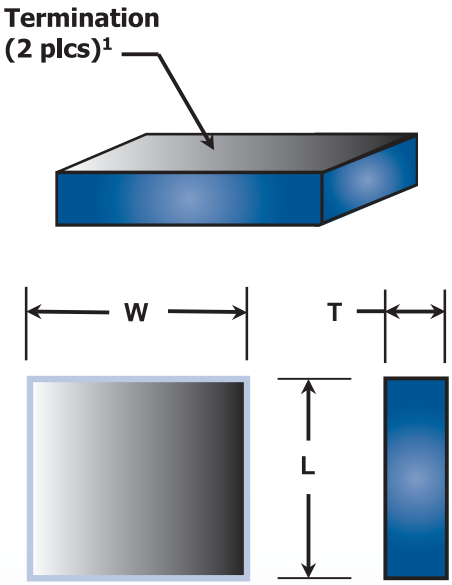
High Voltage Single Layer Bare Rectangular Capacitors

Military & Commercial Level Class 1 & Class 2 Dielectric – 3 kVdc to 20 kVdc



1. Termination Type: 100% fired-on silver

CalRamic Technologies LLC manufactures a series of highly reliable, single layer, rectangular ceramic capacitors that are designed and manufactured under strict quality control guidelines to ensure unparalleled performance in high voltage applications.

These capacitors, which draw on thirty plus years of proven design and process experience, utilize double action pressing to minimize gradients within the dielectric powder and produce a finished capacitor with a uniform fired ceramic density.

Capacitors are available with ultra stable Class I, NPO dielectrics, essential where low losses and tight capacitance tolerances are critical and stable Class II, X5R, X7R and X5U dielectric materials, which are intended for those applications where higher losses and less precision can be tolerated.

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.

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Performance Characteristics

Specification	Dielectric Type (EIA Designation)			
	NPO (COG) (N)	X7R (X)	X5R (W)	X5U (Y)
Material Classification	Type I, Ultra Stable, K76	Type II, Stable, K2350	Type II, Stable, K2500	Type II, Stable, K5000
Coefficient of Thermal Expansion	9 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		-55 to +85°C	
Aging Rate	0	-2% Max per decade hour		-3% Max per decade hour
Temperature Coefficient	±90 PPM / °C	±15%		+22 / -56%
Voltage Coefficient	Negligible	-20% Max @ WVDC		-35% Max @ WVDC
Capacitance Range	4.0 pF to 300 pF	120 pF to 9000 pF	140 pF to 10,200 pF	270 pF to 0.020 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 @ T Max	10,000 MΩ or 100 MΩ - µF, W/E is less			
Dissipation Factor	0.1% Max	2.5% 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 a leaded alternative.

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Electrical / Mechanical Characteristics

Working Voltage	Style	Dimensions [in]				Capacitance Range [pF]							
		L ± 0.010	W ± 0.010	T Max	T Nom	NPO (N)		X7R (X)		X5R (W)		X5U (Y)	
						Min	Max	Min	Max	Min	Max	Min	Max
3 kVDC	3408	0.340	0.080	0.075	0.060	6.8	8.1	200	240	230	275	460	550
	5625	0.560	0.250	0.075	0.060	35	42	1000	1200	1200	1400	2400	2900
	5439	0.540	0.390	0.075	0.060	53	64	1600	1900	1800	2200	3600	4300
	7050	0.700	0.500	0.075	0.060	88	106	2600	3100	3000	3600	6000	7100
	100100	1.000	1.000	0.075	0.060	250	300	7500	9000	8500	10200	17000	20000
5 kVDC	3408	0.340	0.080	0.125	0.100	4	5	120	150	140	170	270	340
	5625	0.560	0.250	0.125	0.100	21	26	620	7700	700	870	1400	1700
	5439	0.540	0.390	0.125	0.100	32	39	940	1200	1100	1300	2100	2600
	7050	0.700	0.500	0.125	0.100	52	65	1500	1900	1800	2200	3500	4400
	100100	1.000	1.000	0.125	0.100	150	184	4400	5500	5000	6200	10000	12400
7.5 kVDC	3408	0.340	0.080	0.180	0.150	•	•	•	•	•	•	•	•
	5625	0.560	0.250	0.180	0.180	14	17	410	500	470	580	940	1200
	5439	0.540	0.390	0.180	0.180	21	26	620	760	700	870	1400	1700
	7050	0.700	0.500	0.180	0.180	35	43	100	1300	1200	1400	2300	2900
	100100	1.000	1.000	0.180	0.180	100	120	2900	3600	3400	4100	6700	8200
10 kVDC	3408	0.340	0.080	0.235	0.200	•	•	•	•	•	•	•	•
	5625	0.560	0.250	0.235	0.200	11	13	310	380	350	430	710	870
	5439	0.540	0.390	0.235	0.200	16	19	470	570	530	650	1100	1300
	7050	0.700	0.500	0.235	0.200	26	32	780	950	880	1100	1800	2200
	100100	1.000	1.000	0.235	0.200	75	92	2200	2700	2500	3100	5000	6200
15 kVDC	3408	0.340	0.080	0.350	0.300	•	•	•	•	•	•	•	•
	5625	0.560	0.250	0.350	0.300	7	8.5	210	250	240	290	470	580
	5439	0.540	0.390	0.350	0.300	11	13	310	380	350	430	710	870
	7050	0.700	0.500	0.350	0.300	17	21	520	630	590	720	1200	1400
	100100	1.000	1.000	0.350	0.300	50	60	1500	1800	1700	2100	3400	4100
20 kVDC	3408	0.340	0.080	0.460	0.400	•	•	•	•	•	•	•	•
	5625	0.560	0.250	0.460	0.400	5.2	6.4	160	190	180	220	350	430
	5439	0.540	0.390	0.460	0.400	7.9	9.6	230	290	270	330	530	650
	7050	0.700	0.500	0.460	0.400	13	16	390	470	440	540	880	1100
	100100	1.000	1.000	0.460	0.400	37	46	1100	1400	1300	1500	2500	3100

