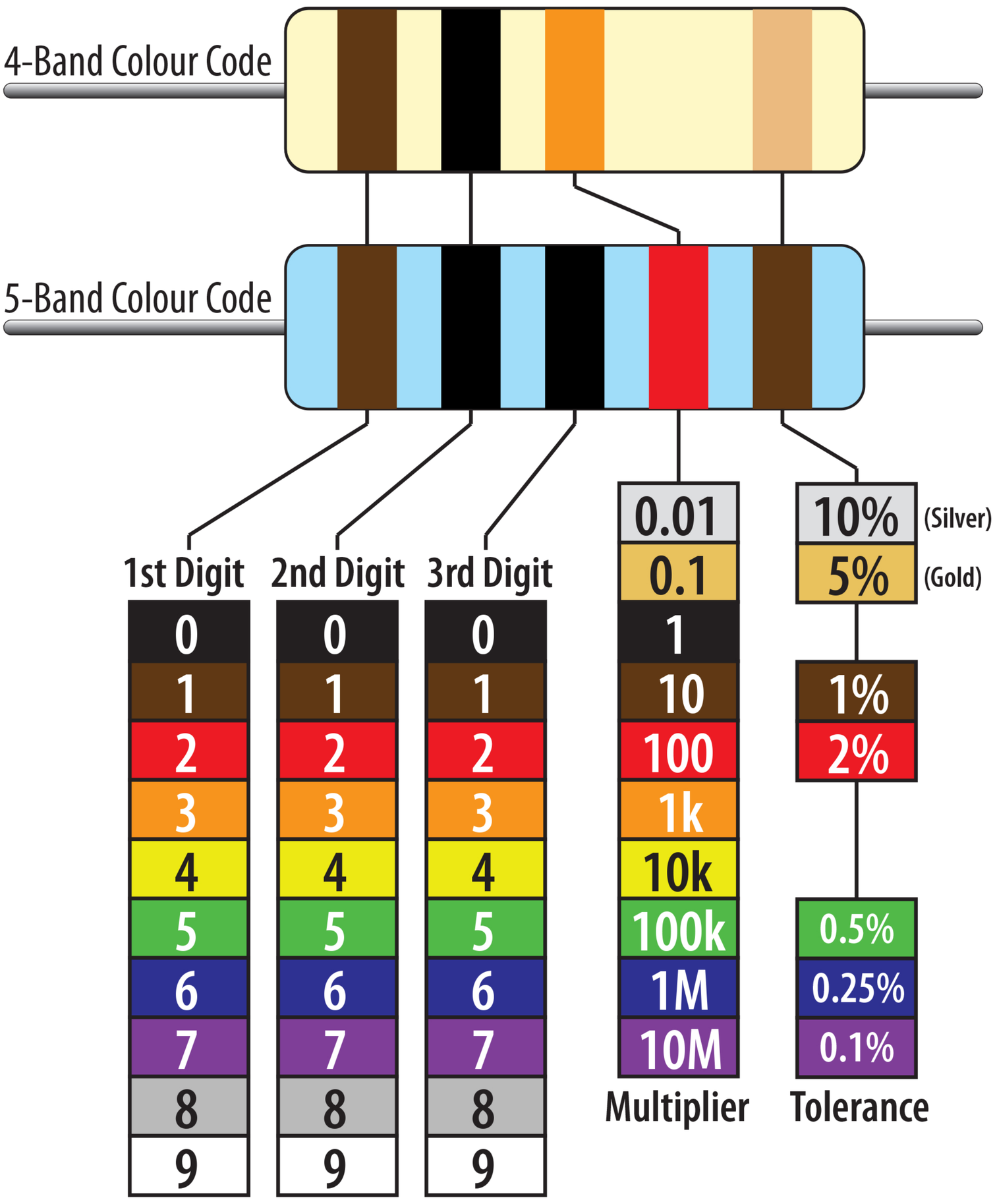
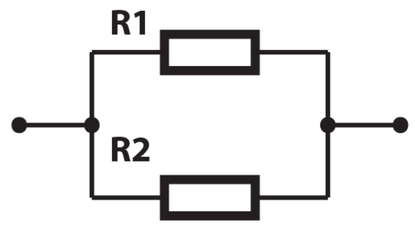
Volthaus Electronics Laboratory

