

# Ceramic Singlelayer DC Disc Capacitors for General Purpose Class 1, Class 2, and Class 3, 1 kV<sub>DC</sub>, 2 kV<sub>DC</sub>, 3 kV<sub>DC</sub>, 6 kV<sub>DC</sub>



## FEATURES

- High capacitance with small size
- High stability
- Crimp and straight lead styles
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**

## APPLICATIONS

- Temperature compensation
- Coupling and decoupling
- Bypassing

## QUICK REFERENCE DATA

| DESCRIPTION                | VALUE                  |      |                  |                  |            |                        |                  |
|----------------------------|------------------------|------|------------------|------------------|------------|------------------------|------------------|
| Ceramic Class              | 1                      |      | 2                |                  |            |                        | 3                |
| Ceramic Dielectric         | SL0                    | S3N  | X7R              | Y5P              | X5F        | Z5U                    | Y5V              |
| Voltage (V <sub>DC</sub> ) | 1000, 2000, 3000, 6000 | 6000 | 1000, 2000, 3000 | 1000, 2000, 3000 | 1000, 2000 | 1000, 2000, 3000, 6000 | 1000, 2000, 3000 |
| Min. Capacitance (pF)      | 10                     | 47   | 100              | 100              | 100        | 1000                   | 1000             |
| Max. Capacitance (pF)      | 470                    | 150  | 4700             | 10 000           | 4700       | 22 000                 | 33 000           |
| Mounting                   | Radial                 |      |                  |                  |            |                        |                  |

## MARKING

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

## OPERATING TEMPERATURE RANGE

SL0, S3N, X7R, X5F: -55 °C to +125 °C

Y5P, Z5U, Y5V: -30 °C to +125 °C

## TEMPERATURE CHARACTERISTICS

Class 1: SL0, S3N

Class 2: X7R, Y5P, X5F, Z5U

Class 3: Y5V

## SECTIONAL SPECIFICATIONS

Climatic category (according to EN 60058-1)

Class 1 and 2: 55/125/21

Class 3: 30/85/21

## APPROVALS

EIA 198

IEC 60384-8

IEC 60384-9

## DESIGN

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

The capacitors may be supplied with straight or kinked leads having a lead spacing of 5.0 mm, 7.5 mm and 10.0 mm.

Coating is made of epoxy resin in accordance with UL 94 V-0.

## CAPACITANCE RANGE

10 pF to 33 nF

## TOLERANCE ON CAPACITANCE

± 5 %; ± 10 %; ± 20 %; + 80 % / - 20 %

## RATED VOLTAGE

1000 V<sub>DC</sub>, 2000 V<sub>DC</sub>, 3000 V<sub>DC</sub>, 6000 V<sub>DC</sub>

## TEST VOLTAGE

200 % of rated voltage

## INSULATION RESISTANCE AT RATED VOLTAGE

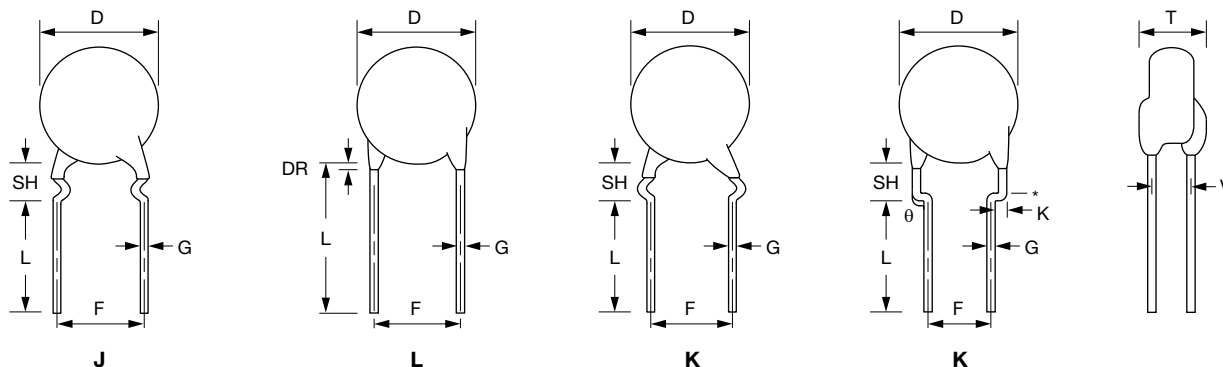
10 GΩ min.

## DISSIPATION FACTOR

Class 1: 0.1 max. when C ≥ 30 pF  
(1 MHz, 1 V where C ≤ 1000 pF,  
and 1 kHz, 1 V where C > 1000 pF)  
For C < 30 pF: DF = 100/(400 + 20 °C)  
DF = dissipation factor in %;  
C = capacitance value in pF

Class 2: 2.5 % max. (1 kHz, 1 V)

Class 3: 5 % max. (1 kHz, 1 V)

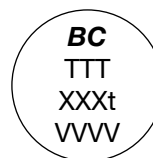
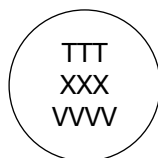
**LEAD CONFIGURATION** (in millimeters)

**Notes**

- Lead-spacing 2.5 mm is available for L lead configuration only
- DR = 3.0 mm max., SH = 4.8 mm max.
- V: 1 kV = 1.2 mm  $\pm$  0.5 mm; 2 kV = 2.6 mm  $\pm$  0.8 mm; 3 kV = 3.5 mm  $\pm$  1.0 mm; 6 kV = 6.2 mm  $\pm$  1.2 mm

