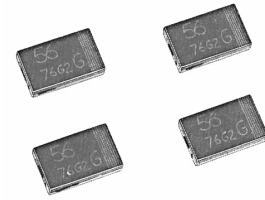


## Surface Mount Type

Series: **CX**

# SP-Cap

Japan

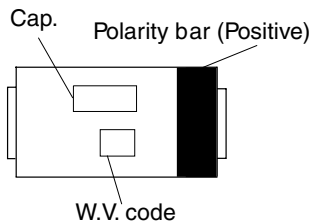


- Features
  - Excellent Noise-absorbent Characteristics
  - Low profile type (2.0mm Height)
  - Pb free
  - 260°C reflow

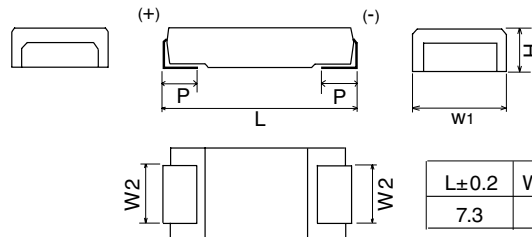
### ■ Specification

Operating Temp. Range	-40 to +105°C			
Rated W.V Range	2 to 6.3 V. DC			
Nominal Cap.Range	100 to 330 μF			
Capacitance Tolerance	± 20 % (120 Hz / +20°C)			
DC Leakage Current	$I \leq 0.1 CV$			
Dissipation Factor	$\leq 0.06$ (120 Hz / +20°C)			
Surge Voltage	Rated Working Voltage x 1.25 (15 to 35°C)			
Endurance	After applying rated working voltage for 1000 hours at +105 ±2 °C, and then being stabilized at +20°C, capacitor shall meet the following limits.			
	Capacitance change	± 10 % of initial measured value		
	D.F.	$\leq$ Initial specified value		
	DC leakage current	$\leq$ Initial specified value		
Moisture resistance	After storing for 500 hours at +60°C, 90%R.H.			
	Capacitance change of initial measured value	2, 2.5V.DC	4 V.DC	6.3V.DC
		+70, -20%	+60, -20%	+50, -20%
	D.F.	$\leq 200$ % of initial specified value		
DC leakage current	$\leq$ Initial specified value			

### ■ Marking



### ■ Dimensions in mm (not to scale)



$L \pm 0.2$	$W1 \pm 0.2$	$W2 \pm 0.1$	$H \pm 0.2$	$P \pm 0.3$
7.3	4.3	2.4	1.9	1.3

### ■ Standard product

Rated W.V. (V.DC)	Capacitance (± 20%) (μF)	Specification		Part Number	Min Pkg Q'ty (pcs)
		* Ripple Current (A r.m.s./100kHz) +20 to 105°C	* ESR (mΩ) max (100kHz/+20°C)		
2	220	2.7	15	EEFCX0D221R	3500
	330	2.7	15	EEFCX0D331R	3500
2.5	220	2.7	15	EEFCX0E221R	3500
4	150	2.7	15	EEFCX0G151R	3500
6.3	100	2.7	15	EEFCX0J101R	3500

## Product Specification

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

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 significant damage, such as damage to vehicles (automobile, train, vessel), traffic lights, medical equipment, aerospace equipment, electric heating appliances, combustion/gas equipment, 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.

### 9.2 Environments and Soldering for Using Capacitors

#### 9.2.1 Storage

Products should be stored in a moisture proof environment. Storage conditions before and after opening the moisture proof packaging 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%

Maximum storage term before opening the package: JEDEC J-STD-020C MSL: Level 2

(2 years after manufactured)

Maximum storage condition after opening the package: JEDEC J-STD-020C MSL: Level 3

(7 days after opening)

Products should be all 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: 100h to 200h(Do not perform more than twice.)

#### 9.2.2 Temperature

Use at or under the rated (guaranteed) temperature.

