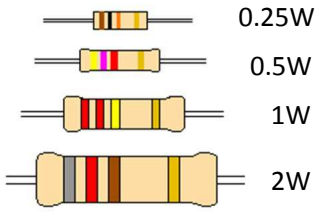
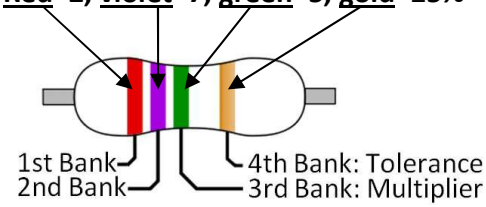
Resistors Identification

Resistance is measured in units of ohms (Ω). Resistors come in several sizes and shapes. Each one with its color code or value printed on it.



Common unit: MΩ, kΩ and Ω. ($M=10^6$, $k=10^3$)

e.g. A four color bank resistor
Color bank order:
Red=2, violet=7, green=5, gold=±5%



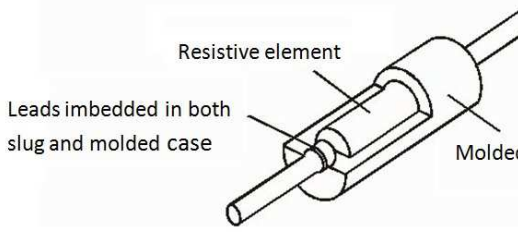
The first two banks are resistor's value.

Resistance:
27×10^5=2,700,000 Ω (±5%)
=2.7MΩ or 2.7M in short-hand

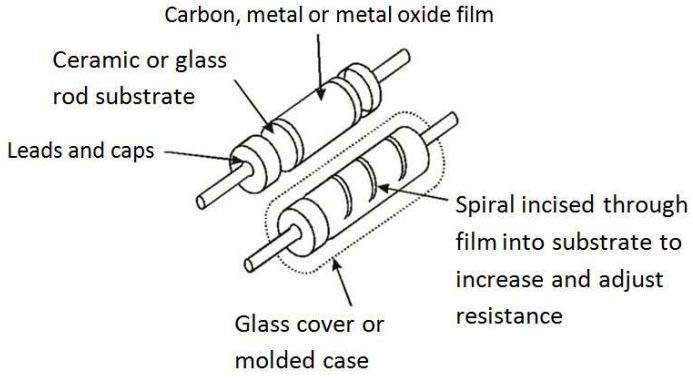
The standard color code is as follows:

Color	Resistor's value (1st and 2nd band)	Multiplier (3rd band)	Tolerance (4th band)
Black	0	$\times10^0$	–
Brown	1	$\times10^1$	±1%
Red	**2**	$\times10^2$	±2%
Orange	3	$\times10^3$	–
Yellow	4	$\times10^4$	–
Green	**5**	**$\times10^5$**	–
Blue	6	$\times10^6$	–
Violet	**7**	$\times10^7$	–
Gray	8	$\times10^8$	–
White	9	$\times10^9$	–
Gold	–	$\times10^{-1}$	**±5%**
Silver	–	$\times10^{-2}$	±10%
None	–	–	±20%

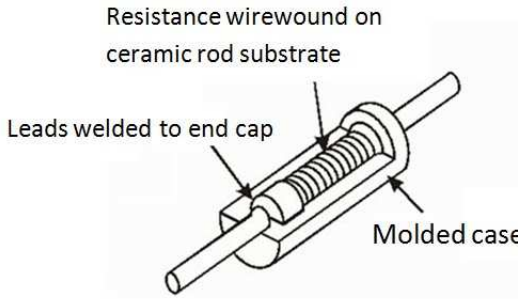
Carbon composition resistor construction



Film resistor construction



Wirewound resistor construction



Capacitors Identification

Capacitance is measured in units of farads (F). Capacitors come in many sizes and types. Here shows you how to read the code number printed on some capacitors.

Common unit: µF, nF and pF
µ=10^{-6}, **n**=10^{-9}, p=10^{-12}

Ceramic capacitors (Non-polarised)

They are always count in pF.

Non-polarised capacitor

The first two digits are capacitor's value in pF
The third digit is the multiplier [No. of zeros (10^x)]
The last character is the tolerance

e.g.
Printed code: 102k
The first two digits are capacitor's value: **10**
The third digit is the multiplier: two zeros (**10^2**)
The last character (k) is the tolerance: **±10%**

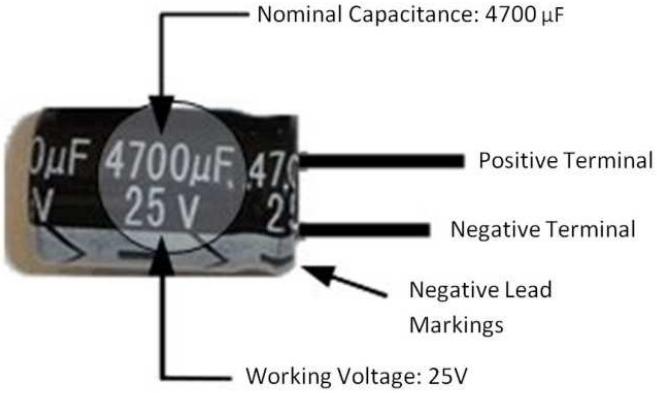
Capacitance:
10x10^2 = 1000 pF (±10%) = 1nF or 1n in short-hand

Tolerance of capacitor:

Code	Tolerance
A	±0.05%
B	±0.1%
C	±0.25%
D	±0.5%
F	±1%
G	±2%
J	±5%
K	**±10%**
M or NONE	±20%
N	±30%
Q	−10%, +30%
S	−20%, +50%
T	−10%, +50%
Z	−20%, +80%

Electrolytic Capacitors (Polarised)

The capacitance and working voltage are always printed on the case in units of µF and V (Volt).



Capacitance = 4700 µF
Max. Working Voltage = 25 V

Polarised capacitor