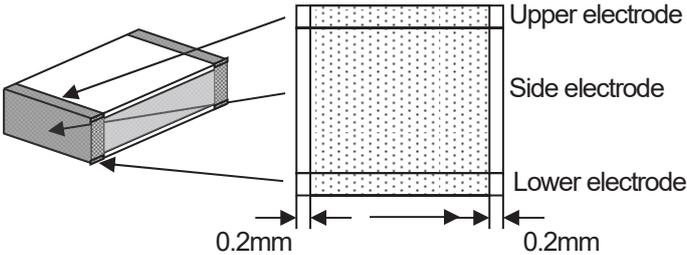


Standard Doc.	PLASTIC FILM CHIP CAPACITOR TYPE ECHU1(C)		Clsr.	28-75
Product Specifications			No.	1-22
			Revision Code	R1
				1 / 16 P.
1. SCOPE	This specification covers the requirement for metallized polyphenylene sulfide dielectric fixed chip capacitor for use in inverter circuit for LCD back light and use in electronic equipments.			
2. PRODUCT NAME	Plastic film chip capacitor Type <b>ECHU1(C)</b>			
3. PRODUCT RANGE	Operating temperature range	-55°C to +105°C [Including temperature-rise on element surface(10°C)]		
	Rated voltage	100VDC (1)		
	Capacitance range	0.01μF to 0.22μF		
	Capacitance tolerance	±2 % (G), ±5 % (J)		
4. CONDITIONAL STANDARD TEST	The test shall be conducted at a temperature from 15°C to 35°C, humidity from 45%RH to 75%RH. However the test shall be conducted at a temperature of 20°C ±2°C, a humidity of 65%RH ±5%RH (Strict test conditions), when doubt is entertained about judgment.			
5. SOLDERING METHOD	Reflow method only			
6. CONSTRUCTION	The capacitor has a non-inductive construction, stacked with metallized polyphenylene sulfide dielectric. The capacitor has outer electrode on both sides.			
7. DIMENSIONS	As specified in the individual drawing.			
8. APPEARANCE	1. Capacitor shall be perfect without cut or turned up film. 2. Plating of outer electrode shall be perfect without defect or rust that matters practical use.			
9. CHARACTER				
No.	Item	Performance	Testing method	
1.	Dielectric Withstand Voltage	Between terminals: Nothing abnormal shall be found, when applied voltage of 150% of the rated voltage for 1 minute. (The capacitor shall be applied the voltage through 2kΩ or more when charge and discharge.)	JIS C 5101-20 4.3.1 IEC 60384-20 4.3.1	
2.	Insulation resistance	Between terminals : 3000MΩ or more When the reading of measuring instrument becomes steady at a value after applying a voltage of DC100V ±5V for 1 minute ±5 seconds, at 20°C ±2°C.	JIS C 5101-20 4.3.4 IEC 60384-20 4.3.4	

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No.	Item	Performance	Testing method
3.	Capacitance	Within a range of specified value. (Measured at a frequency of $1\text{kHz} \pm 0.2\text{kHz}$ , at $20^\circ\text{C} \pm 2^\circ\text{C}$ and a voltage of $5\text{V}_{\text{rms}}$ or less.)	JIS C 5101-20 4.3.2 IEC 60384-20 4.3.2
4.	Dissipation factor	0.6% or less (Measured at a frequency of $1\text{kHz} \pm 0.2\text{kHz}$ , at $20^\circ\text{C} \pm 2^\circ\text{C}$ and a voltage of $5\text{V}_{\text{rms}}$ or less.)	JIS C 5101-20 4.3.3 IEC 60384-20 4.3.3
5.	Connection	The connection of the element shall not open even instantaneously when applied a voltage of 100mV peak or less and applied light force.	
6.	Vibration proof	The capacitor shall be mounted on the PC board, and the following vibration shall be applied to the capacitor. Range of vibration frequency 10Hz to 55Hz total amplitude 1.5mm, rate of frequency vibration to be such as to vary from 10Hz to 55Hz and return to 10Hz in about 1 minute and thus repeated. Thus shall be conducted for 2hours each (total 6hours) in 3 mutually perpendicular directions.  The connection shall not get short-circuit or open when examined the connection of the element in compliance with the previous item (connection of element) during the last 30 minutes of the test.	(According to IEC 60384-1 [JIS C 5101-1] 4. 17)  Sweep : 10 Hz ~ 55 Hz ~ 10 Hz ( 1 min )
7.	Soldering property	The terminal shall be immersed in methanol solution of resin (about 25%) and the terminal shall be immersed in the solder bath at a temperature of $255^\circ\text{C} \pm 5^\circ\text{C}$ for $2.5\text{s} \pm 0.5\text{s}$ . After test immersion, the solder shall be stuck to more than 90% in the surface of the electrodes. Solder in the solder tank is Sn-Ag-Cu.  <div style="text-align: center;"> <p><u>Electrode development chart</u></p>  </div>	JIS C 5101-20 4.7 IEC 60384-20 4.7
		It is 100% in soldering on the terminal surface, and the net multiplication parts in the above-mentioned electrode development chart.	

