DATA SHEET

Mono-kap™ series
Leaded ceramic multilayer capacitors

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

2002 Oct 09

BC COMPONENTS

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.

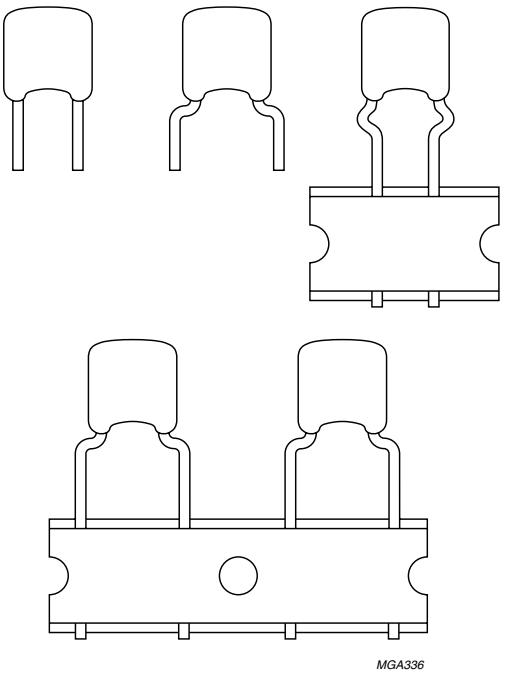


Fig.1 Component outlines.

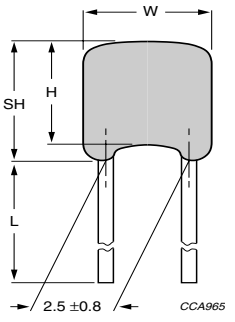
Metal end terminations are applied and fired to provide electrical connection between the individual layers. Tinned leads are attached using a solder.

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 (C0G)		X7R		Z5U		Y5V	

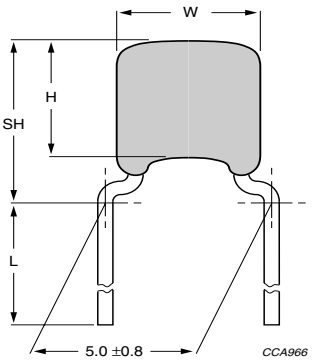
MECHANICAL DATA



L2

Dimensions in mm.

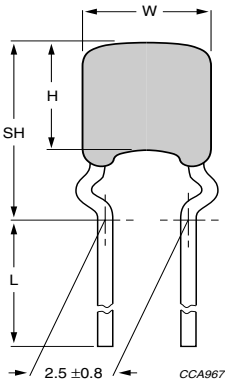
Fig.2 Component outline for lead spacing 2.5 ±0.8 mm (straight wires).



H5

Dimensions in mm.

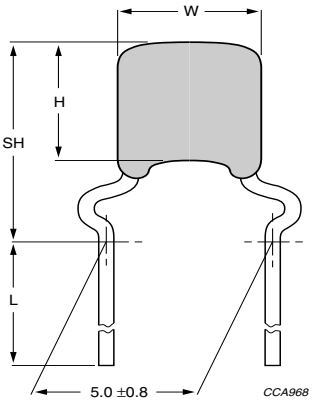
Fig.3 Component outline for lead spacing 5.0 ±0.8 mm (flat bent wires).



K2

Dimensions in mm.

Fig.4 Component outline for lead spacing 2.5 ±0.8 mm (outside kink wires).



K5

Dimensions in mm.
Lead style available on request.

Fig.5 Component outline for lead spacing 5.0 ±0.8 mm (outside kink wires).

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 ≥ 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 (C0G)

C = X7R

E = Z5U

Y = Y5V.

Voltage code (**V**):

1 = 100 V

3 = 25 V

5 = 50 V.

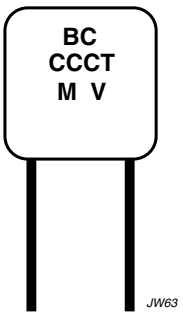


Fig.6 Markings on the body.