Operation at temperatures exceeding specifications causes large changes in the capacitors electrical properties, and deterioration than 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 unit (power transistors, resistors, etc.), and self-heating due to ripple current.

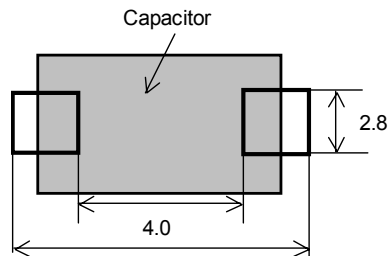
#### 9.2.3 Capacitor Mounting

##### (1) Land Size

Refer to the land size described next page 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.

Typical land pattern (mm)

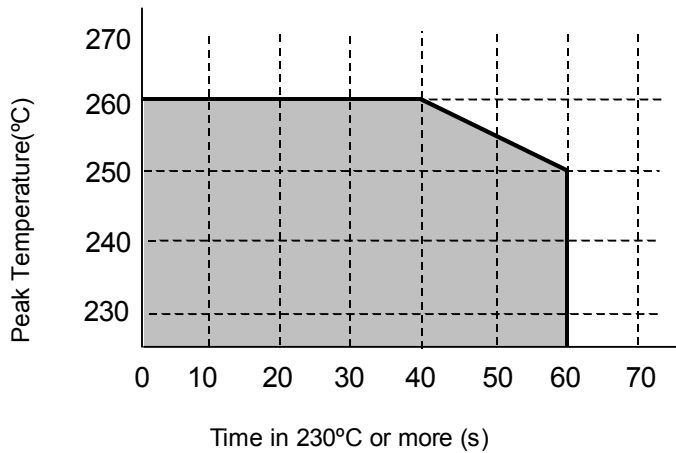
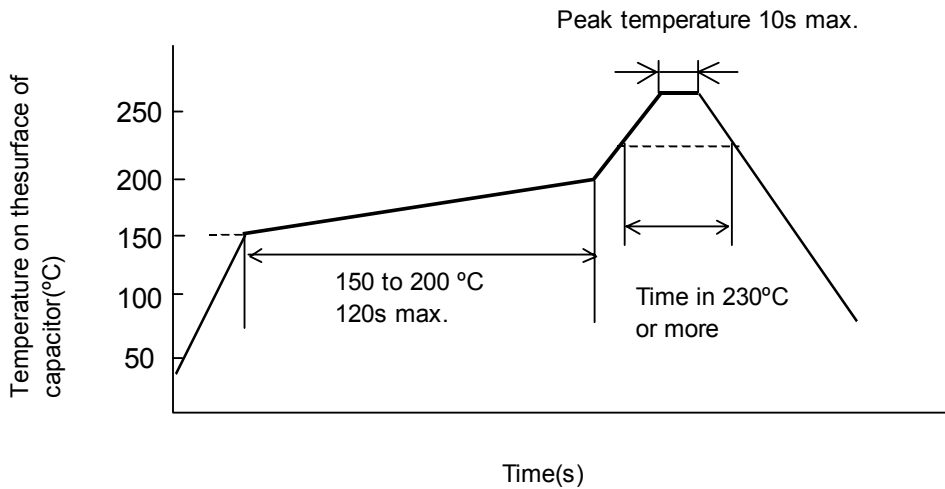


10. Maximum permissible reflow soldering temperature profile

We recommend soldering shall be done according to following maximum permissible reflow soldering temperature profile.

Reflow soldering

Method: Hot air or infrared furnace.  
 Temperature measurement point: Top of capacitor.  
 Measuring method: Thermo-couple(K:  $\phi 0.1\text{mm}$ )  
 Reflow profile:



Ex.

Peak Temp.	Time in 230°C or more
260°C, 10s max.	40s max.
250°C, 10s max.	60s max.

Reflow times: 2max.

Note: Please refer to item 9.2.1 of the Application Guidelines for the proper storing conditions prior to the second reflow.

(The second reflow soldering should be performed in 5 days after the first one.)