VISHAY INTERTECHNOLOGY, INC.

INTERACTIVE
data book

MLCC DIPPED AXIAL AND RADIAL
VISHAY

VSE-DB0074-0911

Notes:

1. To navigate:
   a) Click on the Vishay logo on any datasheet to go to the Contents page for that section. Click on the Vishay logo on any Contents page to go to the main Table of Contents page.
   b) Click on the products within the Table of Contents to go directly to the datasheet.
   c) Use the scroll or page up/page down functions.
   d) Use the Adobe® Acrobat® page function in the browser bar.

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VISHAY INTERTECHNOLOGY, INC.

MLCC DIPPED AXIAL AND RADIAL

Mono-Axial

Mono-Radial

www.vishay.com

SEMICONDUCTORS

RECTIFIERS
- Schottky (single, dual)
- Standard, Fast, and Ultra-Fast Recovery (single, dual)
- Bridge
- Superectifier®
- Sinterglass Avalanche Diodes

HIGH-POWER DIODES AND THYRISTORS
- High-Power Fast-Recovery Diodes
- Phase-Control Thyristors
- Fast Thyristors

SMALL-SIGNAL DIODES
- Schottky and Switching (single, dual)
- Tuner/Capacitance (single, dual)
- Bandswitching
- PIN

ZENER AND SUPPRESSOR DIODES
- Zener (single, dual)
- TVS (TRANSZORB®, Automotive, ESD, Arrays)

FETs
- Low-Voltage TrenchFET® Power MOSFETs
- High-Voltage TrenchFET® Power MOSFETs
- High-Voltage Planar MOSFETs
- JFETs

OPTOELECTRONICS
- IR Emitters and Detectors, and IR Receiver Modules
- Optocouplers and Solid-State Relays
- Optical Sensors
- LEDs and 7-Segment Displays
- Infrared Data Transceiver Modules
- Custom Products

ICs
- Power ICs
- Analog Switches

MODULES
- Power Modules (contain power diodes, thyristors, MOSFETs, IGBTs)

PASSIVE COMPONENTS

RESISTIVE PRODUCTS
- Film Resistors
  - Metal Film Resistors
  - Thin Film Resistors
  - Thick Film Resistors
  - Metal Oxide Film Resistors
  - Carbon Film Resistors
- Wirewound Resistors
- Power Metal Strip® Resistors
- Chip Fuses
- Variable Resistors
  - Cermet Variable Resistors
  - Wirewound Variable Resistors
  - Conductive Plastic Variable Resistors
- Networks/Arrays
- Non-Linear Resistors
  - NTC Thermistors
  - PTC Thermistors
  - Varistors

MAGNETICS
- Inductors
- Transformers

CAPACITORS
- Tantalum Capacitors
  - Molded Chip Tantalum Capacitors
  - Coated Chip Tantalum Capacitors
  - Solid Through-Hole Tantalum Capacitors
  - Wet Tantalum Capacitors
- Ceramic Capacitors
  - Multilayer Chip Capacitors
  - Disc Capacitors
- Film Capacitors
- Power Capacitors
- Heavy-Current Capacitors
- Aluminum Capacitors

Multilayer Ceramic Dipped Axial and Radial Capacitors 50 V_{DC}, 100 V_{DC}, 200 V_{DC} and 500 V_{DC}

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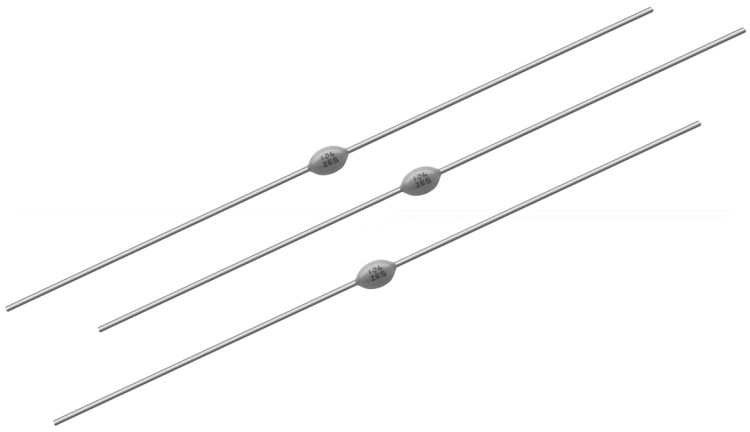
Multilayer Ceramic Dipped Axial and Radial Capacitors

MONO-AXIAL CAPACITORS

MONO-KAP RADIAL CAPACITORS

RADIAL K10 CAPACITORS

Multilayer Ceramic Dipped Axial Capacitors



Contents

Multilayer Ceramic Dipped Axial Capacitors 50 V_{DC}, 100 V_{DC}, 200 V_{DC} and 500 V_{DC}

INTERNAL CONSTRUCTION

Multilayer ceramic capacitors consist of electrodes, the interleaved ceramic dielectric and the external terminal connectors. The capacitance is given by the description:

$$C = \frac{A \times n \times \varepsilon_0 \times \varepsilon_r}{d}$$

A = Electrode area

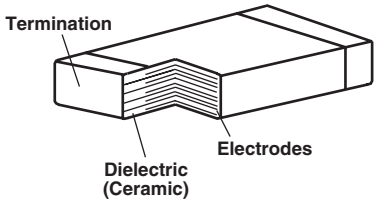
n = Number of active layers

d = Distance between electrodes

ε_r = Dielectric relative

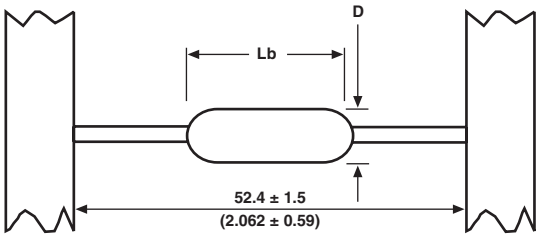
ε_0 = Dielectric constant

Whilst the values “A x n” and “d” are respectively determined by the production process, the dielectric constant is a function of the ceramic material used.



LEAD CONFIGURATION

Axial Size 15 and Size 20
Base material: FeCu
Plating: Electrolytic, tinned



CAPACITOR DIMENSIONS AND WEIGHT in millimeters (inches)			
SIZE	**$Lb_{max.}$**	**Ø $D_{max.}$**	**WEIGHT (g)**
15	3.8 (0.150)	2.5 (0.100)	0.14
20	5.0 (0.200)	3.0 (0.120)	0.15

Multilayer Ceramic Dipped Axial Capacitors 50 V_{DC} and 100 V_{DC}

DIELECTRIC CHARACTERISTICS			
DIELECTRIC ACCORDING TO EIA	**C0G (NP0)**	**X7R**	**Y5V**
According to CECC	CG	C1 (2C1)	2F4
Capacitance Range:			
at 1 MHz, 1 V; where C ≤ 1000 pF	10 pF to 1000 pF	-	-
at 1 kHz, 1 V; where C > 1000 pF	1200 pF to 5600 pF	100 pF to 1.0 µF	0.1 µF to 1.0 µF
Tolerance on the Capacitance:			
where C < 10 pF	± 0.5 pF (D)	-	-
where C > 10 pF	± 5 % (J); ± 10 % (K)	± 10 % (K); ± 20 % (M)	+ 80 %/- 20 % (Z)
Rated DC Voltage	50 V; 100 V		
Dielectric Strength	250 % of rated voltage		
Insulation Resistance (IR)	100 000 MΩ or 1000 MΩ x µF whichever is less at rated voltage within 2 minutes of charging		10 000 MΩ or 1000 MΩ x µF whichever is less at rated voltage within 2 minutes of charging
Temperature Coefficient of the Capacitance	0 x 10^{-6}/K	-	-
Tolerance of the Temperature Coefficient	± 30 x 10^{-6}/K	-	-
Maximum Capacitance change with respect to Capacitance at 25 °C	-	± 15 %	+ 22 %/- 82 %
Dissipation Factor (DF)			
at 1 MHz, 1 V; where C ≤ 1000 pF	$\frac{1}{400 + 20 \times C}$	-	-
at 1 kHz, 1 V; where C > 1000 pF	≤ 0.1 %	≤ 2.5 %	≤ 5 %
Operating Temperature Range	- 55 °C to + 125 °C		- 30 °C to + 85 °C
Storage Temperature Range	25 °C ± 15 °C		
Aging	-	typical 1 % per time decade	typical 7 % per time decade

Note

- The capacitors meet the essential requirements of 'EIA 198'.
  Unless stated otherwise all electrical values apply at an ambient temperature of 25 °C ± 3 °C, at barometric pressures 650 mm to 800 mm of mercury, and relative humidity not to exceed 75 %.

MAIN FEATURES			
	CLASS 1	**CLASS 2**	**CLASS 3**
APPLICATION	For temperature compensation of frequency discriminating circuits and filters, coupling and decoupling in high frequency circuits where low losses and narrow capacitance tolerances are demanded.	As coupling and decoupling capacitors for such application where higher losses and a reduced capacitance stability are tolerated.	As coupling and decoupling capacitors for such application where higher losses and a reduced capacitance stability are tolerated.
PROPERTIES Temperature Dependence Capacitance	High stability of capacitance. Low dissipation factor up to higher frequencies. Defined temperature coefficient of capacitance, positive or negative, linear and reversible. High insulation resistance. No voltage dependence. High long-term stability of electrical values.	High capacitance values with small dimensions. Non-linear dependence of capacitance on temperature.	High capacitance values with small dimensions. Non-linear dependence of capacitance on temperature.
CLASSIFICATION			
Classification EIA:	C0G (NP0)	X7R	Y5V
Classification CECC:	CG	2C1	2F4

TEMPERATURE CHARACTERISTICS OF CAPACITANCE FOR CLASS 2/3 CERAMIC DIELECTRICS ACCORDING TO CECC 32100

CODE LETTER FOR SUB CATEGORY	MAXIMUM CAPACITANCE CHANGE IN % AT THE SPECIFIED TEMPERATURE RANGE		DESIGNATION OF THE SPECIFIED TEMPERATURE RANGE	
			- 55 °C/+ 125 °C	- 30 °C/+ 85 °C
	WITHOUT RATED VOLTAGE	WITH RATED VOLTAGE	1	4
2C	± 20 %	+ 20 %/- 30 %	X	
2F	+ 30 %/- 80 %	+ 30 %/- 90 %		X

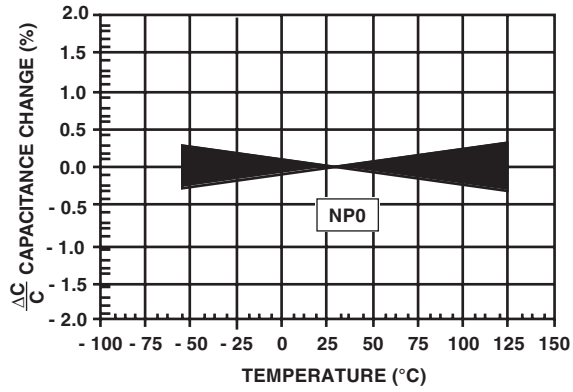
EIA - CODING SYSTEM FOR CLASS 2/3 CERAMIC

A	X	7	R	103	M
TYPE	WORKING TEMPERATURE RANGE		CAPACITANCE CHANGE WITHIN WORKING TEMP. RANGE NO RATED VOLTAGE APPLIED	CAPACITANCE IN pF	TOLERANCE
	LOWER TEMP. LIMIT	UPPER TEMP. LIMIT			
	X = - 55 °C Y = - 30 °C	7 = + 125 °C 5 = + 85 °C	R = ± 15 % V = - 82 %/+ 22 %	The first two digits gives the nominal value, the third digit indicates the number of zeros, e.g. 103 = 10 000 pF For values below 10 pF an R is inserted in the second position instead of a decimal point e.g. 2R2 = 2.2 pF	D = ± 0.50 pF F = ± 1 % G = ± 2 % J = ± 5 % K = ± 10 % M = ± 20 % Z =+ 80 %/- 20 %

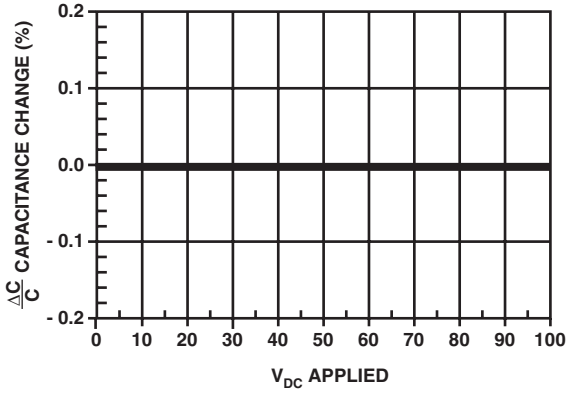
Example: Vishay BCcomponents Description
EIA Description

C0G (NP0) DIELECTRIC - TYPICAL PARAMETERS

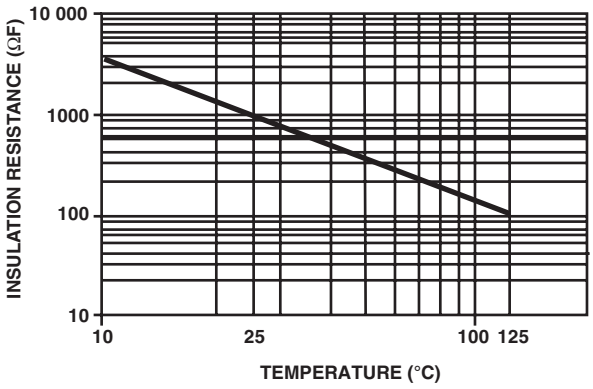
TEMPERATURE COEFFICIENT OF CAPACITANCE



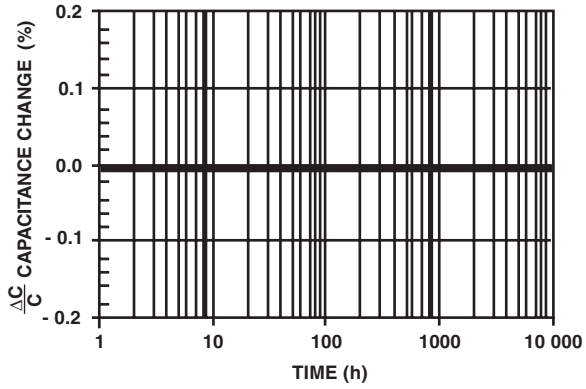
VOLTAGE COEFFICIENT OF CAPACITANCE - NP0



MINIMUM INSULATION
RESISTANCE VS. TEMPERATURE

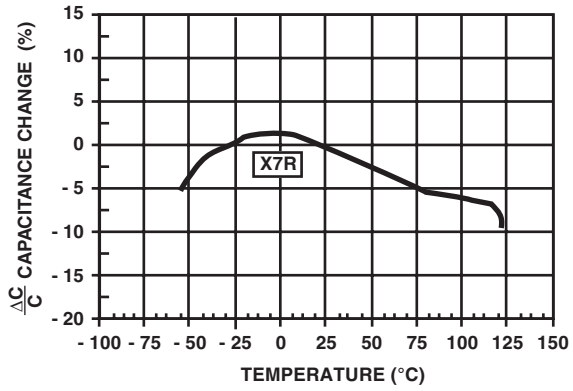


AGING RATE - NP0

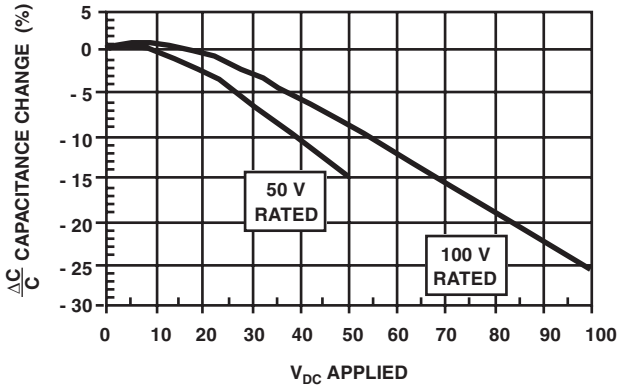


X7R DIELECTRIC - TYPICAL PARAMETERS

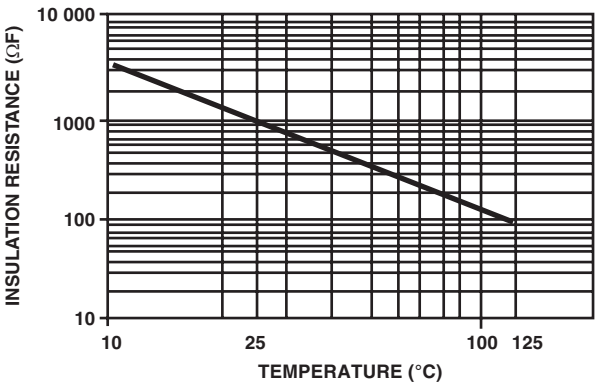
TEMPERATURE COEFFICIENT OF CAPACITANCE



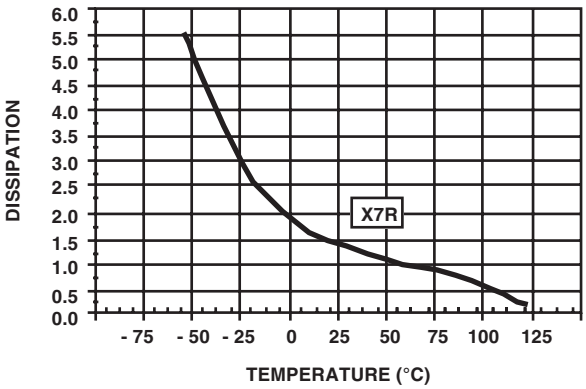
VOLTAGE COEFFICIENT OF CAPACITANCE - X7R



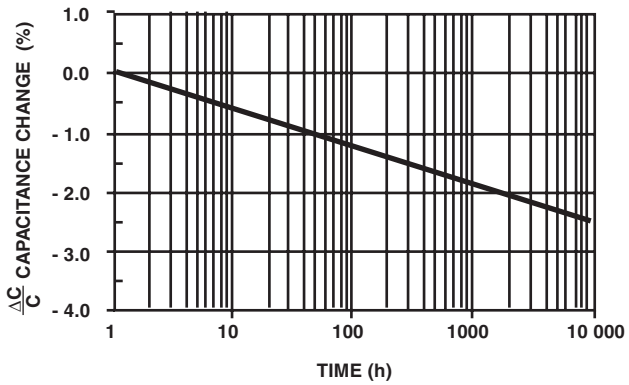
MINIMUM INSULATION RESISTANCE VS. TEMPERATURE



DISSIPATION FACTOR VS. TEMPERATURE

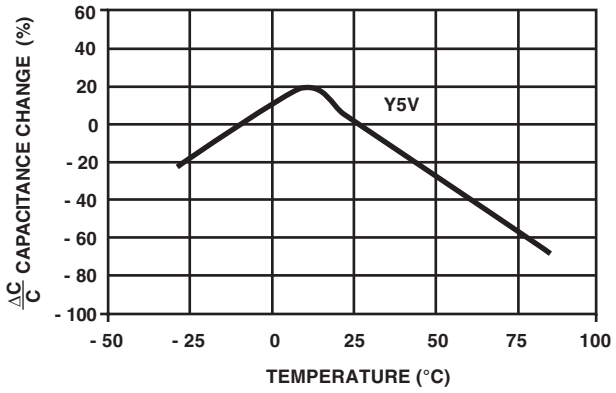


AGING RATE - X7R

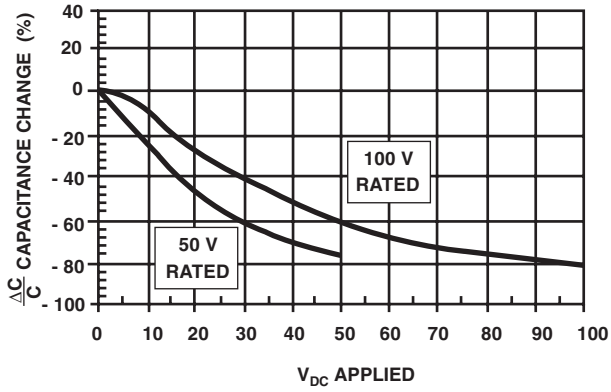


Y5V DIELECTRIC - TYPICAL PARAMETERS

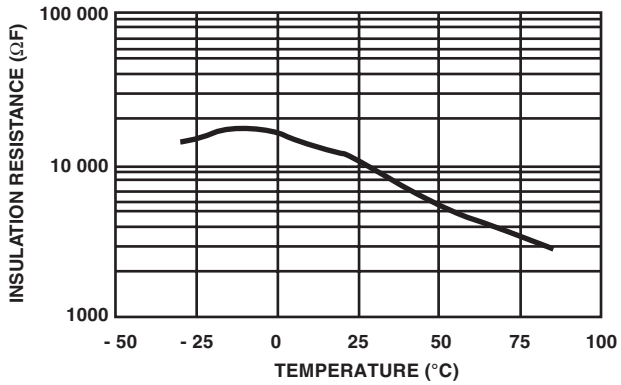
TEMPERATURE COEFFICIENT OF CAPACITOR



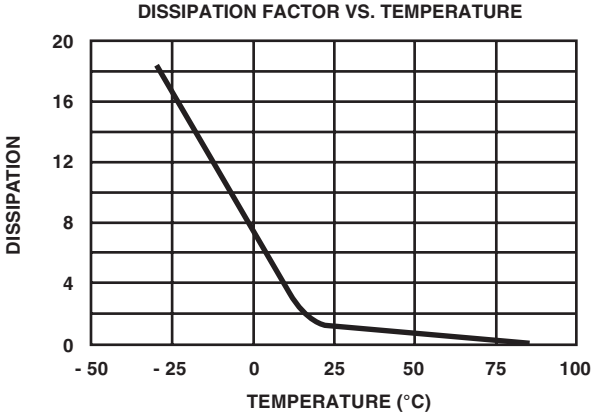
VOLTAGE COEFFICIENT OF CAPACITANCE - Y5V



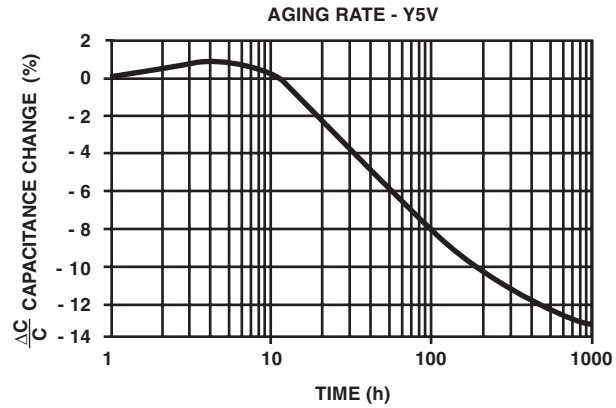
MINIMUM INSULATION RESISTANCE VS. TEMPERATURE



DISSIPATION FACTOR VS. TEMPERATURE



AGING RATE - Y5V



Multilayer Ceramic Dipped Axial Capacitors 200 V_{DC} and 500 V_{DC}

DIELECTRIC CHARACTERISTICS		
DIELECTRIC ACCORDING TO EIA	**C0G (NP0)**	**X7R**
According to CECC	CG	C1 (2C1)
Capacitance Range: at 1 MHz, 1 V; where C ≤ 1000 pF at 1 kHz, 1 V; where C > 1000 pF	 33 pF to 1000 pF 1200 pF to 2200 pF	 - 100 pF to 0.047 µF
Tolerance on the Capacitance: where C < 10 pF where C > 10 pF	 - ± 5 % (J); ± 10 % (K)	 - ± 10 % (K); ± 20 % (M)
Rated DC Voltage	200 V; 500 V	
Dielectric Strength	200 V at 150 % of V_{rated} + 100 V_{DC} 500 V at 130 % of V_{rated} + 100 V_{DC}	
Insulation Resistance (IR)	C < 0.01 µF: 10 000 MΩ min. C ≥ 0.01 µF: 100 MΩ x µF min.	
Temperature Coefficient of the Capacitance	0 x 10^{-6}/K	-
Tolerance of the Temperature Coefficient	± 30 x 10^{-6}/K	-
Maximum Capacitance change with respect to Capacitance at 25 °C	-	± 15 %
Dissipation Factor (DF) at 1 MHz, 1 V; where C ≤ 1000 pF at 1 kHz, 1 V; where C > 1000 pF	 $\frac{1}{400 + 20 \times C}$ ≤ 0.1 %	 - ≤ 2.5 %
Operating Temperature Range	- 55 °C to + 125 °C	
Storage Temperature Range	25 °C ± 15 °C	
Aging	-	typical 1 % per time decade

Note

- The capacitors meet the essential requirements of 'EIA 198'.
  Unless stated otherwise all electrical values apply at an ambient temperature of 25 °C ± 3 °C, at barometric pressures 650 mm to 800 mm of mercury, and relative humidity not to exceed 75 %.

MAIN FEATURES		
	CLASS 1	**CLASS 2**
APPLICATION	For temperature compensation of frequency discriminating circuits and filters, coupling and decoupling in high frequency circuits where low losses and narrow capacitance tolerances are demanded.	As coupling and decoupling capacitors for such application where higher losses and a reduced capacitance stability are tolerated.
PROPERTIES Temperature Dependence Capacitance	High stability of capacitance. Low dissipation factor up to higher frequencies. Defined temperature coefficient of capacitance, positive or negative, linear and reversible. High insulation resistance. No voltage dependence. High long-term stability of electrical values.	High capacitance values with small dimensions. Non-linear dependence of capacitance on temperature.
CLASSIFICATION Classification EIA: Classification CECC:	 C0G (NP0) CG	 X7R 2C1

TEMPERATURE CHARACTERISTICS OF CAPACITANCE FOR CLASS 2/3 CERAMIC DIELECTRICS ACCORDING TO CECC 32100

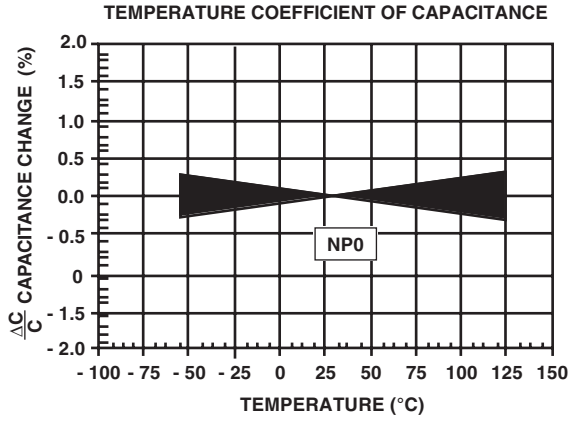
CODE LETTER FOR SUB CATEGORY	MAXIMUM CAPACITANCE CHANGE IN % AT THE SPECIFIED TEMPERATURE RANGE		DESIGNATION OF THE SPECIFIED TEMPERATURE RANGE
			- 55 °C/+ 125 °C
	WITHOUT RATED VOLTAGE	WITH RATED VOLTAGE	1
2C	± 20 %	+ 20 %/- 30 %	X

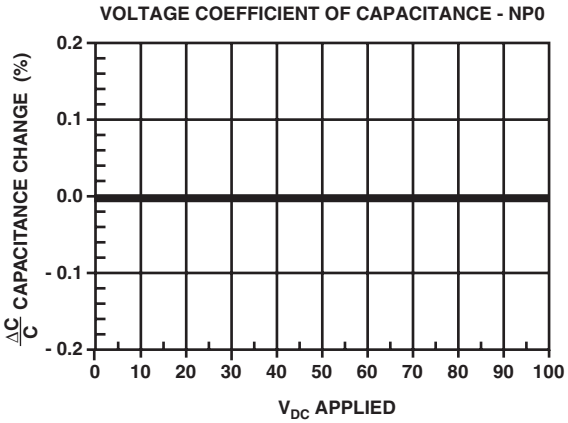
EIA - CODING SYSTEM FOR CLASS 2 CERAMIC

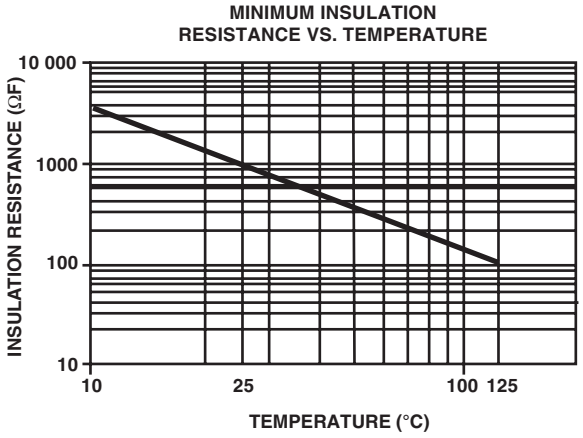
A	X	7	R	103	M
TYPE	WORKING TEMPERATURE RANGE		CAPACITANCE CHANGE WITHIN WORKING TEMP. RANGE NO RATED VOLTAGE APPLIED	CAPACITANCE IN pF	TOLERANCE
	LOWER TEMP. LIMIT	UPPER TEMP. LIMIT			
	X = - 55 °C	7 = + 125 °C	R = ± 15 %	The first two digits gives the nominal value, the third digit indicates the number of zeros, e.g. 103 = 10 000 pF	J = ± 5 % K = ± 10 % M = ± 20 %

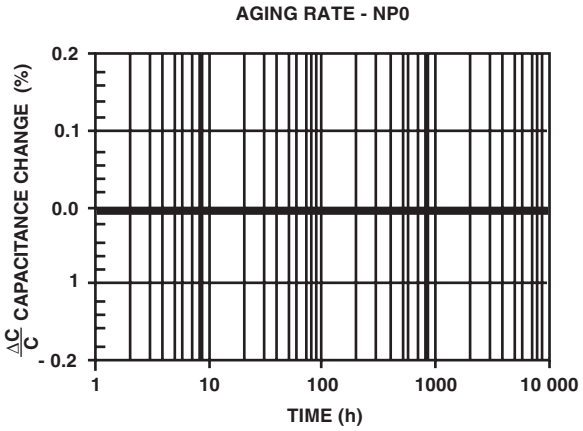
Example: Vishay BCcomponents Description
EIA Description

C0G (NP0) DIELECTRIC - TYPICAL PARAMETERS



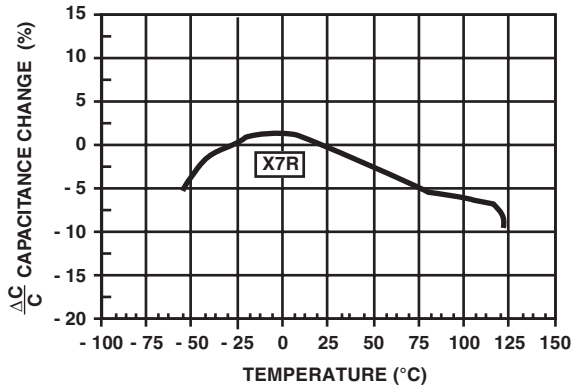




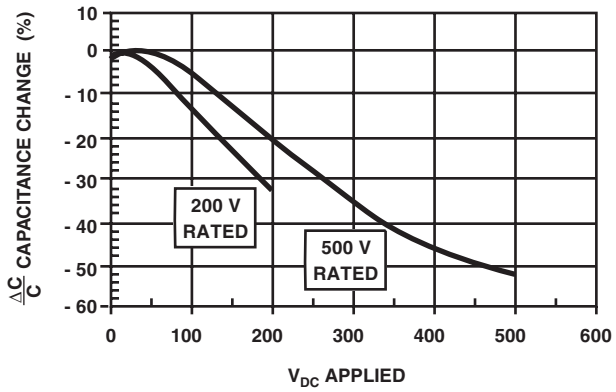


X7R DIELECTRIC - TYPICAL PARAMETERS

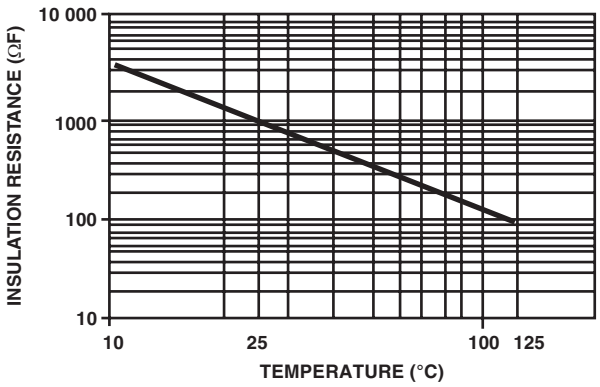
TEMPERATURE COEFFICIENT OF CAPACITANCE



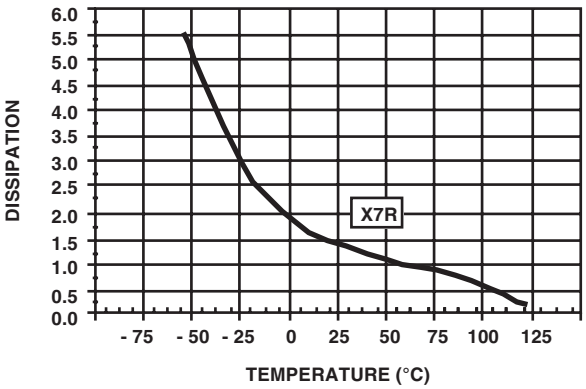
VOLTAGE COEFFICIENT OF CAPACITANCE - X7R



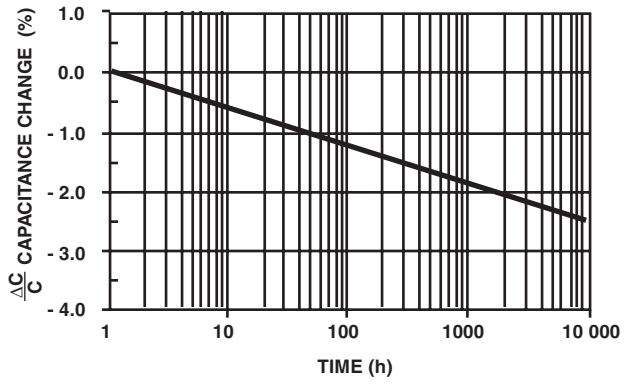
MINIMUM INSULATION RESISTANCE VS. TEMPERATURE



DISSIPATION FACTOR VS. TEMPERATURE

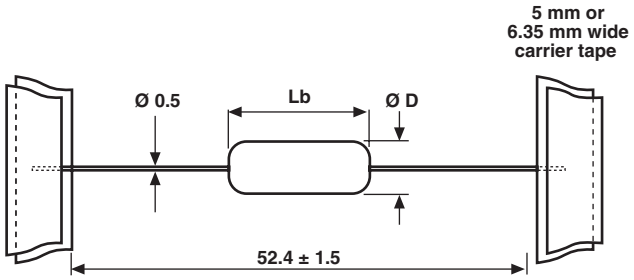


AGING RATE - X7R



Multilayer Ceramic Dipped Axial Capacitors
50 V_{DC}, 100 V_{DC}, 200 V_{DC} and 500 V_{DC}

DIMENSIONS



CAPACITOR DIMENSIONS AND WEIGHT in millimeter (inches)			
SIZE	**$Lb_{max.}$**	**Ø $D_{max.}$**	**WEIGHT (g)**
15	3.8 (0.150)	2.5 (0.100)	≈ 0.14
20	5.0 (0.200)	3.0 (0.120)	≈ 0.15

MARKING

Data Code (DDD):
Three-digit code; first digit denotes year, last two denote week of manufacture.
941 = 1999, week 41

Capacitance Value (CCC):
10 pF to 100 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
(same as used in P/N)

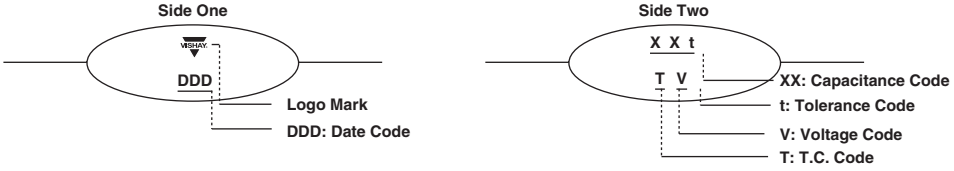
Material Code (**M**)
A = C0G
C = X7R
Y = Y5V

Voltage Code (**V**):
1 = 100 V
2 = 200 V
4 = 500 V
5 = 50 V

For technical questions, contact: cmll@vishay.com
Document Number: 45160
Revision: 17-Jan-06

MARKING CODE DESCRIPTION				
DDD	**XXX**	**t**	**V**	**T**
DATE CODE	**CAPACITANCE CODE**	**TOLERANCE CODE**	**VOLTAGE CODE**	**T.C. CODE**
The first digit is the year, the last two digits are the week 309 = 2003, 9th week 317 = 2003, 17th week	Two significant digits followed by one digit for the multiplier as given below. 0 = x 1 2 = x 100 4 = x 10 000 1 = x 10 3 = x 1000 5 = x 100 000 9 = x 0.1	J = ± 5 % K = ± 10 % M = ± 20 % Z = + 80 %/- 20 %	1 = 100 V 2 = 200 V 4 = 500 V 5 = 50 V	A = C0G (NP0) C = X7R Y = Y5V

CAPACITANCE VALUE < 100 pF:



For Example:

CAPACITANCE VALUE ≥ 100 pF:

For Example:

Note

- Vishay or BCcomponents logo can be marked on the products body

Multilayer Ceramic Dipped Axial Capacitors
50 V_{DC}, 100 V_{DC}, 200 V_{DC} and 500 V_{DC}

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 (180 mm tape).

Maximum of 5 splicers per reel.

AMMOPACK DATA

A maximum of 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 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 exceed ± 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.

