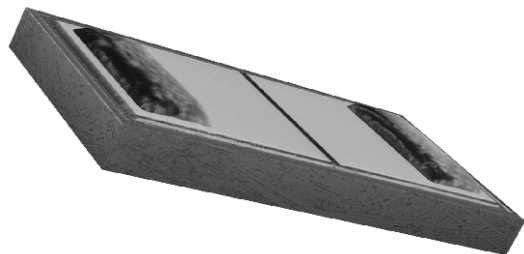




High Performance, High Precision Surface Mount 0402 Capacitor



PATENTED

ELECTRICAL SPECIFICATIONS

Operating Temperature: - 55 °C to + 125 °C
Temperature Coefficient of Capacitance (TCC): 0 ± 30 ppm/°C
Insulation Resistance: 10¹¹ Ω min
Voltage: 2.5 x rated voltage (DC) for 5 seconds
Ageing: none

ENVIRONMENTAL SPECIFICATIONS

Life Test: 1000 hours, + 125 °C at 2 x rated voltage (DC)
Thermal Shock: 100 Cycles, - 55 °C/+ 150 °C
Moisture Resistance: 1000 hours at rated DCV, 85 % RH, + 85 °C

FEATURES

- Terminations are Sn/Ag/Cu or Au. The standard product is lead (Pb)-free and RoHS compliant, but terminations containing lead are available
- New technology surface mount capacitor based on a special semiconductor process
- Construction reduces the parasitic inductance and brings the SRF values to ultra-high frequencies
- Capacitance is extremely stable in a wide range of frequencies from 1 MHz to several GHz
- High Q and low ESR
- Tight tolerance to ± 1 % or 0.05 pF
- Ultra high SRF
- Low parasitic inductance (~ 0.032 nH)
- Capacitance range: 0.1 pF to 180



RoHS*
COMPLIANT

APPLICATIONS

- Wireless communications
- Mobile phones
- Cordless phones
- GPS
- VCO
- Filter Networks
- Matching Networks
- Embedded substrates

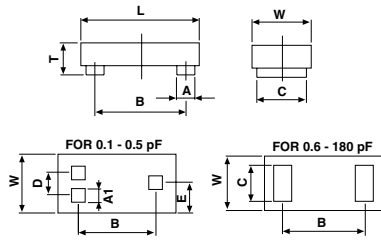
| CAPACITANCE TOLERANCE CODE | | | | | |
|----------------------------|-----------|-----------|----------------------|-------|-------|
| FOR LESS THAN 10 pF | | | FOR 10 pF AND HIGHER | | |
| A | B | C | F | G | J |
| ± 0.05 pF | ± 0.10 pF | ± 0.25 pF | ± 1 % | ± 2 % | ± 5 % |

| ORDERING INFORMATION | | | | | | | | |
|--|------|------|---|-----------------------|---|--|--|--|
| HPC | 0402 | A | 100 | G | X | X | T0 | XX |
| MODEL | SIZE | TYPE | CAPACITANCE VALUE | CAPACITANCE TOLERANCE | TERMINATION | VOLTAGE | PACKAGING | SPECIAL ENGINEERING CONTROL CODE |
| | | | The first two digits are significant, the third is a multiplier. An "R" indicates a decimal point. Examples: 101 = 100 pF 4R7 = 4.7 pF | see chart above | X = Tin/Lead termination W = Lead (Pb)-free terminations | 1 = 6 V Z = 10 V Y = 16 V X = 25 V M = 50 V L = 100 V | T0 = 10 000 pcs T5 = 5000 pcs T1 = 1000 pcs tape and reel | Leave blank when no special requirements apply |
| "W" terminations preferred. "See Part Numbering System, Document 10147, for complete explanations." | | | | | | | | |

* Pb containing terminations are not RoHS compliant, exemptions may apply.



