

## Ceramic Singlelayer DC Disc Capacitors, 4 kV<sub>DC</sub> General Purpose



### FEATURES

- High capacitance in small sizes
- Low losses
- Wide range of different lead styles
- Material categorization:  
for definitions of compliance please see  
[www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)


**RoHS**  
COMPLIANT

### APPLICATIONS

- Lighting ballasts
- SMPS

### DESIGN

The capacitors consist of a ceramic disc which is silver plated on both sides. Connection leads are made of tinned copper 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 10.0 mm or 12.5 mm.

Coating is made of blue colored flame retardant epoxy resin in accordance with UL 94 V-0.

### CAPACITANCE RANGE

10 pF to 4.7 nF

### RATED VOLTAGE

4 kV<sub>DC</sub>

### DIELECTRIC STRENGTH

6000 V<sub>DC</sub>, 2 s    Component test

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

≥ 10 000 MΩ (60 s)

### TOLERANCE ON CAPACITANCE

± 10 %, ± 20 %

### DISSIPATION FACTOR

Class 1:

$C < 30 \text{ pF: } \left( \frac{100 \text{ pF}}{C} + 0.7 \right) \times 10^{-4} \text{ max. (1 MHz)}$

$C \geq 30 \text{ pF: max. 0.1 \% (1 MHz)}$

Class 2:    max. 2.5 % (1 kHz)

### QUICK REFERENCE DATA

| DESCRIPTION                | VALUE     |      |
|----------------------------|-----------|------|
| Ceramic Class              | 1         | 2    |
| Ceramic Dielectric         | N750, Y5U |      |
| Voltage (V <sub>DC</sub> ) | 4000      |      |
| Min. Capacitance (pF)      | 10        | 33   |
| Max. Capacitance (pF)      | 470       | 4700 |
| Mounting                   | Radial    |      |

### MARKING

Marking indicates, capacitance, tolerance code, and rated voltage.

### OPERATING TEMPERATURE RANGE

-40 °C to +85 °C

### TEMPERATURE CHARACTERISTICS

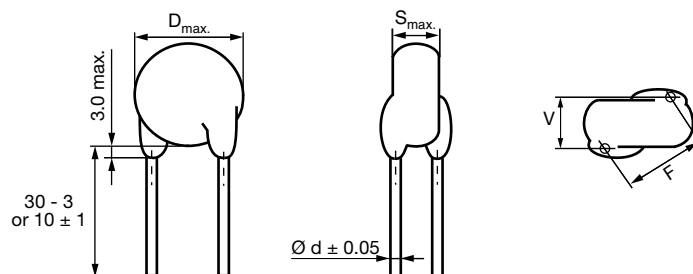
Class 1    N750 (U2J)

