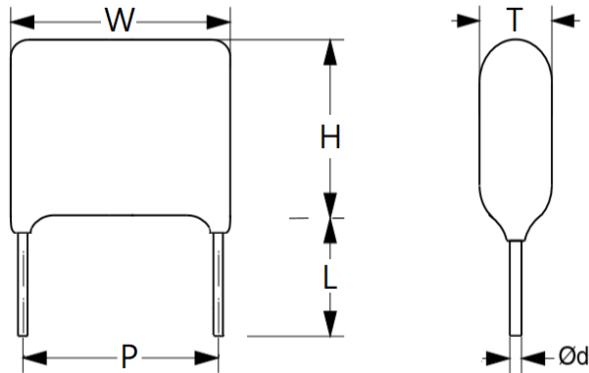


SPPN series

■ Outline Drawing



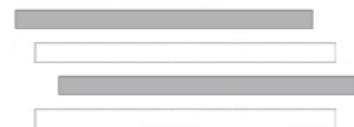
■ Typical Applications

Widely used in high frequency, DC and pulse circuits

■ Features

Polypropylene film/Aluminum foil
non-inductive wound construction
Excellent frequency and temperature characteristics
Very small loss even at high frequency
Flame retardant epoxy resin powder coating (UL94V-0)

■ Construction



■ Specifications

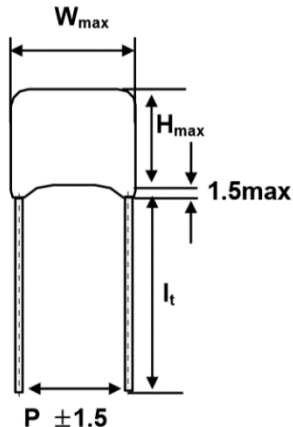
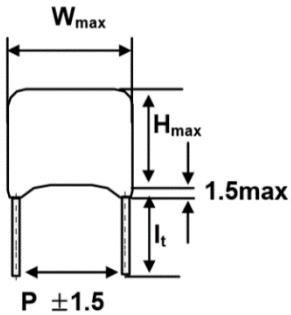
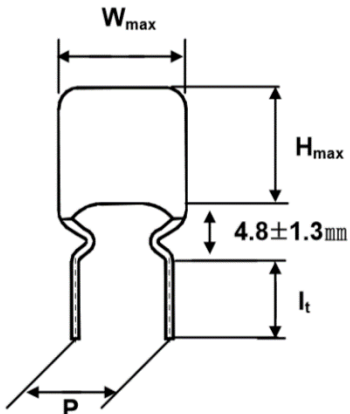
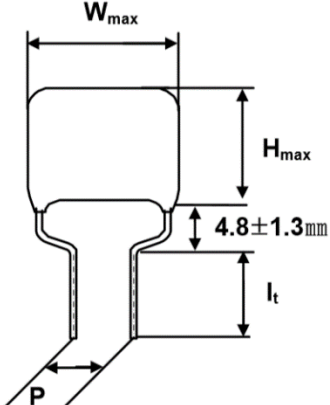
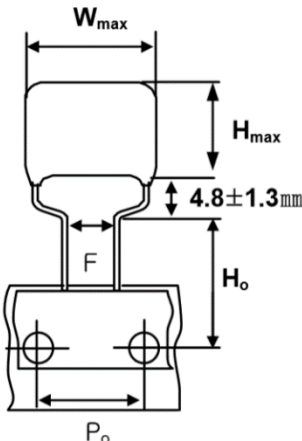
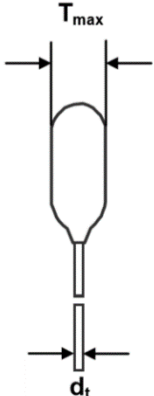
Reference Standard	GB/T 10188 (IEC 60384-13)			
Climatic Category	40/105/21			
Rated Temperature	85°C			
Operating Temperature Range	-40°C~+105°C (+85°C to +105°C: decreasing factor 1.25% per °C for U _R)			
Capacitance Range	0.001μF ~ 0.1μF			
Rated (DC) Voltage	100Vdc	250Vdc	400Vdc	630Vdc
Capacitance Tolerance	±5%(J) 、 ±10%(K)			
Voltage Proof	2U _R , 5s (DC)			
Dissipation Factor	≤ 0.1% (25°C, 1kHz)			
Insulation Resistance	U _R >100V	C _R ≤ 0.1uF IR ≥ 50,000MΩ C _R >0.1uF IR ≥ 5,000s (20°C, 100V, 1min)		

