

max.+85°C,for high frequency and timing circuit,compact size,inductive(inserted tab),polypropylene film/foil, epoxy dipped,radial capacitor

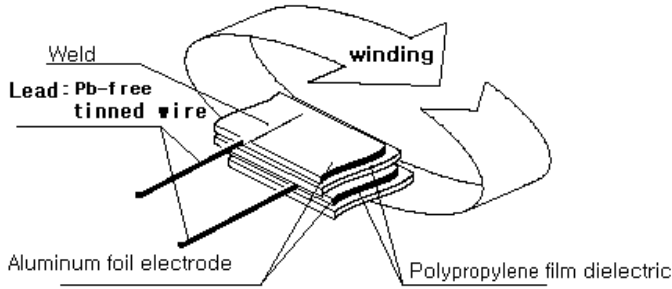
[1]Features

- Low loss and Polystyrene alternative.
- Excellent frequency characteristics and long stability of capacitance.
- Temperature characteristics of capacitance is negative.
- Pb(lead)-free product.
- RoHS Compliant product.

[2]Typical applications

- High frequency circuit for communication equipment,TV, and audio applications.
- Snubber circuits,small watts resonant circuits.
- Tuning circuits.

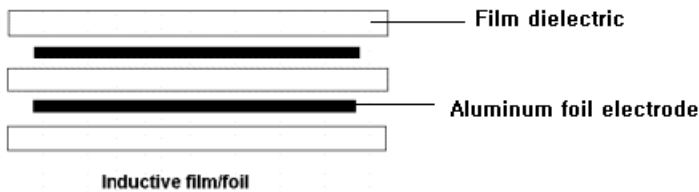
[3]Construction



RoHS Compliant

[1]Style :radial,epoxy dipped design.

[2]Winding :inductively wound from polypropylene film dielectric and aluminum foil electrode(inserted tab).



[3]Termination :Pb-free tinned leads are electrically,directly welded to the aluminum foil electrodes.

[4]Coating :multi dip,epoxy resin.

[4]Specifications

[1]General data

Applicable standard	IEC60384-13,,JIS RC-2346
Rated voltage(URDC)	100VDC,250VDC,400VDC,630VDC,1000VDC
Capacitance range	0.00033uF~0.22uF
Capacitance tolerance	±2%(G),±5%(J),±10%(K) at 20°C,1Khz
Operating temperature range (TR:+70°C,Tmax.:+85°C)	-40~+85°C *+70°C~+85°C :Derate the rated voltage as shown in the below fig. (70% of the rated voltage at +85°C)

[2]Environmental test data

	Test conditions	Test criteria
Low temperature test	-40±2°C	$\frac{\Delta C}{C}$:0~ +3% of value in 20°C
High temperature test	85±2°C	①Rins.(between leads):≥0.1 x specified value in [2]Electrical data
		② $\frac{\Delta C}{C}$:0~ -5% of value in 20°C
Damp heat test	40±2°C,R.H.:90~95% applying URDC for 500+24/0 hours	①Withstand voltage:2.0 x URDC for 1min.
		②Rins(between leads):≥ $\frac{1}{3}$ x specified value in [2]Electrical data
		③DF:≤0.12% at 1Khz
		④ $\frac{\Delta C}{C}$:≤ ±3% of initial value
Endurance test	85±2°C,applying 1.4URDC for 1,000+48/0 hours	①Rins(between leads):≥ $\frac{1}{2}$ x specified value in [2]Electrical data
		②DF:≤0.11% at 1Khz
		③ $\frac{\Delta C}{C}$:≤ ±5% of initial value

3]Electrical data

Withstand voltage	2.5URDC for 2sec.at 20°C,between leads (2.0URDC for 1 min. for type test)		
Dissipation factor(DF)	0.1% max. at 20°C,1Khz		
Insulation resistance(Rins) at 20°C,between leads	≥ 30,000MΩ	applied for 1 min.	100VDC: for URDC<500V 500VDC: for URDC≥500V

[5]Marking

URDC,Capacitance & tolerance are marked on the capacitor.

