

## Ceramic Disc Capacitors

### Safety, Class X1/Y2 440/250V (AC) Series DS

#### FEATURES

- Complying with “EN 132 400” and “IEC 60384-14, 2nd edition, including amendment 1.1995”
- High reliability
- Kinked (preferred) or straight leads.
- Lead (Pb)-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 or 0.8 mm.

The capacitors may be supplied with kinked or straight leads having a lead spacing of 5.0 mm (0.200") or 7.5 mm (0.300") and a lead length from 4 to 30 mm. The standard tolerance on capacitance is  $\pm 10\%$  for U2M and Y5P material,  $\pm 20\%$  for Y5U and  $-20/+80\%$  for Y5V material. Encapsulation is made of flammable resistant epoxy resin in accordance with “UL94V-0”.

#### CAPACITANCE RANGE:

at 1kHz, 1V (RMS); 10 to 10000pF

#### RATED VOLTAGE $U_R$ :

(X1): 440V (AC), 50Hz (IEC 60384-14.2)

(Y2): 250V (AC), 50Hz (IEC 60384-14.2)

#### DIELECTRIC STRENGTH BETWEEN LEADS:

Component test:

1900V (AC), 50Hz, 2 seconds

As repeated test admissible only once with:

1700V (AC), 50Hz, 2 seconds

Random sampling test (destructive test):

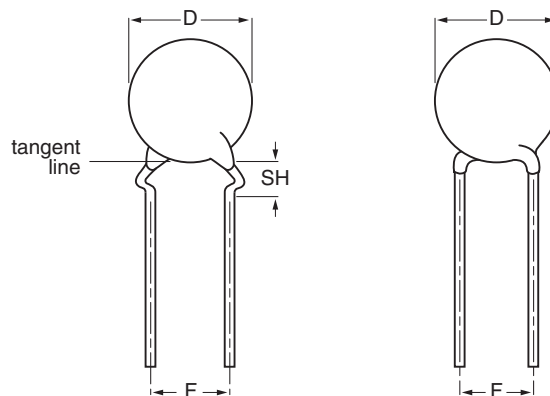
1500V (AC), 50Hz, 60 seconds

#### DIELECTRIC STRENGTH OF BODY INSULATION:

1500V (AC), 50Hz, 60 seconds (destructive test)

#### INSULATION RESISTANCE AT 500V (DC):

$\geq 10000 \text{ M}\Omega$



Capacitors with 5.0 mm (0.20") 7.5 mm (0.30") lead spacing.

#### TOLERANCE ON CAPACITANCE:

$\pm 10\%$ ;  $\pm 20\%$ ;  $-20/+80\%$

#### DISSIPATION FACTOR:

at 1kHz; 1V (RMS); 2.5% max

#### TEMPERATURE COEFFICIENTS:

U2M; Y5P; Y5U; Y5V

#### APPROVALS:

ENEC, UL file E95439 and CSA

#### CLIMATIC CATEGORY:

25/125/56 or 25/85/21

#### OPERATING TEMPERATURE RANGE:

$-30$  to  $+125^\circ\text{C}$

#### MARKING

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

The capacitors meet the essential requirements of “EIA 198”. Unless stated otherwise all electrical values apply at an ambient temperature of  $25 \pm 3^\circ\text{C}$ , at normal atmospheric conditions