**MARKING**

Size 25

Size 29 and above


**Note**

- Refer to specified part for detail marking

**ORDERING CODE INFORMATION**

| S            | 102                                                                                                                                                              | K                                                                        | 29                                 | Y5P                                | N                                                                                                            | 6                                                      | 3                                                                                                        | J                                  | 5                                                     | R                                   |
|--------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|------------------------------------|------------------------------------|--------------------------------------------------------------------------------------------------------------|--------------------------------------------------------|----------------------------------------------------------------------------------------------------------|------------------------------------|-------------------------------------------------------|-------------------------------------|
| 1            | 2 3 4                                                                                                                                                            | 5                                                                        | 6 7                                | 8 9 10                             | 11                                                                                                           | 12                                                     | 13                                                                                                       | 14                                 | 15                                                    | 16                                  |
| Product Type | Capacitance (pF)                                                                                                                                                 | Capacitance Tolerance                                                    | Size Code                          | T.C. Code                          | Rated Voltage                                                                                                | Lead Diameter                                          | Packaging / Lead Length                                                                                  | Lead Style                         | Lead Spacing                                          | RoHS-Compliant                      |
| S series     | The first two digits are the significant figures of capacitance and the last digit is a multiplier as follows:<br>0 = * 1<br>1 = * 10<br>2 = * 100<br>3 = * 1000 | J = $\pm$ 5 %<br>K = $\pm$ 10 %<br>M = $\pm$ 20 %<br>Z = + 80 % / - 20 % | Please refer to relevant datasheet | Please refer to relevant datasheet | N = 1000 V <sub>DC</sub><br>P = 2000 V <sub>DC</sub><br>R = 3000 V <sub>DC</sub><br>U = 6000 V <sub>DC</sub> | 6 = 0.60 mm $\pm$ 0.05 mm<br>8 = 0.80 mm $\pm$ 0.05 mm | 3 = bulk with 30.0 mm $\pm$ 5.0 mm<br>B = bulk with 3.5 mm $\pm$ 0.5 mm<br>T = tape and reel<br>U = ammo | Please refer to relevant datasheet | 5 = 5.0 mm<br>6 = 6.4 mm<br>7 = 7.5 mm<br>0 = 10.0 mm | R = RoHS-compliant and halogen-free |



## ORDERING CODES

| DIELECTRIC SLO (1000 V <sub>DC</sub> / 2000 V <sub>DC</sub> ) |                      |                       |                        |                      |                       |                        |
|---------------------------------------------------------------|----------------------|-----------------------|------------------------|----------------------|-----------------------|------------------------|
| CAP.<br>(pF)                                                  | 1000 V <sub>DC</sub> |                       |                        | 2000 V <sub>DC</sub> |                       |                        |
|                                                               | ORDERING CODE        | DIAMETER<br>(mm max.) | THICKNESS<br>(mm max.) | ORDERING CODE        | DIAMETER<br>(mm max.) | THICKNESS<br>(mm max.) |
| 10                                                            | S100#25SL0N6###R     | 6.5                   | 4                      | S100#25SL0P6###R     | 6.5                   | 4.5                    |
| 12                                                            | S120#25SL0N6###R     | 6.5                   | 4                      | S120#25SL0P6###R     | 6.5                   | 4.5                    |
| 15                                                            | S150#25SL0N6###R     | 6.5                   | 4                      | S150#25SL0P6###R     | 6.5                   | 4.5                    |
| 18                                                            | S180#25SL0N6###R     | 6.5                   | 4                      | S180#25SL0P6###R     | 6.5                   | 4.5                    |
| 22                                                            | S220#25SL0N6###R     | 6.5                   | 4                      | S220#25SL0P6###R     | 6.5                   | 4.5                    |
| 27                                                            | S270#25SL0N6###R     | 6.5                   | 4                      | S270#25SL0P6###R     | 6.5                   | 4.5                    |
| 33                                                            | S330#25SL0N6###R     | 6.5                   | 4                      | S330#29SL0P6###R     | 7.5                   | 4.5                    |
| 39                                                            | S390#25SL0N6###R     | 6.5                   | 4                      | S390#29SL0P6###R     | 7.5                   | 4.5                    |
| 47                                                            | S470#25SL0N6###R     | 6.5                   | 4                      | S470#29SL0P6###R     | 7.5                   | 4.5                    |
| 56                                                            | S560#29SL0N6###R     | 7.5                   | 4                      | S560#29SL0P6###R     | 7.5                   | 4.5                    |
| 68                                                            | S680#29SL0N6###R     | 7.5                   | 4                      | S680#33SL0P6###R     | 8.5                   | 4.5                    |
| 82                                                            | S820#29SL0N6###R     | 7.5                   | 4                      | S820#33SL0P6###R     | 8.5                   | 4.5                    |
| 100                                                           | S101#29SL0N6###R     | 7.5                   | 4                      | S101#39SL0P6###R     | 10                    | 4.5                    |
| 120                                                           | S121#33SL0N6###R     | 8.5                   | 4                      | S121#39SL0P6###R     | 10                    | 4.5                    |
| 150                                                           | S151#33SL0N6###R     | 8.5                   | 4                      | S151#43SL0P6###R     | 11                    | 4.5                    |
| 180                                                           | S181#39SL0N6###R     | 10                    | 4                      | /                    | /                     | /                      |
| 220                                                           | S221#39SL0N6###R     | 10                    | 4                      | /                    | /                     | /                      |

| DIELECTRIC SLO (3000 V <sub>DC</sub> / 6000 V <sub>DC</sub> ) |                      |                       |                        |                                     |                       |                        |
|---------------------------------------------------------------|----------------------|-----------------------|------------------------|-------------------------------------|-----------------------|------------------------|
| CAP.<br>(pF)                                                  | 3000 V <sub>DC</sub> |                       |                        | 6000 V <sub>DC</sub> <sup>(1)</sup> |                       |                        |
|                                                               | ORDERING CODE        | DIAMETER<br>(mm max.) | THICKNESS<br>(mm max.) | ORDERING CODE                       | DIAMETER<br>(mm max.) | THICKNESS<br>(mm max.) |
| 10                                                            | S100#33SL0R6###R     | 8.5                   | 5.5                    | S100#39SL0U83L0R                    | 10                    | 8                      |
| 12                                                            | S120#33SL0R6###R     | 8.5                   | 5.5                    | S120#39SL0U83L0R                    | 10                    | 8                      |
| 15                                                            | S150#33SL0R6###R     | 8.5                   | 5.5                    | S150#43SL0U83L0R                    | 11                    | 8                      |
| 18                                                            | S180#33SL0R6###R     | 8.5                   | 5.5                    | S180#43SL0U83L0R                    | 11                    | 8                      |
| 22                                                            | S220#33SL0R6###R     | 8.5                   | 5.5                    | S220#43SL0U83L0R                    | 11                    | 8                      |
| 27                                                            | S270#33SL0R6###R     | 8.5                   | 5.5                    | S270#47SL0U83L0R                    | 12                    | 8                      |
| 33                                                            | S330#33SL0R6###R     | 8.5                   | 5.5                    | S330#53SL0U83L0R                    | 13.5                  | 8                      |
| 39                                                            | S390#33SL0R6###R     | 8.5                   | 5.5                    | /                                   | /                     | /                      |
| 47                                                            | S470#33SL0R6###R     | 8.5                   | 5.5                    | /                                   | /                     | /                      |
| 56                                                            | S560#39SL0R6###R     | 10                    | 5.5                    | /                                   | /                     | /                      |
| 68                                                            | S680#39SL0R6###R     | 10                    | 5.5                    | /                                   | /                     | /                      |

