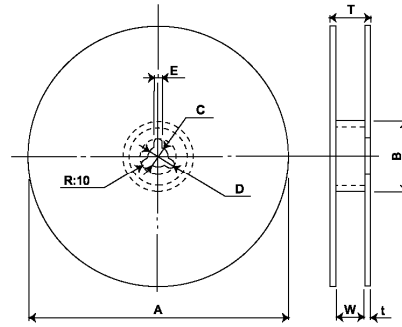




# Surface Mount Aluminum Electrolytic Capacitors

## Packaging Specifications

•Reel Dimensions in mm(not to scale)

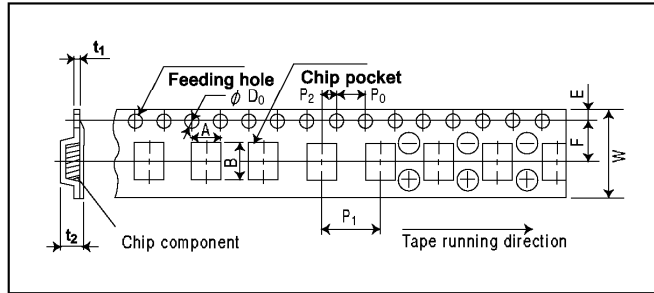


Size	A	B	C	D	E	W	T	t
φ3 ~ φ5	380 ± 2	50min	13.0 ± 0.5	21.0 ± 0.8	2.0 ± 0.5	14 ± 1	20 ± 1	3.0
φ6.3 ~ φ8*1	380 ± 2	50min	13.0 ± 0.5	21.0 ± 0.8	2.0 ± 0.5	18 ± 1	24 ± 1	3.0
φ8*2 ~ φ10	380 ± 2	50min	13.0 ± 0.5	21.0 ± 0.8	2.0 ± 0.5	26 ± 1	32 ± 1	3.0

\* 1: = 6.2 mm \* 2: = 10.2 mm

## Taping Dimensions in mm(not to scale)

Code A : Reel Taping



\* Ask factory for technical specifications.

Size	W	A	B	Po ± 0.1	P1	P2 ± 0.1	F	φD <sub>0</sub>	t1	E	t2
φ3 × 5.4	12.0	3.4	3.5	4.0	8.0	2.0	5.5	1.5 <sup>+0.1</sup> <sub>0</sub>	0.4	1.75	5.8
φ4 × 5.4	12.0	4.7	4.6	4.0	8.0	2.0	5.5	1.5 <sup>+0.1</sup> <sub>0</sub>	0.4	1.75	5.8
φ5 × 5.4	12.0	6.0	6.0	4.0	12.0	2.0	5.5	1.5 <sup>+0.1</sup> <sub>0</sub>	0.4	1.75	5.8
φ6.3 × 5.4	16.0	7.1	7.0	4.0	12.0	2.0	7.5	1.5 <sup>+0.1</sup> <sub>0</sub>	0.4	1.75	5.8
φ8 × 6.2	16.0	8.7	8.7	4.0	12.0	2.0	7.5	1.5 <sup>+0.1</sup> <sub>0</sub>	0.4	1.75	6.8
φ8 × 10.2	24.0	8.7	8.7	4.0	16.0	2.0	11.5	1.5 <sup>+0.1</sup> <sub>0</sub>	0.4	1.75	11.0
φ10 × 10.2	24.0	10.7	10.7	4.0	16.0	2.0	11.5	1.5 <sup>+0.1</sup> <sub>0</sub>	0.4	1.75	11.0

## Packaging Quantity

Size	Inner packaging	Outer packaging
φ3 × 5.4	2000	20000
φ4 × 5.4	2000	20000
φ5 × 5.4	1000	10000
φ6.3 × 5.4	1000	10000
φ8 × 6.2	1000	10000
φ8 × 10.2	500	3000
φ10 × 10.2	500	3000



