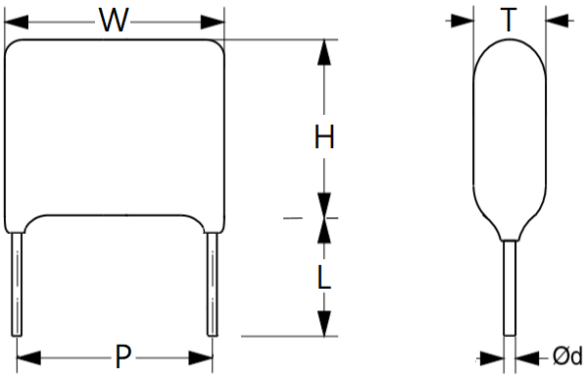
SMEF series

■ Outline Drawing



■ Typical Applications

Suitable for blocking, by-pass and coupling of DC and signals to VHF range

Widely used in filter and low pulse circuits

■ Features

Metalized polyester film,

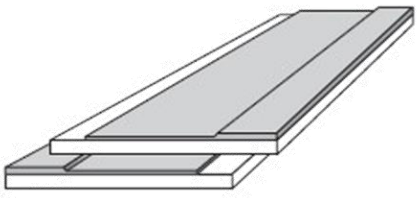
non-inductive wound construction

Wide capacitance range, small size, and light weight

Long life due to self-healing

Flame retardant epoxy resin coating

■ Construction



■ Specifications

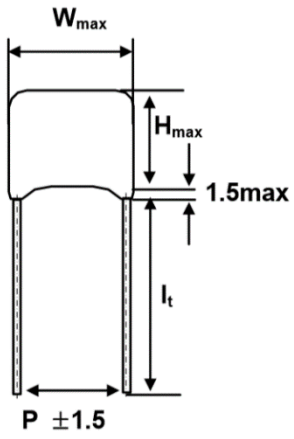
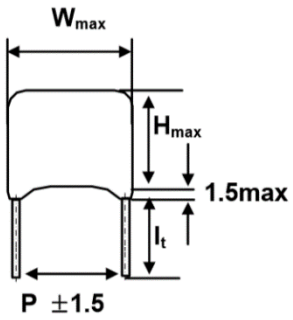
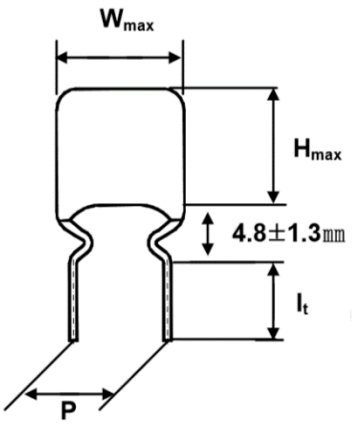
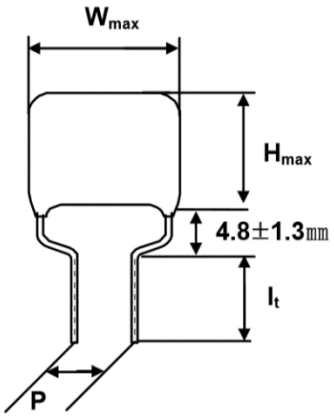
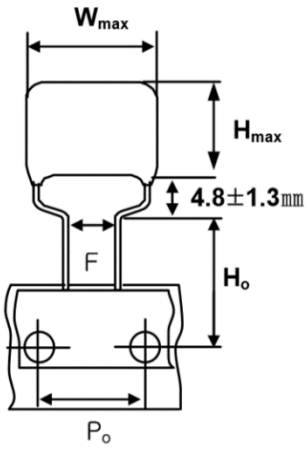
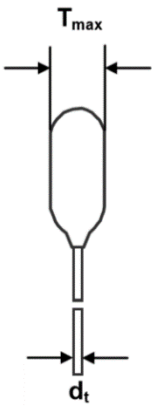
Reference Standard	GB/T 7332 (IEC 60384-2)				
Climatic Category	40/105/21				
Rated Temperature	85℃				
Operating Temperature Range	-40℃~+105℃ (+85℃ to +105℃: decreasing factor 1.25% per ℃ for U_R)				
Capacitance Range	0.01μF ~ 10μF				
Rated (DC) Voltage	63Vdc	100Vdc	250Vdc	400Vdc	630Vdc
Maximum continuous AC voltage	40Vac	63Vac	160Vac	200Vac	220Vac
Capacitance Tolerance	±5%(J)、±10%(K) 、±20%(M)				
Voltage Proof	1.6U_R, 5s (DC)				
Dissipation Factor	≤ 1.0% (25℃, 1kHz)				
Insulation Resistance	U_R>100V	C_R ≤ 0.33μF IR ≥ 7,500MΩ C_R >0.33μF IR ≥ 2,500s (20℃, 100V, 1min)			