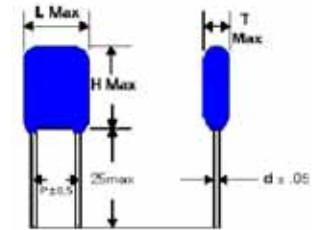
[6]Ordering/part number information

CQ	921	P	G	-	2A	331	J	T/AS	0050
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)

- (1)Kind of capacitor:plastic film/foil capacitor
- (2)Shape of capacitor:inductive wound,Radial epoxy dipped.
- (3)Dielectrics:polypropylene
- (4)Operating temperature:-40°C ~ +85°C
- (5)internal use
- (6)*DC rated voltage code:100VDC
- (7)*Rated capacitance in pF:330pF=0.00033uF
- (8)*Capacitance tolerance code:±5%
- (9)*Packaging and lead configuration code:Single formed,taped packed in ammo for auto.insertion
- (10)*Lead pitch:5mm

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

[7]Dimensions in mm



URDC:100V

uF	L	H	T	P	d
0.00033	6.0	8.5	3.5	3.5	0.5
0.00039	6.0	8.5	3.5	3.5	0.5
0.00047	6.0	8.5	3.5	3.5	0.5
0.00056	6.0	8.5	3.5	3.5	0.5
0.00068	6.0	8.5	3.5	3.5	0.5
0.00082	6.0	8.5	3.5	3.5	0.5
0.001	6.0	8.5	3.5	3.5	0.5
0.0012	6.0	8.5	3.5	3.5	0.5
0.0015	6.0	8.5	3.5	3.5	0.5
0.0018	6.0	8.5	3.5	3.5	0.5
0.0022	6.0	8.5	3.5	3.5	0.5
0.0027	6.5	8.5	3.5	3.5	0.5
0.0033	6.5	8.5	3.5	3.5	0.5
0.0039	6.5	8.5	4.0	3.5	0.5
0.0047	6.5	8.5	4.0	3.5	0.5
0.0056	6.5	8.5	4.0	3.5	0.5
0.0068	6.5	8.5	4.0	3.5	0.5
0.0082	7.0	9.5	4.0	3.5	0.5
0.01	7.0	9.5	4.0	3.5	0.5
0.012	7.5	11.0	4.5	5.0	0.5
0.015	7.5	11.0	4.5	5.0	0.5
0.018	8.0	11.5	5.5	5.0	0.5
0.022	8.0	11.5	5.5	5.0	0.5
0.027	9.0	12.0	6.0	7.5	0.5
0.033	9.0	12.0	6.0	7.5	0.5
0.039	10.0	13.0	6.0	7.5	0.5
0.047	10.0	13.0	6.0	7.5	0.5
0.056	11.0	13.0	6.0	7.5	0.5
0.068	11.0	13.0	6.0	7.5	0.5
0.082	12.0	14.0	7.0	10.0	0.5
0.1	12.0	14.0	7.0	10.0	0.5
0.12	13.0	16.0	7.0	10.0	0.5
0.15	13.0	16.0	7.0	10.0	0.5
0.18	15.0	18.0	9.0	12.5	0.5
0.22	15.0	18.0	9.0	12.5	0.5

