

## 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 $\Omega$  <sup>(1)</sup>  
 6 kV<sub>DC</sub>      min. 75 000 M $\Omega$   
 7.5 kV<sub>DC</sub>    min. 200 000 M $\Omega$ 
**Note**
<sup>(1)</sup> Exemption: 565R30GASS33 min. 25 000 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**

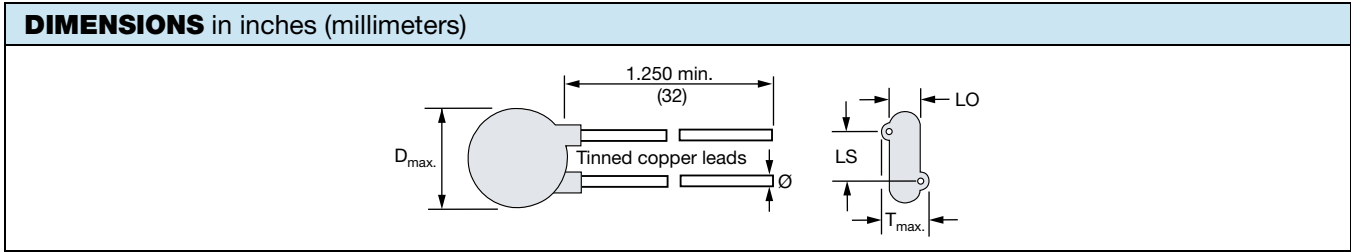
-25 °C to +85 °C

**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			0.490 (12.5)					0.087 (2.2)	564R30TSD10
1500		0.530 (13.5)	0.185 (4.7)	0.079 (2.0)	0.079 (2.0)			564R30TSD15	
1800			0.180 (4.6)	0.083 (2.1)	564R30TSD18				
2200		0.620 (15.7)	0.185 (4.7)	0.083 (2.1)	0.083 (2.1)			564R30TSD22	
2700			0.170 (4.3)	0.075 (1.9)	564R30TSD27				
3300		0.720 (18.3)	0.185 (4.7)	0.087 (2.2)	0.087 (2.2)			564R30TSD33	
3900			0.175 (4.4)	0.075 (1.9)	0.075 (1.9)			564R30TSD39	
4700			0.185 (4.7)	0.087 (2.2)	0.087 (2.2)			564R30TSD47	
6800			0.185 (4.7)	0.087 (2.2)	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)			0.083 (2.1)			564R30TSSD22	
2700		0.560 (14.2)			0.087 (2.2)			564R30TSSD27	
3300		0.620 (15.7)	0.185 (4.7)	0.087 (2.2)	0.087 (2.2)			564R30TSSD33	
3900			0.680 (17.3)	0.091 (2.3)	0.091 (2.3)			564R30TSSD39	
4700		0.790 (20.0)	0.190 (4.8)	0.102 (2.6)	0.102 (2.6)			564R30TSSD47	
5600			0.205 (5.2)	0.091 (2.3)	0.091 (2.3)			564R30TSSD56	
6800			0.205 (5.2)	0.102 (2.6)	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)	0.195 (5.0)	0.250 (6.4)	0.098 (2.5)	20	0.032 (0.81)	564R30GAD10	
1500		0.360 (9.1)	0.190 (4.8)		0.091 (2.3)			0.091 (2.3)	564R30GAD15
1800		0.400 (10.2)			0.098 (2.5)			0.098 (2.5)	564R30GAD18
2200		0.430 (10.9)			0.091 (2.3)			0.091 (2.3)	564R30GAD22
2700		0.460 (11.7)	0.200 (5.1)		0.098 (2.5)			0.098 (2.5)	564R30GAD27
3300		0.530 (13.5)	0.185 (4.7)	0.087 (2.2)	0.087 (2.2)			564R30GAD33	
3900				0.091 (2.3)	0.091 (2.3)			564R30GAD39	
4700		0.620 (15.7)	0.195 (5.0)	0.375 (9.5)	0.102 (2.6)			0.102 (2.6)	564R30GAD47
6800					0.087 (2.2)			0.087 (2.2)	564R30GAD68
8200		0.720 (18.3)	0.200 (5.1)	0.375 (9.5)	0.102 (2.6)			0.102 (2.6)	564R30GAD82
0.033 µF	0.900 (22.9)				0.240 (6.1)	0.087 (2.2)	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>



## **Disclaimer**

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay's knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and / or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Except as expressly indicated in writing, Vishay products are not designed for use in medical, life-saving, or life-sustaining applications or for any other application in which the failure of the Vishay product could result in personal injury or death. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.