Capacitors - AEC-Q200 Approved

# Multilayer Ceramic Dipped Axial and Radial Capacitors for Automotive Applications

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# MULTILAYER CERAMIC DIPPED AXIAL AND RADIAL CAPACITORS

## for Automotive Applications

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## Applications

### Powertrain

- Engine Control Unit
- Common Rail Diesel Electrical Control
- Turbo Charger Control Unit
- Piezoelectric-Injection Driver
- Engine Sensors
- Electrical Fan Control
- Electrical Water Pump
- Ignition Electrical Drive
- Board Load-Control Unit
- Integrated Starter Generator
- Boardnet Management

### Lighting Systems

- Headlight Leveling Control and Advanced Front Lighting Cleaning System
- Sensors for Night Vision Systems and Fog Detection
- LED Lighting
- Ambient Lighting
- HID Electrical

### Chassis

- Active Safety
- Sensors
- EAGA, Electrical Catalytic Converter, Diesel Particle Filter
- Electrical Transmission
- Electric Park Brake
- Active Suspension
- Electrical Power Steering
- Electrical Hydraulic Power Steering
- Tire Pressure Monitoring

### Body and Comfort

- Sensors
- Climate Control
- Seat Adjust and Memory
- Immobilizer and Security Systems
- Dashboard and Interior Illumination
- HVAC—Heating, Ventilating, Air Conditioning
- Multimedia Systems
- Passive Safety
- Reversible Wiper Drives
- Keyless or Passive Entry
- Door / Window / Sunroof Control

### Driver Information

- Driver Information System
- GPS Car Navigation and Audio System
- SDARS / Antenna / Amplifier System
- Bluetooth Communication
- Lidar Sensor



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# MULTILAYER CERAMIC DIPPED AXIAL AND RADIAL CAPACITORS

## for Automotive Applications

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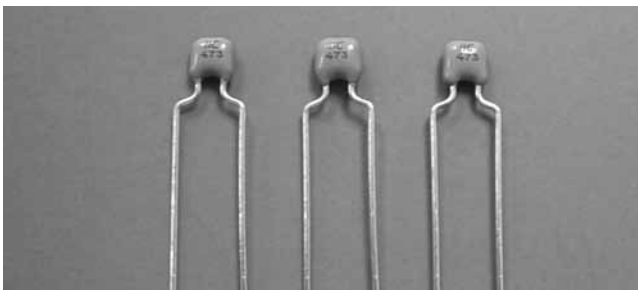
## General Information

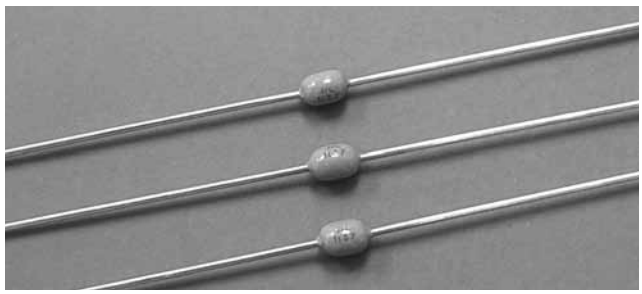
For more than 20 years, Vishay Vitramon has supported the automotive industry with robust, highly reliable MLCCs that have made it a leader in this segment. All Vishay Vitramon MLCCs are manufactured in precious metal technology (PMT/NME) with a wet build process. They are qualified according to AEC-Q200 with PPAP available on request.

These chips are used in the automotive-grade Mono-Axial and Mono-Kap series from Vishay BCcomponents. They feature coppery steel wire lead terminations with a 100 % tin plate matte finish. Their epoxy coating provides mechanical strength for assembly extended-life environmental protection.

RoHS COMPLIANT

AUTOMOTIVE GRADE





| General Specifications | |
|---|---|
| **C0G (NP0) Dielectric** | **X7R, X8R Dielectric** |
| **Note:**<br>Electrical characteristics at + 25 °C unless otherwise specified | **Note:**<br>Electrical characteristics at +25 °C unless otherwise specified |
| **Operating Temperature:**<br>– 55 °C to + 160 °C<br>(above +150 °C, 50 % rated voltage) | **Operating Temperature:**<br>– 55 °C to + 160 °C<br>(above +150 °C, 50 % rated voltage) |
| **Capacitance Range:**<br>100 pF to 10 nF | **Capacitance Range:**<br>470 pF to 1.0 µF |
| **Temperature Coefficient of Capacitance (TCC):**<br>± 30 ppm/°C from – 55 °C to + 125 °C | **Temperature Coefficient of Capacitance (TCC):**<br>X7R: ± 15 % from – 55 °C to + 125 °C, with 0 Vdc applied<br>+ 15 %/– 30 % from – 55 °C to + 150 °C, with 0 Vdc applied<br>X8R: ± 15 % from – 55 °C to + 150 °C, with 0 Vdc applied |
| **Dissipation Factor (DF):**<br>0.1 % maximum at 1.0 Vrms and 1 kHz for values > 1000 pF and 1 MHz for values ≤ 1000 pF | **Dissipation Factor (DF):**<br>2.5 % maximum at 1.0 Vrms and 1 kHz |
| **Voltage Range:**<br>50 Vdc, 100 Vdc, and 200 Vdc | **Voltage Range:**<br>50 Vdc, 100 Vdc, and 200 Vdc |
| **Insulating Resistance:**<br>At + 25 °C 100 000 MΩ min. or 1000 ΩF whichever is less<br>At + 125 °C 10 000 MΩ min. or 100 ΩF whichever is less<br>Test condition: rated voltage within 2 minutes of charging | **Insulating Resistance:**<br>At + 25 °C 100 000 MΩ min. or 1000 ΩF whichever is less<br>At + 125 °C 10 000 MΩ min. or 100 ΩF whichever is less |
| **Aging:**<br>0 % maximum per decade | **Aging Rate:**<br>Typical 1 % maximum per decade |
| **Dielectric Withstanding Voltage (DWV):**<br>This is the maximum voltage the capacitors are tested for a 1-s to 5-s period and the charge/discharge current does not exceed 50 mA<br>DWV: 50 V to 100 V, at 250 % of rated voltage<br>200 V, at 200 % of rated voltage | **Dielectric Withstanding Voltage (DWV)**:<br>This is the maximum voltage the capacitors are tested for a 1-s to 5-s period and the charge/discharge current does not exceed 50 mA<br>DWV: 50 V to 100 V, at 250 % of rated voltage<br>200 V, at 200 % of rated voltage |