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No.	Item	Performance	Testing method
8.	Moisture resistance(I)	<p>The capacitor under test shall be put in the testing oven and kept at condition of the temperature at 40°C ± 2°C and the humidity at 90%RH to 95%RH for 1000hours +48/ -0 hours and then shall be let alone at ordinary condition for 1.5hours ± 0.5 hours. After the test, the capacitor shall be satisfied with the following performance.</p> <p>Appearance : No remarkable change.</p> <p>Dielectric Withstand Voltage : Between terminals Nothing abnormal shall be found, when applied a voltage of 130% of the rated voltage for 1 minute. (The capacitor shall be applied the voltage through 2kΩ or more when charge or discharge.)</p> <p>Insulation resistance : Between terminals 1000MΩ or more</p> <p>Change rate of capacitance : Within ±2% of the value before the test.</p> <p>Dissipation factor : 0.9% or less (at 1kHz)</p>	<p>JIS C 5101-20 4.10 IEC 60384-20 4.10</p>
9.	Moisture resistant loading(I)	<p>The capacitor under test shall be applied the rated voltage continuously for 1000hours +48/ -0 hours in the testing oven and kept at condition of the temperature at +40°C ± 2°C and the humidity at 90%RH to 95%RH and then shall be let alone at ordinary condition for 1.5hours ± 0.5 hours. After the test, the capacitor shall be satisfied with the following performance.</p> <p>Appearance : No remarkable change.</p> <p>Dielectric Withstand Voltage : Between terminals Nothing abnormal shall be found, when applied a voltage of 130% of the rated voltage for 1 minutes. (The capacitor shall be applied the voltage through 2kΩ or more when charge or discharge.)</p> <p>Insulation resistance : Between terminals 1000MΩ or more</p> <p>Change rate of capacitance : Within ±2% of the value before the test.</p> <p>Dissipation factor : 0.9% or less (at 1kHz)</p>	<p>JIS C 5101-20 4.10 IEC 60384-20 4.10</p>

REFERENCE

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No.	Item	Performance	Testing method
10.	High temperature loading	<p>The capacitor under test shall be applied the voltage of 125% of rated voltage through a series-connected resistor of from 20Ω to 1000Ω per 1V, continuously for 1000hours +48/ -0 hours in the testing oven and kept at condition of the temperature at +105°C ±2°C and then shall be let alone at ordinary condition for 1.5hours ±0.5 hours.</p> <p>After the test, the capacitor shall be satisfied with the following performance.</p> <p>Appearance : No remarkable change.</p> <p>Insulation resistance : Between terminals 1000MΩ or more</p> <p>Change rate of capacitance : Within ±2% of the value before the test.</p> <p>Dissipation factor : 0.66% or less (at 1kHz)</p>	<p>JIS C 5101-20 4.11</p> <p>IEC 60384-20 4.11</p>
11.	Heat Resistance	<p>Insulation resistance at +105°C ±2°C after 2hours +1/ -0 hours.</p> <p>Insulation resistance : Between terminals 1000MΩ or more</p> <p>Change rate of capacitance at +105°C±2°C after 2hours +1/ -0 hours. Within +3/ -2% of the value before the test.</p>	<p>JIS C 5101-20 4.9.2</p> <p>IEC 60384-20 4.9.2</p>
12.	Cold Resistance	<p>Change rate of capacitance at -55°C ±2°C after 2hours +1/ -0 hours. Within ±2% of the value before the test.</p>	<p>JIS C 5101-20 4.9.4</p> <p>IEC 60384-20 4.9.4</p>

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No.	Item	Performance	Testing method
13.	Soldering Heat Resistance	<p>1. Reflow method Test condition of the reflow oven shall be adjusted that maximum temperature of the capacitor surface shall be 260°C ±3°C. (see Fig. 1.) After the test, the capacitor shall be let alone at ordinary temperature and humidity for 1hour ±0.5 hours. After this, the capacitor shall be satisfied with the following performance.</p> <p>2. Soldering iron method The soldering iron of a 30-watt shall be used and the temperature of the soldering iron shall be adjusted at 260°C ±10°C. The soldering iron together with a solder wire of 1mm diameter shall be put to each outer electrode of the capacitor for 3.5s ±0.5s. After this, the capacitor shall be satisfied with the following performance.</p> <p>Appearance : No remarkable change.</p> <p>Dielectric Withstand Voltage : Between terminals Nothing abnormal shall be found, when applied a voltage of 150% of the rated voltage for 1 minute. (The capacitor shall be applied the voltage through 2kΩ or more when charge or discharge.)</p> <p>Insulation resistance : Between terminals 1000MΩ or more</p> <p>Change rate of capacitance : Within ±3% of the value before the test.</p> <p>Dissipation factor : 0.66% or less (at 1kHz)</p> <p>Connection Stable</p>	<p>JIS C 5101-20 4.6 IEC 60384-20 4.6</p>

