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Record of Revision

Date	Rev.No	Description	Issued by	Checked by	Remark
2010.02.03	rev.02	Production specification review	J.H Uhm	Sam.Min	

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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.

1. Specification and test method

1-1 CAPACITANCE

CAPACITANCE SHALL BE WITHIN SPECIFIED LIMITS WHEN MEASURED AT A VOLTAGE OF 1Vrms AND A FREQUENCY OF 1MHz AT 20±3°C.

2-2 QUALITY FACTOR (Q)

THE DISSIPATION FACTOR SHALL BE WITHIN LIMITS WHEN MEASURED AT A VOLTAGE 1Vrms AND A FREQUENCY OF 1MHz AT 20±3°C.

TABLE 1)

TEMP. CHA.	SL,CH
Q	Less than 30pF : 400+20×C
	30pF Over : ≥ 1000

1-3 INSULATION RESISTANCE

THE INSULATION RESISTANCE BETWEEN TERMINALS OF CAPACITOR SHALL BE NO LESS THAN 10000MΩ WHEN MEASURED 1MINUTE AFTER APPLICATION OF 500V DC.

1-4 WITHSTAND VOLTAGE

CAPACITORS SHALL BE WITHSTOOD THE TEST VOLTAGE SPECIFIED IN THE INDIVIDUAL SPECIFICATION WITHOUT DAMAGE OR BREAKDOWN WHEN MEASURED 1-5Sec AFTER APPLICATION TWICE OF RATED VOLTAGE.

1-5. DESIGNATION & DIMENSION

Part Number	DC Rated Voltage	Temp. Char.	Capacitance (pF)	Body(D) (mm)max	Thick(T) (mm)max	Lead(F) (mm)	Lead style
CC3ASL470K□□	1000V	SL	47±10%	6.0	4.0	5.0	KINK
CC1HCH100D□□	50V	CH	10±0.5pF	5.0	4.0	5.0	Kink

THREE BLANK COLUMNS ARE FILLED WITH THE LEAD AND PACKING CODES. PLEASE REFER TO THE THREE BLANK COLUMNS ON THE RIGHT FOR THE APPROPRIATE CODE.

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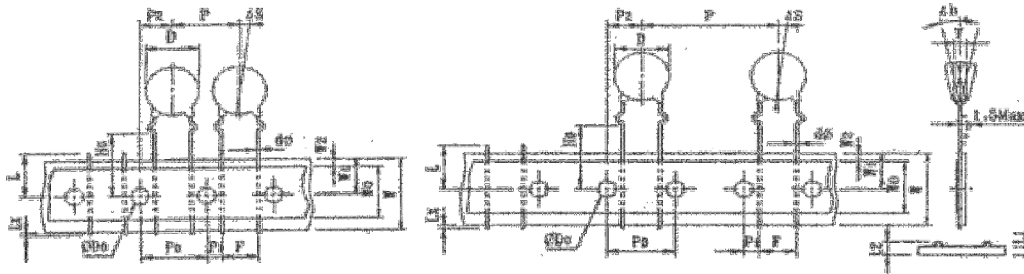
2. Forming Style and Marking, Standard Packing

■ KINK TYPE

2-1-0. CERAMIC CAPACITOR TAPING KINK LEAD TYPE

2-1-1. Encapsulation : epoxy resin, flammability 94v-0

2-1-2. Disc size and lead style : (unit : mm)



* Lead diameter $\varnothing d: 0.50 \pm 0.05(\text{mm})$

2-2. Standard Marking

MARKING ITEMS	EXAMPLE
1. TEMPERATURE CHARACTERISTICS	<p>1 → SL 2 → 470K → 3 3 → 1KV → 4</p>
2. NOMINAL CAPACITANCE	
3. TOLERANCE	
4. RATED VOLTAGE	