| ORDERING INFORMATION, X1 440V (AC); Y1 250V (AC) |             |                          |                              |                           |                                                                                                                            |                                                             |      |      |                                                                                                      |                  |
|--------------------------------------------------|-------------|--------------------------|------------------------------|---------------------------|----------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------|------|------|------------------------------------------------------------------------------------------------------|------------------|
| C<br>(pF)                                        | TOL.<br>(%) | D <sub>max</sub><br>(mm) | LEAD<br>SPACING<br>F<br>(mm) | SH <sup>(2)</sup><br>(mm) | CLEAR TEXT CODE                                                                                                            | PACKAGING CODE<br>8 <sup>th</sup> AND 9 <sup>th</sup> DIGIT |      |      | CATALOG<br>NUMBER <sup>(4)</sup><br>3 <sup>rd</sup> DIGIT:<br>5 = STANDARD,<br>8 = RoHS<br>COMPLIANT |                  |
|                                                  |             |                          |                              |                           | 13 <sup>th</sup> DIGIT:<br>T = REEL; U = AMMO;<br>3 = BULK <sup>(3)</sup><br>16 <sup>th</sup> DIGIT:<br>R = RoHS COMPLIANT | REEL                                                        | AMMO | BULK |                                                                                                      |                  |
|                                                  |             |                          |                              |                           |                                                                                                                            | KINKED                                                      |      |      |                                                                                                      |                  |
| U2M                                              |             |                          |                              |                           |                                                                                                                            |                                                             |      |      |                                                                                                      |                  |
| 10                                               | ±10         | 6.5                      | 5.0                          | 4.0                       | S100K25U2MY6.K5.                                                                                                           | 13                                                          | 14   | 15   | 22.2 815 ..006                                                                                       |                  |
| 15                                               |             |                          |                              |                           | S150K25U2MY6.K5.                                                                                                           |                                                             |      |      | 22.2 815 ..106                                                                                       |                  |
| 22                                               |             |                          |                              |                           | S220K25U2MY6.K5.                                                                                                           |                                                             |      |      | 22.2 815 ..206                                                                                       |                  |
| 33                                               |             |                          |                              |                           | S330K25U2MY6.K5.                                                                                                           |                                                             |      |      | 22.2 815 ..306                                                                                       |                  |
| 47                                               |             | 7.5                      |                              |                           | S470K29U2MY6.K5.                                                                                                           |                                                             |      |      | 22.2 815 ..406                                                                                       |                  |
| 68                                               |             | 8.5                      |                              |                           | S680K33U2MY6.K5.                                                                                                           |                                                             |      |      | 22.2 815 ..606                                                                                       |                  |
| Y5P                                              |             |                          |                              |                           |                                                                                                                            |                                                             |      |      |                                                                                                      |                  |
| 100                                              | ±10         | 6.5                      | 5.0                          | 4.0                       | S101K25Y5PY6.K5.                                                                                                           | 13                                                          | 14   | 15   | 22.2 815 ..016                                                                                       |                  |
| 150                                              |             |                          |                              |                           | S151K25Y5PY6.K5.                                                                                                           |                                                             |      |      | 22.2 815 ..116                                                                                       |                  |
| 220                                              |             |                          |                              |                           | 7.5                                                                                                                        |                                                             |      |      | S221K29Y5PY6.K5.                                                                                     | 22.2 815 ..216   |
| 330                                              |             |                          |                              |                           |                                                                                                                            |                                                             |      |      | S331K29Y5PY6.K5.                                                                                     | 22.2 815 ..316   |
| 470                                              |             | S471K29Y5PY6.K5.         |                              |                           |                                                                                                                            |                                                             |      |      | 22.2 815 ..416                                                                                       |                  |
| 680                                              |             | S681K29Y5PY6.K5.         |                              |                           |                                                                                                                            |                                                             |      |      | 22.2 815 ..616                                                                                       |                  |
| Y5U                                              |             |                          |                              |                           |                                                                                                                            |                                                             |      |      |                                                                                                      |                  |
| 1000                                             | ±20         | 7.5                      | 5.0                          | 4.0                       | S102M29Y5UY6.K5.                                                                                                           | 13                                                          | 14   | 15   | 22.2 815 ..027                                                                                       |                  |
| 1500                                             |             |                          |                              |                           | S152M29Y5UY6.K5.                                                                                                           |                                                             |      |      | 22.2 815 ..127                                                                                       |                  |
| 2200                                             |             | 8.5                      |                              |                           | S222M33Y5UY6.K5.                                                                                                           |                                                             |      |      | 22.2 815 ..227                                                                                       |                  |
| 3300                                             |             |                          |                              |                           | 10.0                                                                                                                       |                                                             |      |      | S332M39Y5UY6.K5.                                                                                     | 22.2 815 ..327   |
| 4700                                             |             |                          |                              |                           |                                                                                                                            |                                                             |      |      | 12.0                                                                                                 | S472M47Y5UY6.K5. |
| Y5V                                              |             |                          |                              |                           |                                                                                                                            |                                                             |      |      |                                                                                                      |                  |
| 2200                                             | -20/+80%    | 8.5                      | 5.0                          | 4.0                       | S222Z33Y5VY6.K5.                                                                                                           | 13                                                          | 14   | 15   | 22.2 815 ..228                                                                                       |                  |
| 3300                                             |             | 10.0                     |                              |                           | S332Z39Y5VY6.K5.                                                                                                           |                                                             |      |      | 22.2 815 ..328                                                                                       |                  |
| 4700                                             |             | 11.0                     |                              |                           | S472Z43Y5VY6.K5.                                                                                                           |                                                             |      |      | 22.2 815 ..428                                                                                       |                  |
| 10000                                            |             |                          | 15.0                         | 7.5                       | 4.8                                                                                                                        | S103Z59Y5VY6.K7.                                            | 35   | 36   | 37                                                                                                   | 22.2 815 ..038   |

