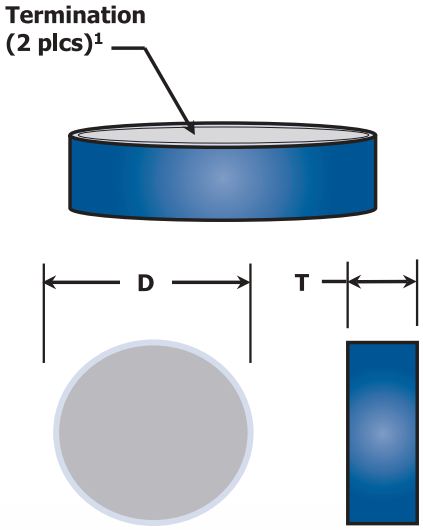
High Voltage Single Layer Bare Disc Capacitors

Military & Commercial Level Class 1 Negative TC Low Loss – 3 kVdc to 20 kVdc



1. **Termination Type: 100% fired-on silver**

CalRamic Technologies LLC manufactures a series of highly reliable, single layer, bare disc, negative temperature compensating, ceramic disc capacitors that deliver both very stable and predictable performance characteristics typically associated with low loss dielectrics.

These capacitors, which draw on thirty plus years of proven design and process experience, are manufactured under strict quality control guidelines and utilize a double action press to minimize gradients within the dielectric powder, producing a finished capacitor with a uniform fired ceramic density and unparalleled performance in high voltage applications. Leaded construction limits risk for damage due to exposure to mechanical and thermal stress.

Essential where low losses and tight capacitance tolerances are critical, these capacitors are ideally suited as snubbers for switching power supplies, coupling and decoupling capacitors, inverter circuitry, lighting ballasts, and other high voltage pulse applications.

Performance Characteristics

Specification	Dielectric Type			
	CR01	CR03	CR17	CR22
Material Classification	N750 (U2J)	N1500 (P3K)	N4700 (T3M)	N5600 (U3N)
Coefficient of Thermal Expansion	11 x 10^{-6} / °C	11 x 10^{-6} / °C	11 x 10^{-6} / °C	11 x 10^{-6} / °C
Density	72 g / in^3			
Operating Temperature Range	-55 to +125°C			
Aging Rate	0			
Temperature Coefficient	-750 PPM / °C ±10% Max	-1500 PPM / °C ±17% Max	-4700 PPM / °C ±52% Max	-5600 PPM / °C ±59% Max
Voltage Coefficient	-8% Max @ WVDC		-14% Max @ WVDC	
Capacitance Range	2.0 pF to 1000 pF	5.5 pF to 2700pF	29 pF to 0.014uF	34 pF to 0.017 µF
Voltage Range	3 kVDC to 20 kVDC			
Insulation Resistance @ +25°C	100,000 MΩ or 1000 MΩ - µF, W/E is less			
Insulation Resistance @ +125°C	10,000 MΩ or 100 MΩ - µF, W/E is less			
Dissipation Factor	0.2% Max			
DWV	1.5 x WVDC			

General Information

1. Standard inspection and Group A testing, when required, is performed in accordance with applicable requirements of MIL-PRF-49467, DSCC 87125, DSCC 89087 and NASA GSFC S-311-15C.
2. Special testing including 100% Partial Discharge (Corona) is available upon request.
3. Custom voltages, package sizes and capacitance values available. Contact factory.
4. Higher voltage parts may require encapsulation to prevent surface arc over and breakdown. When required, parts should first be cleaned, and oven dried at +85°C. Silicone rubbers or a suitable epoxy may be used and de-airing of encapsulates is recommended.
5. Testing of higher voltage parts before installation and / or application of supplemental encapsulation, may be done in a suitable, non-contaminating dielectric fluid like FC-40.
6. Large ceramic capacitors are susceptible to damage when exposed to thermal and / or mechanical shock. Ensure care is taken while handling and during installation or consider selecting leaded alternatives as detailed in catalog page CRT-0006.
7. All parts are RoHS compliant.

