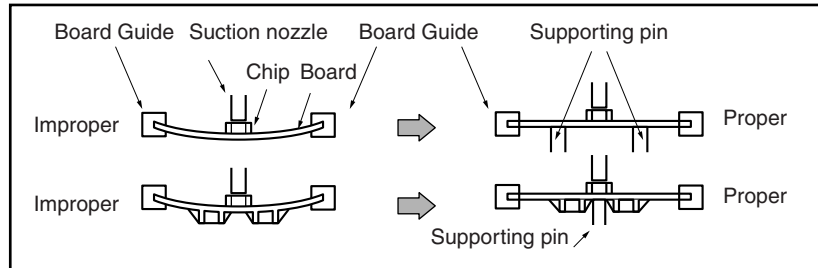


# HANDLING PRECAUTIONS

## ■ Mounting

### 1. Chip mounting

(1) While mounting, if the bottom dead point of the suction nozzle is too low, the force on the chip may be great enough to cause breaking or cracking. Adjust the distance of the bottom dead point of the nozzle from the top surface of the chip, after resetting the substrate straight, to prevent overload on the chip.

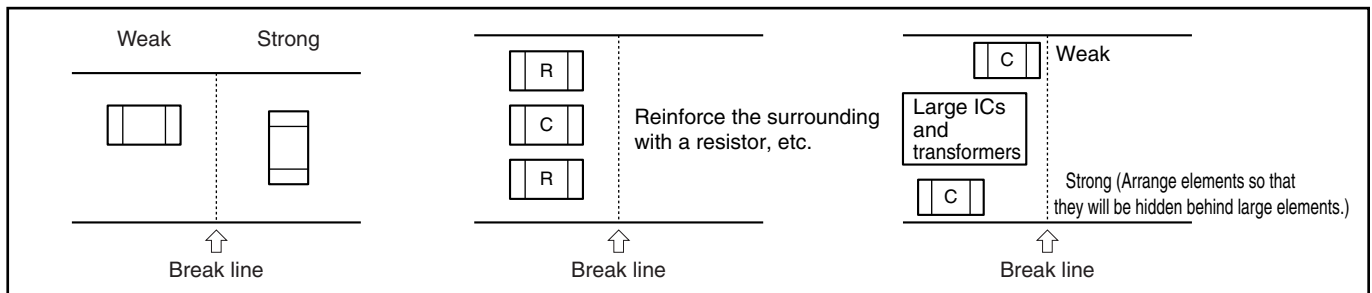


(2) To prevent cracking or breaking, set the static load force between 100~300gf when mounting.

(3) A worn clamp fixture of the mouter can cause an uneven distribution of the clamping force, leading to cracking or breaking of the capacitor. Check the dimensions of the clamping fixture in the closed position, perform routine maintenance on the suction nozzle and clamping fixture, and inspect or change worn parts on a periodic basis.

### 2. Board breaking

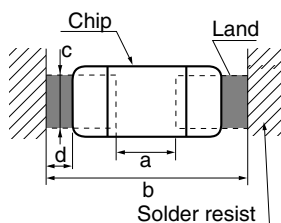
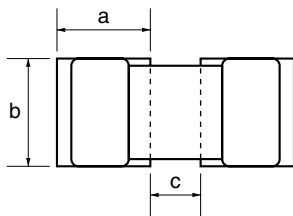
When large multi-circuit boards are broken into individual boards after soldering, flexure stress may be placed on the parts causing them to cracking or breaking. For designing patterns please refer to below.



## ■ Soldering

### 1. Basic design

Recommended land pattern for reflow soldering.



Unit : mm

Type	Type	KC11	KC20	RC30,KC30 VC30	RC40,KC40 VC40	RC70,KS70 KC70VS70 VC70	RC80,KS80 KC80,VS80 VC80,RS80
	Chip length (L)× Width (W)		1.6×0.8	2.0×1.25	3.2×1.6	3.2×2.5	4.5×3.2
Land dimension	a	0.6~0.7	0.6~0.7	0.8~0.9	1.0~1.2	1.1~1.3	1.5~1.7
	b	0.6~0.8	0.8~1.1	1.0~1.4	1.8~2.5	2.3~3.2	3.5~5.0
	c	0.6~0.8	1.0~1.2	2.2~2.4	2.0~2.4	2.6~3.4	3.6~4.6

Unit : mm

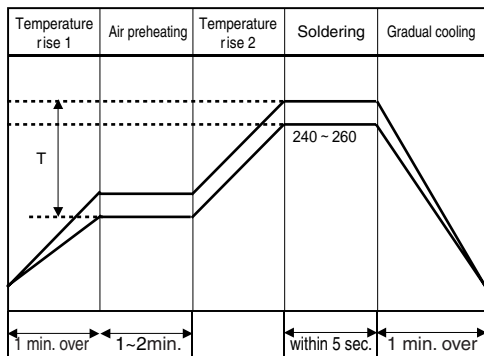
Type	Chip dimension		Land dimension			
	L	W	a	b	c	d
35	3.3	1.6	1.9~2.6	3.9~4.9	1.2~1.6	0.3~0.8
38	3.4	2.6	2.1~2.8	4.1~5.1	2.0~2.7	0.3~0.8
44	4.5	2.0	3.6	8.2	1.8	1.4~2.2
47	4.5	3.2	2.7~3.7	5.7~6.3	2.4~3.3	0.5~1.3
63	5.7	2.0	4.9~5.1	9.5~10.5	1.7~1.9	1.9~2.1
69	5.7	5.0	4.4~5.0	7.5~9.0	4.0~5.0	0.8~1.6

