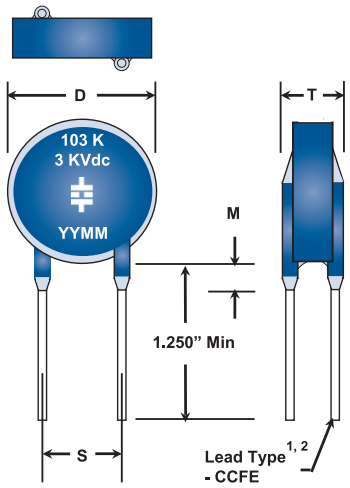
High Voltage Radial Leaded Disc Capacitors

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



1. Lead Size: D30, D40 @ 0.025" Dia (#22 AWG) [0.64 mm] D50 & larger @ 0.032" Dia (#20 AWG) [0.81mm].
2. Lead Finish: Sn60 / Pb40 Solder
3. Order of marking may vary depending on size of capacitor.

CalRamic Technologies LLC manufactures a series of highly reliable, single layer, conformally coated, negative temperature compensating, leaded 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. Group B Inspection is available upon request.
3. Special testing including 100% Partial Discharge (Corona) is available upon request. Contact factory.
4. Custom voltages, package sizes and capacitance values available. Contact factory.
5. Higher voltage parts may require further 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.
6. Testing of higher voltage parts before installation and / or supplemental encapsulation, may be done in a suitable, non-contaminating dielectric fluid like FC-40.
7. Large ceramic capacitors, even leaded devices are susceptible to damage when exposed to thermal and / or mechanical shock. Refer to Technical Bulletin AN103 for handling and installation recommendations.

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Electrical / Mechanical Characteristics

Working Voltage	Disc Style	Dimensions [in]				Actual Capacitance Value Range [pF]							
						CR01		CR03		CR17		CR22	
		D Max	S ± 0.030	T Max	M Max	Min	Max	Min	Max	Min	Max	Min	Max
3 kVDC	D30	0.300	0.250	0.210	0.125	14	30	37	86	190	430	230	510
	D40	0.400	0.250	0.210	0.125	20	63	55	170	280	910	330	1000
	D50	0.500	0.375	0.210	0.125	45	120	130	340	640	1700	750	2000
	D60	0.600	0.375	0.210	0.125	80	160	220	440	1200	2200	1400	2700
	D70	0.700	0.500	0.210	0.125	100	250	280	700	1500	3600	1700	4300
	D80	0.800	0.500	0.210	0.125	150	300	420	860	2200	4300	2500	5100
	D90	0.900	0.500	0.210	0.125	180	430	500	1200	2600	6100	3000	7200
	D100	1.000	0.500	0.210	0.125	250	530	670	1400	3500	7500	4100	8900
	D120	1.200	0.500	0.210	0.125	320	820	880	2200	4500	11000	5300	13000
	D140	1.400	0.625	0.210	0.125	500	1000	1400	2700	7100	14000	8300	17000
5 kVDC	D30	0.300	0.250	0.250	0.125	8	17	22	51	120	250	140	300
	D40	0.400	0.250	0.250	0.125	12	37	33	100	170	550	200	630
	D50	0.500	0.375	0.250	0.125	27	75	74	200	390	1000	450	1200
	D60	0.600	0.375	0.250	0.125	48	98	140	250	680	1400	800	1600
	D70	0.700	0.500	0.250	0.125	60	150	170	410	850	2000	1000	2500
	D80	0.800	0.500	0.250	0.125	90	170	250	510	1300	2500	1500	3000
	D90	0.900	0.500	0.250	0.125	110	250	300	720	1600	3600	1800	4300
	D100	1.000	0.500	0.250	0.125	150	320	410	890	2100	4400	2500	5300
	D120	1.200	0.500	0.250	0.125	190	490	530	1300	2700	7000	3200	8200
	D140	1.400	0.625	0.250	0.125	300	610	820	1700	4300	8700	5000	10000
7.5 kVDC	D30	0.300	0.250	0.310	0.150	5.5	12	15	34	76	170	89	200
	D40	0.400	0.250	0.310	0.150	8	25	22	70	120	360	140	430
	D50	0.500	0.375	0.310	0.150	18	49	50	130	260	700	300	840
	D60	0.600	0.375	0.310	0.150	32	65	87	170	450	920	530	1100
	D70	0.700	0.500	0.310	0.150	40	100	110	270	570	1400	670	1700
	D80	0.800	0.500	0.310	0.150	60	120	170	340	850	1700	1000	2000
	D90	0.900	0.500	0.310	0.150	72	170	200	480	1100	240	1200	2900
	D100	1.000	0.500	0.310	0.150	98	200	270	580	1400	2900	1700	3600
	D120	1.200	0.500	0.310	0.150	130	320	350	910	1800	4600	2200	5500
	D140	1.400	0.625	0.310	0.150	200	410	550	1100	2900	5800	3300	6800
10 kVDC	D30	0.300	0.250	0.440	0.170	4	8	11	25	57	130	67	150
	D40	0.400	0.250	0.440	0.170	6	18	17	53	84	270	99	300
	D50	0.500	0.375	0.440	0.170	14	37	37	100	200	530	230	610
	D60	0.600	0.375	0.440	0.170	24	48	66	130	340	700	400	820
	D70	0.700	0.500	0.440	0.170	30	77	83	200	430	1100	500	1200
	D80	0.800	0.500	0.440	0.170	45	82	130	250	640	1300	750	1500
	D90	0.900	0.500	0.440	0.170	54	130	150	360	760	1700	900	2000
	D100	1.000	0.500	0.440	0.170	73	160	210	440	1100	2200	1300	2500
	D120	1.200	0.500	0.440	0.170	95	240	270	680	1400	3400	1600	4100
	D140	1.400	0.625	0.440	0.170	150	300	410	840	2200	4300	2500	5100
15 kVDC	D30	0.300	0.250	0.545	0.175	3	6	7.5	17	38	87	45	100
	D40	0.400	0.250	0.545	0.175	4	12	11	34	56	170	66	200
	D50	0.500	0.375	0.545	0.175	9	24	25	68	130	340	150	410
	D60	0.600	0.375	0.545	0.175	16	32	44	91	230	460	270	550
	D70	0.700	0.500	0.545	0.175	20	51	55	140	290	720	340	860
	D80	0.800	0.500	0.545	0.175	30	61	83	170	430	870	500	1000
	D90	0.900	0.500	0.545	0.175	36	87	99	240	510	1200	600	1400
	D100	1.000	0.500	0.545	0.175	49	100	140	290	690	1500	810	1700
	D120	1.200	0.500	0.545	0.175	64	160	180	440	900	2200	1100	2700
	D140	1.400	0.625	0.545	0.175	99	200	280	560	1500	2900	1700	3400
20 kVDC	D50	0.500	0.375	0.650	0.175	7	18	19	51	96	250	120	300
	D60	0.600	0.375	0.650	0.175	12	24	33	67	170	340	200	410
	D70	0.700	0.500	0.650	0.175	15	37	42	100	220	550	250	630
	D80	0.800	0.500	0.650	0.175	23	46	62	120	320	650	380	770
	D90	0.900	0.500	0.650	0.175	27	65	74	170	380	920	450	1000
	D100	1.000	0.500	0.650	0.175	37	80	110	220	520	1100	610	1300
	D120	1.200	0.500	0.650	0.175	48	120	140	340	680	1700	800	2000
	D140	1.400	0.625	0.650	0.175	75	150	210	410	1100	2000	1300	2500

