

## Type 718P/719P Orange Drop<sup>®</sup> Radial Lead High AC Voltage Polypropylene Film/Foil Capacitors



### Specifications

#### Capacitance Range:

560 pF to 0.012  $\mu$ F

#### Capacitance Tolerance:

718P:  $\pm 1\%$  to  $\pm 10\%$

719P:  $\pm 3\%$  to  $\pm 10\%$

#### Voltage Rating:

1500 VAC/5000 VDC

#### Operating Temperature

Units may be operated at full rated voltage from  $-55^{\circ}\text{C}$  to  $+105^{\circ}\text{C}$ . Please contact SBE application engineering to discuss thermal management in your application.

#### Dissipation Factor:

See ratings table.

#### Pulse Rise Time, $dV/dt$ :

See ratings table.

#### Insulation Resistance:

At  $+25^{\circ}\text{C}$ : 400,000  $\text{M}\Omega$  minimum

At  $+85^{\circ}\text{C}$ : 20,000  $\text{M}\Omega$  minimum

At  $+105^{\circ}\text{C}$ : 2,000  $\text{M}\Omega$  minimum

#### Corona Inception Voltage (typical):

1625 – 1650 Volts RMS

#### Encapsulation:

Conformal coating of flame retardant Orange epoxy (meets UL94V-0 specifications).

#### Lead Wire (d):

Tinned Copper. #20 AWG, 0.032 (0.8) diameter or #18 AWG, 0.040 (1.0) diameter. See ratings table for specific wire size.

#### Dielectric/Construction:

Polypropylene film with extended foil; utilizing a floating common of metallized polypropylene, which provides self-healing characteristics. This series-section, hybrid design is non-inductively wound.

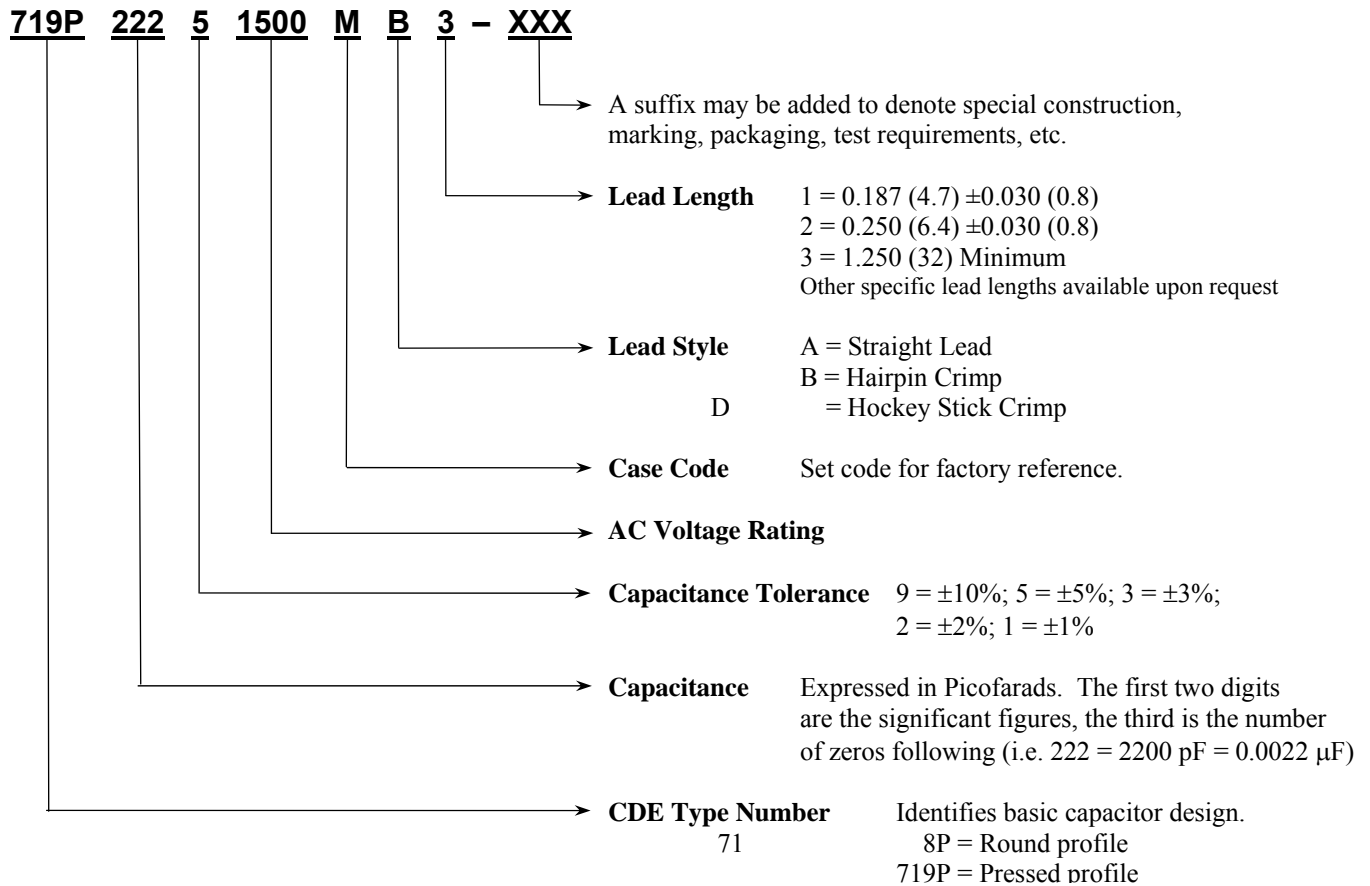
[RoHS Compliant](#)

