

## Lower Voltage Ceramic Singlelayer DC Disc Capacitors 2 kV<sub>DC</sub> to 7.5 kV<sub>DC</sub>


**FEATURES**

- Low losses
- High capacitance in small sizes
- High stability
- Radial leads
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)


**RoHS**  
COMPLIANT

**APPLICATIONS**

- Lighting ballasts
- SMPS
- DC and pulse high voltage

**DESIGN**

The capacitors consist of a ceramic disc of which both sides are silver-plated. Connection leads are made of tinned copper having diameters of 0.025" (0.64 mm) or 0.032" (0.81 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) or 0.500" (12.7 mm).

The standard tolerances are  $\pm 10\%$  or  $\pm 20\%$ .

Coating is made of resin coating or flame retardant epoxy resin in accordance with "UL 94 V-0".

**CAPACITANCE RANGE**

 10 pF to 0.10  $\mu$ F

**RATED VOLTAGE**

2 kV<sub>DC</sub>  
3 kV<sub>DC</sub>  
6 kV<sub>DC</sub>  
7.5 kV<sub>DC</sub>

**DIELECTRIC STRENGTH BETWEEN LEADS**

Component test:

2 kV<sub>DC</sub>      3600 V<sub>DC</sub>, 2 s  
3 kV<sub>DC</sub>      5000 V<sub>DC</sub>, 2 s  
6 kV<sub>DC</sub>      10 500 V<sub>DC</sub>, 2 s  
7.5 kV<sub>DC</sub>    11 250 V<sub>DC</sub>, 2 s

**CERAMIC DIELECTRIC**

C0G, U2J, R3L (Class 1)  
X7R, X5F, X5S, Y5S, Y5U, Y5V, Z5U (Class 2)

QUICK REFERENCE DATA						
DESCRIPTION	VALUE					
Ceramic Class	1		2			
Ceramic Dielectric	U2J, R3L	C0G, U2J, R3L	X7R, Y5S, Y5U, Z5U, Y5V	X5F, X5R, X5S, X7R, Y5S, Y5U, Z5U	X5F, X5S, Y5U, Z5U	X5F, Y5U, Z5U
Voltage (V <sub>DC</sub> )	3000	6000	2000	3000	6000	7500
Min. Capacitance (pF)	10	10	100	47	100	100
Max. Capacitance (pF)	33	47	100 000	33 000	10 000	2500
Mounting	Radial					

**INSULATION RESISTANCE**

2 kV<sub>DC</sub>      min. 10 000 M $\Omega$   
3 kV<sub>DC</sub>      min. 50 000 M $\Omega$   
6 kV<sub>DC</sub>      min. 75 000 M $\Omega$   
7.5 kV<sub>DC</sub>    min. 200 000 M $\Omega$