Class 2    Y5U

### SECTIONAL SPECIFICATIONS

Climatic category (according to EN 60068-1):  
40/085/21

## DIMENSIONS in millimeters



## ORDERING INFORMATION

| CAPACITANCE<br>(pF) | TOLERANCE<br>(%)    | BODY<br>DIAMETER<br>D <sub>max.</sub> (mm) | BODY<br>THICKNESS<br>S <sub>max.</sub> (mm) | LEAD<br>SPACING <sup>(1)</sup><br>F (mm)<br>± 1 mm | LEAD<br>DIAMETER <sup>(1)</sup><br>d (mm)<br>± 0.05 mm | WIDTH <sup>(1)</sup><br>V (mm)<br>± 0.5 mm | ORDERING CODE                                |
|---------------------|---------------------|--------------------------------------------|---------------------------------------------|----------------------------------------------------|--------------------------------------------------------|--------------------------------------------|----------------------------------------------|
|                     |                     |                                            |                                             |                                                    |                                                        |                                            | MISSING DIGITS<br>SEE ORDERING<br>CODE BELOW |
| N750 (U2J)          |                     |                                            |                                             |                                                    |                                                        |                                            |                                              |
| 10                  | ± 10                | 7.0                                        | 4.3                                         | 10.0                                               | 0.6                                                    | 1.7                                        | HDU100KBD###KR                               |
| 15                  |                     |                                            |                                             |                                                    |                                                        |                                            | HDU150KBD###KR                               |
| 22                  |                     |                                            |                                             |                                                    |                                                        |                                            | HDU220KBD###KR                               |
| 33                  |                     |                                            |                                             |                                                    |                                                        |                                            | HDU330KBD###KR                               |
| 47                  |                     |                                            |                                             |                                                    |                                                        |                                            | HDU470KBD###KR                               |
| 68                  |                     | 9.5                                        | 4.7                                         |                                                    | 0.8                                                    | 1.9                                        | HDU680KBD###KR                               |
| 82                  |                     |                                            |                                             |                                                    |                                                        |                                            | HDU820KBD###KR                               |
| 100                 |                     | HDU101KBD###KR                             |                                             |                                                    |                                                        |                                            |                                              |
| 150                 |                     | HDU151KBD###KR                             |                                             |                                                    |                                                        |                                            |                                              |
| 220                 |                     | HDU221KBD###KR                             |                                             |                                                    |                                                        |                                            |                                              |
| 330                 |                     | HDU331KBD###KR                             |                                             |                                                    |                                                        |                                            |                                              |
| 470                 |                     | HDU471KBD###KR                             |                                             |                                                    |                                                        |                                            |                                              |
| Y5U (2E3)           |                     |                                            |                                             |                                                    |                                                        |                                            |                                              |
| 33                  | ± 20 <sup>(2)</sup> | 8.0                                        | 4.5                                         | 12.5                                               | 0.6                                                    | 1.9                                        | HDE330#BD###KR                               |
| 47                  |                     |                                            | 5.0                                         |                                                    |                                                        | 2.3                                        | HDE470#BD###KR                               |
| 68                  |                     |                                            |                                             |                                                    |                                                        |                                            | HDE680#BD###KR                               |
| 100                 |                     |                                            |                                             |                                                    |                                                        |                                            | HDE101#BD###KR                               |
| 150                 |                     |                                            |                                             |                                                    |                                                        |                                            | HDE151#BD###KR                               |
| 220                 |                     |                                            |                                             |                                                    |                                                        |                                            | HDE221#BD###KR                               |
| 330                 |                     |                                            |                                             |                                                    |                                                        |                                            | 2.5                                          |
| 470                 |                     |                                            |                                             |                                                    |                                                        | HDE471#BD###KR                             |                                              |
| 680                 |                     |                                            |                                             |                                                    |                                                        | HDE681#BD###KR                             |                                              |
| 1000                |                     | 9.0                                        | 0.8                                         |                                                    | 2.7                                                    | HDE102#BD###KR                             |                                              |
| 1500                |                     |                                            |                                             |                                                    |                                                        | HDE152#BD###KR                             |                                              |
| 2200                |                     |                                            |                                             |                                                    |                                                        | HDE222#BD###KR                             |                                              |
| 3300                |                     |                                            |                                             |                                                    |                                                        | HDE332#BD###KR                             |                                              |
| 4700                |                     |                                            |                                             |                                                    |                                                        | HDE472#BD###KR                             |                                              |

### Notes

<sup>(1)</sup> Standard lead configuration, other lead spacing and diameter available on request

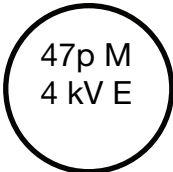
<sup>(2)</sup> ± 10 % available on request



## ORDERING CODE

|         |                                            |                       |                              |              |                    |               |                |
|---------|--------------------------------------------|-----------------------|------------------------------|--------------|--------------------|---------------|----------------|
| #       | 7 <sup>th</sup> digit                      | Capacitance tolerance | $\pm 10\% = K, \pm 20\% = M$ |              |                    |               |                |
| ###     | 10 <sup>th</sup> to 12 <sup>th</sup> digit | Lead configuration    | see "General Information"    |              |                    |               |                |
| Example | HDE                                        | 100                   | M                            | BD           | EF0                | K             | R              |
|         | Series                                     | Capacitance value     | Tolerance code               | Voltage code | Lead configuration | Internal code | RoHS compliant |

## MARKING

|                                                                                   |                                                                                    |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
|  |  |
| HDU 10 pF to 100 pF<br>HDE 33 pF to 1.5 nF                                        | HDU 150 pF to 470 pF<br>HDE 2.2 nF to 4.7 nF                                       |

## RELATED DOCUMENTS

|                     |                                                                        |
|---------------------|------------------------------------------------------------------------|
| General Information | <a href="http://www.vishay.com/doc?22001">www.vishay.com/doc?22001</a> |
|---------------------|------------------------------------------------------------------------|



## 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.

## Material Category Policy

**Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as RoHS-Compliant fulfill the definitions and restrictions defined under Directive 2011/65/EU of The European Parliament and of the Council of June 8, 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (EEE) - recast, unless otherwise specified as non-compliant.**

**Please note that some Vishay documentation may still make reference to RoHS Directive 2002/95/EC. We confirm that all the products identified as being compliant to Directive 2002/95/EC conform to Directive 2011/65/EU.**

**Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as Halogen-Free follow Halogen-Free requirements as per JEDEC JS709A standards. Please note that some Vishay documentation may still make reference to the IEC 61249-2-21 definition. We confirm that all the products identified as being compliant to IEC 61249-2-21 conform to JEDEC JS709A standards.**