

DATA SHEET

EEPW 电子产品世界
.com.cn

Mono-kap™ series **Leaded ceramic multilayer capacitors**

Product specification
Supersedes data of 24th October 2001
File under BCcomponents, BC06

2002 Oct 09

Leaded ceramic multilayer capacitors

Mono-kap™ series

FEATURES

- Very high capacitance per unit volume
- Low cost.

APPLICATIONS

These conformally coated radial leaded capacitors are designed for commercial and industrial applications in four dielectrics, NP0 (ultra-stable), X7R (stable) and Z5U, Y5V (general purpose). Applications include timing, coupling/decoupling, signal comparison and biasing. Mono-kap™ capacitors are suitable for automatic insertion equipment.

DESCRIPTION

The basic capacitor construction consists of ceramic dielectric materials processed into a tape with a typical thickness range from 0.025 to 0.076 mm. Metal electrode patterns are applied using a thick film screening process. Multiple layers are stacked and laminated in such a manner that electrodes are alternately exposed when the pattern is cut into individual chip capacitors. The capacitors are fired through a high temperature profile to mature the ceramic and metal into a homogeneous unit.

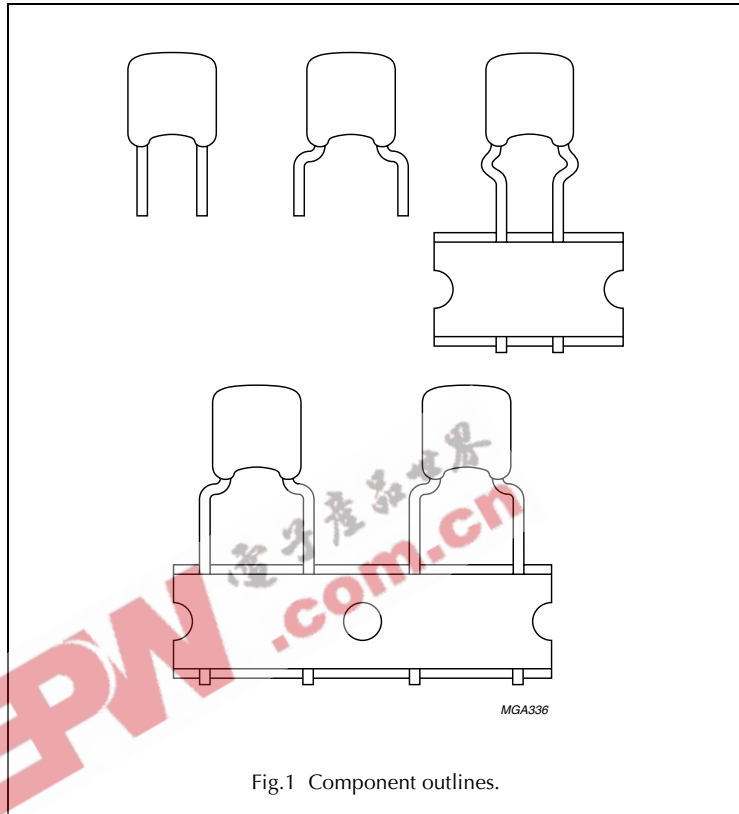


Fig.1 Component outlines.

Metal end terminations are applied and fired to provide electrical connection between the individual layers. Tinned leads are attached using a solder.

Encapsulation consists of a moisture-resistant gold colour conformal epoxy coating that meets the flame requirements of "UL94V-0".

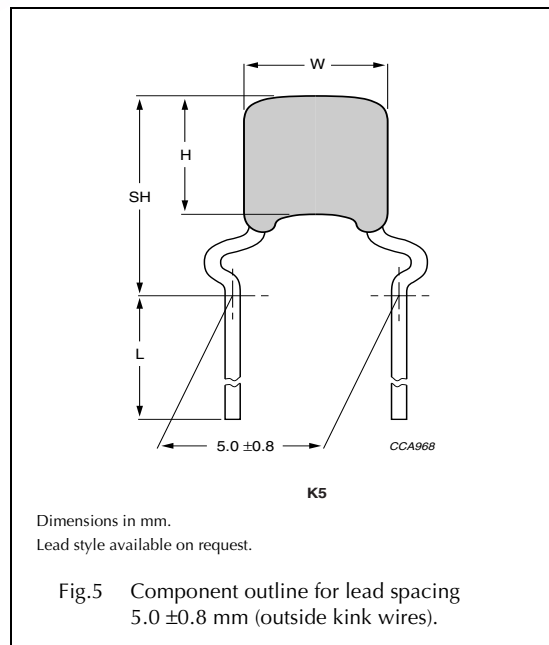
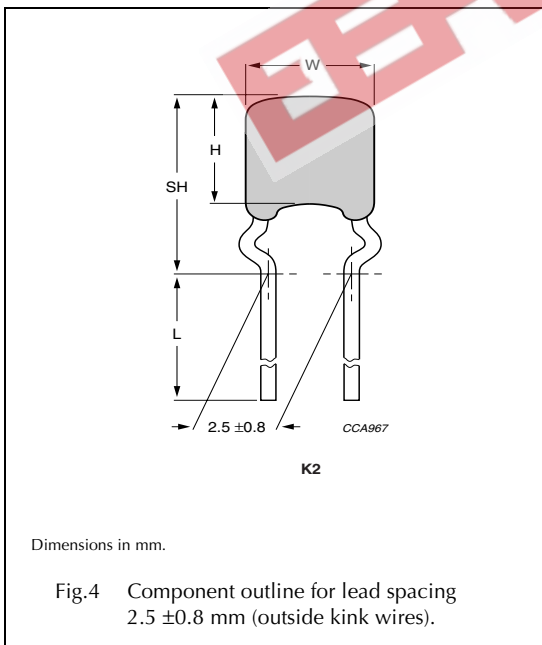
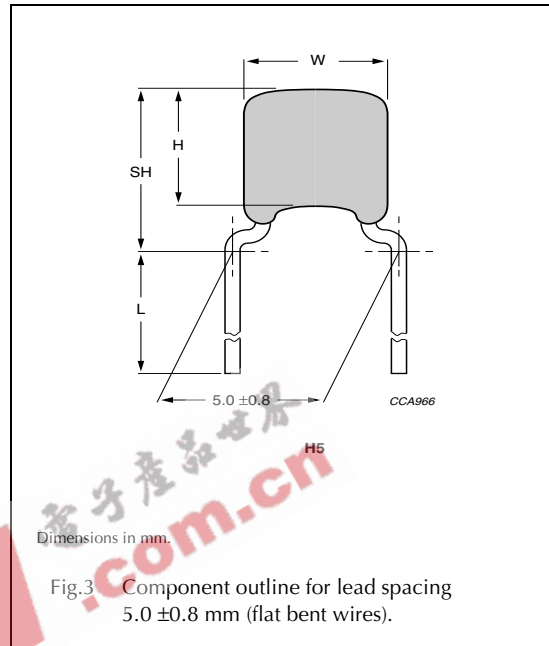
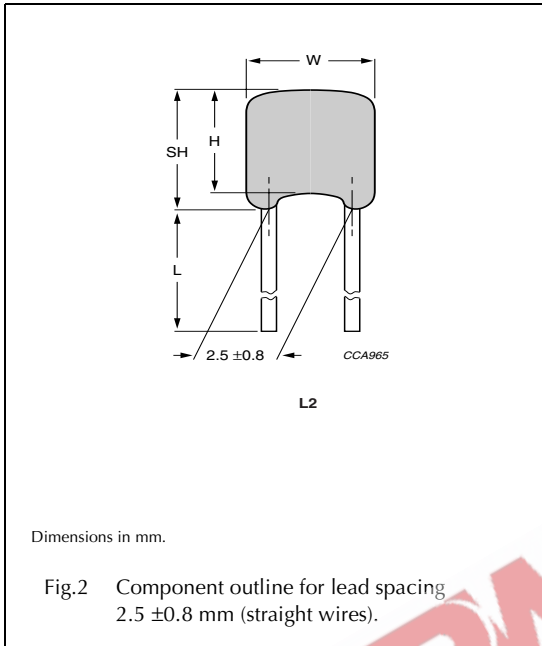
QUICK REFERENCE DATA

