

## 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>(Y5P, 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

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| 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 (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 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                                                                         |             | 13.5                      |                      |                           | 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                                                                         |             | 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 <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<br>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.

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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

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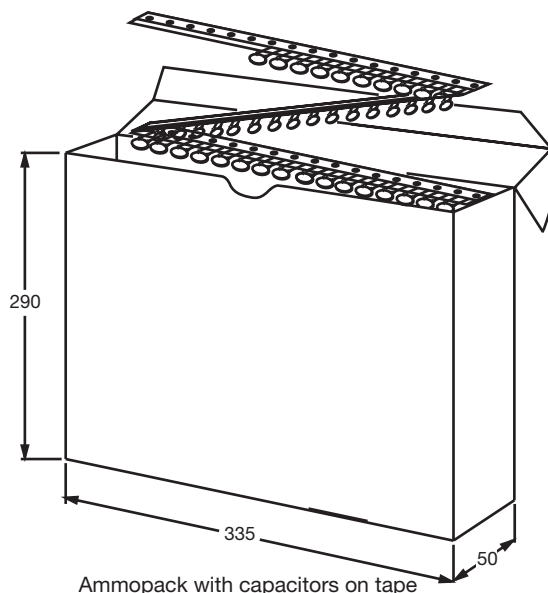
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Class 1 and 2, 500 V<sub>DC</sub>, General Purpose



### REEL AND TAPE DATA in millimeters



Reel with capacitors on tape



Ampopack with capacitors on tape



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