DIMENSIONS

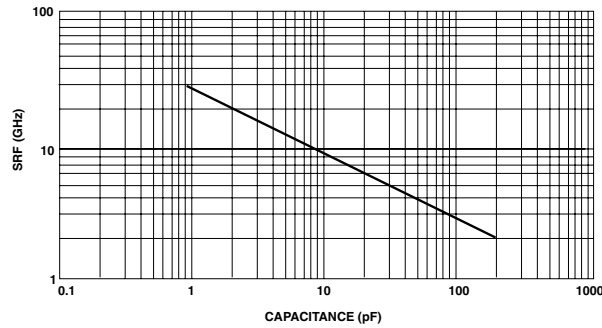


| DIMENSION | INCHES | MILLIMETERS |
|-----------|---------------|-------------|
| L | 0.040 ± 0.002 | 1.02 ± 0.05 |
| W | 0.020 ± 0.002 | 0.51 ± 0.05 |
| T* | 0.016 ± 0.004 | 0.40 ± 0.10 |
| A | 0.006 ± 0.002 | 0.15 ± 0.05 |
| A1 | 0.004 ± 0.001 | 0.10 ± 0.03 |
| B | 0.028 ± 0.002 | 0.71 ± 0.05 |
| C | 0.014 ± 0.002 | 0.36 ± 0.05 |
| D | 0.008 ± 0.002 | 0.20 ± 0.05 |
| E | 0.010 ± 0.002 | 0.25 ± 0.05 |

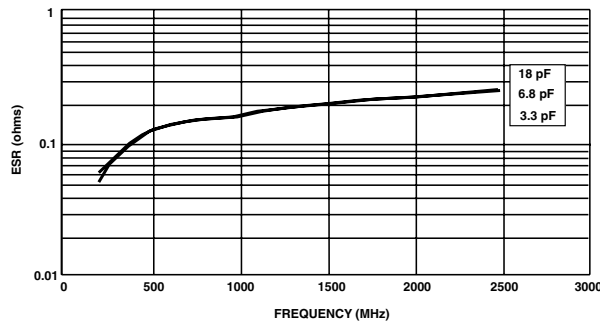
For PCB pad design please see assembly/reflow recommendations document 10125.

* For low profile versions see data sheet HPC0402B/C

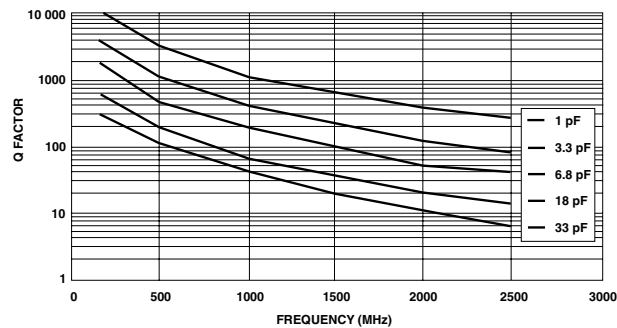
SRF VS. CAPACITANCE (TYPICAL)



ESR VS. FREQUENCY (TYPICAL)



Q VS. FREQUENCY (TYPICAL)



