

max.+105°C, for DC and low frequency applications, compact size, inductive (inserted tab), polyester film/foil, epoxy dipped, radial capacitor

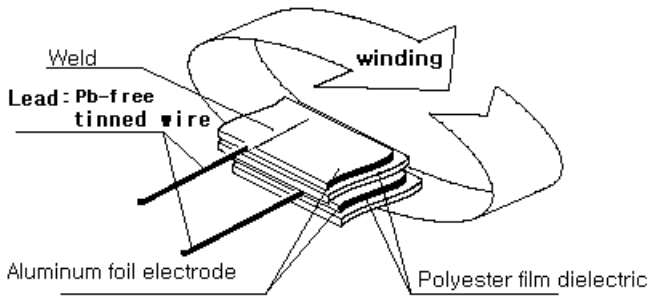
[1] Features

Cost efficient and Ceramic disc alternative.
 Small size
 Pb(lead)-free product.
 RoHS Compliant product.

[2] Typical applications

Coupling & decoupling, for all general purpose use especially for DC & low frequency applications.
 Car radio.
 Noise suppressor for fluorescent lamp.

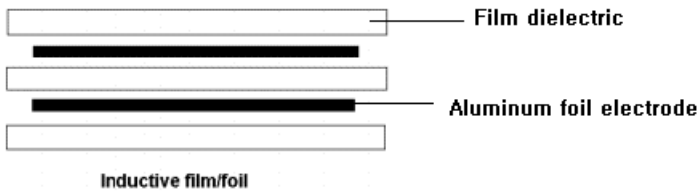
[3] Construction



RoHS Compliant

[1] Style :radial, epoxy dipped design.

[2] Winding :inductively wound from polyester 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	IEC60384-11, JIS C5113	
Rated voltage (URDC)	100VDC, 250VDC, 400VDC, 630VDC, 1000VDC	
Capacitance range	0.00047uF~0.47uF	
Capacitance tolerance	±5%(J), ±10%(K) at 20°C, 1Khz	
Operating temperature range (TR:+85°C, Tmax.:+105°C)	-40~+105°C	*+85°C~+105°C: Derate the rated voltage as shown in the below fig. (50% of the rated voltage at +105°C)

[2] Environmental test data

	Test conditions	Test criteria		
Low temperature test	-40±3°C	$\frac{\Delta C}{C}$: 0~ -7% of value in 20°C		
High temperature test	85±2°C	① Rins.(between leads) <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>CR ≤ 0.33uF: ≥ 1500MΩ</td></tr><tr><td>CR > 0.33uF: ≥ 500s</td></tr></table>	CR ≤ 0.33uF: ≥ 1500MΩ	CR > 0.33uF: ≥ 500s
		CR ≤ 0.33uF: ≥ 1500MΩ		
CR > 0.33uF: ≥ 500s				
$\frac{\Delta C}{C}$: +5~ -2% of value in 20°C				
Damp heat test	40±2°C, R.H.: 90~95% applying URDC for 500+24/0 hours	① Withstand voltage: 1.75 x URDC for 1min. ② Rins.(between leads): ≥ ½ x specified value in [2] Electrical data ③ DF: ≤ 1.2% at 1Khz ④ $\frac{\Delta C}{C}$: ≤ ±5% of initial value		
Endurance test	85±2°C, applying 1.4URDC for 1,000+48/0 hours	① Rins.(between leads): ≥ ½ x specified value in [2] Electrical data ② DF: ≤ 1.2% at 1Khz ③ $\frac{\Delta C}{C}$: ≤ ±8% 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)	1.0% max. at 20°C,1Khz		
Insulation resistance(Rins) at 20°C,between leads	CR≤0.33uF	CR>0.33uF	applied for 1 min. 100VDC: for URDC<500V 500VDC: for URDC≥500V
	≥30,000MΩ	≥10,000s	

*CR = Nominal Capacitance in μF

[5]Marking

URDC,Capacitance & tolerance are marked on the capacitor.