## CFC

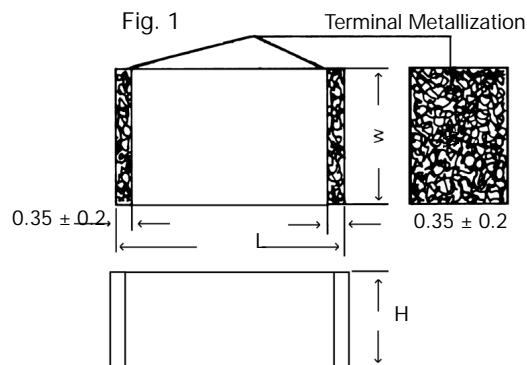
### Surface Mount Stacked Metallized Polyester Film Capacitors

- Stacked metallized polyester film construction
- Very small sizes in EIA 1206, 1210, 1913, 2416 sizes
- Excellent moisture resistance
- Reflow soldering applicable
- Tape/reel package
- Wide temperature range and high stability
- Stable temperature, frequency and bias characteristics
- Please consult factory for other dielectrics

### Specifications:

Item	Characteristics/Specifications	
Operating Temperature Range at Rated Voltage	-55~+105°C	
Rated Voltage	16, 50, 100 VDC	
Rated Capacitance Range (20°C 1KHz)	1000PF ~ .47μF	
Capacitance Tolerance	±5 (J)	
Maximum Dissipation Factor (20°C 1KHz)	1.0%	
Minimum Insulation Resistance (20°C) after 1 minute	3,000M at rated dc voltage except 16Vdc. 16Vdc rating should be measured at 10Vdc	
Withstanding Voltage (between terminals) applied through min. 2K resistor	1.5 times of rated voltage for 1 minute or 1.75 times for 1-5 seconds	
Life Test at 105°C 1,000 hours with 125% of rated voltage	Capacitance Change	Within -6~ +1% of initial measured value
	Dissipation Factor	Maximum 1.1%
	Insulation Resistance	More than 1,000M between terminals
Humidity Load Test 1 at 40°C & 90-95% RH 1,000 hours with Rated voltage	Capacitance Change	Within -5~ +8% of initial measured value
	Dissipation Factor	Maximum 1.5%
	Insulation Resistance	Minimum 100M between terminals
	Withstanding Voltage	Withstand 130% of rated voltage for 1 min.
Humidity Load Test 2 at 60°C & 90-95% RH 500 hours with Rated voltage	Capacitance Change	Within ±10% of initial measured value
	Dissipation Factor	Maximum 2.0%
	Insulation Resistance	Minimum 10M
	Withstanding Voltage	Withstand 130% of rated voltage for 1 min.
Temperature Stability	C/C at -55°C	Within ±3% of initial value at 20°C
	C/C at +105°C	Within ±4% of initial value at 20°C
Resistance to Soldering Heat Reflow with peak at 240 ±3°C and preheating at 155°C for 90 sec.	Capacitance Change	Within ±5% of initial measured value
	Dissipation Factor	Maximum 1.1%
	Insulation Resistance	Minimum 1000M
	Withstanding Voltage	1.5 times of rated voltage for 1 minute or 1.75 times for 1-5 seconds
Solderability Terminal shall be immersed into 10%wt rosin-methanol flux, and then immersed into molten solder at 235±5°C. The solder coverage shall be more than 90% of electrode.		

### Dimensions in mm:



### Chart 1: Case Size Code = EIA Size + Height Code

EIA Size	Case Code	Dimensions (mm)			
		L ± 0.2	W	H ± 0.2	A
1206	B1	3.2	1.6 ± 0.2	0.8	0.35 ± 0.2
	B2			1.0	
	B3			1.4	
1210	C1	3.2	2.5 ± 0.2	1.0	0.35 ± 0.2
	C2			1.4	
	C3			2.4	
1913	D1	4.8	3.3 ± 0.3	1.4	0.35 ± 0.2
	D2			2.0	
	D3			2.8	
2416	E1	6.0	4.12 ± 0.3	1.8	0.43 ± 0.3
	E2			2.0	
	E3			2.4	
	E4			2.8	



