

**[1]Features**

LH-reversed or low profile with optimizing the design by reducing electrode length,these lower ESR,ESL capacitors are suitable for use large current at high frequency application.

Self-heals.

Pb(lead)-free product.

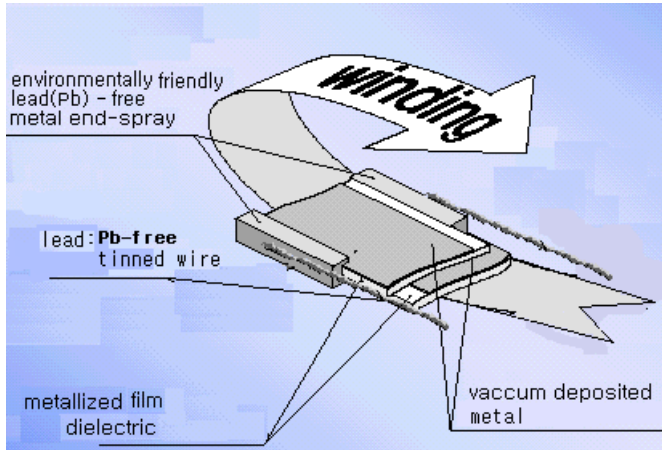
RoHS Compliant product.

**[2]Typical applications**

SMPS,inverter and other large current at high frequency are required.

Low profile style for flat typed equipment(PDP and LCD).

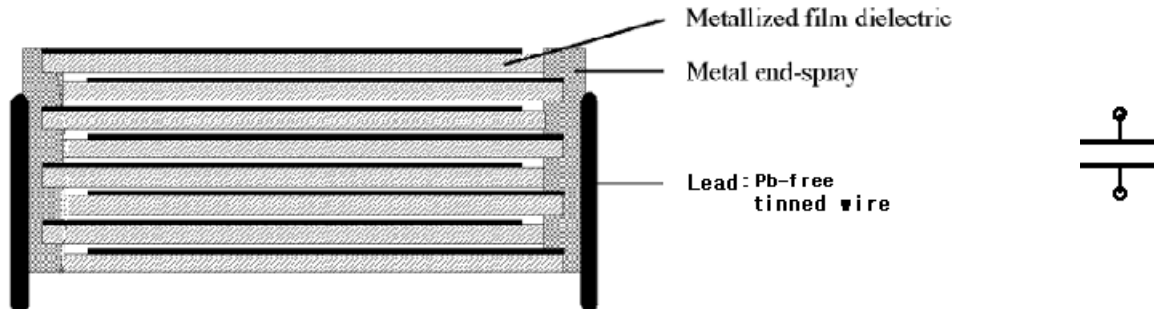
**[3]Construction**



**RoHS Compliant**

**[1]Style** :radial,powder epoxy dipped design.

**[2]Winding** :non-inductively wound self-healing metallized polyester film (vacuum deposited aluminum on polyester film).



**[3]Termination** :Pb-free tinned leads are electrically welded to the contact surface(metal end-spray)made by spraying the parts of metal contact materials on the ends of capacitor winding.

**[4]Coating** :multi dip,powder molded flame retardant epoxy resin(UL94V-O).

**[4]Specifications**

**[1]General data**

<b>Applicable standard</b>	IEC60384-2,JIS C5115		
<b>Rated voltage(URDC)</b>	100VDC,200VDC,400VDC,630VDC		
<b>Capacitance range</b>	0.1uF~15.0uF		
<b>Capacitance tolerance</b>	±5%(J),±10%(K) at 20°C,1Khz		
<b>Operating temperature range</b> (TR:+85°C,Tmax.:+105°C)	-40~+105°C	*+85°C~+105°C:Derate the rated voltage as shown in the below fig. (70% of the rated voltage at +105°C)	

