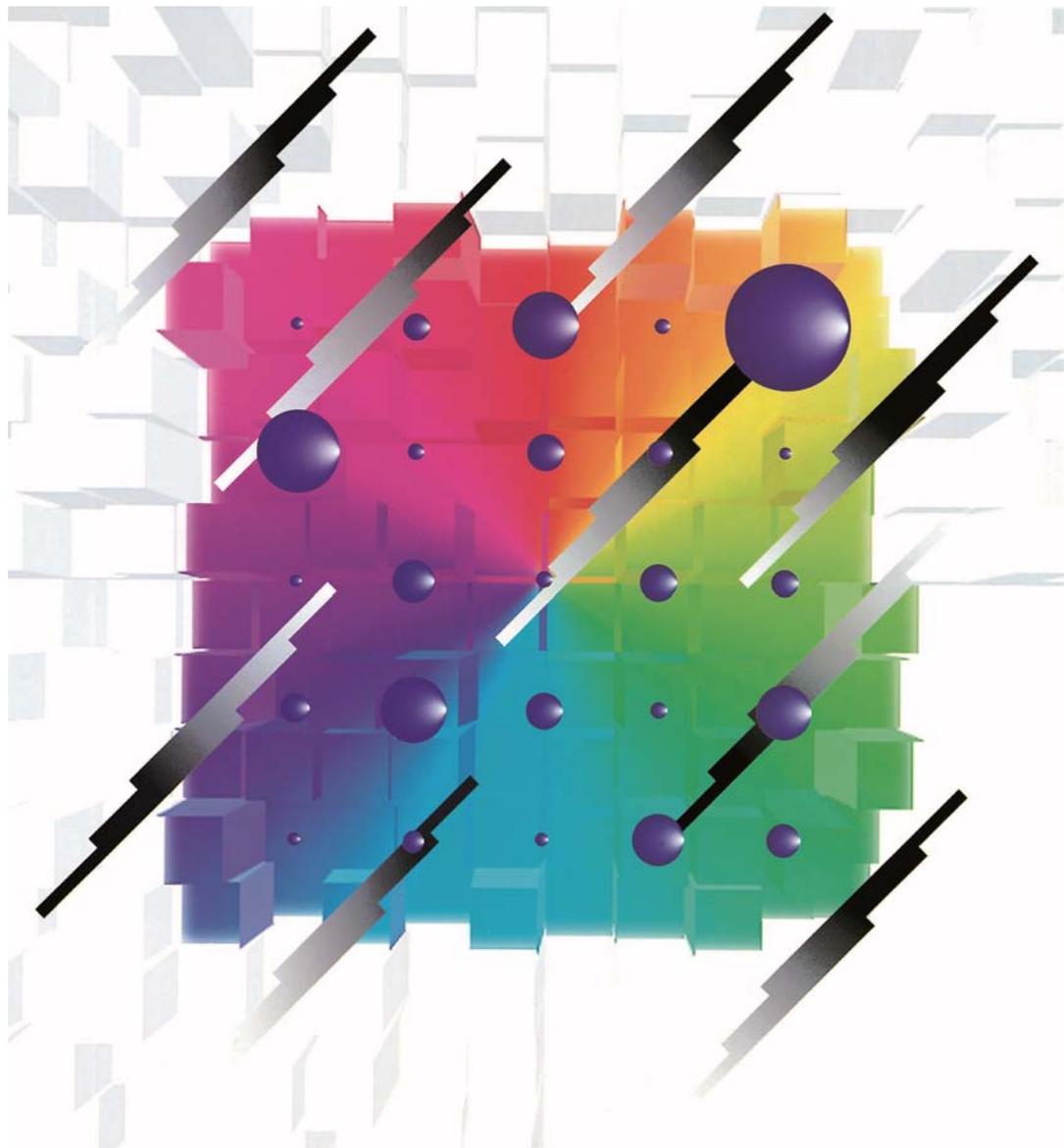


Gold Capacitors

Electric Double Layer Capacitors



Notices

■ Applicable laws and regulations

- This product complies with the RoHS Directive (Restriction of the use of certain hazardous substances in electrical and electronic equipment (DIRECTIVE 2011/65/EU).
- No Ozone Depleting Chemicals(ODC's), controlled under the Montreal Protocol Agreement, are used in producing this product.
We do not use PBBs or PBDEs as brominated flame retardants.
- Export procedure which followed export related regulations, such as foreign exchange and a foreign trade method, on the occasion of export of this product.
- These products are not dangerous goods on the transportation as they don't have an energy storage capacity greater than 0.3Wh (UN3499).

■ Limited applications

- This capacitor is designed to be used for electronics circuits such as audio/visual equipment, home appliances, computers and other office equipment, optical equipment, measuring equipment.
- High reliability and safety are required [be / a possibility that incorrect operation of this product may do harm to a human life or property] more. When use is considered by the use, the delivery specifications which suited the use separately need to be exchanged.

Items to be observed

■ For specification

- This specification guarantees the quality and performance of the product as individual components.
Before use, check and evaluate their compatibility with installed in your products.
- Do not use the products beyond the specifications described in this document.

■ Upon application to products where safety is regarded as important

Install the following systems for a failsafe design to ensure safety if these products are to be used in equipment where a defect in these products may cause the loss of human life or other signification damage, such as damage to vehicles (automobile, train, vessel), traffic lights, medical equipment, aerospace equipment, electric heating appliances, combustion/ gas equipment, rotating rotating equipment, and disaster/crime prevention equipment.

- (1) The system is equipped with a protection circuit and protection device.
- (2) The system is equipped with a redundant circuit or other system to prevent an unsafe status in the event of a single fault.

■ Conditions of use

- Before using the products, carefully check the effects on their quality and performance, and determined whether or not they can be used. These products are designed and manufactured for general-purpose and standard use in general electronic equipment. These products are not intended for use in the following special conditions.
 - (1) In liquid, such as Water, Oil, Chemicals, or Organic solvent.
 - (2) In direct sunlight, outdoors, or in dust.
 - (3) In vapor, such as dew condensation water of resistive element, or water leakage, salty air, or air with a high concentration corrosive gas, such as Cl₂, H₂S, NH₃, SO₂, or NO_x.
 - (4) In an environment where strong static electricity or electromagnetic waves exist.
 - (5) Mounting or placing heat-generating components or inflammables, such as vinyl-coated wires, near these products.
 - (6) Sealing or coating of these products or a printed circuit board on which these products are mounted, with resin and other material.
 - (7) Using res solvent, water or water-soluble cleaner for flux cleaning agent after soldering. (In particular, when using water or a water-soluble cleaning agent, be careful not to leave water residues)
 - (8) Using in the atmosphere which strays acid or alkaline.
 - (9) Using in the atmosphere which there are excessive vibration and shock.
- Please arrange circuit design for preventing impulse or transitional voltage.
Do not apply voltage, which exceeds the full rated voltage when the capacitors receive impulse voltage, instantaneous high voltage, high pulse voltage etc.
- Our products there is a product are using an electrolyte solution. Therefore, misuse can result in rapid deterioration of characteristics and functions of each product. Electrolyte leakage damages printed circuit and affects performance, characteristics, and functions of customer system.

⚠ Application Guidelines (Gold Capacitor)

1. Circuit design

1.1 Product Life

The life of an electric double layer capacitor is limited. Its capacitance will decrease and its internal resistance will increase over time.

The life of a capacitor greatly depends on the ambient temperature, humidity, applied voltage and discharging currents. Capacitor life can be extended when these parameters are set well below the ratings.

The guaranteed durability of electric double-layer capacitors is between 1000 hours at 70 °C and 6000 hours at 85 °C, depending on product series. Generally, it is 1000 hours at 70 °C. The life of the capacitor is guaranteed to be 16000 hours at a normal temperature (30 °C) by applying the acceleration double for every 10 °C. Please choose the product that is suitable for the reliability that you need.

If your application incorporates this capacitor over a long period of time, then check it periodically and replace it when necessary.

1.2 Polarity and voltage

Capacitors have polarities.

Do not apply a reverse or AC voltage. If a reversed voltage is applied to a capacitor for a long period of time, then its life will be reduced and critical failures such as electrolyte leakage might occur.

Do not apply an over-voltage (a voltage exceeding the rated voltage).

If voltage exceeding the rating is applied to the capacitor for a long time, then its life will be reduced and critical failures such as electrolyte leakage or physical damage due to gas generated by electrochemical reaction or explosion might occur.

1.3 Circuits through which ripple currents pass

When using a capacitor in a circuit through which ripple currents pass, please note following matters.

- (1) The internal resistance of electric double-layer capacitors is higher than that of electrolytic capacitors. Electric double-layer capacitors may generate heat due to ripple currents.
- (2) Please do not exceed the maximum operating voltage when the voltage changes from ripple.
- (3) Because internal resistance is high, the gold capacitor is not basically suitable for the absorption of ripple current.

1.4 Ambient temperature and product life

Capacitor life is affected by usage temperatures. Generally speaking, capacitor life is approximately doubled when the temperature is decreased by 10 °C. Therefore, lower the usage temperature as much as possible. Using capacitors beyond the guaranteed range might cause rapid deterioration of their characteristics and cause them to break down. The temperature referred to here includes the ambient temperature within the equipment, the heat produced by heat generating devices (power transistor, resistors, etc.), self-heating due to ripple currents, etc. Take all of these factors into consideration when checking the capacitor's temperature.

Do not place any heat generating devices on the back of the capacitors. Life acceleration can be calculated with the following equation :

$$L_2 = L_1 \times 2^{\left(\frac{T_1 - T_2}{10}\right)}$$

L_1 : Life at temperature T_1 °C (h)

L_2 : Life at temperature T_2 °C (h)

T_1 : Category s upper limit temperature

T_2 : Ambient temperature to calculate the life + heat generation due to ripple current (°C)

* Humidity also affects the capacitor's life. When using capacitors outside the following conditions, please contact us. A temperature at +55 °C and a relative humidity of 90 % to 95% for 500 hours.

