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

Approval Sheet for Product Specification

Customer:

Product: Lead type Low frequency Ceramic capacitors of Medium and high voltage

PART No.:

Mfr. P/N:

Date： 年 月 日

Manufacturer		**Customer Confirm**	
Prepared by	薛志豪	合 格 **OK** □ 不合格 **NG** □	
Checked by	于金龙	**Checked by**	
Approved by	范垂旭	**Approved by**	

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Revision History

Edition	Date	Contents of formulation / modification / repeal	Formulation	Approval
A		New edition released	薛志豪	于金龙

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■ **Features**

- High breakdown strength
- Operating temperature range -25~+125℃
- Coated with flame–retardant epoxy resin (conforming to UL94V–0 standard).
- DC1KV~6KV Rated Voltage item are available.
- Bulk or taping product can be available.

■ **Application**

Using for H–out and supply circuits of color TV and monitor、copy machine、inverter lighting.

■ **Part Number Designation**

CT81 – 1KV – B – 221 K k 5 T

① ② ③ ④ ⑤ ⑥ ⑦ ⑧

①Type

Code	Type Designation
CT81	Class Ⅱ High–Voltage

②Rated Voltage

Code	Rated Vol. （DC）
1KV	1000V
3KV	3000V

③Temperature Characteristic

GB	EIA	Temp. range	Cap. Change
B	Y5P	–25～+85℃	±10%
E	Y5U	–25～+85℃	–56%～+22%
F	Y5V	–25～+85℃	–82%～+22%

④Capacitance

Code	Capacitance
221	220 pF
222	2200 pF

⑤Tolerance

Code	Tolerance
K	±10%
M	±20%
Z	–20%～+80%

⑥Lead Shape

Code	Shape
a	In–kink
k	Out–kink

⑦Lead Space

Code	Lead Space
5	5.0±0.5mm
7.5	7.5±0.5mm

⑧Package

Code	Shape
T	Taping

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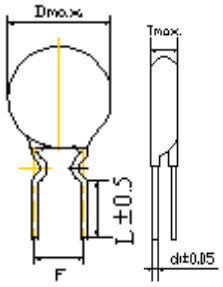
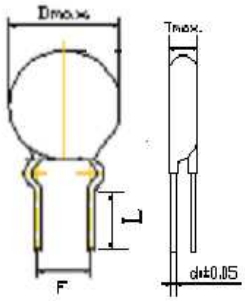
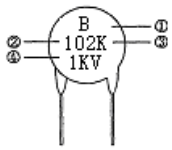
■ Appearance and Structure

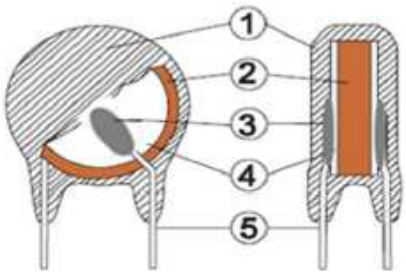
CODE	CODE NO.	D_{max} (mm)	T_{max} (mm)	L (mm)	F (mm)	d (mm)	STYLE
	CT81-1KV-B-470~103K k**	See specific specification				0.5	a 式  k 式 
	CT81-1KV-E-471~103M k**	See specific specification				0.5	
	CT81-1KV-F-102~223M k**	See specific specification				0.5	
	CT81-2KV-B-470~332K k**	See specific specification				0.6	
	CT81-2KV-E-471~103M k**	See specific specification				0.6	
	CT81-2KV-F-102~103M k**	See specific specification				0.6	
	CT81-3KV-B-470~222K k**	See specific specification				0.6	
	CT81-3KV-E-471~682M k**	See specific specification				0.6	
	CT81-3KV-F-102~103M k**	See specific specification				0.6	
	CT81-6KV-B-470~152K k**	See specific specification				0.6	
	CT81-6KV-E-471~472M k**	See specific specification				0.6	
	CT81-6KV-F-102~103M k**	See specific specification				0.6	

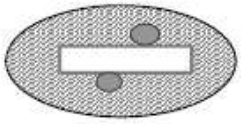
■ Marking



① Temperature Characteristic
② Rated Capacitance
③ Tolerance of Capacitance
④ Rated Voltage

