Messrs:	Ropla	Issued date:	2023.05.02

SPECIFICATION

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

DONG IL Part No
CK3AYF472XBSXL1

DONG IL			CUSTOMER		
WRITTEN by	CHECKED by	APPROVED by	WRITTEN by	CHECKED by	APPROVED by
prec		和			
S.H.PARK		W.C.JUNG			
05/02		05/02	/	/	/

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Please return to me by e-mail of this specification's cover with your signature

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		Record of Revision	Τ			
Date	Rev.No	Description	Issued by	Checked I	oy R	lemark
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	3	
2018.08.17	rev.05	Lead spacing Change standardization $5.0 (-0.2 /+0.8) -> 5.0 \pm 0.3$ mm	S.H.KANG	W.C.JUN	G	
					+	
					+	

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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 YF 472 Ζ В S X **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 Π)

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
D	-25 ~ +85℃	+15 ~ -15%
, N	-25 ~ +125℃	+ 15 ~ -30 %
В	-25 ~ +85℃	+10 ~ -10%
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 $472:47 \times 10^2 = 4700 \text{pF}$

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2-1-5. Capacitance Tolerance.

K: ±10%	M: ±20%	P :-0 ~ +100%	Z:+80~-20%
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2-1-6. Packing Style

В	Bulk Type
Т	Taping Type "Flat Pack"

2-1-7. Lead Variation

K	Kink Type
S	Straight Type

2-1-8. Lead Cutting Length

	<u> </u>	
Lead Type	Code	Length (L)
	0	Taping
	4	3.2 ± 0.3
straight	5	5.0 ± 0.3
out kink	7	6.3 ± 0.5
	X	10.0 ± 0.3
	L	Long

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

L1	12.7 - F5.0
L2	15.0 - F7.5
L3	15.0 - F10

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3. Parts Numbering

arts Numbering	Temp	Capacitance	Tolerance	D	imensions(m	m)
Part Number	Char	(pF)	(%)	D (max)	T (max)	Lead Spacing(F)
CK3AYR101K	YR	100	±10	6.0	4.0	5.0 ± 0.3
CK3AYR151K	YR	100	±10	6.0	4.0	5.0 ± 0.3
CK3AYR221K	YR	220	±10	6.0	4.0	5.0 ± 0.3
CK3AYR331K	YR	331	±10	6.0	4.0	5.0 ± 0.3
CK3AYR471K	YR	470	±10	6.0	4.0	5.0 ± 0.3
CK3AYR102K	YR	1000	±10	9.0	4.0	5.0 ± 0.3
CK3AYR222K	YR	2200	±10	13.0	4.0	5.0 ± 0.3
CK3AYR332K	YR	3300	±10	16.0	4.0	7.5 ± 0.5
CK3AYR472K	YR	4700	±10	22.0	4.0	10.0 ± 0.5
CK3DYR101K	YR	100	±10	8.0	4.0	5.0 ± 0.3
CK3DYR221K	YR	220	±10	8.0	4.0	5.0 ± 0.3
CK3DYR561K	YR	560	±10	9.0	4.0	5.0 ± 0.3
CK3DYR102K	YR	1000	±10	10.0	4.0	7.5 ± 0.5
CK3DYR152K	YR	1500	±10	11.0	4.0	7.5 ± 0.5
CK3AYB101K	YB	100	±10	6.0	4.0	5.0 ± 0.3
CK3AYB221K	YB	220	±10	6.0	4.0	5.0 ± 0.3
CK3AYB471K	YB	470	±10	6.0	4.0	5.0 ± 0.3
CK3AYB102K	YB	1000	±10	7.0	4.0	5.0 ± 0.3
CK3AYB222K	YB	2200	±10	10.0	4.0	5.0 ± 0.3
CK3DYB101K	YB	100	±10	7.0	4.0	5.0 ± 0.3
CK3DYB151K	YB	150	±10	6.0	4.0	5.0 ± 0.3
CK3DYB221K	YB	220	±10	6.0	4.0	5.0 ± 0.3
CK3DYB681K	YB	680	±10	7.0	4.0	5.0 ± 0.3
CK3DYB102K	YB	1000	±10	8.0	4.0	5.0 ± 0.3
CK3DYB222K	YB	2200	±10	10.0	4.0	7.5 ± 0.5