Series	Max. Discharging Current				
	0.047 F or less	0.1 F to 0.33 F	0.47 F to 1.5 F	3.3 F to 4.7 F	10 F to 100 F
SG/SD/SE/NF/F	200 μA	300 μA	1 mA	—	—
RF (-40 °C, -25 °C)	—	300 μA, 3 mA	1 mA, 20 mA	—	—
LF (-40 °C)	—	—	1 mA	—	—
RG (-40 °C, -25 °C)	—	300 μA, 1 mA	1 mA, 20 mA	—	—

* The result that a very long term backup can be expected in calculation might be obtained by use conditions. However, please consider checking regularly and exchanging it when using it for the set that long-term reliability is basically demanded from the Gold Capacitor.

1.5 Voltage drop

Pay particular attention to the instantaneous working current and the voltage drop due to the capacitor's internal resistance when used in backup mode. The discharging current level is different depending on the capacitor's internal resistance. Use a capacitor with a discharging current below what is specified by the corresponding capacitor.

1.6 Series connection

When connecting capacitors in series, add a bleeder resistor in parallel with each capacitor by taking the leakage current into consideration so that the balance of voltages is not disrupted.

* Please present use condition about HZ/HW/HL series, and please contact us.

1.7 Electrolyte is used in the products

Electrolyte is used in the capacitors. Electrolyte leakage will damage printed circuit boards and can affect their performance, characteristics, and functions.

1.8 External sleeve

The external sleeve is not electrical insulation, and thus capacitors should not be used in an environment that requires electrical insulation. The sleeve is covered only for showing ratings.

2. Mounting

2.1 Heat stress at the soldering

When soldering a capacitor to a printed circuit board, excessive heat stress could cause the deterioration of the capacitor's electrical characteristics. For example the integrity of the seal can be compromised causing the electrolyte to leak, and short circuits could occur in addition to and failure of the appearance.

Please observe the following guidelines.

(1) Manual soldering

Do not touch the capacitor body with a soldering iron. Solder the capacitor using a soldering tip temperature of 350 °C or less for 4 seconds or less. Solder a the capacitor three times or less at intervals of 15 seconds or more.

(2) Flow soldering

- 1) Do not dip the body of the products into a soldering bath.
- 2) Keep the product's surface temperature at or below 100 °C for no more than 60 seconds (the peak 105 °C) when soldering. Please refer to the chart at right to set soldering temperature and time. It is recommended to check the product temperature before you use.
- 3) The terminals of the NF/F/RF/LF type are designed so the bottom of the product floats from the PWB. This is to protect against heat stress during soldering. Do not touch the bottom of the product directly to the PWB.

(3) Other heat stress

- 1) Keep the product's surface temperature at or below 100 °C for no more than 60 seconds (the peak 105 °C) when applying heat to bake the PWB or fixing resin, etc. The capacitor voltage must be 0.3 V or less.
- 2) Do not use a product more than once after it has been mounted on the PWB. Excessive heat stress is applied when detaching it from the PWB. Please observe "(1) Manual soldering" when you adjusting it.
- 3) Be sure that excessive heat stress is not applied to the Gold capacitor when other parts in its surroundings of the Gold capacitor are detached or adjusted.

(4) Others

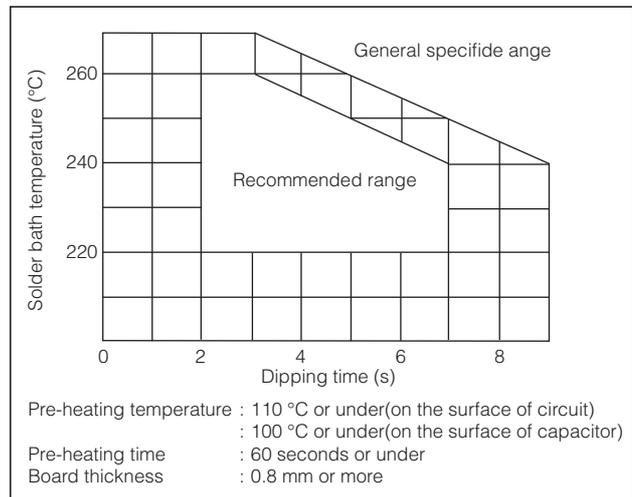
- 1) The lead wires and terminals are plated for solderability. Rasping or filing lead wires or terminals might damage the plating layer and degrade the solderability.
- 2) Do not apply a large mechanical force to the lead wires or terminals. Otherwise, they may break or come off or the capacitor characteristics may be damaged.
- 3) There is a possibility that the sealing performance of the product is deteriorated if a coating material that contains an organic solvent is used.

2.2 Circuit Design

Do not set wiring pattern directly under the mounted capacitor, and pass between terminals. If the electrolyte leaks, short circuit might occur and tracking or migrations are anticipated. If a capacitor is directly touching a PWB, then the bottom of the capacitor and the circuit pattern may short-circuit. On PWBs, blowing flux or solder may cause the capacitor's external sleeve to break or shrink, potentially affecting the internal structure. In addition, please refer to application guidelines for the aluminum electrolytic capacitor.

2.3 Residual voltage

Gold Capacitors can hold a large charge and could have residual voltage. Therefore, some electronic components with a low withstand voltage, such as semi-conductors, might be damaged.



2.4 Circuit board cleaning

Apply the following conditions for flux cleaning after soldering. (Excepted for NF/F/RF/LF series)

Please examine the SG/SD/RG series when washing is necessary.

Temperature : 60 °C or less

Duraiton : 5 minutes or less

Rinse sufficiently and dry the boards.

[Recommended cleaning solvents include]

Pine Alpha ST-100s, Sunelec B-12, DK be-clear CW-5790, Aqua Cleaner 210SEP, Cold Cleaner P3-375, Cclean-thru 750H, Clean-thru 750L, Clean-thru 710M, Techno Cleaner219, Techno Care FRW-17, Techno Care FRW-1, Techno Care FRV1

● Consult with us if you are using a solvent other than any of those listed above or Deionized water.

● The uses of ozone depleting cleaning agents is not recommended in the interest protecting the environment.

3. Precautions for using equipment

Avoid using mounting equipment in environments where :

(1) Capacitors are exposed to water, salt water or oil.

(2) Capacitors are exposed to direct sunlight.

(3) Capacitors are exposed to high temperature and humidity where water can condense on the capacitor surface.

(4) Capacitors are subject to various active gases.

(5) Capacitors are exposed to acidic or alkaline environments.

(6) Capacitors are subject to high-frequency induction.

(7) Capacitors are subject to excessive vibrations or mechanical impact.

A brown excretion might be caused around the sealing, depending on the conditions of use. This excretion is insulation and does not have influence on the electrical characteristics.

4. Maintenance Precautions

Periodically check capacitors used in industrial equipment. When checking and maintaining capacitors, turn off the equipment and discharge the capacitors beforehand. Do not apply stress to the capacitor lead terminals.

Periodically check the following items.

1) Significant appearance abnormalities (deformation, electrolyte leakage, etc.)

2) Electrical characteristics (described in the catalog or delivery specifications)

If any abnormalities are found, then replace the capacitors or take appropriate actions.

5. Emergency procedures

If the capacitors generate heat, then smoke may come out of the exterior resin. Under these conditions turn off the equipment immediately and stop using it.

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

6. Storage

Do not store capacitors in a high-temperature or high-humidity environment. Store capacitors at a room temperature of 5 to 35 °C and a relative humidity of 85 % or less. (Recommended storage term: 1year or less.) Store capacitors in their packaging as long as possible. Avoid storing capacitors under the following conditions.

(1) Exposed to water, high temperatures or humidity, or when condensation can occurs.

(2) Exposed to oil or in environments filled with gaseous oil contents.

(3) Exposed to salt water or environments filled with saline substances.

(4) In environments filled with harmful gases

(hydrogen disulfide, sulfurous acid, nitrous acid, chlorine, bromine, bromomethane, etc.)

(5) In environments filled with harmful alkaline gases such as ammonia.

(6) Exposed to acid or alkaline solvents.

(7) Exposed to direct sunlight, ozone, ultraviolet or radial rays.

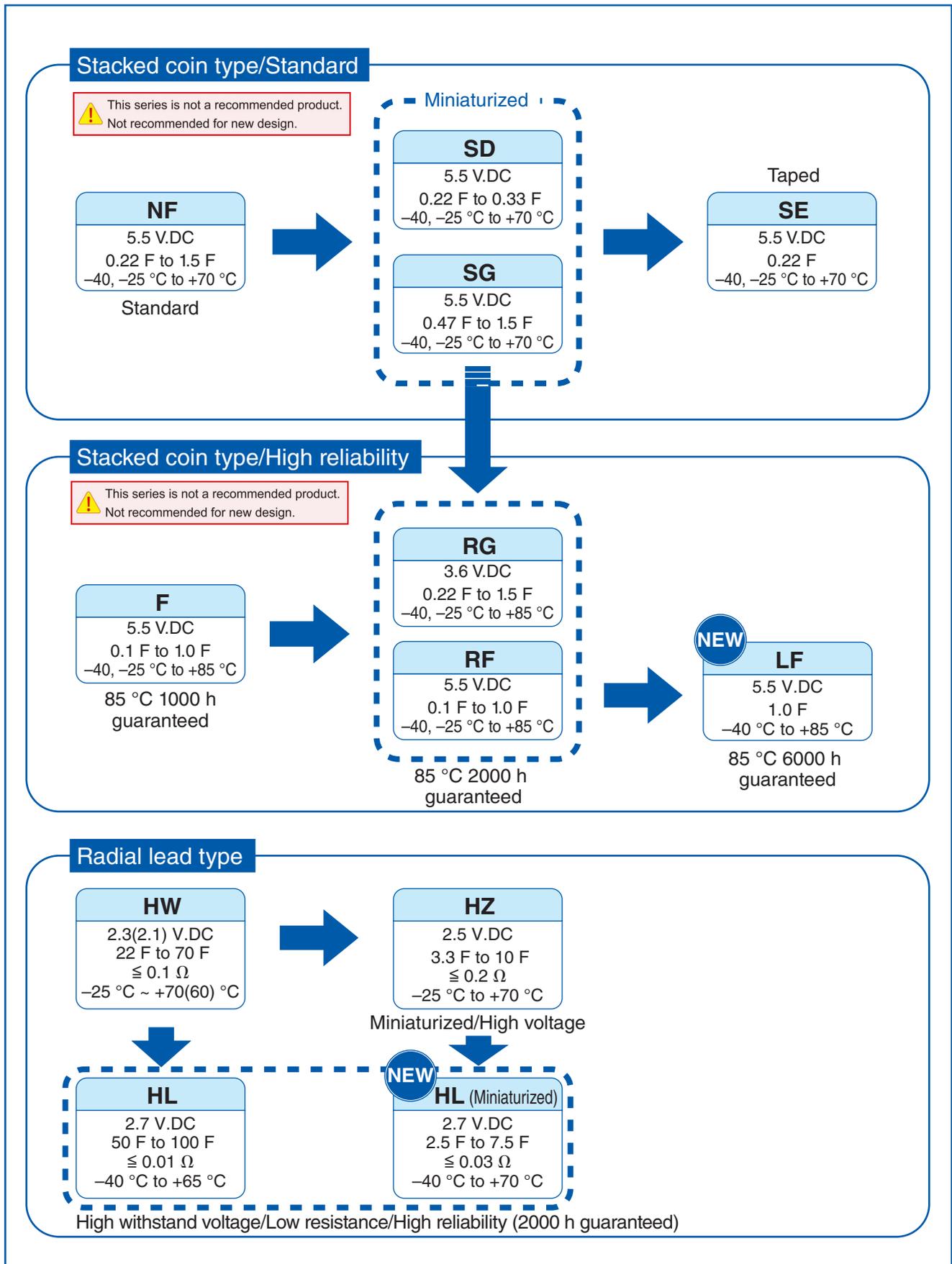
(8) Exposed to vibration or mechanical impact.

