Jianghai Electrolytic Capacitors

Warranty: The information contained in this catalogue does not form part of any quotation or contract, is believed to be accurate, reliable and up to date. However, agreement on these specifications does not mean that the customer may not claim for replacement of individual defective capacitors within the terms of delivery. We cannot however assume any liability beyond the replacement of defective components. This applies in particular to any further consequences of component failure. Furthermore it must be taken into consideration that the figures stated for lifetimes and failure rate refer to the average production status and are therefore to be understood as mean values (statistic expectations) for a large number of delivery lots of identical capacitors. These figures are based on application experience and data obtained from preceding tests under normal conditions, or – for purpose of accelerated aging – more severe conditions. JIANGHAI reserves right to change these specifications without prior notice. Any application information given is advisory and does not form part of any specification. The products are not primarily designed for use in life support applications, devices or systems where malfunction of these products can reasonable be expected to result in personal injury. JIANGHAI customers using or selling these products for use in such applications without prior written consent of JIANGHAI do so at their own risk and agree fully indemnify JIANGHAI for any damages resulting from such improper use or sale. Older versions of catalogues loose automatically their validity.

Polarity: Electrolytic capacitors are polar and shall never be used with incorrect polarity, as there is a possible danger of shortening or destruction.

Voltage: The Rated Voltage should not be exceeded because the lifetime will become shorter than stated.

Surge Voltage: Maximum Voltage, which may be applied to the capacitor for short periods of time: max 1000 cycles of 30sec per 6min, max 5 pulses per hour. Capacity drift +/- 15% max.

Reverse Voltage: Electrolytic Capacitors are polar capacitors. Reverse Voltage (or AC Voltages < 0V) are not allowed.

Temperature Range: Use electrolytic capacitors only according to specified operation temperature range.

Over-Current: Currents exceeding the rated ripple currents should be avoided.

Ripple Current: The combined value of DC voltage and peak AC voltage shall not exceed the rated voltage and shall not be below 0V. Use of aluminum electrolytic capacitors under ripple current with wide amplitude is equivalent to quick charge-discharge operation. If ripple voltage with amplitude over 60Vp-p is expected please contact JIANGHAI.

Rapid Charging/Discharging: In this way of application severe heat is generated, gas may be emitted which may lead to explosion. Consult JIANGHAI about specially designed capacitors for such kind of applications.

Balancing Resistors: Consider balance resistors if capacitors are used in parallel/ serial connections. Please choose low-tolerance resistors to limit voltage drift.

Charge-Discharge Proof: JIANGHAI capacitors are charge-discharge proof, which means that 10^6 switching cycles will cause capacity reduction less than 10%.

Lifetime: There are many different lifetime definitions known without any true standard definition. Take especially care when capacitors are compared that the capacitor fulfill the needed requirements. JIANGHAI publishes all conditions to be as transparent as possible.

- **Load Life:** Period of time, during which the technical parameters of all capacitors are drifting within the given limits. JIANGHAI defines this without allowing a failure rate.
- **Useful Life:** defined like load life, but a given failure percentage of components may be drifted outside the defined limits. Useful life data are usually calculated with a confidence level of 60%. See further details in specifications and data sheets. Total failure percentage: ≤ 1%.
- **Endurance Test:** IEC 60384-4 defines the acceptable drift criteria of electrical parameters after the endurance test are defined (continuous voltage test).
- **Shelf Life:** Definition of time with acceptable drift of capacitor parameters under temperature without load at maximum temperature.

Vibration and Mechanical Stress: Capacitors are sensitive for vibration and mechanical forces applied on the leads. Do not use capacitors, which has been dropped onto a hard surface.

Insulation: If any defect of the sleeve is visible, the component should not be used – same for all kinds of damages visible. A capacitor should be electrically isolated from among the following parts: Aluminum case, cathode lead wire, anode lead wire and circuit pattern, and auxiliary terminal of snap-in type. The PVC sleeve is not recognized as an isolator and therefore the standard capacitor should not be used in a place where insulation function is needed. Please contact JIANGHAI if higher grade of insulation is required.