Not for new designs, this product will be discontinued soon

HPC0402A



Vishay

High Performance, High Precision
Surface Mount 0402 Capacitor

| CAPACITANCE RANGE AND VOLTAGE | | | | | | | |
|-------------------------------|-----------|---------------------------------|-------|-------|-------|-------|-------|
| CAPACITANCE (pF) | TOLERANCE | VOLTAGE RATING AND VOLTAGE CODE | | | | | |
| | | 100 V | 50 V | 25 V | 16 V | 10 V | 6 V |
| | | CODE: | CODE: | CODE: | CODE: | CODE: | CODE: |
| 0.1 | A,B,C | L | M | X | Y | Z | 1 |
| 0.2 | A,B,C | L | M | X | Y | Z | 1 |
| 0.3 | A,B,C | L | M | X | Y | Z | 1 |
| 0.4 | A,B,C | L | M | X | Y | Z | 1 |
| 0.5 | A,B,C | L | M | X | Y | Z | 1 |
| 0.6 | A,B,C | L | M | X | Y | Z | 1 |
| 0.7 | A,B,C | L | M | X | Y | Z | 1 |
| 0.8 | A,B,C | L | M | X | Y | Z | 1 |
| 0.9 | A,B,C | L | M | X | Y | Z | 1 |
| 1.0 | A,B,C | L | M | X | Y | Z | 1 |
| 1.2 | A,B,C | L | M | X | Y | Z | 1 |
| 1.3 | A,B,C | L | M | X | Y | Z | 1 |
| 1.5 | A,B,C | L | M | X | Y | Z | 1 |
| 1.6 | A,B,C | L | M | X | Y | Z | 1 |
| 1.8 | A,B,C | L | M | X | Y | Z | 1 |
| 2.0 | A,B,C | L | M | X | Y | Z | 1 |
| 2.2 | A,B,C | L | M | X | Y | Z | 1 |
| 2.4 | A,B,C | L | M | X | Y | Z | 1 |
| 2.7 | A,B,C | L | M | X | Y | Z | 1 |
| 3.0 | A,B,C | L | M | X | Y | Z | 1 |
| 3.3 | A,B,C | L | M | X | Y | Z | 1 |
| 3.6 | A,B,C | L | M | X | Y | Z | 1 |
| 3.9 | A,B,C | | M | X | Y | Z | 1 |
| 4.3 | A,B,C | | M | X | Y | Z | 1 |
| 4.7 | A,B,C | | M | X | Y | Z | 1 |
| 5.1 | A,B,C | | M | X | Y | Z | 1 |
| 5.6 | A,B,C | | M | X | Y | Z | 1 |
| 6.2 | A,B,C | | M | X | Y | Z | 1 |
| 6.8 | A,B,C | | M | X | Y | Z | 1 |
| 7.5 | A,B,C | | M | X | Y | Z | 1 |
| 8.2 | A,B,C | | M | X | Y | Z | 1 |
| 9.1 | A,B,C | | | X | Y | Z | 1 |
| 10 | F,G,J | | | X | Y | Z | 1 |
| 11 | F,G,J | | | X | Y | Z | 1 |
| 12 | F,G,J | | | X | Y | Z | 1 |
| 13 | F,G,J | | | | Y | Z | 1 |
| 15 | F,G,J | | | | Y | Z | 1 |
| 16 | F,G,J | | | | Y | Z | 1 |
| 18 | F,G,J | | | | Y | Z | 1 |
| 20 | F,G,J | | | | | Z | 1 |
| 22 | F,G,J | | | | | Z | 1 |
| 24 | F,G,J | | | | | Z | 1 |
| 27 | F,G,J | | | | | Z | 1 |
| 30 | F,G,J | | | | | Z | 1 |
| 33 | F,G,J | | | | | Z | 1 |
| 36 | F,G,J | | | | | Z | 1 |
| 39 | F,G,J | | | | | Z | 1 |
| 43 | F,G,J | | | | | Z | 1 |
| 47 | F,G,J | | | | | Z | 1 |
| 51 | F,G,J | | | | | | 1 |
| 56 | F,G,J | | | | | | 1 |
| 62 | F,G,J | | | | | | 1 |
| 68 | F,G,J | | | | | | 1 |
| 75 | F,G,J | | | | | | 1 |
| 82 | F,G,J | | | | | | 1 |
| 91 | F,G,J | | | | | | 1 |
| 100 | F,G,J | | | | | | 1 |
| 110 | F,G,J | | | | | | 1 |
| 120 | F,G,J | | | | | | 1 |
| 130 | F,G,J | | | | | | 1 |
| 150 | F,G,J | | | | | | 1 |
| 160 | F,G,J | | | | | | 1 |
| 180 | F,G,J | | | | | | 1 |



