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

Approval Sheet for Product Specification

Customer:

Product: Lead type 250VAC-Y2 cap

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

- Small size
- High performance
- High insulation resistance
- High breakdown strength
- Operating temperature range -40~+125℃
- Fully symmetric full copper electrode
- Class X1/Y1 capacitors certified by UL/CQC/VDE/ENEC/KC.
- Coated with flame–retardant epoxy resin (conforming to UL94V–0 standard).
- AC250V Rated Voltage item are available.

■ Application

1. Use as X/Y capacitors for AC line filter and primary-secondary coupling on switching power supplies and AC adapters.
2. Ideal applications are D-A insulation and noise reduction for transformerless DAA modems
3. Suitable for all kinds of filter, bypass and coupling circuit

■ Part Number Designation

CT7 -250VAC - Y2 - B - 101 K b 10

① ② ③ ④ ⑤ ⑥ ⑦ ⑧

①Type

Code	Type Designation
CT7	Safety Standard Certified

②Rated Voltage

Code	Rated Vol. （AC）
250VAC	250V

③Class Code

Code	Class Code
Y2	Y2

④Temperature Characteristic

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

⑤Capacitance

Code	Capacitance
22	22 pF
101	100 pF
102	1000 pF

⑥Tolerance

Code	Tolerance
J	±5%
K	±10%
M	±20%

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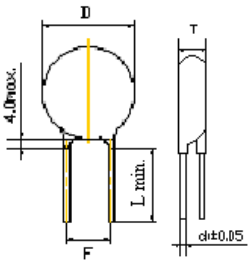
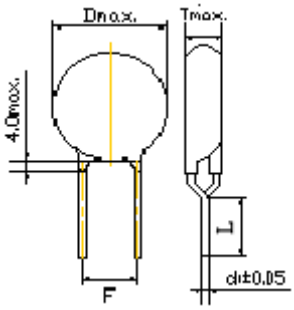
⑦Lead Shape

Code	Shape
b	Straight
Y	Vertical Kink

⑧ Lead Space

Code	Lead Space
7.5	7.5±0.5mm
10	10.0±1.0mm

■ Appearance and Structure

CODE	CODE NO.	D_{max} (mm)	T_{max} (mm)	L (mm)	F (mm)	d (mm)	STYLE
	CT7-250VAC-Y2-SL-020~101K b**	See specific specification				0.6	b 式  Y 式 
	CT7-250VAC-Y2-B-101~681K b10	See specific specification				0.6	
	CT7-250VAC-Y2-E-102~472M b10	See specific specification				0.6	
	CT7-250VAC-Y2-F-102~103M b10	See specific specification				0.6	

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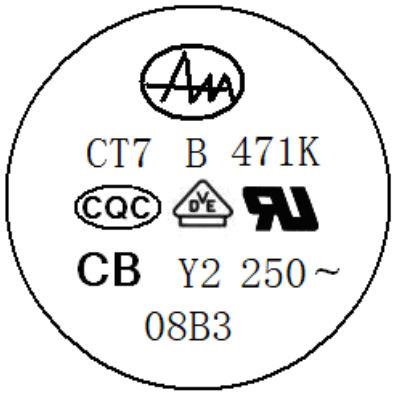
■ 标志

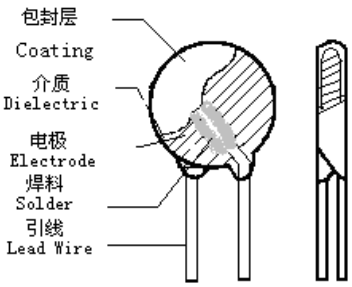


	Manufacturer's Marking
CT7	Type Designation
B	Temperature Characteristic
471	Nominal Capacitance
K	Capacitance Tolerance
	CQC Approval Mark
	VDE Approval Mark
	UL Approval Mark
CB	CB Mark
Y2	Class code
250~	Rated Voltage Mark
08B3	Manufactured Date Code（0：Year，8：Month，B：date，3：Sequence code）

■ **Safety Certification**

No	Certificate authority	Certificate No	Rated voltage
1	CQC	16001152214	250VAC-Y2
2	ENEC	40036847	400VAC-Y1/X1,250VAC-Y1/Y2/X1
3	VDE	40036847	400VAC-Y1/X1,250VAC-Y1/Y2/X1
4	UL	E232980	400VAC-Y1/X1,250VAC-Y1/Y2/X1
5	KC	HU03028-17003A	250VAC-Y2

