

كلية : التربية للعلوم الصرفة

القسم او الفرع: الفيزياء

المرحلة: الثالثة

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اسم المحاضرة باللغة العربية: شفرة الألوان المقاومات في الدوائر الالكترونية

اسم المحاضرة باللغة الإنكليزية: **Color code of resistors in electronic circuits**

The resistor color code

Resistors are typically very small in size, making it difficult to mark resistance values on them. Color bands are printed on them in order to depict the electrical resistance. Resistor color codes are the names given to these color bands. The RMA created the resistor color coding system in the 1920s.



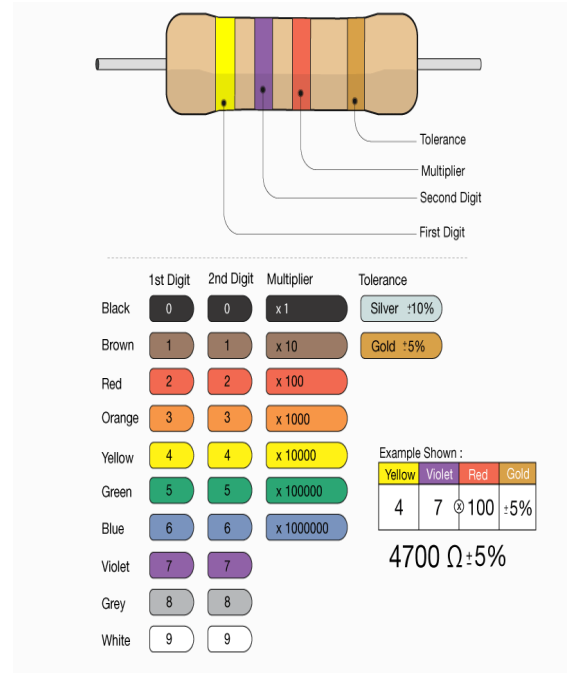
All leaded resistors with a power rating up to one watt are marked with color bands. They are given by several bands and together they specify the resistance value, the tolerance rate and sometimes the reliability or failure rates. The number of bands present in a resistor varies from three to six. The first two bands indicate the resistance value and the third band serves as a multiplier.

Resistor Colour Table

| Colour | Digit | Multiplier | Tolerance |
|--------|-------|------------|-----------|
| Black | 0 | 1 | |
| Brown | 1 | 10 | ± 1% |
| Red | 2 | 100 | ± 2% |
| Orange | 3 | 1000 | |
| Yellow | 4 | 10,000 | |
| Green | 5 | 100,000 | ± 0.5% |
| Blue | 6 | 1,00,000 | ± 0.25% |
| Violet | 7 | 10,000,000 | ± 0.1% |
| Grey | 8 | | ± 0.05% |
| White | 9 | | |
| Gold | | 0.1 | ± 5% |
| Silver | | 0.01 | ± 10% |

Reading Resistor Color Code.

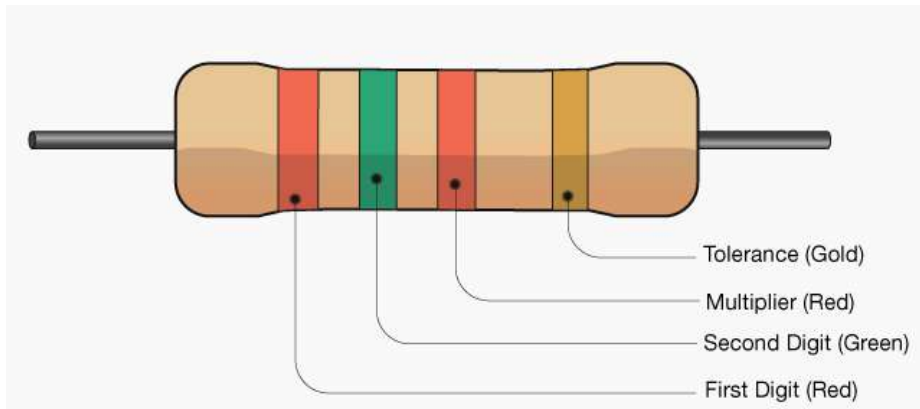
- To read them, hold the resistor such that the tolerance band is on your right. The tolerance band is usually gold or silver in color and is placed a little further away from the other bands.
- Starting from your left, note down all the colors of the bands and write them down in sequence.
- Next, use the table given below to see which digits they represent.
- The band just next to the tolerance band is the multiplier band. So if the color of this band is Red (representing 2), the value given is 10^2 .



Resistor Color Code Examples

Q1) Determine the resistance of the given resistor with the given color sequence (Red, Green, Red, Gold).

As we know, the first two colors represent the significant digits of resistance value so the given colors represent digits 2 and 5. The third band is a multiplier band. Hence, the color red represents a multiplier factor of 10^2 . The last band represents the tolerance level and the tolerance level of the resistor is $\pm 5\%$. Hence, the resistance value of the given resistor is $2500 \pm 5\% \Omega$ or $2.5 \text{ k}\Omega$.



H.W\ What color bands would a resistor of resistance value 1000Ω with a tolerance level $\pm 5\%$ have?

The color bands of the resistor would look like this