For example:

PN: A332K15X7RF5UAA
QTY: 4000
PO:
SO:

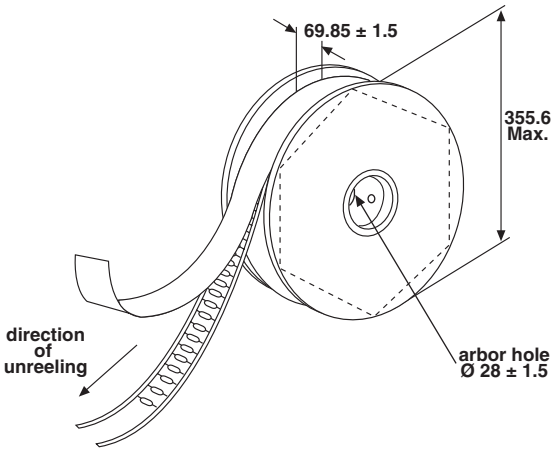
Lot1: 11W601503
Lot2:
Batch: 200602CN
Region: 9520
Ser.No: 0602A03681

DC1: 0602
DC2:
SL: 0010

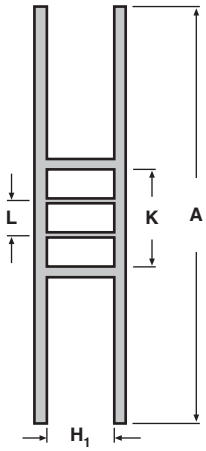
RoHS

1/3

REEL

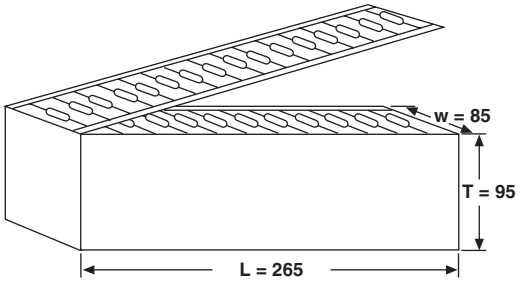


REEL DIMENSIONS



REEL SIZE		(mm)
A	Outer Dia.	355.6
L	Hole Dia.	28 ± 1.5
K	Core Dia.	90
H_1	Internal Width	69.85 ± 1.5

AMMOPACK



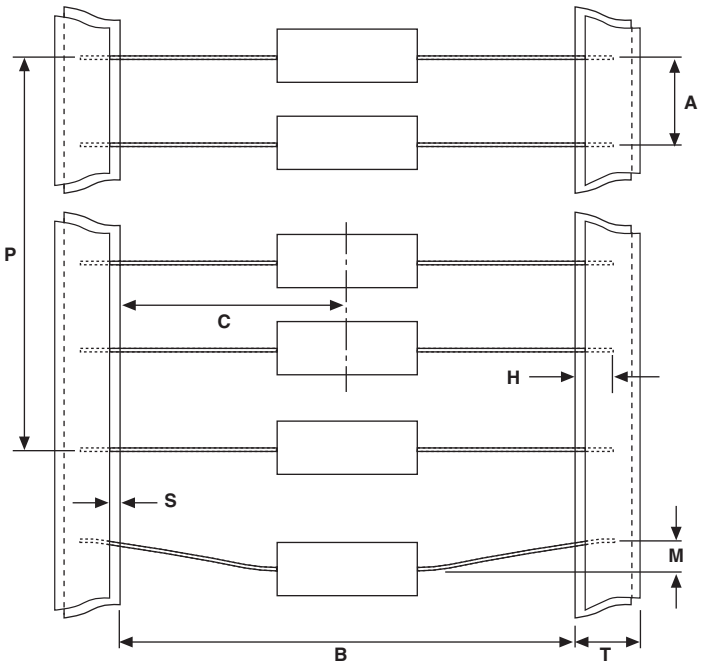
For technical questions, contact: cmll@vishay.com

Document Number: 45162
Revision: 08-Feb-06

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



PARAMETER	SYMBOL	DIMENSIONS	
		mm	inch
Inside tape spacing	B (1)	52.4 ± 1.5	2.062 ± 0.059
Centre to tape spacing	C	± 0.8	± 0.031
Cumulative pitch, 6 consecutive components	P	± 1.5	± 0.059
Components pitch	A	5 ± 0.5	0.197 ± 0.015
Lead bend	M	< 1.2	< 0.047
Exposed adhesive	S	< 0.51	< 0.020
Tape width	T	6.35	0.250
Lead sandwich	H	> 3.96	> 0.156

Note

(1) Inside tape spacing 26.0 + 1.51/- 0.0 is available on request

Multilayer Ceramic Dipped Axial Capacitors 50 V_{DC}, 100 V_{DC}, 200 V_{DC} and 500 V_{DC}

STORAGE

The capacitors must not be stored in a corrosive atmosphere where sulfide or chloride gas, acid, alkali, or salt are present. Moisture exposure should also be avoided.

The solderability of the leads is not affected by storage of up to 24 months. Temperature + 10 °C to + 35 °C, relative humidity up to 60 %.

With reference to class 2 ceramic dielectric capacitors, see the last page of this general information.

SOLDERING

SOLDERING SPECIFICATIONS		
Soldering test for capacitors with wire leads: (According to IEC 60068-2-20, solder bath method)		
	SOLDERABILITY	RESISTANCE TO SOLDERING HEAT
Soldering temperature	235 °C ± 5 °C	260 °C ± 5 °C
Soldering duration	2 s ± 0.5 s	10 s ± 1 s
Distance from component body	≥ 2 mm	≥ 5 mm

SOLDERING RECOMMENDATIONS

Soldering of the component should be achieved using a Sn96.5/Ag3.0/Cu0.5, a Sn60/40 type or a silver-bearing type solder.

As ceramic capacitors are very sensitive to rapid changes in temperature (thermal shock), the solder heat resistance specification (see above table) should not be exceeded.

Subjecting the capacitor to excessive heat may result in thermal shocks that can crack the ceramic body and melt the internal solder junction.

CLEANING

The components should be cleaned with vapor degreasers immediately following the soldering operation.

SOLVENT RESISTANCE AND FLAME ABILITY

The coating and marking of the capacitors are resistant to the following test method: IEC 60068-2-45 (Method XA). The epoxy material is approved according to UL 94 V-0.

MOUNTING

We do not recommend modifying the lead terminals, e.g. bending or cropping as this action could break the coating or crack the ceramic insert. However, if the lead must be modified in such a way, we recommend supporting the lead with a clamping fixture next to the coating.

CAPACITANCE "AGING" OF CERAMIC CAPACITORS

Following the final heat treatment, all class 2 ceramic capacitors reduce their capacitance value. According to logarithmic law, this is due to their special crystalline construction. This change is called "aging". If the capacitors are heat treated (for example when soldering), the capacitance increases again to a higher value deaging, and the aging process begins again.

Note

- The level of this deaging is dependent on the temperature and the duration of the heat; an almost complete deaging is achieved at 150 °C in one hour. These conditions also form the basis for reference measurements when testing. The capacitance change per time decade (aging constant) differs for the various types of ceramic, but typical values can be taken from the equations below.

$$k = \frac{100 \times (C_{11} - C_{12})}{C_{11} \times \log_{10}(t_2/t_1)}$$

$$C_{12} = C_{11} \times (1 - k/100 \times \log_{10}(t_2/t_1))$$

t_1, t_2 = measuring time point (h)

C_{11}, C_{12} = capacitance values for the times t_1, t_2

k = aging constant (%)

REFERENCE MEASUREMENT

Due to aging, it is necessary to quote an age for reference measurements which can be related to the capacitance with fixed tolerance. According to EN 130700, this time period is 1000 h.

If the shelf-life of the capacitor is known, the capacitance for t = 1000 h can be calculated with the aging constant.

In order to avoid the influence of aging, it is important to deage the capacitors before stress-testing. The following procedure is adopted (see also EN 130700):

- Deaging at 125 °C, 1 h
- Storage for 24 h at normal climate temperature
- Initial measurement
- Stress
- Deaging at 125 °C, 1 h
- Storage for 24 h at normal climate temperature
- Final measurement

CAUTION

1. OPERATING VOLTAGE AND FREQUENCY CHARACTERISTIC

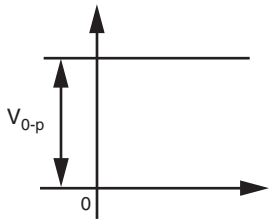
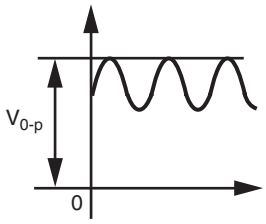
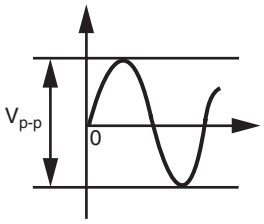
When sinusiodal or ripple voltage applied to DC Ceramic Disc Capacitors, be sure to maintain the peak-to-peak value or the peak value of the sum of both AC + DC within the rated voltage.

When start or stop applying the voltage, resonance may generate irregular voltage.

When rectangular or Pulse Wave Voltage is applied to DC Ceramic Disc Capacitors, the self-heating generated by the capacitor is higher than the sinusoidal application with the same frequency. The allowable voltage rating for the rectangular or pulse wave corresponds approximately with the allowable voltage of a sinusoidal wave with the double fundamental frequency.

The allowable voltage varies, depending on the voltage and the waveform.

Diagrams of the limiting values are available for each capacitor series on request.

VOLTAGE	DC	DC + AC	AC
Waveform Figure			

2. OPERATING TEMPERATURE AND SELF-GENERATED HEAT

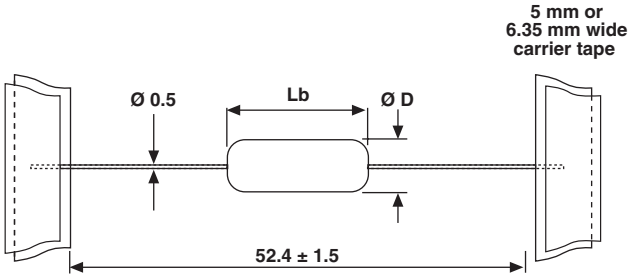
The surface temperature of the capacitors must not exceed the upper limit of its Rated Operating Temperature.

During operation in a high-frequency circuit or a pulse signal circuit, the capacitor itself generates heat due to dielectric losses. Applied voltage should be the load such as self-generated heat is within 20 °C on the condition of environmental temperature 25 °C.

Note, that excessive heat may lead to deterioration of the capacitor's characteristics.

Multilayer Ceramic Dipped Axial Capacitors 50 V_{DC} and 100 V_{DC}

DIMENSIONS



RoHS COMPLIANT

CAPACITOR DIMENSIONS AND WEIGHT in millimeters (inches)			
SIZE	$Lb_{max.}$	Ø $D_{max.}$	WEIGHT (g)
15	3.8 (0.150)	2.5 (0.100)	≈ 0.14
20	5.0 (0.200)	3.0 (0.120)	≈ 0.15

QUICK REFERENCE DATA						
DESCRIPTION	VALUE					
Capacitance range	10 pF to 5600 pF		100 pF to 1.0 µF		0.1 µF to 1.0 µF	
Rated DC voltage	50 V	100 V	50 V	100 V	50 V	100 V
Tolerance on capacitance	± 5 %, ± 10 %		± 10 %, ± 20 %		+ 80 %/- 20 %	
Dielectric Code	C0G (NP0)		X7R		Y5V	

ORDERING INFORMATION

A	103	K	15	X7R	F	5	TAA
PRODUCT TYPE	CAPACITANCE CODE	CAPACITANCE TOLERANCE	SIZE CODE	TEMP. CHAR.	RATED VOLTAGE	LEAD DIAMETER	PACKAGING
A = Mono-Axial	Two significant digits followed by the number of zeros. For example: 473 = 47 000 pF	J = ± 5 % K = ± 10 % M = ± 20 % Z = + 80%/- 20 %	15 = 3.8 (0.15") max. 20 = 5.0 (0.20") max.	C0G X7R Y5V	F = 50 V_{DC} H = 100 V_{DC}	5 = 0.5 mm (0.20")	TAA = T and R UAA = AMMO

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

CAPACITANCE RANGE CHART

C0G (NP0) DIELECTRIC

SIZE		15		20	
RATED VOLTAGE		50	100	50	100
VALUE	CODE				
10 pF	100	•	•		
12 pF	120	•	•		
15 pF	150	•	•		
18 pF	180	•	•		
22 pF	220	•	•		
27 pF	270	•	•		
33 pF	330	•	•		
39 pF	390	•	•		
47 pF	470	•	•		
56 pF	560	•	•		
68 pF	680	•	•		
82 pF	820	•	•		
100 pF	101	•	•		
120 pF	121	•	•		
150 pF	151	•	•		
180 pF	181	•	•		
220 pF	221	•	•		
270 pF	271	•	•		
330 pF	331	•	•		
390 pF	391	•	•		
470 pF	471	•	•		
560 pF	561	•	•		
680 pF	681	•	•		
820 pF	821	•	•		
1000 pF	102	•			•
1200 pF	122	•			•
1500 pF	152	•			•
1800 pF	182	•			•
2200 pF	222	•			•
2700 pF	272			•	•
3300 pF	332			•	•
3900 pF	392			•	
4700 pF	472			•	
5600 pF	562			•	

Y5V DIELECTRIC

SIZE		15		20	
RATED VOLTAGE		50	100	50	100
VALUE	CODE				
0.01 µF	103	•	•		
0.015 µF	153	•	•		
0.022 µF	223	•	•		
0.033 µF	333	•	•		
0.047 µF	473	•	•		
0.068 µF	683	•	•		
0.10 µF	104	•	•		
0.15 µF	154	•			•
0.22 µF	224	•			•
0.33 µF	334	•			
0.47 µF	474			•	
0.68 µF	684			•	
1.0 µF	105			•	

X7R DIELECTRIC

SIZE		15		20	
RATED VOLTAGE		50	100	50	100
VALUE	CODE				
100 pF	101	•	•		
120 pF	121	•	•		
150 pF	151	•	•		
180 pF	181	•	•		
220 pF	221	•	•		
270 pF	271	•	•		
330 pF	331	•	•		
390 pF	391	•	•		
470 pF	471	•	•		
560 pF	561	•	•		
680 pF	681	•	•		
820 pF	821	•	•		
1000 pF	102	•	•		
1200 pF	122	•	•		
1500 pF	152	•	•		
1800 pF	182	•	•		
2200 pF	222	•	•		
2700 pF	272	•	•		
3300 pF	332	•	•		
3900 pF	392	•	•		
4700 pF	472	•	•		
5600 pF	562	•	•		
6800 pF	682	•	•		
8200 pF	822	•	•		
0.01 µF	103	•	•		
0.012 µF	123	•	•		
0.015 µF	153	•	•		
0.018 µF	183	•	•		
0.022 µF	223	•	•		
0.027 µF	273	•			•
0.033 µF	333	•			•
0.039 µF	393	•			•
0.047 µF	473	•			•
0.056 µF	563	•			•
0.068 µF	683	•			•
0.082 µF	823	•			•
0.10 µF	104	•			•
0.12 µF	124			•	
0.15 µF	154			•	
0.22 µF	224			•	
0.33 µF	334			•	
0.47 µF	474			•	
0.68 µF	684			•	
1.0 µF	105			•	

PART NUMBER LISTING - if not in range chart, please contact cmll@vishay.com

MONO-AXIAL Y5V - 50 V_{DC} CLEAR TEXT CODE			
CAPACITANCE (pF)	RATED VOLTAGE (V_{DC})	+ 80 %/- 20 % TOLERANCE	PACKAGING
10 000	50	A103Z15Y5VF5TAA	REEL
10 000		A103Z15Y5VF5UAA	AMMO
15 000		A153Z15Y5VF5TAA	REEL
15 000		A153Z15Y5VF5UAA	AMMO
22 000		A223Z15Y5VF5TAA	REEL
22 000		A223Z15Y5VF5UAA	AMMO
33 000		A333Z15Y5VF5TAA	REEL
33 000		A333Z15Y5VF5UAA	AMMO
47 000		A473Z15Y5VF5TAA	REEL
47 000		A473Z15Y5VF5UAA	AMMO
68 000		A683Z15Y5VF5TAA	REEL
68 000		A683Z15Y5VF5UAA	AMMO
100 000		A104Z15Y5VF5TAA	REEL
100 000		A104Z15Y5VF5UAA	AMMO
150 000		A154Z15Y5VF5TAA	REEL
150 000		A154Z15Y5VF5UAA	AMMO
220 000		A224Z15Y5VF5TAA	REEL
220 000		A224Z15Y5VF5UAA	AMMO
330 000		A334Z15Y5VF5TAA	REEL
330 000		A334Z15Y5VF5UAA	AMMO
470 000		A474Z20Y5VF5TAA	REEL
470 000		A474Z20Y5VF5UAA	AMMO
680 000		A684Z20Y5VF5TAA	REEL
680 000		A684Z20Y5VF5UAA	AMMO
1 000 000		A105Z20Y5VF5TAA	REEL
1 000 000		A105Z20Y5VF5UAA	AMMO

MONO-AXIAL X7R - 50 V_{DC} CLEAR TEXT CODE				
CAPACITANCE (pF)	RATED VOLTAGE (V_{DC})	10 % TOLERANCE	20 % TOLERANCE	PACKAGING
100	50	A101K15X7RF5TAA	A101M15X7RF5TAA	REEL
100		A101K15X7RF5UAA	A101M15X7RF5UAA	AMMO
120		A121K15X7RF5TAA	A121M15X7RF5TAA	REEL
120		A121K15X7RF5UAA	A121M15X7RF5UAA	AMMO
150		A151K15X7RF5TAA	A151M15X7RF5TAA	REEL
150		A151K15X7RF5UAA	A151M15X7RF5UAA	AMMO
180		A181K15X7RF5TAA	A181M15X7RF5TAA	REEL
180		A181K15X7RF5UAA	A181M15X7RF5UAA	AMMO
220		A221K15X7RF5TAA	A221M15X7RF5TAA	REEL
220		A221K15X7RF5UAA	A221M15X7RF5UAA	AMMO
270		A271K15X7RF5TAA	A271M15X7RF5TAA	REEL
270		A271K15X7RF5UAA	A271M15X7RF5UAA	AMMO
330		A331K15X7RF5TAA	A331M15X7RF5TAA	REEL
330		A331K15X7RF5UAA	A331M15X7RF5UAA	AMMO
390		A391K15X7RF5TAA	A391M15X7RF5TAA	REEL
390		A391K15X7RF5UAA	A391M15X7RF5UAA	AMMO
470		A471K15X7RF5TAA	A471M15X7RF5TAA	REEL
470		A471K15X7RF5UAA	A471M15X7RF5UAA	AMMO
560		A561K15X7RF5TAA	A561M15X7RF5TAA	REEL
560		A561K15X7RF5UAA	A561M15X7RF5UAA	AMMO
680		A681K15X7RF5TAA	A681M15X7RF5TAA	REEL
680		A681K15X7RF5UAA	A681M15X7RF5UAA	AMMO

MONO-AXIAL X7R - 50 V_{DC} CLEAR TEXT CODE				
CAPACITANCE (pF)	RATED VOLTAGE (V_{DC})	10 % TOLERANCE	20 % TOLERANCE	PACKAGING
820	50	A821K15X7RF5TAA	A821M15X7RF5TAA	REEL
820		A821K15X7RF5UAA	A821M15X7RF5UAA	AMMO
1000		A102K15X7RF5TAA	A102M15X7RF5TAA	REEL
1000		A102K15X7RF5UAA	A102M15X7RF5UAA	AMMO
1200		A122K15X7RF5TAA	A122M15X7RF5TAA	REEL
1200		A122K15X7RF5UAA	A122M15X7RF5UAA	AMMO
1500		A152K15X7RF5TAA	A152M15X7RF5TAA	REEL
1500		A152K15X7RF5UAA	A152M15X7RF5UAA	AMMO
1800		A182K15X7RF5TAA	A182M15X7RF5TAA	REEL
1800		A182K15X7RF5UAA	A182M15X7RF5UAA	AMMO
2200		A222K15X7RF5TAA	A222M15X7RF5TAA	REEL
2200		A222K15X7RF5UAA	A222M15X7RF5UAA	AMMO
2700		A272K15X7RF5TAA	A272M15X7RF5TAA	REEL
2700		A272K15X7RF5UAA	A272M15X7RF5UAA	AMMO
3300		A332K15X7RF5TAA	A332M15X7RF5TAA	REEL
3300		A332K15X7RF5UAA	A332M15X7RF5UAA	AMMO
3900		A392K15X7RF5TAA	A392M15X7RF5TAA	REEL
3900		A392K15X7RF5UAA	A392M15X7RF5UAA	AMMO
4700		A472K15X7RF5TAA	A472M15X7RF5TAA	REEL
4700		A472K15X7RF5UAA	A472M15X7RF5UAA	AMMO
5600		A562K15X7RF5TAA	A562M15X7RF5TAA	REEL
5600		A562K15X7RF5UAA	A562M15X7RF5UAA	AMMO
6800		A682K15X7RF5TAA	A682M15X7RF5TAA	REEL
6800		A682K15X7RF5UAA	A682M15X7RF5UAA	AMMO
8200		A822K15X7RF5TAA	A822M15X7RF5TAA	REEL
8200		A822K15X7RF5UAA	A822M15X7RF5UAA	AMMO
10 000		A103K15X7RF5TAA	A103M15X7RF5TAA	REEL
10 000		A103K15X7RF5UAA	A103M15X7RF5UAA	AMMO
12 000		A123K15X7RF5TAA	A123M15X7RF5TAA	REEL
12 000		A123K15X7RF5UAA	A123M15X7RF5UAA	AMMO
15 000		A153K15X7RF5TAA	A153M15X7RF5TAA	REEL
15 000		A153K15X7RF5UAA	A153M15X7RF5UAA	AMMO
18 000		A183K15X7RF5TAA	A183M15X7RF5TAA	REEL
18 000		A183K15X7RF5UAA	A183M15X7RF5UAA	AMMO
22 000		A223K15X7RF5TAA	A223M15X7RF5TAA	REEL
22 000		A223K15X7RF5UAA	A223M15X7RF5UAA	AMMO
27 000		A273K15X7RF5TAA	A273M15X7RF5TAA	REEL
27 000		A273K15X7RF5UAA	A273M15X7RF5UAA	AMMO
33 000		A333K15X7RF5TAA	A333M15X7RF5TAA	REEL
33 000		A333K15X7RF5UAA	A333M15X7RF5UAA	AMMO
39 000		A393K15X7RF5TAA	A393M15X7RF5TAA	REEL
39 000		A393K15X7RF5UAA	A393M15X7RF5UAA	AMMO
47 000		A473K15X7RF5TAA	A473M15X7RF5TAA	REEL
47 000		A473K15X7RF5UAA	A473M15X7RF5UAA	AMMO
56 000		A563K15X7RF5TAA	A563M15X7RF5TAA	REEL
56 000		A563K15X7RF5UAA	A563M15X7RF5UAA	AMMO
68 000		A683K15X7RF5TAA	A683M15X7RF5TAA	REEL
68 000		A683K15X7RF5UAA	A683M15X7RF5UAA	AMMO
82 000		A823K15X7RF5TAA	A823M15X7RF5TAA	REEL
82 000		A823K15X7RF5UAA	A823M15X7RF5UAA	AMMO
100 000		A104K15X7RF5TAA	A104M15X7RF5TAA	REEL
100 000		A104K15X7RF5UAA	A104M15X7RF5UAA	AMMO
120 000		A124K20X7RF5TAA	A124M20X7RF5TAA	REEL

MONO-AXIAL X7R - 50 V_{DC} CLEAR TEXT CODE				
CAPACITANCE (pF)	RATED VOLTAGE (V_{DC})	10 % TOLERANCE	20 % TOLERANCE	PACKAGING
120 000	50	A124K20X7RF5UAA	A124M20X7RF5UAA	AMMO
150 000		A154K20X7RF5TAA	A154M20X7RF5TAA	REEL
150 000		A154K20X7RF5UAA	A154M20X7RF5UAA	AMMO
220 000		A224K20X7RF5TAA	A224M20X7RF5TAA	REEL
220 000		A224K20X7RF5UAA	A224M20X7RF5UAA	AMMO
330 000		A334K20X7RF5TAA	A334M20X7RF5TAA	REEL
330 000		A334K20X7RF5UAA	A334M20X7RF5UAA	AMMO
470 000		A474K20X7RF5TAA	A474M20X7RF5TAA	REEL
470 000		A474K20X7RF5UAA	A474M20X7RF5UAA	AMMO
680 000		A684K20X7RF5TAA	A684M20X7RF5TAA	REEL
680 000		A684K20X7RF5UAA	A684M20X7RF5UAA	AMMO
1 000 000		A105K20X7RF5TAA	A105M20X7RF5TAA	REEL
1 000 000		A105K20X7RF5UAA	A105M20X7RF5UAA	AMMO

MONO-AXIAL C0G - 50 V_{DC} CLEAR TEXT CODE				
CAPACITANCE (pF)	RATED VOLTAGE (V_{DC})	5 % TOLERANCE	10 % TOLERANCE	PACKAGING
10	50	A100J15C0GF5TAA	A100K15C0GF5TAA	REEL
10		A100J15C0GF5UAA	A100K15C0GF5UAA	AMMO
12		A120J15C0GF5TAA	A120K15C0GF5TAA	REEL
12		A120J15C0GF5UAA	A120K15C0GF5UAA	AMMO
15		A150J15C0GF5TAA	A150K15C0GF5TAA	REEL
15		A150J15C0GF5UAA	A150K15C0GF5UAA	AMMO
18		A180J15C0GF5TAA	A180K15C0GF5TAA	REEL
18		A180J15C0GF5UAA	A180K15C0GF5UAA	AMMO
22		A220J15C0GF5TAA	A220K15C0GF5TAA	REEL
22		A220J15C0GF5UAA	A220K15C0GF5UAA	AMMO
27		A270J15C0GF5TAA	A270K15C0GF5TAA	REEL
27		A270J15C0GF5UAA	A270K15C0GF5UAA	AMMO
33		A330J15C0GF5TAA	A330K15C0GF5TAA	REEL
33		A330J15C0GF5UAA	A330K15C0GF5UAA	AMMO
39		A390J15C0GF5TAA	A390K15C0GF5TAA	REEL
39		A390J15C0GF5UAA	A390K15C0GF5UAA	AMMO
47		A470J15C0GF5TAA	A470K15C0GF5TAA	REEL
47		A470J15C0GF5UAA	A470K15C0GF5UAA	AMMO
56		A560J15C0GF5TAA	A560K15C0GF5TAA	REEL
56		A560J15C0GF5UAA	A560K15C0GF5UAA	AMMO
68		A680J15C0GF5TAA	A680K15C0GF5TAA	REEL
68		A680J15C0GF5UAA	A680K15C0GF5UAA	AMMO
82		A820J15C0GF5TAA	A820K15C0GF5TAA	REEL
82		A820J15C0GF5UAA	A820K15C0GF5UAA	AMMO
100		A101J15C0GF5TAA	A101K15C0GF5TAA	REEL
100		A101J15C0GF5UAA	A101K15C0GF5UAA	AMMO
120		A121J15C0GF5TAA	A121K15C0GF5TAA	REEL
120		A121J15C0GF5UAA	A121K15C0GF5UAA	AMMO
150		A151J15C0GF5TAA	A151K15C0GF5TAA	REEL
150		A151J15C0GF5UAA	A151K15C0GF5UAA	AMMO
180		A181J15C0GF5TAA	A181K15C0GF5TAA	REEL
180		A181J15C0GF5UAA	A181K15C0GF5UAA	AMMO
220		A221J15C0GF5TAA	A221K15C0GF5TAA	REEL
220		A221J15C0GF5UAA	A221K15C0GF5UAA	AMMO
270		A271J15C0GF5TAA	A271K15C0GF5TAA	REEL
270		A271J15C0GF5UAA	A271K15C0GF5UAA	AMMO
330		A331J15C0GF5TAA	A331K15C0GF5TAA	REEL

MONO-AXIAL C0G - 50 V_{DC} CLEAR TEXT CODE				
CAPACITANCE (pF)	RATED VOLTAGE (V_{DC})	5 % TOLERANCE	10 % TOLERANCE	PACKAGING
330	50	A331J15C0GF5UAA	A331K15C0GF5UAA	AMMO
390		A391J15C0GF5TAA	A391K15C0GF5TAA	REEL
390		A391J15C0GF5UAA	A391K15C0GF5UAA	AMMO
470		A471J15C0GF5TAA	A471K15C0GF5TAA	REEL
470		A471J15C0GF5UAA	A471K15C0GF5UAA	AMMO
560		A561J15C0GF5TAA	A561K15C0GF5TAA	REEL
560		A561J15C0GF5UAA	A561K15C0GF5UAA	AMMO
680		A681J15C0GF5TAA	A681K15C0GF5TAA	REEL
680		A681J15C0GF5UAA	A681K15C0GF5UAA	AMMO
820		A821J15C0GF5TAA	A821K15C0GF5TAA	REEL
820		A821J15C0GF5UAA	A821K15C0GF5UAA	AMMO
1000		A102J15C0GF5TAA	A102K15C0GF5TAA	REEL
1000		A102J15C0GF5UAA	A102K15C0GF5UAA	AMMO
1200		A122J15C0GF5TAA	A122K15C0GF5TAA	REEL
1200		A122J15C0GF5UAA	A122K15C0GF5UAA	AMMO
1500		A152J15C0GF5TAA	A152K15C0GF5TAA	REEL
1500		A152J15C0GF5UAA	A152K15C0GF5UAA	AMMO
1800		A182J15C0GF5TAA	A182K15C0GF5TAA	REEL
1800		A182J15C0GF5UAA	A182K15C0GF5UAA	AMMO
2200		A222J15C0GF5TAA	A222K15C0GF5TAA	REEL
2200		A222J15C0GF5UAA	A222K15C0GF5UAA	AMMO
2700		A272J20C0GF5TAA	A272K20C0GF5TAA	REEL
2700		A272J20C0GF5UAA	A272K20C0GF5UAA	AMMO
3300		A332J20C0GF5TAA	A332K20C0GF5TAA	REEL
3300		A332J20C0GF5UAA	A332K20C0GF5UAA	AMMO
3900		A392J20C0GF5TAA	A392K20C0GF5TAA	REEL
3900		A392J20C0GF5UAA	A392K20C0GF5UAA	AMMO
4700		A472J20C0GF5TAA	A472K20C0GF5TAA	REEL
4700		A472J20C0GF5UAA	A472K20C0GF5UAA	AMMO
5600		A562J20C0GF5TAA	A562K20C0GF5TAA	REEL
5600		A562J20C0GF5UAA	A562K20C0GF5UAA	AMMO

MONO-AXIAL Y5V - 100 V_{DC} CLEAR TEXT CODE			
CAPACITANCE (pF)	RATED VOLTAGE (V_{DC})	+ 80 %/- 20 % TOLERANCE	PACKAGING
10 000	100	A103Z15Y5VH5TAA	REEL
10 000		A103Z15Y5VH5UAA	AMMO
15 000		A153Z15Y5VH5TAA	REEL
15 000		A153Z15Y5VH5UAA	AMMO
22 000		A223Z15Y5VH5TAA	REEL
22 000		A223Z15Y5VH5UAA	AMMO
33 000		A333Z15Y5VH5TAA	REEL
33 000		A333Z15Y5VH5UAA	AMMO
47 000		A473Z15Y5VH5TAA	REEL
47 000		A473Z15Y5VH5UAA	AMMO
68 000		A683Z15Y5VH5TAA	REEL
68 000		A683Z15Y5VH5UAA	AMMO
100 000		A104Z15Y5VH5TAA	REEL
100 000		A104Z15Y5VH5UAA	AMMO
150 000		A154Z20Y5VH5TAA	REEL
150 000		A154Z20Y5VH5UAA	AMMO
220 000		A224Z20Y5VH5TAA	REEL
220 000		A224Z20Y5VH5UAA	AMMO

MONO-AXIAL X7R - 100 V_{DC} CLEAR TEXT CODE				
CAPACITANCE (pF)	RATED VOLTAGE (V_{DC})	10 % TOLERANCE	20 % TOLERANCE	PACKAGING
100	100	A101K15X7RH5TAA	A101M15X7RH5TAA	REEL
100		A101K15X7RH5UAA	A101M15X7RH5UAA	AMMO
120		A121K15X7RH5TAA	A121M15X7RH5TAA	REEL
120		A121K15X7RH5UAA	A121M15X7RH5UAA	AMMO
150		A151K15X7RH5TAA	A151M15X7RH5TAA	REEL
150		A151K15X7RH5UAA	A151M15X7RH5UAA	AMMO
180		A181K15X7RH5TAA	A181M15X7RH5TAA	REEL
180		A181K15X7RH5UAA	A181M15X7RH5UAA	AMMO
220		A221K15X7RH5TAA	A221M15X7RH5TAA	REEL
220		A221K15X7RH5UAA	A221M15X7RH5UAA	AMMO
270		A271K15X7RH5TAA	A271M15X7RH5TAA	REEL
270		A271K15X7RH5UAA	A271M15X7RH5UAA	AMMO
330		A331K15X7RH5TAA	A331M15X7RH5TAA	REEL
330		A331K15X7RH5UAA	A331M15X7RH5UAA	AMMO
390		A391K15X7RH5TAA	A391M15X7RH5TAA	REEL
390		A391K15X7RH5UAA	A391M15X7RH5UAA	AMMO
470		A471K15X7RH5TAA	A471M15X7RH5TAA	REEL
470		A471K15X7RH5UAA	A471M15X7RH5UAA	AMMO
560		A561K15X7RH5TAA	A561M15X7RH5TAA	REEL
560		A561K15X7RH5UAA	A561M15X7RH5UAA	AMMO
680		A681K15X7RH5TAA	A681M15X7RH5TAA	REEL
680		A681K15X7RH5UAA	A681M15X7RH5UAA	AMMO
820		A821K15X7RH5TAA	A821M15X7RH5TAA	REEL
820		A821K15X7RH5UAA	A821M15X7RH5UAA	AMMO
1000		A102K15X7RH5TAA	A102M15X7RH5TAA	REEL
1000		A102K15X7RH5UAA	A102M15X7RH5UAA	AMMO
1200		A122K15X7RH5TAA	A122M15X7RH5TAA	REEL
1200		A122K15X7RH5UAA	A122M15X7RH5UAA	AMMO
1500		A152K15X7RH5TAA	A152M15X7RH5TAA	REEL
1500		A152K15X7RH5UAA	A152M15X7RH5UAA	AMMO
1800		A182K15X7RH5TAA	A182M15X7RH5TAA	REEL
1800		A182K15X7RH5UAA	A182M15X7RH5UAA	AMMO
2200		A222K15X7RH5TAA	A222M15X7RH5TAA	REEL
2200		A222K15X7RH5UAA	A222M15X7RH5UAA	AMMO
2700		A272K15X7RH5TAA	A272M15X7RH5TAA	REEL
2700		A272K15X7RH5UAA	A272M15X7RH5UAA	AMMO
3300		A332K15X7RH5TAA	A332M15X7RH5TAA	REEL
3300		A332K15X7RH5UAA	A332M15X7RH5UAA	AMMO
3900		A392K15X7RH5TAA	A392M15X7RH5TAA	REEL
3900		A392K15X7RH5UAA	A392M15X7RH5UAA	AMMO
4700		A472K15X7RH5TAA	A472M15X7RH5TAA	REEL
4700		A472K15X7RH5UAA	A472M15X7RH5UAA	AMMO
5600		A562K15X7RH5TAA	A562M15X7RH5TAA	REEL
5600		A562K15X7RH5UAA	A562M15X7RH5UAA	AMMO
6800		A682K15X7RH5TAA	A682M15X7RH5TAA	REEL
6800		A682K15X7RH5UAA	A682M15X7RH5UAA	AMMO
8200		A822K15X7RH5TAA	A822M15X7RH5TAA	REEL
8200		A822K15X7RH5UAA	A822M15X7RH5UAA	AMMO
10 000		A103K15X7RH5TAA	A103M15X7RH5TAA	REEL
10 000		A103K15X7RH5UAA	A103M15X7RH5UAA	AMMO
12 000		A123K15X7RH5TAA	A123M15X7RH5TAA	REEL
12 000		A123K15X7RH5UAA	A123M15X7RH5UAA	AMMO

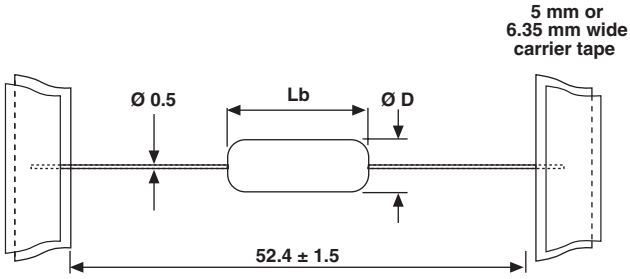
MONO-AXIAL X7R - 100 V_{DC} CLEAR TEXT CODE				
CAPACITANCE (pF)	RATED VOLTAGE (V_{DC})	10 % TOLERANCE	20 % TOLERANCE	PACKAGING
15 000	100	A153K15X7RH5TAA	A153M15X7RH5TAA	REEL
15 000		A153K15X7RH5UAA	A153M15X7RH5UAA	AMMO
18 000		A183K15X7RH5TAA	A183M15X7RH5TAA	REEL
18 000		A183K15X7RH5UAA	A183M15X7RH5UAA	AMMO
22 000		A223K15X7RH5TAA	A223M15X7RH5TAA	REEL
22 000		A223K15X7RH5UAA	A223M15X7RH5UAA	AMMO
27 000		A273K20X7RH5TAA	A273M20X7RH5TAA	REEL
27 000		A273K20X7RH5UAA	A273M20X7RH5UAA	AMMO
33 000		A333K20X7RH5TAA	A333M20X7RH5TAA	REEL
33 000		A333K20X7RH5UAA	A333M20X7RH5UAA	AMMO
39 000		A393K20X7RH5TAA	A393M20X7RH5TAA	REEL
39 000		A393K20X7RH5UAA	A393M20X7RH5UAA	AMMO
47 000		A473K20X7RH5TAA	A473M20X7RH5TAA	REEL
47 000		A473K20X7RH5UAA	A473M20X7RH5UAA	AMMO
56 000		A563K20X7RH5TAA	A563M20X7RH5TAA	REEL
56 000		A563K20X7RH5UAA	A563M20X7RH5UAA	AMMO
68 000		A683K20X7RH5TAA	A683M20X7RH5TAA	REEL
68 000		A683K20X7RH5UAA	A683M20X7RH5UAA	AMMO
82 000		A823K20X7RH5TAA	A823M20X7RH5TAA	REEL
82 000		A823K20X7RH5UAA	A823M20X7RH5UAA	AMMO
100 000		A104K20X7RH5TAA	A104M20X7RH5TAA	REEL
100 000		A104K20X7RH5UAA	A104M20X7RH5UAA	AMMO