■ Structure





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

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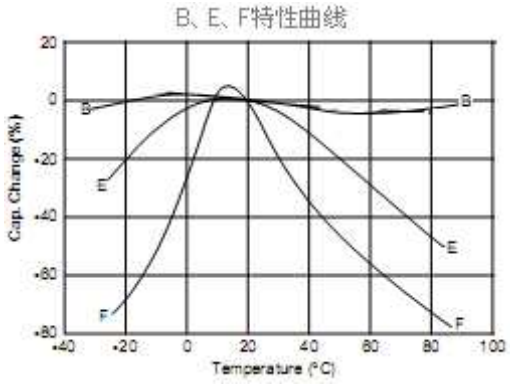
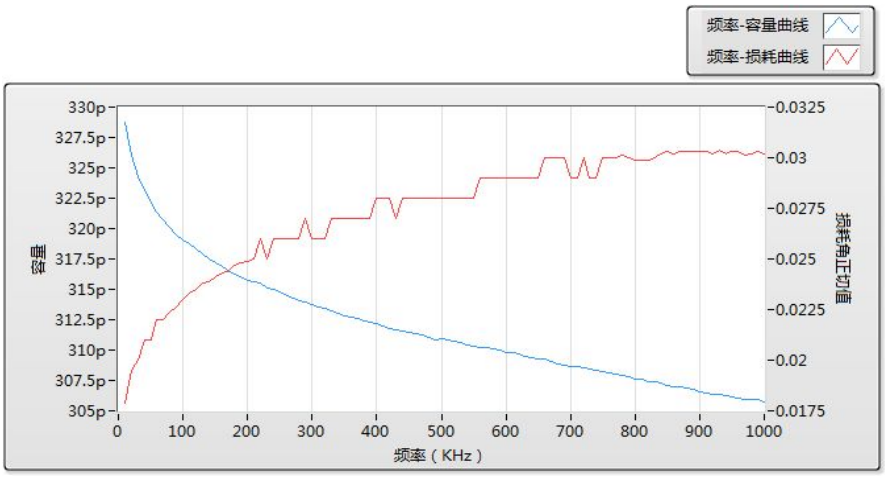
■ Temperature Characteristic Curve



■ Cap. & D.F.—Fre. Curve



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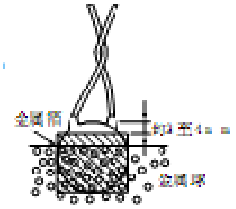
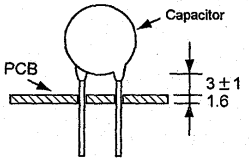
■ **Specification and Test Method**

<table>
<tr><th colspan="2">Item</th><th>Specifications</th><th>Test Method</th></tr>
<tr><td colspan="2">1. Storage Temp. Range</td><td>-40℃～+85℃</td><td></td></tr>
<tr><td colspan="2">2. Operating Temp. Range</td><td>-25℃～+125℃</td><td></td></tr>
<tr><td colspan="2">3. Appearance and dimension</td><td>Appearance has no marked defect
Dimensions should be within specified tolerance</td><td>Appearance be watched on sight
Dimension be measured by caliper</td></tr>
<tr><td colspan="2">4. Marking</td><td>Should be discerned easily</td><td>Be watched on sight</td></tr>
<tr><td colspan="2">5. Capacitance</td><td>Within specified tolerance</td><td rowspan="2">Temp. 20℃±2℃,
Vol. 1.0±0.2V
Freq. 1±0.2KHz,</td></tr>
<tr><td colspan="2">6. Dissipation Factor(D.F.)</td><td><table><tr><th>Char.</th><th>Specifications</th></tr><tr><td>B</td><td>≤2.5%</td></tr><tr><td>E、F</td><td>≤3.5%</td></tr></table></td></tr>
<tr><td colspan="2">7 Insulation Resistance(I.R.)</td><td>10000MΩ min.</td><td>The insulation resistance should be measured with 500±50VDC within 60±5sec of charging</td></tr>
<tr><td rowspan="2">8 Dielectric Strength</td><td>Between Lead Wires</td><td>No failure</td><td>Apply a voltage of 1.5U_R+500V DC for 1 to 5 sec. between the lead Wires.(Charge/discharge current≤50mA)</td></tr>
<tr><td>Body Insulation</td><td>No failure</td><td>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 1.3KV DC for 1 to 5 sec. Between the capacitor lead wires and metal balls.
  </td></tr>
<tr><td colspan="2">9. Temp. Char.</td><td><table><tr><th>Char.</th><th>Capacitance Change</th></tr><tr><td>B</td><td>±10%</td></tr><tr><td>E</td><td>-56%～+22%</td></tr><tr><td>F</td><td>-82%～+22%</td></tr></table></td><td>The capacitance should be measured at each step as below table.<table><tr><th>Step</th><th>1</th><th>2</th><th>3</th><th>4</th><th>5</th></tr><tr><td>Temp.(℃)</td><td>20±2</td><td>-25±2</td><td>20±2</td><td>85±2</td><td>20±2</td></tr></table></td></tr>
<tr><td rowspan="3">10 Vibration Resistance</td><td>Appearance</td><td>No marked defect</td><td rowspan="3">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.
  </td></tr>
<tr><td>Capacitance Change</td><td>Within specified tolerance</td></tr>
<tr><td>Dissipation Factor(D.F.)/ Q</td><td><table><tr><th>Char.</th><th>Specifications</th></tr><tr><td>B</td><td>≤2.5%</td></tr><tr><td>E、F</td><td>≤3.5%</td></tr></table></td></tr>
</table>

