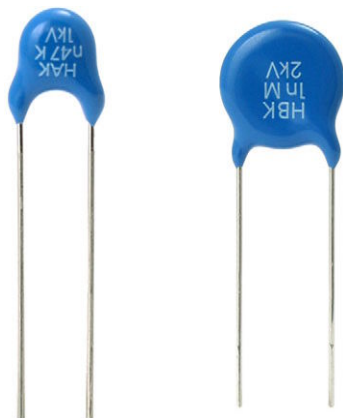


## Ceramic Singlelayer DC Disc Capacitors, Class 2, Low Loss (0.5 %), 1 kV<sub>DC</sub>, 2 kV<sub>DC</sub>, 3 kV<sub>DC</sub>



### FEATURES

- Low losses
- High stability
- Low DF minimizes self heating at HF
- Ideal for switching to 100 kHz
- Material categorization:  
for definitions of compliance please see  
[www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)


**RoHS**  
COMPLIANT

### APPLICATIONS

In electronic circuits where low losses and high capacitance per volume are essential, for example:

- HF ballast
- Switching power supplies
- Snubber and HV circuits

### 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 7.5 mm or 10.0 mm.

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

### CAPACITANCE RANGE

100 pF to 4700 pF

### RATED DC VOLTAGE

- 1 kV<sub>DC</sub>
- 2 kV<sub>DC</sub>
- 3 kV<sub>DC</sub>

### DIELECTRIC STRENGTH

- 2000 V<sub>AC</sub>, 50 Hz, 2 s Component test
- 3000 V<sub>AC</sub>, 50 Hz, 2 s Component test
- 4000 V<sub>AC</sub>, 50 Hz, 2 s Component test

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

≥ 10 000 MΩ (60 s)

### TOLERANCE ON CAPACITANCE

± 20 % (± 10 % available on request)

### DISSIPATION FACTOR

Max. 0.5 % (1 kHz)

### QUICK REFERENCE DATA

DESCRIPTION	VALUE		
Ceramic Class	2		
Ceramic Dielectric	Y5S		
Voltage (V <sub>DC</sub> )	1000	2000	3000
Min. Capacitance (pF)	100	100	100
Max. Capacitance (pF)	4700	4700	3300
Mounting	Radial		

### OPERATING TEMPERATURE RANGE

-40 °C to +125 °C <sup>(1)</sup>

#### Note

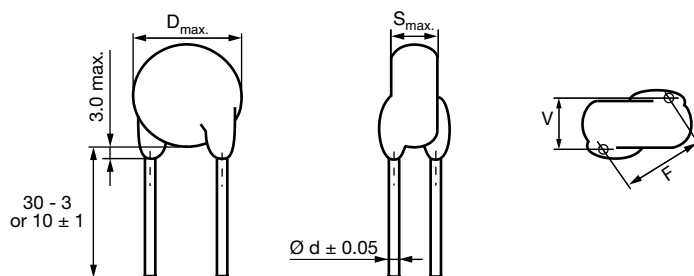
<sup>(1)</sup> For explanation about the difference of operating temperature range and temperature characteristic of capacitance please see  
[www.vishay.com/doc?48299](http://www.vishay.com/doc?48299)

### TEMPERATURE CHARACTERISTICS

Y5S

### SECTIONAL SPECIFICATIONS

Climatic category (according to EN 60068-1):  
40 / 125 / 21

**DIMENSIONS** in millimeters**ORDERING INFORMATION**

CAPACITANCE (pF)	TOLERANCE (%)	BODY DIAMETER D <sub>max.</sub> (mm)	BODY THICKNESS S <sub>max.</sub> (mm)	LEAD SPACING <sup>(1)</sup> F (mm) ± 1 mm	LEAD DIAMETER <sup>(1)</sup> d (mm) ± 0.05 mm	WIDTH <sup>(1)</sup> V (mm) ± 0.5 mm	ORDERING CODE
							MISSING DIGITS SEE ORDERING CODE BELOW
1 kV <sub>DC</sub>							
100	± 20 <sup>(2)</sup>	7.0	5.0	7.5	0.6	1.1	HAK101#BA###KR
150							HAK151#BA###KR
220							HAK221#BA###KR
270							HAK271#BA###KR
330							HAK331#BA###KR
390							HAK391#BA###KR
470							HAK471#BA###KR
560		8.0					HAK561#BA###KR
680							HAK681#BA###KR
820							HAK821#BA###KR
1000		9.0					HAK102#BA###KR
1200							HAK122#BA###KR
1500							HAK152#BA###KR
1800		12.0					HAK182#BA###KR
2200							HAK222#BA###KR
2700							HAK272#BA###KR
3300		14.5					HAK332#BA###KR
3900							HAK392#BA###KR
4700	HAK472#BA###KR						
2 kV <sub>DC</sub>							
100	± 20 <sup>(2)</sup>	7.0	5.0	7.5	0.6	1.6	HBK101#BB###KR
150							HBK151#BB###KR
220							HBK221#BB###KR
270							HBK271#BB###KR
330							HBK331#BB###KR
390							HBK391#BB###KR
470							HBK471#BB###KR
560		8.0					HBK561#BB###KR
680							HBK681#BB###KR
820							HBK821#BB###KR
1000		10.0					HBK102#BB###KR
1200							HBK122#BB###KR
1500							HBK152#BB###KR
1800		12.5					HBK182#BB###KR
2200							HBK222#BB###KR
2700							HBK272#BB###KR
3300		16.5					HBK332#BB###KR
3900							HBK392#BB###KR
4700	HBK472#BB###KR						