## Notes

- Lead diameter is 0.6 mm
  - # 5<sup>th</sup> digit is capacitance tolerance code:  $\pm 5\%$  = J;  $\pm 10\%$  = K
  - # 13<sup>th</sup> digit is packaging code: bulk = 3; reel = T; ammo = U
  - # 14<sup>th</sup> digit is lead style code: L; J; K (J is valid for 1 kV only)
  - # 15<sup>th</sup> digit is lead spacing code: 5.0 mm = 5; 6.4 mm = 6; 7.5 mm = 7; 10.0 mm = 0
- <sup>(1)</sup> For 6000 V part, only straight lead configuration (0.8 mm lead diameter) and bulk packaging are available



| DIELECTRIC Z5U (1000 V <sub>DC</sub> / 2000 V <sub>DC</sub> ) |                      |                       |                        |                      |                       |                        |
|---------------------------------------------------------------|----------------------|-----------------------|------------------------|----------------------|-----------------------|------------------------|
| CAP.<br>(pF)                                                  | 1000 V <sub>DC</sub> |                       |                        | 2000 V <sub>DC</sub> |                       |                        |
|                                                               | ORDERING CODE        | DIAMETER<br>(mm max.) | THICKNESS<br>(mm max.) | ORDERING CODE        | DIAMETER<br>(mm max.) | THICKNESS<br>(mm max.) |
| 1000                                                          | S102#25Z5UN6###R     | 6.5                   | 4                      | S102#29Z5UP6###R     | 7.5                   | 4.5                    |
| 1500                                                          | S152#29Z5UN6###R     | 7.5                   | 4                      | S152#29Z5UP6###R     | 7.5                   | 4.5                    |
| 2200                                                          | S222#29Z5UN6###R     | 7.5                   | 4                      | S222#33Z5UP6###R     | 8.5                   | 4.5                    |
| 3300                                                          | S332#33Z5UN6###R     | 8.5                   | 4                      | S332#43Z5UP6###R     | 11.0                  | 4.5                    |
| 4700                                                          | S472#39Z5UN6###R     | 10                    | 4                      | S472#47Z5UP6###R     | 12.0                  | 4.5                    |
| 6800                                                          | S682#43Z5UN6###R     | 11                    | 4                      | S682#53Z5UP63K7R     | 13.5                  | 4.5                    |
| 10 000                                                        | S103#47Z5UN6###R     | 12                    | 4                      | S103#69Z5UP63K7R     | 17.5                  | 4.5                    |
| 15 000                                                        | S153#59Z5UN63J7R     | 15                    | 4                      | /                    | /                     | /                      |
| 22 000                                                        | S223#75Z5UN83J0R     | 19                    | 4                      | /                    | /                     | /                      |

| DIELECTRIC Z5U (3000 V <sub>DC</sub> / 6000 V <sub>DC</sub> ) |                      |                       |                        |                      |                       |                        |
|---------------------------------------------------------------|----------------------|-----------------------|------------------------|----------------------|-----------------------|------------------------|
| CAP.<br>(pF)                                                  | 3000 V <sub>DC</sub> |                       |                        | 6000 V <sub>DC</sub> |                       |                        |
|                                                               | ORDERING CODE        | DIAMETER<br>(mm max.) | THICKNESS<br>(mm max.) | ORDERING CODE        | DIAMETER<br>(mm max.) | THICKNESS<br>(mm max.) |
| 220                                                           | /                    | /                     | /                      | S221#39Z5UU83L0R     | 10                    | 8                      |
| 330                                                           | /                    | /                     | /                      | S331#43Z5UU83L0R     | 11                    | 8                      |
| 470                                                           | S471#33Z5UR6###R     | 8.5                   | 5.5                    | S471#47Z5UU83L0R     | 12                    | 8                      |
| 1000                                                          | S102#33Z5UR6###R     | 8.5                   | 5.5                    | S102#59Z5UU83L0R     | 15                    | 8                      |
| 1500                                                          | S152#39Z5UR6###R     | 10.0                  | 5.5                    | S152#69Z5UU83L0R     | 17.5                  | 8                      |
| 2200                                                          | S222#43Z5UR6###R     | 11.0                  | 5.5                    | S222M75Z5UU83L0R     | 19                    | 8                      |
| 3300                                                          | S332#53Z5UR63K7R     | 13.5                  | 5.5                    | /                    | /                     | /                      |
| 4700                                                          | S472#69Z5UR63K7R     | 17.5                  | 5.5                    | /                    | /                     | /                      |

