

### ◆ Storage

- ① The chip capacitors shall be packaged in carrier tapes or bulk cases.
- ② Keep storage place temperatures from +5°C to +35°C, humidity from 45 to 70% RH.
- ③ The storage atmosphere must be free of gas containing sulfur and chlorine. Also, avoid exposing the product to saline moisture. If the product is exposed to such atmospheres, the terminations will oxidize and solderability will be affected.
- ④ The solderability is assured for 12 months from our final inspection date if the above storage condition is followed.

### ◆ Circuit Design

- ① Once application and assembly environments have been checked, the capacitor may be used in conformance with the rating and performance, which are provided in both the catalog and the specifications. Exceeding the specifications listed may result in inferior performance. It may also cause a short, open, smoking, or flaming to occur, etc.
- ② Please use the capacitors in conformance with the operating temperature provided in both the catalog and the specifications. Be especially cautious not to exceed the maximum temperature. In the situation the maximum temperature set forth in both the catalog and specifications is exceeded, the capacitor's insulation resistance may deteriorate, power may suddenly surge and short-circuit may occur. The capacitor has a loss, and may self-heat due to equivalent series resistance when alternating electric current is passed there through. As this effect becomes especially pronounced in high frequency circuits, please exercise caution. When using the capacitor in a (self-heating) circuit, please make sure the surface of the capacitor remains under the maximum temperature for usage. Also, please make certain temperature rise remain below 20°C.
- ③ Please keep voltage under the rated voltage, which is applied to the capacitor. Also, please make certain the peak voltage remains below the rated voltage when AC or voltage is super-imposed to the DC voltage. In the situation where AC or pulse voltage is employed, ensure average peak voltage does not exceed the rated voltage. Exceeding the rated voltage provided in both catalog and specifications may lead to defective with standing voltage or, in worse case situations, may cause the capacitor to smoke or flame.

◆ **Handling**

Chip capacitors should be handled with care to avoid contamination or damage. The use of vacuum pick-up or plastic tweezers is recommended for manual placement. Tape and reeled packages are suitable for automatic pick and placement machine.

◆ **Flux**

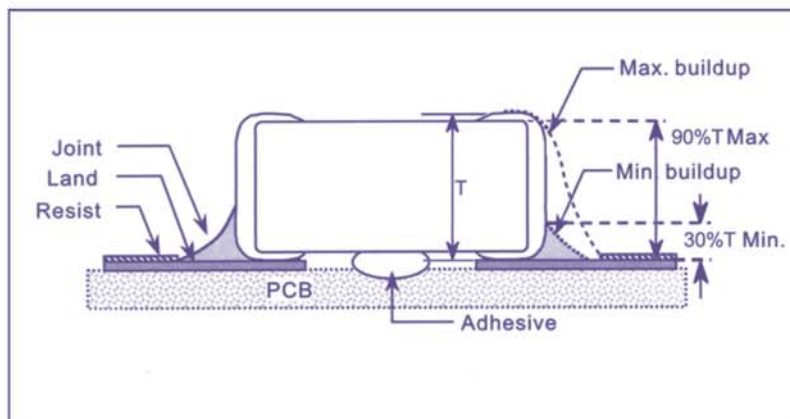
- ① An excessive amount of flux or too rapid temperature rise causes solvent burst, solder can generate a large quantity of gas. The gas spreads small solder particles can cause solder balling effect or bridging problem.
- ② Flux containing too high a percentage of halide may cause corrosion of termination unless sufficiently cleaning.
- ③ Use rosin-type flux and do not use a highly acidic flux (halide content less than 0.2 wt%).
- ④ The water soluble flux causes deteriorated insulation resistance between outer termination unless sufficiently cleaned.

◆ **Component Spacing**

For wave soldering components, the spacing must be sufficient far apart to prevent bridging or shadowing. This is not so important for reflow process but sufficient space for rework should be considered. The suggested spacing for reflow soldering and wave soldering is 0.5mm and 1.0mm, respectively.