Environmental Condition:

- Avoid direct contact with water, salt solution, oil, dewing conditions
- Halogens generally, especially fumigation treatment with bromides must be avoided (also flame retardant agents)
- Avoid exposing to direct sunshine, Ozone, ultraviolet rays and radiation
- Air Pressure: Max: 150kPa, Min 8kPa
- No heavy air pressure changes are allowed.

Storage:

- Temperature 5 to 30°C, Humidity below 75%
- Aluminum electrolytic capacitors should not be stored in damp conditions such as water, saltwater spray or oil spray. Also do not store in an environment full of hazardous gas (hydrogen sulphide, sulphurous acid gas, nitrous acid, chlorine gas, ammonia or bromide gas, and halogens.
- Electrolytic capacitors may accumulate charge naturally during storage. In this case discharge through a 1kOhm resistor before usage (Recovery Voltage).
- Leakage current may be increased during long storage time. In this case the capacitor should be subjected to the rated voltage treatment through a 1kOhm resistor before use for 1 hour, than it should be discharged through a resistor of about 1 Ohm/Volt.
- Storage times above 1 year should be avoided or rated voltage treatment may be necessary.
- In accordance to IEC 60384-4 electrolytic capacitors are to be subjected to a reforming process before acceptance testing. Rated voltage is applied via a serial resistance (100Ω: $U_R \leq 100V_{DC}$, 1kΩ: $U_R > 100V_{DC}$)

Soldering: Soldering conditions (temperature, times) should be within specified conditions, especially for SMD components. Avoid high soldering temperatures as this may reduce lifetime or damage the capacitor. Do never dip the capacitor body into melted solder. Flux should not be adhered to capacitor's body but only to its terminals. For details and different methods please contact JIANGHAI.

Cleaning and Coating: Do not use fixing agents or cleaning substances containing halogens. Also never use solvents containing: halogenated hydrocarbons, alkali, petroleum, trichloroethylene/-ethane, xylene, acetones, trichlorotrifluoroethane, tetrachloroethylene, methylenechloride, chloroform, acetates, ketones, esters, chlorides and bromides. In case of questions see detailed instructions.

Mounting: Other devices, which are mounted near the capacitor, should not touch the capacitor. Additional heat coming from other components near the capacitor may have an impact on lifetime of the capacitor. Do never bend or twist the capacitor after soldering to avoid stress on the leads. Larger can sizes should only be built in an upright position with connectors on top. No printed board circuit tracks are allowed between the lead pads of the capacitor.

Maintenance: Periodical inspection should be carried out for the capacitor: visual inspection to check pressure relief open or leakage of electrolyte, electrical characteristics as leakage current, capacitance, and dissipation factor.

Electrolyte and Separator Paper: Electrolyte and separator paper used in aluminium capacitors may be flammable. Also electrolyte is electrically conductive. Therefore in case electrolyte gets in contact with PC board it may cause corrosion of circuit pattern or short circuit between patterns, and may lead to smoke generation or ignition in worst case.

Caution during Use of Capacitors: Do not touch the terminals of capacitors. Keep the capacitor free from conductive solution, such as acids, alkali and so on. Ensure that the operational environment of the equipment in which the capacitor has been built is within the specified condition mentioned in the catalogue or specification sheets.

Vent: The vent needs a space to work well. Make enough space of more than 2mm for diameter ≤16mm, more than 3mm for diameter 18-35mm, more than 5mm for case diameter 40mm and larger.

Emergency Actions: When the pressure relief vent is open, gas blows out of the capacitor. Turn the main switch of the equipment off or pull out the plug from the power outlet immediately. During pressure relief vent operation, extremely hot gas (>100°C) may blow out of the capacitors. Do not stand close to the capacitors. In case of eye contact, flush the open eye(s) with large amount of clean water immediately. In case of ingestion, gargle with water immediately, do not swallow. Do not touch electrolyte but wash skin with soap and water in case of skin contact.

Definition of Electrical Parameters:
Separate documents as application notes, equivalent circuit diagrams and so on are available on request.