**Notes**

- Lead diameter is 0.6 mm
- # 5<sup>th</sup> digit is capacitance tolerance code:  $\pm 20\%$  = M;  $+ 80\%$  /  $- 20\%$  = Z
- # 13<sup>th</sup> digit is packaging code: bulk = 3; reel = T; ammo = U
- # 14<sup>th</sup> digit is lead style code: L; J; K (J is valid for 1 kV only)
- # 15<sup>th</sup> digit is lead spacing code: 5.0 mm = 5; 6.4 mm = 6; 7.5 mm = 7; 10.0 mm = 0



| DIELECTRIC Y5P (1000 V <sub>DC</sub> / 2000 V <sub>DC</sub> ) |                      |                       |                        |                      |                       |                        |
|---------------------------------------------------------------|----------------------|-----------------------|------------------------|----------------------|-----------------------|------------------------|
| CAP.<br>(pF)                                                  | 1000 V <sub>DC</sub> |                       |                        | 2000 V <sub>DC</sub> |                       |                        |
|                                                               | ORDERING CODE        | DIAMETER<br>(mm max.) | THICKNESS<br>(mm max.) | ORDERING CODE        | DIAMETER<br>(mm max.) | THICKNESS<br>(mm max.) |
| 100                                                           | S101#25Y5PN6###R     | 6.5                   | 4.0                    | S101#25Y5PP6###R     | 6.5                   | 4.5                    |
| 120                                                           | S121#25Y5PN6###R     | 6.5                   | 4.0                    | S121#25Y5PP6###R     | 6.5                   | 4.5                    |
| 150                                                           | S151#25Y5PN6###R     | 6.5                   | 4.0                    | S151#25Y5PP6###R     | 6.5                   | 4.5                    |
| 180                                                           | S181#25Y5PN6###R     | 6.5                   | 4.0                    | S181#25Y5PP6###R     | 6.5                   | 4.5                    |
| 220                                                           | S221#25Y5PN6###R     | 6.5                   | 4.0                    | S221#25Y5PP6###R     | 6.5                   | 4.5                    |
| 270                                                           | S271#25Y5PN6###R     | 6.5                   | 4.0                    | S271#25Y5PP6###R     | 6.5                   | 4.5                    |
| 330                                                           | S331#25Y5PN6###R     | 6.5                   | 4.0                    | S331#25Y5PP6###R     | 6.5                   | 4.5                    |
| 470                                                           | S471#25Y5PN6###R     | 6.5                   | 4.0                    | S471#29Y5PP6###R     | 7.5                   | 4.5                    |
| 560                                                           | S561#29Y5PN6###R     | 7.5                   | 4.0                    | S561#29Y5PP6###R     | 7.5                   | 4.5                    |
| 680                                                           | S681#29Y5PN6###R     | 7.5                   | 4.0                    | S681#29Y5PP6###R     | 7.5                   | 4.5                    |
| 820                                                           | S821#29Y5PN6###R     | 7.5                   | 4.0                    | S821#33Y5PP6###R     | 8.5                   | 4.5                    |
| 1000                                                          | S102#29Y5PN6###R     | 7.5                   | 4.0                    | S102#33Y5PP6###R     | 8.5                   | 4.5                    |
| 1500                                                          | S152#33Y5PN6###R     | 8.5                   | 4.0                    | S152#39Y5PP6###R     | 10.0                  | 4.5                    |
| 1800                                                          | S182#33Y5PN6###R     | 8.5                   | 4.0                    | S182#43Y5PP6###R     | 11.0                  | 4.5                    |
| 2200                                                          | S222#39Y5PN6###R     | 10.0                  | 4.0                    | S222#43Y5PP6###R     | 11.0                  | 4.5                    |
| 3300                                                          | S332#43Y5PN6###R     | 11.0                  | 4.0                    | S332#53Y5PP6###R     | 13.5                  | 4.5                    |
| 4700                                                          | S472#53Y5PN6###R     | 13.5                  | 4.0                    | S472#69Y5PP63K7R     | 17.5                  | 4.5                    |
| 6800                                                          | S682#59Y5PN63J7R     | 15.0                  | 4.0                    | /                    | /                     | /                      |
| 10 000                                                        | S103#75Y5PN83J0R     | 19.0                  | 4.0                    | /                    | /                     | /                      |

| DIELECTRIC Y5P (3000 V <sub>DC</sub> ) |                      |                       |                        |
|----------------------------------------|----------------------|-----------------------|------------------------|
| CAP.<br>(pF)                           | 3000 V <sub>DC</sub> |                       |                        |
|                                        | ORDERING CODE        | DIAMETER<br>(mm max.) | THICKNESS<br>(mm max.) |
| 100                                    | S101#33Y5PR6###R     | 8.5                   | 5.5                    |
| 120                                    | S121#33Y5PR6###R     | 8.5                   | 5.5                    |
| 150                                    | S151#33Y5PR6###R     | 8.5                   | 5.5                    |
| 180                                    | S181#33Y5PR6###R     | 8.5                   | 5.5                    |
| 220                                    | S221#33Y5PR6###R     | 8.5                   | 5.5                    |
| 270                                    | S271#33Y5PR6###R     | 8.5                   | 5.5                    |
| 330                                    | S331#33Y5PR6###R     | 8.5                   | 5.5                    |
| 470                                    | S471#33Y5PR6###R     | 8.5                   | 5.5                    |
| 560                                    | S561#39Y5PR6###R     | 10.0                  | 5.5                    |
| 680                                    | S681#39Y5PR6###R     | 10.0                  | 5.5                    |
| 820                                    | S821#39Y5PR6###R     | 10.0                  | 5.5                    |
| 1000                                   | S102#43Y5PR6###R     | 11.0                  | 5.5                    |
| 1500                                   | S152#47Y5PR6###R     | 12.0                  | 5.5                    |
| 1800                                   | S182#47Y5PR6###R     | 12.0                  | 5.5                    |
| 2200                                   | S222#59Y5PR63K7R     | 15.0                  | 5.5                    |
| 3300                                   | S332#75Y5PR83K0R     | 19.0                  | 5.5                    |

