

max.+105°C, for high pulse, frequency, voltage, large current, polypropylene with double sided metallized film electrodes, thermo-plastic box, radial capacitor

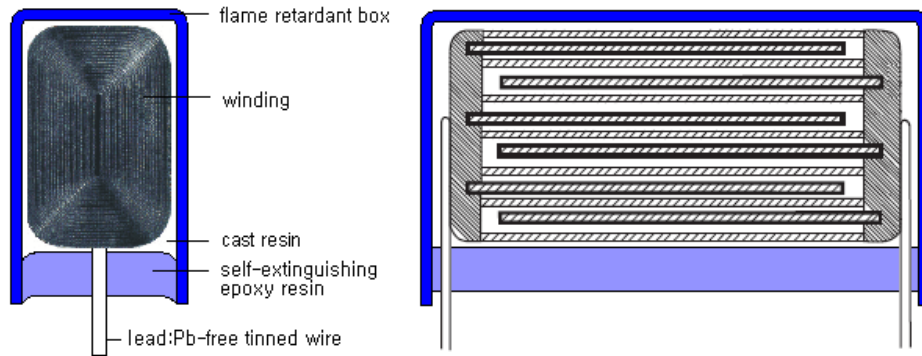
[1]Features

- Low loss.
- Self-heals.
- Excellent pulse, frequency characteristics.
- Pb(lead)-free product.
- RoHS Compliant product.

[2]Typical applications

For high pulse with large current, high frequency, voltage applications (S-correction, fly-back tuning in TV and Monitor, SMPS, lamp capacitor for electrical ballast and compact lamp, Snubber, SCR).

[3]Construction



RoHS Compliant

[1]Style :radial, rectangular thermo-plastic box.

[2]Winding :non-inductively wound from polypropylene film dielectric, with double sided metallized polyester carrier film as electrode, encapsulated with self-extinguishing epoxy resin in a flame retardant box (UL 94V-0).

*internal series multi-section construction: for URAC ≥ 275V

[3]Termination :Pb-free tinned leads.

[4]Specifications

[1]General data

Applicable standard	IEC60384-16, EIAJ RC-2347, JIS C5101-16		
Rated voltage (URDC)	250VDC, 400VDC, 630VDC, 1000VDC, 1600VDC, 2000VDC, 2500VDC		
Capacitance range	0.00047uF~1.0uF		
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. (70% of the rated voltage at +105°C)		

[2]Electrical data

Withstand voltage	1.6URDC for 2sec. at 20°C, between leads (1.5URDC for 1 min. for type test)		
Dissipation factor (DF) at 20°C, 1Khz	0.1% max.		
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

[3]Environmental test data

	Test conditions	Test criteria
Damp heat test	40±2°C, R.H.:90~95% applying URDC for 500+24/0 hours	① Rins (between leads): ≥ 0.3 x specified value in [2]Electrical data ② DF: ≤ 0.12% ③ $\frac{C}{C_0} \leq \pm 5\%$ of initial value
Endurance test	85±2°C, applying 1.25URDC for 1,000+48/0 hours	① Rins (between leads): ≥ 0.3 x specified value in [2]Electrical data ② DF: ≤ 0.11% ③ $\frac{C}{C_0} \leq \pm 5\%$ of initial value

[5]Marking

URDC, Capacitance & tolerance are marked on the capacitor.

[6]Ordering/part number information

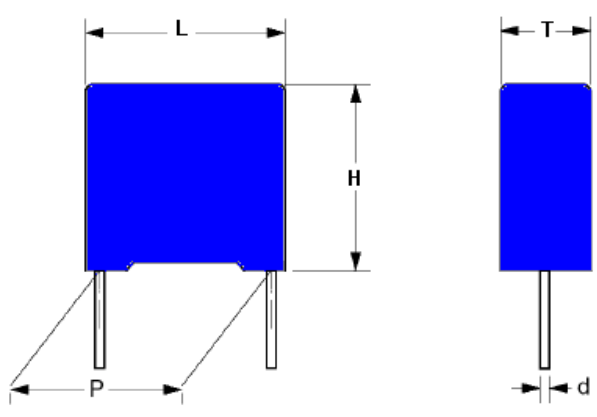
CF(D)	99	P	F	-	3C	103	J	C	050
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)

(1) Kind of capacitor: metallized plastic film capacitor

*(D) indicates the Double-sided metallized capacitor, no code for Single-sided metallized capacitor

- (2) Shape of capacitor: rectangular, thermo-plastic box, radial.
 - (3) Dielectrics: polypropylene
 - (4) Operating temperature: -40°C ~ +105°C
 - (5) internal use
 - (6) *DC rated voltage code: 1600VDC
 - (7) *Rated capacitance in pF: 10,000pF=0.01uF
 - (8) *Capacitance tolerance code: ±5%
 - (9)(10) *Packaging and lead configuration code: bulk, loose parts in a poly.bag. with cut leads 5mm
- *For further details, refer to [\[Part numbering system & taping specification\]](#)

