

目录 Contents

概述:

■ 薄膜电容器简介	General Information	
引用标准	Reference Standard	4
常用的标准术语	Terminologies	5
典型特性、应用及特性曲线	Typical Properties, Applications and Typical graphs	7
电容器结构示意图	Capacitors Construction	8
使用薄膜电容器的注意事项	Caution items in using film capacitor	9
环保产品	Environmental-friendly products	12
订购须知	Purchase specification	12
引线产品包装方式	Packing for tinned-wire capacitor	12
产品代码说明	Part number system	14



电容器分类:

■ 抑制电源电磁干扰电容器		EMI Suppression Capacitors
MKP61	抑制电源电磁干扰薄膜电容器(X2类, 275Vac/305Vac/310Vac/350Vac) EMI suppression capacitor (Class X2 , 275Vac/305Vac/310Vac/350Vac)	16
MKP61 (Mini)	抑制电源电磁干扰薄膜电容器(X2类, 小型化, 275Vac/305Vac/310Vac) EMI suppression capacitor(Class X2,Miniature version,275Vac/305Vac/310Vac)	21
MKP61F (Flat)	抑制电源电磁干扰薄膜电容器(X2类, 扁平化, 275Vac/305Vac/310Vac) EMI suppression capacitor(Class X2,Flat version,275Vac/305Vac/310Vac)	23
MKP61T (THB)	抑制电源电磁干扰薄膜电容器(X2类, THB, 275Vac/305Vac/310Vac) EMI suppression capacitor (Class X2 , THB , 275Vac/305Vac/310Vac	25
MKP61H (THB)	抑制电源电磁干扰薄膜电容器(X2类, THB, 275Vac/305Vac/310Vac/350Vac) EMI suppression capacitor (Class X2 , THB , 275Vac/305Vac/310Vac/350Vac	27
MKP61B (THB)	抑制电源电磁干扰薄膜电容器(X2类, THB, 275Vac/305Vac/310Vac) EMI suppression capacitor (Class X2 , THB , 275Vac/305Vac/310Vac	30
MKP61A (THB)	抑制电源电磁干扰薄膜电容器(X2类, THB, 275Vac/305Vac/310Vac) EMI suppression capacitor (Class X2 , THB , 275Vac/305Vac/310Vac	32
MKP61R (RC-unit)	抑制电源电磁干扰阻容模块(X2类, 300Vac) EMI suppression RC-unit (Class X2 , 300Vac)	34
MKP65	抑制电源电磁干扰薄膜电容器(X1类, 440Vac/480Vac/530Vac) EMI suppression capacitor (Class X1 , 440Vac/480Vac/530Vac)	37
MKP63	抑制电源电磁干扰薄膜电容器(Y2类, 300Vac) EMI suppression capacitor (Class Y2 , 300Vac)	42
■ 电力电子电容器		Capacitors for Power Electronic
MKP89	IGBT 吸收电容器 Snubber capacitor for IGBT	45
MKP89B	IGBT 吸收电容器 (For PCB) Snubber capacitor for IGBT (For PCB)	52
MKP86	干式直流滤波电容器 (定制品) DC-Link capacitor (Customized Products)	60
MKP88	塑料外壳干式直流滤波电容器 DC-Filter capacitor (Box-Type, Dry-Type)	70
CBB60	干式直流滤波电容器 DC-link capacitor (Dry-Type)	74
CBB60A	CBB60A 型车规级 DC-Link 电容器(PCB) CBB60A Type DC-Link Capacitor (HEV/EV、PCB)	88
CBB60B	干式直流滤波电容器 (For PCB) DC-link capacitor (Dry-type, For PCB)	93
CBB60H (THB)	干式直流滤波电容器 (For PCB, THB) DC-link capacitor (Dry-type, For PCB, THB)	106
CBB60T	干式直流滤波电容器 (For PCB, 125°C) DC-link capacitor (Dry-Type, For PCB, 125°C)	119
CBB66A	干式交流滤波电容器 (塑料外壳) AC-link capacitor (Box-Type, Dry-Type)	125
CBB66H (THB)	干式交流滤波电容器 (塑料外壳,THB) AC-link capacitor (Box-Type, Dry-Type,THB)	136

■ 交流电动机电容器
AC Motor Capacitors

CBB61	金属化聚丙烯薄膜交流电动机电容器 (塑料外壳, S0) Metallized polypropylene film AC motor capacitor(Box-Type, S0)	150
CBB61G	金属化聚丙烯薄膜交流电动机电容器 (塑料外壳, S3) Metallized polypropylene film AC motor capacitor(Box-Type, S3)	160

■ 金属化聚丙烯薄膜电容器
Metallized Polypropylene Film Capacitors

CBB20	轴向金属化聚丙烯薄膜电容器 Metallized polypropylene film capacitor (Axial-Type)	164
CBB21	金属化聚丙烯薄膜电容器 (浸渍型) Metallized polypropylene film capacitor (Dipped)	167
CBB21L	金属化聚丙烯薄膜电容器 (浸渍型, 小型化) Metallized polypropylene film capacitor (Dipped, Miniature version)	173
CBB22	金属化聚丙烯薄膜电容器 (浸渍型) Metallized polypropylene film capacitor (Dipped)	175
CBB24	盒式金属化聚丙烯薄膜电容器 Metallized polypropylene film capacitor (Box-Type)	178
CBB24M	盒式金属化聚丙烯薄膜电容器 Metallized polypropylene film capacitor (Box-Type)	187
CBB25	盒式金属化聚丙烯薄膜电容器 Metallized polypropylene film capacitor (Box-type, DC-Filter)	192
CBB25F	盒式金属化聚丙烯薄膜电容器 (扁平化) Metallized polypropylene film capacitor (Flat, Box-type, DC-Filter)	199
CBB25L	盒式金属化聚丙烯薄膜电容器 Metallized polypropylene film capacitor (Box-type, DC-Filter)	201
CBB81	双面金属化聚丙烯薄膜电容器 (浸渍型) Double sided metallized polypropylene film capacitor (Dipped)	203
CBB84	盒式双面金属化聚丙烯薄膜电容器 Double sided metallized polypropylene film capacitor (Box-Type)	207
CBB62	金属化聚丙烯膜介质交流固定电容器 (浸渍型) Metallized polypropylene film A.C. capacitor (Dipped)	213
CBB82	大电流箔式聚丙烯薄膜电容器 (浸渍型) High-current foil polypropylene film capacitor (Dipped)	215