| DESCRIPTION | VALUE | | | | | | | |
|--------------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| | 2252 305 | 2252 306 | 2252 325 | 2252 326 | 2252 345 | 2252 346 | 2252 362 | 2252 365 |
| Capacitance range | 10 pF to 6800 pF | | 100 pF to 1.0 μF | | 1000 pF to 1.0 μF | | 0.01 to 1.0 μF | |
| Rated DC voltage | 50 V | 100 V | 50 V | 100 V | 50 V | 100 V | 25 V | 50 V |
| Tolerance on capacitance | ±5% | | ±10% | | ±20% | | +80%/-20% | |
| Temperature coefficient | NP0 (COG) | | X7R | | Z5U | | Y5V | |

Leaded ceramic multilayer capacitors

Mono-kap™ series

MECHANICAL DATA



Leaded ceramic multilayer capacitors

Mono-kap™ series

Physical dimensions

Table 1 Capacitor dimensions and mass; notes 1 and 2

| SIZE CODE | W _{max} (mm) | H _{max} (mm) | T _{max} ⁽³⁾ (mm) | MAX. SEATING HEIGHT (SH) (mm) | | | | MASS (g) |
|-----------|-----------------------|-----------------------|--------------------------------------|-------------------------------|-----------------|-----------------|-----------------|----------|
| | | | | Fig.2 | Fig.3 | Fig.4 | Fig.5 | |
| 15 | 4.0 (0.15) | 4.0 (0.15) | 2.5 (0.100) | 5.58 (0.220) | 6.50 (0.256) | 7.50 (0.295) | 7.50 (0.295) | ≈0.15 |
| 20 | 5.0 (0.20) | 5.0 (0.20) | 3.2 (0.13) | 6.58 (0.259) | 7.50 (0.295) | 8.50 (0.335) | 8.50 (0.335) | ≈0.16 |

Notes

1. Bulk packed products have a standard lead length $L \geq 25.4$ mm.
2. Dimensions between the parentheses are in inches.
3. Thickness defined as T.

Marking⁽¹⁾ (see Fig.6)

Capacitance code (CCC):

- 10 pF to 99 pF;
actual value in pF (2 digits only)
- 100 pF and above;
coded capacitance value
(same as used in P/N).

Capacitance tolerance (T):

- Standard EIA tolerance.

Material code (M):

- A = NP0 (COG)
- C = X7R
- E = Z5U
- Y = Y5V.

Voltage code (V):

- 1 = 100 V
- 3 = 25 V
- 5 = 50 V.

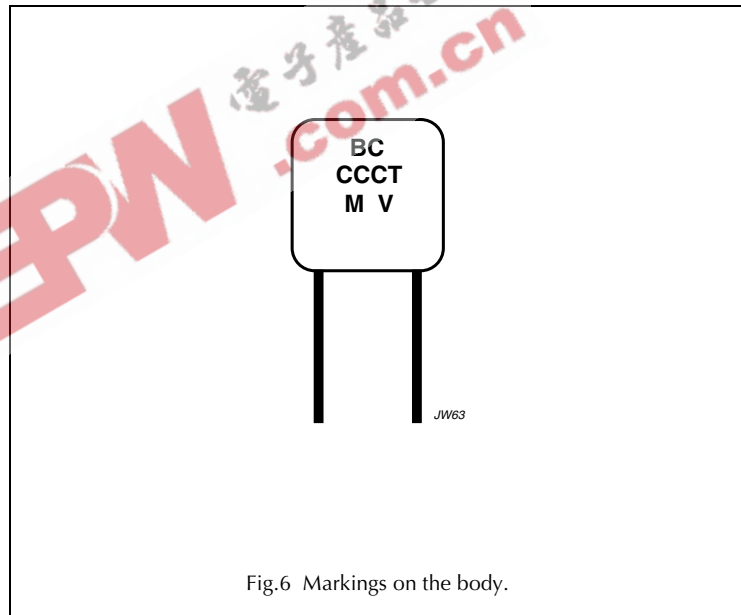


Fig.6 Markings on the body.

(1) 100 pF and above in size code 15 are marked without capacitance tolerance code (T).

Leaded ceramic multilayer capacitors

Mono-kap™ series

CAPACITANCE RANGE CHARTS

NP0 Dielectric

| CAP. | SIZE CODE 15 | | SIZE CODE 20 | |
|---------|--------------|-------|--------------|-------|
| | 50 V | 100 V | 50 V | 100 V |
| 10 pF | | | | |
| 12 | | | | |
| 15 | | | | |
| 18 | | | | |
| 22 | | | | |
| 27 | | | | |
| 33 | | | | |
| 39 | | | | |
| 47 | | | | |
| 56 | | | | |
| 68 | | | | |
| 82 | | | | |
| 100 | | | | |
| 120 | | | | |
| 150 | | | | |
| 180 | | | | |
| 220 | | | | |
| 270 | | | | |
| 330 | | | | |
| 390 | | | | |
| 470 | | | | |
| 560 | | | | |
| 680 | | | | |
| 820 | | | | |
| 1000 | | | | |
| 1200 | | | | |
| 1500 | | | | |
| 1800 | | | | |
| 2200 | | | | |
| 2700 | | | | |
| 3300 | | | | |
| 3900 | | | | |
| 4700 | | | | |
| 5600 | | | | |
| 6800 | | | | |
| 8200 | | | | |
| 0.01 μF | | | | |

X7R Dielectric

| CAP. | SIZE CODE 15 | | SIZE CODE 20 | |
|------------|--------------|-------|--------------|-------|
| | 50 V | 100 V | 50 V | 100 V |
| 100-220 pF | | | | |
| 270 | | | | |
| 330 | | | | |
| 390 | | | | |
| 470 | | | | |
| 560 | | | | |
| 680 | | | | |
| 820 | | | | |
| 1000 | | | | |
| 1200 | | | | |
| 1500 | | | | |
| 1800 | | | | |
| 2200 | | | | |
| 2700 | | | | |
| 3300 | | | | |
| 3900 | | | | |
| 4700 | | | | |
| 5600 | | | | |
| 6800 | | | | |
| 8200 | | | | |
| 0.01 μF | | | | |
| 0.012 | | | | |
| 0.015 | | | | |
| 0.018 | | | | |
| 0.022 | | | | |
| 0.027 | | | | |
| 0.033 | | | | |
| 0.039 | | | | |
| 0.047 | | | | |
| 0.056 | | | | |
| 0.068 | | | | |
| 0.082 | | | | |
| 0.10 | | | | |
| 0.15 | | | | |
| 0.22 | | | | |
| 0.33 | | | | |
| 0.47 | | | | |
| 0.68 | | | | |
| 1.0 | | | | |