**Notes**

- Lead diameter is 0.6 mm
- # 5<sup>th</sup> digit is capacitance tolerance code: ± 5 % = J; ± 10 % = K
- # 13<sup>th</sup> digit is packaging code: bulk = 3; reel = T; ammo = U
- # 14<sup>th</sup> digit is lead style code: L; J; K (J is valid for 1 kV only)
- # 15<sup>th</sup> digit is lead spacing code: 5.0 mm = 5; 6.4 mm = 6; 7.5 mm = 7; 10.0 mm = 0



| DIELECTRIC X7R (1000 V <sub>DC</sub> / 2000 V <sub>DC</sub> ) |                      |                       |                        |                      |                       |                        |
|---------------------------------------------------------------|----------------------|-----------------------|------------------------|----------------------|-----------------------|------------------------|
| CAP.<br>(pF)                                                  | 1000 V <sub>DC</sub> |                       |                        | 2000 V <sub>DC</sub> |                       |                        |
|                                                               | ORDERING CODE        | DIAMETER<br>(mm max.) | THICKNESS<br>(mm max.) | ORDERING CODE        | DIAMETER<br>(mm max.) | THICKNESS<br>(mm max.) |
| 100                                                           | S101#25X7RN6###R     | 6.5                   | 4.0                    | S101#25X7RP6###R     | 6.5                   | 4.5                    |
| 120                                                           | S121#25X7RN6###R     | 6.5                   | 4.0                    | S121#25X7RP6###R     | 6.5                   | 4.5                    |
| 150                                                           | S151#25X7RN6###R     | 6.5                   | 4.0                    | S151#25X7RP6###R     | 6.5                   | 4.5                    |
| 180                                                           | S181#25X7RN6###R     | 6.5                   | 4.0                    | S181#25X7RP6###R     | 6.5                   | 4.5                    |
| 220                                                           | S221#25X7RN6###R     | 6.5                   | 4.0                    | S221#25X7RP6###R     | 6.5                   | 4.5                    |
| 270                                                           | S271#25X7RN6###R     | 6.5                   | 4.0                    | S271#25X7RP6###R     | 6.5                   | 4.5                    |
| 330                                                           | S331#25X7RN6###R     | 6.5                   | 4.0                    | S331#25X7RP6###R     | 6.5                   | 4.5                    |
| 470                                                           | S471#29X7RN6###R     | 7.5                   | 4.0                    | S471#29X7RP6###R     | 7.5                   | 4.5                    |
| 560                                                           | S561#29X7RN6###R     | 7.5                   | 4.0                    | S561#33X7RP6###R     | 8.5                   | 4.5                    |
| 680                                                           | S681#29X7RN6###R     | 7.5                   | 4.0                    | S681#33X7RP6###R     | 8.5                   | 4.5                    |
| 820                                                           | S821#29X7RN6###R     | 7.5                   | 4.0                    | S821#39X7RP6###R     | 10.0                  | 4.5                    |
| 1000                                                          | S102#33X7RN6###R     | 8.5                   | 4.0                    | S102#39X7RP6###R     | 10.0                  | 4.5                    |
| 1500                                                          | S152#39X7RN6###R     | 10.0                  | 4.0                    | S152#43X7RP6###R     | 11.0                  | 4.5                    |
| 1800                                                          | S182#43X7RN6###R     | 11.0                  | 4.0                    | S182#47X7RP6###R     | 12.0                  | 4.5                    |
| 2200                                                          | S222#43X7RN6###R     | 11.0                  | 4.0                    | S222#53X7RP6###R     | 13.0                  | 4.5                    |
| 3300                                                          | S332#47X7RN6###R     | 12.0                  | 4.0                    | S332#59X7RP63K7R     | 15.0                  | 4.5                    |
| 4700                                                          | S472#59X7RN63J7R     | 15.0                  | 4.0                    | /                    | /                     | /                      |

| DIELECTRIC X7R (3000 V <sub>DC</sub> ) |                      |                       |                        |
|----------------------------------------|----------------------|-----------------------|------------------------|
| CAP.<br>(pF)                           | 3000 V <sub>DC</sub> |                       |                        |
|                                        | ORDERING CODE        | DIAMETER<br>(mm max.) | THICKNESS<br>(mm max.) |
| 100                                    | S101#33X7RR6###R     | 8.5                   | 5.5                    |
| 120                                    | S121#33X7RR6###R     | 8.5                   | 5.5                    |
| 150                                    | S151#33X7RR6###R     | 8.5                   | 5.5                    |
| 180                                    | S181#33X7RR6###R     | 8.5                   | 5.5                    |
| 220                                    | S221#33X7RR6###R     | 8.5                   | 5.5                    |
| 270                                    | S271#33X7RR6###R     | 8.5                   | 5.5                    |
| 330                                    | S331#33X7RR6###R     | 8.5                   | 5.5                    |
| 470                                    | S471#33X7RR6###R     | 8.5                   | 5.5                    |
| 560                                    | S561#39X7RR6###R     | 10.0                  | 5.5                    |
| 680                                    | S681#39X7RR6###R     | 10.0                  | 5.5                    |
| 820                                    | S821#43X7RR6###R     | 11.0                  | 5.5                    |
| 1000                                   | S102#43X7RR6###R     | 11.0                  | 5.5                    |
| 1500                                   | S152#53X7RR6###R     | 13.0                  | 5.5                    |
| 1800                                   | S182#59X7RR63K7R     | 15.0                  | 5.5                    |
| 2200                                   | S222#69X7RR63K7R     | 17.5                  | 5.5                    |

**Notes**

- Lead diameter is 0.6 mm
- # 5<sup>th</sup> digit is capacitance tolerance code:  $\pm 5\%$  = J;  $\pm 10\%$  = K
- # 13<sup>th</sup> digit is packaging code: bulk = 3; reel = T; ammo = U
- # 14<sup>th</sup> digit is lead style code: L; J; K (J is valid for 1 kV only)
- # 15<sup>th</sup> digit is lead spacing code: 5.0 mm = 5; 6.4 mm = 6; 7.5 mm = 7; 10.0 mm = 0