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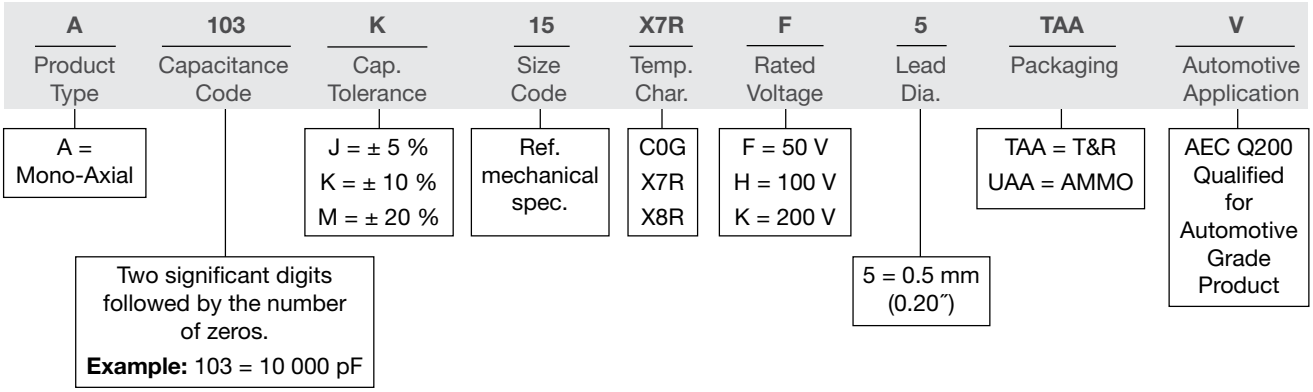
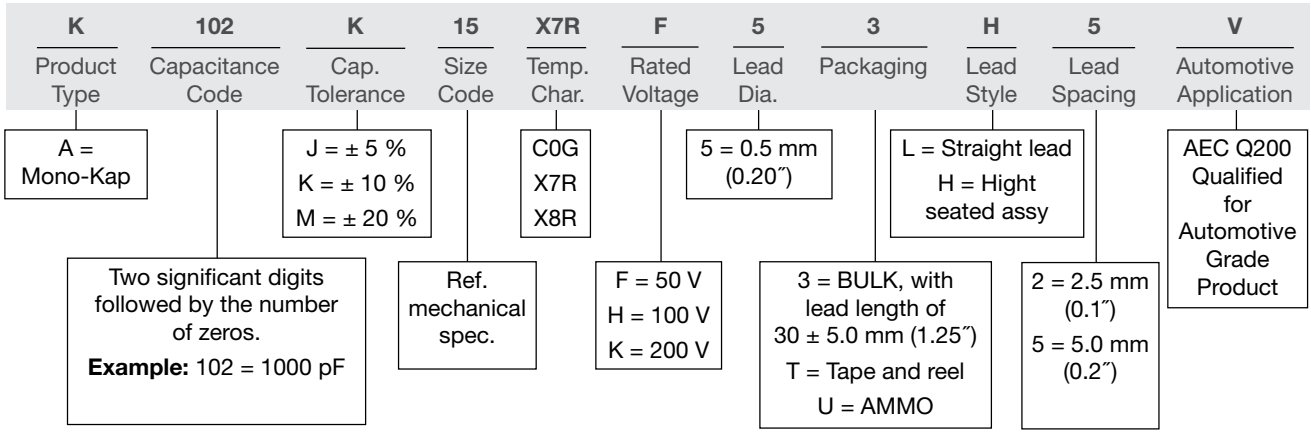
# Ordering Information

## Mono-Axial




**Ordering Example: A-103-K-15-X7R-F-5-TAA-V**

## Mono-Kap




**Ordering Example: K-473-K-15-X7R-F-5-3-H-5-V**



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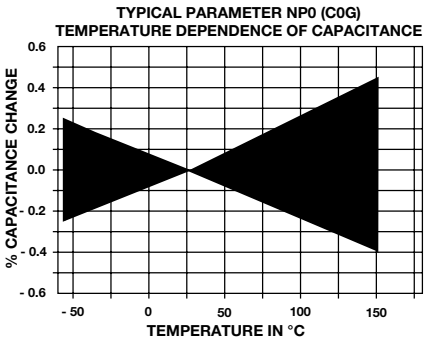
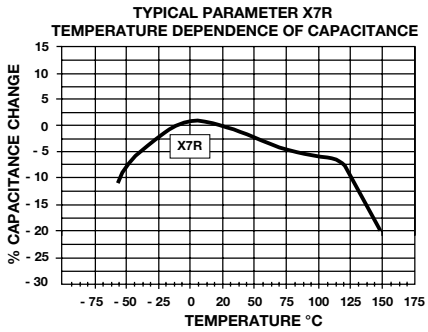
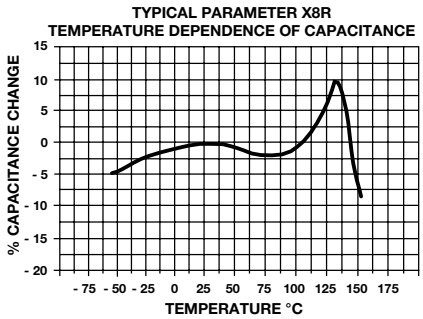
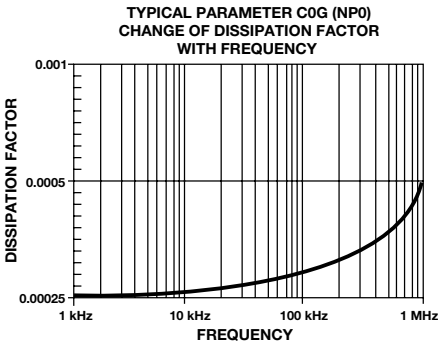
## Electrical Data and Dielectric Characteristics

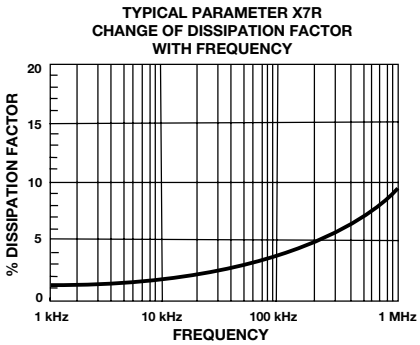


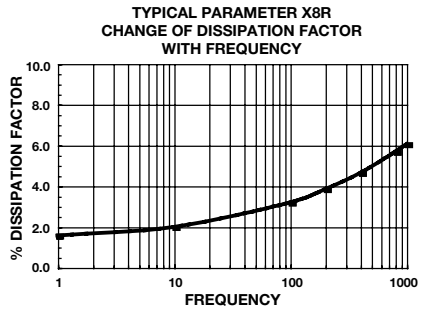



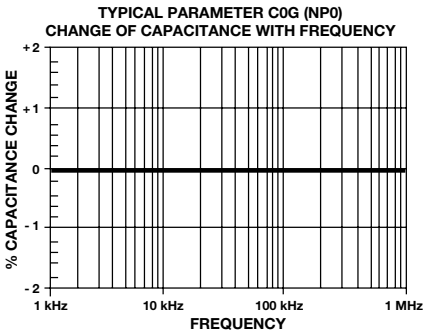



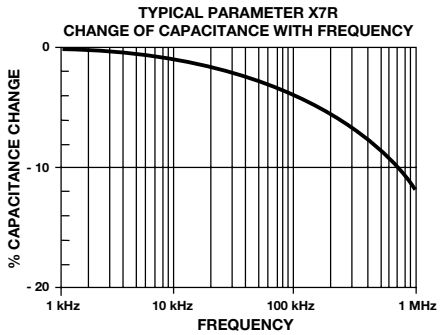

Remark: NP0 and X7R are defined temperature up to + 125 °C

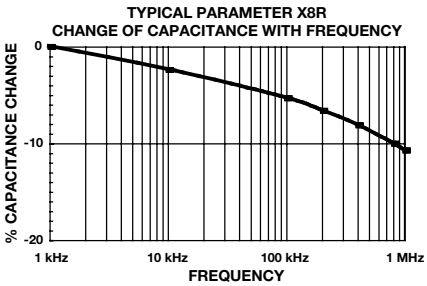


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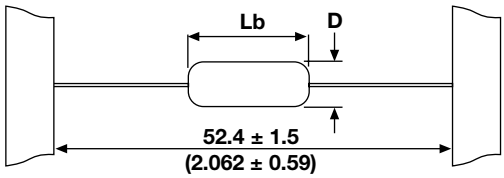
# Dimensions Data

