High Voltage Ceramic Singlelayer DC Disc Capacitors, Class 2, Low Loss (0.5 %), 15 kV_{DC}

QUICK REFERENCE DATA	
DESCRIPTION	**VALUE**
Ceramic Class	2
Ceramic Dielectric	Y5T
Voltage (V_{DC})	15 000
Min. Capacitance (pF)	100
Max. Capacitance (pF)	1500
Mounting	Radial

MARKING

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

OPERATING TEMPERATURE RANGE

-40 °C to +125 °C

TEMPERATURE CHARACTERISTICS

Y5T

SECTIONAL SPECIFICATIONS

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

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

RoHS COMPLIANT

APPLICATIONS

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

- SMPS
- DC and pulse high voltage
- X-ray and laser equipment

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 0.8 mm.

The capacitors may be supplied with straight or kinked leads having a lead spacing of 12.5 mm.

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

CAPACITANCE RANGE

100 pF to 1.5 nF

RATED VOLTAGE

15 kV_{DC}

DIELECTRIC STRENGTH

22 500 V_{DC}, 2 s Component test

INSULATION RESISTANCE AT 500 V_{DC}

≥ 100 000 MΩ (60 s)

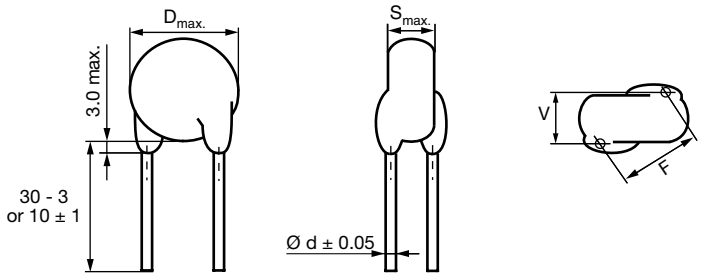
TOLERANCE ON CAPACITANCE

± 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
100	± 20 (2)	8.0	8.0	12.5	0.8	5.0	HIK101#BJ###KR
120		9.0					HIK121#BJ###KR
150							HIK151#BJ###KR
180		10.0				5.2	HIK181#BJ###KR
220							HIK221#BJ###KR
270		11.0					HIK271#BJ###KR
330		11.5					HIK331#BJ###KR
390		13.0	8.4				HIK391#BJ###KR
470		15.0				5.4	HIK471#BJ###KR
560							HIK561#BJ###KR
680		16.0					HIK681#BJ###KR
820		18.5				5.6	HIK821#BJ###KR
1000		20.0					HIK102#BJ###KR
1200		24.0				5.8	HIK122#BJ###KR
1500							HIK152#BJ###KR

Notes

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

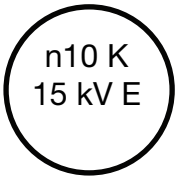
(2) ± 10 % available on request

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	HIK	152	M	BJ	EH0	K	R
	Series	Capacitance value	Tolerance code	Voltage code	Lead configuration	Internal code	RoHS-compliant

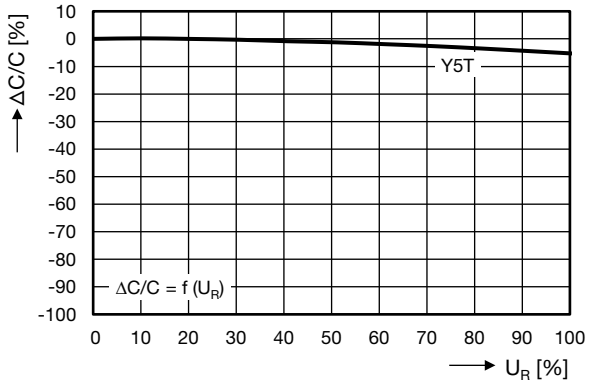
MARKING



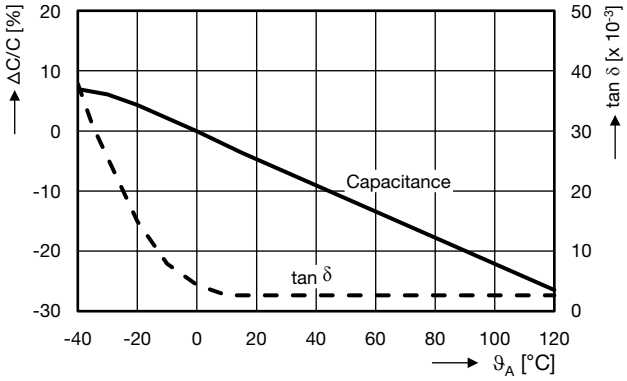
HIK 100 pF to 270 pF

HIK 330 pF to 1.5 nF

CAPACITANCE CHANGE VS. VOLTAGE (Typical)



CAPACITANCE CHANGE AND DISSIPATION FACTOR VS. TEMPERATURE (Typical)



1. QUALIFICATION

1.1 BASICS

All components are tested according to the related testing plan, which you find in series datasheet. We do not guarantee if any limit is exceeded. Internal test procedures are more severe than noted in the table “Performance” because of aging and storage effects of the components.

1.2 LIMITS OF APPLICATION

Please take care whilst designing our parts into one of these applications, which require highest reliability and possible errors might harm life, body or property of a third party.

- Transportation (aerospace, aircraft, train, ship, submarine, etc.)
- Medical equipment
- Critical control equipment (power plant, traffic signals, disaster prevention)
- Other application requiring similar reliability characteristics

2. STORAGE

2.1 ORIGINAL PACKAGING

Storing in the sealed original packages is preferred.

