**Resistance Calculator**

This calculator will help you identify the value, tolerance and temperature coefficient of a color coded resistor by simply selecting the bands colors. It will also calculate the minimum and maximum values based on the tolerance ratio. This calculator supports resistors with 3, 4, 5, and 6 bands.

1.How to use?

To use the calculator, follow these easy steps:

1. Select the number of bands on the resistor you are trying to identify.
2. For each band, select the matching color in the table column indicating the band number.
3. The resistance value will be calculated and shown along with the minimum and maximum values.

## Resistor Color-coding

Color-coding is a method used to indicate the resistive value, tolerance, and temperature coefficient of resistors with low wattage rating because of their small size. Color bands are used because they can be easily and cheaply printed on a small electronic component. Color-coding is also used for capacitors, inductors and diodes.

When the resistor body surface is large enough, as in large wattage resistors, the resistance value, tolerance, and wattage are usually printed on the body of the resistor. Surface mounted resistors (SMD) use another coding system that uses alphanumeric codes printed on its surface instead of color codes.

The coding is defined in the international standard [IEC 60062:2016](https://www.sis.se/api/document/preview/8021442/). It describes the coding standard for both resistors and capacitors.

## Reading Color Codes

Resistors cases usually have three to six bands that indicate their resistance, tolerance and sometimes their temperature coefficient of resistance (TCR). The bands are read from left to right. The reading direction is not always clear. To distinguish the reading direction, the tolerance band width is sometimes printed with 1.5 - 2 times the width of other bands. A larger gap between the tolerance band and the other bands is sometimes noticeable. If a gold or silver band is present, then they must be at the right end since they are never used for significant digits. It is always better to check the manufacturer’s documentation or use a multimeter to get the exact resistance value.

In a three-band resistor, the first two bands represent the first two significant digits followed by one band for the multiplier. Since no tolerance band is available, the tolerance will always be ±20%.

## Tolerance

Tolerance is the percentage of error between the actual measured resistive value and the stated value. This is due to the manufacturing process and it is expressed as a percentage of its preferred value

## Calculating

To calculate the resistance value, you need to group the values of the significant digits bands — i.e., the values of the first two or three bands from the left, depending on the total number of bands. Then you need to multiply that value by the multiplier to get the resistance value of the resistor.

Let's take for example a four-band resistor with the following band colors: Violet Green Yellow Gold

Since it is a four-band resistor, the first two bands (violet and green) will indicate the significant digits which are, according to the table above; **75**.

We then multiply that number by the multiplier indicated with the 3rd band (yellow) which has the value of; **x104 = 10000**.  
The result of the multiplication will be: **75 x 10000 = 750000Ω = 750kΩ**.

The fourth band (gold) will indicate the tolerance which in our example is: **±5%**  
To calculate the minimum and maximum resistance values, we multiply the resistance value by the tolerance percentage to come up with the following values:  
Minimum = 750000 - (750000 x 5/100) = 750000 - 37500 = 712500 = 712.5kΩ  
Maximum = 750000 + (750000 x 5/100) = 750000 + 37500 = 787500 = 787.5kΩ