SMEF series

■ Product code system

SMEF	J	103	K	0630	D	B	10	23
Type	Internal use	Capacitance	Tolerance	Rated Voltage	Voltage	Lead forming	Lead Pitch	Lead Length
SMEF= Metallized Polyester Capacitor (Dipped)	--	103 =10000pF =10nF =0.01μF	J=±5% K=±10% M=±20%	0063=63V 0100=100V 0250=250V 0400=400V 0630=630V	D=DC	Shown as Table I	08=7.5mm 10=10mm 15=15mm 23=22.5mm 28=27.5mm	04=3.5mm 15=15mm 23=23mm

■ Table I

Code	B (Straight 23mm)	K (Short)	R (Inside Kink)
Lead Forming			
Code	**U** (Vertical Kink)	**T** (Taping)	--
Lead Forming			

SMEF series

■ **Dimensions (mm)**

63(40Vac)/100Vdc (63Vac)

Cap. μF	W	H	T	P	d	Part number
0.010	10	9	5.5	7.5	0.6	SMEF_103+0100D*08**
0.015	10	9.5	6	7.5	0.6	SMEF_153+0100D*08**
0.022	10	9	5.5	7.5	0.6	SMEF_223+0100D*08**
0.027	10	9.5	6	7.5	0.6	SMEF_273+0100D*08**
0.033	10	8.5	5	7.5	0.6	SMEF_333+0100D*08**
0.039	10	9	5	7.5	0.6	SMEF_393+0100D*08**
0.047	10	9	5.5	7.5	0.6	SMEF_473+0100D*08**
0.056	10	9.5	6	7.5	0.6	SMEF_563+0100D*08**
0.068	10	9	5.5	7.5	0.6	SMEF_683+0100D*08**
0.082	10	9.5	6	7.5	0.6	SMEF_823+0100D*08**
0.10	10	8.5	5	7.5	0.6	SMEF_104+0100D*08**
0.15	10	8.5	5	7.5	0.6	SMEF_154+0100D*08**
0.22	10	9.5	5.5	7.5	0.6	SMEF_224+0100D*08**
0.27	10	10	6.5	7.5	0.6	SMEF_274+0100D*08**
0.33	13	10.5	6	10	0.6	SMEF_334+0100D*10**
0.39	13	11	6	10	0.6	SMEF_394+0100D*10**
0.47	13	11.5	6.5	10	0.6	SMEF_474+0100D*10**
0.56	13	12	7	10	0.6	SMEF_564+0100D*10**
0.68	18	11.5	6	15	0.8	SMEF_684+0100D*15**
0.82	18	12.5	6.5	15	0.8	SMEF_824+0100D*15**
1.0	18	12.5	7	15	0.8	SMEF_105+0100D*15**
1.5	18	14	8.5	15	0.8	SMEF_155+0100D*15**
1.8	18	14.5	9	15	0.8	SMEF_185+0100D*15**
2.2	24	14.5	8.5	20	0.8	SMEF_225+0100D*20**
2.7	24	15	8.5	20	0.8	SMEF_275+0100D*20**
3.3	24	16	9.5	20	0.8	SMEF_335+0100D*20**
4.7	29	17	10	25	0.8	SMEF_475+0100D*25**
5.6	29	17.5	10.5	25	0.8	SMEF_565+0100D*25**
6.8	29	18.5	11.5	25	0.8	SMEF_685+0100D*25**
8.2	29	19.5	12.5	25	0.8	SMEF_825+0100D*25**
10	29	21	14	25	0.8	SMEF_106+0100D*25**

