

Manufacturer : Anshan Keifat Electronic Ceramic Technical Co.,Ltd. No:

## Approval Sheet for Product Specification

**Customer:**

**Product: Lead type UHV Ceramic capacitors**

**PART No.:**

**Mfr. P/N:**

**Date:**        年    月    日

Manufacturer		Customer Confirm	
Prepared by	薛志豪	合 格 OK <input type="checkbox"/>	
		不 合 格 NG <input type="checkbox"/>	
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■ **Features**

- Small size
- Excellent temperature & frequency characteristics
- Low dissipation
- High insulation resistance
- High breakdown strength
- Fully symmetric full copper electrode

■ **Application**

Using for turning capacitor in focus circuit for display, High voltage DC supplies, Color TV doublers and triplers, High voltage or high frequency power supplies, Medicine equipment, Ultrasonic equipment, Welding equipment, etc.

■ **Part Number Designation**

CT8 - 10KV - DN - 221 K b 10

① ② ③ ④ ⑤ ⑥ ⑦

① **Type**

Code	Type Designation
CT8	Class II UHV ceramic capacitor

② **Rated Voltage**

Code	Rated Vol. (DC)
10KV	10000V
30KV	30000V

③ **Temperature Characteristic**

GB	EIA	Temp. range	Cap. Change
SL		+25~+85℃	+350~-1000ppm/℃
B	Y5P	-25~+85℃	±10%
DN	N4700	-25~+85℃	±35%
E	Y5U	-25~+85℃	-56%~+22%
F	Y5V	-25~+85℃	-82%~+22%

④ **Capacitance**

Code	Capacitance
221	220 pF
222	2200 pF

⑤ **Tolerance**

Code	Tolerance
K	±10%
M	±20%

⑥ **Lead Shape**

Code	Shape
b	Straight
Y	Vertical-kink

⑦ **Lead Space**

Code	Lead Space
10	10±1.0mm
12.5	12.5±1.5mm



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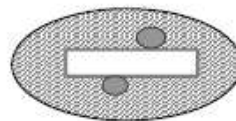
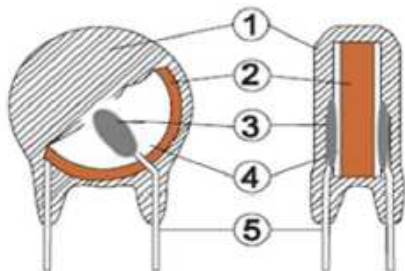
■ **Appearance and Structure**

CODE	CODE NO.	D <sub>max</sub> (mm)	T <sub>max</sub> (mm)	L (mm)	F (mm)	d (mm)	STYLE
	CT8-8~30KV-SL-100~151K b**	See specific specification					
	CT8-8~30KV-B-101~152K b**	See specific specification					
	CT8-8~30KV-DN-101~102K b**	See specific specification					
	CT8-8~30KV-E-471~472M b**	See specific specification					
	CT8-8~30KV-F-102~472M b**	See specific specification					

■ **Marking**

	① Manufacturer Marking
	② Rated Capacitance
	③ Tolerance of Capacitance
	④ Rated Voltage

■ **Structure**



- ① Coating : Epoxy Resin
- ② Dielectric : Ceramic
- ③ Electrode : Copper
- ④ Solder : Alloy Tin
- ⑤ Lead wire : CP Lead