7. Discarding

Dispose of capacitors as industrial waste. They are comprised of various metals and resin.

The precautions for the use of Electric Double Layer Capacitors (Gold Capacitors) follow the "Precautionary guidelines for the use of fixed Electric Double Layer Capacitors for electronic equipment", RCR-2370C issued by EIAJ in July 2008. Please refer to the above guidelines for details.

Diagram



Panasonic Electric Double Layer Capacitors (Gold Capacitors)

Explanation of part numbers

Part number system

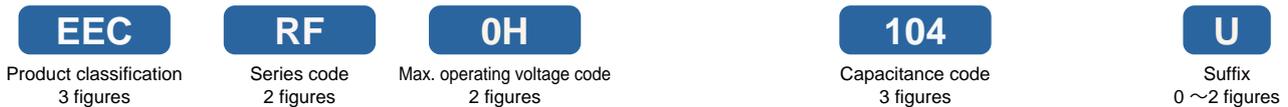
【 Multilayer Coin Type 】

**⚠ This series is not a recommended product.
Not recommended for new design.**

◇ Series : RG



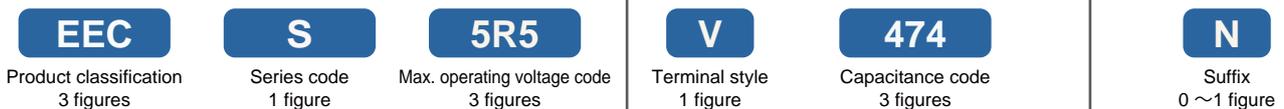
◇ Series : RF、SE



◇ Series : SD



◇ Series : SG



◇ Series : NF、F



Series	Code
RG (-25°C to +85 °C : 2000 h)	RG
RF (-25°C to +85 °C : 2000 h)	RF
SE (-25°C to +70 °C : 1000 h)	SE
SG (-25°C to +70 °C : 1000 h)	S
F (-25°C to +85 °C : 1000 h)	①F ②H
NF (-25°C to +70 °C : 1000 h)	①F ②U
SD (-25°C to +70 °C : 1000 h)	①S ②D

Max. operating voltage (V.D.C)	Code
3.6	0V
5.5	0H
5.5	5R5

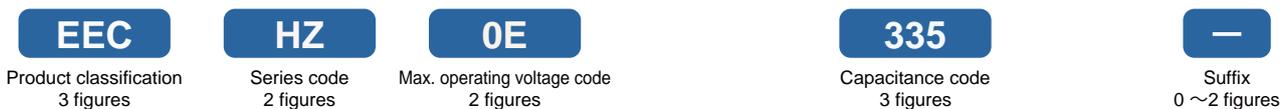
Capacitance (F)	Code
0.1	104
0.22	224
0.33	334
0.47	474
0.68	684
1.0	105
1.5	155

* Terminal style (RG, SG, SD)
V or H

* Suffix (Series common)
N : Low temperature guarantee (-40°C to)

【 Wound Type 】

◇ Series : HZ、HW、HL



Series	Code
HZ (-25°C to +70 °C : 1000 h)	HZ
HW (-25°C to +60 °C(+70°C) : 1000 h)	HW
HL (-40°C to +65 °C : 2000 h)	HL

Max. operating voltage (V.D.C)	Code
2.1	0D
2.3	0D
2.5	0E
2.7	0E

Capacitance (F)	Code
3.3	335
4.7	475
10	106
22	226
30	306
50	506
70	706
100	107

Stacked Coin Type

! This series is not a recommended product.
Not recommended for new design.

Series : **RG** Low temperature assured product



Features

- Endurance : +85 °C 2000 h
- Category temperature range : -40 °C to +85 °C
- RoHS compliant

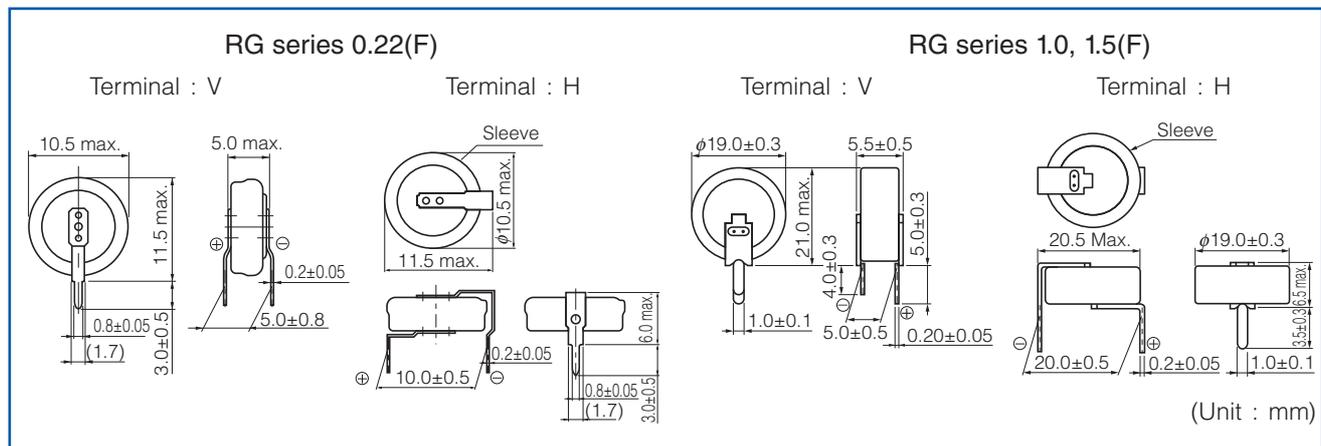
Recommended applications

- Backup of data/RTC of base station, electronic meter, and industrial equipment

Specifications

Category temp. range	-40 °C to +85 °C	
Maximum operating voltage	3.6 V.DC	
Nominal capacitance	0.22 F	1.0 F, 1.5 F
Characteristics at low temperature	Capacitance change	±30 % of initial measured value at +20 °C (at -40 °C)
	Internal resistance	≤ 7 times of initial measured value at +20 °C (at -40 °C)
Endurance	After 2000 hours application of maximum operating voltage at +85 °C	
	Capacitance change	±30 % of initial measured value at 20 °C
Shelf life	After 2000 hours storage at +85 °C without load (voltage)	
	Capacitance change	Capacitance change shall meet the specified limits for Endurance
	Internal resistance	Internal resistance shall meet the specified limits for Endurance

Dimensions in mm(not to scale)



Characteristics list

Maximum operating voltage (V.DC)	Capacitance (F)	Capacitance tolerance (F)	Internal resistance (Initial specified value) (Ω) at 1 kHz	Recommended discharge current (mA)	Parts number	Mass (Reference value) (g)	Min. packaging q'ty (pcs)
3.6	0.22	0.176 to 0.396	≤ 50	300 μA or less	EECRG0V224()N	1.0	200
	1.0	0.8 to 1.8	≤ 20	1 mA or less	EECRG0V105()N	4.1	100
	1.5	1.2 to 2.7	≤ 20	1 mA or less	EECRG0V155()N	4.2	100

Do not use reflow soldering. (IR, Atmospherheating methods, etc.) Please refer to the page of "Application guidelines".

() : Please use V or H to indicate terminal type.

The recommended discharge current is a reference value. Please design your equipment(circuit) in consideration of IR drop.

Stacked Coin Type

! This series is not a recommended product.
Not recommended for new design.



Series : **RG**

Features

- Endurance : +85 °C 2000 h
- Can be discharged mA current
- RoHS compliant

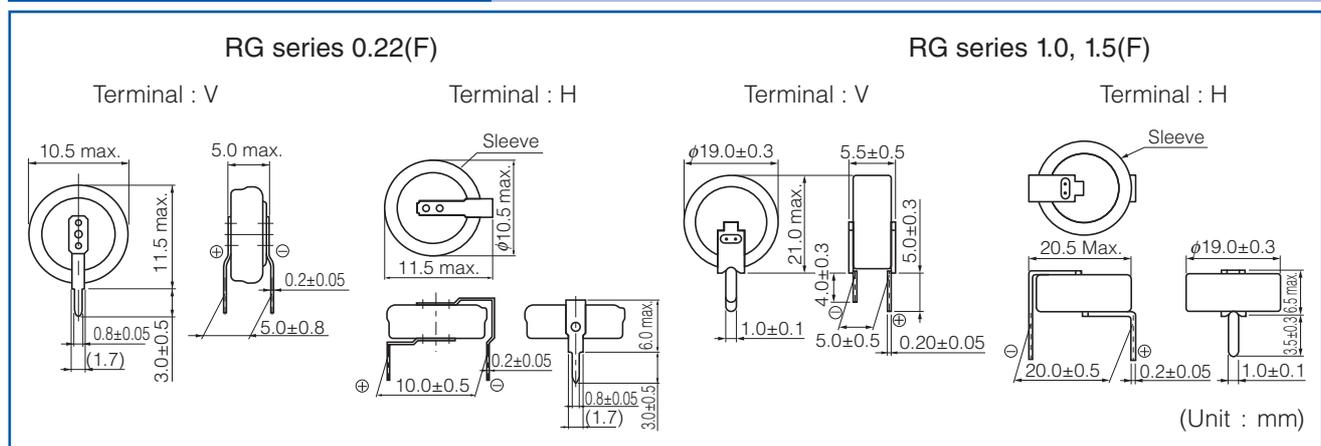
Recommended applications

- Backup of data/RTC of base station, electronic meter, and industrial equipment
- For assist of rapid load change