## ORDERING INFORMATION

CAPACITANCE (pF)	TOLERANCE (%)	BODY DIAMETER D <sub>max.</sub> (mm)	BODY THICKNESS S <sub>max.</sub> (mm)	LEAD SPACING <sup>(1)</sup> F (mm) ± 1 mm	LEAD DIAMETER <sup>(1)</sup> d (mm) ± 0.05 mm	WIDTH <sup>(1)</sup> V (mm) ± 0.5 mm	ORDERING CODE
							MISSING DIGITS SEE ORDERING CODE BELOW
3 kV <sub>DC</sub>							
100	± 20 <sup>(2)</sup>	7.0	5.0	10.0	0.6	1.6	HCK101#BC###KR
150							HCK151#BC###KR
220							HCK221#BC###KR
270							HCK271#BC###KR
330		8.0					HCK331#BC###KR
390							HCK391#BC###KR
470		9.0					HCK471#BC###KR
560							HCK561#BC###KR
680		10.0					HCK681#BC###KR
820							HCK821#BC###KR
1000		11.0					HCK102#BC###KR
1200							HCK122#BC###KR
1500		12.0					HCK152#BC###KR
1800							HCK182#BC###KR
2200		13.0					HCK222#BC###KR
2700							HCK272#BC###KR
3300		15.0					HCK332#BC###KR



## Notes

<sup>(1)</sup> Standard lead configuration, other lead spacing and diameter available on request<sup>(2)</sup> ± 10 % available on request

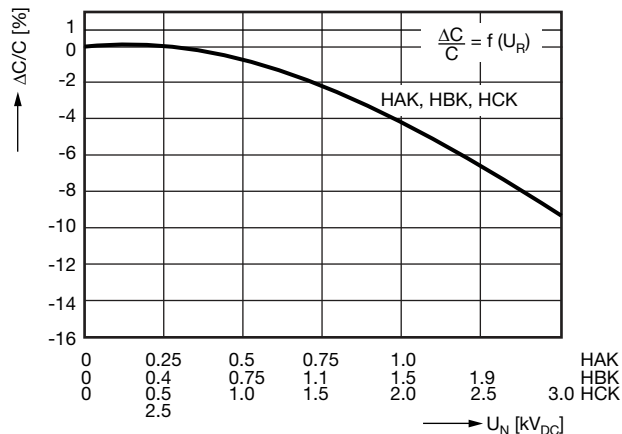
## ORDERING CODE

#	7 <sup>th</sup> digit	Capacitance tolerance	± 10 % = K, ± 20 % = M				
###	10 <sup>th</sup> to 12 <sup>th</sup> digit	Lead configuration	See "General Information" <a href="http://www.vishay.com/doc?22001">www.vishay.com/doc?22001</a>				
<b>Example</b>	<b>HCK</b>	<b>02</b>	<b>M</b>	<b>BC</b>	<b>DF0</b>	<b>K</b>	<b>R</b>
	Series	Capacitance value	Tolerance code	Voltage code	Lead configuration	Internal code	RoHS compliant