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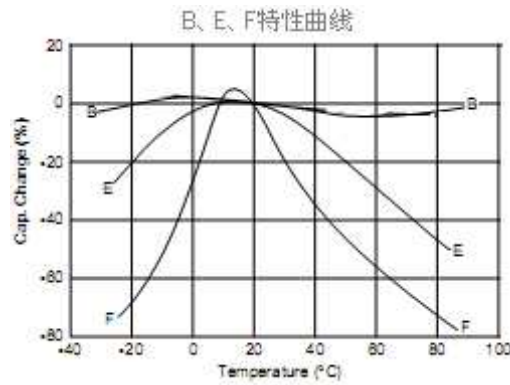
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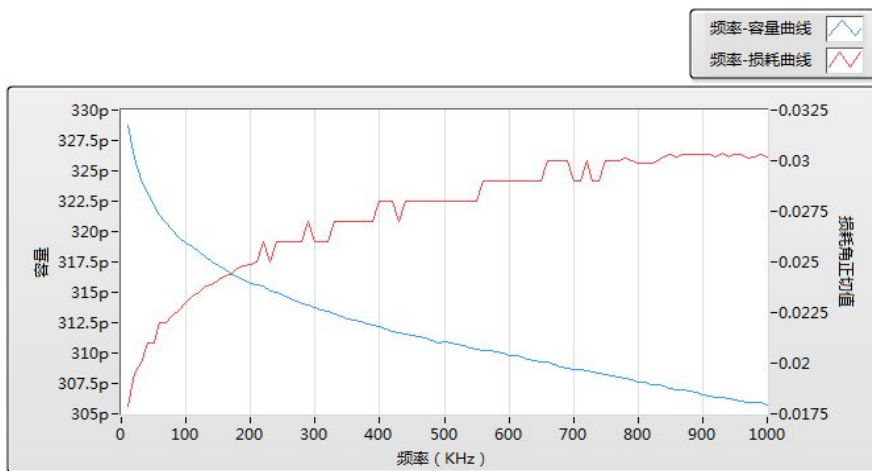
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Temperature Characteristic Curve



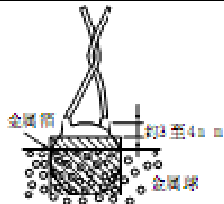
Cap. & D.F.—Fre. Curve



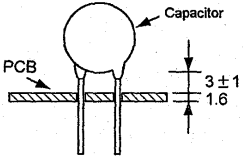
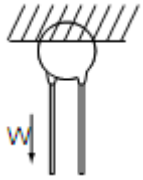
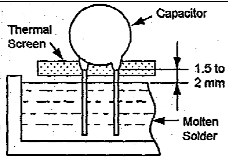


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■ **Specification and Test Method**

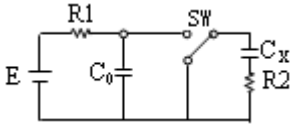
Item		Specifications	Test Method																								
1.	Storage Temp. Range	-40°C~+85°C																									
2.	Operating Temp. Range	-25°C~+85°C																									
3.	Appearance and dimension	Appearance has no marked defect Dimensions should be within specified tolerance	Appearance be watched on sight Dimension be measured by caliper																								
4.	Marking	Should be discerned easily	Be watched on sight																								
5.	Capacitance	Within specified tolerance	Temp. 20°C±2°C, Vol. 1.0±0.2V Freq. 1±0.1KHz,(SL: 1±0.1MHz)																								
6.	Dissipation Factor(D.F.)	<table border="1"> <thead> <tr> <th>Char.</th> <th>Specifications</th> </tr> </thead> <tbody> <tr> <td>SL</td> <td>≤0.15%</td> </tr> <tr> <td>B、E</td> <td>≤2.5%</td> </tr> <tr> <td>F</td> <td>≤3.5%</td> </tr> <tr> <td>DN</td> <td>≤0.5%</td> </tr> </tbody> </table>		Char.	Specifications	SL	≤0.15%	B、E	≤2.5%	F	≤3.5%	DN	≤0.5%														
		Char.		Specifications																							
		SL		≤0.15%																							
		B、E		≤2.5%																							
F	≤3.5%																										
DN	≤0.5%																										
7	Insulation Resistance(I.R.)	10000MΩ min.	The insulation resistance should be measured with 500±50VDC within 60±5sec of charging																								
8	Between Lead Wires	No failure	Apply a voltage of 1.2U <sub>r</sub> DC for 1 to 5 sec. between the lead Wires.(Charge/discharge current≤50mA)																								
	Body Insulation	No failure	<p>First, the terminals of the capacitor should be connected together. Then, as shown in figure at right, a metal foil body of the capacitor to the distance of about 3 to 4mm from each terminal. Then, the capacitor should be inserted into a container filled with metal balls of about 1mm diameter. Finally, apply a voltage of 3KV DC for 1 to 5 sec. Between the capacitor lead wires and metal balls.</p> 																								
9.	Temp. Char.	<table border="1"> <thead> <tr> <th>Char.</th> <th>Capacitance Change</th> </tr> </thead> <tbody> <tr> <td>SL</td> <td>+350~-1000ppm/°C</td> </tr> <tr> <td>B</td> <td>±10%</td> </tr> <tr> <td>DN</td> <td>±35%</td> </tr> <tr> <td>E</td> <td>-56%~+22%</td> </tr> <tr> <td>F</td> <td>-82%~+22%</td> </tr> </tbody> </table>	Char.	Capacitance Change	SL	+350~-1000ppm/°C	B	±10%	DN	±35%	E	-56%~+22%	F	-82%~+22%	<p>The capacitance should be measured at each step as below table.</p> <table border="1"> <thead> <tr> <th>Step</th> <th>1</th> <th>2</th> <th>3</th> <th>4</th> <th>5</th> </tr> </thead> <tbody> <tr> <td>Temp.(°C)</td> <td>20±2</td> <td>-25±2</td> <td>20±2</td> <td>85±2</td> <td>20±2</td> </tr> </tbody> </table>	Step	1	2	3	4	5	Temp.(°C)	20±2	-25±2	20±2	85±2	20±2
		Char.	Capacitance Change																								
		SL	+350~-1000ppm/°C																								
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Step	1	2	3	4	5																						
Temp.(°C)	20±2	-25±2	20±2	85±2	20±2																						