[7] Dimensions in mm



URDC:250V

uF	L	H	T	d
pitch 10.0mm permissible $\frac{dv}{dt}$ value(≤ 10,000 pulses): 380v/μs				
0.0068	13.0	9.0	4.0	0.6
0.01	13.0	11.0	5.0	0.6
0.015	13.0	11.0	5.0	0.6
0.022	13.0	12.0	6.0	0.6
0.033	13.0	12.0	6.0	0.6
pitch 15.0mm permissible $\frac{dv}{dt}$ value(≤ 10,000 pulses): 200v/μs				
0.047	18.0	11.0	5.0	0.6
0.068	18.0	12.0	6.0	0.6
0.1	18.0	12.0	6.0	0.6
0.15	18.0	12.0	6.0	0.6
pitch 22.5mm permissible $\frac{dv}{dt}$ value(≤ 10,000 pulses): 100v/μs				
0.22	26.5	16.0	7.0	0.8
0.33	26.5	16.0	7.0	0.8
0.47	26.5	17.0	8.5	0.8
pitch 27.5mm permissible $\frac{dv}{dt}$ value(≤ 10,000 pulses): 85v/μs				
0.68	32.0	20.0	11.0	0.8
1.0	32.0	22.0	13.0	0.8

URDC:400V

uF	L	H	T	d
pitch 10.0mm permissible $\frac{dv}{dt}$ value(≤ 10,000 pulses): 510v/μs				
0.0033	13.0	9.0	4.0	0.6
0.0047	13.0	9.0	4.0	0.6
0.0068	13.0	11.0	5.0	0.6
0.01	13.0	11.0	5.0	0.6
0.015	13.0	11.0	5.0	0.6
pitch 15.0mm permissible $\frac{dv}{dt}$ value(≤ 10,000 pulses): 270v/μs				
0.022	18.0	11.0	5.0	0.6
0.033	18.0	11.0	5.0	0.6
0.047	18.0	12.0	6.0	0.6
0.068	18.0	13.5	7.5	0.6
0.1	18.0	14.5	8.5	0.6
pitch 22.5mm permissible $\frac{dv}{dt}$ value(≤ 10,000 pulses): 170v/μs				
0.15	26.5	14.5	7.0	0.8
0.22	26.5	18.5	10.0	0.8
pitch 27.5mm permissible $\frac{dv}{dt}$ value(≤ 10,000 pulses): 140v/μs				
0.33	32.0	20.0	11.0	0.8
0.47	32.0	22.0	13.0	0.8



URDC:630V

uF	L	H	T	d
pitch 10.0mm permissible $\frac{dv}{dt}$ value($\leq 10,000$ pulses):1300 v/ μ s				
0.001	13.0	9.0	4.0	0.6
0.0015	13.0	9.0	4.0	0.6
0.0022	13.0	9.0	4.0	0.6
0.0033	13.0	11.0	5.0	0.6
0.0047	13.0	11.0	5.0	0.6
0.0068	13.0	12.0	6.0	0.6
0.01	13.0	12.0	6.0	0.6
pitch 15.0mm permissible $\frac{dv}{dt}$ value($\leq 10,000$ pulses): 880 v/ μ s				
0.015	18.0	11.0	5.0	0.6
0.022	18.0	12.0	6.0	0.6
0.033	18.0	13.5	7.5	0.6
0.047	18.0	13.5	7.5	0.6
0.068	18.0	14.5	8.5	0.6
pitch 22.5mm permissible $\frac{dv}{dt}$ value($\leq 10,000$ pulses): 470v/ μ s				
0.1	26.5	16.0	7.0	0.8
0.15	26.5	17.0	8.5	0.8
pitch 27.5mm permissible $\frac{dv}{dt}$ value($\leq 10,000$ pulses): 370v/ μ s				
0.22	32.0	22.0	13.0	0.8

URDC:1600V

uF	L	H	T	d
pitch 15.0mm permissible $\frac{dv}{dt}$ value($\leq 10,000$ pulses):3000v/ μ s				
0.0010	18.0	11.0	5.0	0.6
0.0015	18.0	11.0	5.0	0.6
0.0022	18.0	11.0	5.0	0.6
0.0033	18.0	13.5	7.5	0.6
0.0047	18.0	14.5	8.5	0.6
0.0068	18.0	14.5	8.5	0.6
pitch 22.5mm permissible $\frac{dv}{dt}$ value($\leq 10,000$ pulses):1400v/ μ s				
0.01	26.5	17.0	8.5	0.8
0.015	26.5	18.5	10.0	0.8
0.022	26.5	18.5	10.0	0.8
pitch 27.5mm permissible $\frac{dv}{dt}$ value($\leq 10,000$ pulses):1200v/ μ s				
0.033	32.0	20.0	11.0	0.8
0.047	32.0	22.0	13.0	0.8