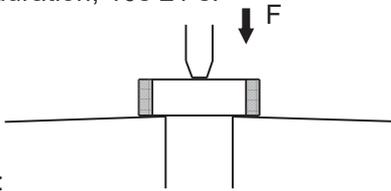
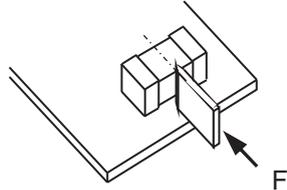
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No.	Item	Performance	Testing method
14.	Temperature cycle	<p>The capacitor under the test shall be put in the testing oven and kept at condition of the temperature of <math>-55^{\circ}\text{C} \pm 3^{\circ}\text{C}</math> for <math>30\text{min} \pm 3\text{min}</math>. After this, the capacitor shall be let alone at the ordinary temperature for 3 min or less.</p> <p>After this, the capacitor under the test shall be put in the testing oven and kept at condition of the temperature of <math>+125^{\circ}\text{C} \pm 2^{\circ}\text{C}</math> for <math>30\text{min} \pm 3\text{min}</math>.</p> <p>Then the capacitor shall be let alone at the ordinary temperature for 3 min or less.</p> <p>This operation shall be counted as 1 cycle, and it shall be repeated for 5 cycles successively.</p> <p>After the test, the capacitor shall be let alone at the ordinary condition for 1.5hours <math>\pm 0.5</math>hours, and shall be satisfied with the following performance.</p> <p style="margin-left: 20px;">Appearance : No remarkable change.</p> <p style="margin-left: 20px;">Insulation resistance : Between terminals 1000M<math>\Omega</math> or more</p> <p style="margin-left: 20px;">Change rate of capacitance : Within <math>\pm 2\%</math> of the value before the test.</p> <p style="margin-left: 20px;">Dissipation factor : 0.66% or less (at 1kHz)</p>	<p>JIS C 5101-20 4.8</p> <p>IEC 60384-20 4.8</p>
15.	dV/dt	<p>Permissible current to pulse current.</p> <p>The pulse permissible current is generally obtained by the product of dV/dt(V/<math>\mu\text{s}</math>) value and capacitance(<math>\mu\text{F}</math>) .</p> <p style="text-align: center;"><math>I = C \cdot dV/dt</math></p> <p>However, number of repetitions is 10,000 cycles or less.</p> <p>Make sure the rms current is within the permissible value. (See Tab.1)</p> <p style="margin-left: 20px;">Insulation resistance : Between terminals 500M<math>\Omega</math> or more</p> <p style="margin-left: 20px;">Change rate of capacitance : Within <math>\pm 3\%</math> of the value before the test.</p> <p style="margin-left: 20px;">Dissipation factor : 0.8% or less (at 1kHz)</p>	

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No.	Item	Performance	Testing method
16.	High temperature high frequency loading	<p>The capacitor under test shall be applied a current and rated voltage of 110% of allowable current specified in Fig.2 showed as below, for 1000hours+48/ -0hours in the testing oven and kept at condition of the temperature at 105°C ±3°C and then shall be let alone at ordinary condition for 1.5hours ±0.5hours.</p> <p>After the test, the capacitor shall be satisfied with the following performance.</p> <p>Appearance : No remarkable change.</p> <p>Insulation resistance : Between terminals 1000MΩ or more</p> <p>Change rate of capacitance : Within ±2% of the value before the test.</p> <p>Dissipation factor : 0.66% or less (at 1kHz)</p>	
17.	Moisture Resistant high Frequency loading	<p>The capacitor under test shall be applied a current and rated voltage of allowable current specified in Fig.2 showed as below, for 1000hours +48/ -0hours in the testing oven and kept at condition of the temperature at 40°C ±2°C and the humidity at 90% to 95% and then shall be let alone at ordinary condition for 1.5hours ±0.5hours.</p> <p>After the test, the capacitor shall be satisfied with the following performance.</p> <p>Appearance : No remarkable change.</p> <p>Withstand voltage : Between terminals Nothing abnormal shall be found, when applied a voltage of 130% of the rated voltage for 1 minutes. (The capacitor shall be applied the voltage through 2kΩ or more when charge or discharge.)</p> <p>Insulation resistance : Between terminals 1000MΩ or more</p> <p>Change rate of capacitance : Within ±2% of the value before the test.</p> <p>Dissipation factor : 0.9% or less (at 1kHz)</p>	

