Messrs: Ropla

Issued date : 2017.06.28

SPECIFICATION

Part Description : **"Type HI-K" CERAMIC CAPACITOR**

Customer Part No	DONG IL Part No
-	CK Series

DONG IL			CUSTOMER		
WRITTEN by	CHECKED by	APPROVED by	WRITTEN by	CHECKED by	APPROVED by
W.C.JUNG		Y.H.LIM			
06/28		06/28	/	/	/

DONG IL ELECTRONICS CO., LTD.

(Head Offics & Manufacture : Korea)

6, Gageumnonggong-gil, Jungangtap-myeon,
Chungju, Chungbuk, Korea 380-921
TEL : +82-43-855-7800
FAX : +82-43-855-7803

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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	
2012.09.10	rev.03	Production specification review [Type Designation (part Number)] rev.	W.C.JUNG	Y.H.LIM	
2014.12.17	rev.04	- added Package box standard information (p.13,14) - added 9. Caution for Certified Ceramic Capacitors (p.15,16)	H.S.KIM	W.C.JUNG	

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	YB	101	K	B	S	L	L1
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

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

Temp. Char	Temp. Range	Change Rate
R	-25 ~ +85℃	+15 ~ -15%
	-25 ~ +125℃	+ 15 ~ -30 %
B	-25 ~ +85℃	+10 ~ -10%
	-25 ~ +105℃	+10 ~ -15%
E	-25 ~ +85℃	+22 ~ -56%
F	-25 ~ +85℃	+30 ~ -80%

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 101 : $10 \times 10^1 = 100$pF

2-1-5. Capacitance Tolerance.

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

2-1-6. Packing Style

B	Bulk Type
T	Taping Type "Flat Pack"

2-1-7. Lead Variation

V	Vertical Type
K	Out-Kink Type
S	Straight Type

2-1-8. Lead Cutting Length

Lead Type	Code	Length (L)
Straight Out kink Vertical	0	Taping
	2	2.1 ± 0.2
	3	2.8 ± 0.3
	4	3.2 ± 0.3
	5	5.0 ± 0.3
	7	6.3 ± 0.5
	X	10.0 ± 0.3
	L	Long

2-1-9. Lead Pitch-Spacing(F)

Code	Lead Pitch-Spacing(F)
L1	12.7 - F5.0
L2	15.0 - F7.5
L3	15.0 - F10.0
L5	25.4 - F10.0

3. Parts Numbering

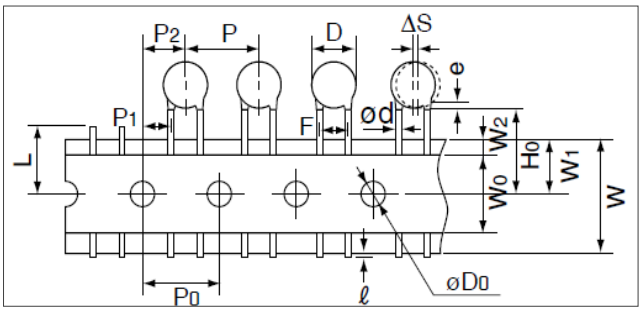
Part Number	Temp Char	Capacitance (pF)	Tolerance (%)	Dimensions(mm)		
				D (max)	T (max)	Lead Spacing(F)
CK3AYR101K	YR	100	±10	6.0	4.5	5.0 (-02/+0.8)
CK3AYR151K	YR	100	±10	6.0	4.5	5.0 (-02/+0.8)
CK3AYR221K	YR	220	±10	6.0	4.5	5.0 (-02/+0.8)
CK3AYR331K	YR	331	±10	6.0	4.5	5.0 (-02/+0.8)
CK3AYR471K	YR	470	±10	6.0	4.5	5.0 (-02/+0.8)
CK3AYR102K	YR	1000	±10	9.0	4.5	5.0 (-02/+0.8)
CK3AYR222K	YR	2200	±10	13.0	4.5	5.0 (-02/+0.8)
CK3AYR332K	YR	3300	±10	16.0	4.5	7.5±1
CK3AYR472K	YR	4700	±10	22.0	4.5	10.0±1
CK3DYR101K	YR	100	±10	8.0	5.0	5.0 (-02/+0.8)
CK3DYR221K	YR	220	±10	8.0	5.0	5.0 (-02/+0.8)
CK3DYR561K	YR	560	±10	9.0	5.0	5.0 (-02/+0.8)
CK3DYR102K	YR	1000	±10	10.0	5.0	7.5±1
CK3DYR152K	YR	1500	±10	11.0	5.0	7.5±1
CK3AYB101K	YB	100	±10	6.0	4.5	5.0 (-02/+0.8)
CK3AYB221K	YB	220	±10	6.0	4.5	5.0 (-02/+0.8)
CK3AYB471K	YB	470	±10	6.0	4.5	5.0 (-02/+0.8)
CK3AYB102K	YB	1000	±10	7.0	4.5	5.0 (-02/+0.8)
CK3AYB152K	YB	1500	±10	9.0	4.5	5.0 (-02/+0.8)
CK3AYB103K	YB	10000	±10	22.0	4.5	10.0±1
CK3DYB101K	YB	100	±10	8.0	5.0	5.0 (-02/+0.8)
CK3DYB221K	YB	220	±10	8.0	5.0	5.0 (-02/+0.8)
CK3DYB102K	YB	1000	±10	9.0	5.0	5.0 (-02/+0.8)
CK3DYB152K	YB	1500	±10	10.0	5.0	7.5±1
CK3DYB472K	YB	4700	±10	14.0	5.0	10.0±1