In addition to the information provided here CDE also offers complete design and manufacturing of specific capacitance values, custom form factors, special lead terminations, etc.

Dimensions are in inches, millimeters are in parenthesis.

# Type 718P/719P, Orange Drop®, High Voltage Polypropylene Film/Foil

## Ordering/Part Number Information



## Standard Marking Format

Sample Marking on unit	Description	Tolerance codes per EIA standards
CDE719P1500VAC	CDE - CDE Identification	F ±1%
222J 0515	719P - Type Number	G ±2%
	1500VAC - AC Voltage Rating	H ±3%
	222J - Capacitance and Tolerance Code	J ±5%
	0515 - Weekly Date Code (i.e. 15th week of 2005)	K ±10%

Dimensions are in inches, millimeters are in parenthesis.

## **Application Notes & Considerations**

### **Corona:**

Corona is a small but locally intense electrical discharge that injects charge into the insulating film adjacent to edges of foil/metallization or a location where air is trapped between foil/metallization and the film. The discharge is caused by a voltage gradient large enough to ionize molecules in either the film or small air pockets. Each discharge does some small but cumulative damage to the film. Corona is a very important consideration for AC and/or pulse applications where the cumulative damage can rapidly accrue and cause dielectric failure. For a plain film & foil part this will result in a short circuit. However, for a capacitor employing metallized film the “clearing” around the dielectric failure site results in progressive capacitance loss. The 718P/719P series utilizes a hybrid film/foil design approach, incorporating the use of extended foil for direct connection of the lead wires and a floating metallized common.

Corona Inception Voltage (CIV) is the peak-to-peak voltage at which corona discharge begins; it is also commonly referred to as Corona Start Voltage (CSV). It is traditionally expressed as the RMS value of a sine wave with the above peak-to-peak value. It is not practical to try and list all the facts and issues associated with corona, therefore we highly encourage you to contact us to discuss your application and the importance of carefully considering the effects of corona.

### **dV/dt (Pulse Rise Time):**

Pulse Rise Time, commonly referred to as dV/dt, is the maximum guaranteed repetitive rate of voltage change [slew rate] a capacitor can withstand without damage during the lifetime of an application, expressed in Volts/μsec or KV/μsec. dV/dt also expresses current pulse capability without requiring a nearly impossible pulse current measurement. Pulse current is only an issue for a pure metallized capacitor where pulse currents above the rated value can destroy the connection to the metallization. With leads welded directly to extended foil, film/foil capacitor dV/dt is only limited by corona inception [AC voltage rating] and application circuit inductance. CDE's dV/dt ratings are provided to assure capacitors are NEVER operated in corona to assure highest possible reliability in pulse applications.

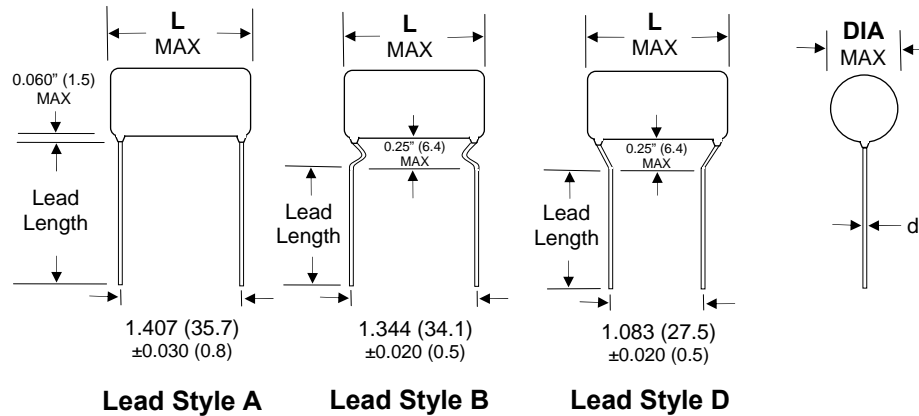
As mentioned above we strongly encourage you to contact us with your questions and/or specific requirements.