| DIELECTRIC Y5V (1000 V <sub>DC</sub> / 2000 V <sub>DC</sub> ) |                      |                       |                        |                      |                       |                        |
|---------------------------------------------------------------|----------------------|-----------------------|------------------------|----------------------|-----------------------|------------------------|
| CAP.<br>(pF)                                                  | 1000 V <sub>DC</sub> |                       |                        | 2000 V <sub>DC</sub> |                       |                        |
|                                                               | ORDERING CODE        | DIAMETER<br>(mm max.) | THICKNESS<br>(mm max.) | ORDERING CODE        | DIAMETER<br>(mm max.) | THICKNESS<br>(mm max.) |
| 1000                                                          | S102Z25Y5VN6###R     | 6.5                   | 4.0                    | S102Z29Y5VP6###R     | 7.5                   | 4.5                    |
| 1500                                                          | S152Z25Y5VN6###R     | 6.5                   | 4.0                    | S152Z29Y5VP6###R     | 7.5                   | 4.5                    |
| 2200                                                          | S222Z29Y5VN6###R     | 7.5                   | 4.0                    | S222Z33Y5VP6###R     | 8.5                   | 4.5                    |
| 3300                                                          | S332Z29Y5VN6###R     | 7.5                   | 4.0                    | S332Z39Y5VP6###R     | 10.0                  | 4.5                    |
| 4700                                                          | S472Z33Y5VN6###R     | 8.5                   | 4.0                    | S472Z43Y5VP6###R     | 11.0                  | 4.5                    |
| 6800                                                          | S682Z39Y5VN6###R     | 10.0                  | 4.0                    | S682Z47Y5VP6###R     | 12.0                  | 4.5                    |
| 10 000                                                        | S103Z43Y5VN6###R     | 11.0                  | 4.0                    | S103Z59Y5VP6###R     | 15.0                  | 4.5                    |
| 15 000                                                        | S153Z53Y5VN63J7R     | 13.5                  | 4.0                    | /                    | /                     | /                      |
| 22 000                                                        | S223Z59Y5VN63J7R     | 15.0                  | 4.0                    | /                    | /                     | /                      |
| 33 000                                                        | S333Z75Y5VN83J0R     | 19.0                  | 4.0                    | /                    | /                     | /                      |

| DIELECTRIC Y5V (3000 V <sub>DC</sub> ) |                      |                       |                        |
|----------------------------------------|----------------------|-----------------------|------------------------|
| CAP.<br>(pF)                           | 3000 V <sub>DC</sub> |                       |                        |
|                                        | ORDERING CODE        | DIAMETER<br>(mm max.) | THICKNESS<br>(mm max.) |
| 1000                                   | S102Z33Y5VR6###R     | 8.5                   | 5.5                    |
| 1500                                   | S152Z33Y5VR6###R     | 8.5                   | 5.5                    |
| 2200                                   | S222Z39Y5VR6###R     | 10.0                  | 5.5                    |
| 3300                                   | S332Z43Y5VR6###R     | 11.0                  | 5.5                    |
| 4700                                   | S472Z47Y5VR6###R     | 12.0                  | 5.5                    |
| 6800                                   | S682Z59Y5VR6###R     | 15.0                  | 5.5                    |

**Notes**

- Lead diameter is 0.6 mm
- # 5<sup>th</sup> digit is capacitance tolerance code:  $\pm 5\%$  = J;  $\pm 10\%$  = K
- # 13<sup>th</sup> digit is packaging code: bulk = 3; reel = T; ammo = U
- # 14<sup>th</sup> digit is lead style code: L; J; K (J is valid for 1 kV only)
- # 15<sup>th</sup> digit is lead spacing code: 5.0 mm = 5; 6.4 mm = 6; 7.5 mm = 7; 10.0 mm = 0

| <b>DIELECTRIC X5F (1000 V<sub>DC</sub> / 2000 V<sub>DC</sub>)</b> |                      |                       |                        |                      |                       |                        |
|-------------------------------------------------------------------|----------------------|-----------------------|------------------------|----------------------|-----------------------|------------------------|
| CAP.<br>(pF)                                                      | 1000 V <sub>DC</sub> |                       |                        | 2000 V <sub>DC</sub> |                       |                        |
|                                                                   | ORDERING CODE        | DIAMETER<br>(mm max.) | THICKNESS<br>(mm max.) | ORDERING CODE        | DIAMETER<br>(mm max.) | THICKNESS<br>(mm max.) |
| 100                                                               | S101#25X5FN6###R     | 6.5                   | 4.0                    | S101#25X5FP6###R     | 6.5                   | 4.5                    |
| 120                                                               | S121#25X5FN6###R     | 6.5                   | 4.0                    | S121#25X5FP6###R     | 6.5                   | 4.5                    |
| 150                                                               | S151#25X5FN6###R     | 6.5                   | 4.0                    | S151#25X5FP6###R     | 6.5                   | 4.5                    |
| 180                                                               | S181#25X5FN6###R     | 6.5                   | 4.0                    | S181#25X5FP6###R     | 6.5                   | 4.5                    |
| 220                                                               | S221#25X5FN6###R     | 6.5                   | 4.0                    | S221#25X5FP6###R     | 6.5                   | 4.5                    |
| 270                                                               | S271#25X5FN6###R     | 6.5                   | 4.0                    | S271#29X5FP6###R     | 7.5                   | 4.5                    |
| 330                                                               | S331#25X5FN6###R     | 6.5                   | 4.0                    | S331#29X5FP6###R     | 7.5                   | 4.5                    |
| 390                                                               | S391#25X5FN6###R     | 6.5                   | 4.0                    | S391#31X5FP6###R     | 8.0                   | 4.5                    |
| 470                                                               | S471#25X5FN6###R     | 6.5                   | 4.0                    | S471#31X5FP6###R     | 8.0                   | 4.5                    |
| 560                                                               | S561#29X5FN6###R     | 7.5                   | 4.0                    | S561#33X5FP6###R     | 8.5                   | 4.5                    |
| 680                                                               | S681#29X5FN6###R     | 7.5                   | 4.0                    | S681#39X5FP6###R     | 10.0                  | 4.5                    |
| 820                                                               | S821#29X5FN6###R     | 7.5                   | 4.0                    | S821#43X5FP6###R     | 11.0                  | 4.5                    |
| 1000                                                              | S102#29X5FN6###R     | 7.5                   | 4.0                    | S102#43X5FP6###R     | 11.0                  | 4.5                    |
| 1500                                                              | S152#39X5FN6###R     | 10.0                  | 4.0                    | S152#47X5FP6###R     | 12.0                  | 4.5                    |
| 1800                                                              | S182#43X5FN6###R     | 11.0                  | 4.0                    | S182#53X5FP63K7R     | 13.5                  | 4.5                    |
| 2200                                                              | S222#43X5FN6###R     | 11.0                  | 4.0                    | S222#59X5FP63K7R     | 15.0                  | 4.5                    |
| 3300                                                              | S332#53X5FN63J7R     | 12.0                  | 4.0                    | S332#65X5FP63K7R     | 16.5                  | 4.5                    |
| 4700                                                              | S472#63X5FN63J7R     | 15.0                  | 4.0                    | /                    | /                     | /                      |