◆ **Solder Fillet**

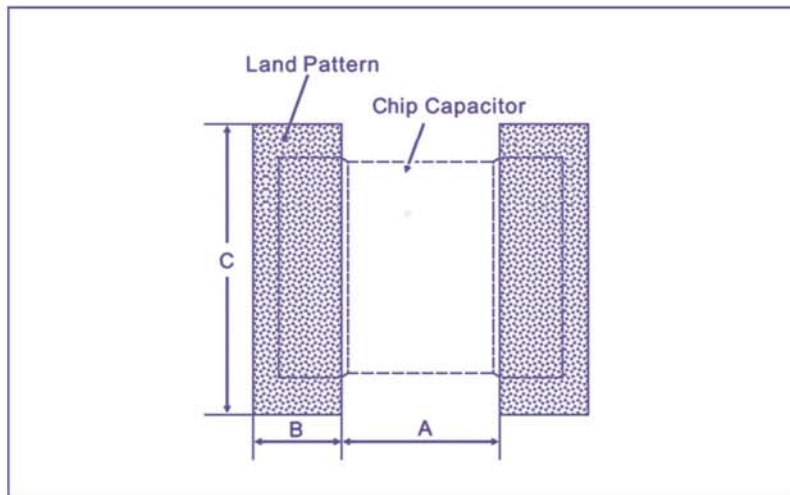
Too much solder amount may increase solder stress and cause crack risk. Insufficient solder amount may reduce adhesive strength and cause parts falling off PCB. When soldering, confirm that the solder 30%T to 90%T.



### ◆ Recommended Land Pattern Dimensions

When mounting the capacitor to substrate, it's important to consider carefully that the amount of solder (size of fillet) used has a direct effect upon the capacitor once it's mounted.

- ① The greater the amount of solder, the greater the stress to the elements. As this may cause the substrate to break or crack.
- ② In the situation where two or more devices are mounted onto a common land separate the device into exclusive pads by using soldering resist.



### ◆ Reflow Soldering

unit: millimeter

		10A/70A	10B/70B	10C/70C	10E/70E	
Capacitor Dimensions	L	1.40	2.79	5.84	9.65	
	W	1.40	2.79	6.35	9.65	
Land Dimensions	Normal Mounting	A	0.65	1.80	4.80	8.00
		B	1.10	1.30	2.00	1.60
		C	2.00	3.40	7.00	10.20
	High Density Mounting	A	0.65	1.80	4.80	8.00
		B	0.60	0.80	1.50	1.10
		C	1.50	2.90	6.50	9.70



### ◆ Resin Mold

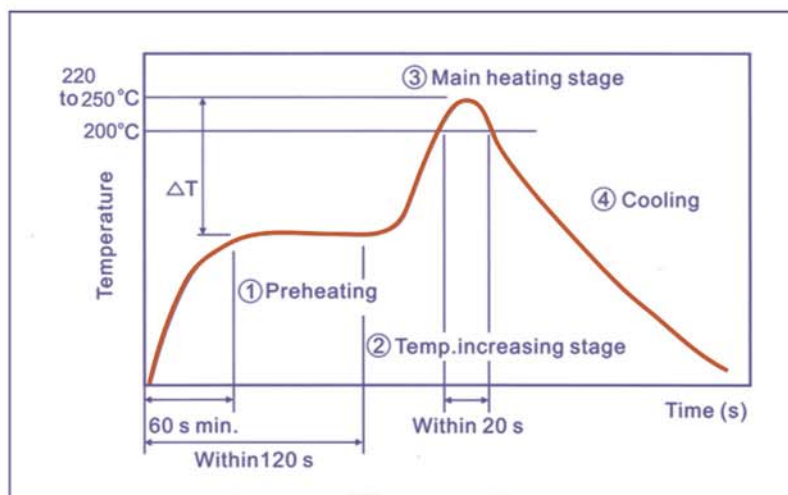
If a large amount of resin is used for molding the chip, cracks may occur due to contraction stress during curing. To avoid such cracks, use a low shrinkage resin. The insulation resistance of the chip will degrade due to moisture absorption. Use a low moisture absorption resin. Check carefully that the resin does not generate a decomposition gas or reaction gas during the curing process or during normal storage. Such gases may crack the chip capacitor or damage the device itself.

### ◆ Soldering For Chip Capacitors

#### ● Reflow Soldering

When sudden heat is applied to the elements, the mechanical strength of the components should decrease because remarkable temperature change can cause deformity of components inside. In order to avoid mechanical damage in the elements, preheating should be requested for both of the components and the PCB board. Preheating conditions are given in the blow table, It is requested to keep temperature gap between the soldering and the elements surface ( $\Delta T$ ) as small as possible.

When elements are sank in solvent after mounting, be sure to maintain the temperature gap ( $\Delta T$ ) between the element and solvent within the range shown in the below table.



