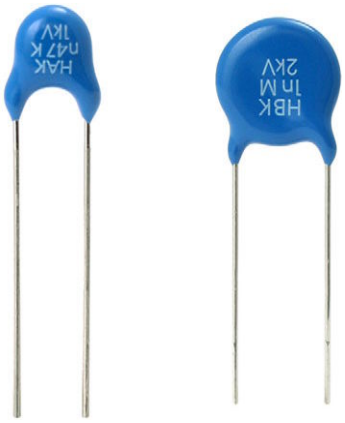
Ceramic Singlelayer DC Disc Capacitors, Class 2, Low Loss (0.5 %), 1 kV_{DC}, 2 kV_{DC}, 3 kV_{DC}



QUICK REFERENCE DATA			
DESCRIPTION	VALUE		
Ceramic Class	2		
Ceramic Dielectric	Y5S		
Voltage (V_{DC})	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 (1)

Note

(1) For explanation about the difference of operating temperature range and temperature characteristic of capacitance please see www.vishay.com/doc?48299

TEMPERATURE CHARACTERISTICS

Y5S

SECTIONAL SPECIFICATIONS

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

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

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_{DC}
- 2 kV_{DC}
- 3 kV_{DC}

DIELECTRIC STRENGTH

- 2000 V_{AC}, 50 Hz, 2 s Component test
- 3000 V_{AC}, 50 Hz, 2 s Component test
- 4000 V_{AC}, 50 Hz, 2 s Component test

INSULATION RESISTANCE AT 500 V_{DC}

≥ 10 000 MΩ (60 s)

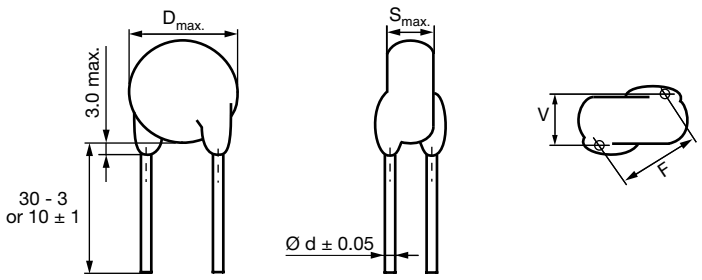
TOLERANCE ON CAPACITANCE

± 20 % (± 10 % available on request)

DISSIPATION FACTOR

Max. 0.5 % (1 kHz)

DIMENSIONS in millimeters



ORDERING INFORMATION

CAPACITANCE (pF)	TOLERANCE (%)	BODY DIAMETER $D_{max.}$ (mm)	BODY THICKNESS $S_{max.}$ (mm)	LEAD SPACING (1) F (mm) ± 1 mm	LEAD DIAMETER (1) d (mm) ± 0.05 mm	WIDTH (1) V (mm) ± 0.5 mm	ORDERING CODE MISSING DIGITS SEE ORDERING CODE BELOW
1 kV_{DC}							
100	± 20 (2)	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		9.0					HAK821#BA###KR
1000							HAK102#BA###KR
1200		10.0					HAK122#BA###KR
1500		11.0					HAK152#BA###KR
1800		12.0					HAK182#BA###KR
2200							HAK222#BA###KR
2700		14.5					HAK272#BA###KR
3300							HAK332#BA###KR
3900		15.5					HAK392#BA###KR
4700		16.5					HAK472#BA###KR
2 kV_{DC}							
100	± 20 (2)	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		8.0					HBK391#BB###KR
470							HBK471#BB###KR
560		9.0					HBK561#BB###KR
680							HBK681#BB###KR
820		10.0					HBK821#BB###KR
1000		11.0					HBK102#BB###KR
1200							HBK122#BB###KR
1500		12.5					HBK152#BB###KR
1800		14.5					HBK182#BB###KR
2200							HBK222#BB###KR
2700		16.5					HBK272#BB###KR
3300		17.5					HBK332#BB###KR
3900		19.5					HBK392#BB###KR
4700		25.5					HBK472#BB###KR