■ **Structure**



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

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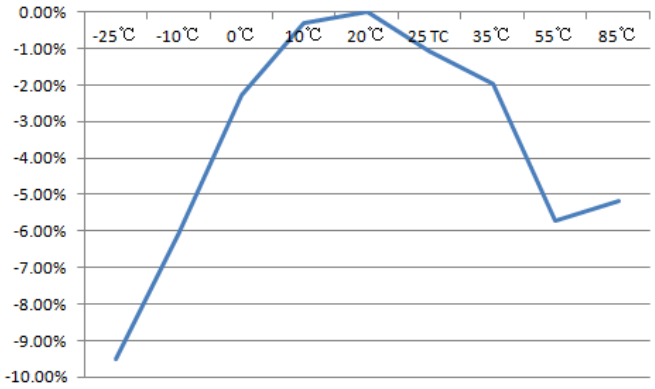
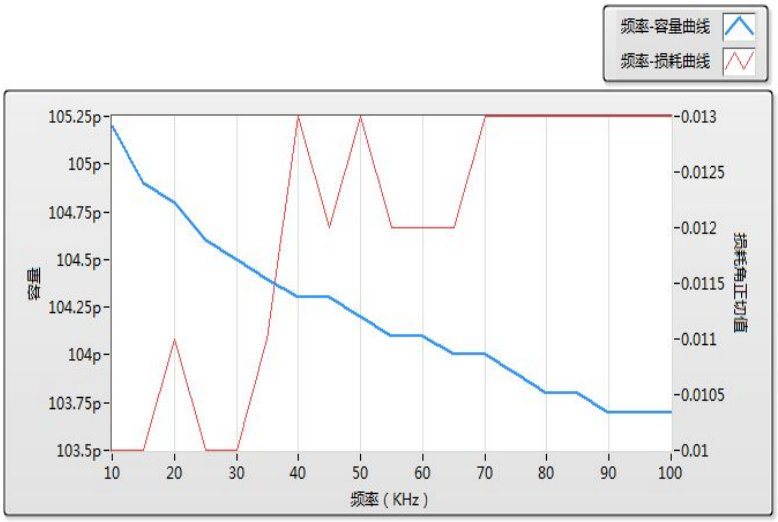
■ Temperature Characteristic Curve



■ Cap. & D.F.—Fre. Curve



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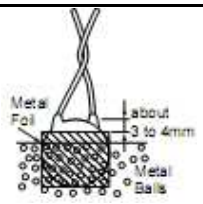
■ **Specification and Test Method**

Item	Specifications	Test Method
1 Operating Temp. Range	-40℃～+125℃	
2 Appearance	No defects or abnormalities	Visual inspection
3 Dimensions	Within the specified dimensions	Dimension be measured by caliper
4 Marking	To be easily legible	The capacitor should be visually inspected.
5 Capacitance	In specified tolerance	Temp. 20℃±2℃, Vol. AC 5Vrms Max. Freq. SL: 1±0.1MHz , B、E、F:1±0.1KHz, The capacitance, dissipation factor should be measured at 20℃ with 1±0.1KHz (char. SL: 1±0.1MHz) and AC 5Vrms Max.
6 Dissipation Factor(D.F.)/Q	Char. / Specifications SL / ≤0.15% **B、E / ≤2.5%** F / ≤3.5%	
7 Insulation Resistance (I.R.)	10000MΩ min	The insulation resistance should be measured with DC 500±50V within 60±5 sec. of charging. The voltage should be applied to the capacitor through a resistor of 1MΩ.
8 Dielectric Strength — Between Lead Wires	No	Apply a voltage of Table 1 for 1min. between the lead Wires.(Charge/discharge current≤50mA) <Table 1>: Type / Test Voltage X1Y1 / AC4000V(rms) X1Y2 / AC2500V(rms)
8 Dielectric Strength — Body Insulation	No	First, the terminals of the capacitor should be connected together. Then, as shown in figure at right, a metal foil should be closely wrapped around the body of the capacitor to the distance of about 3 to 4mm form each terminal. Then, the capacitor should be inserted into a container filled with metal balls of about 1mm diameter. Finally, apply a voltage of Table 2 for 60 sec. Between the capacitor lead wires and metal balls.  <Table 2>: Type / Test Voltage X1Y1 / AC4000V(r.m.s.) X1Y2 / AC2500V(r.m.s.)
9 Temperature Characteristic	Char. / Capacitance Change SL / +350～-1000ppm/℃ (+20℃~+85℃) **B / ±10%** E / -56%～+22% F / -82%～+22%	The capacitance should be measured at each step as below table.