MONO-AXIAL C0G - 100 V_{DC} CLEAR TEXT CODE				
CAPACITANCE (pF)	RATED VOLTAGE (V_{DC})	5 % TOLERANCE	10 % TOLERANCE	PACKAGING
10	100	A100J15C0GH5TAA	A100K15C0GH5TAA	REEL
10		A100J15C0GH5UAA	A100K15C0GH5UAA	AMMO
12		A120J15C0GH5TAA	A120K15C0GH5TAA	REEL
12		A120J15C0GH5UAA	A120K15C0GH5UAA	AMMO
15		A150J15C0GH5TAA	A150K15C0GH5TAA	REEL
15		A150J15C0GH5UAA	A150K15C0GH5UAA	AMMO
18		A180J15C0GH5TAA	A180K15C0GH5TAA	REEL
18		A180J15C0GH5UAA	A180K15C0GH5UAA	AMMO
22		A220J15C0GH5TAA	A220K15C0GH5TAA	REEL
22		A220J15C0GH5UAA	A220K15C0GH5UAA	AMMO
27		A270J15C0GH5TAA	A270K15C0GH5TAA	REEL
27		A270J15C0GH5UAA	A270K15C0GH5UAA	AMMO
33		A330J15C0GH5TAA	A330K15C0GH5TAA	REEL
33		A330J15C0GH5UAA	A330K15C0GH5UAA	AMMO
39		A390J15C0GH5TAA	A390K15C0GH5TAA	REEL
39		A390J15C0GH5UAA	A390K15C0GH5UAA	AMMO
47		A470J15C0GH5TAA	A470K15C0GH5TAA	REEL
47		A470J15C0GH5UAA	A470K15C0GH5UAA	AMMO
56		A560J15C0GH5TAA	A560K15C0GH5TAA	REEL
56		A560J15C0GH5UAA	A560K15C0GH5UAA	AMMO
68		A680J15C0GH5TAA	A680K15C0GH5TAA	REEL
68		A680J15C0GH5UAA	A680K15C0GH5UAA	AMMO
82		A820J15C0GH5TAA	A820K15C0GH5TAA	REEL
82		A820J15C0GH5UAA	A820K15C0GH5UAA	AMMO
100		A101J15C0GH5TAA	A101K15C0GH5TAA	REEL
100		A101J15C0GH5UAA	A101K15C0GH5UAA	AMMO
120		A121J15C0GH5TAA	A121K15C0GH5TAA	REEL

MONO-AXIAL C0G - 100 V_{DC} CLEAR TEXT CODE				
CAPACITANCE (pF)	RATED VOLTAGE (V_{DC})	5 % TOLERANCE	10 % TOLERANCE	PACKAGING
120	100	A121J15C0GH5UAA	A121K15C0GH5UAA	AMMO
150		A151J15C0GH5TAA	A151K15C0GH5TAA	REEL
150		A151J15C0GH5UAA	A151K15C0GH5UAA	AMMO
180		A181J15C0GH5TAA	A181K15C0GH5TAA	REEL
180		A181J15C0GH5UAA	A181K15C0GH5UAA	AMMO
220		A221J15C0GH5TAA	A221K15C0GH5TAA	REEL
220		A221J15C0GH5UAA	A221K15C0GH5UAA	AMMO
270		A271J15C0GH5TAA	A271K15C0GH5TAA	REEL
270		A271J15C0GH5UAA	A271K15C0GH5UAA	AMMO
330		A331J15C0GH5TAA	A331K15C0GH5TAA	REEL
330		A331J15C0GH5UAA	A331K15C0GH5UAA	AMMO
390		A391J15C0GH5TAA	A391K15C0GH5TAA	REEL
390		A391J15C0GH5UAA	A391K15C0GH5UAA	AMMO
470		A471J15C0GH5TAA	A471K15C0GH5TAA	REEL
470		A471J15C0GH5UAA	A471K15C0GH5UAA	AMMO
560		A561J15C0GH5TAA	A561K15C0GH5TAA	REEL
560		A561J15C0GH5UAA	A561K15C0GH5UAA	AMMO
680		A681J15C0GH5TAA	A681K15C0GH5TAA	REEL
680		A681J15C0GH5UAA	A681K15C0GH5UAA	AMMO
820		A821J15C0GH5TAA	A821K15C0GH5TAA	REEL
820		A821J15C0GH5UAA	A821K15C0GH5UAA	AMMO
1000		A102J20C0GH5TAA	A102K20C0GH5TAA	REEL
1000		A102J20C0GH5UAA	A102K20C0GH5UAA	AMMO
1200		A122J20C0GH5TAA	A122K20C0GH5TAA	REEL
1200		A122J20C0GH5UAA	A122K20C0GH5UAA	AMMO
1500		A152J20C0GH5TAA	A152K20C0GH5TAA	REEL
1500		A152J20C0GH5UAA	A152K20C0GH5UAA	AMMO
1800		A182J20C0GH5TAA	A182K20C0GH5TAA	REEL
1800		A182J20C0GH5UAA	A182K20C0GH5UAA	AMMO
2200		A222J20C0GH5TAA	A222K20C0GH5TAA	REEL
2200		A222J20C0GH5UAA	A222K20C0GH5UAA	AMMO
2700		A272J20C0GH5TAA	A272K20C0GH5TAA	REEL
2700		A272J20C0GH5UAA	A272K20C0GH5UAA	AMMO
3300		A332J20C0GH5TAA	A332K20C0GH5TAA	REEL
3300		A332J20C0GH5UAA	A332K20C0GH5UAA	AMMO
3900		A392J20C0GH5TAA	A392K20C0GH5TAA	REEL
3900		A392J20C0GH5UAA	A392K20C0GH5UAA	AMMO
4700		A472J20C0GH5TAA	A472K20C0GH5TAA	REEL
4700		A472J20C0GH5UAA	A472K20C0GH5UAA	AMMO
5600		A562J20C0GH5TAA	A562K20C0GH5TAA	REEL
5600		A562J20C0GH5UAA	A562K20C0GH5UAA	AMMO

Multilayer Ceramic Dipped Axial Capacitors 200 V_{DC} and 500 V_{DC}

DIMENSIONS



RoHS COMPLIANT

CAPACITOR DIMENSIONS AND WEIGHT in millimeters (inches)			
SIZE	**$Lb_{max.}$**	**Ø $D_{max.}$**	**WEIGHT (g)**
15	3.8 (0.150)	2.5 (0.100)	≈ 0.14
20	5.0 (0.200)	3.0 (0.120)	≈ 0.15

QUICK REFERENCE DATA				
DESCRIPTION	**VALUE**			
Capacitance range	33 pF to 2200 pF		100 pF to 0.047 µF	
Rated DC voltage	200 V	500 V	200 V	500 V
Tolerance on capacitance	± 5 %, ± 10 %		± 10 %, ± 20 %	
Dielectric Code	C0G (NP0)		X7R	

ORDERING INFORMATION

A	**103**	**K**	**15**	**X7R**	**K**	**5**	**TAA**
PRODUCT TYPE	CAPACITANCE CODE	CAPACITANCE TOLERANCE	SIZE CODE	TEMP. CHAR.	RATED VOLTAGE	LEAD DIAMETER	PACKAGING
A = Mono-Axial	Two significant digits followed by the number of zeros. For example: 473 = 47 000 pF	J = ± 5 % K = ± 10 % M = ± 20 %	15 = 3.8 (0.15") max. 20 = 5.0 (0.20") max.	C0G X7R	K = 200 V_{DC} L = 500 V_{DC}	5 = 0.5 mm (0.20")	TAA = T and R UAA = AMMO

Ordering Example: A-103-K-15-X7R-K-5-TAA

For technical questions, contact: cmll@vishay.com
Document Number: 45167
Revision: 17-Jan-06

Multilayer Ceramic Dipped Axial Capacitors
200 V_{DC} and 500 V_{DC}

CAPACITANCE RANGE CHART

C0G (NP0) DIELECTRIC

SIZE		15		20	
RATED VOLTAGE		200	500	200	500
VALUE	CODE				
10 pF	100				
12 pF	120				
15 pF	150				
18 pF	180				
22 pF	220				
27 pF	270				
33 pF	330	•	•		
39 pF	390	•	•		
47 pF	470	•	•		
56 pF	560	•	•		
68 pF	680	•	•		
82 pF	820	•	•		
100 pF	101	•	•		
120 pF	121	•	•		
150 pF	151	•	•		
180 pF	181	•	•		
220 pF	221	•	•		
270 pF	271	•	•		
330 pF	331	•	•		
390 pF	391	•	•		
470 pF	471	•			•
560 pF	561	•			•
680 pF	681	•			•
820 pF	821	•			•
1000 pF	102			•	•
1200 pF	122			•	
1500 pF	152			•	
1800 pF	182			•	
2200 pF	222			•	
2700 pF	272				
3300 pF	332				
3900 pF	392				
4700 pF	472				

X7R DIELECTRIC

SIZE		15		20	
RATED VOLTAGE		200	500	200	500
VALUE	CODE				
100 pF	101	•	•		
120 pF	121	•	•		
150 pF	151	•	•		
180 pF	181	•	•		
220 pF	221	•	•		
270 pF	271	•	•		
330 pF	331	•	•		
390 pF	391	•	•		
470 pF	471	•	•		
560 pF	561	•	•		
680 pF	681	•	•		
820 pF	821	•	•		
1000 pF	102	•	•		
1200 pF	122	•	•		
1500 pF	152	•	•		
1800 pF	182	•	•		
2200 pF	222	•	•		
2700 pF	272	•	•		
3300 pF	332	•			•
3900 pF	392	•			•
4700 pF	472	•			•
5600 pF	562	•			•
6800 pF	682	•			•
8200 pF	822	•			•
0.01 µF	103	•			•
0.012 µF	123	•			•
0.015 µF	153	•			•
0.018 µF	183	•			•
0.022 µF	223	•			•
0.027 µF	273			•	•
0.033 µF	333			•	•
0.039 µF	393			•	
0.047 µF	473			•	
0.056 µF	563				
0.068 µF	683				
0.082 µF	823				
0.10 µF	104				

PART NUMBER LISTING - if not in range chart, please contact cmll@vishay.com

MONO-AXIAL X7R - 200 V_{DC} CLEAR TEXT CODE				
CAPACITANCE (pF)	RATED VOLTAGE (V_{DC})	10 % TOLERANCE	20 % TOLERANCE	PACKAGING
100	200	A101K15X7RK5TAA	A101M15X7RK5TAA	REEL
100		A101K15X7RK5UAA	A101M15X7RK5UAA	AMMO
120		A121K15X7RK5TAA	A121M15X7RK5TAA	REEL
120		A121K15X7RK5UAA	A121M15X7RK5UAA	AMMO
150		A151K15X7RK5TAA	A151M15X7RK5TAA	REEL
150		A151K15X7RK5UAA	A151M15X7RK5UAA	AMMO
180		A181K15X7RK5TAA	A181M15X7RK5TAA	REEL
180		A181K15X7RK5UAA	A181M15X7RK5UAA	AMMO
220		A221K15X7RK5TAA	A221M15X7RK5TAA	REEL
220		A221K15X7RK5UAA	A221M15X7RK5UAA	AMMO
270		A271K15X7RK5TAA	A271M15X7RK5TAA	REEL
270		A271K15X7RK5UAA	A271M15X7RK5UAA	AMMO
330		A331K15X7RK5TAA	A331M15X7RK5TAA	REEL
330		A331K15X7RK5UAA	A331M15X7RK5UAA	AMMO
390		A391K15X7RK5TAA	A391M15X7RK5TAA	REEL
390		A391K15X7RK5UAA	A391M15X7RK5UAA	AMMO
470		A471K15X7RK5TAA	A471M15X7RK5TAA	REEL
470		A471K15X7RK5UAA	A471M15X7RK5UAA	AMMO
560		A561K15X7RK5TAA	A561M15X7RK5TAA	REEL
560		A561K15X7RK5UAA	A561M15X7RK5UAA	AMMO
680		A681K15X7RK5TAA	A681M15X7RK5TAA	REEL
680		A681K15X7RK5UAA	A681M15X7RK5UAA	AMMO
820		A821K15X7RK5TAA	A821M15X7RK5TAA	REEL
820		A821K15X7RK5UAA	A821M15X7RK5UAA	AMMO
1000		A102K15X7RK5TAA	A102M15X7RK5TAA	REEL
1000		A102K15X7RK5UAA	A102M15X7RK5UAA	AMMO
1200		A122K15X7RK5TAA	A122M15X7RK5TAA	REEL
1200		A122K15X7RK5UAA	A122M15X7RK5UAA	AMMO
1500		A152K15X7RK5TAA	A152M15X7RK5TAA	REEL
1500		A152K15X7RK5UAA	A152M15X7RK5UAA	AMMO
1800		A182K15X7RK5TAA	A182M15X7RK5TAA	REEL
1800		A182K15X7RK5UAA	A182M15X7RK5UAA	AMMO
2200		A222K15X7RK5TAA	A222M15X7RK5TAA	REEL
2200		A222K15X7RK5UAA	A222M15X7RK5UAA	AMMO
2700		A272K15X7RK5TAA	A272M15X7RK5TAA	REEL
2700		A272K15X7RK5UAA	A272M15X7RK5UAA	AMMO
3300		A332K15X7RK5TAA	A332M15X7RK5TAA	REEL
3300		A332K15X7RK5UAA	A332M15X7RK5UAA	AMMO
3900		A392K15X7RK5TAA	A392M15X7RK5TAA	REEL
3900		A392K15X7RK5UAA	A392M15X7RK5UAA	AMMO
4700		A472K15X7RK5TAA	A472M15X7RK5TAA	REEL
4700		A472K15X7RK5UAA	A472M15X7RK5UAA	AMMO
5600		A562K15X7RK5TAA	A562M15X7RK5TAA	REEL
5600		A562K15X7RK5UAA	A562M15X7RK5UAA	AMMO
6800		A682K15X7RK5TAA	A682M15X7RK5TAA	REEL
6800		A682K15X7RK5UAA	A682M15X7RK5UAA	AMMO
8200		A822K15X7RK5TAA	A822M15X7RK5TAA	REEL
8200		A822K15X7RK5UAA	A822M15X7RK5UAA	AMMO
10 000		A103K15X7RK5TAA	A103M15X7RK5TAA	REEL
10 000		A103K15X7RK5UAA	A103M15X7RK5UAA	AMMO
12 000		A123K15X7RK5TAA	A123M15X7RK5TAA	REEL

MONO-AXIAL X7R - 200 V_{DC} CLEAR TEXT CODE				
CAPACITANCE (pF)	RATED VOLTAGE (V_{DC})	10 % TOLERANCE	20 % TOLERANCE	PACKAGING
12 000	200	A123K15X7RK5UAA	A123M15X7RK5UAA	AMMO
15 000		A153K15X7RK5TAA	A153M15X7RK5TAA	REEL
15 000		A153K15X7RK5UAA	A153M15X7RK5UAA	AMMO
18 000		A183K15X7RK5TAA	A183M15X7RK5TAA	REEL
18 000		A183K15X7RK5UAA	A183M15X7RK5UAA	AMMO
22 000		A223K15X7RK5TAA	A223M15X7RK5TAA	REEL
22 000		A223K15X7RK5UAA	A223M15X7RK5UAA	AMMO
27 000		A273K20X7RK5TAA	A273M20X7RK5TAA	REEL
27 000		A273K20X7RK5UAA	A273M20X7RK5UAA	AMMO
33 000		A333K20X7RK5TAA	A333M20X7RK5TAA	REEL
33 000		A333K20X7RK5UAA	A333M20X7RK5UAA	AMMO
39 000		A393K20X7RK5TAA	A393M20X7RK5TAA	REEL
39 000		A393K20X7RK5UAA	A393M20X7RK5UAA	AMMO
47 000		A473K20X7RK5TAA	A473M20X7RK5TAA	REEL
47 000		A473K20X7RK5UAA	A473M20X7RK5UAA	AMMO

MONO-AXIAL C0G - 200 V_{DC} CLEAR TEXT CODE				
CAPACITANCE (pF)	RATED VOLTAGE (V_{DC})	5 % TOLERANCE	10 % TOLERANCE	PACKAGING
33	200	A330J15C0GK5TAA	A330K15C0GK5TAA	REEL
33		A330J15C0GK5UAA	A330K15C0GK5UAA	AMMO
39		A390J15C0GK5TAA	A390K15C0GK5TAA	REEL
39		A390J15C0GK5UAA	A390K15C0GK5UAA	AMMO
47		A470J15C0GK5TAA	A470K15C0GK5TAA	REEL
47		A470J15C0GK5UAA	A470K15C0GK5UAA	AMMO
56		A560J15C0GK5TAA	A560K15C0GK5TAA	REEL
56		A560J15C0GK5UAA	A560K15C0GK5UAA	AMMO
68		A680J15C0GK5TAA	A680K15C0GK5TAA	REEL
68		A680J15C0GK5UAA	A680K15C0GK5UAA	AMMO
82		A820J15C0GK5TAA	A820K15C0GK5TAA	REEL
82		A820J15C0GK5UAA	A820K15C0GK5UAA	AMMO
100		A101J15C0GK5TAA	A101K15C0GK5TAA	REEL
100		A101J15C0GK5UAA	A101K15C0GK5UAA	AMMO
120		A121J15C0GK5TAA	A121K15C0GK5TAA	REEL
120		A121J15C0GK5UAA	A121K15C0GK5UAA	AMMO
150		A151J15C0GL5TAA	A151K15C0GL5TAA	REEL
150		A151J15C0GL5UAA	A151K15C0GL5UAA	AMMO
180		A181J15C0GL5TAA	A181K15C0GL5TAA	REEL
180		A181J15C0GL5UAA	A181K15C0GL5UAA	AMMO
220		A221J15C0GL5TAA	A221K15C0GL5TAA	REEL
220		A221J15C0GL5UAA	A221K15C0GL5UAA	AMMO
270		A271J15C0GL5TAA	A271K15C0GL5TAA	REEL
270		A271J15C0GL5UAA	A271K15C0GL5UAA	AMMO
330		A331J15C0GL5TAA	A331K15C0GL5TAA	REEL
330		A331J15C0GL5UAA	A331K15C0GL5UAA	AMMO
390		A391J15C0GL5TAA	A391K15C0GL5TAA	REEL
390		A391J15C0GL5UAA	A391K15C0GL5UAA	AMMO
470		A471J20C0GL5TAA	A471K20C0GL5TAA	REEL
470		A471J20C0GL5UAA	A471K20C0GL5UAA	AMMO
560		A561J20C0GL5TAA	A561K20C0GL5TAA	REEL
560		A561J20C0GL5UAA	A561K20C0GL5UAA	AMMO
680		A681J20C0GL5TAA	A681K20C0GL5TAA	REEL
680		A681J20C0GL5UAA	A681K20C0GL5UAA	AMMO
820		A821J20C0GL5TAA	A821K20C0GL5TAA	REEL

MONO-AXIAL C0G - 200 V_{DC} CLEAR TEXT CODE				
CAPACITANCE (pF)	RATED VOLTAGE (V_{DC})	5 % TOLERANCE	10 % TOLERANCE	PACKAGING
820	200	A821J20C0GL5UAA	A821K20C0GL5UAA	AMMO
1000		A102J20C0GL5TAA	A102K20C0GL5TAA	REEL
1000		A102J20C0GL5UAA	A102K20C0GL5UAA	AMMO
1200		A122J20C0GL5TAA	A122K20C0GL5TAA	REEL
1200		A122J20C0GL5UAA	A122K20C0GL5UAA	AMMO
1500		A152J20C0GL5TAA	A152K20C0GL5TAA	REEL
1500		A152J20C0GL5UAA	A152K20C0GL5UAA	AMMO
1800		A182J20C0GL5TAA	A182K20C0GL5TAA	REEL
1800		A182J20C0GL5UAA	A182K20C0GL5UAA	AMMO
2200		A222J20C0GK5TAA	A220K20C0GK5TAA	REEL
2200		A222J20C0GK5UAA	A220K20C0GK5UAA	AMMO

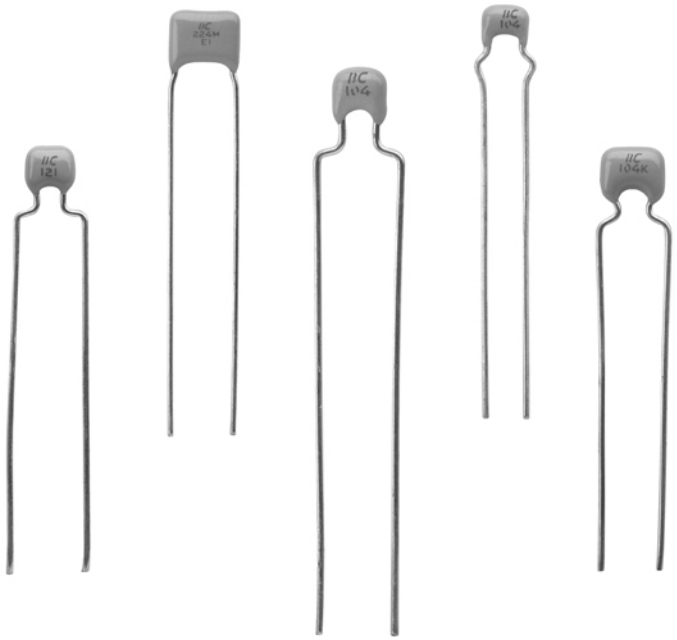
MONO-AXIAL X7R - 500 V_{DC} CLEAR TEXT CODE				
CAPACITANCE (pF)	RATED VOLTAGE (V_{DC})	10 % TOLERANCE	20 % TOLERANCE	PACKAGING
100	500	A101K15X7RL5TAA	A101M15X7RL5TAA	REEL
100		A101K15X7RL5UAA	A101M15X7RL5UAA	AMMO
120		A121K15X7RL5TAA	A121M15X7RL5TAA	REEL
120		A121K15X7RL5UAA	A121M15X7RL5UAA	AMMO
150		A151K15X7RL5TAA	A151M15X7RL5TAA	REEL
150		A151K15X7RL5UAA	A151M15X7RL5UAA	AMMO
180		A181K15X7RL5TAA	A181M15X7RL5TAA	REEL
180		A181K15X7RL5UAA	A181M15X7RL5UAA	AMMO
220		A221K15X7RL5TAA	A221M15X7RL5TAA	REEL
220		A221K15X7RL5UAA	A221M15X7RL5UAA	AMMO
270		A271K15X7RL5TAA	A271M15X7RL5TAA	REEL
270		A271K15X7RL5UAA	A271M15X7RL5UAA	AMMO
330		A331K15X7RL5TAA	A331M15X7RL5TAA	REEL
330		A331K15X7RL5UAA	A331M15X7RL5UAA	AMMO
390		A391K15X7RL5TAA	A391M15X7RL5TAA	REEL
390		A391K15X7RL5UAA	A391M15X7RL5UAA	AMMO
470		A471K15X7RL5TAA	A471M15X7RL5TAA	REEL
470		A471K15X7RL5UAA	A471M15X7RL5UAA	AMMO
560		A561K15X7RL5TAA	A561M15X7RL5TAA	REEL
560		A561K15X7RL5UAA	A561M15X7RL5UAA	AMMO
680		A681K15X7RL5TAA	A681M15X7RL5TAA	REEL
680		A681K15X7RL5UAA	A681M15X7RL5UAA	AMMO
820		A821K15X7RL5TAA	A821M15X7RL5TAA	REEL
820		A821K15X7RL5UAA	A821M15X7RL5UAA	AMMO
1000		A102K15X7RL5TAA	A102M15X7RL5TAA	REEL
1000		A102K15X7RL5UAA	A102M15X7RL5UAA	AMMO
1200		A122K15X7RL5TAA	A122M15X7RL5TAA	REEL
1200		A122K15X7RL5UAA	A122M15X7RL5UAA	AMMO
1500		A152K15X7RL5TAA	A152M15X7RL5TAA	REEL
1500		A152K15X7RL5UAA	A152M15X7RL5UAA	AMMO
1800		A182K15X7RL5TAA	A182M15X7RL5TAA	REEL
1800		A182K15X7RL5UAA	A182M15X7RL5UAA	AMMO
2200		A222K15X7RL5TAA	A222M15X7RL5TAA	REEL
2200		A222K15X7RL5UAA	A222M15X7RL5UAA	AMMO
2700		A272K15X7RL5TAA	A272M15X7RL5TAA	REEL
2700		A272K15X7RL5UAA	A272M15X7RL5UAA	AMMO
3300		A332K20X7RL5TAA	A332M20X7RL5TAA	REEL

MONO-AXIAL X7R - 500 V_{DC} CLEAR TEXT CODE				
CAPACITANCE (pF)	RATED VOLTAGE (V_{DC})	10 % TOLERANCE	20 % TOLERANCE	PACKAGING
3300	500	A332K20X7RL5UAA	A332M20X7RL5UAA	AMMO
3900		A392K20X7RL5TAA	A392M20X7RL5TAA	REEL
3900		A392K20X7RL5UAA	A392M20X7RL5UAA	AMMO
4700		A472K20X7RL5TAA	A472M20X7RL5TAA	REEL
4700		A472K20X7RL5UAA	A472M20X7RL5UAA	AMMO
5600		A562K20X7RL5TAA	A562M20X7RL5TAA	REEL
5600		A562K20X7RL5UAA	A562M20X7RL5UAA	AMMO
6800		A682K20X7RL5TAA	A682M20X7RL5TAA	REEL
6800		A682K20X7RL5UAA	A682M20X7RL5UAA	AMMO
8200		A822K20X7RL5TAA	A822M20X7RL5TAA	REEL
8200		A822K20X7RL5UAA	A822M20X7RL5UAA	AMMO
10 000		A103K20X7RL5TAA	A103M20X7RL5TAA	REEL
10 000		A103K20X7RL5UAA	A103M20X7RL5UAA	AMMO
12 000		A123K20X7RL5TAA	A123M20X7RL5TAA	REEL
12 000		A123K20X7RL5UAA	A123M20X7RL5UAA	AMMO
15 000		A153K20X7RL5TAA	A153M20X7RL5TAA	REEL
15 000		A153K20X7RL5UAA	A153M20X7RL5UAA	AMMO
18 000		A183K20X7RL5TAA	A183M20X7RL5TAA	REEL
18 000		A183K20X7RL5UAA	A183M20X7RL5UAA	AMMO
22 000		A223K20X7RL5TAA	A223M20X7RL5TAA	REEL
22 000		A223K20X7RL5UAA	A223M20X7RL5UAA	AMMO
27 000		A273K20X7RL5TAA	A273M20X7RL5TAA	REEL
27 000		A273K20X7RL5UAA	A273M20X7RL5UAA	AMMO
33 000		A333K20X7RL5TAA	A333M20X7RL5TAA	REEL
33 000		A333K20X7RL5UAA	A333M20X7RL5UAA	AMMO

MONO-AXIAL C0G - 500 V_{DC} CLEAR TEXT CODE				
CAPACITANCE (pF)	RATED VOLTAGE (V_{DC})	5 % TOLERANCE	10 % TOLERANCE	PACKAGING
33	500	A330J15C0GL5TAA	A330K15C0GL5TAA	REEL
33		A330J15C0GL5UAA	A330K15C0GL5UAA	AMMO
39		A390J15C0GL5TAA	A390K15C0GL5TAA	REEL
39		A390J15C0GL5UAA	A390K15C0GL5UAA	AMMO
47		A470J15C0GL5TAA	A470K15C0GL5TAA	REEL
47		A470J15C0GL5UAA	A470K15C0GL5UAA	AMMO
56		A560J15C0GL5TAA	A560K15C0GL5TAA	REEL
56		A560J15C0GL5UAA	A560K15C0GL5UAA	AMMO
68		A680J15C0GL5TAA	A680K15C0GL5TAA	REEL
68		A680J15C0GL5UAA	A680K15C0GL5UAA	AMMO
82		A820J15C0GL5TAA	A820K15C0GL5TAA	REEL
82		A820J15C0GL5UAA	A820K15C0GL5UAA	AMMO
100		A101J15C0GL5TAA	A101K15C0GL5TAA	REEL
100		A101J15C0GL5UAA	A101K15C0GL5UAA	AMMO
120		A121J15C0GL5TAA	A121K15C0GL5TAA	REEL
120		A121J15C0GL5UAA	A121K15C0GL5UAA	AMMO
150		A151J15C0GL5TAA	A151K15C0GL5TAA	REEL
150		A151J15C0GL5UAA	A151K15C0GL5UAA	AMMO
180		A181J15C0GL5TAA	A181K15C0GL5TAA	REEL
180		A181J15C0GL5UAA	A181K15C0GL5UAA	AMMO
220		A221J15C0GL5TAA	A221K15C0GL5TAA	REEL
220		A221J15C0GL5UAA	A221K15C0GL5UAA	AMMO

MONO-AXIAL C0G - 500 V_{DC} CLEAR TEXT CODE				
CAPACITANCE (pF)	RATED VOLTAGE (V_{DC})	5 % TOLERANCE	10 % TOLERANCE	PACKAGING
270	500	A271J15C0GL5TAA	A271K15C0GL5TAA	REEL
270		A271J15C0GL5UAA	A271K15C0GL5UAA	AMMO
330		A331J15C0GL5TAA	A331K15C0GL5TAA	REEL
330		A331J15C0GL5UAA	A331K15C0GL5UAA	AMMO
390		A391J15C0GL5TAA	A391K15C0GL5TAA	REEL
390		A391J15C0GL5UAA	A391K15C0GL5UAA	AMMO
470		A471J20C0GL5TAA	A471K20C0GL5TAA	REEL
470		A471J20C0GL5UAA	A471K20C0GL5UAA	AMMO
560		A561J20C0GL5TAA	A561K20C0GL5TAA	REEL
560		A561J20C0GL5UAA	A561K20C0GL5UAA	AMMO
680		A681J20C0GL5TAA	A681K20C0GL5TAA	REEL
680		A681J20C0GL5UAA	A681K20C0GL5UAA	AMMO
820		A821J20C0GL5TAA	A821K20C0GL5TAA	REEL
820		A821J20C0GL5UAA	A821K20C0GL5UAA	AMMO
1000		A102J20C0GL5TAA	A102K20C0GL5TAA	REEL
1000		A102J20C0GL5UAA	A102K20C0GL5UAA	AMMO

Multilayer Ceramic Dipped Radial Capacitors



Contents

Multilayer Ceramic Dipped Radial Capacitors
50 V_{DC}, 100 V_{DC}, 200 V_{DC} and 500 V_{DC}

INTERNAL CONSTRUCTION

Multilayer ceramic capacitors consist of electrodes, the interleaved ceramic dielectric and the external terminal connectors. The capacitance is given by the description:

$$C = \frac{A \times n \times \varepsilon_0 \times \varepsilon_r}{d}$$

A = Electrode area

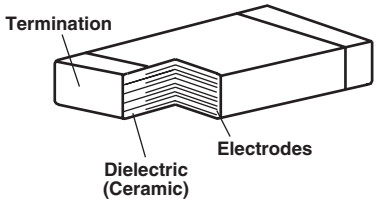
n = Number of active layers

d = Distance between electrodes

ε_r = Dielectric relative

ε_0 = Dielectric constant

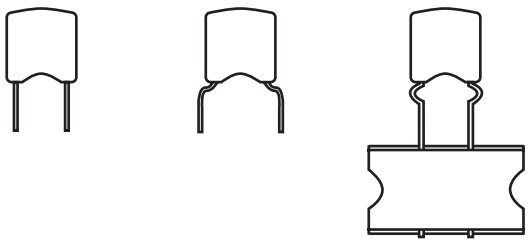
Whilst the values “A x n” and “d” are respectively determined by the production process, the dielectric constant is a function of the ceramic material used.

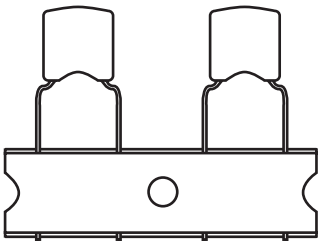


LEAD CONFIGURATION

Radial Size 15 and Size 20
Base material: FeCu
Plating: Matte electrolytic, tinned

COMPONTENT OUTLINES





Multilayer Ceramic Dipped Radial Capacitors
50 V_{DC} and 100 V_{DC}

DIELECTRIC CHARACTERISTICS			
DIELECTRIC ACCORDING TO EIA	**C0G (NP0)**	**X7R**	**Y5V**
According to CECC	CG	C1 (2C1)	2F4
Capacitance Range:			
at 1 MHz, 1 V; where C ≤ 1000 pF	10 pF to 1000 pF	-	-
at 1 kHz, 1 V; where C > 1000 pF	1200 pF to 6800 pF	100 pF to 1.0 µF	0.1 µF to 1.0 µF
Tolerance on the Capacitance:			
where C < 10 pF	± 0.5 pF (D)	-	-
where C > 10 pF	± 5 % (J); ± 10 % (K)	± 10 % (K); ± 20 % (M)	+ 80 %/- 20 % (Z)
Rated DC Voltage	50 V; 100 V		
Dielectric Strength	250 % of rated voltage		
Insulation Resistance (IR)	100 000 MΩ or 1000 MΩ x µF whichever is less at rated voltage within 2 minutes of charging		10 000 MΩ or 1000 MΩ x µF whichever is less at rated voltage within 2 minutes of charging
Temperature Coefficient of the Capacitance	0 x 10^{-6}/K	-	-
Tolerance of the Temperature Coefficient	± 30 x 10^{-6}/K	-	-
Maximum Capacitance change with respect to Capacitance at 25 °C	-	± 15 %	+ 22 %/- 82 %
Dissipation Factor (DF)			
at 1 MHz, 1 V; where C ≤ 1000 pF	$\frac{1}{400 + 20 \times C}$	-	-
at 1 kHz, 1 V; where C > 1000 pF	≤ 0.1 %	≤ 2.5 %	≤ 5 %
Operating Temperature Range	- 55 °C to + 125 °C		- 30 °C to + 85 °C
Storage Temperature Range	25 °C ± 15 °C		
Aging	-	typical 1 % per time decade	typical 7 % per time decade

Note

- The capacitors meet the essential requirements of 'EIA 198'.
  Unless stated otherwise all electrical values apply at an ambient temperature of 25 °C ± 3 °C, at barometric pressures 650 mm to 800 mm of mercury, and relative humidity not to exceed 75 %.