Not for new designs, this product will be discontinued soon

HPC0402A

High Performance, High Precision
Surface Mount 0402 Capacitor

Vishay

| ELECTRICAL SPECIFICATIONS ¹⁾ | | | | | | | | | | | | |
|---|----------------------|-------------------|--------------|--------|--------------|------|--------------|------|--------------|-----|--------------|-----|
| CAPACITANCE (pF) | TOLERANC E CODE** | SRF (GHz) TYP. | 200 MHz | | 500 MHz | | 1000 MHz | | 2000 MHz | | 2500 MHz | |
| | | | Ceff TYP. | Q | Ceff TYP. | Q | Ceff TYP. | Q | Ceff TYP. | Q | Ceff TYP. | Q |
| 0.1 | A,B,C | N/A | | | | | | | | | | |
| 0.2 | A,B,C | N/A | | | | | | | | | | |
| 0.3 | A,B,C | N/A | | | | | | | | | | |
| 0.4 | A,B,C | N/A | | | | | | | | | | |
| 0.5 | A,B,C | N/A | | | | | | | | | | |
| 0.6 | A,B,C | N/A | | | | | | | | | | |
| 0.7 | A,B,C | N/A | | | | | | | | | | |
| 0.8 | A,B,C | 32.5 | 0.80 | 12 994 | 0.80 | 3924 | 0.80 | 1392 | 0.80 | 439 | 0.80 | 296 |
| 0.9 | A,B,C | 30.6 | 0.90 | 12 052 | 0.90 | 3639 | 0.90 | 1291 | 0.90 | 407 | 0.91 | 275 |
| 1.0 | A,B,C | 29.1 | 1.00 | 11 340 | 1.00 | 3424 | 1.00 | 1215 | 1.00 | 383 | 1.01 | 258 |
| 1.2 | A,B,C | 26.5 | 1.20 | 10 395 | 1.20 | 3139 | 1.20 | 1113 | 1.21 | 351 | 1.21 | 236 |
| 1.3 | A,B,C | 25.5 | 1.30 | 9595 | 1.30 | 2897 | 1.30 | 1028 | 1.31 | 324 | 1.31 | 218 |
| 1.5 | A,B,C | 23.7 | 1.50 | 8316 | 1.50 | 2511 | 1.50 | 890 | 1.51 | 280 | 1.52 | 189 |
| 1.6 | A,B,C | 23.0 | 1.60 | 7796 | 1.60 | 2354 | 1.60 | 835 | 1.61 | 263 | 1.62 | 177 |
| 1.8 | A,B,C | 21.7 | 1.80 | 6930 | 1.80 | 2092 | 1.80 | 742 | 1.82 | 233 | 1.82 | 157 |
| 2.0 | A,B,C | 20.5 | 2.00 | 6237 | 2.00 | 1883 | 2.00 | 667 | 2.02 | 210 | 2.03 | 141 |
| 2.2 | A,B,C | 19.6 | 2.20 | 5670 | 2.20 | 1711 | 2.21 | 607 | 2.22 | 190 | 2.24 | 128 |
| 2.4 | A,B,C | 18.8 | 2.40 | 5197 | 2.40 | 1569 | 2.41 | 556 | 2.43 | 174 | 2.44 | 117 |
| 2.7 | A,B,C | 17.7 | 2.70 | 4620 | 2.70 | 1394 | 2.71 | 494 | 2.73 | 155 | 2.76 | 104 |
| 3.0 | A,B,C | 16.8 | 3.00 | 4158 | 3.00 | 1255 | 3.01 | 444 | 3.04 | 139 | 3.07 | 93 |
| 3.3 | A,B,C | 16.0 | 3.30 | 3780 | 3.30 | 1141 | 3.31 | 404 | 3.35 | 126 | 3.38 | 85 |
| 3.6 | A,B,C | 15.3 | 3.60 | 3464 | 3.60 | 1045 | 3.62 | 370 | 3.66 | 116 | 3.70 | 77 |
| 3.9 | A,B,C | 14.7 | 3.90 | 3198 | 3.90 | 965 | 3.92 | 341 | 3.97 | 107 | 4.02 | 71 |
| 4.3 | A,B,C | 14.0 | 4.30 | 2900 | 4.31 | 875 | 4.32 | 310 | 4.39 | 96 | 4.44 | 64 |
| 4.7 | A,B,C | 13.4 | 4.70 | 2654 | 4.71 | 801 | 4.73 | 283 | 4.81 | 88 | 4.87 | 59 |
| 5.1 | A,B,C | 12.9 | 5.10 | 2445 | 5.11 | 738 | 5.13 | 261 | 5.23 | 81 | 5.30 | 54 |
| 5.6 | A,B,C | 12.3 | 5.60 | 2227 | 5.61 | 672 | 5.64 | 237 | 5.75 | 74 | 5.84 | 49 |
| 6.2 | A,B,C | 11.7 | 6.20 | 2011 | 6.21 | 607 | 6.25 | 214 | 6.39 | 66 | 6.50 | 44 |
| 6.8 | A,B,C | 11.1 | 6.80 | 1834 | 6.81 | 553 | 6.86 | 195 | 7.03 | 60 | 7.16 | 40 |
| 7.5 | A,B,C | 10.6 | 7.50 | 1663 | 7.52 | 501 | 7.57 | 177 | 7.78 | 54 | 7.94 | 36 |