Chip Capacitor	10A/70A	10B/70B	10C/70C	10E/70E
Preheating	$\Delta T \leq 190^\circ\text{C}$		$\Delta T \leq 150^\circ\text{C}$	

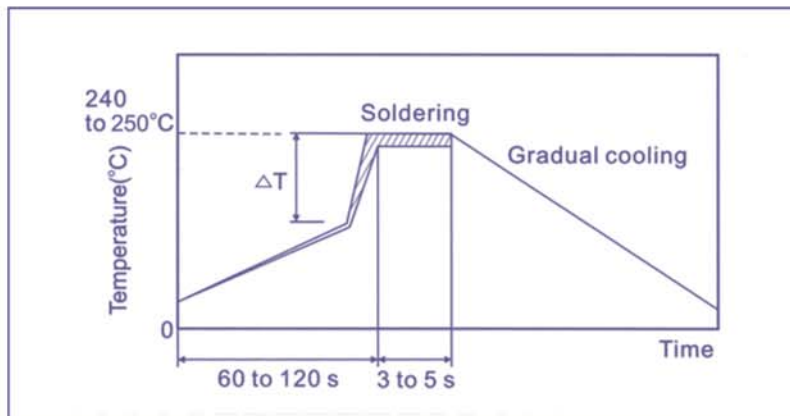
● **Flow Soldering**

When sudden heat is applied to the elements, the mechanical strength of the components should decrease because remarkable temperature change can cause deformity of components inside. And an over long soldering time or high soldering temperature results in leaching by the external electrodes, causing poor adhesion or a reduction in capacitance value due to loss of contact between electrodes and end termination.

In order to avoid mechanical damage in the elements, preheating should be requested for both of the components and the PCB board. Preheating conditions are given in the blow table, It is requested to keep temperature gap between the soldering and the elements surface ( $\Delta T$ ) as small as possible.

When elements are sank in solvent after mounting, be sure to maintain the temperature gas ( $\Delta T$ ) between the element and solvent within the range shown in the below table.

Do not apply the flow soldering to capacitors not listed in the below table.

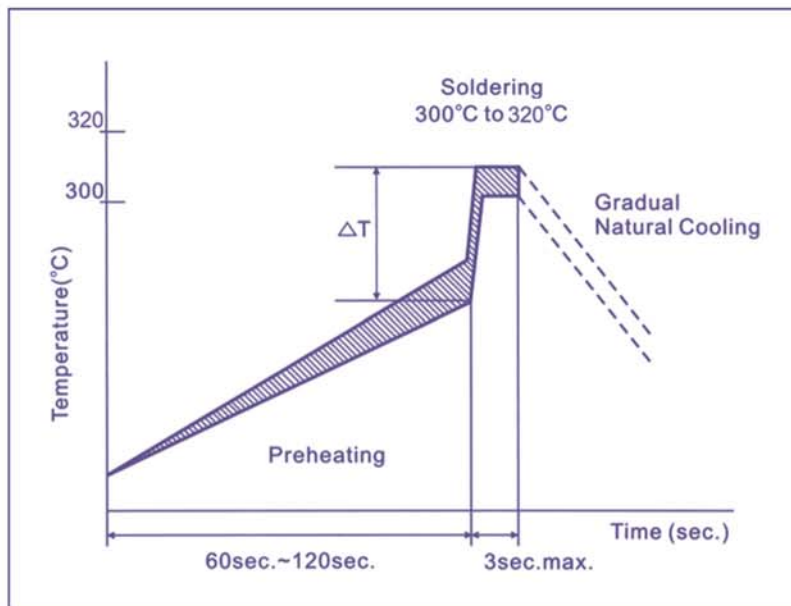


Chip Capacitor	10A/70A	10D/70D
Preheating	$\Delta T \leq 150^\circ\text{C}$	

Kete does not recommend flow soldering for its 10B/70B, 10C/70C, 10E/70E.

● **Soldering Iron**

When sudden heat is given to the elements by soldering iron, the mechanical strength of the components should lower down because remarkable temperature change can cause deformity of components inside. In order to avoid mechanical damage in the elements, preheating should be requested for both of the components and the PCB board. Preheating conditions are given in the below table, It is requested to keep temperature gap between the soldering and the elements surface ( $\Delta T$ ) as small as possible. After the soldering, it should not be allowed to cool down suddenly.



Chip Capacitor	10A/70A	10B/70B	10C/70C	10E/70E
Preheating	$\Delta T \leq 190^\circ\text{C}$		$\Delta \leq 150^\circ\text{C}$	

	Soldering Iron Wattage (max)	Iron-tip Diameter (max)
10A/70A/10D/10D	20W	3mm
10B/70B	40W	4mm
10C/70C	40W	6mm
10E/70E	40W	9mm

● **Recommended Soft Solder**

- ① 62.5Sn, 36.1Pb, 1.4Ag      ② 63Sn, 37Pb      ③ 95.5Sn, 3.8Ag, 0.7Cu
- ④ 5Sn, 93.5Pb, 1.5Ag      ⑤ 5Sn, 95Pb