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

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				

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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 µF				
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 µF				
0.015				
0.022				
0.033				
0.047				
0.068				
0.10				
0.15				
0.22				
0.33				
0.47				
0.68				
1.0				

ORDERING INFORMATION

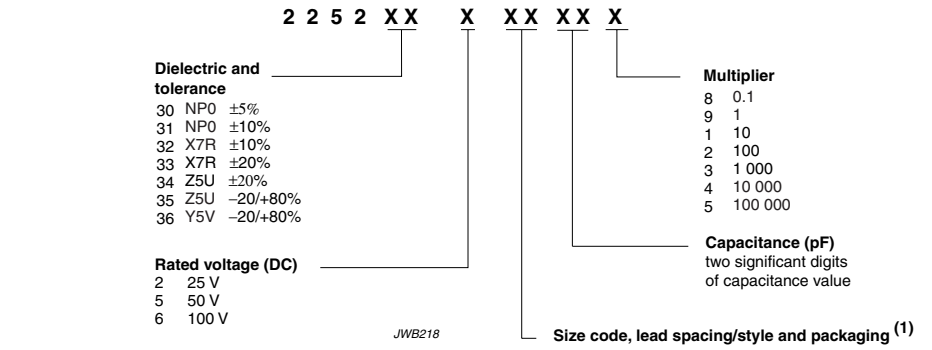
Components may be ordered by using either a simple 15-digit clear text code, or BCcomponents 12NC.

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



(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
	5.0 (.200")	high seat (H); note 1	08	10	12
20	2.5 (.100")	straight lead (L); note 1	14	16	17
		outward kink (K)	18	20	21
	5.0 (.200")	high seat (H); note 1	22	24	26

Note

1. Preferred types.

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 8th AND 9th DIGIT			CATALOGUE NUMBER (2)(3)
				13th 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

C	$U_{R(DC)}$ (V)	LEAD SPACING	SIZE CODE	CLEAR TEXT CODE	PACKAGING CODE 8th AND 9th DIGIT			CATALOGUE NUMBER (2)(3)
				13th 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
1000 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
1500 pF	50	5.0	15	K152J15C0GF5.H5	10	12	08	2252 305..152
2200 pF	50	5.0	15	K222J15C0GF5.H5	10	12	08	2252 305..222
3300 pF	50	5.0	20	K332J20C0GF5.H5	24	26	22	2252 305..332
4700 pF	50	5.0	20	K472J20C0GF5.H5	24	26	22	2252 305..472
6800 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 8th AND 9th DIGIT			CATALOGUE NUMBER (2)(3)
				13th 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

C	$U_{R(DC)}$ (V)	LEAD SPACING	SIZE CODE	CLEAR TEXT CODE	PACKAGING CODE 8th AND 9th DIGIT			CATALOGUE NUMBER (2)(3)
				13th 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

C	$U_{R(DC)}$ (V)	LEAD SPACING	SIZE CODE	CLEAR TEXT CODE	PACKAGING CODE 8th AND 9th DIGIT			CATALOGUE NUMBER (2)(3)
				13th 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.H5	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.

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

DESCRIPTION	VALUE
Capacitors with temperature coefficient Z5U	
Capacitance range at 1 kHz, 0.5 V	1000 pF to 1.0 µF
Tolerance on the capacitance	±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	10000 MΩ or 1000 MΩ × µF, whichever is less at rated voltage within 2 minutes of charging
Dissipation factor at 1 kHz, 0.5 V	≤4%
Operating temperature range	10 to 85 °C
Storage temperature range	25 ±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 µF
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	10000 MΩ or 1000 MΩ × µF, whichever is less at rated voltage within 2 minutes of charging
Dissipation factor at 1 kHz, 1 V	≤5%
Operating temperature range	10 to 85 °C
Storage temperature range	25 ±15 °C
Ageing	typical 6% per time decade

