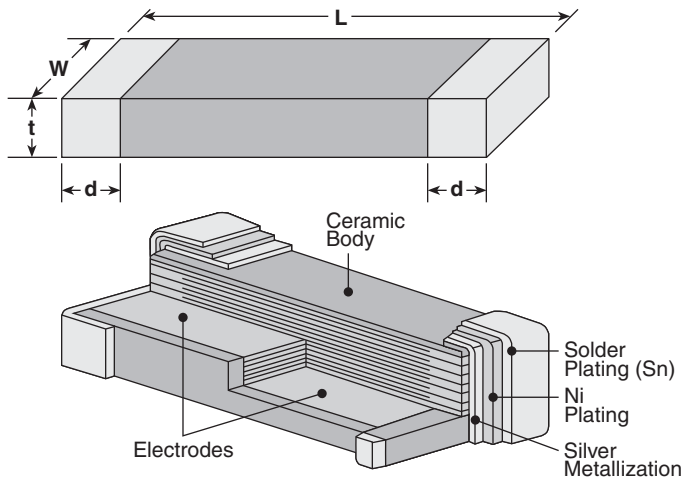




features

- High Q factor
- Low T.C.C.
- Available in high capacitance values (up to 100 μ F)
- Products with lead-free terminations meet EU RoHS requirements

dimensions and construction



| Case Size | Dimensions inches (mm) | | | |
|-------------|-------------------------------------|--------------------------------------|----------------|--------------------------------------|
| | L | W | t (Max.) | d |
| 0402 | .039 \pm .004 (1.0 \pm 0.1) | .02 \pm .004 (0.5 \pm 0.1) | .021 (0.55) | .01 \pm .006 (0.25 \pm 0.15) |
| 0603 | .063 \pm .006 (1.6 \pm 0.15) | .032 \pm .006 (0.81 \pm 0.15) | .035 (0.9) | .014 \pm .006 (0.35 \pm 0.15) |
| 0805 | .079 \pm .008 (2.01 \pm 0.2) | .049 \pm .008 (1.25 \pm 0.2) | .051 (1.3) | .02 \pm .01 (0.50 \pm 0.25) |
| 1206 | .126 \pm .008 (3.2 \pm 0.2) | .063 \pm .008 (1.6 \pm 0.2) | .059 (1.5) | .02 \pm .01 (0.5 \pm 0.25) |
| 1210 | .126 \pm .008 (3.2 \pm 0.2) | .098 \pm .008 (2.5 \pm 0.2) | .067 (1.7) | .02 \pm .01 (0.5 \pm 0.25) |

capacitors

ordering information

| New Part # | NPO | 0805 | H | T | TD | 101 | K |
|------------|--------------------------|--------------------------------------|--|-----------------------------|---|---|--|
| | Dielectric | Size | Voltage | Termination Material | Packaging | Capacitance | Tolerance |
| | NPO X5R X7R Y5V | 0402 0603 0805 1206 1210 | A = 10V C = 16V E = 25V H = 50V I = 100V J = 200V K = 6.3V | T: Sn | TP: 7" 2mm pitch (0402 only) TD: 7" paper tape TE: 7" embossed plastic TDB: 13" paper tape TEB: 13" embossed plastic | NPO, X5R, X7R, Y5V: 2 significant digits + no. of zeros. "R" indicates decimal point | B: \pm 0.1pF C: \pm 0.25pF D: \pm 0.5pF F: \pm 1% G: \pm 2% J: \pm 5% K: \pm 10% M: \pm 20% Z: +80, -20% |

For further information on packaging, please refer to Appendix B.

