VISHAY INTERTECHNOLOGY, INC.

INTERACTIVE
data book

CERAMIC DISC CAPACITORS
VISHAY BCCOMPONENTS

VSE-DB0071-1001

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.
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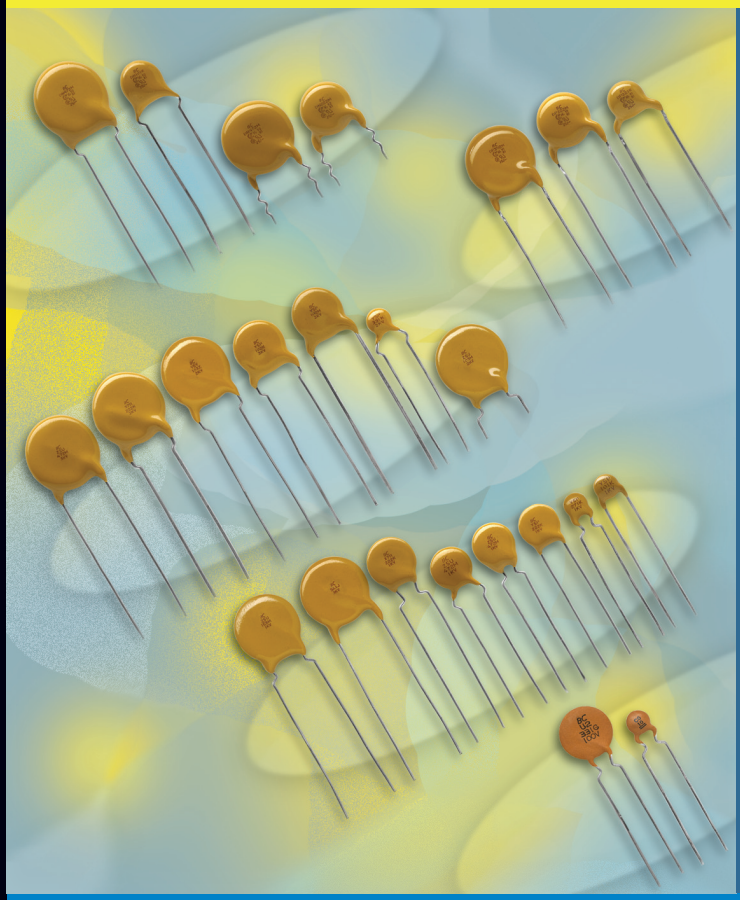

DATA BOOK

CERAMIC DISC CAPACITORS

VISHAY BCCOMPONENTS

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

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Ceramic Disc Capacitors

Ceramic Disc, RFI and Safety Capacitors

IN ACCORDANCE WITH IEC RECOMMENDATIONS CERAMIC CAPACITORS ARE SUBDIVIDED INTO TWO CLASSES:

- CERAMIC CLASS 1 or low-K capacitors are mainly manufactured of titanium dioxide or magnesium silicate
- CERAMIC CLASS 2 or high-K capacitors contain mostly alkaline titanates

- Compliant to RoHS directive 2002/95/EC

RoHS COMPLIANT

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 RFI and safety capacitors.	As coupling and decoupling capacitors for such application where higher losses and a reduced capacitance stability are required. As RFI and safety capacitors
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.
DC VOLTAGE capacitance dependence	None	Increasing with ε
DISSIPATION FACTOR TAN δ	Max. 0.15 % (Typical)	Max. 3.5 % (Typical)
INSULATION RESISTANCE	$\geq$ 10 GΩ	$\geq$ 1 GΩ
CAPACITANCE TOLERANCES	< 10 pF: ± 0.25 pF, ± 0.5 pF, ± 1 pF $\geq$ 10 pF: ± 2 %, ± 5 %, ± 10 %, ± 20 %	± 10 %, ± 20 %, (+ 80/- 20) %
RATED VOLTAGE	Up to 6 kV_{DC}	Up to 6 kV_{DC}

STANDARDS AND SPECIFICATIONS	
GENERAL STANDARDS	
IEC 60062	Marking codes for resistors and capacitors
IEC 60068	Basic environmental testing procedures
SPECIAL STANDARDS FOR CERAMIC CAPACITORS	
EN 130600 and IEC 60384-8	Fixed capacitors of ceramic dielectric, class 1
EN 130700 and IEC 60384-9	Fixed capacitors of ceramic dielectric, class 2
STANDARD FOR SPECIAL APPLICATION PURPOSES	
CSA C22.2	RFI - and safety capacitors
EN 132400	
IEC 60065	
IEC 60384-14.2	
UL 1414	
VDE 0560, part 2'5.70 and VDE 0860/8.81	

MEASURING AND TESTING CONDITIONS		
	CLASS 1	CLASS 2
CAPACITANCE AND DISSIPATION FACTOR	C ≥ 1000 pF	C ≥ 100 pF
	1 kHz, 1 V_{RMS} to 5 V_{RMS}	1 kHz, 1.0 V_{RMS} ± 0.2 V_{RMS}
	C < 1000 pF	C < 100 pF
	1 MHz, 1 V_{RMS} to 5 V_{RMS}	1 MHz, 1.0 V_{RMS} ± 0.2 V_{RMS}
INSULATION RESISTANCE TEMPERATURE DEPENDENCE CAPACITANCE	Rated voltage < 100 V:	measuring voltage = (10 ± 1) V
	≥ 100 V to < 500 V:	measuring voltage = (100 ± 15) V
	≥ 500 V:	measuring voltage = (500 ± 50) V
	Measuring time:	60 s ± 5 s
DIELECTRIC STRENGTH	Rated voltage ≤ 500 V:	Test voltage = 2.5 x U_R
	> 500 V:	measuring voltage = 1.5 x U_R
	Measuring time:	2 s

Notes

- Climatic test conditions: Temperature 20 °C to 25 °C
- Relative humidity 50 % to 70 %

NOMINAL VALUE SERIES ACCORDING TO IEC 60063		
E 6 (± 20 % TOLERANCE)	E 12 (± 10 % TOLERANCE)	E 24 (± 5 % TOLERANCE)
100	100	100
-	-	110
-	120	120
-	-	130
150	150	150
-	-	160
-	180	180
-	-	200
220	220	220
-	-	240
-	270	270
-	-	300
330	330	330
-	-	360
-	390	390
-	-	430
470	470	470
-	-	510
-	560	560
-	-	620
680	680	680
-	-	750
-	820	820
-	-	910

Note

- E6 values preferred

CAPACITANCE CODING SYSTEM			
CAPACITANCE VALUE	**CODE**	**CAPACITANCE VALUE**	
	p33	0.33 pF	
	3p3	3.3 pF	
	33p	33 pF	
	330p	330 pF	
	n33	330 pF (0.33 nF)	
	3n3	3300 pF (3.3 nF)	
	33n	33 000 pF (33 nF)	
	330n	330 000 pF (330 nF)	
	µ33	0.33 µF	
	3µ3	3.3 µF	
CAPACITANCE TOLERANCE	**CODE LETTER**	**C - TOLERANCE < 10 pF (pF)**	**C - TOLERANCE ≥ 10 pF (%)**
	C	± 0.25	-
	D	± 0.5	± 0.5
	G	-	± 2
	J	-	± 5
	K	-	± 10
	M	-	± 20
	Z	-	+ 80/- 20
RATED VOLTAGE	**CLEAR TEXT**		

CERAMIC DIELECTRIC	**CLASS 1**	**CLASS 2**
	P100	X7R
	NP0	Y5P
	N150	Z5U
	N750	Z5V
	N1500	Y5V
	SL0	Y5U
	S3N	

Notes

- The types of ceramic in bold print are standard versions, the color coding is applied to the top edge of the capacitor.
- The actual markings are given in detail on the respective datasheet.

PRODUCTION CODE ACCORDING TO IEC 60062

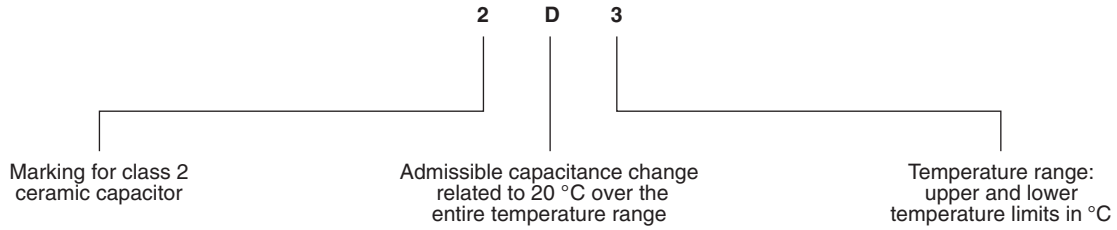
- The production code is indicated with a 4 FIGURE CODE
  4 figure code (year/WEEK)
- The 1st two figures indicate the year and the second two figures indicate the week.

  Examples:

  18th Week 1998 = 9818
  50th Week 1999 = 9950
  32nd Week 2000 = 0032
  41st Week 2001 = 0141
  27th Week 2002 = 0227
  22nd Week 2003 = 0322
  15th Week 2004 = 0415

MARKING OF THE TEMPERATURE CHARACTERISTIC OF CAPACITANCE FOR CLASS 2 CERAMIC CAPACITORS

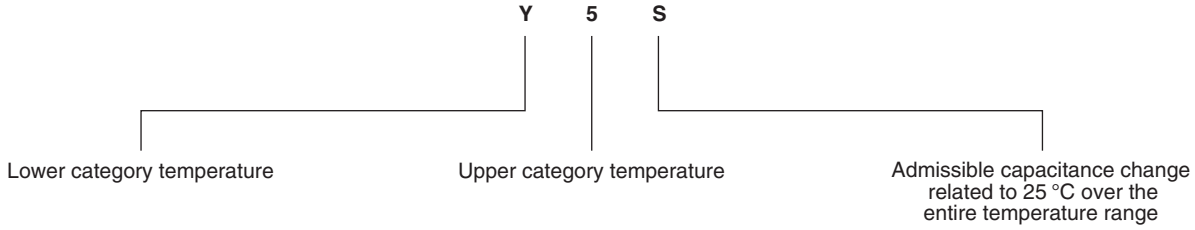
According to EN 130700 or IEC 60384-9



DC VOLTAGE		CODE LETTER
WITHOUT	WITH	
± 10 %	+ 10 %/- 15 %	B
± 20 %	+ 20 %/- 30 %	C
+ 20 %/- 30 %	+ 20 %/- 40 %	D
+ 22 %/- 56 %	+ 22 %/- 70 %	E
+ 30 %/- 80 %	+ 30 %/- 90 %	F
± 15 %	+ 15 %/- 40 %	R
± 15 %	+ 15 %/- 25 %	X

TEMPERATURE RANGE	CODE FIGURE
- 55 to + 125	1
- 55 to + 85	2
- 40 to + 85	3
- 25 to + 85	4
- 10 to + 85	5

According to EIA standard RS 198



TEMPERATURE	CODE LETTER
- 55 °C	X
- 30 °C	Y
+ 10 °C	Z

TEMPERATURE	CODE FIGURE
+ 45 °C	2
+ 65 °C	4
+ 85 °C	5
+ 105 °C	6
+ 125 °C	7

CHANGE	CODE LETTER
± 1 %	A
± 1.5 %	B
± 2.2 %	C
± 3.3 %	D
± 4.7 %	E
± 7.5 %	F
± 10 %	P
± 15 %	R
± 22 %	S
+ 22 %/- 33 %	T
+ 22 %/- 56 %	U
+ 22 %/- 82 %	V

CLASS 1 CERAMIC TYPE

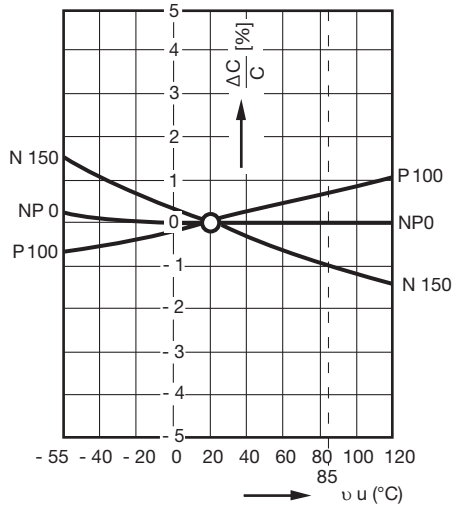
TEMPERATURE COEFFICIENT OF THE CAPACITANCE FOR CLASS 1 CERAMIC CAPACITORS

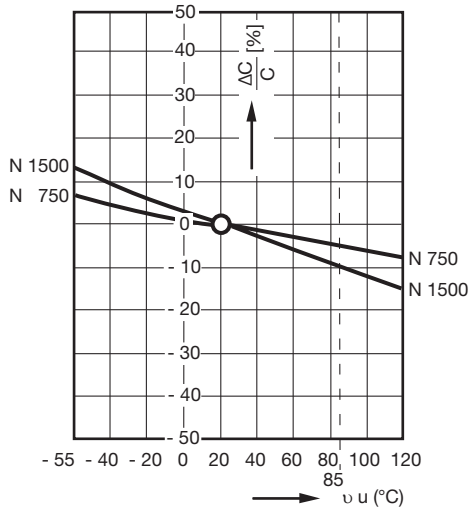
$$\frac{\Delta C}{C}\,[\%] = 100 \times \alpha \times \Delta\vartheta$$

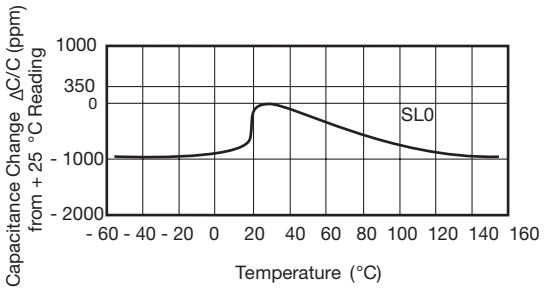
ΔC = Capacitance change

α = Temperature coefficient in $10^{-6}/°C$

$\Delta\vartheta$ = Temperature change in °C







VOLTAGE DEPENDENCE OF CAPACITANCE

None

FREQUENCY DEPENDENCE OF CAPACITANCE

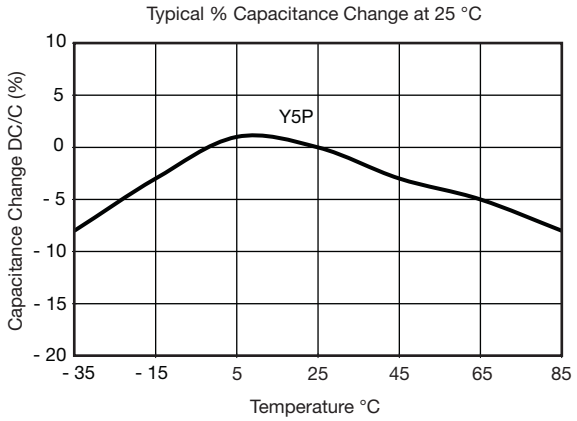
Max. - 2 % at 10 MHz

DISSIPATION FACTOR

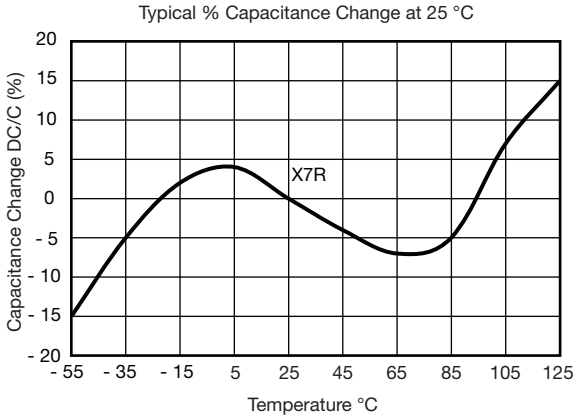
- For values greater than 50 pF: see datasheet
- For lower values the dissipation factor is calculated according to the type of ceramic (rated temperature coefficient) under consideration of the capacitance acc. to EN 130600.
- The dissipation factor as well as the measuring method to be agreed between manufacturer and user for values lower than 5 pF.

CLASS 2 CERAMIC TYPE

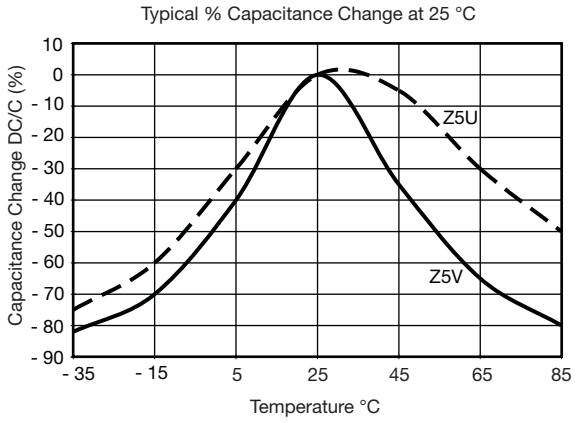
CERAMIC DIELECTRIC: Y5P



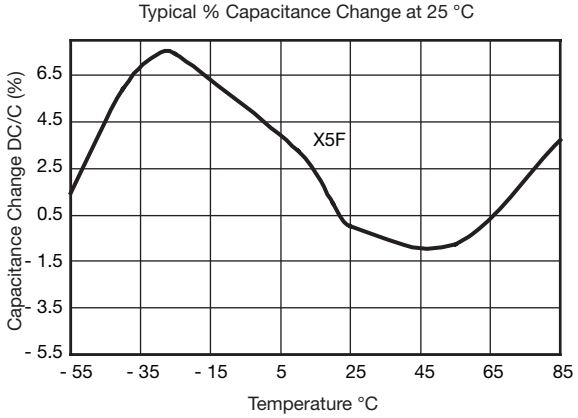
CERAMIC DIELECTRIC: X7R



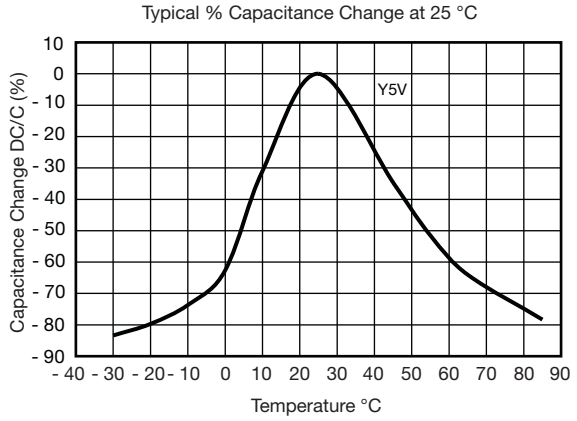
CERAMIC DIELECTRIC: ZSU/Z5V



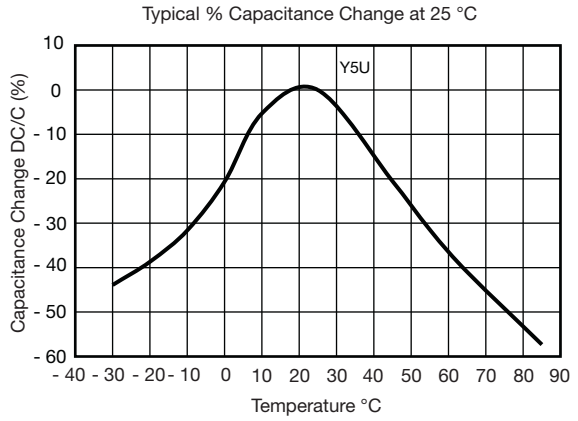
CERAMIC DIELECTRIC: X5F



CERAMIC DIELECTRIC: Y5V



CERAMIC DIELECTRIC: X5U



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.

$$k = \frac{100 \times (C_{11} - C_{12})}{C_{11} \times \log_{10}(t2/t1)}$$

$$C12 = C11 \times (1 - k/100 \times \log10\,[t2/t1])$$

t1, t2 = measuring time point (h)
C11, C12 = capacitance values for the times t1, t2
k = aging constant (%)

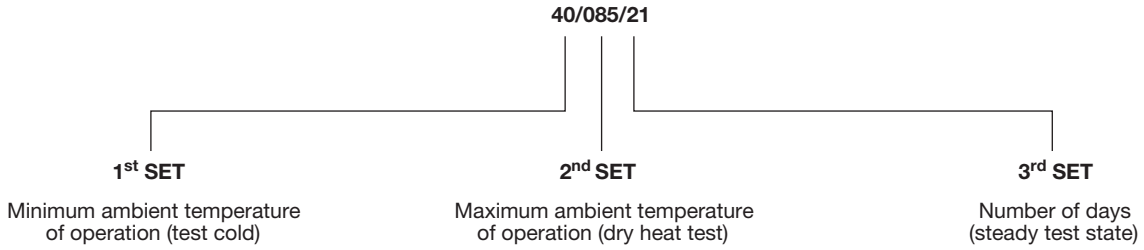
REFERENCE MEASUREMENT

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.

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

COMPONENT CLIMATIC CATEGORY



The large number of possible combinations of tests and severities may be reduced by the selection of a few standard groupings according to IEC 60068-1

Category examples according to IEC 60068-1
25/085/04
25/085/21
40/085/21
55/125/21

First set: Two digits denoting the minimum ambient temperature of operation (Cold test)

65	- 65 °C
55	- 55 °C
40	- 40 °C
25	- 25 °C
10	- 10 °C
00	0 °C
05	+ 5 °C

Second set: Three digits denoting the maximum ambient temperature (Dry heat test)

155	+ 155 °C
125	+ 125 °C
110	+ 110 °C
090	+ 90 °C
085	+ 85 °C
080	+ 80 °C
075	+ 75 °C
070	+ 70 °C
065	+ 65 °C
060	+ 60 °C
055	+ 55 °C

Third set: Two digits denoting the number of days of the damp heat steady state test (Ca)

56	56 days
21	21 days
10	10 days
04	4 days
00	The component is not required to be exposed to damp heat 56 days

STORAGE

he capacitors must not be stored in a corrosive atmosphere, where sulphide or chloride gas, acid, alkali or salt are present. Exposure of the components to moisture, should be avoided. The solderability of the leads is not affected by storage of up to 24 months (temperature + 10 °C to + 40 °C, relative humidity up to 60 % RH). Class 2 Ceramic Dielectric Capacitors are also subject to aging see previous page.

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 ± 5) °C	(260 ± 5) °C
Soldering Duration	(2 ± 0.5) s	(10 ± 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 Sn type solder. Ceramic capacitors are very sensitive to rapid changes in temperature (Thermal shock) therefore the solder heat resistance specification (see above table) should not be exceeded. Subjecting the capacitor to excessive heating may result in thermal shocks that can crack the ceramic body. Similarly, excessive heating can cause the internal solder junction to melt.

CLEANING

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

SOLVENT RESISTANCE

The coating and marking of the capacitors are resistant to the following test method:
IEC 60068-2-45 (Method XA)

MOUNTING

We do not recommend modifying the lead terminals, e.g. bending or cropping. This action could break the coating or crack the ceramic insert. If however, the lead must be modified in any way, we recommend support of the lead with a clamping fixture next to the coating.

AQL/FIT VALUES/SUPPLIED QUALITY

AQL 0.1 FOR THE SUM OF THE ELECTRIC MAIN FAULTS

- C - Tolerance > 1.5 x tolerance limit
- DF > 1.5 x catalog value
- RIS < catalog value
- Inadequate dielectric breakdown
- Interruption

AQL 0.25 FOR THE SUM OF THE MECHANICAL MAIN FAULTS

- Marking wrong or missing
- Dimensions out of tolerance
- Coating failure
- Lead space out of tolerance
- Poor solderability of leads
- Wrong lead length

AQL 0.65 FOR SECONDARY FAULTS

- Coating extension out of tolerance
- Marking incomplete
- Tape dimensions out of tolerance
- Testing in accordance to IEC 60410

Notes

The following agreements are possible on request:

- Lower AQL values
- Confirmed Initial random sampling test with appropriate report
- Report on production test findings
- Agreement on ppm concept

RELIABILITY

By careful control of the manufacturing process stages, the quality of the product is maintained at the highest possible level. To obtain data on the reliability of our ceramic capacitors, many long-term tests under increased temperature and voltage conditions have been carried out in our laboratories.

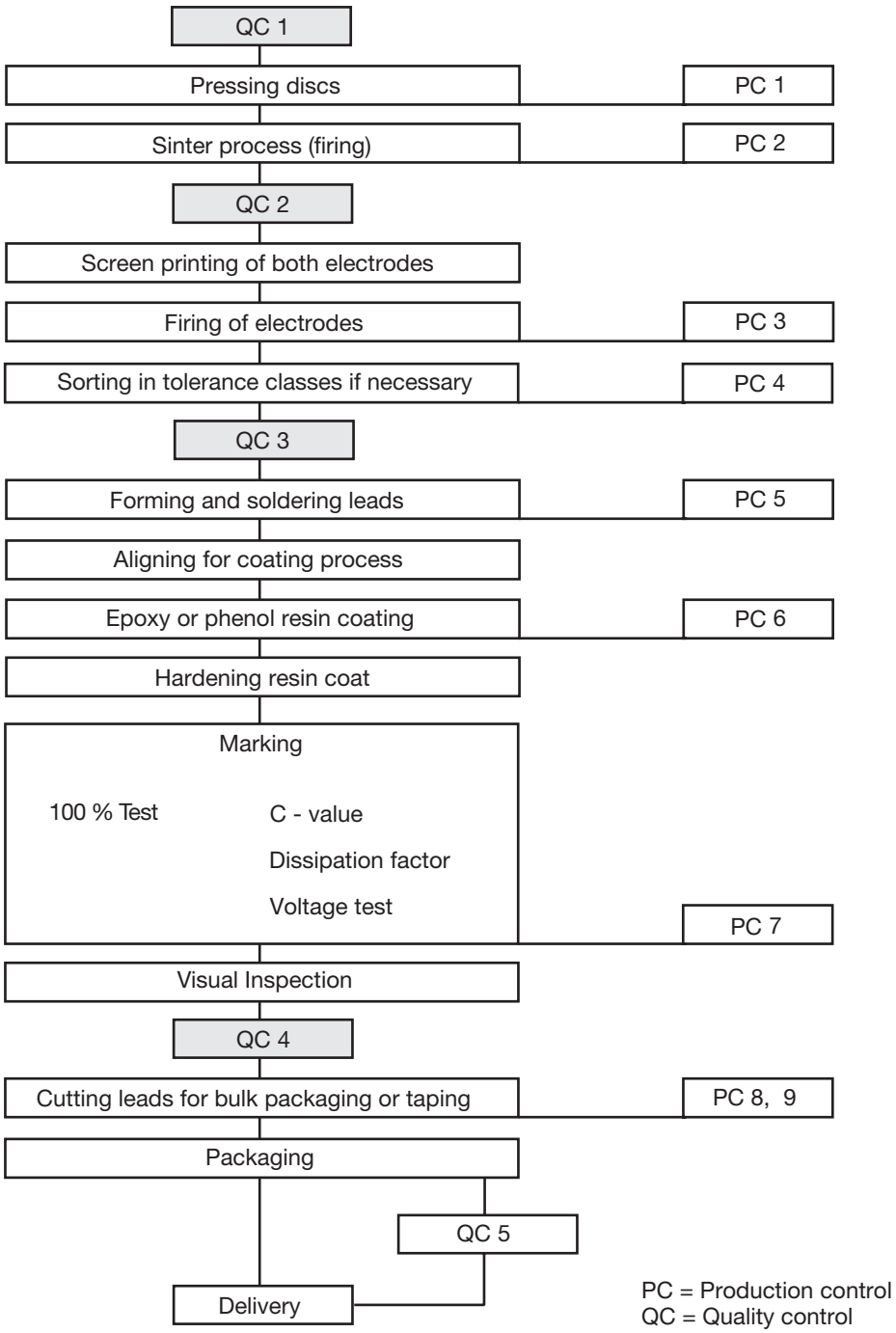
Based on the results of these tests, the following can be stated:

Reference Conditions:	Ambient temperature: (40 ± 2) °C
	Relative humidity: 90 % to 95 %
	Electrical stress: 0 V rated voltage (U_R), RFI safety cap 100 % U_R
Failure Criteria:	Short circuit (R ≤ 1 GΩ) or short circuit (R ≤ 3 GΩ RFI safety caps)
Failure Tests:	Class 1 capacitors: I = 500 FIT
	Class 2 capacitors: I = 500 FIT

By derating the voltage load, greatly increased reliability can be predicted.

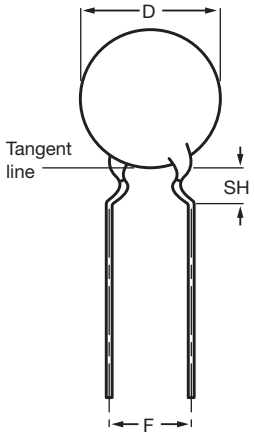
Temperature, up to the maximum category temperature, is not believed to significantly affect the reliability.