## Mono-Axial

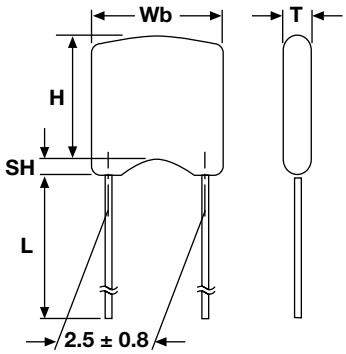



| Capacitor Dimensions and Weight | | | | |
|---|---|---|---|---|
| **Size Code** | **$Lb_{max}$ (1)** | **$ØD_{max}$ (1)** | **Lead diameter (mm)** | **Weight (g)** |
| **15** | 0.15 (3.8) | 0.10 (2.5) | 0.5 ± 0.05 | ≈ 0.14 |
| **20** | 0.20 (5.0) | 0.12 (3.0) | 0.5 ± 0.05 | ≈ 0.15 |

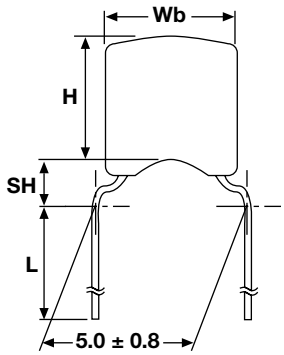
Note: 1. Dimensions between parentheses are in millimeters.
2. If inserted with 1210 chip, then $Ød_{max}$ is 4.5 mm (0.18").

## Mono-Kap

**L2**
Component outline for
Lead spacing 2.5 ± 0.8 mm
(straight leads)

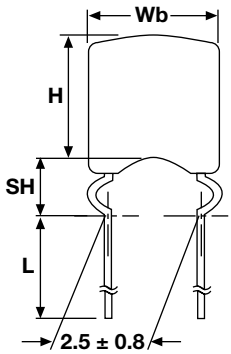



**H5**
Component outline for
Lead spacing 5.0 ± 0.8 mm
(flat bent leads)

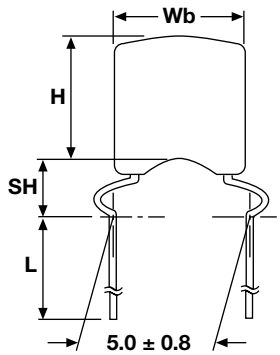



L2 and H5 are preferred styles

**K2**
Component outline for
Lead spacing 2.5 ± 0.8 mm
(outside kink)




**K5**
Component outline for
Lead spacing 2.5 ± 0.8 mm
(outside kink)




| CAPACITOR DIMENSIONS (Unit: mm) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **SIZE CODE** | **Wb** | **H** | **T** | **Lead Diameter** | **MAX. SEATING HEIGHT (SH)** | | | |
| | | | | | **L2** | **H5** | **K2** | **K5** |
| 15 | 3.0-3.8 | 2.0-3.8 | 1.6-2.6 | 0.5±0.05 | 1.6 | 2.6 | 3.5 | 3.5 |
| 20 | 4.3-5.1 | 2.5-5.1 | 1.9-3.2 | 0.5±0.05 | 1.6 | 2.6 | 3.5 | 3.5 |



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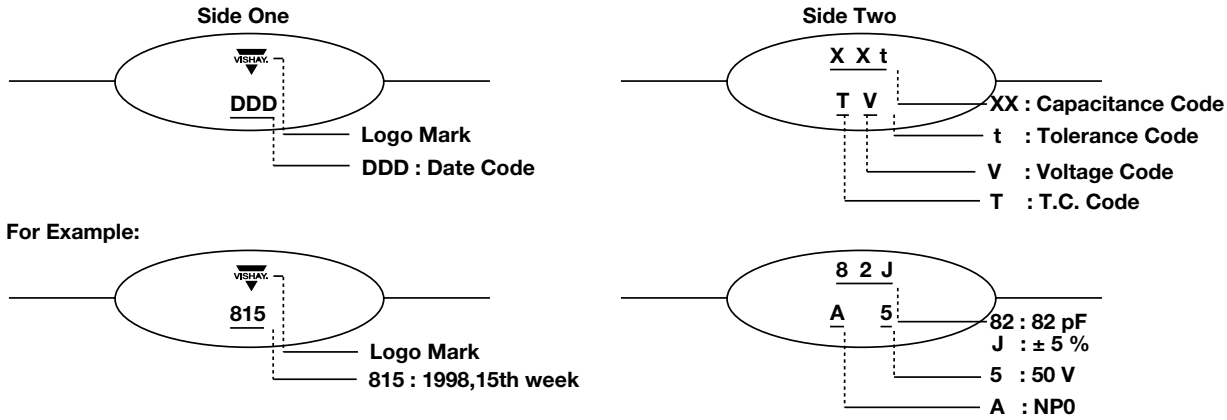
# Marking

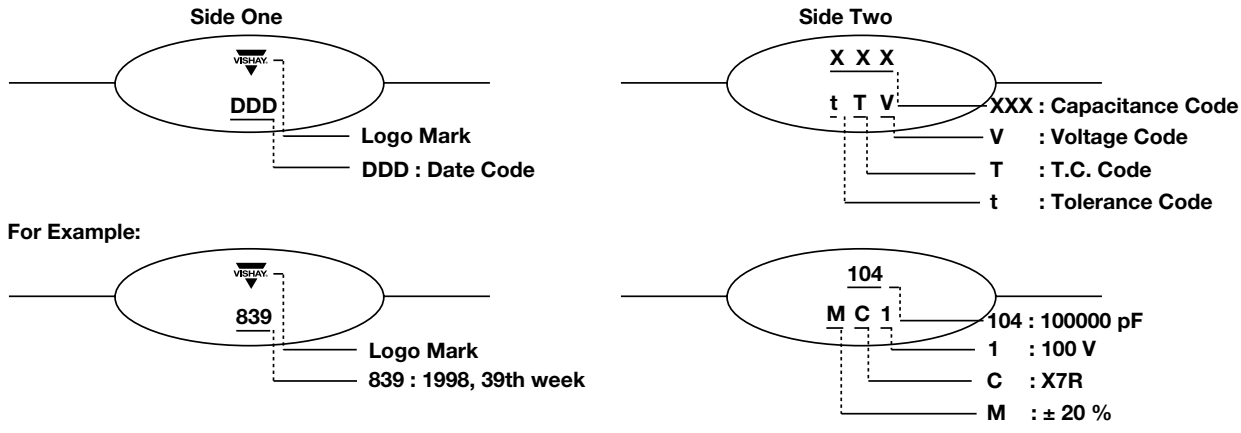
## Mono-Axial Marking Code Description

| DDD<br>Date Code | XXX<br>Capacitance Code | t<br>Tolerance Code | V<br>Voltage Code | T<br>T.C. Code |
|---|---|---|---|---|
| The first digit is the year, the last two digits are the week<br>**Examples:**<br>309 = 2003, 9th week<br>317 = 2003, 17th week | Two significant digits followed by one digit for the multiplier as given below.<br>0=x 1 2=x 100 4=x 10 000<br>1=x 10 3=x 1000 5=x 100 000 | J = ± 5 %<br>K = ± 10 %<br>M = ± 20 % | 1 = 100 V<br>2 = 200 V<br>5 = 50 V | A = C0G(NP0)<br>C = X7R<br>R = X8R |

### Capacitance Value < 100 pF




### Capacitance Value ≥ 100 pF




Note: VISHAY or BCcomponents logo can be marked on the products body.