## HANDLING PRECAUTIONS

### 2. General cautions for soldering

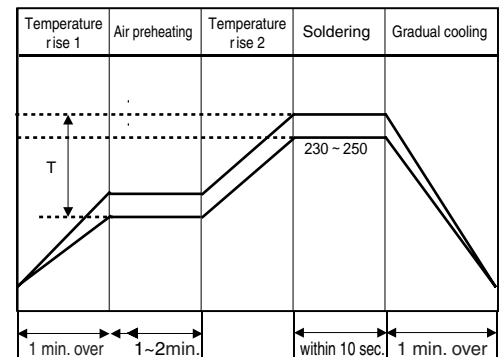
- (1) Excessively high soldering temperatures or long soldering times can cause leaching of terminations, and consequently decrease adherence strength, and capacitance value, etc.
- (2) For soldering, please refer to the soldering curves below.
- (3) When using a soldering iron for repair work, make sure to apply the tip of the iron and the solder to the edge of the chip at the same time, being careful not to touch the chip directly with the iron.

Reflow soldering recommended conditions (Pb free)



- note1: Keeping time must be counted from the time that surface temperature of the capacitor reaches the temperature above.
- note2: Temperature tolerance ( T ) between preheating and soldering must be the tolerance in the right list.
- note3: Keep the temperature rise speed within 2~5 / sec..
- note4: Keep the cold removal speed within 1~4 / sec..
- note5: 40 or more types and stacked types are not applicable to flow soldering.

Reflow soldering recommended conditions (Pb free)



[ Temperature tolerance T ]

Size	Temperature tolerance
30 or less types	T=150
40 or more types	T=130
Stacked type capacitor	T=100

- (4) Please use a mild flux (containing less than 0.2wt% Cl). Also, if the flux is water soluble, be sure to wash thoroughly to remove any residue from the underside of components that could affect resistance.

### 3. Cleaning

When using ultrasonic cleaning, the board may resonate if the output power is too high. Because this vibration can cause cracking or decrease in the adhesion of the termination, we recommend the conditions below.

Frequency : 28kHz  
 Output power : 20W/liter  
 Cleaning time : 5 minutes max.

### ■Storage/keeping

- (1) Deterioration of solderability can be caused by oxidization/sulfurization because of high temperature, high humidity or chlorine/sulfur gas. Parts should be used within 6 months if possible and stored below 40°C and 70%RH in a atmosphere free of sulfur, chlorine or toxic gasses.
- (2) These capacitors are made of ceramics. Avoid dropping or other mechanical shock that could damage the parts.
- (3) The capacitors kept in your storage for over 6 months should be used only after checking solderability.

## HANDLING PRECAUTIONS

### ■ Guide to application

1. The products are designed and manufactured for the use in ordinary electronic products. There is a possibility to cause performance deterioration depends on the way of using. In case of the product breaking down in short mode, varistor itself become hot then the circuit board might have been damaged by a fire.

If any of these products are used in special applications requiring high reliability, where product defects or its misconduct might pose a safety risk or cause a social problem, please consult sales offices well in advance.

aerospace instrument

submarine repeater(bottom of the sea relay, work equipment in the sea inside etc.)

atomic power control system

vehicle instrument including its accessories

fuel control equipment

other transportation equipments(vehicles, airplanes, trains, vessels and traffic rights etc.)

safety equipment

medical equipment(life-support equipment etc.)

power generation control equipment

disaster prevention and security equipment

for military and the Defense Agency applications

information processing equipment(communications infrastructure etc.)

other equipments required the same quality and reliability as above equipments

2. In case of circuit design using the products, the safety for end users should be confirmed if the products have any problem.

And products' security must be kept taking into consideration of the sufficient fail safe design (secure the protection circuit) in order not to be unsafe as a system when the products are in defects by single trouble.

3. The names of products and their specifications listed in this catalog may be changed for improvement or the production of some products may be discontinued without any advance notice. Before using the products, please ask for delivery specifications and confirm its contents.

4. The specific characteristic and quality of a product as a single item are guaranteed in this catalog. When using the products, please make sure that you check and evaluate them as they are contained in a package.

5. Our warranty does not apply to troubles that may arise as a result of using products ignoring their characteristics, ratings and the application scope described in this catalog.

6. Although we have taken all possible measures to ensure the quality and reliability of our products, there is a possibility that accidents causing injury or death, fire or social damage may occur if products are not used as instructed. If you have any questions regarding how to use the products, please consult with our customer service personnel.

7. If problem arises regarding a third party's industrial proprietary rights as a result of using this products, our company will have no liability for the problem except for those related to our products' structure and production method.