PRODUCTION FLOWCHART

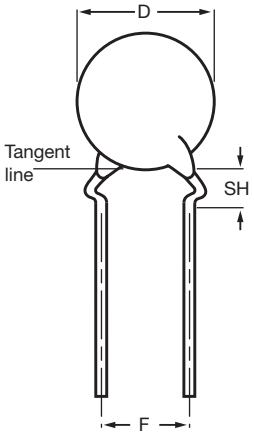


STANDARD LEAD CONFIGURATIONS

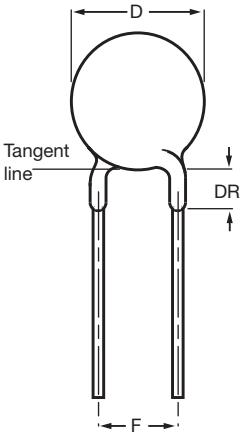
J = inside crimp kinked leads



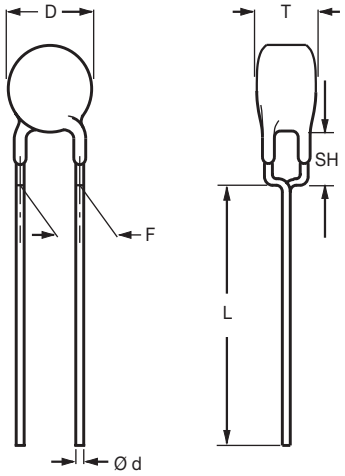
K = outside crimp kinked leads



L = straight leads



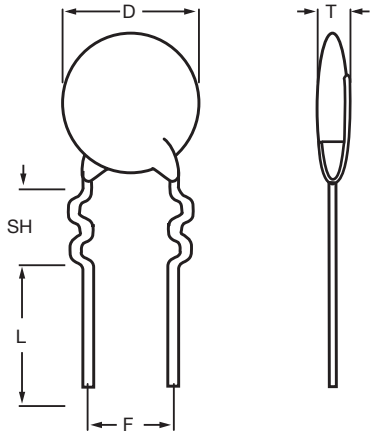
V = inline kinked leads



D = diameter
F = lead spacing
SH = seated height
T = thickness
L = lead length
DR = run down

NON-STANDARD LEAD STYLES AVAILABLE ON REQUEST

T = double crimp leads

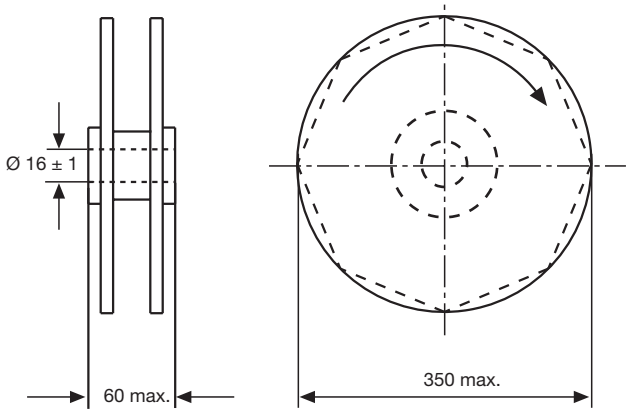


PACKAGING RADIAL TAPE AND AMMOPACK			
DESCRIPTION	**CODE**	**5.0 mm LEAD SPACING 12.7 mm FEED HOLE PITCH**	**7.5 mm LEAD SPACING 15.0 mm FEED HOLE PITCH**
Body Dimension	D	11.0 max.	14.0 max.
Feed Hole Diameter	D_0	4.0 ± 0.2	4.0 ± 0.2
Wire Lead Diameter	d	0.6 ± 0.05	0.60 ± 0.05
Lead End Protrusion	e	1.0 max.	1.0 max.
Lead Spacing	F	5.0 + 0.6/- 0.4	7.5 + 0.6/- 0.4
Height to seating plane (for straight leads)	H_0	20.0 ± 0.5	20.0 ± 0.5
Height to seating plane (for kinked leads)	H_0	16.0 ± 0.5	16.0 ± 0.5
Top of Component Height	H_1	32.0 max.	40.0 max.
Body Inclination	Δh	0 ± 1.0	0 ± 1.0
Rejected Component Cut Height	L	11.0 max.	11.0 max.
Component Pitch	p	12.7 ± 1.0	15.0 ± 1.0
Feed Hole Pitch	P_0	12.7 ± 0.3	15.0 ± 0.3
Feed Hole Off Alignment	P_1	3.85 ± 0.7	3.75 ± 0.7
	P_2	6.35 ± 1.3	7.5 ± 1.5
Plane Deviation	ΔP	1.0 max.	1.0 max.
Overall Tape Thickness	t	0.9 max.	0.9 max.
Overall Tape and Lead Thickness	t_1	1.5 max.	1.5 max.
Carrier Tape Width	W	18.0 + 1.0/- 0.5	18.0 + 1.0/- 0.5
Adhesive Tape Width	W_0	5.0 min.	5.0 min.
Feed Hole Height Off Alignment	W_1	9.0 + 0.75/- 0.5	9.0 + 0.75/- 0.5
Adhesive Tape Margin	W_2	3.0 max.	3.0 max.
Reference Drawing		Fig. 1	Fig. 1

PACKAGING RADIAL TAPE AND AMMOPACK			
DESCRIPTION	**CODE**	**7.5 mm LEAD SPACING 12.7 mm FEED HOLE PITCH 25.4 mm COMPONENT PITCH**	**10.0 mm LEAD SPACING 15.0 mm FEED HOLE PITCH 25.4 mm COMPONENT PITCH**
Body Dimension	D	22.0 max.	22.0 max.
Feed Hole Diameter	D_0	4.0 ± 0.2	4.0 ± 0.2
Wire Lead Diameter	d	0.6 ± 0.05	0.8 ± 0.05
Lead End Protrusion	e	1.0 max.	1.0 max.
Lead Spacing	F	7.5 + 0.6/- 0.4	10.0 + 0.6/- 0.4
Height to seating plane (for straight leads)	H_0	20.0 ± 0.5	20.0 ± 0.5
Height to seating plane (for kinked leads)	H_0	16.0 ± 0.5	16.0 ± 0.5
Top of Component Height	H_1	43.0 max.	43.0 max.
Body Inclination	Δh	0 ± 1.0	0 ± 1.0
Rejected Component Cut Height	L	11.0 max.	11.0 max.
Component Pitch	p	25.4 ± 1.0	25.4 ± 1.0
Feed Hole Pitch	P_0	12.7 ± 0.3	12.7 ± 0.3
Feed Hole Off Alignment	P_1	8.9 ± 0.7	8.9 ± 0.7
	P_2	12.7 ± 1.5	12.7 ± 1.5
Plane Deviation	ΔP	1.0 max.	1.0 max.
Overall Tape Thickness	t	0.9 max.	0.9 max.
Overall Tape and Lead Thickness	t_1	1.5 max.	1.7 max.
Carrier Tape Width	W	18.0 + 1.0/- 0.5	18.0 + 1.0/- 0.5
Adhesive Tape Width	W_0	5.0 min.	5.0 min.
Feed Hole Height Off Alignment	W_1	9.0 + 0.75/- 0.5	9.0 + 0.75/- 0.5
Adhesive Tape Margin	W_2	3.0 max.	3.0 max.
Reference Drawing		Fig. 2	Fig. 2

PACKAGING VERSIONS

Reel Packaging



Ammo Packaging

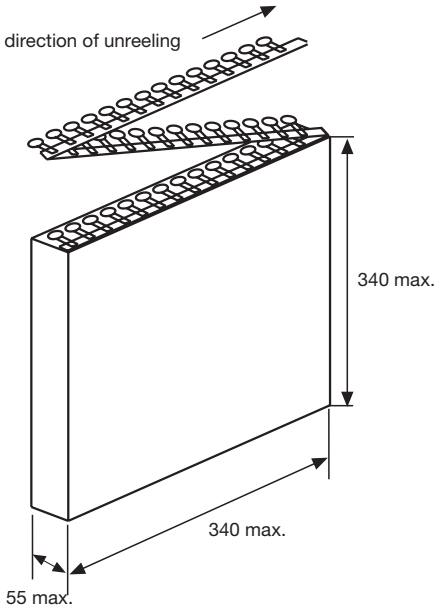


Fig. 1
Illustration for component pitch 12.7 and 15.0 mm
Feed hole pitch 12.7 and 15.0 mm
(12.7 mm for F = 5.0 and 6.4; 15 mm for F = 5.0, 6.4 and 7.5)

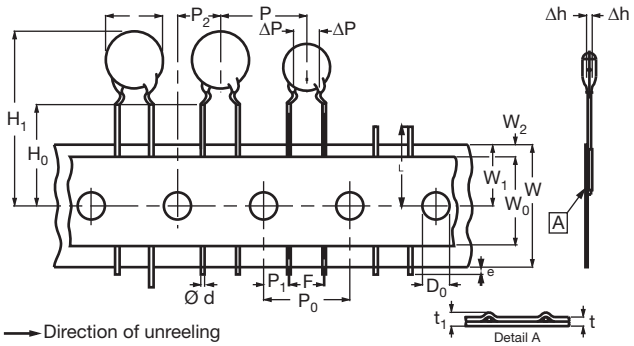
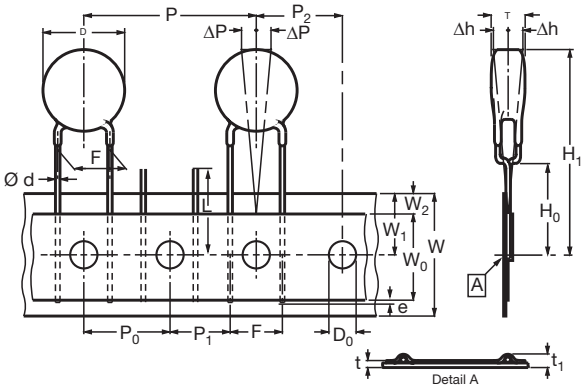


Fig. 2
Illustration for component pitch 25.4 mm
Feed hole pitch 12.7 mm
(for F = 7.5 and 10.0)

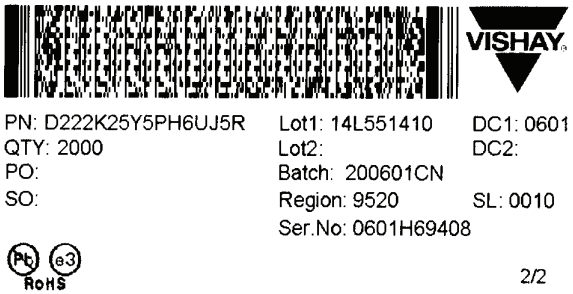


CLEAR TEXT ORDERING CODE										
D	**471**	**K**	**20**	**YP5**	**L**	**6**	**3**	**J**	**5**	**R**
1	2 3 4	5	6 7	8 9 10	11	12	13	14	15	16
Product Type	Capacitance	Capacitance Tolerance	Size Code	Temperature Characteristic	Rated Voltage	Lead Diameter	Packaging/ Lead length	Lead Style	Lead Spacing	RoHS Compliant
D = general type with phenolic resin coat S = safety recognized or general type, heavy duty with epoxy resin coat F = low dissipation type VY1 = safety recognized with epoxy resin coat VY2 = safety recognized with epoxy resin coat H = HV disc X7R	The first two digits are the significant figures of capacitance and the last digit is a multiplyer as follows: 0 = x 1 1 = x 10 2 = x 100 3 = x 1000 4 = x 10 000 9 = x 0.1	C = ± 0.25 pF D = ± 0.5 pF G = ± 2 % J = ± 5 % K = ± 10 % M = ± 20 % Z = + 80 %/ - 20 %	please see relevant datasheet or page 17	please see relevant datasheet or page 6	E = 25 V F = 50 V H = 100 V L = 500 V N = 1 kV P = 2 kV R = 3 kV U = 6 kV S = X1/Y2 250 V (AC) Q = X1/Y1 250 V (AC)	6 = 0.6 mm ± 0.05 mm (0.024") 8 = 0.8 mm ± 0.05 mm (0.031")	3 = bulk 30 mm ± 5.0 mm (1.18 ± 0.197") 5 = bulk 5.0 mm ± 0.8 mm (0.197" ± 0.031") T = tape and reel U = ammopack	please see relevant datasheet or page 13	2 = 2.5 mm (0.100") 5 = 5.0 mm (0.200") 6 = 6.4 mm (0.250") 7 = 7.5 mm (0.300") 0 = 10.0 mm (0.375")	

LABELLING

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

Manufacturer, capacitance, tolerance, batch number, quantity of components, rated voltage and dielectric. On special request other designations can be shown. For example:



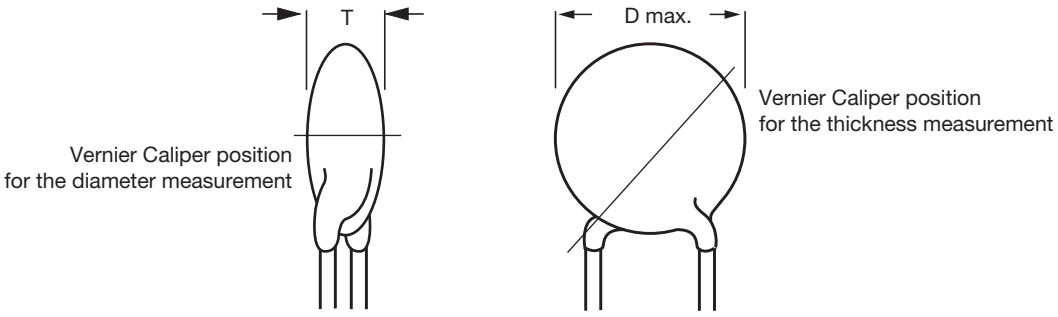
SMALLEST PACKAGING QUANTITIES (SPQ)

PACKAGING	PRODUCT FAMILY(D)	SIZE CODE	LEAD SPACE (F)	STANDARD PACKAGING SPEC.		
				WORKING VOLTAGE (W)	SPQ (PCS)	BOX DIMENSIONS L x W x H (mm)
Bulk	Disc Cap; long lead; (L ≥ 25.4 mm)	20 to 25	All	All (except 6 kV)	1000	245 x 120 x 65
		29 to 39			1000	
		43 to 47			1000	
		53 to 75			500	
		84 to 96			250	
		39 to 49		6 kV	500	
		53 to 75			250	
	Disc Cap; short lead; (L ≤ 10 mm)	20 to 25	All	All	5000	245 x 120 x 65
		29 to 39			3000	
		43 to 47			2000	
		53 to 59			1000	
		63 to 84			500	
		96			250	
	Safety Disc; short lead; (L ≤ 10 mm) DN	20 to 33	All	250 V_{AC}	3000	245 x 120 x 65
		39 to 47			2000	
		53 to 59			1000	
		63 to 75			500	
		≥ 84			250	
Tape and Reel	Disc Cap	≤ 47	≤ 6.4 mm	< 500 V_{DC}	2500	370 x 370 x 60
				500 ≤ WV ≤ 2000 V_{DC}	2000	
				3000 V_{DC}	1000	
			≥ 7.5 mm	All	1000	
		≥ 53	≤ 6.4 mm		500	
			≥ 7.5 mm		500	
	Safety Disc DN, VY2	≤ 53	≥ 7.5 mm	250 V_{AC}	1000	
		≥ 59			500	
		All	> 7.5		500	
Ammopack	Disc Cap	≤ 47	≤ 6.4 mm	< 500 V_{DC}	2000	335 x 240 x 50
				500 ≤ WV < 2000 V_{DC}	2000	335 x 290 x 50
				2000 V_{DC} and 3000 V_{DC}	1500	
			≥ 7.5 mm	All	1500	360 x 330 x 55
		≤ 53	≤ 6.4 mm		1500	335 x 290 x 50
			≥ 7.5 mm		1000	
	Safety Disc DN, VY2	≤ 53	≤ 7.5 mm	250 V_{AC}	1000	
		≥ 59			750	360 x 330 x 55
		All	> 7.5		750	

SIZE CODE	
SIZE CODE (CTC)	**DISC DIAMETER (OUTPUT)**
20	5.0 mm max.
25	6.5 mm max.
29	7.5 mm max.
31	8.0 mm max.
33	8.5 mm max.
35	8.9 mm max.
39	10.0 mm max.
41	10.5 mm max.
43	11.0 mm max.
47	12.0 mm max.
49	12.5 mm max.
51	13.0 mm max.
53	13.5 mm max.
59	15.0 mm max.
61	15.5 mm max.
65	16.5 mm max.
69	17.5 mm max.
75	19.0 mm max.
84	21.5 mm max.
93	23.6 mm max.
96	24.5 mm max.

MEASUREMENT

On the basis of the center of the product, measure the thickness with vernier caliper along every direction. Calipering position refers to the figure below. The maximum value is the thickness value.



CAUTION

1. OPERATING VOLTAGE AND FREQUENCY CHARACTERISTIC

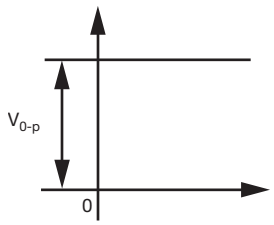
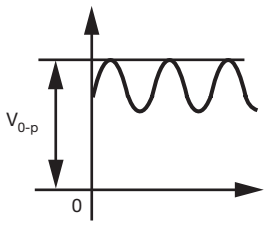
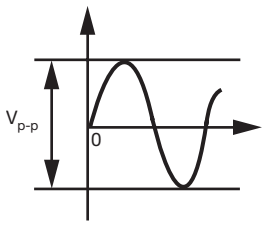
When sinusiodal or ripple voltage applied to DC Ceramic Disc Capacitors, be sure to maintain the peak-to-peak value or the peak value of the sum of both AC + DC within the rated voltage.

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 generate heat due to dielectric losses.

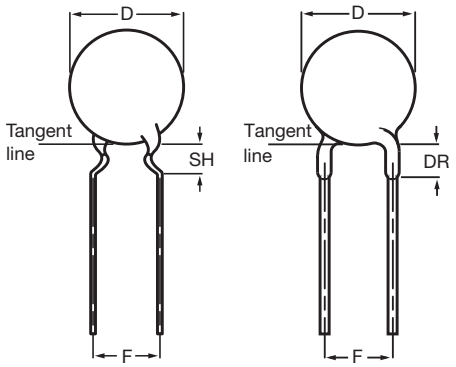
Applied voltage should be the load such as self-generated heat is within 20 °C on the condition of environmental temperature 25 °C.

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

Ceramic Disc Capacitors, Low Voltage

Contents

Ceramic Disc Capacitors
Class 1 and 2, 50 V_{DC}, General Purpose



Capacitors with 5 mm (0.20") and 2.5 mm (0.10") lead spacing

FEATURES

- Low losses
- High stability
- High capacitance in small size
- Kinked (preferred) or straight leads
- Compliant to RoHS directive 2002/95/EC

APPLICATIONS

- Bypassing
- Coupling
- Resonant circuit

DESIGN

The capacitors consist of a ceramic disc both sides of which are silver-plated. Connection leads are made of tinned copper having a diameter of 0.6 mm.

The capacitors have inward kinked leads with a spacing of 5 mm (0.20") and straight leads with 2.5 mm (0.10"), lead length from 4 mm to 30 mm.
Encapsulation is made of phenolic resin.

QUICK REFERENCE DATA		
DESCRIPTION	CLASS 1 (NP0, SL0)	CLASS 2 (Y5P, Z5U, Y5V, Z5V)
Voltage (V_{DC})	50	
Min. Capacitance (pF)	1	150
Max. Capacitance (pF)	100	47 000
Mounting	Through hole	

MARKING

Marking indicates capacitance value and tolerance in accordance with “EIA 198”

OPERATING TEMPERATURE RANGE

Class 1, - 55 °C to + 125 °C

Class 2, - 30 °C to + 85 °C

TEMPERATURE COEFFICIENT Y5R (2C4) - 30 °C TO + 85 °C

Class 1, NP0; SL0

Class 2, Y5P; Z5U; Y5V; Z5V

SECTIONAL SPECIFICATIONS

Class 1, IEC 60 384-8,

Class 2, IEC 60 384-9,

EIA 198

CLIMATIC CATEGORY

Class 1, - 55 °C to + 125 °C

Class 2, - 30 °C to + 85 °C

CAPACITANCE RANGE

Class 1, at 1 MHz, 1.2 V_{RMS}; 1.0 pF to 100 pF
1 kHz, 1 V_{RMS} ± 0.2 V_{RMS} for capacitance values higher than 1000 pF

Class 2, at 1 kHz, 1 V_{RMS} ± 0.2 V_{RMS} 150 pF to 47 000 pF

RATED DC VOLTAGE

50 V

DIELECTRIC STRENGTH

250 % of rated voltage

INSULATION RESISTANCE AT 500 V_{DC}

≥ 10 000 MΩ

TOLERANCE ON CAPACITANCE

± 5 %; ± 10 %; ± 20 %; + 80 %/- 20 %

DISSIPATION FACTOR

Class 1, C ≤ 30 pF ≤ 20 x (10/C + 0.7) x 10^{-4} maximum

Class 1, C > 30 pF ≤ 0.2 %

Class 2, ≤ 3.0 %

Note

- The capacitors meet the essential requirements of “IEC 60384-9 and EIA 198”. Unless stated otherwise all electrical values apply at an ambient temperature of 25 °C ± 3 °C, at normal atmospheric conditions

ORDERING INFORMATION, CLASS 1, 50 V_{DC}, KINKED					
C (pF)	TOL. (%)	$D_{MAX.}$ (mm)	$SH/DR_{MAX.}$ [1] (mm)	CLEAR TEXT CODE	
				13TH DIGIT: T = REEL; U = AMMO; 3 = BULK	
CLASS 1 NP0					
1.0	± 0.25 pF	5.0	5.0	4.0	D109C20C0KF6.J5R
			2.5	1.5	D109C20C0KF6.L2R
1.5			5.0	4.0	D159C20C0KF6.J5R
			2.5	1.5	D159C20C0KF6.L2R
2.2			5.0	4.0	D229C20C0JF6.J5R
			2.5	1.5	D229C20C0JF6.L2R
3.3			5.0	4.0	D339C20C0JF6.J5R
			2.5	1.5	D339C20C0JF6.L2R
4.7			5.0	4.0	D479C20C0HF6.J5R
			2.5	1.5	D479C20C0HF6.L2R
6.8	± 0.5 pF		5.0	4.0	D689D20C0HF6.J5R
			2.5	1.5	D689D20C0HF6.L2R
10	± 5.0		5.0	4.0	D100J20C0GF6.J5R
			2.5	1.5	D100J20C0GF6.L2R
12			5.0	4.0	D120J20C0GF6.J5R
			2.5	1.5	D120J20C0GF6.L2R
15			5.0	4.0	D150J20C0GF6.J5R
			2.5	1.5	D150J20C0GF6.L2R
18			5.0	4.0	D180J20C0GF6.J5R
			2.5	1.5	D180J20C0GF6.L2R
22			5.0	4.0	D220J20C0GF6.J5R
			2.5	1.5	D220J20C0GF6.L2R
27			5.0	4.0	D270J20C0GF6.J5R
			2.5	1.5	D270J20C0GF6.L2R
33			5.0	4.0	D330J20C0GF6.J5R
			2.5	1.5	D330J20C0GF6.L2R
39			5.0	4.0	D390J20C0GF6.J5R
			2.5	1.5	D390J20C0GF6.L2R
47			5.0	4.0	D470J20C0GF6.J5R
			2.5	1.5	D470J20C0GF6.L2R
CLASS 1 SL0					
56	± 5.0	5.0	5.0	4.0	D560J20SL0F6.J5R
			2.5	1.5	D560J20SL0F6.L2R
68			5.0	4.0	D680J20SL0F6.J5R
			2.5	1.5	D680J20SL0F6.L2R
82			5.0	4.0	D820J20SL0F6.J5R
			2.5	1.5	D820J20SL0F6.L2R
100			5.0	4.0	D101J20SL0F6.J5R
			2.5	1.5	D101J20SL0F6.L2R

Notes

[1] SH = seated height; DR = run down

- Maximum thickness 4.0 mm
- Lead style codes refer to lead configurations

ORDERING INFORMATION, CLASS 2, 50 V_{DC}, KINKED

C (pF)	TOL. (%)	$D_{MAX.}$ (mm)	$SH/DR_{MAX.}$ [1] (mm)	CLEAR TEXT CODE 13TH DIGIT: T = REEL; U = AMMO; 3 = BULK	
CLASS 2 Y5P					
150	± 10	5	5.0	4.0	D151K20Y5PF6.J5R
			2.5	1.5	D151K20Y5PF6.L2R
180			5.0	4.0	D181K20Y5PF6.J5R
			2.5	1.5	D181K20Y5PF6.L2R
220			5.0	4.0	D221K20Y5PF6.J5R
			2.5	1.5	D221K20Y5PF6.L2R
330			5.0	4.0	D331K20Y5PF6.J5R
			2.5	1.5	D331K20Y5PF6.L2R
470			5.0	4.0	D471K20Y5PF6.J5R
			2.5	1.5	D471K20Y5PF6.L2R
680			5.0	4.0	D681K20Y5PF6.J5R
			2.5	1.5	D681K20Y5PF6.L2R
1000			5.0	4.0	D102K20Y5PF6.J5R
			2.5	1.5	D102K20Y5PF6.L2R
1500			5.0	4.0	D152K20Y5PF6.J5R
			2.5	1.5	D152K20Y5PF6.L2R
1800		6.5	5.0	4.0	D182K25Y5PF6.J5R
			2.5	1.5	D182K25Y5PF6.L2R
2200			5.0	4.0	D222K25Y5PF6.J5R
			2.5	1.5	D222K25Y5PF6.L2R
3300			5.0	4.0	D332K25Y5PF6.J5R
			2.5	1.5	D332K25Y5PF6.L2R
4700		7.5	5.0	4.0	D472K29Y5PF6.J5R
			2.5	1.5	D472K29Y5PF6.L2R
6800		8.5	5.0	4.0	D682K33Y5PF6.J5R
			2.5	1.5	D682K33Y5PF6.L2R
10 000		10	5.0	4.0	D103K39Y5PF6.J5R
			2.5	1.5	D103K39Y5PF6.L2R

Notes

[1] SH = seated height; DR = run down

- Maximum thickness 4.0 mm
- Lead style codes refer to lead configurations

ORDERING INFORMATION, CLASS 2, 50 V_{DC}, KINKED AND STRAIGHT

C (pF)	TOL. (%)	$D_{MAX.}$ (mm)	$SH/DR_{MAX.}$ [1] (mm)	CLEAR TEXT CODE 13TH DIGIT: T = REEL; U = AMMO; 3 = BULK	
CLASS 2 Z5U					
1000	± 20	5	5.0	4.0	D102M20Z5UF6.J5R
			2.5	1.5	D102M20Z5UF6.L2R
1500			5.0	4.0	D152M20Z5UF6.J5R
			2.5	1.5	D152M20Z5UF6.L2R
2200			5.0	4.0	D222M20Z5UF6.J5R
			2.5	1.5	D222M20Z5UF6.L2R
3300			5.0	4.0	D332M20Z5UF6.J5R
			2.5	1.5	D332M20Z5UF6.L2R
4700			5.0	4.0	D472M20Z5UF6.J5R
			2.5	1.5	D472M20Z5UF6.L2R
6800	± 20	6.5	5.0	4.0	D682M25Z5UF6.J5R
			2.5	1.5	D682M25Z5UF6.L2R

ORDERING INFORMATION, CLASS 2, 50 V_{DC}, KINKED AND STRAIGHT

C (pF)	TOL. (%)	$D_{MAX.}$ (mm)	$SH/DR_{MAX.}$ [1] (mm)	CLEAR TEXT CODE 13TH DIGIT: T = REEL; U = AMMO; 3 = BULK	
CLASS 2 Z5U					
10 000	± 20	7.5	5.0	4.0	D103M29Z5UF6.J5R
			2.5	1.5	D103M29Z5UF6.L2R
15 000		8.5	5.0	4.0	D153M33Z5UF6.J5R
			2.5	1.5	D153M33Z5UF6.L2R
22 000		10	5.0	4.0	D223M39Z5UF6.J5R
			2.5	1.5	D223M39Z5UF6.L2R
CLASS 2 Y5V					
1000	+ 80/-20	5	5.0	4.0	D102Z20Y5VF6.J5R
			2.5	1.5	D102Z20Y5VF6.L2R
1500			5.0	4.0	D152Z20Y5VF6.J5R
			2.5	1.5	D152Z20Y5VF6.L2R
2200			5.0	4.0	D222Z20Y5VF6.J5R
			2.5	1.5	D222Z20Y5VF6.L2R
3300			5.0	4.0	D332Z20Y5VF6.J5R
			2.5	1.5	D332Z20Y5VF6.L2R
4700			5.0	4.0	D472Z20Y5VF6.J5R
			2.5	1.5	D472Z20Y5VF6.L2R
6800		6.5	5.0	4.0	D682Z25Y5VF6.J5R
			2.5	1.5	D682Z25Y5VF6.L2R
10 000		7.5	5.0	4.0	D103Z29Y5VF6.J5R
			2.5	1.5	D103Z29Y5VF6.L2R
15 000		8.5	5.0	4.0	D153Z33Y5VF6.J5R
			2.5	1.5	D153Z33Y5VF6.L2R
22 000		10	5.0	4.0	D223Z39Y5VF6.J5R
			2.5	1.5	D223Z39Y5VF6.L2R
CLASS 2 Z5V					
4700	+ 80/-20	5	5.0	4.0	D472Z20Z5VF6.J5R
			2.5	1.5	D472Z20Z5VF6.L2R
10 000		6.5	5.0	4.0	D103Z25Z5VF6.J5R
			2.5	1.5	D103Z25Z5VF6.L2R
22 000		7.5	5.0	4.0	D223Z29Z5VF6.J5R
			2.5	1.5	D223Z29Z5VF6.L2R
47 000		10	5.0	4.0	D473Z39Z5VF6.J5R
			2.5	1.5	D473Z39Z5VF6.L2R

Notes

[1] SH = seated height; DR = run down

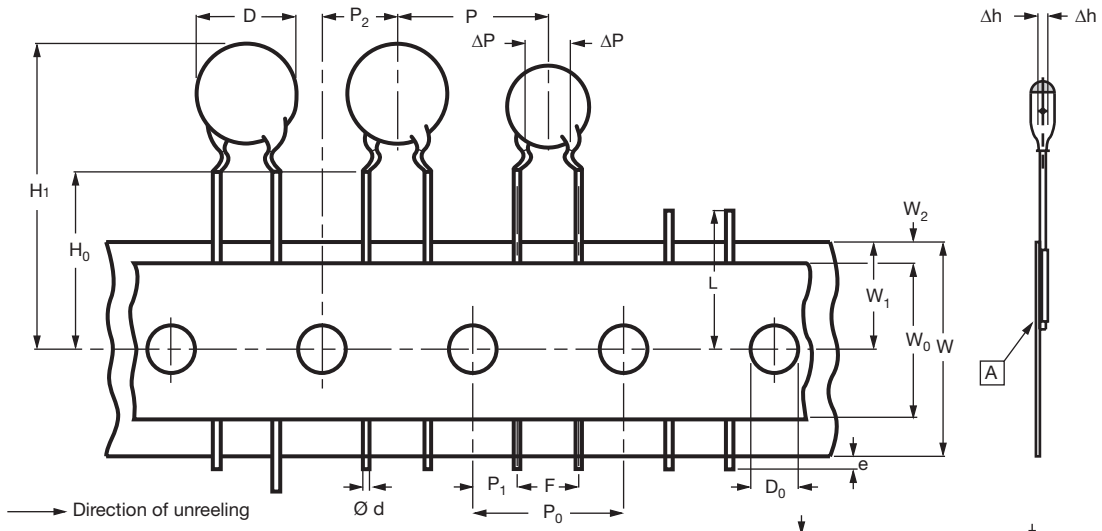
- Maximum thickness 4.0 mm
- Lead style codes refer to lead configurations

PACKAGING

$D_{MAX.}$	SIZE CODE	PACKAGING QUANTITIES		
		BULK	REEL	AMMO
5.0 (0.20")	20	1000	2500	2000
6.5 (0.25")	25			
7.5 (0.29")	29			
8.5 (0.33")	33			
10.0 (0.39")	39			
11.0 (0.43")	43			

Note

- The capacitors are supplied in bulk packaging (cardboard boxes), in tape on reel or in ammopack



Kinked capacitors on tape, lead spacing 5.0 mm (0.2")

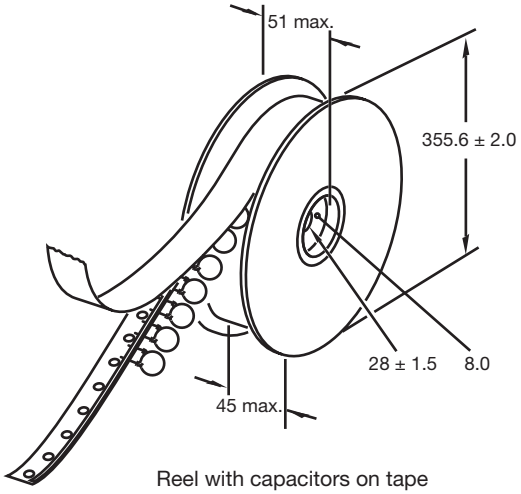
DIMENSIONS OF TAPE			
SYMBOL	PARAMETER	DIMENSIONS (mm)	
		FEED-HOLE PITCH P_0 = 12.7	FEED-HOLE PITCH P_0 = 15.0
		NOMINAL	TOLERANCE
D	Body diameter	11.0 maximum	-
d	Lead diameter	0.6	± 0.05
P	Pitch between capacitors	12.7	± 1.0
P_0 (1)	Feed-hole pitch	12.7	± 0.3
ΔP	Plane deviation	1.0 maximum	-
P_1 (2)	Feed-hole center to lead center	3.85	± 0.7
P_2 (2)	Feed-hole center to component center	6.35	± 1.3
F	Lead spacing	5.0	0.6/- 0.4
Δh	Component alignment	0	± 1.0
W	Tape width	18.0	+ 1.0/- 0.5
W_0	Hold-down tape width	5.0 minimum	-
W_1	Hole position	9.0	+ 0.75/- 0.5
W_2	Hold-down tape margin	3.0 maximum	-
H_0	Height to seating plane	16.0	± 0.5
H_1	Maximum component height	32.0	-
e	Lead end protrusion	1.0 maximum	-
L	Maximum length of snipped lead	11.0	-
D_0	Feed-hole diameter	4.0	± 0.2
t	Total tape thickness	0.9 maximum	-
t_1	Maximum thickness of tape and wires	1.5 maximum	-

Notes

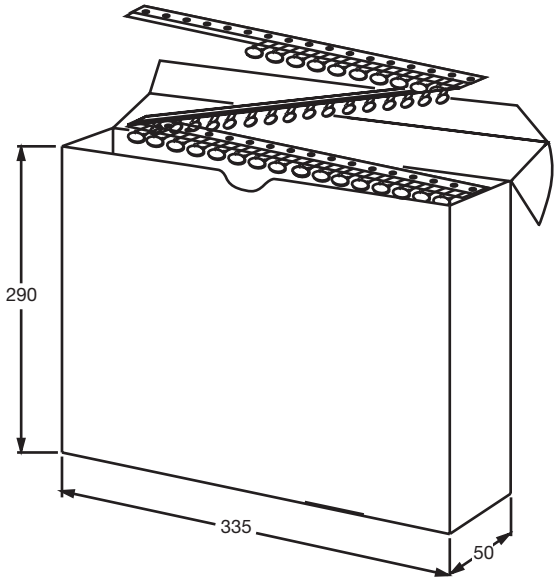
(1) Cumulative pitch error: ± ≤ 1 mm/20 pitches

(2) Obliquity maximum 3°

REEL AND TAPE DATA in millimeters

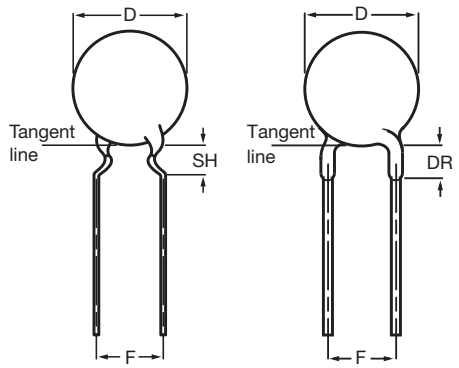


Reel with capacitors on tape



Ammopack with capacitors on tape

Ceramic Disc Capacitors
Class 1 and 2, 100 V_{DC}, General Purpose



Capacitors with 5 mm (0.20") and 2.5 mm (0.10") lead spacing

QUICK REFERENCE DATA		
DESCRIPTION	CLASS 1 (NP0, SL0)	CLASS 2 (YP5, Z50, Y5V, Z5V)
Voltage (V_{DC})	100	
Min. Capacitance (pF)	1.0	150
Max. Capacitance (pF)	100	47 000
Mounting	Through hole	

MARKING
Marking indicates capacitance value and tolerance in accordance with “EIA 198”.