Specifications

Category temp. range	-25 °C to +85 °C	
Maximum operating voltage	3.6 V.DC	
Nominal capacitance	0.22 F	1.0 F, 1.5 F
Characteristics at low temperature	Capacitance change	±30 % of initial measured value at +20 °C (at -25 °C)
	Internal resistance	≤ 5 times of initial measured value at +20 °C (at -25 °C)
Endurance	After 2000 hours application of maximum operating voltage at +85 °C	
	Capacitance change	±30 % of initial measured value at 20 °C
Shelf life	After 2000 hours storage at +85 °C without load (voltage)	
	Capacitance change	Capacitance change shall meet the specified limits for Endurance
	Internal resistance	Internal resistance shall meet the specified limits for Endurance

Dimensions in mm(not to scale)



Characteristics list

Maximum operating voltage (V.DC)	Capacitance (F)	Capacitance tolerance (F)	Internal resistance (Initial specified value) (Ω) at 1 kHz	Recommended discharge current (mA)	Parts number	Mass (Reference value) (g)	Min. packaging q'ty (pcs)
3.6	0.22	0.176 to 0.396	≤ 50	1 or less	EECRG0V224()	1.0	200
	1.0	0.8 to 1.8	≤ 20	20 or less	EECRG0V105()	4.1	100
	1.5	1.2 to 2.7	≤ 20	20 or less	EECRG0V155()	4.2	100

Do not use reflow soldering. (IR, Atmospherheating methods, etc.) Please refer to the page of "Application guidelines".

() : Please use V or H to indicate terminal type.

The recommended discharge current is a reference value. Please design your equipment(circuit) in consideration of IR dorop.

Stacked Coin Type

 This series is not a recommended product.
Not recommended for new design.

Series : **RF** Low temperature assured product



Features

- Endurance : +85 °C 2000 h
- Category temperature range : -40 °C to +85 °C
- RoHS compliant

Recommended applications

- Backup of data/RTC of base station, electronic meter, and industrial equipment

Specifications

Category temp. range	-40 °C to +85 °C	
Maximum operating voltage	5.5 V.DC	
Nominal capacitance	0.1 F	0.68 F, 1.0 F
Characteristics at low temperature	Capacitance change	±30 % of initial measured value at +20 °C (at -40 °C)
	Internal resistance	≤ 7 times of initial measured value at +20 °C (at -40 °C)
Endurance	After 2000 hours application of maximum operating voltage at +85 °C	
	Capacitance change	±30 % of initial measured value at 20 °C
Shelf life	After 2000 hours storage at +85 °C without load (voltage)	
	Capacitance change	Capacitance change shall meet the specified limits for Endurance
	Internal resistance	Internal resistance shall meet the specified limits for Endurance

Dimensions in mm(not to scale)

Cap (F)	φD (mm)
0.1	13.5 max
0.68, 1.0	21.5 max

(Unit : mm)

Recommended lead diameter: $\phi 1.1 \pm 0.05$

Characteristics list

Maximum operating voltage (V.DC)	Capacitance (F)	Capacitance tolerance (F)	Internal resistance (Initial specified value) (Ω) at 1 kHz	Recommended discharge current	Parts number	Mass (Reference value) (g)	Min. packaging q'ty (pcs)
5.5	0.1	0.080 to 0.180	≤ 75	300 μ A or less	EECRF0H104N	3.3	200
	0.68	0.544 to 1.224	≤ 20	1 mA or less	EECRF0H684N	10.0	100
	1.0	0.8 to 1.8	≤ 20	1 mA or less	EECRF0H105N	10.0	100

Do not use reflow soldering. (IR, Atmospherheating methods, etc.) Please refer to the page of "Application guidelines".
The recommended discharge current is a reference value. Please design your equipment(circuit) in consideration of IR drop.

Stacked Coin Type

! This series is not a recommended product.
Not recommended for new design.



Series : RF

Features

- Endurance : +85 °C 2000 h
- Can be discharged mA current
- RoHS compliant

Recommended applications

- Backup of data/RTC of base station, electronic meter, and industrial equipment
- For assist of rapid load change

Specifications

Category temp. range	-25 °C to +85 °C	
Maximum operating voltage	5.5 V.DC	
Nominal capacitance	0.1 F	0.68 F, 1.0 F
Characteristics at low temperature	Capacitance change	±30 % of initial measured value at +20 °C (at -25 °C)
	Internal resistance	≤ 5 times of initial measured value at +20 °C (at -25 °C)
Endurance	After 2000 hours application of maximum operating voltage at +85 °C	
	Capacitance change	±30 % of initial measured value at 20 °C
Shelf life	After 2000 hours storage at +85 °C without load (voltage)	
	Capacitance change	Capacitance change shall meet the specified limits for Endurance
	Internal resistance	Internal resistance shall meet the specified limits for Endurance

Dimensions in mm(not to scale)

(Unit : mm)

Cap (F)	φD (mm)
0.1	13.5 max
0.68, 1.0	21.5 max

φ1.1±0.05 (Recommended)

Characteristics list

Maximum operating voltage (V.DC)	Capacitance (F)	Capacitance tolerance (F)	Internal resistance (Initial specified value) (Ω) at 1 kHz	Recommended discharge current (mA)	Parts number	Mass (Reference value) (g)	Min. packaging q'ty (pcs)
5.5	0.1	0.080 to 0.180	≤ 75	3 or less	EECRF0H104	3.3	200
	0.68	0.544 to 1.224	≤ 20	20 or less	EECRF0H684	10.0	100
	1.0	0.8 to 1.8	≤ 20	20 or less	EECRF0H105	10.0	100

Do not use reflow soldering. (IR, Atmospherheating methods, etc.) Please refer to the page of "Application guidelines".
The recommended discharge current is a reference value. Please design your equipment(circuit) in consideration of IR drop.

Stacked Coin Type

! This series is not a recommended product.
Not recommended for new design.



Series : **LF** Low temperature assured product

Features

- Endurance : +85 °C 6000 h (More than 10 years at 40 °C) *1
- Category temperature range : -40 °C to +85 °C
- RoHS compliant

Recommended applications

- Backup of data/RTC of base station, electronic meter, and industrial equipment

Specifications

Category temp. range	-40 °C to +85 °C	
Maximum operating voltage	5.5 V.DC	
Nominal capacitance	1.0 F	
Characteristics at low temperature	Capacitance change	±30 % of initial measured value at +20 °C (at -40 °C)
	Internal resistance	≤ 7 times of initial measured value at +20 °C (at -40 °C)
Endurance	After 6000 hours application of maximum operating voltage at +85 °C	
	Capacitance change	±30 % of initial measured value
	Internal resistance	120 Ω or less (1.0 F)
Shelf life	After 2000 hours storage at +85 °C without load (voltage)	
	Capacitance change	Capacitance change shall meet the specified limits for Endurance
	Internal resistance	Internal resistance shall meet the specified limits for Endurance

Dimensions in mm(not to scale)

(Unit : mm)

Cap (F)	φD (mm)
1.0	21.5 max

φ1.1±0.05 (Recommended)

Characteristics list

Category temp. range (°C)	Maximum operating voltage (V.DC)	Capacitance (F)	Capacitance tolerance (F)	Internal resistance (Initial specified value) (Ω) at 1 kHz	Recommended *2 discharge current	Parts number	Mass (Reference value) (g)	Min. packaging q'ty (pcs)
-40 to +85	5.5	1.0	0.8 to 1.8	≤ 20	1 mA or less	EECLF0H105	10.0	100

*1 For the concept of product life refer to 1.4 for the "ambient temperature and the product life" of the application guidelines.

*2 Recommended discharge current are reference values. Please consider the deterioration of electrical characteristics with time and IR drop.

Do not use reflow soldering. Please refer to the page of "Application guidelines".

Stacked Coin Type

 This series is not a recommended product.
Not recommended for new design.

Series : **SD** Low temperature assured product



Features

- Endurance : +70 °C 1000 h
- Category temperature range : -40 °C to +70 °C
- RoHS compliant

Recommended applications

- Memory back-up for video and audio equipment, cameras, telephones, printers, data terminals, rice cookers, intelligent remote controls

Specifications

Category temp. range	-40 °C to +70 °C	
Maximum operating voltage	5.5 V.DC	
Nominal cap.range	0.22 F, 0.33 F	
Characteristics at low temperature	Capacitance change	±30 % of initial measured value at +20 °C (at -40 °C)
	Internal resistance	≤ 7 times of initial measured value at +20 °C (at -40 °C)
Endurance	After 1000 hours application of 5.5 V.DC at +70 °C, the capacitor shall meet the following limits.	
	Capacitance change	±30 % of initial measured value
Shelf life	After 1000 hours storage at +70 °C without load, the capacitor shall meet the specified limits for Endurance.	

Dimensions in mm(not to scale)

Terminal: V

(Unit : mm)

Cap. (F)	B
0.22	5.0
0.33	5.5

Terminal: H

(Unit : mm)

Cap. (F)	A
0.22	6.0
0.33	6.5

Characteristics list

Maximum operating voltage (V.DC)	Capacitance (F)	Capacitance tolerance (F)	Internal resistance (Initial specified value) (Ω) at 1 kHz	Recommended discharge current (μA)	Parts number	Mass (Reference value) (g)	Min. packaging q'ty (pcs)
5.5	0.22	0.176 to 0.396	≤ 75	300 or less	EECS0HD224()N	1.0	200
	0.33	0.264 to 0.594	≤ 75	300 or less	EECS0HD334()N	1.1	200

() Please use V or H, to indicate the terminal style.

Note : Do not use reflow soldering. (IR, Atmosphere heating methods, etc.)

Please refer to the page of "Application guidelines".

Stacked Coin Type

Series : **SD**

! This series is not a recommended product.
Not recommended for new design.



