

Lower Voltage Ceramic Singlelayer DC Disc Capacitors 1 kV_{DC} to 3 kV_{DC} Low Dissipation Factor


RoHS
COMPLIANT

FEATURES

- Low losses
- High stability
- Low DF minimizes self heating at HF
- Ideal for high switching to 100 kHz
- Radial leads
- Material categorization: For definitions of compliance please see www.vishay.com/doc?99912

APPLICATIONS

- SMPS
- HF ballast
- Snubber and HV circuits

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 0.022" (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 tolerances are $\pm 5\%$, $\pm 10\%$.

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

CAPACITANCE RANGE

10 pF to 6800 pF

RATED VOLTAGE

1000 V_{DC} (500 V_{RMS})
 2000 V_{DC} (1000 V_{RMS})
 3000 V_{DC} (1500 V_{RMS})

DIELECTRIC STRENGTH BETWEEN LEADS

Component test:

1000 V_{DC} 2500 V_{DC}, 2 s
 2000 V_{DC} 4000 V_{DC}, 2 s
 3000 V_{DC} 6000 V_{DC}, 2 s

CERAMIC DIELECTRIC

C0G, N1500, N2000, N2200, N2500, N2800 (Class 1)

| QUICK REFERENCE DATA | | | |
|----------------------------|--|------|------|
| DESCRIPTION | VALUE | | |
| Ceramic Class | 1 | | |
| Ceramic Dielectric | C0G, N1500, N2000, N2200, N2500, N2800 | | |
| Voltage (V _{DC}) | 1000 | 2000 | 3000 |
| Min. Capacitance (pF) | 10 | 10 | 10 |
| Max. Capacitance (pF) | 6800 | 6800 | 4700 |
| Mounting | Radial | | |

INSULATION RESISTANCE

Min. 50 000 M Ω

TOLERANCE ON CAPACITANCE

$\pm 5\%$, $\pm 10\%$

DISSIPATION FACTOR

0.1 % max. at 1 kHz; 1 V

CATEGORY TEMPERATURE RANGE

- 55 °C to + 125 °C

CLIMATIC CATEGORY ACC. TO EN 60068-1

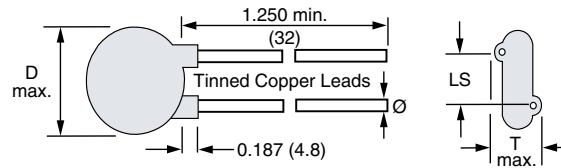
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OPERATING TEMPERATURE RANGE

- 55 °C to + 105 °C

DIMENSIONS in inches (millimeters)

