Ceramic Singlelayer DC Disc Capacitors, 2 kV_{DC} 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

Pb e3 RoHS COMPLIANT

APPLICATIONS

- Lighting ballasts
- Switching power supplies
- Bypassing, coupling and decoupling
- DC blocking

QUICK REFERENCE DATA		
DESCRIPTION	VALUE	
Ceramic Class	1	2
Ceramic Dielectric	N750, Y5T, Y5U, Y5V	
Voltage (V_{DC})	2000	
Min. Capacitance (pF)	10	56
Max. Capacitance (pF)	470	22 000
Mounting	Radial	

OPERATING TEMPERATURE RANGE

-40 °C to +85 °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

Class 1 N750 (U2J)

Class 2 Y5T, Y5U, Y5V

SECTIONAL SPECIFICATIONS

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

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.

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

CAPACITANCE RANGE

10 pF to 22 nF

RATED VOLTAGE

2 kV_{DC}

DIELECTRIC STRENGTH

3000 V_{DC}, 2 s Component test

INSULATION RESISTANCE AT 500 V_{DC}

≥ 10 000 MΩ (60 s)

TOLERANCE ON CAPACITANCE

± 10 %, ± 20 %, - 20 % / + 50 %

DISSIPATION FACTOR

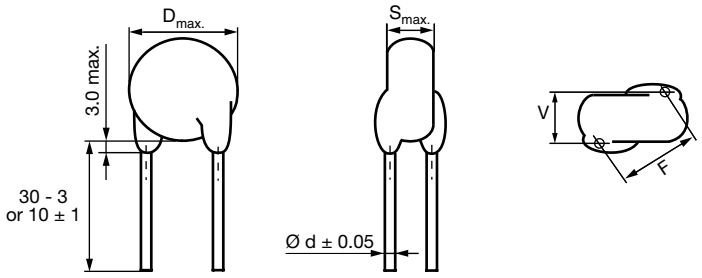
Class 1:

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

C ≥ 30 pF: max. 0.1 % (1 MHz)

Class 2: max. 2.5 % (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
N750 (U2J)							
10	± 10	7.0	4.0	7.5	0.6	1.2	HBU100KBB###KR
15							HBU150KBB###KR
22							HBU220KBB###KR
33						1.3	HBU330KBB###KR
47						1.4	HBU470KBB###KR
68		8.0					HBU680KBB###KR
82			4.2				HBU820KBB###KR
100		10.0					HBU101KBB###KR
150							HBU151KBB###KR
220		12.0					HBU221KBB###KR
330		15.0					HBU331KBB###KR
470		17.0					HBU471KBB###KR
Y5T (2D3)							
56	± 10, ± 20	7.0	3.0	7.5	0.6	1.4	HBZ560#BB###KR
68							HBZ680#BB###KR
82							HBZ820#BB###KR
100							HBZ101#BB###KR
150							HBZ151#BB###KR
220							HBZ221#BB###KR
330							HBZ331#BB###KR
470							HBZ471#BB###KR
680		9.0					HBZ681#BB###KR
1000							HBZ102#BB###KR
1500		11.0					HBZ152#BB###KR
2200		13.0					HBZ222#BB###KR
3300		15.0					HBZ332#BB###KR
4700		17.0					HBZ472#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
Y5U (2E3)							
680	± 20	7.0	3.0	7.5	0.6	1.4	HBE681MBB###KR
1000							HBE102MBB###KR
1500		9.0					HBE152MBB###KR
2200							HBE222MBB###KR
3300		11.0					HBE332MBB###KR
4700		13.0					HBE472MBB###KR
6800		15.0					HBE682MBB###KR
10 000		17.0					HBE103MBB###KR
Y5V (2F3)							
1500	- 20 / + 50 [2]	7.0	3.0	7.5	0.6	1.2	HBX152#BB###KR
2200		9.0					HBX222#BB###KR
3300							HBX332#BB###KR
4700		11.0					HBX472#BB###KR
6800							HBX682#BB###KR
10 000		15.0					HBX103#BB###KR
15 000		17.0					HBX153#BB###KR
22 000		20.0					HBX223#BB###KR

Notes

[1] Standard lead configuration, other lead spacing and diameter available on request

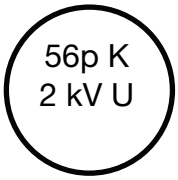
[2] ± 20 % available on request

ORDERING CODE

#	7th digit	Capacitance tolerance	± 10 % = K, ± 20 % = M, - 20 % / + 50 % = S
###	10th to 12th digit	Lead configuration	See “General Information” www.vishay.com/doc?22001

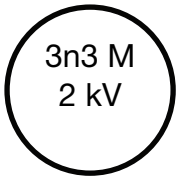
Example	HBX	223	S	BB	CRU	K	R
	Series	Capacitance value	Tolerance code	Voltage code	Lead configuration	Internal code	RoHS compliant

MARKING



HBU 10 pF to 220 pF
HBZ 56 pF to 2.2 nF
HBE 680 pF to 4.7 nF

HBU 330 pF to 470 pF
HBZ 3.3 nF to 4.7 nF
HBE 6.8 nF to 10 nF



HBX 1.5 nF to 4.7 nF

HBX 6.8 nF to 22 nF

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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