- **Other sizes & voltages available upon request**

Part Number / Ordering Information

SL	7050	W	122	K	752	M	C

Disc
SL = Single layer

Style
7050
- Reference table

Dielectric
N = NPO
W = X5R
X = X7R
Y = X5U

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

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

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

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

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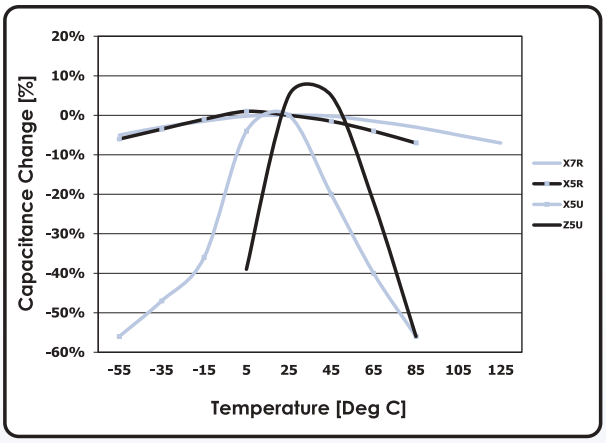
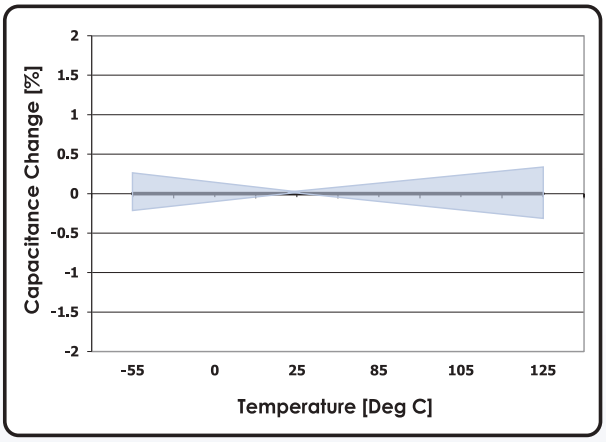
MADE IN USA

C

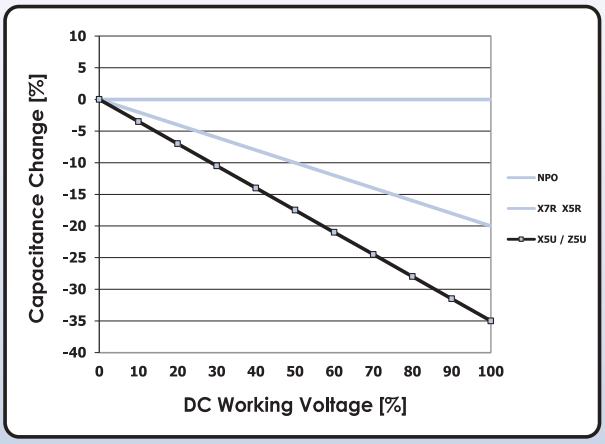
Performance Charts (Typical)



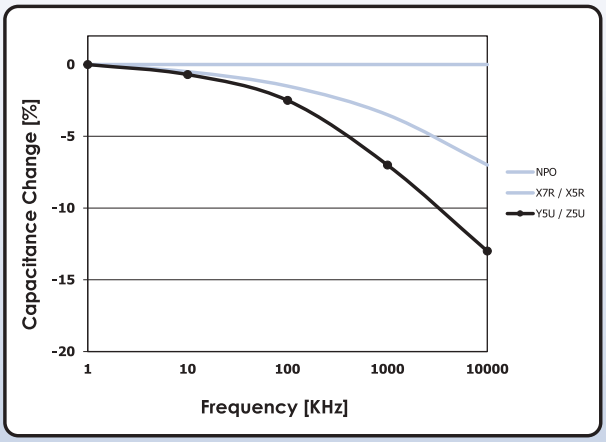
Class II Temperature Coefficient



NPO Temperature Coefficient



Voltage Coefficient



Capacitance Vs Frequency

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.

MADE IN USA

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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