[6]Ordering/part number information

CQ	921	M	G	(s)	2A	104	K	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:polyester

(4)Operating temperature:-40°C ~ +105°C

(5)(s) indicates the small size,no code for standard size.

(6)*DC rated voltage code:100VDC

(7)*Rated capacitance in pF:100000pF=0.1uF

(8)*Capacitance tolerance code:±10%

(9)*Packaging and lead configuration code: Single formed,taped packed in ammo for auto.insertion

(10)*Lead pitch:5mm

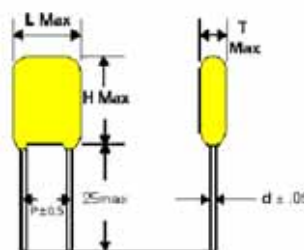
*For further details,refer to  [\[Part numbering system & taping specification\]](#)

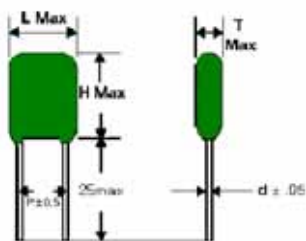
[7]Dimensions in mm

 Small size:CQ921MG(s) series

URdc:100V

uF	L	H	T	P	d
0.00047	6.0	7.5	3.5	3.5	0.5
0.00056	6.0	7.5	3.5	3.5	0.5
0.00068	6.0	7.5	3.5	3.5	0.5
0.00082	6.0	7.5	3.5	3.5	0.5
0.001	4.8	7.0	2.5	3.5	0.5
0.0012	4.8	7.0	2.5	3.5	0.5
0.0015	4.8	7.0	2.5	3.5	0.5
0.0018	4.8	7.0	2.5	3.5	0.5
0.0022	4.8	7.0	2.8	3.5	0.5
0.0027	4.8	7.0	2.8	3.5	0.5
0.0033	4.8	7.0	2.8	3.5	0.5
0.0039	5.0	7.0	2.8	3.5	0.5
0.0047	5.0	7.0	2.8	3.5	0.5
0.0056	5.0	7.0	2.8	3.5	0.5
0.0068	5.0	7.0	2.8	3.5	0.5
0.0082	5.0	7.0	2.8	3.5	0.5
0.01	5.5	7.0	3.0	3.5	0.5
0.012	5.8	7.0	3.3	3.5	0.5
0.015	5.3	8.5	3.0	3.5	0.5
0.018	5.3	8.5	3.0	3.5	0.5
0.022	5.5	9.0	3.5	3.5	0.5
0.027	5.5	9.0	3.5	3.5	0.5
0.033	5.8	9.0	3.5	3.5	0.5
0.039	6.5	9.0	3.5	5.0	0.5
0.047	7.0	9.0	3.5	5.0	0.5
0.056	7.0	9.5	4.0	5.0	0.5
0.068	7.5	9.5	4.5	5.0	0.5
0.082	8.0	9.5	4.5	5.0	0.5
0.1	8.3	9.5	5.0	5.0	0.5
0.12	7.8	11.0	5.0	5.0	0.5
0.15	8.5	11.5	5.5	5.0	0.5
0.18	10.0	11.5	6.5	7.5	0.5
0.22	10.5	12.0	7.0	7.5	0.5
0.27	11.0	14.0	6.5	7.5	0.6
0.33	11.5	14.0	7.0	7.5	0.6
0.39	12.5	14.5	7.5	7.5	0.6
0.47	13.0	14.5	8.5	7.5	0.6





