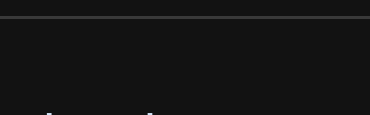


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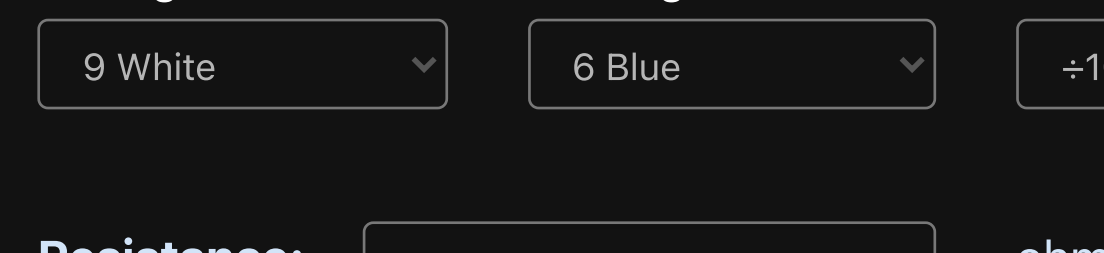
Resistor Color Code Calculator and Chart—4 Band, 5 Band, or 6 Band Resistors



A handy all-in-one tool for reading resistor color code values for a 4 band resistor, 5 band resistor, or 6 band resistor.

4 Band5 Band6 Band

4 Band Resistor



1st Digit2nd DigitMultiplierTolerance

9 White6 Blue±100 Silver± 5% Gold

Resistance: ohms

Tolerance: ohms

Minimum: ohms

Maximum: ohms

How to Use the Resistor Color Code Calculator

Are you having trouble reading resistor color codes? If your answer is yes, this tool is specifically designed for you! Our Resistor Color Code Calculator is a handy tool for reading carbon-composition resistors, whether it's a 4 band, 5 band, or 6 band type.

To use this tool, simply click on a particular color and number and watch how the actual bands on the resistor illustration change. The resistance value is displayed on the field below, together with the tolerance and the temperature coefficient.

Resistor Color Bands

As shown above, a carbon-composition resistor can have 4 to 6 bands. A 5-band resistor is more precise than a 4-band type because of the inclusion of a third significant digit. A 6-band resistor is like a 5-band resistor but includes a temperature coefficient band (the 6th band).

Below (Table 1), you can see an overview of the different band types.

Table 1. An overview of the different bands in a resistor.

4 Band	5 Band	6 Band
1st band	1st significant digit	1st significant digit
2nd band	2nd significant digit	2nd significant digit
3rd band	multiplier	3rd significant digit
4th band	tolerance	multiplier
5th band	N/A	tolerance
6th band	N/A	temperature coefficient

Each color represents a number if it's located from the 1st to 2nd band for a 4 band type or 1st to 3rd band for a 5 band and 6 band type. Table 2 shows the different band colors and their values.

Table 2. Resistor colors and values.

Color	Value
Black (2nd and 3rd bands only)	0
Brown	1
Red	2
Orange	3
Yellow	4
Green	5
Blue	6
Violet	7
Grey	8
White	9

Mnemonics were created to easily memorize the sequence of the colors. The most popular mnemonic is "Big Boys Race Our Young Girls But Violet Generally Wins" where the first letter of each word corresponds to the first letter of the color.

If the color is found on the 3rd band for a 4 band type or the 4th band for a 5 band and 6 band type, then it's a multiplier. as shown in Table 3.

Table 3. Resistor colors and value multiplier.

Color	Value
Black	x1
Brown	x10
Red	x100
Orange	x1000
Yellow	x10000
Green	x100000
Blue	x1000000
Violet	x10000000
Grey	x100000000
White	x1000000000

Notice that the number of zeroes equals the color's number as per the previous table.

The 4th band (or 5th for the 5 band and 6 band) indicates the tolerance values. Here, two colors are added (gold and silver).

Table 4. Resistor colors and tolerance values, including gold and silver.

Color	Value
Black	N/A
Brown	±1%
Red	±2%
Orange	±3%
Yellow	±4%
Green	±0.5%
Blue	±0.25%
Violet	±0.10%
Grey	±0.05%
White	N/A
Gold	±5%
Silver	±10%

The 6th band for a 6 band type resistor is the temperature coefficient. This indicates how much the actual resistance value of the resistor changes when the temperature changes. Table 5 shows these values for each corresponding color.

Table 5. Resistor color and temperature coefficients.

Color	Value
Black	N/A
Brown	100 ppm/°C
Red	50 ppm/°C
Orange	15 ppm/°C
Yellow	25 ppm/°C
Green	N/A
Blue	10 ppm/°C
Violet	5 ppm/°C
Grey	N/A
White	N/A

Resistor Color Code Exceptions

Below we'll go over some of the exceptions to the resistor color code.

5 Band Resistor With the 4th Band of Gold or Silver

All 5 band resistors with the 4th band of silver or gold form an exception and are utilized on specific or older resistors. The first two bands represent the significant digits, the 3rd band is a multiplication factor, the 4th band is for tolerance, and the 5th band is for the temperature coefficient (ppm/K).

Deviating Resistor Band Colors

To prevent metal and other particles from getting in the coating of high-voltage resistors, the gold and silver bands are often replaced with yellow and gray bands.

Single Black Resistor Band or Zero Ohm Resistor

A single black band on a resistor is called a zero-ohm resistor. Basically, it is a wire link used to connect traces on a printed circuit board (PCB) that is packaged in the same physical package format as a resistor. This packaging allows the zero-ohm resistor to be placed on the circuit board using the equipment typically used to place other resistors.

Resistance Reliability Band

When resistors are produced per military specifications, they will often include a band that indicates reliability. This band is specifically for failure rate percentage per 1000 hours of service. This band is rarely used in commercial electronics. In addition, 4 band resistors typically use this reliability band.

More information about this can be found in the US military handbook MIL-HDBK-199.

Further Reading

- Textbook – Resistor: Ohm's Law
- Textbook – Resistor Color Codes
- Worksheet – Resistors
- Understanding Electrical Resistance

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- ilane** April 29, 2016

Yep. Those were the days. I'll never forget the basics of this. Some of the stuff, though, is esoteric as hell. Who'd make these days a ±0.05% tolerance resistor and mark it with color bands? Who has ever made one?

Like

Reply
- col_paneK** November 05, 2016

Funny. I never heard that mnemonic, but something similar which I won't repeat.

Like

Reply
- Eugene Edwards** December 22, 2016

I find this to be extremely helpful it's about to save me \$250.00 because now I can replace the resistor I fried on my electric board instead of buying a whole new board I'm so grateful to finally find a site that gives detailed information on electronics no one in this area wants to learn it so colleges have not had the class available thank you very much

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