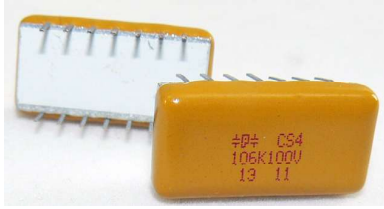


Type CS (Capstick®) Metallized Polymer Network

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

[Regulatory Information](#)

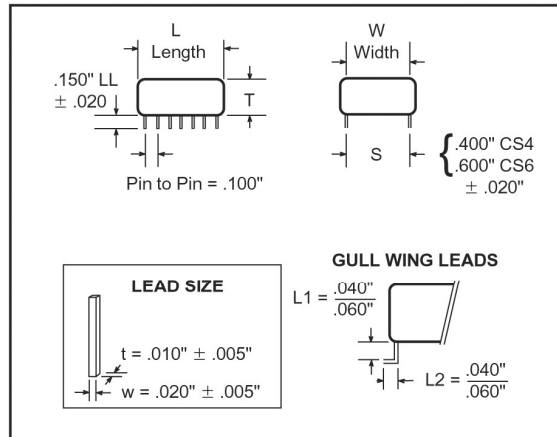
Capacitance Range:	0.33 μF to 20.0 μF
Voltage Range:	50 Vdc, 100 Vdc, 250 Vdc, 400 Vdc, 500 Vdc
Capacitance Tolerance:	$\pm 10\%$
Operating Temperature Range for 50, 100 and 250 Vdc:	-55 °C to +125 °C (with 50% Vdc derating >85 °C)
Operating Temperature Range for 400 and 500 Vdc:	-55 °C to +125 °C with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

Part Numbering System

405	K	100	CS	4	G	-	FA
Cap				Pin	"Optional"		
(μ F)	Tolerance	Voltage	Series	Spacing	(*)		
334 = 0.33 μ F	K = $\pm 10\%$	050 = 50 Vdc	CS	4 = 0.4" (10.0 mm)	Blank = Straight Pins		Blank = 9/10 RoHS
405 = 4.0 μ F		100 = 100 Vdc		6 = 0.6" (15.0 mm)	G = Gull Wing		FA = 10/10 RoHS
206 = 20.0 μ F		400 = 400 Vdc					

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Capacitor Outline Drawing



Test Method and Performance

Accelerated Dry Life	
Test Conditions	Temperature: +85 °C ±5 °C Applied Voltage: 1.25 x rated voltage Test Duration: 1000 hours performance
Requirements	Capacitance : Change of ≤5.0% Dissipation Factor: ≤1.0% @ 1 kHz Insulation Resistance: ≥1K MΩ • μF, need not exceed 1 K MΩ
Humidity	
Test Conditions	Temperature: +85 °C ±2.0 °C Applied Voltage: Zero voltage Humidity: 85% ±2% RH Test Duration: 21 days
Performance Requirements	Capacitance Change of ≤7.0% Dissipation Factor ≤1.0% @ 1 kHz Insulation Resistance ≥ 30% of limit value
Soldering	
Test Conditions	Thru Hole Soldering Temperature: 260 °C, 5 sec. SMD Reflow Soldering Temperature: 220 °C, 30 sec.
Performance Requirements	Capacitance: Change of ≤ 2%
Capacitance Drift:	≤2.0% over 2 years between 0 °C and 35 °C and a RH of between 35% and 65%
Vibration	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

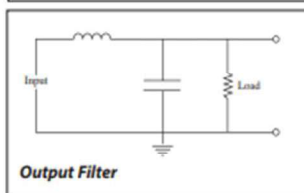
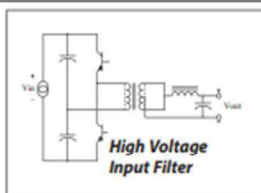
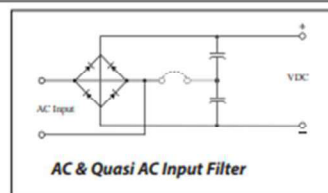
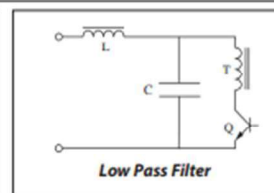
RoHS Compliant

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
50 Vdc										
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
100 Vdc										
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
250 Vdc										
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
400 Vdc										
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
500 Vdc										
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