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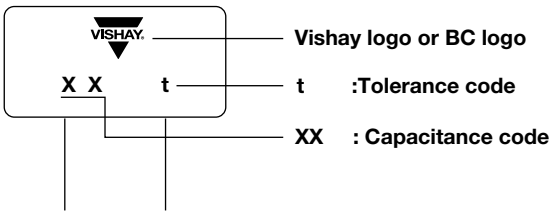
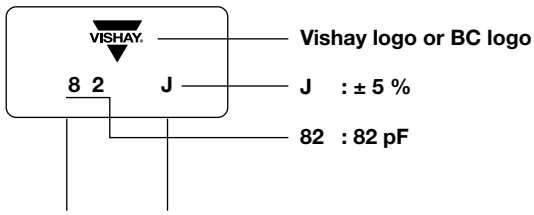
# Marking

## Mono-Kap

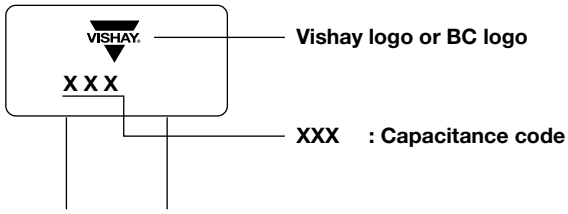
### Size 15 Capacitance Value < 100 pF



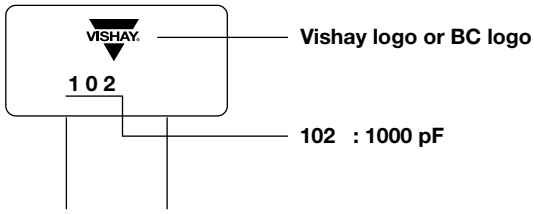

For example



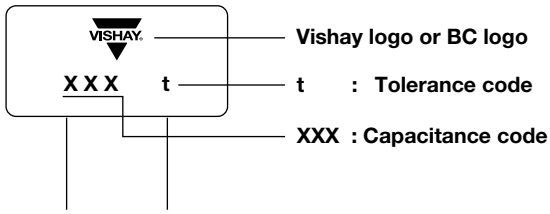

### Size 15 Capacitance Value ≥ 100 pF



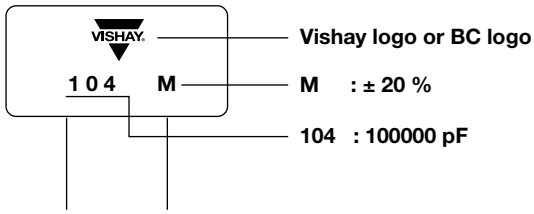

For example




### Size 20 Capacitance Value ≥ 100 pF




For example



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# Packaging

## Mono-Axial

### Reel Data

- A maximum of 0.5 % of the total number of capacitors per reel may be missing.
- A maximum of 1 consecutive vacant positions is followed by 6 consecutive components.
- Tape begins and ends with a minimum of 4 empty positions (50 mm tape).
- Maximum of 5 splicers per reel.

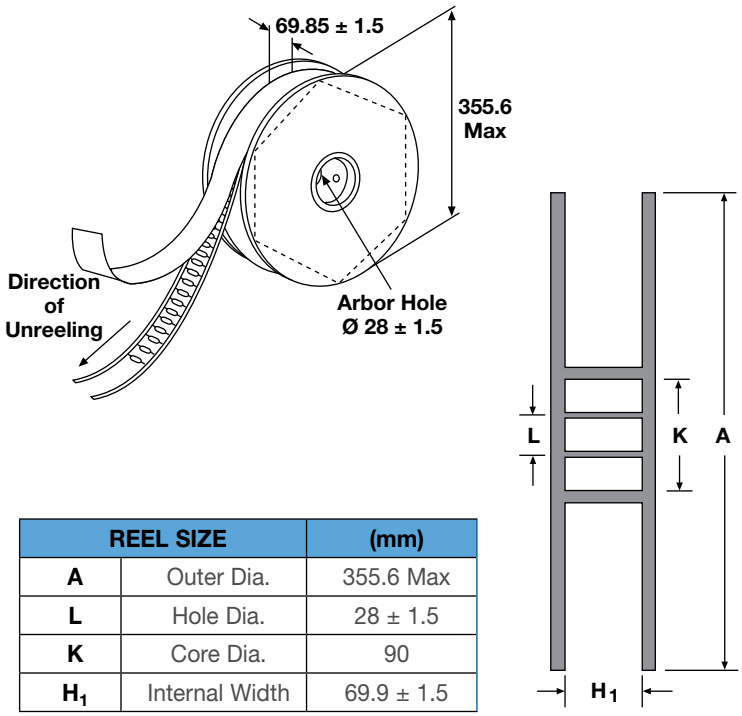
### Ammopack Data

- A maximum of 0.5 % of the total number of capacitors per reel may be missing.
- A maximum of 1 consecutive vacant positions is followed by 6 consecutive components.
- Tape begins and ends with a minimum of 4 empty positions (180 mm tape).
- Maximum of 5 splicers per reel.
- The cumulative pitch tolerance over 20 consecutive units is not to excessed ± 1.0 mm.
- Lead space (F) shall be measured at (3.6 ± 0.5) mm from the capacitor seating plane.

### Labelling

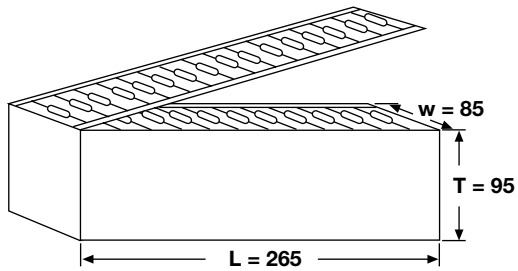
- Each reel is provided with a label showing the following details:
- Manufacturer, A style, capacitance, tolerance, batch number, quantity of components, rated voltage, dielectric.
- On special request other designations can be shown.
- See example.

