SPEC No.	SPECIFICATION	Rev. No.	Page No.
DIS-H-204	HIGH-DIELECTRIC HIGH VOLTAGE CERAMIC CAPACITOR	02	1

Record of Revision

Date	Rev.No	Description	Issued by	Checked by	Remark
2010.02.03	rev.01	Production specification review	J.H Uhm	B.S. Min	
2011.06.28	rev.02	2-1. Type Designation" Halogen Free "추가	S.H PARK	H.S. CHI	
2012.06.13	rev.03	Temperature Characteristics review	W.C. JUNG	J.H. Park	

1. SCOPE

This specification is applied to high dielectric constant and temperature compensation ceramic capacitor.

■ Features

1. Small size and high capacitance
2. Coated with flame-retardant epoxy resin (equivalent to UL94V-0 standard)
3. Taping available for automatic insertion.

2. Part Number for System

2-1. Type Designation

CK	3A	YR	102	K	F	K	H	P07	C04	F	C
2-1-1	2-1-2	2-1-3	2-1-4	2-1-5	2-1-6	2-1-7	2-1-8	2-1-9	2-1-10	2-1-11	2-1-12

For lead type straight short lead, lead tolerance is only ±0.3 mm available.

2-1-1. Type

CK : Epoxy coated High dielectric constant fixed ceramic capacitor.(class Ⅱ)

2-1-2. Rating Voltage(DC)

3A : 1KV, 3D : 2KV, 3F : 3KV, 3J : 6KV

2-1-3. Temperature Characteristics

T.C	Temp. Char	
	-25℃ ~ +85℃	+85℃ ~ +125℃
R	Within ±15 %	Within +15% ~ -30 %
B	Within ±10 %	
E	Within +22% ~ -56 %	
F	Within +30% ~ -80 %	

Pre-heatment : Capacitor should be stored at 125±3℃ for 1 hr., then placed at room condition for 24 ±2 hrs.

2-1-4. Nominal Capacitance

The nominal capacitance value in pF is expressed by three digit number.
The first two digits denote significant figure ; the last digit denotes the mulitiplier of 10 in pF of zero to follow. Ex) In case of 102 : 10 x 10^2 = 1000pF

2-1-5. Capacitance Tolerance.

K : ±10%	M : ±20%	P :-0 ~ +100%	Z : +80~-20%

2-1-6. Packing Style

B	Bulk Type
F	Taping Type "Flat Pack"

2-1-7. Lead Variation

K	Kink Type or Vertical Type
S	Straight Type

2-1-8. Halogen Free

H	Brominated & Chlorine-Based flame retardants Free

2-1-9. Lead Spacing (F)

Not mentioned	5.0 (-02/+0.8)
P07	7.5 ± 1.0
P10	10.0 ±1.0

2-1-10. Lead Cutting Length

Lead Type	Code	Length (L)
straight out kink vertical	C03	2.8 ± 0.3
	C04	3.2 ± 0.3
	C07	6.3 ± 0.5
	C10	10.0 ± 0.3
ㄱ Forming	C04	LEFT : 2.9+0.6 / RIGHT : 4.9+0.6
	C05	LEFT : 4.7+0.6 / RIGHT : 6.7+0.6
	C07	7.0 ± 0.3

* Straight Long Type : 20 ± 1.0

2-1-11. Lead "ㄱ" Forming

F	Straight "ㄱ" Forming

2-1-12. Lead wire Material

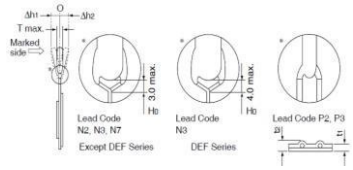
C : Sn plated copper cover Steel-Wire, Lead Wire Plating thickness(3㎛ min)
(material: Fe)

