Metallized Polypropylene Film Capacitors (Dipped)

■ Features

- Metallized polypropylene structure
- Low loss at high frequency
- Small inherent temperature rise
- Flame retardant epoxy resin powder coating (UL94 V-0)

■ Typical Applications

- Widely used in high frequency, DC,AC and pulse circuits
- Providing optimum performance with small size in S-correction circuits for colour TV set
- Specially designed for S-correction circuits of large screen monitor and colour TV
- Suitable for the situation where applies high frequency and high current pulse

■ Specifications

Reference Standard	GB/T 14579(IEC 60384–17)
Climatic Category	40/105/21
Rated Temperature	85℃
Operating Temperature Range	–40℃ ~105℃ (+85℃ to +105℃：decreasing factor 1.25% per ℃ for U_R)
Rated Voltage	100V、250V、400V、630V、1 000V、1 250V
Capacitance Range	0.0010μF ~ 3.3μF
Capacitance Tolerance	±5%(J)、±10%(K)、±20%(M)
Voltage Proof	1.6U_R (5s)
Dissipation Factor	≤ 10×10^{-4}(1kHz，20℃)
Insulation Resistance	≥ 100 000MΩ， C_N ≤ 0.33μF ≥ 30 000s， C_N > 0.33μF (20℃ ,100V, 1min)

Maximum Pulse Rise Time(dV/dt):

If the working voltage(U) is lower than the rated voltage(U_R),the capacitor can be worked at a higher dV/dt. In this case, the maximum allowed dV/dt is obtain by multiplying the right value with U_R/U.

Pattern II

U_R(V)	dV/dt (V/μs)			
	P=7.5	P=10.0	P=15.0	P=22.5
100/250	660	560	310	130
400	900	780	600	300
630	1 500	1 200	900	400
1 000/1 250	2 500	2 200	––	––

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RND components

Part Number Codes

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
RND 150H	M	P	P	3	A	1	P	1	0	K	0	I	2	0	0

1. 1-3 Type of Capacitor:

TYPE	MKP	MEF	MPP
CODE	MKP	MEF	MPP

2. 4-6 Rated Voltage:

063: 63VDC/JIS 1J.
100: 100VDC/JIS 2A.
250: 250VDC/JIS2E.
400: 400VDC/JIS 2G.
630: 630VDC/JIS 2J.
1K0: 1,000VDC/JIS 3A.
1K6: 1,600VDC/JIS 3C.
1N0: 10,000VDC/JIS 4A.
2A7: 275VAC
3A1:310VAC.

3. 7-9 Symbols of Capacitance in uF:

A: Indicates tens. EX: 12uF=A12, 10uF=A10.

W(Word): Indicates unit. EX: 1.5uF=W15

P(Point): Digits following the decimal point. EX: 0.22uF=P22

S(Single Zero): Digits following the decimal point followed by one zero. EX: 0.015uF=S15

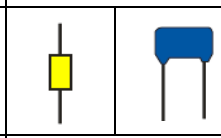
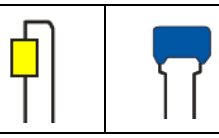
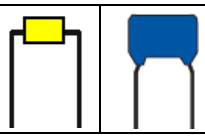
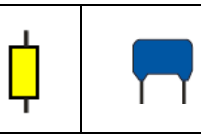
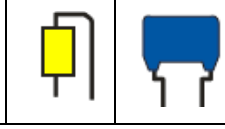
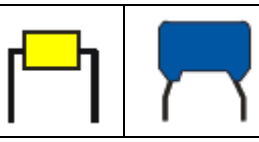
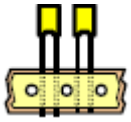
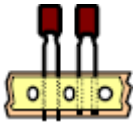
D(Double Zeroes): Digits following the decimal point followed by two zeroes. EX: 0.0047uF=D47

T(Triple Zeroes): Digits following the decimal point followed by three zeroes. EX: 0.00068uF=T68

4. 10 Symbols of Capacitance Tolerance:

TOLERANCE	±1%	±2%	±3%	±5%	±10%	±20%	+80%-20%	+100%-0%
CODE	F	G	H	J	K	M	Z	P

5. 11 Lead Style Code:

CODE	0	1	2	3	4
LEAD TYPE					
CODE	5	6	7	A	B
LEAD TYPE					

6. 12 Lead Space (mm)

SPACE	3.5	4.0	5.0	6.0	7.5	10.0	12.5	15.0	20.0	22.5	27.5	30.0	31.5	32.0	37.5	42.5	
CODE	A	B	C	E	D	F	V	I	M	N	R	U	S	T	Q	W	O
SPACE	47.5	52.5															
CODE	P	Y															

