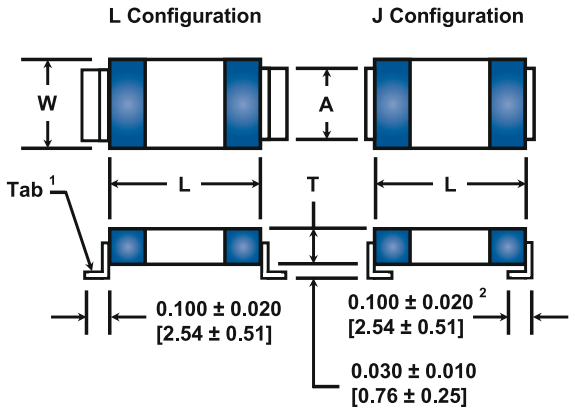
High Voltage Surface Mount Pulse Capacitors

Military & Commercial Level Class 1 Negative TC Low Loss – 500 Vdc to 10 kVdc



1. Tab thickness 0.009 ± 0.001 [0.25 ± 0.025]
2. Tab Length SM01, SM02, SM03 @ 0.040 ± 0.010 [1.02 ± 0.26]

CalRamic Technologies LLC manufactures a series of highly reliable, military / commercial level high voltage, leaded surface mount, ceramic chip capacitors that are intended for those environments where the assembly may be exposed to high levels of thermal and / or mechanical shock. Conservatively designed they are ideal for use in demanding high voltage, high current applications.

Intended for continuous operation at full rated voltage and across the entire operating temperature range, these capacitors utilize an inherently low loss dielectric material and a special internal design specifically intended to provide a device that exhibits very low ESR / ESL characteristics, especially at higher frequencies.

Available with stable CR09 dielectric material, these capacitors are ideally suited for high current, pulse discharge applications.

Performance Characteristics

Specification	Dielectric Type
	CR09
Material Classification	N2200 (R3L)
Coefficient of Thermal Expansion	11 x 10^{-6} / °C
Density	72 g / in^3
Operating Temperature Range	-55 to +125°C
Aging Rate	0
Temperature Coefficient	-2200 PPM / °C ±24% Max
Voltage Coefficient	-7% Max @ WVDC
Capacitance Range	120 pF to 1.0uF
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 ≤ 1250 Vdc or 1.2 X WVDC > 1250 Vdc

Mechanical Dimensions

Dimensions Inches [mm]	Product Style												
	PDSM01	PDSM02	PDSM03	PDSM10	PDSM04	PDSM11	PDSM05	PDSM06	PDSM07	PDSM13	PDSM14	PDSM15	PDSM16
Length [L]	0.150 ±0.015 [3.81 ±0.38]	0.200 ±0.020 [5.08 ±0.51]	0.250 ±0.025 [6.35 ±0.64]	0.300 ±0.030 [7.62 ±0.76]	0.350 ±0.030 [8.89 ±0.76]	0.400 ±0.030 [10.20 ±0.76]	0.450 ±0.030 [11.43 ±0.76]	0.550 ±0.030 [14.00 ±0.76]	0.650 ±0.030 [16.50 ±0.76]	0.700 ±0.030 [17.80 ±0.76]	0.900 ±0.030 [22.90 ±0.76]	1.100 ±0.030 [27.90 ±0.76]	1.300 ±0.030 [33.02 ±0.76]
Width [W]	0.150 ±0.015 [3.81 ±0.38]	0.200 ±.020 [5.08 ±0.51]	0.200 ±0.020 [5.08 ±0.51]	0.150 ±0.015 [3.81 ±0.38]	0.300 ±0.030 [7.62 ±0.76]	0.200 ±0.020 [5.08 ±0.51]	0.400 ±0.030 [10.16 ±0.76]	0.500 ±0.030 [12.70 ±0.76]	0.600 ±0.030 [10.20 ±0.76]	0.300 ±0.030 [7.62 ±0.76]	0.400 ±0.030 [10.16 ±0.76]	0.500 ±0.030 [12.70 ±0.76]	0.600 ±0.030 [10.20 ±0.76]
Thickness [T] [Max]	0.140 [3.55]	0.180 [4.57]	0.180 [4.57]	0.140 [3.55]	0.220 [5.59]	0.220 [5.59]	0.220 [5.59]	0.220 [5.59]	0.220 [5.59]	0.220 [5.59]	0.220 [5.59]	0.220 [5.59]	0.220 [5.59]
Tab [A] [Max]	0.100 [2.54]	0.100 [2.54]	0.100 [2.54]	0.100 [2.54]	0.200 5.08]	0.100 [2.54]	0.300 [7.62]	0.400 [10.2]	0.500 [12.7]	0.200 5.08]	0.300 [7.62]	0.400 [10.2]	0.500 [12.7]