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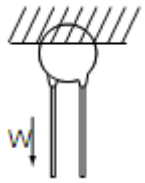
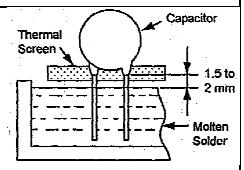
<table>
<tr><th colspan="2">Item</th><th>Specifications</th><th>Test Method</th></tr>
<tr><td rowspan="2">11. Strength of Lead wires</td><td>Tensile</td><td rowspan="2">Lead wire should not be cut off and capacitor should not be broken.</td><td>Fix the body of the capacitor and apply a tensile weight gradually to each lead wire in the radial direction of capacitor up to 10N,and keep for 10±1sec.
 
</td></tr>
<tr><td>Bending</td><td>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.</td></tr>
<tr><td colspan="2">12. Solder ability</td><td>Lead wire should be soldered With uniformly coated on the axial direction over 90% of the circumferential direction</td><td>The lead wires of the capacitor should be dipped into alcohol Solution of 25% wt rosin and then into molten solder of 245℃ 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.</td></tr>
<tr><td rowspan="4">13. Soldering Effect</td><td>Appearance</td><td>No marked defect</td><td rowspan="4">The lead wires should be immersed in solder of 260±10℃ up to 1.5 to 2.0mm from the roof of terminal for 3+1/−0sec.
 
</td></tr>
<tr><td>Capacitance Change</td><td>Within specified tolerance</td></tr>
<tr><td>I.R.</td><td>1000MΩ min</td></tr>
<tr><td>Dielectric Strength</td><td>Per Item 8.</td></tr>
<tr><td rowspan="4">14. Humidity (under Steady State)</td><td>Appearance</td><td>No marked defect</td><td rowspan="4">Set the capacitor for 500+24/−0 hours at 40±2℃ in 90−95% RH.
Pre−treatment: The capacitor should be placed at 85±2℃ 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.</td></tr>
<tr><td>Capacitance Change</td><td><table><tr><th>Char.</th><th>Capacitance Change</th></tr><tr><td>B</td><td>±10%</td></tr><tr><td>E、F</td><td>±20%</td></tr></table></td></tr>
<tr><td>Dissipation Factor(D.F.)/Q</td><td><table><tr><th>Char.</th><th>Specifications</th></tr><tr><td>B</td><td>≤5.0%</td></tr><tr><td>E、F</td><td>≤7.0%</td></tr></table></td></tr>
<tr><td>I.R.</td><td>4000MΩ min</td></tr>
<tr><td>Dielectric Strength</td><td>Per Item 8.</td></tr>
<tr><td rowspan="4">16. 寿命试验</td><td>Appearance</td><td>无显著异常</td><td rowspan="4">Apply a DC voltage of 1.5U_R for 1000h at 125℃ (Charge/discharge current≤50mA)
Pre−treatment: The capacitor should be placed at 85±2℃ 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.</td></tr>
<tr><td>Capacitance Change</td><td><table><tr><th>Char.</th><th>Capacitance Change</th></tr><tr><td>B</td><td>±10%</td></tr><tr><td>E、F</td><td>±20%</td></tr></table></td></tr>
<tr><td>Dissipation Factor(D.F.)/Q</td><td><table><tr><th>Char.</th><th>Specifications</th></tr><tr><td>B</td><td>≤5.0%</td></tr><tr><td>E、F</td><td>≤7.0%</td></tr></table></td></tr>
<tr><td>I.R.</td><td>2000MΩ min</td></tr>
<tr><td>Dielectric Strength</td><td>Per Item 8.</td></tr>
</table>

