

X7R Dielectric

Specifications and Test Methods



| Parameter/Test | | X7R Specification Limits | Measuring Conditions | |
|---------------------------------------|-----------------------|---|--|--------------------|
| Operating Temperature Range | | -55°C to +125°C | Temperature Cycle Chamber | |
| Capacitance | | Within specified tolerance | | |
| Dissipation Factor | | $\leq 10\%$ for $\geq 50V$ DC rating $\leq 12.5\%$ for 25V DC rating $\leq 12.5\%$ for $\leq 10V$ DC rating Contact Factory for DF by PN | Freq.: 1.0 kHz $\pm 10\%$ Voltage: 1.0Vrms $\pm .2V$ For Cap > 10 μ F, 0.5Vrm @ 120Hz | |
| Insulation Resistance | | 10,000M Ω or 500M Ω - μ F, whichever is less | Charge device with rated voltage for 120 \pm 5 secs @ room temp/humidity | |
| Dielectric Strength | | No breakdown or visual defects | Charge device with 250% of rated voltage for 1-5 seconds, w/ charge and discharge current limited to 50 mA (max) Note: Charge device with 150% of rated voltage for 500V devices. | |
| Resistance to Flexure Stresses | Appearance | No defects | Deflection: 2mm Test Time: 30 seconds | |
| | Capacitance Variation | $\leq \pm 12\%$ | | |
| | Dissipation Factor | Meets Initial Values (As Above) | | |
| | Insulation Resistance | \geq Initial Value x 0.3 | | |
| Solderability | | $\geq 95\%$ of each terminal should be covered with fresh solder | Dip device in eutectic solder at 230 \pm 5°C for 5.0 \pm 0.5 seconds | |
| Resistance to Solder Heat | Appearance | No defects, <25% leaching of either end terminal | Dip device in eutectic solder at 260°C for 60 seconds. Store at room temperature for 24 \pm 2 hours before measuring electrical properties. | |
| | Capacitance Variation | $\leq \pm 7.5\%$ | | |
| | Dissipation Factor | Meets Initial Values (As Above) | | |
| | Insulation Resistance | Meets Initial Values (As Above) | | |
| | Dielectric Strength | Meets Initial Values (As Above) | | |
| Thermal Shock | Appearance | No visual defects | Step 1: -55°C \pm 2° | 30 \pm 3 minutes |
| | Capacitance Variation | $\leq \pm 7.5\%$ | Step 2: Room Temp | ≤ 3 minutes |
| | Dissipation Factor | Meets Initial Values (As Above) | Step 3: +125°C \pm 2° | 30 \pm 3 minutes |
| | Insulation Resistance | Meets Initial Values (As Above) | Step 4: Room Temp | ≤ 3 minutes |
| | Dielectric Strength | Meets Initial Values (As Above) | Repeat for 5 cycles and measure after 24 \pm 2 hours at room temperature | |
| Load Life | Appearance | No visual defects | Pre-treatment: After mounting, perform heat treatment 150+0/-10C for 2 hour, then stabilise for 24+/-2 hour at room temp, then measure. Charge device with \geq rated voltage in test chamber set at 125°C \pm 2°C for 1000 hours (+48, -0). Pre-treatment: After remove from test chamber, perform heat treatment 150+0/-10C for 2 hour, then stabilise for 24+/-2 hour at room temp, then measure. Contact KYOCERA AVX for datasheet of specific parts. | |
| | Capacitance Variation | $\leq \pm 12.5\%$ | | |
| | Dissipation Factor | \leq Initial Value x 2.0 (See Above) | | |
| | Insulation Resistance | \geq Initial Value x 0.3 (See Above) | | |
| | Dielectric Strength | Meets Initial Values (As Above) | | |
| Load Humidity | Appearance | No visual defects | Pre-treatment: After mounting, perform heat treatment 150+0/-10C for 2 hour, then stabilise for 24+/-2 hour at room temp, then measure. Store in a test chamber set at 85°C \pm 2°C/ 85% \pm 5% relative humidity for 1000 hours (+48, -0) with rated voltage applied. Pre-treatment: After remove from test chamber, perform heat treatment 150+0/-10C for 2 hour, then stabilise for 24+/-2 hour at room temp, then measure. | |
| | Capacitance Variation | $\leq \pm 12.5\%$ | | |
| | Dissipation Factor | \leq Initial Value x 2.0 (See Above) | | |
| | Insulation Resistance | \geq Initial Value x 0.3 (See Above) | | |
| | Dielectric Strength | Meets Initial Values (As Above) | | |