OPERATING TEMPERATURE RANGE
Class 1, - 55 °C to + 125 °C
Class 2, - 30 °C to + 85 °C

TEMPERATURE COEFFICIENTS
Class 1, NP0; SL0
Class 2, Y5P; Z5U; Y5V; Z5V

SECTIONAL SPECIFICATIONS
Class 1, IEC 60 384-8,
Class 2, IEC 60 384-9,
EIA 198

CLIMATIC CATEGORY
Class 1, 55/125/21
Class 2, 10/85/21 and 30/85/21

FEATURES
- Low losses
- High stability
- High capacitance in small size
- Kinked (preferred) or straight leads
- Compliant to RoHS directive 2002/95/EC

RoHS COMPLIANT

APPLICATIONS
- Bypassing
- Coupling
- Resonant circuit

DESIGN
The capacitors consist of a ceramic disc both sides of which are silver-plated. Connection leads are made of tinned copper having a diameter of 0.6 mm.
The capacitors have inward kinked leads with a spacing of 5 mm (0.200") and straight leads with 2.5 mm (0.100"), lead length from 4 mm to 30 mm.

CAPACITANCE RANGE
1.0 pF to 100 pF; Class 1, at 1 MHz, 1.2 V_{RMS}
150 pF to 47 000 pF; Class 2, at 1 kHz, 1 V_{RMS} ± 0.2 V_{RMS}
1 kHz, 1 V_{RMS} ± 0.2 V_{RMS} for capacitance values higher than 1000 pF

RATED DC VOLTAGE
100 V

DIELECTRIC STRENGTH
250 % of rated voltage

INSULATION RESISTANCE AT 100 V_{DC}
≥ 10 000 MΩ

TOLERANCE ON CAPACITANCE
± 0.25 pF; ± 0.5 pF; ± 5 % ; ± 10 %; ± 20 %; + 80/- 20 %

DISSIPATION FACTOR
Class 1, C ≤ 30 pF; ≤ 2 x (10/C + 0.7) x 10^{-4} maximum
Class 1, C > 30 pF; ≤ 0.2 %
Class 2, ≤ 3.0 %

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 normal atmospheric conditions.

ORDERING INFORMATION, CLASS 1, 100 V_{DC}, KINKED AND STRAIGHT					
C (pF)	TOL. (%)	$D_{MAX.}$ (mm)	LEAD SPACING F (mm)	$SH/DR_{MAX.}$ [1] (mm)	CLEAR TEXT CODE 13TH DIGIT: T = REEL; U = AMMO; 3 = BULK
CLASS 1 NP0					
1.0	± 0.25 pF	5.0	5.0	4.0	D109C20C0KH6.J5R
			2.5	1.5	D109C20C0KH6.L2R
1.5			5.0	4.0	D159C20C0KH6.J5R
			2.5	1.5	D159C20C0KH6.L2R
2.2			5.0	4.0	D229C20C0JH6.J5R
			2.5	1.5	D229C20C0JH6.L2R
3.3			5.0	4.0	D339C20C0JH6.J5R
			2.5	1.5	D339C20C0JH6.L2R
4.7			5.0	4.0	D479C20C0HH6.J5R
			2.5	1.5	D479C20C0HH6.L2R
6.8	± 0.5 pF		5.0	4.0	D689D20C0HH6.J5R
			2.5	1.5	D689D20C0HH6.L2R
10	± 5		5.0	4.0	D100J20C0GH6.J5R
			2.5	1.5	D100J20C0GH6.L2R
12			5.0	4.0	D120J20C0GH6.J5R
			2.5	1.5	D120J20C0GH6.L2R
15			5.0	4.0	D150J20C0GH6.J5R
			2.5	1.5	D150J20C0GH6.L2R
18			5.0	4.0	D180J20C0GH6.J5R
			2.5	1.5	D180J20C0GH6.L2R
22			5.0	4.0	D220J20C0GH6.J5R
			2.5	1.5	D220J20C0GH6.L2R
27			5.0	4.0	D270J20C0GH6.J5R
			2.5	1.5	D270J20C0GH6.L2R
33			5.0	4.0	D330J20C0GH6.J5R
			2.5	1.5	D330J20C0GH6.L2R
39		6.5	5.0	4.0	D390J25C0GH6.J5R
			2.5	1.5	D390J25C0GH6.L2R
47			5.0	4.0	D470J25C0GH6.J5R
			2.5	1.5	D470J25C0GH6.L2R
CLASS 1 SL0					
56	± 5	5.0	5.0	4.0	D560J20SL0H6.J5R
			2.5	1.5	D560J20SL0H6.L2R
68			5.0	4.0	D680J20SL0H6.J5R
			2.5	1.5	D680J20SL0H6.L2R
82			5.0	4.0	D820J20SL0H6.J5R
			2.5	1.5	D820J20SL0H6.L2R
100			5.0	4.0	D101J20SL0H6.J5R
			2.5	1.5	D101J20SL0H6.L2R

Notes

[1] SH = seated height; DR = run down

- Maximum thickness 4.0 mm
- Lead style codes refer to lead cofigurations

ORDERING INFORMATION, CLASS 2, 100 V_{DC}, KINKED AND STRAIGHT					
C (pF)	TOL. (%)	$D_{MAX.}$ (mm)	LEAD SPACING F (mm)	$SH/DR_{MAX.}$ [1] (mm)	CLEAR TEXT CODE 13TH DIGIT: T = REEL; U = AMMO; 3 = BULK
CLASS 2 Y5P					
150	±10	5.0	5.0	4.0	D151K20Y5PH6.J5R
			2.5	1.5	D151K20Y5PH6.L2R
180			5.0	4.0	D181K20Y5PH6.J5R
			2.5	1.5	D181K20Y5PH6.L2R
220			5.0	4.0	D221K20Y5PH6.J5R
			2.5	1.5	D221K20Y5PH6.L2R
330			5.0	4.0	D331K20Y5PH6.J5R
			2.5	1.5	D331K20Y5PH6.L2R
470			5.0	4.0	D471K20Y5PH6.J5R
			2.5	1.5	D471K20Y5PH6.L2R
680			5.0	4.0	D681K20Y5PH6.J5R
			2.5	1.5	D681K20Y5PH6.L2R
1000			5.0	4.0	D102K20Y5PH6.J5R
			2.5	1.5	D102K20Y5PH6.L2R
1500		6.5	5.0	4.0	D152K25Y5PH6.J5R
			2.5	1.5	D152K25Y5PH6.L2R
1800			5.0	4.0	D182K25Y5PH6.J5R
			2.5	1.5	D182K25Y5PH6.L2R
2200			5.0	4.0	D222K25Y5PH6.J5R
			2.5	1.5	D222K25Y5PH6.L2R
3300		7.5	5.0	4.0	D332K29Y5PH6.J5R
			2.5	1.5	D332K29Y5PH6.L2R
4700		8.5	5.0	4.0	D472K33Y5PH6.J5R
			2.5	1.5	D472K33Y5PH6.L2R
6800		10.0	5.0	4.0	D682K39Y5PH6.J5R
			2.5	1.5	D682K39Y5PH6.L2R
10000		11.0	5.0	4.0	D103K43Y5PH6.J5R
			2.5	1.5	D103K43Y5PH6.L2R
CLASS 2 Z5U					
1000	± 20	5.0	5.0	4.0	D102M20Z5UH6.J5R
			2.5	1.5	D102M20Z5UH6.L2R
1500			5.0	4.0	D152M20Z5UH6.J5R
			2.5	1.5	D152M20Z5UH6.L2R
2200			5.0	4.0	D222M20Z5UH6.J5R
			2.5	1.5	D222M20Z5UH6.L2R
3300			5.0	4.0	D332M20Z5UH6.J5R
			2.5	1.5	D332M20Z5UH6.L2R
4700		6.5	5.0	4.0	D472M25Z5UH6.J5R
			2.5	1.5	D472M25Z5UH6.L2R
6800			5.0	4.0	D682M25Z5UH6.J5R
			2.5	1.5	D682M25Z5UH6.L2R
10 000		7.5	5.0	4.0	D103M29Z5UH6.J5R
			2.5	1.5	D103M29Z5UH6.L2R
15 000		8.5	5.0	4.0	D153M33Z5UH6.J5R
			2.5	1.5	D153M33Z5UH6.L2R
22 000		10.0	5.0	4.0	D223M39Z5UH6.J5R
			2.5	1.5	D223M39Z5UH6.L2R

Note

[1] SH = seated height; DR = run down

- Maximum thickness 4.0 mm
- Lead style codes refer to lead cofiguration

ORDERING INFORMATION, CLASS 2, 100 V_{DC}, KINKED AND STRAIGHT					
C (pF)	TOL. (%)	$D_{MAX.}$ (mm)	LEAD SPACING F (mm)	$SH/DR_{MAX.}$ (1) (mm)	CLEAR TEXT CODE 13TH DIGIT: T = REEL; U = AMMO; 3 = BULK
CLASS 2 Y5V					
1000	+ 80/- 20	5.0	5.0	4.0	D102Z20Y5VH6.J5R
			2.5	1.5	D102Z20Y5VH6.L2R
1500			5.0	4.0	D152Z20Y5VH6.J5R
			2.5	1.5	D152Z20Y5VH6.L2R
2200			5.0	4.0	D222Z20Y5VH6.J5R
			2.5	1.5	D222Z20Y5VH6.L2R
3300			5.0	4.0	D332Z20Y5VH6.J5R
			2.5	1.5	D332Z20Y5VH6.L2R
4700		6.5	5.0	4.0	D472Z25Y5VH6.J5R
			2.5	1.5	D472Z25Y5VH6.L2R
6800			5.0	4.0	D682Z25Y5VH6.J5R
			2.5	1.5	D682Z25Y5VH6.L2R
10 000		7.5	5.0	4.0	D103Z29Y5VH6.J5R
			2.5	1.5	D103Z29Y5VH6.L2R
15 000		8.5	5.0	4.0	D153Z33Y5VH6.J5R
			2.5	1.5	D153Z33Y5VH6.L2R
22 000		10.0	5.0	4.0	D223Z39Y5VH6.J5R
			2.5	1.5	D223Z39Y5VH6.L2R
CLASS 2 Z5V					
4700	+ 80/- 20	5.0	5.0	4.0	D472Z20Z5VH6.J5R
			2.5	1.5	D472Z20Z5VH6.L2R
10 000		6.5	5.0	4.0	D103Z25Z5VH6.J5R
			2.5	1.5	D103Z25Z5VH6.L2R
22 000		8.5	5.0	4.0	D223Z33Z5VH6.J5R
			2.5	1.5	D223Z33Z5VH6.L2R
47 000		11.0	5.0	4.0	D473Z43Z5VH6.J5R
			2.5	1.5	D473Z43Z5VH6.L2R

Note

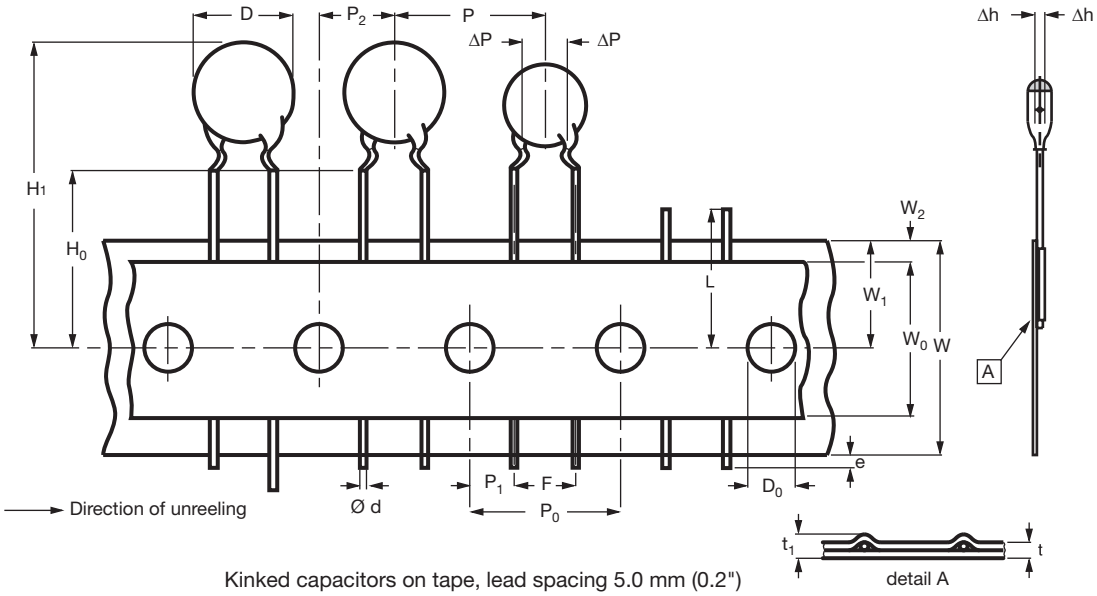
(1) SH = seated height; DR = run down

- Maximum thickness 4.0 mm
- Lead style codes refer to lead cofiguration

PACKAGING				
$D_{MAX.}$ (mm)	SIZE CODE	PACKAGING QUANTITIES		
		BULK	REEL	AMMO
5.0 (0.20")	20	1000	2500	2000
6.5 (0.25")	25			
7.5 (0.29")	29			
8.5 (0.33")	33			
10.0 (0.39")	39			
11.0 (0.43")	43			

Note

- The capacitors are supplied in bulk packaging (cardboard boxes), in tape on reel or in ammopack



Kinked capacitors on tape, lead spacing 5.0 mm (0.2")

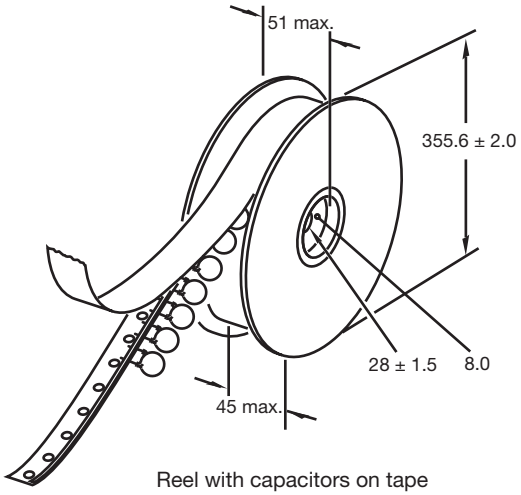
DIMENSION OF TAPE			
SYMBOL	PARAMETER	DIMENSIONS (mm)	
		NOMINAL	TOLERANCE
D	Body diameter	11.0 maximum	-
d	Lead diameter	0.6	± 0.05
P	Pitch between capacitors	12.7	± 1.0
P_0 (1)	Feed-hole pitch	12.7	± 0.3 (1)
ΔP	Plane deviation	1.0 maximum	-
P_1 (2)	Feed-hole center to lead center	3.85	± 0.7; (2)
P_2 (2)	Feed-hole center to component center	6.35	± 1.3; (2)
F	Lead spacing	5.0	0.6 - 0.4
Δh	Component alignment	0	± 1.0
W	Tape width	18.0	1.0 - 0.5
W_0	Hold-down tape width	5.0 minimum	-
W_1	Hole position	9.0	0.75 - 0.5
W_2	Hold-down tape margin	3.0 maximum	-
H_0	Height to seating plane	16.0	± 0.5
H_1	Maximum component height	32.0	-
e	Lead end protrusion	1.0 maximum	-
L	Maximum length of snipped lead	11.0	-
D_0	Feed-hole diameter	4.0	± 0.2
t	Total tape thickness	0.9 maximum	-
t_1	Maximum thickness of tape and wires	1.5 maximum	-

Notes

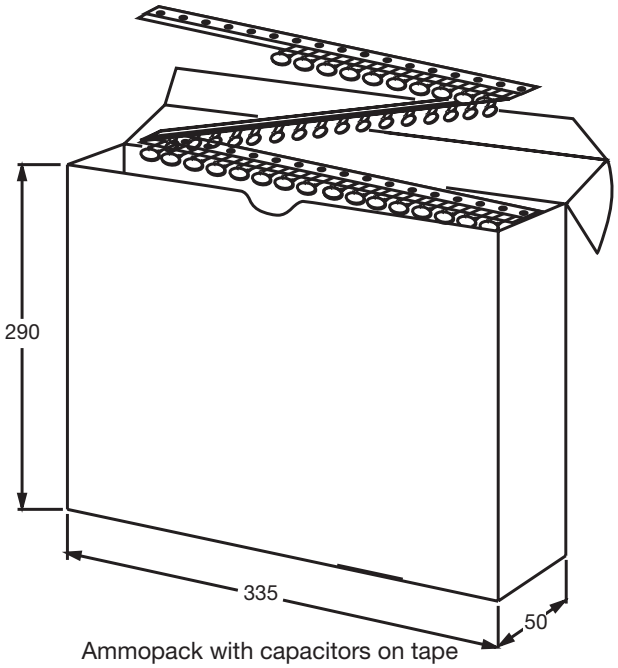
(1) Cumulative pitch error: ± ≤ 1 mm/20 pitches

(2) Obliquity maximum 3°

REEL AND TAPE DATA in millimeters

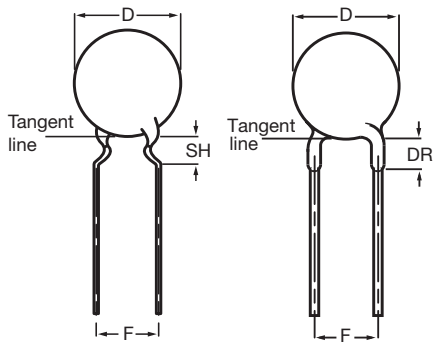


Reel with capacitors on tape



Ammopack with capacitors on tape

Ceramic Disc Capacitors
Class 1, 100 V_{DC}, Narrow Tolerance



Capacitors with 5 mm (0.20") and 2.5 mm (0.100") lead spacing

FEATURES

- Low losses
- High stability
- High capacitance in small size
- Kinked (preferred) or straight leads
- Compliant to RoHS directive 2002/95/EC

RoHS COMPLIANT

APPLICATIONS

- Bypassing
- Coupling
- Resonant circuit

DESIGN

The capacitors consist of a ceramic disc both sides of which are silver-plated. Connection leads are made of tinned copper having a diameter of 0.6 mm.

The capacitors have inward kinked leads with a spacing of 5 mm (0.20") and 2.5 mm (0.10") and a lead length from 4 mm to 30 mm. Encapsulation is made of phenolic resin.

QUICK REFERENCE DATA	
DESCRIPTION	**CLASS 1 (NP0, N750)**
Voltage (V_{DC})	100
Min. Capacitance (pF)	1.5
Max. Capacitance (pF)	330
Mounting	Through hole

MARKING

Marking indicates capacitance value and tolerance in accordance with EIA 198.

OPERATING TEMPERATURE RANGE

Class 1, - 55 to + 125 °C

TEMPERATURE COEFFICIENTS

Class 1, NP0; N750

SECTIONAL SPECIFICATIONS

Class 1, IEC 60 384-8,

EIA 198

CLIMATIC CATEGORY

Class 1, 55/125/56

CAPACITANCE RANGE

1.5 pF to 330 pF; Class 1, at 1 MHz, 1.2 V_{RMS};

1 kHz, 1 V_{RMS} ± 0.2 V_{RMS} for capacitance values higher than 1000 pF

RATED DC VOLTAGE

100 V

DIELECTRIC STRENGTH

250 % of rated voltage

INSULATION RESISTANCE AT 100 V_{DC}

≥ 10 000 MΩ

TOLERANCE ON CAPACITANCE

± 0.25 pF; ± 0.5 pF; ± 2 %

DISSIPATION FACTOR

Class 1, C ≤ 30 pF; ≤ 20 x (10/C + 0.7) x 10^{-4} maximum

Class 1, C > 30 pF; ≤ 0.2 %

Note

- The capacitors meet the essential requirements of EIA 198. Unless stated otherwise all electrical values apply at an ambient temperature of 25 ± 3 °C, at normal atmospheric conditions.

ORDERING INFORMATION, CLASS 1, 100 V_{DC}, KINKED AND STRAIGHT					
C (PF)	TOL. (%)	$D_{MAX.}$ (mm)	LEAD SPACING F (mm)	$SH/DR_{MAX.}$ (1) (mm)	CLEAR TEXT CODE 13TH DIGIT: T = REEL; U = AMMO; 3 = BULK
CLASS 1 NP0					
1.5	± 0.25 pF	5.0	5.0	4.0	D159C20C0KH6.J5R
			2.5	1.5	D159C20C0KH6.L2R
1.8			5.0	4.0	D189C20C0KH6.J5R
			2.5	1.5	D189C20C0KH6.L2R
2.2			5.0	4.0	D229C20C0JH6.J5R
			2.5	1.5	D229C20C0JH6.L2R
3.3			5.0	4.0	D339C20C0JH6.J5R
			2.5	1.5	D339C20C0JH6.L2R
4.7			5.0	4.0	D479C20C0HH6.J5R
			2.5	1.5	D479C20C0HH6.L2R
6.8			5.0	4.0	D689C20C0HH6.J5R
			2.5	1.5	D689C20C0HH6.L2R
10	± 2		5.0	4.0	D100G20C0GH6.J5R
			2.5	1.5	D100G20C0GH6.L2R
15			5.0	4.0	D150G20C0GH6.J5R
			2.5	1.5	D150G20C0GH6.L2R
22			5.0	4.0	D220G20C0GH6.J5R
			2.5	1.5	D220G20C0GH6.L2R
33			5.0	4.0	D330G20C0GH6.J5R
			2.5	1.5	D330G20C0GH6.L2R
47	± 2	6.5	5.0	4.0	D470G25C0GH6.J5R
			2.5	1.5	D470G25C0GH6.L2R
68			5.0	4.0	D680G25C0GH6.J5R
			2.5	1.5	D680G25C0GH6.L2R
100		7.5	5.0	4.0	D101G29C0GH6.J5R
			2.5	1.5	D101G29C0GH6.L2R
150		8.5	5.0	4.0	D151G33C0GH6.J5R
			2.5	1.5	D151G33C0GH6.L2R
220		11.0	5.0	4.0	D221G43C0GH6.J5R
			2.5	1.5	D221G43C0GH6.L2R
CLASS 1 N750					
6.8	± 0.25 pF	5.5	5.0	4.0	D689C20U2JH6.J5R
			2.5	1.5	D689C20U2JH6.L2R
10	± 2		5.0	4.0	D100G20U2JH6.J5R
			2.5	1.5	D100G20U2JH6.L2R
15			5.0	4.0	D150G20U2JH6.J5R
			2.5	1.5	D150G20U2JH6.L2R
22			5.0	4.0	D220G20U2JH6.J5R
			2.5	1.5	D220G20U2JH6.L2R
33			5.0	4.0	D330G20U2JH6.J5R
			2.5	1.5	D330G20U2JH6.L2R
47			5.0	4.0	D470G20U2JH6.J5R
			2.5	1.5	D470G20U2JH6.L2R
68		6.5	5.0	4.0	D680G25U2JH6.J5R
			2.5	1.5	D680G25U2JH6.L2R

ORDERING INFORMATION, CLASS 1, 100 V_{DC}, KINKED AND STRAIGHT					
C (PF)	TOL. (%)	$D_{MAX.}$ (mm)	LEAD SPACING F (mm)	SH/$DR_{MAX.}$ [1] (mm)	CLEAR TEXT CODE 13TH DIGIT: T = REEL; U = AMMO; 3 = BULK
CLASS 1 N 750					
100	± 2	7.5	5.0	4.0	D101G29U2JH6.J5R
			2.5	1.5	D101G29U2JH6.L2R
150		8.5	5.0	4.0	D151G33U2JH6.J5R
			2.5	1.5	D151G33U2JH6.L2R
220		10	5.0	4.0	D221G39U2JH6.J5R
			2.5	1.5	D221G39U2JH6.L2R
330		12	5.0	4.0	D331G47U2JH6.J5R
			2.5	1.5	D331G47U2JH6.L2R

Note

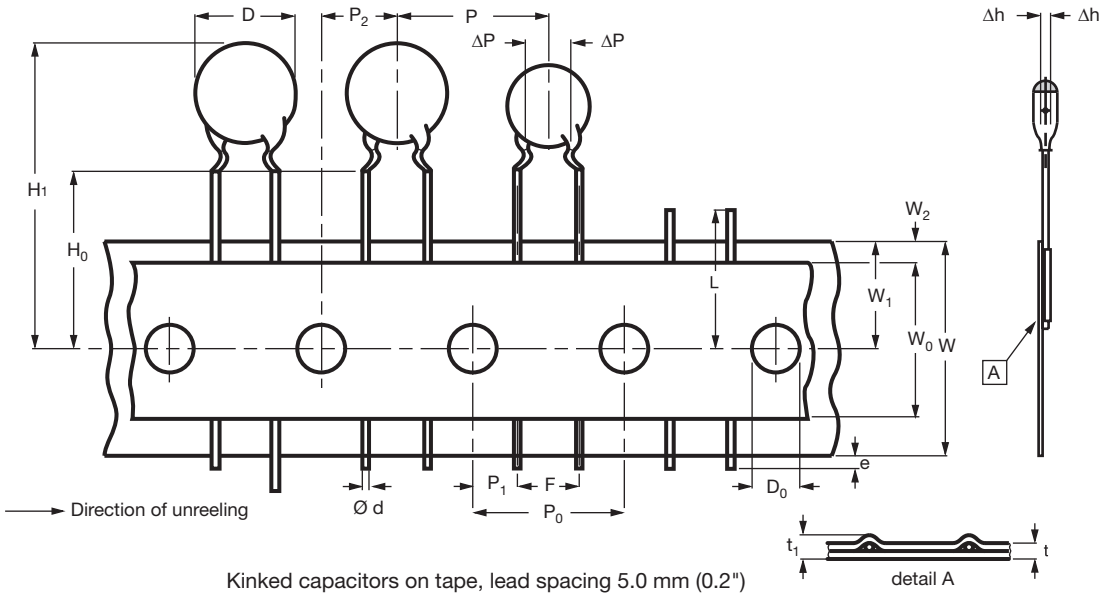
[1] SH = seated height; DR = run down

- 1. Maximum thickness 3.5 mm
- Lead style codes refer to inward kinked leads and straight leads

PACKAGING				
$D_{MAX.}$ (mm)	SIZE CODE	PACKAGING QUANTITIES		
		BULK	REEL	AMMO
5.0 (0.20")	20	1000	2500	2000
6.5 (0.25")	25			
7.5 (0.29")	29			
8.5 (0.33")	33			
10.0 (0.39")	39			
11.0 (0.43")	43			
12.0 (0.47")	47			

Note

- The capacitors are supplied in bulk packaging (cardboard boxes), in tape on reel or in ammopack



Kinked capacitors on tape, lead spacing 5.0 mm (0.2")

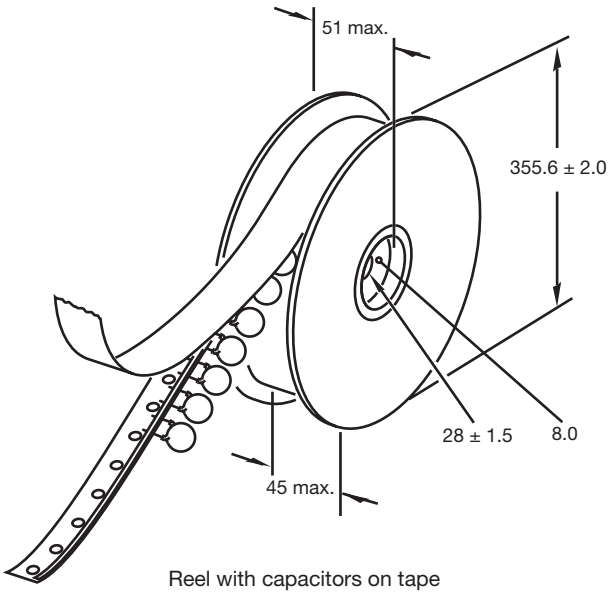
DIMENSION OF TAPE			
SYMBOL	PARAMETER	DIMENSIONS (mm)	
		NOMINAL	TOLERANCE
D	Body diameter	11.0 maximum	-
d	Lead diameter	0.6	± 0.05
P	Pitch between capacitors	12.7	± 1.0
P_0 (1)	Feed-hole pitch	12.7	± 0.3
ΔP	Plane deviation	1.0 maximum	-
P_1 (2)	Feed-hole center to lead center	3.85	± 0.7
P_2 (2)	Feed-hole center to component center	6.35	± 1.3
F	Lead spacing	5.0	0.6 - 0.4
Δh	Component alignment	0	± 1.0
W	Tape width	18.0	1.0 - 0.5
W_0	Hold-down tape width	5.0 minimum	-
W_1	Hole position	9.0	0.75 - 0.5
W_2	Hold-down tape margin	3.0 maximum	-
H_0	Height to seating plane	16.0	± 0.5
H_1	Maximum component height	32.0	-
e	Lead end protrusion	1.0 maximum	-
L	Maximum length of snipped lead	11.0	-
D_0	Feed-hole diameter	4.0	± 0.2
t	Total tape thickness	0.9 maximum	-
t_1	Maximum thickness of tape and wires	1.5 maximum	-

Notes

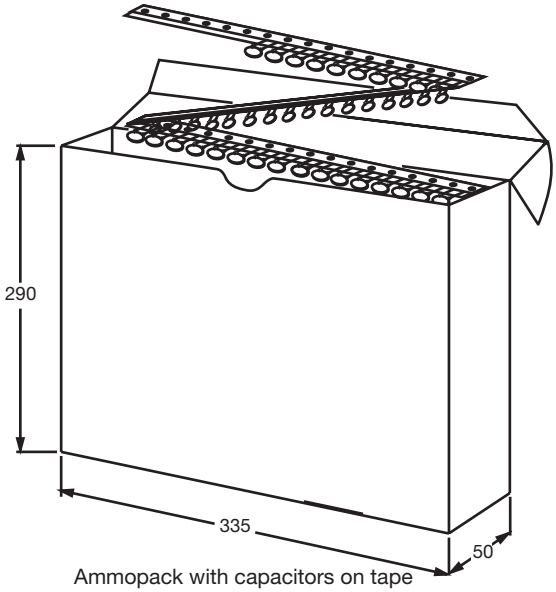
(1) Cumulative pitch error: ± ≤ 1 mm/20 pitches

(2) Obliquity maximum 3°

REEL AND TAPE DATA in millimeters

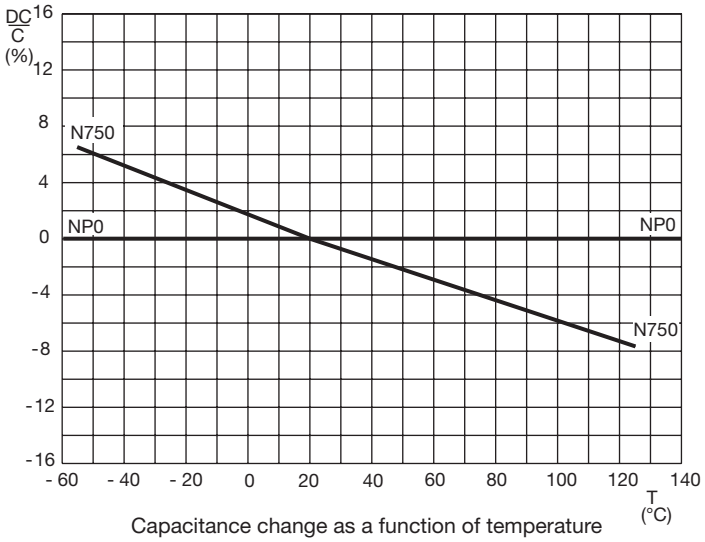


Reel with capacitors on tape



Ammopack with capacitors on tape

TEMPERATURE COEFFICIENT IN ACCORDANCE WITH RS198		
C = 0.0	0 = - 1	G = ± 30
M = 1.0	1 = - 10	H = ± 60
P = 1.5	2 = - 100	J = ± 120
R = 2.2	3 = - 1000	K = ± 250
S = 3.3	5 = + 1	L = ± 500
T = 4.7	6 = + 10	M = ± 1000
U = 7.5	7 = + 100	N = ± 2500
-	8 = + 1000	-

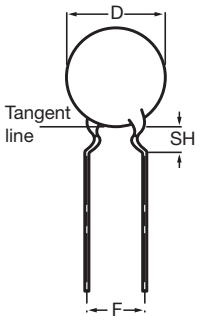


Capacitance change as a function of temperature

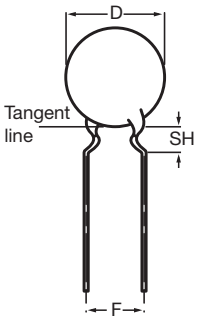
Ceramic Disc Capacitors, High Voltage

Contents

Ceramic Disc Capacitors
Class 1 and 2, 500 V_{DC}, General Purpose



Capacitors with 5 mm (0.20") lead spacing



Capacitors with 7.5 mm (0.30") lead spacing

FEATURES

- Low losses
- High stability
- High capacitance in small size
- Kinked (preferred) or straight leads
- Compliant to RoHS directive 2002/95/EC

RoHS COMPLIANT

APPLICATIONS

- Bypassing
- Coupling
- Resonant circuit

DESIGN

The capacitors consist of a ceramic disc both sides of which are silver-plated. Connection leads are made of tinned copper having a diameter of 0.6 mm.

