Lower Voltage Ceramic DC Disc Capacitors 1000 V_{DC} General Purpose



QUICK REFERENCE DATA						
DESCRIPTION	VALUE					
Ceramic Class	1		2			
Ceramic Dielectric	C0G	U2J	X5F	X7R	Y5U	Z5U
Voltage (V_{DC})	1000					
Min. Capacitance (pF)	10	33	100	1000	1000	1200
Max. Capacitance (pF)	10	33	500	1000	1000	100 000
Mounting	Radial					

INSULATION RESISTANCE

Min. 1000 ΩF or 20 000 MΩ for 10 pF to 0.020 µF

Min. 15 000 MΩ for 0.050 µF

Min. 5000 MΩ for 0.10 µF

TOLERANCE ON CAPACITANCE

± 20 %

DISSIPATION FACTOR

2.5 % max. at 1 kHz; 1 V

CATEGORY TEMPERATURE RANGE

(-55 to +125) °C	C0G, U2J, X7R
(-25 to +85) °C	X5F, Y5U, Z5U

CLIMATIC CATEGORY ACC. TO EN 60068-1

55/125/21	C0G, U2J, X7R
25/085/21	X5F, Y5U, Z5U

OPERATING TEMPERATURE RANGE

-55 °C to +105 °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

FEATURES

RoHS COMPLIANT

- Low losses
- High stability
- High capacitance in small size
- Complete range of capacitance values
- Radial leads
- Ceramic singlelayer capacitor
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

APPLICATIONS

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

DESIGN

The capacitors consist of a ceramic disc of which both sides are silver-plated. Connection leads are made of tinned copper or tinned copper clad steel having diameters of 0.020" (0.51 mm) or 0.025" (0.64 mm).

The capacitors may be supplied with radial kinked or straight leads having lead spacing of 0.250" (6.35 mm) or 0.375" (9.5 mm).

The standard tolerance is ± 20 %.

Coating is made of resin coating or flammable resistant epoxy resin in accordance with “UL 94 V-0”.

CAPACITANCE RANGE

10 pF to 0.1 µF

RATED VOLTAGE

1000 V_{DC}

DIELECTRIC STRENGTH BETWEEN LEADS

Component test, 100 % test at production line:

2500 V_{DC}, 2 s

CERAMIC DIELECTRIC

C0G, U2J (Class 1)
X5F, X7R, Y5U, Z5U (Class 2)

For technical questions, contact: ceramitesupport@vishay.com

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DIMENSIONS in inches (millimeters)

Fig. 1

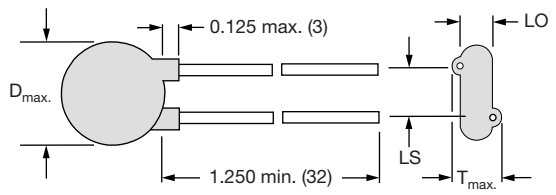
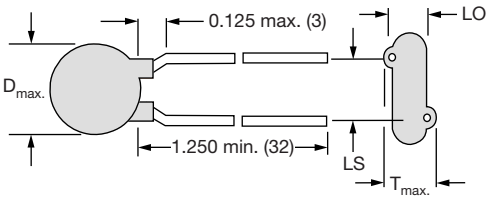


Fig. 2



ORDERING INFORMATION, CERAMIC 1000 V_{DC} GENERAL PURPOSE

C (pF)	TOL. (%)	$D_{max.}$ DIAMETER INCH (mm)	$T_{max.}$ THICKNESS INCH (mm)	LS LEAD SPACE INCH (mm) ± 1 mm	LO LEAD OFFSET INCH (mm) ± 0.5 mm	FIG.	WIRE SIZE		ORDERING CODE
							AWG	INCH (mm)	
C0G (NP0)									
10	± 20	0.250 (6.4)	0.156 (4.0)	0.250 (6.4)	0.051 (1.3)	2	24	0.020 (0.51)	561R5GAQ10
U2J (N750)									
33	± 20	0.290 (7.4)	0.156 (4.0)	0.250 (6.4)	0.039 (1.0)	2	24	0.020 (0.51)	561R5GAQ33
X5F									
100	± 20	0.250 (6.4)	0.156 (4.0)	0.250 (6.4)	0.055 (1.4)	2	24	0.020 (0.51)	562R5GAT10
150					0.043 (1.1)				562R5GAT15
200					0.039 (1.0)				562R5GAT20
220					0.051 (1.3)				562R5GAT22
330					0.039 (1.0)				562R5GAT33
470					0.039 (1.0)				562R5GAT47
500					0.039 (1.0)				562R5GAT50
X7R									
1000	± 20	0.290 (7.4)	0.156 (4.0)	0.250 (6.4)	0.047 (1.2)	2	24	0.020 (0.51)	562R5GAD10
Y5U									
1000	+ 100 / - 0	0.290 (7.4)	0.156 (4.0)	0.250 (6.4)	0.039 (1.0)	2	24	0.020 (0.51)	562R5HKD10
Z5U									
1200	± 20	0.290 (7.4)	0.156 (4.0)	0.250 (6.4)	0.043 (1.1)	2	24	0.020 (0.51)	562R5GAD12
1500					0.039 (1.0)				562R5GAD15
2000					0.047 (1.2)				562R5GAD20
2200					0.047 (1.2)				562R5GAD22
2500					0.043 (1.1)				562R5GAD25
2700					0.043 (1.1)				562R5GAD27
3000					0.039 (1.0)				562R5GAD30
3300					0.039 (1.0)				562R5GAD33
4700		0.370 (9.4)	0.156 (4.0)	0.250 (6.4)	0.047 (1.2)	1	22	0.025 (0.64)	562R5GAD47
5000		0.370 (9.4)	0.156 (4.0)	0.250 (6.4)	0.043 (1.1)				562R5GAD50
6800		0.440 (11.2)	0.156 (4.0)	0.250 (6.4)	0.047 (1.2)				562R5GAD68
8200		0.440 (11.2)	0.156 (4.0)	0.250 (6.4)	0.043 (1.1)				562R5GAD82
0.010 µF		0.490 (12.4)	0.156 (4.0)	0.375 (9.5)	0.047 (1.2)				562R5GAS10
0.010 µF		0.490 (12.4)	0.156 (4.0)	0.250 (6.4)	0.047 (1.2)				562R5HKMS10
0.010 µF	+ 100 / - 0	0.490 (12.4)	0.156 (4.0)	0.375 (9.5)	0.043 (1.1)				562R5HKS10
0.015 µF	± 20	0.560 (14.2)	0.156 (4.0)	0.375 (9.5)	0.043 (1.1)				562R5GAS15
0.020 µF		0.680 (17.3)	0.156 (4.0)	0.375 (9.5)	0.047 (1.2)				562R5GAS20
0.050 µF		0.770 (19.6)	0.200 (5.1)	0.375 (9.5)	0.047 (1.2)				565R10HKS50
0.10 µF		0.950 (24.1)	0.200 (5.1)	0.375 (9.5)	0.047 (1.2)				565R10GAP10

