TO :

NO :

APPROVAL SHEET

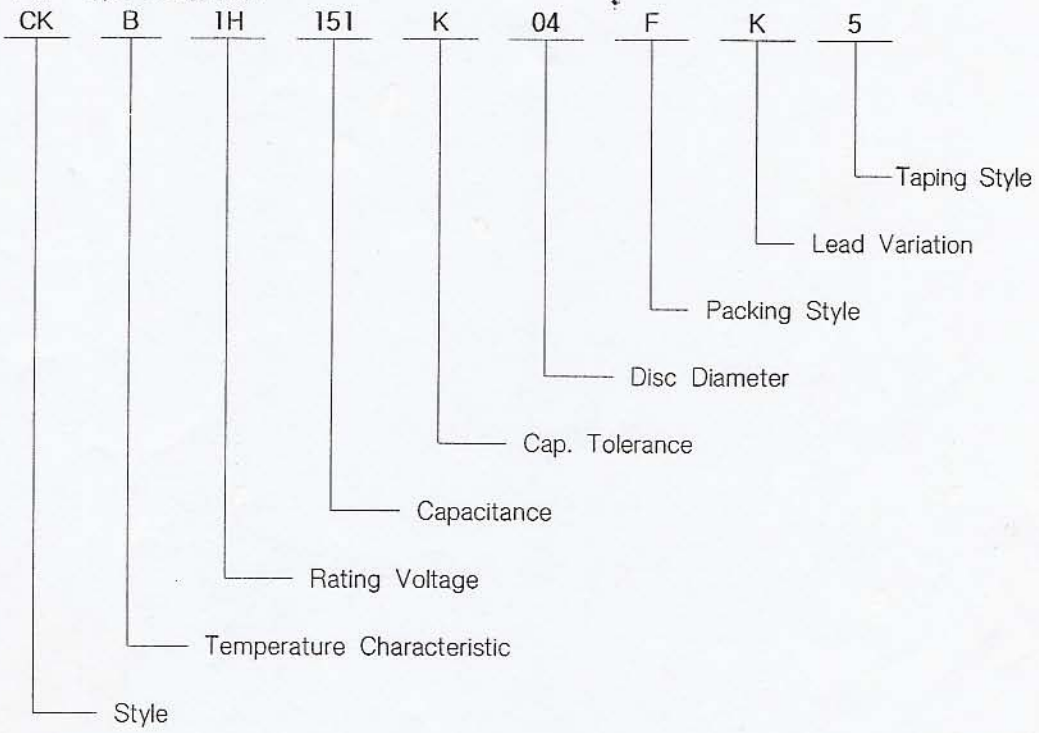
ITEM : CERAMIC DIELECTRIC CAPACITOR
(Class Ⅰ, Ⅱ)

SAMWON PARTS CO.,LTD

1. Scope.

This specification relates temperature compensating, high dielectric constant disc type fixed ceramic capacitor, intended for use in equipment for telecommunication and in electronic devices.

1-1. Type Designation



1-2. Specification

1-2-1. Style

CC : Temperature compensating fixed ceramic capacitor (class Ⅰ) - Phenol coated ceramic capacitor
EC : Temperature compensating fixed ceramic capacitor (class Ⅰ) - Epoxy coated ceramic capacitor
CK : High dielectric constant fixed ceramic capacitor (class Ⅱ) - Phenol coated ceramic capacitor
EK : High dielectric constant fixed ceramic capacitor (class Ⅱ) - Epoxy coated ceramic capacitor

1-2-2. Temperature coefficient and Temperature characteristics

1-2-2-1. CC,EC (class Ⅰ)

T.C	NP0	N80	N150	N220	N330	N470	N750	P350-N1000
Symbol	C	L	P	R	S	T	U	SL

	Written	Checked	Approved

1-2-2-2. CK,EK (class II)

EIA Code	SAMWHA Symbol	Temp. Range	Change Rate
Y5P	B	-25℃ ~ +85℃	±10%
Y5U	E	-25℃ ~ +85℃	+22% ~ -56%
Z4V	Fz	+10℃ ~ +65℃	+22% ~ -82%

1-2-3. Rating Voltage

1H : 50V, 2H : 500V, 3A : 1kV, 3D : 2kV, 3F : 3kV, 3J : 6kV

1-2-4. Capacitance

The nominal capacitance value in pF is expressed by three digit number. The first two digits represent significant figures and the last digit is the number of zero to follow.

EX. 0.5pF - 0R5, 10000pF - 103.