The capacitors have inward kinked leads with a spacing of 5 mm (0.200") or 7.5 mm (0.300") and a lead length from 4 mm to 30 mm. Encapsulation is made of phenolic resin.

QUICK REFERENCE DATA		
DESCRIPTION	CLASS 1 (C0G (NP0), SL0)	CLASS 2 (YP5, Z5U, Y5V, X5F)
Voltage (V_{DC})	500	
Min. Capacitance (pF)	10	100
Max. Capacitance (pF)	82	22 000
Mounting	Through hole	

MARKING

Marking indicates capacitance value and tolerance in accordance with “EIA 198”.

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 normal atmospheric conditions.

OPERATING TEMPERATURE RANGE

Class 1, - 55 °C to + 125 °C

Class 2, - 55 °C to + 85 °C

TEMPERATURE COEFFICIENTS

Class 1, C0G (NP0); SL0

Class 2, Y5P; Z5U; Y5V; X5F

SECTIONAL SPECIFICATIONS

Class 1, IEC 60 384-8

Class 2, IEC 60 384-9

EIA 198

CLIMATIC CATEGORY

Class 1, 55/125/21

Class 2, 10/85/21, 30/85/21 and 55/85/21

CAPACITANCE RANGE

Class 1, at 1 MHz, 1.2 V_{RMS}; 10 pF to 82 pF

Class 2, at 1 kHz, 1 ± 0.2 V_{RMS}; 100 pF to 22 000 pF

1 kHz, 1 V_{RMS} ± 0.2 V_{RMS} for capacitance values higher than 1000 pF

RATED DC VOLTAGE

500 V

DIELECTRIC STRENGTH

250 % of rated voltage

INSULATION RESISTANCE AT 500 V_{DC}

≥ 10 000 MΩ

TOLERANCE ON CAPACITANCE

± 5 %; ± 10 %; ± 20 %; + 80/- 20 %

DISSIPATION FACTOR

Class 1, C ≤ 30 pF; ≤ 20 x (10/C + 0.7) x 10^{-4} maximum

Class 1, C > 30 pF; ≤ 0.2 %

Class 2, ≤ 3.0 %

ORDERING INFORMATION (PREFERED TYPES), CLASS 1, 500 V_{DC}, KINKED					
C (pF)	TOL. (%)	$D_{MAX.}$ (mm)	LEAD SPACING (mm)	SH (1) (mm)	CLEAR TEXT CODE 13TH DIGIT: T = REEL; U = AMMO; 3 = BULK 16TH DIGIT: R = RoHS COMPLIANT
CLASS 1 NP0					
10	± 5	5.0	5.0	4.0	D100J20C0GL6.J5.
12					D120J20C0GL6.J5.
15					D150J20C0GL6.J5.
18		6.5			D180J25C0GL6.J5.
22					D220J25C0GL6.J5.
27					D270J25C0GL6.J5.
CLASS 1 SL0					
33	± 5	5.0	5.0	4.0	D330J20SL0L6.J5.
39					D390J20SL0L6.J5.
47					D470J20SL0L6.J5.
56					D560J20SL0L6.J5.
68		6.5			D680J25SL0L6.J5.
82					D820J25SL0L6.J5.

Notes

(1) SH = seated height

- Maximum thickness 4.0 mm
- Lead style codes refer to inward kinked leads. Other styles available on request

ORDERING INFORMATION (PREFERED TYPES), CLASS 2, 500 V_{DC}, KINKED					
C (pF)	TOL. (%)	$D_{MAX.}$ (mm)	LEAD SPACING (mm)	SH (1) (mm)	CLEAR TEXT CODE 13TH DIGIT: T = REEL; U = AMMO; 3 = BULK 16TH DIGIT: R = RoHS COMPLIANT
CLASS 2 Y5P					
100	± 10	5	5	4.0	D101K20Y5PL6.J5.
150					D151K20Y5PL6.J5.
220					D221K20Y5PL6.J5.
330					D331K20Y5PL6.J5.
470					D471K20Y5PL6.J5.
680		6.5			D681K25Y5PL6.J5.
1000					D102K25Y5PL6.J5.
1500		7.5			D152K29Y5PL6.J5.
2200		8.5			D222K33Y5PL6.J5.
3300		10			D332K39Y5PL6.J5.
4700		11			D472K43Y5PL6.J5.
6800		13.5	7.5		D682K53Y5PL6.J7
10 000		17.5			D103K69Y5PL6.J7.
CLASS 2 Y5V					
1000	+ 80/- 20	5	5	4.0	D102Z20Y5VL6.J5.
1500					D152Z20Y5VL6.J5.
2200		6.5			D222Z25Y5VL6.J5.
3300					D322Z25Y5VL6.J5.
4700		7.5			D472Z29Y5VL6.J5.
6800		8.5			D682Z33Y5VL6.J5.
10 000		10.0			D103Z39Y5VL6.J5.
15 000		11.0			D153Z43Y5VL6.J5.
22 000		13.5	7.5		D223Z53Y5VL6.J7.

ORDERING INFORMATION (PREFERED TYPES), CLASS 2, 500 V_{DC}, KINKED

C (pF)	TOL. (%)	$D_{MAX.}$ (mm)	LEAD SPACING (mm)	SH [1] (mm)	CLEAR TEXT CODE 13^{TH} DIGIT: T = REEL; U = AMMO; 3 = BULK 16^{TH} DIGIT: R = RoHS COMPLIANT
CLASS 2 Z5U					
1000	± 20	5.0	5.0	4.0	D102M20Z5UL6.J5.
1500					D152M25Z5UL6.J5.
2200					D222M25Z5UL6.J5.
3300		7.5			D332M29Z5UL6.J5.
4700		8.5			D472M33Z5UL6.J5.
6800		10.0			D682M39Z5UL6.J5.
10 000		11.0			D103M43Z5UL6.J5.
15 000		13.5	7.5		D153M53Z5UL6.J7.
22 000		15.0			D223M59Z5UL6.J7.
CLASS 2 X5F					
1 00	± 10	5.0	5.0	4.0	D101K20X5FL6.J5.R.
2 20					D221K20X5FL6.J5.R.
330					D331K20X5FL6.J5.R.
470		6.5			D471K25X5FL6.J5.R.
680					D681K25X5FL6.J5.R.
1000		7.5			D102K29X5FL6.J5.R.
2200		10.0			D222K39X5FL6.J5.R.
3300		12.0	7.5		D332K47X5FL6.J7R.
4700		13.5		4.8	D472K53X5FL6.J7R.

Note

[1] SH = seated height

- Maximum thickness 4.0 mm
- Lead style codes refer to inward kinked leads. Other styles available on request

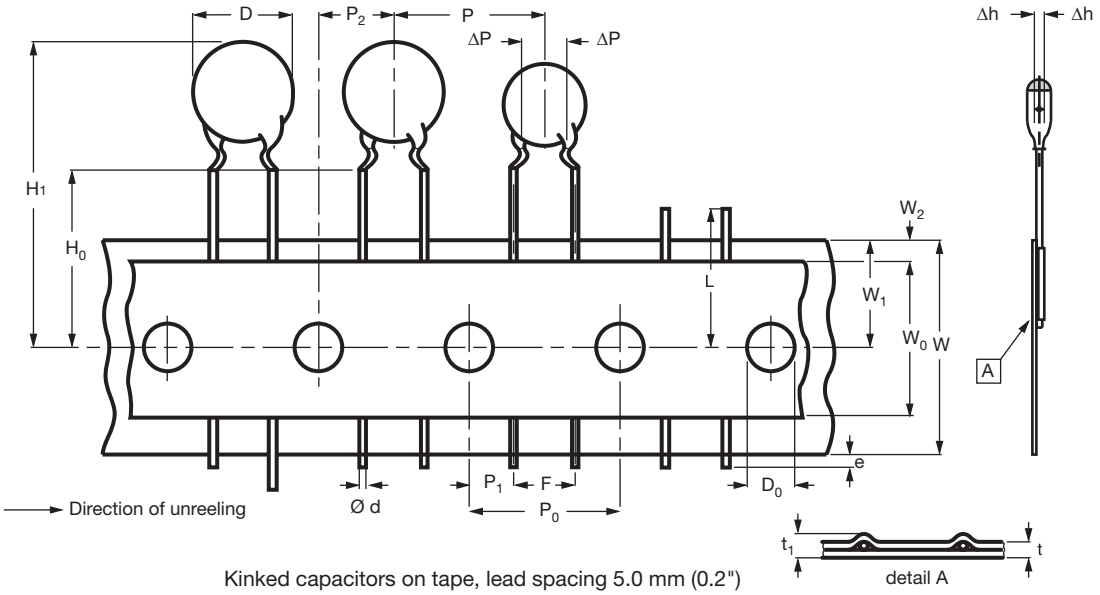
PACKAGING

$D_{MAX.}$ (mm)	SIZE CODE	PACKAGING QUANTITIES		
		BULK	REEL	AMMO
5.0 (0.20")	20	1000	2000	2000
6.5 (0.25")	25			
7.5 (0.29")	29			
8.5 (0.33")	33			
10.0 (0.39")	39			
11.0 (0.43")	43			
12.0 (0.47")	47			
13.5 (0.53")	53	500	-	-
15.0 (0.59")	59			
17.5 (0.69")	69			

Note

- The capacitors are supplied in bulk packaging (cardboard boxes), in tape on reel or in ammopack.

Ceramic Disc Capacitors
Class 1 and 2, 500 V_{DC}, General Purpose

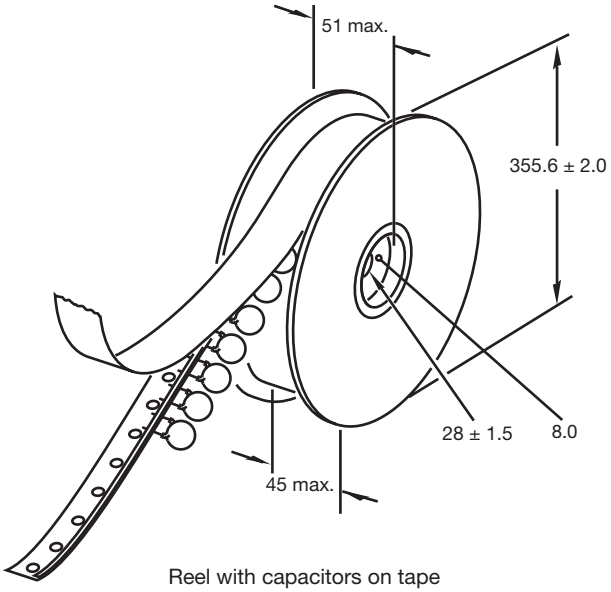


Kinked capacitors on tape, lead spacing 5.0 mm (0.2")

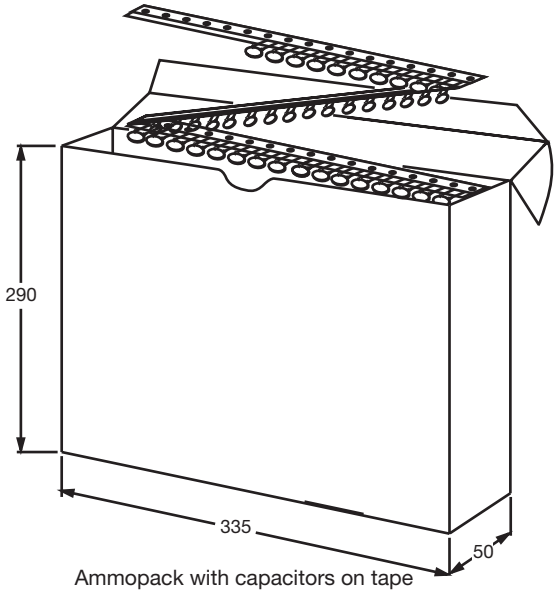
DIMENSIONS OF TAPE			
SYMBOL	PARAMETER	DIMENSIONS (mm)	
		NOMINAL	TOLERANCE
D	Body diameter	11.0 maximum	-
d	Lead diameter	0.6	± 0.05
P (1)	Pitch between capacitors	12.7	± 1.0
P_0	Feed-hole pitch	12.7	± 0.3
ΔP	Plane deviation	1.0 maximum	-
P_1 (2)	Feed-hole center to lead center	3.85	± 0.7
P_2 (2)	Feed-hole center to component center	6.35	± 1.3
F	Lead spacing	5.0	0.6 - 0.4
Δh	Component alignment	0	± 1.0
W	Tape width	18.0	1.0 - 0.5
W_0	Hold-down tape width	5.0 minimum	-
W_1	Hole position	9.0	0.75 - 0.5
W_2	Hold-down tape margin	3.0 maximum	-
H_0	Height to seating plane	16.0	± 0.5
H_1	Maximum component height	32.0	-
e	Lead end protrusion	1.0 maximum	-
L	Maximum length of snipped lead	11.0	-
D_0	Feed-hole diameter	4.0	± 0.2
t	Total tape thickness	0.9 maximum	-
t_1	Maximum thickness of tape and wires	1.5 maximum	-

Notes
(1) Cumulative pitch error: ± ≤ 1 mm/20 pitches
(2) Obliquity maximum 3°

REEL AND TAPE DATA in millimeters

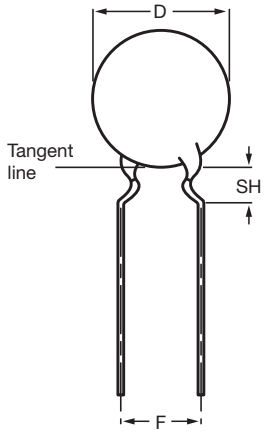


Reel with capacitors on tape



Ammopack with capacitors on tape

Ceramic Disc Capacitors
Class 1, 500 V_{DC}, Narrow Tolerance



Capacitor with 5 mm (0.20") lead spacing

QUICK REFERENCE DATA	
DESCRIPTION	**CLASS 1 (NP0, N750)**
Voltage (V_{DC})	500
Min. Capacitance (pF)	1.0
Max. Capacitance (pF)	150
Mounting	Through hole

MARKING

Marking indicates capacitance value and tolerance in accordance with “EIA 198”.

OPERATING TEMPERATURE RANGE

Class 1, - 55 °C to + 125 °C

TEMPERATURE COEFFICIENTS

Class 1, NP0; N750

SECTIONAL SPECIFICATIONS

Class 1, IEC 60 384-8,

EIA 198

CLIMATIC CATEGORY

Class 1, 55/125/21

FEATURES

- Low losses
- High stability
- High capacitance in small size
- Kinked (preferred) or straight leads
- Compliant to RoHS directive 2002/95/EC

Pb e3 RoHS COMPLIANT

APPLICATIONS

- Bypassing
- Coupling
- Resonant circuit

DESIGN

The capacitors consist of a ceramic disc both sides of which are silver-plated. Connection leads are made of tinned copper having a diameter of 0.6 mm.

The capacitors have inward kinked leads with a spacing of 5 mm (0.200") and a lead length from 4 mm to 30 mm. Encapsulation is made of phenolic resin.

CAPACITANCE RANGE

Class 1, at 1 MHz, 1.2 V_{RMS}; 1.0 pF to 150 pF

1 kHz, 1 V_{RMS} ± 0.2 V_{RMS} for capacitance values higher than 1000 pF

RATED VOLTAGE DC

500 V

DIELECTRIC STRENGTH

250 % of rated voltage

INSULATION RESISTANCE AT 500 V_{DC}

≥ 10 000 MΩ

TOLERANCE ON CAPACITANCE

± 0.25 pF; ± 2 %

DISSIPATION FACTOR

Class 1, C ≤ 30 pF; ≤ 20 x (10/C + 0.7) x 10^{-4} maximum

Class 1, C > 30 pF; ≤ 0.2 %

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 normal atmospheric conditions.

ORDERING INFORMATION CLASS 1, 500 V_{DC}, KINKED					
C (pF)	TOL. (%)	$D_{MAX.}$ (mm)	LEAD SPACING (mm)	SH [1] (mm)	CLEAR TEXT CODE 13TH DIGIT: T = REEL; U = AMMO; 3 = BULK 16TH DIGIT: R = RoHS COMPLIANT
CLASS 1 NP0					
1.0	± 0.25 pF	5.0	5.0	4.0	D109C20C0KL6.J5.
1.5					D159C20C0KL6.J5.
2.2					D229C20C0JL6.J5.
3.3					D339C20C0JL6.J5.
4.7					D479C20C0HL6.J5.
6.8					D689C20C0HL6.J5.
10	± 2				D100G20C0GL6.J5.
15					D150G20C0GL6.J5.
22		6.5			D220G25C0GL6.J5.
33					D330G25C0GL6.J5.
47		7.5			D470G29C0GL6.J5.
68		8.5			D680G33C0GL6.J5.
100		10			D101G39C0GL6.J5.
150		12			D151G47C0GL6.J5.

ORDERING INFORMATION CLASS 1, 500 V_{DC}, KINKED					
C (pF)	TOL. (%)	$D_{MAX.}$ (mm)	LEAD SPACING (mm)	SH [1] (mm)	CLEAR TEXT CODE 13TH DIGIT: T = REEL; U = AMMO; 3 = BULK 16TH DIGIT: R = RoHS COMPLIANT
CLASS 1 N750					
6.8	± 0.25	5	5	4.0	D689C20U2JL6.J5.
10	± 2				D100G20U2JL6.J5.
15					D150G20U2JL6.J5.
22					D220G20U2JL6.J5.
33		6.5			D330G25U2JL6.J5.
47		7.5			D470G29U2JL6.J5.
68		8.5			D680G33U2JL6.J5.
100		10			D101G39U2JL6.J5.
150		12			D151G47U2JL6.J5.

Notes

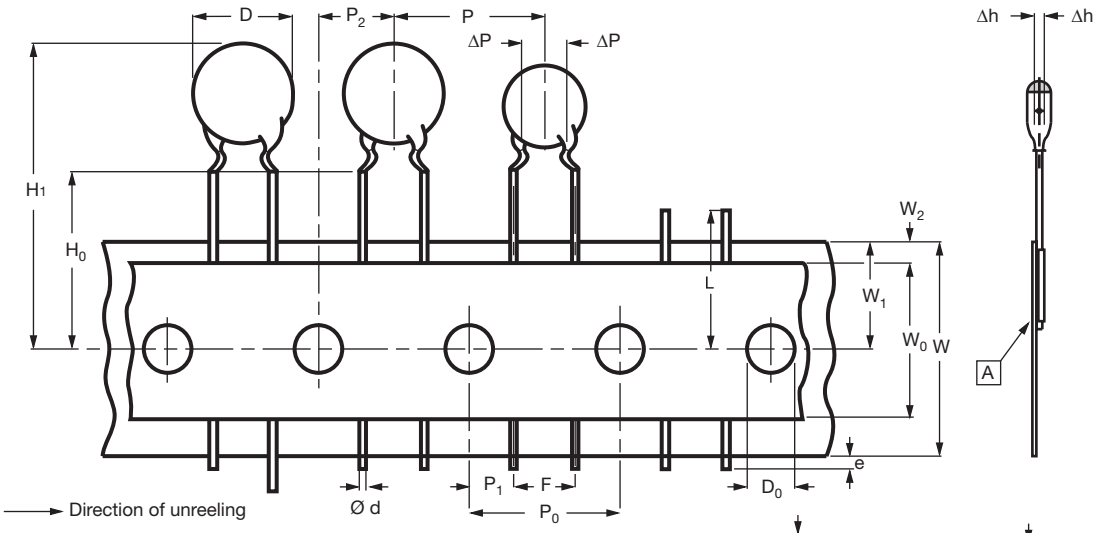
[1] SH = seated height

- Maximum thickness 4.0 mm
- Lead style codes refer to inward kinked leads. Other styles available on request
- Other capacitances values E12 series available

PACKAGING				
$D_{MAX.}$ (mm)	SIZE CODE	PACKAGING QUANTITIES		
		BULK	REEL	AMMO
5.0 (0.20")	20	1000	2000	2000
6.5 (0.25")	25			
7.5 (0.29")	29			
8.5 (0.33")	33			
10.0 (0.39")	39			
11.0 (0.43")	43			
12.0 (0.47")	47			

Note

- The capacitors are supplied in bulk packaging (cardboard boxes), in tape on reel or in ammopack.



Kinked capacitors on tape, lead spacing 5.0 mm (0.2")

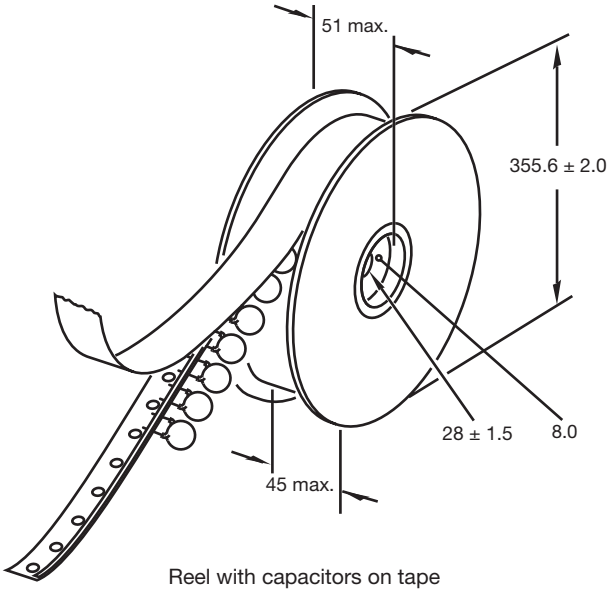
DIMENSIONS OF TAPE			
SYMBOL	PARAMETER	DIMENSIONS (mm)	
		NOMINAL	TOLERANCE
D	Body diameter	11.0 maximum	-
d	Lead diameter	0.6	± 0.05
P	Pitch between capacitors	12.7	± 1.0
P_0 (1)	Feed-hole pitch	12.7	± 0.3
ΔP	Plane deviation	1.0 maximum	-
P_1 (2)	Feed-hole center to lead center	3.85	± 0.7
P_2 (2)	Feed-hole center to component center	6.35	± 1.3
F	Lead spacing	5.0	0.6 - 0.4
Δh	Component alignment	0	± 1.0
W	Tape width	18.0	1.0 - 0.5
W_0	Hold-down tape width	5.0 minimum	-
W_1	Hole position	9.0	0.75 - 0.5
W_2	Hold-down tape margin	3.0 maximum	-
H_0	Height to seating plane	16.0	± 0.5
H_1	Maximum component height	32.0	-
e	Lead end protrusion	1.0 maximum	-
L	Maximum length of snipped lead	11.0	-
D_0	Feed-hole diameter	4.0	± 0.2
t	Total tape thickness	0.9 maximum	-
t_1	Maximum thickness of tape and wires	1.5 maximum	-

Notes

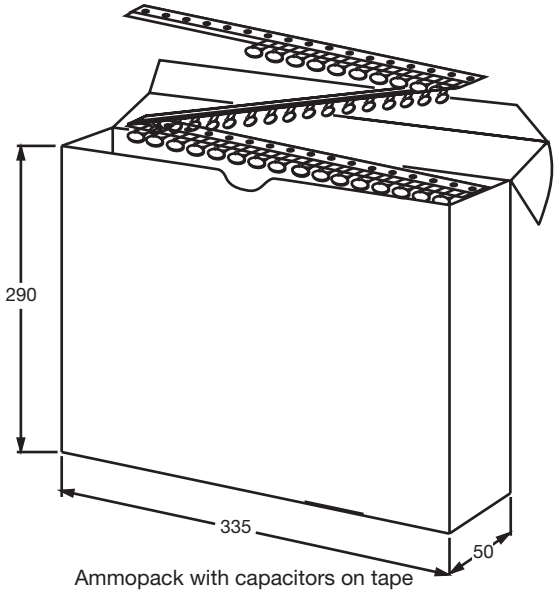
(1) Cumulative pitch error: ± ≤ 1 mm/20 pitches

(2) Obliquity maximum 3°

REEL AND TAPE DATA in millimeters

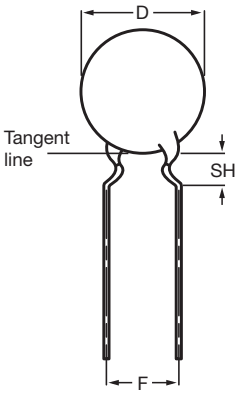


Reel with capacitors on tape

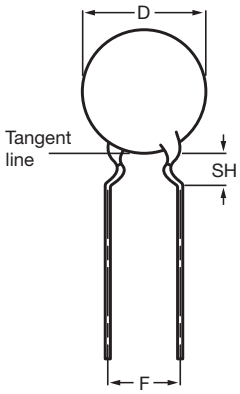


Ammopack with capacitors on tape

Ceramic Disc Capacitors
Class 2, 500 V_{DC}, 1 kV_{DC}, General Purpose



Capacitors with 5 mm (0.20") lead spacing



Capacitors with 7.5 mm (0.30") lead spacing

QUICK REFERENCE DATA		
DESCRIPTION	CLASS 2 (X7R)	
Voltage (V_{DC})	500	1000
Min. Capacitance (pF)	1000	
Max. Capacitance (pF)	4700	
Mounting	Through hole	

MARKING

Marking indicates capacitance value and tolerance in accordance with “EIA 198”.

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 normal atmospheric conditions.

OPERATING TEMPERATURE RANGE

Class 2, 55 °C to +125 °C

TEMPERATURE COEFFICIENTS

Class 2, X7R

SECTIONAL SPECIFICATIONS

Class 2, IEC 60 384-9,

EIA 198

CLIMATIC CATEGORY

Class 2, 55/125/21

FEATURES

- High capacitance in small size
- Kinked (preferred) or straight leads
- Compliant to RoHS directive 2002/95/EC

Pb e3 RoHS COMPLIANT

APPLICATIONS

- Bypassing
- Coupling
- Resonant circuit

DESIGN

The capacitors consist of a ceramic disc both sides of which are silver-plated. Connection leads are made of tinned copper having a diameter of 0.6 mm.

The capacitors have inward kinked leads with a spacing of 5 mm (0.200") or 7.5 mm (0.300") and a lead length from 4 mm to 30 mm. Encapsulation is made of phenolic resin for 500 V_{DC} and epoxy resin for 1 kV_{DC} .

CAPACITANCE RANGE

Class 2, at 1 kHz, 1 V_{RMS} ± 0.2 V_{RMS}; 1000 pF to 4700 pF

RATED DC VOLTAGE

500 V and 1 kV

DIELECTRIC STRENGTH

250 % of rated voltage for 500 V_{DC}

200 % of rated voltage for 1 kV_{DC}

INSULATION RESISTANCE AT 500 V_{DC}

≥ 10 000 MΩ

TOLERANCE ON CAPACITANCE

± 10 %; ± 20 %

DISSIPATION FACTOR

Class 2, ≤ 2.5 %

ORDERING INFORMATION (PREFERED TYPES), CLASS 2, 500 V_{DC}, KINKED					
C (pF)	TOL. (%)	$D_{MAX.}$ (mm)	LEAD SPACING (mm)	SH (1) (mm)	CLEAR TEXT CODE 13TH DIGIT: T = REEL; U = AMMO; 3 = BULK
CLASS 2 X7R					
1000	± 10	6.5	5.0	4.0	H102K25X7RL6.J5R
1500		7.5			H152K29X7RL6.J5R
2200		8.5			H222K33X7RL6.J5R
3300		10			H332K39X7RL6.J5R
4700		12	7.5		H472K47X7RL6.J7R

Notes

(1) SH = seated height

- Maximum thickness 4.0 mm
- Lead style codes refer to inward kinked leads. Other styles available on request

ORDERING INFORMATION (PREFERED TYPES), CLASS 2, 1 kV_{DC}, KINKED					
C (pF)	TOL. (%)	$D_{MAX.}$ (mm)	LEAD SPACING (mm)	SH (1) (mm)	CLEAR TEXT CODE 13TH DIGIT: T = REEL; U = AMMO; 3 = BULK
CLASS 2 X7R					
1000	± 10	6.5	5.0	4.0	H102K25X7RN6.J5R
1500		8			H152K31X7RN6.J5R
2200		9			H222K35X7RN6.J5R
3300		10.5			H332K41X7RN6.J5R
4700		12	7.5		H472K47X7RN6.J7R

Notes

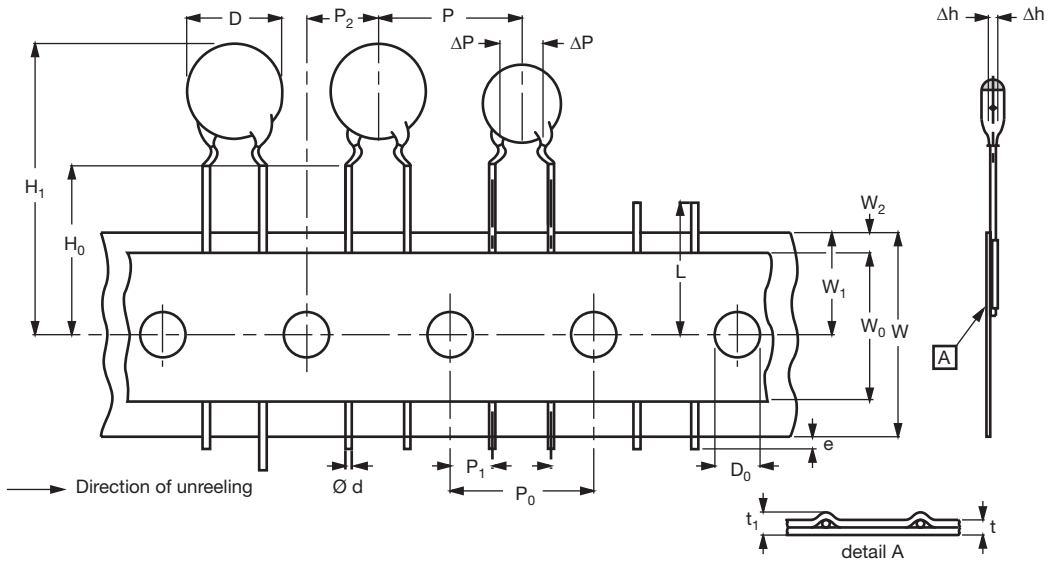
(1) SH = seated height

- Maximum thickness 4.0 mm
- Lead style codes refer to inward kinked leads. Other styles available on request

PACKAGING				
$D_{MAX.}$ (mm)	SIZE CODE	PACKAGING QUANTITIES		
		BULK	REEL	AMMO
5.0 (0.20")	20	1000	2000	2000
6.5 (0.25")	25			
7.5 (0.29")	29			
8.5 (0.33")	33			
10.0 (0.39")	39			
11.0 (0.43")	43			
12.0 (0.47")	47		-	-
13.5 (0.53")	53	500		
15.0 (0.59")	59			
17.5 (0.69")	69			

Note

- The capacitors are supplied in bulk packaging (cardboard boxes), in tape on reel or in ammopack.