**Notes**

- Lead diameter is 0.6 mm
- # 5<sup>th</sup> digit is capacitance tolerance code:  $\pm 5\%$  = J;  $\pm 10\%$  = K
- # 13<sup>th</sup> digit is packaging code: bulk = 3; reel = T; ammo = U
- # 14<sup>th</sup> digit is lead style code: L; J; K (J is valid for 1 kV only)
- # 15<sup>th</sup> digit is lead spacing code: 5.0 mm = 5; 6.4 mm = 6; 7.5 mm = 7; 10.0 mm = 0

| <b>DIELECTRIC S3N (6000 V<sub>DC</sub>)</b> |                      |                       |                        |
|---------------------------------------------|----------------------|-----------------------|------------------------|
| CAP.<br>(pF)                                | 6000 V <sub>DC</sub> |                       |                        |
|                                             | ORDERING CODE        | DIAMETER<br>(mm max.) | THICKNESS<br>(mm max.) |
| 47                                          | S470M43S3NU83L0R     | 11.0                  | 8.0                    |
| 68                                          | S680M53S3NU83L0R     | 13.5                  | 8.0                    |
| 100                                         | S101M59S3NU83L0R     | 15.0                  | 8.0                    |
| 150                                         | S151M59S3NU83L0R     | 15.0                  | 8.0                    |

**Notes**

- Lead diameter is 0.6 mm
- # 5<sup>th</sup> digit is capacitance tolerance code:  $\pm 5\%$  = J;  $\pm 10\%$  = K
- # 13<sup>th</sup> digit is packaging code: bulk = 3; reel = T; ammo = U
- # 14<sup>th</sup> digit is lead style code: L; J; K (J is valid for 1 kV only)
- # 15<sup>th</sup> digit is lead spacing code: 5.0 mm = 5; 6.4 mm = 6; 7.5 mm = 7; 10.0 mm = 0

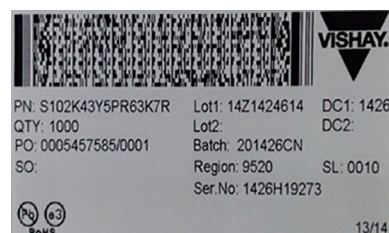
**TAPING AND PACKAGING**
**LABELLING**

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

manufacturer, D style, capacitance, tolerance, batch number, quantity of components, rated voltage, dielectric.

On special request other designations can be shown.

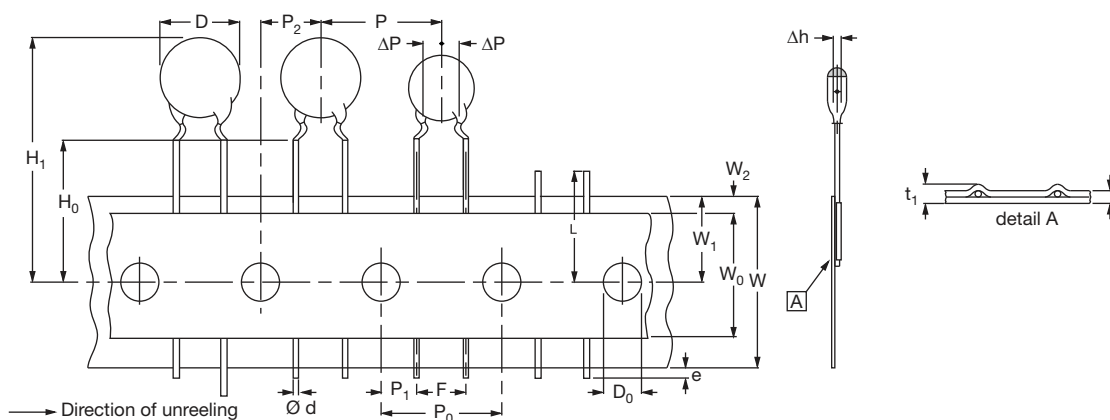
For example:



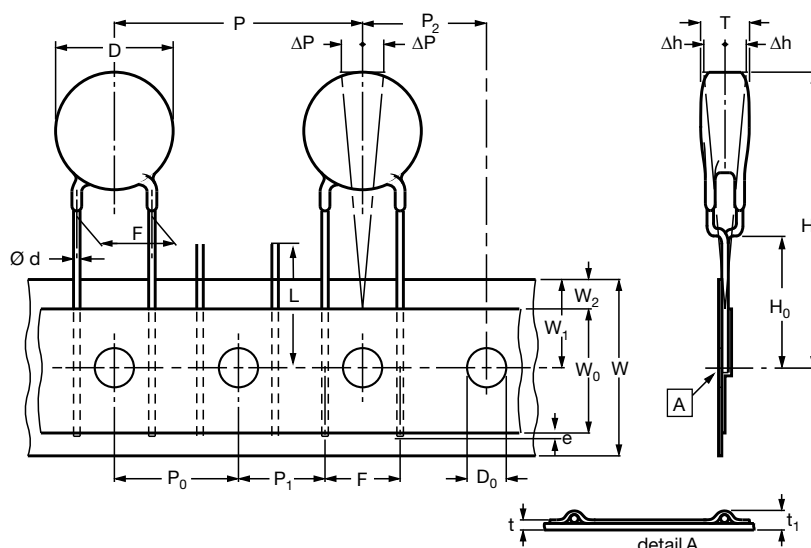
**PACKAGING QUANTITIES AND BOX DIMENSIONS**

| PACKAGING           | SIZE CODE | LEAD SPACING (mm) | RATED VOLTAGE | SMALLEST PACKAGING QUANTITY (SPQ) | BOX DIMENSIONS L x W x H (mm) |
|---------------------|-----------|-------------------|---------------|-----------------------------------|-------------------------------|
| Tape on reel        | $\leq 47$ | $\leq 6.4$        | $\leq 2000$   | 2000                              | 370 x 370 x 60                |
|                     |           |                   | 3000          | 1000                              |                               |
|                     |           | $\geq 7.5$        | all           | 1000                              |                               |
|                     | $\geq 59$ | all               | all           | 500                               |                               |
| Ammopack            | $\leq 47$ | $\leq 6.4$        | $< 2000$      | 2000                              | 335 x 240 x 50                |
|                     |           |                   | $\geq 2000$   | 1500                              |                               |
|                     |           | $\geq 7.5$        | all           | 1500                              |                               |
|                     | $> 47$    | $> 6.4$           | all           | 1000                              | 335 x 290 x 50                |
| Bulk <sup>(1)</sup> | $< 49$    | all               | $< 6000$      | 1000                              | 245 x 120 x 65                |
|                     | 49 to 75  | all               | $< 6000$      | 500                               |                               |
|                     | $> 75$    | all               | $< 6000$      | 250                               |                               |
|                     | $\leq 49$ | all               | 6000          | 500                               |                               |
|                     | $> 49$    | all               | 6000          | 250                               |                               |