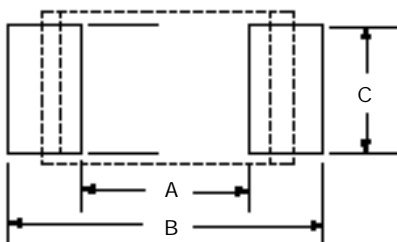
# Chip Film Capacitors

## CFC - Standard Products Table

Voltage	16 VDC				50 VDC				100 VDC		
EIA Size	1206	1210	1913	2416	1206	1210	1913	2416	1206	1210	1913
0.0010μF									B2		
0.0012μF									B2		
0.0015μF									B2		
0.0018μF									B2		
0.0022μF									B2		
0.0027μF									B2		
0.0033μF					B1				B3		
0.0039μF					B1				B3		
0.0047μF					B1				B3		
0.0056μF					B1					C2	
0.0068μF					B1					C2	
0.0082μF					B2					C3	
0.010μF					B2					C3	
0.012μF	B2					C1					D1
0.015μF	B2					C1					D1
0.018μF	B2					C2					D1
0.022μF	B2					C2					D1
0.027μF	B2					C2					D1
0.033μF	B3					C3					D1
0.039μF	B3					C3					D1
0.047μF	B3					C3					D2
0.056μF		C2					D2				
0.068μF		C2					D2				
0.082μF		C3					D3				
0.1μF		C3					D4				
0.12μF			D1					E1			
0.15μF			D2					E2			
0.18μF			D2					E3			
0.22μF			D3					E4			
0.27μF				E1							
0.33μF				E2							
0.39μF				E3							
0.47μF				E4							

### Handling Cautions and Recommendations:

1. Recommended Land Pattern (mm)



### Example for Land Dimensions (mm)

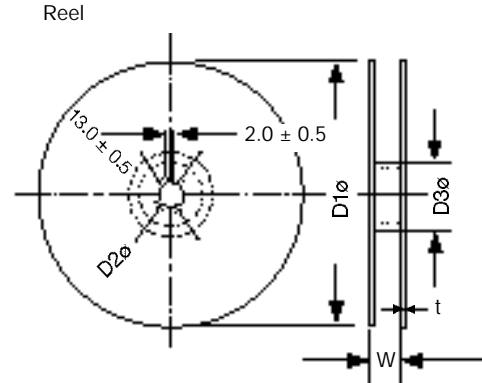
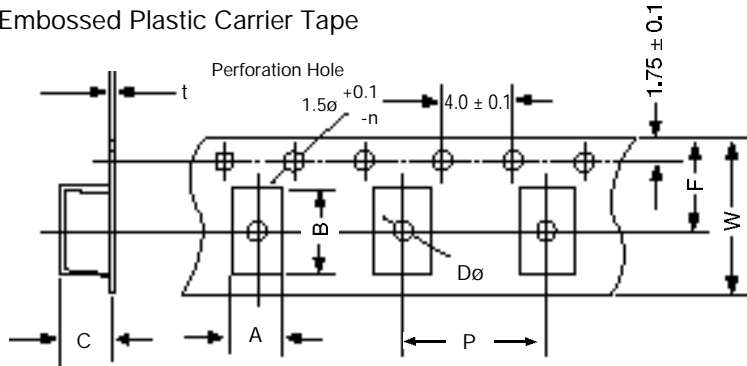
Code	Land Dimensions					
	Flow Soldering			Reflow Soldering		
	A	B	C	A	B	C
B1	2.2	3.8	1.4	2.2	3.8	1.4
B2	2.2	3.8	1.4	2.2	3.8	1.4
B3	2.2	3.8	1.4	2.2	3.8	1.4
C1	2.2	3.8	2.3	2.2	3.8	2.3
C2	2.2	3.8	2.3	2.2	3.8	2.3
C3	2.2	3.8	2.3	2.2	3.8	2.3

Code	Land Dimensions					
	Flow Soldering			Reflow Soldering		
	A	B	C	A	B	C
D1	2.6	6.6	3.0	2.6	6.6	3.0
D2	2.6	6.6	3.0	2.6	6.6	3.0
E1	3.8	7.8	3.8	3.8	7.8	3.8
E2	3.8	7.8	3.8	3.8	7.8	3.8
E3	3.8	7.8	3.8	3.8	7.8	3.8
E4	3.8	7.8	3.8	3.8	7.8	3.8