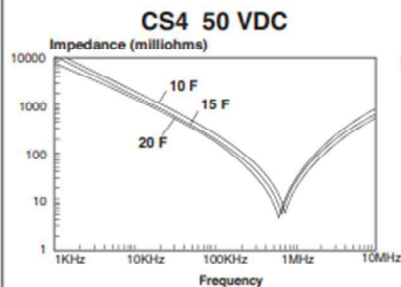
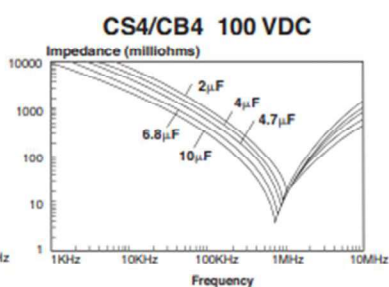
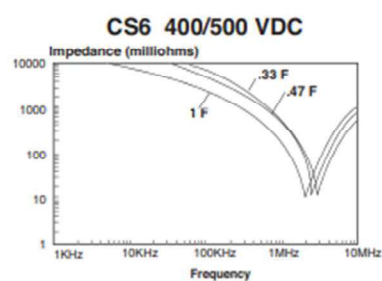
Performance Characteristics over a range of -55°C to +85°C

MAXIMUM RMS CURRENT (AMPS) VS. FREQUENCY							MAXIMUM RMS VOLTAGE VS. FREQUENCY						
Value μF	Rated VDC	1 KHz	10 KHz	100 KHz	500 KHz	1MHz	Value μF	Rated VDC	1 KHz	10 KHz	100 KHz	500 KHz	1MHz
0.47	500	0.8	1.9	3.9	6.2	7.1	0.47	500	250	64	13.1	4.2	2.4
1.0	500	1.1	2.4	5.9	9.5	10.6	1.0	500	176	38	9.4	3.0	1.6
0.33	400	0.7	1.3	3.5	6.0	6.9	0.33	400	250	64	17.2	6.9	4.0
0.47	400	0.8	1.9	3.9	6.2	7.0	0.47	400	250	64	13.1	4.2	2.4
1.0	400	1.1	2.4	5.9	9.5	10.5	1.0	400	176	38	9.4	3.0	1.6
1.0	250	0.7	1.6	3.3	5.2	5.9	1.0	250	94	24	5.0	1.6	0.9
2.0	100	0.4	2.6	6.0	8.3	8.9	2.0	100	35	21	4.7	1.3	0.7
4.0	100	1.9	4.2	10.2	11.5	12.0	4.0	100	35	18	4.2	1.0	0.4
4.7	100	2.0	4.5	10.8	12.2	12.6	4.7	100	35	18	3.7	0.8	0.3
6.8	100	2.9	6.6	12.5	13.7	14.0	6.8	100	35	18	2.9	0.6	0.3
10.0	100	4.3	9.9	14.1	15.3	15.6	10.0	100	35	18	2.2	0.5	0.3
10.0	50	4.2	9.7	14.0	15.3	15.6	10.0	50	35	18	2.2	0.5	0.2
20.0	50	9.3	13.3	16.7	17.8	18.0	20.0	50	35	18	1.3	0.3	0.1

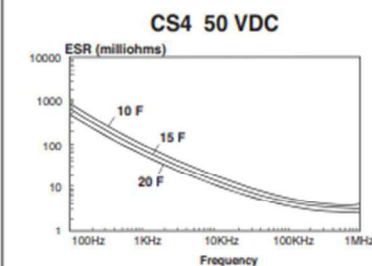
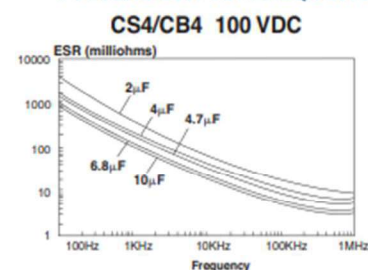
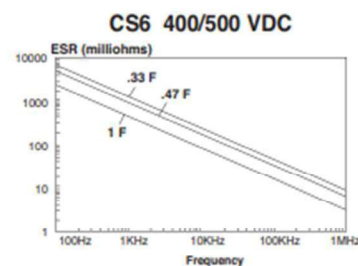
TYPICAL APPLICATIONS



TYPICAL IMPEDANCE VS. FREQUENCY



TYPICAL ESR VS. FREQUENCY



Type CS (Capstick®) Metallized Polymer Network

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