MARKING ITEMS	EXAMPLE
1. TEMPERATURE CHARACTERISTICS	<p>1 → (blank) 2 → 100D → 3 3 → 50V → 4</p>
2. NOMINAL CAPACITANCE	
3. TOLERANCE	
4. RATED VOLTAGE	

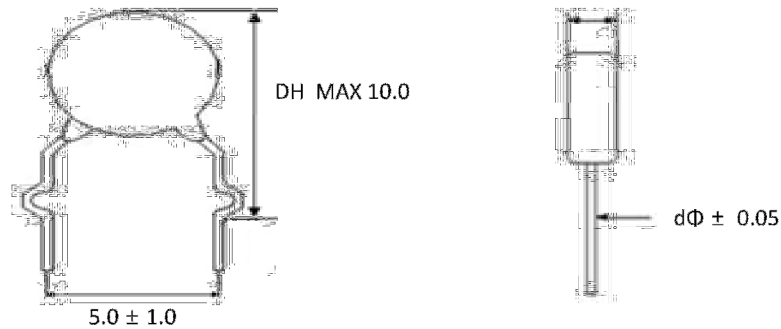
2-3. Standard Packing Specification

Type	PITCH	구분	TAPING	
			IN BOX	OUT BOX
DC	12.7	전규격	2000	12000
	15.0		1000	6000

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3. PART NUMBER FOR SYSTEM

(Ex.) CC 3A SL 470 K F K
 ① ② ③ ④ ⑤ ⑥ ⑦



KINK TYPE

l unit(mm)

① TYPE : CC	② RATED VOLTAGE : DC 1000V
③ TEMPERATURE CHARACTERISTICS : +350~-1000PPM/°C	④ CAPACITANCE : 47pF
⑤ CAPACITANCE TOLERANCE : ±10%	⑥ PACKING STYLE : TAPING TYPE
⑦ LEAD VARIATION : KINK STYLE	

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

3-1. Specification

CC : Epoxy coated temperature compensation constant fixed ceramic capacitor.(class I)

3-1-1. Rating Voltage (DC)

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

3-1-2. Nominal Capacitance

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

ex) 470 : 47pF

3-1-3. Capacitance Tolerance

ex) C : ±0.25pF, D : ±0.5pF, J : ±5%, K : ±10%, M : ±20%

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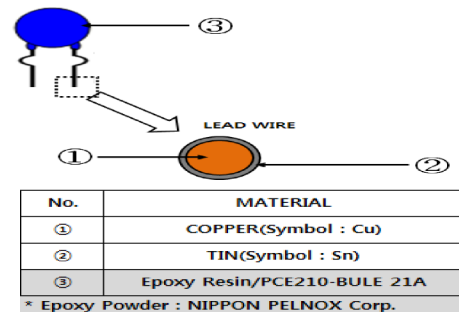
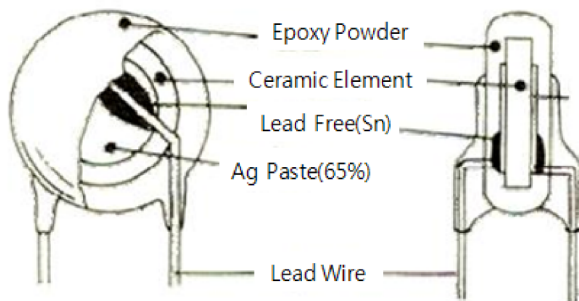
4. STANDARD CAPACITANCE

