

二、使用注意事项

在使用时，请您索取产品的规格书，并在规格规定范围内使用。

如果在超出规格书及注意事项的范围下使用，有可能导致短路，开路，冒烟，起火等。因此，请务必在规定的范围内使用。

如果不明白或规格书上没有记载的项目，请与我们联系。

另外，如您用在关系到人身安全的装置及设备使用时，也请与我们联系。

二、Instructions for handling

For use of any type of capacitor, you are recommended to obtain individual specification in advance and use it within the limits specified thereby.

Use beyond such limits may lead to failures like short/open circuiting, smoking or even combustion.

For characteristics not clear or unlisted in our specification, please feel free to come to us.

Especially for life-affecting equipment, you are requested to ask for our council.

1.工作电压

薄膜电容器的最大电压值会因施加的电压波形，电流波形，频率，环境温度（电容器表面温度），电容量的不同而产生变化。使用前请先确认电容器两端的电压/电流波形，频率是否在规定范围之内。

Operation voltage

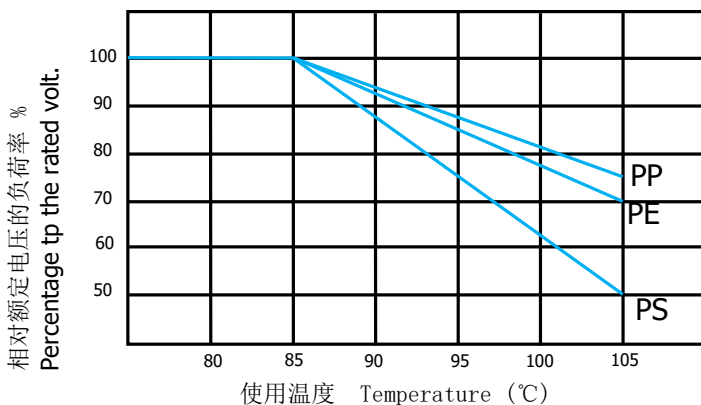
The plastic film capacitor varies in the maximum applicable voltage depending on the applied voltage waveform, current waveform, frequency, ambient temperature (capacitor surface temperature), capacitance value, etc. Be sure to use capacitors within the specified values by checking the voltage waveform, current waveform, and frequency applied to them.

※因温度变化调整电压时

电容器如果在高温环境下使用，由于热劣化，会减少使用寿命。因此在高温环境下使用时，请根据下图所示调查使用电压。

※Voltage Derating versus Temperature

When using capacitors at temperature higher than the normally specified maximum temperature, it is necessary to reduce the working voltage as shown in the figures below.



2.交流电路使用时

工作电流：

通过电容器的脉冲（或交流）电流等于电容量和电压上升速率的乘积，即： $I=C \times dv/dt$ 。

（1）容许电流

1) 正弦波

在正弦波下使用时，请根据各型号所示的频率数，在对应的容许电流特性的容许电流值（Arms）下使用。如果超出容许数值使用时，由于电容器自身的发热，有可能导致产品损伤。

Capacitors for Use in AC Circuit

Operating current:

The pulse(or AC)current flowing through the capacitor is expressed as:
 $I=C \times dv/dt$.

Permissible Current

Sine Wave

Capacitors should be used within the limits of permissible current (Arms) shown in the table for permissible current. If used in excess of permissible value, the capacitor may be deteriorated and damaged by its self-heating.

2) 正弦波以外

在正弦波以外的情况下使用时，其有效电流值在频率的容许电流特性范围以内。因此，请在各型号所示的容许峰值电流值以下使用。在超出规格值条件下进行急剧充放电时，会导致电容器的特性产生变化甚至被破坏。另外，在使用前，请确认好电流的波形，以及电容器的温度上升。

(2) 额定DC品在AC电路上使用时

在商务频率数（50、60Hz）下使用时，请按以下所示的电压使用。

Non-Sine Wave

When is use for non-sine wave, its effective current should be kept below the permissible current against frequency ,also, its peak current be below the capacitor's permissible peak current.