**Notes**

- Maximum thickness 4.5 mm.
- SH = seated height.
- Straight leads are available on request.
- 3<sup>rd</sup> digit to complete RoHS catalog number. 8<sup>th</sup> and 9<sup>th</sup> digit of the catalog number to be completed with the packaging code.

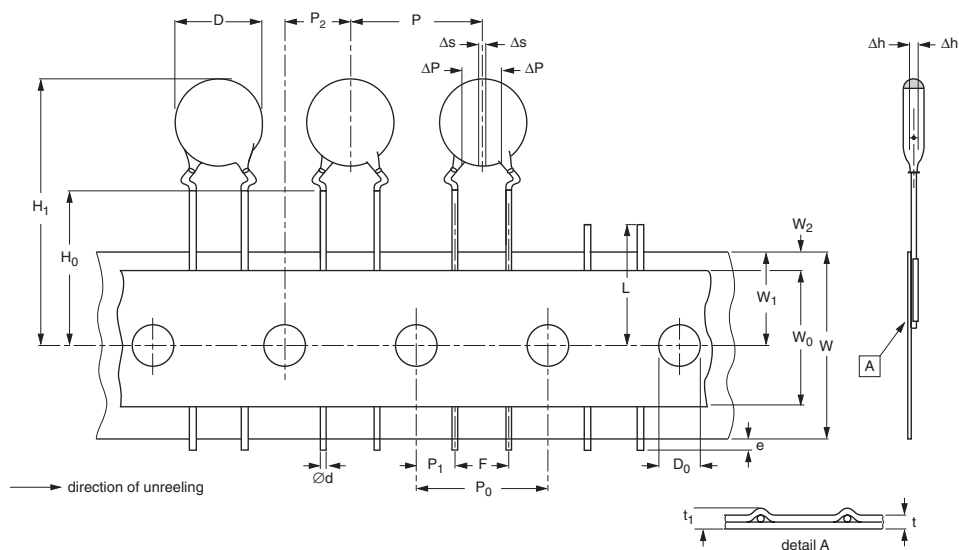
| PACKAGING                |           |                      |      |      |
|--------------------------|-----------|----------------------|------|------|
| D <sub>max</sub><br>(mm) | SIZE CODE | PACKAGING QUANTITIES |      |      |
|                          |           | BULK                 | REEL | AMMO |
| 8.5 (0.33")              | 33        | 1000                 | 1000 | 1500 |
| 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        |                      |      |      |

**Note**

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

**Ceramic Disc Capacitors**  
**Safety, Class X1/Y2 440/250V (AC)**  
**Series DS**

Vishay BCcomponents



Kinked capacitors on tape, lead spacing 5 mm (0.20") or 7.5 mm (0.30").