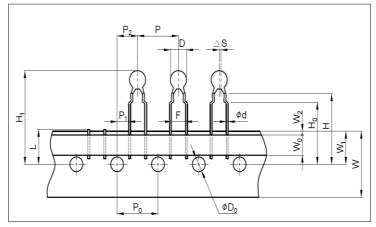
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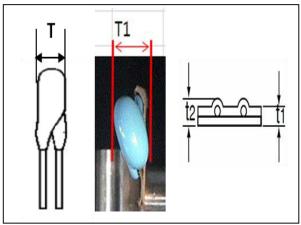
	Temp	Capacitance	Tolerance	Di	imensions(m	m)
Part Number	Char	(pF)	(%)	D (max)	T (max)	Lead Spacing(F)
CK3FYB101K	YB	100	±10	7.0	4.5	5.0 ± 0.3
CK3FYB471K	YB	470	±10	7.0	4.5	5.0 ± 0.3
CK3FYB821K	YB	820	±10	9.0	4.5	7.5 ± 0.5
CK3FYB102K	YB	1000	±10	10.0	4.5	7.5 ± 0.5
CK3FYB152K	YB	1500	±10	12.0	4.5	10.0 ± 0.5
CK3FYB222K	YB	2200	±10	13.0	4.5	10.0 ± 0.5
CK3JYB471K	YB	470	±10	8.0	5.0	7.5 ± 0.5
CK3JYB681K	YB	680	±10	9.0	5.0	7.5 ± 0.5
CK3JYB102K	YB	1000	±10	10.0	5.0	10.0 ± 0.5
CK3AYE102P	YE	1000	-0 ~ +100	6.0	4.0	5.0 ± 0.3
CK3AYE222P	YE	2200	-0 ~ +100	7.0	4.0	5.0 ± 0.3
CK3DYE103M	YE	10000	±20	13.0	4.0	5.0 ± 0.3
CK3DYE102P	YE	1000	-0 ~ +100	8.0	4.5	5.0 ± 0.3
CK3DYE222P	YE	2200	-0 ~ +100	9.0	4.5	5.0 ± 0.3
CK3AYF472Z	YF	4700	-20 ~ + 80	7.0	4.0	5.0 ± 0.3
CK3AYF103Z	YF	10000	-20 ~ + 80	10.0	4.0	5.0 ± 0.3
CK3AYF223Z	YF	22000	-20 ~ + 80	15.0	4.0	7.5 ± 0.5

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4. Taping and Bulk Type

4-1. Taping Type





ITEM	CODE	Dimensions(mm)
Body Diameter	D	Max 7.0
Pady Thickness	Т	Max 4.0
Body Thickness	T1	Max 4.5
Lead Diameter	ød	(0.5,0.55,0.60)±0.05
Pitch of Sprocket Hole	P0	12.7±0.3
Pitch of Component	Р	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±1.5
Lead Spacing(Center to center of Lead)	F	5.0 ± 0.3
Deviation along Tape, Left, or Right	△S	0±2.0
Deviation across Tape	△h	0±2.0
Carrier tape width	W	18.0 +0.8 -0.2
Hold down tape Width	W0	5.0 Min
Position of Sproket hole	W1	9.0±0.5
Hold Down Tape Position	W2	3.0 Max
Height of Component From Hole Center	Н	20.0±1.0
Lead-Wire Clinch Height	H0	16.0±0.5
Cpmponent Height	H1	32.25 Max
Portion to Cut in case of Defect	L	11.0 Max
Lead Protrusion	Lx	1.0 Max
Diameter of Sprocket Hole	øD0	4.0±0.2
Total Tape Thickness	t1	0.7±0.2
Total Thickness, Tape and Lead Wire	t2	1.5 Max

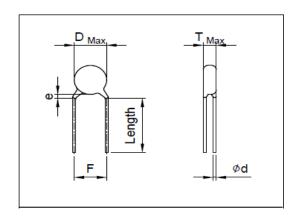
^{*} Taping pattern in the Package is all "FLAT PACK".