SPPN series

■ Product code system

SPPN	I	103	K	0250	D	B	10	23
Type	Internal use	Capacitance	Tolerance	Rated Voltage	Voltage	Lead forming	Lead Pitch	Lead Length
SPPN= Polypropylene Film/Foil Capacitor (Dipped)	--	103 =10000pF =10nF =0.01μF	J=±5% K=±10%	0100=100V 0250=250V 0400=400V 0630=630V	D=DC	Shown as Table I	07=6.5mm 08=7.5mm 10=10mm 13=13mm 19=19mm	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			

SPPN series

■ Dimensions (mm)

100Vdc						
Cap. μF	W	H	T	P	d	Part number
0.0010	9	8.5	4.5	6.5	0.6	SPPN_102+0100D*07**
0.0015	9	9.5	5.5	6.5	0.6	SPPN_152+0100D*07**
0.0018	9	9.5	5.5	6.5	0.6	SPPN_182+0100D*07**
0.0022	9	9.5	5.5	6.5	0.6	SPPN_222+0100D*07**
0.0027	9	9	5	6.5	0.6	SPPN_272+0100D*07**
0.0033	9	9	5.5	6.5	0.6	SPPN_332+0100D*07**
0.0039	9	9.5	5.5	6.5	0.6	SPPN_392+0100D*07**
0.0047	9	9	5	6.5	0.6	SPPN_472+0100D*07**
0.0056	9	9.5	5.5	6.5	0.6	SPPN_562+0100D*07**
0.0068	9	10	6	6.5	0.6	SPPN_682+0100D*07**
0.0075	10	9.5	6	7.5	0.6	SPPN_752+0100D*08**
0.0082	10	10	6	7.5	0.6	SPPN_822+0100D*08**
0.0091	10	10	6	7.5	0.6	SPPN_912+0100D*08**
0.010	10	10.5	6.5	7.5	0.6	SPPN_103+0100D*08**
0.012	10	11	7	7.5	0.6	SPPN_123+0100D*08**
0.015	12	10.5	6.5	8.5	0.6	SPPN_153+0100D*09**
0.018	12	10.5	7	8.5	0.6	SPPN_183+0100D*09**
0.022	12	11	7.5	8.5	0.6	SPPN_223+0100D*09**
0.027	12	12	8	8.5	0.6	SPPN_273+0100D*09**
0.033	13.5	11.5	7	10	0.6	SPPN_333+0100D*10**
0.039	13.5	12	7.5	10	0.6	SPPN_393+0100D*10**
0.047	13.5	12.5	8	10	0.6	SPPN_473+0100D*10**
0.056	13.5	13	8.5	10	0.6	SPPN_563+0100D*10**
0.068	17	13	7.5	13	0.6	SPPN_683+0100D*10**
0.082	17	13.5	8	13	0.6	SPPN_823+0100D*10**
0.10	17	14	8.5	13	0.6	SPPN_104+0100D*10**