**[2]Electrical data**

<b>Withstand voltage</b>	1.6URDC for 2sec.at 20°C,between leads(1.6URDC for 1 min. for type test)			
<b>Dissipation factor(DF)</b> at 20°C,1Khz	CR ≤ 1.0uF:0.8% max.			
	CR > 1.0uF:1.0% max.			
<b>Insulation resistance(Rins)</b> at 20°C,between leads		CR ≤ 0.33uF	CR > 0.33uF	applied for 1 min. 100VDC:for URDC < 500V 500VDC:for URDC ≥ 500V
	URDC ≤ 100V	≥ 15,000MΩ	≥ 5,000s	
	URDC > 100V	≥ 30,000MΩ	≥ 10,000s	

\*CR = Nominal Capacitance in μF

### 3] Environmental test data

	Test conditions	Test criteria
<b>Damp heat test</b>	40±2°C, R.H.:90~95% applying URDC for 500+24/0 hours	①Rins(between leads): ≥0.5 x specified value in ②Electrical data ②DF: ≤1.1% ③ $\frac{C}{C}$ : ≤ ±5% of initial value
<b>Endurance test</b>	85±2°C, applying 1.25URDC for 1,000+48/0 hours	①Rins(between leads): ≥0.5 x specified value in ②Electrical data ②DF: ≤1.2% ③ $\frac{C}{C}$ : ≤ ±7% of initial value

### 5] Marking

URDC, Capacitance & tolerance are marked on the capacitor.

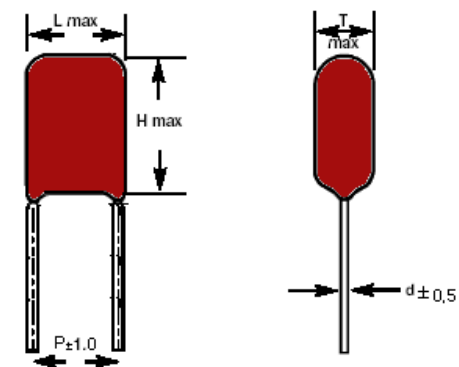
### 6] Ordering/part number information

<b>CF</b>	<b>922</b>	<b>M</b>	<b>F</b>	<b>R(L)</b>	<b>2G</b>	<b>105</b>	<b>K</b>	<b>FS</b>	<b>0100</b>
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)

- (1) Kind of capacitor: metallized plastic film capacitor
- (2) Shape of capacitor: non-inductive wound, Radial epoxy dipped.
- (3) Dielectrics: polyester
- (4) Operating temperature: -40°C ~ +105°C
- (5) LH-reversed  
\*added(L) indicates low profile (small "H" dimension)
- (6) \*DC rated voltage code: 400VDC
- (7) \*Rated capacitance in pF: 1,000,000pF=1.0uF
- (8) \*Capacitance tolerance code: ±10%
- (9) \*Packaging and lead configuration code: bulk, loose parts in a poly.bag. single formed leads-inner crimped
- (10) \*Lead pitch: 10mm

\*For further details, refer to [\[Part numbering system & taping specification\]](#)

### 7] Dimensions in mm



#### URDC:100V

uF	L	H	T	d
<b>pitch 15.0mm</b>				
4.7	19.0	22.5	11.5	1.0
6.8	19.0	25.0	14.0	1.0
10.0	19.0	28.5	17.0	1.0
<b>pitch 22.5mm</b>				
12.0	26.5	26.0	14.5	1.0
15.0	26.5	28.0	16.5	1.0

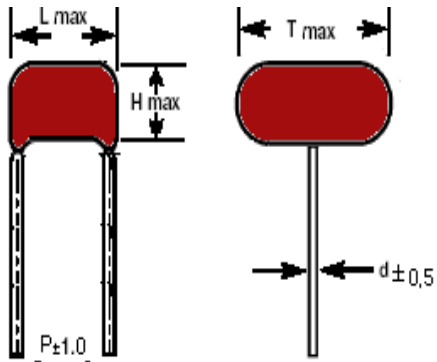
#### URDC:200V

uF	L	H	T	d
<b>pitch 7.5mm</b>				
0.22	11.5	8.5	15.5	0.8
0.33	11.5	9.0	19.0	0.8
0.47	11.5	10.0	20.5	0.8
0.68	11.5	11.5	23.5	0.8
<b>pitch 10.0mm</b>				
1.0	14.5	11.0	22.5	1.0
1.5	14.5	14.0	25.5	1.0
<b>pitch 15.0mm</b>				
2.2	19.0	12.5	24.0	1.0
3.3	19.0	15.5	28.0	1.0