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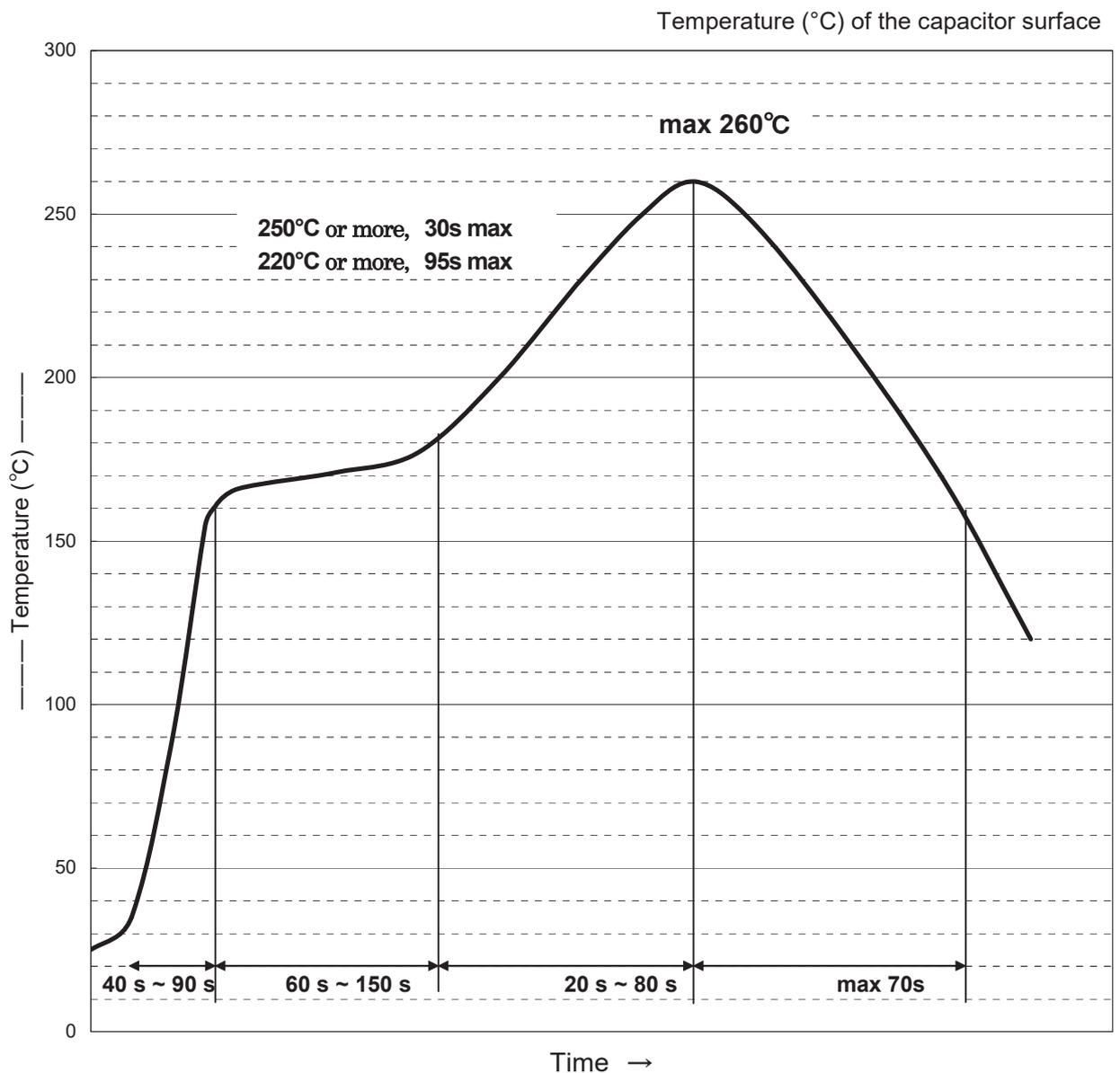
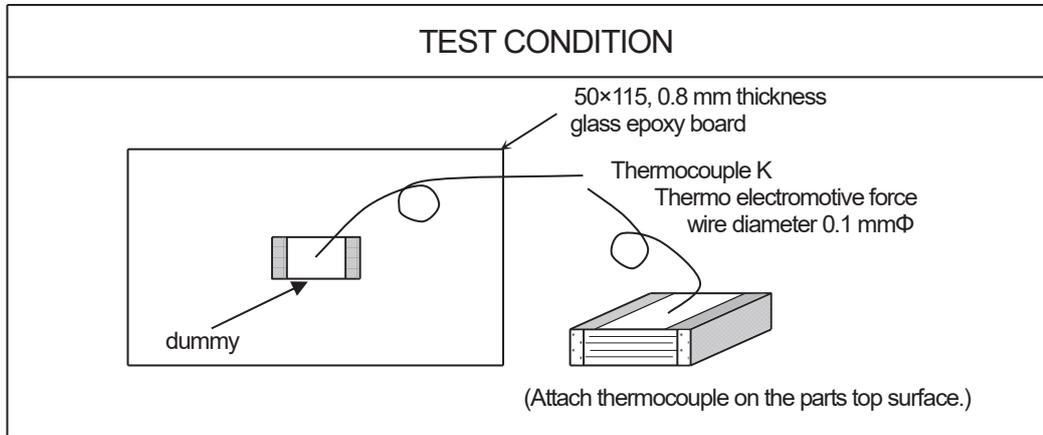
No.	Item	Performance	Testing method
18.	Robustness of capacitor body	The equipment shall permit pressurizing. Apply a force to the center of specimen, using a pressurizing as shown in the drawing. The pressure shall be $5N \pm 0.5N$ , and the holding duration, $10s \pm 1s$ . <div style="text-align: center; margin: 10px 0;">  </div> Appearance : No remarkable change.	
19.	Adhesiveness	Mount the specimen to the testing wiring printed board. Examine, with a magnifier of magnification of 10, the appearance of specimen. As shown in below, apply the pressurizing jig to the center in the longitudinal direction of specimen. Apply a force to the pressurizing jig gradually in the horizontal direction with the testing printed wiring board. The pressure shall be $5N \pm 0.5N$ , and the holding duration, $10s \pm 1s$ . After the test, use magnifier of magnification of 10, and check for cracks of soldering position. <div style="text-align: center; margin: 10px 0;">  </div> Appearance No remarkable change.	JIS C 5101-20 4.4 IEC 60384-20 4.4
20.	Resistance of Board to bending	The bending stroke shall be 1mm. Pressurizing shall be carried out at the rate of 1mm/s. After reaching the specified bending, keep it for $5s \pm 1s$ . After the test no breaking of the terminal shall be found.	JIS C 5101-20 4.5 IEC 60384-20 4.5