### **CDE's Design Philosophy:**

The CDE approach is to design and manufacture capacitors to outlast the life of the product they are installed in. Our units are designed and rated to operate continuously at the maximum limits stated in our specifications. There are times when an application will push these limits. Our expertise lies in understanding the limits of film capacitors and we welcome the opportunity to assist you in understanding these limits also!

# Type 718P/719P, Orange Drop<sup>®</sup>, High Voltage Polypropylene Film/Foil

## Lead Styles/Lead Spacings



## Type 718P, 1500 VAC/5000 VDC Sizes/Ratings

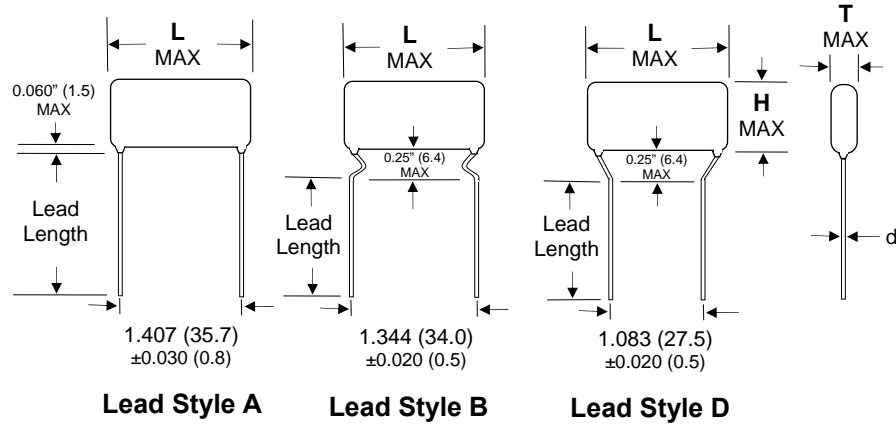
Cap Value (µF)	Part Number*	L MAX	DIA MAX	Wire (d)	Max dV/dt (Volts/µsec)	Peak I Amps	Max % D.F.		Max ESR (mΩ)	
							10KHz	100KHz	10KHz	100KHz
.00056	718P56151500M	1.60 (40.6)	0.30 (7.6)	0.032 (0.8)	357000	200	0.021	0.029	6106	812
.00068	718P68151500M	1.60 (40.6)	0.31 (7.9)	0.032 (0.8)	324000	220	0.021	0.029	5028	669
.00082	718P82151500M	1.60 (40.6)	0.33 (8.4)	0.032 (0.8)	295000	242	0.021	0.029	4170	555
.001	718P10251500M	1.60 (40.6)	0.35 (8.9)	0.032 (0.8)	267000	266	0.021	0.029	3419	455
.0012	718P12251500M	1.60 (40.6)	0.36 (9.1)	0.032 (0.8)	244000	292	0.021	0.029	2850	380
.0015	718P15251500M	1.60 (40.6)	0.39 (9.9)	0.032 (0.8)	218000	326	0.021	0.029	2280	304
.0016	718P16251500M	1.60 (40.6)	0.39 (9.9)	0.032 (0.8)	211000	338	0.021	0.029	2137	285
.0018	718P18251500M	1.60 (40.6)	0.41 (10.4)	0.032 (0.8)	199000	358	0.021	0.029	1900	254
.0020	718P20251500M	1.60 (40.6)	0.42 (10.7)	0.032 (0.8)	189000	378	0.021	0.029	1710	228
.0022	718P22251500M	1.60 (40.6)	0.44 (11.2)	0.032 (0.8)	180000	396	0.021	0.029	1555	208
.0023	718P23251500M	1.60 (40.6)	0.44 (11.2)	0.032 (0.8)	176000	404	0.021	0.029	1487	199
.0024	718P24251500M	1.60 (40.6)	0.45 (11.4)	0.032 (0.8)	172000	414	0.021	0.029	1425	190
.0025	718P25251500M	1.60 (40.6)	0.46 (11.7)	0.032 (0.8)	169000	422	0.021	0.029	1368	183
.0027	718P27251500M	1.60 (40.6)	0.47 (11.9)	0.032 (0.8)	162000	438	0.021	0.029	1267	169
