

## 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 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 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 withstanding voltage or, in worse case situations, may cause the capacitor to smoke or flame.

4. It's is a common phenomenon of high-dielectric products to have a deteriorated amount of static electricity due to the application of DC voltage.

## STORAGE

1. The chip capacitors shall be packaged in carrier tapes or bulk cases.
2. Keep storage place temperatures from +5 to 35 degree 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.

## 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.

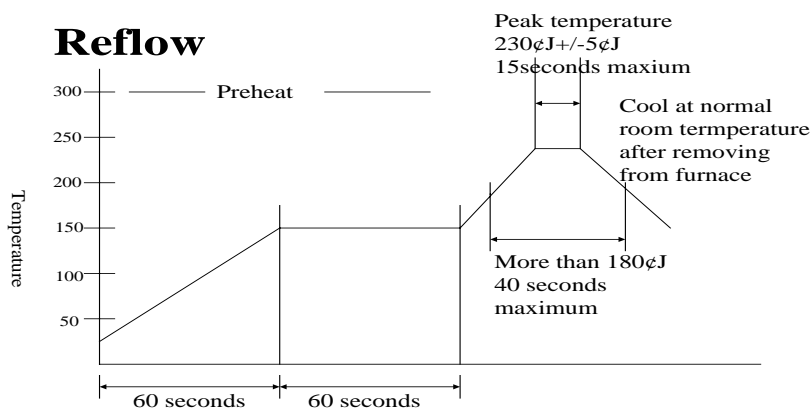
## SOLDERING

### 1. Resin Mold:

- a. 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.
- b. The insulation resistance of the chip will degrade due to moisture absorption. Use a low moisture absorption resin.
- c. 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.

### 2. Soldering Method:

- a. Ceramic could easily be damaged by rapid heating or cooling. If some heat shock is unavoidable, limit the temperature difference ( $\Delta T$ ) to within 130 degree C.
- b. Recommended soldering profile is shown as follows.

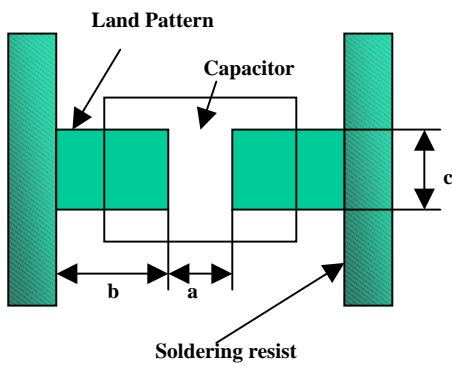


- c. Special precautions for using soldering irons: Preheat the capacitor to approx. 150 degree C then solder quickly on a hot plate using a soldering iron adjusted to 250 to 280 degree C.

## RECOMMENDED PAD 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.

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



(Unit: mm)

Size	LxW	a	b	c
0603(0201)	0.6*0.3	0.15 to 0.35	0.20 to 0.30	0.25 to 0.35
1005(0402)	1.0*0.5	0.30 to 0.50	0.35 to 0.45	0.40 to 0.60
1608(0603)	1.6*0.8	0.70 to 1.00	0.80 to 1.00	0.60 to 0.80
2012(0805)	2.0*1.25	1.00 to 1.30	1.00 to 1.20	0.80 to 1.00
3216(1206)	3.2*1.6	2.10 to 2.50	1.10 to 1.30	1.00 to 1.30
3225(1210)	3.2*2.5	2.10 to 2.50	1.10 to 1.30	1.90 to 2.30
4520(1808)	4.5*2.0	2.50 to 3.20	1.80 to 2.30	2.60 to 1.80
4532(1812)	4.5*3.2	2.50 to 3.20	1.80 to 2.30	2.60 to 3.00