250Vdc (160Vac)

Cap. μF	W	H	T	P	d	Part number
0.010	10	9	5.5	7.5	0.6	SMEF_103+0250D*08**
0.015	10	9.5	6	7.5	0.6	SMEF_153+0250D*08**
0.022	10	9.5	5.5	7.5	0.6	SMEF_223+0250D*08**
0.027	10	9.5	6	7.5	0.6	SMEF_273+0250D*08**
0.033	10	8.5	5.5	7.5	0.6	SMEF_333+0250D*08**
0.039	10	9	5	7.5	0.6	SMEF_393+0250D*08**
0.047	10	9	5.5	7.5	0.6	SMEF_473+0250D*08**
0.056	10	9.5	6	7.5	0.6	SMEF_563+0250D*08**
0.068	10	9	5.5	7.5	0.6	SMEF_683+0250D*08**
0.082	10	9.5	6	7.5	0.6	SMEF_823+0250D*08**
0.10	10	10	6	7.5	0.6	SMEF_104+0250D*08**
0.15	10	10.5	6.5	7.5	0.6	SMEF_154+0250D*08**
0.22	13	11	6.5	10	0.6	SMEF_224+0250D*10**
0.27	13	11.5	7	10	0.6	SMEF_274+0250D*10**
0.33	13	12.5	7	10	0.6	SMEF_334+0250D*10**
0.39	18	11.5	6	15	0.8	SMEF_394+0250D*15**
0.47	18	12	6.5	15	0.8	SMEF_474+0250D*15**
0.56	18	12	7	15	0.8	SMEF_564+0250D*15**
0.68	18	13	7.5	15	0.8	SMEF_684+0250D*15**
0.82	18	13.5	8.5	15	0.8	SMEF_824+0250D*15**
1.0	18	14	9	15	0.8	SMEF_105+0250D*15**
1.5	24	14	9	20	0.8	SMEF_155+0250D*20**
1.8	24	16	9.5	20	0.8	SMEF_185+0250D*20**
2.2	24	17	10	20	0.8	SMEF_225+0250D*20**
2.7	24	18	11.5	20	0.8	SMEF_275+0250D*20**
3.3	29	18	11.5	25	0.8	SMEF_335+0250D*25**
4.7	29	20	13	25	0.8	SMEF_475+0250D*25**
5.6	29	19.5	12.5	25	0.8	SMEF_565+0250D*25**
6.8	34	21.5	13.5	30	0.8	SMEF_685+0250D*30**
8.2	34	23	14.5	30	0.8	SMEF_825+0250D*30**
10	34	24.5	16	30	0.8	SMEF_106+0250D*30**

SMEF series

■ Dimensions (mm)

400Vdc (200Vac)