## CFC Taping Specifications:

Embossed Plastic Carrier Tape



Tape Dimensions (mm)

Case Size	A ± 0.1	B ± 0.1	C ± 0.2	t ± 0.3	W ± 0.3	F ± 0.05	P ± 0.1	D +0.2 -0
B 1	1.9	3.5	1.5	0.25	8.0	3.5	4.0	1.0
B 2			1.9					
B 3			1.9					
C 1	2.8	3.5	1.9	0.25	8.0	3.5	4.0	1.0
C 2			2.5					
C 3			2.5					
D 1	3.8	5.1	2.0	0.30	12.0	5.5	8.0	1.5
D 2			2.6					
D 3			3.4					
E 1	4.6	6.3	2.7	0.30	12.0	5.5	8.0	1.5
E 2			2.7					
E 3			3.5					

Reel Dimensions (mm) & Quantity per Reel (pcs)

Case Code	D1 ± 2.0	D2	D3 ± 2.0	W	t ± 0.5	Q'ty/Reel
B 1	178	23.5 ± 0.5	60.0	9.5 ± 0.5	1.2	3,000
B 2						3,000
B 3						2,000
C 1	178	23.5 ± 0.5	60.0	9.5 ± 0.5	1.2	2,000
C 2						
C 3						
D 1	330	21.0 ± 0.8	80.0	14.0 ± 1.5	2.0	3,000
D 2						3,000
D 3						2,000
E 1	330	21.0 ± 0.8	80.0	14.0 ± 1.5	2.0	3,000
E 2						3,000
E 3						2,000

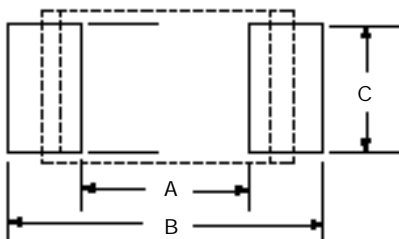
Note: Each reel has minimum 400mm leader tape and/or empty tape.

The ending of tape has minimum 400mm empty tape.

Case Code	EIA Size	A	B	C
B1 ~ B3	1206	2.2	3.8	1.4
C1 ~ C3	1210	2.2	3.8	2.3
D1 ~ D3	1913	2.6	6.6	3.0
E1 ~ E3	2416	3.8	7.8	3.8

## Handling Cautions and Recommendations:

1. Recommended Land Pattern (mm)



# Chip Film Capacitors

## CFCH

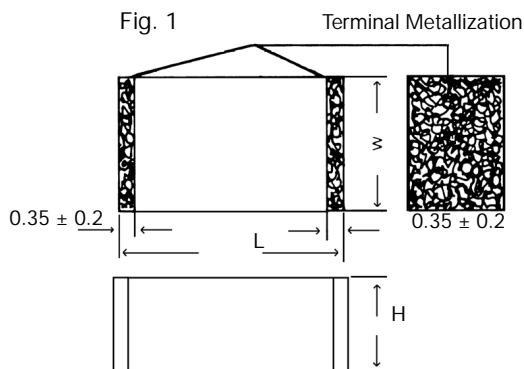
### Surface Mount Stacked Metallized Polyester Film Capacitors

- Stacked metallized polyester film construction
- Very small sizes in EIA 0805, 1206, 1210, 1913 sizes
- Excellent moisture resistance
- Reflow soldering applicable
- Tape/reel package
- Wide temperature range and high stability
- Stable temperature, frequency and bias characteristics
- Please consult factory for other dielectrics