7. 13-14 Lead Length 3A=3.5 4A=4.5 05=5mm 5A=5.5 20=20mm

8. 15 Feature Codes 0:RoHS A:Halogen Free B:Capacitive Divider

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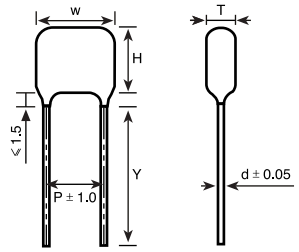
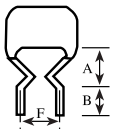
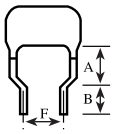
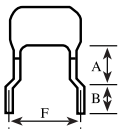
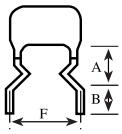
RND components

Dimensions(mm)



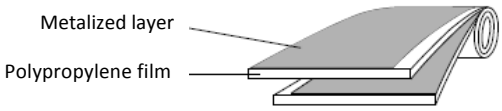
Forming Lead Shapes

I	II	III	IV
			
P ⩾ F		P < F	
0mm ⩽ P-F ⩽ 3mm	3mm < P-F ⩽ 8mm	3mm < F-P ⩽ 5mm	0mm < F-P ⩽ 3mm
F ± 1.0mm; A ⩽ 5.0mm; B=4.5 ± 0.5mm			

Rated Cap.	100/160VDC					200/250VDC					400VDC					630VDC				
	W	H	T	P	d	W	H	T	P	d	W	H	T	P	d	W	H	T	P	d
	max	max	max	±1.0	±0.05	max	max	max	±1.0	±0.05	max	max	max	±1.0	±0.05	max	max	max	±1.0	±0.05
4700pF																13.0	9.0	5.0	10.0	0.6
5600pF																13.0	9.5	5.0	10.0	0.6
6800pF						12.0	7.5	4.0	10.0	0.6						13.0	10.0	5.0	10.0	0.6
8200pF																13.0	11.0	5.5	10.0	0.6
0.010uF						12.0	8.0	4.5	10.0	0.6	12.0	8.0	4.5	10.0	0.6	12.0	8.0	5.0	10.0	0.6
0.012uF						10.5	10.0	5.5	7.5	0.6	10.5	10.5	6.0	7.5	0.6	13.0	12.0	6.5	10.0	0.6
0.015uF						10.5	10.5	5.5	7.5	0.6	10.5	11.0	6.5	7.5	0.6	13.0	12.5	7.0	10.0	0.6
0.018uF						10.5	10.5	5.5	7.5	0.6	10.5	11.5	7.0	7.5	0.6	13.0	13.0	7.5	10.0	0.6
0.022uF	10.5	9.0	5.5	7.5	0.6	12.0	8.0	4.5	10.0	0.6	10.5	12.0	8.0	7.5	0.6	13.0	13.5	8.0	10.0	0.6
0.027uF	10.5	9.0	5.5	7.5	0.6	10.5	11.0	6.5	7.5	0.6	13.0	12.0	6.5	10.0	0.6	13.0	14.0	8.5	10.0	0.6
0.033uF	10.5	9.0	5.5	7.5	0.6	12.0	8.0	4.5	10.0	0.6	13.0	12.5	6.5	10.0	0.6	12.0	9.0	4.0	10.0	0.6
0.039uF	10.5	9.5	5.5	7.5	0.6	10.5	12.0	7.5	7.5	0.6	13.0	13.0	7.5	10.0	0.6	18.0	14.0	8.0	15.0	0.8
0.047uF	10.5	9.5	5.5	7.5	0.6	12.0	7.0	4.5	10.0	0.6	12.0	8.0	4.5	10.0	0.6	12.0	8.0	4.5	10.0	0.6
0.056uF	10.5	10.0	6.0	7.5	0.6	13.0	12.0	7.0	10.0	0.6	13.0	14.5	8.5	10.0	0.6	18.0	15.0	8.5	15.0	0.8
0.068uF	10.5	10.0	6.5	7.5	0.6	12.0	9.0	5.5	10.0	0.6	12.0	8.0	4.5	10.0	0.6	12.0	9.0	5.5	10.0	0.6
0.082uF	10.5	11.0	6.5	7.5	0.6	13.0	13.5	8.0	10.0	0.6	18.0	14.5	7.5	15.0	0.8	24.0	17.0	9.5	20.0	0.8
0.10uF	10.5	12.0	7.0	7.5	0.6	12.0	8.0	4.5	10.0	0.6	12.0	9.0	6.0	10.0	0.6	18.0	8.0	5.0	15.0	0.8
0.10uF						18.0	9.0	6.0	15.0	0.8	18.0	15.5	8.5	15.0	0.8	24.0	18.5	11.0	20.0	0.8
0.15uF	13.0	12.0	7.0	10.0	0.6	12.0	9.0	5.0	10.0	0.6	12.0	10.0	6.0	10.0	0.6	24.0	19.0	12.0	20.0	0.8
0.18uF	13.0	12.5	7.0	10.0	0.6	18.0	14.0	7.5	15.0	0.8	24.0	14.5	8.5	20.0	0.8	24.0	20.0	12.5	20.0	0.8
0.22uF	13.0	13.0	7.5	10.0	0.6	12.0	10.0	6.0	10.0	0.6	12.0	12.0	7.0	10.0	0.6	18.0	12.0	6.5	15.0	0.8
0.22uF						18.0	10.5	6.0	15.0	0.8	24.0	15.5	10.0	20.0	0.8	30.0	23.0	12.5	25.0	0.8
0.33uF	18.0	13.0	7.5	15.0	0.8	18.0	9.0	5.5	15.0	0.8	18.0	12.0	6.5	15.0	0.8	18.0	13.5	8.0	15.0	0.8
0.33uF						12.0	11.0	4.5	10.0	0.6										
0.47uF	18.0	14.0	8.5	15.0	0.8	24.0	16.0	9.0	20.0	0.8	18.0	13.0	8.0	15.0	0.8	18.0	16.0	9.0	15.0	0.8
0.47uF																25.0	14.0	7.0	22.5	0.8
0.68uF	18.0	16.5	10.0	15.0	0.8	18.0	14.0	8.0	15.0	0.8						25.0	15.0	8.5	22.5	0.8
0.68uF						12.0	16.5	9.0	10.0	0.6	18.0	16.5	8.5	15.0	0.8	18.0	19.0	10.5	15.0	0.8
0.82uF						12.0	16.5	10.0	10.0	0.6						25.0	17.5	8.5	22.5	0.8
1.0uF	24.0	18.0	11.0	20.0	0.8	18.0	13.0	8.0	15.0	0.8	18.0	17.0	10.0	15.0	0.8	26.5	16.5	10.0	22.5	0.8
1.0uF						25.0	13.5	6.5	22.5	0.8										
1.5uF	24.0	19.5	11.0	20.0	0.8	25.0	15.0	8.0	22.5	0.8	18.0	21.5	13.0	15.0	0.8	25.0	20.0	13.0	22.5	0.8
1.5uF											25.0	17.5	10.5	22.5	0.8					
2.2uF	24.0	21.0	12.5	20.0	0.8	25.0	18.0	9.5	22.5	0.8	25.0	19.5	13.0	22.5	0.8					
3.3uF						25.0	25.0	14.5	22.5	0.8						25.0	28.0	18.0	22.5	0.8

