Metallized Polyester Film Capacitors (Dipped)

RND components

■ Features

- Metallized polyester film, non-inductive wound construction
- Wide capacitance range, small size, and light weight
- Long life due to self-healing effect
- Flame retardation epoxy resin coating

■ Typical Applications

- Suitable for blocking, by-pass and coupling of DC and signals to VHF range
- Widely used in filter and low pulse circuits

■ Specifications

Reference Standard	GB/T 7332 (IEC 60384–2)					
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	50/63V、100V、250V、400V、630V					
Capacitance Range	0.010μF ~ 10.0μF					
Capacitance Tolerance	±5%(J)、±10%(K)					
Voltage Proof	1.6U_R (5s)					
Dissipation Factor	≤ 1.0% (20℃ ,1kHz)					
Insulation Resistance	U_R≤100V	≥ 3 750MΩ, C_N ≤ 0.33μF ≥ 1 250s, C_N > 0.33μF	(20℃ ,10V, 1min)			
	U_R>100V	≥ 30 000MΩ, C_N ≤ 0.33μF ≥ 5 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.	U_R(V)	dV/dt (V/μs) for Pattern III				
		P=7.5	P=10.0	P=15.0	P=22.5	P=27.5
	50/63	7.5	6	3	2	––
	100	15	9	5	3	––
	250	30	20	12	8	5
	400	40	30	20	10	7
	630	––	40	25	12	10
	1 000	70	60	30	15	12
	1 250	80	70	40	18	14

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Part Number Codes

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
RND 150H	M	E	F	6	3	0	S	2	2	J	0	F	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

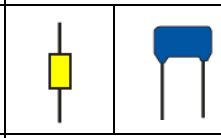
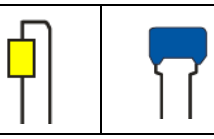
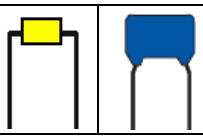
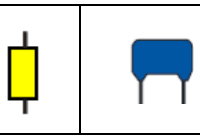
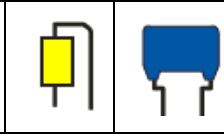
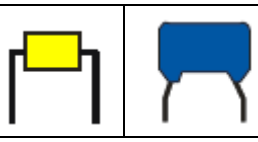
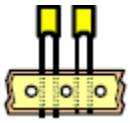
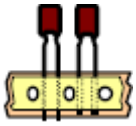
D(Double Zeroes): Digits following the decimal point followed by two zeroes. EX: 0.0047uF=D47

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	17.5	25													
CODE	P	Y	K	H													

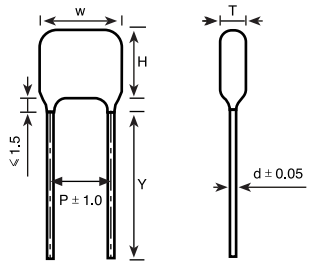
7. 13-14 Lead Length 3A=3.5 4A=4.5 05=5mm 5A=5.5 20=20mm

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

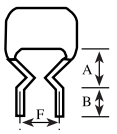
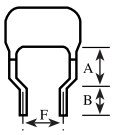
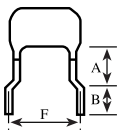
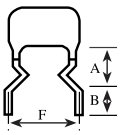
Metallized Polyester Film Capacitors (Dipped)

RND components

Dimensions(mm)