Leaded ceramic multilayer capacitors

Mono-kap™ series

Z5U Dielectric

| CAP. | SIZE CODE 15 | | SIZE CODE 20 | |
|--------------|--------------|-------|--------------|-------|
| | 50 V | 100 V | 50 V | 100 V |
| 1000 pF | | | | |
| 1500 | | | | |
| 2200 | | | | |
| 3300 | | | | |
| 4700 | | | | |
| 6800 | | | | |
| 0.01 μ F | | | | |
| 0.015 | | | | |
| 0.022 | | | | |
| 0.033 | | | | |
| 0.047 | | | | |
| 0.068 | | | | |
| 0.10 | | | | |
| 0.15 | | | | |
| 0.22 | | | | |
| 0.33 | | | | |
| 0.47 | | | | |
| 0.68 | | | | |
| 1.0 | | | | |

Y5V Dielectric

| CAP. | SIZE CODE 15 | | SIZE CODE 20 | |
|--------------|--------------|------|--------------|------|
| | 25 V | 50 V | 25 V | 50 V |
| 0.01 μ F | | | | |
| 0.015 | | | | |
| 0.022 | | | | |
| 0.033 | | | | |
| 0.047 | | | | |
| 0.068 | | | | |
| 0.10 | | | | |
| 0.15 | | | | |
| 0.22 | | | | |
| 0.33 | | | | |
| 0.47 | | | | |
| 0.68 | | | | |
| 1.0 | | | | |

Leaded ceramic multilayer capacitors

Mono-kap™ series

ORDERING INFORMATION

Components may be ordered by using either a simple 15-digit clear text code, or BCcomponents 12NC.

Clear text code

EXAMPLE: K103K15X7RF53H5

| PRODUCT TYPE | CAPACITANCE (pF) | TOLERANCE | SIZE CODE MAX. (mm) | DIELECTRIC | RATED VOLTAGE | LEAD DIMENSIONS, STYLE AND PACKAGING | | | |
|--------------|---|--|--------------------------------------|--------------------------------|-----------------------------------|--------------------------------------|--|---|------------------------------------|
| | | | | | | DIA. (mm) | PACKAGING/LENGTH (mm) | STYLE | SPACING |
| K = mono-kap | two significant digits followed by the number of zeros: 101 = 100 103 = 10000 | J = ±5% K = ±10% M = ±20% Z = +80%/−20% | 15 = 3.8 (.150") 20 = 5.0 (.200") | COG (NP0) X7R Z5U Y5V | E = 25 V F = 50 V H = 100 V | 5 = 0.5 (0.020") | 3 = bulk, lead length 30 ±5.0 (1.25") T = tape/reel U = ammo | L = straight H = high seat K = outward kink | 2 = 2.5 (.100") 5 = 5.0 (.200") |

Ordering code 12NC

Dielectric and tolerance

| | | |
|----|-----|----------|
| 30 | NP0 | ±5% |
| 31 | NP0 | ±10% |
| 32 | X7R | ±10% |
| 33 | X7R | ±20% |
| 34 | Z5U | ±20% |
| 35 | Z5U | −20/+80% |
| 36 | Y5V | −20/+80% |

Rated voltage (DC)

| | |
|---|-------|
| 2 | 25 V |
| 5 | 50 V |
| 6 | 100 V |

Multiplier

| | |
|---|---------|
| 8 | 0.1 |
| 9 | 1 |
| 1 | 10 |
| 2 | 100 |
| 3 | 1 000 |
| 4 | 10 000 |
| 5 | 100 000 |

Capacitance (pF)
two significant digits of capacitance value

Size code, lead spacing/style and packaging (1)

JWB218

(1) See Table 2.

Table 2 Size code, lead spacing/style and packaging

| SIZE CODE (mm) | LEAD SPACING (mm) | LEAD STYLE | BULK | TAPE/REEL | AMMO |
|----------------|-------------------|---------------------------|-------------|-----------|------|
| | | | CODE NUMBER | | |
| 15 | 2.5 (.100") | straight lead (L); note 1 | 00 | 02 | 03 |
| | | outward kink (K) | 04 | 06 | 07 |
| 20 | 2.5 (.100") | high seat (H); note 1 | 08 | 10 | 12 |
| | | straight lead (L); note 1 | 14 | 16 | 17 |
| | 5.0 (.200") | outward kink (K) | 18 | 20 | 21 |
| | 5.0 (.200") | high seat (H); note 1 | 22 | 24 | 26 |

Note

1. Preferred types.

Leaded ceramic multilayer capacitors

Mono-kap™ series

Table 3 Capacitance, rated voltage, mechanical dimensions and ordering information; note 1