Metallized Polypropylene Film Capacitors (Dipped)

Construction of Component



Item	Component	Material	RoHS Requirements
1	Element	Metallized OPP film	Compliant with RoHS
2	Metal spray layer	Zn and Zn-Tin alloy wire	Compliant with RoHS
3	Leads	Tinned copper-base alloy wire	Compliant with RoHS
4	Coating	Flame retardant epoxy resin(UL940V)	Compliant with RoHS
5	Marking	Inks	Compliant with RoHS
		Laser	

2. Technical Specification

No.	Test item	Performance	Test method (refer to IEC60384-16)
1	Withstand voltage		Ref 4.2.1 clause
	(T-T)	No permanent breakdown or flashover	Apply 150% of rated voltage / 60sec
	Terminal case		Apply 200% of rated voltage for 2 to 5 sec.
2	Insulation resistance	C_R≤0.33μf； IR>30000MΩ	Ref 4.2.4 clause Charge voltage 100VDC Charge time 60sec
		C_R>0.33μf ； IR>10000S	
3	Capacitance	J±5%；K±10%；M±20%	Ref 4.2.2 clause 1V, 1KHZ
4	Dissipation factor	<= 0.001 (0.10%) at 1 KHz. <= 0.005 (0.50%) at 10 KHz. C_R <=1.0uf,	Ref 4.2.3 clause 1V, 1KHZ
5	Solderability	At least 90% immersed lead wire should be covered new solder.	Ref 4.5 clause Test Ta Solder temperature :235±5℃ Immersion time: 2±0.5 sec
6	Terminal strength	There shall be no visible damage	Ref 4.3 clause 0.5<d≤0.8 ,10N 0.8<d≤1.25,20N Ub： 0.5<d≤0.8 ,5N 0.8<d≤1.25,10N Tense: 0.5<d≤0.8 ,5N 0.8<d≤1.25,10N Bend: 0.5<d≤0.8 ,5N 0.8<d≤1.25,10N Bent 2 times each direction