Part Number	Temp Char	Capacitance (pF)	Tolerance (%)	Dimensions(mm)		
				D (max)	T (max)	Lead Spacing(F)
CK3FYB101K	YB	100	±10	7.0	5.5	5.0 (-02/+0.8)
CK3FYB471K	YB	470	±10	7.0	5.5	5.0 (-02/+0.8)
CK3FYB821K	YB	820	±10	9.0	5.5	7.5±1
CK3FYB102K	YB	1000	±10	10.0	5.5	7.5±1
CK3FYB152K	YB	1500	±10	12.0	5.5	10.0±1
CK3FYB222K	YB	2200	±10	13.0	5.5	10.0±1
CK3JYB471K	YB	470	±10	8.0	6.0	7.5±1
CK3JYB681K	YB	680	±10	9.0	6.0	7.5±1
CK3JYB102K	YB	1000	±10	10.0	6.0	10.0±1
CK3AYE102P	YE	1000	-0 ~ +100	6.0	4.5	5.0 (-02/+0.8)
CK3AYE222P	YE	2200	-0 ~ +100	7.0	4.5	5.0 (-02/+0.8)
CK3AYE472P	YE	4700	-0 ~ +100	9.0	4.5	5.0 (-02/+0.8)
CK3AYE103P	YE	10000	-0 ~ +100	16.0	4.5	7.5±1
CK3DYE102P	YE	1000	-0 ~ +100	8.0	5.0	5.0 (-02/+0.8)
CK3DYE222P	YE	2200	-0 ~ +100	9.0	5.0	5.0 (-02/+0.8)
CK3FYE472P	YE	4700	-0 ~ +100	12.0	5.5	10.0±1
CK3AYF472Z	YF	4700	-20 ~ + 80	7.0	4.5	5.0 (-02/+0.8)
CK3AYF103Z	YF	10000	-20 ~ + 80	9.0	4.5	5.0 (-02/+0.8)
CK3DYF103Z	YF	10000	-20 ~ + 80	16.0	5.0	10.0±1