URDC:100V

uF	L	H	T	P	d
0.001	5.0	10.5	3.0	3.5	0.5
0.0012	5.0	10.5	3.0	3.5	0.5
0.0015	5.0	10.5	3.0	4.0	0.5
0.0018	5.0	10.5	3.0	4.0	0.5
0.0022	5.5	10.5	3.0	4.0	0.5
0.0027	5.5	10.5	3.0	4.0	0.5
0.0033	5.5	10.5	3.0	4.0	0.5
0.0039	5.5	10.5	3.0	4.0	0.5
0.0047	5.5	10.5	3.0	4.0	0.5
0.0056	5.5	10.5	3.0	4.0	0.5
0.0068	5.5	10.5	3.0	4.0	0.5
0.0082	6.5	10.5	3.0	4.0	0.5
0.01	6.5	10.5	3.0	4.0	0.5
0.012	6.5	11.5	3.0	5.0	0.5
0.015	6.5	11.5	3.0	5.0	0.5
0.018	6.5	11.5	3.0	5.0	0.5
0.022	6.5	11.5	3.5	6.5	0.5
0.027	7.5	11.5	3.5	6.5	0.5
0.033	7.5	11.5	3.5	6.5	0.5
0.039	7.5	11.5	3.5	6.5	0.5
0.047	7.5	12.5	4.5	6.5	0.5
0.056	9.0	12.5	4.5	7.0	0.5
0.068	9.0	12.5	4.5	7.0	0.5
0.082	10.0	12.5	5.5	7.5	0.5
0.1	10.0	12.5	5.5	7.5	0.5
0.12	10.0	12.5	6.0	8.5	0.5
0.15	12.5	18.5	6.0	8.5	0.5
0.18	12.5	18.5	6.0	8.5	0.5
0.22	12.5	18.5	6.5	8.5	0.5
0.27	12.5	18.5	8.5	8.5	0.6
0.33	15.0	19.5	8.0	9.5	0.6
0.39	16.0	19.5	9.0	9.5	0.6
0.47	18.5	19.5	11.5	10.0	0.6

URDC:250V

uF	L	H	T	P	d
0.001	5.0	10.5	3.0	3.5	0.5
0.0012	5.0	10.5	3.0	3.5	0.5
0.0015	5.0	10.5	3.0	4.0	0.5
0.0018	5.0	10.5	3.0	4.0	0.5
0.0022	5.5	10.5	3.0	4.0	0.5
0.0027	5.5	10.5	3.0	4.0	0.5
0.0033	5.5	10.5	3.0	4.0	0.5
0.0039	5.5	10.5	3.0	4.0	0.5
0.0047	5.5	10.5	3.0	4.0	0.5
0.0056	5.5	10.5	3.0	4.0	0.5
0.0068	5.5	10.5	3.0	4.0	0.5
0.0082	6.5	10.5	3.0	4.0	0.5
0.01	6.5	10.5	3.0	4.0	0.5
0.012	9.5	12.0	4.5	5.0	0.5
0.015	9.5	12.0	4.5	5.0	0.5
0.018	9.5	12.0	5.0	5.0	0.5
0.022	10.0	12.0	5.0	5.0	0.5
0.027	10.0	12.0	5.0	6.5	0.5
0.033	10.0	13.0	5.0	6.5	0.5
0.039	10.0	13.0	5.0	6.5	0.5
0.047	10.0	13.0	5.5	6.5	0.5
0.056	11.0	13.0	5.5	7.0	0.5
0.068	11.0	13.0	5.5	7.0	0.5
0.082	11.0	13.0	6.5	7.5	0.5
0.1	11.0	13.0	7.5	7.5	0.5

URDC:400V

uF	L	H	T	P	d
0.001	5.0	10.5	3.0	3.5	0.5
0.0012	5.0	10.5	3.0	3.5	0.5
0.0015	5.0	10.5	3.0	4.0	0.5
0.0018	5.0	10.5	3.0	4.0	0.5
0.0022	5.5	10.5	3.0	4.0	0.5
0.0027	5.5	10.5	3.0	4.0	0.5
0.0033	5.5	10.5	3.0	4.0	0.5
0.0039	5.5	10.5	3.0	4.0	0.5
0.0047	5.5	10.5	3.0	4.0	0.5
0.0056	5.5	10.5	3.0	4.0	0.5
0.0068	5.5	10.5	3.0	4.0	0.5
0.0082	6.5	10.5	3.0	4.0	0.5
0.01	6.5	10.5	3.0	5.0	0.5
0.012	10.0	13.0	5.5	6.0	0.5
0.015	10.0	13.0	5.5	6.0	0.5
0.018	10.0	13.0	5.5	6.0	0.5
0.022	10.0	13.0	5.5	6.0	0.5
0.027	10.0	13.0	5.5	6.5	0.5
0.033	10.0	13.0	5.5	6.5	0.5
0.039	11.0	14.0	6.0	7.0	0.5
0.047	11.0	14.0	6.0	7.0	0.5
0.056	13.0	18.0	8.0	8.0	0.5
0.068	13.0	18.0	8.0	8.0	0.5
0.082	15.0	20.0	10.0	9.0	0.5
0.1	15.0	20.0	10.0	9.0	0.5