1-2-5. Cap. Tolerance

Symbol	C	D	J	K	M	P	Z
Cap. Tol	±0.25pF	±0.5pF	±5%	±10%	±20%	+100 ~ -0%	+80 ~ -20%

1-2-6. Disc Diameter

Code	04	05	06	08	10	12	14	16	18	20
Dia(Φmm)	4.0	5.0	6.3	8.0	10.0	12.5	14.0	16.0	18.0	20.0
Below 500V	±1.0	±1.0	±1.0	±1.0	±1.2	±1.3	±1.4	±1.6	±1.8	±2.0
Above 1kV	-	-	Max	Max	Max	max	Max	Max	Max	Max

1-2-7. Packing Style and Lead Variation

Packing Style		Lead Variation	
F	Taping Type Flat Pack	S	Straight Type
		K	In-kink Type
		F	Out-Forming Type
B	Bulk	S	Straight Type
		N	Straight Short Type
		K	In-kink Type Out-Forming Type
		W	Kink Short Type

1-2-8. Lead Spacing and Pitch of Component [mm]

5 : F=5.0, P=12.7
7 : F=7.5, P=15.0
8 : F=7.5, P=30.0
1 : F=10.0, P=25.4
2 : F=10.0, P=30.0

2. Requirements and method of test

No	ITEM	Rated value		Testing method/application (EIA-STD, RS-198-C)
		Class I	Class II	
1	Operating Temperature Range	-25℃ ~ 85℃	See 1-2-2-2	

No	Item		Rated Value		Testing method/application (EIA-STD, RS-198-C)
			Class I	Class II	
2	Capacitance		Within the specified range		-. Temperature : 25℃ -. Frequency : 1±0.1MHz(class 1) 1±0.1kHz(class 2) -. Measured voltage : 1±0.1Vrms
3	Dissipation Factor (tan δ ,Q)		Less than 30㎊ : Q≥400+20C 30㎊ or over : Q≥1000 (C:Capacitance)	B, E : 2.5%Max Fz : 5.0%Max	-. Based on Items 2.2.3 of EIA RS-198-C
4	Insulation resistance	Between terminals	More than 10000㏁		-. Based on Items 2.2.5 of EIA RS-198-C
5	Withstand Voltage	Between terminals	No abnormality is recognized		1) Class I -. Less than 1kV : Rated voltage × 300% for 1 to 5 sec -. 1kV or above : Rated voltage × 200% for 1 to 5 sec 2) Class II -. Less than 1kV : Rated voltage × 250% for 1 to 5 sec -. 1kV or above : Rated voltage × 200% for 1 to 5 sec 3) The discharge current, however was 50㎃ or less.
		Between exterior terminals	No abnormality is recognized		-. The smaller voltage of the rated voltage × 250% or 1.3kV DC was applied for 1 to 5 sec
6	Capacitance Temperature Characteristics		See 1-2-2-1	See 1-2-2-2	-.Based on Items 2.2.12 of EIA RS-198-C
7	Vibration Resistance	External view	No remarkable abnormality is recognized	No remarkable abnormality is recognized	-. Vibration frequency range : 10 to 55㎐ -. Full amplitude : 1.5mm
		Capacitance	Within the specified range	Within the specified range	
		Dissipation Factor (tan δ ,Q)	Satisfies No 3	Satisfies No 3	

No	ITEM		Rated value		Testing method/application (EIA-STD, RS-198-C)
			Class I	Class II	
8	Solder Heat Resistance	External view	No remarkable abnormality is recognized	No remarkable abnormality is recognized	-. Soldering temperature : 350±10℃, Immersion with -0 a nominal D dimension of 5mm or below, the soldering temperature shall be 260±5℃ and the immersion time shall be 5 ± 1 sec
		Rate change for capacitance	Within the greater value of ±2.5% and ±0.25pF	B :Within ±5% E :Within ±15% Fz:Within ±20%	
9	Soldering Property		The lead wire is soldered more than 3/4 of it in the circumferential direction and to the immersed part continuously in the axial direction		-. Soldering temp : 230±5℃ -. Immersion time : 2±0.5 sec
10	Humidity Resistance Test	External view	No remarkable abnormality is recognized		-. Temperature : 40±2℃ -. Humidity : 90~95% RH -. Testing time : 500+24,-0 hours
		Rate change for capacitance	Within the greater value of ±3.0% and ±0.3pF	B :Within ±10% E :Within ±20% Fz:Within ±30%	
		Dissipation Factor (tan δ ,Q)	Less than 10pF: Q≥200+10C 10pF or above & less than 30pF: Q≥275+5/2C 30pF or more : Q≥350	B, E : 5%Max Fz : 7.5%Max	
		Insulation resistance	More than 1000MΩ		
11	Humidity Resistance Load Test	External view	Rated value is the same humidity resistance test		-. Temperature : 40±2℃ -. Humidity : 90~95% RH -. Testing time : 500+24,-0 hours -. Applied voltage : Rated voltage -. The discharge current shall be 50mA or less
		Rate change for capacitance			
		Dissipation Factor (tan δ ,Q)	less than 30pF: Q≥100+10/3C 30pF or more : Q≥200	B, E : 5%Max Fz : 7.5%Max	
		Insulation resistance	More than 500MΩ		