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Item	Specifications		Test Method		
10. Vibration Resistance	Appearance	No marked defect	The capacitor should be firmly soldered to the supporting lead wire and vibrated at a frequency range of 10 to 55Hz. 1.5mm in total amplitude. With about a 1 minute rate of vibration change from 10Hz to 55Hz and back to 10Hz. Apply for a total of 6 hrs. 2hrs .each in 3 mutually perpendicular directions. 		
	Capacitance Change	Within specified tolerance			
	Dissipation Factor(D.F.)/Q	Char.			Specifications
		SL			≤0.15%
B、E		≤2.5%			
F	≤3.5%				
DN	≤0.5%				
11. Strength of Lead wires	Tensile	Lead wire should not be cut off and capacitor should not be broken.	Fix the body of the capacitor and apply a tensile weight gradually to each lead wire in the radial direction of capacitor up to 10N, and keep for 10±1sec. 		
	Bending		Each lead wire should be subjected to 5N weight and then a 90° bend, at the point of egress, in one direction return to original position, and then a 90° bend in the opposite direction at the rate of one bend in 2 to 3s for 2 times.		
12. Solder ability		Lead wire should be soldered With uniformly coated on the axial direction over 90% of the circumferential direction	The lead wires of the capacitor should be dipped into alcohol Solution of 25% wt rosin and then into molten solder of 245°C within 2.0sec. In both case the depth of dipping is up to about 2.0 to 2.5mm from the root of the lead wires.		
13. Soldering Effect	Appearance	No marked defect	The lead wires should be immersed in solder of 260±10°C up to 1.5 to 2.0mm from the roof of terminal for 3+1/-0sec. 		
	Capacitance Change	Within specified tolerance			
	I.R.	10000MΩ min			
	Dielectric Strength	Per Item 8.			
14. Humidity (under Steady State)	Appearance	No marked defect	Set the capacitor for 500+24/-0 hours at 40±2°C in 90-95% RH. Pre-treatment: The capacitor should be placed at 85±2°C for 1 hour, then, placed at room condition for 24±2 hours before initial measurement. Post-treatment: Capacitors should be stored for 24±2 hours at room condition.		
	Capacitance Change	Char.			Capacitance Change
		SL			±5% or ±0.5pF Which is larger
		B、DN			±10%
		E、F			±20%
	Dissipation Factor(D.F.)/Q	Char.			Specifications
		SL			≤0.3%
B、E		≤5.0%			
F		≤7.0%			
DN	≤1.0%				
I.R.	5000MΩ min				
Dielectric Strength	Per Item 8.				