## Reel and Reel Dimensions




| REEL SIZE | | (mm) |
|---|---|---|
| A | Outer Dia. | 355.6 Max |
| L | Hole Dia. | 28 ± 1.5 |
| K | Core Dia. | 90 |
| $H_1$ | Internal Width | 69.9 ± 1.5 |

## Ammopack




## Labelling Example

>>



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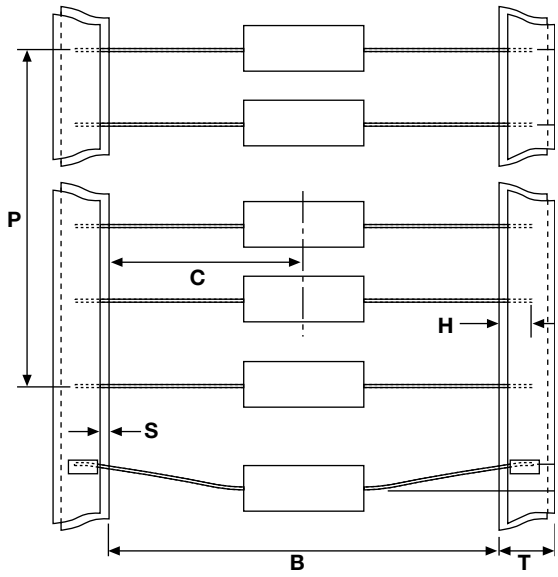
# Packaging

## Mono-Axial (continued)

### Packaging Quantities and Box Dimensions

| Packaging | Size Code | Smallest Packaging Quantity (SPQ) | Box Dimensions L x W x H (mm) |
|---|---|---|---|
| Tape on reel | 15; 20 | 7000 | 370 x 370 x 90 |
| Ammopack | 15; 20 | 4000 | 265 x 85 x 95 |

### Capacitors on Bandolier




| Symbol | Parameter | Dimensions | |
|---|---|---|---|
| | | mm | inch |
| B[1] | Inside tape spacing | 52.4 ± 1.5 | 2.062 ± 0.059 |
| C | Centre to tape spacing | ± 0.8 | ± 0.031 |
| P | Cumulative pitch, 6 consecutive components | ± 1.5 | ± 0.059 |
| A | Components pitch | 5 ± 0.5 | 0.197 ± 0.015 |
| M | Lead bend | < 1.2 | < 0.047 |
| S | Exposed adhesive | < 0.51 | > 0.020 |
| T | Tape width | 6.35 | 0.25 |
| H | Lead sandwich | > 3.96 | > 0.156 |

Note:
1. Inside tape spacing 26.0 + 1.51/– 0.0 is available on request

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# Packaging

## Mono-Kap

### Reel Data

- A maximum of 0.5 % of the total number of capacitors per reel may be missing.
- A maximum of 1 consecutive vacant positions is followed by 6 consecutive components.
- Tape begins and ends with a minimum of 4 empty positions (50 mm tape).
- Maximum of 5 splicers per reel.

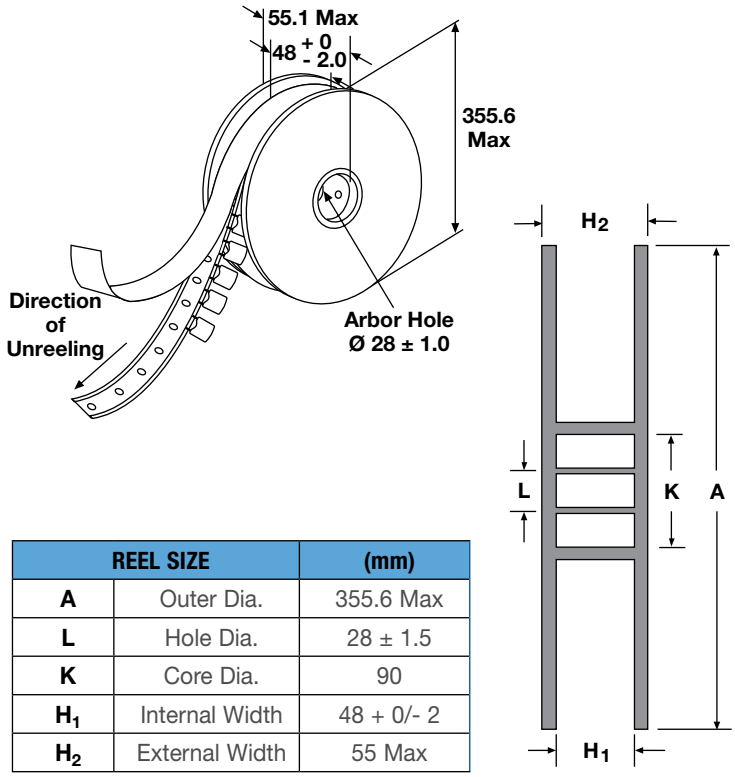
### Ammopack Data

- A maximum of 0.5 % of the total number of capacitors per reel may be missing.
- A maximum of 1 consecutive vacant positions is followed by 6 consecutive components.
- Tape begins and ends with a minimum of 4 empty positions (50 mm tape).
- Maximum of 5 splicers per reel.
- The cumulative pitch tolerance over 20 consecutive units is not to excessed ± 1.0 mm.
- Lead space (F) shall be measured at (3.6 ± 0.5) mm from the capacitor seating plane.

### Labelling

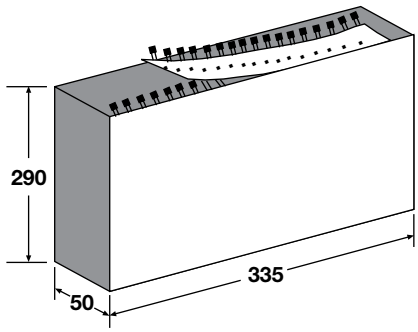
- Each reel is provided with a label showing the following details:
- Manufacturer, K style, capacitance, tolerance, batch number, quantity of components, rated voltage, dielectric.
- On special request other designations can be shown.
- See example.

## Reel and Reel Dimensions

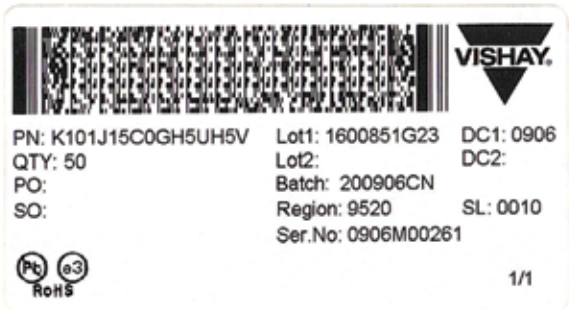



| REEL SIZE | | (mm) |
|---|---|---|
| A | Outer Dia. | 355.6 Max |
| L | Hole Dia. | 28 ± 1.5 |
| K | Core Dia. | 90 |
| $H_1$ | Internal Width | 48 + 0/- 2 |
| $H_2$ | External Width | 55 Max |

## Ammopack




## Labelling Example




## Packaging Quantities and Box Dimensions

| Packaging | Size Code | Smallest Packaging Quantity (SPQ) | Box Dimensions L x W x H (mm) |
|---|---|---|---|
| Tape on reel | 15 | 4000 | 370 x 370 x 60 |
| | 20 | 3000 | |
| Ammopack | 15; 20 | 2500 | 335 x 290 x 50 |
| Bulk (Note 1) | 15; 20 | 5000 | 245 x 120 x 65 |

Note:
1. SPQ contains one or a multiple of poly-bags, 1000 units per bag.

