

Notices

■ Applicable laws and regulations

- This product satisfies the requirements of the RoHS Directive (2002/95/EC) (related to the specified hazardous substances contained in electrical and electronic equipment).
- The ozone-depleting chemicals regulated by the Montreal Protocol are not intentionally used in the materials used in our manufacturing processes.
PBDEs (Poly-Brominated Biphenyls) / PBDEs (Poly-Brominated Diphenyl ethers)
The above specified brominated flame retardants are not intentionally used.
- The materials used in this product are all referred to as existing chemicals by the Law Concerning Examination and Regulation of Manufacture and Handling of Chemical Substances.
- When exporting this product, observe the export procedures specified in export control laws such as the Foreign Exchange and Foreign Trade Control Law.

■ Limited applications

- This product is intended to be used for general-purpose standard applications for general electronic equipment (such as AV equipment, household appliances, business or office equipment, information or communications equipment, etc.)
- If this product is being examined for possible use in applications where higher reliability or safety is required, in cases where a malfunction of this product may endanger life or property, then the delivery specifications meeting the application requirements must be agreed to and exchanged.

■ Country of Origin and Manufacturing Facility

Country of origin: Japan and Singapore Name of factory:

- Panasonic Electronic Devices Co., Ltd.
Capacitor Business Unit
25 Nishinaka Kowata
Uji City, Kyoto 611-8585 JAPAN
- Panasonic Electronic Devices Singapore Pte. Ltd. (PEDSG)
No.3 Bedok South Road, Singapore 469269
THE REPUBLIC OF SINGAPORE

Items to be observed

- <1> The purpose of these specifications is to ensure the quality of components as individual components. Before use, check and evaluate their operation when mounted on your products.
- <2> Do not use our components outside of the corresponding specifications.

■ When using this capacitor in a product where safety is critical

We take great care in the quality of this product. However, performance may deteriorate and short-circuiting or open-circuiting may occur if it will be used in transportation equipment (e.g. trains, cars, traffic lights), airborne equipment, aerospace equipment, electric heating appliances, combustion/gas equipment, rotating equipment, disaster/crime prevention equipment, or other equipment where a defect in this component may cause the loss of human life or other significant damage. Ensure that the target equipment has a failsafe design and is provided with the following systems to guarantee adequate safety.

- (1) * Ensure the safety of the whole system by installing a protection circuit and a protection device.
- (2) Redundant circuits, etc. to maintain the safety of the entire system so that a single independent failure will not lead to unsafe conditions.

■ Conditions of use:

This product is intended to be used in electronic equipment for general-purpose standard applications and is not designed for use in any special environments.
When this capacitor is used in a special environment or under special conditions, its performance may be affected.
Before use, verify the performance and reliability of the capacitor

⚠ Application Guidelines

1. Circuit design

1-1 Prohibited circuits for use

Polymer Aluminum capacitors (SP-Cap) are expected to malfunction in the following circuits. Therefore, their use is prohibited.

- (1) Time constant circuits
- (2) Coupling circuits
- (3) Capacitors connected in series
- (4) Circuits significantly affected by leakage current
- (5) High-impedance voltage retention circuits

1.2 Polarity and voltage The SP-Cap has polarities.

Do not apply a reversed or alternating-current voltage.

If the polarity is reversed, then a leakage current may occur, leading to short-circuiting or capacitor breakdown.

Do not apply an excessive voltage (a voltage exceeding the rating).

“Applied voltage” refers to a voltage containing a peak transient instantaneous voltage and a peak ripple voltage.

It does not only refer to a stationary line voltage. Design circuits so that peak voltages do not exceed the specified voltage.

1.3 Ripple current

Observe the allowable ripple current.

If an excessive ripple current passes through the SP-Cap, then self-generated heat may cause a current leak or a short-circuit. While observing the allowable ripple current, do not apply a ripple voltage as described in paragraph 1.2.

1.4 Leakage current

The leakage current may increase even if the following usage environment is within the specified requirements.

However, even if the leakage current increases, the capacitor’s self-repairing function will reduce the leakage current in most cases when a voltage is applied.

- (1) After reflow soldering
- (2) Unloading conditions such as unloading at a high temperature, high temperature and humidity, rapid temperature change, etc.

1.5 Temperature

Use capacitors within the specified temperature range. If they are used outside the specified temperature range, then the electrical characteristics may vary or deteriorate significantly, leading to failure.

The temperature referred to here includes the ambient temperature including heat produced by heat generating devices (power transistors, resistors, etc.), self-heating due to ripple currents, etc.

Take these factors into consideration when checking the capacitor temperature.