Fig. 1


ORDERING INFORMATION, CERAMIC 1 kV_{DC} LOW DISSIPATION FACTOR

| C (pF) | TOL. (%) | D _{max.} DIAMETER INCH (mm) | T _{max.} THICKNESS INCH (mm) | LS LEAD SPACE INCH (mm) | WIRE SIZE | | FIG. | ORDERING CODE |
|------------------|--------------|--|---|-------------------------------|-----------|--------------|------|------------------|
| | | | | | AWG | INCH (mm) | | |
| C0G (NPO) | | | | | | | | |
| 10 | ± 5 | 0.250 (6.4) | 0.156 (4.0) | 0.250 (6.4) | 22 | 0.025 (0.64) | 1 | 561R1DF0Q10 |
| 12 | | | | | | | | 561R1DF0Q12 |
| N1500 | | | | | | | | |
| 15 | ± 5 | 0.250 (6.4) | 0.156 (4.0) | 0.250 (6.4) | 22 | 0.025 (0.64) | 1 | 561R1DF0Q15 |
| 18 | | | | | | | | 561R1DF0Q18 |
| 22 | | | | | | | | 561R1DF0Q22 |
| 47 | | | | | | | | 561R1DF0Q47 |
| 56 | | | | | | | | 561R1DF0Q56 |
| 68 | | | | | | | | 561R1DF0Q68 |
| 82 | 561R1DF0Q82 | | | | | | | |
| N2200 | | | | | | | | |
| 27 | ± 10 | 0.250 (6.4) | 0.156 (4.0) | 0.250 (6.4) | 22 | 0.025 (0.64) | 1 | 561R1DF0Q27 |
| 33 | | | | | | | | 561R1DF0Q33 |
| 39 | | | | | | | | 561R1DF0Q39 |
| N2000 | | | | | | | | |
| 100 | ± 10 | 0.250 (6.4) | 0.156 (4.0) | 0.250 (6.4) | 22 | 0.025 (0.64) | 1 | 561R1DF0T10 |
| 120 | | | | | | | | 561R1DF0T12 |
| 150 | | | | | | | | 561R1DF0T15 |
| 180 | | | | | | | | 561R1DF0T18 |
| N2500 | | | | | | | | |
| 220 | ± 10 | 0.250 (6.4) | 0.156 (4.0) | 0.250 (6.4) | 22 | 0.025 (0.64) | 1 | 561R1DF0T22 |
| 270 | | | | | | | | 561R1DF0T27 |
| N2800 | | | | | | | | |
| 330 | ± 10 | 0.250 (6.4) | 0.156 (4.0) | 0.250 (6.4) | 22 | 0.025 (0.64) | 1 | 561R1DF0T33 |
| 390 | | | | | | | | 561R1DF0T39 |
| 470 | | 0.290 (7.4) | | | | | | 561R1DF0T47 |
| 560 | | | | | | | | 561R1DF0T56 |
| 680 | | | | | | | | 561R1DF0T68 |
| 820 | | | | | | | | 561R1DF0T82 |
| 1000 | | 0.370 (9.4) | | | | | | 561R1DF0D10 |
| 1200 | | | | | | | | 561R1DF0D12 |
| 1500 | | 0.405 (10.3) | | | | | | 561R1DF0D15 |
| 1800 | | 0.440 (11.2) | | | | | | 561R1DF0D18 |
| 2200 | | 0.460 (11.7) | | | | | | 561R1DF0D22 |
| 2300 | | | | | | | | 561R1DF0D23 |
| 2400 | | | | | | | | 561R1DF0D24 |
| 2500 | | | | | | | | 561R1DF0D25 |
| 2700 | | 0.490 (12.4) | | | | | | 561R1DF0D27 |
| 3300 | | 0.530 (13.5) | | | | | | 561R1DF0D33 |
| 3900 | 0.560 (14.2) | 561R1DF0D39 | | | | | | |
| 4700 | 0.630 (16.0) | 561R1DF0D47 | | | | | | |
| 5600 | 0.680 (17.3) | 561R1DF0D56 | | | | | | |
| 6800 | 0.760 (19.3) | 561R1DF0D68 | | | | | | |

Note

- Alternate lead spacings of 5 mm, 7.5 mm or 10 mm are available on request.