Features

- Endurance : +70 °C 1000 h
- RoHS compliant

Recommended applications

- Memory back-up for video and audio equipment, cameras, telephones, printers, data terminals, rice cookers, intelligent remote controls

Specifications

Category temp. range	-25 °C to +70 °C	
Maximum operating voltage	5.5 V.DC	
Nominal cap.range	0.22 F, 0.33 F	
Characteristics at low temperature	Capacitance change	±30 % of initial measured value at +20 °C (at -25 °C)
	Internal resistance	≤ 5 times of initial measured value at +20 °C (at -25 °C)
Endurance	After 1000 hours application of 5.5 V.DC at +70 °C, the capacitor shall meet the following limits.	
	Capacitance change	±30 % of initial measured value
	Internal resistance	≤ 4 times of initial specified value
Shelf life	After 1000 hours storage at +70 °C without load, the capacitor shall meet the specified limits for Endurance.	

Dimensions in mm(not to scale)

Terminal : V

(Unit : mm)

Cap. (F)	B
0.22	5.0
0.33	5.5

Terminal : H

(Unit : mm)

Cap. (F)	A
0.22	6.0
0.33	6.5

Characteristics list

Maximum operating voltage (V.DC)	Capacitance (F)	Capacitance tolerance (F)	Internal resistance (Initial specified value) (Ω) at 1 kHz	Recommended discharge current (μA)	Parts number	Mass (Reference value) (g)	Min. packaging q'ty (pcs)
5.5	0.22	0.176 to 0.396	≤ 75	300 or less	EECS0HD224 ()	1.0	200
	0.33	0.264 to 0.594	≤ 75	300 or less	EECS0HD334 ()	1.1	200

() Please use V or H, to indicate the terminal style.
Note : Do not use reflow soldering. (IR, Atmosphere heating methods, etc.)
Please refer to the page of "Application guidelines".

Stacked Coin Type

! This series is not a recommended product.
Not recommended for new design.

Series : **SG** Low temperature assured product



Features

- Endurance : +70 °C 1000 h
- Category temperature range : -40 °C to +70 °C
- Maximum height of 6.5 mm (H Terminal)
- RoHS compliant

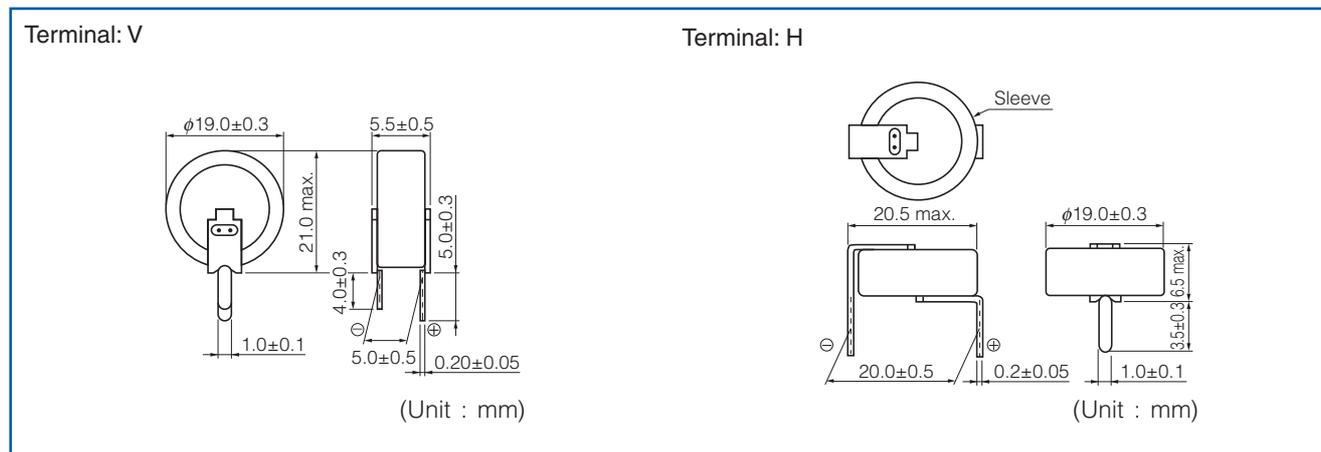
Recommended applications

- Memory back-up for video and audio equipment, cameras, telephones, printers, data terminals, rice cookers and intelligent remote controls

Specifications

Category temp. range	-40 °C to +70 °C	
Maximum operating voltage	5.5 V.DC	
Nominal cap.range	0.47 F to 1.5 F	
Characteristics at low temperature	Capacitance change	±30 % of initial measured value at +20 °C (at -40 °C)
	Internal resistance	≤ 7 times of initial measured value at +20 °C (at -40 °C)
Endurance	After 1000 hours application of 5.5 V.DC at +70 °C, the capacitor shall meet the following limits.	
	Capacitance change	±30 % of initial measured value
Shelf life	Internal resistance	≤ 4 times of initial specified value
	After 1000 hours storage at +70 °C without load, the capacitor shall meet the specified limits for Endurance.	

Dimensions in mm(not to scale)



Characteristics list

Maximum operating voltage (V.DC)	Capacitance (F)	Capacitance tolerance (F)	Internal resistance (Initial specified value) (Ω) at 1kHz	Recommended discharge current (mA)	Part number	Mass (Reference value) (g)	Min. packaging q'ty (pcs)
5.5	0.47	0.376 to 1.41	≤ 30	1 or less	EECS5R5()474N	4.1	100
	1.0	0.80 to 1.80	≤ 30	1 or less	EECS5R5()105N	4.1	100
	1.5	1.20 to 2.70	≤ 30	1 or less	EECS5R5()155N	4.2	100

() Please use V or H, to indicate the terminal style.

Note : Do not use reflow soldering. (IR, Atmosphere heating methods, etc.)

Please refer to the page of "Application guidelines".

Stacked Coin Type

! This series is not a recommended product.
Not recommended for new design.

Series : **SG**



Features

- Endurance : +70 °C 1000 h
- Maximum height of 6.5 mm (H Terminal)
- RoHS compliant

Recommended applications

- Memory back-up for video and audio equipment, cameras, telephones, printers, data terminals, rice cookers and intelligent remote controls

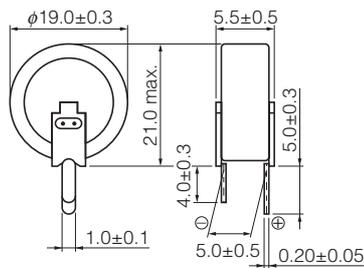
Specifications

Category temp. range	-25 °C to +70 °C	
Maximum operating voltage	5.5 V.DC	
Nominal cap.range	0.47 F to 1.5 F	
Characteristics at low temperature	Capacitance change	±30 % of initial measured value at +20 °C (at -25 °C)
	Internal resistance	≤ 5 times of initial measured value at +20 °C (at -25 °C)
Endurance	After 1000 hours application of 5.5 V.DC at +70 °C, the capacitor shall meet the following limits.	
	Capacitance change	±30 % of initial measured value
	Internal resistance	≤ 4 times of initial specified value
Shelf life	After 1000 hours storage at +70 °C without load, the capacitor shall meet the specified limits for Endurance.	

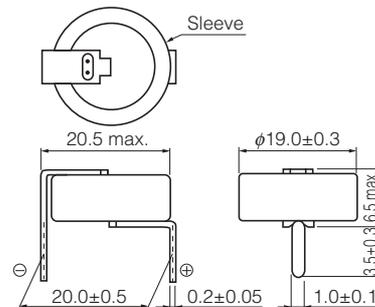
Dimensions in mm(not to scale)

Terminal: V

Terminal: H



(Unit : mm)



(Unit : mm)

Characteristics list

Maximum operating voltage (V.DC)	Capacitance (F)	Capacitance tolerance (F)	Internal resistance (Initial specified value) (Ω) at 1kHz	Recommended discharge current (mA)	Part number	Mass (Reference value) (g)	Min. packaging q'ty (pcs)
5.5	0.47	0.376 to 1.41	≤ 30	1 or less	EECS5R5()474	4.1	100
	1.0	0.80 to 1.80	≤ 30	1 or less	EECS5R5()105	4.1	100
	1.5	1.20 to 2.70	≤ 30	1 or less	EECS5R5()155	4.2	100

() Please use V or H, to indicate the terminal style.

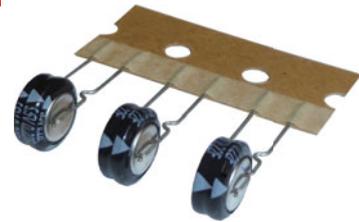
Note : Do not use reflow soldering. (IR, Atmosphere heating methods, etc.)

Please refer to the page of "Application guidelines".

Stacked Coin Type

! This series is not a recommended product.
Not recommended for new design.

Series : **SE** Low temperature assured product



Features

- Endurance : +70 °C 1000 h
- Category temperature range : -40 °C to +70 °C
- Automatic insertion available
- RoHS compliant

Recommended applications

- Memory back-up for video and audio equipment, cameras, telephones, printers, data terminals, rice cookers and intelligent remote controls.

Specifications

Category temp. range	-40 °C to +70 °C	
Maximum operating voltage	5.5 V.DC	
Nominal cap.range	0.22 F	
Characteristics at low temperature	Capacitance change	±30 % of initial measured value at +20 °C (at -40 °C)
	Internal resistance	≤ 7 times of initial measured value at +20 °C (at -40 °C)
Endurance	After 1000 hours application of 5.5 V.DC at +70 °C, the capacitor shall meet the following limits.	
	Capacitance change	±30 % of initial measured value
Shelf life	After 1000 hours storage at +70 °C without load, the capacitor shall meet the specified limits for Endurance.	
	Internal resistance	≤ 4 times of initial specified value

Dimensions in mm(not to scale)

(Unit : mm)

Dimensions	Nominal	Tolerance
φd	0.55	±0.05
P ₀	12.7	±0.2
F	5.0	+0.8 -0.2
W	18.0	±0.5
W ₀	5.5 ≤	-
W ₁	9.0	±0.5
W ₂	0 to 3.0	-
H ₀	16.4	±0.5
φD ₀	4.0	±0.2
P	12.7	±1.0
P ₁	3.85	±0.50
P ₂	6.35	±1.00
Δh, Δh ₁	0	±1.0
H ₁	30.3 ≥	-

Characteristics list

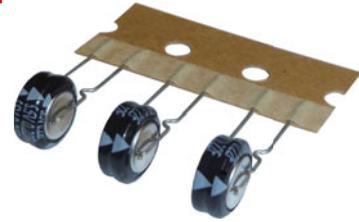
Maximum operating voltage (V.DC)	Capacitance (F)	Capacitance tolerance (F)	Internal resistance (Initial specified value) (Ω) at 1kHz	Recommended discharge current (μA)	Part number	Mass (Reference value) (g)	Min. packaging q'ty (pcs)
5.5	0.22	0.176 to 0.396	≤ 75	300 or less	EECSE0H224N	1.0	1000

- Note: 1. When ordering please observe the minimum packaging quantity.
 2. When the surface mount component goes through UV or a heat oven to affix the adhesive glue, the capacitor's surface temperature should not exceed 100 °C for more than 60 seconds (maximum temperature should not exceed 105 °C)
 3. Do not use reflow soldering. (IR, Atmosphere heating methods, etc.)
 Please refer to the page of "Application guidelines".