applications and ratings

| Dielectric | Capacitance Range | Capacitance Tolerance* | Voltage Ratings | Dissipation Factor | T.C.C. | Test Voltage | Operating Temperature | Insulation Resistance |
|------------|-------------------|--|--|---|----------------------|----------------|-----------------------|---|
| NPO | 0.47pF - 1000μF | .47pF~8.2pF= C:±0.25pF 5.6pF~8.2pF= D±0.5pF 10pF~ 10000pF= F:±1%, G:±2%,J:±5% | 50V 100V 200V | For Values >30pF: 0.1% max., ≤30pF: Q = 400 + 20 x C DF = 1/Q C is in pF | 0 ± 30 ppm/°C | 1.0 ± 0.2 Vrms | -55°C to +125°C | +25°C 100,000MΩ min. or 1000 MΩ - μF min. whichever is less |
| X5R | 0.068μF - 100μF | K: ±10% | 6.3V 10V | 6.3V = 7.5% max. 10V = 10% max. | ±15% (0 VDC) | 1.0 ± 0.2 Vrms | -55°C to +85°C | +25°C 100,000MΩ min. or 500 MΩ - μF min. whichever is less |
| X7R | 100pF - 4.7μF | K: ±10% | 10V 16V 25V 50V 100V 200V | 10V = 10% max. 16V = 3.5% max. 25V, 50V, 100V = 2.5% max. | ±15% (0 VDC) | 1.0 ± 0.2 Vrms | -55°C to +125°C | +25°C 100,000MΩ min. or 1000 MΩ - μF min. whichever is less |
| Y5V | 10000pF - 22μF | Z: +80, -20% | 10V 16V 25V 50V | 16V & 25V = 7.0% 50V = 5.0% | +22% to -82% max. | 1.0 ± 0.2 Vrms | -30°C to +85°C | +25°C 10,000MΩ min. or 1000 MΩ - μF min. whichever is less |

* Special tolerances available, please consult factory.

For complete environmental specifications, please refer to www.koaspeer.com

X5R capacitance voltage availability

| Size | | | 0402 | 0603 | | 0805 | 1206 | 1210 |
|--------------------------|-------|-----|-----------|------------|-----------|------------|-----------|-----------|
| Capacitance values pF | μF | | 10 (A) | 6.3 (K) | 10 (A) | 6.3 (K) | 10 (A) | 10 (A) |
| 56000 | 0.056 | 563 | | | | | | |
| 68000 | 0.068 | 683 | | | | | | |
| 82000 | 0.082 | 823 | | | | | | |
| 100000 | 0.10 | 104 | | | | | | |
| 120000 | 0.12 | 124 | | | | | | |
| 150000 | 0.15 | 154 | | | | | | |
| 180000 | 0.18 | 184 | | | | | | |
| 220000 | 0.22 | 224 | | | | | | |
| 270000 | 0.27 | 274 | | | | | | |
| 330000 | 0.33 | 334 | | | | | | |
| 470000 | 0.47 | 474 | | | | | | |
| 560000 | 0.56 | 564 | | | | | | |
| 680000 | 0.68 | 684 | | | | | | |
| 820000 | 0.82 | 824 | | | | | | |
| 1000000 | 1.0 | 105 | | | | | | |
| 1200000 | 1.2 | 125 | | | | | | |
| 1500000 | 1.5 | 155 | | | | | | |
| 1800000 | 1.8 | 185 | | | | | | |
| 2200000 | 2.2 | 225 | | | | | | |
| 3300000 | 3.3 | 335 | | | | | | |
| 4700000 | 4.7 | 475 | | | | | | |
| 6800000 | 6.8 | 685 | | | | | | |
| 10000000 | 10 | 106 | | | | | | |
| 22000000 | 22 | 226 | | | | | | |
| 47000000 | 47 | 476 | | | | | | |
| 100000000 | 100 | 107 | | | | | | |

Capacitance tolerance available: ±10%

Specifications given herein may be changed at any time without prior notice. Please confirm technical specifications before you order and/or use.