### Specifications:

Item	Characteristics/Specifications	
Operating Temperature Range at Rated Voltage	-55~+125°C	
Rated Voltage	16, 50 VDC	
Rated Capacitance Range (20°C 1KHz)	100PF ~ .1μF	
Capacitance Tolerance	±5 (J)	
Maximum Dissipation Factor (20°C 1KHz)	1.0%	
Minimum Insulation Resistance (20°C) after 1 minute	3,000M at rated dc voltage except 16Vdc. 16Vdc rating should be measured at 10Vdc	
Withstanding Voltage (between terminals) applied through min. 2K resistor	1.5 times of rated voltage for 1 minute or 1.75 times for 1-5 seconds	
Life Test at 105°C 1,000 hours with 125% of rated voltage	Capacitance Change	Within -6~ +1% of initial measured value
	Dissipation Factor	Maximum 1.1%
Humidity Load Test 1 at 40°C & 90-95% RH 1,000 hours with Rated voltage	Insulation Resistance	More than 1,000M between terminals
	Capacitance Change	Within -5~ +8% of initial measured value
	Dissipation Factor	Maximum 1.5%
Humidity Load Test 2 at 60°C & 90-95% RH 500 hours with Rated voltage	Insulation Resistance	Minimum 100M between terminals
	Withstanding Voltage	Withstand 130% of rated voltage for 1 min.
	Capacitance Change	Within ±10% of initial measured value
Temperature Stability	C/C at -55°C	Within ±3% of initial value at 20°C
	C/C at +105°C	Within ±4% of initial value at 20°C
Resistance to Soldering Heat Reflow with peak at 240 ±3°C and preheating at 155°C for 90 sec.	Capacitance Change	Within ±5% of initial measured value
	Dissipation Factor	Maximum 1.1%
	Insulation Resistance	Minimum 1000M
	Withstanding Voltage	1.5 times of rated voltage for 1 minute or 1.75 times for 1-5 seconds
Solderability Terminal shall be immersed into 10%wt rosin-methanol flux, and then immersed into molten solder at 235±5°C. The solder coverage shall be more than 90% of electrode.		

### Dimensions in mm:



### Chart 1: Case Size Code = EIA Size + Height Code

EIA Size	Case Code	Dimensions (mm)			
		L ± 0.2	W	H ± 0.2	A
0805	A1	2.0	1.2	0.8	0.35 ± 0.2
	A2			1.0	
1206	B1	3.2	1.6 ± 0.2	0.8	0.35 ± 0.2
	B2			1.0	
	B3			1.4	
1210	C1	3.2	2.5 ± 0.2	1.0	0.35 ± 0.2
	C2			1.4	
	C3			2.4	
1913	D1	4.8	3.3 ± 0.3	1.4	0.35 ± 0.2
	D2			2.0	
	D3			2.8	

## CFCH - Standard Products Table

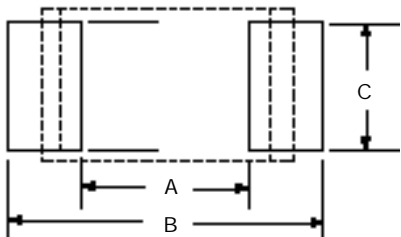
Voltage	16 VDC			50 VDC			
EIA Size	0805	1206	1210	0805	1206	1210	1913
100pF				A1			
120pF				A1			
150pF				A1			
180pF				A1			
220pF				A1			
270pF				A1			
330pF				A1			
470pF				A1			
560pF				A1			
680pF				A1			
820pF				A1			
.001μF				A1			
.0012μF				A1			
.0015μF				A1			
.0018μF				A1			
.0022μF				A1			
.0027μF				A1			
.0033μF	A1				B1		
.0039μF	A1				B1		
.0047μF	A1				B1		
.0056μF	A1				B1		
.0068μF	A1				B1		
.0082μF	A2				B2		
.01μF	A2				B2		
.012μF		B1				C1	
.015μF		B1				C1	
.018μF		B1				C2	
.022μF		B1				C2	
.027μF		B2				C2	
.033μF		B2				C3	
.039μF		B3				C3	
.047μF		B3					D1
.056μF			C2				D1
.068μF			C2				D1
.082μF			C3				D2
.1μF			C3				D2