Cap. µF	W	H	T	P	d	Part number
0.010	10	9	5.5	7.5	0.6	SMEF_103+0400D*08**
0.015	10	9.5	6	7.5	0.6	SMEF_153+0400D*08**
0.018	10	10	6	7.5	0.6	SMEF_183+0400D*08**
0.022	10	9.5	5.5	7.5	0.6	SMEF_223+0400D*08**
0.027	10	9.5	6	7.5	0.6	SMEF_273+0400D*08**
0.033	10	10	6	7.5	0.6	SMEF_333+0400D*08**
0.039	10	10.5	6.5	7.5	0.6	SMEF_393+0400D*08**
0.047	10	10.5	7	7.5	0.6	SMEF_473+0400D*08**
0.056	13	10.5	6	10	0.6	SMEF_563+0400D*10**
0.068	13	11	6.5	10	0.6	SMEF_683+0400D*10**
0.082	13	11.5	7	10	0.6	SMEF_823+0400D*10**
0.10	13	12	7	10	0.6	SMEF_104+0400D*10**
0.12	13	12.5	8	10	0.6	SMEF_124+0400D*10**
0.15	18	11.5	7	15	0.8	SMEF_154+0400D*15**
0.18	18	12	7.5	15	0.8	SMEF_184+0400D*15**
0.22	18	13	8	15	0.8	SMEF_224*0400D*15**
0.27	18	13.5	9	15	0.8	SMEF_274*0400D*15**
0.33	18	14.5	9.5	15	0.8	SMEF_334+0400D*15**
0.39	18	15.5	9.5	15	0.8	SMEF_394+0400D*15**
0.47	18	16	10.5	15	0.8	SMEF_474+0400D*15**
0.56	24	15	9.5	20	0.8	SMEF_564+0400D*20**
0.68	24	16	10.5	20	0.8	SMEF_684+0400D*20**
0.82	24	17	11.5	20	0.8	SMEF_824+0400D*20**
1.0	29	17	10.5	25	0.8	SMEF_105+0400D*25**
1.2	29	18	11.5	25	0.8	SMEF_125+0400D*25**
1.5	29	19.5	12.5	25	0.8	SMEF_155+0400D*25**
1.8	34	21	12	30	0.8	SMEF_185+0400D*30**
2.2	34	21.5	13.5	30	0.8	SMEF_225+0400D*30**
2.7	34	23	14.5	30	0.8	SMEF_275+0400D*30**
3.3	34	24.5	16.5	30	0.8	SMEF_335+0400D*30**
4.7	34	28	19.5	30	0.8	SMEF_475+0400D*30**

630Vdc (220Vac)

Cap. µF	W	H	T	P	d	Part number
0.010	13	9	5	10	0.6	SMEF_103+0630D*10**
0.015	13	9.5	5.5	10	0.6	SMEF_153+0630D*10**
0.018	13	10	6	10	0.6	SMEF_183+0630D*10**
0.022	13	10	6	10	0.6	SMEF_223+0630D*10**
0.027	13	10.5	6.5	10	0.6	SMEF_273+0630D*10**
0.033	13	11	7	10	0.6	SMEF_333+0630D*10**
0.039	13	11.5	7	10	0.6	SMEF_393+0630D*10**
0.047	13	12.5	8	10	0.6	SMEF_473+0630D*10**
0.056	13	13	8.5	10	0.6	SMEF_563+0630D*10**
0.068	18	12	7.5	15	0.8	SMEF_683+0630D*15**
0.10	18	13	8	15	0.8	SMEF_104+0630D*15**
0.12	18	13.5	9	15	0.8	SMEF_124+0630D*15**
0.15	18	14	9.5	15	0.8	SMEF_154+0630D*15**
0.18	18	15	10	15	0.8	SMEF_184+0630D*15**
0.22	18	16	11	15	0.8	SMEF_224+0630D*15**
0.27	24	16	9.5	20	0.8	SMEF_274+0630D*20**
0.33	24	17	10	20	0.8	SMEF_334+0630D*20**
0.39	24	18	11	20	0.8	SMEF_394+0630D*20**
0.47	29	18	10	25	0.8	SMEF_474+0630D*25**
0.56	29	19	10.5	25	0.8	SMEF_564+0630D*25**
0.68	29	20	12	25	0.8	SMEF_684+0630D*25**
0.82	29	21.5	13	25	0.8	SMEF_824+0630D*25**
1.0	34	21.5	13	30	0.8	SMEF_105+0630D*30**
1.2	34	22.5	14.5	30	0.8	SMEF_125+0630D*30**
1.5	34	24	15.5	30	0.8	SMEF_155+0630D*30**
1.8	34	26	17.5	30	0.8	SMEF_185+0630D*30**
2.2	34	27.5	19.5	30	0.8	SMEF_225+0630D*30**

+	=	Capacitance tolerance: K=±10% , J=±5%
*	=	Lead forming
**	=	Lead length

■ Specifications (GB/T 7332)