250Vdc						
Cap. μF	W	H	T	P	d	Part number
0.0010	12	9.5	5.5	8.5	0.6	SPPN_102+0250D*09**
0.0015	12	10	6.5	8.5	0.6	SPPN_152+0250D*09**
0.0018	12	10.5	6.5	8.5	0.6	SPPN_182+0250D*09**
0.0022	12	9.5	5.5	8.5	0.6	SPPN_222+0250D*09**
0.0027	12	10	6	8.5	0.6	SPPN_272+0250D*09**
0.0033	12	10	6	8.5	0.6	SPPN_332+0250D*09**
0.0039	12	10.5	6.5	8.5	0.6	SPPN_392+0250D*09**
0.0047	12	10	6	8.5	0.6	SPPN_472+0250D*09**
0.0056	12	10.5	6.5	8.5	0.6	SPPN_562+0250D*09**
0.0068	12	10.5	7	8.5	0.6	SPPN_682+0250D*09**
0.0075	13.5	10.5	6.5	10	0.6	SPPN_752+0250D*10**
0.0082	13.5	10.5	6.5	10	0.6	SPPN_822+0250D*10**
0.0091	13.5	10.5	6.5	10	0.6	SPPN_912+0250D*10**
0.010	13.5	11	7	10	0.6	SPPN_103+0250D*10**
0.012	18	11	6	14	0.6	SPPN_123+0250D*14**
0.015	18	11.5	6	14	0.6	SPPN_153+0250D*14**
0.018	18	11.5	6.5	14	0.6	SPPN_183+0250D*14**
0.022	18	12	7	14	0.6	SPPN_223+0250D*14**
0.027	18	13.5	7	14	0.6	SPPN_273+0250D*14**
0.033	18	14	7.5	14	0.6	SPPN_333+0250D*14**
0.039	18	14.5	8	14	0.6	SPPN_393+0250D*14**
0.047	18	15.5	8.5	14	0.6	SPPN_473+0250D*14**
0.056	22.5	16	8	19	0.8	SPPN_563+0250D*19**
0.068	22.5	16.5	8.5	19	0.8	SPPN_683+0250D*19**
0.082	22.5	17	9.5	19	0.8	SPPN_823+0250D*19**
0.10	22.5	18	10	19	0.8	SPPN_104+0250D*19**

+ = Capacitance tolerance: K=±10%, J=±5%

* = Lead forming

** = Lead length

SPPN series

■ Dimensions (mm)

400Vdc						
Cap. μF	W	H	T	P	d	Part number
0.0010	13.5	10	6	10	0.6	SPPN_102+0400D*10**
0.0012	13.5	10.5	6.5	10	0.6	SPPN_122+0400D*10**
0.0015	13.5	10.5	6.5	10	0.6	SPPN_152+0400D*10**
0.0016	13.5	10	6	10	0.6	SPPN_162+0400D*10**
0.0018	13.5	10.5	6.5	10	0.6	SPPN_182+0400D*10**
0.002	13.5	9	5.5	10	0.6	SPPN_202+0400D*10**
0.0022	13.5	9.5	5.5	10	0.6	SPPN_222+0400D*10**
0.0024	13.5	9.5	5.5	10	0.6	SPPN_242+0400D*10**
0.0027	13.5	9.5	5.5	10	0.6	SPPN_272+0400D*10**
0.0030	13.5	9.5	6	10	0.6	SPPN_302+0400D*10**
0.0033	13.5	9.5	6	10	0.6	SPPN_332+0400D*10**
0.0036	15	11	5.5	11	0.6	SPPN_362+0400D*11**
0.0039	15	11	6	11	0.6	SPPN_392+0400D*11**
0.0043	15	11	6	11	0.6	SPPN_432+0400D*11**
0.0047	15	11.5	6	11	0.6	SPPN_472+0400D*11**
0.0051	15	11.5	6.5	11	0.6	SPPN_512+0400D*11**
0.0056	15	11.5	6.5	11	0.6	SPPN_562+0400D*11**
0.0062	15	12	6.5	11	0.6	SPPN_622+0400D*11**
0.0068	15	12	7	11	0.6	SPPN_682+0400D*11**
0.0075	15	12	7	11	0.6	SPPN_752+0400D*11**
0.0082	15	12.5	7	11	0.6	SPPN_822+0400D*11**
0.0091	15	12.5	7.5	11	0.6	SPPN_912+0400D*11**
0.010	15	13	8	11	0.6	SPPN_103+0400D*11**