3. Parts Numbering

Part Number	Temp Char	Capacitance (pF)	Tolerance (%)	Dimensions(mm)		
				D (max)	T (max)	Lead Spacing(F)
CK3AYR101K	R	100	±10	6.0	4.5	5.0 (-02/+0.8)
CK3AYR221K	R	220	±10	6.0	4.5	5.0 (-02/+0.8)
CK3AYR471K	R	470	±10	6.0	4.5	5.0 (-02/+0.8)
CK3AYR681K	R	680	±10	7.0	4.5	5.0 (-02/+0.8)
CK3AYR102K	R	1000	±10	8.0	4.5	5.0 (-02/+0.8)
CK3AYR222K	R	2200	±10	13.0	4.5	5.0 (-02/+0.8)
CK3AYR332K	R	3300	±10	16.0	4.5	7.5±1
CK3AYR472K	R	4700	±10	22.0	4.5	10.0±1
CK3DYR101K	R	100	±10	8.0	5.0	5.0 (-02/+0.8)
CK3DYR221K	R	220	±10	8.0	5.0	5.0 (-02/+0.8)
CK3DYR561K	R	560	±10	9.0	5.0	5.0 (-02/+0.8)
CK3DYR102K	R	1000	±10	10.0	5.0	7.5±1
CK3DYR152K	R	1500	±10	11.0	5.0	7.5±1
CK3AYB101K	B	100	±10	6.0	4.5	5.0 (-02/+0.8)
CK3AYB102K	B	1000	±10	7.0	4.5	5.0 (-02/+0.8)
CK3AYB152K	B	1500	±10	9.0	4.5	5.0 (-02/+0.8)
CK3AYB222K	B	2200	±10	9.0	4.5	5.0 (-02/+0.8)
CK3AYB332K	B	3300	±10	13.0	4.5	5.0 (-02/+0.8)
CK3AYB472K	B	4700	±10	16.0	4.5	7.5±1
CK3DYB101K	B	100	±10	8.0	5.0	5.0 (-02/+0.8)
CK3DYB221K	B	220	±10	8.0	5.0	5.0 (-02/+0.8)
CK3DYB102K	B	1000	±10	9.0	5.0	5.0 (-02/+0.8)
CK3DYB152K	B	1500	±10	10.0	5.0	7.5±1
CK3DYB222K	B	2200	±10	11.0	5.0	7.5±1
CK3DYB472K	B	4700	±10	16.0	5.0	10.0±1

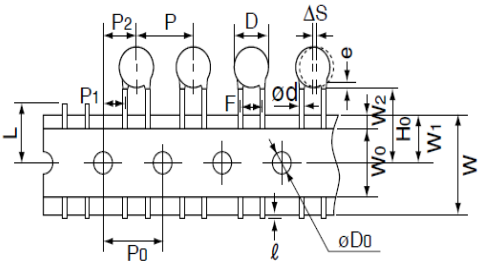
Part Number	Temp Char	Capacitance (pF)	Tolerance (%)	Dimensions(mm)		
				D (max)	T (max)	Lead Spacing(F)
CK3FYB101K	B	100	±10	7.0	5.5	5.0 (-02/+0.8)
CK3FYB561K	B	560	±10	8.0	5.5	5.0 (-02/+0.8)
CK3FYB821K	B	820	±10	9.0	5.5	7.5±1
CK3FYB102K	B	1000	±10	10.0	5.5	7.5±1
CK3FYB152K	B	1500	±10	12.0	5.5	10.0±1
CK3FYB222K	B	2200	±10	13.0	5.5	10.0±1
CK3JYB471K	B	470	±10	8.0	6.0	7.5±1
CK3JYB681K	B	680	±10	9.0	6.0	7.5±1
CK3JYB102K	B	1000	±10	10.0	6.0	10.0±1
CK3AYE102P	E	1000	-0 ~ +100	6.0	4.5	5.0 (-02/+0.8)
CK3AYE222P	E	2200	-0 ~ +100	7.0	4.5	5.0 (-02/+0.8)
CK3AYE472P	E	4700	-0 ~ +100	9.0	4.5	5.0 (-02/+0.8)
CK3AYE103P	E	10000	-0 ~ +100	16.0	4.5	7.5±1
CK3DYE102P	E	1000	-0 ~ +100	8.0	5.0	5.0 (-02/+0.8)
CK3DYE222P	E	2200	-0 ~ +100	9.0	5.0	7.5±1
CK3FYE472P	E	4700	-0 ~ +100	12.0	5.5	10.0±1
CK3AYF103Z	F	10000	-20 ~ + 80	9.0	4.5	5.0 (-02/+0.8)
CK3DYF103Z	F	10000	-20 ~ + 80	16.0	5.0	10.0±1

