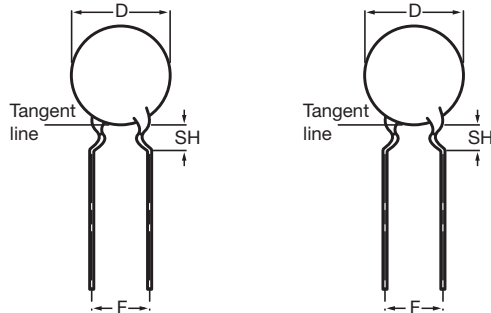


## Ceramic Disc Capacitors

### Class 1 and 2, 500 V<sub>DC</sub>, General Purpose



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

#### QUICK REFERENCE DATA

| DESCRIPTION                | CLASS 1<br>(C0G (NP0),<br>SL0) | CLASS 2<br>(YP5, Z5U, Y5V, X5F) |
|----------------------------|--------------------------------|---------------------------------|
| Voltage (V <sub>DC</sub> ) | 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

#### 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 (0.200") or 7.5 mm (0.300") 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<sub>RMS</sub>; 10 pF to 82 pF

Class 2, at 1 kHz, 1 ± 0.2 V<sub>RMS</sub>; 100 pF to 22 000 pF

1 kHz, 1 V<sub>RMS</sub> ± 0.2 V<sub>RMS</sub> for capacitance values higher than 1000 pF

#### RATED DC VOLTAGE

500 V

#### DIELECTRIC STRENGTH

250 % of rated voltage

#### INSULATION RESISTANCE AT 500 V<sub>DC</sub>

≥ 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<sup>-4</sup> maximum

Class 1, C > 30 pF; ≤ 0.2 %

Class 2, ≤ 3.0 %



**RoHS**  
COMPLIANT



Ceramic Disc Capacitors  
Class 1 and 2, 500 V<sub>DC</sub>, General Purpose

Vishay BCcomponents

| ORDERING INFORMATION (PREFERED TYPES), CLASS 1, 500 V <sub>DC</sub> , KINKED |             |                           |                      |                           |                                                         |
|------------------------------------------------------------------------------|-------------|---------------------------|----------------------|---------------------------|---------------------------------------------------------|
| C<br>(pF)                                                                    | TOL.<br>(%) | D <sub>MAX.</sub><br>(mm) | LEAD SPACING<br>(mm) | SH <sup>(1)</sup><br>(mm) | CLEAR TEXT CODE                                         |
|                                                                              |             |                           |                      |                           | 13 <sup>TH</sup> DIGIT:<br>T = REEL; U = AMMO; 3 = BULK |
|                                                                              |             |                           |                      |                           | 16 <sup>TH</sup> DIGIT:<br>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                                                                           |             | 6.5                       |                      |                           | D560J20SL0L6.J5.                                        |
| 68                                                                           |             |                           |                      |                           | D680J25SL0L6.J5.                                        |
| 82                                                                           |             |                           |                      |                           | D820J25SL0L6.J5.                                        |