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C

Electrical / Mechanical Characteristics

Working Voltage	Disc Style	Dimensions [in]			Capacitance Range [pF]							
					CR01		CR03		CR17		CR22	
		D Max	T Nom	T Max	Min	Max	Min	Max	Min	Max	Min	Max
3 kVDC	D0606	0.220	0.060	0.075	14	30	37	86	190	430	230	510
	D0706	0.245	0.060	0.075	17.0	46	46	120	230	670	280	750
	D0806	0.275	0.060	0.075	20	63	55	170	280	910	330	1000
	D1006	0.330	0.060	0.075	32	91	92	250	460	1300	540	1500
	D1206	0.400	0.060	0.075	45	120	130	340	640	1700	750	2000
	D1406	0.460	0.060	0.075	80	160	220	440	1200	2200	1400	2700
	D1606	0.525	0.060	0.075	90	200	250	570	1300	2900	1500	3500
	D1806	0.590	0.060	0.075	100	250	280	700	1500	3600	1700	4300
	D2006	0.650	0.060	0.075	120	270	350	780	1800	3900	2100	4700
	D2206	0.710	0.060	0.075	150	300	420	860	2200	4300	2500	5100
	D2406	0.775	0.060	0.075	180	430	500	1200	2600	6100	3000	7200
	D2606	0.840	0.060	0.075	210	480	580	1300	3000	6800	3500	8000
	D2906	0.930	0.060	0.075	250	530	670	1400	3500	7500	4100	8900
	D3206	1.030	0.060	0.075	320	820	880	2200	4500	11000	5300	13000
	D3606	1.150	0.060	0.075	480	1200	1300	3300	6700	16000	7900	19000
5 kVDC	D0610	0.220	0.125	0.100	8	17	22	51	120	250	140	300
	D0710	0.245	0.125	0.100	10	25	29	75	140	400	170	460
	D0810	0.275	0.125	0.100	12	33	37	100	170	550	200	630
	D1010	0.330	0.125	0.100	19	53	56	150	280	770	320	910
	D1210	0.400	0.125	0.100	27	74	75	200	390	1000	450	1200
	D1410	0.460	0.125	0.100	48	98	140	250	680	1400	800	1600
	D1610	0.525	0.125	0.100	54	120	150	330	760	1700	900	2000
	D1810	0.590	0.125	0.100	60	150	170	410	850	2000	1000	2500
	D2010	0.650	0.125	0.100	75	160	210	460	1000	2200	1200	2700
	D2210	0.710	0.125	0.100	90	170	250	510	1300	2500	1500	3000
	D2410	0.775	0.125	0.100	110	250	300	720	1600	3600	1800	4300
	D2610	0.840	0.125	0.100	130	280	350	800	1800	4000	2100	4800
	D2910	0.930	0.125	0.100	150	320	410	890	2100	4400	2500	5300
	D3210	1.030	0.125	0.100	190	490	530	1300	2700	7000	3200	8200
	D3610	1.150	0.125	0.100	240	550	670	1500	3500	7800	4100	9100
	D4010	1.280	0.125	0.100	300	610	820	1700	4300	8700	5000	10000
7.5 kVDC	D0615	0.220	0.180	0.150	5.5	12	15	34	76	170	89	200
	D0715	0.245	0.180	0.150	6.7	17.0	20	52	98	260	110	310
	D0815	0.275	0.180	0.150	8	22	25	70	120	360	140	430
	D1015	0.330	0.180	0.150	13.0	35.0	37	100	190	530	220	630
	D1215	0.400	0.180	0.150	18	49	50	130	260	700	300	840
	D1415	0.460	0.180	0.150	32	65	87	170	450	920	530	1100
	D1615	0.525	0.180	0.150	36	82	98	220	510	1100	600	1400
	D1815	0.590	0.180	0.150	40	100	110	270	570	1400	670	1700
	D2015	0.650	0.180	0.150	50	110	140	300	710	1500	830	1800
	D2215	0.710	0.180	0.150	60	120	170	340	850	1700	1000	2000
	D2415	0.775	0.180	0.150	72	170	200	480	1100	2400	1200	2900
	D2615	0.840	0.180	0.150	85	180	230	530	1200	2600	1400	3200