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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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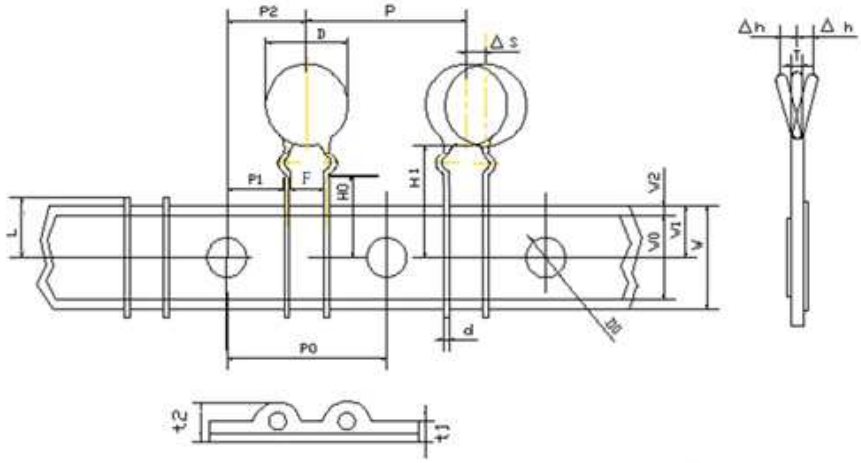
Taping



符号	尺寸(mm)	符号	尺寸(mm)
P0	12.7±0.2	W2	3.0max.
P	12.7±1.0	t1	0.6±0.3
F	5.0±0.5	t2	1.5max.
P1	3.85±0.5	D	13.5max.
P2	6.35±1.0	D0	4±0.1
H0	16.5±0.5	d	0.6±0.05
H	18.0±1.0	L	11max.
W	18.0±0.5	T	4.5max.
W0	10.0±1.0	△S	0±0.8
W1	$9.0^{+0}_{-0.5}$	△h	±1.0max.

Product Label

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

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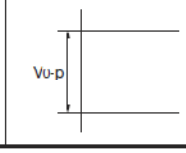
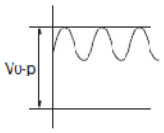
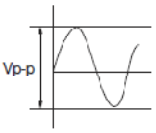
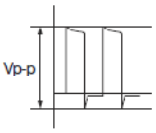
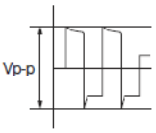
■ **Caution (Rating)**

1. Operating Voltage

When DC-rated capacitors are to be used in AC or ripple current circuits, be sure to maintain the V p-p value of the applied voltage or the Vo-p 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.

Voltage	DC Voltage	DC+AC Voltage	AC Voltage	Pulse Voltage (1)	Pulse Voltage (2)
Positional Measurement					

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℃ under the condition where the capacitor is subjected to an atmospheric temperature of 25℃. 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

(1) Test Equipment

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

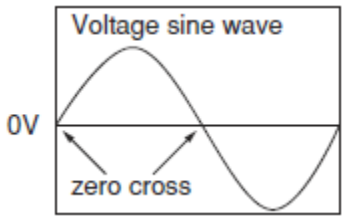
If the distorted sine wave or overload exceeding the specified voltage value is applied, a defect may be caused.

(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 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.

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.

Notice (Rating)

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.

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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.