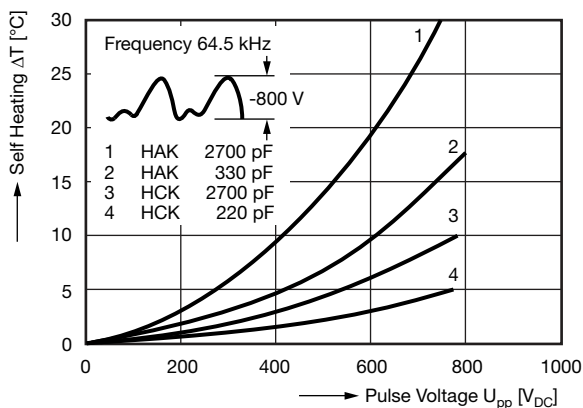
## MARKING

 D <sub>max.</sub> ≤ 10 mm	 D <sub>max.</sub> ≥ 11 mm
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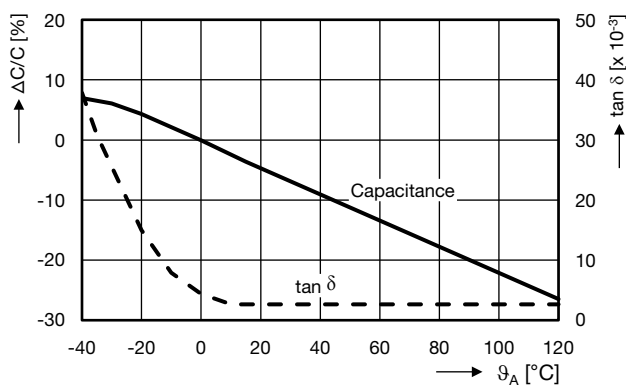
## CAPACITANCE CHANGE VS. VOLTAGE (Typical)



## SELF HEATING (Typical)



## CAPACITANCE CHANGE AND DISSIPATION FACTOR VS. TEMPERATURE (Typical)



**STORAGE**

The capacitors must not be stored in a corrosive atmosphere, where sulphide or chloride gas, acid, alkali or salt are present. Exposure of the components to moisture, should be avoided. The solderability of the leads is not affected by storage of up to 24 months (temperature +10 °C to +35 °C, relative humidity up to 60 %). Class 2 ceramic dielectric capacitors are also subject to aging, see [www.vishay.com/doc?22001](http://www.vishay.com/doc?22001).

**SOLDERING**

<b>SOLDERING SPECIFICATIONS</b>		
Soldering test for capacitors with wire leads: (according to IEC 60068-2-20, solder bath method)		
	<b>SOLDERABILITY</b>	<b>RESISTANCE TO SOLDERING HEAT</b>
Soldering temperature	235 °C ± 5 °C	260 °C ± 5 °C
Soldering duration	2 s ± 0.5 s	10 s ± 1 s
Distance from component body	≥ 2 mm	≥ 5 mm

**SOLDERING RECOMMENDATIONS**

Soldering of the component should be achieved using a Sn60/40 type or a silver-bearing Sn62/36/2Ag type solder. Ceramic capacitors are very sensitive to rapid changes in temperature (thermal shock) therefore the solder heat resistance specification (see Soldering Specifications table) should not be exceeded. Subjecting the capacitor to excessive heating may result in thermal shocks that can crack the ceramic body. Similarly, excessive heating can cause the internal solder junction to melt.

**CLEANING**

The components should be cleaned immediately following the soldering operation with vapor degreasers.

**SOLVENT RESISTANCE**

The coating and marking of the capacitors are resistant to the following test method: IEC 60068-2-45 (method XA).

**MOUNTING**

If a defined product stop is required for mounting on a PCB, a mechanically formed product stop (kinked or inline wire) or a mounting tool should be used.

We do not recommend modifying the lead terminals, e.g. bending or cropping. This action could break the coating or crack the ceramic insert. If however, the lead must be modified in any way, we recommend support of the lead with a clamping fixture next to the coating.

**OPERATING VOLTAGE**

In case the voltage is applied to the circuit, starting as well as stopping, may generate irregular voltage for a transit period because of resonance or switching. Be sure to use a capacitor with a rated voltage range that includes these irregular voltages.

**OPERATING TEMPERATURE AND SELF-GENERATED HEAT**

Keep the surface temperature of a capacitor below the upper limit of its rated operating temperature range. Be sure to take into account the heat generated by the capacitor itself. When the capacitor is used in a high frequency, pulse, or similar application, it may have self-generated heat due to dielectric dissipation.

Temperature increase due to self-generated heating should not exceed 20 °C while operating at an atmosphere temperature of 25 °C.

When measuring, the surface temperature, make sure that the capacitor is not affected by radiant, conductive and convective heat by its surroundings. Excessive heat may lead to thermo-mechanical deterioration of the capacitor's characteristics and reliability.

<b>RELATED DOCUMENTS</b>	
General Information	<a href="http://www.vishay.com/doc?22001">www.vishay.com/doc?22001</a>



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