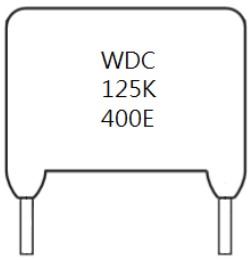
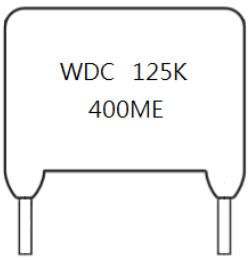
試驗項目 Test items	性能要求 Performance requirements	試驗條件 Conditions of test
電容量 Capacitance	在規定公差內 Within the tolerance specified	1KHz, 1Vrms Max. at 25℃
損耗因素 Dissipation Factor	0.01 (1.0%) Max.	1KHz, 1Vrms Max. at 25℃
耐電壓 Voltage proof	應無異常 Shall be no abnormality	引線間 Between terminals 1.6U_R (Vdc) Test of 5sec.
絕緣電阻 Insulation resistance	C_R ≤ 0.33μF IR ≥ 7,500MΩ, C_R >0.33μF IR ≥ 2,500s	100Vdc, 60sec / 20℃
引出端強度試驗 Robustness of terminations	無斷線, 電容器無損壞 No wire breakage and no damage of capacitor	端子強度 Tense Strength of Terminal 負載重量 Load Force : 1.0 Kg 保持時間 Holding Time : 10 ± 1sec 抗彎強度 Bending Strength of Terminal 負載重量 Load Force : 0.5 Kg 彎曲時間 Bending Time : 4 x 90 ˚
耐焊接熱 Resistance to soldering heat	(1) Appearance : No visible damage (2) △C/C : ≤ ±2% of the initial value (3) DF (tanδ) : ≤ 0.005 of increased value	焊接溫度 Solder temperature: 260±5℃ 焊接時間 Solder time: 5±0.5sec
可焊性 Solderability	表面鍍錫 95% 95% of the surface tinning	焊接溫度 Solder temperature: 260±5℃ 焊接時間 Solder time: 2±0.5sec
溫度快速變化 Rapid change of temperature	應目視檢查電容器, 並無可見損壞 The capacitors shall be visually examined and there shall be no visible damage.	下限溫度 Lower category temperature: -40℃ 上限溫度 Upper category temperature: 85℃ 循環次數 Number of cycles: 5 持續時間 Duration t1 = 30 min
振動 Vibration	應目視檢查電容器, 並無可見損壞 The capacitors shall be visually examined and there shall be no visible damage	頻率範圍 Frequency range: 10~55Hz 振幅軸向 Course: X、Y、Z (axis) 持續時間 2h / axis (6h in total) 位移振幅 Displacement amplitude: 0.75mm

SMEF series

■ Specifications (GB/T 7332)

試驗項目 Test items	性能要求 Performance requirements	試驗條件 Conditions of test
氣候序列 Climatic sequence	(1) Appearance : No visible damage (2) ▵C/C : ≤ ±5% of the initial value (3) DF (tanδ) : ≤ 0.008 of increased value (4) IR : ≥ 50% of the applicable limits (5) Voltage proof : Normal	乾熱 Dry Heat 上限溫度 Upper Temperature: 85℃ 持續時間 Lower Duration: 16Hrs 寒冷 Cold 下限溫度 Temperature: -40℃ 持續時間 Duration: 2Hrs
濕熱穩態 Damp Heat Steady State	(1) Appearance : No visible damage (2) ▵C/C : ≤ ±5% of the Initial value (3) DF (tanδ) : ≤ 0.005 of increased value (4) IR : ≥ 50% of the applicable limits (5) Voltage proof : Normal	溫度+40°C, 濕度 93%, 21 天 +40°C and 93% RH, 21 days
耐久性 Endurance	(1) Appearance : No Visible Damage (2) ▵C/C : ≤ ±8% of the initial value (3) DF (tanδ) : ≤ 0.005 of increased value (4) IR : ≥ 50% of the applicable limits	實驗電壓 U_R x 125%, 實驗溫度 Temperature: +85°C 實驗時間 Time: 1000Hrs
充放電 Charge and discharge	(1) Appearance : No visible damage (2) ▵C/C : ≤ ±5% of the initial value (3) DF (tanδ) : ≤ 0.005 of increased value (4) IR : ≥ 50% of the applicable limits	實驗電壓 Test voltage : U_R ±5% 充放電 Charge and discharge: 1/time/sec 重複次數 Repeated for 10000 cycles