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Part Number / Ordering Information

D30	D50	CR17	152	K	M	C	R	/LS250	/025

Voltage
D30 = 3 kVDC
D100 = 10 kVDC
D150 = 15 kVDC
D200 = 20 kVDC

Style
D50
- Reference table

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

Capacitance
Value in pF
- Two significant figures, plus number of zeros
5R5 = 5.5 pF
152 = 1000 pF
103 = 10,000 pF

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

Screening
- Excludes Partial Discharge (Corona)

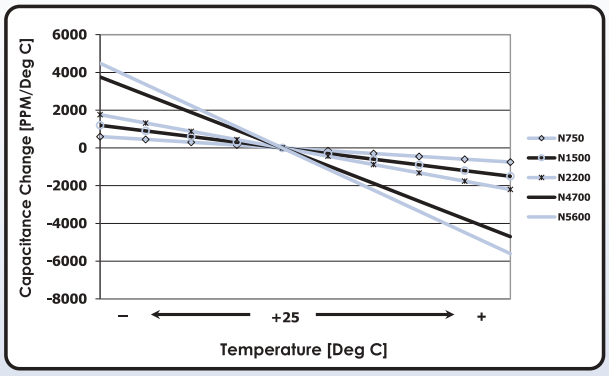
Partial Discharge (Corona)
C - Partial Discharge (Corona)

RoHS
R = RoHS

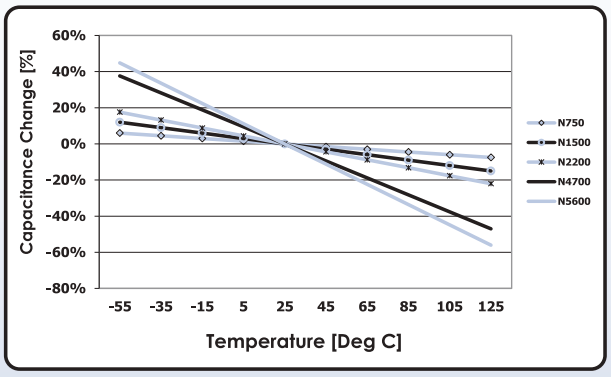
Alternative Lead Spacing
/LS250 = 0.250"
/LS375 = 0.375"
/LSXXX = X.XXX"

Alternative Lead Diameter
/025 = 0.025"
/032 = 0.032"

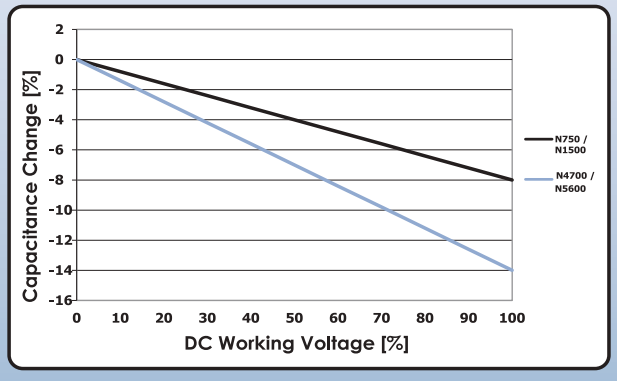
Performance Charts (Typical)



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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