Charging and discharging under conditions in excess of specifications should be avoided because it may lead to deterioration of performance capability and even to destruction of the capacitor. In application, you are recommended to ascertain current waves, capacitor heat generation, etc. and the consult with CSD.

Permissible AC Voltage versus DC Rated Voltage

When using a capacitor by DC rated voltage at commercial power frequency(50Hz,60Hz), the permissible AC voltage is shown in the table below.

注意：DC额定电压产品请不要用在电源的一次侧。当DC有偏流存在时，峰值电压(Vo-p)请在以下所示的额定电压下使用。

CAUTION : The capacitor of DC rating should not be used at the primary side of power supplies. If DC bias contained, Vo-p should not exceed the DC voltage.

直流额定电压	C2-	C3-	C6-	C1-	C33		
50					30		
63					40		
100		63			63		
250	125	125			125		
300							
400	200	200					
450	200	200	200				
630	250	250	250				
800	250			250			
1000	400	400		400			
1200				400			
1250	400	500		400			
1600	500			500			
2000							

(3) 温度使用范围

电容器的使用温度为电容器表面温度（环境温度）+电容自身发热的升温+其它热源的热辐射升温。在交流或高频电路使用时，流过电容器的电流使其发热，如果发热量过大，会导致电容劣化或热破坏。

在使用时，请按下表所示，确认自热升温规格值和温度使用范围。

Permissible AC Voltage versus DC Rated Voltage

The operating temperature of a capacitor is defined with ambient temperature + self-heating temperature rise+ temperature rise due to thermal radiation from other heat sources.

When using capacitors in AC conditions or in high frequency circuits, capacitors will generate heats due to the flowing current. In case of high self-heating. a capacitor shall be placed at risk for thermal breakdown or deterioration of the capacitor. When using capacitors, please make sure that you requirements are within the limit of self-heating temperature rise and of operating temperature range.

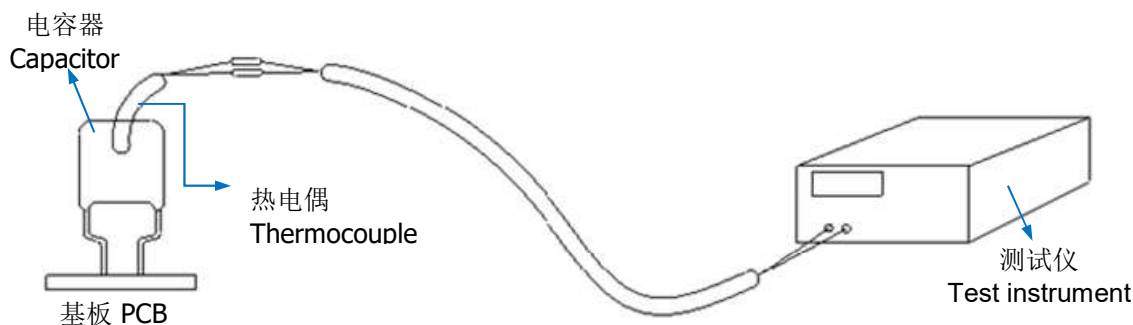
●温度上升表 Temperature rising graphic

电容器种类 Type of capacitor	自己温度上升 Self temperature rise	型号 Type
聚酯薄膜电容器 Polyester capacitor	15℃以内 Within 15℃	C33
金属化聚酯薄膜电容器 Metallized Polyester capacitor	15℃以内 Within 15℃	C3-
聚丙烯薄膜/箔式电容器 Polypropylene film/foil capacitor	10℃以内 Within 10℃	C1-
金属化聚丙烯薄膜电容器 Metallized Polypropylene capacitor	10℃以内 Within 10℃	C2-/C6-

●表面温升 (ΔT)

测量电容器表面温升的方法如图1，被测试电容器必须施加工作交流，脉冲电压及工作频率。

图1：测量电容器表面升温方法



●Surface over temperature (ΔT)

Method for determining the surface over temperature of the capacitor is showed in fig.1. The capacitor being tested must be supplied by the working AC or pulse voltage and frequency.

