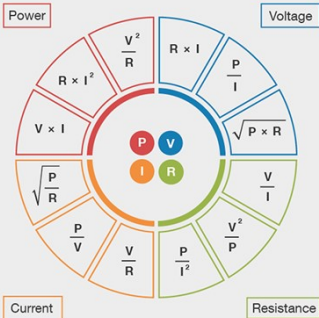


TinkrPostr

ELECTRONICS CHEAT SHEET POSTER

Your quick reference companion in learning, referencing and debugging your electronics projects

Ohm's Law



American Wire Gauge

AWG No.	Diameter (in)	Diameter (mm)	CS Area (mm ²)	Resistance (Ω/km)
4/0	.4600	11.68	107.2	.1608
3/0	.4096	10.40	85.03	.2028
2/0	.3648	9.266	67.43	.2557
1/0	.3249	8.252	53.48	.3224
1	.2893	7.348	42.41	.4066
2	.2576	6.544	33.63	.5127
3	.2294	5.827	26.67	.6465
4	.2043	5.189	21.15	.8152
5	.1819	4.621	16.77	1.028
6	.1620	4.115	13.30	1.296
7	.1443	3.665	10.55	1.634
8	.1285	3.264	8.366	2.061
9	.1144	2.906	6.634	2.599
10	.1019	2.588	5.261	3.277
11	.0907	2.305	4.172	4.132
12	.0808	2.053	3.309	5.211
13	.0720	1.828	2.624	6.571
14	.0641	1.628	2.081	8.286
15	.0571	1.450	1.650	10.45
16	.0508	1.291	1.309	13.17
18	.0403	1.024	.8231	20.95
20	.0320	.8118	.5176	33.31
22	.0253	.6438	.3255	52.96
24	.0201	.5106	.2047	84.22
26	.0159	.4049	.1288	133.9
28	.0126	.3211	.08098	212.9
30	.0100	.2546	.05093	338.6
32	.00795	.2019	.03203	538.3
34	.00630	.1601	.02014	856.0
36	.00500	.1270	.01267	1361
38	.00397	.1007	.00797	2164
40	.00314	.0799	.00501	3441

Other Stuffs

Thanks to the Contributors

Richard Crowley
Michael Lebon
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Cate Caimon
John Quinn
Jean François Dupuis
Joseph Johnson
Andrew Goulah

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Resistor Color Coding

4 Band

473
= 47 × 10³
= 47 000 Ω
= 47 kΩ ± 5%

5 Band

4703
= 470 × 10³
= 470 000 Ω
= 470 kΩ ± 5%

6 Band

= 470 kΩ ± 5%
@ Temp. Coeff.
50 ppm/K

1st Band

2nd Band

3rd Band

Multiplier

Tolerance

Temp. Coeff. (ppm/K)

Color

1st Band

2nd Band

3rd Band

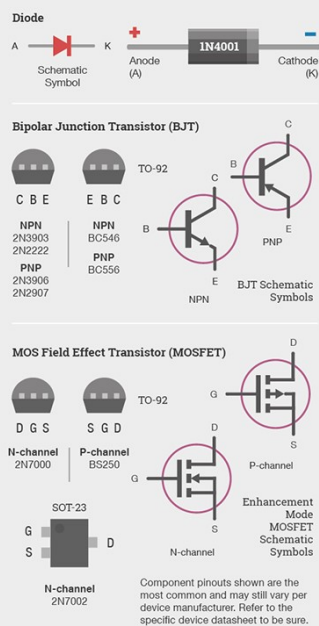
Multiplier

Tolerance

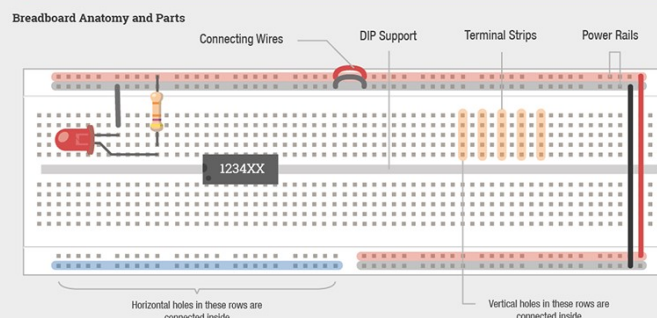
Temp. Coeff. (ppm/K)