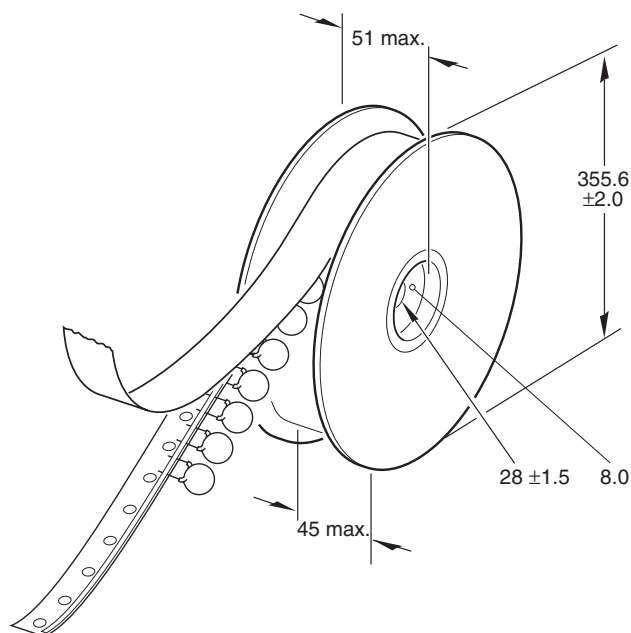
### DIMENSIONS OF TAPE

| SYMBOL     | PARAMETER                            | DIMENSIONS<br>(mm)              |                                 |
|------------|--------------------------------------|---------------------------------|---------------------------------|
|            |                                      | FEED-HOLE PITCH<br>$P_0 = 12.7$ | FEED-HOLE PITCH<br>$P_0 = 15.0$ |
| D          | body diameter                        | 11.0 max.                       | 14.0 max.                       |
| d          | lead diameter                        | $0.6 \pm 0.05$                  | $0.6 \pm 0.05$                  |
| P          | pitch between capacitors             | $12.7 \pm 1.0$                  | $15.0 \pm 1.0$                  |
| $P_0$      | feed-hole pitch                      | $12.7 \pm 0.3$ ; note 1         | $15.0 \pm 0.3$ ; note 1         |
| $\Delta P$ | plane deviation                      | 1.0 max.                        | 1.0 max.                        |
| $P_1$      | feed-hole centre to lead centre      | $3.85 \pm 0.7$ ; note 2         | $3.75 \pm 1.0$ ; note 2         |
| $P_2$      | feed-hole centre to component centre | $6.35 \pm 1.3$ ; note 2         | $7.5 \pm 1.5$ ; note 2          |
| F          | lead spacing                         | $5.0 + 0.6/-0.4$                | $7.5 \pm 1.0$                   |
| $\Delta h$ | component alignment                  | $0 \pm 1.0$                     | $0 \pm 1.0$                     |
| $\Delta s$ | deviation along tape, left or right  | $0 \pm 1.0$                     | $0 \pm 1.0$                     |
| 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              | $16.0 \pm 0.5$                  | $16.0 \pm 0.5$                  |
| $H_1$      | maximum component height             | 32.0                            | 40.0                            |
| e          | lead end protrusion                  | 1.0 max.                        | 1.0 max.                        |
| L          | maximum length of snapped lead       | 11.0                            | 11.0                            |
| $D_0$      | feed-hole diameter                   | $4.0 \pm 0.2$                   | $4.0 \pm 0.2$                   |
| t          | total tape thickness                 | 0.9 max.                        | 0.9 max.                        |
| $t_1$      | maximum thickness of tape and wires  | 1.5 max.                        | 1.5 max.                        |

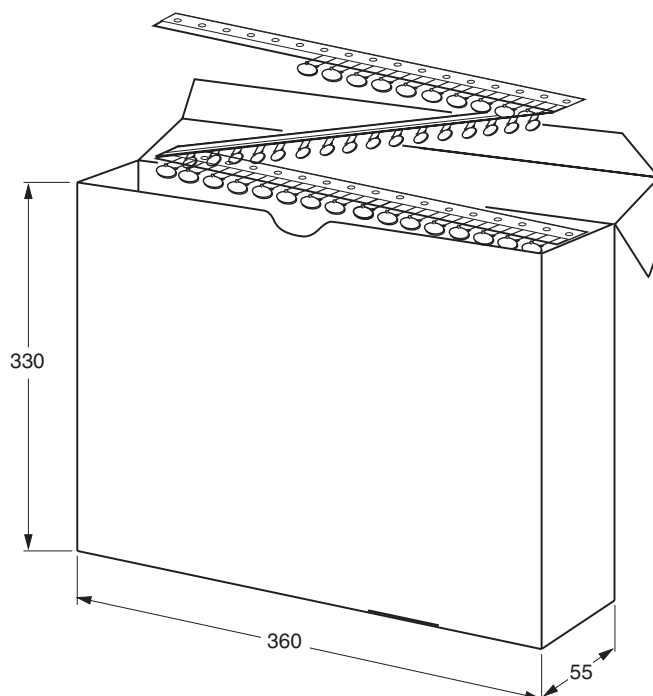
#### Notes

- Cumulative pitch error:  $\pm 1$  mm/20 pitches.
- Obliquity maximum 3°.

## REEL AND TAPE DATA in millimeters



Reel with capacitors on tape.



Ampopack with capacitors on tape.



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