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Item		Specifications		Test Method
16. Life test	Appearance	无显著异常		Apply a DC voltage of $U_R$ for 1000h at $125^\circ\text{C}$ (Charge/discharge current $\leq 50\text{mA}$ ) Pre-treatment: The capacitor should be placed at $85 \pm 2^\circ\text{C}$ for 1 hour, then, placed at room condition for $24 \pm 2$ hours before initial measurement. Post-treatment: Capacitors should be stored for $24 \pm 2$ hours at room condition.
	Capacitance Change	Char.	Capacitance Change	
		SL	$\pm 5\%$ or $\pm 0.5\text{pF}$ Which is larger	
		B、DN	$\pm 10\%$	
		E、F	$\pm 20\%$	
	Dissipation Factor(D.F.)/Q	Char.	Specifications	
		SL	$\leq 0.3\%$	
B、E		$\leq 5.0\%$		
F		$\leq 7.0\%$		
	DN	$\leq 1.0\%$		
I.R.	2000M $\Omega$ min			
Dielectric Strength	Per Item 8.			
17. Discharge Test	Appearance	No marked defect		Apply the rated voltage for 2000 cycles In the Epoxy (Charge/discharge current $\leq 50\text{mA}$ ). 
	Capacitance Change	Char.	Capacitance Change	
		SL	$\pm 5\%$ or $\pm 0.5\text{pF}$ Which is larger	
		B、DN	$\pm 10\%$	
		E、F	$\pm 20\%$	
	D.F.	Char.	Specifications	
		SL	$\leq 0.3\%$	
B、E		$\leq 5.0\%$		
F		$\leq 7.0\%$		
	DN	$\leq 1.0\%$		
I.R.	5000M $\Omega$ min.			
Dielectric strength	Per Item 8			



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Item		Specifications		Test Method																		
16. Temperature Cycle	Appearance	无显著异常		<p>The capacitor should be subjected to 5 temperature cycles.</p> <p>&lt; Temperature Cycle &gt;</p> <table border="1"> <thead> <tr> <th>Step</th> <th>Temperature(°C)</th> <th>Time(min)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>-25+0/-3</td> <td>30</td> </tr> <tr> <td>2</td> <td>Room temp.</td> <td>3</td> </tr> <tr> <td>3</td> <td>85+3/-0</td> <td>30</td> </tr> <tr> <td>4</td> <td>Room temp.</td> <td>3</td> </tr> <tr> <td colspan="3">Cycle time:5 cycle</td> </tr> </tbody> </table>	Step	Temperature(°C)	Time(min)	1	-25+0/-3	30	2	Room temp.	3	3	85+3/-0	30	4	Room temp.	3	Cycle time:5 cycle		
	Step	Temperature(°C)	Time(min)																			
	1	-25+0/-3	30																			
	2	Room temp.	3																			
	3	85+3/-0	30																			
	4	Room temp.	3																			
	Cycle time:5 cycle																					
Capacitance Change	Char.	Capacitance Change																				
	SL	±5% or ±0.5pF Which is larger																				
	B、DN	±10%																				
	E、F	±20%																				
Dissipation Factor(D.F.)/Q	Char.	Specifications																				
	SL	≤0.3%																				
	B、E	≤5.0%																				
	F	≤7.0%																				
	DN	≤1.0%																				
I.R.	2000MΩ min																					
Dielectric Strength	Per Item 8.																					



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■ **Package**  
**Bulk**  
**packing bag**



**Inner package**



Dimension: mm			MOQ (Kpcs)	Inner package quantity (Kpcs)
L ± 10	W ± 5	H ± 5		
330	240	120	1 (短脚)	—
			0.5 (长脚)	—



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**Product Label**



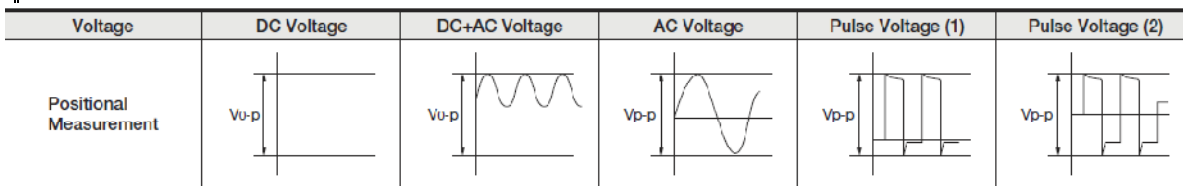
No.	Description	No.	Description
1	Code Number	5	Remark
2	ITEM	6	Check
3	SPEC	7	Produce Date
4	Quantity	8	Batch

■ **Caution (Rating)**

1. Operating Voltage

When DC-rated capacitors are to be used in AC or ripple current circuits, be sure to maintain the V<sub>p-p</sub> value of the applied voltage or the V<sub>o-p</sub> that contains DC bias within the rated voltage range.