**Notes**

<sup>(1)</sup> SH = seated height

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

| ORDERING INFORMATION (PREFERRED TYPES), CLASS 2, 500 V <sub>DC</sub> , KINKED |             |                           |                      |                           |                                                         |                  |
|-------------------------------------------------------------------------------|-------------|---------------------------|----------------------|---------------------------|---------------------------------------------------------|------------------|
| C<br>(pF)                                                                     | TOL.<br>(%) | D <sub>MAX.</sub><br>(mm) | LEAD SPACING<br>(mm) | SH <sup>(1)</sup><br>(mm) | CLEAR TEXT CODE                                         |                  |
|                                                                               |             |                           |                      |                           | 13 <sup>TH</sup> DIGIT:<br>T = REEL; U = AMMO; 3 = BULK |                  |
|                                                                               |             |                           |                      |                           | 16 <sup>TH</sup> DIGIT:<br>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                                                                          |             |                           |                      |                           | D152K29Y5PL6.J5.                                        |                  |
| 2200                                                                          |             |                           |                      |                           | D222K33Y5PL6.J5.                                        |                  |
| 3300                                                                          |             |                           |                      |                           | D332K39Y5PL6.J5.                                        |                  |
| 4700                                                                          |             | D472K43Y5PL6.J5.          |                      |                           |                                                         |                  |
| 6800                                                                          |             | 7.5                       | D682K53Y5PL6.J7      |                           |                                                         |                  |
| 10 000                                                                        |             |                           | D103K69Y5PL6.J7.     |                           |                                                         |                  |
| CLASS 2 Y5V                                                                   |             |                           |                      |                           |                                                         |                  |
| 1000                                                                          | + 80/- 20   |                           | 5                    | 5                         | 4.0                                                     | D102Z20Y5VL6.J5. |
| 1500                                                                          |             | 6.5                       | D152Z20Y5VL6.J5.     |                           |                                                         |                  |
| 2200                                                                          |             |                           | D222Z25Y5VL6.J5.     |                           |                                                         |                  |
| 3300                                                                          |             |                           | D322Z25Y5VL6.J5.     |                           |                                                         |                  |
| 4700                                                                          |             |                           | D472Z29Y5VL6.J5.     |                           |                                                         |                  |
| 6800                                                                          |             |                           | 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 <sub>DC</sub> , KINKED |             |                            |                      |                           |                                                         |
|------------------------------------------------------------------------------|-------------|----------------------------|----------------------|---------------------------|---------------------------------------------------------|
| C<br>(pF)                                                                    | TOL.<br>(%) | D <sub>MAX</sub> .<br>(mm) | LEAD SPACING<br>(mm) | SH <sup>(1)</sup><br>(mm) | CLEAR TEXT CODE                                         |
|                                                                              |             |                            |                      |                           | 13 <sup>TH</sup> DIGIT:<br>T = REEL; U = AMMO; 3 = BULK |
|                                                                              |             |                            |                      |                           | 16 <sup>TH</sup> DIGIT:<br>R = RoHS COMPLIANT           |
| CLASS 2 Z5U                                                                  |             |                            |                      |                           |                                                         |
| 1000                                                                         | ± 20        | 5.0                        | 5.0                  | 4.0                       | D102M20Z5UL6.J5.                                        |
| 1500                                                                         |             |                            |                      |                           | D152M25Z5UL6.J5.                                        |
| 2200                                                                         |             |                            |                      |                           | D222M25Z5UL6.J5.                                        |
| 3300                                                                         |             |                            |                      |                           | D332M29Z5UL6.J5.                                        |
| 4700                                                                         |             |                            |                      |                           | D472M33Z5UL6.J5.                                        |
| 6800                                                                         |             |                            |                      |                           | D682M39Z5UL6.J5.                                        |
| 10 000                                                                       |             | 11.0                       | D103M43Z5UL6.J5.     |                           |                                                         |
| 15 000                                                                       |             | 13.5                       | 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                                                                          |             |                            |                      |                           | D471K25X5FL6.J5.R.                                      |
| 680                                                                          |             |                            |                      |                           | D681K25X5FL6.J5.R.                                      |
| 1000                                                                         |             |                            |                      |                           | D102K29X5FL6.J5.R.                                      |
| 2200                                                                         |             | D222K39X5FL6.J5.R.         |                      |                           |                                                         |
| 3300                                                                         |             | 12.0                       | D332K47X5FL6.J7R.    |                           |                                                         |
| 4700                                                                         |             | 13.5                       | 4.8                  | D472K53X5FL6.J7R.         |                                                         |

## Note

<sup>(1)</sup> SH = seated height

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

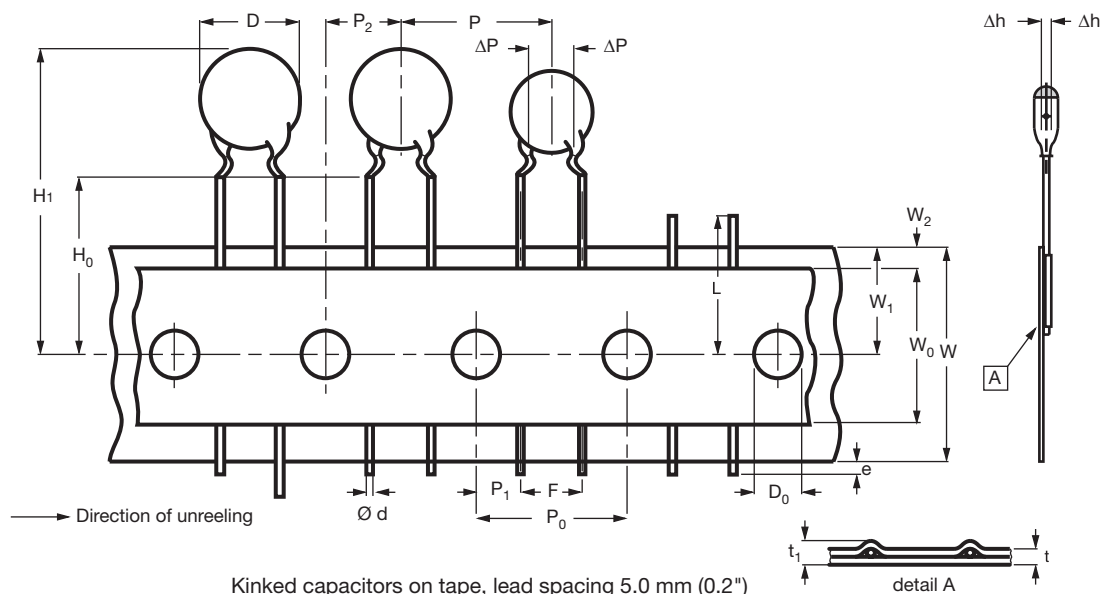
| PACKAGING                 |           |                      |      |      |
|---------------------------|-----------|----------------------|------|------|
| D <sub>MAX.</sub><br>(mm) | SIZE CODE | PACKAGING QUANTITIES |      |      |
|                           |           | BULK                 | 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        | 500                  | -    | -    |
| 13.5 (0.53")              | 53        |                      |      |      |
| 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<sub>DC</sub>, General Purpose