**URDC:400V**

uF	L	H	T	d
<b>pitch 7.5mm</b>				
0.1	11.5	14.0	7.5	0.8
0.15	11.5	15.0	7.5	0.8
<b>pitch 10.0mm</b>				
0.22	14.5	16.0	6.5	0.8
0.33	14.5	18.5	7.5	0.8
0.47	14.5	20.0	9.0	0.8
0.68	14.5	22.5	11.5	0.8
1.0	14.5	25.0	14.0	1.0
<b>pitch 15.0mm</b>				
1.5	19.0	23.5	13.0	1.0
2.2	19.0	27.0	16.0	1.0

[Low profile for PDP and LCD]



**URDC:200V**

uF	L	H	T	d
<b>pitch 7.5mm</b>				
0.22	11.5	15.5	8.5	0.8
0.33	11.5	19.0	9.0	0.8
0.47	11.5	20.5	10.0	0.8
0.68	11.5	23.5	11.5	0.8
<b>pitch 10.0mm</b>				
1.0	14.5	22.5	11.0	1.0
1.5	14.5	25.5	14.0	1.0
<b>pitch 15.0mm</b>				
2.2	19.0	24.0	12.5	1.0
3.3	19.0	28.0	15.5	1.0

**URDC:630V**

uF	L	H	T	d
<b>pitch 15.0mm</b>				
0.22	19.0	19.0	9.0	1.0
0.33	19.0	22.0	11.0	1.0
0.47	19.0	24.0	13.0	1.0
0.68	19.0	27.0	16.0	1.0
1.0	19.0	30.0	19.5	1.0

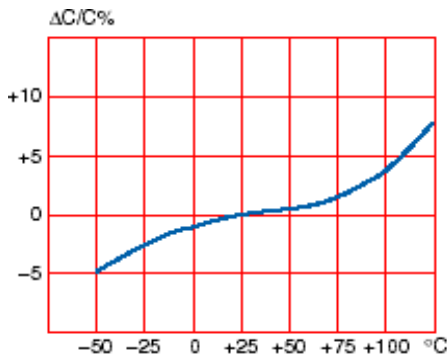
**URDC:400V**

uF	L	H	T	d
<b>pitch 10.0mm</b>				
0.22	14.5	6.5	16.0	0.8
0.33	14.5	7.5	18.5	0.8
0.47	14.5	9.0	20.0	0.8
0.68	14.5	11.5	22.5	0.8
1.0	14.5	14.0	25.0	1.0
<b>pitch 15.0mm</b>				
1.5	19.0	13.0	23.5	1.0
2.2	19.0	16.0	27.0	1.0

