

Lower Voltage Ceramic Singlelayer DC Disc Capacitors 2 kV_{DC} to 7.5 kV_{DC}


RoHS
COMPLIANT

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

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 μ F

RATED VOLTAGE

 2 kV_{DC}
 3 kV_{DC}
 6 kV_{DC}
 7.5 kV_{DC}
DIELECTRIC STRENGTH BETWEEN LEADS

Component test:

 2 kV_{DC} 3600 V_{DC}, 2 s
 3 kV_{DC} 5000 V_{DC}, 2 s
 6 kV_{DC} 10 500 V_{DC}, 2 s
 7.5 kV_{DC} 11 250 V_{DC}, 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 _{DC}) | 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_{DC} min. 10 000 M Ω
 3 kV_{DC} min. 50 000 M Ω ⁽¹⁾
 6 kV_{DC} min. 75 000 M Ω
 7.5 kV_{DC} min. 200 000 M Ω
Note
⁽¹⁾ Exemption: 565R30GASS33 min. 25 000 M Ω
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

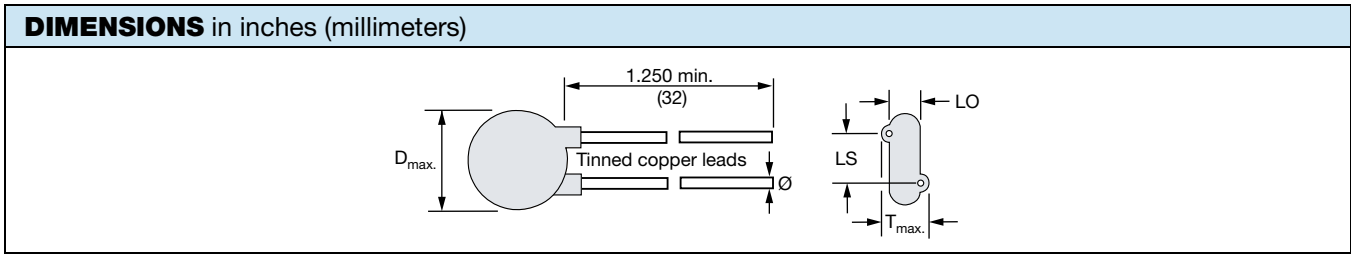
-25 °C to +85 °C

CLIMATIC CATEGORY ACC. TO EN 60068-1

25/085/21

OPERATING TEMPERATURE RANGE

-25 °C to +105 °C



| ORDERING INFORMATION, CERAMIC 2 kV _{DC} | | | | | | | | | |
|--|-------------|--|---|---|--|-----------|--------------|------------------|--------------|
| 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 | WIRE SIZE | | ORDERING CODE | |
| | | | | | | AWG | INCH (mm) | | |
| X7R | | | | | | | | | |
| 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) |
| Y5S | | | | | | | | | |
| 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 |
| Y5U | | | | | | | | | |
| 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 | |
| Z5U | | | | | | | | | |
| 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 |
| Y5V | | | | | | | | | |
| 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 _{DC} | | | | | | | | |
|--|--------------|--|---|---|--|-------------|--------------|------------------|
| 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 | WIRE SIZE | | ORDERING CODE |
| | | | | | | AWG | INCH (mm) | |
| U2J (N750) | | | | | | | | |
| 10 | ± 20 | 0.330 (8.4) | 0.210 (5.3) | 0.250 (6.4) | 0.110 (2.8) | 20 | 0.032 (0.81) | 564R30GAQ10 |
| R3L (N2200) | | | | | | | | |
| 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 |
| X5F | | | | | | | | |
| 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 |
| X5R | | | | | | | | |
| 330 | ± 20 | 0.330 (8.4) | 0.175 (4.4) | 0.250 (6.4) | 0.075 (1.9) | 20 | 0.032 (0.81) | 564R30GAT33 |
| X5S | | | | | | | | |
| 470 | ± 20 | 0.330 (8.4) | 0.175 (4.4) | 0.250 (6.4) | 0.075 (1.9) | 20 | 0.032 (0.81) | 564R30GAT47 |
| X7R | | | | | | | | |
| 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) | | 0.083 (2.1) | 564R30TSD18 | | | |
| 2200 | | | 0.180 (4.6) | 0.079 (2.0) | 564R30TSD22 | | | |
| 2700 | | 0.620 (15.7) | 0.185 (4.7) | 0.083 (2.1) | 564R30TSD27 | | | |
| 3300 | | | 0.170 (4.3) | 0.075 (1.9) | 564R30TSD33 | | | |
| 3900 | | 0.720 (18.3) | 0.185 (4.7) | 0.087 (2.2) | 0.087 (2.2) | | | 564R30TSD39 |
| 4700 | | | | | 0.175 (4.4) | | | 0.075 (1.9) |
| 6800 | | | 0.900 (22.9) | 0.185 (4.7) | 0.087 (2.2) | | | 0.087 (2.2) |
| | | | | | | | | |
| Y5S | | | | | | | | |
| 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) | | | 0.083 (2.1) | | | 564R30TSSD27 |
| 3300 | | 0.620 (15.7) | 0.087 (2.2) | 564R30TSSD33 | | | | |
| 3900 | | 0.680 (17.3) | 0.185 (4.7) | 0.375 (9.5) | 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 | | | |
| Y5U | | | | | | | | |
| 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 |
| Z5U | | | | | | | | |
| 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) |
| 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 _{DC} | | | | | | | | |
|--|-------------|--|---|---|--|-----------|--------------|------------------|
| 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 | WIRE SIZE | | ORDERING CODE |
| | | | | | | AWG | INCH (mm) | |
| C0G (NP0) | | | | | | | | |
| 10 | ± 20 | 0.400 (10.2) | 0.220 (5.6) | 0.375 (9.5) | 0.122 (3.1) | 20 | 0.032 (0.81) | 564R60GAQ10 |
| U2J (N750) | | | | | | | | |
| 22 | ± 20 | 0.460 (11.7) | 0.240 (6.1) | 0.375 (9.5) | 0.142 (3.6) | 20 | 0.032 (0.81) | 564R60GAQ22 |
| R3L (N2200) | | | | | | | | |
| 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 |
| X5F | | | | | | | | |
| 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 |
| X5S | | | | | | | | |
| 330 | ± 20 | 0.400 (10.2) | 0.260 (6.6) | 0.375 (9.5) | 0.161 (4.1) | 20 | 0.032 (0.81) | 564R60GAT33 |
| Y5U | | | | | | | | |
| 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 |
| Z5U | | | | | | | | |
| 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 _{DC} | | | | | | | | |
|--|-------------|--|---|---|--|-----------|--------------|------------------|
| 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 | WIRE SIZE | | ORDERING CODE |
| | | | | | | AWG | INCH (mm) | |
| X5F | | | | | | | | |
| 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 |
| Y5U | | | | | | | | |
| 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 |
| Z5U | | | | | | | | |
| 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 | www.vishay.com/doc?23140 |



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.