630Vdc						
Cap. μF	W	H	T	P	d	Part number
0.0010	15	10	6	11	0.6	SPPN_102+0630D*11**
0.0012	15	10.5	6.5	11	0.6	SPPN_122+0630D*11**
0.0015	15	10.5	6.5	11	0.6	SPPN_152+0630D*11**
0.0016	15	10.5	6	11	0.6	SPPN_162+0630D*11**
0.0018	15	11	6	11	0.6	SPPN_182+0630D*11**
0.002	15	11	6.5	11	0.6	SPPN_202+0630D*11**
0.0022	15	11	6.5	11	0.6	SPPN_222+0630D*11**
0.0024	15	11.5	6.5	11	0.6	SPPN_242+0630D*11**
0.0027	15	11.5	7	11	0.6	SPPN_272+0630D*11**
0.0030	15	11.5	7	11	0.6	SPPN_302+0630D*11**
0.0033	15	12	7	11	0.6	SPPN_332+0630D*11**
0.0036	15	12	7.5	11	0.6	SPPN_362+0630D*11**
0.0039	15	12.5	7.5	11	0.6	SPPN_392+0630D*11**
0.0043	15	12.5	8	11	0.6	SPPN_432+0630D*11**
0.0047	15	13	8	11	0.6	SPPN_472+0630D*11**
0.0051	18	11.5	6.5	14	0.6	SPPN_512+0630D*14**
0.0056	18	12	6.5	14	0.6	SPPN_562+0630D*14**
0.0062	18	12	7	14	0.6	SPPN_622+0630D*14**
0.0068	18	12.5	7	14	0.6	SPPN_682+0630D*14**
0.0075	18	12.5	7.5	14	0.6	SPPN_752+0630D*14**
0.0082	18	13	7.5	14	0.6	SPPN_822+0630D*14**
0.0091	18	14	7.5	14	0.6	SPPN_912+0630D*14**
0.010	18	14.5	7.5	14	0.6	SPPN_103+0630D*14**

+ = Capacitance tolerance: K=±10%, J=±5%

* = Lead forming

** = Lead length

SPPN series

■ Specifications (GB/T 10188)

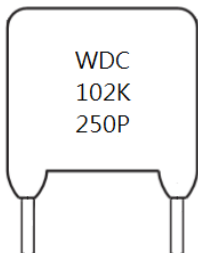
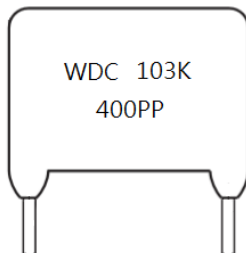
試驗項目 Test items	性能要求 Performance requirements	試驗條件 Conditions of test
電容量 Capacitance	在規定公差內 Within the tolerance specified	1KHz, 1Vrms Max. at 25°C
損耗因素 Dissipation Factor	0.001 (0.1%) Max.	1KHz, 1Vrms Max. at 25°C
耐電壓 Voltage proof	應無異常 Shall be no abnormality	引線間 Between terminals 2U _R (Vdc) Test of 5sec.
		引線與外盒間 Between terminal and enclosure U _R ×200%, Minimum 400Vdc
絕緣電阻 Insulation resistance	C _R ≤ 0.10μF IR ≥ 50,000MΩ, C _R > 0.10μF IR ≥ 5,000s	100Vdc, 60sec / 20°C
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) ΔC/C : ≤ ±2% of the initial value (3) DF (tanδ) : ≤ 0.001 of increased value	焊接溫度 Solder temperature: 260±5°C 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°C 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°C 上限溫度 Upper category temperature: 85°C 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

SPPN series

■ Specifications (GB/T 10188)