| C | U _{R(DC)} (V) | LEAD SPACING | SIZE CODE | CLEAR TEXT CODE | PACKAGING CODE 8 th AND 9 th DIGIT | | | CATALOGUE NUMBER ⁽²⁾⁽³⁾ |
|--------------------------------|---------------------------|-----------------|--------------|--|---|------|------|---------------------------------------|
| | | | | 13 th DIGIT: T = REEL; U = AMMO; 3 = BULK | REEL | AMMO | BULK | |
| NP0 (C0G) ±5% tolerance | | | | | | | | |
| 10 pF | 50 | 5.0 | 15 | K100J15C0GF5.H5 | 10 | 12 | 08 | 2252 305..109 |
| | | 2.5 | | K100J15C0GF5.L2 | 02 | 03 | 00 | 2252 305..109 |
| | 100 | 5.0 | 15 | K100J15C0GH5.H5 | 10 | 12 | 08 | 2252 306..109 |
| | | 2.5 | | K100J15C0GH5.L2 | 02 | 03 | 00 | 2252 306..109 |
| 12 pF | 50 | 5.0 | 15 | K120J15C0GF5.H5 | 10 | 12 | 08 | 2252 305..129 |
| | | 2.5 | | K120J15C0GF5.L2 | 02 | 03 | 00 | 2252 305..129 |
| 15 pF | 50 | 5.0 | 15 | K150J15C0GF5.H5 | 10 | 12 | 08 | 2252 305..159 |
| | | 2.5 | | K150J15C0GF5.L2 | 02 | 03 | 00 | 2252 305..159 |
| 18 pF | 50 | 5.0 | 15 | K180J15C0GF5.H5 | 10 | 12 | 08 | 2252 305..189 |
| | | 2.5 | | K180J15C0GF5.L2 | 02 | 03 | 00 | 2252 305..189 |
| 22 pF | 50 | 5.0 | 15 | K220J15C0GF5.H5 | 10 | 12 | 08 | 2252 305..229 |
| | | 2.5 | | K220J15C0GF5.L2 | 02 | 03 | 00 | 2252 305..229 |
| | 100 | 5.0 | 15 | K220J15C0GH5.H5 | 10 | 12 | 08 | 2252 306..229 |
| | | 2.5 | | K220J15C0GH5.L2 | 02 | 03 | 00 | 2252 306..229 |
| 27 pF | 50 | 5.0 | 15 | K270J15C0GF5.H5 | 10 | 12 | 08 | 2252 305..279 |
| | | 2.5 | | K270J15C0GF5.L2 | 02 | 03 | 00 | 2252 305..279 |
| 33 pF | 50 | 5.0 | 15 | K330J15C0GF5.H5 | 10 | 12 | 08 | 2252 305..339 |
| | | 2.5 | | K330J15C0GF5.L2 | 02 | 03 | 00 | 2252 305..339 |
| 39 pF | 50 | 5.0 | 15 | K390J15C0GF5.H5 | 10 | 12 | 08 | 2252 305..399 |
| | | 2.5 | | K390J15C0GF5.L2 | 02 | 03 | 00 | 2252 305..399 |
| 47 pF | 50 | 5.0 | 15 | K470J15C0GF5.H5 | 10 | 12 | 08 | 2252 305..479 |
| | | 2.5 | | K470J15C0GF5.L2 | 02 | 03 | 00 | 2252 305..479 |
| | 100 | 5.0 | 15 | K470J15C0GH5.H5 | 10 | 12 | 08 | 2252 306..479 |
| | | 2.5 | | K470J15C0GH5.L2 | 02 | 03 | 00 | 2252 306..479 |
| 56 pF | 50 | 5.0 | 15 | K560J15C0GF5.H5 | 10 | 12 | 08 | 2252 305..569 |
| | | 2.5 | | K560J15C0GF5.L2 | 02 | 03 | 00 | 2252 305..569 |
| 68 pF | 50 | 5.0 | 15 | K680J15C0GF5.H5 | 10 | 12 | 08 | 2252 305..689 |
| | | 2.5 | | K680J15C0GF5.L2 | 02 | 03 | 00 | 2252 305..689 |
| 82 pF | 50 | 5.0 | 15 | K820J15C0GF5.H5 | 10 | 12 | 08 | 2252 305..829 |
| | | 2.5 | | K820J15C0GF5.L2 | 02 | 03 | 00 | 2252 305..829 |

Leaded ceramic multilayer capacitors

Mono-kap™ series

| C | U _{R(DC)} (V) | LEAD SPACING | SIZE CODE | CLEAR TEXT CODE | PACKAGING CODE 8 th AND 9 th DIGIT | | | CATALOGUE NUMBER ⁽²⁾⁽³⁾ |
|---------------------------|---------------------------|-----------------|--------------|--|---|------|------|---------------------------------------|
| | | | | 13 th DIGIT: T = REEL; U = AMMO; 3 = BULK | REEL | AMMO | BULK | |
| 100 pF | 50 | 5.0 | 15 | K101J15C0GF5.H5 | 10 | 12 | 08 | 2252 305..101 |
| | | 2.5 | | K101J15C0GF5.L2 | 02 | 03 | 00 | 2252 305..101 |
| | 100 | 5.0 | 15 | K101J15C0GH5.H5 | 10 | 12 | 08 | 2252 306..101 |
| | | 2.5 | | K101J15C0GH5.L2 | 02 | 03 | 00 | 2252 306..101 |
| 150 pF | 50 | 5.0 | 15 | K151J15C0GF5.H5 | 10 | 12 | 08 | 2252 305..151 |
| | | 2.5 | | K151J15C0GF5.L2 | 02 | 03 | 00 | 2252 305..151 |
| 220 pF | 50 | 5.0 | 15 | K221J15C0GF5.H5 | 10 | 12 | 08 | 2252 305..221 |
| | | 2.5 | | K221J15C0GF5.L2 | 02 | 03 | 00 | 2252 305..221 |
| | 100 | 5.0 | 15 | K221J15C0GH5.H5 | 10 | 12 | 08 | 2252 306..221 |
| | | 2.5 | | K221J15C0GH5.L2 | 02 | 03 | 00 | 2252 306..221 |
| 330 pF | 50 | 5.0 | 15 | K331J15C0GF5.H5 | 10 | 12 | 08 | 2252 305..331 |
| | | 2.5 | | K331J15C0GF5.L2 | 02 | 03 | 00 | 2252 305..331 |
| 470 pF | 50 | 5.0 | 15 | K471J15C0GF5.H5 | 10 | 12 | 08 | 2252 305..471 |
| | | 2.5 | | K471J15C0GF5.L2 | 02 | 03 | 00 | 2252 305..471 |
| | 100 | 5.0 | 15 | K471J15C0GH5.H5 | 10 | 12 | 08 | 2252 306..471 |
| | | 2.5 | | K471J15C0GH5.L2 | 02 | 03 | 00 | 2252 306..471 |
| 680 pF | 50 | 5.0 | 15 | K681J15C0GF5.H5 | 10 | 12 | 08 | 2252 305..681 |
| | | 2.5 | | K681J15C0GF5.L2 | 02 | 03 | 00 | 2252 305..681 |
| 1 000 pF | 50 | 5.0 | 15 | K102J15C0GF5.H5 | 10 | 12 | 08 | 2252 305..102 |
| | | 2.5 | | K102J15C0GF5.L2 | 02 | 03 | 00 | 2252 305..102 |
| | 100 | 5.0 | 20 | K102J20C0GH5.H5 | 24 | 26 | 22 | 2252 306..102 |
| | | 2.5 | | K102J20C0GH5.L2 | 16 | 17 | 14 | 2252 306..102 |
| 1 500 pF | 50 | 5.0 | 15 | K152J15C0GF5.H5 | 10 | 12 | 08 | 2252 305..152 |
| 2 200 pF | 50 | 5.0 | 15 | K222J15C0GF5.H5 | 10 | 12 | 08 | 2252 305..222 |
| 3 300 pF | 50 | 5.0 | 20 | K332J20C0GF5.H5 | 24 | 26 | 22 | 2252 305..332 |
| 4 700 pF | 50 | 5.0 | 20 | K472J20C0GF5.H5 | 24 | 26 | 22 | 2252 305..472 |
| 6 800 pF | 50 | 5.0 | 20 | K682J20C0GF5.H5 | 24 | 26 | 22 | 2252 305..682 |
| X7R ±10% tolerance | | | | | | | | |
| 100 pF | 50 | 5.0 | 15 | K101K15X7RF5.H5 | 10 | 12 | 08 | 2252 325..101 |
| | | 2.5 | | K101K15X7RF5.L2 | 02 | 03 | 00 | 2252 325..101 |
| | 100 | 5.0 | 15 | K101K15X7RH5.H5 | 10 | 12 | 08 | 2252 326..101 |
| | | 2.5 | | K101K15X7RH5.L2 | 02 | 03 | 00 | 2252 326..101 |
| 150 pF | 50 | 5.0 | 15 | K151K15X7RF5.H5 | 10 | 12 | 08 | 2252 325..151 |
| | | 2.5 | | K151K15X7RF5.L2 | 02 | 03 | 00 | 2252 325..151 |
| | 100 | 5.0 | 15 | K151K15X7RH5.H5 | 10 | 12 | 08 | 2252 326..151 |
| | | 2.5 | | K151K15X7RH5.L2 | 02 | 03 | 00 | 2252 326..151 |