**TOLERANCE ON CAPACITANCE**

$\pm 10\%$ ,  $\pm 20\%$ ,  $-20\%$  to  $+80\%$

**DISSIPATION FACTOR**

Class 1: 0.2 % max. at 1 MHz; 1 V  
Class 2: 2.0 % max. at 1 kHz; 1 V

**CATEGORY TEMPERATURE RANGE**

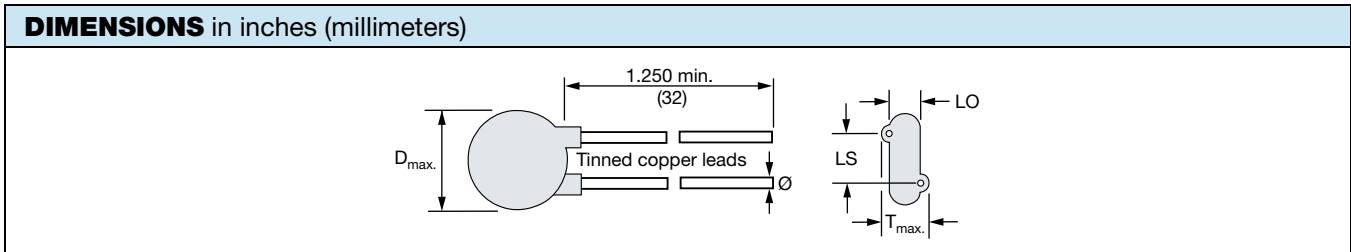
-25 °C to +85 °C

**CLIMATIC CATEGORY ACC. TO EN 60068-1**

25/085/21

**OPERATING TEMPERATURE RANGE**

-25 °C to +105 °C



ORDERING INFORMATION, CERAMIC 2 kV <sub>DC</sub>									
C (pF)	TOL. (%)	D <sub>max.</sub> DIAMETER INCH (mm)	T <sub>max.</sub> THICKNESS INCH (mm)	LS LEAD SPACE INCH (mm) ± 1 mm	LO LEAD OFFSET INCH (mm) ± 0.5 mm	WIRE SIZE		ORDERING CODE	
						AWG	INCH (mm)		
<b>X7R</b>									
100	± 10	0.330 (8.4)	0.190 (4.8)	0.250 (6.4)	0.075 (1.9)	20	0.032 (0.81)	564R20TST10	
220			0.180 (4.6)					564R20TST22	
330			0.170 (4.3)					564R20TST33	
470			0.185 (4.7)					564R20TST47	
560			0.175 (4.4)					564R20TST56	
680			0.170 (4.3)					564R20TST68	
1000		0.400 (10.2)	0.160 (4.1)					0.083 (2.1)	564R20TSD10
1500		0.460 (11.7)	0.170 (4.3)					0.063 (1.6)	564R20TSD15
1800								0.055 (1.4)	564R20TSD18
2200								0.067 (1.7)	564R20TSD22
3300								0.063 (1.6)	564R20TSD33
3900								0.075 (1.9)	564R20TSD39
4700								0.680 (17.3)	0.375 (9.5)
<b>Y5S</b>									
1000	± 20	0.330 (8.4)	0.175 (4.4)	0.250 (6.4)	0.067 (1.7)	20	0.032 (0.81)	564R20TSSD10	
2200		0.460 (11.7)	0.170 (4.3)		0.071 (1.8)			564R20TSSD22	
5600		0.790 (20.0)	0.190 (4.8)		0.375 (9.5)			0.091 (2.3)	564R20TSSD56
<b>Y5U</b>									
1000	± 20	0.330 (8.4)	0.170 (4.3)	0.250 (6.4)	0.067 (1.7)	20	0.032 (0.81)	564R20GAD10	
1500		0.330 (8.4)	0.170 (4.3)		0.071 (1.8)			564R20GAD15	
<b>Z5U</b>									
1800	± 20	0.360 (9.1)	0.170 (4.3)	0.250 (6.4)	0.071 (1.8)	20	0.032 (0.81)	564R20GAD18	
2200		0.400 (10.2)	0.175 (4.4)		0.075 (1.9)			564R20GAD22	
3300		0.430 (10.9)			0.071 (1.8)			564R20GAD33	
4700		0.530 (13.5)			0.075 (1.9)			564R20GAD47	
6800		0.560 (14.2)	0.170 (4.3)		0.375 (9.5)			0.067 (1.7)	564R20GAD68
<b>Y5V</b>									
0.01 µF	± 20	0.620 (15.7)	0.170 (4.3)	0.375 (9.5)	0.067 (1.7)	20	0.032 (0.81)	564R20GASS10	
0.05 µF		0.950 (24.1)	0.174 (4.4)		0.067 (1.7)			20	564R20GAS50
0.10 µF		0.950 (24.1)	0.240 (6.1)		0.067 (1.7)			22	0.025 (0.64)