Stacked Coin Type

! This series is not a recommended product.
Not recommended for new design.

Series : **SE**



Features

- Endurance : +70 °C 1000 h
- Automatic insertion available
- RoHS compliant

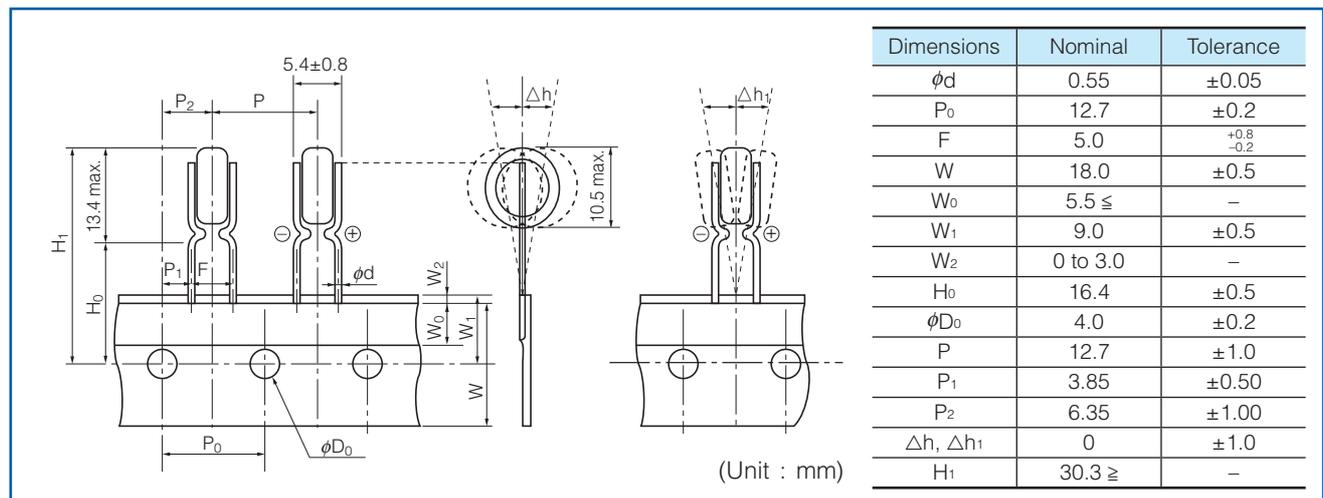
Recommended applications

- Memory back-up for video and audio equipment, cameras, telephones, printers, data terminals, rice cookers and intelligent remote controls.

Specifications

Category temp. range	-25 °C to +70 °C	
Maximum operating voltage	5.5 V.DC	
Nominal cap.range	0.22 F	
Characteristics at low temperature	Capacitance change	±30 % of initial measured value at +20 °C (at -25 °C)
	Internal resistance	≤ 5 times of initial measured value at +20 °C (at -25 °C)
Endurance	After 1000 hours application of 5.5 V.DC at +70 °C, the capacitor shall meet the following limits.	
	Capacitance change	±30 % of initial measured value
Shelf life	After 1000 hours storage at +70 °C without load, the capacitor shall meet the specified limits for Endurance.	

Dimensions in mm(not to scale)



Characteristics list

Maximum operating voltage (V.DC)	Capacitance (F)	Capacitance tolerance (F)	Internal resistance (Initial specified value) (Ω) at 1kHz	Recommended discharge current (μA)	Part number	Mass (Reference value) (g)	Min. packaging q'ty (pcs)
5.5	0.22	0.176 to 0.396	≤ 75	300 or less	EECSE0H224	1.0	1000

- Note: 1. When ordering please observe the minimum packaging quantity.
 2. When the surface mount component goes through UV or a heat oven to affix the adhesive glue, the capacitor's surface temperature should not exceed 100 °C for more than 60 seconds (maximum temperature should not exceed 105 °C)
 3. Do not use reflow soldering. (IR, Atmosphere heating methods, etc.)
 Please refer to the page of "Application guidelines".

Stacked Coin Type

! This series is not a recommended product.
Not recommended for new design.



Series : **NF** Low temperature assured product

Features

- Endurance : +70 °C 1000 h
- Category temperature range : -40 °C to +70 °C
- RoHS compliant

Recommended applications

- Memory back-up for video and audio equipment, cameras, telephones, printers, data terminals, rice cookers and intelligent remote controls.

Specifications

Category temp. range	-40 °C to +70 °C	
Maximum operating voltage	5.5 V.DC	
Nominal cap.range	0.22 F to 1.5 F	
Characteristics at low temperature	Capacitance change	±30 % of initial measured value at +20 °C (at -40 °C)
	Internal resistance	≤ 7 times of initial measured value at +20 °C (at -40 °C)
Endurance	After 1000 hours application of 5.5 V.DC at +70 °C, the capacitor shall meet the following limits.	
	Capacitance change	±30 % of initial measured value
Shelf life	Internal resistance	≤ 4 times of initial specified value
	After 1000 hours storage at +70 °C without load, the capacitor shall meet the specified limits for Endurance.	

Dimensions in mm(not to scale)

Technical drawings showing dimensions in mm (not to scale):

- Side view: Sleeve, 5.0±0.3, 0.5±0.1, L max., 6±1
- Top view: φD max.
- Lead dimensions: 1.2±0.1, 0.8±0.1, 2.5±0.5, 3.5±0.5, 6±1
- Lead hole diameter: φ1.1±0.05 (Recommended)

(Unit : mm)

Case code	Size	
	D	L
A	13.5	7.5
B	21.5	8.0

Characteristics list

Maximum operating voltage (V.DC)	Capacitance (F)	Capacitance tolerance (F)	Internal resistance (Initial specified value) (Ω) at 1 kHz	Recommended discharge current	Parts number	Case code	Mass (Reference value) (g)	Min. packaging q'ty (pcs)
5.5	0.22	0.176 to 0.396	≤ 75	300 μA or less	EECF5R5U224N	A	2.6	200
	0.47	0.376 to 1.41	≤ 30	1 mA or less	EECF5R5U474N	B	7.9	100
	1.0	0.80 to 1.80	≤ 30	1 mA or less	EECF5R5U105N	B	8.1	100
	1.5	1.20 to 2.70	≤ 30	1 mA or less	EECF5R5U155N	B	8.1	100

Note : Do not use reflow soldering. (IR, Atmosphere heating methods, etc.)
Please refer to the page of "Application guidelines".

Stacked Coin Type

! This series is not a recommended product.
Not recommended for new design.

Series : **NF**



Features

- Endurance : +70 °C 1000 h
- RoHS compliant

Recommended applications

- Memory back-up for video and audio equipment, cameras, telephones, printers, data terminals, rice cookers and intelligent remote controls.

Specifications

Category temp. range	-25 °C to +70 °C	
Maximum operating voltage	5.5 V.DC	
Nominal cap.range	0.22 F to 1.5 F	
Characteristics at low temperature	Capacitance change	±30 % of initial measured value at +20 °C (at -25 °C)
	Internal resistance	≤ 5 times of initial measured value at +20 °C (at -25 °C)
Endurance	After 1000 hours application of 5.5 V.DC at +70 °C, the capacitor shall meet the following limits.	
	Capacitance change	±30 % of initial measured value
Shelf life	After 1000 hours storage at +70 °C without load, the capacitor shall meet the specified limits for Endurance.	

Dimensions in mm(not to scale)

Technical drawings showing dimensions in mm (not to scale):

- Side view: Sleeve, L max., 6±1, 0.5±0.1, 5.0±0.3
- Top view: φD max.
- Lead dimensions: 1.2±0.1, 0.8±0.1, 2.5±0.5, 3.5±0.5, 6±1
- Lead diameter: φ1.1±0.05 (Recommended)

(Unit : mm)

Case code	Size	
	D	L
A	13.5	7.5
B	21.5	8.0

Characteristics list

Maximum operating voltage (V.DC)	Capacitance (F)	Capacitance tolerance (F)	Internal resistance (Initial specified value) (Ω) at 1 kHz	Recommended discharge current	Parts number	Case code	Mass (Reference value) (g)	Min. packaging q'ty (pcs)
5.5	0.22	0.176 to 0.396	≤ 75	300 μA or less	EECF5R5U224	A	2.6	200
	0.47	0.376 to 1.41	≤ 30	1 mA or less	EECF5R5U474	B	7.9	100
	1.0	0.80 to 1.80	≤ 30	1 mA or less	EECF5R5U105	B	8.1	100
	1.5	1.20 to 2.70	≤ 30	1 mA or less	EECF5R5U155	B	8.1	100

Note : Do not use reflow soldering. (IR, Atmosphere heating methods, etc.)
Please refer to the page of "Application guidelines".

Stacked Coin Type

! This series is not a recommended product.
Not recommended for new design.