2.2 STORING CONDITIONS

Epoxy coating does not protect perfectly from all environmental conditions. Some materials can penetrate the epoxy and harm the performance of the parts. Therefore it is not recommended to use or store the parts in corrosive or humid atmosphere.

Optimal storing conditions should not exceed +10 °C to +35 °C and relative humidity up to 60 %.

3. ASSEMBLY

3.1 WIRE FORMING

If wire forming is needed, excessive mechanical force to the component body must be avoided as it might cause cracks in the ceramic element.

Do not crack coating extension of the epoxy layer, when applying force onto the wire.

3.2 SOLDERING

For best performance it is recommended to dry the components at 125 °C for 2 hours before assembly.

Do not exceed resistance to soldering heat specification of the component. Subjecting this product to excessive heating could melt the internal junction solder and may result in thermal shocks that can crack the ceramic element.

Manual Soldering / Rework

Set the soldering iron (50 W max.) to less than 300 °C and solder the wires within 4 seconds onto the PCB. Exceeding that recommendations might reduce the electrical performance of the component.

Wave Soldering

Most common way to assemble these kind of components is carried out in 4 steps:

1. Increasing temperature to 120 °C within about 20 s
2. Preheating at 120 °C for about 60 s
3. Soldering at 260 °C in less than 10 s
4. Gradual air cooling in constant air flow

Reflow Soldering

It is not recommended to use reflow soldering with these components.

3.3 MOLDING AND COATING

Molding and / or applying another coating material might harm the performance of the components. Therefore it is recommended to test the electrical characteristics of the molded / coated part in advance.

Typical error is a reduced withstand voltage because of an inadequate solvent in the molding material, which penetrates the epoxy coating (please see recommendations for cleaning and drying in section 4.1 to 4.3). A similar result can be caused by an inadequate coating material, which might pull the original epoxy off the ceramic element.

4. CLEANING AND DRYING

4.1 CLEANING AGENTS

Cleaning agents might have an influence to the performance of the components after washing and after unsuitable drying. The following agents have been tested and classified:

Recommended

- DI water
- Isopropanol
- Ethanol
- Ehtyl alcohol
- ...

Not Recommended

- Acetone
- ...

4.2 ULTRASONIC

Settings for ultrasonic cleaning

Rinse bath capacity: output of 20 Watts per liter or less

Rinsing time: 300 s max.

Do not vibrate the PCB / PWB directly.

Excessive ultrasonic cleaning may lead to permanent destruction of the component.

4.3 DRYING

In case of cleaning the assembled PCB with cleaning agents a proper drying is recommended. It is recommended to properly insulate the assembled PCB (see section 5.2) after drying.

5. TESTING AND OPERATION

5.1 SHORT CIRCUIT

Avoid repetitive zero-ohm-short circuits because they might harm the components core construction, such as arcs between lead wires because of inadequate insulation material (e.g air).

5.2 INSULATION

During operation, components should be surrounded by adequate insulating material (silicone oil, epoxy, or molding material). Voltage breakdowns or leakage current through this material (between lead wires or to ground) is not acceptable. It is recommended to properly clean and dry the assembled PCB (see section 4.1 to 4.3) before enclosing in insulating material.

5.3 APPLIED VOLTAGE

When using DC-rated components in AC applications (also ripple) the peak-to-peak voltage should not exceed the nominal DC-rating of the component.

6. CAUTION

6.1 OPERATING VOLTAGE AND FREQUENCY CHARACTERISTIC

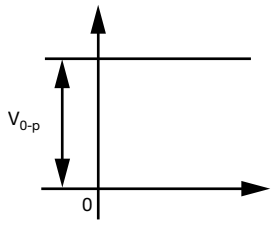
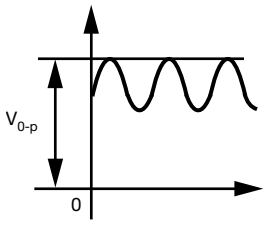
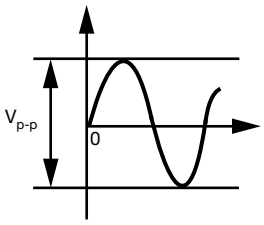
When sinusoidal or ripple voltage applied to DC ceramic disc capacitors, be sure to maintain the peak-to-peak value or the peak value of the sum of both AC + DC within the rated voltage.

When start or stop applying the voltage, resonance may generate irregular voltage.

When rectangular or pulse wave voltage is applied to DC ceramic disc capacitors, the self-heating generated by the capacitor is higher than the sinusoidal application with the same frequency. The allowable voltage rating for the rectangular or pulse wave corresponds approximately with the allowable voltage of a sinusoidal wave with the double fundamental frequency.

The allowable voltage varies, depending on the voltage and the waveform.

Diagrams of the limiting values are available for each capacitor series on request.

VOLTAGE	DC	DC + AC	AC
Waveform figure			

6.2 OPERATING TEMPERATURE AND SELF-GENERATED HEAT

The surface temperature of the capacitors must not exceed the upper limit of its rated operating temperature.

During operation in a high frequency circuit or a pulse signal circuit, the capacitor itself generate heat due to dielectric losses.

Applied voltage should be the load such as self-generated heat is within 20 °C on the condition of environmental temperature 25 °C.

Note, that excessive heat may lead to deterioration of the capacitor's characteristics.

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

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