Black	0	0	0	x10 ⁰		250
Brown	1	1	1	x10 ¹	±1%	100
Red	2	2	2	x10 ²	±2%	50
Orange	3	3	3	x10 ³		15
Yellow	4	4	4	x10 ⁴		25
Green	5	5	5	x10 ⁵	±50%	20
Blue	6	6	6	x10 ⁶	±25%	10
Violet	7	7	7	x10 ⁷	±10%	5
Grey	8	8	8		±0.5%	1
White	9	9	9			
Gold				x10 ⁻¹	±5%	
Silver				x10 ⁻²	±10%	

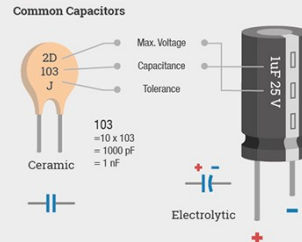
Diodes and Transistors



The Breadboard



Capacitor Coding



Capacitance Conversion Table

Microfarads (μF)	Nanofarads (nF)	Picofarads (pF)
0.000001 μF	= 0.001 nF	= 1 pF
0.00001 μF	= 0.01 nF	= 10 pF
0.0001 μF	= 0.1 nF	= 100 pF
0.001 μF	= 1 nF	= 1 000 pF
0.01 μF	= 10 nF	= 10 000 pF
0.1 μF	= 100 nF	= 100 000 pF
1 μF	= 1 000 nF	= 1 000 000 pF

Max. Operating Voltage

1H	50 V	2E	250 V	B	±0.1 pF	H	±3%
2A	100 V	2G	400 V	C	±.25 pF	J	±5%
2T	150 V	2J	630 V	D	±.50 pF	K	±10%
2B	200 V			F	±1%	M	±20%
				G	±2%	Z	-30% -20%

Light Emitting Diode (LED)

Typical LED Characteristics

Color	Wavelength (nm)	Typical Forward Voltage (V) @ 20 mA
Red	630 - 660	1.8
Orange	605 - 620	2.0
Yellow	585 - 595	2.2
Green	550 - 570	3.5
Blue	430 - 505	3.6
White	450	4.0
Ultraviolet	850 - 940	1.2

Surface Mount Devices (SMDs)

SMD Resistor Markings

3 Digit	4 Digit
473 = 47 × 10 ³ = 47 000 Ω = 47 kΩ	4702 = 470 × 10 ² Ω = 47 000 Ω = 47 kΩ
with Radix Point 4R7 = 4.7 Ω	with Radix Point 0R47 = 0.47 Ω

SMD Capacitor Markings

Tantalum	Electrolytic Capacitor
473 = 47 × 10 ³ pF = 47 nF @ 16V	473 = 47 × 10 ³ pF = 47 nF @ 16V

Electrical Units

Basic Electrical Units

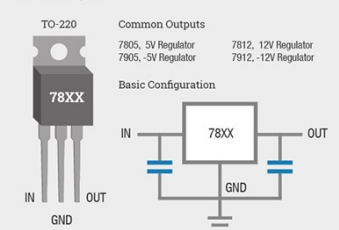
Quantity	Abbrev. / Unit	Quantity	Abbrev. / Unit
Capacitance	F Farad	Inductance	H Henry
Charge	C Coulomb	Magnetic Flux	Wb Weber
Current	A Ampere	Potential	V Volt
Energy	J Joule	Power	W Watt
Force	N Newton	Resistance	Ω Ohm
Frequency	Hz Hertz		

Metric Prefixes

Prefix	Symbol	Factor	Value
Tera-	T	×10 ¹²	1 000 000 000 000
Giga-	G	×10 ⁹	1 000 000 000
Mega-	M	×10 ⁶	1 000 000
Kilo-	K	×10 ³	1 000
Hecto-	H	×10 ²	100
Deka-	Da	×10 ¹	10
(base)	-	×10 ⁰	1
Deci-	d	×10 ⁻¹	0.1
Centi-	c	×10 ⁻²	0.01
Milli-	m	×10 ⁻³	0.001
Micro-	μ	×10 ⁻⁶	0.000 000 1
Nano-	n	×10 ⁻⁹	0.000 000 000 1
Pico-	p	×10 ⁻¹²	0.000 000 000 000 1

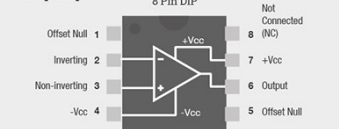
Regulator

LM78XX Regulator

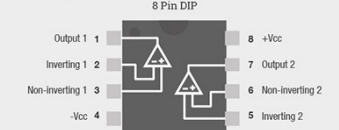


Op-Amp

741 Op-Amp



LM358 Dual Op-Amp



555 IC

555 IC Pinout



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