URDC:250V

uF	L	H	T	P	d
0.00033	6.0	8.5	3.5	3.5	0.5
0.00039	6.0	8.5	3.5	3.5	0.5
0.00047	6.0	8.5	3.5	3.5	0.5
0.00056	6.0	8.5	3.5	3.5	0.5
0.00068	6.0	8.5	3.5	3.5	0.5
0.00082	6.0	8.5	3.5	3.5	0.5
0.001	6.0	8.5	3.5	3.5	0.5
0.0012	6.0	8.5	3.5	3.5	0.5
0.0015	6.0	8.5	3.5	3.5	0.5
0.0018	6.0	8.5	3.5	3.5	0.5
0.0022	6.0	8.5	3.5	3.5	0.5
0.0027	6.5	8.5	3.5	3.5	0.5
0.0033	6.5	10.5	4.0	3.5	0.5
0.0039	7.0	11.0	4.0	3.5	0.5
0.0047	7.0	11.0	4.0	3.5	0.5
0.0056	7.0	11.0	4.0	3.5	0.5
0.0068	7.5	11.0	4.5	5.0	0.5
0.0082	8.0	11.0	5.0	5.0	0.5
0.01	8.0	11.0	5.0	5.0	0.5
0.012	9.0	12.5	5.0	7.5	0.5
0.015	9.0	12.5	5.0	7.5	0.5
0.018	10.0	13.5	5.5	7.5	0.5
0.022	10.0	13.5	5.5	7.5	0.5
0.027	11.5	14.0	7.0	7.5	0.5
0.033	11.5	14.0	7.0	7.5	0.5
0.039	13.0	15.0	8.0	10.0	0.5
0.047	13.0	15.0	8.0	10.0	0.5
0.056	13.0	15.0	8.0	10.0	0.5
0.068	13.0	15.0	8.0	10.0	0.5
0.082	14.5	17.0	10.0	12.5	0.5
0.1	14.5	17.0	10.0	12.5	0.5



URDC:400V

uF	L	H	T	P	d
0.001	7.8	10.0	4.5	5.0	0.5
0.0012	7.8	10.0	4.5	5.0	0.5
0.0015	7.8	10.0	4.5	5.0	0.5
0.0018	8.0	10.5	4.5	5.0	0.5
0.0022	8.0	10.5	4.5	5.0	0.5
0.0027	8.0	13.0	4.5	5.0	0.5
0.0033	8.0	13.0	4.5	5.0	0.5
0.0039	8.0	13.0	5.0	5.0	0.5
0.0047	8.5	13.0	5.0	5.0	0.5
0.0056	8.5	13.5	5.0	5.0	0.5
0.0068	9.0	13.5	5.0	7.5	0.5
0.0082	9.0	13.5	5.0	7.5	0.5
0.01	9.5	13.5	5.0	7.5	0.5
0.012	9.5	13.5	5.0	7.5	0.5
0.015	10.0	14.0	5.5	7.5	0.5
0.018	10.0	14.5	5.5	7.5	0.5
0.022	11.0	15.0	6.0	7.5	0.5
0.027	11.5	16.0	7.0	7.5	0.5
0.033	11.5	17.0	7.0	7.5	0.5
0.039	12.5	18.0	8.0	10.0	0.5
0.047	13.5	19.0	8.0	10.0	0.5
0.056	13.5	19.0	8.0	10.0	0.5
0.068	14.0	22.0	8.0	10.0	0.5
0.082	15.0	24.0	10.0	12.5	0.5
0.1	16.0	24.0	10.0	12.5	0.5

URDC:1000V

uF	L	H	T	P	d
0.001	6.5	12.0	4.5	3.5	0.5
0.0012	6.5	12.0	4.5	3.5	0.5
0.0015	7.0	12.0	4.5	5.0	0.5
0.0018	7.5	12.0	4.5	5.0	0.5
0.0022	7.5	12.0	4.5	5.0	0.5
0.0027	8.0	12.0	5.0	5.0	0.5
0.0033	9.0	14.0	5.0	7.5	0.5
0.0039	9.5	14.0	5.5	7.5	0.5
0.0047	10.0	14.0	5.5	7.5	0.5
0.0056	11.0	14.0	5.5	7.5	0.5
0.0068	12.0	14.0	6.0	10.0	0.5