■ 金属化聚酯薄膜电容器
Metallized Polyester Film Capacitors

CL20	轴向金属化聚酯薄膜电容器 Metallized polyester film capacitor (Axial-Type)	217
CL21	金属化聚酯薄膜电容器 (浸渍型) Metallized polyester film capacitor (Dipped)	220
CL21X	金属化聚酯薄膜电容器 (浸渍型, 小型化) Metallized polyester film capacitor (Dipped, Miniature version)	227
CL24	盒式聚酯薄膜电容器 Metallized polyester film capacitor (Box-Type)	232
CL62	金属化聚酯薄膜电容器 (浸渍型) Metallized polyester film capacitor (Dipped)	236
CDH	点火电容器 (浸渍型) Ignition capacitor (Dipped)	238

■ 金属化聚苯硫醚薄膜电容器
Metallized polyphenylene sulfide Film Capacitors

CPS21	金属化聚苯硫醚薄膜电容器 (浸渍型) Metallized polyphenylene sulfide film capacitor (Dipped)	239
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薄膜电容器简介 General Information

一、薄膜电容器的标准体系

电子设备用固定电容器的标准体系是由总规范、分规范、空白详细规范、及详细规范（企业标准）组成。也就是说，企业标准是按总规范和分规范的基本要求，填写空白详细规范而成。

The Standard system

The standard system of plastic film capacitor for use in electronic equipment composes the generic specification, sectional specification, blank detail specification and detail specification (manufacturer specification). That is to say a manufacturer specification is derived from blank detail specification according to the basic requirements of generic and section specifications.

标准号 (No.)	标准 (Standards)
GB/T 2693 (IEC 60384-1)	第 1 部分: 总规范 Part 1: Generic specification
GB/T 7332 (IEC 60384-2)	第 2 部分: 分规范: 金属化聚酯膜介质直流固定电容器 Part 2: Sectional specification: Fixed metallized polyester film D.C. capacitor
GB/T 7333 (IEC 60384-2-1)	第 2 部分: 空白详细规范: 金属化聚酯膜介质直流固定电容器 Part 2: Blank detail specification: Fixed metallized polyester film D.C. capacitor 详细规范: Detail specification for CL21、CL21X、CL24、CL20、CDH
GB/T6346.11 (IEC 60384-11)	第 11 部分: 分规范: 金属箔式聚酯膜介质直流固定电容器 Part 11: Sectional specification: Fixed polyester film metal foil D.C. capacitor
GB/T 6346.1101 (IEC 60384-11-1)	第 11 部分: 分规范: 金属箔式聚酯膜介质直流固定电容器 Part 11: Blank detail specification: Fixed polyester film metal foil D.C. capacitor 详细规范: Detail specification for CL11、CH11
GB/T 10188 (IEC 60384-13)	第 13 部分: 分规范: 金属箔式聚丙烯膜介质直流固定电容器 Part 13: Sectional specification: Fixed polypropylene film metal foil D.C. capacitor
GB/T 10189 (IEC 60384-13-1)	第 13 部分: 空白详细规范: 金属箔式聚丙烯膜介质直流固定电容器 Part 13: Blank detail specification: Fixed polypropylene film metal foil D.C. capacitor
GB/T 6346.14 (IEC 60384-14)	第 14 部分: 分规范: 抑制电源电磁干扰用固定电容器 Part 14: Sectional specification: Fixed capacitors for electromagnetic interference suppression and connection to the supply mains
GB/T 6346.1401 (IEC 60384-14-1)	第 14 部分: 空白详细规范: 抑制电源电磁干扰用固定电容器 Part 14: Blank detail specification: Fixed capacitors for electromagnetic interference suppression and connection to the supply mains 详细规范: Detail specification for MKP61、MKP63、MKP65
GB/T 10190 (IEC 60384-16)	第 16 部分: 分规范: 金属化聚丙烯膜介质直流固定电容器 Part 16: Sectional specification: Fixed metallized polypropylene film D.C. capacitor
GB/T 10191 (IEC 60384-16-1)	第 16 部分: 空白详细规范: 金属化聚丙烯膜介质直流固定电容器 Part 16: Blank detail specification: Fixed metallized polypropylene film D.C. capacitor 详细规范: Detail specification for CBB21、CBB22、CBB21L、CBB24、CBB25、CBB81、CBB84、CBB20

GB/T 14579 (IEC 60384-17)	第 17 部分: 分规范: 金属化聚丙烯膜介质交流和脉冲固定电容器 Part 17: Sectional specification: Fixed metallized polypropylene film A.C. and pulse capacitor
GB/T 14580 (IEC 60384-17-1)	第 17 部分: 空白详细规范: 金属化聚丙烯膜介质交流和脉冲固定电容器 Part 17: Blank detail specification: Fixed metallized polypropylene film A.C. and pulse capacitor 详细规范: Detail specification for CBB62、CBB82、CBB24M
GB/T 17702 (IEC 61071)	电力电子电容器 Capacitors for power electronics 详细规范: Detail specification for MKP89、MKP89B、MKP86、MKP88、CBB60、CBB60B、CBB66A、CBB60T
GB/T 3667.1 (IEC 60252-1)	第 1 部分: 交流电动机电容器 Part 1: AC motor capacitor 详细规范: Detail specification for CBB61
IEC 60384-20	金属化聚苯硫醚膜介质直流片式固定电容器 Fixed metallized polyphenylene sulfide film dielectric surface mount D.C. capacitors 详细规范: Detail specification for CSP21
AEC-Q200	表 4: 薄膜电容器参考方法; Table 4: Table methods referenced film capacitors. 详细规范: Detail specification for MKP86、CBB60T、MKP61H、CBB84、CBB60A