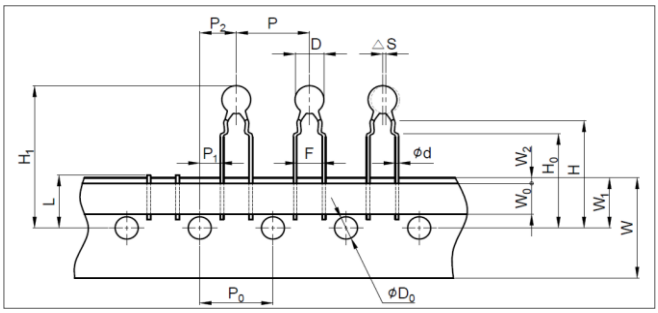
4. Taping and Bulk Type

4-1. Taping Type

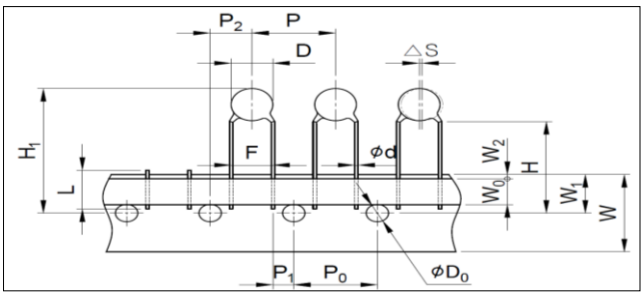
① 12.7 Pitch Straight



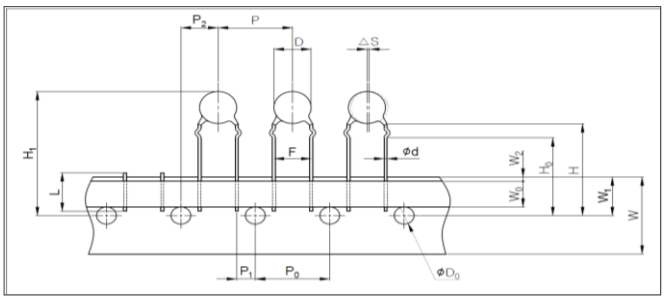
② 12.7 Pitch KINK



③ 15.0 Pitch Straight



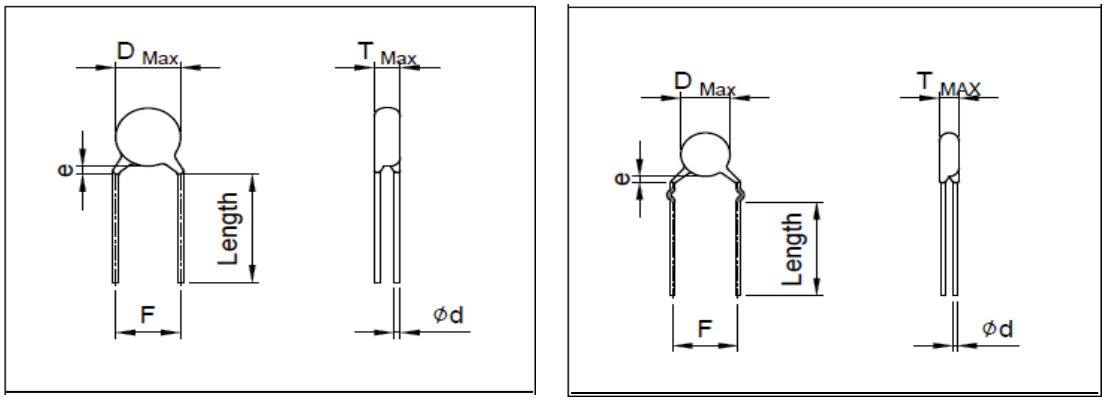
④ 15.0 Pitch KINK



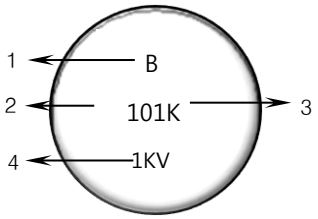
ITEM	CODE	Dimensions(mm)			
		①	②	③	④
Bady Diameter	D	5.0 < D ≤ 11.0		13.0 Max	
Pitch of component	P	**12.7±1.0**		**15.0±1.0**	
Pitch of Sprocket Hole	P_0	12.7±0.3		15.0±0.3	
Lead spacing	F	5.0 (-0.2/+0.8)		7.5±1.0	
Length from hole center to component center	P_2	6.35±1.5		7.5±1.5	
Length from hole 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_0 / H	17±1.0, 20±1.0			
Protrusion length	ℓ	+0.5 to -1.0			
Diameter of sprocket hole	ϕD_0	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_0	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. RATED VOLTAGE	

6. Specification and Reliability Test Method

6-1 Capacitance

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

6-2 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

6-3. Insulation Resistance

Insulation Resistance shall exceed 10,000MΩ when measured after 1 minute ±10% charge with 500V DC

6-4 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.

6-5 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.

6-6 Reliability Test

6-6-1 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)

TEMP. CHAR	TEMP. RANGE	RATE OF CAPACITANCE VARIATION
R	-25℃~+85℃	±15%
	-25℃~+125℃	-15%~+30%
B	-25℃~+85℃	±10%
	-25℃~+105℃	-10%~+15%
E	-25℃~+85℃	+22%~-56%
F	-25℃~+85℃	+30%~-80%

6-6-2 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			

6-6-3 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			

6-6-4 High Temperature Loading Test

Capacitors shall be subjected to a temperature of 125±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			

6-6-5 Thermal Shock Test

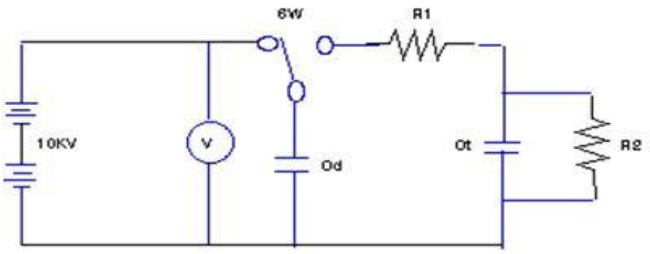
-45℃(30min)~+125℃(30min), It is 100 Cycle operation to → one Cycle (One hour) measure it after 12 to 24 hour, the following measurement satisfies table 6).