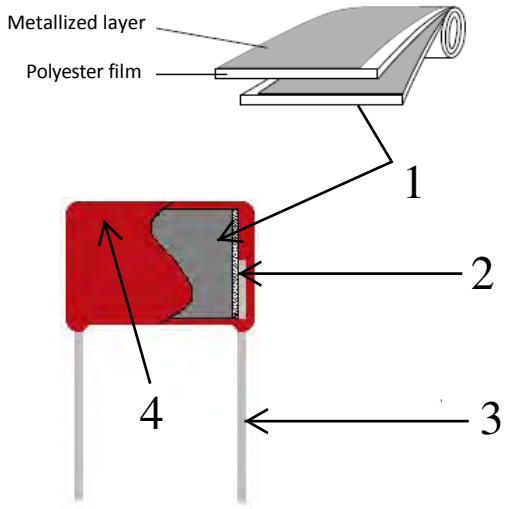
Forming Lead Shapes

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.	50/63/100VDC					Rated Cap.	250VDC(160VAC)					Rated Cap.	400VDC(200VAC)				
	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
0.047uF	10.5	8.5	4.5	7.5	0.6	0.022uF	10.5	9.5	5.5	7.5	0.6	0.01uF	12.0	8.0	4.5	10.0	0.6
0.056uF	10.5	10.0	5.5	7.5	0.6	0.027uF	10.5	9.5	5.5	7.5	0.6	0.012uF	10.5	10.5	6.5	7.5	0.6
0.068uF	10.5	10.0	6.0	7.5	0.6	0.033uF	10.5	10.0	5.5	7.5	0.6	0.015uF	10.5	11.5	6.5	7.5	0.6
0.082uF	10.5	10.5	6.0	7.5	0.6	0.039uF	10.5	10.0	6.0	7.5	0.6	0.018uF	10.5	12.0	6.5	7.5	0.6
0.1uF	10.5	11.0	6.5	7.5	0.6	0.047uF	10.5	10.0	6.0	7.5	0.6	0.022uF	12.0	8.0	4.5	10.0	0.6
0.12uF	10.5	11.5	7.0	7.5	0.6	0.056uF	10.5	10.5	6.0	7.5	0.6	0.027uF	13.0	11.0	6.0	10.0	0.6
0.15uF	10.5	12.0	7.5	7.5	0.6	0.068uF	10.5	10.5	6.5	7.5	0.6	0.033uF	12.0	7.5	4.0	10.0	0.6
0.18uF	10.5	13.0	8.0	7.5	0.6	0.082uF	10.5	11.0	7.0	7.5	0.6	0.039uF	13.0	11.5	7.0	10.0	0.6
0.22uF	13.0	12.0	7.0	10.0	0.6	0.1uF	12.0	7.5	4.5	10.0	0.6	0.047uF	12.0	8.0	4.0	10.0	0.6
0.27uF	13.0	12.5	7.5	10.0	0.6	0.12uF	13.0	12.0	6.5	10.0	0.6	0.056uF	13.0	12.0	7.5	10.0	0.6
0.33uF	13.0	13.0	8.0	10.0	0.6	0.15uF	13.0	12.0	7.0	10.0	0.6	0.068uF	12.0	9.0	5.5	10.0	0.6
0.39uF	13.0	13.5	8.5	10.0	0.6	0.18uF	13.0	12.5	7.0	10.0	0.6	0.082uF	13.0	12.5	8.0	10.0	0.6
0.47uF	13.0	14.5	9.0	10.0	0.6	0.22uF	12.0	10.0	5.0	10.0	0.6	0.1uF	12.0	9.0	4.0	10.0	0.6
0.56uF	18.0	13.5	8.0	15.0	0.6	0.27uF	13.0	13.5	7.5	10.0	0.6	0.12uF	18.0	12.5	7.0	15.0	0.6
0.68uF	18.0	14.5	8.5	15.0	0.8	0.33uF	12.0	11.5	6.5	10.0	0.6	0.15uF	18.0	13.0	7.5	15.0	0.6
0.82uF	18.0	15.0	9.5	15.0	0.8	0.39uF	18.0	15.0	9.0	15.0	0.8	0.18uF	18.0	13.5	8.0	15.0	0.8
1uF	18.0	15.5	10.0	15.0	0.8	0.47uF	12.0	14.5	6.5	10.0	0.6	0.22uF	12.0	10.0	6.0	10.0	0.6
1.2uF	18.0	16.5	11.0	15.0	0.8	0.56uF	18.0	16.0	10.0	15.0	0.8	0.27uF	18.0	14.5	9.0	15.0	0.8
1.5uF	18.0	17.5	11.5	15.0	0.8	0.68uF	18.0	16.5	10.5	15.0	0.8	0.33uF	12.0	13.0	7.5	10.0	0.6
1.8uF	24.0	18.0	10.0	20.0	0.8	0.82uF	24.0	16.0	10.0	20.0	0.8	0.39uF	18.0	16.0	10.0	15.0	0.8
2.2uF	24.0	18.5	11.0	20.0	0.8	1uF	18.0	14.0	7.0	15.0	0.8	0.47uF	18.0	12.0	7.0	15.0	0.8
2.7uF	24.0	21.0	13.0	20.0	0.8	1.2uF	24.0	19.0	11.0	20.0	0.8	0.56uF	24.0	16.0	10.0	20.0	0.8
3.3uF	24.0	22.5	14.0	20.0	0.8	1.5uF	18.0	15.0	9.0	15.0	0.8	0.68uF	18.0	14.5	7.5	15.0	0.8
3.9uF	24.0	23.5	14.5	20.0	0.8	1.8uF	24.0	21.0	12.5	20.0	0.8	0.82uF	30.0	17.0	10.5	26.0	0.8
4.7uF	32.0	24.5	13.5	27.5	0.8	2.2uF	18.0	17.5	10.5	15.0	0.8	1uF	25.0	14.0	9.0	22.5	0.8
5.6uF	32.0	25.0	14.0	27.5	0.8	2.7uF	32.0	24.0	14.0	27.5	0.8	1.2uF	30.0	19.0	12.0	26.0	0.8
6.8uF	32.0	26.0	15.5	27.5	0.8	3.3uF	25.0	17.0	10.0	22.5	0.8	1.5uF	25.0	17.0	11.0	22.5	0.8
8.2uF	32.0	27.5	16.5	27.5	0.8	4.7uF	25.0	20.0	11.5	22.5	0.8	1.8uF	37.0	25.0	16.5	32.5	0.8
10uF	37.0	28.0	18.0	32.5	1.0	5.6uF	42.0	27.0	15.0	37.5	1.0	2.2uF	37.0	26.0	17.5	32.5	0.8