Step	1	2	3	4	5
Temp.(℃)	20±2	-25±2	20±2	85±2	20±2

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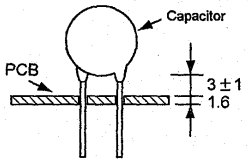
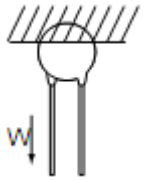
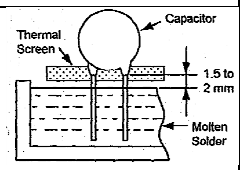
Item		Specifications	Test Method
10 Vibration Resistance	Appearance	No marked defect	The capacitor should be firmly soldered to the supporting lead wire and vibrated at a frequency range of 10 to 55Hz. 1.5mm in total amplitude. With about a 1 minute rate of vibration change from 10Hz to 55Hz and back to 10Hz.Apply for a total of 6 hrs. 2hrs .each in 3 mutually perpendicular directions. 
	Capacitance	In specified tolerance	
	Dissipation Factor(D.F.)/Q	Char. / Specifications: SL ≤0.15%; **B、E ≤2.5%**; F ≤3.5%	
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. Solderability of leads		Lead wire should be soldered With uniform coating on the axial direction over 95% 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℃ 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℃ up to 1.5 to 2.0mm from the roof of terminal for 3+1/−0sec. 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: Capacitor should be stored for 24±2 hours at room condition. 
	Capacitance Change	In specified tolerance	
	I.R.	1000MΩ min	
	Dielectric Strength	Per Item 8.	

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Item		Specifications	Test Method
14. Humidity (under Steady State)	Appearance	No marked defect	Set the capacitor for 500+24/−0 hrs. at 40±2℃ in 90 to 95% relative humidity . 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: Capacitor should be stored for 24±2 hours at room condition.
	Capacitance Change	Char. / Capacitance Change SL: ±5% or ±0.5pF (whichever is larger) **B: ±10%** E、F: ±20%	
	Dissipation Factor(D.F.)/Q	Char. / Specifications SL: ≤0.3% **B、E: ≤5.0%** F: ≤7.0%	
	I.R.	3000MΩ min	
	Dielectric Strength	Per Item 8.	
15. Humidity Cycling	Appearance	No marked defect	Apply the rated voltage for 500(+24/−0) hrs. at 40±2℃ in 90 to 95% relative humidity . (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: Capacitor should be stored for 24±2 hours at room condition.
	Capacitance Change	Char. / Capacitance Change SL: ±5% or ±0.5pF (whichever is larger) **B: ±10%** E、F: ±20%	
	Dissipation Factor(D.F.)/Q	Char. / Specifications SL: ≤0.3% **B、E: ≤5.0%** F: ≤7.0%	
	I.R.	3000MΩ min	
	Dielectric Strength	Per Item 8.	
16. Life Test	Appearance	No marked defect	Apply a voltage of $1.7U_R$ for 1000hrs. at 125℃ (Charge/discharge current≤50mA) and relative humidity of 50% max. 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.
	Capacitance Change	Char. / Capacitance Change SL: ±5% or ±0.5pF (whichever is larger) **B: ±10%** E、F: ±20%	
	Dissipation Factor(D.F.)/Q	Char. / Specifications SL: ≤0.3% **B、E: ≤5.0%** F: ≤7.0%	
	I.R.	3000MΩ min	
	Dielectric Strength	Per Item 8.	

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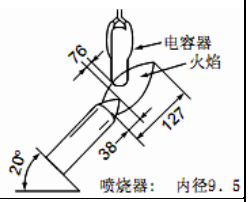
<table>
<tr><th colspan="2">Item</th><th>Specifications</th><th>Test Method</th></tr>
<tr><td colspan="2">17. Flame test</td><td>The capacitor flame discontinued as follows.
<table><tr><th>Cycle</th><th>Time(sec.)</th></tr><tr><td>1、2</td><td>30max.</td></tr><tr><td>3</td><td>60max.</td></tr></table></td><td>The capacitor should be subjected to applied flame for 15 sec. And then removed for 15 sec. Until 3 cycles are completed.
 