URDC:1000V **

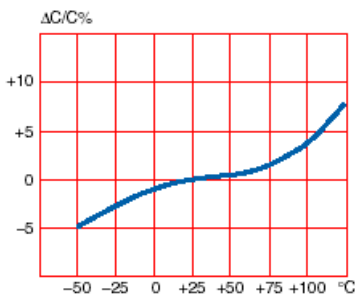
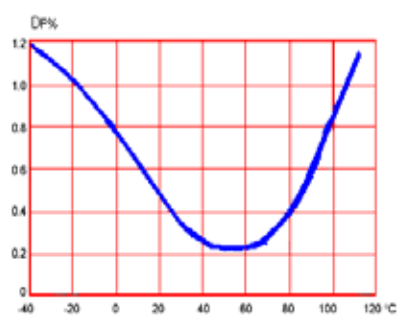
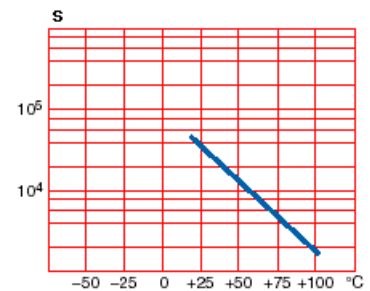
uF	L	H	T	P	d
0.001	9.0	10.5	4.2	6.0	0.5
0.0012	9.0	10.5	4.2	6.0	0.5
0.0015	9.0	10.5	4.2	6.0	0.5
0.0018	9.0	10.5	4.2	6.0	0.5
0.0022	9.0	11.0	4.8	6.0	0.5
0.0027	9.0	14.5	5.0	6.0	0.5
0.0033	9.0	14.5	5.0	6.0	0.5
0.0039	9.5	15.0	5.8	6.5	0.5
0.0047	10.0	15.0	5.8	6.5	0.5
0.0056	10.5	15.0	5.8	6.5	0.5
0.0060	10.5	16.0	5.5	6.5	0.5
0.0068	10.8	15.0	5.8	6.5	0.5
0.0082	11.2	15.5	6.5	6.5	0.5
0.01	11.2	15.5	6.8	7.0	0.5

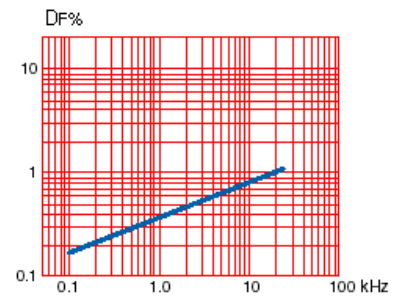
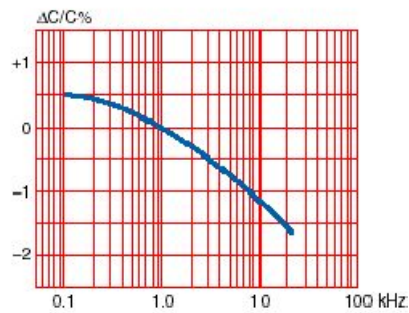
**Withstand voltage:1,600VAC for 2sec.at 20°C,between leads.