.0028	718P28251500M	1.60 (40.6)	0.48 (12.2)	0.032 (0.8)	159000	446	0.021	0.029	1222	163
.0030	718P30251500M	1.60 (40.6)	0.49 (12.4)	0.032 (0.8)	154000	462	0.021	0.029	1140	153
.0033	718P33251500M	1.60 (40.6)	0.50 (12.7)	0.032 (0.8)	147000	484	0.021	0.029	1037	139
.0036	718P36251500M	1.60 (40.6)	0.52 (13.2)	0.032 (0.8)	141000	506	0.021	0.029	950	127
.0039	718P39251500M	1.60 (40.6)	0.54 (13.7)	0.032 (0.8)	135000	528	0.021	0.029	877	118
.0040	718P40251500M	1.60 (40.6)	0.54 (13.7)	0.032 (0.8)	133000	534	0.021	0.029	855	115
.0043	718P43251500M	1.60 (40.6)	0.56 (14.2)	0.032 (0.8)	129000	554	0.021	0.029	796	107
.0047	718P47251500M	1.60 (40.6)	0.58 (14.7)	0.040 (1.0)	123000	578	0.021	0.029	728	97
.0050	718P50251500M	1.60 (40.6)	0.59 (15.0)	0.040 (1.0)	119000	596	0.021	0.029	684	92
.0051	718P51251500M	1.60 (40.6)	0.60 (15.2)	0.040 (1.0)	118000	602	0.021	0.029	671	90
.0056	718P56251500M	1.60 (40.6)	0.62 (15.7)	0.040 (1.0)	113000	632	0.021	0.029	611	82
.0060	718P60251500M	1.60 (40.6)	0.63 (16.0)	0.040 (1.0)	109000	654	0.021	0.029	570	77
.0062	718P62251500M	1.60 (40.6)	0.64 (16.3)	0.040 (1.0)	107000	664	0.021	0.029	552	74
.0068	718P68251500M	1.60 (40.6)	0.67 (17.0)	0.040 (1.0)	102000	696	0.021	0.029	503	68
.0070	718P70251500M	1.60 (40.6)	0.68 (17.3)	0.040 (1.0)	101000	706	0.021	0.029	489	66
.0075	718P75251500M	1.60 (40.6)	0.70 (17.8)	0.040 (1.0)	97000	730	0.021	0.029	456	61
.0080	718P80251500M	1.60 (40.6)	0.71 (18.0)	0.040 (1.0)	94000	754	0.021	0.029	428	58
.0082	718P82251500M	1.60 (40.6)	0.72 (18.3)	0.040 (1.0)	93000	764	0.021	0.029	417	56
.0090	718P90251500M	1.60 (40.6)	0.75 (19.1)	0.040 (1.0)	89000	800	0.021	0.029	380	51
.0091	718P91251500M	1.60 (40.6)	0.75 (19.1)	0.040 (1.0)	88000	806	0.021	0.029	376	51
.0093	718P93251500M	1.60 (40.6)	0.76 (19.3)	0.040 (1.0)	88000	806	0.021	0.029	368	50
.01	718P10351500M	1.60 (40.6)	0.78 (19.8)	0.040 (1.0)	84000	844	0.022	0.029	342	46
.012	718P12351500M	1.60 (40.6)	0.85 (21.6)	0.040 (1.0)	77000	924	0.022	0.029	285	39