2. Technical Specification

No.	Test item	Performance	Test method (refer to IEC60384-16)
7	Resistance to Solder heat	There should be no visible damage, ΔC/C<±3%	Ref 4.4 clause Tb , method 1A Solder temperature 260±5℃ Immersion time：10±1sec
8	Initial measurement	Capacitance, Tanδ	
	Rapid change of temperature	There should be no visible damage,	Ref 4.6 clause θ_A=-40℃, θ_B=-+85℃ Duration=30min
	Vibration	There should be no visible damage.	Ref 4.7 clause Amplitude 0.75mm or acceleration 0.98m/s^2 ,(whichever is the smaller values) 10~500HZ 2h each direction, total 6h
	Bump	There should be no visible damage, ΔC/C<±3%	Ref 4.8 clause 4000 times ,acceleration 390m/s^2 Pulse duration 6ms
	Final measurement	There should be no visible damage,ΔC/C<±3%	

2. Technical Specification

No.	Test item		Performance	Test method (refer to IEC60384-16
8	Final measurement		Increase of Tanδ CR≤1uf: ≤0.0015 IR>50% *Rate value	
9		Initial measurement		Ref 4.10clause
		Dry heat		+85℃, 16h
		Cold		-40℃,2h
		Damp heat, cyclic		Test Db, remaining cycles
	Final measurement		There should be no visible damage, legible marking. Capacitance change ΔC/C<±3% Increase of Tanδ C_R≤1uf: ≤0.0015 IR>50% *Rate value	
10	Damp heat steady state		There should be no visible damage, legible marking. Capacitance change ΔC/C<±3% Increase of Tanδ: CR≤1uf: ≤0.001	Ref 4.11clause Temperature: 40±2% Humidity: 93±$^{2}_{3}$%RH Duration:21 days

2. Technical Specification

No.	Test item	Performance	Test method (refer to IEC60384-16)
11	Endurance	There should be no visible damage, legible marking. Capacitance change ΔC/C≤3% Increase of Tanδ: C_R≤1uf: ≤0.002 IR>50% *Rate value	Ref 4.12 clause (1.25*U_R) at 105℃,1000h
12	Charge and discharge	Capacitance change ΔC/C≤3% Increase of Tanδ: C_R≤1uf: ≤0.003 IR>50% *Rate value	Ref 4.13 clause $\frac{10\times10^{-6}}{C_R}\Omega$ $R=\frac{U}{C\frac{dU}{dt}}$ Times: 10000 Duration of charge: 0.5sec Duration of discharge: 0.5sec
13	Inherent temperature rise	Inherent temperature rise	Test temperature: normal room temperature

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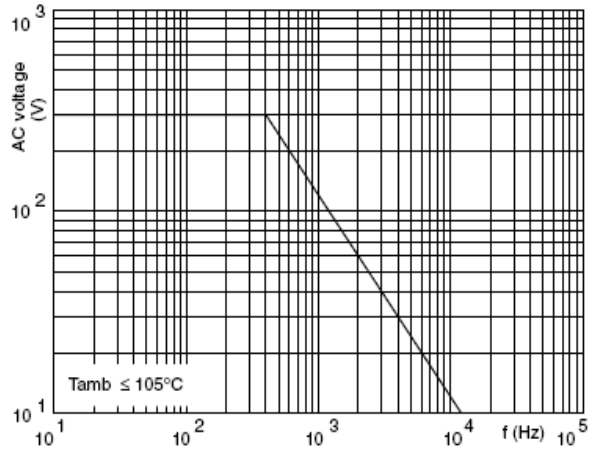
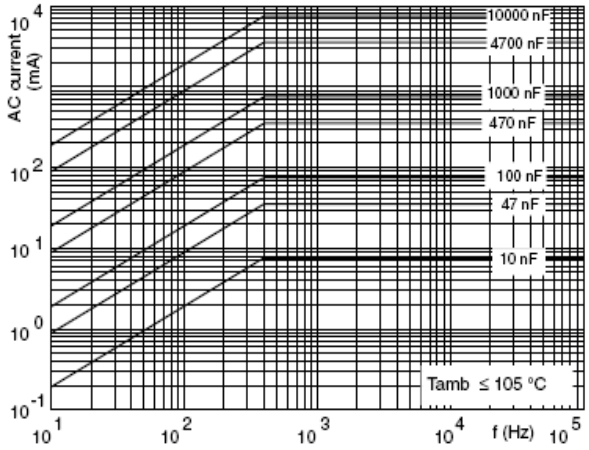
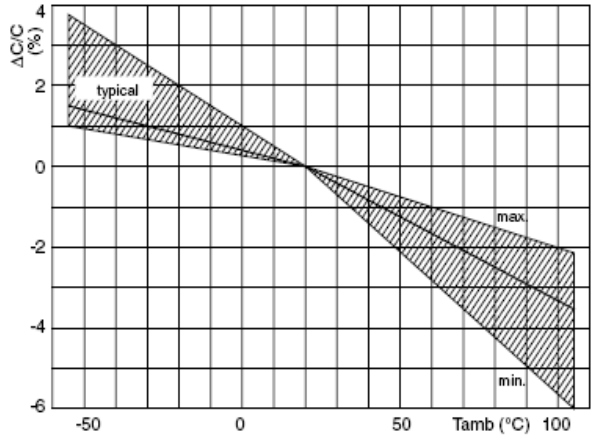
Characteristic Curve