1/05/11

NPO capacitance voltage availability

| Size | | | | 0402* | 0603* | | 0805 | | | 1206 | | |
|------|--------------------------|-----------|------|-----------|-----------|------------|-----------|------------|------------|-----------|------------|------------|
| pF | Capacitance values µF | Cap. Code | WVDC | 50 (H) | 50 (H) | 100 (I) | 50 (H) | 100 (I) | 200 (J) | 50 (H) | 100 (I) | 200 (J) |
| 0.47 | .00000047 | R47 | | | | | | | | | | |
| 0.56 | .00000056 | R56 | | | | | | | | | | |
| 0.68 | .00000068 | R68 | | | | | | | | | | |
| 0.82 | .00000082 | R82 | | | | | | | | | | |
| 1 | .0000010 | 1R0 | | | | | | | | | | |
| 1.2 | .0000012 | 1R2 | | | | | | | | | | |
| 1.5 | .0000015 | 1R5 | | | | | | | | | | |
| 1.8 | .0000018 | 1R8 | | | | | | | | | | |
| 2.2 | .0000022 | 2R2 | | | | | | | | | | |
| 2.7 | .0000027 | 2R7 | | | | | | | | | | |
| 3.3 | .0000033 | 3R3 | | | | | | | | | | |
| 3.9 | .0000039 | 3R9 | | | | | | | | | | |
| 4.7 | .0000047 | 4R7 | | | | | | | | | | |
| 5.6 | .0000056 | 5R6 | | | | | | | | | | |
| 6.8 | .0000068 | 6R8 | | | | | | | | | | |
| 8.2 | .0000082 | 8R2 | | | | | | | | | | |
| 10 | .000010 | 100 | | | | | | | | | | |
| 12 | .000012 | 120 | | | | | | | | | | |
| 15 | .000015 | 150 | | | | | | | | | | |
| 18 | .000018 | 180 | | | | | | | | | | |
| 22 | .000022 | 220 | | | | | | | | | | |
| 27 | .000027 | 270 | | | | | | | | | | |
| 33 | .000033 | 330 | | | | | | | | | | |
| 39 | .000039 | 390 | | | | | | | | | | |
| 47 | .000047 | 470 | | | | | | | | | | |
| 56 | .000056 | 560 | | | | | | | | | | |
| 68 | .000068 | 680 | | | | | | | | | | |
| 82 | .000082 | 820 | | | | | | | | | | |
| 100 | .0001 | 101 | | | | | | | | | | |
| 120 | .00012 | 121 | | | | | | | | | | |
| 150 | .00015 | 151 | | | | | | | | | | |
| 180 | .00018 | 181 | | | | | | | | | | |
| 220 | .00022 | 221 | | | | | | | | | | |
| 270 | .00027 | 271 | | | | | | | | | | |
| 330 | .00033 | 331 | | | | | | | | | | |
| 390 | .00039 | 391 | | | | | | | | | | |
| 470 | .00047 | 471 | | | | | | | | | | |
| 560 | .00056 | 561 | | | | | | | | | | |
| 680 | .00068 | 681 | | | | | | | | | | |
| 820 | .00082 | 821 | | | | | | | | | | |
| 1000 | .0010 | 102 | | | | | | | | | | |
| 1200 | .0012 | 122 | | | | | | | | | | |

Capacitance tolerance available:

.47pF~8.2pF = C: ±0.25pF

5.6pF~8.2pF = D: ±0.5pF

10pF~10000pF = F: ±1%, G: ±2%, J: ±5%

X7R capacitance voltage availability

| Size | | | 0402 | | | | 0603 | | | | 0805 | | | | 1206 | | | | | 1210 | | | | |
|-------------------|--------------|-----------|------|-----|-----|-----|------|-----|-----|-----|------|-----|-----|-----|------|-----|-----|-----|-----|------|-----|-----|-----|-----|
| Capacitance pF | values μF | Cap. Code | 10 | 16 | 25 | 50 | 10 | 16 | 25 | 50 | 10 | 16 | 25 | 50 | 100 | 200 | 10 | 16 | 50 | 100 | 200 | 50 | 100 | 200 |
| | | | (A) | (C) | (E) | (H) | (A) | (C) | (E) | (H) | (A) | (C) | (E) | (H) | (I) | (J) | (A) | (C) | (H) | (I) | (J) | (H) | (I) | (J) |
| 100 | .0001 | 101 | | | | | | | | | | | | | | | | | | | | | | |
| 120 | .00012 | 121 | | | | | | | | | | | | | | | | | | | | | | |
| 150 | .00015 | 151 | | | | | | | | | | | | | | | | | | | | | | |
| 180 | .00018 | 181 | | | | | | | | | | | | | | | | | | | | | | |
| 220 | .00022 | 221 | | | | | | | | | | | | | | | | | | | | | | |
| 270 | .00027 | 271 | | | | | | | | | | | | | | | | | | | | | | |
| 330 | .00033 | 331 | | | | | | | | | | | | | | | | | | | | | | |
| 390 | .00039 | 391 | | | | | | | | | | | | | | | | | | | | | | |
| 470 | .00047 | 471 | | | | | | | | | | | | | | | | | | | | | | |
| 560 | .00056 | 561 | | | | | | | | | | | | | | | | | | | | | | |
| 680 | .00068 | 681 | | | | | | | | | | | | | | | | | | | | | | |
| 820 | .00082 | 821 | | | | | | | | | | | | | | | | | | | | | | |
| 1000 | .0010 | 102 | | | | | | | | | | | | | | | | | | | | | | |
| 1200 | .0012 | 122 | | | | | | | | | | | | | | | | | | | | | | |
| 1500 | .0015 | 152 | | | | | | | | | | | | | | | | | | | | | | |
| 1800 | .0018 | 182 | | | | | | | | | | | | | | | | | | | | | | |
| 2200 | .0022 | 222 | | | | | | | | | | | | | | | | | | | | | | |
| 2700 | .0027 | 272 | | | | | | | | | | | | | | | | | | | | | | |
| 3300 | .0033 | 332 | | | | | | | | | | | | | | | | | | | | | | |
| 3900 | .0039 | 392 | | | | | | | | | | | | | | | | | | | | | | |
| 4700 | .0047 | 472 | | | | | | | | | | | | | | | | | | | | | | |
| 5600 | .0056 | 562 | | | | | | | | | | | | | | | | | | | | | | |
| 6800 | .0068 | 682 | | | | | | | | | | | | | | | | | | | | | | |
| 8200 | .0082 | 822 | | | | | | | | | | | | | | | | | | | | | | |
| 10000 | .010 | 103 | | | | | | | | | | | | | | | | | | | | | | |
| 12000 | .012 | 123 | | | | | | | | | | | | | | | | | | | | | | |
| 15000 | .015 | 153 | | | | | | | | | | | | | | | | | | | | | | |
| 18000 | .018 | 183 | | | | | | | | | | | | | | | | | | | | | | |
| 22000 | .022 | 223 | | | | | | | | | | | | | | | | | | | | | | |
| 27000 | .027 | 273 | | | | | | | | | | | | | | | | | | | | | | |
| 33000 | .033 | 333 | | | | | | | | | | | | | | | | | | | | | | |
| 39000 | .039 | 393 | | | | | | | | | | | | | | | | | | | | | | |
| 47000 | .047 | 473 | | | | | | | | | | | | | | | | | | | | | | |
| 56000 | .056 | 563 | | | | | | | | | | | | | | | | | | | | | | |
| 68000 | .068 | 683 | | | | | | | | | | | | | | | | | | | | | | |
| 82000 | .082 | 823 | | | | | | | | | | | | | | | | | | | | | | |
| 100000 | .100 | 104 | | | | | | | | | | | | | | | | | | | | | | |
| 120000 | .120 | 124 | | | | | | | | | | | | | | | | | | | | | | |
| 150000 | .150 | 154 | | | | | | | | | | | | | | | | | | | | | | |
| 180000 | .180 | 184 | | | | | | | | | | | | | | | | | | | | | | |
| 220000 | .220 | 224 | | | | | | | | | | | | | | | | | | | | | | |
| 270000 | .270 | 274 | | | | | | | | | | | | | | | | | | | | | | |
| 330000 | .330 | 334 | | | | | | | | | | | | | | | | | | | | | | |
| 390000 | .390 | 394 | | | | | | | | | | | | | | | | | | | | | | |
| 470000 | .470 | 474 | | | | | | | | | | | | | | | | | | | | | | |
| 560000 | .560 | 564 | | | | | | | | | | | | | | | | | | | | | | |
| 680000 | .680 | 684 | | | | | | | | | | | | | | | | | | | | | | |
| 1000000 | 1.00 | 105 | | | | | | | | | | | | | | | | | | | | | | |
| 1200000 | 1.20 | 125 | | | | | | | | | | | | | | | | | | | | | | |
| 1500000 | 1.50 | 155 | | | | | | | | | | | | | | | | | | | | | | |
| 1800000 | 1.80 | 185 | | | | | | | | | | | | | | | | | | | | | | |
| 2200000 | 2.20 | 225 | | | | | | | | | | | | | | | | | | | | | | |
| 3900000 | 3.90 | 395 | | | | | | | | | | | | | | | | | | | | | | |
| 4700000 | 4.70 | 475 | | | | | | | | | | | | | | | | | | | | | | |