二、常用的标准术语

1、额定温度

可以连续施加额定电压的最高环境温度。

2、下限类别温度

电容器设计所确定的能连续工作的最低环境温度。

3、上限类别温度

电容器设计所确定的能连续工作的最高环境温度。

4、额定电压 (U_R)

在下限类别温度和额定温度之间的任意温度下, 可以连续施加在电容器上的最大电压或脉冲电压的峰值。

5、类别电压 (U_C)

电容器在上限类别温度下可以连续施加在电容器上的最高电压。

6、损耗角正切 ($\tan \delta$)

在规定频率的正弦电压下, 电容器的损耗功率除以电容器的无功功率。

Terminologies

1. Rated Temperature

The maximum ambient temperature at which the rated voltage can be applied on a capacitor continuously.

2. Lower Category Temperature

The lowest ambient temperature at which a capacitor can operate continuously.

3. Upper Category Temperature

The hottest ambient temperature at which a capacitor can operate continuously. in which capacitor may continuously work.

4. Rated Voltage (U_R)

The maximum voltage that may be continuously applied to a capacitor at any ambient temperature below rated temperature.

5. Category Temperature (U_C)

The maximum voltage that can be applied to capacitor at upper category temperature.

6. Dissipation Factor ($\tan \delta$)

Ration between effective power(power dissipation) and reactive power for a sine wave load of specified frequency.



7、绝缘电阻 (I.R.)

电容器充电一分钟后所加直流电压和流经电容器的漏电流之比, 单位为 $M\Omega$ 。

一般情况下, 绝缘电阻用来描述容量小于等于 $0.33\mu F$ 的电容器的绝缘特性。

8、时间常数 (τ)

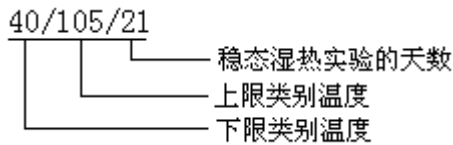
绝缘电阻和电容量的乘积。通常用下式表示:

$$\tau (s) = I.R. (M\Omega) \times C (\mu F)$$

一般情况下, 时间常数用于描述大容量 ($> 0.33\mu F$) 的电容器的绝缘特性。

9、气候类别

电容器所属的气候类别用斜线分隔得三个数字分别表示下限类别温度、上限类别温度、稳态湿热实验的天数。(IEC 60068-1: 如 40/105/21)



10、电容量温度系数 (a)

电容器的电容量在规定温度范围内随温度的变化率。通常以 $20^\circ C$ 时电容量为基准, 用 $10^{-6}/^\circ C$ 表示。(ppm/ $^\circ C$)

$$a_i = \frac{C_i - C_0}{C_0(T_i - T_0)}$$

C_i : 电容器在温度 T_i 时的容量。

C_0 : 电容器在温度 T_0 ($20 \pm 2^\circ C$) 时的容量。

11、自愈性 (仅对金属化薄膜电容器)

金属化膜电容器的介质局部击穿之后, 电容器的电气特性能迅速地基本上恢复到击穿之前数值的特性。

12、表面温升

电容器在交流或脉冲条件下工作时, 由于电容器的损耗而引起的电容器温度相对于环境温度的升高。请检查电容器表面的温度以确保其不超过其上线类别温度。

13、电压爬升斜率

最大电压爬升斜率 (dv/dt) 值决定了电容器所能承受的峰值电流, 单位为 $V/\mu s$

7. Insulation Resistance (I.R.)

The insulation resistance is the ration between an applied D.C. voltage and the resulting leakage current after a specified time, expressed in $M\Omega$.

In general, insulation resistance is used for describing smaller capacitance capacitors' insulation character. ($C \leq 0.33\mu F$)

8. Time Constant (τ)

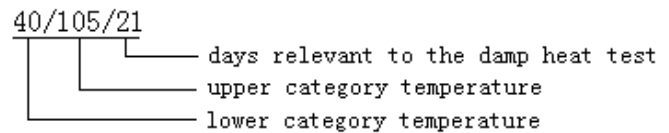
The time constant is expressed in seconds with the following formula:

$$\tau (s) = I.R. (M\Omega) \times C (\mu F)$$

In general, time constant is used for describing larger capacitance capacitors' insulation character. ($C > 0.33\mu F$)

9. Climatic Category

The climatic category which the capacitor belongs to is expressed in three numbers separated by slashes, the three numbers each express upper category temperature, lower category temperature and days relevant to the damp heat test.



10. Temperature Coefficient of Capacitance (a)

The charge rate of capacitance with temperature measured over a specified range of temperature. It is normally expressed in parts per million per Celsius degree ($10^{-6}/^\circ C$) and referred to $20^\circ C$.

$$a_i = \frac{C_i - C_0}{C_0(T_i - T_0)}$$

C_i : Capacitance at temperature T_i .

C_0 : Capacitance at temperature T_0 .

11. Self-healing (Only for metallized film capacitor)

The process by which the electrical properties of a metalized capacitor before a local breakdown are rapidly and essentially restored after the breakdown.

12. Surface Overtemperature

When a capacitor is used in AC applications, associated self-heating will increase its surface temperature above the ambient temperature. It's essential to take this into account in order not to exceed the upper category temperature. A temperature check should be performed on a capacitor in case of doubt.

13. dv/dt

Maximum admissible dv/dt defines the capability of capacitor to withstand high current peak due to fast voltage changes, expressed in $V/\mu s$.