■ Mark

Pitch 7.5mm	Pitch ≥10mm
	
1. WDC is a registered trademark of WINDAY	2. Capacitance: 125 indicates 1.2μF or 1200nF
3. Capacitors Tolerance: K=±10%	4. Rated Voltage: 400Vdc, Indicates 400
5. E or ME for Metallized polyester film capacitor	

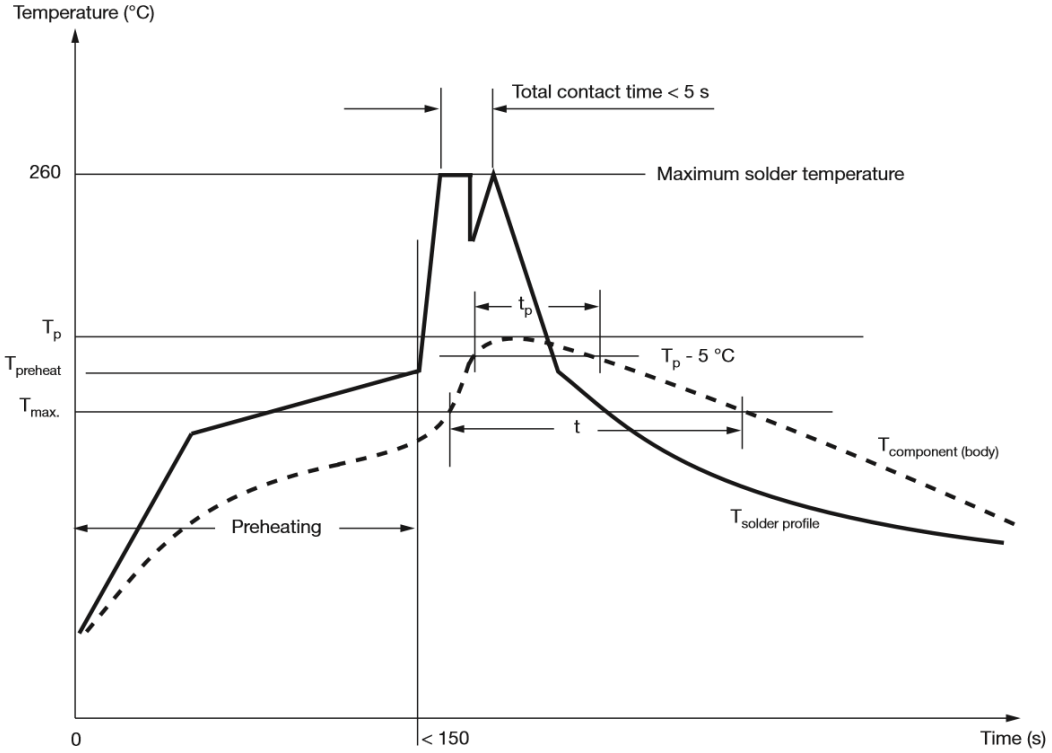
■ Soldering Guidelines for Film Capacitors

WDC recommends that users observe the following guidelines for soldering our film capacitors. Adherence to these recommendations will help to safeguard product specifications and reliability while preventing damage to the capacitors during soldering.

SOLDERING GUIDELINES AND RECOMMENDED WAVE SOLDERING PROFILE

With regard to the resistance to soldering heat and the solderability, our products comply with "IEC 60384-1" and the additional type specifications. The recommended wave soldering profile for our leaded components is defined as follows:

■ Wave Soldering Recommendations



Tp : Peak temperature of the component body (top)

Tmax : Maximum application temperature of the component

The PSL (Process Sensitivity Level) is classified according JEDEC standard J-STD-075 "Classification of Non-IC Electronic Components for Assembly Processes" and summarized in following tables per product family and pitch size of the component:

SERIES	PRODUCT PITCH SIZE							
	5 mm	7.5 mm	10 mm	15 mm	20/22.5 mm	27.5 mm	31.5 mm	37.5 mm
SMEF		(2),(4)	(1),(3)	(1),(3)	(1),(3)	(1),(3)	(1),(3)	(1),(3)