ORDERING INFORMATION

CAPACITANCE (pF)	TOLERANCE (%)	BODY DIAMETER $D_{max.}$ (mm)	BODY THICKNESS $S_{max.}$ (mm)	LEAD SPACING (1) F (mm) ± 1 mm	LEAD DIAMETER (1) d (mm) ± 0.05 mm	WIDTH (1) V (mm) ± 0.5 mm	ORDERING CODE MISSING DIGITS SEE ORDERING CODE BELOW
3 kV_{DC}							
100	± 20 (2)	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		9.0					HCK391#BC###KR
470							HCK471#BC###KR
560		10.0					HCK561#BC###KR
680							HCK681#BC###KR
820		11.0					HCK821#BC###KR
1000		12.0					HCK102#BC###KR
1200		13.0					HCK122#BC###KR
1500		15.0					HCK152#BC###KR
1800		16.0					HCK182#BC###KR
2200		17.0					HCK222#BC###KR
2700		18.0					HCK272#BC###KR
3300		20.0					HCK332#BC###KR

Notes

(1) Standard lead configuration, other lead spacing and diameter available on request

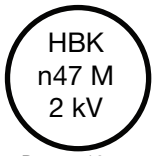
(2) ± 10 % available on request

ORDERING CODE

#	7th digit	Capacitance tolerance	± 10 % = K, ± 20 % = M
###	10th to 12th digit	Lead configuration	See “General Information” www.vishay.com/doc?22001

Example	HCK	02	M	BC	DF0	K	R
	Series	Capacitance value	Tolerance code	Voltage code	Lead configuration	Internal code	RoHS compliant

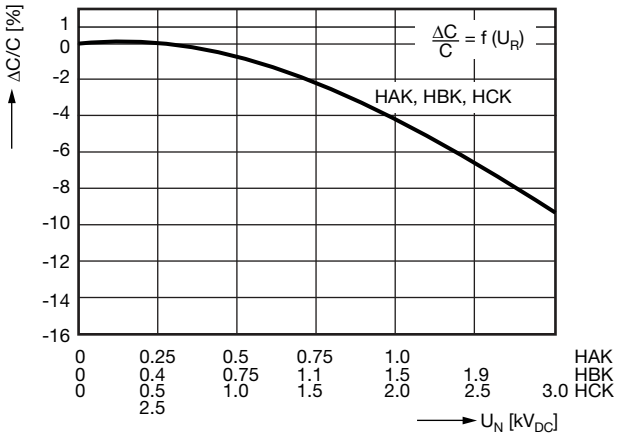
MARKING



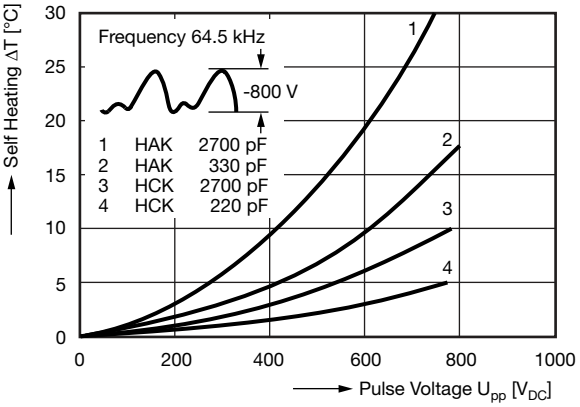
$D_{max.} \leq 10$ mm

$D_{max.} \geq 11$ mm

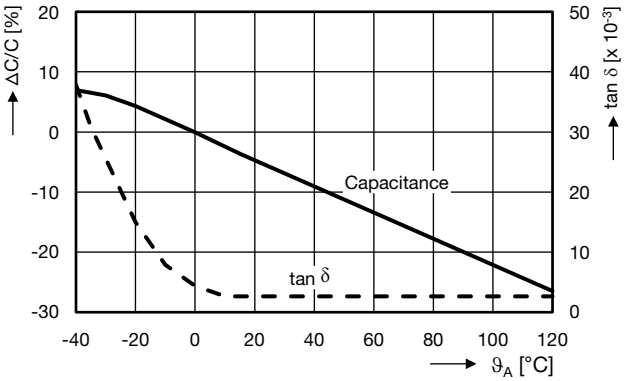
CAPACITANCE CHANGE VS. VOLTAGE (Typical)



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.

SOLDERING

SOLDERING SPECIFICATIONS		
Soldering test for capacitors with wire leads: (according to IEC 60068-2-20, solder bath method)		
	SOLDERABILITY	RESISTANCE TO SOLDERING HEAT
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.

RELATED DOCUMENTS	
General Information	www.vishay.com/doc?22001

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