\* For complete part number please refer to Ordering/Part Number Information page.

Dimensions are in inches, millimeters are in parenthesis.

# Type 718P/719P, Orange Drop®, High Voltage Polypropylene Film/Foil

## Lead Styles/Lead Spacings



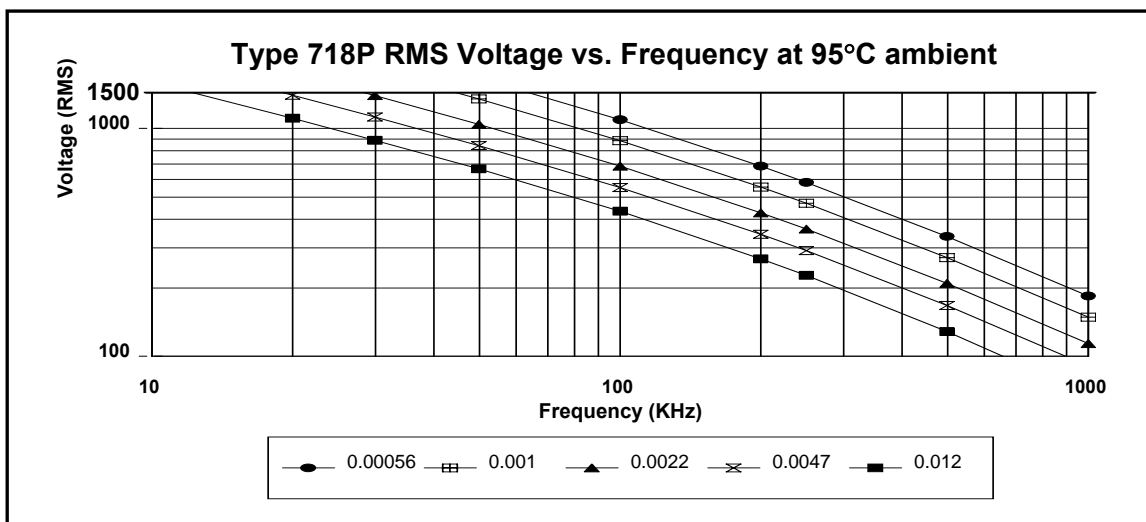
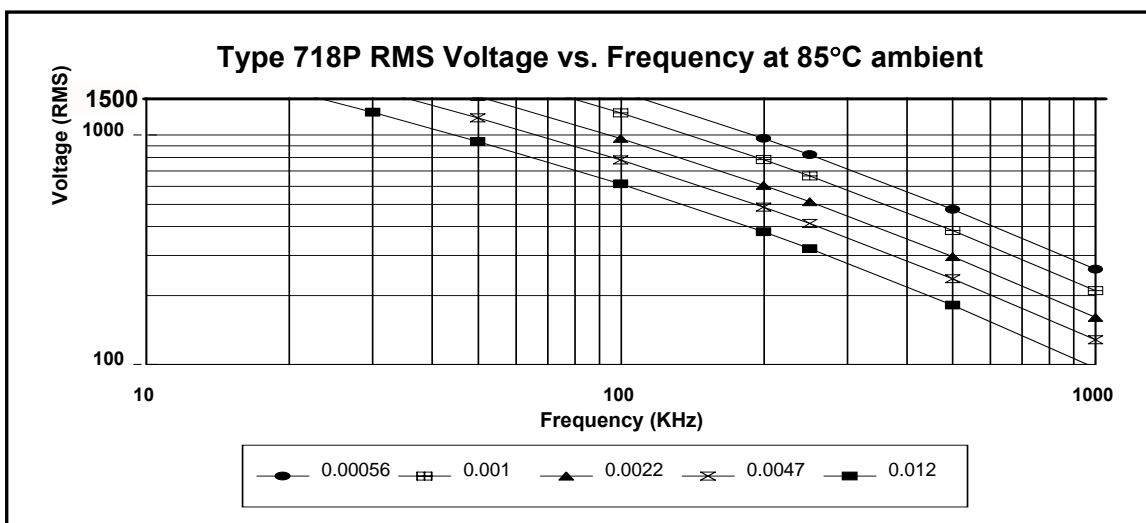
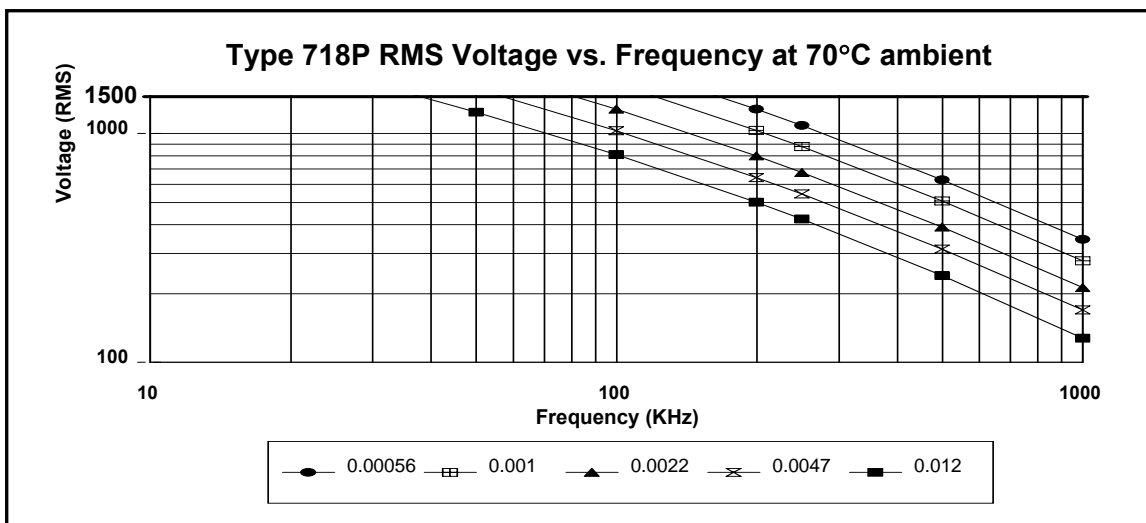
## Type 719P, 1500 VAC/5000 VDC Sizes/Ratings