(1) No risk

(2) Risk for parameter change if PSL is not strictly followed

(3) The component has a preheat limitation of 150 °C

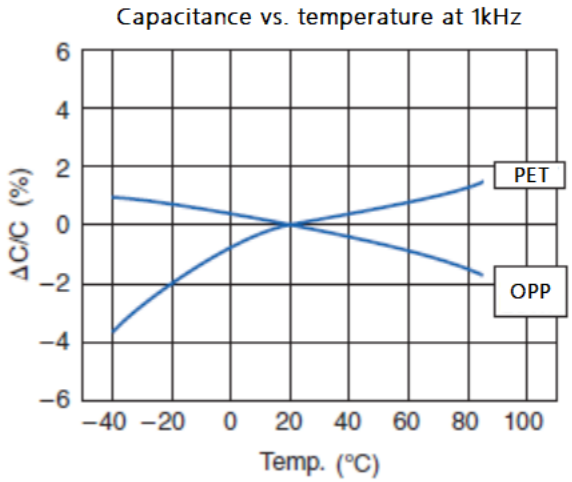
(4) Temperature is measured at the body top and must be kept as follows:

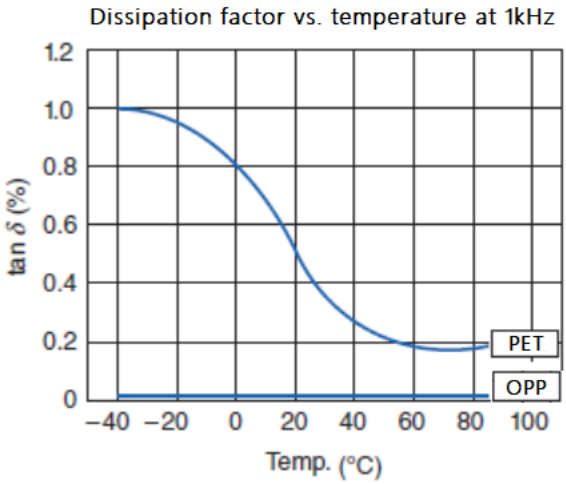
During preheating: Tmax. ≤ 125 °C

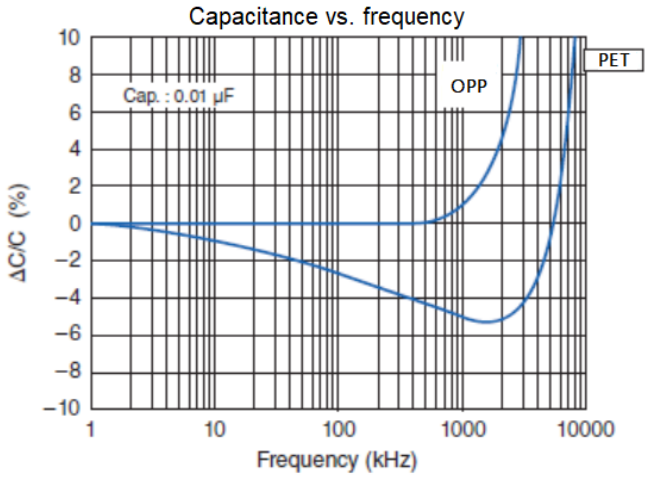
During soldering: Tp ≤ 135 °C, tp ≤ 30 s, t ≤ 50 s