Kinked capacitors on tape, lead spacing 5.0 mm (0.2")

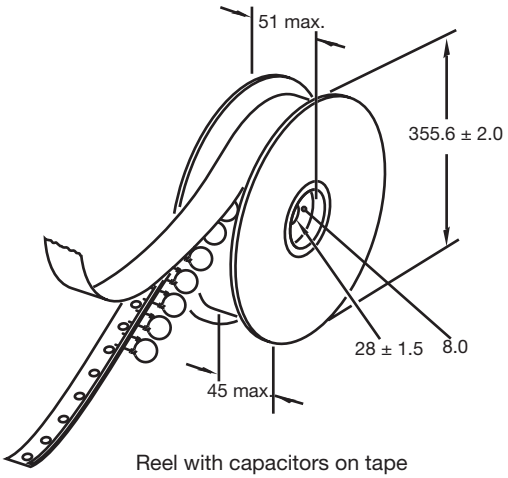
DIMENSIONS OF TAPE			
SYMBOL	PARAMETER	DIMENSIONS (mm)	
		NOMINAL	TOLERANCE
D	Body diameter	11.0 maximum	-
d	Lead diameter	0.6	± 0.05
P	Pitch between capacitors	12.7	± 1.0
P_0 (1)	Feed-hole pitch	12.7	± 0.3
ΔP	Plane deviation	1.0 maximum	-
P_1 (2)	Feed-hole center to lead center	3.85	± 0.7
P_2 (2)	Feed-hole center to component center	6.35	± 1.3
F	Lead spacing	5.0	0.6 - 0.4
Δh	Component alignment	0	± 1.0
W	Tape width	18.0	1.0 - 0.5
W_0	Hold-down tape width	5.0 minimum	-
W_1	Hole position	9.0	0.75 - 0.5
W_2	Hold-down tape margin	3.0 maximum	-
H_0	Height to seating plane	16.0	± 0.5
H_1	Maximum component height	32.0	-
e	Lead end protrusion	1.0 maximum	-
L	Maximum length of snipped lead	11.0	-
D_0	Feed-hole diameter	4.0	± 0.2
t	Total tape thickness	0.9 maximum	-
t_1	Maximum thickness of tape and wires	1.5 maximum	-

Notes

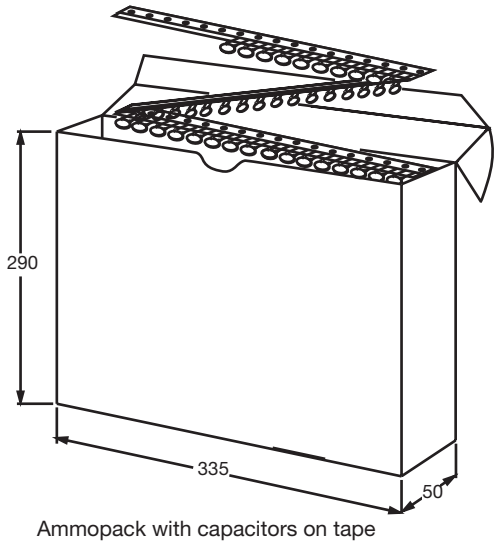
(1) Cumulative pitch error: ± ≤ 1 mm/20 pitches

(2) Obliquity maximum 3°

REEL AND TAPE DATA in millimeters

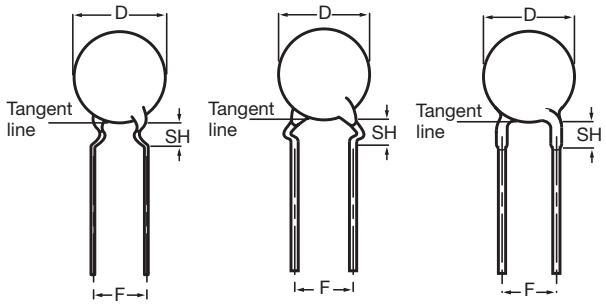


Reel with capacitors on tape



Ammopack with capacitors on tape

Ceramic Disc Capacitors Class 1 and 2, 1 kV_{DC}, 2 kV_{DC}, 3 kV_{DC} and 6 kV_{DC}, General Purpose



Capacitors with 5 mm (0.20"), 7.5 mm (0.30") and 10 mm (0.40") lead spacing

FEATURES

- Low losses
- High stability
- High capacitance in small size
- Kinked (preferred) or straight leads
- Compliant to RoHS directive 2002/95/EC

Pb e3 RoHS COMPLIANT

APPLICATIONS

- DC high voltage
- Pulse high voltage
- SMPS
- HV power supply
- HF ballast

QUICK REFERENCE DATA		
DESCRIPTION	CLASS 1 (SL0, S3N)	CLASS 2 (Y5P, X7R, Z5U, Y5V, X5F)
Voltage (V_{DC})	1000, 2000, 3000, 6000	
Min. Capacitance (pF)	10	100
Max. Capacitance (pF)	220	33 000
Mounting	Through hole	

MARKING

Straight and kinked leaded versions are gold coloured Marking indicates capacitance value and tolerance in accordance with “EIA 198” and voltage:

OPERATING TEMPERATURE RANGE

Class 1 SL0, S3N, - 55 °C to + 125 °C

Class 2, X7R - 55 °C to + 125 °C

Class 2, Y5P, Z5U, Y5V, - 30 °C to + 85 °C

Class 2, X5F - 55 °C to + 85 °C

TEMPERATURE COEFFICIENTS

Class 1 SL0, S3N

Class 2 X7R, Y5P, Z5U, Y5V, X5F

SECTIONAL SPECIFICATIONS

Class 1, IEC 60 384-8,

Class 2, IEC 60 384-9,

EIA 198

CLIMATIC CATEGORY

Class 1, SL0, 55/125/21

Class 2, X7R, 55/125/21

Class 2, Y5P, Z5U, Y5V, 30/85/21

Class 2, X5F, 55/85/21

DESIGN

The capacitors consist of a ceramic disc both sides of which are silver-plated. Connection leads are made of tinned copper having a diameter of 0.6 mm or 0.8 mm up to 3 kV and 0.8 mm for 6 kV.

The capacitors may be supplied with kinked or straight leads with a lead spacing of 5 mm (0.20"), 7.5 mm (0.30") or 10 mm (0.40") and a lead length from 4 mm to 30 mm. The standard tolerance on capacitance is 5 % or 10 % for class 1 capacitors and ± 10 % or ± 20 % for class 2 capacitors. Encapsulation is made of gold-colored epoxy-resin, flammable resistant in accordance with “UL 94 V-0”

CAPACITANCE RANGE

Class 1, at 1 MHz, 1.2 V_{RMS} ; 10 pF to 220 pF

1 kHz, 1 V_{RMS} ± 0.2 V_{RMS} for capacitance values higher than 1000 pF

Class 2, at 1 kHz, 1 V_{RMS} ± 0.2 V_{RMS} ; 100 pF to 33 000 pF

RATED DC VOLTAGE

1 kV; 2 kV; 3 kV; 6 kV

DIELECTRIC STRENGTH

200 % of rated voltage

INSULATION RESISTANCE AT 500 V_{DC}

≥ 10 000 MΩ

TOLERANCE ON CAPACITANCE

± 5 %; ± 10 %; ± 20 %; + 80/- 20 %

Other tolerances available on request

DISSIPATION FACTOR

Class 1, C ≤ 30 pF; ≤ 20 x (10/C + 0.7) x 10^{-4} max.

Class 1, C > 30 pF; ≤ 0.2 %

Class 2, ≤ 3.0 %

ORDERING INFORMATION 1 kV_{DC}, STRAIGHT

C (pF)	TOL. (%)	$D_{MAX.}$ (mm)	LEAD SPACING (mm)	SH [1] (mm)	CLEAR TEXT CODE 13TH DIGIT: T = REEL; U = AMMO; 3 = BULK 16TH DIGIT: R = RoHS COMPLIANT
CLASS 1 SL0					
10	± 5	6.5	5.0	4.0	S100J25SL0N6.J5.
	± 10				S100K25SL0N6.J5.
12	± 5				S120J25SL0N6.J5.
	± 10				S120K25SL0N6.J5.
15	± 5				S150J25SL0N6.J5.
	± 10				S150K25SL0N6.J5.
18	± 5				S180J25SL0N6.J5.
	± 10				S180K25SL0N6.J5.
22	± 5				S220J25SL0N6.J5.
	± 10				S220K25SL0N6.J5.
27	± 5				S270J25SL0N6.J5.
	± 10				S270K25SL0N6.J5.
33	± 5				S330J25SL0N6.J5.
	± 10				S330K25SL0N6.J5.
39	± 5				S390J25SL0N6.J5.
	± 10				S390K25SL0N6.J5.
47	± 5				S470J25SL0N6.J5.
	± 10				S470K25SL0N6.J5.
56	± 5	7.5			S560J29SL0N6.J5.
	± 10				S560K29SL0N6.J5.
68	± 5				S680J29SL0N6.J5.
	± 10				S680K29SL0N6.J5.
82	± 5				S820J29SL0N6.J5.
	± 10				S820K29SL0N6.J5.
100	± 5				S101J29SL0N6.J5.
	± 10				S101K29SL0N6.J5.
120	± 5	8.5			S121J33SL0N6.J5.
	± 10				S121K33SL0N6.J5.
150		10			S151K33SL0N6.J5.
220					S221K39SL0N6.J5.
CLASS 2 X7R					
100	± 10	6.5	5.0	4.0	S101K25X7RN6.J5.
150					S151K25X7RN6.J5.
220					S221K25X7RN6.J5.
330					S331K25X7RN6.J5.
470		7.5			S471K29X7RN6.J5.
680					S681K29X7RN6.J5.
1000		8.5			S102K33X7RN6.J5.
1500		10			S152K39X7RN6.J5.
2200		11			S222K43X7RN6.J5.
3 300		12	7.5		S332K47X7RN6.J7.
4 700		15		4.8	S472K59X7RN6.J7.
CLASS 2 Y5P					
100	± 10	6.5	5.0	4.0	S101K25Y5PN6.J5.
150					S151K25Y5PN6.J5.
220					S221K25Y5PN6.J5.
330					S331K25Y5PN6.J5.
470					S471K25Y5PN6.J5.
680		7.5			S681K29Y5PN6.J5.
1000					S102K29Y5PN6.J5.
1500		8.5			S152K33Y5PN6.J5.

ORDERING INFORMATION 1 kV_{DC}, STRAIGHT

C (pF)	TOL. (%)	$D_{MAX.}$ (mm)	LEAD SPACING (mm)	SH [1] (mm)	CLEAR TEXT CODE 13TH DIGIT: T = REEL; U = AMMO; 3 = BULK 16TH DIGIT: R = RoHS COMPLIANT
CLASS 2 Y5P					
2200	± 10	10	5.0	4.0	S222K39Y5PN6.J5.
3300		11			S332K43Y5PN6.J5.
4700		13.5	7.5	4.8	S472K53Y5PN63J7.
6800		15			S682K59Y5PN63J7.
10 000		19	10		S103K75Y5PN83J0.
CLASS 2 Z5U					
1000	± 20	6.5	5.0	4.0	S102M25Z5UN6.J5.
1500					S152M29Z5UN6.J5.
2200					S222M29Z5UN6.J5.
3300		8.5			S332M33Z5UN6.J5.
4700		10			S472M39Z5UN6.J5.
6800		11			S682M43Z5UN6.J5.
10 000		12	7.5	4.8	S103M47Z5UN63J7.
15 000		15			S153M59Z5UN63J7.
22 000		19	10		S223M75Z5UN83J0.
CLASS 2 Y5V					
1000	+ 80/- 20	6.5	5.0	4.0	S102Z25Y5VN6.J5.
1500					S152Z25Y5VN6.J5.
2200		7.5			S222Z29Y5VN6.J5.
3300					S332Z29Y5VN6.J5.
4700		8.5			S472Z33Y5VN6.J5.
6800		10			S682Z39Y5VN6.J5.
10 000		11			S103Z43Y5VN6.J5.
15 000		13.5	7.5	4.8	S153Z53Y5VN6.J7.
22 000		15			S223Z59Y5VN6.J7.
33 000		19	10		S333Z75Y5VN8.J0.

ORDERING INFORMATION 1 kV_{DC}, KINKED

C (pF)	TOL. (%)	$D_{MAX.}$ (mm)	LEAD SPACING (mm)	SH [2] (mm)	CLEAR TEXT CODE 13TH DIGIT: T = REEL; U = AMMO; 3 = BULK 16TH DIGIT: R = RoHS COMPLIANT
CLASS 2 X5F					
100	± 10	6.5	5.0	4.0	S101K25X5FN6.J5R
220					S221K25X5FN6.J5R
270					S271K25X5FN6.J5R
330					S331K25X5FN6.J5R
390					S391K25X5FN6.J5R
470					S471K25X5FN6.J5R
680		7.5			S681K29X5FN6.J5R
820					S821K29X5FN6.J5R
1000					S102K29X5FN6.J5R
2200		11			S222K43X5FN6.J5R
3300		13.5	7.5	4.8	S332K53X5FN6.J7R
4700		16			S472K63X5FN63J7R

Notes

[1] SH = seated height

- Maximum thickness 4.0 mm
- Lead style codes refer to inward kinked leads. Other styles available on request

ORDERING INFORMATION 2 kV_{DC}, KINKED

C (pF)	TOL. (%)	$D_{MAX.}$ (mm)	LEAD SPACING (mm)	SH [1] (mm)	CLEAR TEXT CODE 13TH DIGIT: T = REEL; U = AMMO; 3 = BULK 16TH DIGIT: R = RoHS COMPLIANT
CLASS 1 SL0					
10	± 5	6.5	5.0	4.0	S100J25SL0P6.K5.
	± 10				S100K25SL0P6.K5.
12	± 5				S120J25SL0P6.K5.
	± 10				S120K25SL0P6.K5.
15	± 5				S150J25SL0P6.K5.
	± 10				S150K25SL0P6.K5.
18	± 5				S180J25SL0P6.K5.
	± 10				S180K25SL0P6.K5.
22	± 5				S220J25SL0P6.K5.
	± 10				S220K25SL0P6.K5.
27	± 5				S270J25SL0P6.K5.
	± 10				S270K25SL0P6.K5.
33	± 5	7.5			S330J29SL0P6.K5.
	± 10				S330K29SL0P6.K5.
39	± 5				S390J29SL0P6.K5.
	± 10				S390K29SL0P6.K5.
47	± 5				S470J29SL0P6.K5.
	± 10				S470K29SL0P6.K5.
56	± 5				S560J29SL0P6.K5.
	± 10				S560K29SL0P6.K5.
68	± 5	8.5			S680J33SL0P6.K5.
	± 10				S680K33SL0P6.K5.
82	± 5				S820J33SL0P6.K5.
	± 10				S820K33SL0P6.K5.
100	± 5	10			S101J39SL0P6.K5.
	± 10				S101K39SL0P6.K5.
120	± 5				S121J39SL0P6.K5.
	± 10				S121K39SL0P6.K5.
150	± 10	11			S151K43SL0P6.K5.
CLASS 2 X7R					
100	± 10	6.5	5.0	4.0	S101K25X7RP6.K5.
150					S151K25X7RP6.K5.
220					S221K25X7RP6.K5.
330					S331K25X7RP6.K5.
470		7.5			S471K29X7RP6.K5.
680		8.5			S681K33X7RP6.K5.
1000		10			S102K39X7RP6.K5.
1500		11			S152K43X7RP6.K5.
2200		13.5	7.5	4.8	S222K53X7RP6.K7.
3300		15			S332K59X7RP6.K7.
CLASS 2 Y5P					
100	± 10	6.5	5.0	4.0	S101K25Y5PP6.K5.
150					S151K25Y5PP6.K5.
220					S221K25Y5PP6.K5.
330					S331K25Y5PP6.K5.
470		7.5			S471K29Y5PP6.K5.
680					S681K29Y5PP6.K5.
1000		8.5			S102K33Y5PP6.K5.
1500		10			S152K39Y5PP6.K5.
2200		11			S222K43Y5PP6.K5.
3300		13.5	7.5	4.8	S332K53Y5PP63K7.
4700		17.5			S472K69Y5PP63K7.

ORDERING INFORMATION 2 kV_{DC}, KINKED

C (pF)	TOL. (%)	$D_{MAX.}$ (mm)	LEAD SPACING (mm)	SH [1] (mm)	CLEAR TEXT CODE 13TH DIGIT: T = REEL; U = AMMO; 3 = BULK 16TH DIGIT: R = RoHS COMPLIANT
CLASS 2 Z5U					
1000	± 20	7.5	5.0	4.0	S102M29Z5UP6.K5.
1500					S152M29Z5UP6.K5.
2200		8.5			S222M33Z5UP6.K5.
3300		11			S332M43Z5UP6.K5.
4700		12	7.5	4.8	S472M47Z5UP63K7.
6800		13.5			S682M53Z5UP63K7.
10 000		17.5			S103M69Z5UP63K7.
CLASS 2 Y5V					
1000	+ 80/- 20	7.5	5.0	4.0	S102Z29Y5VP6.K5.
1500					S152Z29Y5VP6.K5.
2200		8.5			S222Z33Y5VP6.K5.
3300		10.5			S322Z39Y5VP6.K5.
4700		11			S472Z43Y5VP6.K5.
6800		12	7.5	4.8	S682Z47Y5VP6.K7.
10 000		15			S103Z59Y5VP6.K7.
CLASS 2 X5F					
1 00	± 10	6.5	5.0	4.0	S101K25X5FP6.K5R
220					S221K25X5FP6.K5R
330		7.5			S331K29X5FP6.K5R
470		8			S471K31X5FP6.K5R
680		10			S681K39X5FP6.K5R
1000		11			S102K43X5FP6.K5R
2200		15	7.5	4.8	S222K59X5FP6.K7R
3300		16.5			S332K65X5FP63K7R

Notes

[1] SH = seated height

- Maximum thickness 4.0 mm
- Lead style codes refer to inward kinked leads. Other styles available on request

ORDERING INFORMATION CLASS 3 kV_{DC}, KINKED

C (pF)	TOL. (%)	$D_{MAX.}$ (mm)	LEAD SPACING (mm)	SH [1] (mm)	CLEAR TEXT CODE 13TH DIGIT: T = REEL; U = AMMO; 3 = BULK 16TH DIGIT: R = RoHS COMPLIANT
CLASS 1 SL					
10	± 10	8.5	7.5	4.0	S100K33SL0R63K7.
15					S150K33SL0R63K7.
22					S220K33SL0R63K7.
33					S330K33SL0R63K7.
47					S470K33SL0R63K7.
68		10			S680K39SL0R63K7.
CLASS 2 X7R					
100	± 10	8.5	7.5	4.0	S101K33X7RR63K7.
150					S151K33X7RR63K7.
220					S221K33X7RR63K7.
330					S331K33X7RR63K7.
470					S471K33X7RR63K7.
680		10			S681K39X7RR63K7.
1000		11			S102K43X7RR63K7.
1500		13.5		4.8	S152K53X7RR63K7.
2200		17.5			S222K59X7RR83K7.

ORDERING INFORMATION CLASS 3 kV_{DC}, KINKED

C (pF)	TOL. (%)	$D_{MAX.}$ (mm)	LEAD SPACING (mm)	SH [1] (mm)	CLEAR TEXT CODE 13TH DIGIT: T = REEL; U = AMMO; 3 = BULK 16TH DIGIT: R = RoHS COMPLIANT
CLASS 2 Y5P					
100	± 10	8.5	7.5	4.0	S101K33Y5PR63K7.
150					S151K33Y5PR63K7.
220					S221K33Y5PR63K7.
330					S331K33Y5PR63K7.
470					S471K33Y5PR63K7.
680		10			S681K39Y5PR63K7.
1000		11			S102K43Y5PR63K7.
1500		12		4.8	S152K47Y5PR63K7.
2200		15			S222K59Y5PR63K7.
3 300		19	10		S332K75Y5PR83K0.
CLASS 2 Z5U					
470	± 20	8.5	7.5	4.0	S471M33Z5UR63K7.
680					S681M33Z5UR63K7.
1000					S102M33Z5UR63K7.
1500		10			S152M39Z5UR63K7.
2200		11			S222M43Z5UR63K7.
3300		13.5		4.8	S332M53Z5UR63K7.
4700		17.5			S472M69Z5UR83K7.
CLASS 2 Y5V					
1000	+ 80/- 20	8.5	7.5	4.0	S102Z33Y5VR63K7.
1500					S152Z33Y5VR63K7.
2200		10			S222Z39Y5VR63K7.
3300		11			S322Z43Y5VR63K7.
4700		12		4.8	S472Z47Y5VR63K7.
6800		15			S682Z59Y5VR63K7.

Notes

[1] SH = seated height

- Maximum thickness 4.0 mm
- Lead style codes refer to inward kinked leads. Other styles available on request

ORDERING INFORMATION CLASS 6 kV_{DC}, KINKED

C (pF)	TOL. (%)	$D_{MAX.}$ (mm)	LEAD SPACING (mm)	SH [1] (mm)	CLEAR TEXT CODE 13TH DIGIT: T = REEL; U = AMMO; 3 = BULK 16TH DIGIT: R = RoHS COMPLIANT
CLASS 1 SL					
10	± 20	10	10	3.0	S100M39SL0U83L0.
15					S150M43SL0U83L0.
22					S220M43SL0U83L0.
33		13.5			S330M53SL0U83L0.
CLASS 1 S3N					
47	± 20	11	10	3.0	S470M43S3NU83L0.
68		13.5			S680M53S3NU83L0.
100		15			S101M59S3NU83L0.
150		15			S151M59S3NU83L0.
CLASS 2 Z5U					
220	± 20	10	10	3.0	S221M39Z5UU83L0.
330		11			S331M43Z5UU83L0.
470		12			S471M47Z5UU83L0.

ORDERING INFORMATION CLASS 6 kV_{DC}, KINKED

C (pF)	TOL. (%)	$D_{MAX.}$ (mm)	LEAD SPACING (mm)	SH [1] (mm)	CLEAR TEXT CODE 13^{TH} DIGIT: T = REEL; U = AMMO; 3 = BULK 16^{TH} DIGIT: R = RoHS COMPLIANT
CLASS 2 Z5U					
680	± 20	13.5	10	3.0	S681M53Z5UU83L0.
1000		15			S102M59Z5UU83L0.
1500		17.5			S152M69Z5UU83L0.
2200		19			S222M75Z5UU83L0.

Notes

[1] SH = seated height

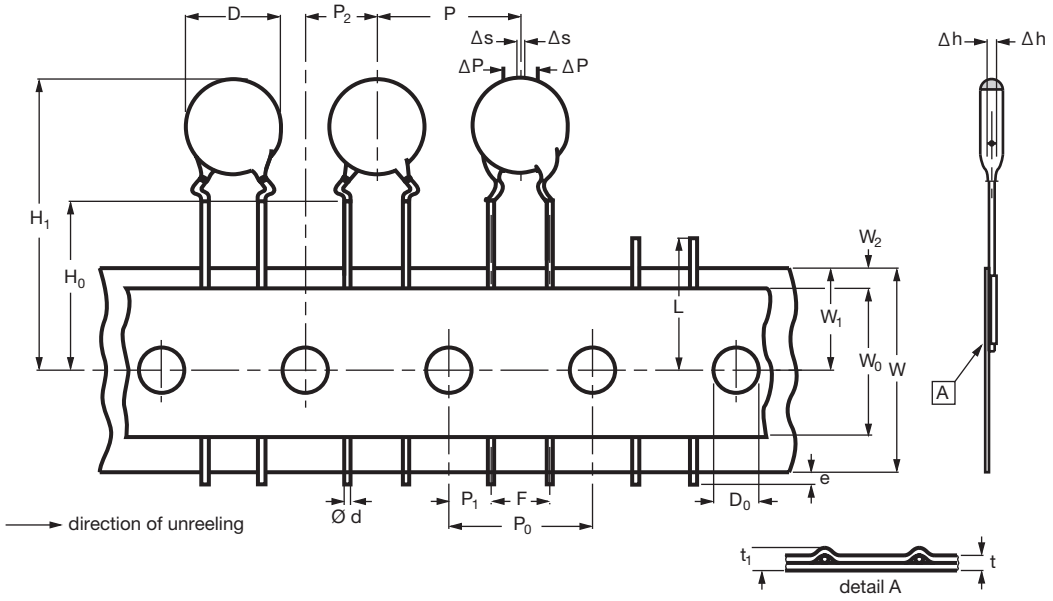
- Maximum thickness 4.0 mm
- Lead style codes refer to inward kinked leads. Other styles available on request

PACKAGING

PACKAGING TYPE	SIZE CODE	LEAD SPACE (mm)	VOLTAGE (V_{DC})	SPQ	BOX DIMENSIONS L x W x H (mm)
Bulk (long lead L ≥ 25.4 mm	20 to 47	all	all	1000	245 x 120 x 65
				1000	
				1000	
	53 to 75			500	
	84 to 96			250	
Tape and reel	≤ 47	≤ 6.40	< 500	2500	370 x 370 x 60
			500 ≤ WV ≤ 2000	2000	
			3000	1000	
		≥ 7.5	all	1000	
Ammopack	≤ 47	≤ 6.40	< 500	2000	335 x 240 x 50
			500 ≤ WV < 2000	1500	335 x 290 x 50
			2000 and 3000	1500	
		≥ 7.5	all	1500	360 x 330 x 55

Note

- The capacitors are supplied in bulk packaging (cardboard boxes), in tape on reel or in ammopack



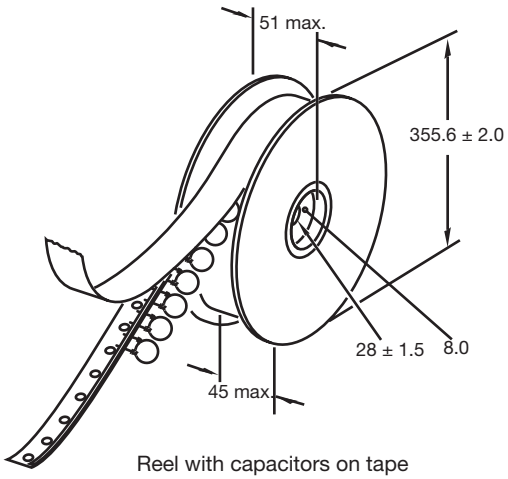
DIMENSIONS OF TAPE			
SYMBOL	PARAMETER	DIMENSIONS (mm)	
		NOMINAL	TOLERANCE
D	Body diameter	11.0 maximum	-
d	Lead diameter	0.6	± 0.05
P	Pitch between capacitors	12.7	± 1.0
P_0 (1)	Feed-hole pitch	12.7	± 0.3
ΔP	Plane deviation	1.0 maximum	-
P_1 (2)	Feed-hole center to lead center	3.85	± 0.7
P_2 (2)	Feed-hole center to component center	6.35	± 1.3
F	Lead spacing	5.0	0.6 - 0.4
Δh	Component alignment	0	± 1.0
W	Tape width	18.0	1.0 - 0.5
W_0	Hold-down tape width	5.0 minimum	-
W_1	Hole position	9.0	0.75 - 0.5
W_2	Hold-down tape margin	3.0 maximum	-
H_0	Height to seating plane	16.0	± 0.5
H_1	Maximum component height	32.0	-
e	Lead end protrusion	1.0 maximum	-
L	Maximum length of snipped lead	11.0	-
D_0	Feed-hole diameter	4.0	± 0.2
t	Total tape thickness	0.9 maximum	-
t_1	Maximum thickness of tape and wires	1.5 maximum	-

Notes

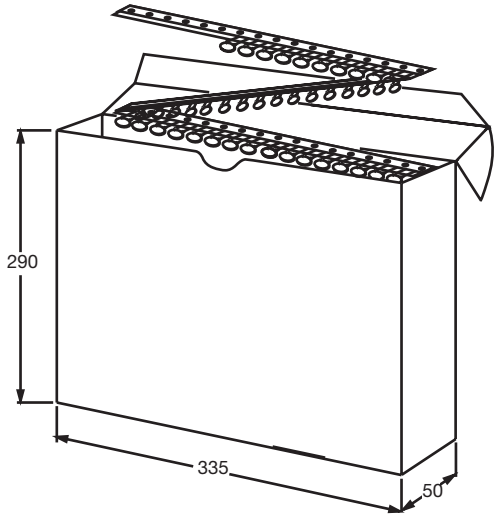
(1) Cumulative pitch error: ± ≤ 1 mm/20 pitches

(2) Obliquity maximum 3°

REEL AND TAPE DATA in millimeters

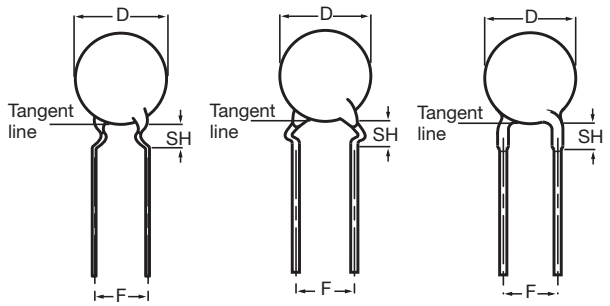


Reel with capacitors on tape



Ammopack with capacitors on tape

Ceramic Disc Capacitors
Class 2, Low Loss (0.5 %), 500 V_{DC}, 1 kV_{DC}, 2 kV_{DC} and 3 kV_{DC}



Capacitors with 5 mm (0.20"), 7.5 mm (0.30") and 10 mm (0.40") lead spacing

FEATURES

- High reliability
- Low losses
- High capacitance in small size
- Kinked (preferred) or straight leads
- Compliant to RoHS directive 2002/95/EC

Pb e3 RoHS COMPLIANT

APPLICATIONS

In electronic circuits where low losses and high capacitance per volume are essential, for example:

- SMPS
- HF ballast
- Snubber and high voltage circuits

DESIGN

The capacitors consist of a ceramic disc both sides of which are silver-plated. Connection leads are made of tinned copper having a diameter of 0.6 mm or 0.8 mm.

The capacitors may be supplied with kinked or straight leads with a lead spacing of 5 mm (0.20"), 7.5 mm (0.30") or 10 mm (0.40") and a lead length from 4 mm to 30 mm. The standard tolerance on capacitance is ± 10 %. Encapsulation is made of gold colored epoxy-resin, flammable resistant in accordance with “UL 94 V-0”.