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) $\Delta C/C : \leq \pm 5\%$ of the initial value (3) $DF (\tan\delta) : \leq 140\%$ of the initial value (4) $IR : \geq 50\%$ of the applicable limits (5) Voltage proof : $U_R \times 1$	乾熱 Dry Heat 上限溫度 Upper Temperature: 85°C 持續時間 Lower Duration: 16Hrs
		寒冷 Cold 下限溫度 Temperature: -40°C 持續時間 Duration: 2Hrs
濕熱穩態 Damp Heat Steady State	(1) Appearance : No visible damage (2) $\Delta C/C : \leq \pm 2\%$ of the Initial value (3) $DF (\tan\delta) : \leq 140\%$ of the initial value (4) $IR : \geq 50\%$ of the applicable limits (5) Voltage proof : $U_R \times 1$	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) $\Delta C/C : \leq \pm 2\%$ of the initial value (3) $DF (\tan\delta) : \leq 140\%$ of the initial value (4) $IR : \geq 50\%$ of the applicable limits	實驗電壓 $U_R \times 150\%$, 實驗溫度 Temperature: +85°C 實驗時間 Time: 1000Hrs

■ Mark

Pitch < 10mm	Pitch ≥ 10 mm
	
1. WDC is a registered trademark of WINDAY	2. Capacitance: 103 indicates 0.01μF or 10nF
3. Capacitors Tolerance: K=±10%	4. Rated Voltage: 400Vdc, Indicates 400
5. P or PP for Polypropylene film/foil	

SPPN series

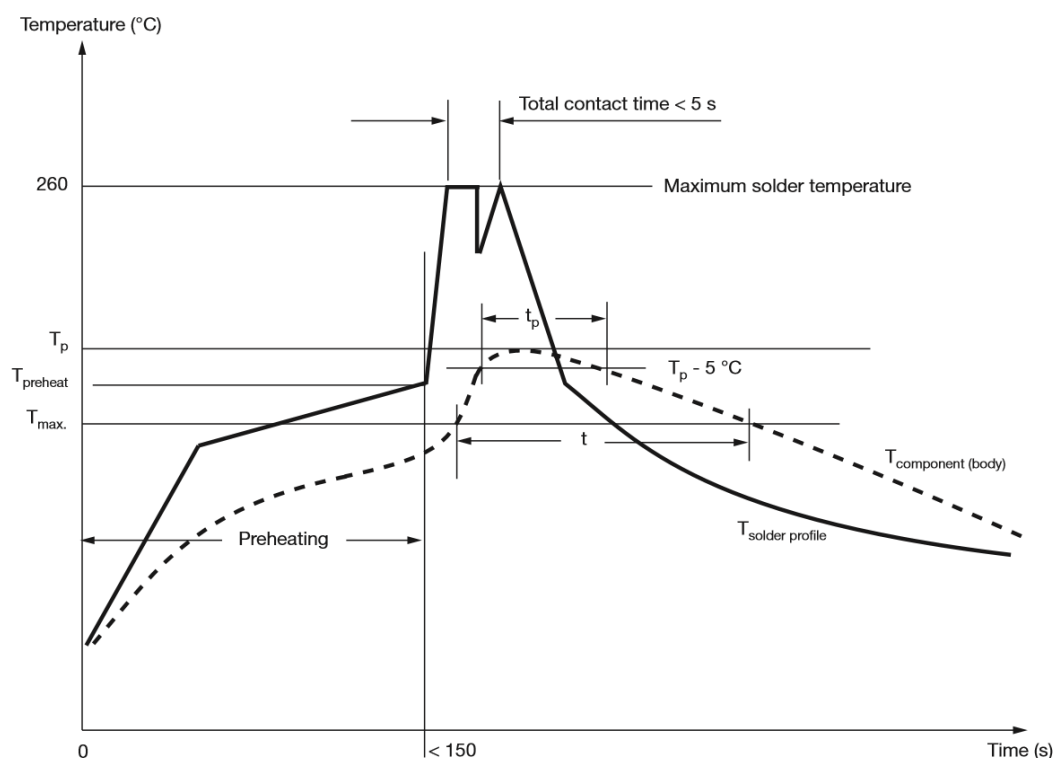
■ Soldering Guidelines for Film Capacitors