URDC:2500V

uF	L	H	T	d
pitch 22.5mm permissible $\frac{dv}{dt}$ value($\leq 10,000$ pulses): v/ μ s				
0.001	26.5	15.0	6.0	0.8
0.0015	26.5	15.0	6.0	0.8
0.0022	26.5	15.0	6.0	0.8
0.0033	26.5	15.0	6.0	0.8
0.0047	26.5	17.0	8.5	0.8
0.0068	26.5	18.0	10.0	0.8

*Pulse permissible current(Ao-p)=C(μ F)x permissible $\frac{dv}{dt}$ value(V/ μ s).

If, the operating pulse voltage < the URDC, the max. permissible $\frac{dv}{dt}$ value can be $\frac{URDC}{Up-p} \times$ permissible $\frac{dv}{dt}$ value

[8]Operating temperature

①In DC circuit : the operating temperature =Ta

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

②surface heating occurs.

[9]Derating of rated voltage(UR)

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

URDC:1000V

uF	L	H	T	d
pitch 15.0mm permissible $\frac{dv}{dt}$ value($\leq 10,000$ pulses):1400v/ μ s				
0.0022	18.0	11.0	5.0	0.6
0.0033	18.0	11.0	5.0	0.6
0.0047	18.0	11.0	5.0	0.6
0.0068	18.0	12.0	6.0	0.6
0.01	18.0	13.5	7.5	0.6
0.015	18.0	14.5	8.5	0.6
pitch 22.5mm permissible $\frac{dv}{dt}$ value($\leq 10,000$ pulses): 750v/ μ s				
0.022	26.5	16.0	7.0	0.8
0.033	26.5	18.5	10.0	0.8
pitch 27.5mm permissible $\frac{dv}{dt}$ value($\leq 10,000$ pulses): 600v/ μ s				
0.047	32.0	20.0	11.0	0.8
0.068	32.0	22.0	13.0	0.8

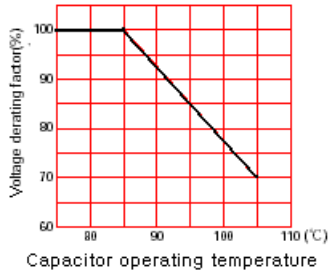
URDC:2000V

uF	L	H	T	d
pitch 15.0mm permissible $\frac{dv}{dt}$ value($\leq 10,000$ pulses): v/ μ s				
0.00047	18.0	11.0	5.0	0.6
0.00068	18.0	11.0	5.0	0.6
0.001	18.0	11.0	5.0	0.6
0.0015	18.0	12.0	6.0	0.6
0.0022	18.0	12.0	6.0	0.6
0.0033	18.0	13.5	7.5	0.6
pitch 22.5mm permissible $\frac{dv}{dt}$ value($\leq 10,000$ pulses):1900v/ μ s				
0.0047	26.5	16.0	7.0	0.8
0.0068	26.5	17.0	8.5	0.8
0.01	26.5	18.5	10.0	0.8
pitch 27.5mm permissible $\frac{dv}{dt}$ value($\leq 10,000$ pulses):1600v/ μ s				
0.015	32.0	20.0	11.0	0.8
0.022	32.0	22.0	13.0	0.8



[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.



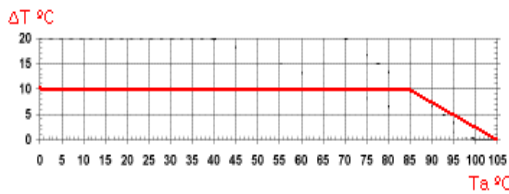
[2]when used in an AC circuit

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

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)	
250V	125Vrms	
400V	160Vrms	<p>*Not suitable for AC mains applications</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>
630V	200Vrms	
1000V	400Vrms	
1600V	450Vrms	
2000V	500Vrms	
2500V	700Vrms	

[10]Max. allowable ΔT



[11]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.

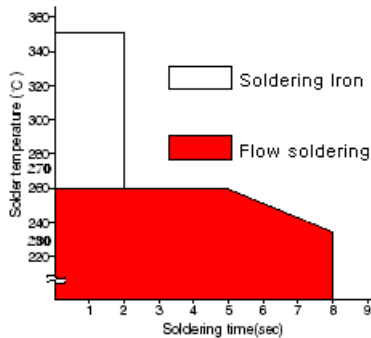
This series of polypropylene film capacitors have lower mounting heat resisting temperature than other polyester film capacitors.

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)Do not move the capacitor after soldering for a minimum of 20sec. Failures by short or by opening may result.
- ii)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](#)