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			

6-6-6 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.



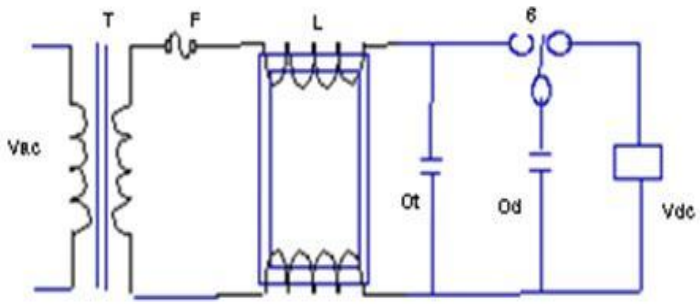
Ct : Capacitor under test
Cd: 0.001μF
R1: 1000Ω
R2: 100MΩ

Visual examination . . . . No mechanical damage

Dielectric withstanding voltage . . . The voltage as satisfied in the individual specification

6-6-7 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

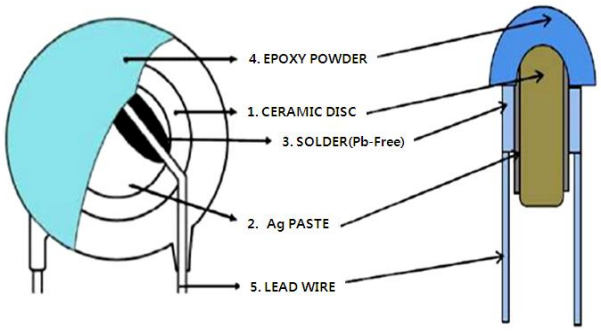
CAPACITANCE VALUE OF CT	0~0.005μF	0.0051~0.05μF
CAPACITANCE VALUE OF CD	0.005μF	0.05μF
DISSIPATION FACTOR OF CD	0.5 % max	0.5 % max
APPEARANCE	The cheesecloth around capacitors shall not glow of flame	

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

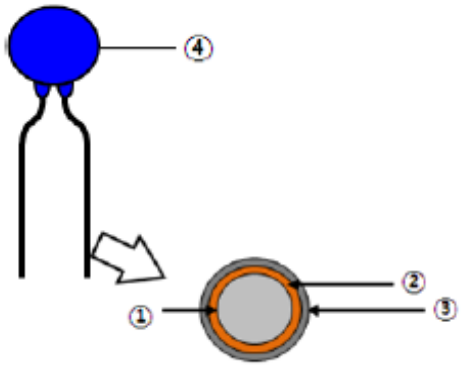
CD : dump capacitor 0.005μF(CT≥0.05μF) OR 0.05μF(0.005μF<CT≤0.05μF)
CT : capacitance under test

7. Capacitor structure & Material

7-1 Capacitor structure



7-2. Lead wire



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

7-3 Material Vender Imformation

NO	Material Name	Vender Name	Location	Substance
1	Dieletric Powder	CPT, and etc..	Korea	BaTiO3, TiO3
2	Ag Paste	Daejoo and etc..	Korea	Ag, resin and etc.
3	Solder(Lead Free)	DONG IL	Korea	Sn, Ag, Cu
4	Epoxy Resin	Pelnox and etc..	Japan	Silica, Bisphenol A, etc.
5	Lead Wire	Kistron and etc..	Korea	Cu-plated Steel-Wire

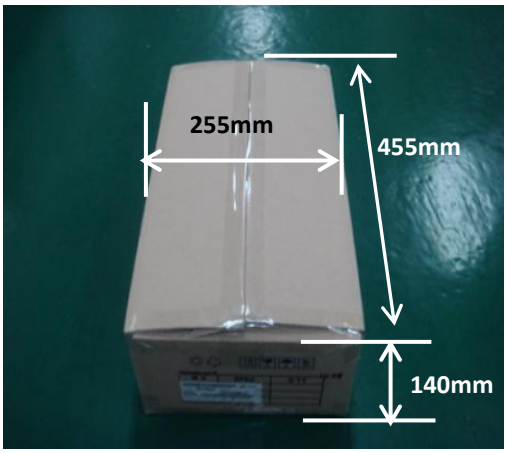
8. Packing Specification

8-1. Bulk Type

Type	Diameter /mm	Straight Long type		Forming Cutting type	
		Vinyl	In box	Vinyl	In box
DC	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