Fig1:Method fo determining the surface overtemperature of the capacitor

(4) 翁鸣声

电容器在交流电路使用时，因两电极间库仑力的作用，薄膜介质因机械振动而产生翁鸣声。这并非电容器特性存在问题，在使用时请确认其它方面有无异常。

Mechanical Resonance

Using under AC voltage results in the possibility of micro vibration of dielectric film driven by coulomb force producing thereby beat sounds(hum). Extensive test results have shown that this mechanical vibration in no way affects the electrical performance of the capacitor. However, it's highly recommended to check by yourself if this phenomenon could be the claim in the market or not.

3.定时电路等苛刻条件下使用时

电容器的特性会因其使用环境而产生变化。即使在一般情况下使用时，由于会吸收空气中的湿气，容量会发生若干变化。但介质不同，容量变化也不一样。因此，在定时电路上使用时，我们推荐使用聚丙烯薄膜电容 (C21、C24)

Capacitance Stability

Although film capacitors highly stable in terms of maintaining capacitance value, in certain critical applications such as RC time constant circuits, extra care in capacitor selection is recommended. Since the greatest cause of capacitance drift is moisture ingress, in critical applications, CSD recommends that capacitor types using polypropylene(such as C21、C24)

4. 电容器充放电

收于电容器充放电电流取决于电容量和电压上升速率的乘积，即使是低电压放电，也有可能产生大的瞬间充放电电流。这可能导致电容短路或开路等，损害电容器性能。当进行充放电时，请串联一个20Ω/V~1000Ω/V或更高的限流电阻，将充放电电流限制在规定的范围内。当多个薄膜电容器并联进行耐电压测试或寿命测试时，请为每个电容器串联一个20Ω/V~1000Ω/V或更高的限流电阻。

Charging and discharging

Because the charging and discharging current of capacitor is obtained by the product of voltage rise rate (dv/dt) and capacitance, low voltage charging and discharging may also cause deterioration of capacitor such as shorting and open due to sudden charging and discharging current.

When charging and discharging, pass through a resistance of 20Ω/V to 1000Ω/V or more to limit current. When connecting multiple film capacitors in parallel in withstand voltage test or life test, connect a resistance of 20Ω/V to 1000Ω/V or more in series to each capacitor.

5. 焊锡作业

(1) 有引线型的电容焊锡

1) 用电烙铁和焊锡槽进行焊锡时，热量会随着引线进入到电容器内部。请严格按照以下条件进行作业。当进行第二次焊接时，必须等到首次焊接作业完成后，电容器本体返回到常温时再进行（自然放置约30分钟）。

2) 当与贴片电容混合使用时，焊锡条件会发生变化。详细请与我们联系。

Soldering resistance

(1) Soldering for leaded components

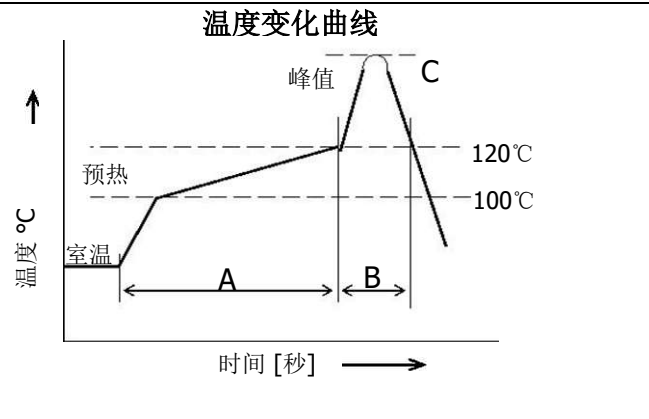
1) Because soldering allows for the thermal conduction through the capacitor lead wires into the capacitor itself, extreme care should always be taken in maintaining the proper soldering parameters. The figures below give examples of recommended time/temperature soldering profiles for use with plastic film capacitors. When dipped twice in the solder bath, the second dipping must be after the capacitor surface temperature comes down to the room temperature (around 30 minutes by natural cooling).

