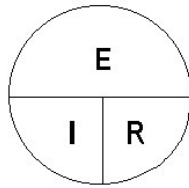


### OHM's LAW



**E = Electromotive Force**  
measured in VOLTS       $E = I \times R$

**I = Current**  
measured in AMPS       $I = E \div R$

**R = Resistance**  
measured in OHM's       $R = E \div I$

SERIES CIRCUIT FORMULAS	PARALLEL CIRCUIT FORMULAS
$E_T = E_{R_1} + E_{R_2} + E_{R_3}$ etc.	$E_T = E_{R_1} = E_{R_2} = E_{R_3}$ etc.
$I_T = I_{R_1} = I_{R_2} = I_{R_3}$ etc.	$I_T = I_{R_1} + I_{R_2} + I_{R_3}$ etc.
$P_T = P_{R_1} + P_{R_2} + P_{R_3}$ etc.	$P_T = P_{R_1} + P_{R_2} + P_{R_3}$ etc.
$R_T = R_1 + R_2 + R_3$ etc.	$R_T = \frac{R_1 \times R_2}{R_1 + R_2}$ (two resistors at a time)
	$R_T = \frac{R_1}{N}$ (resistors of equal value) (number of resistors)
	$R_T = \frac{1}{\frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}} \text{ etc.}$

### Resistor Color Code Chart

**Commercial 5 band-1%**      **Commercial 4 band**      **Military MIL-R-22684**

1st Significant Figure  
2nd Significant Figure  
3rd Significant Figure  
Multiplier  
Tolerance

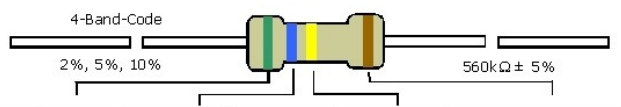
Examples: 360Ω, 1%      25,000Ω, 10%      400Ω, 2% Solderable

White means Military

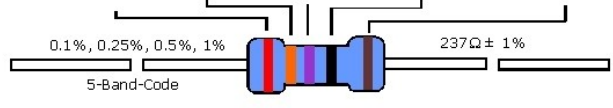
**SIGNIFICANT FIGURES** (0-9)

**MULTIPLIER** (10<sup>0</sup> to 10<sup>9</sup>)

**TOLERANCE** (1%, 2%, 5%, 10%)



COLOR	1st BAND	2nd BAND	3rd BAND	MULTIPLIER	TOLERANCE
Black	0	0	0	1Ω	
Brown	1	1	1	10Ω	± 1% (F)
Red	2	2	2	100Ω	± 2% (G)
Orange	3	3	3	1KΩ	
Yellow	4	4	4	10KΩ	
Green	5	5	5	100KΩ	± 0.5% (D)
Blue	6	6	6	1MΩ	± 0.25% (C)
Violet	7	7	7	10MΩ	± 0.10% (B)
Grey	8	8	8		± 0.05%
White	9	9	9		
Gold				0.1	± 5% (J)
Silver				0.01	± 10% (K)



### VALUE CROSS REFERENCE

**1PF = 0.001NF = 0.000001UF**  
**10PF = 0.01NF = 0.00001UF**  
**100PF = 0.1NF = 0.0001UF**  
**1000PF = 1NF = 0.001UF**  
**10000PF = 10NF = 0.01UF**  
**100000PF = 100NF = 0.1UF**  
**1000000PF = 1000NF = 1UF**

### SPECIAL VALUE CODES

**101 = 100PF      102 = 1000PF**  
**103 = 0.01UF      104 = 0.1UF**  
**105 = 1UF      106 = 10UF**

**C = ±0.25 PF**  
**D = ±0.5 PF**  
**F = ±1%**  
**G = ±2%**  
**J = ±5%**  
**K = ±10%**  
**M = ±20%**  
**Y = +50%.-20%**

### CAPACITOR COLOUR CODE

Temperature coefficient      First figure      Second figure

470      Tolerance      47pF 6-3V

Multiplier      Voltage

470pF 2%

10000pF 20%

Working Voltage 250V

EXAMPLE: 0-015uF 20%

Code	Value	Tolerance
0-010	0.010	20%
0-015	0.015	20%
0-022	0.022	20%
0-033	0.033	20%
0-047	0.047	20%
0-068	0.068	20%
0-10	0.10	20%
0-15	0.15	20%
0-22	0.22	20%
0-33	0.33	20%
0-47	0.47	20%
0-68	0.68	20%
1-0	1.0	20%
1-5	1.5	20%
2-2	2.2	20%