Series : **F** Low temperature assured product

Features

- Endurance : +85 °C 1000 h
- Category temperature range : -40 °C to +85 °C
- RoHS compliant

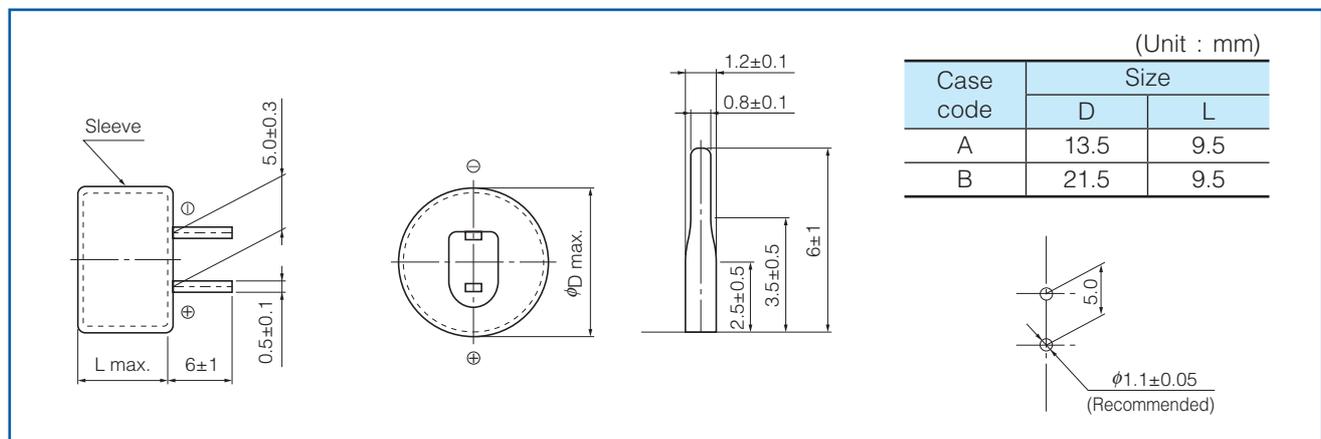
Recommended Applications

- Backup of data/RTC of base station, electronic meter, and industrial equipment

Specifications

Category temp. range	-40 °C to +85 °C	
Maximum operating voltage	5.5 V.DC	
Nominal cap.range	0.1 F to 1.0 F	
Characteristics at low temperature	Capacitance change	±30 % of initial measured value at +20 °C (at -40 °C)
	Internal resistance	≤ 7 times of initial measured value at +20 °C (at -40 °C)
Endurance	After 1000 hours application of 5.5 V.DC at +85 °C, the capacitor shall meet the following limits.	
	Capacitance change	±30 % of initial measured value
Shelf Life	After 1000 hours storage at +85 °C without load, the capacitor shall meet the specified limits for Endurance.	

Dimensions in mm(not to scale)



Characteristics list

Maximum operating voltage (V.DC)	Capacitance (F)	Capacitance tolerance (F)	Internal resistance (Initial specified value) (Ω) at 1 kHz	Recommended discharge current	Parts number	Case code	Mass (Reference value) (g)	Min. packaging q'ty (pcs)
5.5	0.10	0.080 to 0.180	≤ 100	300 μA or less	EECF5R5H104N	A	3.3	200
	0.47	0.376 to 0.846	≤ 75	1 mA or less	EECF5R5H474N	B	10.0	100
	0.68	0.544 to 1.224	≤ 50	1 mA or less	EECF5R5H684N	B	10.0	100
	1.00	0.80 to 1.80	≤ 50	1 mA or less	EECF5R5H105N	B	10.0	100

Note : Do not use reflow soldering. (IR, Atmosphere heating methods, etc.)
Please refer to the page of "Application guidelines".

Stacked Coin Type

! This series is not a recommended product.
Not recommended for new design.



Series : F

Features

- Endurance : +85 °C 1000 h
- RoHS compliant

Recommended Applications

- Backup of data/RTC of base station, electronic meter, and industrial equipment

Specifications

Category temp. range	-25 °C to +85 °C	
Maximum operating voltage	5.5 V.DC	
Nominal cap.range	0.1 F to 1.0 F	
Characteristics at low temperature	Capacitance change	±30 % of initial measured value at +20 °C (at -25 °C)
	Internal resistance	≤ 5 times of initial measured value at +20 °C (at -25 °C)
Endurance	After 1000 hours application of 5.5 V.DC at +85 °C, the capacitor shall meet the following limits.	
	Capacitance change	±30 % of initial measured value
Shelf Life	After 1000 hours storage at +85 °C without load, the capacitor shall meet the specified limits for Endurance.	
	Internal resistance	≤ 4 times of initial specified value

Dimensions in mm(not to scale)

Side view dimensions: Sleeve, 5.0±0.3, L max., 6±1, 0.5±0.1.

Top view dimensions: φD max.

Cross-sectional view dimensions: 1.2±0.1, 0.8±0.1, 2.5±0.5, 3.5±0.5, 6±1.

(Unit : mm)

Case code	Size	
	D	L
A	13.5	9.5
B	21.5	9.5

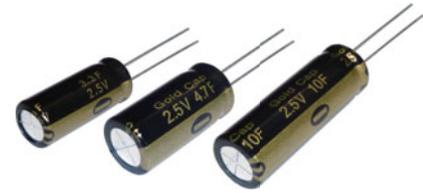
Characteristics list

Maximum operating voltage (V.DC)	Capacitance (F)	Capacitance tolerance (F)	Internal resistance (Initial specified value) (Ω) at 1 kHz	Recommended discharge current	Parts number	Case code	Mass (Reference value) (g)	Min. packaging q'ty (pcs)
5.5	0.10	0.080 to 0.180	≤ 100	300 μA or less	EECF5R5H104	A	3.3	200
	0.47	0.376 to 0.846	≤ 75	1 mA or less	EECF5R5H474	B	10.0	100
	0.68	0.544 to 1.224	≤ 50	1 mA or less	EECF5R5H684	B	10.0	100
	1.00	0.80 to 1.80	≤ 50	1 mA or less	EECF5R5H105	B	10.0	100

Note : Do not use reflow soldering. (IR, Atmosphere heating methods, etc.)
Please refer to the page of "Application guidelines".

Radial Lead Type

Series : HZ



Features

- Miniaturized, High voltage
- Can be discharge mA or more current
- RoHS compliant

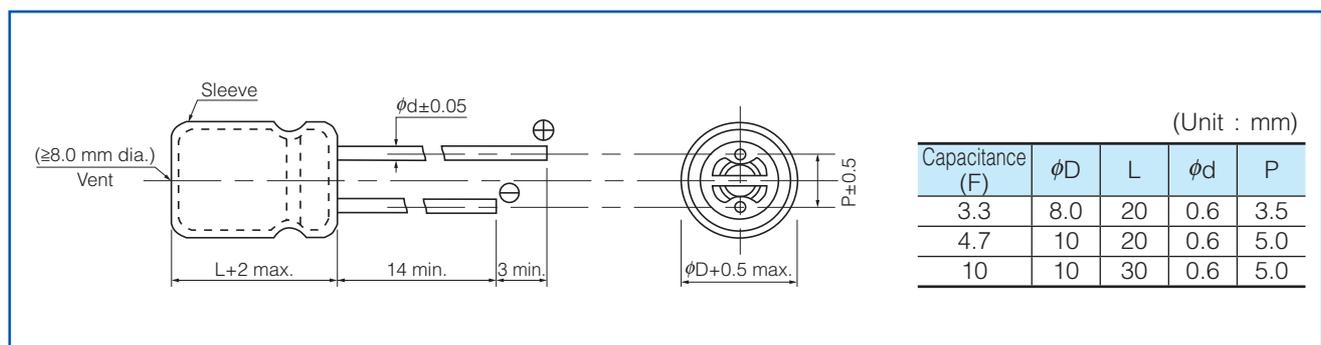
Recommended Applications

- Solar battery operated circuits
- Back-up Power Supplies (UPS)

Specifications

Category temp. range	-25 °C to +70 °C		
Maximum operating voltage	2.5 V.DC		
Nominal cap. range	3.3 F	4.7 F	10 F
Characteristics at low temperature	Capacitance change	±30 % of initial measured value at 20 °C (at -25 °C)	
	Internal resistance	≤ 4 times of initial specified value. (at -25 °C)	
Endurance	After 1000 hours application of 2.5 V.DC at +70 °C		
	Capacitance change	±30 % of initial measured value at 20 °C	
	Internal resistance	≤ 4 times of initial specified value.	
Shelf Life	After 1000 hours storage at +70 °C without load (voltage)		
	Capacitance change	±30 % of initial measured value at 20 °C	
	Internal resistance	≤ 4 times of initial specified value.	

Dimensions in mm(not to scale)



Characteristics list

Category temp. range (°C)	Maximum operating voltage (V.DC)	Capacitance (F)	Capacitance tolerance (F)	Internal resistance (Initial specified value) (Ω) at 1 kHz	Recommended *1 discharge current	Parts number	Mass (Reference value) (g)	Min. packaging q'ty (pcs)
-25 to +70	2.5	3.3	2.64 to 4.62	≤ 0.3	300 mA or less	EECHZ0E335	1.5	200
		4.7	3.76 to 6.58	≤ 0.3	300 mA or less	EECHZ0E475	2.1	200
		10	8 to 14	≤ 0.2	1 A or less	EECHZ0E106	3.1	200

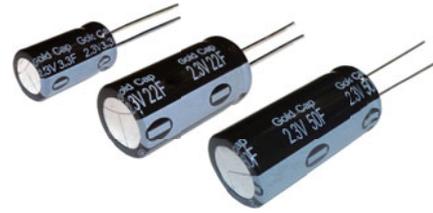
*1 The recommended discharge current is a reference value. Please design your equipment (circuit) in consideration of IR drop.

Do not use reflow soldering. Please refer to the page of "Application guidelines".

Remark1: Install the space of 2 mm or more in the upper part of the product so as not to disturb the movement of the pressure valve.