Rated Cap.	630VDC(220VAC)					Rated Cap.	630VDC(220VAC)					Rated Cap.	630VDC(220VAC)				
	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
0.01uF	12.0	10.5	6.5	10.0	0.6	0.068uF	13.0	13.5	9.0	100	0.6	0.39uF	24.0	15.5	10.0	20.0	0.8
0.012uF	13.0	10	5	10.0	0.6	0.082uF	13.0	13.5	9.5	10	0.6	0.47uF	18.0	16.0	9.0	15.0	0.8
0.015uF	13.0	10	5	10.0	0.6	0.1uF	18	11.5	7.0	15	0.8	0.56uF	24.0	16.5	10.0	20.0	0.8
0.018uF	13.0	11	6	10.0	0.6	0.12uF	18	14.0	9.5	15	0.8	0.68uF	24.0	17.0	11.0	20.0	0.8
0.022uF	12.0	11	7	10.0	0.6	0.15uF	18	14.5	10.0	15	0.8	0.82uF	24.0	18.0	12.0	20.0	0.8
0.027uF	13.0	11.5	6	10.0	0.6	0.18uF	18	15.5	10.0	15	0.8	1.0uF	25.0	18.5	10.0	22.5	0.8
0.033uF	12.0	11.5	7.5	10.0	0.6	0.22uF	18	12.0	7.0	15	0.8	1.2uF	24.0	21.0	16.5	20.0	0.8
0.047uF	13.0	12	7	10	0.6	0.27uF	18	16	11.0	15	0.8	1.8uF	30.5	22.5	15.5	20.0	0.8
0.056uF	13.0	12	7	10	0.6	0.33uF	18	13.5	8.5	15	0.8	2.2uF	25.0	25.0	15.0	22.5	0.8

