

1 In designing device circuits

- (1) Confirming operating and installation environment, use capacitors within the performance limits prescribed in their catalog or product specifications.
- (2) Do not use capacitors at the environment of which temperature drastically changes even though it stays within the prescribed range.
- (3) Do not use capacitors at the humid or dewy environment.
- (4) Select the proper capacitors matching for an application.
- (5) Do not use the capacitors, which have particularly been designed for a specific application, into other applications. In particular, do not use the capacitor samples, which are provided for the purpose of appearance or electrical check, for other purpose.
- (6) Charge and discharge cycles that are rapidly repeated at more than the prescribed conditions causes capacitors to deteriorate in their characteristics or breakdown.
- (7) Unless otherwise prescribed, do not apply the surge or ripple voltage of which peak voltage exceeds the specified full rated voltage.
- (8) Where using capacitors at a rated temperature, do not apply voltage more than the derating voltage specified at the temperature.
- (9) Where using capacitors into AC or pulsing circuits, do not apply current more than the specified maximum permissible current. For the details, consult us.
- (10) A rise in capacitor temperature, which is caused by a ripple current, shall be so set as not to exceed the specified limit at non-circulating air condition. Note that a capacitor changes in the temperature rise by the operating temperature as its capacitance changes.
- (11) The sum of ambient temperature, including the influence of heat from other components, and the rise of temperature by self-heating must be within the specified upper category.
- (12) Do not connect capacitors in series or parallel. Consult us for it.

2 Installation and assembly board washing

- (1) Do not pull or twist the lead wires of a capacitor by applying the force more than the limits when installing the capacitor into the printed circuit board. In particular, the capacitor shall be so installed into the board as not to have a crack in the covering resin of the capacitor. If it cannot be avoided, use capacitors with pre-formed lead wires.
- (2) If a large-sized capacitor is installed and/or the device is exposed to a vibration shock, anchor the body of the capacitor to the board by means of a clamp or adhesive that does not effect the capacitor.
- (3) Do not touch the exterior cover of a capacitor to the metal part of the device or other components.
- (4) For soldering, follow the specified conditions. Because the plastic film of the capacitors is effected by heat, overheating the capacitors during soldering causes $\tan \delta$ to increase.
- (5) If the assembly boards are washed for the purposes of removing residual flux, follow the specified conditions.
 - ①Alcohols, Water soluble solvents.

②Cleaning Methods Vaporized Cleaning, Dip Cleaning, Ultrasonic Cleaning. When Cleaning, Temperature and Period Shall not Be Exceeded 50°C and 5 Minutes.

③After Treatment It is Necessary To Remove Cleaning Solvent From P.W.B. By enough Dryness.

3 While devices are operating

- (1) Do not touch a capacitor, while under load, directly with bare hands. Touching the capacitor causes a shock hazard.
- (2) Even under non-load condition, a capacitor may have charge. Also, the capacitor that has been discharged may be spontaneously recharged by dielectric absorption. Handle the capacitor after discharging with a discharge resistor.
- (3) Do not short the terminals of a capacitor by applying any conductive object. Do not spill any electric-conductive liquid such as acid or alkaline solution over the capacitor as Well.
- (4) Do not use capacitors at the following environment ;
 - ①Water, chemicals or oil spatters on the capacitors.
 - ②Direct sunlight pours down onto the capacitors.
 - ③Ozone, ultraviolet rays or radiation is applied to the capacitors.
 - ④Corrosive gas is exposed to the capacitors.

4 If a capacitor should fail while under load, follow the below

If smoke, fire or stench should be emitted while the device is operating, turn off or unplug the power supply of the device and then extinguish a fire.

5 Storage and handling

- (1) For the capacitors that are stored for more than a year, make sure of their characteristics and lead solder ability before use.
- (2) Don't increase an excessive vibration, a shock, pressure, and so on to the capacitors.
- (3) Don't add the excessive power to the lead wire.
- (4) Scratching the dielectric film of a capacitor causes If a capacitor body is scratched or damaged so deep that the dielectric film is damaged, the dielectric will be destructively damaged. Handle capacitors with care.

6 Disposal

Burning capacitors may discharge toxic gas. Ask a specialist for the disposal of industrial wastes.

7 Catalogs

Product specifications in this catalog are subject to change without notice. Please request and make sure our product specifications before purchase and/or use.

8 Response to the Substances of Concern

- (1) Nippon Chemi-Con aims for developing products that meet laws and regulations concerning substances of concern.
 (Some products may contain regulated substances for exempted application.)
 Please contact us for more information about law-compliance status.
- (2) According to the content of REACH handbook (Guidance on requirements for substances in articles which is published on May 2008), our electronic components are "articles without any intended release". Therefore they are not applicable for "Registration" for EU REACH Regulation Article 7 (1).
 Reference: Electrolytic Condenser Investigation Society
 "Study of REACH Regulation in EU about Electrolytic Capacitor"
 (publicized on 13 March 2008)