4. Taping and Bulk Type

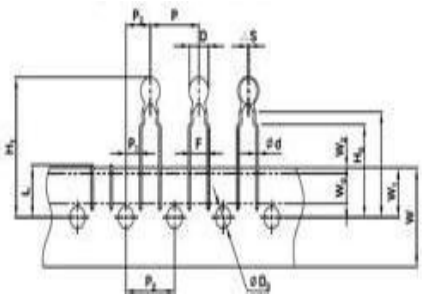


4-1. Taping Type

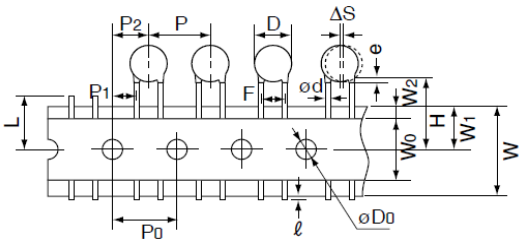
① **12.7 Pitch** Straight



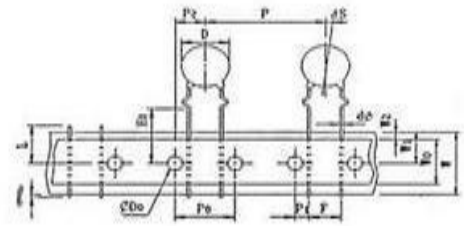
② **12.7 Pitch** KINK



③ **15.0 Pitch** Straight



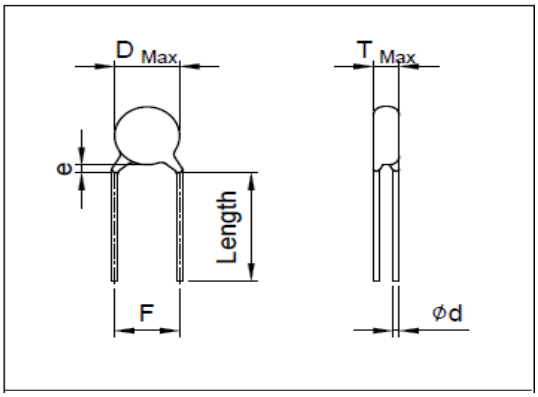
④ **15.0 Pitch** KINK



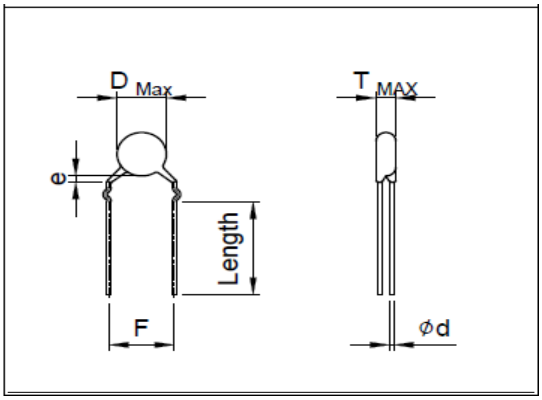
ITEM	CODE	Dimensions(mm)			
		①	②	③	④
Bady Diameter	D	5.0 < D ≤ 11.0		13.0 Max	
Pitch of component	P	**12.7±1.0**		**15.0±1.0**	
Pitch of Sprocket Hole	P_o	12.7±0.3		15.0±0.3	
Lead spacing	F	5.0 (-0.2/+0.8)		7.5±1.0	
Length from hole center to component center	P_2	6.35±1.5		7.5±1.5	
Length from hole center to lead	P_1	3.85±0.7		3.75±1.0	
Deviation along tape, left or right	Δs	0±1.0			
Carrier tape width	W	18.0 +0.8 ~ -0.2			
Position of sproket hole	W_1	9.0±0.5			
Lead distance between and bottom planes	H_o / H	17±1.0, 20±1.0			
Protrusion length	ℓ	+0.5 to -1.0			
Diameter of sprocket hole	ϕD_o	4.0±0.2			
Lead diameter	ϕd	0.50, 0.55, 0.60 ±0.05			
Total tape thickness	t_1	0.7±0.2			
Total thickness,tape and lead wire	t_2	1.5 Max			
Body thickness	T	4.0 Max		6.0 Max	
Portion to cut in case of defect	L	12.0 Max			
Hold down tape width	W_o	5.0 Min		7.0 Min	
Hold down tape position	W_2	3.0 Max			

4-2. Bulk Type

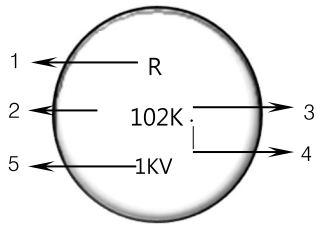
straight



out Kink



5. Standard Marking

MARKING ITEMS	EXAMPLE
1. TEMPERATURE CHARACTERISTICS	
2. NOMINAL CAPACITANCE	
3. TOLERANCE	
4. IN CASE OF DOT MARKING: Halogen Free	
5. RATED VOLTAGE	