| ORDERING INFORMATION, CERAMIC 2 kV _{DC} LOW DISSIPATION FACTOR | | | | | | | | |
|---|-------------|--|---|-------------------------------|-----------|--------------|------|------------------|
| C (pF) | TOL. (%) | D _{max.} DIAMETER INCH (mm) | T _{max.} THICKNESS INCH (mm) | LS LEAD SPACE INCH (mm) | WIRE SIZE | | FIG. | ORDERING CODE |
| | | | | | AWG | INCH (mm) | | |
| COG (NPO) | | | | | | | | |
| 10 | ± 5 | 0.290 (7.4) | 0.160 (4.1) | 0.250 (6.4) | 20 | 0.032 (0.81) | 1 | 564R2DF0Q10 |
| N1500 | | | | | | | | |
| 12 | ± 5 | 0.290 (7.4) | 0.170 (4.3) | 0.250 (6.4) | 20 | 0.032 (0.81) | 1 | 564R2DF0Q12 |
| 27 | | | 0.220 (5.6) | | | | | 564R2DF0Q27 |
| 33 | | | 0.195 (5.0) | | | | | 564R2DF0Q33 |
| 39 | | | 0.180 (4.6) | | | | | 564R2DF0Q39 |
| 47 | | | 0.170 (4.3) | | | | | 564R2DF0Q47 |
| N2200 | | | | | | | | |
| 15 | ± 5 | 0.290 (7.4) | 0.185 (4.7) | 0.250 (6.4) | 20 | 0.032 (0.81) | 1 | 564R2DF0Q15 |
| 18 | | | 0.170 (4.3) | | | | | 564R2DF0Q18 |
| 22 | | | 0.170 (4.3) | | | | | 564R2DF0Q22 |
| N2000 | | | | | | | | |
| 56 | ± 5 | 0.290 (7.4) | 0.210 (5.3) | 0.250 (6.4) | 20 | 0.032 (0.81) | 1 | 564R2DF0Q56 |
| 68 | | | 0.190 (4.8) | | | | | 564R2DF0Q68 |
| 82 | | | 0.175 (4.5) | | | | | 564R2DF0Q82 |
| 100 | | | 0.170 (4.3) | | | | | 564R2DF0T10 |
| N2500 | | | | | | | | |
| 120 | ± 10 | 0.290 (7.4) | 0.185 (4.7) | 0.250 (6.4) | 20 | 0.032 (0.81) | 1 | 564R2DF0T12 |
| 150 | | | 0.170 (4.3) | | | | | 564R2DF0T15 |
| 180 | | | 0.185 (4.7) | | | | | 564R2DF0T18 |
| 270 | | | 0.330 (8.4) | | | | | 564R2DF0T27 |
| 470 | | | 0.400 (10.2) | | | | | 564R2DF0T47 |
| N2800 | | | | | | | | |
| 220 | ± 10 | 0.290 (7.4) | 0.170 (4.3) | 0.250 (6.4) | 20 | 0.032 (0.81) | 1 | 564R2DF0T22 |
| 330 | | 0.330 (8.4) | 0.185 (4.7) | | | | | 564R2DF0T33 |
| 390 | | 0.330 (8.4) | 0.175 (4.5) | | | | | 564R2DF0T39 |
| 560 | | 0.400 (10.2) | 0.185 (4.7) | | | | | 564R2DF0T56 |
| 680 | | 0.400 (10.2) | 0.170 (4.3) | | | | | 564R2DF0T68 |
| 820 | | 0.430 (10.9) | 0.175 (4.5) | | | | | 564R2DF0T82 |
| 1000 | | 0.460 (11.7) | 0.170 (4.3) | | | | | 564R2DF0D10 |
| 1200 | | 0.490 (12.5) | | | | | | 564R2DF0D12 |
| 1500 | | 0.530 (13.5) | 0.375 (9.5) | | | | | 564R2DF0D15 |
| 1800 | | 0.560 (14.2) | | | | | | 0.170 (4.3) |
| 2200 | | 0.680 (17.3) | | 0.180 (4.6) | | | | 564R2DF0D22 |
| 2300 | | | | 0.175 (4.5) | | | | 564R2DF0D23 |
| 2400 | | | | 0.175 (4.5) | | | | 564R2DF0D24 |
| 2500 | | | | 0.170 (4.3) | | | | 564R2DF0D25 |
| 2700 | | 564R2DF0D27 | | | | | | |
| 3300 | | 0.720 (18.3) | | | | | | 564R2DF0D33 |
| 3900 | | 0.790 (20.1) | | | | | | 564R2DF0D39 |
| 4700 | | 0.900 (22.9) | | 0.180 (4.6) | | | | 564R2DF0D47 |
| 5600 | | 0.900 (22.9) | 0.170 (4.3) | 564R2DF0D56 | | | | |
| 6800 | | 0.950 (24.1) | 0.170 (4.3) | 564R2DF0D68 | | | | |

Note

- Alternate lead spacings of 5 mm, 7.5 mm or 10 mm are available on request.



