



Application Guidelines

Specialty Polymer Aluminum Electrolytic Capacitor should be used in compliance with the following guidelines.

1. Circuit Design

1.1 Prohibited Circuits for use

Do not use the capacitors in the following circuits.

- (1) Time-constant circuits
- (2) Coupling circuits
- (3) 2 or more capacitors connected serially
- (4) Circuits which are greatly affected by leakage current

1.2 Voltage

The application of over-voltage and reverse voltage described below can cause increases in leakage current and short circuits.

Applied voltage, refers to the voltage value including the peak value of the transient instantaneous voltage and the peak value of ripple voltage, not just steady state line voltage.

Design your circuit so that the peak voltage does not exceed the specified voltage.

[Over-voltage]

Do not apply voltage in excess of the rated voltage.

Use at 85% or less of the rated voltage for H-Series 125°C rating, 15% voltage derating is required.

[Derating]

Voltage derating may be required depending on the operating temperature over 105 °C (25% voltage derating at 125 °C).

1.3 Ripple Current

Use the capacitors within the stipulated, permitted ripple current.

When excessive ripple current is applied to the capacitor, it causes increases in leakage current and short circuits due to self-heating.

Even when using the capacitor under the permissible ripple current, reverse voltage may occur if the DC bias voltage is low.

1.4 Leakage Current

There is a risk of leakage current characteristics increasing even if the following usage conditions or environments are within the stipulated range.

However, even if leakage current increases once, it has the characteristic that leakage current becomes small in most cases after voltage is applied due to its self-correction mechanism.

- (1) After re-flow
- (2) Shelf conditions such as (1) high temperature with no load, (2) high temperature high humidity with no load and (3) sudden temperature changes.

1.5 Failure Rate

The majority of failure modes are short circuits or an increase in leakage current.

The main factors of failure are mechanical stress, heat stress, and electrical stress due to re-flow heat and heat from the operating environment temperature.

Even within the stipulated limits, it is possible to lower the failure rate by reducing usage conditions such as temperature and voltage. Please be sure to have ample safety margins in your design.

[Expected Failure Rate]

- (1) Data based on our reliability tests: 46FIT or less (Based on applied rated voltage at 105°C)
- (2) Market failure rate : 0.13FIT or less (Based on c=0, Reliability standard : 60%)

Always consider safety when designing equipment and circuits. Plan for worst case failure modes such as short circuits and open circuits which might occur during use.

- (1) Provide protection circuits and protection devices to allow safe failure modes.
- (2) Design redundant or secondary circuits where possible to assure continued operation in case of main circuit failure.

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2. Usage & Storage Conditions and Soldering

2.1 Storage

Products should be stored in a moisture proof environment. Storage conditions before and after opening the moisture proof packaging should be maintained as follows. (If these conditions are exceeded, the package may absorb moisture and there is a risk of damage to the exterior due to heat stress during mounting.)

[Environment of storage]

Temperature: 5°C to 30°C without direct sunlight

Humidity : Less than 70%RH

Maximum storage term and condition before opening the package:

2 years after manufacture

(JEDEC J-STD-020B MSL: Level 2)

Maximum storage term and condition after opening the package:

Less than 14 days*

(JEDEC J-STD-0208B MSL: Level 3)

* Series FD, H, and CD(12.5V & 16V) : 7 days or less

All products should be used within the storage term after opening the package.

After the storage limit, baking treatment is necessary to be able to use the products.

The storage conditions after baking are the same as those after opening the package.

[Baking conditions]

Temperature: 50 ± 2°C

Time: 100 to 200 hours

(Do not perform more than twice.)



2.2 Temperature

Use at or under the rated (guaranteed) temperature. Operation at temperatures exceeding specifications causes large changes in the capacitors electrical properties, and deterioration that can potentially lead to failure.

When calculating the operating temperature of the capacitor, be sure to include not only the ambient temperature and internal temperature of the unit, but also radiation from heat generating elements inside the equipment (power transistors, resistors, etc.), and self-heating due to ripple current.

2.3 Capacitor Mounting

(1) Land Size

Refer to the land size table for appropriate design dimensions. Circuit board design requires examination of the most suitable dimensions taking conditions such as circuit board, parts and re-flow into consideration. These products are designed specifically for re-flow soldering.

Consult with our factory before performing mounting processes other than re-flow soldering.

(2) Heat stress of re-flow, etc.

Specified re-flow conditions must be strictly observed. Soldering under other conditions can cause short circuits and increases in ESR.

(3) Repair and modification by soldering iron

When using a soldering iron, set the tip temperature to no more than 350°C, and work in as short a time as possible under 10 seconds. While soldering, do not apply strong force to the capacitor.

(4) Mechanical stress

Do not apply excessive force to the capacitor, since this can damage the electrodes and adversely affect the capacitor's mountability. It can also cause an increase of leakage current, separation of the lead wire and element, and damage to the capacitor body, all of which can adversely affect the electrical performance of the capacitor.

2.4 Transportation

Take sufficient care during handling because excessive vibration, and/or shock can cause the reliability of the capacitor to decrease.

2.5 Circuit Board Cleaning

Products should be cleaned after soldering in accordance with the following conditions.

Temperature: Less than 60°C

Time: Within 5 minutes (Ultrasound OK)

Be sure to sufficiently wash and dry (20 min. at 100°C) the board afterward.

[Recommended cleaning solvents]

Pine Alpha ST-100S, Sunelec B-12, DK beclear CW-5790, Aqua Cleaner 210SEP, Cold Cleaner P3-375, Telpen Cleaner EC-7R, Clean-thru 750H, Clean-thru 750L, Clean-thru710M, Techno Cleaner 219, Techno Care FRW-17, Techno Care FRW-1, Techno care FRV-1, AXREL32

Note 1 : Consult our factory when performing processes with cleaning solvents other than those listed above.

2 : The use of ozone depleting cleaning agents are not recommended in the interest of protecting the environment.

3. Others

3.1 Precautions for using capacitors

Capacitors are not to be used in the following environments.

- (1) Environments where the capacitor is subject to direct contact with water, salt water or oil.
- (2) Environments where capacitors are exposed to direct sunlight.
- (3) High temperature, or humid environments where condensation can form on the surface of the capacitor.
- (4) Environments where the capacitor is in contact with chemically active gases.
- (5) Acidic or alkaline environments.
- (6) Environments subject to high-frequency induction.
- (7) Environments subject to excessive vibration and/or shock.

3.2 Emergency Procedures

If the capacitor is overheated, the resin case may emit smoke. If this occurs, immediately switch off the equipment's main power supply to stop operation. Keep your face and hands away from the capacitor, since the temperature may be high enough to cause the capacitor to ignite and burn.

3.3 Capacitor Disposal

Since capacitors are composed of various metals and resins, treat them as industrial waste when arranging for their disposal.

3.4 Using Capacitor for Applications which Can Affect Human Life

Consult with our factory before use in applications which can affect human life.

Don't use for control circuits which affect human life, such as medical equipment, airplanes, etc. without consent of our company.