MAIN FEATURES			
	CLASS 1	**CLASS 2**	**CLASS 3**
APPLICATION	For temperature compensation of frequency discriminating circuits and filters, coupling and decoupling in high frequency circuits where low losses and narrow capacitance tolerances are demanded.	As coupling and decoupling capacitors for such application where higher losses and a reduced capacitance stability are tolerated.	As coupling and decoupling capacitors for such application where higher losses and a reduced capacitance stability are tolerated.
PROPERTIES Temperature Dependence Capacitance	High stability of capacitance. Low dissipation factor up to higher frequencies. Defined temperature coefficient of capacitance, positive or negative, linear and reversible. High insulation resistance. No voltage dependence. High long-term stability of electrical values.	High capacitance values with small dimensions. Non-linear dependence of capacitance on temperature.	High capacitance values with small dimensions. Non-linear dependence of capacitance on temperature.
CLASSIFICATION			
Classification EIA:	C0G (NP0)	X7R	Y5V
Classification CECC:	CG	2C1	2F4

TEMPERATURE CHARACTERISTICS OF CAPACITANCE FOR CLASS 2/3 CERAMIC DIELECTRICS ACCORDING TO CECC 32100

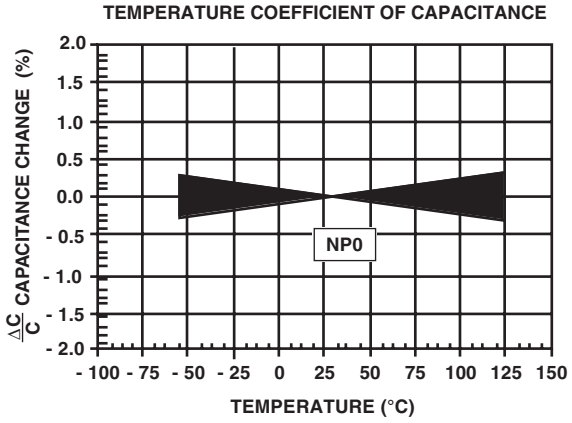
CODE LETTER FOR SUB CATEGORY	MAXIMUM CAPACITANCE CHANGE IN % AT THE SPECIFIED TEMPERATURE RANGE		DESIGNATION OF THE SPECIFIED TEMPERATURE RANGE	
			- 55 °C/+ 125 °C	- 30 °C/+ 85 °C
	WITHOUT RATED VOLTAGE	WITH RATED VOLTAGE	1	4
2C	± 20 %	+ 20 %/- 30 %	X	
2F	+ 30 %/- 80 %	+ 30 %/- 90 %		X

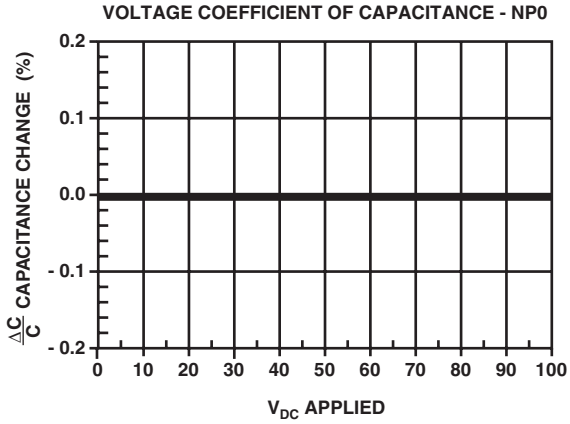
EIA - CODING SYSTEM FOR CLASS 2/3 CERAMIC

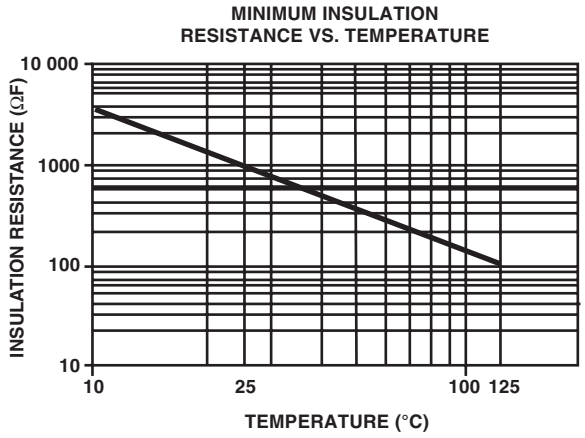
A	X	7	R	103	M
TYPE	WORKING TEMPERATURE RANGE LOWER TEMP. LIMIT	WORKING TEMPERATURE RANGE UPPER TEMP. LIMIT	CAPACITANCE CHANGE WITHIN WORKING TEMP. RANGE NO RATED VOLTAGE APPLIED	CAPACITANCE IN pF	TOLERANCE
	X = - 55 °C Y = - 30 °C	7 = + 125 °C 5 = + 85 °C	R = ± 15 % V = - 82 %/+ 22 %	The first two digits gives the nominal value, the third digit indicates the number of zeros, e.g. 103 = 10 000 pF For values below 10 pF an R is inserted in the second position instead of a decimal point e.g. 2R2 = 2.2 pF	D = ± 0.50 pF F = ± 1 % G = ± 2 % J = ± 5 % K = ± 10 % M = ± 20 % Z =+ 80 %/- 20 %

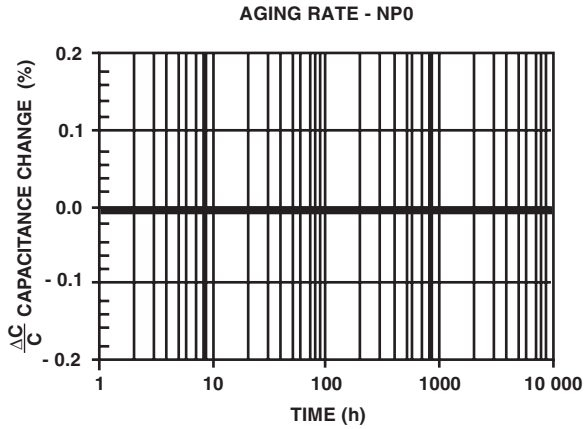
Example: Vishay BCcomponents Description
EIA Description

C0G (NP0) DIELECTRIC - TYPICAL PARAMETERS



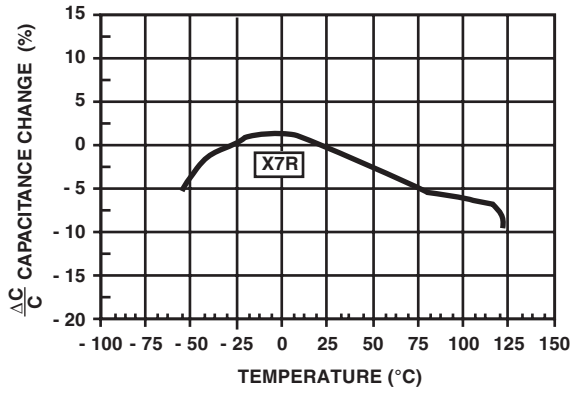




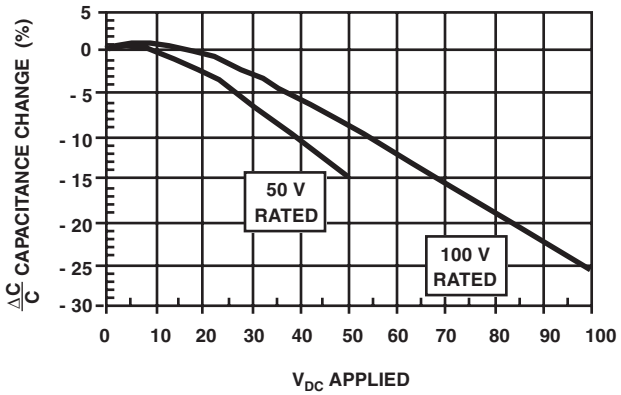


X7R DIELECTRIC - TYPICAL PARAMETERS

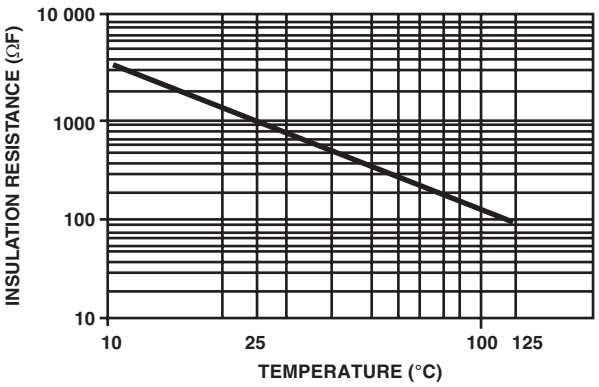
TEMPERATURE COEFFICIENT OF CAPACITANCE



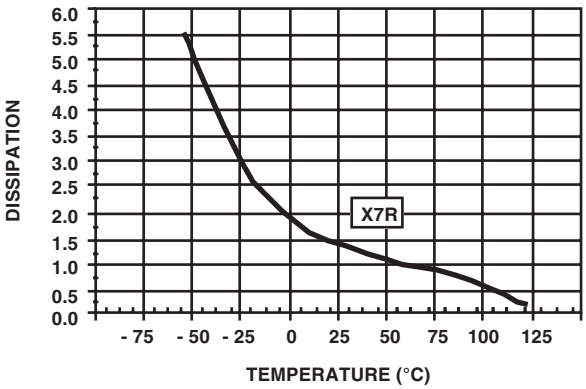
VOLTAGE COEFFICIENT OF CAPACITANCE - X7R



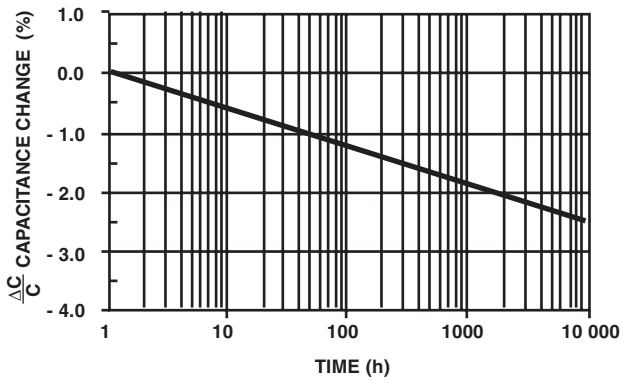
MINIMUM INSULATION RESISTANCE VS. TEMPERATURE



DISSIPATION FACTOR VS. TEMPERATURE

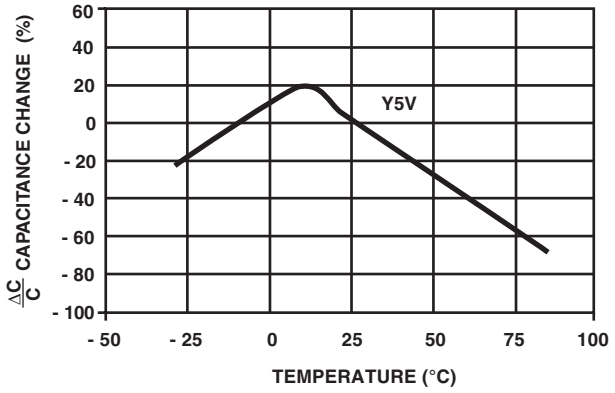


AGING RATE - X7R

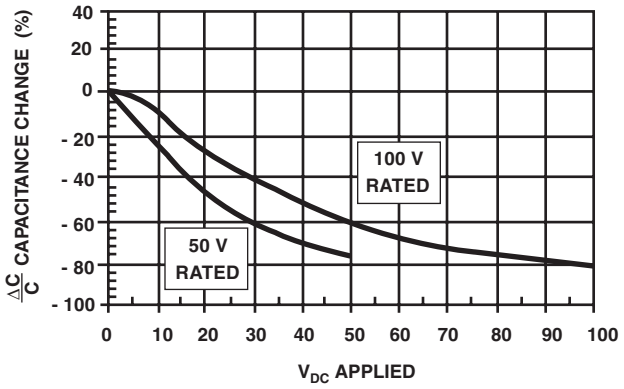


Y5V DIELECTRIC - TYPICAL PARAMETERS

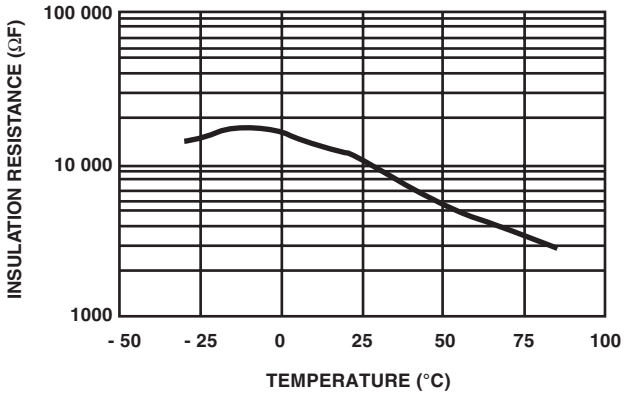
TEMPERATURE COEFFICIENT OF CAPACITOR



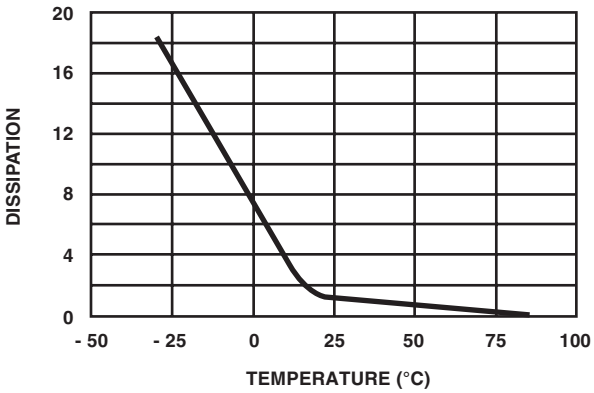
VOLTAGE COEFFICIENT OF CAPACITANCE - Y5V



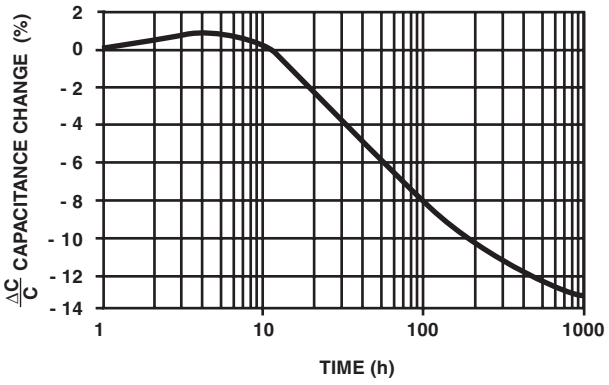
MINIMUM INSULATION RESISTANCE VS. TEMPERATURE



DISSIPATION FACTOR VS. TEMPERATURE



AGING RATE - Y5V



Multilayer Ceramic Dipped Radial Capacitors
200 V_{DC} and 500 V_{DC}

DIELECTRIC CHARACTERISTICS		
DIELECTRIC ACCORDING TO EIA	**C0G (NP0)**	**X7R**
According to CECC	CG	C1 (2C1)
Capacitance Range: at 1 MHz, 1 V; where C ≤ 1000 pF at 1 kHz, 1 V; where C > 1000 pF	 10 pF to 1000 pF 1200 pF to 3900 pF	 - 100 pF to 0.047 µF
Tolerance on the Capacitance: where C < 10 pF where C > 10 pF	 - ± 5 % (J); ± 10 % (K)	 - ± 10 % (K); ± 20 % (M)
Rated DC Voltage	200 V; 500 V	
Dielectric Strength	200 V at 150 % of V_{rated} + 100 V_{DC} 500 V at 130 % of V_{rated} + 100 V_{DC}	
Insulation Resistance (IR)	C < 0.01 µF: 10 000 MΩ min. C ≥ 0.01 µF: 100 MΩ x µF min.	
Temperature Coefficient of the Capacitance	0 x 10^{-6}/K	-
Tolerance of the Temperature Coefficient	± 30 x 10^{-6}/K	-
Maximum Capacitance change with respect to Capacitance at 25 °C	-	± 15 %
Dissipation Factor (DF) at 1 MHz, 1 V; where C ≤ 1000 pF at 1 kHz, 1 V; where C > 1000 pF	 $\frac{1}{400 + 20 \times C}$ ≤ 0.1 %	 - ≤ 2.5 %
Operating Temperature Range	- 55 °C to + 125 °C	
Storage Temperature Range	25 °C ± 15 °C	
Aging	-	typical 1 % per time decade

Note

- The capacitors meet the essential requirements of 'EIA 198'.
  Unless stated otherwise all electrical values apply at an ambient temperature of 25 °C ± 3 °C, at barometric pressures 650 mm to 800 mm of mercury, and relative humidity not to exceed 75 %.

MAIN FEATURES		
	CLASS 1	**CLASS 2**
APPLICATION	For temperature compensation of frequency discriminating circuits and filters, coupling and decoupling in high frequency circuits where low losses and narrow capacitance tolerances are demanded.	As coupling and decoupling capacitors for such application where higher losses and a reduced capacitance stability are tolerated.
PROPERTIES Temperature Dependence Capacitance	High stability of capacitance. Low dissipation factor up to higher frequencies. Defined temperature coefficient of capacitance, positive or negative, linear and reversible. High insulation resistance. No voltage dependence. High long-term stability of electrical values.	High capacitance values with small dimensions. Non-linear dependence of capacitance on temperature.
CLASSIFICATION Classification EIA: Classification CECC:	 C0G (NP0) CG	 X7R 2C1

TEMPERATURE CHARACTERISTICS OF CAPACITANCE FOR CLASS 2/3 CERAMIC DIELECTRICS ACCORDING TO CECC 32100

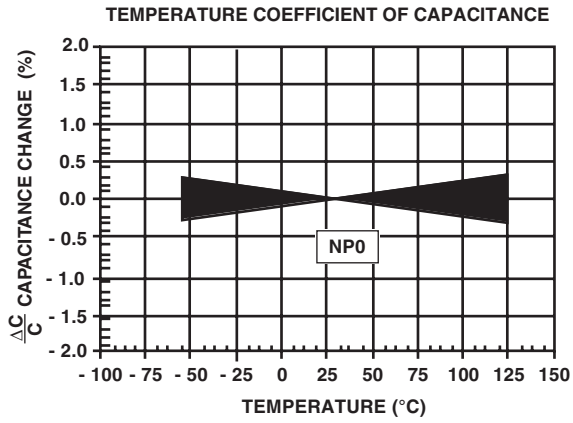
CODE LETTER FOR SUB CATEGORY	MAXIMUM CAPACITANCE CHANGE IN % AT THE SPECIFIED TEMPERATURE RANGE		DESIGNATION OF THE SPECIFIED TEMPERATURE RANGE
			- 55 °C/+ 125 °C
	WITHOUT RATED VOLTAGE	WITH RATED VOLTAGE	1
2C	± 20 %	+ 20 %/- 30 %	X

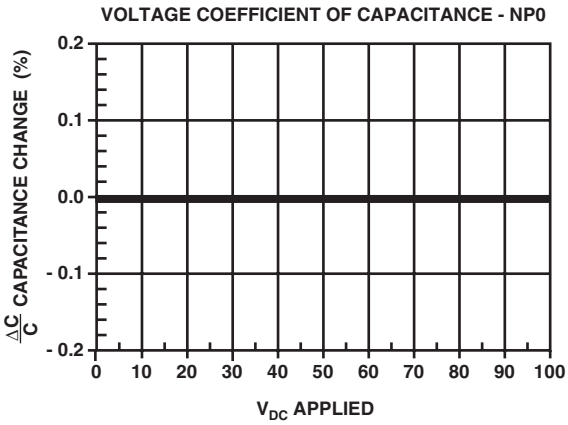
EIA - CODING SYSTEM FOR CLASS 2 CERAMIC

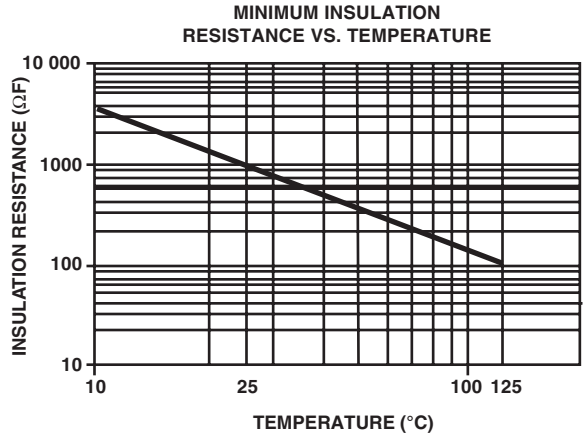
A	X	7	R	103	M
TYPE	WORKING TEMPERATURE RANGE		CAPACITANCE CHANGE WITHIN WORKING TEMP. RANGE NO RATED VOLTAGE APPLIED	CAPACITANCE IN pF	TOLERANCE
	LOWER TEMP. LIMIT	UPPER TEMP. LIMIT			
	X = - 55 °C	7 = + 125 °C	R = ± 15 %	The first two digits gives the nominal value, the third digit indicates the number of zeros, e.g. 103 = 10 000 pF	J = ± 5 % K = ± 10 % M = ± 20 %

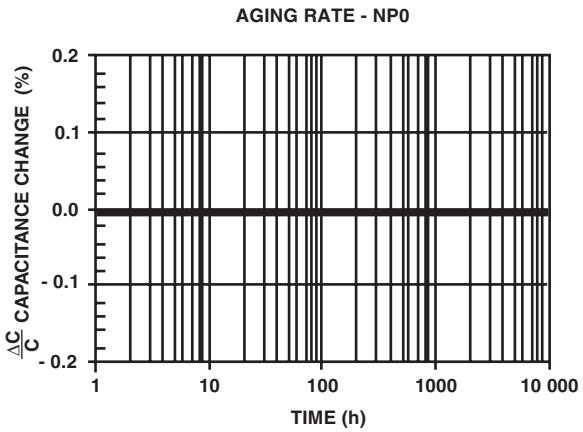
Example: Vishay BCcomponents Description
EIA Description

C0G (NP0) DIELECTRIC - TYPICAL PARAMETERS



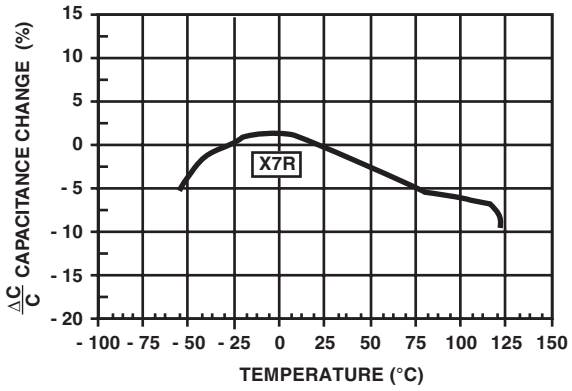




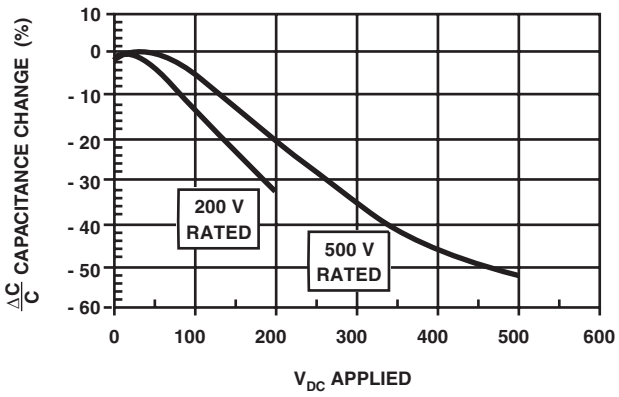


X7R DIELECTRIC - TYPICAL PARAMETERS

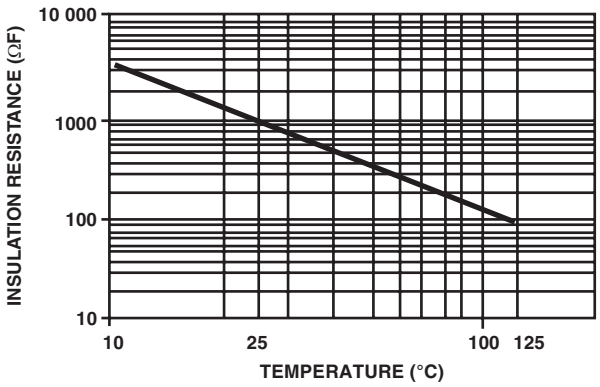
TEMPERATURE COEFFICIENT OF CAPACITANCE



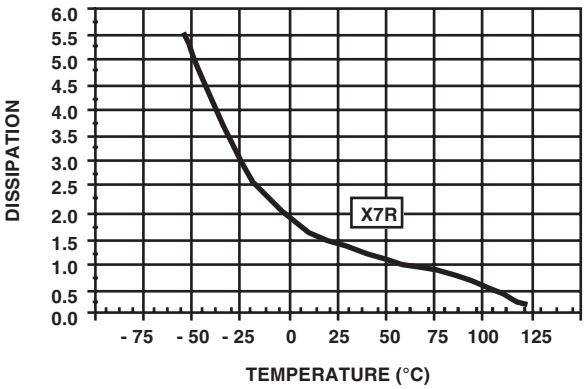
VOLTAGE COEFFICIENT OF CAPACITANCE - X7R



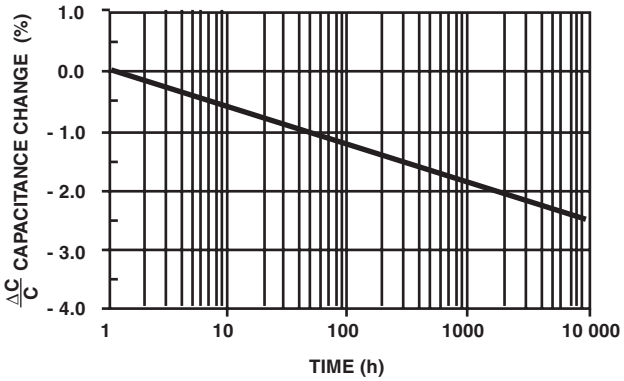
MINIMUM INSULATION RESISTANCE VS. TEMPERATURE



DISSIPATION FACTOR VS. TEMPERATURE

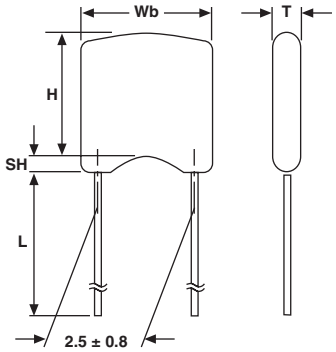


AGING RATE - X7R



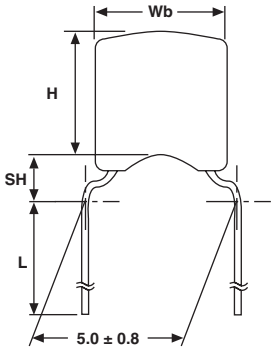
Multilayer Ceramic Dipped Radial Capacitors
50 V_{DC}, 100 V_{DC}, 200 V_{DC} and 500 V_{DC}

DIMENSIONS



L2

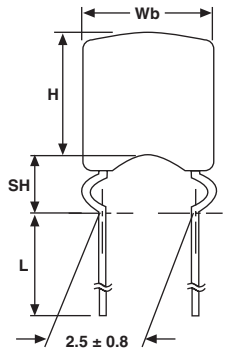
Component outline for
lead spacing 2.5 mm ± 0.8 mm
(straight leads)



H5

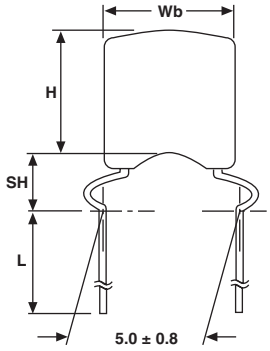
Component outline for
lead spacing 5.0 mm ± 0.8 mm
(flat bent leads)

L2 and H5 are preferred styles



K2

Component outline for
lead spacing 2.5 mm ± 0.8 mm
(outside kink)



K5

Component outline for
lead spacing 5.0 mm ± 0.8 mm
(outside kink)

CAPACITOR DIMENSIONS AND WEIGHT in millimeter (inches)

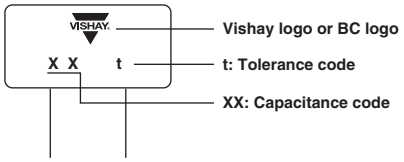
SIZE	$Wb_{max.}$	$H_{max.}$	$T_{max.}$	MAX. SEATING HEIGHT (SH)				WEIGHT (g)
				L2	H5	K2	K5	
15	4.0 (0.157)	4.0 (0.157)	2.5 (0.098)	1.58 (0.062)	2.54 (0.100)	3.50 (0.140)	3.50 (0.140)	≈ 0.15
20	5.0 (0.197)	5.0 (0.197)	3.2 (0.126)	1.58 (0.062)	2.54 (0.100)	3.50 (0.140)	3.50 (0.140)	≈ 0.16

Note

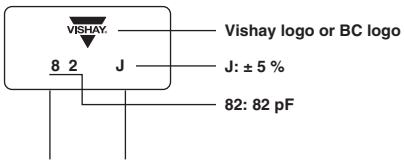
- Bulk packed types have a standard lead length L = 25.4 mm (1.0") minimum
- Thickness is defined as “T”

MARKING

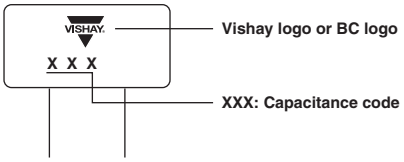
SIZE 15 CAPACITANCE VALUE < 100 pF



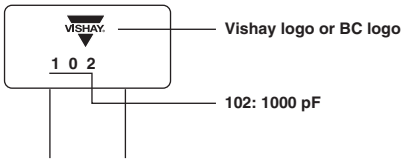
For example



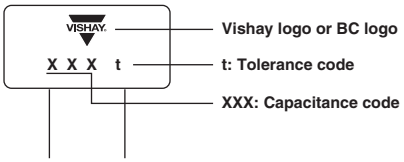
SIZE 15 CAPACITANCE VALUE ≥ 100 pF



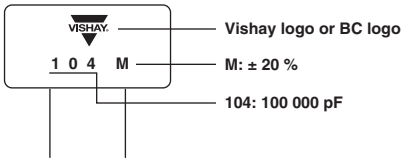
For example



SIZE 20 CAPACITANCE VALUE ≥ 100 pF



For example



Note

- Vishay or BCcomponents logo can be marked on the products body

Multilayer Ceramic Dipped Radial Capacitors 50 V_{DC}, 100 V_{DC}, 200 V_{DC} and 500 V_{DC}

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 box may be missing.

A maximum of 2 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 exceed ± 1.0 mm.

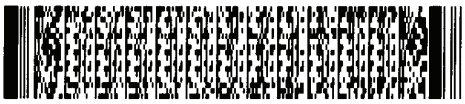
Lead space (F) shall be measured at (3.6 ± 0.5) mm from the capacitor seating plane.

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.

For example:



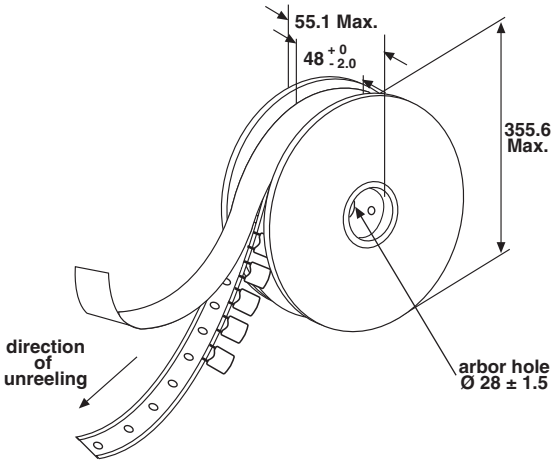
PN: K105M20X7RF5TH5
QTY: 3000
PO:
SO:

Lot1: 16M601330
Lot2:
Batch: 200602CN
Region: 9520
Ser.No: 0602P17408

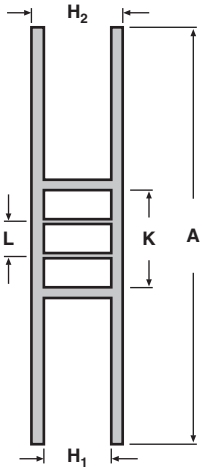
DC1: 0602
DC2:
SL: 0010

1/13

REEL

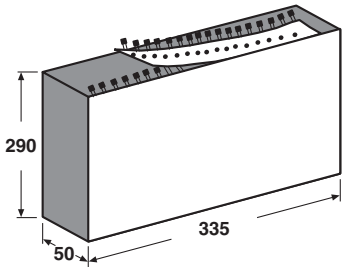


REEL DIMENSIONS



REEL SIZE		(mm)
A	Outer Dia.	360
L	Hole Dia.	30
K	Core Dia.	90
H_1	Internal Width	42
H_2	External Width	51

AMMOPACK



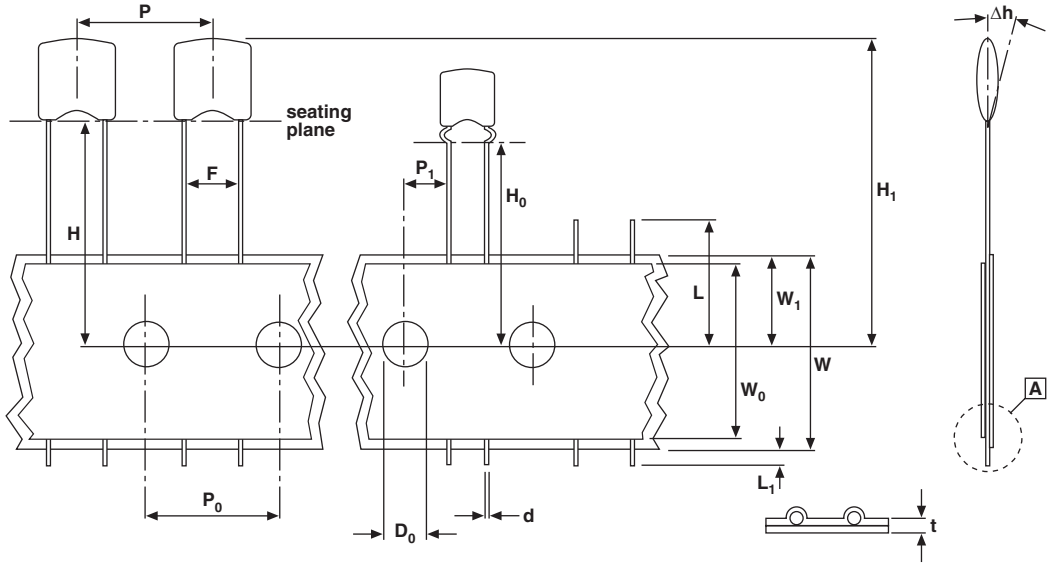
PACKAGING QUANTITIES AND BOX DIMENSIONS

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 (1)	15; 20	5000	245 x 120 x 65

Note

(1) SPQ contains one or a multiple of poly-bags, 1000 units per bag

CAPACITORS ON TAPE



PARAMETER	SYMBOL	DIMENSIONS	
		mm	inch
Cut off length	L	≤ 11	≤ 0.443
Lead end protrusion	L_1	≤ 1	≤ 0.039
Height to seating plane (straight leads)	H	≥ 18	≥ 0.709
Height to seating plane (formed leads)	H_0	16 ± 0.5	0.630 ± 0.020
Top of component height	H_1	≤ 32	≤ 1.260
Body inclination	Δh	0.0 ± 1.0	0 ± 0.039
Carrier tape width	W	18 + 1.0/- 0.5	0.709 + 0.039/- 0.020
Hold down tape width	W_0	15 ref. (1)	0.591 ref. (1)
Sprocket hole position	W_1	9 + 0.075/- 0.5	0.354 + 0.030/- 0.020
1e lead space (2)	F	2.5 + 0.6/- 0.4	0.100 + 0.024/- 0.016
2e lead space (2)		5.0 + 0.6/- 0.4	0.200 + 0.024/- 0.016
Sprocket hole pitch	P_0	12.7 ± 0.3	0.500 ± 0.012
1e sprocket hole centre to lead centre	P_1	5.08 ± 0.7	0.200 ± 0.028
2e sprocket hole centre to lead centre		3.85 ± 0.7	0.150 ± 0.028
Sprocket hole diameter	D_0	4.0 ± 0.2	0.157 ± 0.008
Overall tape thickness	t	≤ 0.9	≤ 0.035
Wire lead diameter	d	0.5 ± 0.05	0.02 ± 0.002
Pitch	P	12.7 ± 1.0	0.50 ± 0.039

Notes

(1) Tape width of 6 mm (0.236") permissible

(2) e = 2.54 mm

Multilayer Ceramic Dipped Radial Capacitors
50 V_{DC}, 100 V_{DC}, 200 V_{DC} and 500 V_{DC}

STORAGE

The capacitors must not be stored in a corrosive atmosphere where sulfide or chloride gas, acid, alkali, or salt are present. Moisture exposure should also be avoided.

The solderability of the leads is not affected by storage of up to 24 months. Temperature + 10 °C to + 35 °C, relative humidity up to 60 %.

With reference to class 2 ceramic dielectric capacitors, see the last page of this general information.

SOLDERING

SOLDERING SPECIFICATIONS		
Soldering test for capacitors with wire leads: (According to IEC 60068-2-20, solder bath method)		
	SOLDERABILITY	RESISTANCE TO SOLDERING HEAT
Soldering temperature	235 °C ± 5 °C	260 °C ± 5 °C
Soldering duration	2 s ± 0.5 s	10 s ± 1 s
Distance from component body	≥ 2 mm	≥ 5 mm

SOLDERING RECOMMENDATIONS

Soldering of the component should be achieved using a Sn96.5/Ag3.0/Cu0.5, a Sn60/40 type or a silver-bearing type solder.

As ceramic capacitors are very sensitive to rapid changes in temperature (thermal shock), the solder heat resistance specification (see above table) should not be exceeded.

Subjecting the capacitor to excessive heat may result in thermal shocks that can crack the ceramic body and melt the internal solder junction.

CLEANING

The components should be cleaned with vapor degreasers immediately following the soldering operation.

SOLVENT RESISTANCE AND FLAME ABILITY

The coating and marking of the capacitors are resistant to the following test method: IEC 60068-2-45 (Method XA). The epoxy material is approved according to UL 94 V-0.

MOUNTING

We do not recommend modifying the lead terminals, e.g. bending or cropping as this action could break the coating or crack the ceramic insert. However, if the lead must be modified in such a way, we recommend supporting the lead with a clamping fixture next to the coating.

CAPACITANCE "AGING" OF CERAMIC CAPACITORS

Following the final heat treatment, all class 2 ceramic capacitors reduce their capacitance value. According to logarithmic law, this is due to their special crystalline construction. This change is called "aging". If the capacitors are heat treated (for example when soldering), the capacitance increases again to a higher value deaging, and the aging process begins again.

Note

- The level of this deaging is dependent on the temperature and the duration of the heat; an almost complete deaging is achieved at 150 °C in one hour. These conditions also form the basis for reference measurements when testing. The capacitance change per time decade (aging constant) differs for the various types of ceramic, but typical values can be taken from the equations below.

$$k = \frac{100 \times (C_{11} - C_{12})}{C_{11} \times \log_{10}(t_2/t_1)}$$

$$C_{12} = C_{11} \times (1 - k/100 \times \log_{10}(t_2/t_1))$$

t_1, t_2 = measuring time point (h)

C_{11}, C_{12} = capacitance values for the times t_1, t_2

k = aging constant (%)

REFERENCE MEASUREMENT

Due to aging, it is necessary to quote an age for reference measurements which can be related to the capacitance with fixed tolerance. According to EN 130700, this time period is 1000 h.

If the shelf-life of the capacitor is known, the capacitance for t = 1000 h can be calculated with the aging constant.

In order to avoid the influence of aging, it is important to deage the capacitors before stress-testing. The following procedure is adopted (see also EN 130700):

- Deaging at 125 °C, 1 h
- Storage for 24 h at normal climate temperature
- Initial measurement
- Stress
- Deaging at 125 °C, 1 h
- Storage for 24 h at normal climate temperature
- Final measurement

CAUTION

1. OPERATING VOLTAGE AND FREQUENCY CHARACTERISTIC

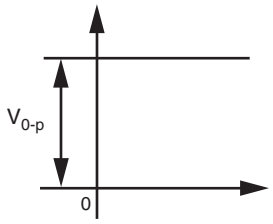
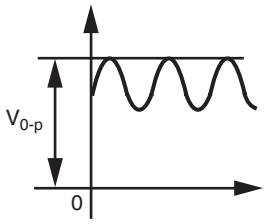
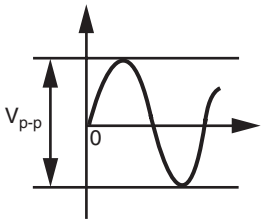
When sinusiodal or ripple voltage applied to DC Ceramic Disc Capacitors, be sure to maintain the peak-to-peak value or the peak value of the sum of both AC + DC within the rated voltage.

When start or stop applying the voltage, resonance may generate irregular voltage.

When rectangular or Pulse Wave Voltage is applied to DC Ceramic Disc Capacitors, the self-heating generated by the capacitor is higher than the sinusoidal application with the same frequency. The allowable voltage rating for the rectangular or pulse wave corresponds approximately with the allowable voltage of a sinusoidal wave with the double fundamental frequency.

The allowable voltage varies, depending on the voltage and the waveform.

Diagrams of the limiting values are available for each capacitor series on request.

VOLTAGE	DC	DC + AC	AC
Waveform Figure			

2. OPERATING TEMPERATURE AND SELF-GENERATED HEAT

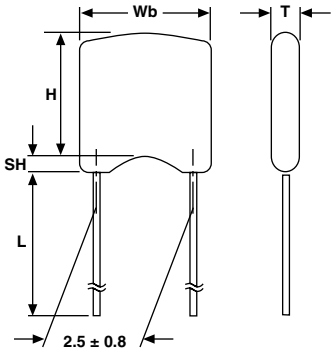
The surface temperature of the capacitors must not exceed the upper limit of its Rated Operating Temperature.

During operation in a high-frequency circuit or a pulse signal circuit, the capacitor itself generates heat due to dielectric losses. Applied voltage should be the load such as self-generated heat is within 20 °C on the condition of environmental temperature 25 °C.

Note, that excessive heat may lead to deterioration of the capacitor's characteristics.