>>



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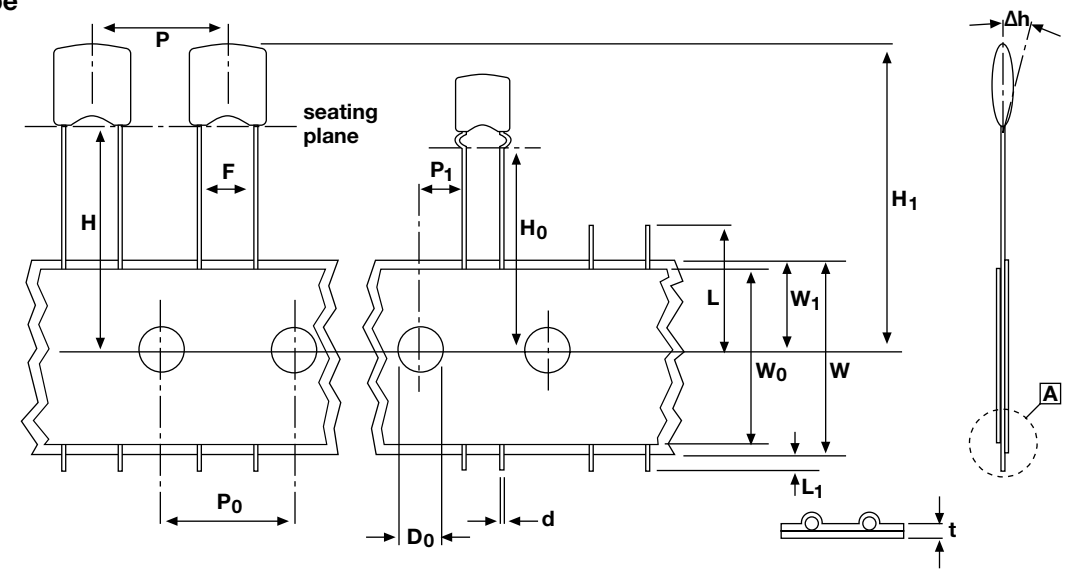
# Packaging

## Mono-Kap (continued)

### Capacitors on Tape




| Symbol | Parameter | Dimensions | |
|---|---|---|---|
| | | mm | inch |
| L | Cut of length | ≤ 11 | ≤ 0.443 |
| $L_1$ | Lead end protrusion | ≤ 1 | ≤ 0.039 |
| H | Height to seating plane (straight leads) | ≥ 18 | ≥ 0.709 |
| $H_0$ | Height to seating plane (crimp leads) | 16.0 ± 0.5 | 0.630 ± 0.020 |
| $H_1$ | Top of Component height | ≤ 32 | ≤ 1.26 |
| Δh | Body inclination | 0.0 ± 1.0 | 0 ± 0.039 |
| W | Carrier tape width | 18.0 + 1.0/– 0.5 | 0.709 + 0.039/– 0.02 |
| $W_0$ | Hold down tape width | 15.0 ref. (Note 2) | 0.591 ref. (Note 2) |
| $W_1$ | Sprocket hole position | 9 + 0.075/– 0.5 | 0.354 + 0.03/– 0.02 |
| F | 1e lead space (Note 3) | 2.5 + 0.60/– 0.40 | 0.10 + 0.024/– 0.016 |
| | 2e lead space (Note 3) | 5.0 + 0.60/– 0.40 | 0.20 + 0.024/– 0.016 |
| $P_0$ | Sprocket hole pitch | 12.7 ± 0.3 | 0.50 ± 0.012 |
| $P_1$ | 1e sprocket hole centre to lead centre | 5.08 ± 0.7 | 0.20 ± 0.028 |
| | 2e sprocket hole centre to lead centre | 3.85 ± 0.7 | 0.015 ± 0.028 |
| $D_0$ | Sprocket hole diameter | 4.0 ± 0.30 | 0.157 ± 0.012 |
| t | Overall tape thickness | ≤ 0.9 | ≤ 0.035 |
| d | Wire lead diameter | 0.50 ± 0.05 | 0.02 ± 0.002 |
| P | Taping pitch | 12.7 ref. | 0.50 ref. |

Note:
2. Tape width of 6 mm (0.236 inch) permissible.
3. e = 2.54 mm.



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## Product Range

### Mono-Axial C0G Dielectric

| C | Tol. (%) | Lb Max (mm) | ØD Max (mm) | Clear Text Code without Lead configuration and Packaging[1] |
|---|---|---|---|---|
| 50 Vdc | | | | |
| 100 pF | 5 | 3.81 | 2.54 | A101J15C0GF□□□□V |
| 150 pF | | | | A151J15C0GF□□□□V |
| 220 pF | | | | A221J15C0GF□□□□V |
| 330 pF | | | | A331J15C0GF□□□□V |
| 470 pF | | | | A471J15C0GF□□□□V |
| 680 pF | | | | A681J15C0GF□□□□V |
| 1000 pF | | | | A102J15C0GF□□□□V |
| 1500 pF | | | | A152J15C0GF□□□□V |
| 2200 pF | | | | A222J15C0GF□□□□V |
| 3300 pF | | | | A332J15C0GF□□□□V |
| 3900 pF | | | | A392J15C0GF□□□□V |
| 4700 pF | 5 | 5.08 | 3.05 | A472J20C0GF□□□□V |
| 6800 pF | | | | A682J20C0GF□□□□V |
| 0.01 µF | | | | A103J20C0GF□□□□V |
| 100 Vdc | | | | |
| 100 pF | 5 | 3.81 | 3.81 | A101J15C0GH□□□□V |
| 150 pF | | | | A151J15C0GH□□□□V |
| 220 pF | | | | A221J15C0GH□□□□V |
| 330 pF | | | | A331J15C0GH□□□□V |
| 470 pF | | | | A471J15C0GH□□□□V |
| 680 pF | | | | A681J15C0GH□□□□V |
| 1000 pF | | | | A102J15C0GH□□□□V |
| 1500 pF | | | | A152J15C0GH□□□□V |
| 1800 pF | | | | A182J15C0GH□□□□V |
| 2200 pF | | 5.08 | 3.05 | A222J20C0GH□□□□V |
| 3300 pF | | | | A332J20C0GH□□□□V |
| 4700 pF | | | | A472J20C0GH□□□□V |
| 6800 pF | | | | A682J20C0GH□□□□V |
| 0.01 µF | | | | A103J20C0GH□□□□V |
| 200 Vdc | | | | |
| 100 pF | 5 | 3.81 | 2.54 | A101J15C0GK□□□□V |
| 150 pF | | | | A151J15C0GK□□□□V |
| 220 pF | | | | A221J15C0GK□□□□V |
| 330 pF | | | | A331J15C0GK□□□□V |
| 470 pF | | | | A471J15C0GK□□□□V |
| 680 pF | | | | A681J15C0GK□□□□V |
| 1000 pF | | | | A102J15C0GK□□□□V |

Note:
1.The four blank digits are filled with lead configuration and packaging, and please refer to ordering information