X7R Dielectric Capacitance Range



PREFERRED SIZES ARE SHADED

| SIZE | 1210 | | | | | | | 1812 | | | | | 1825 | | | 2220 | | | | 2225 | | | | | |
|----------------|--------------------------------|----|----|----|-----|-----|-----|--------------------------------|----|----|-----|-----|--------------------------------|----|-----|--------------------------------|----|----|-----|--------------------------------|-----|----|-----|-----|---|
| Soldering | Reflow Only | | | | | | | Reflow Only | | | | | Reflow Only | | | Reflow Only | | | | Reflow Only | | | | | |
| Packaging | Paper/Embossed | | | | | | | All Embossed | | | | | All Embossed | | | All Embossed | | | | All Embossed | | | | | |
| (L) Length | 3.30 ± 0.4 (0.130 ± 0.016) | | | | | | | 4.50 ± 0.40 (0.177 ± 0.016) | | | | | 4.50 ± 0.40 (0.177 ± 0.016) | | | 5.70 ± 0.50 (0.224 ± 0.020) | | | | 5.70 ± 0.40 (0.224 ± 0.016) | | | | | |
| (W) Width | 2.50 ± 0.30 (0.098 ± 0.012) | | | | | | | 3.20 ± 0.40 (0.126 ± 0.016) | | | | | 6.40 ± 0.40 (0.252 ± 0.016) | | | 5.00 ± 0.40 (0.197 ± 0.016) | | | | 6.30 ± 0.40 (0.248 ± 0.016) | | | | | |
| (t) Terminal | 0.50 ± 0.25 (0.020 ± 0.010) | | | | | | | 0.61 ± 0.36 (0.024 ± 0.014) | | | | | 0.61 ± 0.36 (0.024 ± 0.014) | | | 0.64 ± 0.39 (0.025 ± 0.015) | | | | 0.64 ± 0.39 (0.025 ± 0.015) | | | | | |
| WVDC | 10 | 16 | 25 | 50 | 100 | 200 | 500 | 16 | 25 | 50 | 100 | 200 | 500 | 50 | 100 | 200 | 25 | 50 | 100 | 200 | 500 | 50 | 100 | 200 | |
| Cap 100 101 | | | | | | | | | | | | | | | | | | | | | | | | | |
| (pF) 150 151 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 220 221 | | | | K | K | K | M | | | | | | | | | | | | | | | | | | |
| 330 331 | | | | K | K | K | M | | | N | N | N | N | | | | | | | | | | | | |
| 470 471 | | | | K | K | K | M | | | N | N | N | N | | | | | | | | | | | | |
| 680 681 | | | | K | K | K | M | | | N | N | N | N | | | | | | | | | | | | |
| 1000 102 | K | K | K | K | K | K | M | N | N | N | N | N | N | X | X | X | X | X | X | X | X | X | X | X | X |
| 1500 152 | K | K | K | K | K | K | M | N | N | N | N | N | N | X | X | X | X | X | X | X | X | X | X | X | X |
| 2200 222 | K | K | K | K | K | K | M | N | N | N | N | N | N | X | X | X | X | X | X | X | X | X | X | X | X |
| 3300 332 | K | K | K | K | K | K | P | N | N | N | N | N | N | X | X | X | X | X | X | X | X | X | X | X | X |
| 4700 472 | K | K | K | K | K | K | P | N | N | N | N | N | P | X | X | X | X | X | X | X | X | X | X | X | X |
| 6800 682 | K | K | K | K | K | K | P | N | N | N | N | N | P | X | X | X | X | X | X | X | X | X | X | X | X |
| Cap 0.01 103 | K | K | K | K | K | K | P | N | N | N | N | N | P | X | X | X | X | X | X | X | X | X | X | X | X |
| (µF) 0.015 153 | K | K | K | K | K | K | P | N | N | N | N | N | P | X | X | X | X | X | X | X | X | X | X | X | X |
| 0.022 223 | K | K | K | K | K | K | P | Q | N | N | N | N | N | P | X | X | X | X | X | X | X | X | X | X | X |
| 0.033 333 | K | K | K | K | K | K | P | X | N | N | N | N | N | X | X | X | X | X | X | X | X | X | X | X | X |
| 0.047 473 | K | K | K | K | K | K | P | X | N | N | N | N | P | X | X | X | X | X | X | X | X | X | X | X | X |
| 0.068 683 | K | K | K | K | K | K | P | X | N | N | N | N | P | X | X | X | X | X | X | X | X | X | X | X | X |
| 0.1 104 | K | K | K | K | K | K | P | X | N | N | N | P | P | X | X | X | X | X | X | X | X | X | X | X | X |
| 0.15 154 | K | K | K | K | M | P | Z | Z | N | N | N | P | P | Z | X | X | X | X | X | X | X | X | X | X | X |
| 0.22 224 | K | K | K | M | P | Z | | | N | N | N | P | Q | Z | X | X | X | X | X | X | X | X | X | X | X |
| 0.33 334 | K | K | K | M | Q | Z | | | N | N | N | P | X | Z | X | X | X | X | X | X | X | X | X | X | X |
| 0.47 474 | M | M | M | P | Q | Z | | | N | N | N | Q | X | Z | X | X | X | X | X | X | X | X | X | X | X |
| 0.68 684 | M | M | P | X | X | Z | | | Q | Q | Q | Q | Z | | X | X | X | X | X | X | Z | X | X | X | X |
| 1.0 105 | P | P | P | X | Z | | | | Q | Q | Q | X | Z | X | X | X | X | X | X | 7 | X | X | X | X | |
| 1.5 155 | N | N | Z | Z | Z | | | | Z | Z | Z | | | X | X | Z | X | X | Z | X | X | Z | X | X | Z |
| 2.2 225 | X | X | Z | Z | Z | | | | Z | Z | Z | | | X | X | Z | X | X | Z | X | X | Z | X | X | Z |
| 3.3 335 | X | X | Z | Z | Z | | | | Z | Z | Z | | | X | X | | X | Z | X | Z | X | X | X | X | X |
| 4.7 475 | Z | Z | Z | Z | Z | | | | Z | Z | Z | | | X | X | | Z | Z | Z | X | X | Z | X | X | Z |
| 10 106 | Z | Z | Z | Z | | | | Z | Z | Z | | | Z | Z | | Z | Z | | Z | Z | | Z | Z | Z | Z |
| 22 226 | Z | Z | Z | | | | | | | | | | | | | | | | Z | | | | | | |
| 47 476 | Z | | | | | | | | | | | | | | | | | | | | | | | | |
| 100 107 | | | | | | | | | | | | | | | | | | | | | | | | | |
| WVDC | 10 | 16 | 25 | 50 | 100 | 200 | 500 | 16 | 25 | 50 | 100 | 200 | 500 | 50 | 100 | 200 | 25 | 50 | 100 | 200 | 500 | 50 | 100 | 200 | |
| SIZE | 1210 | | | | | | | 1812 | | | | | 1825 | | | 2220 | | | | 2225 | | | | | |