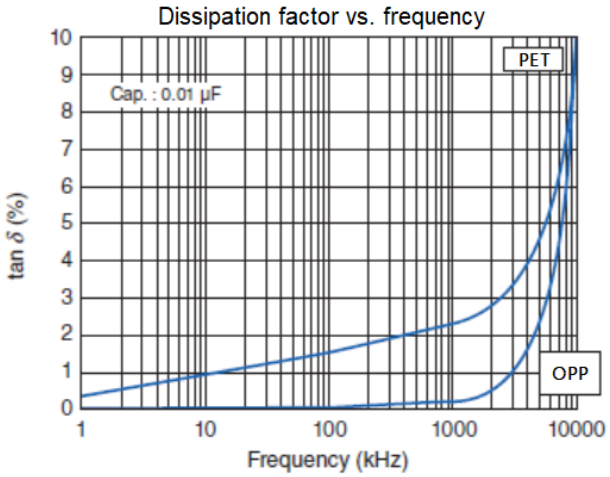
SMEF series

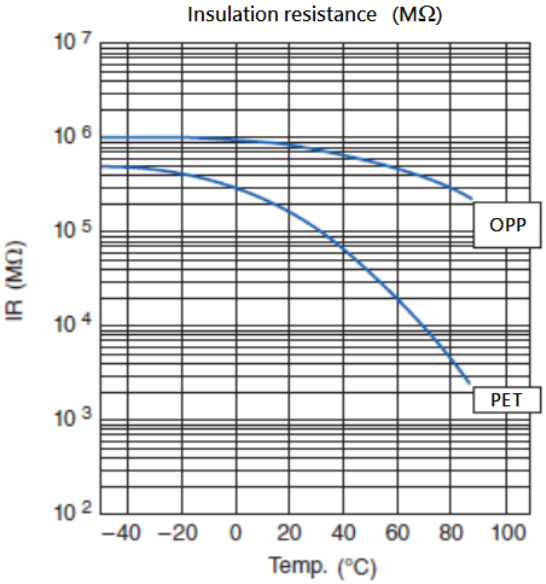
■ Typical graphs





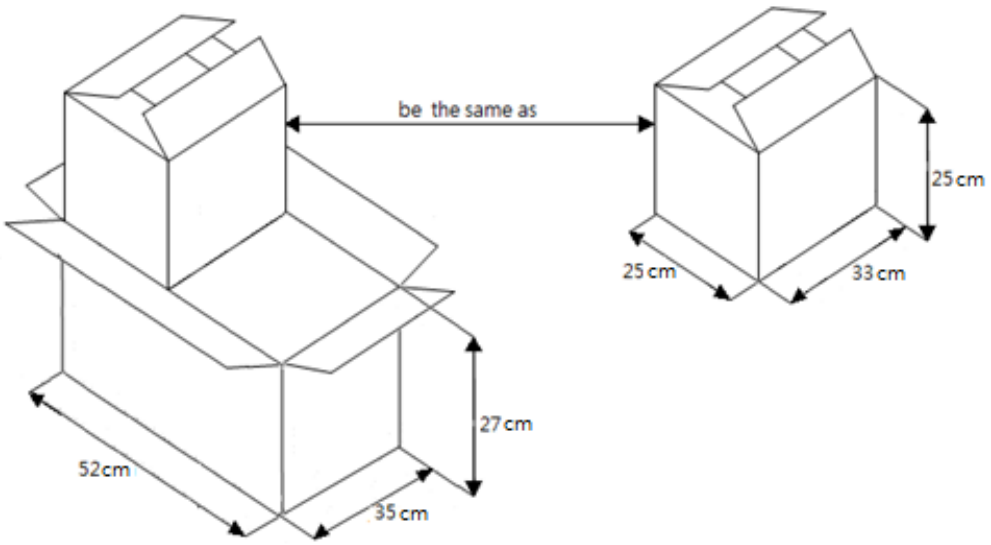






PET :	Metallized Polyester film capacitor
OPP :	Metallized Polypropylene film capacitor

■ Packaging



Pitch (mm)	Pcs / Bag	Pcs / Inner carton (L33:cm XH:25cm X T:25cm)	Pcs / Out box (L52:cm XH:27cm X T:35cm)
5~10	1000	10000	20000
15	500	5000	10000
20	500	5000	10000
22.5	300	3000	6000
27.5	200	2000	4000
≥27.5	100	1000	2000

■ Storage conditions and duration

Packaged capacitors should be kept in clean, ventilated, dry coffers, not near the heat source, not subject to direct sunlight, is strictly prohibited and chemical reagents, acid and harmful gas storage together.

Capacitor at a temperature within the range 20 ~ 25 ℃, humidity less than 50% of the state of storage for one year.