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## Product Range

### Mono-Axial X7R Dielectric

| C | Tol. (%) | Lb Max (mm) | ØD Max (mm) | Clear Text Code without Lead configuration and Packaging[1] |
|---|---|---|---|---|
| 50 Vdc | | | | |
| 470 pF | 10 | 3.81 | 2.54 | A471K15X7RF□□□□V |
| 680 pF | | | | A681K15X7RF□□□□V |
| 1000 pF | | | | A102K15X7RF□□□□V |
| 1500 pF | | | | A152K15X7RF□□□□V |
| 2200 pF | | | | A222K15X7RF□□□□V |
| 3300 pF | | | | A332K15X7RF□□□□V |
| 4700 pF | | | | A472K15X7RF□□□□V |
| 6800 pF | | | | A682K15X7RF□□□□V |
| 0.010 µF | | | | A103K15X7RF□□□□V |
| 0.015 µF | | | | A153K15X7RF□□□□V |
| 0.022 µF | | | | A223K15X7RF□□□□V |
| 0.033 µF | | | | A333K15X7RF□□□□V |
| 0.047 µF | | | | A473K15X7RF□□□□V |
| 0.068 µF | | | | A683K15X7RF□□□□V |
| 0.10 µF | | | | A104K15X7RF□□□□V |
| 0.15 µF | | | | A154K15X7RF□□□□V |
| 0.22 µF | 10 | 5.08 | 3.05 | A224K20X7RF□□□□V |
| 0.33 µF | | | | A334K20X7RF□□□□V |
| 0.47 µF | | | | A474K20X7RF□□□□V |
| 0.68 µF | | 5.08 | 4.5[2] | A684K20X7RF□□□□V |
| 1.0 µF | | | | A105K20X7RF□□□□V |
| 100 Vdc | | | | |
| 470 pF | 10 | 3.81 | 3.81 | A471K15X7RH□□□□V |
| 680 pF | | | | A681K15X7RH□□□□V |
| 1000 pF | | | | A102K15X7RH□□□□V |
| 1500 pF | | | | A152K15X7RH□□□□V |
| 2200 pF | | | | A222K15X7RH□□□□V |
| 3300 pF | | | | A332K15X7RH□□□□V |
| 4700 pF | | | | A472K15X7RH□□□□V |
| 6800 pF | | | | A682K15X7RH□□□□V |
| 0.010 µF | | | | A103K15X7RH□□□□V |
| 0.015 µF | | | | A153K15X7RH□□□□V |
| 0.022 µF | | | | A223K15X7RH□□□□V |
| 0.033 µF | | | | A333K15X7RH□□□□V |
| 0.047 µF | | | | A473K15X7RH□□□□V |
| 0.068 µF | | | | A683K15X7RH□□□□V |
| 0.10 µF | | | | A104K15X7RH□□□□V |

Note:
1.The four blank digits are filled with lead configuration and packaging, and please refer to ordering information
2. Inserted with 1210 chip

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## Product Range

### Mono-Axial X7R Dielectric (continued)

| C | Tol. (%) | Lb Max (mm) | ØD Max (mm) | Clear Text Code without Lead configuration and Packaging[1] |
|---|---|---|---|---|
| 100 Vdc (continued) | | | | |
| 0.15 µF | 10 | 5.08 | 3.05 | A154K20X7RH□□□□V |
| 0.22 µF | | | | A224K20X7RH□□□□V |
| 0.33 µF | | 5.08 | 4.5[2] | A334K20X7RH□□□□V |
| 0.47 µF | | | | A474K20X7RH□□□□V |
| 200 Vdc | | | | |
| 330 pF | 10 | 3.81 | 3.81 | A331K15X7RK□□□□V |
| 470 pF | | | | A471K15X7RK□□□□V |
| 680 pF | | | | A681K15X7RK□□□□V |
| 1000 pF | | | | A102K15X7RK□□□□V |
| 1500 pF | | | | A152K15X7RK□□□□V |
| 2200 pF | | | | A222K15X7RK□□□□V |
| 3300 pF | | | | A332K15X7RK□□□□V |
| 4700 pF | | | | A472K15X7RK□□□□V |
| 6800 pF | | | | A682K15X7RK□□□□V |
| 0.010 µF | | | | A103K15X7RK□□□□V |
| 0.015 µF | | | | A153K15X7RK□□□□V |
| 0.022 µF | | | | A223K15X7RK□□□□V |
| 0.033 µF | | 5.08 | 3.05 | A333K20X7RK□□□□V |
| 0.047 µF | | | | A473K20X7RK□□□□V |
| 0.068 µF | | | | A683K20X7RK□□□□V |
| 0.10 µF | | | | A683K20X7RK□□□□V |

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## Product Range

### Mono-Axial X8R Dielectric

| C | Tol. (%) | Lb Max (mm) | ØD Max (mm) | Clear Text Code without Lead configuration and Packaging[1] |
|---|---|---|---|---|
| 50 Vdc | | | | |
| 470 pF | 10 | 3.81 | 2.54 | A471K15X8RF□□□□V |
| 680 pF | | | | A681K15X8RF□□□□V |
| 1000 pF | | | | A102K15X8RF□□□□V |
| 1500 pF | | | | A152K15X8RF□□□□V |
| 2200 pF | | | | A152K15X8RF□□□□V |
| 3300 pF | | | | A332K15X8RF□□□□V |
| 4700 pF | | | | A472K15X8RF□□□□V |
| 6800 pF | | | | A682K15X8RF□□□□V |
| 0.010 µF | | | | A103K15X8RF□□□□V |
| 0.015 µF | | | | A153K15X8RF□□□□V |
| 0.022 µF | | | | A223K15X8RF□□□□V |
| 0.033 µF | | | | A333K15X8RF□□□□V |
| 0.047 µF | | | | A473K15X8RF□□□□V |
| 0.056 µF | | | | A563K15X8RF□□□□V |
| 0.068 µF | | 5.08 | 3.05 | A683K20X8RF□□□□V |
| 0.10 µF | | | | A104K20X8RF□□□□V |
| 0.15 µF | | 5.08 | 4.5[2] | A154K20X8RF□□□□V |
| 0.22 µF | | | | A224K20X8RF□□□□V |
| 0.33 µF | | | | A334K20X8RF□□□□V |

Note:
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2. Inserted with 1210 chip



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## Product Range

### Mono-Kap C0G Dielectric

| C | Tol. (%) | $W_b$ Max (mm) | H Max (mm) | T Max (mm) | Clear Text Code without Lead configuration and Packaging[1] |
|---|---|---|---|---|---|
| 50 Vdc | | | | | |
| 100 pF | 5 | 3.81 | 3.81 | 2.54 | K101J15C0GF□□□□V |
| 150 pF | | | | | K151J15C0GF□□□□V |
| 220 pF | | | | | K221J15C0GF□□□□V |
| 330 pF | | | | | K331J15C0GF□□□□V |
| 470 pF | | | | | K471J15C0GF□□□□V |
| 680 pF | | | | | K681J15C0GF□□□□V |
| 1000 pF | | | | | K102J15C0GF□□□□V |
| 1500 pF | | | | | K152J15C0GF□□□□V |
| 2200 pF | | | | | K222J15C0GF□□□□V |
| 3300 pF | | | | | K332J15C0GF□□□□V |
| 3900 pF | | | | | K392J15C0GF□□□□V |
| 4700 pF | 5 | 5.08 | 5.08 | 3.18 | K472J20C0GF□□□□V |
| 6800 pF | | | | | K682J20C0GF□□□□V |
| 0.01 µF | | | | | K103J20C0GF□□□□V |
| 100 Vdc | | | | | |
| 100 pF | 5 | 3.81 | 3.81 | 2.54 | K101J15C0GH□□□□V |
| 150 pF | | | | | K151J15C0GH□□□□V |
| 220 pF | | | | | K221J15C0GH□□□□V |
| 330 pF | | | | | K331J15C0GH□□□□V |
| 470 pF | | | | | K471J15C0GH□□□□V |
| 680 pF | | | | | K681J15C0GH□□□□V |
| 1000 pF | | | | | K102J15C0GH□□□□V |
| 1500 pF | | | | | K152J15C0GH□□□□V |
| 1800 pF | | | | | K182J15C0GH□□□□V |
| 2200 pF | | 5.08 | 5.08 | 3.18 | K222J20C0GH□□□□V |
| 3300 pF | | | | | K332J20C0GH□□□□V |
| 4700 pF | | | | | K472J20C0GH□□□□V |
| 6800 pF | | | | | K682J20C0GH□□□□V |
| 0.01 µF | | | | | K103J20C0GH□□□□V |
| 200 Vdc | | | | | |
| 100 pF | 5 | 3.81 | 3.81 | 2.54 | K101J15C0GK□□□□V |
| 150 pF | | | | | K151J15C0GK□□□□V |
| 220 pF | | | | | K221J15C0GK□□□□V |
| 330 pF | | | | | K331J15C0GK□□□□V |
| 470 pF | | | | | K471J15C0GK□□□□V |
| 680 pF | | | | | K681J15C0GK□□□□V |
| 1000 pF | | | | | K102J15C0GK□□□□V |