	D2915	0.930	0.180	0.150	98	200	270	580	1400	2900	1700	3600
	D3215	1.030	0.180	0.150	130	320	350	910	1800	4600	2200	5500
	D3615	1.150	0.180	0.150	160	360	450	1000	2300	5200	2700	6100
	D4015	1.280	0.180	0.150	200	410	550	1100	2900	5800	3300	6800
10 kVDC	D0620	0.220	0.235	0.200	4	8	11	25	57	130	67	150
	D0720	0.245	0.235	0.200	5.0	13	14	39	70	200	83	220
	D0820	0.275	0.235	0.200	6	18	17	53	84	270	99	300
	D1020	0.330	0.235	0.200	10	27	27	76	140	400	160	450
	D1220	0.400	0.235	0.200	14	37	37	100	200	530	230	610
	D1420	0.460	0.235	0.200	24	48	66	130	340	700	400	820
	D1620	0.525	0.235	0.200	27	62	74	160	380	900	450	1000
	D1820	0.590	0.235	0.200	30	77	83	200	430	1100	500	1200
	D2020	0.650	0.235	0.200	37	79	106	220	530	1200	620	1300
	D2220	0.710	0.235	0.200	45	82	130	250	640	1300	750	1500
	D2420	0.775	0.235	0.200	54	130	150	360	760	1700	900	2000
	D2620	0.840	0.235	0.200	63	140	180	400	930	1900	1100	2200
	D2920	0.930	0.235	0.200	73	160	210	440	1100	2200	1300	2500
	D3220	1.030	0.235	0.200	95	240	270	680	1400	3400	1600	4100
	D3620	1.150	0.235	0.200	120	270	340	760	1800	3800	2000	4600
	D4020	1.280	0.235	0.200	150	300	410	840	2200	4300	2500	5100
15 kVDC	D0630	0.220	0.350	0.300	3	6	7.5	17	38	87	45	100
	D0730	0.245	0.350	0.300	3.5	8.5	9.7	25	47	120	55	150
	D0830	0.275	0.350	0.300	4	11	12	34	56	170	66	200
	D1030	0.330	0.350	0.300	6.5	17.0	18	51	90	250	100	300
	D1230	0.400	0.350	0.300	9	24	25	68	130	340	150	410
	D1430	0.460	0.350	0.300	16	32	44	91	230	460	270	550
	D1630	0.525	0.350	0.300	18	41	49	110	260	590	300	700
	D1830	0.590	0.350	0.300	20	51	55	140	290	720	340	860
	D2030	0.650	0.350	0.300	25	56	69	150	360	790	420	930
	D2230	0.710	0.350	0.300	30	61	83	170	430	870	500	1000
	D2430	0.775	0.350	0.300	36	87	99	240	510	1200	600	1400
	D2630	0.840	0.350	0.300	42	93	110	260	600	1300	700	1500
	D2930	0.930	0.350	0.300	49	100	140	290	690	1500	810	1700
	D3230	1.030	0.350	0.300	64	160	180	440	900	2200	1100	2700
	D3630	1.150	0.350	0.300	81	180	230	500	1200	2500	1400	3000
	D4030	1.280	0.350	0.300	99	200	280	560	1500	2900	1700	3400
20 kVDC	D1040	0.330	0.460	0.400	5.8	15	16	42	79	200	99	240
	D1240	0.400	0.460	0.400	7	18	19	51	96	250	120	300
	D1440	0.460	0.460	0.400	12	24	33	67	170	340	200	410
	D1640	0.525	0.460	0.400	13.0	30.0	37	83	190	440	220	520
	D1840	0.245	0.460	0.400	15	37	42	100	220	550	250	630
	D2040	0.650	0.460	0.400	19	41	52	110	270	600	310	700
	D2240	0.710	0.460	0.400	23	46	62	120	320	650	380	770
	D2440	0.775	0.460	0.400	27	65	74	170	380	920	450	1000
	D2640	0.812	0.460	0.400	32	72	92	190	450	1000	530	1100
	D2940	0.930	0.460	0.400	37	80	110	220	520	1100	610	1300
	D3240	1.030	0.460	0.400	48	120	140	340	680	1700	800	2000
	D3640	0.840	0.460	0.400	61	130	170	370	890	1800	1000	2200
	D4040	1.280	0.460	0.400	75	150	210	410	1100	2000	1300	2500