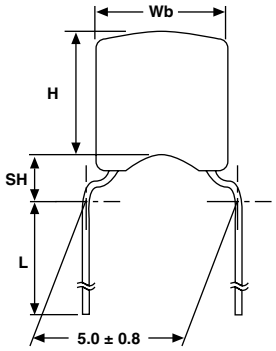
Multilayer Ceramic Dipped Radial Capacitors
50 V_{DC} and 100 V_{DC}

DIMENSIONS



L2

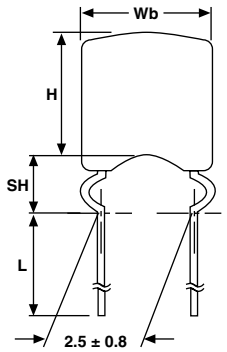
Component outline for
lead spacing 2.5 mm ± 0.8 mm
(straight leads)



H5

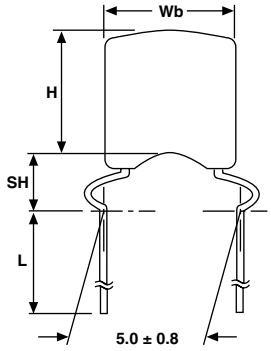
Component outline for
lead spacing 5.0 mm ± 0.8 mm
(flat bent leads)

L2 and H5 are preferred styles



K2

Component outline for
lead spacing 2.5 mm ± 0.8 mm
(outside kink)



K5

Component outline for
lead spacing 5.0 mm ± 0.8 mm
(outside kink)

CAPACITOR DIMENSIONS AND WEIGHT in millimeter (inches)								
SIZE	**$Wb_{max.}$**	**$H_{max.}$**	**$T_{max.}$**	**MAX. SEATING HEIGHT (SH)**				**WEIGHT (g)**
				L2	**H5**	**K2**	**K5**	
15	4.0 (0.157)	4.0 (0.157)	2.5 (0.098)	1.58 (0.062)	2.54 (0.100)	3.50 (0.140)	3.50 (0.140)	≈ 0.15
20	5.0 (0.197)	5.0 (0.197)	3.2 (0.126)	1.58 (0.062)	2.54 (0.100)	3.50 (0.140)	3.50 (0.140)	≈ 0.16

Note

- Bulk packed types have a standard lead length L = 25.4 mm (1.0") minimum
- Thickness is defined as "T"

Multilayer Ceramic Dipped Radial Capacitors
50 V_{DC} and 100 V_{DC}

QUICK REFERENCE DATA

DESCRIPTION	VALUE					
Capacitance range	10 pF to 8200 pF		100 pF to 1.0 µF		0.1 µF to 1.0 µF	
Rated DC voltage	50 V	100 V	50 V	100 V	50 V	100 V
Tolerance on capacitance	± 5 %, ± 10 %		± 10 %, ± 20 %		+ 80 %/- 20 %	
Dielectric Code	C0G (NP0)		X7R		Y5V	

ORDERING INFORMATION

K	103	K	15	X7R	F	5	3	H	5
PRODUCT TYPE	CAPACITANCE CODE	CAPACITANCE TOLERANCE	SIZE CODE	TEMP. CHAR.	RATED VOLTAGE	LEAD DIA.	LEAD LENGTH/ PACKAGING	LEAD STYLE	LEAD SPACING
K = Mono-Kap	Two significant digits followed by the number of zeros. For example: 103 = 10 000 pF	J = ± 5 % K = ± 10 % M = ± 20 % Z = + 80 %/- 20 %	Ref. mech. spec.	C0G X7R Y5V	F = 50 V_{DC} H = 100 V_{DC}	5 = 0.5 mm (0.20")	3 = Bulk, with lead length of 30 mm ± 5.0 mm (1.25") T = Tape and reel U = Ammopack	L = Straight Lead H = High seated assy	2 = 2.5 mm (0.100") 5 = 5.0 mm (0.200")

Ordering Example: K-103-K-15-X7R-F-5-3-H-5

Multilayer Ceramic Dipped Radial Capacitors
50 V_{DC} and 100 V_{DC}

CAPACITANCE RANGE CHART

C0G (NP0) DIELECTRIC

SIZE		15		20	
RATED VOLTAGE		50	100	50	100
VALUE	CODE				
10 pF	100	•	•		
12 pF	120	•	•		
15 pF	150	•	•		
18 pF	180	•	•		
22 pF	220	•	•		
27 pF	270	•	•		
33 pF	330	•	•		
39 pF	390	•	•		
47 pF	470	•	•		
56 pF	560	•	•		
68 pF	680	•	•		
82 pF	820	•	•		
100 pF	101	•	•		
120 pF	121	•	•		
150 pF	151	•	•		
180 pF	181	•	•		
220 pF	221	•	•		
270 pF	271	•	•		
330 pF	331	•	•		
390 pF	391	•	•		
470 pF	471	•	•		
560 pF	561	•	•		
680 pF	681	•	•		
820 pF	821	•	•		
1000 pF	102	•			•
1200 pF	122	•			•
1500 pF	152	•			•
1800 pF	182	•			•
2200 pF	222	•			•
2700 pF	272			•	•
3300 pF	332			•	•
3900 pF	392			•	•
4700 pF	472			•	•
5600 pF	562			•	•
6800 pF	682			•	
8200 pF	822			•	
0.01 µF	103				

Y5V DIELECTRIC

SIZE		15		20	
RATED VOLTAGE		50	100	50	100
VALUE	CODE				
0.01 µF	103				
0.015 µF	153				
0.022 µF	223				
0.033 µF	333				
0.047 µF	473				
0.068 µF	683				
0.10 µF	104				
0.15 µF	154				
0.22 µF	224				
0.33 µF	334				
0.47 µF	474				
0.68 µF	684				
1.0 µF	105				

X7R DIELECTRIC

SIZE		15		20	
RATED VOLTAGE		50	100	50	100
VALUE	CODE				
100 pF	101	•	•		
120 pF	121	•	•		
150 pF	151	•	•		
180 pF	181	•	•		
220 pF	221	•	•		
270 pF	271	•	•		
330 pF	331	•	•		
390 pF	391	•	•		
470 pF	471	•	•		
560 pF	561	•	•		
680 pF	681	•	•		
820 pF	821	•	•		
1000 pF	102	•	•		
1200 pF	122	•	•		
1500 pF	152	•	•		
1800 pF	182	•	•		
2200 pF	222	•	•		
2700 pF	272	•	•		
3300 pF	332	•	•		
3900 pF	392	•	•		
4700 pF	472	•	•		
5600 pF	562	•	•		
6800 pF	682	•	•		
8200 pF	822	•	•		
0.01 µF	103	•	•		
0.012 µF	123	•	•		
0.015 µF	153	•	•		
0.018 µF	183	•	•		
0.022 µF	223	•	•		
0.027 µF	273	•			•
0.033 µF	333	•			•
0.039 µF	393	•			•
0.047 µF	473	•			•
0.056 µF	563	•			•
0.068 µF	683	•			•
0.082 µF	823	•			•
0.10 µF	104	•			•
0.12 µF	124				•
0.15 µF	154			•	•
0.22 µF	224			•	
0.33 µF	334			•	
0.47 µF	474			•	
0.68 µF	684			•	
1.0 µF	105			•	

PART NUMBER LISTING - if not in range chart, please contact cmll@vishay.com

MONO-KAP Y5V - 50 V_{DC} CLEAR TEXT CODE			
CAPACITANCE (pF)	RATED VOLTAGE (V_{DC})	+ 80 %/- 20 % TOLERANCE 13th digit (T = Reel, U = Ammo, 3 = Bulk)	LEAD SPACING mm (inch)
10 000	50	K103Z15Y5VF5.L2	2.5 (0.10)
10 000		K103Z15Y5VF5.H5	5.0 (0.20)
15 000		K153Z15Y5VF5.L2	2.5 (0.10)
15 000		K153Z15Y5VF5.H5	5.0 (0.20)
22 000		K223Z15Y5VF5.L2	2.5 (0.10)
22 000		K223Z15Y5VF5.H5	5.0 (0.20)
33 000		K333Z15Y5VF5.L2	2.5 (0.10)
33 000		K333Z15Y5VF5.H5	5.0 (0.20)
47 000		K473Z15Y5VF5.L2	2.5 (0.10)
47 000		K473Z15Y5VF5.H5	5.0 (0.20)
68 000		K683Z15Y5VF5.L2	2.5 (0.10)
68 000		K683Z15Y5VF5.H5	5.0 (0.20)
100 000		K104Z15Y5VF5.L2	2.5 (0.10)
100 000		K104Z15Y5VF5.H5	5.0 (0.20)
150 000		K154Z15Y5VF5.L2	2.5 (0.10)
150 000		K154Z15Y5VF5.H5	5.0 (0.20)
220 000		K224Z15Y5VF5.L2	2.5 (0.10)
220 000		K224Z15Y5VF5.H5	5.0 (0.20)
330 000		K334Z20Y5VF5.L2	2.5 (0.10)
330 000		K334Z20Y5VF5.H5	5.0 (0.20)
470 000		K474Z20Y5VF5.L2	2.5 (0.10)
470 000		K474Z20Y5VF5.H5	5.0 (0.20)
680 000		K684Z20Y5VF5.L2	2.5 (0.10)
680 000		K684Z20Y5VF5.H5	5.0 (0.20)
1 000 000		K105Z20Y5VF5.L2	2.5 (0.10)
1 000 000		K105Z20Y5VF5.H5	5.0 (0.20)

MONO-KAP X7R - 50 V_{DC} CLEAR TEXT CODE				
CAPACITANCE (pF)	RATED VOLTAGE (V_{DC})	10 % TOLERANCE 13th digit (T = Reel, U = Ammo, 3 = Bulk)	20 % TOLERANCE 13th digit (T = Reel, U = Ammo, 3 = Bulk)	LEAD SPACING mm (inch)
100	50	K101K15X7RF5.L2	K101M15X7RF5.L2	2.5 (0.10)
100		K101K15X7RF5.H5	K101M15X7RF5.H5	5.0 (0.20)
120		K121K15X7RF5.L2	K121M15X7RF5.L2	2.5 (0.10)
120		K121K15X7RF5.H5	K121M15X7RF5.H5	5.0 (0.20)
150		K151K15X7RF5.L2	K151M15X7RF5.L2	2.5 (0.10)
150		K151K15X7RF5.H5	K151M15X7RF5.H5	5.0 (0.20)
180		K181K15X7RF5.L2	K181M15X7RF5.L2	2.5 (0.10)
180		K181K15X7RF5.H5	K181M15X7RF5.H5	5.0 (0.20)
220		K221K15X7RF5.L2	K221M15X7RF5.L2	2.5 (0.10)
220		K221K15X7RF5.H5	K221M15X7RF5.H5	5.0 (0.20)
270		K271K15X7RF5.L2	K271M15X7RF5.L2	2.5 (0.10)
270		K271K15X7RF5.H5	K271M15X7RF5.H5	5.0 (0.20)
330		K331K15X7RF5.L2	K331M15X7RF5.L2	2.5 (0.10)
330		K331K15X7RF5.H5	K331M15X7RF5.H5	5.0 (0.20)

MONO-KAP X7R - 50 V_{DC} CLEAR TEXT CODE				
CAPACITANCE (pF)	RATED VOLTAGE (V_{DC})	10 % TOLERANCE 13th digit (T = Reel, U = Ammo, 3 = Bulk)	20 % TOLERANCE 13th digit (T = Reel, U = Ammo, 3 = Bulk)	LEAD SPACING mm (inch)
390	50	K391K15X7RF5.L2	K391M15X7RF5.L2	2.5 (0.10)
390		K391K15X7RF5.H5	K391M15X7RF5.H5	5.0 (0.20)
470		K471K15X7RF5.L2	K471M15X7RF5.L2	2.5 (0.10)
470		K471K15X7RF5.H5	K471M15X7RF5.H5	5.0 (0.20)
560		K561K15X7RF5.L2	K561M15X7RF5.L2	2.5 (0.10)
560		K561K15X7RF5.H5	K561M15X7RF5.H5	5.0 (0.20)
680		K681K15X7RF5.L2	K681M15X7RF5.L2	2.5 (0.10)
680		K681K15X7RF5.H5	K681M15X7RF5.H5	5.0 (0.20)
820		K821K15X7RF5.L2	K821M15X7RF5.L2	2.5 (0.10)
820		K821K15X7RF5.H5	K821M15X7RF5.H5	5.0 (0.20)
1000		K102K15X7RF5.L2	K102M15X7RF5.L2	2.5 (0.10)
1000		K102K15X7RF5.H5	K102M15X7RF5.H5	5.0 (0.20)
1200		K122K15X7RF5.L2	K122M15X7RF5.L2	2.5 (0.10)
1200		K122K15X7RF5.H5	K122M15X7RF5.H5	5.0 (0.20)
1500		K152K15X7RF5.L2	K152M15X7RF5.L2	2.5 (0.10)
1500		K152K15X7RF5.H5	K152M15X7RF5.H5	5.0 (0.20)
1800		K182K15X7RF5.L2	K182M15X7RF5.L2	2.5 (0.10)
1800		K182K15X7RF5.H5	K182M15X7RF5.H5	5.0 (0.20)
2200		K222K15X7RF5.L2	K222M15X7RF5.L2	2.5 (0.10)
2200		K222K15X7RF5.H5	K222M15X7RF5.H5	5.0 (0.20)
2700		K272K15X7RF5.L2	K272M15X7RF5.L2	2.5 (0.10)
2700		K272K15X7RF5.H5	K272M15X7RF5.H5	5.0 (0.20)
3300		K332K15X7RF5.L2	K332M15X7RF5.L2	2.5 (0.10)
3300		K332K15X7RF5.H5	K332M15X7RF5.H5	5.0 (0.20)
3900		K392K15X7RF5.L2	K392M15X7RF5.L2	2.5 (0.10)
3900		K392K15X7RF5.H5	K392M15X7RF5.H5	5.0 (0.20)
4700		K472K15X7RF5.L2	K472M15X7RF5.L2	2.5 (0.10)
4700		K472K15X7RF5.H5	K472M15X7RF5.H5	5.0 (0.20)
5600		K562K15X7RF5.L2	K562M15X7RF5.L2	2.5 (0.10)
5600		K562K15X7RF5.H5	K562M15X7RF5.H5	5.0 (0.20)
6800		K682K15X7RF5.L2	K682M15X7RF5.L2	2.5 (0.10)
6800		K682K15X7RF5.H5	K682M15X7RF5.H5	5.0 (0.20)
8200		K822K15X7RF5.L2	K822M15X7RF5.L2	2.5 (0.10)
8200		K822K15X7RF5.H5	K822M15X7RF5.H5	5.0 (0.20)
10 000		K103K15X7RF5.L2	K103M15X7RF5.L2	2.5 (0.10)
10 000		K103K15X7RF5.H5	K103M15X7RF5.H5	5.0 (0.20)
12 000		K123K15X7RF5.L2	K123M15X7RF5.L2	2.5 (0.10)
12 000		K123K15X7RF5.H5	K123M15X7RF5.H5	5.0 (0.20)
15 000		K153K15X7RF5.L2	K153M15X7RF5.L2	2.5 (0.10)
15 000		K153K15X7RF5.H5	K153M15X7RF5.H5	5.0 (0.20)
18 000		K183K15X7RF5.L2	K183M15X7RF5.L2	2.5 (0.10)
18 000		K183K15X7RF5.H5	K183M15X7RF5.H5	5.0 (0.20)
22 000		K223K15X7RF5.L2	K223M15X7RF5.L2	2.5 (0.10)
22 000		K223K15X7RF5.H5	K223M15X7RF5.H5	5.0 (0.20)
27 000		K273K15X7RF5.L2	K273M15X7RF5.L2	2.5 (0.10)
27 000		K273K15X7RF5.H5	K273M15X7RF5.H5	5.0 (0.20)

MONO-KAP X7R - 50 V_{DC} CLEAR TEXT CODE				
CAPACITANCE (pF)	RATED VOLTAGE (V_{DC})	10 % TOLERANCE 13th digit (T = Reel, U = Ammo, 3 = Bulk)	20 % TOLERANCE 13th digit (T = Reel, U = Ammo, 3 = Bulk)	LEAD SPACING mm (inch)
33 000	50	K333K15X7RF5.L2	K333M15X7RF5.L2	2.5 (0.10)
33 000		K333K15X7RF5.H5	K333M15X7RF5.H5	5.0 (0.20)
39 000		K393K15X7RF5.L2	K393M15X7RF5.L2	2.5 (0.10)
39 000		K393K15X7RF5.H5	K393M15X7RF5.H5	5.0 (0.20)
47 000		K473K15X7RF5.L2	K473M15X7RF5.L2	2.5 (0.10)
47 000		K473K15X7RF5.H5	K473M15X7RF5.H5	5.0 (0.20)
56 000		K563K15X7RF5.L2	K563M15X7RF5.L2	2.5 (0.10)
56 000		K563K15X7RF5.H5	K563M15X7RF5.H5	5.0 (0.20)
68 000		K683K15X7RF5.L2	K683M15X7RF5.L2	2.5 (0.10)
68 000		K683K15X7RF5.H5	K683M15X7RF5.H5	5.0 (0.20)
82 000		K823K15X7RF5.L2	K823M15X7RF5.L2	2.5 (0.10)
82 000		K823K15X7RF5.H5	K823M15X7RF5.H5	5.0 (0.20)
100 000		K104K15X7RF5.L2	K104M15X7RF5.L2	2.5 (0.10)
100 000		K104K15X7RF5.H5	K104M15X7RF5.H5	5.0 (0.20)
150 000		K154K20X7RF5.L2	K154M20X7RF5.L2	2.5 (0.10)
150 000		K154K20X7RF5.H5	K154M20X7RF5.H5	5.0 (0.20)
220 000		K224K20X7RF5.L2	K224M20X7RF5.L2	2.5 (0.10)
220 000		K224K20X7RF5.H5	K224M20X7RF5.H5	5.0 (0.20)
330 000		K334K20X7RF5.L2	K334M20X7RF5.L2	2.5 (0.10)
330 000		K334K20X7RF5.H5	K334M20X7RF5.H5	5.0 (0.20)
470 000		K474K20X7RF5.L2	K474M20X7RF5.L2	2.5 (0.10)
470 000		K474K20X7RF5.H5	K474M20X7RF5.H5	5.0 (0.20)
680 000		K684K20X7RF5.L2	K684M20X7RF5.L2	2.5 (0.10)
680 000		K684K20X7RF5.H5	K684M20X7RF5.H5	5.0 (0.20)
1 000 000		K105K20X7RF5.L2	K105M20X7RF5.L2	2.5 (0.10)
1 000 000		K105K20X7RF5.H5	K105M20X7RF5.H5	5.0 (0.20)

MONO-KAP C0G - 50 V_{DC} CLEAR TEXT CODE				
CAPACITANCE (pF)	RATED VOLTAGE (V_{DC})	5 % TOLERANCE 13th digit (T = Reel, U = Ammo, 3 = Bulk)	10 % TOLERANCE 13th digit (T = Reel, U = Ammo, 3 = Bulk)	LEAD SPACING mm (inch)
10	50	K100J15C0GF5.L2	K100K15C0GF5.L2	2.5 (0.10)
10		K100J15C0GF5.H5	K100K15C0GF5.H5	5.0 (0.20)
12		K120J15C0GF5.L2	K120K15C0GF5.L2	2.5 (0.10)
12		K120J15C0GF5.H5	K120K15C0GF5.H5	5.0 (0.20)
15		K150J15C0GF5.L2	K150K15C0GF5.L2	2.5 (0.10)
15		K150J15C0GF5.H5	K150K15C0GF5.H5	5.0 (0.20)
18		K180J15C0GF5.L2	K180K15C0GF5.L2	2.5 (0.10)
18		K180J15C0GF5.H5	K180K15C0GF5.H5	5.0 (0.20)
22		K220J15C0GF5.L2	K220K15C0GF5.L2	2.5 (0.10)
22		K220J15C0GF5.H5	K220K15C0GF5.H5	5.0 (0.20)
27		K270J15C0GF5.L2	K270K15C0GF5.L2	2.5 (0.10)
27		K270J15C0GF5.H5	K270K15C0GF5.H5	5.0 (0.20)
33		K330J15C0GF5.L2	K330K15C0GF5.L2	2.5 (0.10)
33		K330J15C0GF5.H5	K330K15C0GF5.H5	5.0 (0.20)
39		K390J15C0GF5.L2	K390K15C0GF5.L2	2.5 (0.10)
39		K390J15C0GF5.H5	K390K15C0GF5.H5	5.0 (0.20)

MONO-KAP C0G - 50 V_{DC} CLEAR TEXT CODE				
CAPACITANCE (pF)	RATED VOLTAGE (V_{DC})	5 % TOLERANCE 13th digit (T = Reel, U = Ammo, 3 = Bulk)	10 % TOLERANCE 13th digit (T = Reel, U = Ammo, 3 = Bulk)	LEAD SPACING mm (inch)
47	50	K470J15C0GF5.L2	K470K15C0GF5.L2	2.5 (0.10)
47		K470J15C0GF5.H5	K470K15C0GF5.H5	5.0 (0.20)
56		K560J15C0GF5.L2	K560K15C0GF5.L2	2.5 (0.10)
56		K560J15C0GF5.H5	K560K15C0GF5.H5	5.0 (0.20)
68		K680J15C0GF5.L2	K680K15C0GF5.L2	2.5 (0.10)
68		K680J15C0GF5.H5	K680K15C0GF5.H5	5.0 (0.20)
82		K820J15C0GF5.L2	K820K15C0GF5.L2	2.5 (0.10)
82		K820J15C0GF5.H5	K820K15C0GF5.H5	5.0 (0.20)
100		K101J15C0GF5.L2	K101K15C0GF5.L2	2.5 (0.10)
100		K101J15C0GF5.H5	K101K15C0GF5.H5	5.0 (0.20)
120		K121J15C0GF5.L2	K121K15C0GF5.L2	2.5 (0.10)
120		K121J15C0GF5.H5	K121K15C0GF5.H5	5.0 (0.20)
150		K151J15C0GF5.L2	K151K15C0GF5.L2	2.5 (0.10)
150		K151J15C0GF5.H5	K151K15C0GF5.H5	5.0 (0.20)
180		K181J15C0GF5.L2	K181K15C0GF5.L2	2.5 (0.10)
180		K181J15C0GF5.H5	K181K15C0GF5.H5	5.0 (0.20)
220		K221J15C0GF5.L2	K221K15C0GF5.L2	2.5 (0.10)
220		K221J15C0GF5.H5	K221K15C0GF5.H5	5.0 (0.20)
270		K271J15C0GF5.L2	K271K15C0GF5.L2	2.5 (0.10)
270		K271J15C0GF5.H5	K271K15C0GF5.H5	5.0 (0.20)
330		K331J15C0GF5.L2	K331K15C0GF5.L2	2.5 (0.10)
330		K331J15C0GF5.H5	K331K15C0GF5.H5	5.0 (0.20)
390		K391J15C0GF5.L2	K391K15C0GF5.L2	2.5 (0.10)
390		K391J15C0GF5.H5	K391K15C0GF5.H5	5.0 (0.20)
470		K471J15C0GF5.L2	K471K15C0GF5.L2	2.5 (0.10)
470		K471J15C0GF5.H5	K471K15C0GF5.H5	5.0 (0.20)
560		K561J15C0GF5.L2	K561K15C0GF5.L2	2.5 (0.10)
560		K561J15C0GF5.H5	K561K15C0GF5.H5	5.0 (0.20)
680		K681J15C0GF5.L2	K681K15C0GF5.L2	2.5 (0.10)
680		K681J15C0GF5.H5	K681K15C0GF5.H5	5.0 (0.20)
820		K821J15C0GF5.L2	K821K15C0GF5.L2	2.5 (0.10)
820		K821J15C0GF5.H5	K821K15C0GF5.H5	5.0 (0.20)
1000		K102J15C0GF5.L2	K102K15C0GF5.L2	2.5 (0.10)
1000		K102J15C0GF5.H5	K102K15C0GF5.H5	5.0 (0.20)
1200		K122J15C0GF5.L2	K122K15C0GF5.L2	2.5 (0.10)
1200		K122J15C0GF5.H5	K122K15C0GF5.H5	5.0 (0.20)
1500		K152J15C0GF5.L2	K152K15C0GF5.L2	2.5 (0.10)
1500		K152J15C0GF5.H5	K152K15C0GF5.H5	5.0 (0.20)
1800		K182J15C0GF5.L2	K182K15C0GF5.L2	2.5 (0.10)
1800		K182J15C0GF5.H5	K182K15C0GF5.H5	5.0 (0.20)
2200		K222J15C0GF5.L2	K222K15C0GF5.L2	2.5 (0.10)
2200		K222J15C0GF5.H5	K222K15C0GF5.H5	5.0 (0.20)
2700		K272J20C0GF5.L2	K272K20C0GF5.L2	2.5 (0.10)
2700		K272J20C0GF5.H5	K272K20C0GF5.H5	5.0 (0.20)
3300		K332J20C0GF5.L2	K332K20C0GF5.L2	2.5 (0.10)
3300		K332J20C0GF5.H5	K332K20C0GF5.H5	5.0 (0.20)

MONO-KAP C0G - 50 V_{DC} CLEAR TEXT CODE				
CAPACITANCE (pF)	RATED VOLTAGE (V_{DC})	5 % TOLERANCE 13th digit (T = Reel, U = Ammo, 3 = Bulk)	10 % TOLERANCE 13th digit (T = Reel, U = Ammo, 3 = Bulk)	LEAD SPACING mm (inch)
3900	50	K392J20C0GF5.L2	K392K20C0GF5.L2	2.5 (0.10)
3900		K392J20C0GF5.H5	K392K20C0GF5.H5	5.0 (0.20)
4700		K472J20C0GF5.L2	K472K20C0GF5.L2	2.5 (0.10)
4700		K472J20C0GF5.H5	K472K20C0GF5.H5	5.0 (0.20)
5600		K562J20C0GF5.L2	K562K20C0GF5.L2	2.5 (0.10)
5600		K562J20C0GF5.H5	K562K20C0GF5.H5	5.0 (0.20)
6800		K682J20C0GF5.L2	K682K20C0GF5.L2	2.5 (0.10)
6800		K682J20C0GF5.H5	K682K20C0GF5.H5	5.0 (0.20)
8200		K822J20C0GF5.L2	K822K20C0GF5.L2	2.5 (0.10)
8200		K822J20C0GF5.H5	K822K20C0GF5.H5	5.0 (0.20)
10 000		K103J20C0GF5.L2	K103K20C0GF5.L2	2.5 (0.10)
10 000		K103J20C0GF5.H5	K103K20C0GF5.H5	5.0 (0.20)

MONO-KAP Y5V - 100 V_{DC} CLEAR TEXT CODE			
CAPACITANCE (pF)	RATED VOLTAGE (V_{DC})	+ 80 %/- 20 % TOLERANCE 13th digit (T = Reel, U = Ammo, 3 = Bulk)	LEAD SPACING mm (inch)
10 000	100	K103Z15Y5VH53L2	2.5 (0.10)
10 000		K103Z15Y5VH53H5	5.0 (0.20)
15 000		K153Z15Y5VH53L2	2.5 (0.10)
15 000		K153Z15Y5VH53H5	5.0 (0.20)
22 000		K223Z15Y5VH53L2	2.5 (0.10)
22 000		K223Z15Y5VH53H5	5.0 (0.20)
33 000		K333Z15Y5VH53L2	2.5 (0.10)
33 000		K333Z15Y5VH53H5	5.0 (0.20)
47 000		K473Z15Y5VH53L2	2.5 (0.10)
47 000		K473Z15Y5VH53H5	5.0 (0.20)
68 000		K683Z15Y5VH53L2	2.5 (0.10)
68 000		K683Z15Y5VH53H5	5.0 (0.20)
100 000		K104Z15Y5VH53L2	2.5 (0.10)
100 000		K104Z15Y5VH53H5	5.0 (0.20)
150 000		K154Z20Y5VH53L2	2.5 (0.10)
150 000		K154Z20Y5VH53H5	5.0 (0.20)
220 000		K224Z20Y5VH53L2	2.5 (0.10)
220 000		K224Z20Y5VH53H5	5.0 (0.20)

MONO-KAP X7R - 100 V_{DC} CLEAR TEXT CODE				
CAPACITANCE (pF)	RATED VOLTAGE (V_{DC})	10 % TOLERANCE 13th digit (T = Reel, U = Ammo, 3 = Bulk)	20 % TOLERANCE 13th digit (T = Reel, U = Ammo, 3 = Bulk)	LEAD SPACING mm (inch)
100	100	K101K15X7RH5.L2	K101M15X7RH5.L2	2.5 (0.10)
100		K101K15X7RH5.H5	K101M15X7RH5.H5	5.0 (0.20)
120		K121K15X7RH5.L2	K121M15X7RH5.L2	2.5 (0.10)
120		K121K15X7RH5.H5	K121M15X7RH5.H5	5.0 (0.20)
150		K151K15X7RH5.L2	K151M15X7RH5.L2	2.5 (0.10)
150		K151K15X7RH5.H5	K151M15X7RH5.H5	5.0 (0.20)
180		K181K15X7RH5.L2	K181M15X7RH5.L2	2.5 (0.10)
180		K181K15X7RH5.H5	K181M15X7RH5.H5	5.0 (0.20)
220		K221K15X7RH5.L2	K221M15X7RH5.L2	2.5 (0.10)
220		K221K15X7RH5.H5	K221M15X7RH5.H5	5.0 (0.20)
270		K271K15X7RH5.L2	K271M15X7RH5.L2	2.5 (0.10)
270		K271K15X7RH5.H5	K271M15X7RH5.H5	5.0 (0.20)
330		K331K15X7RH5.L2	K331M15X7RH5.L2	2.5 (0.10)
330		K331K15X7RH5.H5	K331M15X7RH5.H5	5.0 (0.20)
390		K391K15X7RH5.L2	K391M15X7RH5.L2	2.5 (0.10)
390		K391K15X7RH5.H5	K391M15X7RH5.H5	5.0 (0.20)
470		K471K15X7RH5.L2	K471M15X7RH5.L2	2.5 (0.10)
470		K471K15X7RH5.H5	K471M15X7RH5.H5	5.0 (0.20)
560		K561K15X7RH5.L2	K561M15X7RH5.L2	2.5 (0.10)
560		K561K15X7RH5.H5	K561M15X7RH5.H5	5.0 (0.20)
680		K681K15X7RH5.L2	K681M15X7RH5.L2	2.5 (0.10)
680		K681K15X7RH5.H5	K681M15X7RH5.H5	5.0 (0.20)
820		K821K15X7RH5.L2	K821M15X7RH5.L2	2.5 (0.10)
820		K821K15X7RH5.H5	K821M15X7RH5.H5	5.0 (0.20)
1000		K102K15X7RH5.L2	K102M15X7RH5.L2	2.5 (0.10)
1000		K102K15X7RH5.H5	K102M15X7RH5.H5	5.0 (0.20)
1200		K122K15X7RH5.L2	K122M15X7RH5.L2	2.5 (0.10)
1200		K122K15X7RH5.H5	K122M15X7RH5.H5	5.0 (0.20)
1500		K152K15X7RH5.L2	K152M15X7RH5.L2	2.5 (0.10)
1500		K152K15X7RH5.H5	K152M15X7RH5.H5	5.0 (0.20)
1800		K182K15X7RH5.L2	K182M15X7RH5.L2	2.5 (0.10)
1800		K182K15X7RH5.H5	K182M15X7RH5.H5	5.0 (0.20)
2200		K222K15X7RH5.L2	K222M15X7RH5.L2	2.5 (0.10)
2200		K222K15X7RH5.H5	K222M15X7RH5.H5	5.0 (0.20)
2700		K272K15X7RH5.L2	K272M15X7RH5.L2	2.5 (0.10)
2700		K272K15X7RH5.H5	K272M15X7RH5.H5	5.0 (0.20)
3300		K332K15X7RH5.L2	K332M15X7RH5.L2	2.5 (0.10)
3300		K332K15X7RH5.H5	K332M15X7RH5.H5	5.0 (0.20)
3900		K392K15X7RH5.L2	K392M15X7RH5.L2	2.5 (0.10)
3900		K392K15X7RH5.H5	K392M15X7RH5.H5	5.0 (0.20)
4700		K472K15X7RH5.L2	K472M15X7RH5.L2	2.5 (0.10)
4700		K472K15X7RH5.H5	K472M15X7RH5.H5	5.0 (0.20)
5600		K562K15X7RH5.L2	K562M15X7RH5.L2	2.5 (0.10)
5600		K562K15X7RH5.H5	K562M15X7RH5.H5	5.0 (0.20)
6800		K682K15X7RH5.L2	K682M15X7RH5.L2	2.5 (0.10)
6800		K682K15X7RH5.H5	K682M15X7RH5.H5	5.0 (0.20)

MONO-KAP X7R - 100 V_{DC} CLEAR TEXT CODE				
CAPACITANCE (pF)	RATED VOLTAGE (V_{DC})	10 % TOLERANCE 13th digit (T = Reel, U = Ammo, 3 = Bulk)	20 % TOLERANCE 13th digit (T = Reel, U = Ammo, 3 = Bulk)	LEAD SPACING mm (inch)
8200	100	K822K15X7RH5.L2	K822M15X7RH5.L2	2.5 (0.10)
8200		K822K15X7RH5.H5	K822M15X7RH5.H5	5.0 (0.20)
10 000		K103K15X7RH5.L2	K103M15X7RH5.L2	2.5 (0.10)
10 000		K103K15X7RH5.H5	K103M15X7RH5.H5	5.0 (0.20)
12 000		K123K15X7RH5.L2	K123M15X7RH5.L2	2.5 (0.10)
12 000		K123K15X7RH5.H5	K123M15X7RH5.H5	5.0 (0.20)
15 000		K153K15X7RH5.L2	K153M15X7RH5.L2	2.5 (0.10)
15 000		K153K15X7RH5.H5	K153M15X7RH5.H5	5.0 (0.20)
18 000		K183K15X7RH5.L2	K183M15X7RH5.L2	2.5 (0.10)
18 000		K183K15X7RH5.H5	K183M15X7RH5.H5	5.0 (0.20)
22 000		K223K15X7RH5.L2	K223M15X7RH5.L2	2.5 (0.10)
22 000		K223K15X7RH5.H5	K223M15X7RH5.H5	5.0 (0.20)
27 000		K273K20X7RH5.L2	K273M20X7RH5.L2	2.5 (0.10)
27 000		K273K20X7RH5.H5	K273M20X7RH5.H5	5.0 (0.20)
33 000		K333K20X7RH5.L2	K333M20X7RH5.L2	2.5 (0.10)
33 000		K333K20X7RH5.H5	K333M20X7RH5.H5	5.0 (0.20)
39 000		K393K20X7RH5.L2	K393M20X7RH5.L2	2.5 (0.10)
39 000		K393K20X7RH5.H5	K393M20X7RH5.H5	5.0 (0.20)
47 000		K473K20X7RH5.L2	K473M20X7RH5.L2	2.5 (0.10)
47 000		K473K20X7RH5.H5	K473M20X7RH5.H5	5.0 (0.20)
56 000		K563K20X7RH5.L2	K563M20X7RH5.L2	2.5 (0.10)
56 000		K563K20X7RH5.H5	K563M20X7RH5.H5	5.0 (0.20)
68 000		K683K20X7RH5.L2	K683M20X7RH5.L2	2.5 (0.10)
68 000		K683K20X7RH5.H5	K683M20X7RH5.H5	5.0 (0.20)
82 000		K823K20X7RH5.L2	K823M20X7RH5.L2	2.5 (0.10)
82 000		K823K20X7RH5.H5	K823M20X7RH5.H5	5.0 (0.20)
100 000		K104K20X7RH5.L2	K104M20X7RH5.L2	2.5 (0.10)
100 000		K104K20X7RH5.H5	K104M20X7RH5.H5	5.0 (0.20)

MONO-KAP C0G - 100 V_{DC} CLEAR TEXT CODE				
CAPACITANCE (pF)	RATED VOLTAGE (V_{DC})	5 % TOLERANCE 13th digit (T = Reel, U = Ammo, 3 = Bulk)	10 % TOLERANCE 13th digit (T = Reel, U = Ammo, 3 = Bulk)	LEAD SPACING mm (inch)
10	100	K100J15C0GH5.L2	K100K15C0GH5.L2	2.5 (0.10)
10		K100J15C0GH5.H5	K100K15C0GH5.H5	5.0 (0.20)
12		K120J15C0GH5.L2	K120K15C0GH5.L2	2.5 (0.10)
12		K120J15C0GH5.H5	K120K15C0GH5.H5	5.0 (0.20)
15		K150J15C0GH5.L2	K150K15C0GH5.L2	2.5 (0.10)
15		K150J15C0GH5.H5	K150K15C0GH5.H5	5.0 (0.20)
18		K180J15C0GH5.L2	K180K15C0GH5.L2	2.5 (0.10)
18		K180J15C0GH5.H5	K180K15C0GH5.H5	5.0 (0.20)
22		K220J15C0GH5.L2	K220K15C0GH5.L2	2.5 (0.10)
22		K220J15C0GH5.H5	K220K15C0GH5.H5	5.0 (0.20)
27		K270J15C0GH5.L2	K270K15C0GH5.L2	2.5 (0.10)
27		K270J15C0GH5.H5	K270K15C0GH5.H5	5.0 (0.20)

