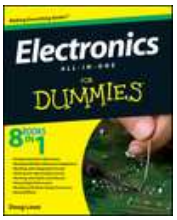
dummies
A Wiley Brand

Electronics Components: How to Read Capacitance Values on a Capacitor



RELATED BOOK

Electronics All-in-One For Dummies

By **Doug Lowe**

If there's enough room on the capacitor, most manufacturers of electronics components print the capacitance directly on the capacitor along with other information such as the working voltage and perhaps the tolerance. However, small capacitors don't have enough room for all that. Many capacitor manufacturers use a shorthand notation to indicate capacitance on small caps.

If you have a capacitor that has nothing other than a three-digit number printed on it, the third digit represents the number of zeros to add to the end of the first two digits. The resulting number is the capacitance in pF. For example, *101* represents 100 pF: the digits 10 followed by one additional zero.

If there are only two digits listed, the number is simply the capacitance in pF. Thus, the digits *22* indicate a 22 pF capacitor.

This shows how some common capacitor values are represented using this notation:

Marking	Capacitance (pF)	Capacitance (ìF)
101	100 pF	0.0001 ìF
221	220 pF	0.00022 ìF
471	470 pF	0.00047 ìF
102	1,000 pF	0.001 ìF

222	2,200 pF	0.0022 ìF
472	4,700 pF	0.0047 ìF
103	10,000 pF	0.01 ìF
223	22,000 pF	0.022 ìF
473	47,000 pF	0.047 ìF
104	100,000 pF	0.1 ìF
224	220,000 pF	0.22 ìF
474	470,000 pF	0.47 ìF
105	1,000,000 pF	1 ìF
225	2,200,000 pF	2.2 ìF
475	4,700,000 pF	4.7 ìF

You may also see a letter printed on the capacitor to indicate the tolerance. You can interpret the tolerance letter as follows:

Letter	**Tolerance**
A	±0.05 pF
B	±0.1 pF
C	±0.25 pF
D	±0.5 pF
E	±0.5%
F	±1%
G	±2%
H	±3%
J	±5 %
K	±10%
L	±15%
M	±20%
N	±30%

P	–0%, + 100%
S	–20%, + 50%
W	–0%, + 200%
X	–20%, + 40%
Z	–20%, + 80%

Notice that the tolerances for codes P through Z are a little odd. For codes P and W, the manufacturer promises that the capacitance will be no less than the stated value but may be as much as 100% or 200% over the stated value.

For codes S, X, and Z, the actual capacitance may be as much as 20% below the stated value or as much as 50%, 40%, or 80% over the stated value. For example, if the marking is 101P, the actual capacitance is no less than 100 pF but may be as much as 200 pF. If the marking is 101Z, the capacitance is between 80 pF and 180 pF.