三、典型特性、应用及特性曲线

1、典型特性

聚酯薄膜

工作温度范围宽

介电常数大

自愈特性好

容积比大

稳定性好

聚丙烯薄膜

损耗角正切值极低

绝缘电阻高

频率特性好

自愈特性好

稳定性好

2、典型应用

聚酯薄膜电容器

隔直和耦合

旁路

退偶

滤波

定时

低压脉冲电路

振荡电路

聚丙烯薄膜电容器

交流

高频脉冲

高稳定的定时场合

开关电源

照明

工控

高 Q 滤波

Typical Properties, Applications and Typical graphs

1. Typical Properties

Polyester Film

Very wide operating temperature range

Bigger dielectric constant

Excellent self-healing properties

Good ratio of box size to capacitance

Good stability

Polypropylene Film

Very low dissipation factor($\text{tg}\delta$)

High insulation resistance

Good behavior at high frequency

Excellent self-healing properties

Good stability

1. Typical Application

Polyester film capacitor

Blocking and coupling

By-passing

Decoupling

Filter

Timing

Low impulse circuits

Resonant circuits

Polypropylene film capacitor

A.C. application

High frequency impulse

Timing with high stability

SMPS

Lighting

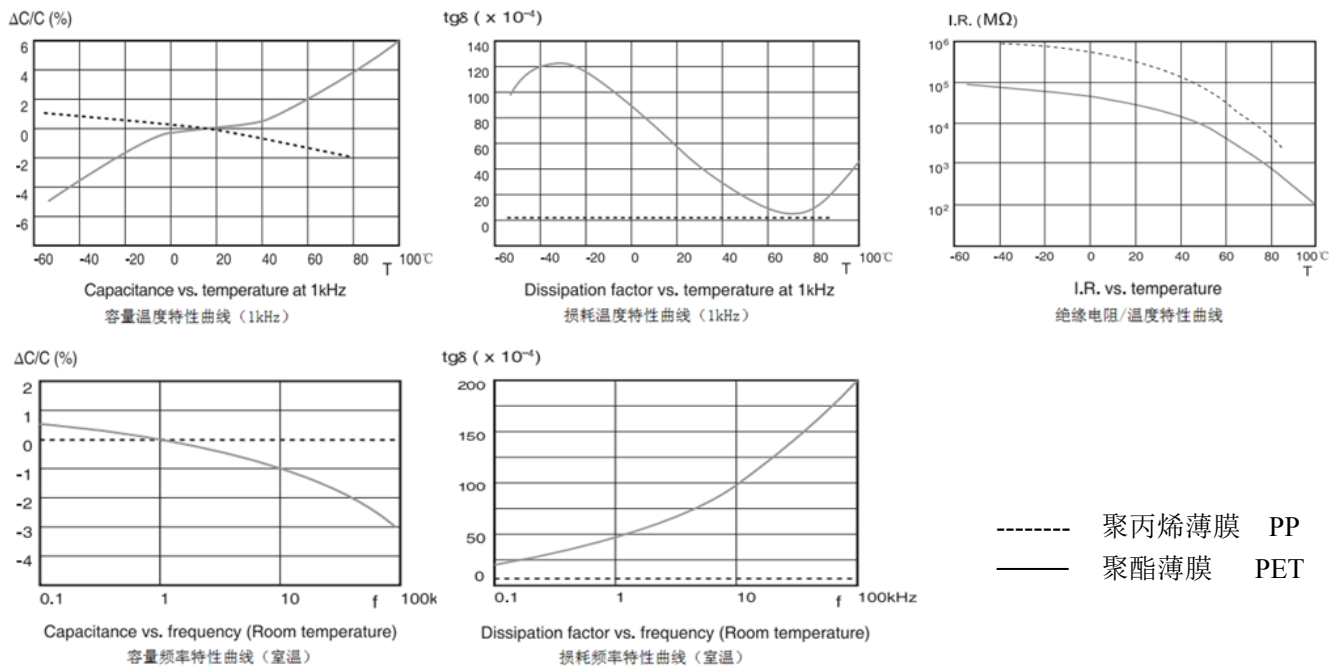
Industrial controller

High Q filter



3、特性曲线

Typical graphs



四、电容器结构示意图

Capacitors Construction

CL21, CL24, CBB21, CBB24, CPS21	CL21X, CBB22, MKP61, CBB60B, CBB60T, CBB66A	CBB21, CBB24, CBB28, MKP89	膜箔式
MKP63, CBB66A	CBB24, CBB28, MKP89	CBB24, MKP89	CBB82
CBB81, CBB84	CBB81, CBB84	CBB81, CBB84	Axial(CL20, CBB20)
薄膜 Film		金属化膜 Metallized film	
双面金属化膜 Double sided metallized film		铝箔 Aluminum foil	

五、使用薄膜电容器的注意事项

Caution items in using film capacitor

1、工作电压的选取

薄膜电容器的选用取决于其工作时所施加的最高电压，并受到施加电压的波形、电流波形、频率、环境温度（电容器外表面温度）、环境湿度、电容量等因素的影响。使用前请先检查电容器两端的电压波形、电流波形及频率是否在所选取电容器的额定值的范围内。

1. Chose of the operation voltage

The 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 capacitor within its specified values by checking the voltage waveform, current waveform and frequency, the permissible voltage varies for different capacitor type.

2、工作电流

通过电容器的电流为电容量 C 与电压爬升速率 dv/dt 的乘积，即 $I=C \times dv/dt$ 。

当在电容器两端施加交流或脉冲电压时，由于电容器存在损耗，通过电容器的交流或脉冲电流会使电容器自身发热而产生温升，极端条件下会出现热击穿并伴随冒烟、起火的危险。因此，电容器安全使用条件不仅受额定电压的限制，而且还受到额定电流的限制。

额定电流被认为是由击穿模式决定的脉冲电流（峰值电流，由 dv/dt 所限制）和连续电流（通常以峰值或者有效值表示）组成，使用时需确认这两种电流都在电容器的允许范围之内。

高频高脉冲下，我们推荐使用聚丙烯薄膜电容器 CBB24。

2. Operation current

The A.C. or impulse current flowing though the capacitor depends on the product of voltage rise rate (dv/dt) and capacitance: $I=C \times dv/dt$.

