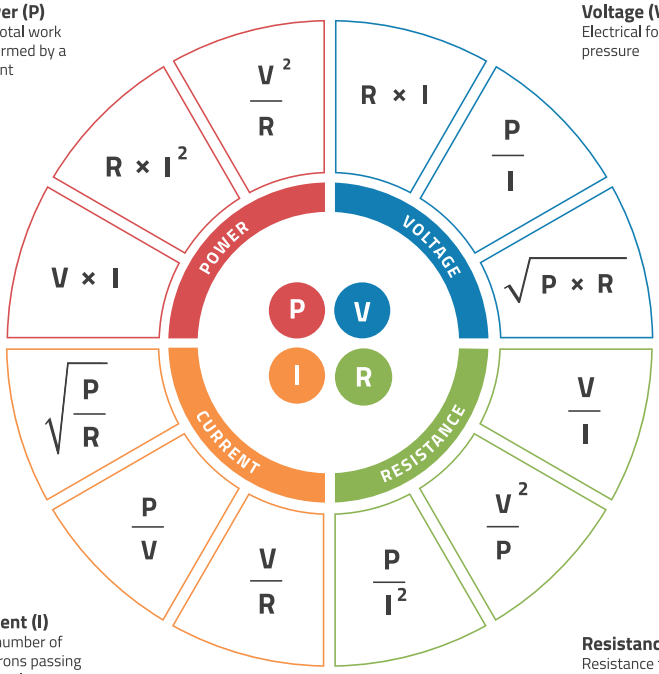
Ohm's Law

Power (P)
The total work performed by a current

Voltage (V)
Electrical force or pressure



Current (I)
The number of electrons passing in a single point

Resistance (R)
Resistance to the flow of current

Basic Units

Quantity		Unit
Capacitance	F	Farad
Charge	C	Coulomb
Current	A	Ampere
Energy	J	Joule
Force	N	Newton
Frequency	Hz	Hertz
Inductance	H	Henry
Magnetic Flux	Wb	Weber
Potential	V	Volt
Power	W	Watt
Resistance	Ω	Ohm

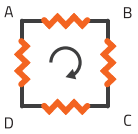
Kirchhoff's Laws

Closed Loop Rule

The directed sum of the electrical potential differences (voltage) around any closed circuit is zero

$$\sum \Delta V_{close\ loop} = 0$$

VAB + VBC +
VCD + VDA = 0

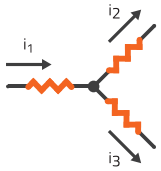


Junction Rule

The sum of currents entering the junction are thus equal to the sum of currents leaving.

$$\sum i_{in} = \sum i_{out}$$

$i_1 = i_2 + i_3$



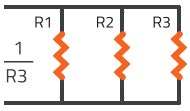
Resistor Network

Series

$R_T = R1 + R2 + R3$

Parallel

$$\frac{1}{R_T} = \frac{1}{R1} + \frac{1}{R2} + \frac{1}{R3}$$



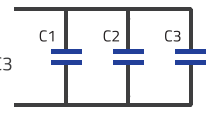
Capacitor Network

Series

$$\frac{1}{C_T} = \frac{1}{C1} + \frac{1}{C2} + \frac{1}{C3}$$

Parallel

$C_T = C1 + C2 + C3$



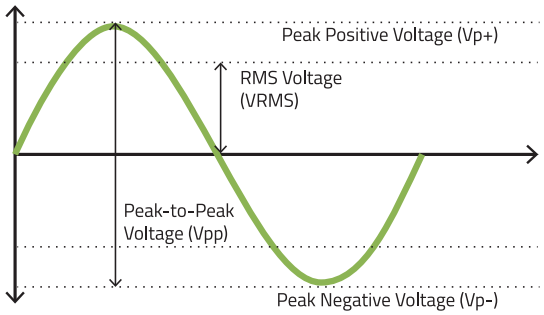
Unit Prefixes

Tera-	T	$\times 10^{12}$	Milli-	m	$\times 10^{-3}$
Giga-	G	$\times 10^{9}$	Micro-	μ	$\times 10^{-6}$
Mega-	M	$\times 10^{6}$	Nano-	n	$\times 10^{-9}$
Kilo-	K	$\times 10^{3}$	Pico-	p	$\times 10^{-12}$
Hecto-	H	$\times 10^{2}$			
Deka-	Da	$\times 10^{1}$			
(base)	-	$\times 10^{0}$			
Deci-	d	$\times 10^{-1}$			
Centi-	c	$\times 10^{-2}$			

examples:
25 μA
= 25 x 10-6 A
= 0.000025 A

4.7MΩ
= 4.7 x 106 Ω
= 4 700 000 Ω

Alternating Current



Average AC Voltage
= 0.637 x Peak
= 0.9 x RMS

RMS AC Voltage
= 0.707 x Peak
= 1.11 x Average

Peak AC Voltage
= 1.414 x RMS
= 1.57 x Average

Basic Electronics Theory

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