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**Fig.1 Standard surface temperature curve of the capacitor for reflow method**

Please confirm the test of the reflow method within the range of the under mentioned profile.

(The guarantee temperature and time are numerical values of the bold-faced type in the profile.)



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10. ⚠ Caution about safety in use

I. Operating range (voltage, current, operating temperature)

Use the capacitor within the specified limits listed below (a to d). Over rated conditions might cause deterioration, damage, smoke and fire. Do not use capacitor beyond range of the condition.

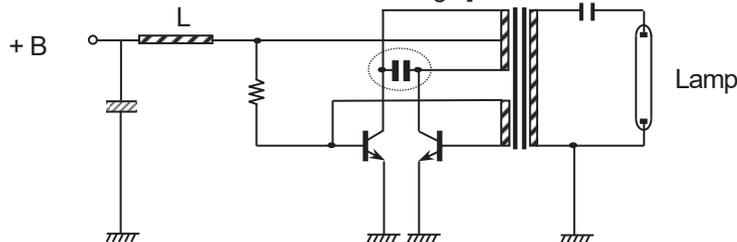
a) Permissible voltage

- DC rated voltage of this product is 100V. Use the capacitor within DC rated voltage.
- When used in AC applied circuit, less than 40Vrms should be applied.  
 When used in a high frequency, less than 40Vrms should be applied and current applied should be less than the value of permissible current in Fig.2 in page 16. Please consult in advance when capacitors are used between 60Hz to 10 kHz at frequency.

Not to be in connected directly to Primary or AC line. Guarantee contents refer to No.16 and No.17 of CHARACTER

- Use the peak of pulse voltage applied the capacitor within the DC rated voltage.
- Caution about safety in inverter circuit for LCD back light use:  
 Use the +B voltage applied within 13.0V, as shown below [Typical electronic inverter circuit for LCD back light].  
 And please use the peak of pulse voltage (especially, in case of the using PWM brightness circuit) applied the capacitor within the DC rated voltage.

[Typical electronic inverter circuit for LCD back light]



b) Permissible current

- The permissible current must be considered by dividing into pulse current (peak current) and continuous current (rms current). When using, therefore, make sure the both current are within the permissible values. In the case that a continuous current value is able not to be measured, use the capacitor within 10°C as the inherent temperature rise confirmed by the measuring method shown in page 15.
- Continuous current should be within specified figure in Fig.2. Contact us when the waveforms are totally different from the sine wave.
- Pulse current should be within the figures calculated by Tab. 1. Use within 10000 cycles of pulse current. When pulse current applied more than 10000 cycles, please consult us before use.

c) Operating temperature range

- It must be noted, however the operating temperature range is the surface temperature of the capacitor, not the ambient temperature of the capacitor.
- In actual use, make sure the sum of the ambient temperature + own temperature rise value (Within specified value), that is the capacitor surface temperature is within the rated operating temperature range.
- If there is cooling plate of the other part of any resistance heated to high temperature near the capacitor, the capacitor may be locally heated by the radiation heat, exceeding the operating temperature range, and smoking or firing may be caused. Check the capacitor surface temperature at the heat source side.

d) Others

- Protective means for safety should be provided in case the pulse and rms current may exceed the permissible values due to abnormal action of elsewhere in the circuit.
- Please consult in advance when capacitors are connected in parallel to supplement capacitance.