6. Packing Specification

6.1. Taping Type

Type	PITCH	TAPING	
		IN BOX	OUT BOX
DC	**12.7**	2,000	12,000
	15.0	1,000	6,000

6-2. Bulk Type

Dia (DΦ)	Straight Long type		Forming Cutting type	
	Vinyl	In box	Vinyl	In box
6Φ	1,000	5,000	1,000	6,000
7Φ~8Φ	1,000	4,000	1,000	6,000
9Φ~10Φ	500	2,000	1,000	4,000
14Φ	500	2,000	500	2,000

7. Specification and Reliability Test Method

7-1 Capacitance

Capacitance shall be within specified limits when measured at a Voltage of 1Vrms and a frequency of 1KHz at 20±3℃.

7-2 Dissipation Factor tanδ(%)

The dissipation factor shall be within limits when measured at a Voltage 1Vrms and a frequency of 1KHz at 20±3℃.

table 1)

Temp.Char.	R	B	E	F
tanδ(%)	0.2% max	2.5% max	2.5% max	5.0% max

7-3 Withstand Voltage (between Terminals)

Capacitors shall be withstood the test voltage specified in the individual specification without damage or breakdown when measured 60Sec after application twice of rated voltage.

7-4 Withstand Voltage (between terminal and body)

Capacitors shall not be damage when rated voltege as below condition Applied both connected leads and body.
60Sec after appilcation twice of rated voltage.

7-5 Reliability Test

7-5-1 Temperature Charecteristics

The rate of capacitance variation shall be satisfied table 2) when Measured the capacitance within the temperature range of table 2).
(Standard temperature : 20±3℃)

table 2)

T.C	Temp. Char	RATE OF CAPACITANCE VARIATION
R	-25℃~+85℃	±15 %
	+85℃ ~ +125℃	+15 ~ -30 %
B	-25℃~+85℃	±10%
E	-25℃~+85℃	+22%~-56%
F	-25℃~+85℃	+30%~-80%

7-5-2 Humidity Test

Shall be subjected to a temperature of 40±3℃ and
Relative humidity between 90~95% for 500 (0~+24) hours and the
Maintaided at normal temperature and humidity for a period of 4~24
hours the following table 3) shall be satisfied.

table 3)

TEMP. CHAR	R	B	E	F
Change Rate	±10%	±10%	±20%	±30%
Dissipation Factor (Tanδ%)	0.6%MAX	5% MAX	5% MAX	7.5% MAX
Insulation Resistance	3000MΩ MIN			

7-5-3 Humidity Loading Test

Capacitors shall be subjested to a temperature of 40±3℃ and apply 100% of
DC rated voltege, relative humidity between 90~95% after application rated
voltege and limiting the charging and discharging current to 50mA for
500Hours and then tested within 4~24 hours the following table 4)
shall be satisfied.

table 4)

TEMP. CHAR	R	B	E	F
Change Rate	±10%	±10%	±20%	±30%
Dissipation Factor(Tanδ%)	0.6%MAX	5% MAX	5% MAX	7.5% MAX
Insulation Resistance	3000MΩ MIN			

7-5-4 High Temperature Loading Test

Capacitors shall be subjected to a temperature of 85±3℃ and apply 200% of DC rated voltage(application twice of rated voltage) and limit the charging and discharging current to 50mA for 1000Hours and then maintained a normal temperature and humidity for a period of 4~24 hours the following table 5) shall be satisfied.

table 5)

TEMP. CHAR	R	B	E	F
Change Rate	±10%	±10%	±20%	±30%
Dissipation Factor(Tanδ%)	0.6%MAX	4% MAX	4% MAX	7.5% MAX
Insulation Resistance	3000MΩ MIN			

7-5-5 Thermal Shock Test

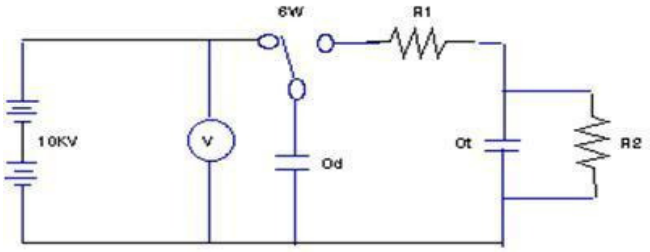
-45℃(30min)~+125℃(30min), It is 100 Cycle operation to → one Cycle (One hour) measure it after 12 to 24 hour, the following measurement satisfies table 6).

table 6)

TEMP. CHAR	R	B	E	F
Change Rate	±10%	±10%	±20%	±30%
Dissipation Factor(Tanδ%)	0.6%MAX	4% MAX	4% MAX	7.5% MAX
Insulation Resistance	3000MΩ MIN			

7-5-6 Discharge Test (I)

Capacitors shall comply with two following requirements, after with standing 50 discharges from a 1000pF capacitor. Charged to potential of 10kv DC, with an interval of 5 seconds between successive discharge, as shown below.