ORDERING INFORMATION, CERAMIC 3 kV <sub>DC</sub>								
C (pF)	TOL. (%)	D <sub>max.</sub> DIAMETER INCH (mm)	T <sub>max.</sub> THICKNESS INCH (mm)	LS LEAD SPACE INCH (mm) ± 1 mm	LO LEAD OFFSET INCH (mm) ± 0.5 mm	WIRE SIZE		ORDERING CODE
						AWG	INCH (mm)	
<b>U2J (N750)</b>								
10	± 20	0.330 (8.4)	0.210 (5.3)	0.250 (6.4)	0.110 (2.8)	20	0.032 (0.81)	564R30GAQ10
<b>R3L (N2200)</b>								
22	± 20	0.330 (8.4)	0.200 (5.1)	0.250 (6.4)	0.102 (2.6)	20	0.032 (0.81)	564R30GAQ22
27			0.190 (4.8)		0.091 (2.3)			564R30GAQ27
33			0.170 (4.3)		0.071 (1.8)			564R30GAQ33
<b>X5F</b>								
56	± 20	0.330 (8.4)	0.190 (4.8)	0.250 (6.4)	0.091 (2.3)	20	0.032 (0.81)	564R30GAQ56
68			0.200 (5.1)		0.102 (2.6)			564R30GAQ68
270			0.180 (4.6)		0.083 (2.1)			564R30GAT27
<b>X5R</b>								
330	± 20	0.330 (8.4)	0.175 (4.4)	0.250 (6.4)	0.075 (1.9)	20	0.032 (0.81)	564R30GAT33
<b>X5S</b>								
470	± 20	0.330 (8.4)	0.175 (4.4)	0.250 (6.4)	0.075 (1.9)	20	0.032 (0.81)	564R30GAT47
<b>X7R</b>								
47	± 20	0.330 (8.4)	0.230 (5.8)	0.250 (6.4)	0.130 (3.3)	20	0.032 (0.81)	564R30GAQ47
100			0.180 (4.6)		0.083 (2.1)			564R30GAT10
150			0.190 (4.8)		0.091 (2.3)			564R30GAT15
220			0.175 (4.4)		0.075 (1.9)			564R30GAT22
390			0.180 (4.6)		0.079 (2.0)			564R30GAT39
680	± 10	0.400 (10.2)	0.190 (4.8)	0.091 (2.3)	0.091 (2.3)	20	0.032 (0.81)	564R30TST68
1000			0.185 (4.7)					0.087 (2.2)
1500		0.490 (12.5)	0.185 (4.7)	0.079 (2.0)	564R30TSD15			
1800		0.530 (13.5)		0.079 (2.0)	564R30TSD18			
2200		0.620 (15.7)	0.185 (4.7)	0.083 (2.1)	564R30TSD22			
2700			0.170 (4.3)	0.083 (2.1)	564R30TSD27			
3300		0.720 (18.3)	0.185 (4.7)	0.075 (1.9)	564R30TSD33			
3900			0.175 (4.4)	0.087 (2.2)	564R30TSD39			
4700			0.175 (4.4)	0.075 (1.9)	564R30TSD47			
6800			0.185 (4.7)	0.087 (2.2)	564R30TSD68			
<b>Y5S</b>								
1000	± 20	0.400 (10.2)	0.190 (4.8)	0.250 (6.4)	0.098 (2.5)	20	0.032 (0.81)	564R30TSSD10
1500		0.460 (11.7)			0.091 (2.3)			564R30TSSD15
1800		0.490 (12.4)			0.087 (2.2)			564R30TSSD18
2200		0.530 (13.5)						564R30TSSD22
2700		0.560 (14.2)			0.185 (4.7)			564R30TSSD27
3300		0.620 (15.7)	0.083 (2.1)	564R30TSSD33				
3900		0.680 (17.3)	0.185 (4.7)	0.087 (2.2)	564R30TSSD39			
4700				0.091 (2.3)	564R30TSSD47			
5600		0.790 (20.0)	0.190 (4.8)	0.091 (2.3)	564R30TSSD56			
6800		0.900 (22.9)	0.205 (5.2)	0.102 (2.6)	564R30TSSD68			
<b>Y5U</b>								
680	± 20	0.330 (8.4)	0.175 (4.4)	0.250 (6.4)	0.075 (1.9)	20	0.032 (0.81)	564R30GAT68
0.010 μF		0.720 (18.3)	0.185 (4.7)	0.375 (9.5)	0.091 (2.3)			564R30GAS10
<b>Z5U</b>								
1000	± 20	0.330 (8.4)	0.190 (4.8)	0.250 (6.4)	0.098 (2.5)	20	0.032 (0.81)	564R30GAD10
1500		0.360 (9.1)			0.091 (2.3)			564R30GAD15
1800		0.400 (10.2)	0.098 (2.5)		564R30GAD18			
2200		0.430 (10.9)	0.091 (2.3)		564R30GAD22			
2700		0.460 (11.7)	0.200 (5.1)		0.098 (2.5)			564R30GAD27
3300		0.530 (13.5)	0.185 (4.7)	0.087 (2.2)	564R30GAD33			
3900				0.091 (2.3)	564R30GAD39			
4700		0.620 (15.7)	0.195 (5.0)	0.375 (9.5)	0.102 (2.6)			564R30GAD47
6800					0.091 (2.3)			564R30GAD68
8200		0.720 (18.3)	0.200 (5.1)	0.375 (9.5)	0.102 (2.6)			564R30GAD82
0.033 μF	0.900 (22.9)					0.240 (6.1)	0.087 (2.2)	565R30GASS33