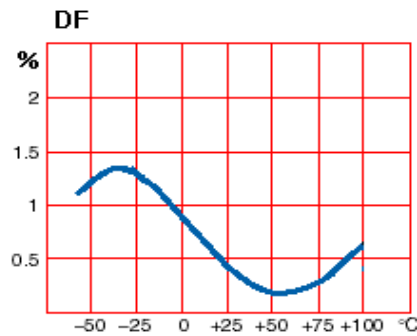
[8] Typical performance characteristics

\*slightly different depending on individual ratings

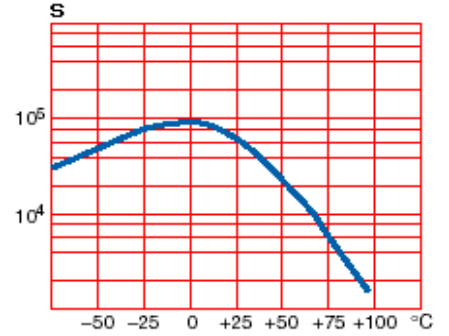
[Capacitance-temperature] at 1kHz



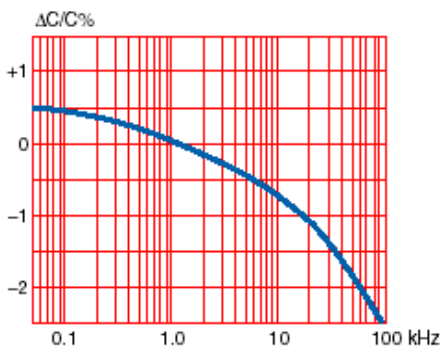
[DF-temperature] at 1kHz



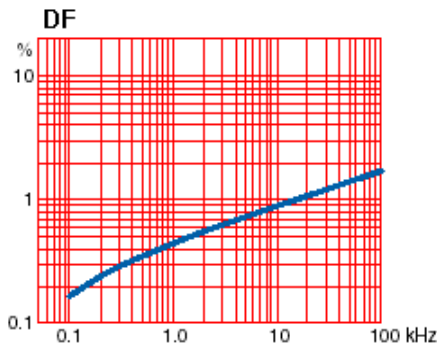
[Rins-Temperature]



[Capacitance-frequency at +20°C]



[DF-frequency at +20°C]



**[9]Operating temperature**

①In DC circuit : the operating temperature =Ta

②It must be noted,however,that the operating temperature will be the Th(=Ta+ΔT),not the Ta, if ①self-heating(ΔT) or

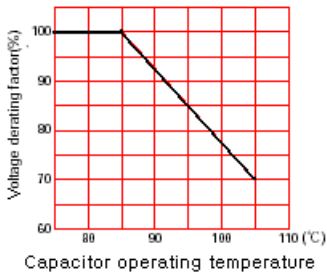
②surface heating occurs.

**[10]Derating of rated voltage(UR)**

The UR has to be derated,for operation at higher temperature and in AC circuit.

**①where operating temperature is high**

If capacitors are used in temperature exceeds +85°C(TR) but without exceeding +105°C(Tmax.),the UR has to be derated according to the graph below.



**②when used in an AC circuit**

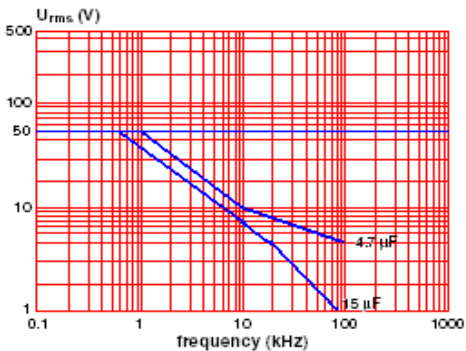
If DC rated capacitors are used in an AC circuit,the operating AC voltage should be derated due to heat generation or corona discharge.

①at commercial frequency(50/60Hz),and an operating temperature of -40~+85°C(including self-heating),the URAC are specified below.

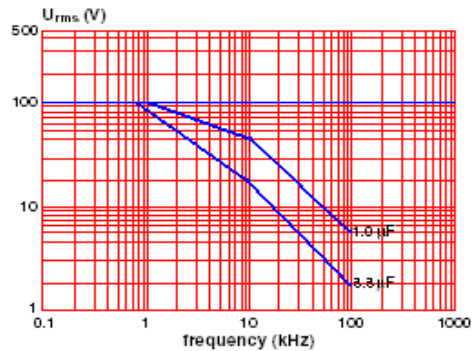
URDC	URAC(at 50/60Hz)	
100V	50Vrms	<p><b>*Not suitable for AC mains applications</b></p> <p>Even if, URAC of a capacitor covers AC mains voltage range,standard film capacitors in this series are basically not suitable for operation directly connected to AC mains(e.g.across the line). For these AC mains application,the CFS series are recommended.</p>
200V	100Vrms	
400V	200Vrms	
630V	220Vrms	

②at high frequency(over 60Hz),derate the URAC according to the below "max. permissible AC rms voltage(Urms)-frequency" graphs, at Th=max.+85°C and ΔT=10°C.

