

# Type CS (Capstick®) Metallized Polymer Network

## Radial Multi-pin Metallized Polymer Network for DC to DC Converters



The Type CS multi-pin metallized polymer network is ideal for the low ESR/ESL requirements in DC to DC converters and switching power supply applications. This unique, robust, capacitor design offers high ripple current capability and high capacitance in a small package. It is available with straight pins on 0.10" centers for through-hole mounting or with gull wing leads for surface mount assembly. Type CS (Capstick®) is encapsulated in a rugged conformal coating and is packaged in anti-static tubes for easy handling.

### Highlights

- ◆ Rugged conformal coated case meets UL94V-0
- ◆ Low ESR/ESL
- ◆ High ripple current
- ◆ High capacitance in a small package
- ◆ Non-inductive design
- ◆ Non-polar
- ◆ Surface mount or through hole assembly
- ◆ Multi-pin leads on 0.10" centers

### Specifications

**RoHS Compliant**

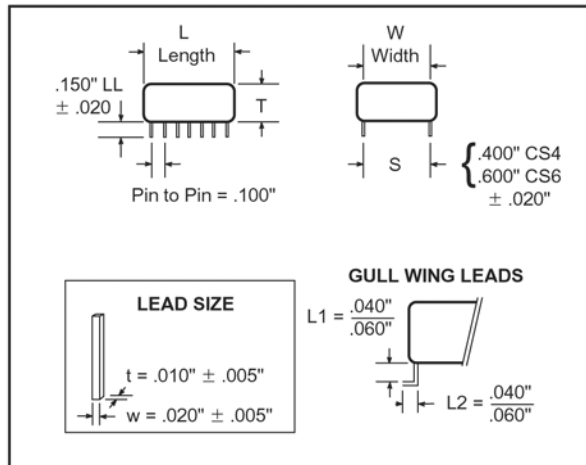
<b>Capacitance Range:</b>	<b>0.33 <math>\mu</math>F to 20.0 <math>\mu</math>F</b>
<b>Voltage Range:</b>	<b>50 Vdc, 100 Vdc, 250 Vdc, 400 Vdc, 500 Vdc</b>
<b>Capacitance Tolerance:</b>	<b><math>\pm</math>10%</b>
<b>Operating Temperature Range for 50, 100 and 250 Vdc:</b>	<b>-55 °C to +125 °C (with 50% Vdc derating &gt;85 °C)</b>
<b>Operating Temperature Range for 400 and 500 Vdc:</b>	<b>-55 °C to +125 °C with no derating</b>
<b>Construction:</b>	<b>Multilayer metallized polymer dielectric</b>
<b>Temperature Coefficient:</b>	<b>+6% from -55 °C to +85 °C</b>
<b>Dielectric Withstand Voltage:</b>	<b>1.3 x rated voltage: 50/100/250/500 Vdc 1.6 x rated voltage: 400 Vdc</b>
<b>Dissipation Factor (DF):</b>	<b><math>\leq</math>1.0% @ 1 kHz</b>
<b>Total Self Inductance (L):</b>	<b>&lt;6 nH typical (CS6) &lt; 4 nH typical (CS4)</b>
<b>Lead Material:</b>	<b>Tinned copper alloy frame</b>
<b>Insulation Resistance:</b>	<b><math>\geq</math>1000 M<math>\Omega</math> · <math>\mu</math>F - need not exceed 1000 M<math>\Omega</math></b>

### Part Numbering System

<b>405</b>	<b>K</b>	<b>100</b>	<b>CS</b>	<b>4</b>	<b>G</b>	<b>-</b>	<b>FA</b>
Cap				Pin	"Optional"		
( $\mu$ F)	Tolerance	Voltage	Series	Spacing	(*)		
334 = 0.33 $\mu$ F	K = $\pm$ 10%	050 = 50 Vdc	CS	4 = 0.4" (10.0 mm)	Blank = Straight Pins		Blank = 5/6 RoHS
405 = 4.0 $\mu$ F		100 = 100 Vdc		6 = 0.6" (15.0 mm)	G = Gull Wing		FA = 6/6 RoHS
206 = 20.0 $\mu$ F		400 = 400 Vdc					

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## Capacitor Outline Drawing