**Insulation resistance(Rins):≥20,000MΩ at 20°C,applied 500VDC for 1 min.between leads.

[8]Typical performance characteristics

*slightly different depending on individual ratings

[Capacitance-temperature] at 1kHz**[DF-temperature] at 1kHz****[Rins-Temperature]**



[9]Operating temperature

1 In DC circuit : the operating temperature =Ta

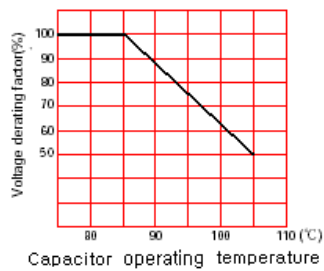
2 It must be noted,however,that the operating temperature will be the Th(=Ta+ΔT),not the Ta, if ①self-heating(ΔT) or ②surface heating occurs.

[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 +85°C(TR) but without exceeding +105°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~+85°C(including self-heating),the URAC are specified below.

URDC	URAC(at 50/60Hz)
100V	63Vrms
250V	125Vrms
400V	200Vrms
630V	220Vrms
1000V	250Vrms

***Not suitable for AC mains applications**

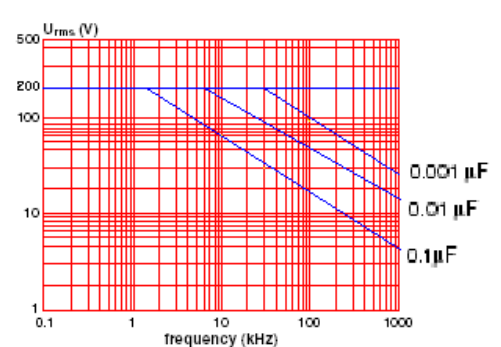
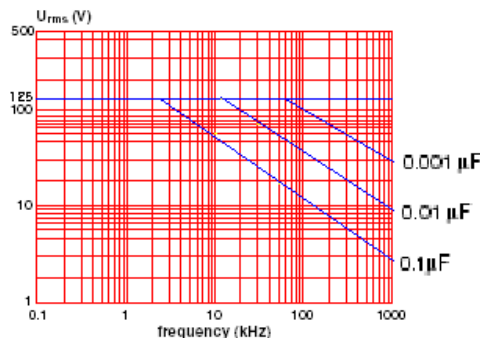
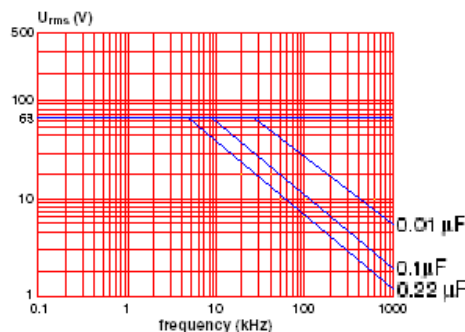
Even if, URAC of a capacitor covers AC mains voltage range,standard film capacitors in this series are basically not suitable for operation directly connected to AC mains(e.g.across the line). For these AC mains application,the CFS series are recommended.

2 at 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:63Vrms(50/60Hz)

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

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

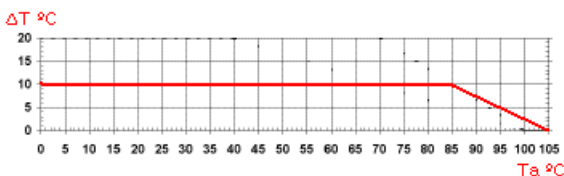


*The AC voltages mentioned refer to clean sinusoidal voltages without transients.

*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.

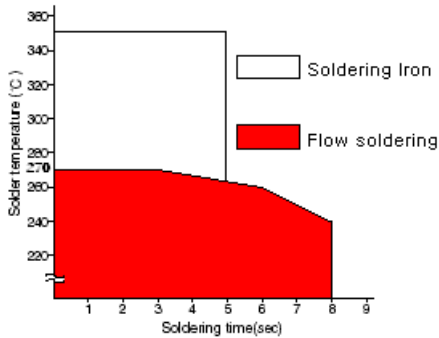
Apart from being dependent on the solder bath temperature and soldering time,the heat stress is also affected by initial (pre-heating) and the post-soldering (cooling)temperatures.

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](#)