| Letter | A | B | C | E | G | J | K | M | N | P | Q | X | Y | Z | 7 |
|----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Max. Thickness | 0.33 (0.013) | 0.22 (0.009) | 0.56 (0.022) | 0.71 (0.028) | 0.90 (0.035) | 0.94 (0.037) | 1.02 (0.040) | 1.27 (0.050) | 1.40 (0.055) | 1.52 (0.060) | 1.78 (0.070) | 2.29 (0.090) | 2.54 (0.100) | 2.79 (0.110) | 3.30 (0.130) |
| | PAPER | | | | | | EMBOSSED | | | | | | | | |

NOTE: Contact factory for non-specified capacitance values

Mouser Electronics

Authorized Distributor

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AVX:

[08051X471KSJME](#) [1206CA681MAJ1A](#) [08051C153KAT4H](#) [08051C222KAT4H](#) [0201YC681K](#) [08051C561JAT4H](#)
[08052C102JAT4H](#) [08052C561JAT4H](#) [12065X222MAT2A](#) [05045C102KA79A](#) [05045C471KA19A](#) [05045C472MAT1A](#)
[08051X102KS19A](#) [08051X102KSJ9A](#) [08051X102KSJME](#) [08051X121KSJ9A](#) [08051X221KSJ9A](#) [08055X103KSJ9A](#)
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[18051X103KSJ9A](#) [18121X473KSJME](#) [18125X104KSJ9A](#) [18251X104KSJ9A](#) [18255X474KSJ9A](#) [05045C102KA11A](#)
[22251C105K/BULK](#) [22251E225ZA1M6](#) [22251E225ZA116](#) [05041C151KAT1A](#) [05045C101KA11A](#) [05045C101KA79A](#)
[05045C102KAT9A](#) [05045C102KA71A](#) [05045C102KA76A](#) [05045C102MAT9A](#) [05045C103JAT1A](#) [05045C103JA11A](#)
[05045C103JA16A](#) [05045C103KA11A](#) [05045C103KA19A](#) [05045C103KA76A\100](#) [05045C103MAT1A](#)
[05045C103MA71A](#) [05045C103MA79A](#) [05045C121KAT1A](#) [05045C122JAT9A](#) [05045C151KAT1A](#) [05045C152JAT1A](#)
[05045C152JHT6A](#) [05045C152KA79A](#) [05045C152MA79A](#) [05045C181KAT1A](#) [05045C182KAT1A](#) [05045C221KAT1A](#)
[05045C221KA79A](#) [05045C222JAT1A](#) [05045C222JA16A](#) [05045C331KAT1A](#) [05045C332JA16A](#) [05045C332KAT1A](#)
[05045C332KA79A](#) [05045C391KAT1A](#) [05045C392JA16A\H](#) [05045C392KAT1A](#) [05045C471KA79A](#) [05045C472JA16A](#)
[05045C472JA19A\H](#) [05045C472KAT1A](#) [05045C472KA16A](#) [05045C561JA19A\H](#) [05045C561KAT1A](#)
[05045C562KAT1A](#) [05045C681KAT1A](#) [05045C681KA11A](#) [05045C681KA79A](#) [05045C682JA19A\H](#)
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