PACKAGING

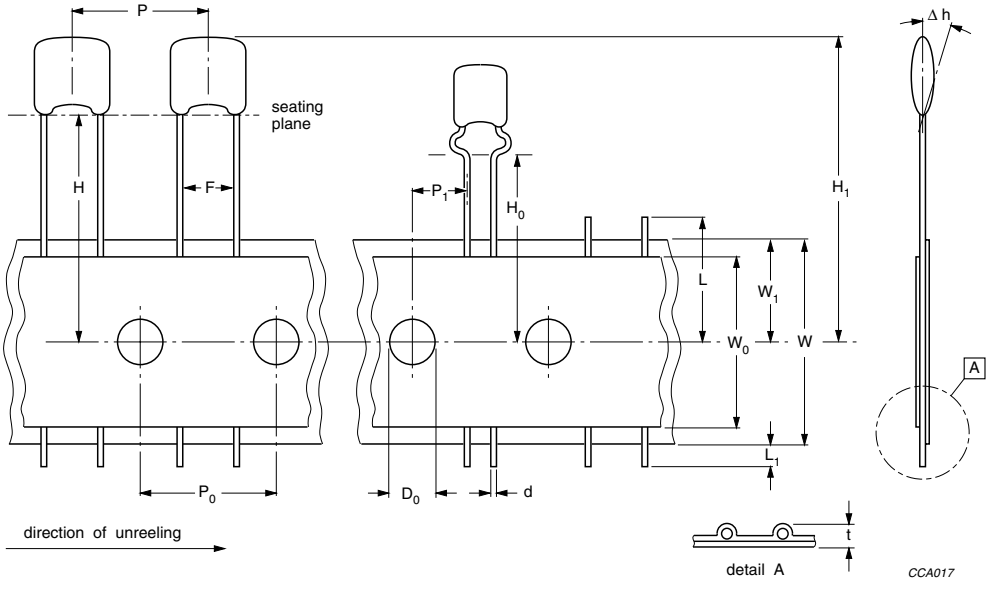
Table 5 Packaging quantities and box dimensions

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



Lead space (F) shall be measured at 3.6 ±0.5 mm from the capacitor seating plane.
Maximum 0.5% of the total number of capacitors per reel may be missing.
A maximum of 1 consecutive vacant position is followed by 6 consecutive components.
Tape begins and ends with minimum of 24 empty positions (300 mm tape).
Maximum of 5 splices per reel.
For dimensions see Table 6.

Fig.7 Capacitors on tape, with lead spacing 5.0 and 2.5 mm.

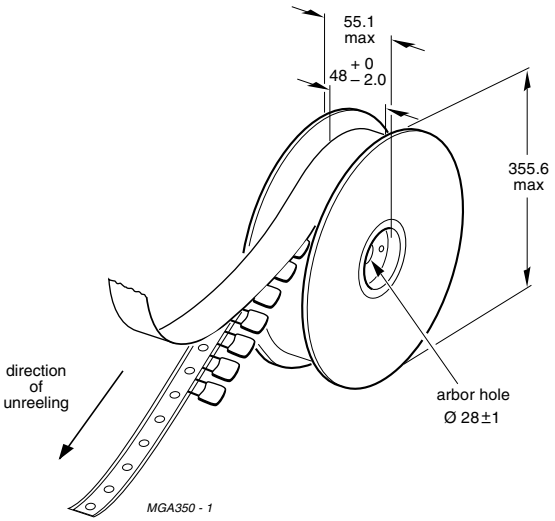
Table 6 Dimensions of tape; see Fig.7

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.

REEL AND DATA



Dimensions in mm.

Maximum 0.5% of the total number of capacitors per reel may be missing.
A maximum of 2 consecutive vacant position is followed by 6 consecutive components.

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

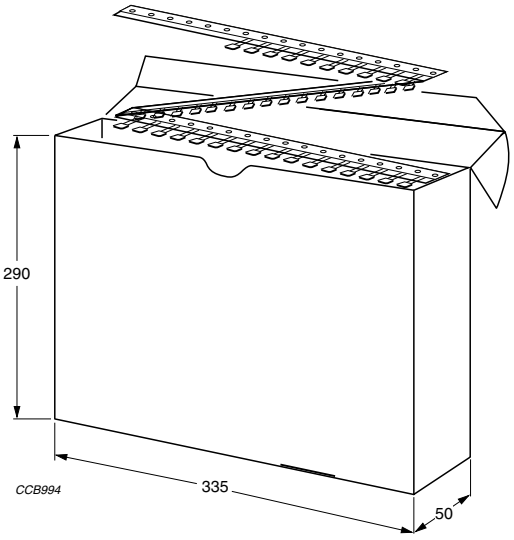
Maximum of 5 splices per reel.

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.8 Reel with capacitors on tape.

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.