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Part Number / Ordering Information

D	1030	CR17	122	K	752	M	C

Disc
D = Bare Disc

Style
7050
- Reference table

Dielectric
CR01 = N750
CR03 = N1500
CR17 = N4700
CR22 = N5600

Capacitance
Value in pF
- Two significant figures, plus number of zeros
6R8 = 6.8 pF
122 = 1200 pF
203 = 20,000 pF

Tolerance
J = ±5%, NPO only
K = ±10%
M = ±20%
P = -0 / +100%
Z = -20 / +80%

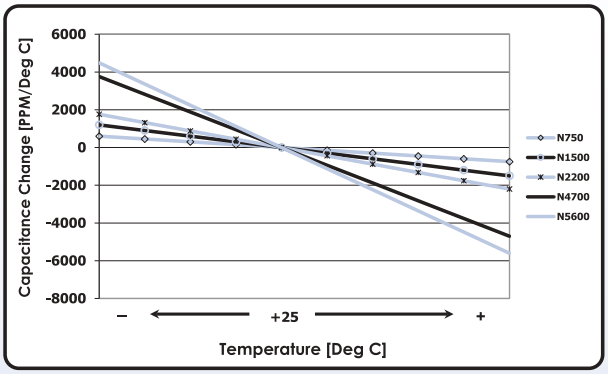
Voltage
752 = 7.5 kVDC
103 = 10 kVDC
153 = 15 kVDC

Screening
M = Group A
- Excluding Partial Discharge (Corona)

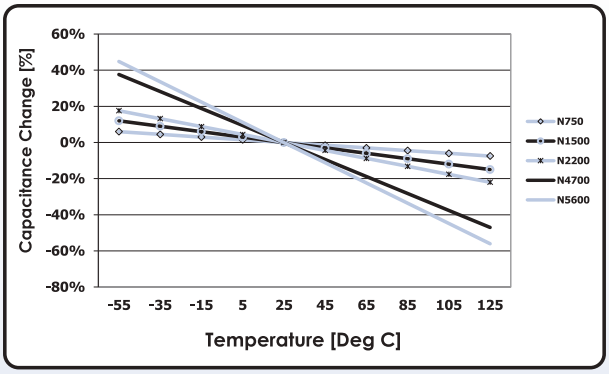
Partial Discharge (Corona)
C = Partial Discharge (Corona)

Note: Group A is not included unless designated in part number

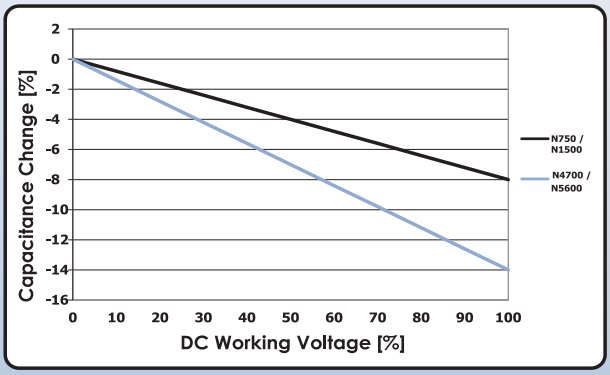
Performance Charts (Typical)



Temperature Coefficient [PPM / °C]



Temperature Coefficient [% Vs Temp]



Voltage Coefficient

Partnering with our clients for combined success.

ISO 9001:2015 CERTIFIED QUALITY MANAGEMENT SYSTEM

MADE IN USA

CalRamic Technologies LLC manufactures High Voltage Ceramic Capacitors. All of our products are manufactured in the United States. Applications of our products are Space Level, Military Aircraft and Ground Based Systems, Commercial Aerospace, SMPS, Medical Imaging, High Temperature (Geophysical and Geothermal), Pulse Discharge and High Repetition Rate, and a variety of commercial and industrial applications.