Leaded ceramic multilayer capacitors

Mono-kap™ series

| C | U _{R(DC)} (V) | LEAD SPACING | SIZE CODE | CLEAR TEXT CODE | PACKAGING CODE 8 th AND 9 th DIGIT | | | CATALOGUE NUMBER ⁽²⁾⁽³⁾ |
|----------|---------------------------|-----------------|--------------|--|---|------|------|---------------------------------------|
| | | | | 13 th DIGIT: T = REEL; U = AMMO; 3 = BULK | REEL | AMMO | BULK | |
| 220 pF | 50 | 5.0 | 15 | K221K15X7RF5.H5 | 10 | 12 | 08 | 2252 325..221 |
| | | 2.5 | | K221K15X7RF5.L2 | 02 | 03 | 00 | 2252 325..221 |
| | 100 | 5.0 | 15 | K221K15X7RH5.H5 | 10 | 12 | 08 | 2252 326..221 |
| | | 2.5 | | K221K15X7RH5.L2 | 02 | 03 | 00 | 2252 326..221 |
| 330 pF | 50 | 5.0 | 15 | K331K15X7RF5.H5 | 10 | 12 | 08 | 2252 325..331 |
| | | 2.5 | | K331K15X7RF5.L2 | 02 | 03 | 00 | 2252 325..331 |
| 470 pF | 50 | 5.0 | 15 | K471K15X7RF5.H5 | 10 | 12 | 08 | 2252 325..471 |
| | | 2.5 | | K471K15X7RF5.L2 | 02 | 03 | 00 | 2252 325..471 |
| | 100 | 5.0 | 15 | K471K15X7RH5.H5 | 10 | 12 | 08 | 2252 326..471 |
| | | 2.5 | | K471K15X7RH5.L2 | 02 | 03 | 00 | 2252 326..471 |
| 680 pF | 50 | 5.0 | 15 | K681K15X7RF5.H5 | 10 | 12 | 08 | 2252 325..681 |
| | | 2.5 | | K681K15X7RF5.L2 | 02 | 03 | 00 | 2252 325..681 |
| 1000 pF | 50 | 5.0 | 15 | K102K15X7RF5.H5 | 10 | 12 | 08 | 2252 325..102 |
| | | 2.5 | | K102K15X7RF5.L2 | 02 | 03 | 00 | 2252 325..102 |
| | 100 | 5.0 | 15 | K102K15X7RH5.H5 | 10 | 12 | 08 | 2252 326..102 |
| | | 2.5 | | K102K15X7RH5.L2 | 02 | 03 | 00 | 2252 326..102 |
| 1500 pF | 50 | 5.0 | 15 | K152K15X7RF5.H5 | 10 | 12 | 08 | 2252 325..152 |
| | | 2.5 | | K152K15X7RF5.L2 | 02 | 03 | 00 | 2252 325..152 |
| 2200 pF | 50 | 5.0 | 15 | K222K15X7RF5.H5 | 10 | 12 | 08 | 2252 325..222 |
| | | 2.5 | | K222K15X7RF5.L2 | 02 | 03 | 00 | 2252 325..222 |
| | 100 | 5.0 | 15 | K222K15X7RH5.H5 | 10 | 12 | 08 | 2252 326..222 |
| | | 2.5 | | K222K15X7RH5.L2 | 02 | 03 | 00 | 2252 326..222 |
| 3300 pF | 50 | 5.0 | 15 | K332K15X7RF5.H5 | 10 | 12 | 08 | 2252 325..332 |
| | | 2.5 | | K332K15X7RF5.L2 | 02 | 03 | 00 | 2252 325..332 |
| 4700 pF | 50 | 5.0 | 15 | K472K15X7RF5.H5 | 10 | 12 | 08 | 2252 325..472 |
| | | 2.5 | | K472K15X7RF5.L2 | 02 | 03 | 00 | 2252 325..472 |
| | 100 | 5.0 | 15 | K472K15X7RH5.H5 | 10 | 12 | 08 | 2252 326..472 |
| | | 2.5 | | K472K15X7RH5.L2 | 02 | 03 | 00 | 2252 326..472 |
| 6800 pF | 50 | 5.0 | 15 | K682K15X7RF5.H5 | 10 | 12 | 08 | 2252 325..682 |
| | | 2.5 | | K682K15X7RF5.L2 | 02 | 03 | 00 | 2252 325..682 |
| 0.01 μF | 50 | 5.0 | 15 | K103K15X7RF5.H5 | 10 | 12 | 08 | 2252 325..103 |
| | | 2.5 | | K103K15X7RF5.L2 | 02 | 03 | 00 | 2252 325..103 |
| | 100 | 5.0 | 15 | K103K15X7RH5.H5 | 10 | 12 | 08 | 2252 326..103 |
| | | 2.5 | | K103K15X7RH5.L2 | 02 | 03 | 00 | 2252 326..103 |
| 0.015 μF | 50 | 5.0 | 15 | K153K15X7RF5.H5 | 10 | 12 | 08 | 2252 325..153 |
| | | 2.5 | | K153K15X7RF5.L2 | 02 | 03 | 00 | 2252 325..153 |