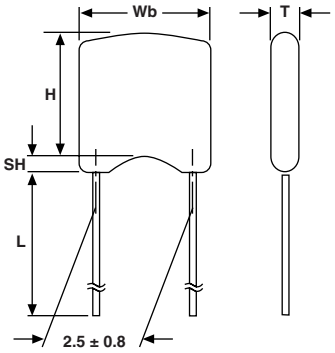
MONO-KAP C0G - 100 V_{DC} CLEAR TEXT CODE				
CAPACITANCE (pF)	RATED VOLTAGE (V_{DC})	5 % TOLERANCE 13th digit (T = Reel, U = Ammo, 3 = Bulk)	10 % TOLERANCE 13th digit (T = Reel, U = Ammo, 3 = Bulk)	LEAD SPACING mm (inch)
33	100	K330J15C0GH5.L2	K330K15C0GH5.L2	2.5 (0.10)
33		K330J15C0GH5.H5	K330K15C0GH5.H5	5.0 (0.20)
39		K390J15C0GH5.L2	K390K15C0GH5.L2	2.5 (0.10)
39		K390J15C0GH5.H5	K390K15C0GH5.H5	5.0 (0.20)
47		K470J15C0GH5.L2	K470K15C0GH5.L2	2.5 (0.10)
47		K470J15C0GH5.H5	K470K15C0GH5.H5	5.0 (0.20)
56		K560J15C0GH5.L2	K560K15C0GH5.L2	2.5 (0.10)
56		K560J15C0GH5.H5	K560K15C0GH5.H5	5.0 (0.20)
68		K680J15C0GH5.L2	K680K15C0GH5.L2	2.5 (0.10)
68		K680J15C0GH5.H5	K680K15C0GH5.H5	5.0 (0.20)
82		K820J15C0GH5.L2	K820K15C0GH5.L2	2.5 (0.10)
82		K820J15C0GH5.H5	K820K15C0GH5.H5	5.0 (0.20)
100		K101J15C0GH5.L2	K101K15C0GH5.L2	2.5 (0.10)
100		K101J15C0GH5.H5	K101K15C0GH5.H5	5.0 (0.20)
120		K121J15C0GH5.L2	K121K15C0GH5.L2	2.5 (0.10)
120		K121J15C0GH5.H5	K121K15C0GH5.H5	5.0 (0.20)
150		K151J15C0GH5.L2	K151K15C0GH5.L2	2.5 (0.10)
150		K151J15C0GH5.H5	K151K15C0GH5.H5	5.0 (0.20)
180		K181J15C0GH5.L2	K181K15C0GH5.L2	2.5 (0.10)
180		K181J15C0GH5.H5	K181K15C0GH5.H5	5.0 (0.20)
220		K221J15C0GH5.L2	K221K15C0GH5.L2	2.5 (0.10)
220		K221J15C0GH5.H5	K221K15C0GH5.H5	5.0 (0.20)
270		K271J15C0GH5.L2	K271K15C0GH5.L2	2.5 (0.10)
270		K271J15C0GH5.H5	K271K15C0GH5.H5	5.0 (0.20)
330		K331J15C0GH5.L2	K331K15C0GH5.L2	2.5 (0.10)
330		K331J15C0GH5.H5	K331K15C0GH5.H5	5.0 (0.20)
390		K391J15C0GH5.L2	K391K15C0GH5.L2	2.5 (0.10)
390		K391J15C0GH5.H5	K391K15C0GH5.H5	5.0 (0.20)
470		K471J15C0GH5.L2	K471K15C0GH5.L2	2.5 (0.10)
470		K471J15C0GH5.H5	K471K15C0GH5.H5	5.0 (0.20)
560		K561J15C0GH5.L2	K561K15C0GH5.L2	2.5 (0.10)
560		K561J15C0GH5.H5	K561K15C0GH5.H5	5.0 (0.20)
680		K681J15C0GH5.L2	K681K15C0GH5.L2	2.5 (0.10)
680		K681J15C0GH5.H5	K681K15C0GH5.H5	5.0 (0.20)
820		K821J15C0GH5.L2	K821K15C0GH5.L2	2.5 (0.10)
820		K821J15C0GH5.H5	K821K15C0GH5.H5	5.0 (0.20)
1000		K102J20C0GH5.L2	K102K20C0GH5.L2	2.5 (0.10)
1000		K102J20C0GH5.H5	K102K20C0GH5.H5	5.0 (0.20)
1200		K122J20C0GH5.L2	K122K20C0GH5.L2	2.5 (0.10)
1200		K122J20C0GH5.H5	K122K20C0GH5.H5	5.0 (0.20)
1500		K152J20C0GH5.L2	K152K20C0GH5.L2	2.5 (0.10)
1500		K152J20C0GH5.H5	K152K20C0GH5.H5	5.0 (0.20)
1800		K182J20C0GH5.L2	K182K20C0GH5.L2	2.5 (0.10)
1800		K182J20C0GH5.H5	K182K20C0GH5.H5	5.0 (0.20)
2200		K222J20C0GH5.L2	K222K20C0GH5.L2	2.5 (0.10)
2200		K222J20C0GH5.H5	K222K20C0GH5.H5	5.0 (0.20)

MONO-KAP C0G - 100 V_{DC} CLEAR TEXT CODE				
CAPACITANCE (pF)	**RATED VOLTAGE (V_{DC})**	**5 % TOLERANCE 13th digit (T = Reel, U = Ammo, 3 = Bulk)**	**10 % TOLERANCE 13th digit (T = Reel, U = Ammo, 3 = Bulk)**	**LEAD SPACING mm (inch)**
2700	100	K272J20C0GH5.L2	K272K20C0GH5.L2	2.5 (0.10)
2700		K272J20C0GH5.H5	K272K20C0GH5.H5	5.0 (0.20)
3300		K332J20C0GH5.L2	K332K20C0GH5.L2	2.5 (0.10)
3300		K332J20C0GH5.H5	K332K20C0GH5.H5	5.0 (0.20)
3900		K392J20C0GH5.L2	K392K20C0GH5.L2	2.5 (0.10)
3900		K392J20C0GH5.H5	K392K20C0GH5.H5	5.0 (0.20)
4700		K472J20C0GH5.L2	K472K20C0GH5.L2	2.5 (0.10)
4700		K472J20C0GH5.H5	K472K20C0GH5.H5	5.0 (0.20)
5600		K562J20C0GH5.L2	K562K20C0GH5.L2	2.5 (0.10)
5600		K562J20C0GH5.H5	K562K20C0GH5.H5	5.0 (0.20)

Multilayer Ceramic Dipped Radial Capacitors
200 V_{DC} and 500 V_{DC}

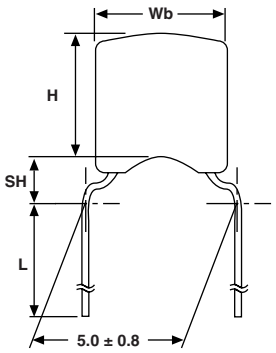
DIMENSIONS

RoHS COMPLIANT



L2

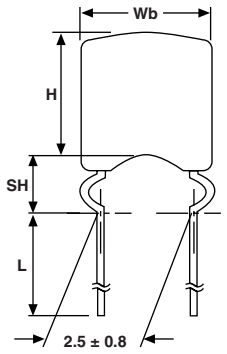
Component outline for lead spacing 2.5 ± 0.8 mm (straight leads)



H5

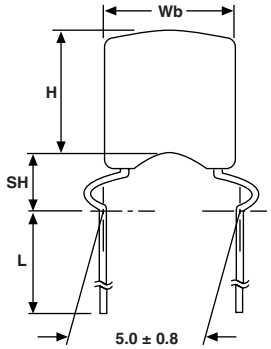
Component outline for lead spacing 5.0 ± 0.8 mm (flat bent leads)

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 5.0 ± 0.8 mm (outside kink)

CAPACITOR DIMENSIONS AND WEIGHT in millimeter (inches)								
SIZE	**$Wb_{max.}$**	**$H_{max.}$**	**$T_{max.}$**	**MAX. SEATING HEIGHT (SH)**				**WEIGHT (g)**
				L2	**H5**	**K2**	**K5**	
15	4.0 (0.157)	4.0 (0.157)	2.5 (0.098)	1.58 (0.062)	2.54 (0.100)	3.50 (0.140)	3.50 (0.140)	≈ 0.15
20	5.0 (0.197)	5.0 (0.197)	3.2 (0.126)	1.58 (0.062)	2.54 (0.100)	3.50 (0.140)	3.50 (0.140)	≈ 0.16

Note

- Bulk packed types have a standard lead length L = 25.4 mm (1.0") minimum
- Thickness is defined as "T"

Multilayer Ceramic Dipped Radial Capacitors 200 V_{DC} and 500 V_{DC}

QUICK REFERENCE DATA

DESCRIPTION	VALUE			
Capacitance range	33 pF to 3900 pF		100 pF to 0.047 µF	
Rated DC voltage	200 V	500 V	200 V	500 V
Tolerance on capacitance	± 5 %, ± 10 %		± 10 %, ± 20 %	
Dielectric Code	C0G (NP0)		X7R	

ORDERING INFORMATION

K	103	K	15	X7R	K	5	3	H	5
PRODUCT TYPE	CAPACITANCE CODE	CAPACITANCE TOLERANCE	SIZE CODE	TEMP. CHAR.	RATED VOLTAGE	LEAD DIA.	LEAD LENGTH/ PACKAGING	LEAD STYLE	LEAD SPACING
K = Mono-Kap	Two significant digits followed by the number of zeros. For example: 103 = 10 000 pF	J = ± 5 % K = ± 10 % M = ± 20 %	Ref. mech. spec.	C0G X7R	K = 200 V_{DC} L = 500 V_{DC}	5 = 0.5 mm (0.20")	3 = Bulk, with lead length of 30 ± 5.0 mm (1.25") T = Tape and reel U = Ammopack	L = Straight Lead H = High seated assy	2 = 2.5 (0.100") 5 = 5.0 (0.200")

Ordering Example: K-103-K-15-X7R-K-5-3-H-5

Multilayer Ceramic Dipped Radial Capacitors
200 V_{DC} and 500 V_{DC}

CAPACITANCE RANGE CHART

C0G (NP0) DIELECTRIC

SIZE		15		20	
RATED VOLTAGE		200	500	200	500
VALUE	CODE				
10 pF	100				
12 pF	120				
15 pF	150				
18 pF	180				
22 pF	220				
27 pF	270				
33 pF	330	•	•		
39 pF	390	•	•		
47 pF	470	•	•		
56 pF	560	•	•		
68 pF	680	•	•		
82 pF	820	•	•		
100 pF	101	•	•		
120 pF	121	•	•		
150 pF	151	•	•		
180 pF	181	•	•		
220 pF	221	•	•		
270 pF	271	•	•		
330 pF	331	•	•		
390 pF	391	•	•		
470 pF	471	•			•
560 pF	561	•			•
680 pF	681	•			•
820 pF	821	•			•
1000 pF	102			•	•
1200 pF	122			•	•
1500 pF	152			•	•
1800 pF	182			•	•
2200 pF	222			•	
2700 pF	272			•	
3300 pF	332			•	
3900 pF	392			•	
4700 pF	472				
5600 pF	562				
6800 pF	682				
8200 pF	822				
0.01 µF	103				

X7R DIELECTRIC

SIZE		15		20	
RATED VOLTAGE		200	500	200	500
VALUE	CODE				
100 pF	101	•	•		
120 pF	121	•	•		
150 pF	151	•	•		
180 pF	181	•	•		
220 pF	221	•	•		
270 pF	271	•	•		
330 pF	331	•	•		
390 pF	391	•	•		
470 pF	471	•	•		
560 pF	561	•	•		
680 pF	681	•	•		
820 pF	821	•	•		
1000 pF	102	•	•		
1200 pF	122	•	•		
1500 pF	152	•	•		
1800 pF	182	•	•		
2200 pF	222	•	•		
2700 pF	272	•	•		
3300 pF	332	•			•
3900 pF	392	•			•
4700 pF	472	•			•
5600 pF	562	•			•
6800 pF	682	•			•
8200 pF	822	•			•
0.01 µF	103	•			•
0.012 µF	123	•			•
0.015 µF	153	•			•
0.018 µF	183	•			•
0.022 µF	223	•			•
0.027 µF	273			•	•
0.033 µF	333			•	•
0.039 µF	393			•	•
0.047 µF	473			•	•
0.056 µF	563				
0.068 µF	683				
0.082 µF	823				
0.10 µF	104				
0.15 µF	154				
0.22 µF	224				
0.33 µF	334				
0.47 µF	474				
0.68 µF	684				
1.0 µF	105				

PART NUMBER LISTING - if not in range chart, please contact cmll@vishay.com

MONO-KAP X7R - 200 V_{DC} CLEAR TEXT CODE				
CAPACITANCE (pF)	RATED VOLTAGE (V_{DC})	10 % TOLERANCE 13th digit (T = Reel, U = Ammo, 3 = Bulk)	20 % TOLERANCE 13th digit (T = Reel, U = Ammo, 3 = Bulk)	LEAD SPACING mm (inch)
100	200	K101K15X7RK5.L2	K101M15X7RK5.L2	2.5 (0.10)
100		K101K15X7RK5.H5	K101M15X7RK5.H5	5.0 (0.20)
120		K121K15X7RK5.L2	K121M15X7RK5.L2	2.5 (0.10)
120		K121K15X7RK5.H5	K121M15X7RK5.H5	5.0 (0.20)
150		K151K15X7RK5.L2	K151M15X7RK5.L2	2.5 (0.10)
150		K151K15X7RK5.H5	K151M15X7RK5.H5	5.0 (0.20)
180		K181K15X7RK5.L2	K181M15X7RK5.L2	2.5 (0.10)
180		K181K15X7RK5.H5	K181M15X7RK5.H5	5.0 (0.20)
220		K221K15X7RK5.L2	K221M15X7RK5.L2	2.5 (0.10)
220		K221K15X7RK5.H5	K221M15X7RK5.H5	5.0 (0.20)
270		K271K15X7RK5.L2	K271M15X7RK5.L2	2.5 (0.10)
270		K271K15X7RK5.H5	K271M15X7RK5.H5	5.0 (0.20)
330		K331K15X7RK5.L2	K331M15X7RK5.L2	2.5 (0.10)
330		K331K15X7RK5.H5	K331M15X7RK5.H5	5.0 (0.20)
390		K391K15X7RK5.L2	K391M15X7RK5.L2	2.5 (0.10)
390		K391K15X7RK5.H5	K391M15X7RK5.H5	5.0 (0.20)
470		K471K15X7RK5.L2	K471M15X7RK5.L2	2.5 (0.10)
470		K471K15X7RK5.H5	K471M15X7RK5.H5	5.0 (0.20)
560		K561K15X7RK5.L2	K561M15X7RK5.L2	2.5 (0.10)
560		K561K15X7RK5.H5	K561M15X7RK5.H5	5.0 (0.20)
680		K681K15X7RK5.L2	K681M15X7RK5.L2	2.5 (0.10)
680		K681K15X7RK5.H5	K681M15X7RK5.H5	5.0 (0.20)
820		K821K15X7RK5.L2	K821M15X7RK5.L2	2.5 (0.10)
820		K821K15X7RK5.H5	K821M15X7RK5.H5	5.0 (0.20)
1000		K102K15X7RK5.L2	K102M15X7RK5.L2	2.5 (0.10)
1000		K102K15X7RK5.H5	K102M15X7RK5.H5	5.0 (0.20)
1200		K122K15X7RK5.L2	K122M15X7RK5.L2	2.5 (0.10)
1200		K122K15X7RK5.H5	K122M15X7RK5.H5	5.0 (0.20)
1500		K152K15X7RK5.L2	K152M15X7RK5.L2	2.5 (0.10)
1500		K152K15X7RK5.H5	K152M15X7RK5.H5	5.0 (0.20)
1800		K182K15X7RK5.L2	K182M15X7RK5.L2	2.5 (0.10)
1800		K182K15X7RK5.H5	K182M15X7RK5.H5	5.0 (0.20)
2200		K222K15X7RK5.L2	K222M15X7RK5.L2	2.5 (0.10)
2200		K222K15X7RK5.H5	K222M15X7RK5.H5	5.0 (0.20)
2700		K272K15X7RK5.L2	K272M15X7RK5.L2	2.5 (0.10)
2700		K272K15X7RK5.H5	K272M15X7RK5.H5	5.0 (0.20)
3300		K332K15X7RK5.L2	K332M15X7RK5.L2	2.5 (0.10)
3300		K332K15X7RK5.H5	K332M15X7RK5.H5	5.0 (0.20)
3900		K392K15X7RK5.L2	K392M15X7RK5.L2	2.5 (0.10)
3900		K392K15X7RK5.H5	K392M15X7RK5.H5	5.0 (0.20)
4700		K472K15X7RK5.L2	K472M15X7RK5.L2	2.5 (0.10)
4700		K472K15X7RK5.H5	K472M15X7RK5.H5	5.0 (0.20)
5600		K562K15X7RK5.L2	K562M15X7RK5.L2	2.5 (0.10)

MONO-KAP X7R - 200 V_{DC} CLEAR TEXT CODE				
CAPACITANCE (pF)	RATED VOLTAGE (V_{DC})	10 % TOLERANCE 13th digit (T = Reel, U = Ammo, 3 = Bulk)	20 % TOLERANCE 13th digit (T = Reel, U = Ammo, 3 = Bulk)	LEAD SPACING mm (inch)
5600	200	K562K15X7RK5.H5	K562M15X7RK5.H5	5.0 (0.20)
6800		K682K15X7RK5.L2	K682M15X7RK5.L2	2.5 (0.10)
6800		K682K15X7RK5.H5	K682M15X7RK5.H5	5.0 (0.20)
8200		K822K15X7RK5.L2	K822M15X7RK5.L2	2.5 (0.10)
8200		K822K15X7RK5.H5	K822M15X7RK5.H5	5.0 (0.20)
10 000		K103K15X7RK5.L2	K103M15X7RK5.L2	2.5 (0.10)
10 000		K103K15X7RK5.H5	K103M15X7RK5.H5	5.0 (0.20)
12 000		K123K15X7RK5.L2	K123M15X7RK5.L2	2.5 (0.10)
12 000		K123K15X7RK5.H5	K123M15X7RK5.H5	5.0 (0.20)
15 000		K153K15X7RK5.L2	K153M15X7RK5.L2	2.5 (0.10)
15 000		K153K15X7RK5.H5	K153M15X7RK5.H5	5.0 (0.20)
18 000		K183K15X7RK5.L2	K183M15X7RK5.L2	2.5 (0.10)
18 000		K183K15X7RK5.H5	K183M15X7RK5.H5	5.0 (0.20)
22 000		K223K15X7RK5.L2	K223M15X7RK5.L2	2.5 (0.10)
22 000		K223K15X7RK5.H5	K223M15X7RK5.H5	5.0 (0.20)
27 000		K273K20X7RK5.L2	K273M20X7RK5.L2	2.5 (0.10)
27 000		K273K20X7RK5.H5	K273M20X7RK5.H5	5.0 (0.20)
33 000		K333K20X7RK5.L2	K333M20X7RK5.L2	2.5 (0.10)
33 000		K333K20X7RK5.H5	K333M20X7RK5.H5	5.0 (0.20)
39 000		K393K20X7RK5.L2	K393M20X7RK5.L2	2.5 (0.10)
39 000		K393K20X7RK5.H5	K393M20X7RK5.H5	5.0 (0.20)
47 000		K473K20X7RK5.L2	K473M20X7RK5.L2	2.5 (0.10)
47 000		K473K20X7RK5.H5	K473M20X7RK5.H5	5.0 (0.20)

MONO-KAP C0G - 200 V_{DC} CLEAR TEXT CODE				
CAPACITANCE (pF)	RATED VOLTAGE (V_{DC})	5 % TOLERANCE 13th digit (T = Reel, U = Ammo, 3 = Bulk)	10 % TOLERANCE 13th digit (T = Reel, U = Ammo, 3 = Bulk)	LEAD SPACING mm (inch)
33	200	K330J15C0GK5.L2	K330K15C0GK5.L2	2.5 (0.10)
33		K330J15C0GK5.H5	K330K15C0GK5.H5	5.0 (0.20)
39		K390J15C0GK5.L2	K390K15C0GK5.L2	2.5 (0.10)
39		K390J15C0GK5.H5	K390K15C0GK5.H5	5.0 (0.20)
47		K470J15C0GK5.L2	K470K15C0GK5.L2	2.5 (0.10)
47		K470J15C0GK5.H5	K470K15C0GK5.H5	5.0 (0.20)
56		K560J15C0GK5.L2	K560K15C0GK5.L2	2.5 (0.10)
56		K560J15C0GK5.H5	K560K15C0GK5.H5	5.0 (0.20)
68		K680J15C0GK5.L2	K680K15C0GK5.L2	2.5 (0.10)
68		K680J15C0GK5.H5	K680K15C0GK5.H5	5.0 (0.20)
82		K820J15C0GK5.L2	K820K15C0GK5.L2	2.5 (0.10)
82		K820J15C0GK5.H5	K820K15C0GK5.H5	5.0 (0.20)
100		K101J15C0GK5.L2	K101K15C0GK5.L2	2.5 (0.10)
100		K101J15C0GK5.H5	K101K15C0GK5.H5	5.0 (0.20)
120		K121J15C0GK5.L2	K121K15C0GK5.L2	2.5 (0.10)
120		K121J15C0GK5.H5	K121K15C0GK5.H5	5.0 (0.20)

MONO-KAP C0G - 200 V_{DC} CLEAR TEXT CODE				
CAPACITANCE (pF)	RATED VOLTAGE (V_{DC})	5 % TOLERANCE 13th digit (T = Reel, U = Ammo, 3 = Bulk)	10 % TOLERANCE 13th digit (T = Reel, U = Ammo, 3 = Bulk)	LEAD SPACING mm (inch)
150	200	K151J15C0GK5.L2	K151K15C0GK5.L2	2.5 (0.10)
150		K151J15C0GK5.H5	K151K15C0GK5.H5	5.0 (0.20)
180		K181J15C0GK5.L2	K181K15C0GK5.L2	2.5 (0.10)
180		K181J15C0GK5.H5	K181K15C0GK5.H5	5.0 (0.20)
220		K221J15C0GK5.L2	K221K15C0GK5.L2	2.5 (0.10)
220		K221J15C0GK5.H5	K221K15C0GK5.H5	5.0 (0.20)
270		K271J15C0GK5.L2	K271K15C0GK5.L2	2.5 (0.10)
270		K271J15C0GK5.H5	K271K15C0GK5.H5	5.0 (0.20)
330		K331J15C0GK5.L2	K331K15C0GK5.L2	2.5 (0.10)
330		K331J15C0GK5.H5	K331K15C0GK5.H5	5.0 (0.20)
390		K391J15C0GK5.L2	K391K15C0GK5.L2	2.5 (0.10)
390		K391J15C0GK5.H5	K391K15C0GK5.H5	5.0 (0.20)
470		K471J15C0GK5.L2	K471K15C0GK5.L2	2.5 (0.10)
470		K471J15C0GK5.H5	K471K15C0GK5.H5	5.0 (0.20)
560		K561J15C0GK5.L2	K561K15C0GK5.L2	2.5 (0.10)
560		K561J15C0GK5.H5	K561K15C0GK5.H5	5.0 (0.20)
680		K681J15C0GK5.L2	K681K15C0GK5.L2	2.5 (0.10)
680		K681J15C0GK5.H5	K681K15C0GK5.H5	5.0 (0.20)
820		K821J15C0GK5.L2	K821K15C0GK5.L2	2.5 (0.10)
820		K821J15C0GK5.H5	K821K15C0GK5.H5	5.0 (0.20)
1000		K102J20C0GK5.L2	K102K20C0GK5.L2	2.5 (0.10)
1000		K102J20C0GK5.H5	K102K20C0GK5.H5	5.0 (0.20)
1200		K122J20C0GK5.L2	K122K20C0GK5.L2	2.5 (0.10)
1200		K122J20C0GK5.H5	K122K20C0GK5.H5	5.0 (0.20)
1500		K152J20C0GK5.L2	K152K20C0GK5.L2	2.5 (0.10)
1500		K152J20C0GK5.H5	K152K20C0GK5.H5	5.0 (0.20)
1800		K182J20C0GK5.L2	K182K20C0GK5.L2	2.5 (0.10)
1800		K182J20C0GK5.H5	K182K20C0GK5.H5	5.0 (0.20)
2200		K222J20C0GK5.L2	K222K20C0GK5.L2	2.5 (0.10)
2200		K222J20C0GK5.H5	K222K20C0GK5.H5	5.0 (0.20)
2700		K272J20C0GK5.L2	K272K20C0GK5.L2	2.5 (0.10)
2700		K272J20C0GK5.H5	K272K20C0GK5.H5	5.0 (0.20)
3300		K332J20C0GK5.L2	K332K20C0GK5.L2	2.5 (0.10)
3300		K332J20C0GK5.H5	K332K20C0GK5.H5	5.0 (0.20)
3900		K392J20C0GK5.L2	K392K20C0GK5.L2	2.5 (0.10)
3900		K392J20C0GK5.H5	K392K20C0GK5.H5	5.0 (0.20)

MONO-KAP X7R - 500 V_{DC} CLEAR TEXT CODE				
CAPACITANCE (pF)	RATED VOLTAGE (V_{DC})	10 % TOLERANCE 13th digit (T = Reel, U = Ammo, 3 = Bulk)	20 % TOLERANCE 13th digit (T = Reel, U = Ammo, 3 = Bulk)	LEAD SPACING mm (inch)
100	500	K101K15X7RL5.H5	K101M15X7RL5.H5	5.0 (0.20)
120		K121K15X7RL5.H5	K121M15X7RL5.H5	5.0 (0.20)
150		K151K15X7RL5.H5	K151M15X7RL5.H5	5.0 (0.20)
180		K181K15X7RL5.H5	K181M15X7RL5.H5	5.0 (0.20)
220		K221K15X7RL5.H5	K221M15X7RL5.H5	5.0 (0.20)
270		K271K15X7RL5.H5	K271M15X7RL5.H5	5.0 (0.20)
330		K331K15X7RL5.H5	K331M15X7RL5.H5	5.0 (0.20)
390		K391K15X7RL5.H5	K391M15X7RL5.H5	5.0 (0.20)
470		K471K15X7RL5.H5	K471M15X7RL5.H5	5.0 (0.20)
560		K561K15X7RL5.H5	K561M15X7RL5.H5	5.0 (0.20)
680		K681K15X7RL5.H5	K681M15X7RL5.H5	5.0 (0.20)
820		K821K15X7RL5.H5	K821M15X7RL5.H5	5.0 (0.20)
1000		K102K15X7RL5.H5	K102M15X7RL5.H5	5.0 (0.20)
1200		K122K15X7RL5.H5	K122M15X7RL5.H5	5.0 (0.20)
1500		K152K15X7RL5.H5	K152M15X7RL5.H5	5.0 (0.20)
1800		K182K15X7RL5.H5	K182M15X7RL5.H5	5.0 (0.20)
2200		K222K15X7RL5.H5	K222M15X7RL5.H5	5.0 (0.20)
2700		K272K15X7RL5.H5	K272M15X7RL5.H5	5.0 (0.20)
3300		K332K20X7RL5.H5	K332M20X7RL5.H5	5.0 (0.20)
3900		K392K20X7RL5.H5	K392M20X7RL5.H5	5.0 (0.20)
4700		K472K20X7RL5.H5	K472M20X7RL5.H5	5.0 (0.20)
5600		K562K20X7RL5.H5	K562M20X7RL5.H5	5.0 (0.20)
6800		K682K20X7RL5.H5	K682M20X7RL5.H5	5.0 (0.20)
8200		K822K20X7RL5.H5	K822M20X7RL5.H5	5.0 (0.20)
10 000		K103K20X7RL5.H5	K103M20X7RL5.H5	5.0 (0.20)
12 000		K123K20X7RL5.H5	K123M20X7RL5.H5	5.0 (0.20)
15 000		K153K20X7RL5.H5	K153M20X7RL5.H5	5.0 (0.20)
18 000		K183K20X7RL5.H5	K183M20X7RL5.H5	5.0 (0.20)
22 000		K223K20X7RL5.H5	K223M20X7RL5.H5	5.0 (0.20)
27 000		K273K20X7RL5.H5	K273M20X7RL5.H5	5.0 (0.20)
33 000		K333K20X7RL5.H5	K333M20X7RL5.H5	5.0 (0.20)
39 000		K393K20X7RL5.H5	K393M20X7RL5.H5	5.0 (0.20)
47 000		K473K20X7RL5.H5	K473M20X7RL5.H5	5.0 (0.20)

MONO-KAP C0G - 500 V_{DC} CLEAR TEXT CODE				
CAPACITANCE (pF)	RATED VOLTAGE (V_{DC})	5 % TOLERANCE 13th digit (T = Reel, U = Ammo, 3 = Bulk)	10 % TOLERANCE 13th digit (T = Reel, U = Ammo, 3 = Bulk)	LEAD SPACING mm (inch)
33	500	K330J15C0GL5.H5	K330K15C0GL5.H5	5.0 (0.20)
39		K390J15C0GL5.H5	K390K15C0GL5.H5	5.0 (0.20)
47		K470J15C0GL5.H5	K470K15C0GL5.H5	5.0 (0.20)
56		K560J15C0GL5.H5	K560K15C0GL5.H5	5.0 (0.20)
68		K680J15C0GL5.H5	K680K15C0GL5.H5	5.0 (0.20)
82		K820J15C0GL5.H5	K820K15C0GL5.H5	5.0 (0.20)
100		K101J15C0GL5.H5	K101K15C0GL5.H5	5.0 (0.20)
120		K121J15C0GL5.H5	K121K15C0GL5.H5	5.0 (0.20)
150		K151J15C0GL5.H5	K151K15C0GL5.H5	5.0 (0.20)
180		K181J15C0GL5.H5	K181K15C0GL5.H5	5.0 (0.20)
220		K221J15C0GL5.H5	K221K15C0GL5.H5	5.0 (0.20)
270		K271J15C0GL5.H5	K271K15C0GL5.H5	5.0 (0.20)
330		K331J15C0GL5.H5	K331K15C0GL5.H5	5.0 (0.20)
390		K391J15C0GL5.H5	K391K15C0GL5.H5	5.0 (0.20)
470		K471J20C0GL5.H5	K471K20C0GL5.H5	5.0 (0.20)
560		K561J20C0GL5.H5	K561K20C0GL5.H5	5.0 (0.20)
680		K681J20C0GL5.H5	K681K20C0GL5.H5	5.0 (0.20)
820		K821J20C0GL5.H5	K821K20C0GL5.H5	5.0 (0.20)
1000		K102J20C0GL5.H5	K102K20C0GL5.H5	5.0 (0.20)
1200		K122J20C0GL5.H5	K122K20C0GL5.H5	5.0 (0.20)
1500		K152J20C0GL5.H5	K152K20C0GL5.H5	5.0 (0.20)
1800		K182J20C0GL5.H5	K182K20C0GL5.H5	5.0 (0.20)

Multilayer Ceramic Dipped Axial and Radial Capacitors
C0G and X7R Dielectric Capacitors

AXIAL ORDERING INFORMATION

A	103	K	15	X7R	F	5	TAA
PRODUCT TYPE	CAPACITANCE CODE	CAPACITANCE TOLERANCE	SIZE CODE	TEMP. CHAR.	RATED VOLTAGE	LEAD DIAMETER	PACKAGING
A = Mono-Axial	10 pF to 1.0 µF (3 digit code). First two digits are significant. Third digit is number of zeros. For example: 100 = 10 pF, 101 = 100 pF, 332 = 3300 pF, 103 = 10 000 pF = 0.01 µF. Values less than 10 pF: 109 = 1.0 pF, 479 = 4.7 pF	J = ± 5 % K = ± 10 % M = ± 20 % Z = + 80 %/- 20 %	15 (0805) and 20 (1206) or (1210)	C0G X7R Y5V	F = 50 V_{DC} H = 100 V_{DC} K = 200 V_{DC} L = 500 V_{DC}	5 = 0.5 mm (0.020")	TAA = T and R UAA = AMMO

RADIAL ORDERING INFORMATION

K	103	K	15	X7R	F	5	3	H	5
PRODUCT TYPE	CAPACITANCE CODE	CAPACITANCE TOLERANCE	SIZE CODE	TEMP. CHAR.	RATED VOLTAGE	LEAD DIA.	LEAD LENGTH/ PACKAGING	LEAD STYLE	LEAD SPACING
K = Mono-Kap	10 pF to 1.0 µF (3 digit code). First two digits are significant. Third digit is number of zeros. For example: 100 = 10 pF, 101 = 100 pF, 332 = 3300 pF, 103 = 10 000 pF = 0.01 µF. Values less than 10 pF: 109 = 1.0 pF, 479 = 4.7 pF	J = ± 5 % K = ± 10 % M = ± 20 % Z = + 80 %/- 20 %	15 (0805) and 20 (1206) or (1210)	C0G X7R Y5V	F = 50 V_{DC} H = 100 V_{DC} K = 200 V_{DC} L = 500 V_{DC}	5 = 0.5 mm (0.20")	3 = Bulk U = Ammopack T = Tape and reel	L = Straight Lead H = High seated assy	2 = 2.5 (0.100") 5 = 5.0 (0.200")

Cross Reference List
Vishay Sprague vs. Vishay BCcomponents Part Numbers

MULTILAYER CERAMIC DIPPED RADIAL CAPACITORS					
C-VALUE (pF)	VOLT	PITCH (mm)	VISHAY SPRAGUE (1)	PITCH ± 0.8 (mm)	VISHAY BCcomponents/ CLEARTEXT (1)
100 000	50 V	7.62	1C30Z5U104M050B	7.50	K104M15X7RF53H7
100 000	50 V	2.54	1C10Z5U104M050R	2.54	K104M15X7RF5TL2
100 000	50 V	5.00	1C20Z5U104M050R	5.00	K104M15X7RF5TH5
100 000	50 V	2.54	1C10X7R104K050B	2.54	K104K15X7RF53L2
100 000	50 V	5.00	1C20Z5U104M050B	5.00	K104M15X7RF53H5
10 000	50 V	5.00	1C20Z5U103M050B	5.00	K103M15X7RF53H5
100 000	50 V	2.54	1C10X7R104K050R	2.54	K104K15X7RF5TL2
100 000	50 V	5.00	1C20X7R104K050R	5.00	K104K15X7RF5TH5
10 000	50 V	6.35	1C25Z5U103M050B	6.40	K103M15X7RF53H6
1 000 000	50 V	10.16	2C40Z5U105M050B	10.00	K105M20X7RF53H0
10 000	50 V	2.54	1C10X7R103K050B	2.54	K103K15X7RF53L2
100 000	50 V	6.35	1C25Z5U104M050B	6.40	K104M15X7RF53H6
10 000	50 V	2.54	1C10Z5U103M050B	2.54	K103M15X7RF53L2
100 000	50 V	5.00	1C20X7R104K050B	5.00	K104K15X7RF53H5
100 000	100 V	2.54	1C10Z5U104M100B	2.54	K104M20X7RH53L2
1 000 000	50 V	5.00	2C20Z5U105M050B	5.00	K105M20X7RF53H5
1000	50 V	2.54	1C10X7R102K050B	2.54	K102K15X7RF53L2
100 000	100 V	2.54	1C10X7R104K100B	2.54	K104K20X7RH53L2
10 000	50 V	5.00	1C20X7R103K050R	5.00	K103K15X7RF5TH5
10 000	50 V	5.00	1C20X7R103K050B	5.00	K103K15X7RF53H5
1 000 000	50 V	5.00	2C37Z5U105M050B	5.00	K105M20X7RF53H5
10 000	50 V	2.54	1C10X7R103K050R	2.54	K103K15X7RF5TL2
47 000	50 V	2.54	1C10X7R473K050B	2.54	K473K15X7RF53L2
10 000	50 V	5.00	1C20Z5U103M050R	5.00	K103M15X7RF5TH5
1 000 000	50 V	5.00	2C20Z5U105M050R	5.00	K105M20X7RF5TH5
1 000 000	50 V	6.35	2C25Z5U105M050B	6.40	K105M20X7RF53H6
22 000	50 V	2.54	1C10X7R223K050B	2.54	K223K15X7RF53L2
220	50 V	5.00	1C20C0G221J050B	5.00	K221J15C0GF53H5
22	50 V	2.54	1C10C0G220J050B	2.54	K220J15C0GF53L2
220 000	50 V	5.00	1C20Z5U224M050B	5.00	K224M20X7RF53H5
10 000	50 V	6.35	1C25X7R103K050B	6.40	K103K15X7RF53H6
3300	50 V	5.00	1C20C0G332J050B	5.00	K332J20C0GF53H5
470 000	50 V	5.00	2C37Z5U474M050B	5.00	K474M20X7RF53H5
47 000	100 V	2.54	1C10X7R473K100B	2.54	K473K20X7RH53L2
100 000	50 V	6.35	1C25X7R104K050B	6.40	K104K15X7RF53H6
100	50 V	2.54	1C10C0G101J050B	2.54	K101J15C0GF53L2
1000	50 V	2.54	1C10C0G102J050B	2.54	K102J15C0GF53L2
47	100 V	2.54	1C10C0G470J100B	2.54	K470J15C0GH53L2
220 000	50 V	2.54	1C10Z5U224M050B	2.54	K224M20X7RF53L2
22	50 V	5.00	1C20C0G220J050B	5.00	K220J15C0GF53H5
100 000	100 V	5.00	1C20X7R104K100B	5.00	K104K20X7RH53H5
1000	50 V	5.00	1C20X7R102K050R	5.00	K102K15X7RF5TH5

Note

(1) Listed according to most preferable used types

Cross Reference List
Vishay Sprague vs. Vishay BCcomponents Part Numbers

MULTILAYER CERAMIC DIPPED RADIAL CAPACITORS					
C-VALUE (pF)	VOLT	PITCH (mm)	VISHAY SPRAGUE (1)	PITCH ± 0.8 (mm)	VISHAY BCcomponents/ CLEARTEXT (1)
10 000	100 V	2.54	1C10X7R103K100B	2.54	K103K15X7RH53L2
47	50 V	2.54	1C10C0G470J050B	2.54	K470J15C0GF53L2
10 000	50 V	2.54	1C10Z5U103M050R	2.54	K103M15X7RF5TL2
22 000	50 V	5.00	1C20X7R223K050R	5.00	K223K15X7RF5TH5
2200	50 V	5.00	1C20C0G222J050B	5.00	K222J15C0GF53H5
470	50 V	5.00	1C20C0G471J050B	5.00	K471J15C0GF53H5
1000	50 V	5.00	1C20X7R102K050B	5.00	K102K15X7RF53H5
1000	100 V	2.54	1C10X7R102K100B	2.54	K102K15X7RH53L2
330 000	50 V	5.00	1C20Z5U334M050B	5.00	K334M20X7RF53H5
22	100 V	2.54	1C10C0G220J100B	2.54	K220J15C0GH53L2
100 000	100 V	2.54	1C10X7R104K100R	2.54	K104K20X7RH5TL2
47 000	50 V	2.54	1C10Z5U473M050B	2.54	K473M15X7RF53L2
10 000	100 V	5.00	1C20X7R103K100R	5.00	K103K15X7RH5TH5
330	50 V	5.00	1C20C0G331J050B	5.00	K331J15C0GF53H5
47 000	50 V	6.35	1C25Z5U473M050B	6.40	K473M15X7RF53H6
47 000	50 V	5.00	1C20Z5U473M050B	5.00	K473M15X7RF53H5
100 000	50 V	7.62	1C30X7R104K050B	7.50	K104K15X7RF53H7
10 000	50 V	7.62	1C30Z5U103M050B	7.50	K103M15X7RF53H7
470 000	50 V	5.00	2C20X7R474K050R	5.00	K474K20X7RF5TH5
10 000	100 V	5.00	1C20X7R103K100B	5.00	K103K15X7RH53H5
470 000	50 V	5.00	2C20Z5U474M050B	5.00	K474M20X7RF53H5
2200	100 V	5.00	1C20X7R222K100B	5.00	K222K15X7RH53H5
47 000	50 V	5.00	1C20X7R473K050B	5.00	K473K15X7RF53H5
1000	100 V	2.54	1C10C0G102J100B	2.54	K102J20C0GH53L2
470	50 V	2.54	1C10C0G471J050B	2.54	K471J15C0GF53L2
33 000	50 V	2.54	1C10X7R333K050B	2.54	K333K15X7RF53L2
100	50 V	5.00	1C20C0G101J050B	5.00	K101J15C0GF53H5
22 000	50 V	5.00	1C20Z5U223M050B	5.00	K223M15X7RF53H5
22 000	50 V	6.35	1C25Z5U223M050B	6.40	K223M15X7RF53H6
10 000	50 V	7.62	1C30X7R103K050B	7.50	K103K15X7RF53H7
220 000	50 V	6.35	1C25Z5U224M050B	6.40	K224M20X7RF53H6
470 000	50 V	5.00	2C20X7R474K050B	5.00	K474K20X7RF53H5
22	50 V	2.54	1C10C0G220J050R	2.54	K220J15C0GF5TL2
330	50 V	2.54	1C10C0G331J050B	2.54	K331J15C0GF53L2
22 000	50 V	2.54	1C10X7R223K050R	2.54	K223K15X7RF5TL2
22 000	50 V	2.54	1C10Z5U223M050R	2.54	K223M15X7RF5TL2
330 000	50 V	2.54	1C10Z5U334M050B	2.54	K334M20X7RF53L2
100	50 V	5.00	1C20C0G101J050R	5.00	K101J15C0GF5TH5
22	50 V	5.00	1C20C0G220J050R	5.00	K220J15C0GF5TH5
470	50 V	5.00	1C20C0G471J050R	5.00	K471J15C0GF5TH5
100 000	100 V	5.00	1C20X7R104K100R	5.00	K104K20X7RH5TH5
1000	100 V	6.35	1C25X7R102K100B	6.40	K102K15X7RH53H6
33 000	50 V	6.35	1C25X7R333K050B	6.40	K333K15X7RF53H6
220 000	50 V	5.00	2C20X7R224K050B	5.00	K224K20X7RF53H5
470 000	50 V	5.00	2C20Z5U474M050R	5.00	K474M20X7RF5TH5