Vishay BCcomponents


**DIMENSIONS OF TAPE**

| SYMBOL                        | PARAMETER                            | DIMENSIONS (mm) |               |
|-------------------------------|--------------------------------------|-----------------|---------------|
|                               |                                      | NOMINAL         | TOLERANCE     |
| D                             | Body diameter                        | 11.0 maximum    | -             |
| d                             | Lead diameter                        | 0.6             | ± 0.05        |
| P <sup>(1)</sup>              | Pitch between capacitors             | 12.7            | ± 1.0         |
| P <sub>0</sub>                | Feed-hole pitch                      | 12.7            | ± 0.3         |
| ΔP                            | Plane deviation                      | 1.0 maximum     | -             |
| P <sub>1</sub> <sup>(2)</sup> | Feed-hole center to lead center      | 3.85            | ± 0.7         |
| P <sub>2</sub> <sup>(2)</sup> | Feed-hole center to component center | 6.35            | ± 1.3         |
| F                             | Lead spacing                         | 5.0             | 0.6<br>- 0.4  |
| Δh                            | Component alignment                  | 0               | ± 1.0         |
| W                             | Tape width                           | 18.0            | 1.0<br>- 0.5  |
| W <sub>0</sub>                | Hold-down tape width                 | 5.0 minimum     | -             |
| W <sub>1</sub>                | Hole position                        | 9.0             | 0.75<br>- 0.5 |
| W <sub>2</sub>                | Hold-down tape margin                | 3.0 maximum     | -             |
| H <sub>0</sub>                | Height to seating plane              | 16.0            | ± 0.5         |
| H <sub>1</sub>                | Maximum component height             | 32.0            | -             |
| e                             | Lead end protrusion                  | 1.0 maximum     | -             |
| L                             | Maximum length of snapped lead       | 11.0            | -             |
| D <sub>0</sub>                | Feed-hole diameter                   | 4.0             | ± 0.2         |
| t                             | Total tape thickness                 | 0.9 maximum     | -             |
| t <sub>1</sub>                | Maximum thickness of tape and wires  | 1.5 maximum     | -             |

**Notes**

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

<sup>(2)</sup> Obliquity maximum 3°

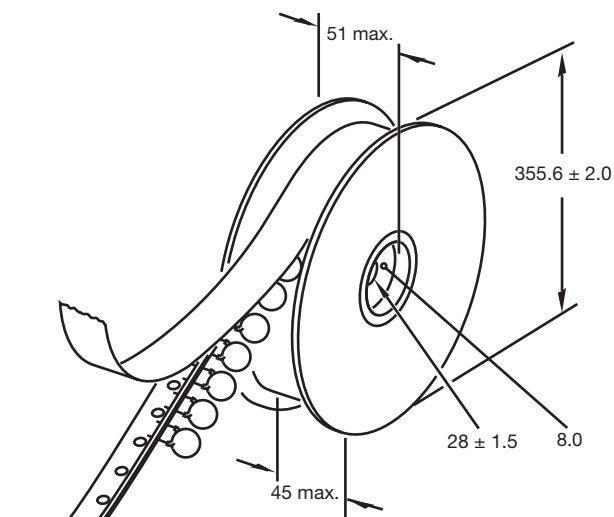
## D Series

Vishay BCcomponents

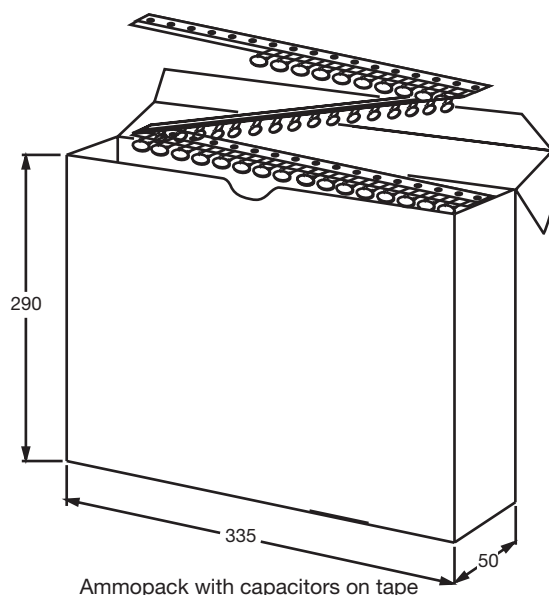
Ceramic Disc Capacitors  
Class 1 and 2, 500 V<sub>DC</sub>, General Purpose



### REEL AND TAPE DATA in millimeters



Reel with capacitors on tape



Ampopack with capacitors on tape



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