Due to the dissipation factor of the capacitor will generate the internal heat under the application of high frequency or high pulse current, temperature rise in it will occur and may cause deterioration of with standing voltage, even lead to break down. Therefore, the safety use of capacitor must be within the rated voltage and the permissible current.

The rated current must be considered by dividing into pulse current (peak current) and continuous current (rms current) depending on the break down mode, and when using, should make sure the both currents are within the permissible values.

Under the application of high frequency or high pulse, we recommend to use the polypropylene film capacitor CBB24.

3、各种波形的峰值与有效值换算关系

3. Calculation of rms in various waveform

种类 (Type)	1	2	3	4
波形 (waveform)				
有效值 (rms)	$E / \sqrt{2}$	$E/\sqrt{2}$	$E \sqrt{t/(2T)}$	$E/\sqrt{3}$
种类 (Type)	1	2	3	4
波形 (waveform)				
有效值 (rms)	$E \sqrt{t/(3T)}$	E	$E \sqrt{t/T}$	$\sqrt{\frac{t}{2T} (I_1^2 + I_2^2 + I_3^2 + I_4^2)}$



4、抑制电源电磁干扰用电容器

电容器用于电源跨线电路抑制电磁干扰时，不仅有正常的电压，还会有异常脉冲电压发生，这可能会导致电容器发生电击穿甚至冒烟或者起火。所以，电源跨线用电容器请使用经过安全认证的安规电容器。

不允许将非安规电容器用作电源跨线电容器。

X 类抑制电源电磁干扰用电容器

适用于在电容器失效时不会导致电击危险的场合，分为 X1, X2, X3 三个类别

Y 类抑制电源电磁干扰用电容器

适用于在电容器失效时会导致电击危险的场合，分为 Y1, Y2, Y3, Y4 四个类别

4. EMI suppression of A.C. power supply

When using a capacitor across-the-line as means for suppression of electromagnetic interference, not only the supply voltage is always applied, but also abnormal surge such as impulse voltage, which may lead the capacitor to breakdown even to smoking or firing. Therefore, please use those approved products which conform to corresponding safety standards as the across-the-line capacitor. The capacitor which is not approved will not be used in across-the-line.

EMI suppression of A.C. power supply (Class X)

It is suitable for being used in situation where failure of the capacitor could not lead to danger of electric shock, classified as class X1, X2, X3.

EMI suppression of A.C. power supply (Class Y)

It is suitable for being used in situation where failure of the capacitor could lead to danger of electric shock, classified as class Y1, Y2, Y3, Y4.

类别 (Class)	使用时的峰值脉冲电压 (kV) Peak impulse voltage in service(kV)	绝缘类型 Insulation type	应用 Application	耐久性实验前施加的峰值脉冲电压 (kV) Peak impulse voltage up before endurance test
X1	>2.5 ≤4.0	III	高脉冲应用 High pulse application	$C_R \leq 1.0\mu F, 4$ $C_R > 1.0\mu F, 4 / \sqrt{C_R}$
X2	≤2.5	II	一般用途 General purpose	$C_R \leq 1.0\mu F, 2.5$ $C_R > 1.0\mu F, 2.5 / \sqrt{C_R}$
X3	≤1.2	----	一般用途 General purpose	----

类别	额定电压 (Vac) Rated voltage(Vac)	耐久性实验前施加的峰值脉冲电压 (kV) Peak pulse voltage up before endurance test(kV)
Y1	≤500	8.0
Y2	≥150, ≤300	5.0
Y3	≥150, ≤250	----
Y4	<150	2.5

5、电容器的充电和放电

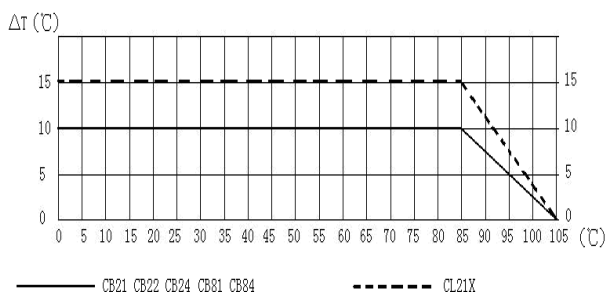
电容器的充放电电流取决于电压爬升或下降的速率 dV/dt 与电容量的乘积，即使是低电压充放电，也可能产生很大的瞬间电流，这可能会导致电容器性能的损害。当进行充放电时，请串联一个 $20\Omega/V \sim 1000\Omega/V$ 或更高的限流电阻，将电容器的充放电电流限制在规定的范围内。

当多个薄膜电容器并联进行耐压或寿命测试时，须为每个电容器串联一个 $20\Omega/V \sim 1000\Omega/V$ 或更高的限流电阻。

6、表面温升 (ΔT)

当电容器用于交流或脉冲场合，由于损耗的存在，流经电容器的电流会使得电容器发热，如果发热量过大，会导致电容器短路甚至燃烧。因此流经电容器的电流不能超过产品目录所规定的最大数值。因此，监测负载时的电容器的表面温升就显得非常必要。

各型号电容器表面允许最大温升



如有超出要求请联系我们的工程师。 If you need the temperature more than above, please contact our engineers.