Resistor Colors and Values Reference Chart

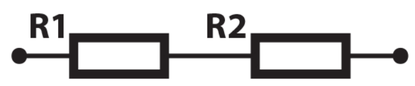


Parallel Resistors



$$\frac{1}{Rtotal} = \frac{1}{R1} + \frac{1}{R2} + \frac{1}{R3} + \ldots$$

Series Resistors



$$Rtotal = R1 + R2 + \ldots$$

Current Limiting Resistors For LEDs

$$R = \frac{\text{Source Voltage - LED Voltage}}{\text{LED Current}}$$

Resistor Power Dissipation

You can calculate the power (in Watts) dissipated by a resistor as long as you know any two of
1) the voltage across the resistor,
2) the current flowing through it, and
3) the value of the resistor.
Make sure you select a resistor with a suitable power rating for the maximum power you expect it to dissipate.

Power = Volts x Amps (P = V x I)

Power = Amps^2 x Ohms (P = I^2 x R)

Power = Volts^2 / Ohms (P = V^2 / R)

Preferred Resistor Values

The EIA "E" series specify the preferred values for various tolerances. The number following the E specifies the number of logarithmic steps per decade. This table shows all possible values for the 4 most common E ranges on a range from 100 to 1000. You can derive all other possible values from this table by multiplying or dividing by 10, 100, 1000, etc.

E24: 5% tolerance **E48: 2% tolerance** **E96: 1% tolerance** **E196: 0.5%, 0.25%, 0.1% and higher tolerances**

E24	E48	E96	E192	E24	E48	E96	E192	E24	E48	E96	E192	E24	E48	E96	E192	E24	E48	E96	E192	E24	E48	E96	E192
100	100	100	100	150	147	147	147	220	215	215	215	330	316	316	316	470	464	464	464	680	681	681	681
			101				149				218				320				470				690
		102	102			150	150			221	221			324	324			475	475			698	698
			104				152				223				328				481				706
	105	105	105		154	154	154		226	226	226		332	332	332		487	487	487		715	715	715
			106				156				229				336				493				723
		107	107			158	158			232	232			340	340			499	499			732	732
			109				160				234				344				505				741
110	110	110	110	160	162	162	162	240	237	237	237	360	348	348	348	510	511	511	511	750	750	750	750
			110				164				240				352				517				759
		113	113			165	165			243	243			357	357			523	523			768	768
			114				167				246				361				530				777
	115	115	115		169	169	169		249	249	249		365	365	365		536	536	536		787	787	787
			117				172				252				370				542				796
		118	118			174	174			255	255			374	374			549	549			806	806
			120				176				258				379				556				816
120	121	121	121	180	178	178	178	270	261	261	261	390	383	383	383	560	562	562	562	820	825	825	825
			123				180				264				388				569				835
		124	124			182	182			267	267			392	392			576	576			845	845
			126				184				271				397				583				856
	127	127	127		187	187	187		274	274	274		402	402	402		590	590	590		866	866	866
			129				189				277				407				597				876
		130	130			191	191			280	280			412	412			604	604			887	887
			132				193				284				417				612				898
130	133	133	133	200	196	196	196	300	287	287	287	430	422	422	422	620	619	619	619	910	909	909	909
			135				198				291				427				626				920
		137	137			200	200			294	294			432	432			634	634			931	931
			138				203				298				437				642				942
	140	140	140		205	205	205		301	301	301		442	442	442		649	649	649		953	953	953
			142				208				305				448				657				965
		143	143			210	210			309	309			453	453			665	665			976	976
			145				213				312				459				673				988