QUICK REFERENCE DATA	
DESCRIPTION	CLASS 2 (Y5P)
Voltage (V_{DC})	500, 1000, 2000, 3000
Min. Capacitance (pF)	100
Max. Capacitance (pF)	4700
Mounting	Through hole

MARKING

Marking indicates capacitance value and tolerance in accordance with “EIA 198” and voltage marks

OPERATING TEMPERATURE RANGE

- 30 °C to + 125 °C

TEMPERATURE COEFFICIENT

Y5P

SECTIONAL SPECIFICATIONS

Class 2 IEC 60384-9, EIA 198

Climatic Category

30/85/21

EXAMPLES OF MARKING CODE

Disc size ($D_{max.}$) ≤ 6.5 mm:	Disc size ($D_{max.}$) ≥ 7.5 mm:
	BC
RP = low loss with T.C. Y5P	RP
101K	102K
2 kV	3 kV

CAPACITANCE RANGE

100 pF to 4700 pF

RATED DC VOLTAGE

500 V; 1 kV; 2 kV; 3 kV

DIELECTRIC STRENGTH

200 % of rated voltage

INSULATION RESISTANCE AT 500 V_{DC}

≥ 10 000 MΩ

TOLERANCE ON CAPACITANCE

± 10 %, other tolerances available on request

DISSIPATION FACTOR

0.5 % max.

Note

The capacitors meet the essential requirements of IEC 60384-9 and EIA 198. Unless stated otherwise all electrical values apply at an ambient temperature of 25 °C ± 3 °C, at normal atmospheric conditions

ORDERING INFORMATION					
C (pF)	TOL. (%)	$D_{MAX.}$ (mm)	LEAD SPACING (mm)	SH [1] (mm)	CLEAR TEXT CODE 13TH DIGIT: T = REEL; U = AMMO; 3 = BULK 16TH DIGIT: R = RoHS COMPLIANT
500 V					
100	± 10	5.0	5.0	4.0	F101K25Y5PL6.J5.
120					F121K25Y5PL6.J5.
150					F151K25Y5PL6.J5.
180					F181K25Y5PL6.J5.
220					F221K25Y5PL6.J5.
270					F271K25Y5PL6.J5.
330					F331K25Y5PL6.J5.
390					F391K25Y5PL6.J5.
470		6.5			F471K25Y5PL6.J5.
560					F561K25Y5PL6.J5.
680					F681K25Y5PL6.J5.
820					F821K25Y5PL6.J5.
1000		7.5			F102K29Y5PL6.J5.
1200		8.5			F122K33Y5PL6.J5.
1500					F152K33Y5PL6.J5.
1800		10			F182K39Y5PL6.J5.
2200					F222K39Y5PL6.J5.
2700		11			F272K43Y5PL6.J5.
3300		12	7.5		F332K47Y5PL63J7.
3900		13.5			F392K53Y5PL63J7.
1 kV					
100	± 10	6.5	5.0	4.0	F101K25Y5PN6.J5.
120					F121K25Y5PN6.J5.
150					F151K25Y5PN6.J5.
180					F181K25Y5PN6.J5.
220					F221K25Y5PN6.J5.
270					F271K25Y5PN6.J5.
330					F331K25Y5PN6.J5.
390					F391K25Y5PN6.J5.
470					F471K25Y5PN6.J5.
560		7.5			F561K29Y5PN6.J5.
680					F681K29Y5PN6.J5.
820		8.5			F821K33Y5PN6.J5.
1000					F102K33Y5PN6.J5.
1200		10			F122K39Y5PN6.J5.
1500					F152K39Y5PN6.J5.
1800					F182K39Y5PN6.J5.
2200		11			F222K43Y5PN6.J5.
2700		13.5	7.5	4.8	F272K53Y5PN63J7.
3300		15			F332K59Y5PN63J7.
3900					F392K59Y5PN63J7.

Ceramic Disc Capacitors Class 2, Low Loss (0.5 %), 500 V_{DC}, 1 kV_{DC}, 2 kV_{DC} and 3 kV_{DC}

ORDERING INFORMATION

C (pF)	TOL. (%)	$D_{MAX.}$ (mm)	LEAD SPACING (mm)	SH [1] (mm)	CLEAR TEXT CODE 13TH DIGIT: T = REEL; U = AMMO; 3 = BULK 16TH DIGIT: R = RoHS COMPLIANT
2 kV					
100	± 10	6.5	5.0	4.0	F101K25Y5PP6.K5.
120					F121K25Y5PP6.K5.
150					F151K25Y5PP6.K5.
180					F181K25Y5PP6.K5.
220					F221K25Y5PP6.K5.
270		7.5			F271K29Y5PP6.K5.
2 kV					
330	± 10	7.5	5.0	4.0	F331K29Y5PP6.K5.
390					F391K29Y5PP6.K5.
470					F471K29Y5PP6.K5.
560		8.5			F561K33Y5PP6.K5.
680					F681K33Y5PP6.K5.
820		11			F821K43Y5PP6.K5.
1000					F102K43Y5PP6.K5.
1200					F122K43Y5PP6.K5.
1500		12	7.5		F152K47Y5PP63K7.
1800		15		4.8	F182K59Y5PP63K7.
2200					F222K59Y5PP63K7.
2700		17.5			F272K69Y5PP63K7.
3300					F332K69Y5PP63K7.
3900		19	10		F392K75Y5PP83K0.
4700					F472K75Y5PP83K0.
3 kV					
100	± 10	8.5	7.5	4.0	F101K33Y5PR6.K7.
120					F121K33Y5PR6.K7.
150					F151K33Y5PR6.K7.
180					F181K33Y5PR6.K7.
220					F221K33Y5PR6.K7.
270					F271K33Y5PR6.K7.
330					F331K33Y5PR6.K7.
390					F391K33Y5PR6.K7.
470					F471K33Y5PR6.K7.
560					F561K33Y5PR6.K7.
680		11			F681K43Y5PR6.K7.
820					F821K43Y5PR6.K7.
1000					F102K43Y5PR63K7.
1200		13.5		4.8	F122K53Y5PR63K7.
1500		15			F152K59Y5PR63K7.
1800					F182K59Y5PR63K7.
2200					F222K59Y5PR63K7.
2700		19	10		F272K75Y5PR83K0.

Notes

[1] SH = seated height

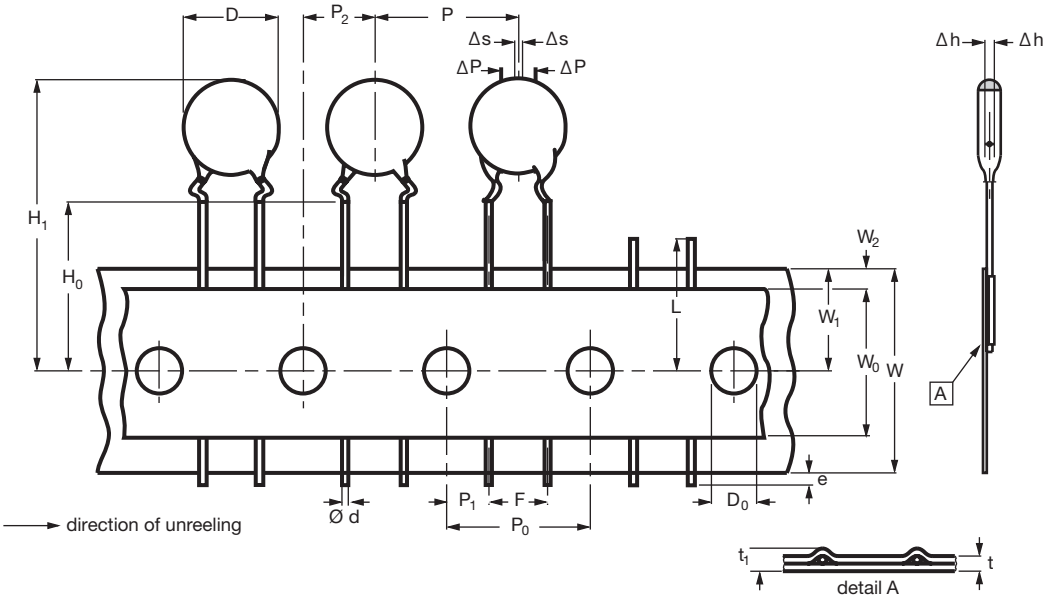
- Maximum thickness 500 V = 3.5 mm; 1 kV = 4.5 mm; 2 kV = 5.0 mm; 3 kV = 6.0 mm
- Lead style codes refer to inward kinked leads. Other styles available on request

PACKAGING

PACKAGING TYPE	SIZE CODE	LEAD SPACE (mm)	VOLTAGE (V_{DC})	SPQ	BOX DIMENSIONS L x W x H (mm)
Bulk (long lead L ≥ 25.4 mm	20 to 47	all	all	1000	245 x 120 x 65
				1000	
				1000	
	53 to 75			500	
	84 to 96			250	
Tape and reel	≤ 47	≤ 6.40		2500	370 x 370 x 60
			500 ≤ WV ≤ 2000	2000	
			3000	1000	
		≥ 7.5	all	1000	
	≥ 53			500	
Ammopack	≤ 47	≤ 6.40		2000	335 x 240 x 50
			500 ≤ WV < 2000	1500	335 x 290 x 50
			2000 and 3000	1500	
		≥ 7.5	all	1500	360 x 330 x 55
	≥ 53			500	335 x 290 x 50

Note

- The capacitors are supplied in bulk packaging (cardboard boxes), in tape on reel or in ammopack



DIMENSIONS OF TAPE

SYMBOL	PARAMETER	DIMENSIONS (mm)	
		NOMINAL	TOLERANCE
D	Body diameter	11.0 maximum	-
d	Lead diameter	0.6	± 0.05
P	Pitch between capacitors	12.7	± 1.0
P_0 (1)	Feed-hole pitch	12.7	± 0.3 (1)
ΔP	Plane deviation	1.0 maximum	-
P_1 (2)	Feed-hole center to lead center	3.85	± 0.7 (2)
P_2 (2)	Feed-hole center to component center	6.35	± 1.3 (2)
F	Lead spacing	5.0	0.6
Δh	Component alignment	0	± 1.0

Ceramic Disc Capacitors
Class 2, Low Loss (0.5 %), 500 V_{DC},
1 kV_{DC}, 2 kV_{DC} and 3 kV_{DC}

DIMENSIONS OF TAPE

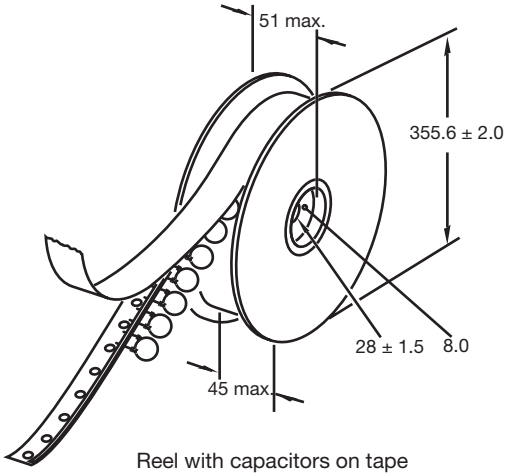
SYMBOL	PARAMETER	DIMENSIONS (mm)	
		NOMINAL	TOLERANCE
W	Tape width	18.0	1.0
W_0	Hold-down tape width	5.0 minimum	-
W_1	Hole position	9.0	0.75
W_2	Hold-down tape margin	3.0 maximum	-
H_0	Height to seating plane	16.0	± 0.5
H_1	Maximum component height	32.0	-
e	Lead end protrusion	1.0 maximum	-
L	Maximum length of snipped lead	11.0	-
D_0	Feed-hole diameter	4.0	± 0.2
t	Total tape thickness	0.9 maximum	-
t_1	Maximum thickness of tape and wires	1.5 maximum	-

Notes

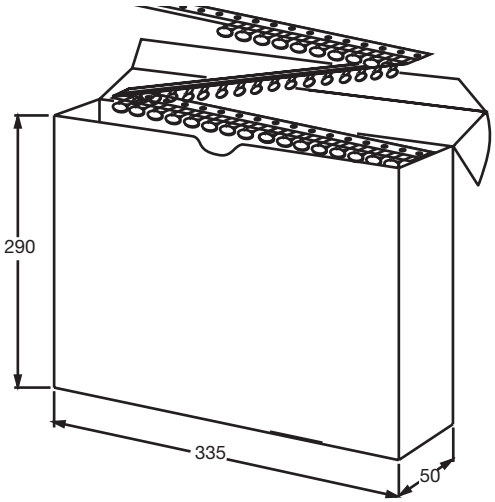
(1) Cumulative pitch error: ± ≤ 1 mm/20 pitches

(2) Obliquity maximum 3°

REEL AND TAPE DATA in millimeters



Reel with capacitors on tape

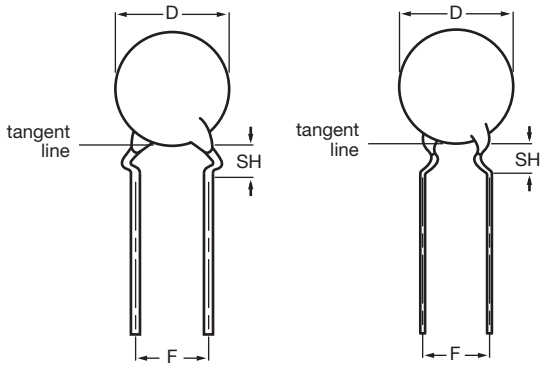


Ammopack with capacitors on tape

DIMENSIONS OF AMMOPACK

PARAMETER	DISC SIZE ($D_{MAX.}$)		UNIT
	6.5 mm	12.0 mm to 13.5 mm	
Taping pitch	12.7	15.0	mm
L	335	360	mm
W	290	330	mm
H	50	55	mm

Ceramic Disc Capacitors Class 2, Low Loss (0.2 %), 500 V_{DC}, 1 kV_{DC}, 2 kV_{DC} and 3 kV_{DC}



Capacitors with outside and inside kink lead spacing

QUICK REFERENCE DATA	
DESCRIPTION	**CLASS 2 (Y5R)**
Voltage (V_{DC})	500, 1000, 2000, 3000
Min. Capacitance (pF)	100
Max. Capacitance (pF)	4700
Mounting	Through hole

MARKING

Marking indicates capacitance value and tolerance in accordance with “EIA 198” and voltage marks.

OPERATING TEMPERATURE RANGE

- 30 °C to + 125 °C

TEMPERATURE COEFFICIENT Y5R (2C4) - 30 °C TO + 85 °C

± 15 %

SECTIONAL SPECIFICATIONS

IEC 60384-9, EIA 198

EXAMPLES OF MARKING CODE

Disc size ($D_{max.}$) ≤ 6.5 mm:	Disc size ($D_{max.}$) ≥ 7.5 mm:
	BC
RP = low loss with T.C. Y5P	RP
101K	102K
2 kV	3 kV

FEATURES

- High reliability
- Low losses
- High capacitance in small size
- Kinked leads
- Compliant to RoHS directive 2002/95/EC

Pb e3 RoHS COMPLIANT

APPLICATIONS

In electronic circuits where low losses and high capacitance per volume are essential, for example:

- SMPS
- HF ballast
- Snubber and high voltage circuits

DESIGN

The capacitors consist of a ceramic disc both sides of which are silver-plated. Connection leads are made of tinned copper having a diameter of 0.6 mm or 0.8 mm.

The capacitors are supplied with kinked leads and lead spacings of 5 mm or 7.5 mm and 10 mm. Encapsulation is made of epoxy-resin, flammable resistant in accordance with “UL 94 V-0”

CAPACITANCE RANGE

100 pF to 4700 pF

RATED DC VOLTAGE

500 V; 1 kV; 2 kV; 3 kV

DIELECTRIC STRENGTH

200 % of rated voltage

INSULATION RESISTANCE AT 500 V_{DC}

≥ 10 000 MΩ min.

TOLERANCE ON CAPACITANCE

± 10 %; ± 20 %

DISSIPATION FACTOR

0.2 % max.

AGING

typical 0.5 % per time decade

Note

The capacitors meet the essential requirements of “IEC 60384-9 and EIA 198”. Unless stated otherwise all electrical values apply at an ambient temperature of 25 °C ± 3 °C, at normal atmospheric conditions

Ceramic Disc Capacitors Class 2, Low Loss (0.2 %), 500 V_{DC}, 1 kV_{DC}, 2 kV_{DC} and 3 kV_{DC}

ORDERING INFORMATION					
C (pF)	TOL. (%)	$D_{MAX.}$ (mm)	LEAD SPACING (mm)	SH [1] (mm)	CLEAR TEXT CODE 13TH DIGIT: T = REEL; U = AMMO; 3 = BULK 16TH DIGIT: R = RoHS COMPLIANT
500 V					
100	± 10	5.0	5.0	4.0	F101K20Y5RL6.J5.
120					F121K20Y5RL6.J5.
150					F151K20Y5RL6.J5.
180					F181K20Y5RL6.J5.
220					F221K20Y5RL6.J5.
270					F271K20Y5RL6.J5.
330					F331K20Y5RL6.J5.
390		6.5			F391K25Y5RL6.J5.
470					F471K25Y5RL6.J5.
560					F561K25Y5RL6.J5.
680					F681K25Y5RL6.J5.
820		7.5			F821K29Y5RL6.J5.
1000					F102K29Y5RL6.J5.
500 V					
1200	± 10	8.5	5.0	4.0	F122K33Y5RL6.J5.
1500					F152K33Y5RL6.J5.
1800		10.0			F182K39Y5RL6.J5.
2200					F222K39Y5RL6.J5.
2700		12.0	7.5		F272K47Y5RL63J7.
1 kV					
100	± 10	6.5	5.0	4.0	F101K25Y5RN6.J5.
120					F121K25Y5RN6.J5.
150					F151K25Y5RN6.J5.
180					F181K25Y5RN6.J5.
220					F221K25Y5RN6.J5.
270		7.5			F271K29Y5RN6.J5.
330					F331K29Y5RN6.J5.
390					F391K29Y5RN6.J5.
470					F471K29Y5RN6.J5.
560		8.5			F561K33Y5RN6.J5.
680					F681K33Y5RN6.J5.
820		10.0			F821K39Y5RN6.J5.
1000					F102K39Y5RN6.J5.
1200		11.0			F122K43Y5RN6.J5.
1500					F152K43Y5RN6.J5.
1800		12.5	7.5		F182K47Y5RN63J7.
2200		13.5			F222K53Y5RN63J7.
2700					F272K53Y5RN63J7.
3300		17.5			F332K69Y5RN63J7.
3900					F392K69Y5RN63J7.
4700		19.0	10.0		F472K75Y5RN83J0.
2 kV					
100	± 10	6.5	5.0	4.0	F101K25Y5RP6.K5.
120					F121K25Y5RP6.K5.
150					F151K25Y5RP6.K5.
180		7.5			F181K29Y5RP6.K5.
220					F221K29Y5RP6.K5.
270					F271K29Y5RP6.K5.
330					F331K29Y5RP6.K5.
390		8.5			F391K33Y5RP6.K5.
470					F471K33Y5RP6.K5.
560		10.0			F561K39Y5RP6.K5.

ORDERING INFORMATION

C (pF)	TOL. (%)	$D_{MAX.}$ (mm)	LEAD SPACING (mm)	SH [1] (mm)	CLEAR TEXT CODE 13TH DIGIT: T = REEL; U = AMMO; 3 = BULK 16TH DIGIT: R = RoHS COMPLIANT
2 kV					
680	± 10	10.0	5.0	4.0	F681K39Y5RP6.K5.
820		11.0			F821K43Y5RP6.K5.
1000					F102K43Y5RP6.K5.
1200		12.0	7.5	4.8	F122K47Y5RP63K7.
1500		13.5			F152K53Y5RP63K7.
1800					F182K53Y5RP63K7.
2200		17.5			F222K69Y5RP63K7.
2700		19.0	10.0		F272K75Y5RP83K0.
3300					F332K75Y5RP83K0.
3900		24.5			F392K75Y5RP83K0.
4700					F472K96Y5RP83K0.
3 kV					
100	± 10	8.5	7.5	4.0	F101K33Y5RR6.K7.
120					F121K33Y5RR6.K7.
150					F151K33Y5RR6.K7.
180					F181K33Y5RR6.K7.
220					F221K33Y5RR6.K7.
270					F271K33Y5RR6.K7.
330					F331K33Y5RR6.K7.
390		10			F391K39Y5RR6.K7.
470					F471K39Y5RR6.K7.
560		11			F561K43Y5RR6.K7.
680					F681K43Y5RR6.K7.
820		13.5		4.8	F821K53Y5RR63K7.
1000					F102K53Y5RR63K7.
1200		15			F122K59Y5RR63K7.
1500					F152K59Y5RR63K7.
1800		19	10.0		F182K75Y5RR83K0.
2200					F222K75Y5RR83K0.
2700		21			F272K84Y5RR83K0.

Notes

[1] SH = seated height

- Maximum thickness: 500 V = 3.5 mm; 1 kV = 4.5 mm; 2 kV = 5.0 mm; 3 kV = 6.0 mm

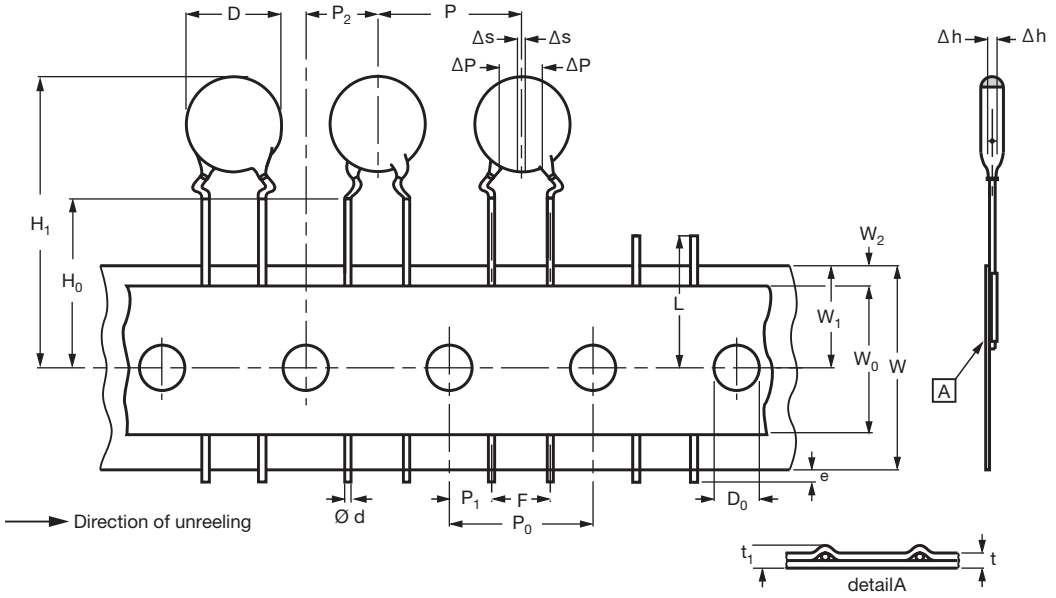
PACKAGING

PACKAGING TYPE	SIZE CODE	LEAD SPACE (mm)	VOLTAGE (V_{DC})	SPQ	BOX DIMENSIONS L x W x H
Bulk (long lead L ≥ 25.4 mm	20 to 25	all	all	1000	245 x 120 x 65
	29 to 39			1000	
	43 to 47			1000	
	53 to 75			500	
	84 to 96			250	
Tape and reel	≤ 47	≤ 6.4	< 500	2500	370 x 370 x 60
			500 ≤ WV ≤ 2000	2000	
			3000	1000	
		≥ 7.5	all	1000	
	≥ 53	all	all	1000	
Ammopack	≤ 47	≤ 6.4	< 500	2000	335 x 240 x 50
			500 ≤ WV < 2000	2000	335 x 290 x 50
			2000 and 3000	1500	
		≥ 7.5	all	1500	360 x 330 x 55
	≥ 53	all	all	1500	335 x 290 x 50

Note

- The capacitors are supplied in bulk packaging (cardboard boxes), in tape on reel or in ammopack

Ceramic Disc Capacitors Class 2, Low Loss (0.2 %), 500 V_{DC}, 1 kV_{DC}, 2 kV_{DC} and 3 kV_{DC}



Kinked capacitors on tape, lead spacing 5.0 mm (0.2") or 7.5 mm (0.3")

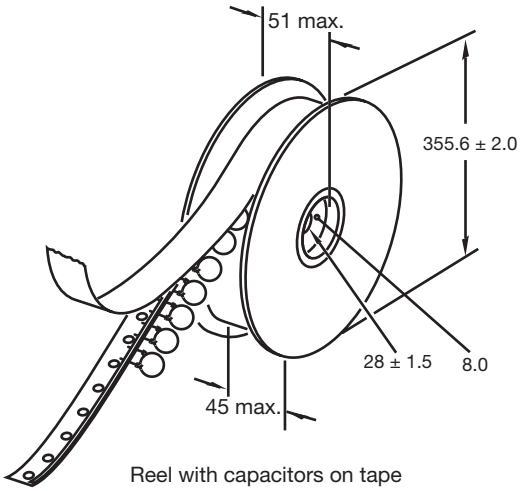
DIMENSIONS OF TAPE			
SYMBOL	PARAMETER	DIMENSIONS (mm)	
		FEED-HOLE PITCH P_0 = 12.7	FEED-HOLE PITCH P_0 = 15.0
D	Body diameter	11.0 max.	14.0 max.
d	Lead diameter	0.6 ± 0.05	0.6 ± 0.05
P (1)	Pitch between capacitors	12.7 ± 1.0	15.0 ± 1.0
P_0	Feed-hole pitch	12.7 ± 0.3	15.0 ± 0.3
ΔP	Plane deviation	1.0 max.	1.0 max.
P_1 (2)	Feed-hole center to lead center	3.85 ± 0.7	3.75 ± 0.7
P_2 (2)	Feed-hole center to component center	6.35 ± 1.3	7.5 ± 1.5
F	Lead spacing	5.0 + 0.6/- 0.4	7.5 + 0.6/- 0.4
Δh	Component alignment	0 ± 1.0	0 ± 1.0
W	Tape width	18.0 + 1.0/- 0.5	18.0 + 1.0/- 0.5
W_0	Hold-down tape width	5.0 min.	5.0 min.
W_1	Hole position	9.0 + 0.75/- 0.5	9.0 + 0.75/- 0.5
W_2	Hold-down tape margin	3.0 max.	3.0 max.
H_0	Height to seating plane	16.0 ± 0.5	16.0 ± 0.5
H_1	Maximum component height	32.0	40.0
e	Lead end protrusion	1.0 max.	1.0 max.
L	Maximum length of snipped lead	11.0	11.0
D_0	Feed-hole diameter	4.0 ± 0.2	4.0 ± 0.2
t	Total tape thickness	0.9 max.	0.9 max.
t_1	Maximum thickness of tape and wires	1.5 max.	1.5 max.

Notes

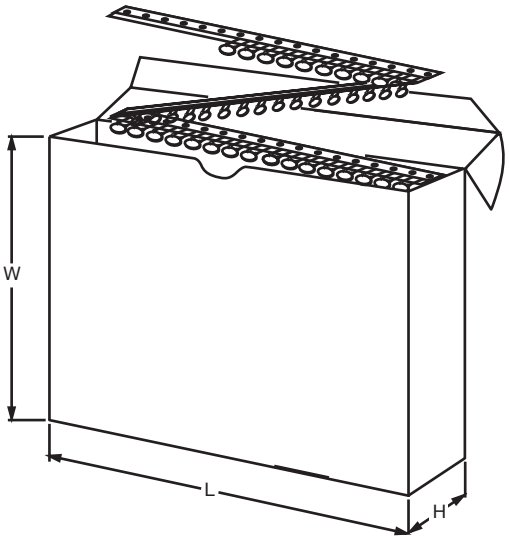
(1) Cumulative pitch error: ± ≤ 1 mm/20 pitches

(2) Obliquity maximum 3°

REEL AND TAPE DATA in millimeters

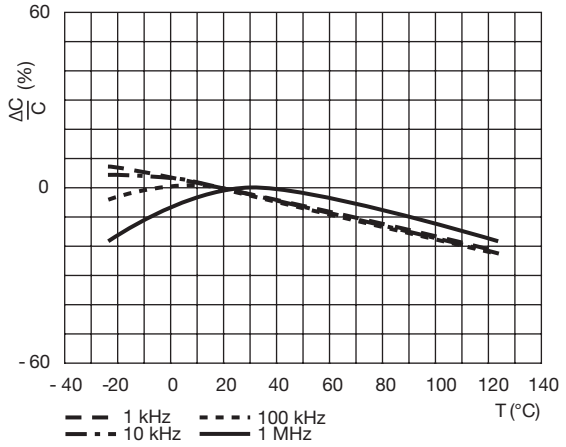


Reel with capacitors on tape

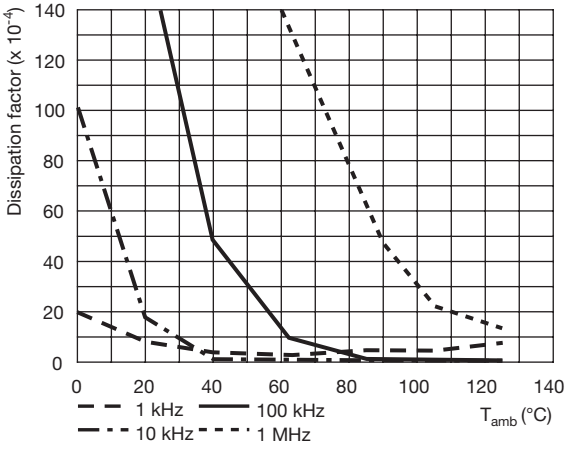


Ammopack with capacitors on tape

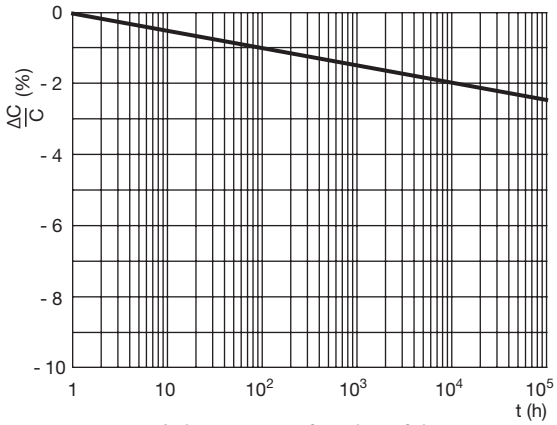
DIMENSIONS OF AMMOPACK			
PARAMETER	DISC SIZE ($D_{MAX.}$)		UNIT
	6.5 mm to 11.0 mm	12.0 mm to 13.5 mm	
Taping pitch	12.7	15.0	mm
L	335	360	mm
W	290	330	mm
H	50	55	mm



Typical capacitance change as a function of temperature and frequency

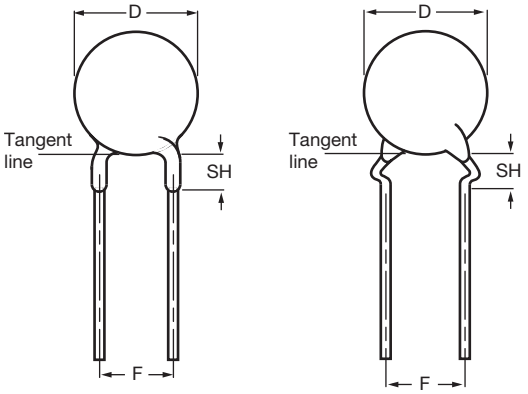


Typical dissipation factor as a function of temperature and frequency



Aging rate as a function of time

Ceramic Disc Capacitors
Class 1, 3 kV_{DC}



Capacitors with 7.5 mm (0.30") and 10 mm (0.40") lead spacing

FEATURES

- Low losses
- High stability
- High capacitance in small size
- Kinked (preferred) or straight leads
- Compliant to RoHS directive 2002/095/EC

Pb e3 RoHS COMPLIANT

APPLICATIONS

- DC high voltage
- Pulse high voltage
- LCD backlight inverter

QUICK REFERENCE DATA	
DESCRIPTION	**CLASS 1 (C0G)**
Voltage (V_{DC})	3000
Min. Capacitance (pF)	2
Max. Capacitance (pF)	220
Mounting	Through hole

MARKING

Straight and kinked leaded versions are gold coloured Marking indicates capacitance value and tolerance in accordance with "EIA 198", and voltage.