Radial lead Type

Series : HW



Features

- Guaranteed at 70 °C (60°C 1000 h)
- Can be discharge mA or more current
- RoHS compliant

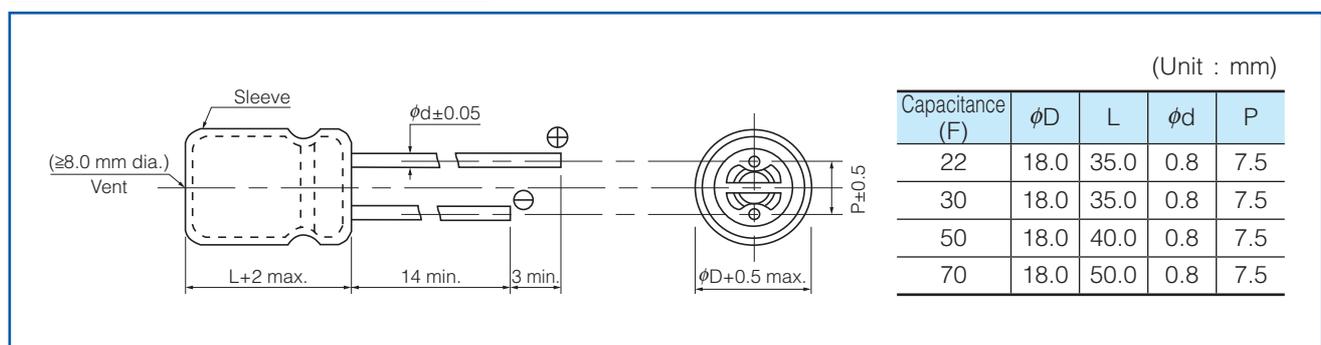
Recommended Applications

- Solar battery operated circuits (Road guidance flasher), Quick charging motor drives (Toy car)
- Back-up Power Supplies (UPS)

Specifications

Category temp. range	-25 °C to +70 °C		-25 °C to +60 °C	
Maximum operating voltage	2.3 V.DC		2.3 V.DC	2.1 V.DC
Nominal cap. range	22 F		30, 50 F	70 F
Characteristics at low Temperature	Capacitance change	±30 % of initial measured value at +20 °C (at -25 °C)		
	Internal resistance	≤ 4 times of initial measured value at +20 °C (at -25 °C)		
Endurance	After 1000 hours application of 2.3 V.DC at +70 °C (+60 °C), the capacitor shall meet the following limits.			
	Capacitance change	±30 % of initial measured value		
Shelf Life	After 1000 hours storage at +70 °C (+60 °C) without load, the capacitor shall meet the specified limits for Endurance.			
	Internal resistance	≤ 2 time of initial specified value		

Dimensions in mm(not to scale)



Characteristics list

* : 10 F or less HW series is not recommended for new design. Please consider HZ series.

Category temp. range (°C)	Maximum operating voltage (V.DC)	Capacitance (F)	Capacitance tolerance (F)	Internal resistance (Initial specified value) (Ω) at 1 kHz	Recommended discharge current (A)	Parts number	Mass (Reference value) (g)	Min. packaging q'ty (pcs)
-25 to +70	2.3	22	17.6 to 30.8	≤ 0.1	1 or less	EECHW0D226	12.0	50
		30	24.0 to 42.0	≤ 0.1	1 or less	EECHW0D306	14.0	50
-25 to +60	2.1	50	40.0 to 70.0	≤ 0.1	1 or less	EECHW0D506	15.0	50
		70	56.0 to 98.0	≤ 0.1	1 or less	EECHW0D706	19.0	50

Note : 1. Do not use reflow soldering. (IR, Atmosphere heating methods, etc.)
Please refer to the page of "Application guidelines".

Radial Lead Type

Series : HL



Features

- Low resistance
- 2.7 V.DC
- Guaranteed at 65 °C 2000 h
- Low temperature -40 °C guaranteed
- RoHS compliant

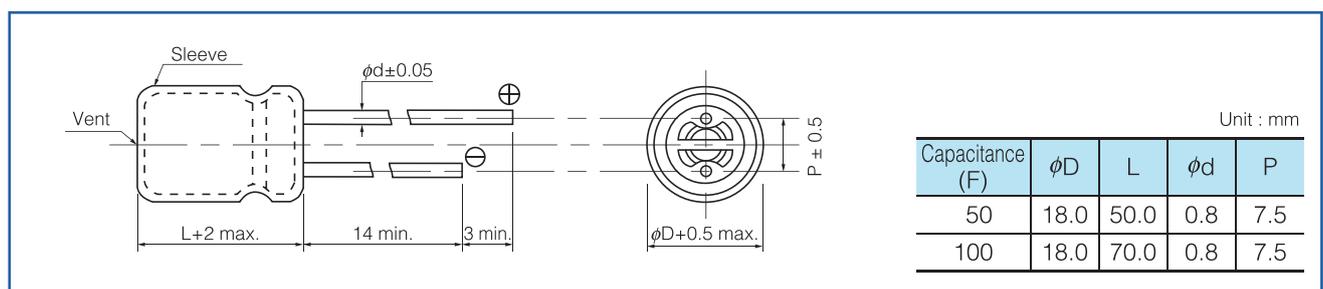
Recommended Applications

- Backup power supply of server, storage
- Driver assist of motor, actuator
- Auxiliary power supply of solar power (Road stand, Street light)

Specifications

Category temp. range	-40 °C to +65 °C	
Maximum operating voltage	2.7 V.DC	
Nominal cap. range	50 F	100 F
Characteristics at low temprature	Capacitance change	±30 % of initial measured value at +20 °C (at -40 °C)
	Internal resistance	≤ 7 times of initial specified value. (at -40 °C)
Endurance	After 2000 hours application of 2.7 V.DC at +65 °C	
	Capacitance change	Within ±30 % of the initial value
	Internal resistance	≤ 2 times of initial specified value.
Shelf life	After 1000 hours storage at +85 °C 1000 h without load (voltage)	
	Capacitance change	Within ±30 % of the initial value
	Internal resistance	≤ 2 times of initial specified value.

Dimensions (not to scale)



Characteristics list

Category temp. range (°C)	Maximum operating voltage (V.DC)	Capacitance (F)	Capacitance tolerance (F)	Internal resistance (Initial specified value) (Ω) at 1 kHz	Recommended *1 discharge current	Parts number	Mass (Reference value) (g)	Min. Packaging Q'ty (pcs)
-40 to +65	2.7	50	40 to 60	≤ 0.015	≤ 10 A	EECHL0E506	19	100
		100	80 to 120	≤ 0.010	≤ 15 A	EECHL0E107	25	100

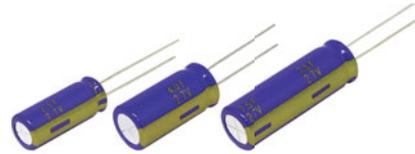
*1 The recommended discharge current is a reference value. Please design your equipment (circuit) in consideration of IR drop.

Do not use reflow soldering. Please refer to the page of "Application guidelines".

Remark1: Install the space of 2 mm or more in the upper part of the product so as not to disturb the movement of the pressure valve.

Radial Lead Type

Series : **HL**
Small size



Features

- Guaranteed 70 °C 2.7 V.DC 2000 h
Guaranteed 85 °C 2.5 V.DC 1000 h
- Low resistance : 30 mΩ max. (1 kHz)*1
- Low temperature : -40 °C guaranteed
- RoHS compliant

Recommended Applications

- Backup power supply of E-meter, storage (SSD)
- Driver assist of motor, actuator
- Backup for power supply of drive recorder, emergency brake, door lock releasing device

Specifications

Category temp. range	-40 °C to +70 °C (+85 °C)		
Maximum operating voltage	2.7 V.DC (2.5 V.DC)		
Nominal cap. range	2.5 F	4.0 F	7.5 F
Characteristics at low temperature	Capacitance change	±30 % of initial measured value at +20 °C (at -40 °C)	
	Internal resistance	≤ 4 times of initial specified value. (at -40 °C)	
Endurance 1	After 2000 hours application of 2.7 V.DC at +70 °C		
	Capacitance change	Within ±40 % of the initial value	
Endurance 2	After 1000 hours application of 2.5 V.DC at +85 °C		
	Capacitance change	Within ±40 % of the initial value	
Shelf life	After 1000 hours storage at +85 °C 1000 h without load (voltage)		
	Capacitance change	Within ±40 % of the initial value	
	Internal resistance	≤ 4 times of initial specified value.	

Dimensions (not to scale)

Unit : mm

Capacitance (F)	φD	L	φd	P
2.5	8.0	20.0	0.6	3.5
4.0	10.0	20.0	0.6	5.0
7.5	10.0	30.0	0.6	5.0

Characteristics list

Category temp. range (°C)	Maximum operating voltage (V.DC)	Capacitance (F)	Capacitance tolerance (F)	Internal resistance (Initial specified value) (Ω) at 1 kHz	Recommended *2 discharge current	Parts number	Mass (Reference value) (g)	Min. Packaging Q'ty (pcs)
-40 to +70 (+85)	2.7 (2.5)	2.5	2.0 to 3.0	≤ 0.07	≤ 2.5 A	EECHL0E255	1.5	200
		4.0	3.2 to 4.8	≤ 0.05	≤ 3.5 A	EECHL0E405	2.3	200
		7.5	6.0 to 9.0	≤ 0.03	≤ 6.0 A	EECHL0E755	3.4	200

*1 φ10×L30

*2 The recommended discharge current is a reference value. Please design your equipment (circuit) in consideration of IR drop.

Do not use reflow soldering. Please refer to the page of "Application guidelines".

Remark1: Install the space of 2 mm or more in the upper part of the product so as not to disturb the movement of the pressure valve.

CAUTION AND WARNING

1. The electronic components contained in this catalog are designed and produced for use in home electric appliances, office equipment, information equipment, communications equipment, and other general purpose electronic devices.
Before use of any of these components for equipment that requires a high degree of safety, such as medical instruments, aerospace equipment, disaster-prevention equipment, security equipment, vehicles (automobile, train, vessel), please be sure to contact our sales representative corporation.
2. When applying one of these components for equipment requiring a high degree of safety, no matter what sort of application it might be, be sure to install a protective circuit or redundancy arrangement to enhance the safety of your equipment. In addition, please carry out the safety test on your own responsibility.
3. When using our products, no matter what sort of equipment they might be used for, be sure to make a written agreement on the specifications with us in advance.
4. Technical information contained in this catalog is intended to convey examples of typical performances and or applications and is not intended to make any warranty with respect to the intellectual property rights or any other related rights of our company or any third parties nor grant any license under such rights.
5. In order to export products in this catalog, the exporter may be subject to the export license requirement under the Foreign Exchange and Foreign Trade Law of Japan.
6. No ozone-depleting substances (ODSs) under the Montreal Protocol are used in the manufacturing processes of Automotive & Industrial Systems Company, Panasonic Corporation.

● Please contact _____

● Factory _____

Device Solutions Business Division
Automotive & Industrial Systems Company

Panasonic[®]

1006 Kadoma, Kadoma City, Osaka 571-8506,
JAPAN

The information in this catalog is valid as of March 2018.