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



T_p : Peak temperature of the component body (top)

$T_{max.}$: 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							
	6.5 mm	7.5 mm	8.5 mm	10 mm	11 mm	12.5/13	14/15 mm	19 mm
SPPN	(3),(5)	(3),(5)	(3),(5)	(2),(5)	(2),(5)	(2),(5)	(1),(6)	(1),(6)

(1) No risk

During soldering: $T_p \leq 110^\circ\text{C}$, $t_p \leq 20\text{ s}$, $t \leq 30\text{ s}$

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

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

(3) Risk for product damage if PSL is not strictly followed

During preheating: $T_{max.} \leq 110^\circ\text{C}$

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

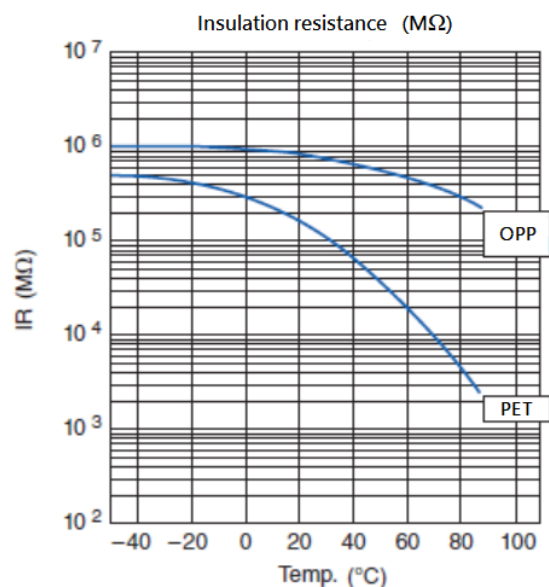
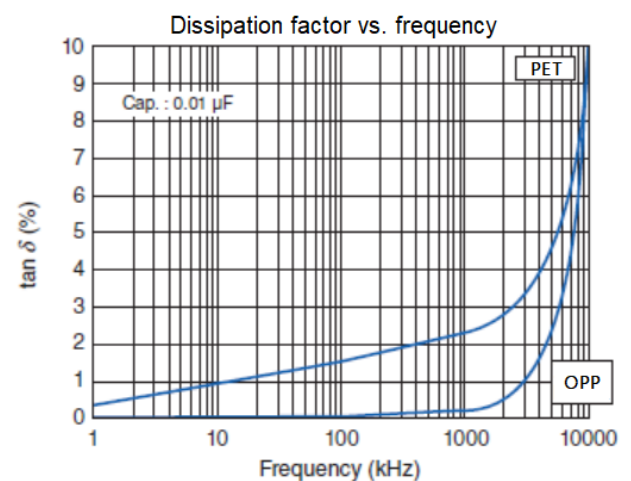
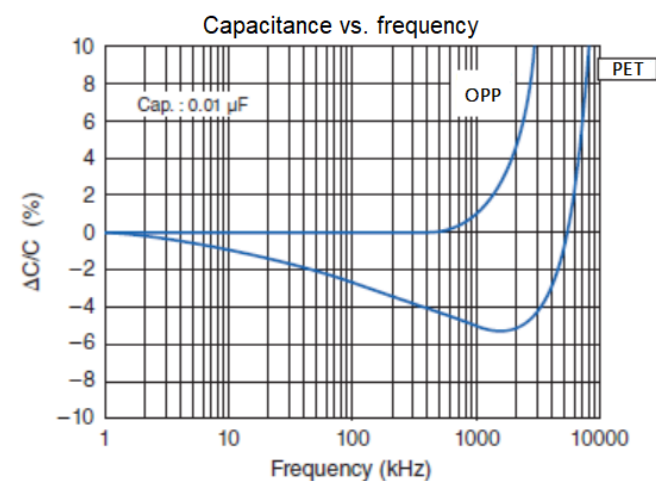
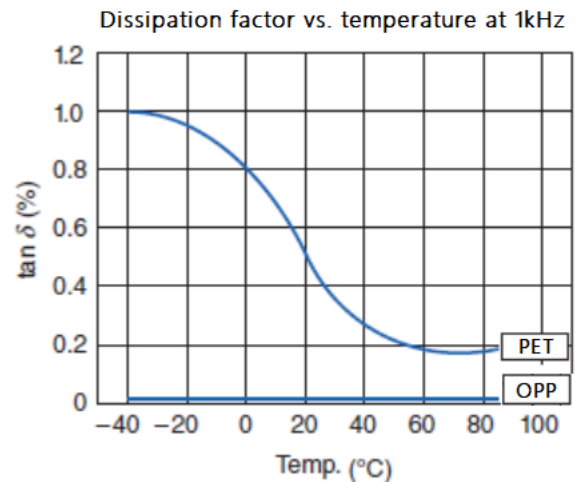
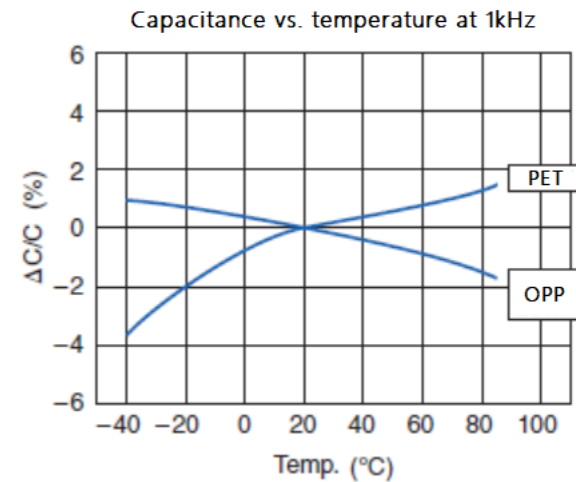
During soldering: $T_p \leq 120^\circ\text{C}$, $t_p \leq 20\text{ s}$, $t \leq 30\text{ s}$