OPERATING TEMPERATURE RANGE

Class 1, C0G; U2J, U2M, - 55 °C to + 125 °C

TEMPERATURE COEFFICIENTS

Class 1, C0G

SECTIONAL SPECIFICATIONS

Class 1, IEC 60384-8,
EIA 198

CLIMATIC CATEGORY

Class 1, C0G; U2J, U2M, 55/125/21

DESIGN

The capacitors consist of a ceramic disc both sides of which are silver-plated. Connection leads are made of tinned copper having a diameter of 0.6 mm or 0.8 mm.

The capacitors may be supplied with kinked or straight leads with a lead spacing of 7.5 mm (0.30") or 10 mm (0.40") and a lead length from 4 mm to 30 mm. The standard tolerance on capacitance is ± 5 % or ± 10 % for class 1 capacitors. Encapsulation is made of gold-colored epoxy-resin, flammable resistant in accordance with "UL 94 V-0"

CAPACITANCE RANGE

Class 1, at 1 MHz, 1.2 V_{RMS}; 2 pF to 220 pF

RATED DC VOLTAGE

3 kV

DIELECTRIC STRENGTH

According to IEC 384-8, 1.5 x U_R + 500 V_{DC} (5 kV_{DC})

INSULATION RESISTANCE AT 500 V_{DC}

≥ 10 000 MΩ

TOLERANCE ON CAPACITANCE

± 5 %; ± 10 %;

Other tolerances available on request

DISSIPATION FACTOR

C ≤ 5 pF, 0.55 % max.

10 pF ≤ C < 33 pF, 20 x (150/C + 7) x 10^{-4}

C ≥ 33 pF; 0.20 % max.

ORDERING INFORMATION 3 kV_{DC}, KINKED					
C (pF)	TOL. (%)	$D_{MAX.}$ (mm)	LEAD SPACING (mm)	SH/$DR_{MAX.}$ [1] (mm)	CLEAR TEXT CODE 13TH DIGIT: T = REEL; U = AMMO; 3 = BULK
CLASS 1 C0G					
2	± 0.25	6.5	7.5	4.0	S209C25C0KR6.K7R
3					S309C25C0JR6.K7R
4.9	± 0.50				S499D25C0HR6.K7R
10	± 5				S100J25U2JR6.K7R
15					S150J25U2JR6.K7R
22					S220J25U2MR6.K7R
33					S330J25U2MR6.K7R
47		7.5			S470J29U2MR6.K7R
68		8			S680J31U2MR6.K7R
100		9			S101J35U2MR6.K7R
120		10			S121J39U2MR6.K7R
150		10.5			S151J41U2MR6.K7R
180		12.5			S181J49U2MR6.K7R
220					S221J49U2MR6.K7R

Notes

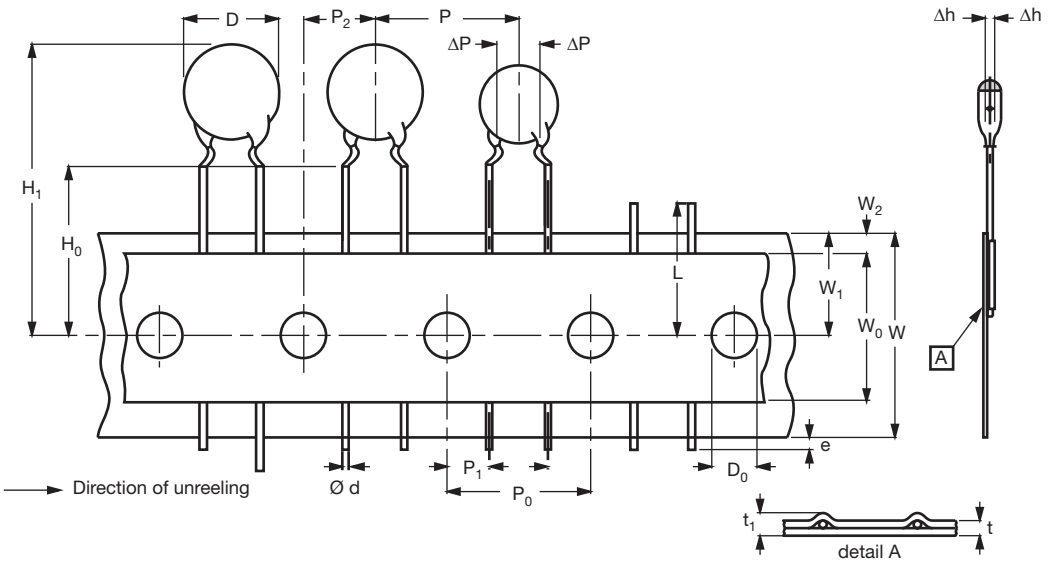
[1] SH = Seated height

- Maximum thickness 5.0 mm
- Refer to outward kinked leads. Other styles available on request (straight or inline kinked leads).

PACKAGING					
PACKAGING TYPE	SIZE CODE	LEAD SPACE (mm)	VOLTAGE (V_{DC})	SPQ	BOX DIMENSIONS L x W x H
Bulk (long lead L ≥ 25.4 mm)	20 to 47	≥ 7.5	3 kV	1000	245 x 120 x 65
				1000	
				1000	
	53 to 45			500	
	84 to 96			250	
Tape and reel	≤ 47			1000	370 x 370 x 60
Ammopack	≤ 47			1500	360 x 330 x 55

Note

- The capacitors are supplied in bulk packaging (cardboard boxes), in tape on reel or in ammopack



Kinked capacitors on tape, lead spacing 5.0 mm (0.2")

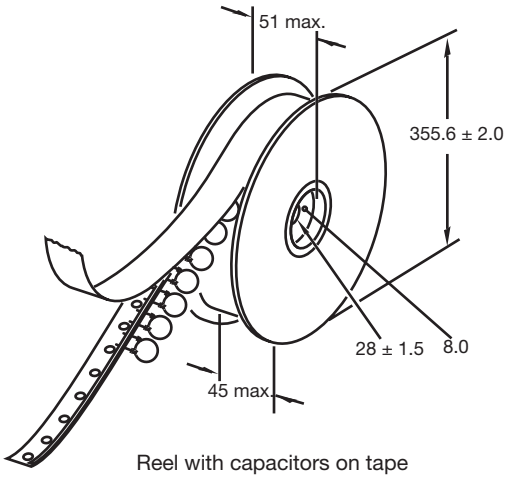
DIMENSIONS OF TAPE			
SYMBOL	PARAMETER	DIMENSIONS (mm)	
		NOMINAL	TOLERANCE
D	Body diameter	14.0 max.	-
d	Lead diameter	0.6	± 0.05
P	Pitch between capacitors	15	± 1.0
P_0 (1)	Feed-hole pitch	15	± 0.3
ΔP	Plane deviation	1.0 max.	-
P_1 (2)	Feed-hole center to lead center	3.75	± 0.7
P_2 (2)	Feed-hole center to component center	7.5	± 1.3
F	Lead spacing	7.5	-1.5
Δh	Component alignment	0	± 1.0
W	Tape width	18.0	1.0 - 0.5
W_0	Hold-down tape width	5.0 min.	-
W_1	Hole position	9.0	0.75 - 0.5
W_2	Hold-down tape margin	3.0 max.	-
H_0	Height to seating plane	16.0	± 0.5
H_1	Maximum component height	40.0	-
e	Lead end protrusion	1.0 max.	-
L	Maximum length of snipped lead	11.0	-
D_0	Feed-hole diameter	4.0	± 0.2
t	Total tape thickness	0.9 max.	-
t_1	Maximum thickness of tape and wires	1.5 max.	-

Notes

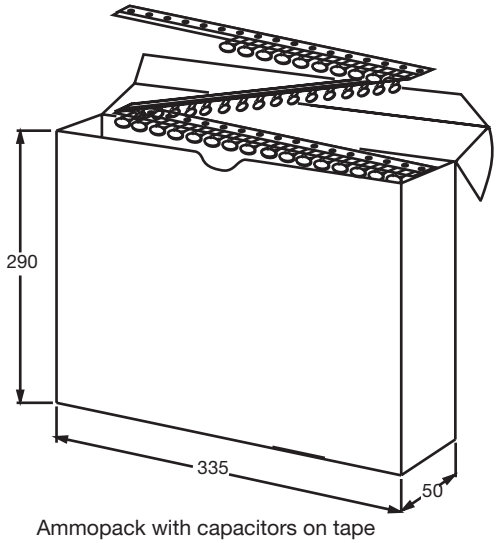
(1) Cumulative pitch error: ± ≤ 1 mm/20 pitches

(2) Obliquity maximum 3°

REEL AND TAPE DATA in millimeters

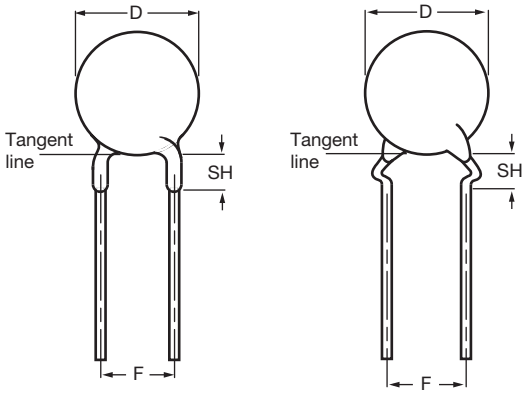


Reel with capacitors on tape



Ammopack with capacitors on tape

Ceramic Disc Capacitors
Class 1, 4 kV_{DC}



Capacitors with 7.5 mm (0.30") and 10 mm (0.40") lead spacing

FEATURES

- Low losses
- High stability
- High capacitance in small size
- Kinked (preferred) or straight leads
- Compliant ot RoHS directive 2002/95/EC

RoHS COMPLIANT

APPLICATIONS

- DC high voltage
- Pulse high voltage
- LCD backlight inverter

QUICK REFERENCE DATA	
DESCRIPTION	**CLASS 1 (C0G)**
Voltage (V_{DC})	4000
Min. Capacitance (pF)	2
Max. Capacitance (pF)	100
Mounting	Through hole

MARKING

Straight and kinked leaded versions are gold colored Marking indicates capacitance value and tolerance in accordance with “EIA 198”, and voltage.

OPERATING TEMPERATURE RANGE

Class1, C0G; U2J, U2M, - 55 °C to + 125 °C

TEMPERATURE COEFFICIENTS

Class 1, C0G

SECTIONAL SPECIFICATIONS

Class 1, C0G, IEC 60384-8,
EIA 198

CLIMATIC CATEGORY

Class 1, C0G; U2J, U2M 55/125/21

DESIGN

The capacitors consist of a ceramic disc both sides of which are silver-plated. Connection leads are made of tinned copper having a diameter of 0.6 mm or 0.8 mm.

The capacitors may be supplied with kinked or straight leads with a lead spacing of 7.5 mm (0.30") or 10 mm (0.40") and a lead length from 4 mm to 30 mm. The standard tolerance on capacitance is ± 5 % or ± 10 % for class 1 capacitors. Encapsulation is made of gold-colored epoxy-resin, flammable resistant in accordance with “UL 94 V-0”.

CAPACITANCE RANGE

Class 1, at 1 MHz, 1.2 V_{RMS}; 2 pF to 100 pF

RATED DC VOLTAGE

4 kV

DIELECTRIC STRENGTH

According to IEC 384-8, 1.5 x U_R + 500 V_{DC} (6.5 kV_{DC})

INSULATION RESISTANCE AT 500 V_{DC}

≥ 10 000 MΩ

TOLERANCE ON CAPACITANCE

± 5 %; ± 10 %
Other tolerances available on request

DISSIPATION FACTOR

C ≤ 5 pF, 0.55 % max.;
10 pF ≤ C < 33 pF, 20 x (150/C + 7) x 10^{-4};
C ≥ 33 pF, 0.20 % max.

ORDERING INFORMATION, 4 kV_{DC}, KINKED					
C (pF)	TOL. (%)	$D_{MAX.}$ (mm)	LEAD SPACING F (mm)	SH [1] (mm)	CLEAR TEXT CODE 13TH DIGIT: T = REEL; U = AMMO; 3 = BULK
CLASS 1 C0G					
2	± 0.5	6.5	7.5	4.0	S209D25C0KV6.K7R
3					S309D25C0JV6.K7R
5		7.5			S509D29C0HV6.K7R
10	± 5	6.5			S100J25U2JV6.K7R
12		7.5			S120J29U2JV6.K7R
15					S150J29U2JV6.K7R
18		6.5			S180J25U2MV6.K7R
22					S220J25U2MV6.K7R
27					S270J25U2MV6.K7R
33		7.5			S330J29U2MV6.K7R
39					S390J29U2MV6.K7R
47		8.0			S470J31U2MV6.K7R
68		9.0			S680J35U2MV6.K7R
100		10.0			S101J39U2MV6.K7R

Notes

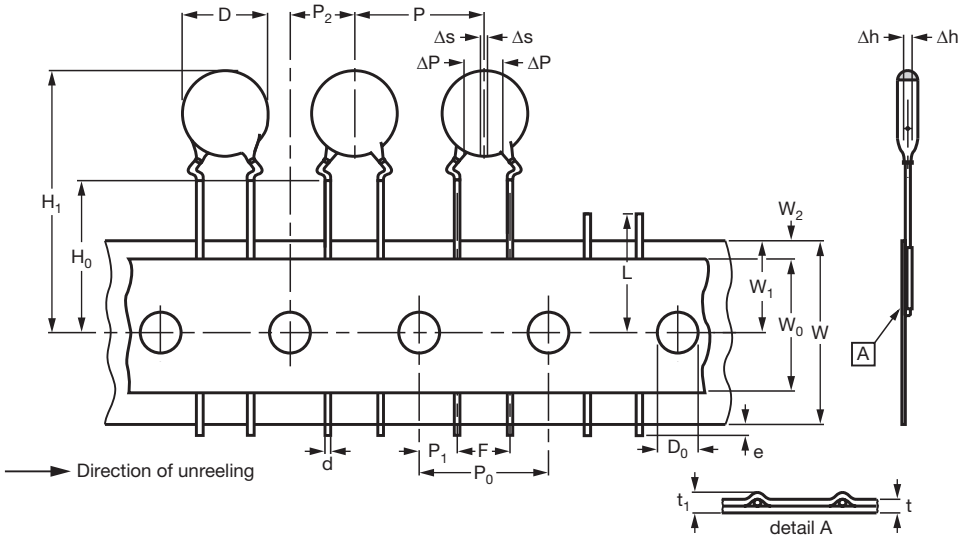
[1] SH = Seated height

- Maximum thickness 5.0 mm
- Refer to outward kinked leads. Other styles available on request (straight or inline kinked leads).

PACKAGING					
PACKAGING TYPE	SIZE CODE	LEAD SPACE (mm)	VOLTAGE (V_{DC})	SPQ	BOX DIMENSIONS L x W x H (mm)
Bulk (long lead L ≥ 25.4 mm)	25 to 47	10.0	4 kV	1000	245 x 120 x 65
				1000	
				1000	
	53 to 75			500	

Note

- The capacitors are supplied in bulk packaging (cardboard boxes), in tape on reel or in ammopack



Kinked capacitors on tape, lead spacing 7.5 mm (0.30")

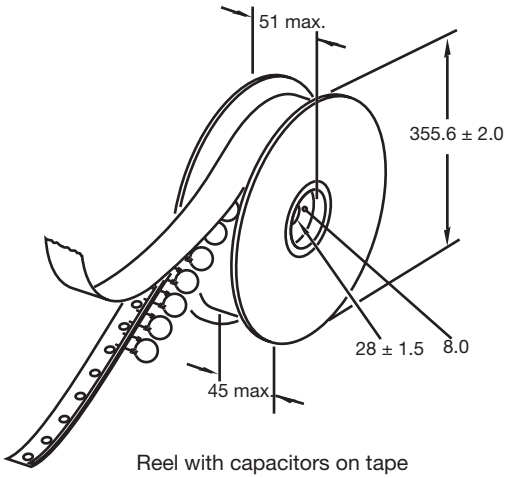
DIMENSIONS OF TAPE			
SYMBOL	PARAMETER	DIMENSIONS (mm)	
		NOMINAL	TOLERANCE
D	Body diameter	14.0 max.	-
d	Lead diameter	0.6	± 0.05
P	Pitch between capacitors	15	± 1.0
P_0 (1)	Feed-hole pitch	15	± 0.3
ΔP	Plane deviation	1.0 max.	-
P_1 (2)	Feed-hole center to lead center	3.75	± 0.7
P_2 (2)	Feed-hole center to component center	7.5	± 1.3
F	Lead spacing	7.5	+ 0.6/- 0.4
Δh	Component alignment	0	± 1.0
W	Tape width	18.0	1.0 - 0.5
W_0	Hold-down tape width	5.0 min.	-
W_1	Hole position	9.0	0.75 - 0.5
W_2	Hold-down tape margin	3.0 max.	-
H_0	Height to seating plane	16.0	± 0.5
H_1	Maximum component height	40.0	-
e	Lead end protrusion	1.0 max.	-
L	Maximum length of snipped lead	11.0	-
D_0	Feed-hole diameter	4.0	± 0.2
t	Total tape thickness	0.9 max.	-
t_1	Maximum thickness of tape and wires	1.5 max.	-

Notes

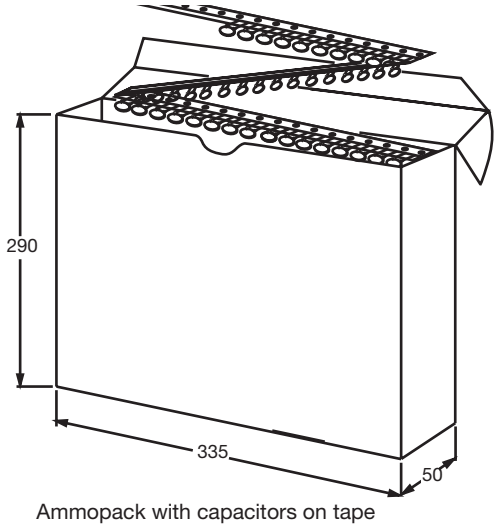
(1) Cumulative pitch error: ± ≤ 1 mm/20 pitches

(2) Obliquity maximum 3°

REEL AND TAPE DATA in millimeters

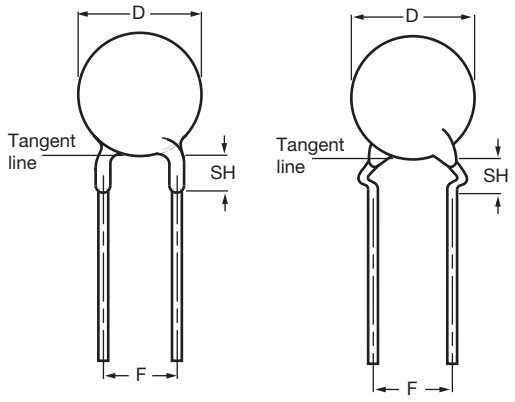


Reel with capacitors on tape



Ammopack with capacitors on tape

Ceramic Disc Capacitors
Class 1, 6 kV_{DC}



Capacitors with 10 mm (0.40") lead spacing

FEATURES

- Low losses
- High stability
- High capacitance in small size
- Kinked (preferred) or straight leads
- Compliant to RoHS directive 2002/95/EC

Pb e3 RoHS COMPLIANT

APPLICATIONS

- DC high voltage
- Pulse high voltage
- LCD backlight inverter

QUICK REFERENCE DATA	
DESCRIPTION	CLASS 1 (C0G)
Voltage (V_{DC})	6000
Min. Capacitance (pF)	2
Max. Capacitance (pF)	150
Mounting	Through hole

MARKING

Straight and kinked leaded versions are gold colored Marking indicates capacitance value and tolerance in accordance with “EIA 198”, and voltage.

OPERATING TEMPERATURE RANGE

Class1, C0G; U2J, U2M, - 55 °C to + 125 °C

TEMPERATURE COEFFICIENTS

Class 1, C0G

SECTIONAL SPECIFICATIONS

Class 1, C0G, IEC 60384-8,

EIA 198

CLIMATIC CATEGORY

Class 1, C0G; U2J, U2M, 55/125/21

DESIGN

The capacitors consist of a ceramic disc both sides of which are silver-plated. Connection leads are made of tinned copper having a diameter of 0.6 mm or 0.8 mm.

The capacitors may be supplied with kinked or straight leads with a lead spacing of 10 mm (0.40") and a lead length from 4 mm to 30 mm. The standard tolerance on capacitance is ± 5 % or ± 10 % for class 1 capacitors. Encapsulation is made of gold-colored epoxy-resin, flammable resistant in accordance with “UL 94 V-0”.

CAPACITANCE RANGE

Class 1, at 1 MHz, 1.2 V_{RMS}; 2 pF to 150 pF

RATED DC VOLTAGE

6 kV

DIELECTRIC STRENGTH

According to IEC 384-8, 1.5 x U_R + 500 V_{DC} (9.5 kV_{DC})

INSULATION RESISTANCE AT 500 V_{DC}

≥ 10 000 MΩ

TOLERANCE ON CAPACITANCE

± 5 %; ± 10 %

Other tolerances available on request

DISSIPATION FACTOR

C ≤ 5 pF, 0.55 % max.

10 pF ≤ C < 33 pF, 20 x (150/C + 7) x 10^{-4}

C ≥ 33 pF; 0.20 % max.

ORDERING INFORMATION, 6 kV_{DC}, KINKED

C (pF)	TOL. (%)	$D_{MAX.}$ (mm)	LEAD SPACING F (mm)	SH [1] (mm)	CLEAR TEXT CODE 13TH DIGIT: 3 = BULK
CLASS 1 C0G					
2	± 0.5	7.5	10.0	4.0	S209D29C0KU6.K0R
3					S309D29C0JU6.K0R
5		6.5			S509D25U2JU6.K0R
10	± 5				S100J25U2MU6.K0R
12					S120J25U2MU6.K0R
15		7.5			S150J29U2MU6.K0R
18					S180J29U2MU6.K0R
22					S220J29U2MU6.K0R
27					S270J29U2MU6.K0R
33		10.0			S330J39U2MU6.K0R
39					S390J39U2MU6.K0R
47					S470J39U2MU6.K0R
68		12.5			S680J49U2MU6.K0R
82					S820J49U2MU6.K0R
100					S101J49U2MU6.K0R
120		15.0			S121J59U2MU6.K0R
150					S151J59U2MU6.K0R

Notes

[1] SH = Seated height

- Maximum thickness 6.0 mm
- Refer to outward kinked leads. Other styles available on request (straight or inline kinked leads).

PACKAGING

PACKAGING TYPE	SIZE CODE	LEAD SPACE (mm)	VOLTAGE (V_{DC})	SPQ	BOX DIMENSIONS L x W x H (mm)
Bulk (long lead L ≥ 25.4 mm)	25 to 47	10.0	6 kV	1000	245 x 120 x 65
				1000	
				1000	
	53 to 75			500	

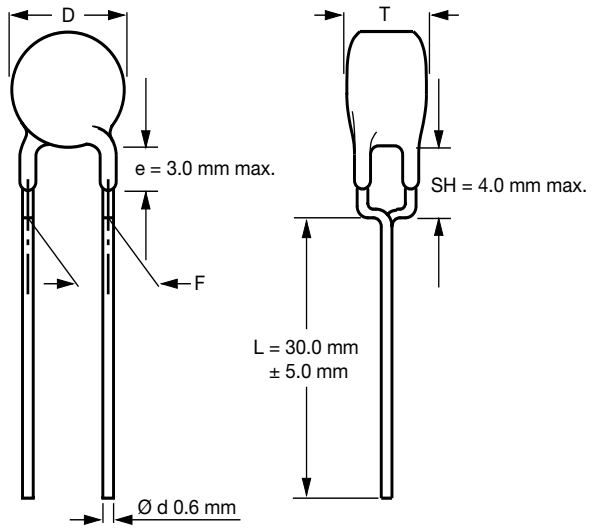
Note

- The capacitors are supplied in bulk packaging (cardboard boxes)

Ceramic Disc Capacitors, Safety Class and Gap-Kap

Contents

AC Line Rated Disc Capacitors
Class X1, 760 V_{AC}, Class Y1, 500 V_{AC}



Capacitors with 10 mm lead spacing

QUICK REFERENCE DATA									
DESCRIPTION	CLASS X1 (U2J)	CLASS X1 (Y5S)	CLASS X1 (Y5U)	CLASS Y1 (U2J)		CLASS Y1 (Y5S)		CLASS Y1 (Y5U)	
Voltage (V_{AC})	760			500	250	500	250	500	250
Min. Capacitance (pF)	10	33	470	10		33		470	
Max. Capacitance (pF)	22	330	4700	22		330		4700	
Mounting	Through hole								

OPERATING TEMPERATURE RANGE

- 40 °C to + 125 °C

TEMPERATURE CHARACTERISTICS

See Ordering Information tables

CLIMATIC CATEGORY

40/125/21 according to EN 60068-1

COATING

According to UL 94 V-0

Epoxy resin, isolating, flame retardant

APPROVALS

ENEC VDE (DE1-32019)
UL 1414 file E183844
CSA 22.2

PACKAGING

Bulk, tape and reel, taped ammopack

FEATURES

- Complying with IEC 60384-14, 3rd edition
- High reliability
- Vertical (inline) kinked or straight leads
- Compliant to RoHS directive 2002/95/EC and in accordance to WEEE 2002/96/EC
- Halogen-free according to IEC 61249-2-21 definition

RoHS COMPLIANT
HALOGEN FREE Available

APPLICATIONS

- X1, Y1 according to IEC 60384-14.2
- Across-the-line
- Line by-pass
- Antenna coupling

DESIGN

The capacitors consist of a ceramic disc both sides of which are silver-plated. Connection leads are made of tinned copper having a diameter of 0.6 mm.

The capacitors may be supplied with vertical (inline) kinked leads having a lead spacing of 10.0 mm. Encapsulation is made of flammable resistant epoxy resin in accordance with “UL 94 V-0”.

CAPACITANCE RANGE

10 pF to 4700 pF

RATED VOLTAGE U_R

IEC 60384-14.2:
(X1): 760 V_{AC}, 50 Hz
(Y1): 500 V_{AC}, 50 Hz
250 V_{AC}, 50 Hz/60 Hz, UL 1414 and CSA 22.2

TEST VOLTAGE

Component test (100 %):
4000 V_{AC}, 50 Hz, 2 s
Random sampling test (destructive test):
4000 V_{AC}, 50 Hz, 60 s
Voltage proof of coating (destructive test):
4000 V_{AC}, 50 Hz, 60 s

INSULATION RESISTANCE

10 000 MΩ minimum

TOLERANCE OF CAPACITANCE

± 20 % (code M); ± 10 % (code K)

DISSIPATION FACTOR

2.5 % maximum

ORDERING INFORMATION

C (pF)	TOL. (%)	TEMP. COEFFICIENT	BODY DIAMETER $D_{MAX.}$ (mm)	BODY THICKNESS $T_{MAX.}$ (mm)	LEAD SPACING F (mm)	CLEAR TEXT CODE 15TH DIGIT: T = REEL; U = AMMO; 3 = BULK (1)	
						RoHS COMPLIANT	RoHS AND HALOGEN-FREE
10	± 10	U2J (N750)	8.0	5.0	10.0	VY1100K31U2JQ6*V0	VY1100K31U2JG6*V0
15						VY1150K31U2JQ6*V0	VY1150K31U2JG6*V0
22						VY1220K31U2JQ6*V0	VY1220K31U2JG6*V0
33		Y5S (2C3)				VY1330K31Y5SQ6*V0	VY1330K31Y5SG6*V0
47						VY1470K31Y5SQ6*V0	VY1470K31Y5SG6*V0
68						VY1680K31Y5SQ6*V0	VY1680K31Y5SG6*V0
100						VY1101K31Y5SQ6*V0	VY1101K31Y5SG6*V0
150						VY1151K31Y5SQ6*V0	VY1151K31Y5SG6*V0
220						VY1221K31Y5SQ6*V0	VY1221K31Y5SG6*V0
330						VY1331K31Y5SQ6*V0	VY1331K31Y5SG6*V0
470	± 20	Y5U (2E3)				VY1471M31Y5UQ6*V0	VY1471M31Y5UG6*V0
680						VY1681M31Y5UQ6*V0	VY1681M31Y5UG6*V0
1000			9.0			VY1102M35Y5UQ6*V0	VY1102M35Y5UG6*V0
1500			10.5			VY1152M41Y5UQ6*V0	VY1152M41Y5UG6*V0
2200			12.0			VY1222M47Y5UQ6*V0	VY1222M47Y5UG6*V0
3300			15.0			VY1332M59Y5UQ6*V0	VY1332M59Y5UG6*V0
3900			15.5			VY1392M61Y5UQ6*V0	VY1392M61Y5UG6*V0
4700			16.0			VY1472M63Y5UQ6*V0	VY1472M63Y5UG6*V0

Notes

(1) 15th digit of the clear text code number to be completed with the packaging code

- Straight leads are available on request
- Coating extension DR valid for straight leads only
- On request available: ± 10 % tolerance
- On request available: Leadspacing 12.5 mm

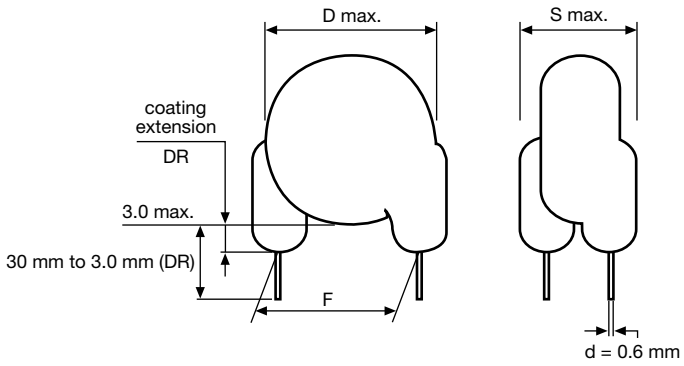
LEADSPACING 10.0 mm

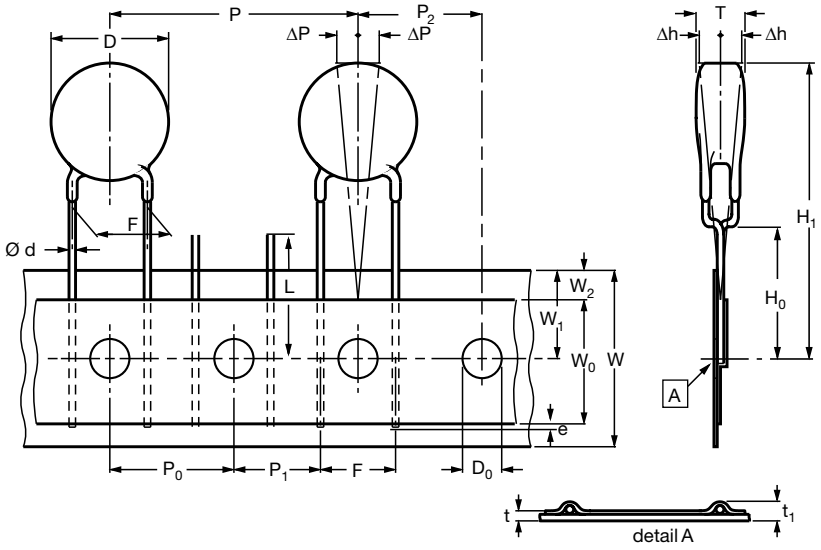
PACKAGING

CAPACITANCE VALUE	SIZE CODE	BODY DIAMETER $D_{MAX.}$ (mm)	PACKAGING QUANTITIES		
			BULK	REEL	AMMO
10 pF to 2200 pF	31 to 47	12.0	1000	500	750
3300 pF to 4700 pF	51 to 63	16.0	500	500	750

Note

- The capacitors are supplied in bulk packaging (cardboard boxes), in tape on reel in ammopack





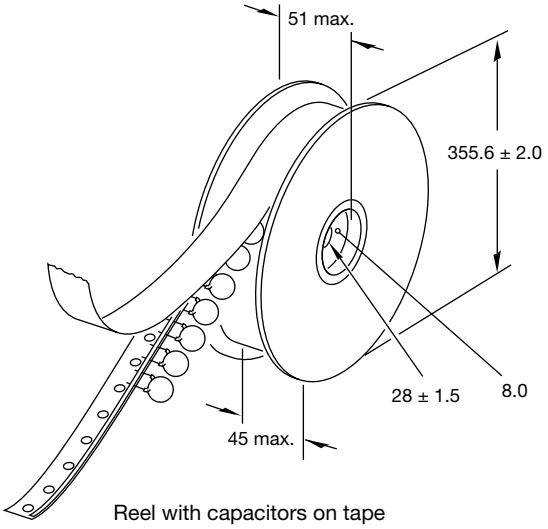
Lead spacing 10 mm, sprocket hole pitch 25.04 mm for lead spacing

DIMENSIONS OF TAPE		
SYMBOL	**PARAMETER**	**DIMENSIONS (mm)**
		FIG. 2
D (1)	Body diameter	16.0 max.
d	Lead diameter	0.6 ± 0.05
P	Pitch of component	25.4 ± 1
P_0 (2)	Pitch of sprocket hole	12.7 ± 0.3
P_1 (3)	Distance, hole center to lead	7.7 ± 1.0
P_2 (3)	Distance, hole to center of component	12.7 ± 1.5
F	Lead spacing	10.0 + 0.6/- 0.4
Δh	Average deviation across tape	± 1.0 max.
ΔP	Average deviation in direction of reeling	± 1.0 max.
W	Carrier tape width	18.0 + 1 - 0.5
W_0	Hold-down tape width	5.0 min.
W_1	Position of sprocket hole	9.0 + 0.75 - 0.5
W_2	Distance of hold-down tape	3.0 max.
H_1	Maximum component height	40.0
H_0	Height to seating plane (for kinked leads)	16.0 ± 0.5
H_0	Height to seating plane (for straight leads)	20.0 ± 0.5
L	Length of cut leads	11.0 max.
I	Length of lead protrusion	1.0 max.
D_0	Diameter of sprocket hole	4.0 ± 0.2
t	Total tape thickness	0.9 max.