2) In the case of soldering conditions shall differ from the normal conditions. Please contact NISSEI for assistance.

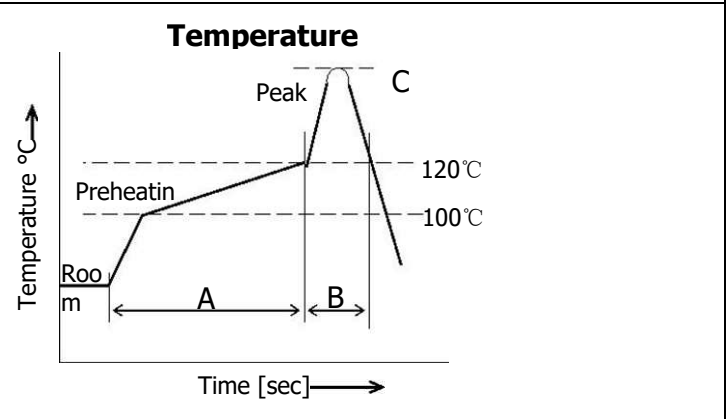
1. 使用电烙铁时 When use with soldering iron	
聚酯薄膜电容器 Polyester film capacitors	烙铁头温度：350℃以下，焊锡时间：5秒以内 Iron tip temperature : Less than 350℃、Soldering time : Within 5 seconds
聚丙烯薄膜电容器 Polypropylene film capacitors	烙铁头温度：350℃以下，焊锡时间：3秒以内 Iron tip temperature : Less than 350℃、Soldering time : Within 3 seconds
2. 使用焊锡槽时 For the use in solder bath	
适用型号/Type C3-	适用型号/Type C1-/C2-/C6-
<p>预热时间120℃ 90秒 Pre heat 120℃ 90sec</p> <p>焊锡温度℃ Solder temp. °C</p> <p>焊锡时间 (秒) Soldering time (sec)</p>	<p>预热时间120℃ 60秒 Pre heat 120℃ 60sec</p> <p>焊锡温度℃ Solder temp. °C</p> <p>焊锡时间 (秒) Soldering time (sec)</p>

3.波峰焊 Wave flow soldering

A: 预热温度120℃,加热时间为100秒以内,温度上升速度为2℃/秒。
B: 浸渍时间2-4秒
C: 峰值温度为260℃, 0.5秒以内。



A: Preheating shall be 120℃ or less. Soldering time shall be within 100 seconds, Temp. rise gradient 2℃/sec (A)
B: Dipping time 2-4 sec
C: Peak temperature 260℃, Peak-temp. hold time 0.5sec or less.



(3) 电烙铁焊锡时

- ①焊锡时, 请勿使电烙铁直接接触电容器。
- ②在基板侧将焊锡丝溶化, 并与电容器芯子融合。
- ③锡与电容器芯子融合时, 要迅速撤去烙铁头。
- ④烙铁头最高温度270℃, 最长时间4秒。将锡的溶融量控制在最小范围内。
- ⑤从基板上取下来的电容器请勿再使用。

(3) Iron Soldering

- ①Do not contact the capacitor element with the iron directly.
- ②Melt the solder on the PC board and then put the capacitor on it.
- ③The iron must be taken away as soon as the solder has taken on the capacitor.
- ④The tip of the soldering iron shall be 270℃ max, 4 sec. max.
- ⑤Please avoid the reuse of the product which is soldered on PC board once.