Our products range from Radial Leaded Multilayer and Disc to Surface Mount Chip capacitors in a variety of dielectrics to suit your application. We can produce large or small production quantities. Our lean manufacturing process and discipline offer the shortest lead times in the industry with out-of-stock same day delivery.

We also offer our “Fast Track” delivery for those special delivery needs. Custom designs and variations are welcome.

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BASIC APPLICATIONS

It is the basic ability of a capacitor to store energy for controlled release that makes it an extremely valuable tool for use in a wide range of applications in the electronics industry. Typical applications would include:

Energy / Pulse Discharge

The energy stored in the capacitor can be discharged for use in an ignition, firing or triggering circuit or as a power source.

Direct Current Blockage

A fully charged capacitor acts as a high impedance device and can block the passage of DC current while still allowing AC current to pass to a specified portion of the circuit.

Coupling of Circuit Components

With the ability to pass AC signals, a capacitor is able to couple one section of an AC circuit to another circuit.

Decoupling of Circuit Components

Capacitors are often used in integrated circuits (IC's) to minimize noise in the logic signal by providing an additional current source.

Filter Capacitors

The reactance of a capacitor is inversely proportional to the frequency thereby offering decreased resistance to current flow at higher frequency levels. This ability to decrease or increase the impedance of the circuit allows the capacitor to discriminate and filter out undesired frequencies.

By-Pass Capacitor

The ability to block DC current and allow the passage of AC current permits the capacitor to be placed in parallel with other components to by-pass the AC at a certain frequency without allowing the DC component of the signal to pass.

Snubber Capacitors

Capacitors can be used to protect sensitive components in a circuit by limiting the energy associated with high voltage transients generated by the opening of relays or silicon controlled rectifiers (SCR) used to drive high inductance loads.

Switch Mode Power Supply

For applications including input and output filters for switch mode power supplies, DC to DC converters, decoupling, snubbers, energy storage and high capacitance discharge circuits.
See pages 27 & 49 for more information.

CalRamic Technologies LLC is an ISO9001-2015 Certified facility. Our commitment to Quality is our primary objective and we pride ourselves on our satisfaction to our client base. Our Goal is to provide the upmost Quality from the initial contact in introducing our company, to quoting the same day if possible, followed by offering short deliveries coupled with “on time deliveries” of our products. And of course, what we consider the most important element, the reliability of the components in the application once delivered. In addition, we remain dynamic and open to our customer’s inputs so we may continue to improve in all aspects related to our chosen field. We continue to grow at a substantial rate and believe that is in direct response to maintaining the Quality Objectives stated above.

42 °C
NEW ELEMENTS 10/9

MORE ABOUT US

CalRamic Technologies LLC is a U.S.-based High Voltage Ceramic Capacitor manufacturer with over 20 years' experience. Our team focuses on producing exceptional quality capacitors by using superior quality materials with a highly trained team.

CalRamic produces a variety of components in a multitude of configurations ranging from 500VDC to 80KVDC. Our Lean Manufacturing principles provide shorter lead times, rapid prototype turnaround deliveries, multiple design derivations for your custom application, and a variety of dielectric types depending on your specific application.

Our quality control system conforms to and exceeds ISO 9001-2015 requirements. We manufacture capacitors suitable for a wide range of applications like: Geothermal, Commercial/Industrial, Medical, Commercial Aerospace, Ground Based Military, Military Aerospace and even Hi-Reliability Space Satellite Systems. Our manufacturing design guidelines, material choices, and precision controls result in performance-based High Voltage Capacitors for your specific application.

The CalRamic Technologies Leadership has created a culture that encourages personal growth and success for each team member, while building a We Succeed as a Team environment. In addition, we look for opportunities to support our local community through non-profit involvement and CalRamic Team events throughout the year.

We are committed to the best approaches and practices that limit environmental impact, and an extensive safety and awareness training program that limits hazardous exposures to our Team Members.

CalRamic Technologies LLC is fully committed to our clients' success. On our website we offer a full ceramic capacitor educational library with Application Notes and Product Training Modules that help our clients understand the technical nature of High Voltage Ceramic Capacitors.

We are fully committed to your application's success.

Jeff Day

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