</td></tr>
<tr><td rowspan="5">18 Temperature and immersion Cycle</td><td>Appearance</td><td>No marked defect</td><td rowspan="5">The capacitor should be subjected to 5 temperature cycles, then consecutively to 2 immersion cycles.
＜Temperature Cycle〉
<table><tr><th>Step</th><th>Temperature(℃)</th><th>Time(min)</th></tr><tr><td>1</td><td>-40+0/-3</td><td>30</td></tr><tr><td>2</td><td>Room temp.</td><td>3</td></tr><tr><td>3</td><td>125+3/-0</td><td>30</td></tr><tr><td>4</td><td>Room temp.</td><td>3</td></tr></table>Cycle time:5 cycles
〈Immersion Cycle〉
<table><tr><th>Step</th><th>Temp.(℃)</th><th>Time(min)</th><th>Immersion Water</th></tr><tr><td>1</td><td>65+5/-0</td><td>15</td><td>Clean water</td></tr><tr><td>2</td><td>0±3</td><td>15</td><td>Salt water</td></tr></table>Cycle time:2 cycles
Pre-treatment:
Capacitor should be stored at 85±2° C for 1 hr., then, placed at room condition for 24±2 hrs.
Post-treatment:
Capacitor should be stored for 24±2 hrs. , at room condition.</td></tr>
<tr><td>Capacitance Change</td><td><table><tr><th>Char.</th><th>Capacitance Change</th></tr><tr><td>SL</td><td>±5% or ±1.0pF (whichever is larger)</td></tr><tr><td>B、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>SL</td><td>≤0.3%</td></tr><tr><td>B、E</td><td>≤5.0%</td></tr><tr><td>F</td><td>≤7.0%</td></tr></table></td></tr>
<tr><td>I.R.</td><td>3000MΩ 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			MPQ（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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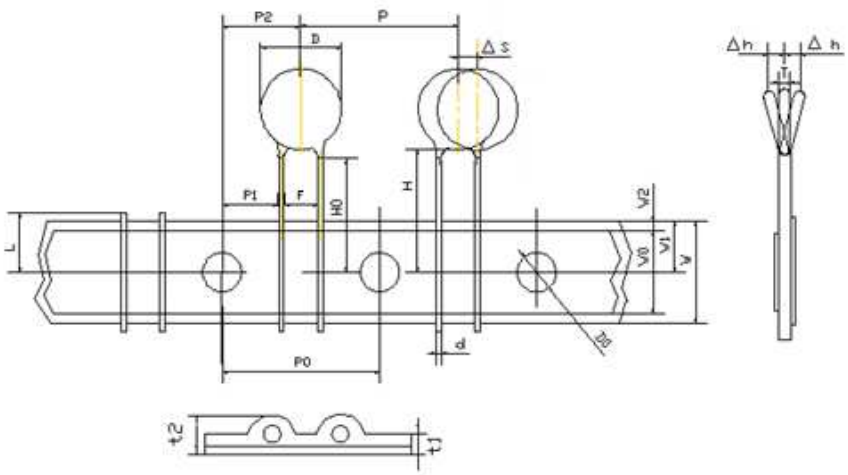
Taping



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	7.5±0.5	t2	1.5max.
P1	2.5±0.5	D	9.0max.
P2	6.35±1.0	D0	4±0.2
H0	19.0±1.0	d	0.5±0.05
H	20.0±1.0	L	11max.
W	18.0±0.5	T	6.0max.
W0	10.0±1.0	△S	0±0.8
W1	$9.0^{+0}_{-0.5}$	△h	±0.8max.

Product Label

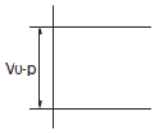
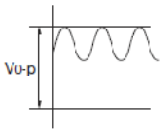
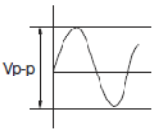
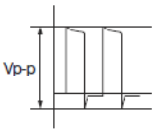
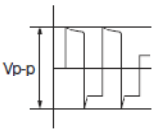
No.	Description	No.	Description
1	Code Number	5	Remark
2	ITEM	6	Check
3	SPEC	7	Produce Date
4	Quantity	8	Batch

■ **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 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 (Apply to B/E Char.)

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.

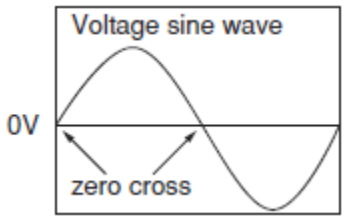
If the distorted sine wave or overload exceeding the specified voltage value is applied, a defect may be caused.

(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.

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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 CH/SL/DL char.

Capacitance might change a little depending on a surrounding temperature or an applied voltage.

Please contact us if you use a strict constant time circuit.

(2) 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.

Please contact us if you need detailed information.

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.