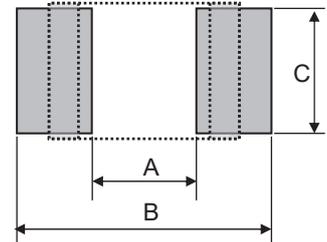
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II. Recommendable land size

For designing land size, refer to the following recommendable land size. (For reflow and flow soldering)

unit: mm

Size code \ Dimensions	A	B	C
E1, E2, E3a, E3 (4833)	2.6	6.6	3.0
D1, D2, D3, D4, D5 (6041)	3.8	7.8	3.8
Z(7150)	4.5	9.0	4.6
Y(7163)	4.5	9.0	5.7



**<Note>**

- A recommended solder paste thickness is between 0.15mm and 0.20mm.

III. Design of P. W. B.

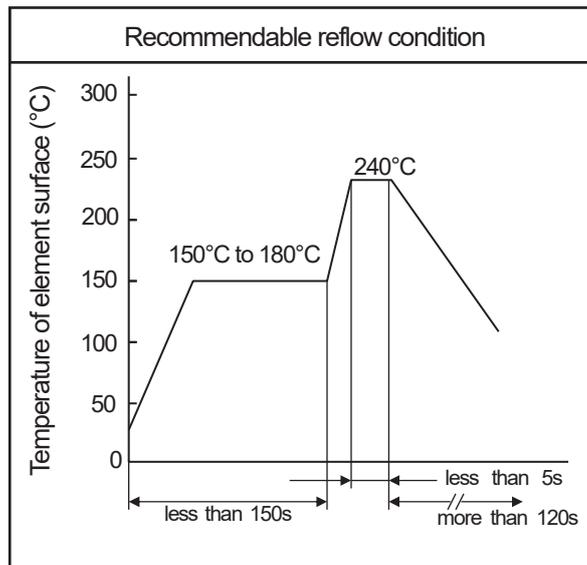
Do not use ceramic and metal board, because they have a large thermal expansion coefficient which is different from that of this capacitor, which are liable to cause a deterioration of thermal cycle endurance.

IV. Soldering

a) Soldering method

This capacitor shall be used in reflow method.

b) Recommendable reflow and flow soldering conditions



**<Note>**

- The above figure is recommendable conditions.
- Soldering frequency shall be maximum two times. Solder after capacitor body temperature returned for normal temperature soldering of a second time.
- When further conditions except for the above, please obey the following conditions. Consult us before use when require further condition expect for the following.  
 (Reflow) 260°C max. , 30 seconds max. at more than 250°C and 95 seconds max. at more than 220°C (temp. at cap. surface).
- The reflow method recommends the hot wind circulation method. The heat influence on the capacitor is different in the methods other than the hot wind circulation method. Please confirm there is no problem in the characteristic of the capacitor beforehand when it is mounted excluding the hot wind circulation method.  
 Please inquire when it is uncertain.

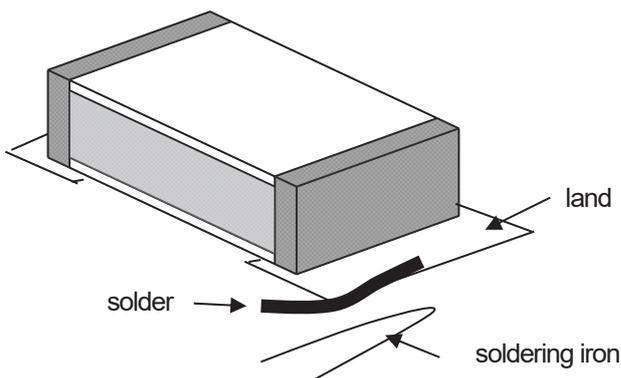
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c) Soldering conditions used in soldering iron

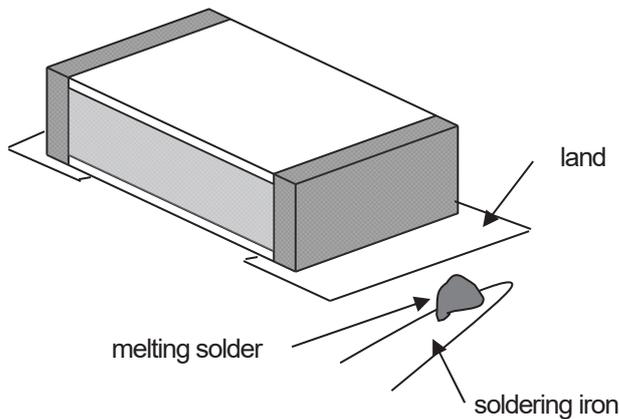
Temperature	Soldering time	Other conditions
270°C maximum	4.0 seconds maximum	Power of soldering iron:30W Pre-heating is not needed

- In the case of sketch (a)
  - Put a soldering iron to an electrode (for less than 4 sec) with solder like sketch (a) shows.
  - \*Put soldering iron lightly.
  - \*Soldering is allowed as one side by one side (without interval) or as both sides at the same time.
  