When the voltage is applied to the circuit, starting or stopping may generate irregular voltage for a transit period because of resonance or switching. Be sure to use a capacitor with a rated voltage range that includes these irregular voltages.



2. Operating Temperature and Self-generated Heat

Keep the surface temperature of a capacitor below the upper limit of its rated operating temperature range. Be sure to take into account the heat generated by the capacitor itself. When the capacitor is used in a high-frequency current, pulse current or similar current, it may have self-generated heat due to dielectric loss. Applied voltage load should be such that self-generated heat is within 20°C under the condition where the capacitor is subjected to an atmospheric temperature of 25°C. When measuring, use a thermocouple of small thermal capacity-K of Φ0.1mm under conditions where the capacitor is not affected by radiant heat from other components or wind from surroundings. Excessive heat may lead to deterioration of the capacitor's characteristics and reliability. (Never attempt to perform measurement with the cooling fan running. Otherwise, accurate measurement cannot be ensured.)

3. Test Condition for Withstanding Voltage



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(1) Test Equipment

Test equipment for AC withstanding voltage should be used with the performance of the wave similar to 50/60Hz sine wave.

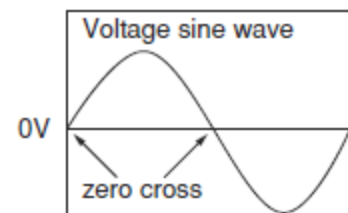
If the distorted sine wave or overload exceeding the specified voltage value is applied, a defect may be caused.

(2) Voltage Applied Method

When the withstanding voltage is applied, the capacitor's lead or terminal should be firmly connected to the output of the withstanding voltage test equipment, and then the voltage should be raised from near zero to the test voltage.

If the test voltage without the raise from near zero voltage would be applied directly to capacitor, test voltage should be applied with the zero cross.\* At the end of the test time, the test voltage should be reduced to near zero, and then capacitor's lead or terminal should be taken off the output of the withstanding voltage test equipment. If the test voltage without the raise from near zero voltage would be applied directly to capacitor, the surge voltage may rise, and therefore, a defect may be caused.

\*ZERO CROSS is the point where voltage sine wave passes 0V. See the figure at below.



4. Fail-Safe

When the capacitor is broken, failure may result in a short circuit. Be sure to provide an appropriate fail-safe function like a fuse on your product if failure could result in an electric shock, fire or fuming.

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

**Caution (Storage and Operating Condition)**

The capacitor should prevent falling when transporting and using, it will cause micro crack because of collision, and will affect the electrical performance of the products.

The insulating Epoxy molded 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. And avoid exposure to moisture. Before cleaning, bonding or molding this product, verify that these processes do not affect produce 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 -40 to 85 degrees centigrade and 15 to 85%. Use capacitors within 6 months after delivery.



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

**Caution (Soldering, Mounting and Handing)**

1. Vibration and Impact

Do not expose a capacitor or its pins 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.

3. Bonding, Resin Molding and Coating

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

In case 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.

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

**Notice (Soldering and Mounting)**

Cleaning (ultrasonic cleaning)

To perform ultrasonic cleaning, observe the following conditions.

Rinse bath capacity: Output of 20 watts per liter or less. Rinsing time: 5 min. max.

Do not vibrate the PCB/PWB directly. Excessive ultrasonic cleaning may lead to fatigue destruction of the pins.



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<b>Notice (Rating)</b>  1. Capacitance Change of Capacitors (1) For B/E /F char.  Capacitors have an aging characteristic, whereby the capacitor continually decreases its capacitance slightly if the capacitor is left on for a long time. Moreover, capacitance might change greatly depending on the surrounding temperature or an applied voltage. Therefore, it is not likely to be suitable for use in a constant time circuit.  2. Performance Check by Equipment  Before using a capacitor, check that there is no problem in the equipment's performance and the specifications.  Generally speaking, CLASS 2 (B/E char.) ceramic capacitors have voltage dependence characteristics and temperature dependence characteristics in capacitance, so the capacitance value may change depending on the operating condition in the equipment. Therefore, be sure to confirm the apparatus performance of receiving influence in the capacitance value change of a capacitor, such as leakage current and noise suppression characteristic.  Moreover, check the surge-proof ability of a capacitor in the equipment, if needed, because the surge voltage may exceed specific value by the inductance of the circuit.		