Note

(1) Listed according to most preferable used types

Cross Reference List
Vishay Sprague vs. Vishay BCcomponents Part Numbers

MULTILAYER CERAMIC DIPPED RADIAL CAPACITORS

C-VALUE (pF)	VOLT	PITCH (mm)	VISHAY SPRAGUE (1)	PITCH ± 0.8 (mm)	VISHAY BCcomponents/ CLEARTEXT (1)
10 000	50 V	2.54	9C10Z5U103M050B	2.54	K103M15X7RF53L2
10	100 V	2.54	1C10C0G100J100B	2.54	K100J15C0GH53L2
100	100 V	2.54	1C10C0G101J100B	2.54	K101J15C0GH53L2
220	50 V	2.54	1C10C0G221J050B	2.54	K221J15C0GF53L2
33	50 V	2.54	1C10C0G330J050B	2.54	K330J15C0GF53L2
33	100 V	2.54	1C10C0G330J100B	2.54	K330J15C0GH53L2
330	100 V	2.54	1C10C0G331J100B	2.54	K331J15C0GH53L2
470	100 V	2.54	1C10C0G471J100B	2.54	K471J15C0GH53L2
22 000	100 V	2.54	1C10X7R223K100B	2.54	K223K15X7RH53L2
4700	50 V	2.54	1C10X7R472K050B	2.54	K472K15X7RF53L2
1000	50 V	5.00	1C20C0G102J050B	5.00	K102J15C0GF53H5
1000	100 V	5.00	1C20C0G102J100B	5.00	K102J20C0GH53H5
2200	50 V	5.00	1C20X7R222K050B	5.00	K222K15X7RF53H5
1000	50 V	6.35	1C25C0G102J050B	6.40	K102J15C0GF53H6
100 000	100 V	6.35	1C25X7R104K100B	6.40	K104K20X7RH53H6
220 000	50 V	5.00	2C20X7R224K050R	5.00	K224K20X7RF5TH5
1 000 000	50 V	10.16	3C40X7R105K050B	10.00	K105K20X7RF53H0
220 000	50 V	5.00	2C37Z5U224M050B	5.00	K224M20X7RF53H5
220	50 V	2.54	1C10C0G221J050R	2.54	K221J15C0GF5TL2
1000	50 V	2.54	1C10X7R102K050R	2.54	K102K15X7RF5TL2
47	50 V	5.00	1C20C0G470J050R	5.00	K470J15C0GF5TH5
1000	100 V	5.00	1C20X7R102K100B	5.00	K102K15X7RH53H5
2200	50 V	5.00	1C20X7R222K050R	5.00	K222K15X7RF5TH5
4700	50 V	5.00	1C20X7R472K050R	5.00	K472K15X7RF5TH5
220 000	50 V	5.00	1C20Z5U224M050R	5.00	K224M20X7RF5TH5
330 000	50 V	5.00	1C20Z5U334M050R	5.00	K334M20X7RF5TH5
100 000	100 V	7.62	1C30X7R104K100B	7.50	K104K20X7RH53H7
1 000 000	50 V	7.62	2C30Z5U105M050B	7.50	K105M20X7RF53H7
10	50 V	2.54	1C10C0G100J050B	2.54	K100J15C0GF53L2
220	100 V	2.54	1C10C0G221J100B	2.54	K221J15C0GH53L2
2200	50 V	2.54	1C10C0G222J050B	2.54	K222J15C0GF53L2
2200	100 V	2.54	1C10C0G222J100B	2.54	K222J20C0GH53L2
2200	100 V	2.54	1C10X7R222K100B	2.54	K222K15X7RH53L2
3300	100 V	2.54	1C10X7R332K100B	2.54	K332K15X7RH53L2
22 000	100 V	2.54	1C10Z5U223M100B	2.54	K223M15X7RH53L2
33 000	50 V	2.54	1C10Z5U333M050B	2.54	K333M15X7RF53L2
33	50 V	5.00	1C20C0G330J050B	5.00	K330J15C0GF53H5
3300	100 V	5.00	1C20X7R332K100B	5.00	K332K15X7RH53H5
22	50 V	6.35	1C25C0G220J050B	6.40	K220J15C0GF53H6
220	50 V	6.35	1C25C0G221J050B	6.40	K221J15C0GF53H6
470	50 V	6.35	1C25C0G471J050B	6.40	K471J15C0GF53H6
10 000	100 V	6.35	1C25X7R103K100B	6.40	K103K15X7RH53H6
33 000	50 V	6.35	1C25Z5U333M050B	6.40	K333M15X7RF53H6
330 000	50 V	6.35	1C25Z5U334M050B	6.40	K334M20X7RF53H6
1000	100 V	7.62	1C30X7R102K100B	7.50	K102K15X7RH53H7

Note

(1) Listed according to most preferable used types

Cross Reference List
Vishay Sprague vs. Vishay BCcomponents Part Numbers

MULTILAYER CERAMIC DIPPED RADIAL CAPACITORS					
C-VALUE (pF)	VOLT	PITCH (mm)	VISHAY SPRAGUE (1)	PITCH ± 0.8 (mm)	VISHAY BCcomponents/ CLEARTEXT (1)
1 000 000	50 V	5.00	2C20X7R105K050R	5.00	K105K20X7RF5TH5
330 000	50 V	5.00	2C37Z5U334M050B	5.00	K334M20X7RF53H5
1 000 000	50 V	5.00	3C37X7R105K050B	5.00	K105K20X7RF53H5
47 000	50 V	6.35	1C25X7R473K050B	6.40	K473K15X7RF53H6
220 000	50 V	10.16	2C40Z5U224M050B	10.00	K224M20X7RF53H0
470 000	50 V	5.00	2C37X7R474K050B	5.00	K474K20X7RF53H5
1000	50 V	2.54	1C10C0G102J050R	2.54	K102J15C0GF5TL2
22	100 V	2.54	1C10C0G220J100R	2.54	K220J15C0GH5TL2
33	50 V	2.54	1C10C0G330J050R	2.54	K330J15C0GF5TL2
3300	50 V	2.54	1C10C0G332J050B	2.54	K332J20C0GF53L2
3300	100 V	2.54	1C10C0G332J100B	2.54	K332J20C0GH53L2
47	50 V	2.54	1C10C0G470J050R	2.54	K470J15C0GF5TL2
470	50 V	2.54	1C10C0G471J050R	2.54	K471J15C0GF5TL2
4700	50 V	2.54	1C10C0G472J050B	2.54	K472J20C0GF53L2
1000	100 V	2.54	1C10X7R102K100R	2.54	K102K15X7RH5TL2
10 000	100 V	2.54	1C10X7R103K100R	2.54	K103K15X7RH5TL2
2200	50 V	2.54	1C10X7R222K050B	2.54	K222K15X7RF53L2
3300	50 V	2.54	1C10X7R332K050B	2.54	K332K15X7RF53L2
33 000	100 V	2.54	1C10X7R333K100B	2.54	K333K20X7RH53L2
4700	50 V	2.54	1C10X7R472K050R	2.54	K472K15X7RF5TL2
4700	100 V	2.54	1C10X7R472K100B	2.54	K472K15X7RH53L2
10 000	100 V	2.54	1C10Z5U103M100B	2.54	K103M15X7RH53L2
22 000	50 V	2.54	1C10Z5U223M050B	2.54	K223M15X7RF53L2
33 000	100 V	2.54	1C10Z5U333M100B	2.54	K333M20X7RH53L2
330 000	50 V	2.54	1C10Z5U334M050R	2.54	K334M20X7RF5TL2
47 000	100 V	2.54	1C10Z5U473M100B	2.54	K473M20X7RH53L2
10	50 V	5.00	1C20C0G100J050B	5.00	K100J15C0GF53H5
10	50 V	5.00	1C20C0G100J050R	5.00	K100J15C0GF5TH5
10	100 V	5.00	1C20C0G100J100B	5.00	K100J15C0GH53H5
10	100 V	5.00	1C20C0G100J100R	5.00	K100J15C0GH5TH5
100	100 V	5.00	1C20C0G101J100B	5.00	K101J15C0GH53H5
1000	50 V	5.00	1C20C0G102J050R	5.00	K102J15C0GF5TH5
22	100 V	5.00	1C20C0G220J100B	5.00	K220J15C0GH53H5
22	100 V	5.00	1C20C0G220J100R	5.00	K220J15C0GH5TH5
220	50 V	5.00	1C20C0G221J050R	5.00	K221J15C0GF5TH5
220	100 V	5.00	1C20C0G221J100B	5.00	K221J15C0GH53H5
2200	100 V	5.00	1C20C0G222J100B	5.00	K222J20C0GH53H5
33	50 V	5.00	1C20C0G330J050R	5.00	K330J15C0GF5TH5
33	100 V	5.00	1C20C0G330J100B	5.00	K330J15C0GH53H5
330	50 V	5.00	1C20C0G331J050R	5.00	K331J15C0GF5TH5
330	100 V	5.00	1C20C0G331J100B	5.00	K331J15C0GH53H5
3300	50 V	5.00	1C20C0G332J050R	5.00	K332J20C0GF5TH5
3300	100 V	5.00	1C20C0G332J100B	5.00	K332J20C0GH53H5
3300	100 V	5.00	1C20C0G332J100R	5.00	K332J20C0GH5TH5
47	50 V	5.00	1C20C0G470J050B	5.00	K470J15C0GF53H5

Note
(1) Listed according to most preferable used types

Cross Reference List
Vishay Sprague vs. Vishay BCcomponents Part Numbers

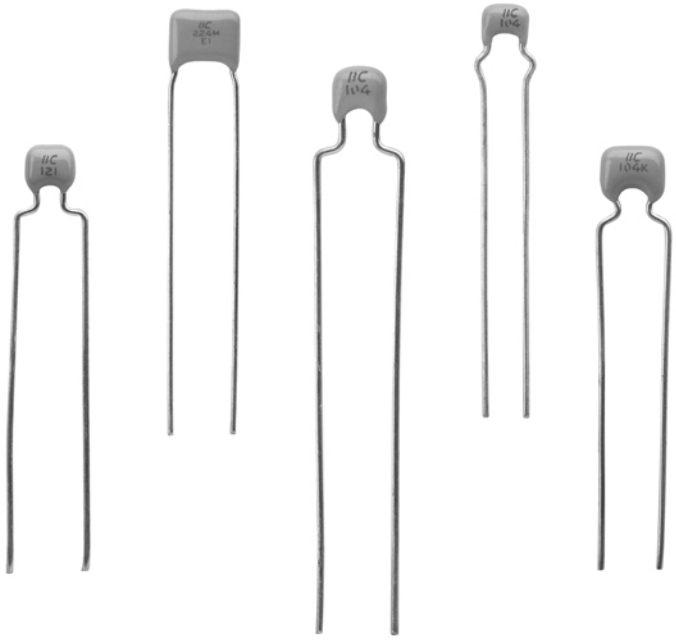
MULTILAYER CERAMIC DIPPED RADIAL CAPACITORS

C-VALUE (pF)	VOLT	PITCH (mm)	VISHAY SPRAGUE (1)	PITCH ± 0.8 (mm)	VISHAY BCcomponents/ CLEARTEXT (1)
47	100 V	5.00	1C20C0G470J100B	5.00	K470J15C0GH53H5
470	100 V	5.00	1C20C0G471J100B	5.00	K471J15C0GH53H5
4700	50 V	5.00	1C20C0G472J050B	5.00	K472J20C0GF53H5
1000	100 V	5.00	1C20X7R102K100R	5.00	K102K15X7RH5TH5
22 000	50 V	5.00	1C20X7R223K050B	5.00	K223K15X7RF53H5
22 000	100 V	5.00	1C20X7R223K100B	5.00	K223K15X7RH53H5
3300	50 V	5.00	1C20X7R332K050B	5.00	K332K15X7RF53H5
33 000	50 V	5.00	1C20X7R333K050B	5.00	K333K15X7RF53H5
33 000	100 V	5.00	1C20X7R333K100B	5.00	K333K20X7RH53H5
4700	50 V	5.00	1C20X7R472K050B	5.00	K472K15X7RF53H5
47 000	100 V	5.00	1C20X7R473K100B	5.00	K473K20X7RH53H5
100 000	100 V	5.00	1C20Z5U104M100B	5.00	K104M20X7RH53H5
22 000	50 V	5.00	1C20Z5U223M050R	5.00	K223M15X7RF5TH5
33 000	50 V	5.00	1C20Z5U333M050B	5.00	K333M15X7RF53H5
33 000	50 V	5.00	1C20Z5U333M050R	5.00	K333M15X7RF5TH5
47 000	50 V	5.00	1C20Z5U473M050R	5.00	K473M15X7RF5TH5
10	50 V	6.35	1C25C0G100J050B	6.40	K100J15C0GF53H6
100	50 V	6.35	1C25C0G101J050B	6.40	K101J15C0GF53H6
100	100 V	6.35	1C25C0G101J100B	6.40	K101J15C0GH53H6
22	100 V	6.35	1C25C0G220J100B	6.40	K220J15C0GH53H6
470	100 V	6.35	1C25C0G471J100B	6.40	K471J15C0GH53H6
1000	50 V	6.35	1C25X7R102K050B	6.40	K102K15X7RF53H6
3300	50 V	6.35	1C25X7R332K050B	6.40	K332K15X7RF53H6
100 000	100 V	6.35	1C25Z5U104M100B	6.40	K104M20X7RH53H6
1000	100 V	7.62	1C30C0G102J100B	7.50	K102J20C0GH53H7
22	50 V	7.62	1C30C0G220J050B	7.50	K220J15C0GF53H7
330	50 V	7.62	1C30C0G331J050B	7.50	K331J15C0GF53H7
1000	50 V	7.62	1C30X7R102K050B	7.50	K102K15X7RF53H7
10 000	100 V	7.62	1C30X7R103K100B	7.50	K103K15X7RH53H7
22 000	100 V	7.62	1C30X7R223K100B	7.50	K223K15X7RH53H7
100 000	100 V	7.62	1C30Z5U104M100B	7.50	K104M20X7RH53H7
330 000	50 V	7.62	1C30Z5U334M050B	7.50	K334M20X7RF53H7
330 000	50 V	5.00	2C20X7R334K050B	5.00	K334K20X7RF53H5
220 000	50 V	6.35	2C25X7R224K050B	6.40	K224K20X7RF53H6
470 000	50 V	6.35	2C25Z5U474M050B	6.40	K474M20X7RF53H6
1 000 000	50 V	7.62	2C30X7R105K050B	7.50	K105K20X7RF53H7
220 000	50 V	7.62	2C30X7R224K050B	7.50	K224K20X7RF53H7
220 000	50 V	5.00	2C37X7R224K050B	5.00	K224K20X7RF53H5
330 000	50 V	10.16	2C40X7R334K050B	10.00	K334K20X7RF53H0
470 000	50 V	10.16	2C40X7R474K050B	10.00	K474K20X7RF53H0
470 000	50 V	10.16	2C40Z5U474M050B	10.00	K474M20X7RF53H0
100	100 V	2.54	9C10C0G101J100B	2.54	K101J15C0GH53L2
22	100 V	2.54	9C10C0G220J100B	2.54	K220J15C0GH53L2
220	50 V	2.54	9C10C0G221J050B	2.54	K221J15C0GF53L2
47 000	50 V	2.54	9C10Z5U473M050B	2.54	K473M15X7RF53L2

Note

(1) Listed according to most preferable used types

Multilayer Ceramic Dipped Radial K10 Series Capacitors



Contents

Multilayer Ceramic Dipped Radial K10 Capacitors

INTERNAL CONSTRUCTION

Multilayer ceramic capacitors consist of electrodes, the interleaved ceramic dielectric and the external terminal connectors. The capacitance is given by the description:

$$C = \frac{A \times n \times \varepsilon_0 \times \varepsilon_r}{d}$$

A = Electrode area

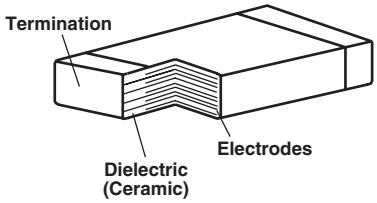
n = Number of active layers

d = Distance between electrodes

ε_r = Dielectric relative

ε_0 = Dielectric constant

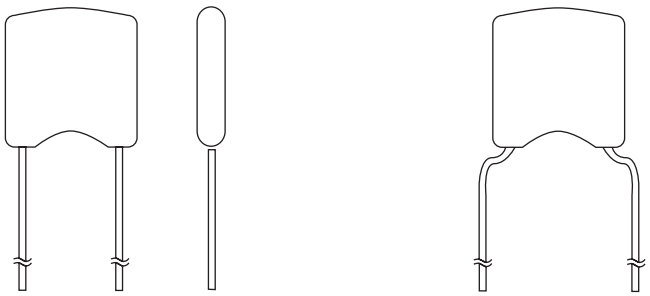
Whilst the values “A x n” and “d” are respectively determined by the production process, the dielectric constant is a function of the ceramic material used.



LEAD CONFIGURATION

Base material: FeCu
Plating: Electrolytic, tinned

COMPONTENT OUTLINES



Multilayer Ceramic Dipped Radial K10 Capacitors

DIELECTRIC CHARACTERISTICS			
DIELECTRIC ACCORDING TO EIA	**C0G (NP0)**	**X7R**	**Y5V**
According to CECC	CG	C1 (2C1)	2F4
Capacitance Range:			
at 1 MHz, 1 V; where C ≤ 1000 pF	10 pF to 1000 pF	-	-
at 1 kHz, 1 V; where C > 1000 pF	-	100 pF to 0.1 µF	0.01 µF to 0.1 µF
Tolerance on the Capacitance:			
where C < 10 pF	± 0.5 pF (D)	-	-
where C > 10 pF	± 5 % (J); ± 10 % (K)	± 10 % (K); ± 20 % (M)	+ 80 %/- 20 % (Z)
Rated DC Voltage	50 V; 100 V	50 V; 100 V	50 V
Dielectric Strength	250 % of rated voltage		
Insulation Resistance (IR)	≥ 10 GΩ		
Temperature Coefficient of the Capacitance	0 x 10^{-6}/K	-	-
Tolerance of the Temperature Coefficient	± 30 x 10^{-6}/K	-	-
Maximum Capacitance change with respect to Capacitance at 25 °C	-	± 15 %	+ 22 %/- 82 %
Dissipation Factor (DF)			
at 1 MHz, 1 V; where C ≤ 1000 pF	$\frac{1}{400 + 20 \times C}$	-	-
at 1 kHz, 1 V; where C > 1000 pF	≤ 0.1 %	≤ 2.5 %	≤ 5 %
Operating Temperature Range	- 55 °C to + 125 °C		- 30 °C to + 85 °C
Storage Temperature Range	25 °C ± 15 °C		
Aging	-	typical 1 % per time decade	typical 7 % per time decade

Note

- The capacitors meet the essential requirements of 'EIA 198'.
  Unless stated otherwise all electrical values apply at an ambient temperature of 25 °C ± 3 °C, at barometric pressures 650 mm to 800 mm of mercury, and relative humidity not to exceed 75 %.

MAIN FEATURES			
	CLASS 1	**CLASS 2**	**CLASS 3**
APPLICATION	For temperature compensation of frequency discriminating circuits and filters, coupling and decoupling in high frequency circuits where low losses and narrow capacitance tolerances are demanded.	As coupling and decoupling capacitors for such application where higher losses and a reduced capacitance stability are tolerated.	As coupling and decoupling capacitors for such application where higher losses and a reduced capacitance stability are tolerated.
PROPERTIES Temperature Dependence Capacitance	High stability of capacitance. Low dissipation factor up to higher frequencies. Defined temperature coefficient of capacitance, positive or negative, linear and reversible. High insulation resistance. No voltage dependence. High long-term stability of electrical values.	High capacitance values with small dimensions. Non-linear dependence of capacitance on temperature.	High capacitance values with small dimensions. Non-linear dependence of capacitance on temperature.
CLASSIFICATION			
Classification EIA:	C0G (NP0)	X7R	Y5V
Classification CECC:	CG	2C1	2F4

TEMPERATURE CHARACTERISTICS OF CAPACITANCE FOR CLASS 2/3 CERAMIC DIELECTRICS ACCORDING TO CECC 32100

CODE LETTER FOR SUB CATEGORY	MAXIMUM CAPACITANCE CHANGE IN % AT THE SPECIFIED TEMPERATURE RANGE		DESIGNATION OF THE SPECIFIED TEMPERATURE RANGE	
			- 55 °C/+ 125 °C	- 30 °C/+ 85 °C
	WITHOUT RATED VOLTAGE	WITH RATED VOLTAGE	1	4
2C	± 20 %	+ 20 %/- 30 %	X	
2F	+ 30 %/- 80 %	+ 30 %/- 90 %		X

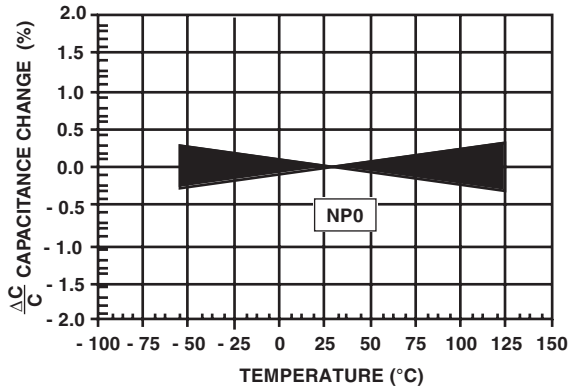
EIA - CODING SYSTEM FOR CLASS 2/3 CERAMIC

K	X	7	R	103	M
TYPE	WORKING TEMPERATURE RANGE LOWER TEMP. LIMIT	WORKING TEMPERATURE RANGE UPPER TEMP. LIMIT	CAPACITANCE CHANGE WITHIN WORKING TEMP. RANGE NO RATED VOLTAGE APPLIED	CAPACITANCE IN pF	TOLERANCE
	X = - 55 °C Y = - 30 °C	7 = + 125 °C 5 = + 85 °C	R = ± 15 % V = - 82 %/+ 22 %	The first two digits gives the nominal value, the third digit indicates the number of zeros, e.g. 103 = 10 000 pF For values below 10 pF an R is inserted in the second position instead of a decimal point e.g. 2R2 = 2.2 pF	D = ± 0.50 pF F = ± 1 % G = ± 2 % J = ± 5 % K = ± 10 % M = ± 20 % Z =+ 80 %/- 20 %

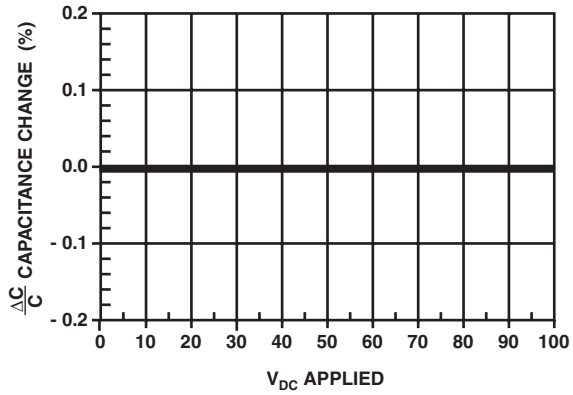
Example: Vishay BCcomponents Description
EIA Description

C0G (NP0) DIELECTRIC - TYPICAL PARAMETERS

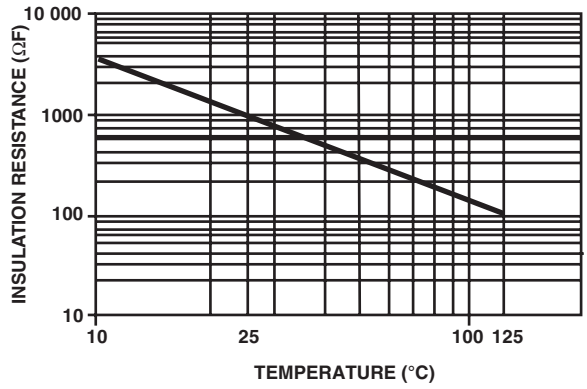
TEMPERATURE COEFFICIENT OF CAPACITANCE



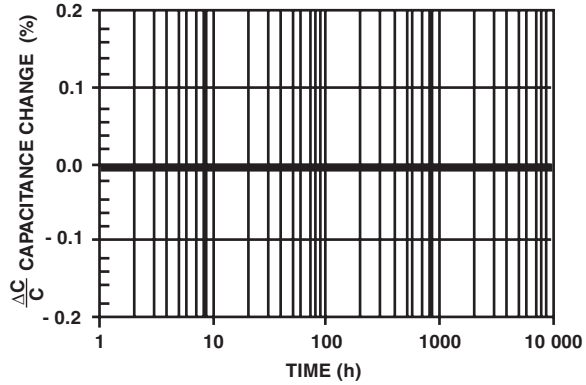
VOLTAGE COEFFICIENT OF CAPACITANCE - NP0



MINIMUM INSULATION RESISTANCE VS. TEMPERATURE

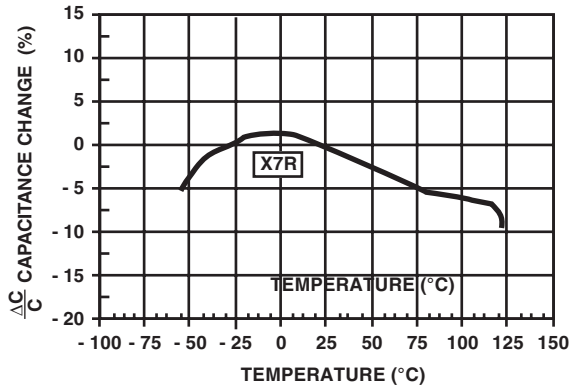


AGING RATE - NP0

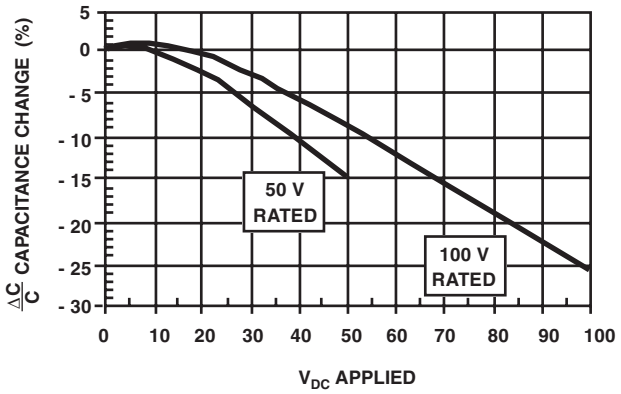


X7R DIELECTRIC - TYPICAL PARAMETERS

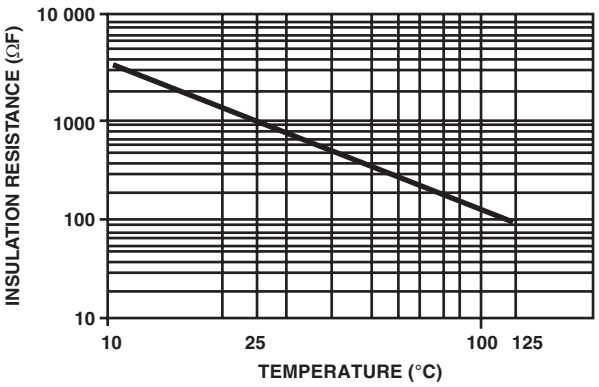
TEMPERATURE COEFFICIENT OF CAPACITANCE



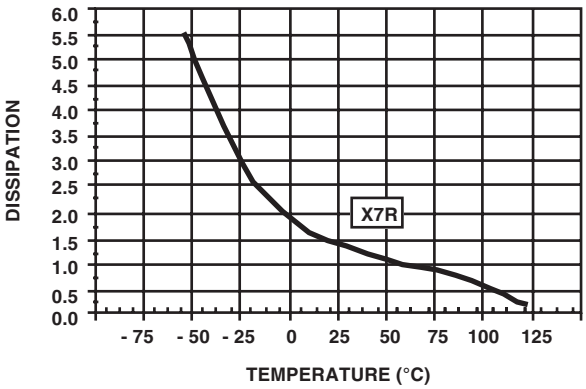
VOLTAGE COEFFICIENT OF CAPACITANCE - X7R



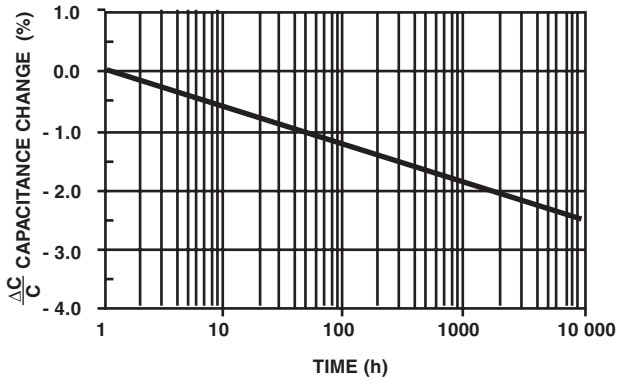
MINIMUM INSULATION RESISTANCE VS. TEMPERATURE



DISSIPATION FACTOR VS. TEMPERATURE

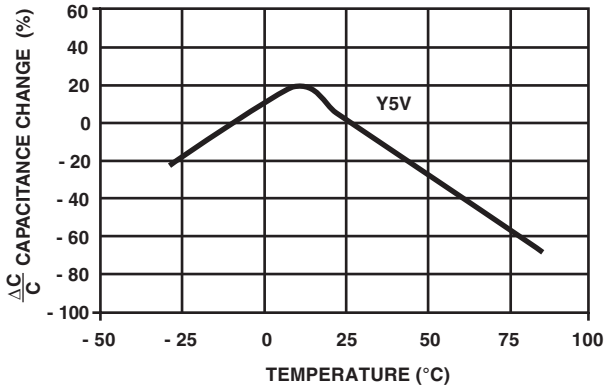


AGING RATE - X7R

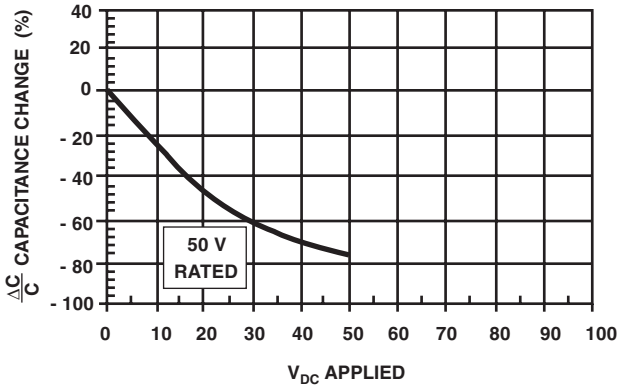


Y5V DIELECTRIC - TYPICAL PARAMETERS

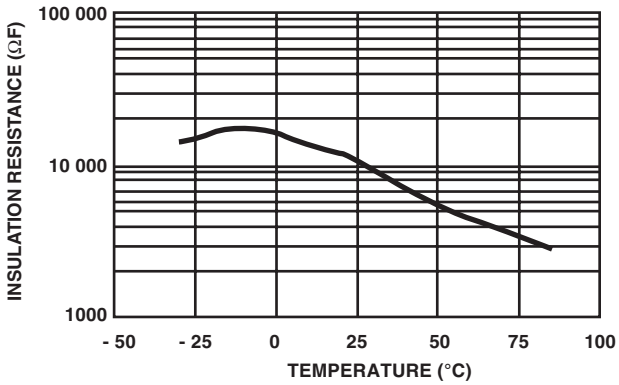
TEMPERATURE COEFFICIENT OF CAPACITOR



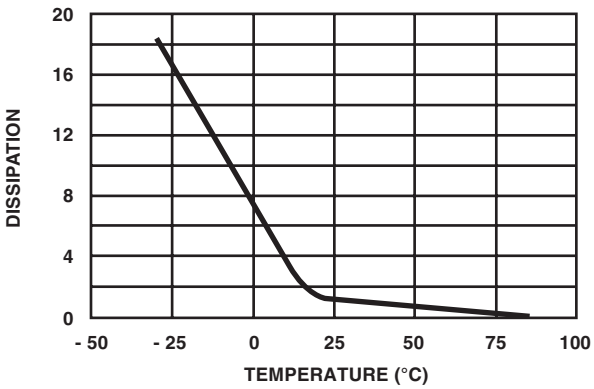
VOLTAGE COEFFICIENT OF CAPACITANCE - Y5V



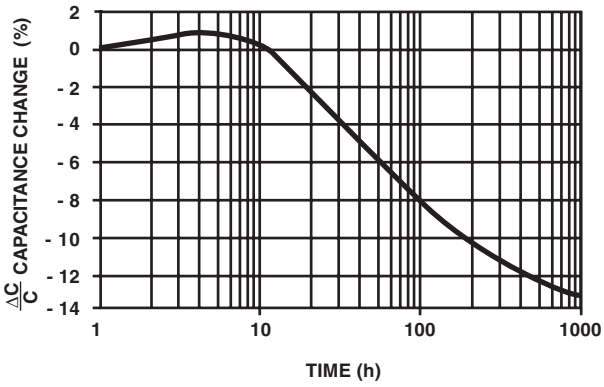
MINIMUM INSULATION RESISTANCE VS. TEMPERATURE



DISSIPATION FACTOR VS. TEMPERATURE

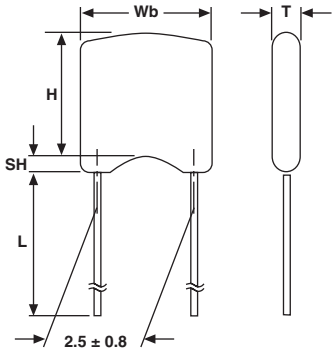


AGING RATE - Y5V



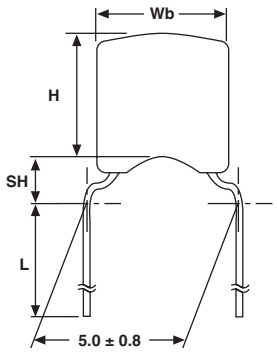
Multilayer Ceramic Dipped Radial K10 Capacitors

DIMENSIONS



L2

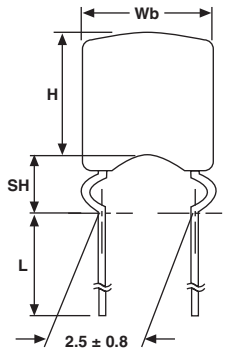
Component outline for
lead spacing 2.5 ± 0.8 mm
(straight leads)



H5

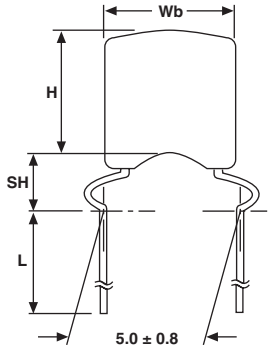
Component outline for
lead spacing 5.0 ± 0.8 mm
(flat bent leads)

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 5.0 ± 0.8 mm
(outside kink)

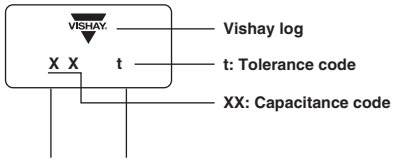
CAPACITOR DIMENSIONS AND WEIGHT in millimeter (inches)								
SIZE	**$Wb_{max.}$**	**$H_{max.}$**	**$T_{max.}$**	**MAX. SEATING HEIGHT (SH)**				**WEIGHT (g)**
				L2	**H5**	**K2**	**K5**	
10	3.6 (0.142)	3.6 (0.142)	2.3 (0.090)	1.58 (0.062)	2.54 (0.100)	3.50 (0.140)	3.50 (0.140)	≈ 0.10

Note

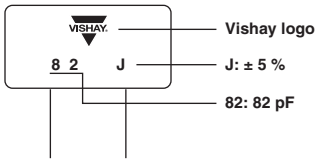
- Bulk packed types have a standard lead length L = 25.4 mm (1.0") minimum
- Thickness is defined as “T”

MARKING

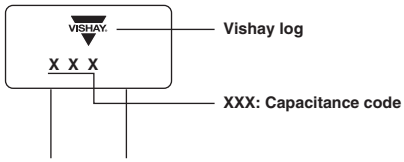
SIZE 10 CAPACITANCE VALUE < 100 pF



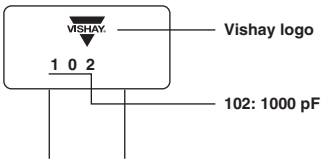
For example



SIZE 10 CAPACITANCE VALUE ≥ 100 pF



For example



Note

- Vishay or BCcomponents logo can be marked on the products body

Multilayer Ceramic Dipped Radial K10 Capacitors

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 box may be missing.