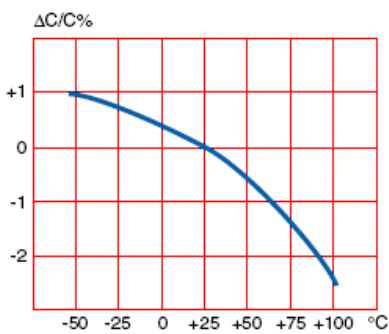
URDC:630V

uF	L	H	T	P	d
0.001	6.5	12.0	3.5	3.5	0.5
0.0012	6.5	12.0	3.5	3.5	0.5
0.0015	6.5	12.0	3.5	3.5	0.5
0.0018	6.5	12.0	3.5	3.5	0.5
0.0022	6.5	12.0	3.5	3.5	0.5
0.0027	6.5	12.0	4.0	3.5	0.5
0.0033	8.5	13.0	4.5	5.0	0.5
0.0039	8.5	13.0	4.5	5.0	0.5
0.0047	8.5	13.0	4.5	5.0	0.5
0.0056	9.0	15.0	4.5	7.5	0.5
0.0068	9.0	15.0	4.5	7.5	0.5
0.0082	9.5	15.0	6.5	7.5	0.5
0.01	10.0	18.0	7.0	7.5	0.5
0.012	10.5	18.0	7.0	7.5	0.5
0.015	11.0	18.0	7.0	7.5	0.5
0.018	12.0	18.0	7.0	10.0	0.5
0.022	13.0	18.0	7.0	10.0	0.5

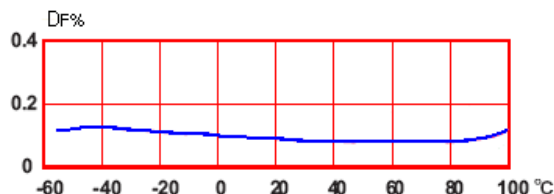
[8]Typical performance characteristics

*slightly different depending on individual ratings

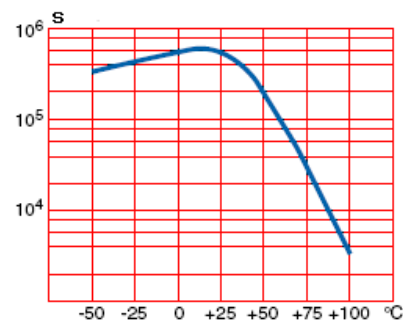
[Capacitance-temperature] at 1kHz



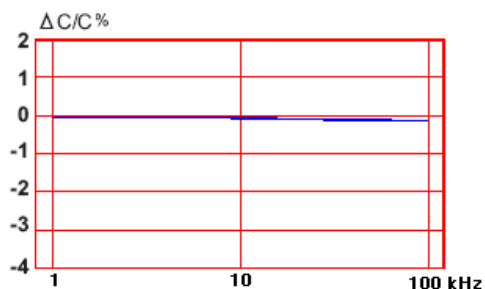
[DF-temperature] at 1kHz



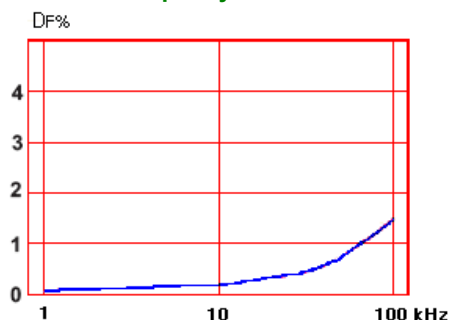
[Rins-Temperature]



[Capacitance-frequency at +20°C]



[DF-frequency at +20°C]



[9]Operating temperature

1 In DC circuit : the operating temperature =Ta

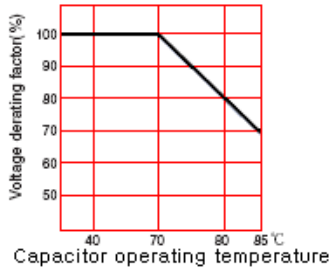
2 It must be noted,however,that the operating temperature will be the Th(=Ta+ΔT),not the Ta, if ①self-heating(ΔT) or ②surface heating occurs.