6.溶剂的使用

使用以清洗为目的溶剂时, 请选择异丙醇酒精的产品, 并进行快速清洗和干燥。

Usage of solvent

When cleaning PC board, the use of alcohol type solvents (isopropyl alcohol, etc.) is recommended. PC boards should be dried quickly after the cleaning process is completed.

7.电容器的使用

1) 避免用烙铁头, 镊子等尖锐物品强烈接触。否则有可能会造成短路和断线。

Physical handling of capacitors

1) Do not apply to strongly to the capacitor sharp edges of chassis, soldering irons and other used in the assembly tweezers, of electronic circuit. Any strong physical contact with the capacitor could result in severe damage to the termination or dielectric causing either a short or open circuit.

2) 要将电容器固定时, 请使用阻燃性材料。

2) When physically fixing the capacitors, use the flame retardant materials.

3) 电容器应保管在-10~+40℃室温下, 相对湿度70%以下, 应避免温度剧烈变化, 阳光直射和腐蚀性, 温度剧烈变化, 阳光直射和腐蚀性气体。在不拆开原包装的基础上, 对于存放两年以上的散装品或存放一年以上的编带品, 在使用前请先检查电气性能和可焊性。

3) Storing conditions shall be inside the room at -10~+40℃ with RH 70% or less. Avoid steep temperature changes, direct exposure to the sun beams or corrosive atmosphere Under the unchanging primal package, capacitors stored more than two years in bulk or stored more than a year in taping, please check their electric characteristics and solder ability before use.

4) 作为样品取得的电容器, 请不要用在市场销售的产品中。

4) Capacitors obtained as sample shall not be used in the field.

8. 阻燃性以及其它

Flame resistance(retardant) and others

1) 取得UL94-0认证阻燃性树脂的型号有
金属化聚酯膜: C3-
聚丙烯膜: C1-
金属化聚丙烯膜: C2-/C6-

1) Flame retardant resin approved to UL94V-O is being used as the exterior coating resin in C3- (metallized polyester), C1- (polypropylene), C2-/C6- (metallized polypropylene)

2) 所有产品的制造工序均未使用含溴阻燃材料和蒙特利尔公约所禁用的破坏臭氧层材料。

2) Specific bromes flame retardant and Ozone depleting substances limited by Montreal protocol are not being used in manufacturing process of per products.

3) 使用前, 请确认使用注意事项。并取得产品规格书, 在规格书规定的条件范围内使用。

3) When using these capacitors, limits shown if the Instruction for Handling as well as in technical specifications shall not be exceeded. If in doubt, please consult us.

9. 储存条件

Storage conditions

1) 由于大气中存在氯化物、氢硫化物、硫酸物质等, 所以产品贮存在大气中, 必须注意引出端的可焊性会变差。

1) It must be noted that the solder ability of the terminals may be deteriorated when stored in an atmosphere filled with moisture, dust, or a reactive oxidizing gas. (Hydrogen chloride, hydrogen sulfide, sulfuric acid, etc.)

2) 产品不能暴露在高温和高湿状态, 必须保存在以下环境中: (在不拆开原包装的基础上)

2) It shouldn't be located in particularly high temperature and high humidity, it must submit to the following conditions(unchanging primal package):

温度: -40°C到35°C;

Temperature: -40°C to 35°C

湿度: 年平均值不超过65%RH

Humidity: Average per year≤65%RH

全年任意30天不超过75%RH

For 30 full days randomly distributed throughout the year≤75%RH

引线式产品贮存时间(从产品包装或产品本体上的日期算起):

Storage time for tinned lead wire: (from the date marked on the capacitor's body or the label glued to the package) :

散装产品(塑料袋包装): 不超过24个月。

Bulk(packed with plastic bag): ≤24 months ;

径编和排列产品: 不超过12个月。

Taping and line up: ≤12 months

10. 绿色产品

Green Products

RoHS符合性

创仕鼎公司所有的产品均符合RoHS指令。

RoHS Compliance

All the items under RoHS