Cap Value (µF)	Part Number*	L MAX	T MAX	H MAX	Wire (d)	Max dV/dt (Volts/µsec)	Peak I Amps	Max % D.F.		Max ESR (mΩ)	
								10KHz	100KHz	10KHz	100KHz
.001	719P10251500M	1.60 (40.6)	0.22 (5.6)	0.42 (10.7)	0.032 (0.8)	267000	266	0.021	0.029	3419	455
.0011	719P11251500M	1.60 (40.6)	0.23 (5.8)	0.43 (10.9)	0.032 (0.8)	254000	280	0.021	0.029	3109	414
.0012	719P12251500M	1.60 (40.6)	0.24 (6.1)	0.43 (10.9)	0.032 (0.8)	244000	292	0.021	0.029	2850	380
.0015	719P15251500M	1.60 (40.6)	0.26 (6.6)	0.46 (11.7)	0.032 (0.8)	218000	326	0.021	0.029	2280	304
.0016	719P16251500M	1.60 (40.6)	0.27 (6.9)	0.47 (11.9)	0.032 (0.8)	211000	338	0.021	0.029	2137	285
.0018	719P18251500M	1.60 (40.6)	0.29 (7.4)	0.48 (12.2)	0.032 (0.8)	199000	358	0.021	0.029	1900	254
.0020	719P20251500M	1.60 (40.6)	0.30 (7.6)	0.50 (12.7)	0.032 (0.8)	189000	378	0.021	0.029	1710	228
.0022	719P22251500M	1.60 (40.6)	0.31 (7.9)	0.51 (13.0)	0.032 (0.8)	180000	396	0.021	0.029	1555	208
.0023	719P23251500M	1.60 (40.6)	0.32 (8.1)	0.52 (13.2)	0.032 (0.8)	176000	404	0.021	0.029	1487	199
.0024	719P24251500M	1.60 (40.6)	0.33 (8.4)	0.52 (13.2)	0.032 (0.8)	172000	414	0.021	0.029	1425	190
.0025	719P25251500M	1.60 (40.6)	0.33 (8.4)	0.53 (13.5)	0.032 (0.8)	169000	422	0.021	0.029	1368	183
.0027	719P27251500M	1.60 (40.6)	0.35 (8.9)	0.54 (13.7)	0.032 (0.8)	162000	438	0.021	0.029	1267	169
.0028	719P28251500M	1.60 (40.6)	0.35 (8.9)	0.55 (14.0)	0.032 (0.8)	159000	446	0.021	0.029	1222	163
.0030	719P30251500M	1.60 (40.6)	0.36 (9.1)	0.56 (14.2)	0.032 (0.8)	154000	462	0.021	0.029	1140	154
.0033	719P33251500M	1.60 (40.6)	0.38 (9.7)	0.58 (14.7)	0.032 (0.8)	147000	484	0.021	0.029	1037	139
.0036	719P36251500M	1.60 (40.6)	0.40 (10.2)	0.59 (15.0)	0.032 (0.8)	141000	506	0.021	0.029	950	127
.0039	719P39251500M	1.60 (40.6)	0.41 (10.4)	0.61 (15.5)	0.032 (0.8)	135000	528	0.021	0.029	877	118
.0040	719P40251500M	1.60 (40.6)	0.42 (10.7)	0.61 (15.5)	0.032 (0.8)	133000	534	0.021	0.029	855	115
.0043	719P43251500M	1.60 (40.6)	0.43 (10.9)	0.63 (16.0)	0.032 (0.8)	129000	554	0.021	0.029	796	107
.0047	719P47251500M	1.60 (40.6)	0.43 (10.9)	0.67 (17.0)	0.040 (1.0)	123000	578	0.021	0.029	728	97
.0050	719P50251500M	1.60 (40.6)	0.44 (11.2)	0.69 (17.5)	0.040 (1.0)	119000	596	0.021	0.029	684	92
.0051	719P51251500M	1.60 (40.6)	0.45 (11.4)	0.69 (17.5)	0.040 (1.0)	118000	602	0.021	0.029	671	90
.0056	719P56251500M	1.60 (40.6)	0.47 (11.9)	0.71 (18.0)	0.040 (1.0)	113000	632	0.021	0.029	611	82
.0060	719P60251500M	1.60 (40.6)	0.49 (12.4)	0.73 (18.5)	0.040 (1.0)	109000	654	0.021	0.029	570	77
.0062	719P62251500M	1.60 (40.6)	0.49 (12.4)	0.74 (18.8)	0.040 (1.0)	107000	664	0.021	0.029	552	74
.0068	719P68251500M	1.60 (40.6)	0.52 (13.2)	0.76 (19.3)	0.040 (1.0)	102000	696	0.021	0.029	503	68
.0070	719P70251500M	1.60 (40.6)	0.53 (13.5)	0.77 (19.6)	0.040 (1.0)	101000	706	0.021	0.029	489	66
.0075	719P75251500M	1.60 (40.6)	0.54 (13.7)	0.79 (20.1)	0.040 (1.0)	97000	730	0.021	0.029	456	61
.0080	719P80251500M	1.60 (40.6)	0.56 (14.2)	0.81 (20.6)	0.040 (1.0)	94000	754	0.021	0.029	428	58
.0082	719P82251500M	1.60 (40.6)	0.57 (14.5)	0.82 (20.8)	0.040 (1.0)	93000	764	0.021	0.029	417	56
.0090	719P90251500M	1.60 (40.6)	0.60 (15.2)	0.84 (21.3)	0.040 (1.0)	89000	800	0.021	0.029	380	51
.0091	719P91251500M	1.60 (40.6)	0.60 (15.2)	0.85 (21.6)	0.040 (1.0)	88000	806	0.021	0.029	376	51
.0093	719P93251500M	1.60 (40.6)	0.61 (15.5)	0.85 (21.6)	0.040 (1.0)	88000	806	0.021	0.029	368	50
.01	719P10351500M	1.60 (40.6)	0.63 (16.0)	0.88 (22.4)	0.040 (1.0)	84000	844	0.022	0.029	342	46
.012	719P12351500M	1.60 (40.6)	0.70 (17.8)	0.94 (23.9)	0.040 (1.0)	77000	924	0.022	0.029	285	39