[10]Derating of rated voltage(UR)

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

1 where operating temperature is high

If capacitors are used in temperature exceeds +70°C(TR) but without exceeding +85°C(Tmax.),the UR has to be derated according to the graph below.



2 when used in an AC circuit

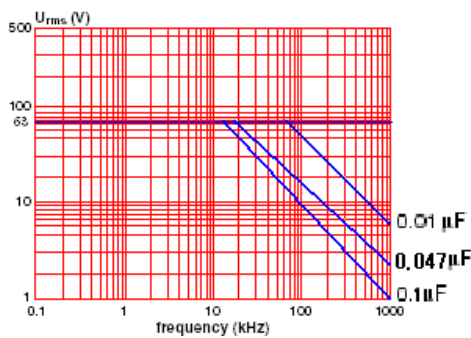
If DC rated capacitors are used in an AC circuit,the operating AC voltage should be derated due to heat generation or corona discharge.

1 at commercial frequency(50/60Hz),and an operating temperature of -40~+70°C(including self-heating),the URAC are specified below.

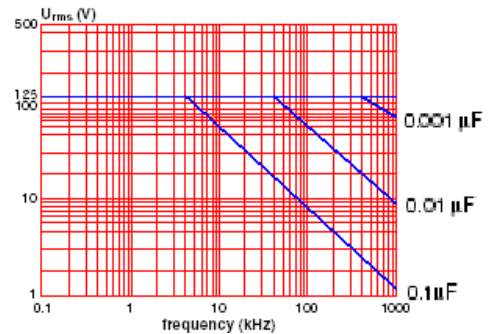
URDC	URAC(at 50/60Hz)	*Not suitable for AC mains applications Even if, URAC of a capacitor covers AC mains voltage range,standard film capacitors in this series are basically not suitable for operation directly connected to AC mains(e.g.across the line). For these AC mains application,the CFS series are recommended.
100V	63Vrms	
250V	125Vrms	
400V	200Vrms	
630V	220Vrms	
1000V	250Vrms	

2 at high frequency(over 60Hz),derate the URAC according to the below "max. permissible AC rms voltage(Urms)-frequency" graphs, at Th=max.+70°C and ΔT=10°C.

URDC:100V ,URAC:63Vrms(50/60Hz)



URDC:250V ,URAC:125Vrms(50/60Hz)

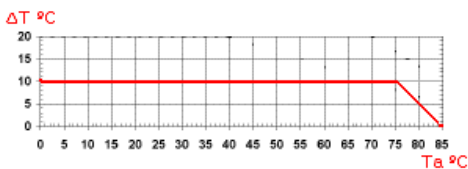


*The AC voltages mentioned refer to clean sinusoidal voltages without transients.

*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.

This series of polypropylene film capacitors have lower mounting heat resisting temperature than other polyester film capacitors.

CQ922PG and CQ921PG series are sensitive for heating,due to their construction and film material.

If directly mounted on the PCB,the capacitor's inside(element)temperature may exceed mounting heat resisting temperature(110°C) due to heat from the lead,and hence a formed-lead is recommended.

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

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

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

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



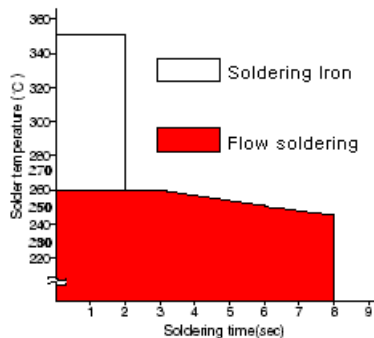
Otherwise,if the mounting heat resisting temperature is exceeded,the dielectric film will suffer heat shrinkage which induces short-circuiting.

Insert the capacitor and solder,after curing the adhesive.

④ avoid reflow soldering.

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

⑥ Flow soldering



Pre-heat:max.100°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](#)