1.6 Failure rate

Most failure modes are “short-circuits” and “leakage current increase”. The main causes of failure include thermal stress due to reflow soldering, the temperature of the environment they are being used in, and/or electrical or mechanical stress. Using lower temperatures and voltages even within the specified range enables the defect rate to be reduced. Therefore, provide such allowances during design.

[Estimated defect rate] (Reference)

- (1) Data in our reliability tests/46 Fits or less
(Estimation with a rated voltage being applied at 105 °C)
- (2) Estimated defect rate in the market/0.13 Fits or less
($c=0$, estimation with a reliability level of 60 %)

2. Mounting

2.1 When mounting

- (1) Check the capacitor ratings (capacitance and voltage) before mounting.
- (2) Check the capacitor polarity before mounting.
- (3) Check the land size for the capacitor before mounting.
- (4) When using a mounter, if the pressure for mounting is too high, then the current leak may increase, short-circuiting may occur, or the capacitor may break down or come off.

2.2 Soldering (reflow soldering)

(1) The SP-Cap is to be used exclusively for reflow soldering. When reflow soldering, use an ambient heat conduction system such as the simultaneous use of infrared and hot-air and not a steam heat conduction system (VPS).

* This capacitor cannot be used for flow or dip soldering.

- (2) Solder capacitors under these soldering conditions (pre-heating, main-heating temperatures and time) described in the specifications.
- (3) Reflow-solder only twice.
- (4) Do not reuse the mounted SP-Cap.
- (5) When modifying or correcting by using a soldering iron, etc.:
Use a soldering iron of 30 W or less, whose iron tip temperature is 350 °C or less. Total soldering time should be no longer than 10 seconds. Do not apply excessive force to the capacitor.

2.3 Circuit board cleaning

Apply the following conditions for flux cleaning after soldering.

Temperature: 60 °C or less, duration: Five minutes or less (Ultrasonic wave may be used.)

However, rinse sufficiently and dry the boards (at 100 °C for 20 minutes or less).

[Applicable solvents]

Pine Alpha ST-100S

Clean-thru 750H, 750L, or 710M

Aqua Cleaner 210SEP

Sunelec B-12, DK

Beclear CW-5790

Techno Cleaner 219

Cold Cleaner P3-375

Telpene Cleaner EC-7R

Technocare FRW-17, FRW-1, or FRV-1

AXREL 32

Remarks 1: If you wish to use solvents other than the above, please contact us.

2: Please do not use ozone-depleting chemicals in order to protect the environment.

2.4 Capacitor handling after soldering

(1) Do not apply an excessive force to the capacitor.

Deformed electrode terminals can affect mounting. Short-circuiting, wire breaking, leakage current increase, or damage to the exterior may be caused.

After mounting the capacitor, do not hold its body or apply a force to it.

3. Precautions for using equipment

3.1 Avoid using equipment to which capacitors are fitted in the following environments.

<1> Capacitors are directly exposed to water, salt water, or oil.

<2> Capacitors are exposed to direct sunlight.

<3> Capacitors are exposed to high temperature and humidity and the capacitor surface is condensed.

<4> Capacitors are exposed to various active gases.

<5> Acidic or alkaline environments

<6> Capacitors are subject to high-frequency induction.

<7> Capacitors are subject to excessive vibrations or shocks.

4. Emergency procedures

If the capacitors generate heat, smoke may come out of the exterior resin. If this is the case, then turn off the equipment immediately and stop using it.

Do not place your face or hands close to the capacitor. Otherwise, burns may be caused.

5. Storage

This product must be stored in an environment with controlled moisture protection.

This product must be stored as follows before and after moisture-protection packing is applied.

(If these requirements are not met, then thermal stress caused by moisture absorption of the package may damage the exterior or the internal elements.)

[Storage environment]

Temperature: 5 to 30 °C, humidity: 70 % or less

Storage period before opening the moisture protection seal: 2 years after manufacturing

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

Storage period after opening the moisture protection seal: 14 days*

(JEDEC J-STD-020C MSL: Level 3)

* The FD, H, and CD series (12.5 V and 16 V) and the capacitors for reflow 260 °C soldering must be used within 7 days (JEDEC J-STD-020C MSL: Level 3).

If the storage period has passed, then the capacitors may be used after performing the baking operation.

Observe the storage period after the sealing is opened.

[Baking conditions]

Temperature: 50±2 °C, Time: 100 to 200 hours (Up to twice)

6. Discarding

Dispose of capacitors as industrial waste because they consist of various metals and resin.

The precautions for the use of functional polymer aluminum electrolytic capacitors follow the "Precautionary guidelines for the use of fixed aluminum electrolytic capacitors for electronic equipment", PCR- 2367B issued by EIAJ in March 2002. Please refer to the above guidelines for details.