Note: 1. The four blank digits are filled with lead configuration and packaging, and please refer to ordering information



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## Product Range

### Mono-Kap X7R Dielectric

| C | Tol. (%) | $W_b$ Max (mm) | H Max (mm) | T Max (mm) | Clear Text Code without Lead configuration and Packaging[1] |
|---|---|---|---|---|---|
| 50 Vdc | | | | | |
| 470 pF | 10 | 3.81 | 3.81 | 2.54 | K471K15X7RF□□□□V |
| 680 pF | | | | | K681K15X7RF□□□□V |
| 1000 pF | | | | | K102K15X7RF□□□□V |
| 1500 pF | | | | | K152K15X7RF□□□□V |
| 2200 pF | | | | | K222K15X7RF□□□□V |
| 3300 pF | | | | | K332K15X7RF□□□□V |
| 4700 pF | | | | | K472K15X7RF□□□□V |
| 6800 pF | | | | | K682K15X7RF□□□□V |
| 0.010 µF | | | | | K103K15X7RF□□□□V |
| 0.015 µF | | | | | K153K15X7RF□□□□V |
| 0.022 µF | | | | | K223K15X7RF□□□□V |
| 0.033 µF | | | | | K333K15X7RF□□□□V |
| 0.047 µF | | | | | K473K15X7RF□□□□V |
| 0.068 µF | | | | | K683K15X7RF□□□□V |
| 0.10 µF | | | | | K104K15X7RF□□□□V |
| 0.15 µF | | | | | K154K15X7RF□□□□V |
| 0.22 µF | 10 | 5.08 | 5.08 | 3.18 | K224K20X7RF□□□□V |
| 0.33 µF | | | | | K334K20X7RF□□□□V |
| 0.47 µF | | | | | K474K20X7RF□□□□V |
| 0.68 µF | | | | | K684K20X7RF□□□□V |
| 1.0 µF | | | | | K105K20X7RF□□□□V |
| 100 Vdc | | | | | |
| 470 pF | 10 | 3.81 | 3.81 | 2.54 | K471K15X7RH□□□□V |
| 680 pF | | | | | K681K15X7RH□□□□V |
| 1000 pF | | | | | K102K15X7RH□□□□V |
| 1500 pF | | | | | K152K15X7RH□□□□V |
| 2200 pF | | | | | K222K15X7RH□□□□V |
| 3300 pF | | | | | K332K15X7RH□□□□V |
| 4700 pF | | | | | K472K15X7RH□□□□V |
| 6800 pF | | | | | K682K15X7RH□□□□V |
| 0.010 µF | | | | | K103K15X7RH□□□□V |
| 0.015 µF | | | | | K153K15X7RH□□□□V |
| 0.022 µF | | | | | K223K15X7RH□□□□V |
| 0.033 µF | | | | | K333K15X7RH□□□□V |
| 0.047 µF | | | | | K473K15X7RH□□□□V |
| 0.068 µF | | | | | K683K15X7RH□□□□V |
| 0.10 µF | | | | | K104K15X7RH□□□□V |

Note:
1. The four blank digits are filled with lead configuration and packaging, and please refer to ordering information

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## Product Range

### Mono-Kap X7R Dielectric (continued)

| C | Tol. (%) | $W_b$ Max (mm) | H Max (mm) | T Max (mm) | Clear Text Code without Lead configuration and Packaging[1] |
|---|---|---|---|---|---|
| 100 Vdc (continued) | | | | | |
| 0.15 µF | 10 | 5.08 | 5.08 | 3.18 | K154K20X7RH□□□□V |
| 0.22 µF | | | | | K224K20X7RH□□□□V |
| 0.33 µF | | | | | K334K20X7RH□□□□V |
| 0.47 µF | | | | | K474K20X7RH□□□□V |
| 200 Vdc | | | | | |
| 330 pF | 10 | 3.81 | 3.81 | 2.54 | K331K15X7RK□□□□V |
| 470 pF | | | | | K471K15X7RK□□□□V |
| 680 pF | | | | | K681K15X7RK□□□□V |
| 1000 pF | | | | | K102K15X7RK□□□□V |
| 1500 pF | | | | | K152K15X7RK□□□□V |
| 2200 pF | | | | | K222K15X7RK□□□□V |
| 3300 pF | | | | | K332K15X7RK□□□□V |
| 4700 pF | | | | | K472K15X7RK□□□□V |
| 6800 pF | | | | | K682K15X7RK□□□□V |
| 0.010 µF | | | | | K103K15X7RK□□□□V |
| 0.015 µF | | | | | K153K15X7RK□□□□V |
| 0.022 µF | | | | | K223K15X7RK□□□□V |
| 0.033 µF | | 5.08 | 5.08 | 3.18 | K333K20X7RK□□□□V |
| 0.047 µF | | | | | K473K20X7RK□□□□V |
| 0.068 µF | | | | | K683K20X7RK□□□□V |
| 0.10 µF | | | | | K104K20X7RK□□□□V |

Note:
1. The four blank digits are filled with lead configuration and packaging, and please refer to ordering information



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Capacitors - AEC-Q200 Approved

## Product Range

### Mono-Axial X8R Dielectric

| C | Tol. (%) | $W_b$ Max (mm) | H Max (mm) | T Max (mm) | Clear Text Code without Lead configuration and Packaging[1] |
|---|---|---|---|---|---|
| 50 Vdc | | | | | |
| 470 pF | 10 | 3.81 | 3.81 | 2.54 | K471K15X8RF□□□□V |
| 680 pF | | | | | K681K15X8RF□□□□V |
| 1000 pF | | | | | K102K15X8RF□□□□V |
| 1500 pF | | | | | K152K15X8RF□□□□V |
| 2200 pF | | | | | K222K15X8RF□□□□V |
| 3300 pF | | | | | K332K15X8RF□□□□V |
| 4700 pF | | | | | K472K15X8RF□□□□V |
| 6800 pF | | | | | K682K15X8RF□□□□V |
| 0.010 µF | | | | | K103K15X8RF□□□□V |
| 0.015 µF | | | | | K153K15X8RF□□□□V |
| 0.022 µF | | | | | K223K15X8RF□□□□V |
| 0.033 µF | | | | | K333K15X8RF□□□□V |
| 0.047 µF | | | | | K473K15X8RF□□□□V |
| 0.056 µF | | | | | K563K15X8RF□□□□V |
| 0.068 µF | 10 | 5.08 | 5.08 | 3.18 | K683K20X8RF□□□□V |
| 0.10 µF | | | | | K104K20X8RF□□□□V |
| 0.15 µF | | | | | K154K20X8RF□□□□V |
| 0.22 µF | | | | | K224K20X8RF□□□□V |
| 0.33 µF | | | | | K334K20X8RF□□□□V |

Note:
1. The four blank digits are filled with lead configuration and packaging, and please refer to ordering information



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Общество с ограниченной ответственностью «МосЧип» ИНН 7719860671 / КПП 771901001
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