Capacitance tolerance available: ±10%

Y5V capacitance voltage availability

| Size | | | 0402 | 0603 | | | 0805 | | | | 1206 | | | |
|--------------------------|-------|-----------|------|------|-----|-----|------|-----|-----|-----|------|-----|-----|-----|
| Capacitance values pF | μF | Cap. Code | 16 | 16 | 25 | 50 | 10 | 16 | 25 | 50 | 10 | 16 | 25 | 50 |
| | | | (C) | (C) | (E) | (H) | (A) | (C) | (E) | (H) | (A) | (C) | (E) | (H) |
| 2200 | .0022 | 222 | | | | | | | | | | | | |
| 2700 | .0027 | 272 | | | | | | | | | | | | |
| 3300 | .0033 | 332 | | | | | | | | | | | | |
| 3900 | .0039 | 392 | | | | | | | | | | | | |
| 4700 | .0047 | 472 | | | | | | | | | | | | |
| 5600 | .0056 | 562 | | | | | | | | | | | | |
| 6800 | .0068 | 682 | | | | | | | | | | | | |
| 8200 | .0082 | 822 | | | | | | | | | | | | |
| 10000 | .010 | 103 | | | | | | | | | | | | |
| 12000 | .012 | 123 | | | | | | | | | | | | |
| 15000 | .015 | 153 | | | | | | | | | | | | |
| 18000 | .018 | 183 | | | | | | | | | | | | |
| 22000 | .022 | 223 | | | | | | | | | | | | |
| 27000 | .027 | 273 | | | | | | | | | | | | |
| 33000 | .033 | 333 | | | | | | | | | | | | |
| 39000 | .039 | 393 | | | | | | | | | | | | |
| 47000 | .047 | 473 | | | | | | | | | | | | |
| 56000 | .056 | 563 | | | | | | | | | | | | |
| 68000 | .068 | 683 | | | | | | | | | | | | |
| 82000 | .082 | 823 | | | | | | | | | | | | |
| 100000 | .100 | 104 | | | | | | | | | | | | |
| 120000 | .120 | 124 | | | | | | | | | | | | |
| 150000 | .150 | 154 | | | | | | | | | | | | |
| 180000 | .180 | 184 | | | | | | | | | | | | |
| 220000 | .220 | 224 | | | | | | | | | | | | |
| 270000 | .270 | 274 | | | | | | | | | | | | |
| 330000 | .330 | 334 | | | | | | | | | | | | |
| 390000 | .390 | 394 | | | | | | | | | | | | |
| 470000 | .470 | 474 | | | | | | | | | | | | |
| 560000 | .560 | 564 | | | | | | | | | | | | |
| 680000 | .680 | 684 | | | | | | | | | | | | |
| 820000 | .820 | 824 | | | | | | | | | | | | |
| 1000000 | 1.0 | 105 | | | | | | | | | | | | |
| 1200000 | 1.2 | 125 | | | | | | | | | | | | |
| 1500000 | 1.5 | 155 | | | | | | | | | | | | |
| 1800000 | 1.8 | 185 | | | | | | | | | | | | |
| 2200000 | 2.2 | 225 | | | | | | | | | | | | |
| 2700000 | 2.7 | 275 | | | | | | | | | | | | |
| 3300000 | 3.3 | 335 | | | | | | | | | | | | |
| 3900000 | 3.9 | 395 | | | | | | | | | | | | |
| 4700000 | 4.7 | 475 | | | | | | | | | | | | |
| 5600000 | 5.6 | 565 | | | | | | | | | | | | |
| 6800000 | 6.8 | 685 | | | | | | | | | | | | |
| 10000000 | 10 | 106 | | | | | | | | | | | | |
| 22000000 | 22 | 226 | | | | | | | | | | | | |

Capacitance tolerance available: +80%, -20%

capacitors