Leaded ceramic multilayer capacitors

Mono-kap™ series

| C | U _{R(DC)} (V) | LEAD SPACING | SIZE CODE | CLEAR TEXT CODE | PACKAGING CODE 8 th AND 9 th DIGIT | | | CATALOGUE NUMBER ⁽²⁾ / ₍₃₎ |
|---------------------------|---------------------------|-----------------|--------------|--|---|------|------|---|
| | | | | 13 th DIGIT: T = REEL; U = AMMO; 3 = BULK | REEL | AMMO | BULK | |
| 0.022 µF | 50 | 5.0 | 15 | K223K15X7RF5.H5 | 10 | 12 | 08 | 2252 325..223 |
| | | 2.5 | | K223K15X7RF5.L2 | 02 | 03 | 00 | 2252 325..223 |
| | 100 | 5.0 | 20 | K223K20X7RH5.H5 | 24 | 26 | 22 | 2252 326..223 |
| | | 2.5 | | K223K20X7RH5.L2 | 16 | 17 | 14 | 2252 326..223 |
| 0.033 µF | 50 | 5.0 | 15 | K333K15X7RF5.H5 | 10 | 12 | 08 | 2252 325..333 |
| | | 2.5 | | K333K15X7RF5.L2 | 02 | 03 | 00 | 2252 325..333 |
| 0.047 µF | 50 | 5.0 | 15 | K473K15X7RF5.H5 | 10 | 12 | 08 | 2252 325..473 |
| | | 2.5 | | K473K15X7RF5.L2 | 02 | 03 | 00 | 2252 325..473 |
| | 100 | 5.0 | 20 | K473K20X7RH5.H5 | 24 | 26 | 22 | 2252 326..473 |
| | | 2.5 | | K473K20X7RH5.L2 | 16 | 17 | 14 | 2252 326..473 |
| 0.068 µF | 50 | 5.0 | 15 | K683K15X7RF5.H5 | 10 | 12 | 08 | 2252 325..683 |
| | | 2.5 | | K683K15X7RF5.L2 | 02 | 03 | 00 | 2252 325..683 |
| 0.1 µF | 50 | 5.0 | 15 | K104K15X7RF5.H5 | 10 | 12 | 08 | 2252 325..104 |
| | | 2.5 | | K104K15X7RF5.L2 | 02 | 03 | 00 | 2252 325..104 |
| | 100 | 5.0 | 20 | K104K20X7RH5.H5 | 24 | 26 | 22 | 2252 326..104 |
| | | 2.5 | | K104K20X7RH5.L2 | 16 | 17 | 14 | 2252 326..104 |
| 0.15 µF | 50 | 5.0 | 20 | K154K20X7RF5.H5 | 24 | 26 | 22 | 2252 325..154 |
| 0.22 µF | 50 | 5.0 | 20 | K224K20X7RF5.H5 | 24 | 26 | 22 | 2252 325..224 |
| 0.47 µF | 50 | 5.0 | 20 | K474K20X7RF5.H5 | 24 | 26 | 22 | 2252 325..474 |
| 1.00 µF | 50 | 5.0 | 20 | K105K20X7RF5.H5 | 24 | 26 | 22 | 2252 325..105 |
| Z5U ±20% tolerance | | | | | | | | |
| 0.01 µF | 50 | 5.0 | 15 | K103M15Z5UF5.H5 | 10 | 12 | 08 | 2252 345..103 |
| | | 2.5 | | K103M15Z5UF5.L2 | 02 | 03 | 00 | 2252 345..103 |
| | 100 | 5.0 | 15 | K103M15Z5UH5.H5 | 10 | 12 | 08 | 2252 346..103 |
| | | 2.5 | | K103M15Z5UH5.L2 | 02 | 03 | 00 | 2252 346..103 |
| 0.022 µF | 50 | 5.0 | 15 | K223M15Z5UF5.H5 | 10 | 12 | 08 | 2252 345..223 |
| | | 2.5 | | K223M15Z5UF5.L2 | 02 | 03 | 00 | 2252 345..223 |
| 0.047 µF | 50 | 5.0 | 15 | K473M15Z5UF5.H5 | 10 | 12 | 08 | 2252 345..473 |
| | | 2.5 | | K473M15Z5UF5.L2 | 02 | 03 | 00 | 2252 345..473 |
| 0.1 µF | 50 | 5.0 | 15 | K104M15Z5UF5.H5 | 10 | 12 | 08 | 2252 345..104 |
| | | 2.5 | | K104M15Z5UF5.L2 | 02 | 03 | 00 | 2252 345..104 |
| | 100 | 5.0 | 20 | K104M20Z5UH5.H5 | 24 | 26 | 22 | 2252 346..104 |
| | | 2.5 | | K104M20Z5UH5.L2 | 16 | 17 | 14 | 2252 346..104 |
| 0.15 µF | 50 | 5.0 | 15 | K154M15Z5UF5.H5 | 10 | 12 | 08 | 2252 345..154 |
| | | 2.5 | | K154M15Z5UF5.L2 | 02 | 03 | 00 | 2252 345..154 |
| 0.22 µF | 50 | 5.0 | 15 | K224M15Z5UF5.H5 | 10 | 12 | 08 | 2252 345..224 |
| | | 2.5 | | K224M15Z5UF5.L2 | 02 | 03 | 00 | 2252 345..224 |

Leaded ceramic multilayer capacitors

Mono-kap™ series

| C | U _{R(DC)} (V) | LEAD SPACING | SIZE CODE | CLEAR TEXT CODE | PACKAGING CODE 8 th AND 9 th DIGIT | | | CATALOGUE NUMBER ⁽²⁾⁽³⁾ |
|-------------------------------|---------------------------|-----------------|--------------|--|---|------|------|---------------------------------------|
| | | | | 13 th DIGIT: T = REEL; U = AMMO; 3 = BULK | REEL | AMMO | BULK | |
| 0.33 µF | 50 | 5.0 | 20 | K334M20Z5UF5.H5 | 24 | 26 | 22 | 2252 345..334 |
| 0.47 µF | 50 | 5.0 | 20 | K474M20Z5UF5.H5 | 24 | 26 | 22 | 2252 345..474 |
| 0.68 µF | 50 | 5.0 | 20 | K684M20Z5UF5.H5 | 24 | 26 | 22 | 2252 345..684 |
| 1.0 µF | 50 | 5.0 | 20 | K105M20Z5UF5.H5 | 24 | 26 | 22 | 2252 345..105 |
| Y5V +80/-20% tolerance | | | | | | | | |
| 0.1 µF | 25 | 5.0 | 15 | K104Z15Y5VE5.H5 | 10 | 12 | 08 | 2252 362..104 |
| | | 2.5 | | K104Z15Y5VE5.L2 | 02 | 03 | 00 | 2252 362..104 |
| | 50 | 5.0 | 15 | K104Z15Y5VF5.H5 | 10 | 12 | 08 | 2252 365..104 |
| | | 2.5 | | K104Z15Y5VF5.L2 | 02 | 03 | 00 | 2252 365..104 |
| 0.22 µF | 25 | 5.0 | 15 | K224Z15Y5VE5.H5 | 10 | 12 | 08 | 2252 362..224 |
| | | 2.5 | | K224Z15Y5VE5.L2 | 02 | 03 | 00 | 2252 362..224 |
| | 50 | 5.0 | 15 | K224Z15Y5VF5.H5 | 10 | 12 | 08 | 2252 365..224 |
| | | 2.5 | | K224Z15Y5VF5.L2 | 02 | 03 | 00 | 2252 365..224 |
| 0.47 µF | 25 | 5.0 | 20 | K474Z20Y5VE5.H5 | 24 | 26 | 22 | 2252 362..474 |
| | | 2.5 | | K474Z20Y5VE5.L2 | 16 | 17 | 14 | 2252 362..474 |
| | 50 | 5.0 | 20 | K474Z20Y5VF5.H5 | 24 | 26 | 22 | 2252 365..474 |
| | | 2.5 | | K474Z20Y5VF5.L2 | 16 | 17 | 14 | 2252 365..474 |
| 1.0 µF | 25 | 5.0 | 20 | K105Z20Y5VE5.H5 | 24 | 26 | 22 | 2252 362..105 |
| | | 2.5 | | K105Z20Y5VE5.L2 | 16 | 17 | 14 | 2252 362..105 |
| | 50 | 5.0 | 20 | K105Z20Y5VF5.H5 | 24 | 26 | 22 | 2252 365..105 |
| | | 2.5 | | K105Z20Y5VF5.L2 | 16 | 17 | 14 | 2252 365..105 |

Notes

1. For maximum thickness refer to Table 1.
2. 8th and 9th digit of the catalogue number to be completed with the packaging code.
3. Packaging codes refer to straight leads for F = 2.5 mm and flat bent leads for F = 5.0 mm. Other styles available on request.

Leaded ceramic multilayer capacitors

Mono-kap™ series

ELECTRICAL CHARACTERISTICS

Table 4 Electrical data for NP0, X7R, Z5U and Y5V

The capacitors meet the essential requirements of "IEC 60384-8", "IEC 60384-9" and "EIA 198".

