Capacitor codes

Turn 104, 473J or 2A into a value in pF, nF and µF, a tolerance and a voltage.

LearnEE
CHEAT SHEET

Reading a 3-digit code

1 **0** **4**

1 0 are the first two digits.
4 is how many zeros follow.
The answer is in **picofarads (pF)**.

104 = 10 and 4 zeros = 100,000 pF = **100 nF = 0.1 µF**

- **473** = 47,000 pF = 47 nF
- **222** = 2,200 pF = 2.2 nF
- **101** = 100 pF
- A third digit of **9** means divide by ten: **109** = 1.0 pF.
- Just two digits, like **22** or **47**, is the value in pF.

pF, nF and µF

pF ÷ 1000 → **nF** ÷ 1000 → **µF**

1 µF = 1000 nF = 1,000,000 pF

Other ways to write it: **4n7** = 4.7 nF, **2p2** = 2.2 pF, **µ47** or **u47** = 0.47 µF. On older parts a plain **.1** or **0.047** is in µF.

Common codes

Code	pF	nF	µF
100	10 pF	0.01 nF	0.00001 µF
220	22 pF	0.022 nF	0.000022 µF
101	100 pF	0.1 nF	0.0001 µF
221	220 pF	0.22 nF	0.00022 µF
471	470 pF	0.47 nF	0.00047 µF
102	1,000 pF	1 nF	0.001 µF
222	2,200 pF	2.2 nF	0.0022 µF
472	4,700 pF	4.7 nF	0.0047 µF
103	10,000 pF	10 nF	0.01 µF
223	22,000 pF	22 nF	0.022 µF
473	47,000 pF	47 nF	0.047 µF
104	100,000 pF	100 nF	0.1 µF
224	220,000 pF	220 nF	0.22 µF
474	470,000 pF	470 nF	0.47 µF
105	1,000,000 pF	1,000 nF	1 µF
225	2,200,000 pF	2,200 nF	2.2 µF
475	4,700,000 pF	4,700 nF	4.7 µF
106	10,000,000 pF	10,000 nF	10 µF

104 (100 nF) is the one by every chip's power pin.

Tolerance letters

B	±0.1 pF	**J**	±5%
C	±0.25 pF	**K**	±10%
D	±0.5 pF	**M**	±20%
F	±1%	**Z**	+80% / −20%
G	±2%		

B, C and D are for capacitors under about 10 pF.

Voltage codes

0J	6.3 V	**1J**	63 V
1A	10 V	**2A**	100 V
1C	16 V	**2D**	200 V
1E	25 V	**2E**	250 V
1V	35 V	**2G**	400 V
1H	50 V	**2J**	630 V

Electrolytics



Value and voltage are printed in full, like 470 µF 25 V. The **stripe marks the − leg**, and the longer leg is +.

Reading a capacitor, step by step

1. **A can with a stripe** is an electrolytic: read the value and voltage as printed.
2. **Three digits** on a ceramic or film capacitor: read the value in pF, then move to nF or µF.
3. **A letter straight after the digits** is the tolerance.
4. **A digit-and-letter pair** like 1H or 2A elsewhere on the body is the voltage.

So **2A104J** is 100 nF, ±5%, rated 100 V. Pick a rating comfortably above the supply: 16 V on a 12 V supply is fine, 10 V will fail.

Common values

Capacitors usually come in the E6 series: **1, 1.5, 2.2, 3.3, 4.7 and 6.8** in each decade.

The ones you'll reach for most: 22 pF, 100 pF, 1 nF, 10 nF, 100 nF, 1 µF, 10 µF, 100 µF and 470 µF.