for a digital circuit.

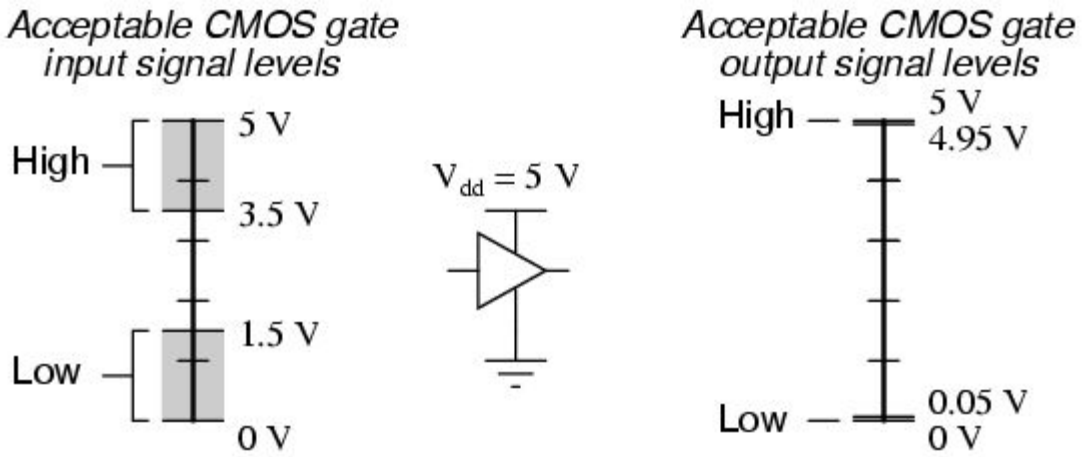
[LOGIC LEVELS]

The variable VH (max) represents the maximum voltage value for the HIGH level and VH (min) represents the minimum voltage value for the HIGH level. The maximum voltage value for the LOW level is represented by VL (max) and the minimum voltage value for the LOW level by VL (min). Voltage values between VL (max) and VH (min) are not acceptable for correct operation.

[LOGIC LEVELS]

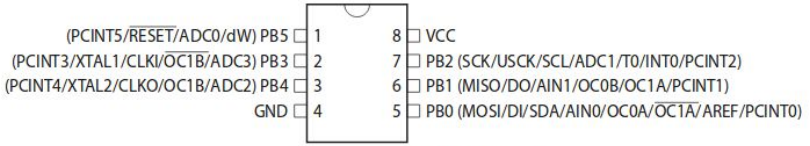
The variable VH (max) represents the maximum voltage value for the HIGH level and VH (min) represents the minimum voltage value for the HIGH level. The maximum voltage value for the LOW level is represented by VL (max) and the minimum voltage value for the LOW level by VL (min). Voltage values between VL (max) and VH (min) are not acceptable for correct operation.

[LOGIC LEVELS]



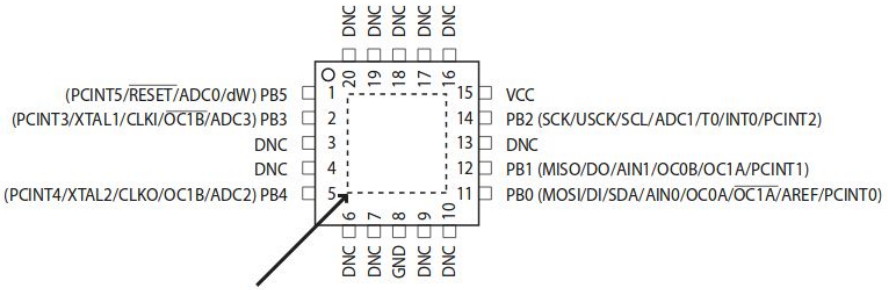
[MICROCONTROLLER]

PDIP/SOIC/TSSOP



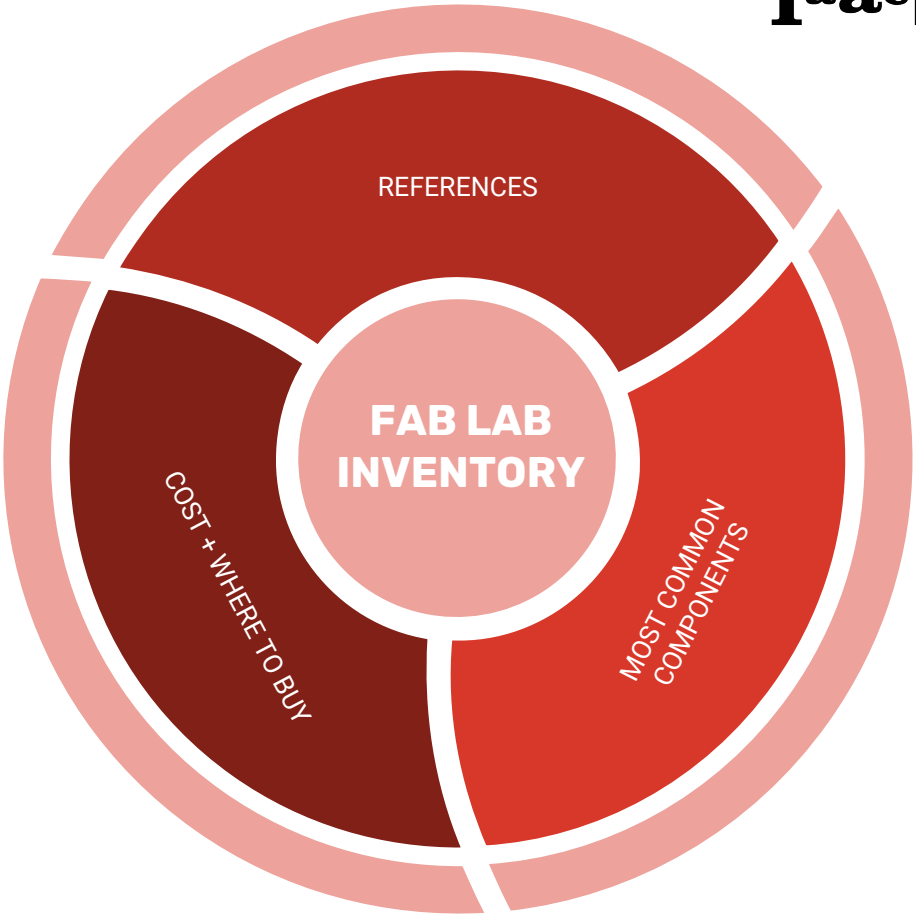
NOTE: TSSOP only for ATtiny45/V

QFN/MLF



NOTE: Bottom pad should be soldered to ground.
DNC: Do Not Connect

[DATASHEET]


REFERENCES
FAB LAB INVENTORY
COST + WHERE TO BUY
MOST COMMON COMPONENTS

[BASICS ELECTRONICS]

ARE YOU LOST ?

THANKS ! :-)

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