ORDERING INFORMATION, CERAMIC 6 kV <sub>DC</sub>								
C (pF)	TOL. (%)	D <sub>max.</sub> DIAMETER INCH (mm)	T <sub>max.</sub> THICKNESS INCH (mm)	LS LEAD SPACE INCH (mm) ± 1 mm	LO LEAD OFFSET INCH (mm) ± 0.5 mm	WIRE SIZE		ORDERING CODE
						AWG	INCH (mm)	
<b>C0G (NP0)</b>								
10	± 20	0.400 (10.2)	0.220 (5.6)	0.375 (9.5)	0.122 (3.1)	20	0.032 (0.81)	564R60GAQ10
<b>U2J (N750)</b>								
22	± 20	0.460 (11.7)	0.240 (6.1)	0.375 (9.5)	0.142 (3.6)	20	0.032 (0.81)	564R60GAQ22
<b>R3L (N2200)</b>								
33	± 20	0.400 (10.2)	0.230 (5.8)	0.375 (9.5)	0.130 (3.3)	20	0.032 (0.81)	564R60GAQ33
47		0.460 (11.7)			0.126 (3.2)			564R60GAQ47
<b>X5F</b>								
100	± 20	0.400 (10.2)	0.240 (6.1)	0.375 (9.5)	0.142 (3.6)	20	0.032 (0.81)	564R60GAT10
220			0.265 (6.7)		0.165 (4.2)			564R60GAT22
<b>X5S</b>								
330	± 20	0.400 (10.2)	0.260 (6.6)	0.375 (9.5)	0.161 (4.1)	20	0.032 (0.81)	564R60GAT33
<b>Y5U</b>								
470	± 20	0.400 (10.2)	0.290 (7.4)	0.375 (9.5)	0.193 (4.9)	20	0.032 (0.81)	564R60GAT47
560			0.240 (6.1)		0.142 (3.6)			564R60GAT56
<b>Z5U</b>								
1000	± 20	0.400 (10.2)	0.270 (6.9)	0.375 (9.5)	0.173 (4.4)	20	0.032 (0.81)	564R60GAD10
1500		0.460 (11.7)	0.280 (7.1)		0.157 (4.0)			564R60GAD15
2200		0.530 (13.5)	0.240 (6.1)		0.142 (3.6)			564R60GAD22
3300		0.620 (15.7)	0.260 (6.6)		0.169 (4.3)			564R60GAD33
4700		0.790 (20.0)			0.161 (4.1)			564R60GAD47
0.010 µF		0.950 (24.1)	0.250 (6.4)		0.150 (3.8)			564R60GAS10

ORDERING INFORMATION, CERAMIC 7.5 kV <sub>DC</sub>								
C (pF)	TOL. (%)	D <sub>max.</sub> DIAMETER INCH (mm)	T <sub>max.</sub> THICKNESS INCH (mm)	LS LEAD SPACE INCH (mm) ± 1 mm	LO LEAD OFFSET INCH (mm) ± 0.5 mm	WIRE SIZE		ORDERING CODE
						AWG	INCH (mm)	
<b>X5F</b>								
100	± 20	0.530 (13.5)	0.310 (7.9)	0.500 (12.7)	0.181 (4.6)	20	0.032 (0.81)	564R75GAT10
470		0.620 (15.7)	0.270 (6.9)		0.161 (4.1)			564R75GAT47
<b>Y5U</b>								
1000	+ 80 / - 20	0.620 (15.7)	0.320 (8.1)	0.500 (12.7)	0.181 (4.6)	20	0.032 (0.81)	564R75GAD10
<b>Z5U</b>								
2500	+ 80 / - 20	0.620 (15.7)	0.280 (7.1)	0.500 (12.7)	0.181 (4.6)	20	0.032 (0.81)	564R75GAD25

**TAPE AND REEL OPTIONS**

Part number codes and specifications for tape and reel packaging are found in the general information document - find web-link below.

RELATED DOCUMENTS	
General Information	<a href="http://www.vishay.com/doc?23140">www.vishay.com/doc?23140</a>



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