Construction of Component



Item	Component	Material	RoHS Requirements
1	Element	Metallized PET 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 IEC60384-2)
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>9000MΩ	Ref 4.2.4 clause Charge voltage 100VDC Charge time 60sec
		C_R>0.33μf ； IR>3000S	
3	Capacitance	J±5%； K±10%； M±20%	Ref 4.2.2 clause 1V, 1KHZ (25℃±5℃)
4	Dissipation factor	<= 0.01 (1.00%) at 1 KHz.	Ref 4.2.3 clause 1V, 1KHZ (25℃±5℃)
5	Solderability	At least 90% immersed lead wire should be covered new solder.	Ref 4.5 clause Test Ta 235±5℃; 2±0.5 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 IEC60384-2)
7	Resistance to solder heat	There should be no visible damage, ΔC/C<±3%	Ref 4.4 clause Tb , method 1A 260±5℃ ; 10±1 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℃ 5 cycles 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<±5%	Ref 4.8 clause 4000 times ,acceleration 390m/s^2 Pulse duration 6ms.
	Final measurement	There should be no visible damage,ΔC/C<±5%	

2. Technical Specification

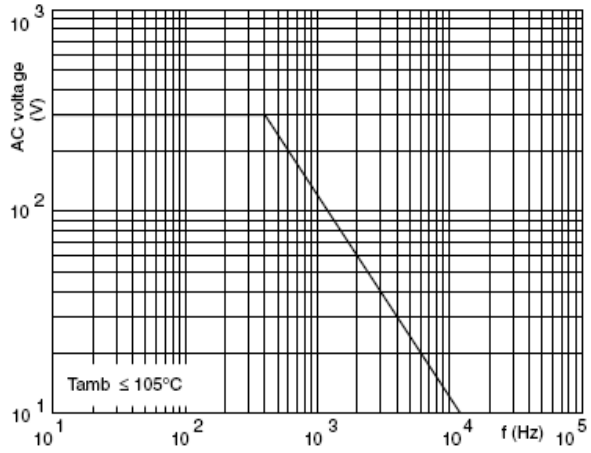
No.	Test item		Performance	Test method (refer to IEC60384-2
9	Final measurement		Increase of Tanδ CR≤1uf: ≤0.003 IR>50% *Rate value	
10		Initial measurement		Ref 4.10 clause
		Dry heat		+85℃, 16h
		Cold		-40℃,2h
		Damp heat, cyclic		Test Db, remaining cycles
	Final measurement		There should be no visible damage, legible marking. Capacitance change: ΔC/C<±5% Increase of Tanδ: CR≤1uf: ≤0.003 IR>50% *Rate value	
11	Damp heat steady state		There should be no visible damage, legible marking. Capacitance change: ΔC/C<±5% Increase of Tanδ: CR≤1uf: ≤0.005 IR>50% *Rate value	Ref 4.11clause Temperature: 40±2% Humidity: $93\pm^{2}_{3}$%RH Duration:21 days

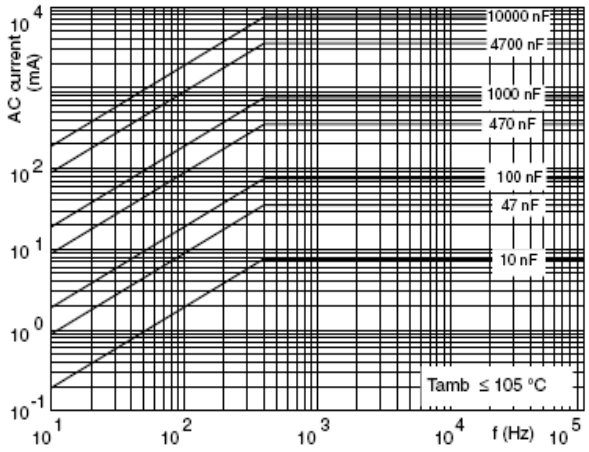
2. Technical Specification

No.	Test item	Performance	Test method (refer to IEC60384-2)
12	Endurance	There should be no visible damage, legible marking. Capacitance change ΔC/C≤5% Increase of Tanδ: C_R≤1uf: ≤0.003 IR>50% *Rate value	Ref 4.12 clause (1.25*U_R) at 105℃,1000h
13	Charge and discharge	There should be no visible damage, legible marking. Capacitance change ΔC/C≤5% Increase of Tanδ: CR≤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
14	Inherent temperature rise	Temperature rise(ΔT)≤10℃	