\* For complete part number please refer to Ordering/Part Number Information page.

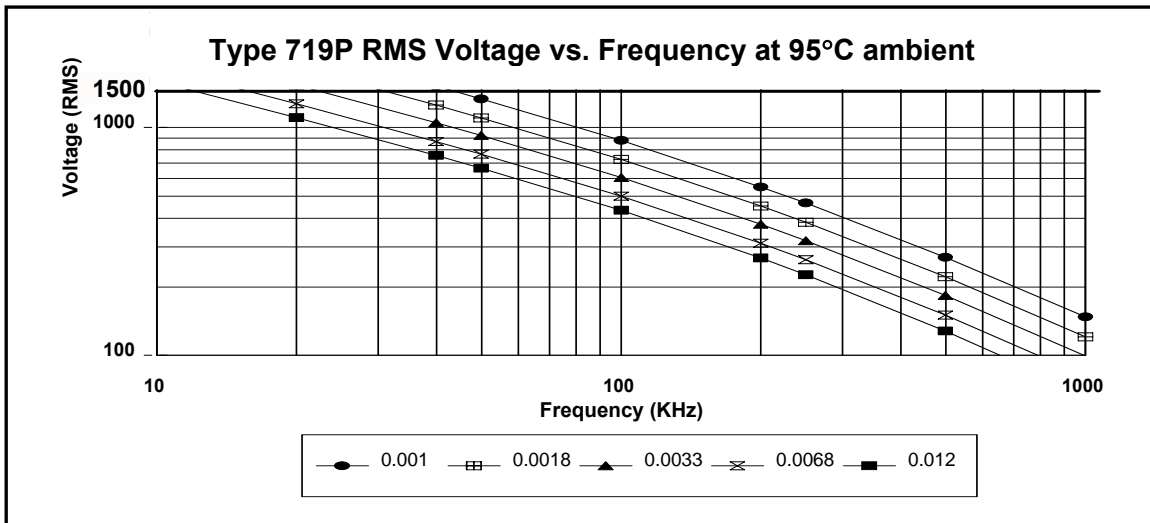
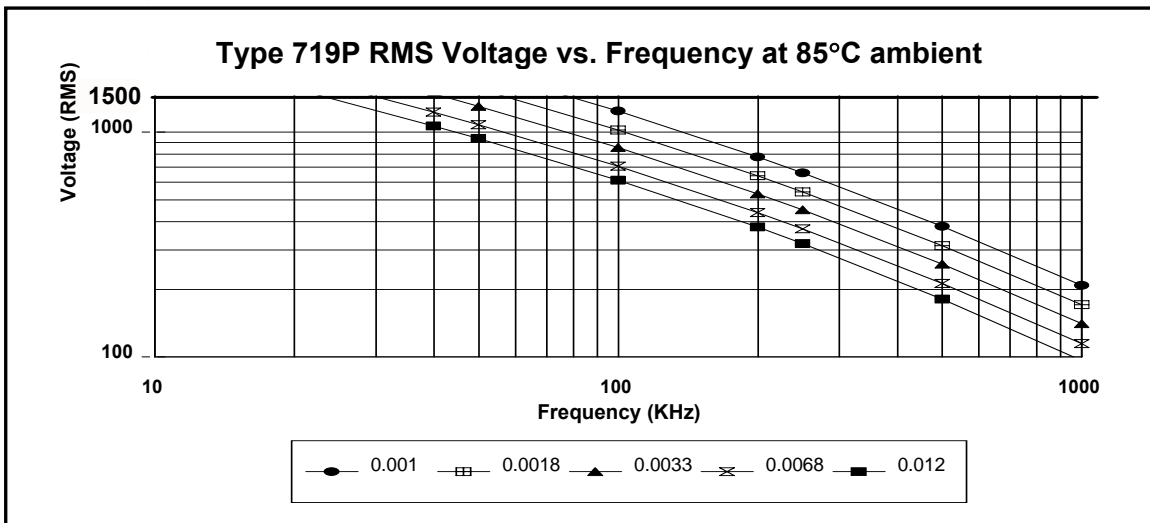
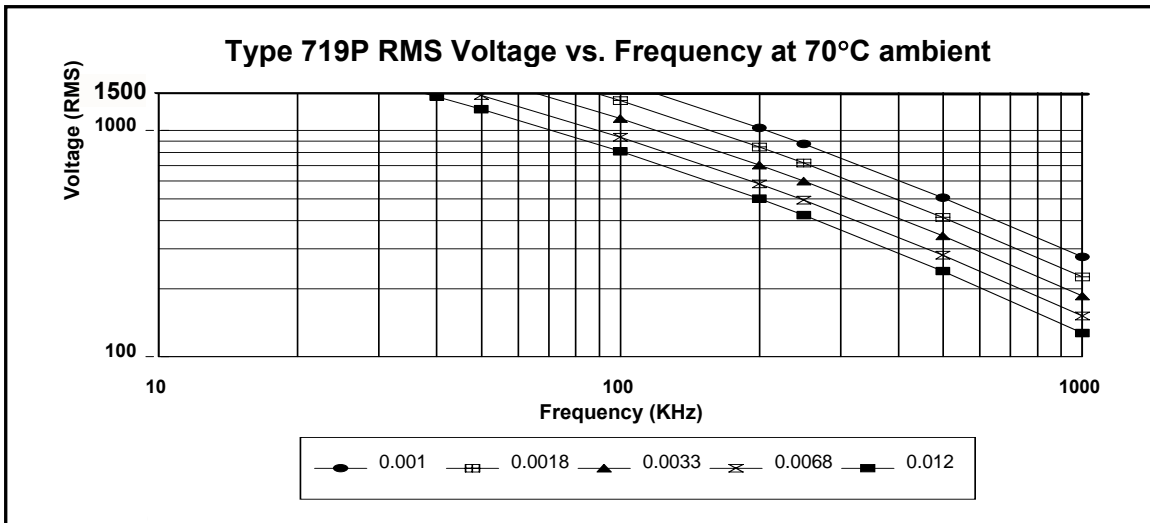
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# Type 718P/719P, Orange Drop, High Voltage, Polypropylene Film/Foil