No	ITEM		Rated value		Testing method/application (EIA-STD, RS-198-C)
			Class I	Class II	
12	High Temperature Load	External view	No remarkable abnormality is recognized		ㄱ. Testing Time : 1000+48,-0 hours ㄴ. Applied voltage : Rated valtage × 200% (1kV or more rated voltage × 150%) ㄷ. The discharge current shall be 50㎃ or less
		Rate change for capacitance	Within the greater value of ±3% and ±0.3㎊	B : Within ±10% E : Within ±20% Fz: Within ±30%	
		Dissipation Factor (tan δ ,Q)	Less than 10㎊: Q≥200+10C 10㎊ or above & less than 30㎊: Q≥275+5/2C 30㎊ or more : Q≥350	B, E : 5%Max Fz : 7.5%Max	
		Insulation resistance	More than 1000㏁		

3. Marking

Followings are marked on the capacitor body

3-1. Temperature compensating (Style : CC, EC)

2 2 1 5 1 K 3 3 2 2 1 J --- 2,3)

3-1-1. Color marking

T.C	Color	T.C	Color
C	Black	S	Green
L	Red	T	Blue
P	Orange	U	Purple
R	Yellow	SL	Omission

3-2. High Dielectric capacitor (Style : CK, EK)

1 0 3 B 1 0 1 K B 1 0 3 K B ----- 1)
2 7 2 K ----- 2,3)
2 K V ----- 4)

1) Temperature Characteristic
2) Nominal capacitance
3) Capacitance Tolerance
4) Rating Voltage
5) Manufacturer's Name (D $\phi \geq 10$)

3), 4), 5) are sometimes omitted owing to the narrow space of capacitors.

4. Enclosure

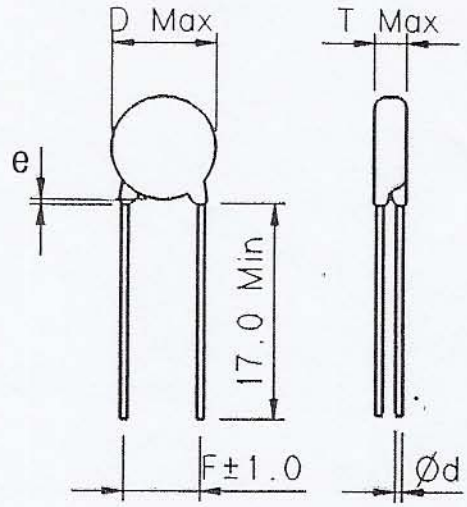
Units are coated with phenol and Epoxy compound and cured

R.V	50 ~ 500V	1kV ~
Material	Phenol Resin (Durez)	Epoxy Resin

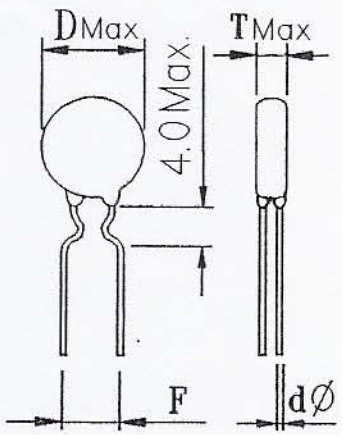
5. Style and Dimension

5-1. 50 ~ 500V

BS Type



BK Type



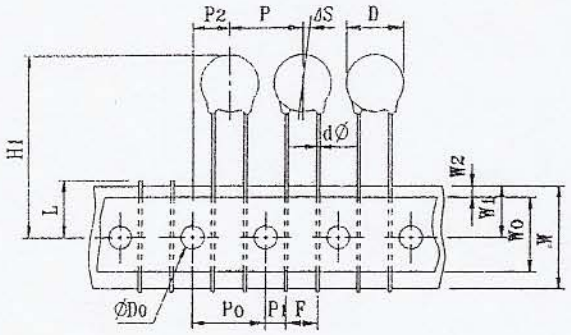
e :