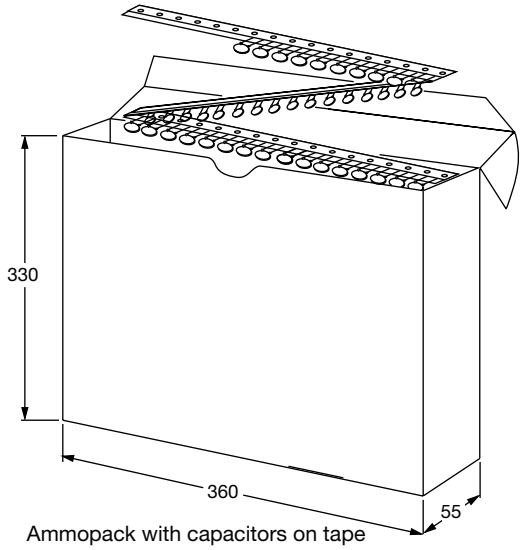
Notes

(1) See ordering information table
(2) Cumulative pitch error: ± 1 mm/20 pitches
(3) Obliquity maximum 3°

REEL AND TAPE DATA in millimeters



Reel with capacitors on tape

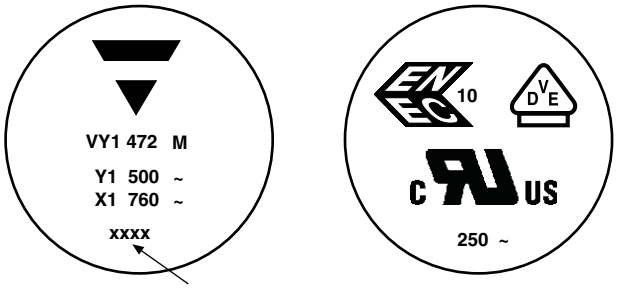


Ammopack with capacitors on tape

STANDARD RECOGNITION

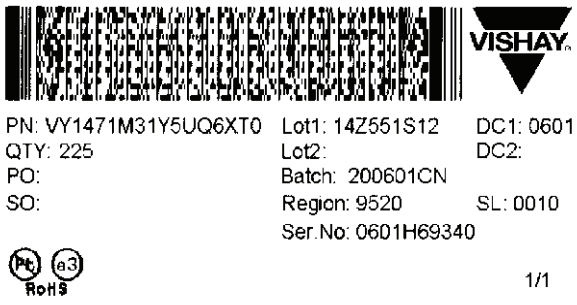
IEC 60384 - 14/3rd issue (2005) - Safety tests
UL 1414 - Across-the-line, antenna-coupling and line-by-pass component
CSA C22.2 - Across-the-line, line to ground and antenna isolation capacitor
CQC - China Quality Certification Centre-Safety Tests

MARKING: 2 SIDES (EXAMPLE)

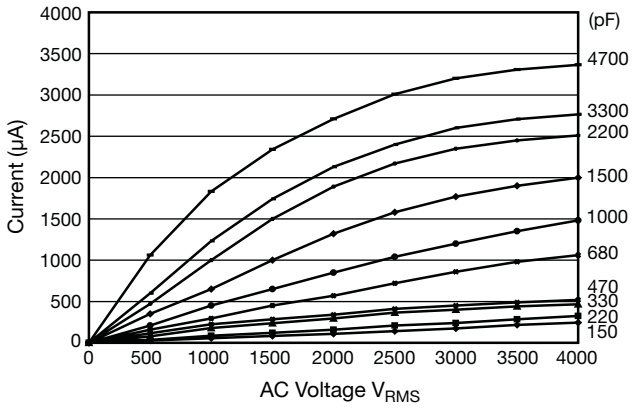


4 digit date code (year/week)

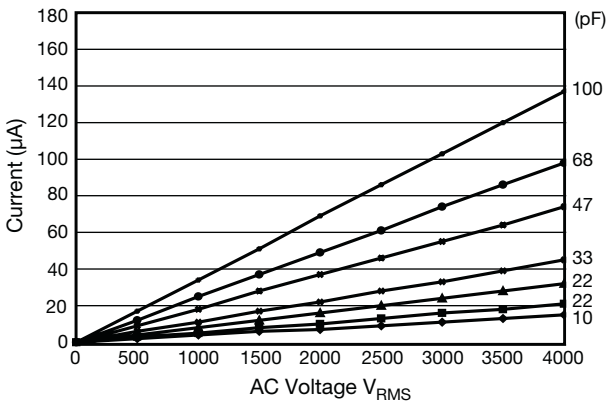
LABEL (EXAMPLE)



Current vs. Voltage (Leakage Current) at 50 Hz 25 °C



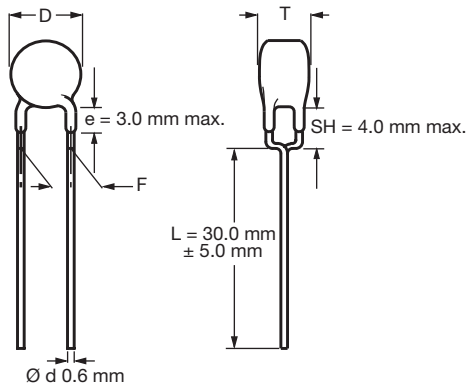
Current vs. Voltage (Leakage Current) at 50 Hz 25 °C



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 normal atmospheric conditions.

AC Line Rated Disc Capacitors
Class X1, 440 V_{AC}, Class Y2, 300 V_{AC}



Capacitors with 5.0 mm, 7.5 mm and 10 mm lead spacing

QUICK REFERENCE DATA						
DESCRIPTION	CLASS X1 (U2J)	CLASS X1 (Y5S)	CLASS X1 (Y5U)	CLASS Y2 (U2J)	CLASS Y2 (Y5S)	CLASS Y2 (Y5U)
Voltage (V_{AC})	440			300		
Min. Capacitance (pF)	10	68	680	10	68	680
Max. Capacitance (pF)	47	680	10 000	47	680	10 000
Mounting	Through hole					

OPERATING TEMPERATURE RANGE
- 40 °C to + 125 °C

TEMPERATURE CHARACTERISTICS
See Ordering Information Tables

CLIMATIC CATEGORY
40/125/21 according to EN 60068-1

COATING
According to UL 94 V-0

Epoxy resin, isolating, flame retardant

APPROVALS
ENEC - VDE DE 1-30691
UL 1414 file E183844
CSA 22.2

PACKAGING
Bulk; tape and reel; taped ammopack

FEATURES
- Complying with IEC 60384-14, 3rd edition
- High reliability
- Vertical (inline) kinked or straight leads
- Compliant to RoHS directive 2002/95/EC and in accordance to WEEE 2002/96/EC
- Halogen-free according to IEC 61249-2-21 definition

RoHS COMPLIANT
HALOGEN FREE Available

APPLICATIONS
- Across-the-line
- Line by-pass
- Antenna coupling

DESIGN
The capacitors consist of a ceramic disc both sides of which are silver-plated. Connection leads are made of tinned copper having a diameter of 0.6 mm.

The capacitors may be supplied with vertical (inline) kinked leads having a lead spacing of 5.0 mm, 7.5 mm, or 10.0 mm. Encapsulation is made of flammable resistant epoxy resin in accordance with “UL 94 V-0”

CAPACITANCE RANGE
10 pF to 0.01 µF

RATED VOLTAGE U_R
IEC 60384-14.2:
(X1): 440 V_{AC}, 50 Hz
(Y2): 300 V_{AC}, 50 Hz

TEST VOLTAGE
Component test (100 %)

2600 V_{AC}, 50 Hz, 2 s

(2600 V_{AC} for LS 7.5 mm and 10 mm)

(2200 V_{AC} for LS 5.0 mm)

Random sampling test (destructive test)

2600 V_{AC}, 50 Hz, 60 s

Voltage proof of coating (destructive test)

2600 V_{AC}, 50 Hz, 60 s

INSULATION RESISTANCE
10 000 MΩ minimum

TOLERANCE OF CAPACITANCE
± 20 % (code M); ± 10 % (code K)

DISSIPATION FACTOR
2.5 % maximum

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 normal atmospheric conditions

ORDERING INFORMATION

C (pF)	TOL. (%)	TEMP. COEFFICIENT	BODY DIAMETER $D_{MAX.}$ (mm)	BODY THICKNESS $T_{MAX.}$ (mm)	LEAD SPACING F (mm)	COATING EXTENSION $e_{MAX.}$ (2) (mm)	CLEAR TEXT CODE 15TH DIGIT: T = REEL; U = AMMO; 3 = BULK (1)	
							RoHS COMPLIANT	RoHS AND HALOGEN-FREE
VY2 for leadspacing 5.0 mm							**2200 V_{AC}, 50 Hz, 2 s**	
10	± 10	U2J (N750)	7.5	5.0	5.0	3.0	VY2100K29U2JS6*V5	VY2100K29U2JG6*V5
15							VY2150K29U2JS6*V5	VY2150K29U2JG6*V5
22							VY2220K29U2JS6*V5	VY2220K29U2JG6*V5
33							VY2330K29U2JS6*V5	VY2330K29U2JG6*V5
47							VY2470K29U2JS6*V5	VY2470K29U2JG6*V5
68		Y5S (2C3)					VY2680K29Y5SS6*V5	VY2680K29Y5SG6*V5
100							VY2101K29Y5SS6*V5	VY2101K29Y5SG6*V5
150							VY2151K29Y5SS6*V5	VY2151K29Y5SG6*V5
220							VY2221K29Y5SS6*V5	VY2221K29Y5SG6*V5
330							VY2331K29Y5SS6*V5	VY2331K29Y5SG6*V5
470							VY2471K29Y5SS6*V5	VY2471K29Y5SG6*V5
680	± 20	Y5U (2E3)					VY2681M29Y5US6*V5	VY2681M29Y5UG6*V5
1000							VY2102M29Y5US6*V5	VY2102M29Y5UG6*V5
1500			8.0				VY2152M31Y5US6*V5	VY2152M31Y5UG6*V5
2200			9.0				VY2222M35Y5US6*V5	VY2222M35Y5UG6*V5
3300			10.5				VY2332M41Y5US6*V5	VY2332M41Y5UG6*V5
3900			11.0				VY2392M43Y5US6*V5	VY2392M43Y5UG6*V5

ORDERING INFORMATION

C (pF)	TOL. (%)	TEMP. COEFFICIENT	BODY DIAMETER $D_{MAX.}$ (mm)	BODY THICKNESS $T_{MAX.}$ (mm)	LEAD SPACING F (mm)	COATING EXTENSION $e_{MAX.}$ (2) (mm)	CLEAR TEXT CODE 15TH DIGIT: T = REEL; U = AMMO; 3 = BULK (1)	
							RoHS COMPLIANT	RoHS AND HALOGEN-FREE
VY2 for leadspacing 7.5 mm							**2600 V_{AC}, 50 Hz, 2 s**	
10	± 10	U2J (N750)	7.5	5.0	7.5	3.0	VY2100K29U2JS6*V7	VY2100K29U2JG6*V7
15							VY2150K29U2JS6*V7	VY2150K29U2JG6*V7
22							VY2220K29U2JS6*V7	VY2220K29U2JG6*V7
33							VY2330K29U2JS6*V7	VY2330K29U2JG6*V7
47							VY2470K29U2JS6*V7	VY2470K29U2JG6*V7
68	± 10	Y5S (2C3)					VY2680K29Y5SS6*V7	VY2680K29Y5SG6*V7
100							VY2101K29Y5SS6*V7	VY2101K29Y5SG6*V7
150							VY2151K29Y5SS6*V7	VY2151K29Y5SG6*V7
220							VY2221K29Y5SS6*V7	VY2221K29Y5SG6*V7
330							VY2331K29Y5SS6*V7	VY2331K29Y5SG6*V7
470							VY2471K29Y5SS6*V7	VY2471K29Y5SG6*V7
680							VY2681M29Y5US6*V7	VY2681M29Y5UG6*V7
1000	± 20	Y5U (2E3)					VY2102M29Y5US6*V7	VY2102M29Y5UG6*V7
1500			8.0				VY2152M31Y5US6*V7	VY2152M31Y5UG6*V7
2200			9.0				VY2222M35Y5US6*V7	VY2222M35Y5UG6*V7
3300			10.5				VY2332M41Y5US6*V7	VY2332M41Y5UG6*V7
3900			11.0				VY2392M43Y5US6*V7	VY2392M43Y5UG6*V7
4700			12.5				VY2472M49Y5US6*V7	VY2472M49Y5UG6*V7
6800			14.5				VY2682M59Y5US63V7	VY2682M59Y5UG63V7
0.01 µF			16.0				VY2103M63Y5US63V7	VY2103M63Y5UG63V7

ORDERING INFORMATION								
C (pF)	TOL. (%)	TEMP. COEFFICIENT	BODY DIAMETER $D_{MAX.}$ (mm)	BODY THICKNESS $T_{MAX.}$ (mm)	LEAD SPACING F (mm)	COATING EXTENSION $e_{MAX.}$ (3) (mm)	CLEAR TEXT CODE 15TH DIGIT: T = REEL; U = AMMO; 3 = BULK (1)	
							RoHS COMPLIANT	RoHS AND HALOGEN-FREE
VY2 for leadspacing 10.0 mm							2600 V_{AC}, 50 Hz, 2 s	
10	± 10	U2J (N750)	7.5	5.0	10.0	3.0	VY2100K29U2JS6*V0	VY2100K29U2JG6*V0
15							VY2150K29U2JS6*V0	VY2150K29U2JG6*V0
22							VY2220K29U2JS6*V0	VY2220K29U2JG6*V0
33							VY2330K29U2JS6*V0	VY2330K29U2JG6*V0
47							VY2470K29U2JS6*V0	VY2470K29U2JG6*V0
68		Y5S (2C3)					VY2680K29Y5SS6*V0	VY2680K29Y5SG6*V0
100							VY2101K29Y5SS6*V0	VY2101K29Y5SG6*V0
150							VY2151K29Y5SS6*V0	VY2151K29Y5SG6*V0
220							VY2221K29Y5SS6*V0	VY2221K29Y5SG6*V0
330							VY2331K29Y5SS6*V0	VY2331K29Y5SG6*V0
470							VY2471K29Y5SS6*V0	VY2471K29Y5SG6*V0
680	± 20	Y5U (2E3)					VY2681M29Y5US6*V0	VY2681M29Y5UG6*V0
1000							VY2102M29Y5US6*V0	VY2102M29Y5UG6*V0
1500			8.0				VY2152M31Y5US6*V0	VY2152M31Y5UG6*V0
2200			9.0				VY2222M35Y5US6*V0	VY2222M35Y5UG6*V0
3300			10.5				VY2332M41Y5US6*V0	VY2332M41Y5UG6*V0
3900			11.0				VY2392M43Y5US6*V0	VY2392M43Y5UG6*V0
4700			12.5				VY2472M49Y5US6*V0	VY2472M49Y5UG6*V0
6800			14.5				VY2682M59Y5US63V0	VY2682M59Y5UG63V0
0.01 µF			16.0				VY2103M63Y5US63V0	VY2103M63Y5UG63V0

Notes

(1) 15th digit of the clear text code number to be completed with the packaging code.

(2) On request available: ± 10 % tolerance for capacitance value 680 pF.

(3) On request available: ± 10 % tolerance for capacitance value 680 pF.

- Straight leads are available on request.

LEADSPACING 10.0 mm

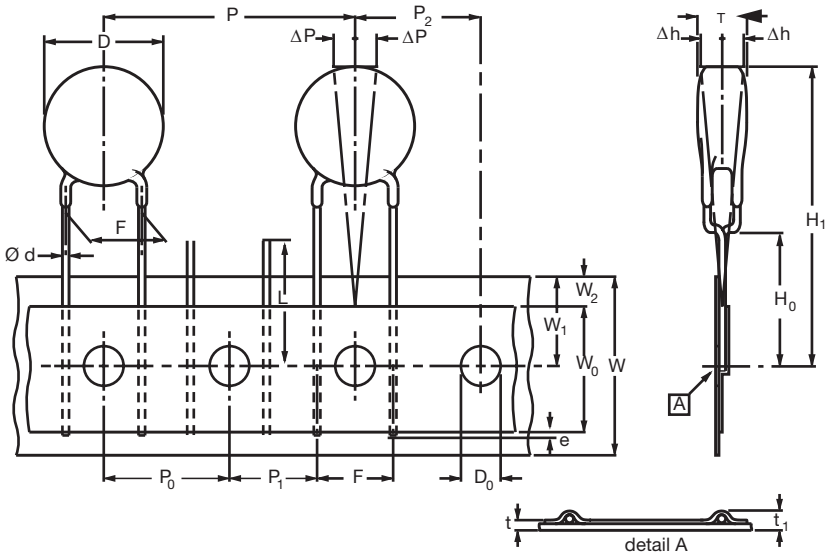
PACKAGING					
CAPACITANCE VALUE	SIZE CODE	BODY DIAMETER $D_{MAX.}$ (mm)	PACKAGING QUANTITIES		
			BULK	REEL	AMMO
10 pF to 4700 pF	29 to 49	12.5	1000	1000	1000
6800 pF to 0.01 µF	59 to 63	16.0	500	-	-

LEADSPACING 10.0 mm

PACKAGING					
CAPACITANCE VALUE	SIZE CODE	BODY DIAMETER $D_{MAX.}$ (mm)	PACKAGING QUANTITIES		
			BULK	REEL	AMMO
10 pF to 4700 pF	29 to 49	12.5	1000	500	750
6800 pF to 0.01 µF	59 to 63	16.0	500	500	750

Note

- The capacitors are supplied in bulk packaging (cardboard boxes), in tape on reel in ammopack



Inline kink (V) leaded capacitors on tape, lead spacing 5.0 mm (0.20"), 7.5 mm (0.30") and 10 mm (0.40")

DIMENSION OF TAPE				
SYMBOL	PARAMETER	DIMENSIONS (mm)		
		FIG.1 5 mm	FIG.1 7.5 mm	FIG.2 10 mm
D (1)	Body diameter	11.0 max.	14.0 max.	16.0 max.
d	Lead diameter	0.6 ± 0.05	0.6 ± 0.05	0.6 ± 0.05
P	Pitch of component	12.7 ± 1	15.0 ± 1	25.4 ± 1
P_0 (2)	Pitch of sprocket hole	12.7 ± 0.3	15.0 ± 0.3	12.7 ± 0.3
P_1 (3)	Distance, hole center to lead	3.85 ± 0.7	3.75 ± 0.7	7.7 ± 1.0
P_2 (3)	Distance, hole to center of component	6.35 ± 1.3	7.5 ± 1.5	12.7 ± 1.5
F	Lead spacing	5.0 (+ 0.6/- 0.4)	7.5 (+ 0.6/- 0.4)	10.0 (+ 0.6/- 0.4)
Δh	Average deviation across tape	± 1.0 max.	± 1.0 max.	± 1.0 max.
ΔP	Average deviation in direction of reeling	± 1.0 max.	± 1.0 max.	± 1.0 max.
W	Carrier tape width	18.0 + 1/- 0.5	18.0 + 1/- 0.5	18.0 + 1/- 0.5
W_0	Hold-down tape width	5.0 min.	5.0 min.	5.0 min.
W_1	Position of sprocket hole	9.0 + 0.75 - 0.5	9.0 + 0.75 - 0.5	9.0 + 0.75 - 0.5
W_2	Distance of hold-down tape	3.0 max.	3.0 max.	3.0 max.
H_1	Maximum component height	32	40	40
H_0	Height to seating plane (for kinked leads)	16.0 ± 0.5	16.0 ± 0.5	16.0 ± 0.5
H_0	Height to seating plane (for straight leads)	20.0 ± 0.5	20.0 ± 0.5	20.0 ± 0.5
L	Length of cut leads	11.0 max.	11.0 max.	11.0 max.
I	Length of lead protrusion	1.0 max.	1.0 max.	1.0 max.
D_0	Diameter of sprocket hole	4.0 ± 0.2	4.0 ± 0.2	4.0 ± 0.2
t	Total tape thickness	0.9 max.	0.9 max.	0.9 max.

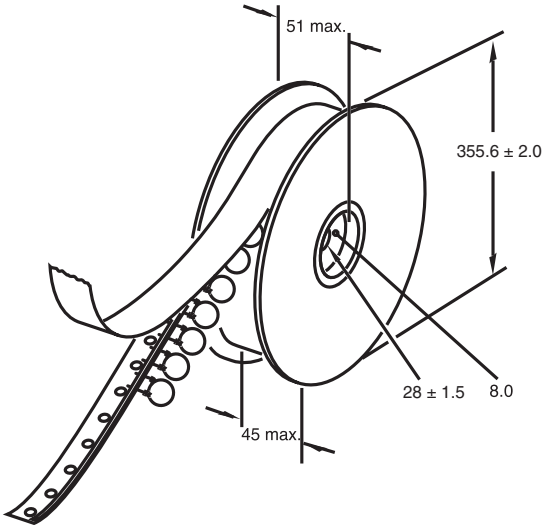
Notes

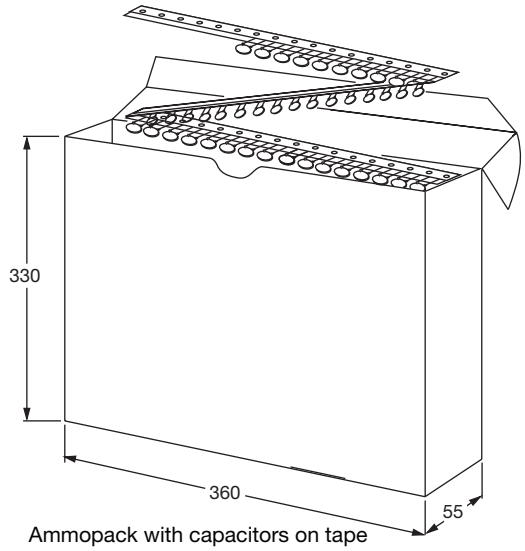
(1) See ordering information table

(2) Cumulative pitch error: ± ≤ 1 mm/20 pitches

(3) Obliquity maximum 3°

REEL AND TAPE DATA in millimeters



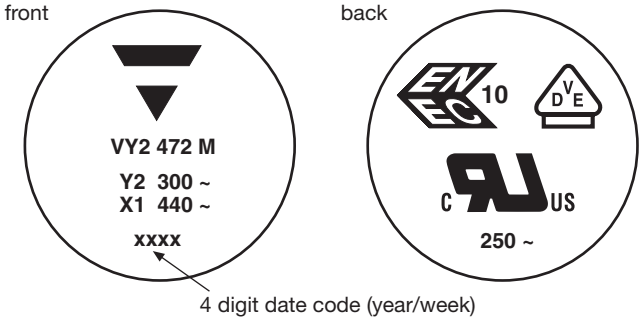


Ammopack with capacitors on tape

STANDARD RECOGNITION

IEC 60384 - 14/3rd issue (2005)- Safety Tests
UL 1414 - Across-the-line, antenna-coupling and line-by-pass component
CQC - China Quality Certification Centre-Safety Tests

MARKING: 2 SIDES (EXAMPLE)

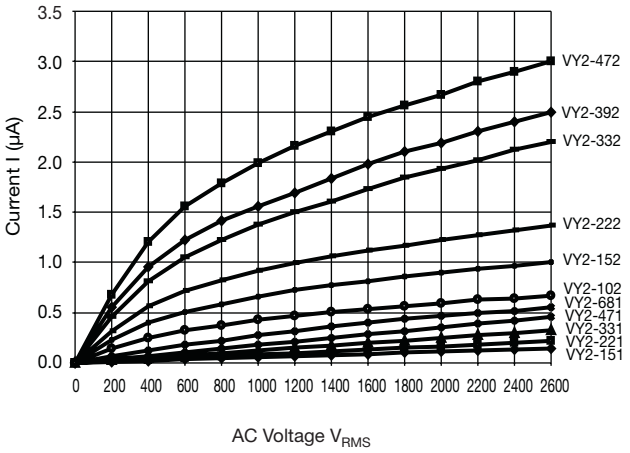


LABEL (EXAMPLE)

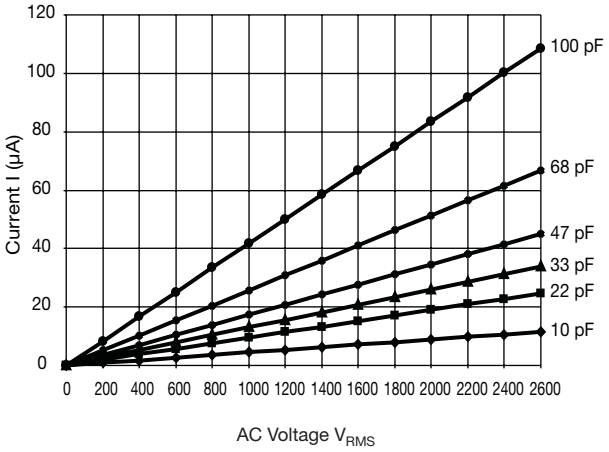
PN: VY2331K29Y5SS6UV7 Lot1: 14Z549306 DC1: 0601
QTY: 1000 Lot2: DC2:
PO: Batch: 200601CN
SO: Region: 9520 SL: 0010
Ser.No: 0601H72383

RoHS

Typical Current vs. Voltage (Leakage Current) at 60 Hz 25 °C



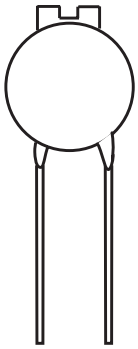
Typical Current vs. Voltage (Leakage Current) at 60 Hz 25 °C



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 normal atmospheric conditions.

Ceramic Disc Capacitors (Straight Leads) Gap-Kap, 1 kV_{DC} to 3 kV_{DC}



Simplified outline

QUICK REFERENCE DATA			
DESCRIPTION	CLASS 2 (Z5P, Z5U)		
Voltage (V_{DC})	1000	1500	3000
Min. Capacitance (pF)	0.75		
Max. Capacitance (pF)	22 000		
Mounting	Through hole		

INTRODUCTION

Vishay BCcomponents Gap-Kap capacitors provide a safe reliable discharge path for stray transient overvoltages and static voltage build-up. Combination of capacitor-spark-gap construction allows the circuit designer to specify lower voltage components and consequently lower cost, with assurance that overvoltage conditions will be prevented.

The Gap-Kap capacitor is ideally suited for many industrial commercial equipment applications. A typical application in color TV monitors utilizes a minimum capacitance Gap-Kap which is inserted between the grid lead and chassis ground. This protects the components of control circuitry by providing a low impedance path to ground for transient voltages of 1500 V and above.

MARKING

Marking indicates capacitance value and tolerance in accordance with “EIA 198” and voltage marks.

OPERATING TEMPERATURE RANGE

- 30 °C to + 85 °C

TEMPERATURE COEFFICIENTS

EIA code Z5P or Z5U

SECTIONAL SPECIFICATIONS

Class 2, IEC 60 384-9, EIA 198

FEATURES

- High reliability
- Straight leads
- Compliant to RoHS directive 2002/95/EC

Pb e3 RoHS COMPLIANT

APPLICATIONS

- Monitors
- Color TV

DESIGN

The capacitors consist of a ceramic disc both sides of which are silver-plated. Connection leads are made of tinned copper having a diameter of 0.8 mm.

The capacitors are supplied with straight leads and lead spacings from 5.0 mm to 10.0 mm. Encapsulation is phenolic resin coated, flammable resistant in accordance with “UL 94 V-0”.

CAPACITANCE RANGE

At 1 kHz, 1 V_{RMS} ± 0.2 V_{RMS}; 0.75 pF to 22 000 pF

RATED DC VOLTAGE

1 kV; 1.5 kV; 3 kV

INSULATION RESISTANCE AT 500 V_{DC}

≥ 10 000 MΩ min.

TOLERANCE ON CAPACITANCE

± 10 %; ± 20 %

DISSIPATION FACTOR

At 1 kHz, 1 V_{RMS} ± 0.2 V_{RMS}; 2.5 % max.

Note

- The capacitors meet the essential requirements of IEC 60 384-9 and EIA 198 Unless stated otherwise all electrical values apply at an ambient temperature of 25 °C ± 3 °C, at normal atmospheric conditions

ORDERING INFORMATION

C (pF)	TOL. (%)	VOLTAGE		$D_{MAX.}$ (mm)	$T_{MAX.}$ (mm)	LEAD SPACING S (mm)	CLEAR TEXT CODE
		WORKING (kV_{DC})	ARC (kV_{DC})				16^{TH} DIGIT: R = RoHS COMPLIANT
0.75	max.	1.0	1.0 to 2.0	11.0	5.0	5.0	S758X43000183L5.
						6.4	S758X43000183L6.
1000	± 20	1.5	2.0 to 3.0	11.0	4.5	5.0	S102M43Z5P283L5.
						6.4	S102M43Z5P283L6.
4700	± 20	3.0	4.0 to 6.0	24.5	6.0	10.0	S472M96Z5P483L0.
10 000	± 20	1.5	2.0 to 3.0	17.5	5.0	10.0	S103M69Z5U283L0.
22 000	± 20	1.5	2.0 to 3.0	24.5	4.5	10.0	S223M96Z5U283L0.

PACKAGING

PACKAGING TYPE	SIZE CODE	LEAD SPACE (mm)	VOLTAGE (V_{DC})	SPQ	BOX DIMENSIONS L x W x H (mm)
Bulk (long lead L ≥ 25.4 mm)	20 to 47	all	all	1000	245 x 120 x 65
				1000	
				1000	
	53 to 75			500	
	84 to 96			250	

Note

- The capacitors are supplied in bulk packaging (cardboard boxes).

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