### Example for Land Dimensions (mm)

Code	Land Dimensions					
	Flow Soldering			Reflow Soldering		
	A	B	C	A	B	C
A1	1.0	2.7	1.1	1.0	2.7	1.1
A2	1.0	2.7	1.1	1.0	2.7	1.1
B1	2.2	3.8	1.4	2.2	3.8	1.4
B2	2.2	3.8	1.4	2.2	3.8	1.4
B3	2.2	3.8	1.4	2.2	3.8	1.4
C1	2.2	3.8	2.3	2.2	3.8	2.3
C2	2.2	3.8	2.3	2.2	3.8	2.3
C3	2.2	3.8	2.3	2.2	3.8	2.3
D1	2.6	6.6	3.0	2.6	6.6	3.0
D2	2.6	6.6	3.0	2.6	6.6	3.0

### Handling Cautions and Recommendations:

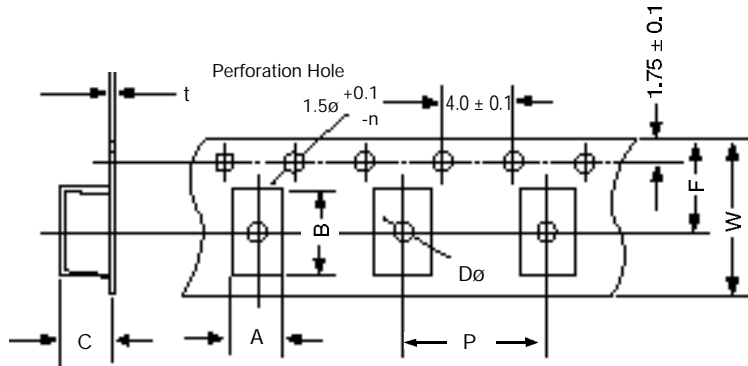
#### 1. Recommended Land Pattern (mm)



# Chip Film Capacitors

CFCH

Chip Type Embossed Taping - Embossed Taping

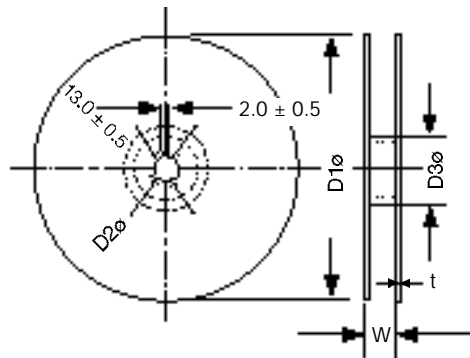


## Standard Packaging Quantities

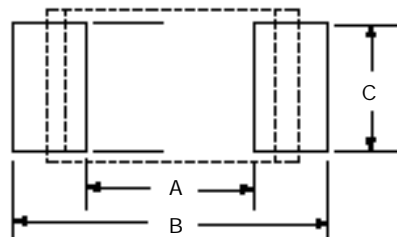
Size Code	Reel	Quantities
A1, A2, B1, B2	ø178	3000pcs/reel
B3, C1, C2, C3	ø178	2000pcs/reel
D1, D2	ø330	3000pcs/reel

Size Code	Dimensions (mm)												
	$A_0 \pm 0.1$	$B_0 \pm 0.1$	$W \pm 0.3$	$F \pm 0.05$	$E \pm 0.1$	$P \pm 0.1$	$P_0 \pm 0.05$	$P_0 \pm 0.1$	$\phi D_{1-0}^{+0.2}$	$\phi D_{1-0}^{+0.2}$	$T \pm 0.05$	$T_s \pm 0.2$	$K \pm 0.1$
A1	1.55	2.3	8.0	3.50	1.75	4.0	2.00	4.0	ø1.5	ø1.0	0.25	1.3	1.2
A2	1.55	2.3										1.5	1.4
B1, B2	1.9	3.5										1.5	1.4
B3	1.9	3.5										1.9	1.8
C1, C2	2.8	3.5										1.9	1.8
C3	2.8	3.5	2.5	2.4									
D1	3.8	5.1	12.0	5.50	1.75	8.0	2.00	4.0	ø1.5	ø1.5	0.30	2.0	1.9
D2	3.8	5.1										2.6	2.5