TYPE	Rated Voltage	Part Number	Dimensions(mm)				Capacitance(μF)
			D (Max)	T (Max)	F	dφ	SL
DC	1KV	CC3A△△□□□△	6,0	4,0	5,0	0,50	10 ~ 68
		CC3D△△□□□△	7,0		5,0	0,50	47 ~ 56
	2KV	CC3D△△□□□△	8,0	4,0	5,0	0,50	68
		CC3D△△□□□△			7,5	0,55	68
	3KV	CC3F△△□□□△	6,0	4,0	5,0-7,5	0,55(B/K)	3 ~ 8
		CC3F△△□□□△	7,0				10 ~ 33
		CC3F△△□□□△	8,0	0,50(T/P)		47 ~ 68	
		CC3F△△□□□△	9,0			100	
	CC3F△△□□□△	14,0	6,0	220			
	6KV	CC3J△△□□□△	7,0	4,5	7,5-10,0	0,60	3 ~ 8
		CC3J△△□□□△	8,0				10 ~ 33
		CC3J△△□□□△	9,0	6,0			47 ~ 56
		CC3J△△□□□△	10,0				68

5. External Materials & Material List

5-1. Parts Name : Disc Ceramic Capacitor

5-2. Specification



5-3. Material list

No	Material Name	Substance	Remark
1	Dielectric Powder	BaTiO ₃ , Tio ₂	
2	Ag Paste	Ag	
3	Lead Free	Sn, Ag, Cu	
4	Epoxy Resin	Pel-Powder	
5	Lead Wire	Cu, Sn	

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

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6. Reliability Test(Specification and Test Methods)

6-1 CAPACITANCE

CAPACITANCE SHALL BE WITHIN SPECIFIED LIMITS WHEN MEASURED AT A VOLTAGE OF 1Vrms AND A FREQUENCY OF 1MHz AT 20±3°C.

6-2 QUALITY FACTOR (Q)

THE DISSIPATION FACTOR SHALL BE WITHIN LIMITS WHEN MEASURED AT A VOLTAGE 1Vrms AND A FREQUENCY OF 1MHz AT 20±3°C.

TABLE 1)

TEMP. CHA.	SL, CH
Q	Less than 30pF : 400+20×C
	30pF Over : ≥ 1000

6-3 INSULATION RESISTANCE

THE INSULATION RESISTANCE BETWEEN TERMINALS OF CAPACITOR SHALL BE NO LESS THAN 10000MΩ WHEN MEASURED 1MINUTE AFTER APPLICATION OF 500V DC.

6-4 WITHSTAND VOLTAGE

CAPACITORS SHALL BE WITHSTOOD THE TEST VOLTAGE SPECIFIED IN THE INDIVIDUAL SPECIFICATION WITHOUT DAMAGE OR BREAKDOWN WHEN MEASURED 1-5Sec AFTER APPLICATION TWICE OF RATED VOLTAGE.

6-5 TEMPERATURE CHARACTERISTICS

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°C)

TABLE 2)

CHARACTERISTICS	MEASURING TEMP. RANGE	RATE OF CAPACITANCE VARIATION
SL	-25°C~+105°C	WITHIN +350~-1500PPM/°C
CH	-25°C~+85°C	WITHIN 0±60 PPM/°C

6-6 HUMIDITY TEST

SHALL BE SUBJECTED TO A TEMPERATURE OF 40±3°C AND RELATIVE HUMIDITY BETWEEN 90~95% FOR 500 (0~+24) HOURS AND THE MAINTAINED AT NORMAL TEMPERATURE AND HUMIDITY FOR A PERIOD OF 4~24 HOURS THE FOLLOWING TABLE 3) SHALL BE SATISFIED.

TABLE 3)

CHARACTERISTICS	SL, CH
RATE OF CAPACITANCE VARIATION	WITHIN ±3%
QUALITY FACTOR (Q)	30pF ↑ ≥350 30pF ↓ ≥275+5/2C 10pF ↓ ≥200+10C
INSULATION RESISTANCE	10,000MΩ MIN

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6-7 HUMIDITY LOADING TEST

CAPACITORS SHALL BE SUBJECTED TO A TEMPERATURE OF $40\pm 3^{\circ}\text{C}$ AND APPLY 100% OF DC RATED VOLTAGE, RELATIVE HUMIDITY BETWEEN 90~95% AFTER APPLICATION RATED VOLTAGE 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)