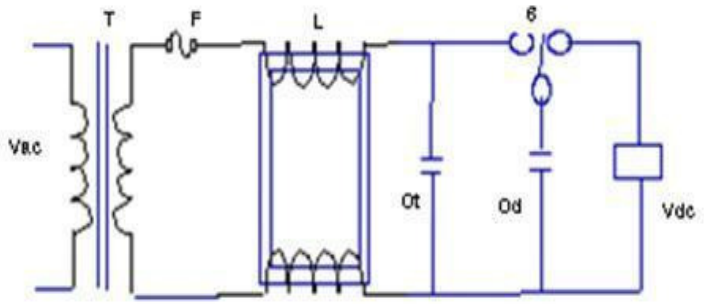


Ct : Capacitor under test
Cd: 0.001μF
R1: 1000Ω
R2: 100MΩ

Visual examination . . . . No mechanical damage
Dielectric withstanding voltage . . . The voltage as satisfied in the individual specification

7-5-7 Discharge Test (II)

Capacitors shall comply with the following requirements, after with standing four discharges from a dump capacitor charged to a voltage value that when dischaged places a potenstial of 5 Kv across the capacitor test, with an interval of 5 seconds between successive discharges, as shown in the circuit below.



Vdc : Variable direct-current voltage source
L : Choke coil of approximately 3mH and 0.03Ω
S : High-voltage switch
Cd : Dump capacitor
Ct : Capacitor under test

The direct current supply is to DE adjusted to potential in accordance with the following

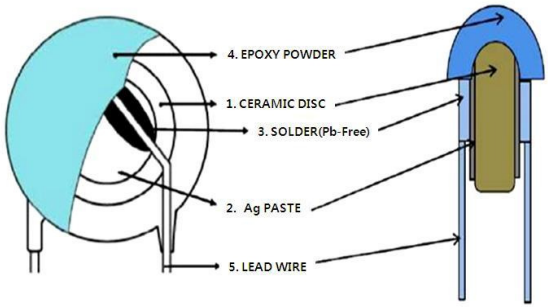
CAPACITANCE VALUE OF CT	0~0.005μF	0.0051~0.05μF
CAPACITANCE VALUE OF CD	0.005μF	0.05μF
DISSIPATION FACTOR OF CD	0.5 % max	0.5 % max
APPEARANCE	The cheesecloth around capacitors shall not glow of flame	

$$VDC = \frac{5000\ (Cd + Ct)}{Cd}\ (V)$$

CD : dump capacitor 0.005μF(CT≥0.05μF) OR 0.05μF(0.005μF<CT≤0.05μF)
CT : capacitance under test

8. 9. Capacitor structure & Material

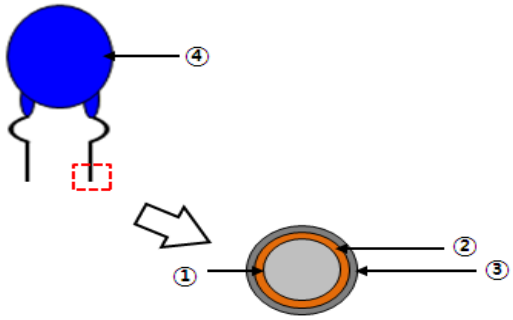
8-1 Capacitor structure



No.	Material	Substance
1	Dieletric Powder	BaTiO3, Tio2
2	Ag Plate	Ag
3	Solder (Lead Free)	Sn, Ag, Cu
4	Epoxy Resin	Pel-Powder
5	Lead Wire	CP (Steel-Wire)

* Lead Wire Plating thickness : 3㎛ min (material: Tin)

8-2 Lead wire



No.	Material
①	Steel-wire (Fe)
②	Copper (Cu)
③	Tin (Sn)
④	Epoxy Resin

8-3 Pb free showing

RoHS

8-4 Halogen free showing

HF
Halogen Free

* The Mark is showing to all Box