7、阻燃性

薄膜电容器的外封装中使用了耐火阻燃材料——阻燃环氧树脂或塑料外壳，但外部的持续高温或火焰仍可使电容器芯子变形而产生外封装破裂，导致电容器芯子熔化或燃烧。

5. Charging and discharging of the capacitor

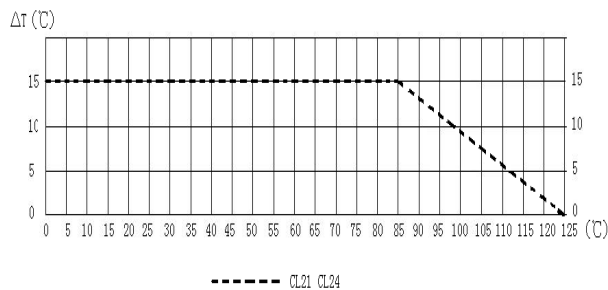
The charge and discharge current depends on the product of voltage change rate (dV/dt) and capacitance, so low voltage charge and discharge may also cause deterioration of capacitor due to sudden charge and discharge current. While performing charge and discharge, please connect a resistance of $20\Omega/V \sim 1000\Omega/V$ or more in series to limit the current.

When connecting few capacitors in parallel for high voltage test or endurance test, please connect a resistance of $20\Omega/V \sim 1000\Omega/V$ or more in series to each capacitor.

6. Surface overtemperature

When capacitor is used in A.C. or pulse applications the current that flows though the capacitor make it heat up. If the capacitor heats up too much it might deteriorate and cause a short circuit or fire. It is essential that the current limits described in the catalogue are not allowed to exceed, so the temperature measuring on surface of the capacitor is necessary to ensure it is not overload.

Maximum self temperature rise for all series.



7. Flame retardation

Flame retardation epoxy resin or plastic case is used in the coating or encapsulating of film capacitor, continuous high ambient temperature or firing will break the coating layer or plastic case, and may lead to melting and firing of the capacitor element.

阻燃等级 Category	电容器体积范围 Volume range (mm ³) _ 施加火焰时间 (s) Flame time				最大燃烧时间 (s) Flame persistence
	体积 ≤ 250 Volume ≤ 250	体积 ≤ 500 Volume ≤ 500	体积 ≤ 1750 Volume ≤ 1750	体积 > 1750 Volume > 500	
A	15	30	60	120	3
B	10	20	30	60	10
C	5	10	20	30	30

8、储存条件

产品不能暴露在高温高湿的环境中，必须保存在以下环境：（不拆开原包装的基础上）

温度：-40~30°C

湿度：年平均值不超过 70%RH

全年任意 30 天不超过 80%RH

引线式产品储存时间（从产品包装或产品本体上的日期算起）：

散装产品：不超过 2 年（袋装），不超过 1 年（非袋装）

编带产品：不超过 1 年

8. Storage conditions

It should not be located in particularly high temperature and high humidity, it must submit to the following conditions (under the unchanging primal package):

Temperature: $\leq 30^\circ\text{C}$

Humidity: Average per year $\leq 70\%RH$; For 30 full days randomly distributed throughout the year $\leq 80\%RH$

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

Bulk: not exceeding 2 years (bag), not exceeding 1 years (no bag)

Taping: not exceeding 1 year



9、焊接建议

焊接最大温度和最长时 间，见下表
 插件产品仅适合做波峰焊接，不适于回流焊接

	最大温度 T max	最长时间 Time	备注 Note
预热 Pre-heating	110° C	1min	Others
	100° C	1min	OPP (P≤7.5)
焊接 Soldering	270° C	4s	Others
	260° C	4s	OPP (P≤7.5)

9. Soldering suggestions

Max soldering temperature and maximum time, see the form below
 Plug parts only suitable for wave soldering, not suitable for reflow soldering

六、环保产品

RoHS

中星公司的所有产品均符合 RoHS 指令和《电子信息产品污染控制管理办法》

Environmental-friendly products

RoHS

Our products in the catalogue are RoHS Compliant

七、订购须知订购或索样前，请尽可能多地提供以下信息：

额定工作电压：A.C.，D.C.；
 容量及其允许偏差：J、K、M 等；
 最终产品：显示器、开关电源、照明等；
 用途或电路图：直流回路、交流脉冲回路、DC-link、DC-filter、降压等；
 使用条件：频率、电流、脉冲峰值、温湿度等
 外形尺寸：包括电容器本体和引出端尺寸
 安全性：当电容器开路或者短路时对其他部件的影响，当其他部件异常时对电容器的影响。

Purchase specification

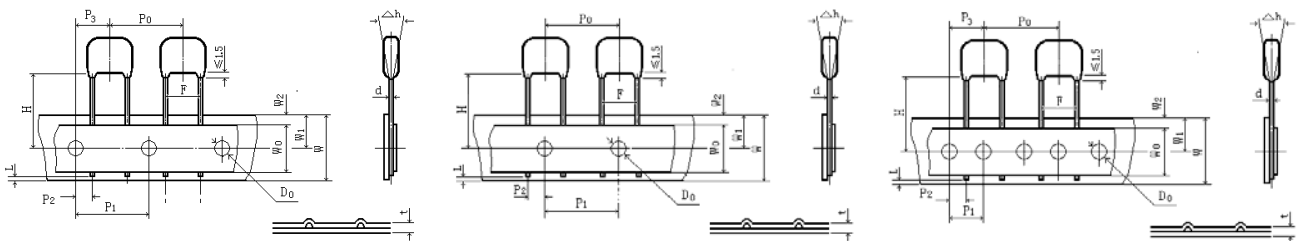
When placing an order or inquiring sample, please specify the following, as much as you can

Rated voltage: A.C., D.C.
 Capacitance value and capacitance tolerance: J, K, M etc.
 Finished product: Monitor, Switching power, lighting.
 Application or circuit diagram: DC circuit, AC pulse circuit, DC-link, DC-filter, etc.
 Condition of operation: frequency, current, impulse peak, temperature and humidity.
 Dimension: including body and lead space.
 Safety: Influence to the other component, when the capacitor gets short or open. Influence to the capacitor, when the other component works irregularly.