## Reel Dimensions



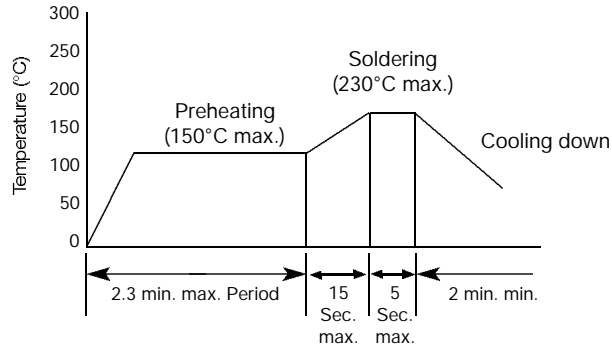
## Leader Part and Tape End (mm)





## CFC/CFCH

1. Flux without halogen content is recommended. Please consult factory for use of the flux with more than 0.1% halogen content which may damage the capacitor.
2. Recommended Soldering Conditions. (Only reflow is applicable and solder dripping not applicable).



### 3. Cleaning Conditions

- (1) Isopropyl alcohol is recommended under following conditions:

Dipping at room temperature: max. 5 minutes

Vapor less than 50°C: max. 5 minutes

Ultrasonic less than 50°C: max. 5 minutes

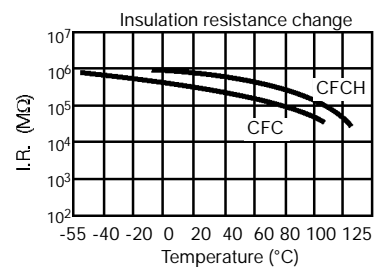
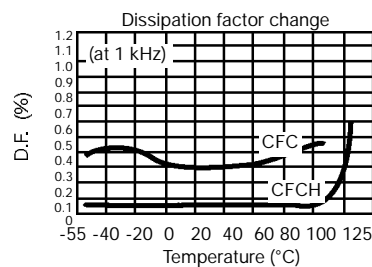
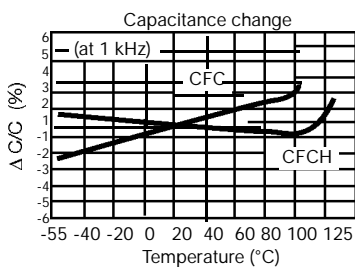
The freon family and trichloroethane can be applicable. In case of other cleaning agents or solvents, please consult our factory.

4. Storage under cool and low humidity without any harmful gas is recommended.

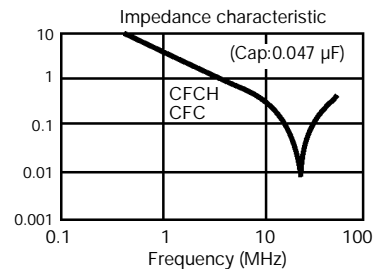
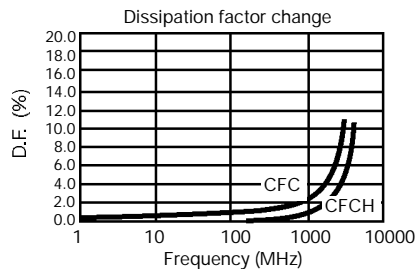
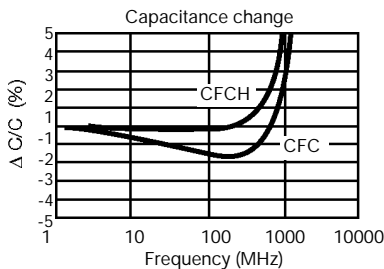
### 5. High frequency application.

The sum of DC voltage and peak value at AC voltage shall not exceed the rated voltage. Also, the capacitor shall be used in a condition that the self temperature rise shall not exceed 10°C at ambient temperature 40°C, and the sum of ambient temperature and self temperature rise shall not exceed 105°C.

## Temperature Characteristics (Typical curve)



## Frequency Characteristics (Typical curve)







# Chip Film Capacitors

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## Part Numbering System