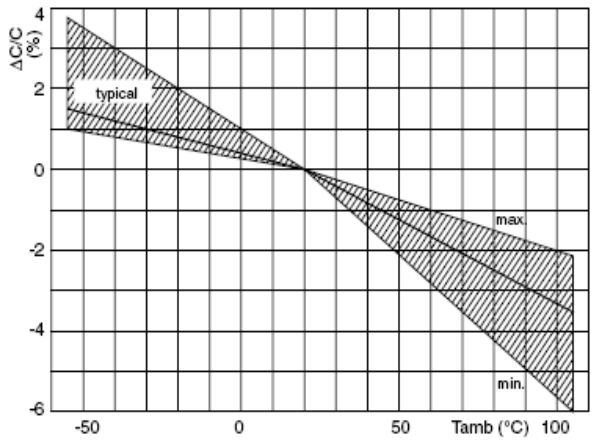
Characteristic Curve

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

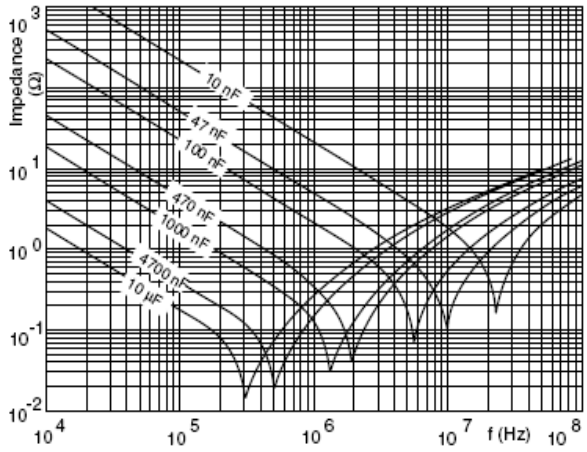




CAPACITANCE

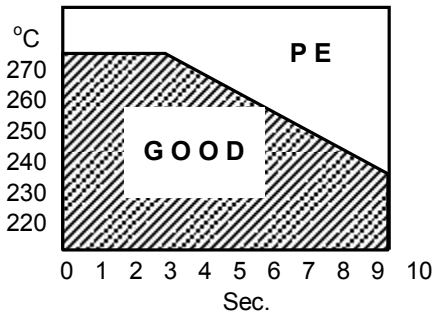


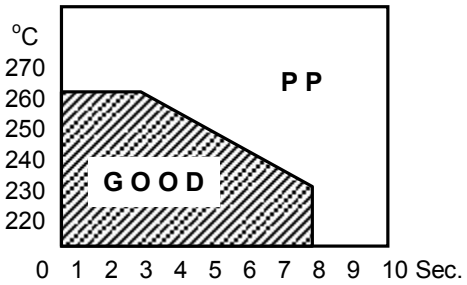
IMPEDANCE



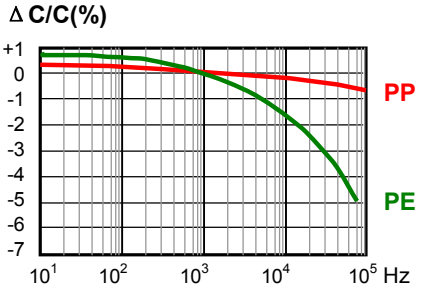
Characteristics Reference

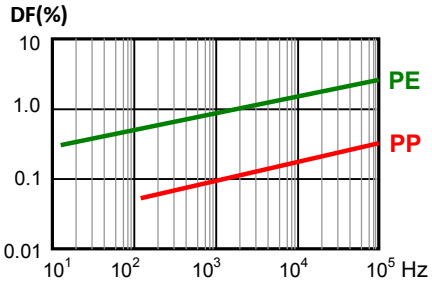
Soldering Temperature VS Time





Frequency Characteristics





Temperature Characteristics