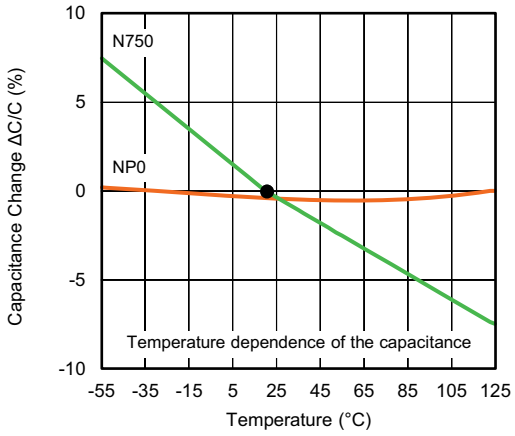
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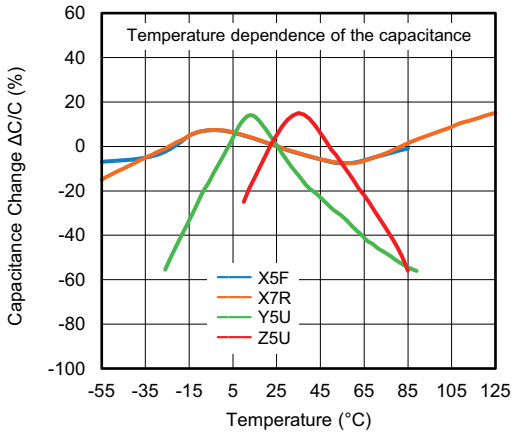
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TAPE AND REEL OPTIONS

- Tape and reel available on diameter sizes 0.250" to 0.680"
- Part number codes and specifications for tape and reel packaging are found in the general information document www.vishay.com/doc?23140

CAPACITANCE CHANGE 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 +40 °C, relative humidity up to 60 % RH). Class 2 ceramic dielectric capacitors are also subject to aging see general information (www.vishay.com/doc?23140).

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 ± 5) °C	(260 ± 5) °C
Soldering duration	(2 ± 0.5) s	(10 ± 1) s
Distance from component body	≥ 2 mm	≥ 5 mm

SOLDERING RECOMMENDATIONS

Ceramic capacitors are very sensitive to rapid changes in temperature (thermal shock) therefore the solder heat resistance specification (see table above) should not be exceeded. Exposing 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.

When soldering radial leaded ceramic capacitors with a soldering iron, it should be performed under the following conditions and should not exceed:

- Maximum temperature of iron-tip: 400 °C
- Maximum soldering iron wattage: 50 W
- Maximum soldering time: 3.5 s

Failure to follow the above cautions may result, in worst case, in short circuit or cause fuming or thermo-mechanical damage when the product is used.

Leaded ceramic capacitors are not designed for reflow process or dipping the body into a solder melt.

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CLEANING

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

CLEANING (ULTRASONIC CLEANING)

To perform ultrasonic cleaning, observe the following conditions:

- Maximum rinse bath capacity output: 20 W/liter
- Maximum rinsing time: 300 s
- Do not vibrate the PCB/PWB directly
- Excessive ultrasonic cleaning may lead to mechanical damage

SOLVENT RESISTANCE

The coating and marking of the capacitors are resistant to the following test method:

IEC 60068-2-45 (method XA)

MOUNTING

We do not recommend modifying the lead terminals, e.g. bending or cropping. This action could break the coating or crack the ceramic insert. In order to avoid such failures we are offering different lead wire designs (e.g. straight, inline, inside crimp, outside crimp etc.) If however, the lead must be modified in any way, we recommend support of the lead with a clamping fixture next to the coating. If a defined product stop is required for mounting on a PCB, a mechanically formed product stop or a mounting tool should be used.

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?23140

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