- In the case of sketch (b)
  - After a solder is melted on a soldering iron like sketch (b), put them to an electrode. (for less than 4sec)
  - \*Put soldering iron lightly.
  - \*Soldering is allowed as one side by one side (without interval) or as both sides at the same time.

Sketch (a)



Sketch (b)



<Note>

- Soldering frequency shall maximum two times. Solder after capacitor body temperature returned for normal temperature soldering of a second time.
- The above condition shall be applied also on re-working after flow and reflow soldering. Readjust with once after flow and reflow soldering.
- When measuring temperature, it shall be operated with solder on soldering iron.
- Please pay attention to the soldering iron not to touch a capacitor body( except electrode ), especially not to touch cut edge side.
- Consult with our engineering section in advance when require further conditions except for the above.

d) Others

- Solder a heat record of the case which soldering in others method with above-mentioned within b) and c).
- It is too much heat record that solders or solders removal this product or the other part which approaches this product using hot air – blow. Consult us before use.
- Do not to use soldering this product by Light beam and laser beam. If used these method, consult us before use.
- Consult us before use, when soldering in other method.

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V. Warning about solder paste

- Solder paste shall be used which contains halogen with less than 0.1wt%. (In case of reflow soldering and using soldering iron.)

VI. Cleaning

a) Case of washfree

Please use a recommended flux, like low residue flux ULF-500VS or inactivated flux AM-173.

b) Applicable solvent

Type	Cleaner	Manufacturer
Alcohol	IPA(isopropyl alcohol)	General industrial use

c) Cleaning method

Item	Conditions	Temperature	Period
Immersion		Room temperature	Within 5minutes
Vaporized cleaning		less than 50°C	Within 5minutes
Ultrasonic cleaning		less than 50°C	Within 5minutes

**<Note>**

- Do not wash by the water.
- When washing right after soldering, make sure the capacitor surface temperature is lower than 60°C.
- It is necessary to remove cleaner from P.W.B. by drying thoroughly after cleaning.
- Cleaner shall contain halogen with less than 0.1wt%, because in case of cleaning after mounting, halogen in flux will dissolve into cleaner.
- Consult with our engineering section in advance when further information for cleaning solvent, conditions are required.

VII. Storage and preservation

- It must be noted that the solderability of the external electrode may deteriorated when stored in an atmosphere filled with moisture, dust, or a reactive oxidizing gas (hydrogen chloride, sulfuric acid, ammonia, hydrogen sulfide etc) .
- Avoid location with particularly high temperature and high humidity, and store in conditions not exceeding 35°C and 85%RH. Storage period limit is 6 months (use within 6 months).
- Consult with our engineering section in advance when require further conditions except for the above.

VIII. Operating environment

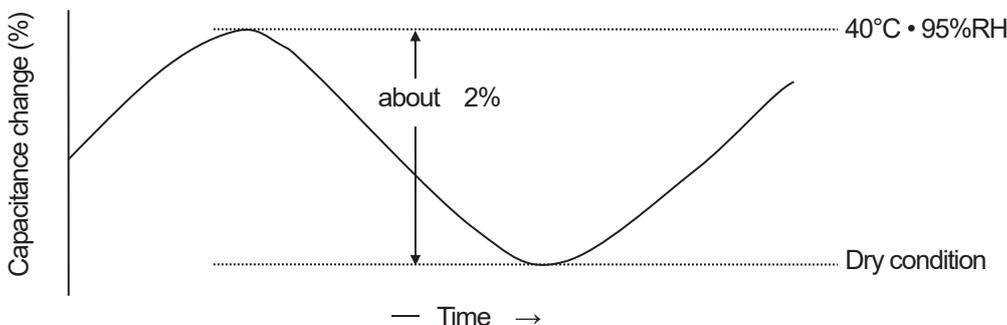
- Consult us when used for a long period in humid environments, because characteristic deterioration as low insulation resistance and oxidized evaporated film may occur due to humidity absorbed with the passing of the time.
- Avoid to use in a place of corrosive and oxidizing gas atmosphere (hydrogen chloride, sulfuric acid, ammonia, hydrogen sulfide etc).
- Avoid use under the environment where water is generated to deteriorated the characteristic of the capacitor when the adhesion of water (drop of water etc.) is generated in the capacitor.
- No dust should be permitted to remain on the surface of the product as this may cause electrical leakage.