| 8.2 | A,B,C | 10.1 | 8.20 | 1521 | 8.22 | 458 | 8.28 | 162 | 8.53 | 50 | 8.73 | 33 |
| 9.1 | A,B,C | 9.6 | 9.10 | 1370 | 9.12 | 413 | 9.20 | 145 | 9.51 | 45 | 9.76 | 29 |
| 10 | F,G,J | 9.2 | 10.0 | 1247 | 10.0 | 376 | 10.1 | 132 | 10.5 | 40 | 10.8 | 27 |
| 11 | F,G,J | 8.8 | 11.0 | 1133 | 11.0 | 341 | 11.1 | 120 | 11.6 | 36 | 12.0 | 24 |
| 12 | F,G,J | 8.4 | 12.0 | 1039 | 12.0 | 313 | 12.2 | 110 | 12.7 | 33 | 13.2 | 22 |
| 13 | F,G,J | 8.1 | 13.0 | 959 | 13.1 | 289 | 13.2 | 101 | 13.9 | 31 | 14.4 | 20 |
| 15 | F,G,J | 7.5 | 15.0 | 831 | 15.1 | 250 | 15.3 | 88 | 16.1 | 26 | 16.9 | 17 |
| 16 | F,G,J | 7.3 | 16.0 | 779 | 16.1 | 234 | 16.3 | 82 | 17.3 | 24 | 18.1 | 16 |
| 18 | F,G,J | 6.8 | 18.0 | 692 | 18.1 | 208 | 18.4 | 73 | 19.7 | 22 | 20.8 | 14 |
| 20 | F,G,J | 6.5 | 20.0 | 623 | 20.1 | 187 | 20.5 | 65 | 22.1 | 19 | 23.5 | 12 |
| 22 | F,G,J | 6.2 | 22.0 | 566 | 22.1 | 170 | 22.6 | 59 | 24.6 | 17 | 26.3 | 11 |
| 24 | F,G,J | 5.9 | 24.0 | 519 | 24.2 | 156 | 24.7 | 54 | 27.1 | 16 | 29.2 | 10 |
| 27 | F,G,J | 5.6 | 27.0 | 461 | 27.2 | 138 | 27.9 | 48 | 31.0 | 14 | 33.7 | 8 |
| 30 | F,G,J | 5.3 | 30.0 | 415 | 30.3 | 124 | 31.1 | 43 | 35.0 | 12 | 38.6 | 7 |
| 33 | F,G,J | 5.1 | 33.1 | 377 | 33.3 | 113 | 34.3 | 39 | 39.1 | 11 | 43.7 | 7 |
| 36 | F,G,J | 4.8 | 36.1 | 346 | 36.4 | 104 | 37.6 | 36 | 43.4 | 10 | 49.1 | 6 |
| 39 | F,G,J | 4.7 | 39.1 | 319 | 39.5 | 95 | 40.9 | 33 | 47.8 | 9 | 54.8 | 5 |
| 43 | F,G,J | 4.4 | 43.1 | 290 | 43.6 | 87 | 45.3 | 30 | 54.0 | 8 | 63.1 | 5 |
| 47 | F,G,J | 4.2 | 47.1 | 265 | 47.7 | 79 | 49.8 | 27 | 60.5 | 7 | 72.1 | 4 |
| 51 | F,G,J | 4.1 | 51.1 | 244 | 51.8 | 73 | 54.3 | 25 | 67.2 | 6 | 81.9 | 3 |
| 56 | F,G,J | 3.9 | 56.1 | 222 | 56.9 | 66 | 60.0 | 22 | 76.2 | 6 | 95.6 | 3 |
| 62 | F,G,J | 3.7 | 62.2 | 201 | 63.2 | 60 | 66.9 | 20 | 87.8 | 5 | 114.6 | 2 |
| 68 | F,G,J | 3.5 | 68.2 | 183 | 69.4 | 54 | 74.0 | 18 | 100.3 | 4 | 136.9 | 2 |
| 75 | F,G,J | 3.4 | 75.3 | 166 | 76.7 | 49 | 82.3 | 16 | 116.3 | 4 | 168.6 | 2 |
| 82 | F,G,J | 3.2 | 82.3 | 152 | 84.0 | 45 | 90.8 | 15 | 134.1 | 3 | 208.6 | 1 |
| 91 | F,G,J | 3.0 | 91.4 | 136 | 93.5 | 40 | 102.0 | 13 | 160.0 | 3 | 278.8 | 1 |
| 100 | F,G,J | 2.9 | 100.5 | 124 | 103.1 | 37 | 113.4 | 12 | 190.0 | 2 | 384.9 | 1 |
| 110 | F,G,J | 2.8 | 110.6 | 113 | 113.7 | 33 | 126.5 | 11 | 229.7 | 2 | | |
| 120 | F,G,J | 2.7 | 120.7 | 103 | 124.4 | 30 | 139.9 | 10 | 278.1 | 2 | | |
| 130 | F,G,J | 2.5 | 130.8 | 95 | 135.2 | 28 | 153.7 | 9 | 338.4 | 1 | | |
| 150 | F,G,J | 2.4 | 151.1 | 83 | 157.0 | 24 | 182.4 | 7 | 518.3 | 1 | | |
| 160 | F,G,J | 2.3 | 161.2 | 77 | 168.0 | 22 | 197.4 | 7 | 661.1 | 1 | | |
| 180 | F,G,J | 2.2 | 181.5 | 69 | 190.1 | 20 | 228.8 | 6 | | | | |

1. 1) Additional non-standard values available on request
 ** A = ± 0.05; B = ± 0.10; C = ± 0.25; F = ± 1 %; G = ± 2 %; J = ± 5 %



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