## Test Method and Performance

Accelerated Dry Life	
<b>Test Conditions</b>	Temperature: $+85\text{ }^\circ\text{C} \pm 5\text{ }^\circ\text{C}$ Applied Voltage: 1.25 x rated voltage Test Duration: 1000 hours performance
<b>Requirements</b>	Capacitance: Change of $\leq 5.0\%$ Dissipation Factor: $\leq 1.0\%$ @ 1 kHz Insulation Resistance: $\geq 1\text{K M}\Omega \cdot \mu\text{F}$ , need not exceed 1 K M $\Omega$
Humidity	
<b>Test Conditions</b>	Temperature: $+85\text{ }^\circ\text{C} \pm 2.0\text{ }^\circ\text{C}$ Applied Voltage: Zero voltage Humidity: $85\% \pm 2\%$ RH Test Duration: 21 days
<b>Performance Requirements</b>	Capacitance Change of $\leq 7.0\%$ Dissipation Factor $\leq 1.0\%$ @ 1 kHz Insulation Resistance $\geq 30\%$ of limit value
Soldering	
<b>Test Conditions</b>	Thru Hole Soldering Temperature: $260\text{ }^\circ\text{C}$ , 5 sec. SMD Reflow Soldering Temperature: $220\text{ }^\circ\text{C}$ , 30 sec.
<b>Performance Requirements</b>	Capacitance: Change of $\leq 2\%$
<b>Capacitance Drift:</b>	$\leq 2.0\%$ over 2 years between $0\text{ }^\circ\text{C}$ and $35\text{ }^\circ\text{C}$ and a RH of between 35% and 65%
<b>Vibration</b>	Conforms to MIL-STD-202 Method 204D

Note: The 400 Vdc rating can handle a 450 Vdc surge and is built to a 640 Vdc high potential.

## Ratings

RoHS Compliant

Catalog Part Number	Cap (μF)	DC Voltage	ESR Ω @ 500 kHz	RMS Current @ 500 kHz	W Max. Inches (mm)	T Max. Inches (mm)	L Max. Inches (mm)	Nom. L.S. Inches (mm)	Leads Per Side	Tube Quantity
<b>50 Vdc</b>										
106K050CS4*	10.00	50	0.0030	15.3	0.5 (12.7)	0.32 (8.1)	0.620 (15.7)	0.4 (10)	5	32
206K050CS4*	20.00	50	0.0025	17.8	0.5 (12.7)	0.32 (8.1)	1.150 (29.2)	0.4 (10)	9	16
<b>100 Vdc</b>										
205K100CS4*	2.00	100	0.009	8.3	0.5 (12.7)	0.25 (6.4)	0.450 (11.4)	0.4 (10)	3	44
405K100CS4*	4.00	100	0.007	11.5	0.5 (12.7)	0.25 (6.4)	0.450 (11.4)	0.4 (10)	3	44
475K100CS4*	4.70	100	0.006	12.2	0.5 (12.7)	0.25 (6.4)	0.525 (13.3)	0.4 (10)	3	38
685K100CS4*	6.80	100	0.005	13.7	0.5 (12.7)	0.25 (6.4)	0.700 (17.8)	0.4 (10)	5	35
106K100CS4*	10.00	100	0.003	15.3	0.5 (12.7)	0.25 (6.4)	0.995 (25.3)	0.4 (10)	7	20
<b>250 Vdc</b>										
105K250CS6*	1.00	250	0.012	5.2	0.7 (17.8)	0.30 (7.6)	0.440 (11.2)	0.6 (15)	3	44
<b>400 Vdc</b>										
334K400CS6*	0.33	400	0.012	6.0	0.7 (17.8)	0.32 (8.1)	0.435 (11.0)	0.6 (15)	3	44
474K400CS6*	0.47	400	0.011	6.2	0.7 (17.8)	0.32 (8.1)	0.460 (11.7)	0.6 (15)	3	42
105K400CS6*	1.00	400	0.008	9.5	0.7 (17.8)	0.32 (8.1)	0.880 (22.4)	0.6 (15)	7	22
<b>500 Vdc</b>										
474K500CS6*	0.47	500	0.011	6.2	0.7 (17.8)	0.32 (8.1)	0.625 (15.9)	0.6 (15)	4	32
105K500CS6*	1.00	500	0.008	9.5	0.7 (17.8)	0.32 (8.1)	1.135 (28.8)	0.6 (15)	8	16

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