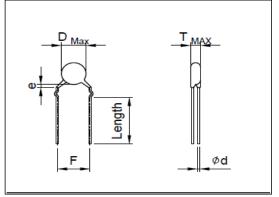
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4-2. Bulk Type

Straight

Out Kink





5. Standard Marking

MARKING ITEMS	EXAMPLE
1. TEMPERATURE CHARACTERISTICS	
2. NOMINAL CAPACITANCE	1 ← F
3. TOLERANCE	2 472Z3 4
4. RATED VOLTAGE	

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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	В	E	F
tanδ(%)	0.2% max	2.5% max	2.5% max	5.0% max

6-3. Insulation Resistance

Insulation Resistance shall exceed 10,000M Ω 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°C)

table 2)

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



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6-6-2 Humidity Test

Shall be subjected to a temperature of $40\pm3^{\circ}$ C and Relative humidity between $90\sim95\%$ for $500~(0\sim+24)$ hours and the Maintaided at normal temperature and humidity for a period of $4\sim24$ hours the following table 3) shall be satisfied.

table 3)

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

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6-6-4 High Temperature Loading Test

Capacitors shall be subjected to a temperature of 125±3°C 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	В	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				

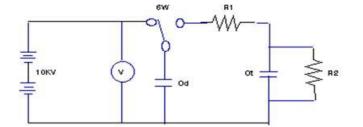
6-6-5 Thermal Shock Test

-45°C(30min)~+125°C(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	В	Е	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

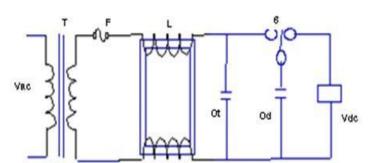
Cd: 0.001μ F R1: 1000Ω R2: $100M\Omega$

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

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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		0~0.005 <i>µ</i> F	0.0051∼0.05µF
CAPACITANCE VALUE OF CD		0.005 <i>µ</i> F	0.05 <i>μ</i> F
DISSIPATION FACTOR OF CD		0.5 % max	0.5 % max
APPEARANCE	The cheesecloth around capacitors shall not		
APPEARANCE	glow of flame		

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

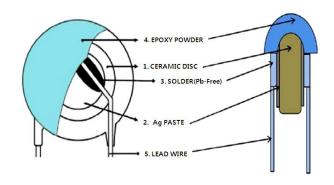
CD : dump capacitor $0.005\mu\text{F}(\text{CT} \ge 0.05\mu\text{F})$ OR $0.05\mu\text{F}(0.005\mu\text{F} < \text{CT} \le 0.05\mu\text{F})$

CT : capacitance under test

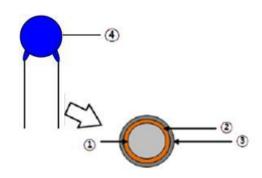
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7. Capacitor structure & Material

7-1 Capacitor structure



7-2. Lead wire



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

7-3 Material Vender Imformation

NO	Material Name	Vender Name	Location	Substance
1	Dieletric Powder	PDC, and etc	Taiwan	BaTiO3, TiO2
2	Ag Paste	Daejoo and etc	Korea	Ag, resin and etc.
3	Solder(Lead Free)	DONG IL	Korea	Sn, Ag, Cu
4	Epoxy Powder	Pelnox	Japan	Silica, Bisphenol A, etc.
4	Epoxy Powder	Kaihua	China	Silica, disprierioi A, etc.
5	Lead Wire	Kistron and etc	Korea	Cu-plated Steel-Wire

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8. Packing Specification

8-1. Bulk Type

Туре	Diameter /mm	Straight Long type		Forming Cutting type		
		Vinyl	In box	Vinyl	In box	
DC	6Ф	1,000	5,000	1,000	6,000	
	7Ф~8Ф	1,000	4,000	1,000	6,000	
	9Ф~10Ф	500	2,000	1,000	4,000	
	14Ф	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>



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8-2. Taping Type

T	PITCH	TAPING		
Туре		IN BOX	OUT BOX	
DC	12.7	2,000	12,000	
DC	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		Explanation
€ RoHS	1	Customer Code
2201-000285A1JX2201051017012000	2	DONG IL Part No
1030179-A03 (2) CK3AYB1U2KFK	3	Q'ty
MCCDS-0002NAD1 CK3AYB102KTK0L1 102FED1D5500		Lead free / RoHS Showing
2651PA0102RDT	5	Labels publisher
DONG IL 3 Q'TY: 12,000 5 K1 6 20220105	6	Production date

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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.



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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.