Standard Doc.	PLASTIC FILM CHIP CAPACITOR TYPE ECHU1(C)	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="font-size: small;">Star.</td> <td style="text-align: center;">28-75</td> </tr> <tr> <td style="font-size: small;">No.</td> <td style="text-align: center;">1-22</td> </tr> <tr> <td style="font-size: small;">Revision Code</td> <td style="text-align: center;">R1</td> </tr> <tr> <td></td> <td style="text-align: center;">14 / 16 P.</td> </tr> </table>	Star.	28-75	No.	1-22	Revision Code	R1		14 / 16 P.
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**IX. Capacitance change due to humidity absorption**

In environment with humidity change, capacitance of this capacitor changes (increases and decreases).  
 Because capacitor absorbing and dis-absorbing due to humidity of environment.  
 Consult with our engineering section detail of this capacitance change.

[ For example : The data shown below is capacitance change from dry condition to 40°C,95%RH condition.]



**X. In case of using resin for fixing the chip parts**

In case of using resin for fixing the chip parts, inquiring in advance of our engineering section is recommended.

**XI. Resin coating**

When capacitors are coated or embedded with resin, inquiring of our engineering section is recommended.

**XII. Handling of a element**

When handle an element of the capacitor with tweezers, use tweezers made of resin and applied stress should be less than 5N. And avoid any contact with the cut surface (except outer electrode surface).

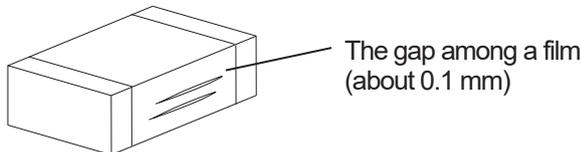
**XIII. Stress, damage**

Please pay attention to the following points, when stress or damage is applied to the capacitor it may become the cause of malfunction.

- Do not apply more than 5N as pull, stress and pressure etc.
- Do not apply strong stress to cut edge side of the capacitor and not give the damage of scratch etc.

**XIV. Appearance**

- The gap among a film about 0.1 mm on the cut edge side may occur by structure and process. But there is not a problem in reliability.
- We make assurance double sure about quality of the appearance. If it obstruct the reliability and performance of the electronic equipment requested, we exchange the appearance boundary sample.



**XV. Singular using**

This capacitor is generally surface mount device. Do not use singular using.

**11. Life designed**

This product is designed as its life time is more than 10 year (actual working hours of capacitor are 50,000h) under the conditions that

- Operating temperature is less than 85°C and applied voltage is than rated voltage × 0.85.

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Tab.1 Permissible pulse current (Max.10000cycles)

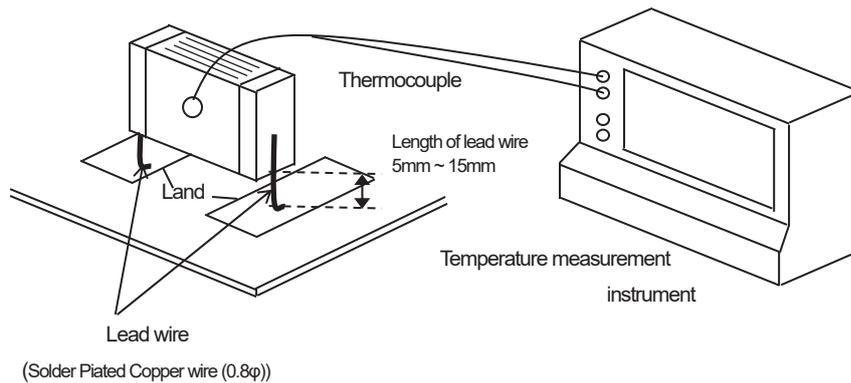
Pulse current applied to this capacitor should be used within permissible pulse current (Max.10000cycles) shown in table.

In case of pulse current is over the specified table, inquire of our engineering section.

Item	dV/dt(V/μs)
ECHU1103JC9	180
ECHU1123JC9	
ECHU1153JC9	
ECHU1183JC9	
ECHU1223JC9	
ECHU1273JC9	
ECHU1333JC9	130
ECHU1393JC9	
ECHU1473JC9	
ECHU1563JC9	
ECHU1683JC9	
ECHU1823JC9	
ECHU1104JC9	100
ECHU1124JC9	
ECHU1154JCV	
ECHU1184JCV	
ECHU1224JCV	
ECHU1224JCV	

Measuring method of inherent temperature rise

As shown in the drawing, attach a thermocouple to the capacitor surface with adhesive, and measure the surface temperature and capacitor surface temperature while avoiding radiation heat from peripheral parts. At this time, use a thermocouple with small thermal capacity (φ0.1 T wire), and to avoid heat release to the board, lift the parts to be measure from the board by using lead wire or the like, and install as shown in the drawing. To avoid effects of convection and wind, put the capacitor into the box or the like, and measure in wind-free condition.



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Fig.2 Permissible Current

- Measuring condition : Sine wave
- Temperature rise of the capacitor surface shall be 10°C or less.
- Caution about safety in inverter circuit for LCD back light use :  
Use the +B voltage applied within 13.0V, as shown [typical electronic inverter circuit for LCD back light], page 10 of 16 .