Unless stated otherwise all electrical values apply at an ambient temperature of 25 ± 3 °C, at barometric pressures of 650 to 800 mm of mercury, and relative humidity not to exceed 75%.

| DESCRIPTION | VALUE |
|---|---|
| Capacitors with temperature coefficient NP0 | |
| Capacitance range: at 1 MHz, 1 V; where $C \leq 1000$ pF at 1 kHz, 1 V; where $C > 1000$ pF | 10 to 1000 pF 1200 pF to 5600 pF |
| Tolerance on the capacitance | $\pm 5\%$; $\pm 10\%$ |
| Rated DC voltage | 50 and 100 V |
| Dielectric strength | 250% of rated voltage |
| Insulation resistance at rated voltage | 100000 M Ω or 1000 M $\Omega \times \mu\text{F}$, whichever is less at rated voltage within 2 minutes of charging |
| Temperature coefficient of the capacitance | $0 \times 10^{-6}/\text{K}$ |
| Tolerance on the temperature coefficient | $\pm 30 \times 10^{-6}/\text{K}$ |
| Dissipation factor: at 1 MHz, 1 V; where $C \leq 30$ pF at 1 kHz, 1 V; where $C > 30$ pF | $< \frac{1}{(400 + 20 \times C)}$ $< 15 \times 10^{-4}$ |
| Operating temperature range | -55 to +125 °C |
| Storage temperature range | 25 \pm 15 °C |
| Capacitors with temperature coefficient X7R | |
| Capacitance range at 1 kHz, 1 V | 100 pF to 0.22 μF |
| Tolerance on the capacitance | $\pm 10\%$; $\pm 20\%$ |
| Maximum capacitance variation with respect to capacitance value at 25 °C | $\pm 15\%$ |
| Rated DC voltage | 50 and 100 V |
| Dielectric strength | 250% of rated voltage |
| Insulation resistance at rated voltage | 100000 M Ω or 1000 M $\Omega \times \mu\text{F}$, whichever is less at rated voltage within 2 minutes of charging |
| Dissipation factor at 1 kHz, 1 V | $\leq 2.5\%$ |
| Operating temperature range | -55 to +125 °C |
| Storage temperature range | 25 \pm 15 °C |
| Ageing | typical 1% per time decade |

Leaded ceramic multilayer capacitors

Mono-kap™ series

| DESCRIPTION | VALUE |
|--|---|
| Capacitors with temperature coefficient Z5U | |
| Capacitance range at 1 kHz, 0.5 V | 1 000 pF to 1.0 μ F |
| Tolerance on the capacitance | $\pm 20\%$; $+80\%$ / -20% |
| Maximum capacitance variation with respect to capacitance value at 25 °C | -56% / $+22\%$ |
| Rated DC voltage | 50 and 100 V |
| Dielectric strength | 250% of rated voltage |
| Insulation resistance at rated voltage | 10 000 M Ω or 1 000 M Ω \times μ F, whichever is less at rated voltage within 2 minutes of charging |
| Dissipation factor at 1 kHz, 0.5 V | $\leq 4\%$ |
| Operating temperature range | 10 to 85 °C |
| Storage temperature range | 25 \pm 15 °C |
| Ageing | typical 6% per time decade |
| Capacitors with temperature coefficient Y5V | |
| Capacitance range at 1 kHz, 1 V | 0.01 to 1.0 μ F |
| Tolerance on the capacitance | $+80\%$ / -20% |
| Maximum capacitance variation with respect to capacitance value at 25 °C | -82% / $+22\%$ |
| Rated DC voltage | 25 and 50 V |
| Dielectric strength | 250% of rated voltage |
| Insulation resistance at rated voltage | 10 000 M Ω or 1 000 M Ω \times μ F, whichever is less at rated voltage within 2 minutes of charging |
| Dissipation factor at 1 kHz, 1 V | $\leq 5\%$ |
| Operating temperature range | 10 to 85 °C |
| Storage temperature range | 25 \pm 15 °C |
| Ageing | typical 6% per time decade |

Leaded ceramic multilayer capacitors

Mono-kap™ series

PACKAGING

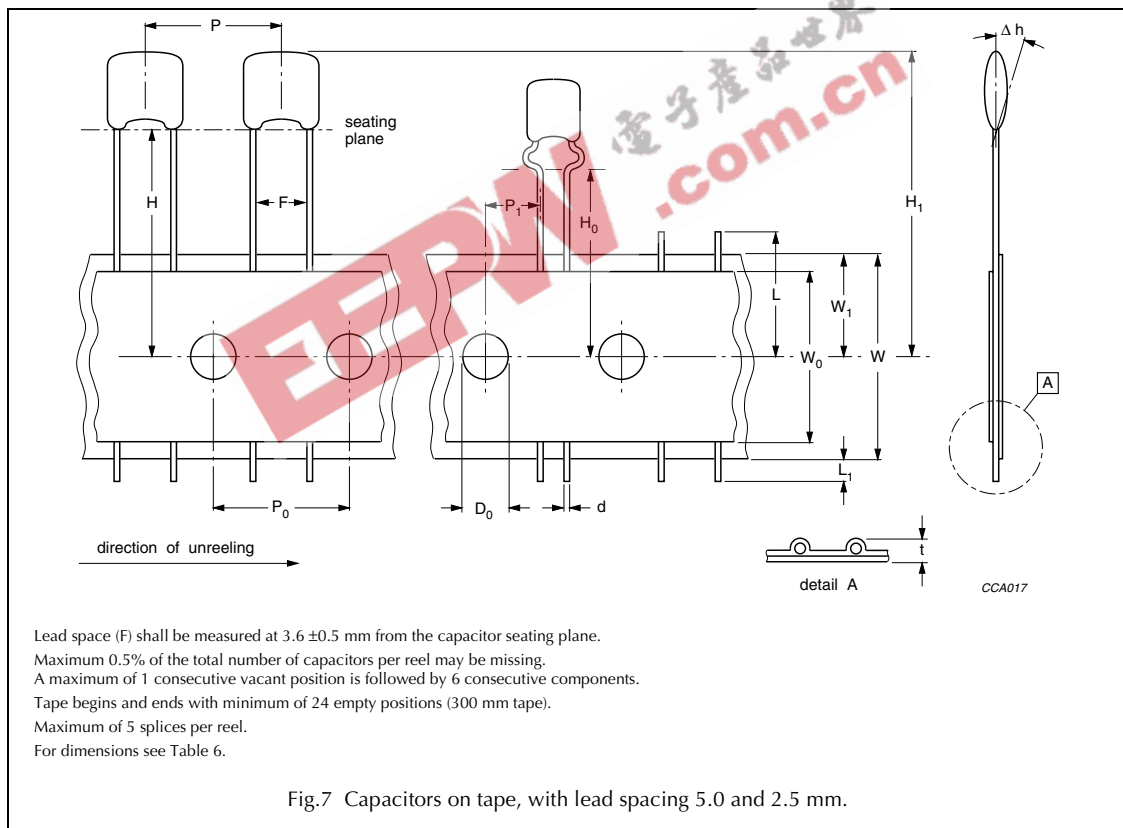
Table 5 Packaging quantities and box dimensions

| PACKAGING | SIZE CODE | SMALLEST PACKAGING QUANTITY (SPQ) | BOX DIMENSIONS L × W × H (mm) |
|---------------------|-----------|-----------------------------------|-------------------------------|
| Tape on reel | 15 | 4000 | 370 × 370 × 60 |
| | 20 | 3000 | |
| Ammopack | 15; 20 | 2500 | 335 × 290 × 50 |
| Bulk ⁽¹⁾ | 15; 20 | 5000 | 245 × 120 × 65 |