8-1-1. In-Box Shape & Size

8-1-2. Out-Box Shape & Size



8-1-3. Out-Box Mark

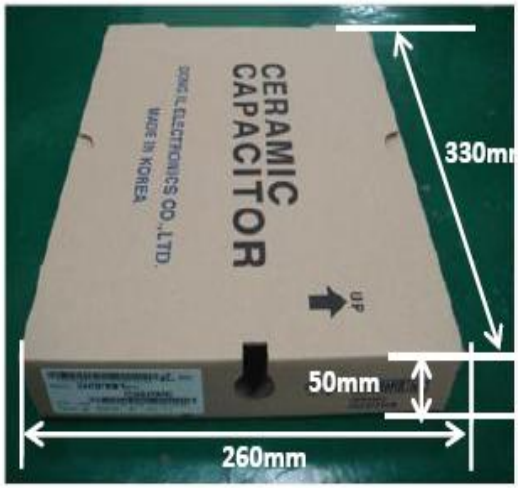
<RoHS, Lead Free>

<Loading Capacity, Handle with Care Mark>

8-2. Taping Type

Type	PITCH	TAPING	
		IN BOX	OUT BOX
DC	12.7	2,000	12,000
	15	1,000	6,000

8-2-1. In-Box Shape & Size



8-2-2. Out-Box Shape & Size

8-2-3. Out-Box Mark

<RoHS, Lead Free>

<Loading Capacity, Handle with Care Mark>

8-3. Packing label

Label sample	NO	Explanation
	①	Customer Part No.
	②	Product Name
	③	Q'ty
	④	Lead free / RoHS Showing
	⑤	Labels publisher
	⑥	Production date

9. Causion for Certified Ceramic Capacitors

FAILURE TO FOLLOW CAUTIONS MAY RESULT, WORST CASE, IN A SHORT CIRCUIT AND CAUSE FUMING OR PARTIAL DISPERSION WHEN THE PRODUCT IS USED.

9-1. Storage and Operating Condition

The insulating coating of capacitors does not form a perfect seal; therefore, do not use or store capacitors in a corrosive atmosphere, especially where chloride gas, sulfide gas, acid, alkali, salt or the like are present. Also, avoid exposure to moisture. Before cleaning, bonding, or molding this product, verify that these processes do not affect product quality by testing the performance of a cleaned, bonded or molded product in the intended equipment. Store the capacitors where the temperature and relative humidity do not exceed -10 to 40 degrees centigrade and 15 to 85%.
Use capacitors within 6 months after delivery. Check the solderability after 6 months or more.

9-2. Soldering and Mounting

1. Vibration and Impact

Do not expose a capacitor or its lead wires to excessive shock or vibration during use. Excessive shock or vibration may cause fatigue destruction of lead wires mounted on the circuit board.
Please take measures to hold a capacitor on the circuit boards by adhesive, molding resin or another coating.
Please confirm there is no influence of holding measures on the product with the intended equipment.

2. Soldering

When soldering this product to a PCB/PWB, do not exceed the solder heat resistance specifications of the capacitor. Subjecting this product to excessive heating could melt the internal junction solder and may result in thermal shocks that can crack the ceramic element.
Soldering the capacitor with a soldering iron should be performed in the following conditions.

*Temperature of iron-tip: 400 degrees C. max.
* Soldering iron wattage: 50W max.
* Soldering time: 3.5 sec. max.

9-2. Soldering and Mounting (Coun')

3. Bonding, Resin Molding and Coating

For bonding, molding or coating this product, verify that these processes do not affect the quality of the capacitor by testing the performance of the bonded, molded or coated product in the intended equipment.

When the amount of applications, dryness/hardening conditions of adhesives and molding resins containing organic solvents (ethyl acetate, methyl ethyl ketone,toluene, etc). are unsuitable, the outer coating resin of a capacitor is damaged by the organic solvents and it may result, worst case, in a short circuit.

The variation in thickness of adhesive, molding resin or coating may cause outer coating resin cracking and/or ceramic element cracking of a capacitor in a temperature cycling.

4. Treatment after Bonding, Resin Molding and Coating

When the outer coating is hot (over 100 degrees C.) after soldering, it becomes soft and fragile. Therefore, please be careful not to give it mechanical stress.

9-3. Handling

Vibration and Impact

Do not expose a capacitor or its lead wires to excessive shock or vibration during use. Excessive shock or vibration may cause fatigue destruction of lead wires mounted on the circuit board.

Please take measures to hold a capacitor on the circuit boards by adhesive, molding resin or another coating.

Please confirm there is no influence of holding measures on the product with the intended equipment.