MAXIMUM RMS VOLTAGE AND AC CURRENT (SINEWAVE) AS A FUNCTION OF FREQUENCY

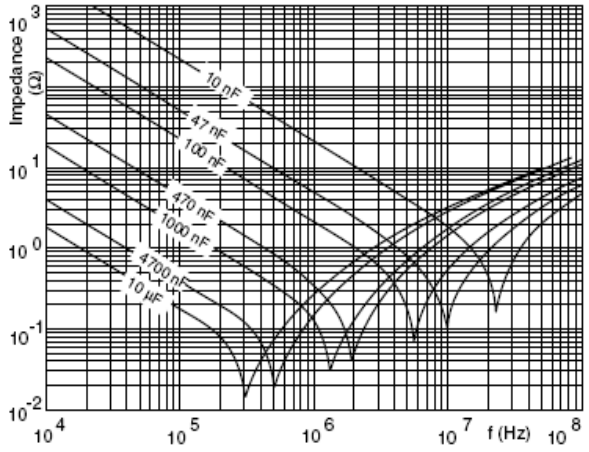




CAPACITANCE



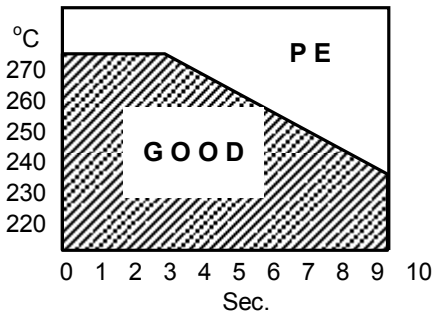
IMPEDANCE

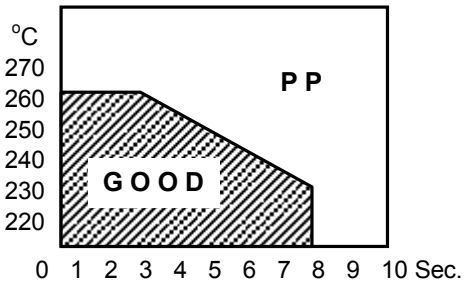


Metallized Polypropylene Film Capacitors (Dipped)

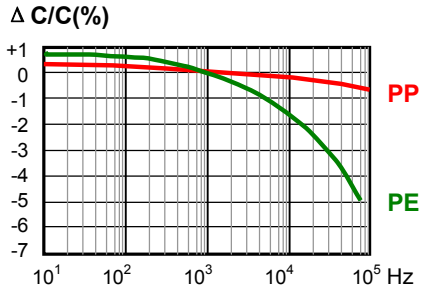
Characteristics Reference

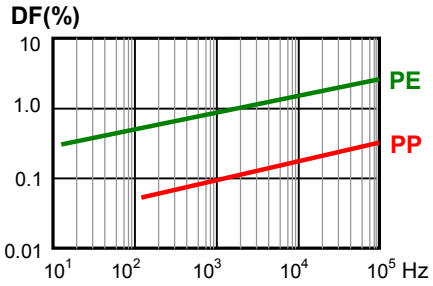
Soldering Temperature VS Time





Frequency Characteristics





Temperature Characteristics