八、引线式产品包装方式

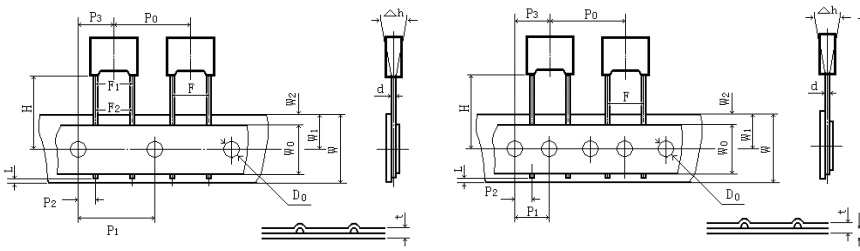
Packing for tinned-wire capacitor

1、编带外形图及尺寸对照表（浸渍型） Outline Drawing and Taping Dimensions(mm) (Dipped)



符号	P ₀	P ₁	P ₂	P ₃	F	△h	W	W ₀	W ₁	W ₂	H	D ₀	t	L	
误差	±1.0	±0.2	±0.5	±1.3	±0.2 ^{0.4}	±2.0	±0.5	min	±0.5	/	±0.5	±0.2	±0.2	/	
尺寸	P=5.0	12.7	12.7	3.85	6.35	5.0	0	18.0	11.0	9.0	0-3.0	18.5	4.0	0.7	0min
	P=7.5	12.7	12.7	2.6	6.35	7.5	0	18.0	11.0	9.0	0-3.0	18.5	4.0	0.7	0min
	P=10.0	12.7	12.7	5.0	/	10.0	0	18.0	11.0	9.0	0-3.0	18.5	4.0	0.7	0min
	P=15.0	25.4	12.7	5.2	12.7	15.0	0	18.0	11.0	9.0	0-3.0	18.5	4.0	0.7	0min

2、编带外形图及尺寸对照表（盒式） Outline Drawing and Taping Dimensions(mm) (Box-Type)



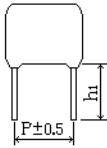
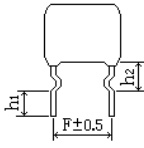
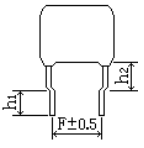
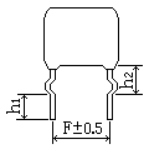
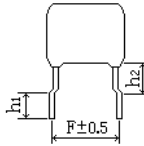
引出线间距 P=5mm/P=7.5mm

引出线间距 P≥10mm

符号	P ₀	P ₁	P ₂	P ₃	F	Δh	W	W ₀	W ₁	W ₂	H	D ₀	t	L	
误差	±1.0	±0.2	±0.5	±1.3	±0.2 ^{0.4}	±2.0	±0.5	min	±0.5	/	±0.5	±0.2	±0.2	/	
尺寸	P=5.0	12.7	12.7	3.85	6.35	5.0	0	18.0	11.0	9.0	0-3.0	18.5	4.0	0.7	0min
	P=7.5	12.7	12.7	2.6	6.35	7.5	0	18.0	11.0	9.0	0-3.0	18.5	4.0	0.7	0min
	P=10.0	25.4	12.7	7.7	12.7	10.0	0	18.0	11.0	9.0	0-3.0	18.5	4.0	0.7	0min
	P=15.0	25.4	12.7	5.2	12.7	15.0	0	18.0	11.0	9.0	0-3.0	18.5	4.0	0.7	0min

备注：如果需要其他形式的编带，请联系我们。 Note: If you need other taping, please contact us

3、成形外形图 Outline Shaping

成形形式代码 Code of Shaping	CT形-图① CT Shaping-Picture①	CK形-图② CK Shaping-Picture②	CY形-图③ CY Shaping-Picture③
成形形式图 Outline Drawings of Shaping		 (0mm≤P-F≤3mm)	 (2.5mm≤P-F≤8mm)
成形形式代码 Code of Shaping	CC形-图④ CC Shaping-Picture④	CX形-图⑤ CX Shaping-Picture⑤	
成形形式图 Outline Drawings of Shaping	 (0mm≤P-F≤3mm)	 (3mm<P-F≤8mm)	

备注：

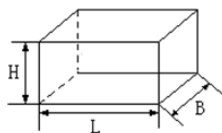
P 指成形前产品引线间距 P is lead space before kink

盒式产品同样适用 box-type is also available

如需其他形式的成形，请联系我们 if you need other shaping, please contact us

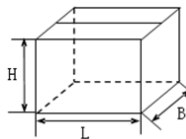
4、包装箱尺寸 Packing in bulk

内包装箱尺寸 Inner packaging box



L ± 3mm	220
B ± 3mm	200
H ± 3mm	105

外包装箱尺寸 Out packaging box



尺寸(DIM)	1	2
L ± 3mm	470	340
B ± 3mm	340	245
H ± 3mm	235	235

备注：外包装箱有大小两种尺寸，分别用1、2两种不同的下标区别。

Note: Out packing box have two difference sizes, includes the bigger one and the smaller one. Those were marking in the 1、2 different ways.