Note

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

Capacitors on tape, lead spacing 5.0 and 2.5 mm



Leaded ceramic multilayer capacitors

Mono-kap™ series

Table 6 Dimensions of tape; see Fig.7

| SYMBOL | PARAMETER | DIMENSIONS | |
|----------------|--|-----------------|---------------------|
| | | mm | inch |
| L | cut off 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 (formed leads) | 16 ±0.5 | 0.630 ±0.020 |
| H ₁ | top of component height | ≤32 | ≤1.260 |
| Δh | body inclination | 0.0 ±1.0 | 0 ±0.039 |
| W | carrier tape width | 18 +1.0/-0.5 | 0.709 +0.039/-0.020 |
| W ₀ | hold down tape width | 15 ref.; note 1 | 0.591 ref.; note 1 |
| W ₁ | sprocket hole position | 9 +0.075/-0.5 | 0.354 +0.030/-0.020 |
| F | 1e lead space; note 2 | 2.5 +0.6/-0.4 | 0.100 +0.024/-0.016 |
| | 2e lead space; note 2 | 5.0 +0.6/-0.4 | 0.200 +0.024/-0.016 |
| P ₀ | sprocket hole pitch | 12.7 ±0.3 | 0.500 ±0.012 |
| P ₁ | 1e sprocket hole centre to lead centre; note 2 | 5.08 ±0.7 | 0.200 ±0.028 |
| | 2e sprocket hole centre to lead centre; note 2 | 3.85 ±0.7 | 0.150 ±0.028 |
| D ₀ | sprocket hole diameter | 4 ±0.3 | 0.157 ±0.012 |
| t | overall tape thickness | ≤0.9 | ≤0.035 |
| d | wire lead diameter | 0.5 ±0.05 | 0.02 ±0.002 |
| P | taping pitch | 12.7 ref. | 0.500 ref. |

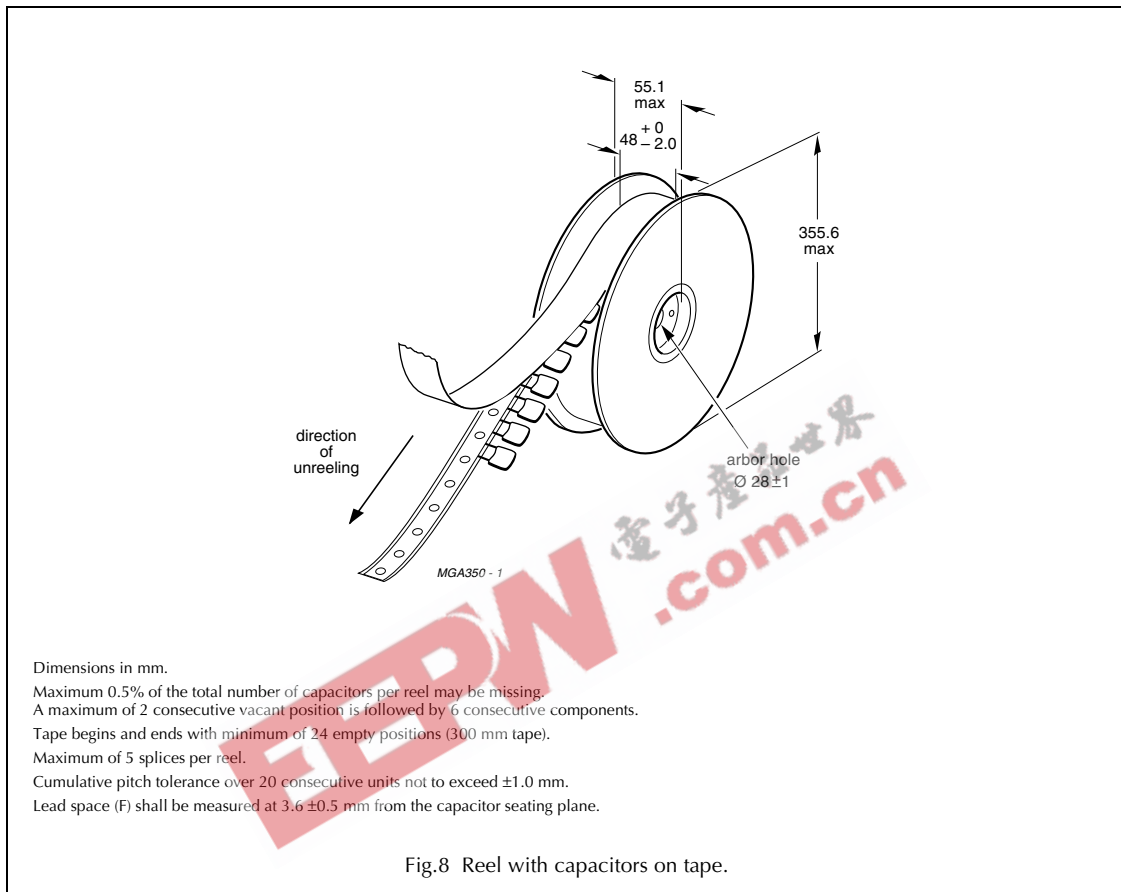
Notes

1. Tape width of 6 mm (0.236 inches) permissible.
2. e = 2.54 mm.

Leaded ceramic multilayer capacitors

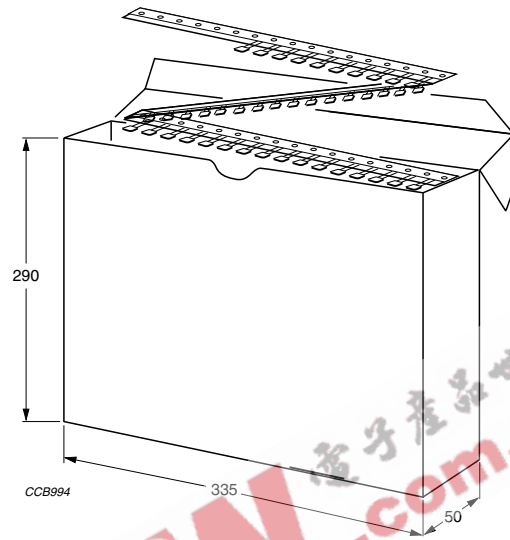
Mono-kap™ series

REEL AND DATA



**Leaded ceramic multilayer
capacitors****Mono-kap™ series**

AMMOPACK DATA



Dimensions in mm.

Maximum 0.5% of the total number of capacitors per box may be missing.

A maximum of 2 consecutive vacant positions is followed by 6 consecutive components.

Tape begins and ends with minimum of 24 empty positions (300 mm tape).

Maximum of 5 splices per box.

Cumulative pitch tolerance over 20 consecutive units not to exceed ± 1.0 mm.

Lead space (F) shall be measured at 3.6 ± 0.5 mm from the capacitor seating plane.

Fig.9 Ammopack with capacitors on tape.