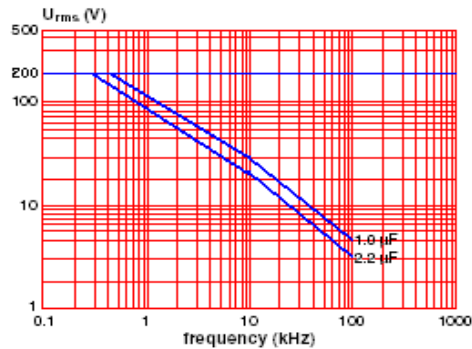
**URDC:100V,URAC:50Vrms(50/60Hz)**



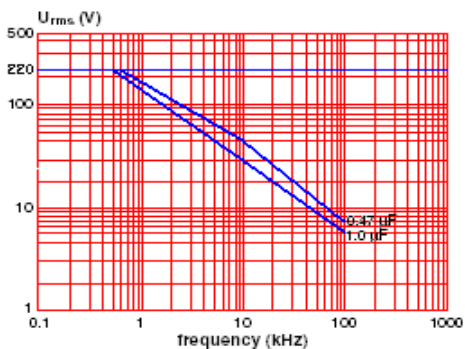
**URDC:200V,URAC:100Vrms(50/60Hz)**



**URDC:400V,URAC:200Vrms(50/60Hz)**



**URDC:630V,URAC:220Vrms(50/60Hz)**

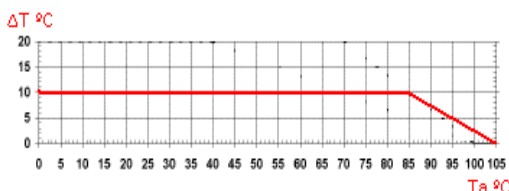


\*The AC voltages mentioned refer to clean sinusoidal voltages without transients.

\*max. permissible AC rms current(Irms)=2πf · C · Urms here, f:operating frequency in Hz  
C:capacitance in F

Urms:obtained Urms from the above graph in V.

**[11]Max. allowable ΔT**



## [12]Soldering operation

In soldering,heat stress to the capacitors has great influence on the change of characteristics of the capacitor,lead to an increase in failures(short circuit)and poor reliability.

Apart from being dependent on the solder bath temperature and soldering time,the heat stress is also affected by initial (pre-heating) and the post-soldering (cooling) temperatures.

Ensure that the soldering process is within specified conditions shown in below.

①The temperature shown below,reflect the condition seen by the capacitor wire leads.

②Exposure of the capacitor body to excessive heat during pre-heat and soldering operations may result in damage to the capacitor.

③When combining with chip parts,avoid passing through an adhesive curing oven in order to cure the resin used for fixing.

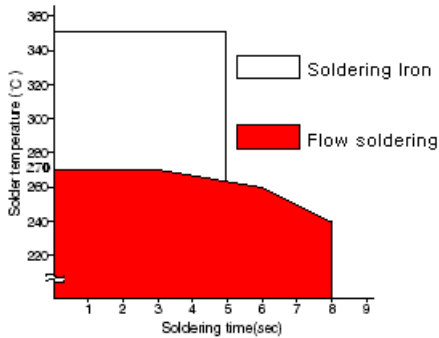
Otherwise,if the mounting heat resisting temperature is exceeded,the dielectric film will suffer heat shrinkage which induces short-circuiting.

Insert the capacitor and solder,after curing the adhesive.

④avoid reflow soldering.

⑤Soldering iron : The soldering iron should not make contact with the body of the capacitor.

⑥Flow soldering



Pre-heat: max.110°C within 1 min.

i )During the soldering,high temperature may cause cracking of the capacitor due to the characteristics of the epoxy resin which is used for external coating of capacitors.

Set the temperature and time so that the cracking may not occurred.

ii)Do not move the capacitor after soldering for a minimum of 20sec.

Failures by short or by opening may result.

iii)If re-work is needed,wait until the capacitor temperature is equal to room temperature.

Do not re-work more than twice.

\*For further details,refer to [General technical information of film capacitors for use in electronics](#)