A maximum of 2 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 exceed ± 1.0 mm.

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

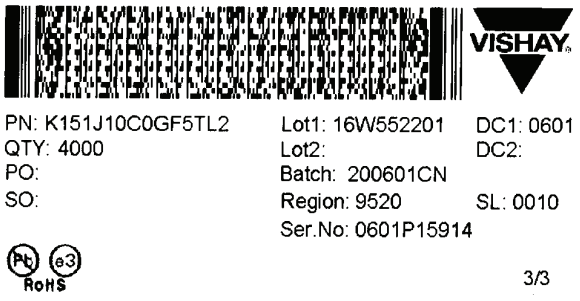
LABELLING

Each reel is provided with a label showing the following details:

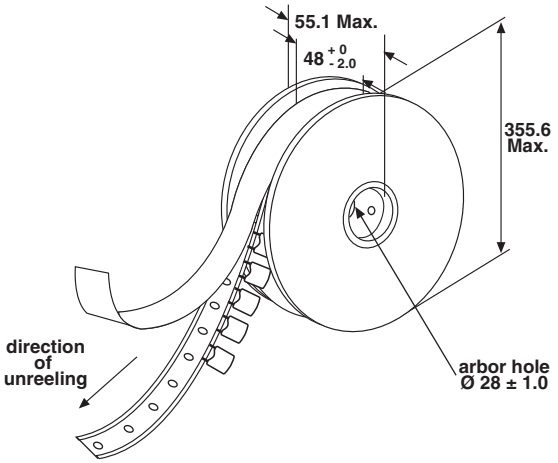
Manufacturer, K style, capacitance, tolerance, batch number, quantity of components, rated voltage, dielectric.

On special request other designations can be shown.

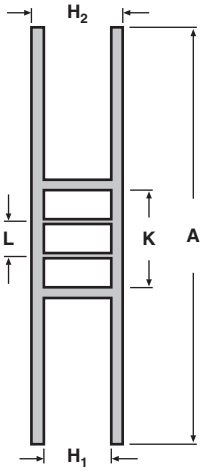
For example:



REEL

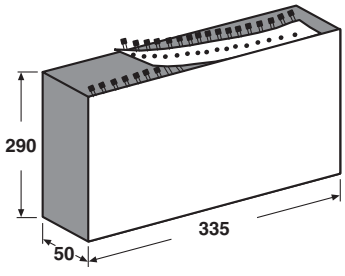


REEL DIMENSIONS



REEL SIZE		(mm)
A	Outer Dia.	360
L	Hole Dia.	30
K	Core Dia.	90
H_1	Internal Width	42
H_2	External Width	51

AMMOPACK



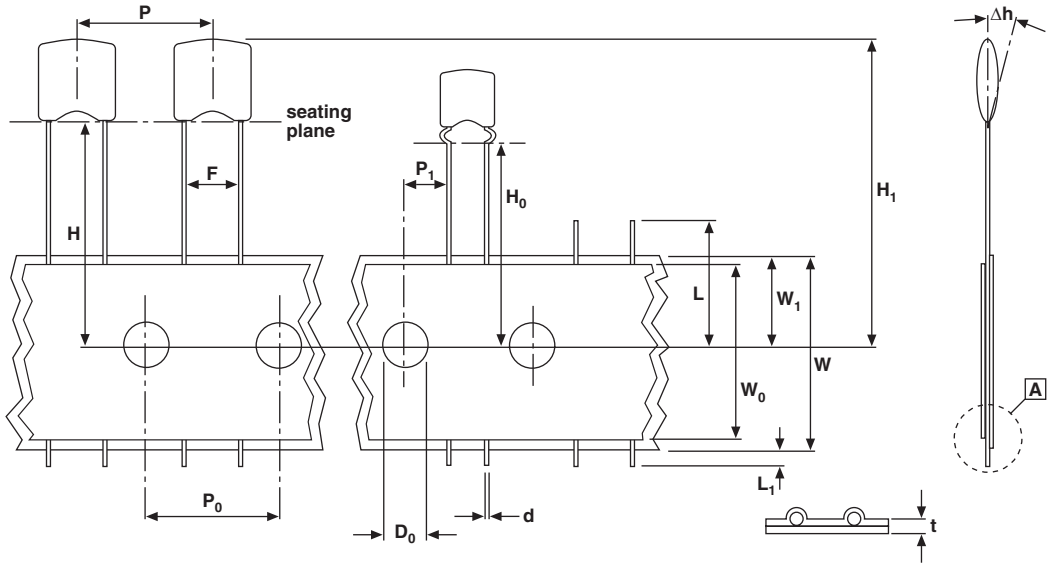
PACKAGING QUANTITIES AND BOX DIMENSIONS

PACKAGING	SMALLEST PACKAGING QUANTITY (SPQ)	BOX DIMENSIONS L x W x H (mm)
Tape on reel	4000	370 x 370 x 60
Ammopack	2500	335 x 290 x 50
Bulk (1)	5000	245 x 120 x 65

Note

(1) SPQ contains one or a multiple of poly-bags, 1000 units per bag

CAPACITORS ON TAPE



PARAMETER	SYMBOL	DIMENSIONS	
		mm	inch
Cut off length	L	≤ 11	≤ 0.443
Lead end protrusion	L_1	≤ 1	≤ 0.039
Height to seating plane (straight leads)	H	≥ 18	≥ 0.709
Height to seating plane (formed leads)	H_0	16 ± 0.5	0.630 ± 0.020
Top of component height	H_1	≤ 32	≤ 1.260
Body inclination	Δh	0.0 ± 1.0	0 ± 0.039
Carrier tape width	W	18 + 1.0/- 0.5	0.709 + 0.039/- 0.020
Hold down tape width	W_0	15 ref. (1)	0.591 ref. (1)
Sprocket hole position	W_1	9 + 0.075/- 0.5	0.354 + 0.030/- 0.020
1e lead space (2)	F	2.5 + 0.6/- 0.4	0.100 + 0.024/- 0.016
2e lead space (2)		5.0 + 0.6/- 0.4	0.200 + 0.024/- 0.016
Sprocket hole pitch	P_0	12.7 ± 0.3	0.500 ± 0.012
1e sprocket hole centre to lead centre	P_1	5.08 ± 0.7	0.200 ± 0.028
2e sprocket hole centre to lead centre		3.85 ± 0.7	0.150 ± 0.028
Sprocket hole diameter	D_0	4.0 ± 0.2	0.157 ± 0.008
Overall tape thickness	t	≤ 0.9	≤ 0.035
Wire lead diameter	d	0.5 ± 0.05	0.02 ± 0.002
Pitch	P	12.7 ± 1.0	0.50 ± 0.039

Notes

(1) Tape width of 6 mm (0.236") permissible

(2) e = 2.54 mm

Multilayer Ceramic Dipped Radial K10 Capacitors

STORAGE

The capacitors must not be stored in a corrosive atmosphere where sulfide or chloride gas, acid, alkali, or salt are present. Moisture exposure should also be avoided.

The solderability of the leads is not affected by storage of up to 24 months. Temperature + 10 °C to + 35 °C, relative humidity up to 60 %.

With reference to class 2 ceramic dielectric capacitors, see the last page of this general information.

SOLDERING

SOLDERING SPECIFICATIONS		
Soldering test for capacitors with wire leads: (According to IEC 60068-2-20, solder bath method)		
	SOLDERABILITY	RESISTANCE TO SOLDERING HEAT
Soldering temperature	235 °C ± 5 °C	260 °C ± 5 °C
Soldering duration	2 s ± 0.5 s	10 s ± 1 s
Distance from component body	≥ 2 mm	≥ 5 mm

SOLDERING RECOMMENDATIONS

Soldering of the component should be achieved using a Sn96.5/Ag3.0/Cu0.5, a Sn60/40 type or a silver-bearing type solder.

As ceramic capacitors are very sensitive to rapid changes in temperature (thermal shock), the solder heat resistance specification (see above table) should not be exceeded.

Subjecting the capacitor to excessive heat may result in thermal shocks that can crack the ceramic body and melt the internal solder junction.

CLEANING

The components should be cleaned with vapor degreasers immediately following the soldering operation.

SOLVENT RESISTANCE AND FLAME ABILITY

The coating and marking of the capacitors are resistant to the following test method: IEC 60068-2-45 (Method XA). The epoxy material is approved according to UL 94 V-0.

MOUNTING

We do not recommend modifying the lead terminals, e.g. bending or cropping as this action could break the coating or crack the ceramic insert. However, if the lead must be modified in such a way, we recommend supporting the lead with a clamping fixture next to the coating.

CAPACITANCE "AGING" OF CERAMIC CAPACITORS

Following the final heat treatment, all class 2 ceramic capacitors reduce their capacitance value. According to logarithmic law, this is due to their special crystalline construction. This change is called "aging". If the capacitors are heat treated (for example when soldering), the capacitance increases again to a higher value deaging, and the aging process begins again.

Note

- The level of this deaging is dependent on the temperature and the duration of the heat; an almost complete deaging is achieved at 150 °C in one hour. These conditions also form the basis for reference measurements when testing. The capacitance change per time decade (aging constant) differs for the various types of ceramic, but typical values can be taken from the equations below.

$$k = \frac{100 \times (C_{11} - C_{12})}{C_{11} \times \log_{10}(t_2/t_1)}$$

$$C_{12} = C_{11} \times (1 - k/100 \times \log_{10}(t_2/t_1))$$

t_1, t_2 = measuring time point (h)

C_{11}, C_{12} = capacitance values for the times t_1, t_2

k = aging constant (%)

REFERENCE MEASUREMENT

Due to aging, it is necessary to quote an age for reference measurements which can be related to the capacitance with fixed tolerance. According to EN 130700, this time period is 1000 h.

If the shelf-life of the capacitor is known, the capacitance for t = 1000 h can be calculated with the aging constant.

In order to avoid the influence of aging, it is important to deage the capacitors before stress-testing. The following procedure is adopted (see also EN 130700):

- Deaging at 125 °C, 1 h
- Storage for 24 h at normal climate temperature
- Initial measurement
- Stress
- Deaging at 125 °C, 1 h
- Storage for 24 h at normal climate temperature
- Final measurement

CAUTION

1. OPERATING VOLTAGE AND FREQUENCY CHARACTERISTIC

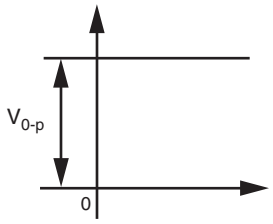
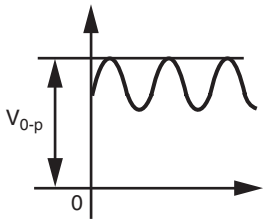
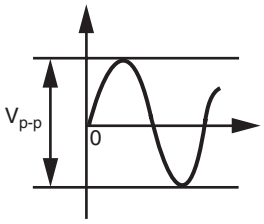
When sinusiodal or ripple voltage applied to DC Ceramic Disc Capacitors, be sure to maintain the peak-to-peak value or the peak value of the sum of both AC + DC within the rated voltage.

When start or stop applying the voltage, resonance may generate irregular voltage.

When rectangular or Pulse Wave Voltage is applied to DC Ceramic Disc Capacitors, the self-heating generated by the capacitor is higher than the sinusoidal application with the same frequency. The allowable voltage rating for the rectangular or pulse wave corresponds approximately with the allowable voltage of a sinusoidal wave with the double fundamental frequency.

The allowable voltage varies, depending on the voltage and the waveform.

Diagrams of the limiting values are available for each capacitor series on request.

VOLTAGE	DC	DC + AC	AC
Waveform Figure			

2. OPERATING TEMPERATURE AND SELF-GENERATED HEAT

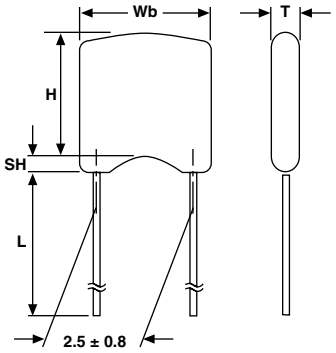
The surface temperature of the capacitors must not exceed the upper limit of its Rated Operating Temperature.

During operation in a high-frequency circuit or a pulse signal circuit, the capacitor itself generates heat due to dielectric losses. Applied voltage should be the load such as self-generated heat is within 20 °C on the condition of environmental temperature 25 °C.

Note, that excessive heat may lead to deterioration of the capacitor's characteristics.

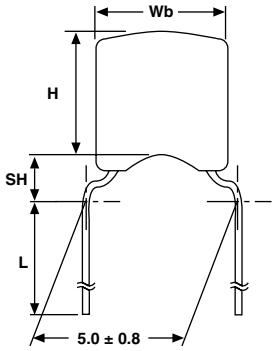
Multilayer Ceramic Dipped Radial K10 Capacitors

DIMENSIONS



L2

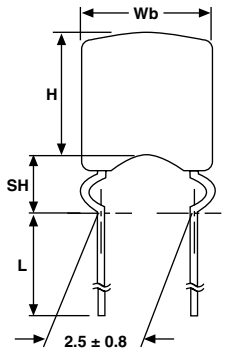
Component outline for
lead spacing 2.5 mm ± 0.8 mm
(straight leads)



H5

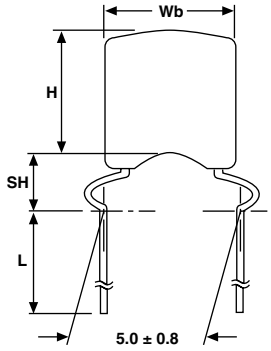
Component outline for
lead spacing 5.0 mm ± 0.8 mm
(flat bent leads)

L2 and H5 are preferred styles



K2

Component outline for
lead spacing 2.5 mm ± 0.8 mm
(outside kink)



K5

Component outline for
lead spacing 5.0 mm ± 0.8 mm
(outside kink)

CAPACITOR DIMENSIONS AND WEIGHT in millimeter (inches)								
SIZE	**$Wb_{max.}$**	**$H_{max.}$**	**$T_{max.}$**	**MAX. SEATING HEIGHT (SH)**				**WEIGHT (g)**
				L2	**H5**	**K2**	**K5**	
10	3.6 (0.142)	3.6 (0.142)	2.3 (0.090)	1.58 (0.062)	2.54 (0.100)	3.50 (0.140)	3.50 (0.140)	≈ 0.10

Note

- Bulk packed types have a standard lead length L = 25.4 mm (1.0") minimum
- Thickness is defined as "T"

QUICK REFERENCE DATA

DESCRIPTION	VALUE				
Capacitance range	10 pF to 1000 pF		100 pF to 0.1 µF		0.01 µF to 0.15 µF
Rated DC voltage	50 V	100 V	50 V	100 V	50 V
Tolerance on capacitance	± 5 %, ± 10 %		± 10 %, ± 20 %		+ 80 %/- 20 %
Dielectric Code	C0G (NP0)		X7R		Y5V

ORDERING INFORMATION

K	103	K	10	X7R	F	5	3	H	5
PRODUCT TYPE	CAPACITANCE CODE	CAPACITANCE TOLERANCE	SIZE CODE	TEMP. CHAR.	RATED VOLTAGE	LEAD DIA.	LEAD LENGTH/ PACKAGING	LEAD STYLE	LEAD SPACING
K = Mono-Kap	Two significant digits followed by the number of zeros. For example: 103 = 10 000 pF	J = ± 5 % K = ± 10 % M = ± 20 % Z = + 80%/- 20 %	Ref. mech. spec.	C0G X7R Y5V	F = 50 V_{DC} H = 100 V_{DC}	5 = 0.5 mm (0.020")	3 = Bulk, with lead length of 30 ± 5.0 mm (1.25") T = Tape and reel U = Ammopack	L = Straight Lead H = High seated assy	2 = 2.5 (0.100") 5 = 5.0 (0.200")

Ordering Example: K-103-K-10-X7R-F-5-3-H-5

CAPACITANCE RANGE CHART

C0G (NP0) DIELECTRIC

SIZE		10	
RATED VOLTAGE		50	100
VALUE	CODE		
10 pF	100	•	•
12 pF	120	•	•
15 pF	150	•	•
18 pF	180	•	•
22 pF	220	•	•
27 pF	270	•	•
33 pF	330	•	•
39 pF	390	•	•
47 pF	470	•	•
56 pF	560	•	•
68 pF	680	•	•
82 pF	820	•	•
100 pF	101	•	•
120 pF	121	•	•
150 pF	151	•	•
180 pF	181	•	•
220 pF	221	•	•
270 pF	271	•	•
330 pF	331	•	•
390 pF	391	•	•
470 pF	471	•	•
560 pF	561	•	•
680 pF	681	•	
820 pF	821	•	
1000 pF	102	•	
1200 pF	122		
1500 pF	152		
1800 pF	182		
2200 pF	222		
2700 pF	272		
3300 pF	332		
3900 pF	392		
4700 pF	472		
5600 pF	562		
6800 pF	682		
8200 pF	822		
0.01 µF	103		

Y5V DIELECTRIC

SIZE		10
RATED VOLTAGE		50
VALUE	CODE	
0.01 µF	103	•
0.015 µF	153	•
0.022 µF	223	•
0.033 µF	333	•
0.047 µF	473	•
0.068 µF	683	•
0.10 µF	104	•
0.15 µF	154	•
0.22 µF	224	
0.33 µF	334	
0.47 µF	474	
0.68 µF	684	
1.0 µF	105	

X7R DIELECTRIC

SIZE		10	
RATED VOLTAGE		50	100
VALUE	CODE		
100 pF	101	•	•
120 pF	121	•	•
150 pF	151	•	•
180 pF	181	•	•
220 pF	221	•	•
270 pF	271	•	•
330 pF	331	•	•
390 pF	391	•	•
470 pF	471	•	•
560 pF	561	•	•
680 pF	681	•	•
820 pF	821	•	•
1000 pF	102	•	•
1200 pF	122	•	•
1500 pF	152	•	•
1800 pF	182	•	•
2200 pF	222	•	•
2700 pF	272	•	•
3300 pF	332	•	•
3900 pF	392	•	•
4700 pF	472	•	•
5600 pF	562	•	•
6800 pF	682	•	•
8200 pF	822	•	•
0.01 µF	103	•	•
0.012 µF	123	•	
0.015 µF	153	•	
0.018 µF	183	•	
0.022 µF	223	•	
0.027 µF	273	•	
0.033 µF	333	•	
0.039 µF	393	•	
0.047 µF	473	•	
0.056 µF	563	•	
0.068 µF	683	•	
0.082 µF	823	•	
0.10 µF	104	•	
0.12 µF	124		
0.15 µF	154		
0.22 µF	224		
0.33 µF	334		
0.47 µF	474		
0.68 µF	684		
1.0 µF	105		

PART NUMBER LISTING - if not in range chart, please contact cmll@vishay.com

MONO-KAP Y5V - 50 V_{DC} CLEAR TEXT CODE			
CAPACITANCE (pF)	RATED VOLTAGE (V_{DC})	+ 80 %/- 20 % TOLERANCE 13th digit (T = Reel, U = Ammo, 3 = Bulk)	LEAD SPACING mm (inch)
10 000	50	K103Z10Y5VF5.L2	2.5 mm (0.10)
15 000		K153Z10Y5VF5.H5	5.0 mm (0.20)
15 000		K153Z10Y5VF5.L2	2.5 mm (0.10)
22 000		K223Z10Y5VF5.H5	5.0 mm (0.20)
22 000		K223Z10Y5VF5.L2	2.5 mm (0.10)
33 000		K333Z10Y5VF5.H5	5.0 mm (0.20)
33 000		K333Z10Y5VF5.L2	2.5 mm (0.10)
47 000		K473Z10Y5VF5.H5	5.0 mm (0.20)
47 000		K473Z10Y5VF5.L2	2.5 mm (0.10)
68 000		K683Z10Y5VF5.H5	5.0 mm (0.20)
68 000		K683Z10Y5VF5.L2	2.5 mm (0.10)
100 000		K104Z10Y5VF5.H5	5.0 mm (0.20)
100 000		K104Z10Y5VF5.L2	2.5 mm (0.10)
150 000		K154Z10Y5VF5.H5	5.0 mm (0.20)
150 000		K154Z10Y5VF5.L2	2.5 mm (0.10)

MONO-KAP X7R - 50 V_{DC} CLEAR TEXT CODE			
CAPACITANCE (pF)	RATED VOLTAGE (V_{DC})	10 % TOLERANCE 13th digit (1) (T = Reel, U = Ammo, 3 = Bulk)	LEAD SPACING mm (inch)
100	50	K101K10X7RF5.L2	2.5 mm (0.20)
100		K101K10X7RF5.H5	5.0 mm (0.20)
120		K121K10X7RF5.L2	2.5 mm (0.10)
120		K121K10X7RF5.H5	5.0 mm (0.20)
150		K151K10X7RF5.L2	2.5 mm (0.10)
150		K151K10X7RF5.H5	5.0 mm (0.20)
180		K181K10X7RF5.L2	2.5 mm (0.10)
180		K181K10X7RF5.H5	5.0 mm (0.20)
220		K221K10X7RF5.L2	2.5 mm (0.10)
220		K221K10X7RF5.H5	5.0 mm (0.20)
270		K271K10X7RF5.L2	2.5 mm (0.10)
270		K271K10X7RF5.H5	5.0 mm (0.20)
330		K331K10X7RF5.L2	2.5 mm (0.10)
330		K331K10X7RF5.H5	5.0 mm (0.20)
390		K391K10X7RF5.L2	2.5 mm (0.10)
390		K391K10X7RF5.H5	5.0 mm (0.20)
470		K471K10X7RF5.L2	2.5 mm (0.10)
470		K471K10X7RF5.H5	5.0 mm (0.20)
560		K561K10X7RF5.L2	2.5 mm (0.10)
560		K561K10X7RF5.H5	5.0 mm (0.20)
680		K681K10X7RF5.L2	2.5 mm (0.10)
680		K681K10X7RF5.H5	5.0 mm (0.20)
820		K821K10X7RF5.L2	2.5 mm (0.10)
820		K821K10X7RF5.H5	5.0 mm (0.20)
1000		K102K10X7RF5.L2	2.5 mm (0.10)
1000		K102K10X7RF5.H5	5.0 mm (0.20)
1200		K122K10X7RF5.L2	2.5 mm (0.10)
1200		K122K10X7RF5.H5	5.0 mm (0.20)
1500		K152K10X7RF5.L2	2.5 mm (0.10)
1500		K152K10X7RF5.H5	5.0 mm (0.20)

MONO-KAP X7R - 50 V_{DC} CLEAR TEXT CODE			
CAPACITANCE (pF)	RATED VOLTAGE (V_{DC})	10 % TOLERANCE 13th digit (1) (T = Reel, U = Ammo, 3 = Bulk)	LEAD SPACING mm (inch)
1800	50	K182K10X7RF5.L2	2.5 mm (0.10)
1800		K182K10X7RF5.H5	5.0 mm (0.20)
2200		K222K10X7RF5.L2	2.5 mm (0.10)
2200		K222K10X7RF5.H5	5.0 mm (0.20)
2700		K272K10X7RF5.L2	2.5 mm (0.10)
2700		K272K10X7RF5.H5	5.0 mm (0.20)
3300		K332K10X7RF5.L2	2.5 mm (0.10)
3300		K332K10X7RF5.H5	5.0 mm (0.20)
3900		K392K10X7RF5.L2	2.5 mm (0.10)
3900		K392K10X7RF5.H5	5.0 mm (0.20)
4700		K472K10X7RF5.L2	2.5 mm (0.10)
4700		K472K10X7RF5.H5	5.0 mm (0.20)
5600		K562K10X7RF5.L2	2.5 mm (0.10)
5600		K562K10X7RF5.H5	5.0 mm (0.20)
6800		K682K10X7RF5.L2	2.5 mm (0.10)
6800		K682K10X7RF5.H5	5.0 mm (0.20)
8200		K822K10X7RF5.L2	2.5 mm (0.10)
8200		K822K10X7RF5.H5	5.0 mm (0.20)
10 000		K103K10X7RF5.L2	2.5 mm (0.10)
10 000		K103K10X7RF5.H5	5.0 mm (0.20)
12 000		K123K10X7RF5.L2	2.5 mm (0.10)
12 000		K123K10X7RF5.H5	5.0 mm (0.20)
15 000		K153K10X7RF5.L2	2.5 mm (0.10)
15 000		K153K10X7RF5.H5	5.0 mm (0.20)
18 000		K183K10X7RF5.L2	2.5 mm (0.10)
18 000		K183K10X7RF5.H5	5.0 mm (0.20)
22 000		K223K10X7RF5.L2	2.5 mm (0.10)
22 000		K223K10X7RF5.H5	5.0 mm (0.20)
27 000		K273K10X7RF5.L2	2.5 mm (0.10)
27 000		K273K10X7RF5.H5	5.0 mm (0.20)
33 000		K333K10X7RF5.L2	2.5 mm (0.10)
33 000		K333K10X7RF5.H5	5.0 mm (0.20)
39 000		K393K10X7RF5.L2	2.5 mm (0.10)
39 000		K393K10X7RF5.H5	5.0 mm (0.20)
39 000		K393K10X7RF5.L2	2.5 mm (0.10)
39 000		K393K10X7RF5.H5	5.0 mm (0.20)
47 000		K473K10X7RF5.L2	2.5 mm (0.10)
47 000		K473K10X7RF5.H5	5.0 mm (0.20)
47 000		K473K10X7RF5.L2	2.5 mm (0.10)
47 000		K473K10X7RF5.H5	5.0 mm (0.20)
56 000		K563K10X7RF5.L2	2.5 mm (0.10)
56 000		K563K10X7RF5.H5	5.0 mm (0.20)
56 000		K563K10X7RF5.L2	2.5 mm (0.10)
56 000		K563K10X7RF5.H5	5.0 mm (0.20)
68 000		K683K10X7RF5.L2	2.5 mm (0.10)
68 000		K683K10X7RF5.H5	5.0 mm (0.20)
82 000		K823K10X7RF5.L2	2.5 mm (0.10)
82 000		K823K10X7RF5.H5	5.0 mm (0.20)
100 000		K104K10X7RF5.L2	2.5 mm (0.10)
100 000		K104K10X7RF5.H5	5.0 mm (0.20)

Note

(1) 20 % tolerance available

MONO-KAP C0G - 50 V_{DC} CLEAR TEXT CODE			
CAPACITANCE (pF)	RATED VOLTAGE (V_{DC})	5 % TOLERANCE 13th digit (T = Reel, U = Ammo, 3 = Bulk)	LEAD SPACING mm (inch)
10	50	K100J10C0GF5.L2	2.5 mm (0.10)
10		K100J10C0GF5.H5	5.0 mm (0.20)
12		K120J10C0GF5.L2	2.5 mm (0.10)
12		K120J10C0GF5.H5	5.0 mm (0.20)
15		K150J10C0GF5.L2	2.5 mm (0.10)
15		K150J10C0GF5.H5	5.0 mm (0.20)
18		K180J10C0GF5.L2	2.5 mm (0.10)
18		K180J10C0GF5.H5	5.0 mm (0.20)
22		K220J10C0GF5.L2	2.5 mm (0.10)
22		K220J10C0GF5.H5	5.0 mm (0.20)
27		K270J10C0GF5.L2	2.5 mm (0.10)
27		K270J10C0GF5.H5	5.0 mm (0.20)
33		K330J10C0GF5.L2	2.5 mm (0.10)
33		K330J10C0GF5.H5	5.0 mm (0.20)
39		K390J10C0GF5.L2	2.5 mm (0.10)
39		K390J10C0GF5.H5	5.0 mm (0.20)
47		K470J10C0GF5.L2	2.5 mm (0.10)
47		K470J10C0GF5.H5	5.0 mm (0.20)
56		K560J10C0GF5.L2	2.5 mm (0.10)
56		K560J10C0GF5.H5	5.0 mm (0.20)
68		K680J10C0GF5.L2	2.5 mm (0.10)
68		K680J10C0GF5.H5	5.0 mm (0.20)
82		K820J10C0GF5.L2	2.5 mm (0.10)
82		K820J10C0GF5.H5	5.0 mm (0.20)
100		K101J10C0GF5.L2	2.5 mm (0.10)
100		K101J10C0GF5.H5	5.0 mm (0.20)
120		K121J10C0GF5.L2	2.5 mm (0.10)
120		K121J10C0GF5.H5	5.0 mm (0.20)
150		K151J10C0GF5.L2	2.5 mm (0.10)
150		K151J10C0GF5.H5	5.0 mm (0.20)
180		K181J10C0GF5.L2	2.5 mm (0.10)
180		K181J10C0GF5.H5	5.0 mm (0.20)
220		K221J10C0GF5.L2	2.5 mm (0.10)
220		K221J10C0GF5.H5	5.0 mm (0.20)
270		K271J10C0GF5.L2	2.5 mm (0.10)
270		K271J10C0GF5.H5	5.0 mm (0.20)
330		K331J10C0GF5.L2	2.5 mm (0.10)
330		K331J10C0GF5.H5	5.0 mm (0.20)
390		K391J10C0GF5.L2	2.5 mm (0.10)
390		K391J10C0GF5.H5	5.0 mm (0.20)
470		K471J10C0GF5.L2	2.5 mm (0.10)
470		K471J10C0GF5.H5	5.0 mm (0.20)
560		K561J10C0GF5.L2	2.5 mm (0.10)
560		K561J10C0GF5.H5	5.0 mm (0.20)
680		K681J10C0GF5.L2	2.5 mm (0.10)
680		K681J10C0GF5.H5	5.0 mm (0.20)
820		K821J10C0GF5.L2	2.5 mm (0.10)
820		K821J10C0GF5.H5	5.0 mm (0.20)
1000		K102J10C0GF5.L2	2.5 mm (0.10)
1000		K102J10C0GF5.H5	5.0 mm (0.20)

Note

(1) 10 % tolerance available

MONO-KAP X7R - 100 V_{DC} CLEAR TEXT CODE			
CAPACITANCE (pF)	RATED VOLTAGE (V_{DC})	10 % TOLERANCE 13th digit (T = Reel, U = Ammo, 3 = Bulk)	LEAD SPACING mm (inch)
100	100	K101K10X7RH5.L2	2.5 mm (0.10)
100		K101K10X7RH5.H5	5.0 mm (0.20)
120		K121K10X7RH5.L2	2.5 mm (0.10)
120		K121K10X7RH5.H5	5.0 mm (0.20)
150		K151K10X7RH5.L2	2.5 mm (0.10)
150		K151K10X7RH5.H5	5.0 mm (0.20)
180		K181K10X7RH5.L2	2.5 mm (0.10)
180		K181K10X7RH5.H5	5.0 mm (0.20)
220		K221K10X7RH5.L2	2.5 mm (0.10)
220		K221K10X7RH5.H5	5.0 mm (0.20)
270		K271K10X7RH5.L2	2.5 mm (0.10)
270		K271K10X7RH5.H5	5.0 mm (0.20)
330		K331K10X7RH5.L2	2.5 mm (0.10)
330		K331K10X7RH5.H5	5.0 mm (0.20)
390		K391K10X7RH5.L2	2.5 mm (0.10)
390		K391K10X7RH5.H5	5.0 mm (0.20)
470		K471K10X7RH5.L2	2.5 mm (0.10)
470		K471K10X7RH5.H5	5.0 mm (0.20)
560		K561K10X7RH5.L2	2.5 mm (0.10)
560		K561K10X7RH5.H5	5.0 mm (0.20)
680		K681K10X7RH5.L2	2.5 mm (0.10)
680		K681K10X7RH5.H5	5.0 mm (0.20)
820		K821K10X7RH5.L2	2.5 mm (0.10)
820		K821K10X7RH5.H5	5.0 mm (0.20)
1000		K102K10X7RH5.L2	2.5 mm (0.10)
1000		K102K10X7RH5.H5	5.0 mm (0.20)
1200		K122K10X7RH5.L2	2.5 mm (0.10)
1200		K122K10X7RH5.H5	5.0 mm (0.20)
1500		K152K10X7RH5.L2	2.5 mm (0.10)
1500		K152K10X7RH5.H5	5.0 mm (0.20)
1800		K182K10X7RH5.L2	2.5 mm (0.10)
1800		K182K10X7RH5.H5	5.0 mm (0.20)
2200		K222K10X7RH5.L2	2.5 mm (0.10)
2200		K222K10X7RH5.H5	5.0 mm (0.20)
2700		K272K10X7RH5.L2	2.5 mm (0.10)
2700		K272K10X7RH5.H5	5.0 mm (0.20)
3300		K332K10X7RH5.L2	2.5 mm (0.10)
3300		K332K10X7RH5.H5	5.0 mm (0.20)
3900		K392K10X7RH5.L2	2.5 mm (0.10)
3900		K392K10X7RH5.H5	5.0 mm (0.20)
4700		K472K10X7RH5.L2	2.5 mm (0.10)
4700		K472K10X7RH5.H5	5.0 mm (0.20)
5600		K562K10X7RH5.L2	2.5 mm (0.10)
5600		K562K10X7RH5.H5	5.0 mm (0.20)
6800		K682K10X7RH5.L2	2.5 mm (0.10)
6800		K682K10X7RH5.H5	5.0 mm (0.20)
8200		K822K10X7RH5.L2	2.5 mm (0.10)
8200		K822K10X7RH5.H5	5.0 mm (0.20)
10 000		K103K10X7RH5.L2	2.5 mm (0.10)
10 000		K103K10X7RH5.H5	5.0 mm (0.20)

Note

(1) 20 % tolerance available

MONO-KAP C0G - 100 V_{DC} CLEAR TEXT CODE			
CAPACITANCE (pF)	RATED VOLTAGE (V_{DC})	5 % TOLERANCE 13th digit (T = Reel, U = Ammo, 3 = Bulk)	LEAD SPACING mm (inch)
10	100	K100J10C0GH5.L2	2.5 mm (0.10)
10		K100J10C0GH5.H5	5.0 mm (0.20)
12		K120J10C0GH5.L2	2.5 mm (0.10)
12		K120J10C0GH5.H5	5.0 mm (0.20)
15		K150J10C0GH5.L2	2.5 mm (0.10)
15		K150J10C0GH5.H5	5.0 mm (0.20)
18		K180J10C0GH5.L2	2.5 mm (0.10)
18		K180J10C0GH5.H5	5.0 mm (0.20)
22		K220J10C0GH5.L2	2.5 mm (0.10)
22		K220J10C0GH5.H5	5.0 mm (0.20)
27		K270J10C0GH5.L2	2.5 mm (0.10)
27		K270J10C0GH5.H5	5.0 mm (0.20)
27		K270J10C0GH5.L2	2.5 mm (0.10)
27		K270J10C0GH5.H5	5.0 mm (0.20)
33		K330J10C0GH5.L2	2.5 mm (0.10)
33		K330J10C0GH5.H5	5.0 mm (0.20)
39		K390J10C0GH5.L2	2.5 mm (0.10)
39		K390J10C0GH5.H5	5.0 mm (0.20)
47		K470J10C0GH5.L2	2.5 mm (0.10)
47		K470J10C0GH5.H5	5.0 mm (0.20)
56		K560J10C0GH5.L2	2.5 mm (0.10)
56		K560J10C0GH5.H5	5.0 mm (0.20)
68		K680J10C0GH5.L2	2.5 mm (0.10)
68		K680J10C0GH5.H5	5.0 mm (0.20)
82		K820J10C0GH5.L2	2.5 mm (0.10)
82		K820J10C0GH5.H5	5.0 mm (0.20)
100		K101J10C0GH5.L2	2.5 mm (0.10)
100		K101J10C0GH5.H5	5.0 mm (0.20)
120		K121J10C0GH5.L2	2.5 mm (0.10)
120		K121J10C0GH5.H5	5.0 mm (0.20)
150		K151J10C0GH5.L2	2.5 mm (0.10)
150		K151J10C0GH5.H5	5.0 mm (0.20)
180		K181J10C0GH5.L2	2.5 mm (0.10)
180		K181J10C0GH5.H5	5.0 mm (0.20)
220		K221J10C0GH5.L2	2.5 mm (0.10)
220		K221J10C0GH5.H5	5.0 mm (0.20)
270		K271J10C0GH5.L2	2.5 mm (0.10)
270		K271J10C0GH5.H5	5.0 mm (0.20)
330		K331J10C0GH5.L2	2.5 mm (0.10)
330		K331J10C0GH5.H5	5.0 mm (0.20)
390		K391J10C0GH5.L2	2.5 mm (0.10)
390		K391J10C0GH5.H5	5.0 mm (0.20)
470		K471J10C0GH5.L2	2.5 mm (0.10)
470		K471J10C0GH5.H5	5.0 mm (0.20)
560		K561J10C0GH5.L2	2.5 mm (0.10)
560		K561J10C0GH5.H5	5.0 mm (0.20)

Note

(1) 10 % tolerance available

Multilayer Ceramic Dipped Radial Capacitors
C0G, X7R, and Y5V Dielectric Capacitors

RADIAL ORDERING INFORMATION

K	103	K	10	X7R	F	5	3	H	5
PRODUCT TYPE	CAPACITANCE CODE	CAPACITANCE TOLERANCE	SIZE CODE	TEMP. CHAR.	RATED VOLTAGE	LEAD DIA.	LEAD LENGTH/ PACKAGING	LEAD STYLE	LEAD SPACING
K = Mono-Kap	10 pF to 1.0 µF (3 digit code). First two digits are significant. Third digit is number of zeros. For example: 100 = 10 pF, 101 = 100 pF, 332 = 3300 pF, 103 = 10 000 pF = 0.01 µF. Values less than 10 pF: 109 = 1.0 pF, 479 = 4.7 pF	J = ± 5 % K = ± 10 % M = ± 20 % Z = + 80 %/- 20 %	10 (0603)	C0G X7R Y5V	F = 50 V_{DC} H = 100 V_{DC}	5 = 0.5 mm (0.20")	3 = Bulk U = Ammopack T = Tape and reel	L = Straight Lead H = High seated assy	2 = 2.5 (0.100") 5 = 5.0 (0.200")

Build Vishay into your Design

WORLDWIDE SALES CONTACTS

Visit www.vishay.com for product information or select below for a current list of sales offices, representatives, and distributors.

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