CHARACTERISTICS	SL,CH
RATE OF CAPACITANCE VARIATION	WITHIN $\pm 7.5\%$
QUALITY FACTOR (Q)	30pF $\uparrow \geq 200$ 30pF $\downarrow \geq 100+10/3C$
INSULATION RESISTANCE	10,000M Ω MIN

6-8 HIGH TEMPERATURE LOADING TEST

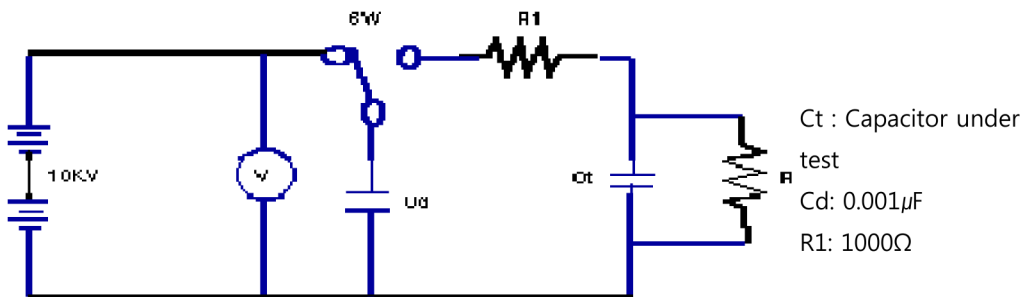
CAPACITORS SHALL BE SUBJECTED TO A TEMPERATURE OF $85\pm 3^{\circ}\text{C}$ AND APPLY 200% OF DC RATED VOLTAGE(APPLICATION TWICE OF RATED VOLTAGE)AND LIMIT THE CHARGING AND DISCHARGING CURRENT TO 50mA FOR 1000 HOURS AND THEN MAINTAINED A NORMAL TEMPERATURE AND HUMIDITY FOR A PERIOD OF 4~24 HOURS THE FOLLOWING TABLE 5) SHALL BE SATISFIED.

TABLE 5)

CHARACTERISTICS	SL,CH
RATE OF CAPACITANCE VARIATION	WITHIN $\pm 3\%$
QUALITY FACTOR (Q)	30pF $\uparrow \geq 350$ 30pF $\downarrow \geq 275+5/2C$ 10pF $\downarrow \geq 200+10C$
INSULATION RESISTANCE	10,000M Ω MIN

6-9 DISCHARGE TEST(I)

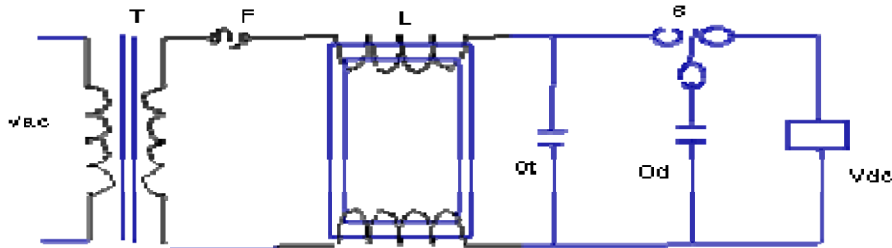
CAPACITORS SHALL COMPLY WITH TWO FOLLOWING REQUIREMENTS, AFTER WITH STANDING 50 DISCHARGES FROM A 1000pF CAPACITOR. CHARGED TO POTENTIAL OF 10KV DC, WITH AN INTERVAL OF 5 SECONDS BETWEEN SUCCESSIVE DISCHARGE, AS SHOWN BELOW.



VISUAL EXAMINATION NO MECHANICAL DAMAGE
 DIELECTRIC WITHSTANDING VOLTAGE . . . THE VOLTAGE AS SATISFIED IN
 THE INDIVIDUAL SPECIFICATION

6-10 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 DISCHARGED PLACES A POTENTIAL 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