During preheating: $T_{max.} \leq 100^\circ\text{C}$

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

SPPN series

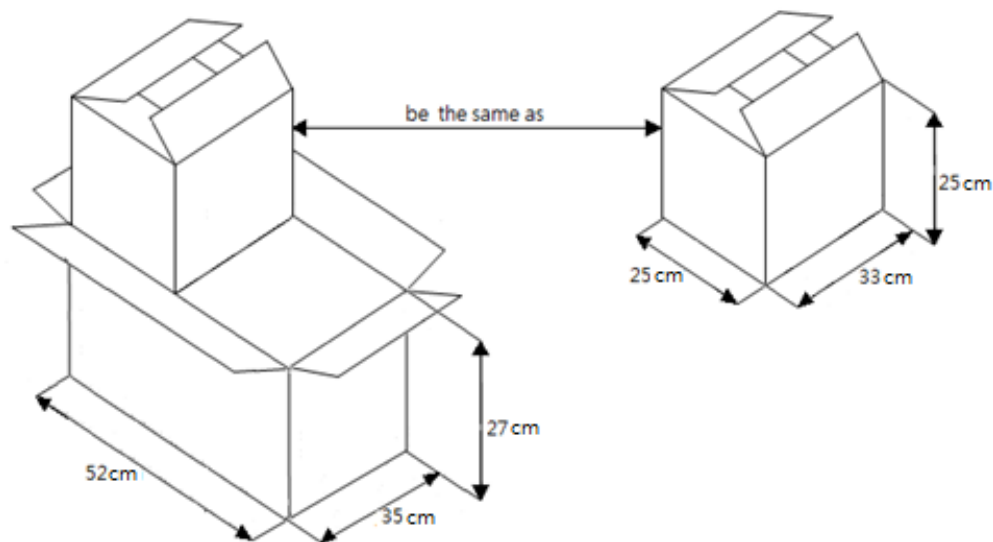
■ Typical graphs



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

SPPN series

■ 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 °C, humidity less than 50% of the state of storage for one year.