**Note**
<sup>(1)</sup> SPQ contains one or a multiple of poly-bags, 1000 units per bag

**CAPACITORS ON TAPE**


| PARAMETER                                    | SYMBOL         | DIMENSIONS (mm)     |                     |                    |
|----------------------------------------------|----------------|---------------------|---------------------|--------------------|
| Body diameter                                | D              | 11.0 max.           | 11.0 max.           | 14.0 max.          |
| Lead diameter                                | d              | 0.6 ± 0.05          | 0.6 ± 0.05          | 0.6 ± 0.05         |
| Pitch of component                           | p              | 12.7 ± 1.0          | 12.7 ± 1.0          | 15.0 ± 1.0         |
| Pitch of sprocket hole                       | P <sub>0</sub> | 12.7 ± 0.3          | 12.7 ± 0.3          | 15.0 ± 0.3         |
| Distance, hole center to lead                | P <sub>1</sub> | 5.1 ± 0.7           | 3.85 ± 0.7          | 3.75 ± 0.7         |
| Distance, hole to center of component        | P <sub>2</sub> | 6.35 ± 1.3          | 6.35 ± 1.3          | 7.5 ± 1.5          |
| Lead spacing                                 | F              | 2.5 + 0.60 / - 0.40 | 5.0 + 0.60 / - 0.40 | 7.5 + 0.6 / - 0.4  |
| Average deviation across tape                | Δh             | ± 1.0 max.          | ± 1.0 max.          | ± 1.0 max.         |
| Average deviation in direction of reeling    | ΔP             | ± 1.0 max.          | ± 1.0 max.          | ± 1.0 max.         |
| Carrier tape width                           | W              | 18.0 + 1.0 / - 0.5  | 18.0 + 1.0 / - 0.5  | 18.0 + 1.0 / - 0.5 |
| Hold-down tape width                         | W <sub>0</sub> | 5.0 min.            | 5.0 min.            | 5.0 min.           |
| Position of sprocket hole                    | W <sub>1</sub> | 9.0 + 0.75 / - 0.5  | 9.0 + 0.75 / - 0.5  | 9.0 + 0.75 / - 0.5 |
| Distance of hold-down tape                   | W <sub>2</sub> | 3.0 max.            | 3.0 max.            | 3.0 max.           |
| Maximum component height                     | H <sub>1</sub> | 32 max.             | 32 max.             | 40 max.            |
| Height to seating plane (for kinked leads)   | H <sub>0</sub> | 16.0 ± 0.5          | 16.0 ± 0.5          | 16.0 ± 0.5         |
| Height to seating plane (for straight leads) | H <sub>0</sub> | 20.0 ± 0.5          | 20.0 ± 0.5          | 20.0 ± 0.5         |
| Length of cut leads                          | L              | 11.0 max.           | 11.0 max.           | 11.0 max.          |
| Length of lead protrusion                    | e              | 1.0 max.            | 1.0 max.            | 1.0 max.           |
| Diameter of sprocket hole                    | D <sub>0</sub> | 4.0 ± 0.2           | 4.0 ± 0.2           | 4.0 ± 0.2          |
| Total tape thickness                         | t              | 0.9 max.            | 0.9 max.            | 0.9 max.           |
| Maximum thickness of taping and wires        | t <sub>1</sub> | 1.5 max.            | 1.5 max.            | 1.5 max.           |



| DIMENSIONS OF TAPE            |                                              |                            |
|-------------------------------|----------------------------------------------|----------------------------|
| SYMBOL                        | PARAMETER                                    | DIMENSIONS (mm)            |
| D <sup>(1)</sup>              | Body diameter                                | 19.0 max.                  |
| d                             | Lead diameter                                | 0.6 ± 0.05                 |
| P                             | Pitch of component                           | 25.4 ± 1                   |
| P <sub>0</sub> <sup>(2)</sup> | Pitch of sprocket hole                       | 12.7 ± 0.3                 |
| P <sub>1</sub> <sup>(3)</sup> | Distance, hole center to lead                | 7.7 or 6.4 ± 1.0           |
| P <sub>2</sub> <sup>(3)</sup> | Distance, hole to center of component        | 12.7 ± 1.5                 |
| F                             | Lead spacing                                 | 10.0 or 12.5 + 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 <sub>0</sub>                | Hold-down tape width                         | 5.0 min.                   |
| W <sub>1</sub>                | Position of sprocket hole                    | 9.0 + 0.75 / - 0.5         |
| W <sub>2</sub>                | Distance of hold-down tape                   | 3.0 max.                   |
| H <sub>1</sub>                | Maximum component height                     | 40.0                       |
| H <sub>0</sub>                | Height to seating plane (for kinked leads)   | 16.0 ± 0.5                 |
| H <sub>0</sub>                | Height to seating plane (for straight leads) | 20.0 ± 0.5                 |
| L                             | Length of cut leads                          | 11.0 max.                  |
| l                             | Length of lead protrusion                    | 1.0 max.                   |
| D <sub>0</sub>                | Diameter of sprocket hole                    | 4.0 ± 0.2                  |
| t                             | Total tape thickness                         | 0.9 max.                   |

**Notes**
<sup>(1)</sup> See Ordering Information table

<sup>(2)</sup> Cumulative pitch error: ± 1 mm / 20 pitches

<sup>(3)</sup> Obliquity maximum 3°



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