

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



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


RoHS
COMPLIANT

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

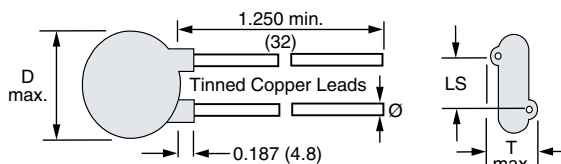
CLIMATIC CATEGORY ACC. TO EN 60068-1

55/125/21

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 (NP0)								
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								561R1DF0D15
1800		0.405 (10.3)						561R1DF0D18
2200								561R1DF0D22
2300		0.460 (11.7)						561R1DF0D23
2400								561R1DF0D24
2500								561R1DF0D25
2700								561R1DF0D27
3300		0.530 (13.5)						561R1DF0D33
3900								561R1DF0D39
4700		0.156 (4.0)	0.375 (9.5)	561R1DF0D47				
5600				561R1DF0D56				
6800				561R1DF0D68				
				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	
C0G (NP0)									
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)	0.170 (4.3)					564R2DF0T27	
470		0.400 (10.2)	0.170 (4.3)					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)		564R2DF0D15					
1800		0.560 (14.2)	0.170 (4.3)	564R2DF0D18					
2200		0.680 (17.3)	0.180 (4.6)	0.375 (9.5)				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)
2500			0.195 (5.0)					564R3DF0D25
2700			0.190 (4.8)					564R3DF0D27
3300			0.900 (22.9)					564R3DF0D33
3900		0.900 (22.9)	0.190 (4.8)					564R3DF0D39
4700		0.950 (24.1)	0.185 (4.7)	564R3DF0D47				

Note

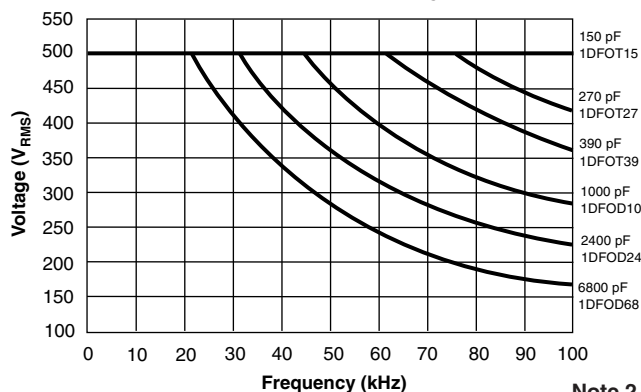
- Alternate lead spacings of 5 mm, 7.5 mm or 10 mm are available on request.

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.

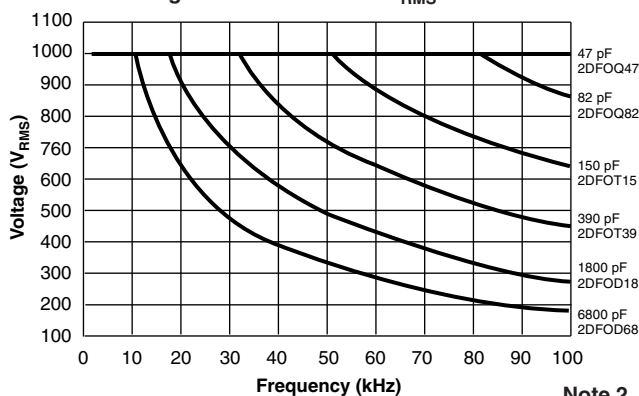


Power Rating - 1DFO Series 500 V_{RMS} Low DF - Note 1



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

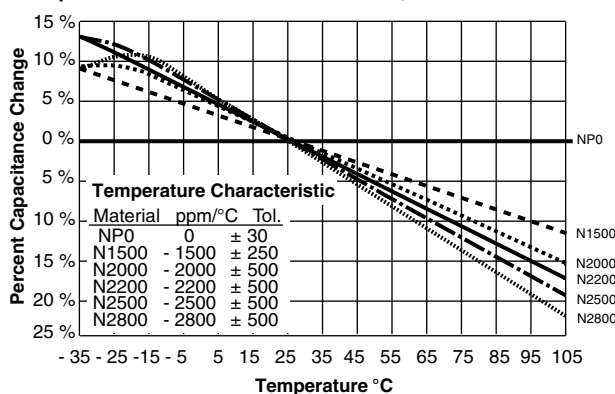
Power ratings are based on still air 60 °C ambient with additional 30 °C rise due to self heating.

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



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.

Material Category Policy

Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as RoHS-Compliant fulfill the definitions and restrictions defined under Directive 2011/65/EU of The European Parliament and of the Council of June 8, 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (EEE) - recast, unless otherwise specified as non-compliant.

Please note that some Vishay documentation may still make reference to RoHS Directive 2002/95/EC. We confirm that all the products identified as being compliant to Directive 2002/95/EC conform to Directive 2011/65/EU.

Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as Halogen-Free follow Halogen-Free requirements as per JEDEC JS709A standards. Please note that some Vishay documentation may still make reference to the IEC 61249-2-21 definition. We confirm that all the products identified as being compliant to IEC 61249-2-21 conform to JEDEC JS709A standards.