Please refer to Page 8 for important information regarding these performance curves

# Type 718P/719P, Orange Drop®, High Voltage Polypropylene Film/Foil



Please refer to Page 8 for important information regarding these performance curves

## **RMS Voltage vs. Frequency Performance Curve Data And Thermal Considerations**

With today's demanding and complex applications it is more critical than ever to have a comprehensive understanding of thermal issues. Because thermal environments vary considerably, our approach is to provide RMS voltage versus frequency performance curves based on the following parameters to be utilized as a guideline in specifying the appropriate part:

- +70°C, +85°C, and +95°C ambient temperatures
- Pure convection cooling
- All heat dissipation from the lead wire is added to the capacitor
- Increased lead wire dissipation at high frequencies is included [skin effect losses]

The ambient temperature is the air temperature adjacent to the capacitor within the application enclosure at the highest exterior temperature permitted by the end user. Since the maximum allowable temperature for polypropylene is +105°C, our performance curves are based on a power level that raises the temperature +20°C from ambient to the hot spot within the capacitor.

We realize that the environment assumed by our performance curves is highly unlikely to represent that of a real application. We also understand that a "pure convection" environment is also highly improbable. There will almost always be a circuit board and other adjacent components that will impede convection based air circulation, and the capacitor under discussion will not be the only "heat generating" device present! Because of all this "variability" our performance curves are calculated conservatively.

### **Considerations:**

The application power level can be compared to the performance curves at a given frequency by the following calculation:

$$(\text{Actual VAC}/\text{Rated VAC})^2 = \text{Power level relative to performance curve power}$$

Temperature rise is directly related to power; power is related to the voltage squared.

Since the maximum allowable temperature for polypropylene is +105°C we strongly recommend that you check the case temperature of the capacitor under worst case conditions. The capacitor surface temperature should be less than:

$$\text{Capacitor surface temperature} < 0.67 * (105 - T_{\text{ambient}}) + T_{\text{ambient}}$$

**Please contact us for more detailed information and methods to optimize allowable voltage in your electrical/thermal environment. We always welcome an engineer-to-engineer discussion of your particular situation!**



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