| ORDERING INFORMATION, CERAMIC 3 kV _{DC} LOW DISSIPATION FACTOR | | | | | | | | |
|---|--------------|--|---|-------------------------------|-----------|--------------|------|------------------|
| C (pF) | TOL. (%) | D _{max.} DIAMETER INCH (mm) | T _{max.} THICKNESS INCH (mm) | LS LEAD SPACE INCH (mm) | WIRE SIZE | | FIG. | ORDERING CODE |
| | | | | | AWG | INCH (mm) | | |
| N1500 | | | | | | | | |
| 10 | ± 5 | 0.290 (7.4) | 0.185 (4.7) | 0.250 (6.4) | 20 | 0.032 (0.81) | 1 | 564R3DF0Q10 |
| 27 | | | 0.220 (5.6) | | | | | 564R3DF0Q27 |
| 33 | | | 0.195 (5.0) | | | | | 564R3DF0Q33 |
| 39 | | | 0.190 (4.8) | | | | | 564R3DF0Q39 |
| 47 | | 0.330 (8.4) | 0.225 (5.7) | | | | | 564R3DF0Q47 |
| N2200 | | | | | | | | |
| 12 | ± 5 | 0.290 (7.4) | 0.210 (5.3) | 0.250 (6.4) | 20 | 0.032 (0.81) | 1 | 564R3DF0Q12 |
| 15 | | | 0.185 (4.7) | | | | | 564R3DF0Q15 |
| 18 | | | 0.185 (4.7) | | | | | 564R3DF0Q18 |
| 22 | | 0.330 (8.4) | 0.210 (5.3) | | | | | 564R3DF0Q22 |
| N2000 | | | | | | | | |
| 56 | ± 5 | 0.290 (7.4) | 0.210 (5.3) | 0.250 (6.4) | 20 | 0.032 (0.81) | 1 | 564R3DF0Q56 |
| 68 | | | 0.190 (4.8) | | | | | 564R3DF0Q68 |
| 82 | | | 0.185 (4.7) | | | | | 564R3DF0Q82 |
| N2500 | | | | | | | | |
| 100 | ± 10 | 0.290 (7.4) | 0.205 (5.2) | 0.250 (6.4) | 20 | 0.032 (0.81) | 1 | 564R3DF0T10 |
| 120 | | 0.290 (7.4) | 0.190 (4.8) | | | | | 564R3DF0T12 |
| 220 | | 0.330 (8.4) | 0.190 (4.8) | | | | | 564R3DF0T22 |
| N2800 | | | | | | | | |
| 150 | ± 10 | 0.290 (7.4) | 0.200 (5.1) | 0.250 (6.4) | 20 | 0.032 (0.81) | 1 | 564R3DF0T15 |
| 180 | | 0.290 (7.4) | 0.190 (4.8) | | | | | 564R3DF0T18 |
| 270 | | 0.330 (8.4) | 0.205 (5.2) | | | | | 564R3DF0T27 |
| 330 | | 0.330 (8.4) | 0.190 (4.8) | | | | | 564R3DF0T33 |
| 390 | | 0.400 (10.2) | 0.215 (5.5) | | | | | 564R3DF0T39 |
| 470 | | 0.400 (10.2) | 0.195 (5.0) | | | | | 564R3DF0T47 |
| 560 | | 0.430 (10.9) | 0.200 (5.1) | | | | | 564R3DF0T56 |
| 680 | | 0.460 (11.7) | 0.195 (5.0) | | | | | 564R3DF0T68 |
| 820 | | 0.490 (12.5) | 0.195 (5.0) | | | | | 564R3DF0T82 |
| 1000 | | 0.530 (13.5) | 0.190 (4.8) | | | | | 564R3DF0D10 |
| 1200 | | 0.560 (14.2) | 0.190 (4.8) | 0.375 (9.5) | | | | 564R3DF0D12 |
| 1500 | | 0.620 (15.8) | | | | | | 564R3DF0D15 |
| 1800 | | 0.680 (17.3) | | | | | | 564R3DF0D18 |
| 2200 | | 0.720 (18.3) | | | | | | 564R3DF0D22 |
| 2300 | | 0.720 (18.3) | 564R3DF0D23 | | | | | |
| 2400 | | 0.790 (20.1) | 0.195 (5.0) | | | | | 564R3DF0D24 |
| 2500 | | | 0.195 (5.0) | | | | | 564R3DF0D25 |
| 2700 | | | 0.190 (4.8) | | | | | 564R3DF0D27 |
| 3300 | | 0.900 (22.9) | 0.200 (5.1) | | | | | 564R3DF0D33 |
| 3900 | | 0.900 (22.9) | 0.190 (4.8) | | | | | 564R3DF0D39 |
| 4700 | 0.950 (24.1) | 0.185 (4.7) | 564R3DF0D47 | | | | | |

Note

- Alternate lead spacings of 5 mm, 7.5 mm or 10 mm are available on request.

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.



Power Rating - 1DFO Series 500 V_{RMS} Low DF - Note 1



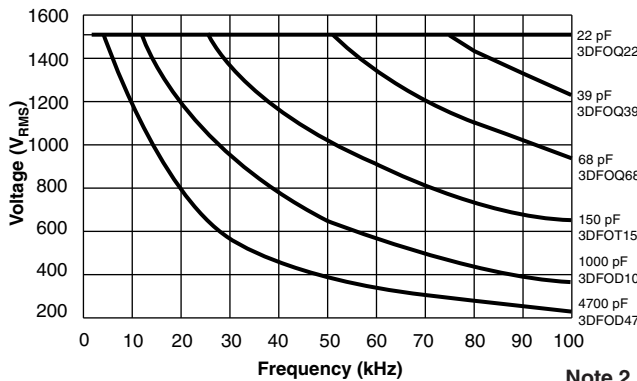
Note 2

Power Rating - 2DFO Series 1000 V_{RMS} Low DF - Note 1



Note 2

Power Rating - 3DFO Series 1500 V_{RMS} Low DF - Note 1



Note 2

Note 1

Power ratings are based on still air 60 °C ambient with additional 30 °C rise due to self heating. Thermal effects such as forced air cooling, component encapsulation or other heat-sinking techniques will alter ratings. Actual circuit for application recommended.

Note 2

For convenience, power rating charts are shown to 100 kHz. Higher frequency operation is permissible with appropriate derating. Consult us for application suggestions.

Temperature Characteristics for 1DFO, 2DFO & 3DFO Series



| RELATED DOCUMENTS | |
|---------------------|--|
| General Information | www.vishay.com/doc?23140 |



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