R.V (V DC)	Unit : mm
50	1.5 Max
500	2.0 Max

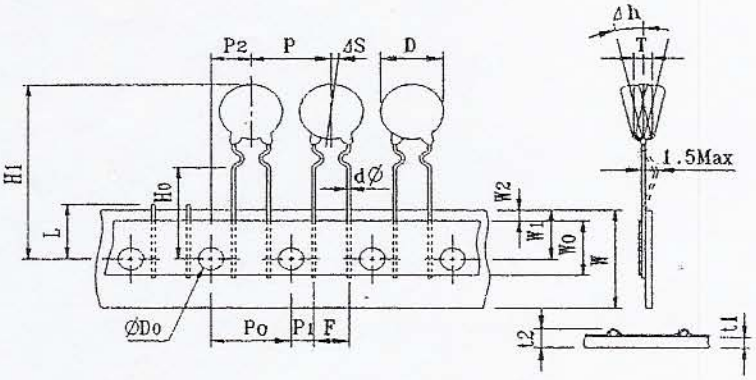
Style	Class 1								Class 2			Dimensions(mm)			
T.C / R.V	NP0 (C)	N80 (L)	N150 (P)	N220 (R)	N330 (S)	N470 (T)	N750 (U)	P350-N1000 (SL)	Y5P, Y5T (B, D)	Y5U (E)	Y5V (F)	D	T	F	dΦ
50V DC.	0.5-30	1-18	2-20	2-25	2-20	2-24	2-36	0.5-91	120-820	-	2200-3300	5.0	3.0	*	0.5
	33-47	20-30	22-30	27-33	22-39	27-39	39-47	100-130	100 1000-1500	-	1000-1500, 4700	5.0		2.5 (5.0)	
	51-91	33-47	33-47	36-68	43-62	43-56	51-91	150-240	1800-2700	-	5600-10000	6.3	3.0	5.0	
	100 -130	51-82	51-82	75-120	68 -100	62 -120	100 -200	270-470	3300-5600	-	15000 -22000	8.0			
	150 -220	91 -120	91 -120	130 -200	110 -180	150 -200	-	510-820	6800-8200	-	33000 -40000	10.0			
	240 -360	91 -120	91 -120	220 -300	110 -180	150 -200	220 -430	-	10000	-	47000	12.5			
500V DC.	7-9, 18-22	-	-	11-16	-	-	-	7-9, 18-68	470-560	-	2200	5.0	4.0	5.0	0.6
	1-6, 10-43	2-20	2-30	2-10, 18-33	2-36	3-43	3-68	1-6, 10-16, 75-120	100-390 680-1500	1000	1000, 4700	6.3			
	47-75	22-36	33 -47	36-56	39-56	47-62	75 -120	130-220	1800-2200	2200	10000	8.0			
	82-120	39-62	51-75	62-82	62 -100	68 -110	150 -160	240-360	2700-3900	4700	-	10.0			
	130 -160	68 -100	82 -120	91 -150	110 -150	120 -180	180 -300	390-560	4700-6800	6800	20000	12.5			
	-	-	-	180 -220	-	-	330 -430	-	-	10000	-	14.0		10.0	0.7
	180 -240	110 -180	150 -180	-	180 -270	220 -300	470	-	8200 -10000	-	-	16.0			
	-	-	-	-	-	-	560 -680	-	-	-	-	18.0			

* : F 2.5⇒Bulk Straight, F:5.0⇒Taping & Bulk Kink

5-4. FS5



5-5. FK5



[Unit : mm]

Item	Symbol	Taping specification		Note
		FS5	FK5	
Body Diameter	D	6.0 ~12.5	12.5 Max	
Body Thickness	T	6.0 Max		
Lead Diameter	dΦ	0.50 ± 0.05 0.55	0.50 ± 0.05 0.55	
Pitch of sprocket hole	Po	12.7 ± 0.3		Accumulative pitch error : ±1mm/20pitch
Pitch of component	P	12.7 ± 1.0		
Lead length from hole center to lead	P1	3.85 ± 0.7		
Lead length from hole center to component center	P2	6.35 ± 1.3		
Lead spacing	F	$5.0^{+0.8}_{-0.2}$		
Deviation along tape	ΔS	0 ± 1.0		
Deviation across tape	Δh	0 ± 2.0		
Carrier tape width	W	$18.0^{+1.0}_{-0.5}$		
Hold down tape width	Wo	5.0 Min.		
Position of sprocket hole	W1	9.0 ± 0.5		
Hold down tape position	W2	3.0 Max.		
Component Height	H1	32.25 Max.		
Diameter of sprocket hole	ΦDo	4.0 ± 0.2		
Lead-wire clinch height	Ho		16.0 ± 0.5	
Length of snipped lead	L	11 Max		
Total tape thickness	t_1	0.7 ± 0.2		
Total thickness, Tape and lead Wire	t_2	1.5 Max		
Lead wire protrusion	Lx	1.0 Max.		