

## Ceramic Singlelayer DC Disc Capacitors, 500 V<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

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

### 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.

The capacitors may be supplied with straight or kinked leads having a lead spacing of 5.0 mm or 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 10 nF

### RATED VOLTAGE

500 V<sub>DC</sub>

### DIELECTRIC STRENGTH

1250 V<sub>DC</sub>, 2 s    Component test

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

≥ 5000 MΩ (60 s)

### TOLERANCE ON CAPACITANCE

± 10 %, ± 20 %, - 20 % / + 50 %

### DISSIPATION FACTOR

C < 100 pF: max. 3.0 % (1 MHz)

C ≥ 100 pF: max. 3.0 % (1 kHz)

QUICK REFERENCE DATA	
DESCRIPTION	VALUE
Ceramic Class	2
Ceramic Dielectric	Y5T, Y5U
Voltage (V <sub>DC</sub> )	500
Min. Capacitance (pF)	10
Max. Capacitance (pF)	10 000
Mounting	Radial

### OPERATING TEMPERATURE RANGE

-40 °C to +85 °C <sup>(1)</sup>

#### Note

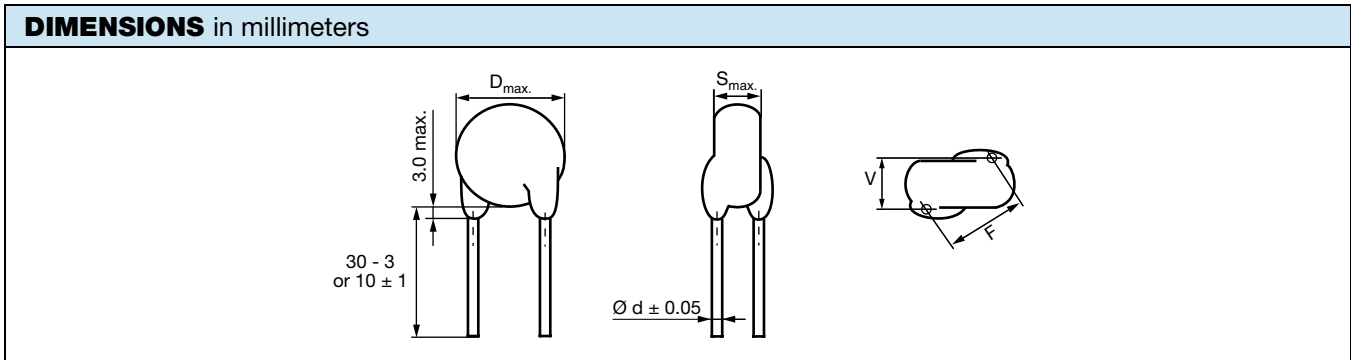
<sup>(1)</sup> For explanation about the difference of operating temperature range and temperature characteristic of capacitance please see [www.vishay.com/doc?48299](http://www.vishay.com/doc?48299)

### TEMPERATURE CHARACTERISTICS

Y5T, Y5U

### SECTIONAL SPECIFICATIONS

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



**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
<b>Y5T</b>							
10	± 10, ± 20	6.0	3.0	5.0	0.6	1.6	HSZ100#AQ###KR
12							HSZ120#AQ###KR
15						1.5	HSZ150#AQ###KR
18							HSZ180#AQ###KR
22						1.1	HSZ220#AQ###KR
27							HSZ270#AQ###KR
33						1.4	HSZ330#AQ###KR
39							HSZ390#AQ###KR
47						1.2	HSZ470#AQ###KR
56							HSZ560#AQ###KR
68						1.4	HSZ680#AQ###KR
82							HSZ820#AQ###KR
100							HSZ101#AQ###KR
120						1.1	HSZ121#AQ###KR
150							HSZ151#AQ###KR
180						1.6	HSZ181#AQ###KR
220							HSZ221#AQ###KR
270						1.3	HSZ271#AQ###KR
330				HSZ331#AQ###KR			
390				1.2		HSZ391#AQ###KR	
470						HSZ471#AQ###KR	
560						HSZ561#AQ###KR	
680				1.1		HSZ681#AQ###KR	
820						HSZ821#AQ###KR	
1000				1.2		HSZ102#AQ###KR	
1200						HSZ122#AQ###KR	
1500				1.1		HSZ152#AQ###KR	
1800						HSZ182#AQ###KR	
2200				1.2		HSZ222#AQ###KR	
2700						HSZ272#AQ###KR	
3300						HSZ332#AQ###KR	
3900				1.1		HSZ392#AQ###KR	
4700						HSZ472#AQ###KR	
		7.0		7.5			
		8.0					
		9.0					
		11.0					
		15.0					

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
<b>Y5U</b>							
470	- 20 / + 50 <sup>(2)</sup>	6.0	4.0	5.0	0.6	1.1	HSE471#AQ###KR
680						1.2	HSE681#AQ###KR
1000						1.4	HSE102#AQ###KR
1500		7.0		1.2		HSE152#AQ###KR	
2200				HSE222#AQ###KR			
3300		11.0		7.5		1.1	HSE332#AQ###KR
4700			HSE472#AQ###KR				
6800		13.0	HSE682#AQ###KR				
8200		15.0	1.4	HSE822#AQ###KR			
10 000				1.2	HSE103#AQ###KR		

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

<sup>(2)</sup> ± 20 % available on request

ORDERING CODE							
#	7 <sup>th</sup> digit	Capacitance tolerance	± 10 % = K, ± 20 % = M, - 20 % / + 50 % = S				
###	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>HSE</b>	<b>103</b>	<b>S</b>	<b>AQ</b>	<b>CRY</b>	<b>K</b>	<b>R</b>
	Series	Capacitance value	Tolerance code	Voltage code	Lead configuration	Internal code	RoHS compliant

MARKING			
HSE 470 pF to 4.7 nF	HSE 6.8 nF to 10 nF	HSZ 10 pF to 3.9 nF	HSZ 4.7 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](http://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	<a href="http://www.vishay.com/doc?22001">www.vishay.com/doc?22001</a>



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