九、产品代码说明

Part number system

16 位产品代码如下 The 16 digits part number is formed as follow:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

第 1~4 位	薄膜电容器型号代码(见表 1)	Digit 1~4	Type code of film capacitor (see table1)
第 5~7 位	标称电容量代码 举例: 103=10×10 ³ pF=0.01μF	Digit 5~7	Rated capacitance value code For example: 103=10×10 ³ pF=0.01μF
第 8 位	标称电容量允许偏差代码 G=±2% H=±3% J=±5% K=±10% M=±20%	Digit 8	Capacitance tolerance code G=±2% H=±3% J=±5% K=±10% M=±20%
第 9~10 位	额定工作电压代码 (参见表 2)	Digit 9~10	Rated voltage code (See table2)
第 11 位	引线脚距代码 (引线式) (参见表 3) 对于 CBB60, CBB61, CBB65, MKP88 是外形尺寸, 参见各系列说明 对于 MKP86、MKP89 (接线片式) 是安装孔距, 参见该系列说明	Digit 11	Pitch code (for tinned-lead-wire type) (See table3) Box code For CBB60, CBB61, CBB65, MKP88 related to each series Distance of hole for fixing For MKP86、MKP89 (lug terminals) related to the MKP89 series
第 12 位	内部特征码	Digit 12	Internal use
第 13~16 位	引线及包装代码 (引线式) (参见表 4) 对于 CBB60, CBB61, MKP89, MKP89B, MKP88, CBB65 是引出端代码, 参见各系列说明	Digit 13~16	Lead form and packing code (for tinned-lead-wire type)(See table3) Terminal code (For CBB60, CBB61, MKP89, MKP89B, MKP88, CBB65 related to each series)

例如:

For example:

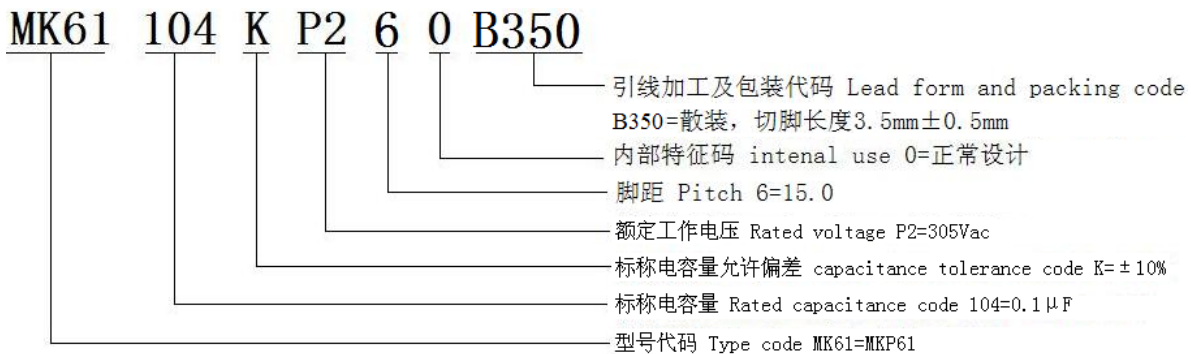


表 1 薄膜电容器型号代码 Table1 Series code of film capacitor

Capacitor Type	CL20	CL21	CL21X	CL24	CL62	CDHX	CBB20	CBB21	CBB22
Series code	CL20	CL21	CL22	CL24	CL62	CDH	CB20	CB21	CB22
Capacitor Type	CBB24	CBB25	CBB25F	CBB60	CBB60B	CBB60H	CBB60T	CBB61	CBB62
Series code	CB24	CB25	C25F	CB60	C60B	C60H	C60T	CB61	CB62
Capacitor Type	CBB66A	CBB66H	CBB81	CBB82	CBB84	MKP61	MKP61F	MKP61R	MKP63
Series code	C66A	C66H	CB81	CB82	CB84	MK61	M61F	M61R	MK63
Capacitor Type	MKP65	MKP86	MKP88	MKP89	MKP89B	CPS21			
Series code	MK65	MK86	MK88	MK89	C89B	CS21			

表 2 额定工作电压代码 Table2 Rated voltage code

	A	B	C	D	E	F	G	H	I	J	K	L	M
1					230			50		63			
2	100	125	160	200	250	300	400	500		630		120	180
3	1000	1250	1600	2000	2500	3000	4000	530			1100	1200	1400
4		1500	2600									2200	2400
	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
1	220		280	320	380	440	550	600	700	800	900		
2	240		305	330		450	520	650	760	850			
3	275		310	350	420	480	560	660	750			1300	3200
4					470					2800		1700	3600

数字加字母表示直流额定工作电压，字母加数字表示交流额定工作电压，如：2E=250Vdc N3=275Vac

Number and then letter indicate DC, but letter and then number indicate AC. For example: 2E=250Vdc N3=275Vac

表 3 脚距代码 Table3 Pitch code

0	2	3	4	5	6	7	8	9
axial	5.0	7.5	10.0	12.5	15.0	17.5	20.0	22.5
A	B	C	D	E	F	G	H	I
25.0	27.5	30.0	32.5	37.5	42.5	52.5	55	

表 4 引线加工和包装代码 Table4 Lead form and packing code

第13位 Digit13		第14位 Digit14		第15位 Digit15		第16位 Digit16		
代码 Code	说明 explanation	代码 Code	说明 explanation	代码 Code	说明 explanation	代码 Code	孔间距 pitch-row	说明 explanation
A or R	弹带包装 或卷带包装 ammo-pack or reel-pack	0	F=5.0mm	0	直脚 Straight	0	P ₁ =12.7mm	产品在两个载带孔之间 each capacitor between two consecutive holes
		1	F=7.5mm			2	P ₁ =15.0mm	
		2	F=10.0mm	K	CK弯脚 CK kinked	1	P ₁ =12.7mm	载带孔在产品引线之间 consecutive hole between two leads of the capacitor
		3	F=15.0mm			3	P ₁ =15.0mm	
K or Y	CK成型或 CY成型 lead kinked (in bulk)	0	F=5.0mm	0	h ₁ =3.5mm	0	/	h ₁ 长度偏差±0.5mm h ₁ length tolerance±0.5mm
		1	F=7.5mm					
		2	F=10.0mm					
		3	F=15.0mm					
B	散装或切脚 in bulk or cut lead (in bulk)	00	标准引线长度15mm (min) standard lead length 15mm (min)		0	/	引线长度偏差±0.5mm Length tolerance±0.5mm	
		35	引线长度3.5mm lead length 3.5mm					