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Electrical Characteristics

(CR09) Capacitance Range														
Style		PDSM01	PDSM02	PDSM03	PDSM10	PDSM04	PDSM11	PDSM05	PDSM06	PDSM07	PDSM13	PDSM14	PDSM15	PDSM16
Min Cap		121	181	221	181	271	281	271	471	471	471	471	471	471
WVDC	500	223	473	683	563	154	124	274	474	824	334	474	684	105
	1,000	153	333	393	333	104	683	184	274	684	224	394	564	824
	2,000	222	562	822	682	223	153	333	683	474	473	823	124	184
	3,000	•	332	472	332	123	103	223	393	104	273	563	823	124
	4,000	•	•	•	721	332	222	562	123	563	822	183	273	393
	5,000	•	•	•	•	•	152	472	103	183	562	123	183	273
	7,000	•	•	•	•	•	•	•	•	153	•	392	822	123
	10,000	•	•	•	•	•	•	•	•	•	•	272	472	822

Notes

1. Standard inspection and Group A testing when required, is performed in accordance with applicable requirements of MIL-PRF-49467.
2. Special testing including Ultrasound (C-SAM) and Partial Discharge (Corona) is available. For more information contact factory.
3. Custom package sizes / aspect ratios, voltages and capacitance values available. Contact factory for more details.
4. Large ceramic capacitors, even leaded devices, are susceptible to damage when exposed to thermal and/or mechanical shock. Refer to Technical Bulletin AN101/AN112 for handling and installation recommendations.
5. High voltage products may require conformal coating to prevent possible arc over.
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.

Part Number / Ordering Information

10	PDSM03	CR09	333	K	M	R

Voltage
05 = 500 Vdc
10 = 1000 Vdc
100 = 10 kVdc

Style
PDSM03
- Reference table

Dielectric
CR09 = N2200

Capacitance
Value in pF
- Two significant figures, plus number of zeros
562 = 5600 pF
333 = 33,000 pF
104 = 100,000 pF

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

Screening
M = Group A
- Excludes corona

RoHS
R = RoHS

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

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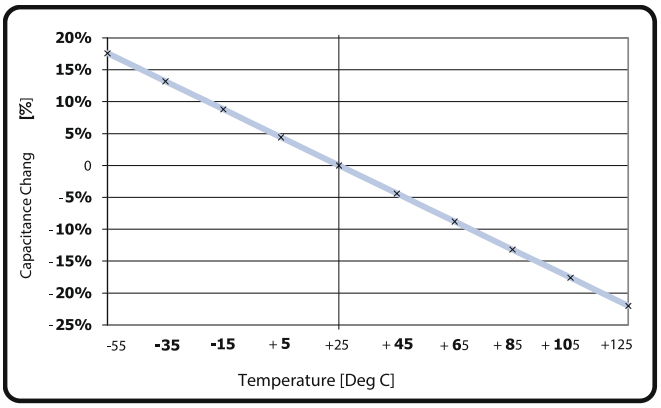
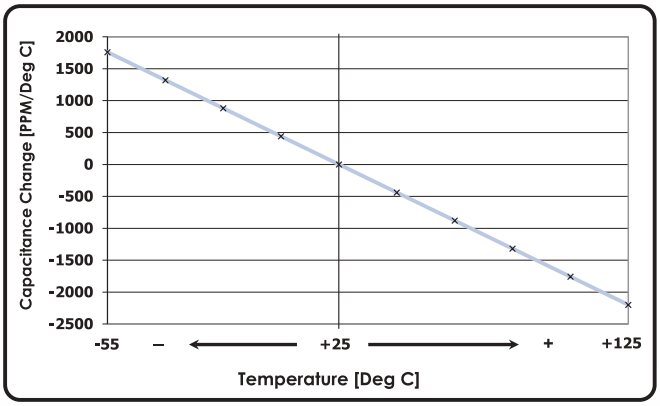
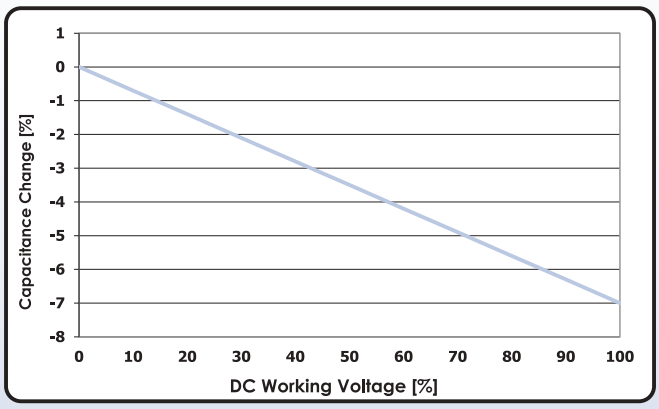
Performance Charts (Typical)



CR09 (N2200) Temperature Coefficient
% Cap Chance Vs Temp



CR09 (N2200) Temperature Coefficient
PPM Cap Change Vs Temp



CR09 (N2200) 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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