

# 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

## 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, X7R, X5F: -55 °C to +125 °C

Y5P, Z5U, Z5V, 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

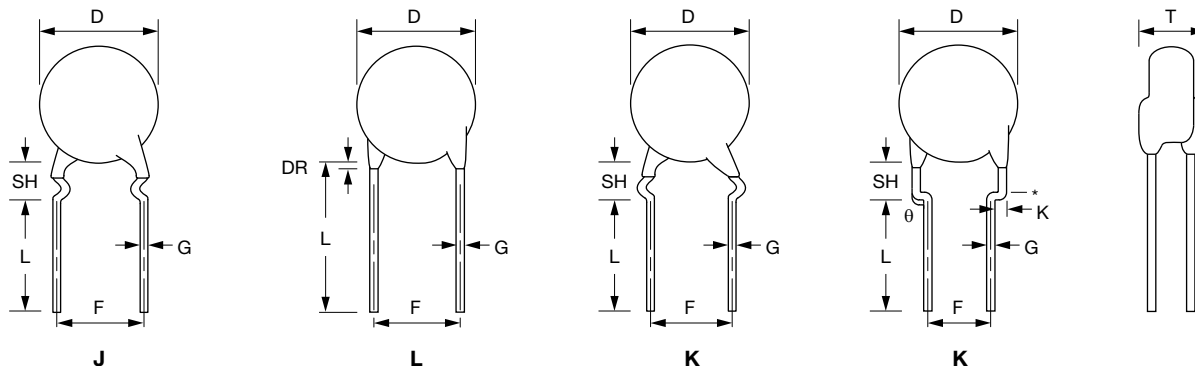
10 GΩ min.

## 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)

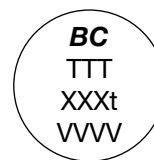
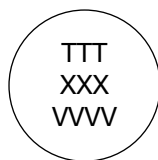
**LEAD CONFIGURATION** (in millimeters)

**Note**

- Lead-spacing 2.5 mm is available for L lead configuration only.

**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<br>$\pm 0.05$ mm<br>8 = 0.80 mm<br>$\pm 0.05$ mm | 3 = bulk<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<br>G = 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#29Y5PN7###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:  $\pm 5\%$  = 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 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#29X7RN7###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#59X7RR63K7R     | 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



| 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#29X5FN7###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

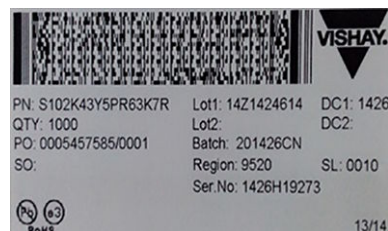
**TAPING AND PACKAGING**
**LABELLING**

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.

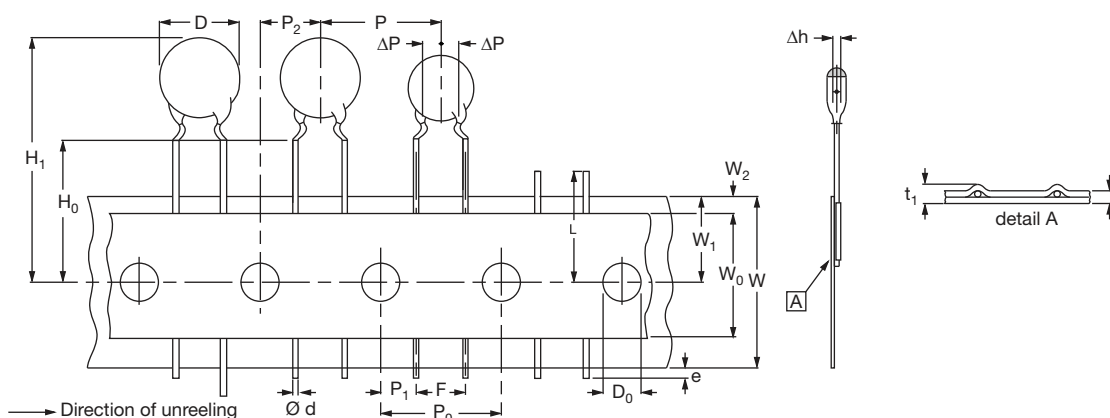
For example:



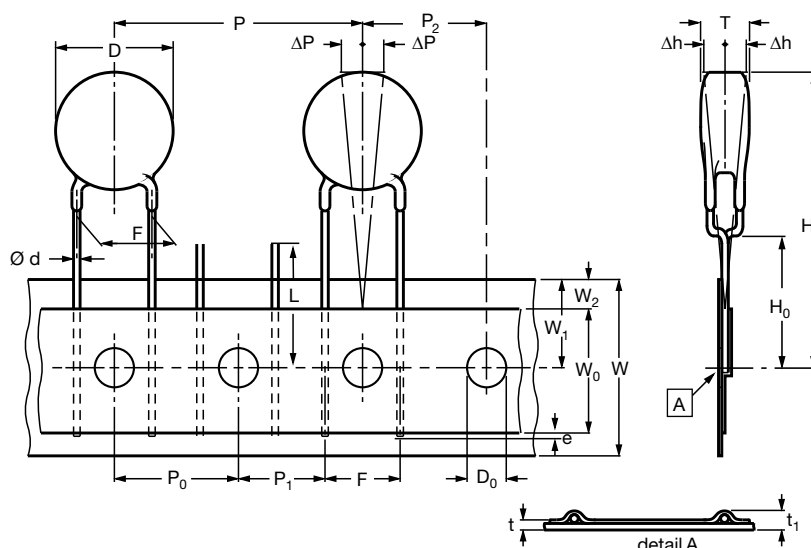
**PACKAGING QUANTITIES AND BOX DIMENSIONS**

| 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.                  |
| I                             | 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°



## Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay's knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and / or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Except as expressly indicated in writing, Vishay products are not designed for use in medical, life-saving, or life-sustaining applications or for any other application in which the failure of the Vishay product could result in personal injury or death. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.